



**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)

**SAC meetings of the Sub-Committees
(SCSI, SCSA, SCESS, SCMEE)**

29 November - 2 December 2010, St. George's Bay, (Malta)

11th Session of the Sub-Committee on Marine Environment and
Ecosystems (SCMEE)

List of Documents & Abstracts*

**As received by the GFCM Secretariat*

Available knowledge on elasmobranches in Mediterranean and Black Sea Bradai M. N., Saidi B. and Enajjar S.

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The authors compiled information on taxonomy, distribution, status, statistics, fisheries, bycatch, biologic and ecologic parameters on age and growth, food and feeding habits reproductive biology and stock assessment and conservation measures. This bibliographic analysis, through about 600 papers and documents, highlighted mainly the following points:

- Works were concentrated mainly in the western Mediterranean. Few works concerned endangered species and those of the GFCM priority list.
- Much systematic confusion persists for some species and some others are doubtful.
- The IUCN red list shows clearly the vulnerability of elasmobranches and the lack of data
- A decline in cartilaginous fish species landings has been observed while fishing effort has generally increased.
- The Bycatch has become one of the issues to be considered in any development of fisheries. Elasmobranches, considered mainly as bycatch, are very sensitive given their particular biological characteristics.
- A standardisation of methods and expression of results on the biology should be generalised in the whole Mediterranean.
- Papers on biologic parameters concern few species primarily in the occidental and central Mediterranean areas.

On bycatch mitigation measures

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A summary of our contributions to GFCM workshops, subcommittees and committees along the last three years, which have driven in the past to scientific recommendations regarding bycatch mitigation measures for threatened species, including marine birds, seals and elasmobranchs will be presented. Since their transmission to the GFCM Commission sessions is in the cue, their compilation together with the related recommendations of the current year may facilitate a more consistent reflection of the work done by the contributors to the GFCM scientific for a, for an adequate follow up of scientific recommendations on bycatch mitigation.

An innovative, citizen science-based jellyfish spotting campaign from the Maltese Islands - the Spot the Jellyfish campaign

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In recent years, there has been a proliferation of gelatinous plankton recording programmes recruiting the public's participation. Very few such programmes have been adopted over the years in Maltese coastal waters (most dating to the 1980's), and these do not constitute a continuous time-series in view of their staggered nature. In fact, most local reports of gelatinous plankton have been carried in media portals, most notably newspapers. A citizen science jellyfish-spotting initiative was launched in the summer of 2010 by the IOI-Malta Operational Centre as part of the IOI-KIDs programme, with the support of local tourism authorities, pursuant to geo-referencing and quantifying jellyfish sightings in Maltese coastal waters. The initiative formed part of an incentive to raise awareness amongst the younger generations, but it targeted contributions from the public in general. Different reporting avenues were made available, including an ad hoc website where reports could be submitted and which featured a constantly updated map of jellyfish in Maltese waters, instructive leaflets, and short-messaging and email services. A simple jellyfish species identification guide was designed and posters with such a guide were affixed in key coastal locations around the islands. A total of 360 reports were received – only those which were substantiated through specimen collection or through photos, videos or detailed descriptions were considered. Validated reports referred to 11 species of cnidaria, ctenophores and pelagic tunicates (pyrosomes and salps), whilst the total number of unidentified gelatinous plankton species was 3. *Porpita porpita* and *Aequorea* sp. (both hydromedusae) and *Leucothea* sp. (a ctenophoran) were recorded for the first time for Maltese waters through the initiative. With the exception of *Pelagia noctiluca* and *Cotylorhiza tuberculata*, for which the reported modal abundance category was 5-10 individuals, all other species of gelatinous plankton were reported as individuals.

The use of artificial reefs for fisheries management in the Mediterranean Sea Fabi G., Grati F., Spagnolo A. and Scarcella G.

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The Mediterranean Sea can be considered as a typical example of the use of artificial reefs for fish stock and fishery management, even though this technology is still at a lower level in respect to Japan. Artificial reefs have been used over 40 years especially to impede illegal trawling in coastal areas and other sensitive habitats, which represent important spawning and nursery areas for many commercial species, and to reduce conflicts between different fishing activities, mainly illegal trawling and small-scale fisheries operating with set gears. The final goals are to enhance overexploited fish stocks and improve small-scale fisheries which are one of the most important activities for the coastal communities. Italy and France were the first countries to realize artificial reefs for fishery management along their coasts between the end of 1960s and the beginning of 1970s. They were followed by Spain and Israel in the early 1980s. In spite of this, Spain is by far the country where the artificial reefs are more numerous and are officially considered as a tool for fisheries management both at national and regional level. A similar policy has been also adopted in Turkey in the recent years. The research on scientific, engineering, legal and socio-economic aspects has strongly contributed to this success, providing a basis of information and experience which have been very useful for a better understanding of the many challenges offered by artificial reefs for the conservation and sustainable use of the marine environment and exploitable resources, as well as for fishery management. In this context, the European Artificial Reef Research Network (1995-1998) has played an important role (Jensen, 1998). The best management approach to reduce stock and congestion effects would be the spatial segregation of different user groups by creating separate sites for each of them. Nevertheless, creating and maintaining multiple artificial reefs in a same area are much more expensive than the other control options. However, no single management control can be optimal for all situations and the choice of one or more options must be based on the nature of the conflicts and the effectiveness of the management options adopted. Also in this case the cooperation among researchers, administrators, stakeholders and official institutions concerned with policy management issues would be essential in

order to develop adequate measures which combine the relevant research findings with the users' needs and the sustainable exploitation of the reef resources.

Post-larval research of small pelagic species in the Alborán Sea: A call for safeguarding fry concentration sites

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Fry concentration sites off the Bay of Málaga are considered essential to the sustainability of the Alborán Sea small pelagic resources. Off the Bay of Málaga, its inshore waters are a haven for advanced stages of development of larval sardine and anchovy where these are retained during the process of ontogenic growth and development. These waters constitute the small pelagic nursery grounds that were once renowned for its fry fisheries (García et al., 1981; Reina-Hervás and Serrano, 1987) targeting on sardine and anchovy larvae, as well, the transparent gobiid, *Aphia minuta*. Small pelagic post-larval research undertaken during the past years in the inshore waters of the Bay of Málaga demonstrate that these fry concentration sites may be categorized as sensitive habitats as they are crucial for the well being and growth of the early life stages of small pelagics as well as other species of commercial and ecological value. A synthetic review highlighting research advances focusing on different aspects of small pelagics post-larval studies undertaken during past years intends to show the importance of fry concentration sites to the recruitment and ultimately to sustainability of the resource. These inshore nurseries widely spread in different parts of the Mediterranean Sea are prone to the impact of a wide suite of human activities that may span from the use of beaches for leisure and tourism to the discharge of sewage and industrial waste. The actual state of affairs call for a need of carrying out a revision of the conditions of acknowledged fry concentration sites to proceed towards a more sustainable use of these waters by the implementation of measures and regulations by local and national administrations.

New proposal of GFCM Fisheries Restricted Area (FRA): Seamounds of the Mallorca Channel (Balearic Islands).

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Oceana is presenting the proposal for a new Fisheries Restricted Area (FRA) covering the main seamounds of the Mallorca Channel (Balearic Islands): Emile Baudot, Ausias March and Ses Olives (>800, 300 and 500-600 meters high respectively). Oceana has studied these seamounds since 2006 with the use of an ROV (Remotely Operated Vehicle), and we have identified more than 200 taxa, 25 of which have been listed by various international conventions and national and international laws, and up to 25 habitats classified according to the EUNIS code. Moreover, at least six identified species are listed as priority species by the General Fisheries Commission for the Mediterranean (GFCM), including *Lophius piscatorius*, *Merluccius merluccius*, *Mullus barbatus*, *Palinurus elephas*, *Scomber scombrus* and *Trachurus trachurus*. New information collected during the summer of 2010 is being analyzed by Oceana, and new discoveries include, among others, a vast field of cnidarian *Isidella elongata* in apparently healthy condition. The unique topographic and hydrographic conditions of the Balearic Promontory, factor greatly in the concentration of both demersal and pelagic commercial species in the area. The Mallorca Channel is also very important to high priced commercial species, especially crustaceans, demersal fish and large pelagics. Little is known on the true extent of fishing activity in the seamounds area, though numerous oceanographic expeditions carried out under the TUNIBAL project have described the importance of the area for the reproduction of tuna and tuna related species, as these areas are known spawning grounds for these species. Additionally, recreational fishing competitions for large pelagic species are known to take place over the Emile Baudot seamound, trawlers often fish for *Plesionika* spp. on Ses Olives, and VMS data is available on bottom trawling fleet fishing for red shrimp (*Aristeus antennatus*) on the slopes of Ausias March. Oceana has also documented a lot of discarded fishing gear, especially fishing line and nets, as well as different types of garbage on the three seamounds and in their surrounding areas. A new FRA encompassing these seamounds would enable the establishment of a proper management plan for fisheries in the area that would promote the preservation of important marine

resources and communities, and benefit recreational, artisanal and commercial fisheries in the Balearic area.

Alien species are replacing the native species in the eastern Mediterranean Goren M.

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The combined impact of the continuous invasion of biota into the Mediterranean through the Suez Canal and the recent increase in sea water temperature, together with the fishery industry, have accelerated the expansion of Indo-Pacific fishes into the eastern Mediterranean. A study of the soft-bottom shallow-water fish fauna (to 40m depth) conducted in the south-eastern Levantine Sea (Ashdod, Israel) compared the status of the alien fish at three depths. The results of the first year and preliminary analysis of the second year, reveal that the fish communities are undergoing rapid change, with alien species replacing the native ones. The first year of the study revealed that in shallow water (9-20 m) alien species comprised ca. 80% of the catch; at a depth of 20 m they species comprised over 50% of the catch; while at a depth of 40 m only ca. one-third of the catch comprised alien species. However, in the second year of the study (2009-2010), it was found that at the latter depth (40m) the proportion of alien species had increased to over 50%. The most abundant alien species in the catch were *Plotosus lineatus*, *Decapterus russelli*, *Nemipterus randalli*, *Callionymus filamentosus* and *Saurida macrolepis*.

Developing a network of Specially Protected Areas of Mediterranean Importance in the Mediterranean open seas including deep seas, having regard of fisheries conservation needs

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A Joint Management Action of the European Community with the United Nations Environment Programme/Mediterranean Action Plan (UNEP MAP) aims to promote through the SPAMI system the establishment of a representative network of marine protected areas in the Mediterranean open seas, including the deep seas. The action is implemented by the UNEP MAP Regional Activity Centre for Specially Protected Areas (RAC/SPA) and envisages a process developed in two phases. The first phase of the initiative concluded on 2009, and includes an assessment to identify, on the basis of available scientific knowledge, priority conservation areas in the Mediterranean open seas, including the deep seas. The assessment was aided by the elaboration of a tailored GIS, and by a document on fisheries management/conservation and step-relief areas in the Mediterranean open seas, including deep seas. It includes a chapter on sensitive habitats and essential fish habitats existing in those marine areas. A list of areas qualifying to contain sites that could be candidates for the SPAMI List was elaborated, steered by a committee which comprises International and Regional institutions including FAO and GFCM. It further revised at a meeting of Barcelona Convention Parties to the SPA/BD Protocol (Extraordinary SPA Focal Points meeting; Istanbul, 1st June 2010), which retained 12 of those areas. Several of these priority conservation areas were considered having regard of the concurrent known existence of valuable marine resources deserving protection from damages related to unsustainable fishing activities, and include within their areas most of the presently existing FRAs.

Fishery ecosystem indicators and dynamics in the Mediterranean for 1970-2005

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Though concerns about sustainability has been raised globally and ecosystem-based approaches have been proposed to manage fisheries, concepts such as “ecosystem health” and “ecosystem sustainability” are difficult to translate into operational objectives. The Ecosystem Approach to Fisheries (EAF) can bring some light to this purpose. The present study aims to implement the EAF in the Mediterranean Sea, which is one of the 64 Large Marine Ecosystems already identified by the National Oceanic and Atmospheric Administration (NOAA). The EAF is particularly suitable to study LME, where the approach needs to be holistic and integrative. Trophic indicators are appropriate tools to aborder this holistic view as well to facilitate the understanding of the dynamic of the ecosystem. The “Marine Trophic Index” (MTI), the “Fishing in Balance” index (FiB), “^{cut}Marine Trophic Index” (^{cut}MTI) and the Pelagic/Demersal index (P/D) are some of such indicators. These indicators can be used to assess the effects of fishing activities at a ecosystem level. These indices were utilised to examine the dynamics and changes in ecosystems of the Mediterranean Large Marine Ecosystem by analyzing the FAO database of fisheries landings, comprising up to 195 species from 1970 to 2005. Ours analysis confirmed that there has been a significant decline in the MTI of Mediterranean landings, that jointly at the rising P/D index, may be interpreted as a result of a decrease in abundance of high trophic level species in the ecosystem. This is also supported by the decreasing trend observed in FiB and ^{3.25}MTI index which suggests that the functioning of the foodweb that underlies fisheries is probably impaired.

Review of the Conclusions and Recommendations of the Workshop on Algal and Jellyfish Blooms in the Mediterranean and Black Sea

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This talk reports on final conclusions and recommendations stemming from the GFCM workshop on Algal and Jellyfish Blooms held in Istanbul, 6-8 October 2010. GFCM recognized the importance of both algal blooms and jellyfish outbreaks in determining deviations from the “normal” ecosystem functioning that sustain fisheries and therefore promoted a joint workshop towards a better integrative understanding of these phenomena by an ecosystem-based approach. Both microalgal and jellyfish blooms must be considered as alternative pathways in ecosystem functions, deriving from the disruption of the regular sequence of seasonal or long-term pulses. The workshop has been attended by experts reporting on the algal and jellyfish proliferations in Mediterranean and Black Sea, the impacts of blooms and outbreaks on human health and marine recreational and industrial human activities, and the methodological approaches to integrated investigations at regional scale. The workshop agreed that fisheries science must incorporate the rest of the ecosystem, and that microalgal and gelatinous plankton blooms are important drivers of ecosystem functioning requiring specific measures in terms of performed research and management policy and procedures. A combination of traditional methodologies, innovative technologies and multidisciplinary approaches (from “citizen science” campaigns and natural history observations to video-acoustic behavioural and distributional records, from ecophysiological investigations to molecular taxonomy and phylogeography) has been suggested to be adopted in medium-term research programmes to a) understand the ecological roles of potential outbreaking species in the health of our seas, b) analyse causes and consequences of outbreaks, c) foresee environmental characteristics of hot spots of jellyfish and algal proliferations, and d) eventually developing mitigation countermeasures against their negative impacts.

Current draw-backs to sustainable fisheries in the Mediterranean: from weak fisheries monitoring and management to jellyfish blooms

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Long-term fisheries and wild-life research in the central Mediterranean around the Maltese Islands has been on going since 1997 to allow for better understanding of how human exploitation and wild life distribution relate and affect each other. The 100,000km² research area covered by both marine and aerial surveys have allowed complementary research platforms to produce detailed and wide spread considerations of the changes in this part of the Mediterranean. Field research has been compared to fisheries statistics and fishermen questionnaires to better understand the developing impacts of various types of fisheries on various marine communities, species and habitats. The use of molecular genetics to sample and study various marine species populations impacted by fisheries directly or indirectly is also furnishing added information toward assessing the status of regional marine species in need of conservation as part of sustainable fisheries management. The changes in marine biodiversity composition and species abundance need long-term data which is often lacking at Mediterranean-wide level, the increasing reports of jellyfish blooms is one such case in point for which the important questions of why and how to solve potential problems to fisheries depend on dedicated and long-term research efforts too.

Records on the landings of the bluntnose six-gill shark in Malta

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The bluntnose sixgill shark, *Hexanchus griseus* (Family Hexanchidae), is a locally caught shark species that has been enlisted as Nearly Threatened by global and regional IUCN assessments, while local legislation had included it in Schedule VI of the Maltese Environment Protection Act. Moreover records of *Hexanchus griseus* landings in Malta show that there has been a constant increase in the fishing effort between the mid-1980s and the mid-1990s followed by a sharp decline in its landings. Thus data collection on this species was a must as to allow for a future plan towards the long-term conservation management plan for this species and for its sustainable fisheries to be set. A total of 436 *Hexanchus griseus* specimens were recorded between 2004 and 2008, with bottom longlines accounting for 97.6% of the catches, 80% of which were caught either as primary or secondary target species. 74.8% were caught between January and April, with a peak in the landings between February and March (55.9%). The seasonality in catches is directly linked to the fishing strategies adopted by Maltese fishermen, who change their gear types to target more commercially important fish. Demographic data on this species has shown that the proportion of females caught is significantly larger than that of males. Moreover based on the total body length data (mean length: females 270cm \pm 63.5cm; males 246cm \pm 39.1cm), it is evident that the majority of individuals caught were either juveniles or adolescents. This indicates that either the fishing methods are targeting immature individuals or else that mature individuals rarely occur in Central Mediterranean possibly due to over-exploitation. This is part of a larger ongoing research project that considers the status of this species and fisheries affecting it throughout the Mediterranean and is also looking into the genetics of the stocks being exploited or affected by various fisheries.