GENERAL FISHERIES COMMISSION
FOR THE MEDITERRANEAN
COMMISSION GÉNÉRALE DES PÊCHES
POUR LA MÉDITERRANÉE

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GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN

Scientific Advisory Committee (SAC)

Transversal workshop on the monitoring recreational fisheries in the GFCM area

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LIST OF DOCUMENTS & ABSTRACTS*

***As received by the GFCM Secretariat**

Balearic Islands (NW Mediterranean) recreational fisheries overview

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The recreative fisheries in Mallorca Island have been studied by IMEDEA in collaboration with the Balearic Islands D.G.Fisheries since 2003. In a first step the best census methodologies were explored, combining visual census (from aircraft, fixed points in the coast and in harbors and on board own boats), in situ and telephonic interviews, voluntary log-books and data from licenses and tournaments. From these we can conclude that recreational fishing is one of the islands' main leisure activities, with around 10% of the population participating (population of the Balearic Islands around 1 million people). Anglers tend to be middle class (most anglers own a small boat moored at marinas or use ramps), middle-aged males (90% male, mean age 46.2 years). The most popular fishing method is from a boat (62.9%), followed by fishing from shore (32.4%) and spearfishing (3.6%). The mean time for a fishing trip is around 3.5 h d^{-1}. Typically, anglers use more than one type of gear (mean 1.27). The frequency of fishing is 4 to 6 times per month, mainly on holidays and weekends, increasing in summer (Morales-Nin, 2005).

The activity has a sizeable impact on the coastal fauna, with diverse catches of at least 1209.25 t $year^{-1}$ (i.e., about 615 000 fishing outings $year^{-1}$). Thus, the amount of carbon extracted annually is at least 137 kg C km^{-2} $year^{-1}$, and the recreational fishery removes about 31% of production at the trophic level 4. Although these are gross estimates and more detailed studies of the effects of recreational fishing are needed, it is unquestionable that there exists an important impact on coastal fish communities (Morales-Nin, 2005). Finally, another relevant characteristic of the recreational fishery at the Balearic Islands is that it is largely multispecific.

These initial studies focused on measuring the size of the recreational fishery, have been continued to evaluate the catch and effort, fishing mortality, biological impacts and socio-economy of the recreational fishery in Mallorca by means of: visual census on board own embarkations, experimental fishing, mail surveys and interviews. The possible interrelations with the small scale fishery are explored by means of surveys and sampling on the Fishing Wharf.

Recreational fisheries in Mallorca Island: A socioeconomic approach

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IMEDEA

The Mediterranean is the world´s leading tourist area, accounting for approximately 35% of all international tourist arrivals and revenues and the Balearics are one of Europe´s leading sun, sea and sand tourism destinations. In 2009 the Balearic archipelago welcomed 11.609.161 visitors and Mallorca accommodated 8.718.788 of them.

It is assumed that about 5% of the resident population practices recreational fishing in Mallorca while the total number of tourists who practice recreational fishing is unknown. During 2009 IMEDEA developed three different surveys to better understand who goes fishing and how much they spend. The first one focused on the resident recreational fishing activities, while the two others were focused on tourism and nautical tourism respectively. Methodologies used and preliminary results will be presented.

An integrative study on the recreational shore fishing in the south of Portugal

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In Portugal, although recreational fishing is an important leisure activity involving approximately 6% of the Portuguese population, until recently little attention has been paid to this activity by fisheries scientists and managers. The aim of our study was to characterize and quantify shore-based recreational fisheries in the south and southwest Portugal (250 Km coastline). Specific objectives were to: 1) estimate recreational shore-angling catch, harvest and effort and investigate spatial and temporal differences; 2) quantify undersized catches and discarding; 3) evaluate the socioeconomic importance of the activity in the regional context. A non-uniform probability complemented survey was conducted monthly between August 2006 and July 2007, using roving creel surveys, aerial surveys and fishing logbooks. Roving creel surveys and logbooks were used to gather information on socioeconomic variables and fishing trips, including angler demographics, expenditures, target species and catches (released and retained). Aerial surveys provided information on fishing effort. A total of 192 roving creel surveys and 24 aerial surveys were carried out, and 256 logbooks were distributed to volunteer anglers. During the roving creel surveys, 1321 anglers were interviewed, resulting in usable fishing trip data from 1318 questionnaires, and socioeconomic information from 1201 questionnaires. While response rates were high (~95%) in the roving creel surveys, fishing logbooks had a low return rate (~7%). The majority of recreational anglers sampled were male, married, professionally active, in their late forties, with a low level of education, and with an average monthly income of 500-1000€ (excluding taxes). Seventy-seven per cent lived in one of the two regions of the sampling area (Algarve or Alentejo). On average, anglers had 23 years of fishing experience. Most anglers claimed fishing all year round, with an average of 65 fishing trips/year. Overall, anglers spent 13.2€ per fishing trip, and 865€ per year, although only bait, tackle and transportation expenditures were considered in this study. Annual expenditures for the above mentioned items were estimated to total 2.2 million Euros in the study area.

Based on the aerial surveys we estimated a total fishing effort of 705,236 angler-hours, corresponding to 166,430 fishing trips. Average time spent per fishing trip was 4.7 hours. Of the 1318 creels observed during roving creel surveys, 831 (63.1%) had catches. A total of 48 species were recorded, belonging to 22 families. The most important family was Sparidae, represented by 16 fish species and accounting for 78% of the total catches in number and 75% in weight.

Estimated recreational shore fishing harvest was 160.2 tons of fish (788 048 individuals), of which 147.4 tons (589 132 individuals) were retained. The most commonly caught species were white seabream Diplodus sargus (44%), common two-banded seabream Diplodus vulgaris (14%) and bogue Boops boops (8%). Overall, shore based recreational harvests represented 0.8% of the commercial landings, for the same period, area and species. Only white seabream (65%), grey triggerfish (33%) and spotted seabass (16%), showed recreational harvest values higher than 10% of the recorded commercial landings.

Bluefin Tuna Migratory Behavior in the Western and Central Mediterranean Sea Revealed by Electronic Tags

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The objective of the study was to assess the migratory behavior of the Atlantic bluefin tuna (juvenile and adults) in the Western and Central Mediterranean as well as other ecological features of the species, using electronic tags. A total of 19 pop-up tags, 2 mini pop-ups and 25 internal archive tags were deployed in the Mediterranean in 2008, 2009 and 2010 on large adults (pop-ups) and small adults & juveniles (mini pop-ups and archivals) of Atlantic BFT. Data were recovered on tracks, depth, external temperature and also body temperature. From the results obtained in 2008 and 2009 from those individuals with tags attached for more than 30 days (i.e. 10 pop-ups and 1 archival), we found extended use of suitable Mediterranean habitats by the species outside the breeding period. None of the tagged tunas left the Mediterranean during the tracking period.

Evaluation of the phenomenon of recreational fisheries in Italy: biological and socio-economic aspects and design and implementation of an integrated monitoring system.

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This abstract is the result of two Research Programs funded by the European Union (EU Study project n 96/018 titled "*Sport fisheries in Eastern Mediterranean (Greece & Italy): parameter estimates, linkages and conflict with professional fisheries*" and EU Study project n. 00/003 titled "*Sport Fisheries in Eastern and Central Mediterranean: Design, implementation and economic evaluation of an integrated monitoring system*") in order to evaluate the phenomenon of recreational fisheries in Italy. The projects took into account only the recreational fishermen who practice the activity at the sea and by vessels. The first project analysed the quantitative aspects of this fishery (numbers of recreational fishermen and vessels, catches, fishing effort, etc.), the laws and the administrative framework regulating this activity, and various socio-economic aspects (profile of recreational fishermen, productive capacity, conflicts with professional fishermen, etc.). The main objective of the second one was to propose an efficient and feasible data collection system and also to provide a software package named STARFISH_RF (STAtistics Realiable for FISHery - Recreational Fisheries) for managing computer data. STARFISH_RF was developed using Microsoft Visual Basic 5.0 language. In Italy, regulations of recreational fishery was almost lacking: each fisherman had the permission to catch a maximum quantity fixed in 5 kgs of fish and 3 kgs of mussels per day or to catch a record size fish. During the survey any license was required unless some local authorities required an authorization for fish-pots (maximum 2) and 1 longline with a maximum of 100 hooks for each vessel. The recreational fisheries were under the control of the Port Authorities (the *Capitanerie di Porto).*

Due to the absence of licensing system in Italy, the evaluation of number of recreational fishermen was based on data provided by Ministry of Transport and Navigation related of number of pleasure boats below 7.5 m.: we obtained about 1500000 recreational fishermen (we assumed that occasionally most of these pleasure vessels practiced recreational fishery and that an average of 2 persons fished in the same boat). Due to the great extension of Italian coastline and on the basis of EU proposal, were chosen five

Italian regions (Veneto, Marche, Latium, Liguria Sicily). In these areas were extracted 12 ports with probability proportional to size (number of mooring places for the pleasure boats). In order to select a sample of recreational fishermen available to collaborate to research, we organized before "face to face" meetings in headquarters of recreational fishermen associations (FIPSAS for example). A sample of 102 fishermen were selected during the meetings. We utilized "telephone interviews methodology", to collect both data on fishing activity of previous year and structural characteristics of vessels, and to collect data monthly. In order to estimate the various aspects related to this complex phenomenon, seven questionnaires were planned, each type addressed to following sections:

- Single recreational fishermen
- Recreational fishermen associations
- Suppliers of equipment
- Professional fishermen
- Professional fishermen associations
- Public authorities
- Patrol service

The majority of vessels were between 4 and 6 m in length and had an engine power lower than 100 HP. The most popular recreational fishing gears were rod, tuna fishing line and handline (bolentino). Although seasonal fluctuations of usage for these gears were not considerable; the usage of rod decreased in winter while tuna fishing was more practiced from summer to winter.

The trend was the same for the usage of bolentino, because seasonal values were quite similar. The total data (collected monthly and of the previous year) showed that bogue (Boops boops), striped sea bream (*Lithognatus mormyrus*), horse mackerel (*Trachurus trachurus*), seabream (*Diplodus spp*), Tuna (*Thunnus spp*) and mackerel (*Scomber scomber*) were the most fished species.

Regarding the estimation of catches, fishing effort and production, we obtained that the average number of fishing days of a fisherman was around 27 for the year 1998 (on the basis on monthly data) while a number of 56 fishing days was estimated for the

previous year (on the basis on yearly data). The average daily catch was 6.3 kg and average annual catch was 167 kg per recreational fishermen vessel. At national level, the total production of the recreational fishermen was about 24000 tons which was equal to 10% of the total fisheries production. Regarding the status of recreational fisherman our data collection showed that the typical recreational fisherman was a male, from 30 to 50 years old, employed, and graduated as level of education. No conflicts seemed to exist among recreational fishermen, but conflict exist between recreational fishermen and those who fish illegally. For this reason, conflicts between illegal recreational and professional fishermen were frequent: competition for space seemed to be one of the most important cause of conflict, but also market competition was quite considerable one. Generally these conflicts were resolved with arguments and seldom the authorities acted as mediators. For all interviewed categories the lack of specific rules (license system, regulation of fishing gears and fishing areas) was a critical point of the inefficacy of the authorities interventions.

The holding of the second project has enabled to design and test two different databases:

- Database a, in order to collect data on annual basis to target a general picture of phenomenon, and to collect "*una tantum*" information
- Database b, in order to collect data on monthly basis and describe tendency of recreational fisheries over the time.

Data collected by questionnaires were processed using the software package STARFISH –RF to test all different phases of data processing (data input, data checking, data printing, etc).
In order to collect data comparable to those of professional fishery, to develop this data collection system, we took into account two main sources: the Council regulation no 1543/2000 and the Commission regulation no 1639/2001.

REFERENCE

M.G. Pawson, H. Glenn, G. Padda, 20008. The definition of marine recreational fishing in Europe. Marine Policy 32 (2008): 339–350.

Characteristics of Marine Recreational Fishery Focusing on Spearfishing in Turkey

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With the income per capita increasing in Turkey in recent years, there is a growing tendency of people sparing more money and time for outdoor and leisure activities, foremost among which is recreational fishing. Undoubtedly, this fact largely owes to the beauty of the Turkish coasts and their convenience for such activities. Presently a substantial percentage of the Turkish coastal population regularly enjoys fishing for pleasure and personal consumption along almost 8,800 kilometers of coastline in the Mediterranean, Aegean, Marmara and Black Seas. In the present study we review the current regulations of marine recreational fishery with a special emphasis on spearfishing in Turkey. The government agency responsible for regulations and management of this activity is the Ministry of Agriculture and Rural Affairs. The recreational fishery is open access. Although there is no compulsory recreational fishing license system and does not give any privilege to users, many (approx. 100,000) of the recreational fishers purchase licenses voluntarily. Monitoring recreational fishery has always been insufficient, however, some data pertaining to recreational fishers will be available with the help of the new Fisheries Information System (FIS) currently developed for Turkey in order to create the application and procedures needed to both comply with the EC Fisheries Acquis and improve fisheries management. This system provides also the list of licence holders. In the scope of this study, data related to spearfishing, both a most preferred and problematic way of recreational fishing, have been collected and processed. For this purpose, surveys were conducted with the managers of the spearfishing associations and members thereof, totaling 45 spearfishers so far. There are 4 spearfishing associations in Turkey, all of which were established within the last five years. These associations have a total of 439 members and they carry educational, informational and lobbying activities. Three of these associations which find the legal regulations insufficient have stated that fishing groupers should be free. Associations arguing that they are not the ones harming fish stocks but trawlers and purse seiners, have different opinions on permitting the marketing of spearfished goods.

Three of the associations refrain from commenting while one argues it should be prohibited. Spearfishing is performed by males and the mean age of spearfishers is 31.6 ±8.9. Among those favouring this hobby, level of education is significantly high (82% have some college degree). Almost half (48%) are married and have recreational fishing licence and 88% of the fishers surveyed stated that the notice regulating recreational fishing is incompetent and faulty. One third of the spearfishers state that groupers fishing should be free, that a 5 kg daily quota is insufficient and the catch should be free to sell. Contrarily, a 92% argued that speargun is the most selective and nature friendly gear. 80% hold trawlers responsible for the decline in fish stocks. Spearfishers declare that their average fishing time is 37±20.3 days/year and they spend 314.1±175.9 € for general expenses and 78.5–785.3 € for gears per year. Although spearfishers state that they consume all of their catches, the high demand among respondents that marketing should be free could be a cursor that there is indeed illegal marketing. 60% of the spearfishers perform the activity close to the coast, 4% on the vessel and 36% both. Vessel length varies from 3.2 to 6.6 meters and engine power is between 9-25 HP. Only 24% of the spearfishers stated they had been inspected by the coastguard. Catch quantity changes between 3-17 kg with an average weight of 7.6±4.1 kg. Spearfishers declared that their target species are *Sparus aurata, Dicentrarchus labrax, Dentex dentex, Diplodus sargus* and *Mugil* sp. However it is known that groupers are the most targeted species in spearfishing. Most of the problems spearfishers face is stated to be lack of community awareness, inspectors, coast guard, professional fishers and owners of aquaculture cages. However, from an administrative and managerial point of view, the key problems appear to be lack of monitoring and illegal fishing done under the pretence of recreational fishing. Regulations are quite detailed and cover most fundamental aspects of recreational fishing. However, current rules and regulations fall short in eliminating the disputes between artisanal fishery and recreational fishery as in contributing to fishery management (both recreational and commercial fishery) and ensuring the sustainability of recreational fishing.

La pêche maritime récréative en Méditerranée marocaine
Recreative Marine Fishery in the Moroccan Mediterranean Sea

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Résumé

La pêche maritime récréative au niveau de la façade méditerranéenne du Maroc, connaît une croissance remarquable des effectives de personnes qui la pratiquent. Elle est représentée par deux type : la pêche à pied et la pêche sous-marine, qui sont régies des dahir de 1962 et 1972. Les informations disponibles sur cette activité existent au niveau du Département de la Pêche Maritime (Maroc), à notre connaissance aucune étude sur l'importance socio-économique n'a été faite jusqu'à présent, à l'exception d'une seule qui a touché la pêche récréative continentale. Les espèces capturées sont très diverses en particulier ceux de littoral rocheux : le Mérou pour la pêche sous-marine et les sparidés pour la pêche à pied. Afin de mieux cerner et suivre l'évolution de cette activité, nous proposons de développer un système de collecte et de suivi, qui peut être intégré dans le Système d'Information Halieutique qui en cours d'établissement par l'INRH.

Abstract

Recreative Marine Fishery in the Moroccan Mediterranean Sea became more and more important activity. It shows a very important increase of the number of people who practise it. It is represented by two types: the fishing-rod and underwater fishing controlled bye Dahir of 1962 and 1972. The available Information of this activity, at Marine Fishery Department, show that there was no socio-economic study, made until now, except one related to continental recreative fishery. The different species captured, are essentially those of the littoral rocks, as Grouper for underwater fishing and Sparidae for the fishing-rod. In order to better understanding of this activity and determine its evolution, we propose to develop an information system of data collection and processing which will be integrated, like a component in the Halieutique information System (SIH) in course of establishment by the INRH.

Is the term '*recreational fisheries*' too generic for management?

J. Kappel
EAA and EFTTA

EAA and EFTTA find that the terms "recreational fisheries" and "recreational fishing" would often be too generic to secure fair and equitable management schemes and measures. In particular recreational angling has no interest in but suffers from being mixed up with other recreational fishing practises and artisanal, subsistence and semi-commercial fishing.

EAA´s work on a recreational angling definition[1] – adopted by the EAA general assembly 2004[2].

To separate recreational fishing and fisheries into well-defined sub-segments is not a simple straightforward task either in one language or a number of languages. Some common terms in use have more than one meaning, others have different names but the same meaning. Some terms are common in some languages but cannot be found in other languages e.g. angling and recreational angling. However, anglers and other recreational fishers, managers, politicians, scientists etc. have a great need for proper terms and definitions simply to use a common language, to understand each other, to direct research, to guide lobbying, for local management purposes and for legal uses.

Some years ago EAA made an effort to clarify the numerous terms in use for recreational angling and sport fishing. Finally, in 2004 a recreational angling definition was agreed by the EAA´s general assembly, which at the time was made up of key angling organisations from 18 European countries. It has to be said that from a scientific point of view the end result is not the end of the story but it has helped in bringing more clarity and less confusion and has served us well as a guideline for angling organisations, the scientific community and decision makers.

[1] English: http://www.eaa-europe.eu/fileadmin/templates/eaa/docs/DEFINITION-EAA_Angling_Def_long_FINAL_EN.pdf
French: http://www.eaa-europe.eu/fileadmin/templates/eaa/docs/EAA_Angling_Def_long_ver7_FINAL_FR.pdf
[2] EFTTA has made a formal decision that they support the EAA definition as it reads.

The definition was worked out in the English language first and then, with great difficulties, translated or maybe more correctly *transformed* into the French language. Both language versions were adopted.[i] However, by then, and still today, they both rightfully can be criticized for not being as clear or unambiguous as they could be or ought to be. Furthermore, the French version can be criticized for making use of "artificial" or "odd" language slightly distant from common French language at the expediency of making it to fit with English terms and vocabulary.

The problem with the English version was and is that it defines *recreational angling* not in one but two terms "recreational angling" and "sport fishing". The preparatory work aimed at one term only. Many terms were put forward and scrapped during the process (e.g. "leisure fishing with rod and line", spare time fishing … ", "pleasure fishing"). In the end the two said terms were preferred with a majority of organisations in favour of "recreational angling" for its precision but with almost all against deleting the term "sport fishing" for various reasons (one reason was/is that many recreational angling organisations (still) have the sport word in the name of their organisation). Also the tackle trade (EFTTA) would like the sport word to have a say. So the general assembly finally agreed to let both terms remain while being well aware that this was not an optimal solution from a scientific point of view.

In this regard some issues remain open for dispute. Both the English and the French version make no difference between recreational angling and sport fishing but make them equal as two expressions/terms for the same thing (which is "recreational angling"). Competition or tournament angling is not mentioned but implicitly taken as a sub-discipline of recreational angling/sportfishing. However, in the French version the term "Pêche sportive" in common French would have a distinct notion towards competitive fishing and tournaments and organisations, which core activity it is to arrange and take part in fishing competitions.

An important outcome it was that the EAA general assembly set in stone once and for all (in the definition) that recreational anglers do not sell their catch and that that principle should extend to include all kinds of recreational fishing/fisheries.

Internally within EAA this" definition-exercise" also helped to clarify among the membership that some member organisations have not only anglers as affiliates but also other recreational fishermen, and they defend those fishermen´s interest on an equal

footing with their angling members. In France there is no tradition for organising or defending rod and line fishermen only but a whole range of recreational fishers and fishing practises and that the angling term doesn´t exist in that and other (latin) languages. Time will tell if and how many angling organisations will change name (delete the sport word) in future as a consequence of this definition work. Time also will tell if the French "odd" terms in this definition someday may be accepted as the preferred and common terms by the French speaking angling community. And finally time will show if other Latin-language countries will work on their vocabulary to find and promote an unambiguous term for angling, which works fine in their language. This is not a necessity, but it could be practical.

Recreational Angling is only one segment under the generic term Recreational Fishing but a most important one – that should be recognised by scientists and decision-makers

Management schemes and decisions should be science based and reasoned. That all can agree on no matter their occupation be it fisherman, scientist or decision maker. However, in the scientific literature and studies it is often seen that the two terms recreational fishing and sport fishing or angling are used synonymously. However, this has been a cause for confusion and bias with regard to undertaking surveys, the interpretation of findings and conclusions, which at the end of the day are influencing to the greatest extent the decision makers´ minds and policies.

Various sub-segments of recreational fishing can be defined by fishing method or gear (rod and line, traps, long-lines, pots, nets, spears) and/or by fishing place (shore, beach, pier, wading-out, boat, under-water) and/or modality (leisure, sport, subsistence, tourism). There are also identifiable differences in motivation for going fishing. These are both catch and non-catch related. The sub-segments often show differences with regard to how and how much of an impact they may have on the environment and the fish stocks; and they show even greater differences measured by their socio and economic contribution to society and their participants. From the few segmented studies available it is clear that recreational angling (rod and line) when identified – be it for leisure or sport – shows the highest values of all recreational fishing segments measured by the number of participants and in socio-economic value per sector, fisherman or per

fish caught. These segment differences should not be overlooked. Various recreational segments cannot be managed by the same measures. Non-segmented management would not be a fair and equitable treatment of the fishers. It would produce sub-optimal management to the detriment of the fishermen but also the environment and the local communities and businesses dependant on the spending from recreational fishermen and their families.

Unambiguous terms and terminology - of paramount importance

Ambiguous terms and terminology can lead to sub-optimal management or even mismanagement of the various kinds of recreational fishing segments and fishers. Some might be denied access to fisheries or the use of certain fishing gear for reasons of bias in the scientific advice due to ambiguous or bogus terms and wording, wrong or misleading data. Lack of recreational fishing data is a problem in general and for segments in particular. Often when catch data is collected it is not accompanied by any kind of socio or economic figures. For this reason alone the recreational fishing sector at large and recreational angling in particular is placed at a disadvantage with other marine uses and users.

At the present time we see the evolving transition to ecosystem based management of fisheries. Marine spatial planning is pushed highest up the European agenda and new policies and initiatives are put in place to secure and preserve biodiversity. We see a dramatic increase in Marine Protected Areas these years, globally and in European marine waters. This is a cause for worry among all kinds of fishermen.

The above mentioned issues all make segmentation, proper terms and terminology for recreational fisheries a much needed and urgent task. The designation of MPAs for example, the physical placement of them and which activities can or cannot be allowed in them ought to be reasoned and based on the best science available. The problem is that the “best science available” might not be fit for purpose.

However, we have high hopes that the present work on the monitoring of recreational fisheries in the GFCM area will provide an important contribution to remedy the situation for the Mediterranean Sea area and eventually other European marine waters.

Guidelines for the management of shark and ray recreational fishing in the Mediterranean

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Guidelines are under elaboration to reduce the negative impacts of recreational fisheries on sharks and rays in the Mediterranean. The guidelines will educate recreational fishermen in the use of simple management tools and best practice fishing and handling techniques to reduce fishing mortality. In addition, the guidelines will provide recommendations for tag and release and reporting of catches of sharks and rays. Uptake of these guidelines will reduce the harmful impacts of recreational fisheries, which can become a source of valuable data for biological research, fisheries management and conservation. The creation of these guidelines forms part of RAC/SPA activities to promote the implementation of its Action Plan for the Conservation of Cartilaginous Fishes in the Mediterranean Sea. The guidelines consist of four sections:

- A brief **rationale**. This explains in easily understood language the potential harmful impacts of recreational fisheries on sharks and rays and the need for a transition to catch and release fishing methods and uptake of the guidelines.
- A **code of conduct** for capture and handling of sharks and rays. The fishing methods and handling protocols recommended will reduce post-release mortality and the risk of sub-lethal consequences resulting from injury or stress.
- Guidelines for **tagging** of sharks and rays. The guidelines describe best practice for tagging, to minimise the risk to animals and maximise the value of data obtained.
- **Reporting** guidelines. These include a protocol for reporting recreational catches of sharks and rays and recommendations for the type of catch information that should be recorded and submitted.

The guidelines will reflect current understanding of best practice for recreational shark and ray fisheries, based on national and regional recreational fishing regulations, best practice recommendations of world and regional recreational fishing organisations and expert opinion. A full list of resources and links to relevant organisations will be provided.

Key elements to take into account on monitoring spearfishing

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FECDAS, Spain

Studies that evaluate recreational fisheries impact are limited, and the great majority dedicated to boat fishing. Even more difficult is to find studies including a part, or being only about spearfishing, and their evaluation is mainly tackled from a negative bias, aesthetics of the activity taking preference over real impact. From the Catalan and Spanish Federations of Underwater Activities (FECDAS/FEDAS) we consider that this is due to spearfishing reality ignorance. With the aim of correcting this distorted perception and in order to contribute to establish the basis to get a scientific and objective analysis of the activity, some of the key elements less known of this type of fishing are provided.

A new approach to estimate fishing mortality based in the angler behaviour and catchability

J. Alós and M. Cabanellas-Reboredo
IMEDEA

An accurate scientific data (i.e., objective data) is a key consideration in the stock assessment of the recreational fisheries (RF). Novel sampling techniques and data assessment could be implementing in a long term manner to understand the processes that occurs both at individual and population level. Here a novel frame-work to monitor recreational fisheries in the Balearic Islands (GFCM Area) is presented as complement to traditional monitor methods. The method was based in an accurate description of the spatial-temporal of the effort based in individual observation done using visual census method. This methodology seems to be more robust and reliable that other methods such surveys (due the objective of the data) and creel surveys (due the number of observations per day). This novel form to monitor RF also included an improved individual-based information of the angler behaviour, the knowledge of the biological aspects of fish stock (i.e. such as movement) and the aspects regarding the catchability (the probability to a fish would be catch by a an angler) allow us to establish a new framework to monitor RF and a new approach to estimate fishing mortality (F). All of this information is key topic in population dynamic of exploited stock and it is a useful tool to management due predictive capacity of different management scenarios.

Recreational fishery assessment of the European squid in NW Mediterranean

M. Cabanellas-Reboredo and J. Alós
IMEDEA

The European squid *Loligo vulgaris* is one of the most important species targeted by commercial fisheries in the NW Mediterranean. Only, the declared captures by this professional fleets amount to 119.5 tons/year. The study by Morales-Nin et al. (2005) reported that the recreational fishery is one of the main leisure activities in Mallorca Island, being *Loligo vulgaris* one of the most important specie targeted by this sector. Moreover, this species represents high socio-economical value, rising like an icon of the traditional fishing. In this sense, the captures by Recreational fleet should be considered. While, the captures of the professional sector were registered by landings records at Wharfs, the captures by Recreational Fishery were not registered. For that reason, is necessary an assessment of these recreational sector.

Therefore, we would determine the population dynamics and exploitation of the species, by: 1) the characterization of the spatial-temporal distribution of the professional and recreational fishing efforts, 2), the determination of the annual fishing mortality and 3) the study of the biology and the population dynamics of this species. Methods include visual census to characterise the effort patterns, the evaluation of landing data recorded in Palma Wharf and experimental angling. As well as reproductive indexes and age and growth using daily growth increments in the statoliths. Moreover, the movement and behavioural patterns will be investigated combining conventional and acoustic tagging. All the information will be integrate in models of population dynamics in order to obtain the bases for the managements a sustainability of this important fishery.