Report of the Subcommittee of Ecosystems and Bycatch (SC-ECO)
(hybrid/ Madrid (Spain), May 27-31, 2024)

The results, conclusions and recommendations contained in this report only reflect the view of the Subcommittee of Ecosystems and Bycatch. Therefore, these should be considered preliminary until the SCRS adopts them at its annual Plenary meeting and the Commission revises them at its Annual Meeting. Accordingly, ICCAT reserves the right to comment, object and endorse this report, until it is finally adopted at its Annual Meeting.

1. Opening, adoption of the agenda and meeting arrangements

The meeting was held in Madrid and online 27-31 May 2024, with interpretation. The Executive Secretary opened the meeting and welcomed the participants (the Subcommittee). The Co-convenors, A. Hanke and A. Domingo, reviewed the agenda, which was adopted with minor changes (**Appendix 1**). The List of participants is included in **Appendix 2**. The List of documents presented at the meeting is attached as **Appendix 3**. Document and presentation summaries are included in **Appendix 4**.

The following participants served as Rapporteurs:

1. N.G. Taylor
2. D. Die, D. Ochi, M.J. Juan Jordá , E. Andonegi, A. Hanke
3. A. Hanke
4. B. Keller, N.G. Taylor
5. A. Hanke
6. J.C. Baez, K. Ramírez**,** L. Rueda
7. B. Keller, S. Jimenez, J. Bell, D. Ochi
8. J. Bell, G. Díaz
9. A. Domingo
10. N.G. Taylor
11. A. Domingo
12. A. Domingo
13. J. Carlson
14. A. Domingo, M. Neves dos Santos, G. Díaz
15. A. Domingo, A. Hanke
16. A. Domingo, A. Hanke
17. N.G. Taylor

2. Review the progress on developing status indicators, pressure indicators and reference levels for the components of the Ecosystem Report Card (EcoCard)

SCRS/2024/091 presented work on demographic indicators, which was facilitated by the recently signed memorandum of understanding (MoU) between ICCAT and the Sargasso Sea Commission.

The Subcommittee noted that the SCRS advice to the Commission is primarily based on relative biomass and relative fishing mortality, so adding new indicators will have to be coupled with a clear explanation of how these indicators are going to be used in the development of management advice. Moreover, it is important to limit the complexity of indicators for the EcoCard. The Ecosystem and Bycatch Subcommittee should consider whether these indicators are worth considering as additional, or as alternatives to the indicators presently considered in the EcoCard. The Subcommittee noted that additional computations would be required to calculate these indicators. It was pointed out that the code is available as part of an R package and all the analysis in the paper are available in RMarkdown. They could be run routinely by stock assessment working groups, as long as the assessments are based on age-structured models. However, uncertainty would have to be derived using methods such as Markov Chain Monte Carlo (MCMC), which currently are difficult to complete during stock assessment meetings. The Subcommittee also suggested consulting with the Species Groups to evaluate if the indicators add value to the assessment of stock status and outlook in the context of the advice that the SCRS provides to the Commission.

SCRS/2024/093 presented the project "Integrated Ocean observing systems for dynamic ocean management" (IOS4DOM). The project team is interested in using ICCAT GBYP aerial survey data to supplement the data currently used to model the spatio-temporal distribution of cetaceans and sea turtle aggregations in the western Mediterranean. The authors intend to participate in the work of the SCRS from now on and note that their work can contribute to the development of ecosystem indicators, defining species habitats for harvested and protected species, as well as providing information on bycatch mitigation.

The Subcommittee noted that cetaceans and sea turtle data from ICCAT GBYP aerial surveys have to be used with caution. This is because the sampling programme for these flights was not designed to detect such groups of species. Flights recorded the presence of cetaceans and sea turtles only when such recording did not interfere with the main purpose of monitoring bluefin tuna. Moreover, the flight tracks and timing of the flights were designed to optimize the likelihood of observing tuna, not the other species. The authors noted that the current work does consider the limitations of data such as the GBYP observations through using hierarchical Bayesian models. The research team is connected to those research groups that are studying the recent observations of nesting in the western Mediterranean. No attempt has been made to implement data on prey species (small pelagic fishes) on the habitat models for cetaceans, but as an alternative, in the future there are plans to incorporate biogeochemical indicators in the habitat distribution models.

The Subcommittee noted that the ICCAT Mediterranean observatory (Alvarez-Berastegui *et al.,* 2023) is developing data sets on small pelagic fishes that could be used for these habitat models.

Presentation SCRS/P/2024/064 described how the Atlantic Highly Migratory Species (HMS) Climate Vulnerability Assessments (CVA) are conducted in the United States (U.S.). The HMS CVAs evaluates the vulnerability of 58 U.S. managed species/stocks to climate change using life history or behavioral characteristics ("sensitivity attributes") combined with the results of a climate projection model ("exposure analysis"). The results of the sensitivity analysis, informed by panelist scoring, were combined with the results of an exposure analysis to develop final vulnerability rankings for HMS. Relevant outcomes of the HMS CVA may help identify information gaps, research needs (NOAA, 2024a), contribute to management strategy evaluation (Peterson and Walter, 2023), and U.S. domestic management actions to encourage sustainable management (NOAA, 2024b). Detailed information on CVAs is accessible through various web products:

– CVA Visualization Tool
– Northeast US Atlantic Habitat and Fish CVAs Crosswalk
– NOAA Fisheries Climate Vulnerability Assessments

During the discussion a few points about the CVAs were clarified in response to the Subcommittee's questions. In the past, CVAs were done at a regional level to support the work of U.S. fishery management councils. For HMS species, however, the HMS CVAs has included the Northwest Atlantic, Gulf of Mexico, and Caribbean Sea. The species selected for CVAs were chosen according to their management priority as reflected by the fact that they were included in a specific fishery management plan. Details on the methodology for the CVA are included in Morrison *et al.* (2015). Individual components of these CVAs could be considered as indicators for the EcoCard. Neutral ratings in the CVA's overall indication on the impacts on the species (or the so-called directional effects) does not mean there is no effect, but rather that the effect is neither positive nor negative. Experts rating such directional effect were asked to consider impact on a broad basis.

SCRS/2024/087 presented progress on the EcoTest framework for testing ecosystem indicators with an example application to a multi-species, multi-fleet operating model (OM) for a hypothetical longline fishery.

The Subcommittee was asked for clarification of the kind of data archetypes (i.e., the data classes and degree of completeness) to be proposed for testing using EcoTest. The authors proposed it is the job of the Subcommittee to make the choices of archetypes. These choices have to be made on the basis of expert knowledge from the Subcommittee about the important characteristics of the system. Management interventions will affect some of the indicators, such as catch, so that information has to be provided as input to the modeling team. The species involved in the case study were chosen to develop the methodology. If successful, the method would be applied to secondary species that do not have a stock assessment. The operating model could be made as a true-multispecies model by creating species interactions in the operating models. The model currently only includes longline fleets. More fleets could be implemented.

Adding spatial aspects are in theory possible, but acquiring the necessary data required to support it will be very challenging. Scenarios were considered where correlation could be present or not and on the basis of different mechanisms for the existence of correlation. This includes scenarios where correlations are due to links in productivity, or to links in fishing mortality, or whether management is being implemented independently for each species. The authors argue that if we can develop an appropriate range of plausible scenarios, it is not critical to know the process that creates the correlation. If life history parameters are not stationary, such variability could be incorporated in the simulation, but it would be necessary to discuss how to predict how these parameters vary in the future.

In response to the author's request for Subcommittee support to advance the development of the EcoTest tool, an EcoTest Technical Team was formed.

2.1 Review progress on the development of methods for prioritizing species at risk and validating indicators

SCRS/2024/099 reported on progress in the development of a machine-learning tool to facilitate prioritizing species impacted by ICCAT fisheries for consideration in an ecosystem approach to fisheries management (EAFM) framework.

The Subcommittee discussed the potential applications of this risk assessment tool and if it could be used to compare risks across eco-regions; and/or to help evaluate and verify indicators for implementing EAFM. It noted that it would be useful for making informed management decisions and prioritizing conservation efforts.

The Subcommittee discussed how to interpret the risk score for a particular species. An example discussed was Ocean sunfish (*Mola mola)*. Ocean sunfish have certain biological characteristics, such as generally occupying surface waters and having relatively low reproductive capacity, which might contribute to its high vulnerability ranking in the assessment. However, when it is caught as bycatch it is usually released. It often survives the encounter, which potentially skews the results given that the risk-assessment tool does not rely on survival data. The Subcommittee further discussed the difficulties identifying fish of the family *Molidae*; this issue further complicates the risk assessment. It was noted that the details of individual species risk scores are less important because these scores will be used to identify the higher order taxa that are at risk.

The Subcommittee noted that many data sources had significant gaps, which could affect the reliability of the model's predictions. They also noted that the comparative runs with variables with a high proportion of available data resulted in different predictions of catchability with slightly lower accuracy. The final risk score assessment utilized the combination of two model runs with and without using variables with a high proportion of missing values. Further enhancements to the supporting database, and in particular fulfilling data gaps, would be an obvious way of improving the model's predictive capacity and was encouraged. The Subcommittee also noted that the assessment only provided point estimates and recommended incorporating a method for representing uncertainty.

The rankings from the new risk assessment tool did not align with the rankings from the 2015 ecological risk assessment for sharks that was conducted by the SCRS (Cortes *et al.,* 2010; Cortes *et al.,* 2015). This raised concerns about the consistency and reliability of the new tool compared to the established Environmental Risk Assessment (ERAs). Like the Ocean sunfish case, the Subcommittee noted that the intra-taxonomic difference of the risk scores in this assessment tool are less important than the higher order taxa scores. It also emphasized the need for continuous improvement of the supporting database to enhance the overall quality of predictions.

The Subcommittee suggested expanding the taxa considered in the tool to include other sensitive species such as marine turtles and seabirds. This would help in making the tool more comprehensive and useful for broader ecological assessments and for potentially identifing species for the seabirds and marine turtles EcoCard components as well as highlighting the impact of other fisheries on species linked to ICCAT stocks. Future work by the Subcommittee will be to validate the approach and the estimates.

2.2 Review progress on case studies and ecoregion

SCRS/P/2024/062 presented progress on the development of an ecosystem modelling approach using Ecopath with Ecosim (EWE) to characterize the structure and functioning of the pelagic oceanic ecosystem of the tropical Atlantic Ocean and to assess the impact of tuna fisheries and climate change on the food web.

The Subcommittee discussed the type of ecological indicators EWE can generate as outputs. These include biomass-based, catch-based, trophic-based, size-based and species-based indicators. The authors explained how these types of indicators could be used to monitor the state of the ecosystem in the tropical Atlantic Ocean and how a selection of them could be used to inform the regional EcoCard for the tropical Atlantic case study. The Subcommittee also discussed how temperature and primary productivity will be used as drivers to force the climate change scenarios in the ecosystem model.

SCRS/P/2024/065 described the Project "Strengthening the Stewardship of an Economically and Biologically Significant High Seas Area – The Sargasso Sea" will help strengthen cooperation among international and other organizations, as outlined in the Hamilton Declaration, to protect this vital ecosystem.

The Subcommittee discussed how the Sargasso Sea case study will help strengthen cooperation among international and sectoral organizations to protect this vital ecosystem and discussed how the Sargasso Case study can help identify objectives for the use of ecoregions and how it will help in the development of practical examples to demonstrate their benefits as a tool to progress with EAFM implementation in ICCAT.

The Subcommittee was also introduced to the progress on the Inter-American Seas Case study. It was explained that the Inter-American Seas Case study has yet to agree to a Terms of Reference. The case study will focus on how to develop appropriate ecosystem indicators for a system where: 1) a large proportion of ICCAT fisheries within the Inter-American Seas are conducted by small scale fleets, including a significant number of recreational fleets; and 2) the catch of ICCAT within the study area for those ICCAT species that are actively managed and assessed is a small proportion of the total catch of each stock.

The Subcommittee noted that it is essential to have meaningful participation of developing countries in the study partnership. There are ongoing efforts to try to obtain additional funding before the initial partnership can be formalized and to agree to a set of Terms of Reference (ToRs) for the case study. The Subcommittee will review the ToRs once they are presented to it to determine the linkages of this project with the Subcommittee.

SCRS/2024/010 summarized the main objectives, outputs, and main discussions that took place during the Second ICCAT Ecoregion Workshop on the identification of regions in the ICCAT Convention area for supporting the implementation of the ecosystem approach to fisheries management.

The Subcommittee discussed how the ongoing case studies (e.g., tropical Atlantic case study, Mediterranean case study) are benefiting from being connected to a spatial framework (e.g., to a specific ecoregion). The Subcommittee supported the continuation of regional case studies for producing relevant knowledge and products for informing the development of regional EcoCards.

The Subcommittee agreed that addressing the Subcommittee objectives of monitoring the impacts of fishing and climate change on ICCAT species and associated ecosystems requires, in most cases, using a spatially explicit approach. The Subcommittee also noted that there are some research activities that require defining a spatial framework *a priori* (e.g. ecosystem models, cumulative impact assessments, ecosystem status assessments).

The Subcommittee discussed the reasons why area units may be needed to support an ecosystem approach to management. The Subcommittee noted that some of the questions the Subcommittee is interested in addressing are:

1) how does the ecosystem support the productivity of an ICCAT stock?
2) how do changes in the ecosystem affect the productivity of an ICCAT stock?
3) how does fishing in an area affect the ecosystem?

The Subcommittee noted that the current ICCAT stock areas could be used to answer these questions and noted that there are 25 stocks for which the SCRS regularly provides advice. Some of these stock areas overlap and some stocks share the same stock area. The Subcommittee discussed that the existing stock areas could be used as spatial units or regions to produce practical examples and tools (e.g., indicator-based EcoCards, ecosystem models) to support EAFM implementation.

The Subcommittee acknowledged the importance of continuing the case studies, however the Subcommittee has yet to reach consensus on ecoregion boundaries. The Subcommittee recommended that the ecoregion delineation process be informed by clearer objectives for their use. The objectives have yet to be agreed to by the Subcommittee.

SCRS/2024/096 aimed to open a Group discussion on the utility of different options like ecoregions, existing FAO areas (FAO, 2024), or others that could be used as spatial units to inform EAFM implementation in ICCAT. The analysis estimated how much the candidate ecoregions overlap with the FAO statistical subunits. The authors conclude that they are very similar, and that the FAO subunits have the advantage of being based on grids and have previous historical data. The Subcommittee agreed that further research and discussion is required, after discussions regarding the objectives of the spatial management units have concluded.

The Subcommittee discussed that there are benefits from not departing from established spatial units, such as those ICCAT spatial units defining stock boundaries. ICCAT has defined their own species-specific spatial units, named stock areas, and subunits within them, called statistical sampling areas. Boundaries of ICCAT areas have evolved as knowledge on life history and spatial precision of data reporting has improved. Any spatial units defined by the SCRS should acknowledge that area boundaries will evolve.

SCRS/2024/085 contributes to the development of a pilot product to assess the general applicability of ICCAT candidate ecoregions as a spatial framework to support the development of integrated and ecosystem-based advice products. This study contributes to the development of an Ecosystem-Fishery Overviews (EFO) as a proof of concept for the Tropical Atlantic Ecoregion and the Southern Subtropical Atlantic Ecoregion.

The Subcommittee noted the development of several sections of the pilot Ecosystem Fishery Overview (EFO) (1. Who is fishing? 2. What is being caught?) rely on the use of the ICCAT fishery statistics (Task 1 and Task 2 datasets). The Subcommittee discussed several limitations and weaknesses of the ICCAT fishery statistics (Task 1 and Task 2 datasets) such as underreporting of catches for several ICCAT species and fleets. It was recommended that sections using these ICCAT datasets should express clearly the limitations and uncertainties of data and the product being developed. It was also noted that ICCAT datasets were initially designed with the objective to address the Convention mandate. Since then, the datasets have been growing to address other emerging needs. Since the 2000s the quality of the statistics, and particularly the purse seine and longline data, have improved. Despite the limitations, the Subcommittee recognized that there are no alternative datasets with the same spatial, taxonomic, or temporal coverage.

The Subcommittee asked to clarify what added value the EFOs could offer. The authors explained that EFOs aimed to provide a holistic narrative of each ecoregion, covering the ecosystems in general as well as focusing on the core species and fisheries under management within the ecoregion and their effects on the ecosystem.

It was noted that there are ecosystem processes and research questions that cannot be addressed from a single-species perspective alone. It was noted that the pilot EFOs provided an example of reporting and monitoring at the Ecoregion level. It was suggested that an example could be prepared and shared with the Subcommittee, to solicit what type of products and sections they would like to see in an EFO.

It was emphasized that the development of any EAFM supporting product requires the Commission's involvement as demonstrated in the Management Strategy Evaluation (MSE) process.

2.3 Discuss content of Evergreen document

A draft of the Evergreen document was reviewed in order to assess its accuracy, completeness and suitability for sharing with researchers new to the work of the Subcommittee. The document would be a so-called living document and updated on an as-needed basis. There was support for posting just the table of contents in a location on the Subcommittee on Ecosystems tab on the Science/Standing Committee on Research and Statistics (SCRS) area of the ICCAT website with a note that the entire document is available upon request. This would serve as an interim measure until the contents could be assessed with respect to potential confidentiality issues. It was agreed that the current draft would be made available on a shared location to allow the Subcommittee to address identified omissions and errors in the document prior to presentation and potential adoption at the 2024 annual meeting of the SCRS.

3. Review the intersessional work of the subgroup working on the applicability and functionality of the Ecosystem Report Card (EcoCard) as a tool for monitoring the impacts of ICCAT fisheries

The major outcomes of the Sub-group on the Ecosystem Report Card reported in SCRS/2024/100 were reviewed. The discussions concluded that the Subcommittee should prioritize the development of the EAFM framework and the associated EcoCard rather than divide the limited resources of the Subcommittee across multiple tasks. A review of the ability of the indicators in the current EcoCard to provide science advice was a concern. This motivated a renewed focus on EcoCard development to ensure that there are links between the climate and ecosystem considerations that can be reflected in the indicators that could be informative to management.

The option of engaging the Commission in the development of a Road Map that related the work of the Subcommittee to the provision of management advice was considered important but should not supersede advancing the EcoCard development. A venue for dialogue with the Commission on the Road Map is the 2024 Meeting of the Joint Experts Group on Climate Change.

When discussing the impediments to incorporate ecosystem and climate change considerations into the advice of the Species Groups, it was explained that the awareness and importance of including these considerations is growing. However, the tools used to provide advice often cannot include these considerations directly. The provision of ecosystem and climate change considerations was considered to be challenging due to the short timelines for delivery of data inputs to a particular meeting and the limit in capacity to handle multiple meetings. It was recommended that thought should be given when developing the calendar of meetings to providing sufficient time for the Subcommittee to prepare the data for each of the meetings.

A questionnaire designed to elicit responses from the Commission on their management objectives with respect to ecosystems, multispecies trade-offs, cumulative impacts on bycatch species, and habitat was discussed. It was agreed that given the subject matter complexity, a meeting between scientists and managers would be a better avenue to initiate discussions. A meeting would allow for a more complete explanation, with examples, of why these concepts are important to introduce into the management and advice framework. Given that they are the subject matter experts, the Subcommittee also suggested that they could design a Road Map that incorporates these new elements.

4. Review of work related to incorporating climate change impacts into management decisions

4.1 Discuss potential collaborative work with other Regional Fisheries Management Organizations (RFMOs) on climate change

SCRS/P/2024/66 was presented to address various options for developing a framework for an EAFM for shared stocks of forage fishes in the Northeast Atlantic. The motivation for the work was to address the broad call for developing Ecological Reference Points (ERPs) as either parameters in Harvest Control Rules (HCRs) or performance statistics as part of MSE. An EAFM approach may be more important for forage fish, given such species' contributions to fisheries and ecosystem function. The authors explore the feasibility of developing ERPs for forage fish in the Northeast Atlantic, which are prey for ICCAT stocks. In particular, ecosystem models and a single species MSE were used to develop a case study for Northeast Atlantic

mackerel. The MSE was conducted as a stress test of the current International Council for the Exploration of the Sea (ICES) advice rule based on a stock assessment where natural mortality was assumed to be equal to 0.15 at all ages in all years, despite evidence of changes in distribution, size-at-age and predator populations.

To conduct a stress test, an Operating Model was conditioned with alternative assumptions about natural mortality, conditioned on strategic ecosystem models, ecosystem models of medium complexity, and life history theory. Performance metrics included achieving Maximum Sustainable Yield (MSY) and ensuring that productivity was not impaired, and also ERPs. The ERPs included forage, i.e. the amount of biomass consumed by the predators, rebuilding time and Age-Based Index at Maximum Sustainable Yield (ABIMSY, Griffiths *et al.*, 2024).

Also, rebuilding time can be computed for any model that can perform a forecast, i.e. age or biomass based single species assessment models, and strategic and tactical ecosystem models. This allows one-way coupling of single species and ecosystem models, to see if the forage available under a given advice rule maintains predators at their current levels, promotes recovery or results in a decline. ABIMSY allows comparison with objectives related to good environmental status, that ensure recruitment resilience by maintaining the age structure of a population (Griffiths *et al.*, 2024). The authors showed that predator needs can be accounted for in catch advice by incorporating these additional performance statistics in the MSE. These novel statistics provide a framework to begin stress testing catch advice while incorporating certain ecosystem considerations and trade-offs. The author noted it was important to distinguish that there is a difference between the performance statistics used in the MSE and the control parameters within the HCR itself.

4.2 Discuss reporting of climate change and ecosystem impacts in the SCRS annual report

SCRS/2024/081 presented an approach for incorporating climate considerations into management advice. A key issue discussed was non-stationarity given physical and potentially ecological changes. The document noted that historically, attributing fish population dynamics to environmental changes has been challenging. Non-stationarity makes it difficult to do stock assessments with reliable predictive capability that rely on time-series analyses. The document proposed a process to develop climate-ready Management Procedures using Management Strategy Evaluation with Operating Models that include specific climate linkages.

Spatial Ecosystem and Population Dynamics Model (SEAPODYM) is currently being applied as part of the Common Oceans project in the Atlantic and the Indian Ocean. Some limitations to applying it in the Atlantic were discussed given the current resolution of data, such as the inability to parameterize SEAPODYM completely using ICCAT data because there are not sufficient catch and effort data available at a 1x1 degree resolution. It was noted that SEAPODYM is currently being revised to allow parameterizing aspects of the model's dynamics with estimates from fisheries where the high-resolution data are available.

Ecosystem-based performance indicators were proposed as a pragmatic approach to incorporate climate considerations in management advice. This tactic would allow for stress testing Management Procedures against Ecosystem Reference Points. In response, the presenter noted that fisheries management advice would benefit from improved understanding of both conventional and ecosystem reference points; one way to do this could be to use case studies that would allow for scientists and managers to explore these issues in practical applications.

The Subcommittee expressed some concern about providing climate-conditioned advice to the Species Groups. Noting that some MSE processes are already exploring climate change through robustness tests, it was noted that the Subcommittee should not duplicate work already done. But given that most ICCAT species are not being studied through an MSE process, it was noted that the Subcommittee could generate climate-conditioned advice for non-assessed species. The Subcommittee discussed how its activities might be used to provide climate-conditioned advice using the approached discussed in SCRS/2024/081. The presenter noted that one option could be for Subcommittee members to become involved in developing the OMs used for stocks managed under MSE.

4.3 Review ToRs for project to trial providing climate conditioned advice

The convener reviewed the Terms of Reference for the trial project to provide climate conditioned advice and discussed the importance of selecting a species or stock that would be appropriate for this work. Initially, the Subcommittee suggested that a species in the Mediterranean would be an appropriate selection given ongoing work. The Subcommittee discussed that northern swordfish and northern albacore are likely better candidate stocks for this work given the availability of data related to the stock's productivity, spatial ecology, and other factors. It was recommended that the Subcommittee work with the appropriate Species Group Rapporteur prior to finalizing a selection for the project.

4.4 Review impacts of offshore wind farms on ICCAT fisheries, stocks and science advice

SCRS/2024/092 drew from recent syntheses and related scientific literature to summarize possible interactions of highly migratory species (HMS) with offshore wind infrastructure (OSW) and development activities.

One of the Ecosystems conveners noted that some OSW farm impacts directly affect species groups, so the Subcommittee should recommend that these groups track pertinent issues that may affect their data streams or other areas of importance. The Subcommittee noted the development of OSW farms where bluefin tuna traps currently exist, which could create some conflict among the user groups. This issue is especially problematic in certain areas of the Mediterranean, where migratory corridors are being considered as areas for the future development of OSW farms. The Mediterranean was highlighted as an interesting example for studying windfarms given that the structures are located within a nation's EEZ and the potential issue of ICCAT obtaining relevant information to understand the impact on highly migratory species. The Subcommittee discussed the utility of nations providing information on windfarms as it relates to ICCAT species. While green energy may be beneficial, there is a need to consider the effects of these developments on highly migratory species. In Morocco and coastal Africa, some spatial marine planning has been conducted to better understand how to have an integrative approach throughout the Moroccan coastline. In ICCAT, it will be critical to share this type of information with partners to identify areas where migratory species could be negatively affected by the development.

The Subcommittee noted that there are multiple effects to consider. These include: the effects on the fishery and the effect on the actual fish species. For this reason, the benefit of collecting data from the beginning of development of the windfarms was emphasized.

5.   Review requests from the Commission and contents of the SCRS strategic plan

The Subcommittee discussed the *Resolution by ICCAT on the implementation of biodiversity conservation instruments* (Res. 23-23), in areas beyond national jurisdiction. It noted that the Resolution would require a considerable amount of the Subcommittee's time and capacity to address the request and that this would further impede progress on the development of the EcoCard. It was suggested that, given the Sargasso Sea Case Study´s current objectives align with the Commission request, they could provide some limited responses.

Finally, the Subcommittee discussed how to appropriately react to the contents of the draft Plan of Action on Climate Change (PACC). Given the meeting's time constraints, the Subcommittee agreed to respond to a subset of the stock-take exercise questionnaire called for by the *Resolution by ICCAT on next steps of the Joint Experts Group on Climate Change in 2024* (Res. 23-19) that had already been circulated by the SCRS Chair to the SCRS Officers to inform on the Plan of Action on Climate Change.

The Subcommittee agreed that the responses would be compiled and provided in advance of the PACC meeting in July by the Subcommittee Co-convenors.

6. Sea turtles

6.1 Review progress on collaborative work of sea turtle and presentation of the next steps

SCRS/2024/101 presented a review of sea turtle interactions in the Mexican yellowfin tuna longline fleet in the Gulf of Mexico and the Caribbean Sea. Fishing effort, species and number of marine turtles were analysed for the years 2017-2022, whose results indicated a presence of *Eretmochelys imbricata*, *Caretta caretta*, and *Dermochelys coriacea*. Each record of an interaction had fishing gear and fishing activities information. The data indicated that sea turtle bycatch per unit effort (BPUE) was minimal or zero.

The Subcommittee discussed longline characteristics and the composition of shark and ray bycatch. Likewise, they asked how these species were identified. The authors indicated that there was 100% observer coverage with trained observers that permitted these species to be identified reliably.

The Subcommittee asked about which hooks fishery used. In compliance with Mexican legislation, the authors indicated that the fleet uses number 16 circle hooks. The Subcommittee noted that the small numbers of turtle interactions in the Gulf of Mexico are consistent with similarly small numbers of turtle interactions of the U.S. fleet in the Gulf of Mexico, which also uses circular hooks. The Subcommittee further discussed the post-release survival with circular hooks. Moroccan fishermen indicated that in their longline fishery releasing turtles captured with J-hooks is easier than with circle hooks. The Subcommittee noted that to evaluate the relative impact of ICCAT fisheries on sea turtles, it is important to quantify turtle interactions with other non-ICCAT fisheries in the region including trawl and gillnet gears.

Document SCRS/P/2024/071 presented advances on the collaborative work to assess sea turtle bycatch in pelagic longline and tuna purse seine fleets. The project has data from the Atlantic Ocean, the Indian Ocean, and the Mediterranean Sea. There are participants from several countries involved in ICCAT and Indian Ocean Tuna Commission (IOTC) fisheries. The project quantified fishing effort for both the pelagic longline and purse seine fleet, and spatial and environmental variables as well as other temporal and fishery-related variables were included in the models.

The Subcommittee asked about the why the turtle Regional Management Units (RMUs) had been changed. In response, the same criteria to create them was used in previous RMUs, i.e. genetic characteristics, fisheries, etc., but the new RMUs also considered expert advice. The new RMUs are bigger so fewer turtles fell outside the limits of the RMUs.

SCRS/P/2024/070 described the work conducted on the Evaluation of ICCAT fisheries impact on marine turtles in the Mediterranean Sea. It presented data available to date, as well as preliminary exploratory analyses. The main objectives and future steps were discussed. In addition, the paper stressed the need for more data to have complete spatial coverage, which will allow the fulfilment of the work's general objective.

The Subcommittee suggested exploring catch seasonality to detect migrations, seasons of greater presence of turtles, and considering the status of captured populations. The Subcommittee suggested including electronic tagging work to estimate survival and other biological information. The Subcommittee suggested improving knowledge about areas and events with high BPUE, which could indicate Mediterranean Sea turtle aggregations. The Subcommittee was interested in exchanging their experience on this topic through the inclusion of other fishing fleets and the collaboration of more scientists. This would both increase the information available and would increase participation in the analysis of the results. The document's authors were open to receiving a greater number of participants for their incorporation in the development of the research. In this regard, studies conducted by Morocco have reached similar conclusions. The Subcommittee noted the importance of such variables as the type of hook, hook size, and type of bait for future use in BPUE standardization.

The workshop to continue the evaluation of the impact of ICCAT fisheries on sea turtles in the Mediterranean Sea will take place from September 30 to October 4 in San Pedro del Pinatar, Murcia (Spain). Scientists were invited to join the process and collaborate on the evaluation.

Presentation SCRS/P/2024/072 described the General Fisheries Commission of the Mediterranean (GFCM) Seas' actions to mitigate incidental catch of vulnerable species. The Subcommittee noted the need for prioritization of areas and gears with higher interaction due to the broad scale of analysis presented in this work.

Collaboration between ICCAT and GFCM was discussed. Many of the same scientists work with both organizations. This fact can facilitate collaboration and communication. In this regard a GFCM/ICCAT joint workshop on sea turtle bycatch has been proposed to initiate a collaborative process in this matter. The Subcommittee agrees that this workshop, as well as the ICCAT workshop to continue the evaluation of the impact of ICCAT fisheries on sea turtles in the Mediterranean Sea in Murcia, could be a good opportunity for cooperation and sharing of information.

7. Update about seabirds and their interaction with fisheries

7.1 Review of Recs. 07-07 and 11-09

SCRS/2024/89 reviewed the *Recommendation by ICCAT on reducing incidental bycatch of seabirds in longline fisheries* (Rec. 07-07) and the *Supplemental Recommendation by ICCAT on reducing incidental bycatch of seabirds in ICCAT longline fisheries* (Rec. 11-09) against the latest best practice advice of The Agreement on the Conservation of Albatrosses and Petrels (ACAP) for reducing the impact of pelagic longline fisheries on seabirds. These two recommendations outline seabird bycatch mitigation and other measures for ICCAT longline vessels. This document was supported by SCRS/2024/90, which provided the ACAP Review of mitigation measures and Best Practice Advice for Reducing the Impact of Pelagic Longline Fisheries on Seabirds. The review on SCRS/2024/89 concluded that mitigation measures from Rec. 07-07 and Rec. 11-09 are inconsistent between them and that they should be consistently specified and harmonized in a single revised recommendation for ICCAT vessels. To achieve greater effectiveness, the definition and specifications of each single measure should be aligned with the ACAP advice. The branch line weighting specifications are those that show the greatest discrepancy with ACAP advice. SCRS/2024/89 noted to the Subcommittee that the most effective combinations to reduce seabird bycatch in ICCAT pelagic longline vessels is the simultaneous use of night setting, bird-scaring line, and branch line weighting or hook shielding devices (HSD) or underwater bait setters. Finally, the document expressed that it is advisable that the Recommendations be reviewed considering the updated and newly available mitigation measures.

ACAP's advice was recognized as an important source of information on the efficacy of mitigation measures. However, the Subcommittee noted that there were other perspectives on the application of such measures in practice. The Subcommittee hopes that future work will clarify and potentially resolve some of these issues.

It was highlighted that there is no evidence of seabirds becoming habituated to bird-scaring lines. However, it was clarified that they should still be used in combination with other recommended measures since birds can have access to baited hooks beyond the bird-scaring lines' aerial coverage.

There was also discussion about available mitigation measures for the Mediterranean, strategies to reduce bycatch and the need for more data on seabird interactions. It was mentioned that the weekend ban on trawling in the Mediterranean led to an increase in seabird bycatch in longline fishing. In some cases, this was because scavenging birds increased their abundance around longliners due to the absence of discards from trawling. It was mentioned that no similar situations were known in the South Atlantic.

SCRS/2024/079 summarized work by scientists from organizations within the United Kingdom (UK), and from ACAP and the Inter-American Tropical Tuna Commission (IATTC). The paper takes a risk-based approach (based on the Expansion-assisted iterative fluorescence in situ hybridization (EASI-Fish) model developed in IATTC) to evaluate the performance of different possible combinations and specifications of conservation and management measures applicable to pelagic longlines within the South Atlantic. This study was completed, building upon ACAP's global evaluation, to address concerns that information previously reviewed has been insufficiently tailored to the ICCAT Convention area. The recommendations of SCRS/2024/079 were to update the specifications of the three existing measures to meet the ACAP best-practice guidance, the requirement for simultaneous use of all three existing measures, and the inclusion of hook shielding devices as an alternate. Any of these measures could apply to latitudes south of 20 degrees South.

The Subcommittee highlighted that the output is predominantly influenced by the parameters estimated for the performance of individual conservation measures. The authors noted that this was by design, and other model parameters relating to interaction rates (e.g. overlap between fleets and species) were deliberately fixed per each scenario, to support the interpretation of the relative performance of different conservation measures for the selected species. It was noted that, without provision of any contrary evidentiary basis, the relative effectiveness of individual mitigation measures contains significant uncertainty. Some members of the Subcommittee considered that these uncertainties resulted in the analysis being uninformative, despite the analysis being based on parameters derived from available field observations and derived from a systematic literature review. This represents the best science that is publicly available. The Subcommittee noted concerns with this study having discrepancies with information not-yet-presented to the Subcommittee. The Subcommittee requested that this information be provided at the earliest opportunity, or else it would not be possible to consider within the current review of seabird conservation and management measures (CMMs) included within the 2024 SCRS work plan.

The Subcommittee questioned the methodology used by the authors to estimate BPUE using seabird bycatch data collected by CPCs' observer programmes and reported to ICCAT. In particular, the Subcommittee questioned the use of EFFDIS as a source of fishing effort information and the estimation of an average observer coverage rate across the entire area south of 25° S and for all the fleets considered. This estimated nominal BPUE (using EFFDIS and an average observer coverage rate of 6%, based on data provided by the Secretariat) without any temporal and spatial standardization was compared to an average BPUE estimated from studies considered in the document. Based on the comparison, the authors concluded that the ICCAT-derived BPUE was 2 to 3 times lower than the BPUE recorded in other studies. Based on this result and other observations (for instance the number of longline fleets for which no seabird bycatch records were submitted, or the limited number of years for which seabird bycatch data were available (2019-2021)), the authors suggested that seabird bycatch is underreported among ICCAT fleets and, therefore, the data were unreliable.

The Subcommittee considered that the methodology used by the authors to estimate BPUE from ICCAT data was questionable and that it was inappropriate to compare such BPUE with results from other studies. Therefore, the Subcommittee could not support the author's conclusions regarding the reliability of the ICCAT observer data. The authors expressed willingness to undertake addressing this misinterpretation intersessionally. However, the Subcommittee recognized that the results of the modeling approach and of the comparisons of the effectiveness of the different mitigation measures were unrelated to this discussion point and, as such, the results were considered valid.

SCRS/2024/094 investigated the impact on seabird bycatch by small-scale fisheries across southeastern Brazil. It highlighted that there are significant bycatch rates in these fisheries and there is an urgent need for enhanced monitoring and mitigation measures. The document concluded that mitigation measures need to be tested and adapted to the fleet characteristics and it was suggested small-scale fisheries should be considered in the revision process of Rec. 11-09.

The Subcommittee raised a question about the percentage of fisheries operations using night setting and the use of other mitigation measures. The answer was that there were no records of sets that took place 100% at night. It was noted that no mitigation measures are currently used in these fisheries. The Subcommittee further asked about the type of bait used, and noted that fishers use various types of bait, including sardines, but no use of artificial bait.

The Subcommittee discussed the utility of the presentations to address the request by the Commission to review the efficacy of mitigation measures. They noted that there are no formal stipulations for how such impact or efficacy assessments are to be conducted. Because the papers collectively discussed mitigations measures, the Subcommittee discussed SCRS/2024/089, SCRS/2024/090, SCRS/2024/079, and SCRS/2024/094 at the same time. The Subcommittee recalled the necessity of conducting a fisheries impact assessment to evaluate the effectiveness of current bycatch mitigation measures and to make recommendations for improvements, as called for by Rec. 11-09.

The Subcommittee further discussed that some of the mitigation measures in Rec. 07-07 and Rec. 11-09 are not in line with ACAP's best practices or decisions recently taken within the IOTC or the Western and Central Pacific Fisheries Commission (WCPFC) and could be updated.

The Subcommittee expressed concern that there were only a limited number of HSD venders available. The Subcommittee also acknowledged that this issue had not hindered the inclusion of HSDs within IOTC or WCPFC.

Observer data are essential for providing accurate information on bycatch rates and the success of mitigation strategies and the Subcommittee urges that national observer programmes be supported and, where possible, expanded.

The Subcommittee also emphasized the importance of collaboration and data sharing among international bodies and fisheries organizations in order to do analysis of bycatch. This collaboration is vital for assessing bycatch impacts and mitigation measures.

8. Effect of the mitigation measures: intra and inter taxa

Document SCRS/2024/048 summarizes ongoing research with the French longline fishery for Atlantic bluefin operating in the Gulf of Lion regarding bycatch mitigation measures, post-release survival and habitat usage of several species, notably pelagic stingray and blue shark. The document also discusses different observation approaches designed to characterize the fishery and to collect data on bycatch.

Document SCRS/2024/088 presented and discussed the use of a series of novel bycatch release devices and how these were incorporated into the guidelines for best bycatch handling and release practice in tropical tuna purse seiners. The document particularly focused on the safe release of large animals such as sharks and mobulid rays. The Subcommittee indicated that there are now a range of potential new options, which range in cost and complexity for installing these on-board existing tuna purse seine vessels. AZTI have prepared an updated Best Handling and Release Practice Guide, which is available online to inform managers and industry wishing to improve their standards.

The Subcommittee inquired if sea trials of the different release devices were only conducted in the Atlantic Ocean. The authors indicated that sea trials were also carried out in the Pacific and Indian Oceans. The Subcommittee also inquired about the cost of installing hoppers with release ramps and how this cost is compared with the cost of other release devices. It was explained that while a hopper with release ramps has the higher cost of all the release devices (approximately US$ 20,000 – 30,000), at the same time such a cost can be easily handled by large purse seine vessels. Finally, the importance of closely working with the fishing industry to explain the benefits of adopting the discussed release devices (e.g., crew safety, higher bycatch survival, less restrictions in the future, more chances of obtaining eco-certification for their products) was emphasized by the authors.

9. Present the progress made by the Sub-group on Technical Gear Changes and Electronic Monitoring Systems (EMS)

SCRS/P/2024/068 provided an update on the progress of the Technical Sub-group on Electronic Monitoring (EM) in ICCAT fisheries. The Sub-group Rapporteur noted that following the work over the last few years, ICCAT adopted the *Recommendation by ICCAT to establish minimum standards and programme requirements for the use of Electronic Monitoring Systems (EMS) in ICCAT fisheries* (Rec. 23-18), addressing at this stage specifically the pelagic longlines and purse seines (targeting tropical tunas).

The Subcommittee asked if the human observer coverage as defined in the *Recommendation by ICCAT to establish minimum standards for fishing vessel scientific observer program* (Rec. 16-14) needs to be maintained. The Subgroup convener confirmed that yes, as Rec. 23-18 on EMS states that those systems should be used to complement the human observer coverage as defined in Rec. 16-14, and not as a substitute.

The Subcommittee asked if Rec. 23-18 would apply to the Mediterranean. It was confirmed that yes, as it applies to all ICCAT fisheries using either pelagic longlines or purse seines (targeting tropical tunas).

The Subcommittee noted that Morocco had tried to carry out experiments with EMS in smaller artisanal vessels (<=7m), but it was impossible to set up EMS systems for those fleets. Another member of the Subcommittee noted that some CPCs (e.g., USA.) have developed some protocols for simplified EMS systems for those smaller artisanal vessels. The Rapporteur of the Technical Sub-group on EM then noted that while it might be more complex to put those systems in those smaller vessels, it is also in those smaller vessels where it is also difficult to deploy human observers (due to lack of space, security, etc.). As such, currently there is almost no data in ICCAT from those fleets on bycatch and discards. Alternative methods such as port-sampling would only cover what is landed in the ports, but not the bycatch/discards components, which are also very important.

The Subcommittee agreed that the Technical Sub-group on EM should continue its work in 2024 and 2025. One priority is to focus on revising current knowledge and establishing minimum standards for simplified EMS systems for smaller vessels that are also ICCAT fleets (e.g., coastal LL, gillnets). Another relevant task would be to review EMS Domestic Plans, as they start to be submitted by the CPCs to ICCAT, as the SCRS is tasked to provide assistance in such revision under Rec. 23-18.

SCRS/P/2024/067 provided an update on the work of the Sub-group on Technical Gear Changes. The Sub-group is exploring the effects of terminal gear modification to address the *Recommendation by ICCAT to establish rebuilding programs for blue marlin and white marlin/roundscale spearfish* (Rec. 19-05) (paragraph 21). To address this, 3 main tasks were proposed, namely: 1) collect, review, and summarize past studies and identify data-gaps, 2) design experimental studies to assess the effects of terminal gear modifications on catch rates, retention rates, at-haulback mortality and post-release mortality, and 3) to design a study on the effects of fishing practices (e.g., timing, soaking time, bait, depths, areas) that could reduce bycatch and bycatch mortality.

The Subcommittee noted that recently there was a workshop carried out by the IOTC (within the Working Party on Ecosystems and Bycatch (WPEB)) summarizing mitigation measures specifically for sharks and asked if the outcomes of that workshop had been included in this Sub-group work. The Convenor noted that those outcomes of the IOTC workshop have not been included yet but could be useful to complement what has been done in Task 1 of the Sub-group on Technical Gear Changes, which contains mainly revisions of previous works and data gaps.

The Subcommittee inquired what had been done to date with regards to miniPAT deployment for post-release mortality studies. The Rapporteur of the Sub-group on Technical Gear Changes highlighted that what has been done to date within the Sub-group on Technical Gear Changes was mostly planning experimental at-sea trials, and that under those studies the miniPATS could be deployed.

The advantage of such an approach is that it is a controlled experimental design study. Accordingly, all variables are controlled. Therefore, it is easier to detect changes relative to the variables of interest (in this case hook type/size, gangion, and bait types) that can influence and have an effect on the post-release mortality.

The Subcommittee agreed that the Sub-group on Technical Gear Changes continues the work and meet intersessionally in 2024 and 2025 to continue with the progress made up to date. The main priorities for future work are: 1) synthesize the revision work done up to date; 2) complete the power analysis and provide a summary where the experimental at-sea trials could be carried out, preferably with an associated tentative budget; and 3) prepare a data call template for requesting detailed fishery observer operational data that could be used for statistical modeling of potential variables affecting bycatch and associated mortality.

Finally, the Subcommittee reiterated that the Sub-group on Technical Gear Changes should continue to report to Subcommittee on its progress addressing the different tasks.

10. Update on Common Oceans (formerly ABNJ) project(s)

The Secretariat gave a brief update on current Common Oceans Tuna projects being done by ICCAT. ICCAT has four projects on: compliance-related capacity building, enhancing online reporting, the ECOtest project, and for running three workshops in conjunction with other tRMFOs on matters of common interest. The

Subcommittee received updates on ECOtest (see section 2 and SCRS/2024/087). The Secretariat did not provide updates on compliance-related capacity building or enhancing online reporting but did update the Subcommittee on three technical workshops of "common interest" to the tRMFOs.

The Common Oceans Tuna Project is supporting three technical workshops. A working group of members of all the tRMFOs were consulted about which themes should be discussed. This working group decided in March 2024 that the workshops would be about bycatch, MSE, and stock assessment methods. Climate change was the fourth theme that was considered but the Subcommittee decided that this would be addressed within the other three themes. The final dates and locations have yet to be finalized but it is likely that the first meeting will be on bycatch in January 2025. Additional information about the Common Oceans Tuna Project can be found on their website. Announcements about the workshops, including the process to participate will be distributed in circulars from the tRMFOs once they are finalized.

11. Explore the use of scientific reference points as a tool for assessing and managing ICCAT fisheries with respect to bycatch species

There were no documents presented for this agenda item.

12. Investigate available information on hotspots and/or areas with high BPUE to aid in the management of ICCAT fisheries with respect to bycatch species

There were no documents presented for this agenda item.

Although items 11 and 12 were on the agenda, little progress has been made on them. The Subcommittee recognized that these points, which are from previous agendas, were not included in the workplan. In any case, the Subcommittee discussed their relevance, and it was agreed that point 12, related to identification of areas of high bycatch, was an activity that the Subcommittee could address initially using the information from the ICCAT databases.

13. Reponses to the Commission

SCRS/2024/040 summarized information on mobulid rays' life history, bycatch, management by other tuna RFMOs and listings by conservation organizations such as International Union for Conservation of Nature (IUCN), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Convention on Migratory Species (CMS). The document was intended to inform the Subcommittee for the drafting of a response to the *Recommendation by ICCAT on mobulid rays (family Mobulidae) caught in association with ICCAT fisheries* (Rec. 23-14).

Initial discussion by the Subcommittee noted that a similar background document on the status of mobulid rays is being produced by another group with members of the SCRS Shark Species Group. It was noted that any individuals wishing to contribute to this document should contact the Chair of the SCRS Shark Species Group. The Subcommittee suggested that the document include suggestions for studies to fill in data gaps. Collaboration by these groups was suggested as a way forward, with presentations by both groups at the SCRS Species Group and the Standing Committee on Research and Statistics meeting in September. It was also stated that a presentation would be given on the status of whale sharks following the *Recommendation by ICCAT for the conservation of whale sharks (*Rhincodon typus*) caught in association with ICCAT fisheries* (Rec. 23-12). The Subcommittee recommended a proposal be drafted to the Commission and included in the report.

The Subcommittee recommended that the SCRS Shark Species Group reviews, if available, any additional information on mobulid rays in addition to the information presented in document SCRS/2024/040. Based on the information received until the present, the Subcommittee recommended that the Commission adopts precautionary management measures for mobulid rays as described in Rec. 23-14.

14.   Other matters

Document SCRS/P/2024/061 presented the information on the project on sunfish carried out by the Instituto Español de Oceanografía (IEO). The main objective of the project is to estimate post-release survival and collect ecological information on trophic habits and genetic structure, among others, of sunfish captured accidentally in a trapnet fishery targeting small tunas located in the Spanish Mediterranean coast.

The Subcommittee expressed interest in this research programme and that ICCAT continues supplying conventional tags. However, to date, there have been no recaptures. The Subcommittee recommended that tagging be increased, and the potential tag-shedding problem be investigated.

14.1 Form ST12 on turtles

The Secretariat presented the candidate ST12 form for consideration of the Subcommittee. The form was created in response to the *Recommendation by ICCAT on the bycatch of sea turtles caught in association with ICCAT fisheries (combine, streamline, and amend Recommendations 10-09 and 13-11)* (Rec. 22-12). The Subcommittee decided that they would review the form, compile the feedback, and discuss it at the 2024 meeting of the Subcommittee of Statistics.

The Subcommittee discussed if the form could be used for sighting and stranding data. The Subcommittee noted that sighting and stranding data serve a different purpose to the observer data. The problems with using sighting and stranding data included: that sighting and identifying turtles is problematic; onboard observers are often too busy to look for turtles, quantifying the observation effort, and others. The Subcommittee decided that it was not appropriate to attempt to combine both data sources in a single form.

The Subcommittee noted that the information requested in Rec. 22-12, paragraph 5, was problematic in at least two additional ways. The first was that many fields requested in paragraph 5 were duplicated in form ST09. The second was that unlike the ST09 form, which was designed to allow flexibility for CPCs to report data to ICCAT at levels of spatial resolution that were consistent with national legislation, Rec. 22-12 requires fine scale data that some CPCs may not be able to provide due to domestic legislation. The Subcommittee agreed to draft a summary of these issues to present it to the next meeting of the Subcommittee of Statistics.

14.2 Possible changes to the Subcommittee structure

The Subcommittee discussed potential changes that might help to improve the delivery of its mandate including changes to the Subcommittee current structure. Among the options discussed was the possibility to split the two Subcommittee components (ecosystems and bycatch) into two separate Subcommittees. In the end, the Subcommittee agreed not to change its current structure. It agreed to explore alternative options to improve its functioning and the delivery of its mandate. Such options included opting for less ambitious work plans, meeting intersessionally to conduct additional work, ensuring that the existing workplans are followed, moving the meeting of the Subcommittee to earlier in the calendar year (i.e., January or February), and considering extending the duration of the Subcommittee meeting by one or two days. The Subcommittee decided that while the current tasks listed in the workplan of the Ecosystem component are all important to complete eventually, they must be ranked in terms of priority with emphasis given to the top two or three. Prioritizing the long list of tasks that need to be completed by the Subcommittee will alleviate the workload and facilitate working in a more efficient way.

14.3 Funding for research

The Secretariat informed the Subcommittee that the Science budget for 2024 must be used strictly in line with the approved budget by the Commission. This is detailed in Table 1 of Appendix 2 to ANNEX 7 of the to the *Report for Biennial Period 2022-2023, Part II (2023), Vol. 1*. No extensions and no changes between budget line items will be permitted.

The Secretariat emphasized the importance of receiving all terms of reference (ToRs) for science funding soon after the SCRS Plenary. As such, the Secretariat would have more time to complete its administrative processes for issuing contracts. In this way, Calls for Tenders or Quotation Requests could be issued earlier. The Secretariat pointed out that these guidelines, and particularly the deadline for developing ToRs, were consistent with both the development of longer-term research plans (approximately six years), and the detailed budget requests covering the next two years. This will also facilitate the discussion of proposed science budget requests for submission to the SCRS Plenary meeting. Having all the ToRs prepared before the annual Commission meeting should help the Commission consider science funding requests and should also help projects start sooner. Given the new guidelines on the use of funds, this efficiency is critical.

The Subcommittee acknowledged the new guidelines and the importance of providing the ToRs in advance of the Commission annual meeting.

14.4 Bycatch Estimation Project

The Subcommittee discussed the upcoming SCRS training Workshop on the Use of the Bycatch Estimation Tool (15-17 July 2024). The Bycatch Estimation Tool, which is an R application was developed under the supervision of the SCRS Working Group on Stock Assessment Methods (WGSAM). The upcoming training workshop will be attended by ten national scientists that have met the criteria established by the SCRS Chair, the Chair of the WGSAM, and the Secretariat.

Currently, dead and live discards are being reported by only a few CPCs. The Subcommittee, as already done by other SCRS Working Groups, recommended that CPCs increase their efforts to report dead and live discards and improve their estimation methodology. Therefore, the Subcommittee embraced the Bycatch Estimation Tool (BYET) initiative and the corresponding training workshop. The Subcommittee recommended that more training workshops on the use of BYET be conducted in the future so more national scientists can take advantage of this newly developed tool. Their expectation is that this will result in an increase in the number of CPCs that will report dead and live discards.

15. Recommendations

Pertaining to bycatch

Without financial Implications

- The Subcommittee recognized the progress made by national scientists in characterizing the impact of ICCAT fisheries in the Mediterranean on sea turtles and recommended that such efforts continue.

- The Subcommittee reviewed the new information presented related to the latest research on seabird bycatch mitigation measures. The Subcommittee recognized that since the adoption of Rec. 11-09, no revision has been conducted by the Subcommittee on the population status of seabirds in the South Atlantic, nor on their interactions with ICCAT fisheries, or on the effectiveness of the adopted bycatch mitigation measures. Therefore, the Subcommittee recommended that the SCRS should continue reviewing and discussing mitigation measures available for different ICCAT fisheries interacting with seabirds, including, but not limited to, the possibility of recommending to the Commission that additional mitigation measures could be adopted by ICCAT.

- The Subcommittee recommended that all CPCs with any relevant information on seabird bycatch mitigation submit such data as well as any associated analysis at the next meeting of the Subcommittee for consideration in developing advice to the Commission based on the best available science.

- The Subcommittee noted that there are many knowledge gaps in mobulid ray life history, and that there are similar gaps in reported catch including live and dead discards in ICCAT fisheries. It recommended that CPCs make an effort to improve reporting, to provide their historical data, and to do research.

- The Subcommittee recommended that the Technical Sub-group on EM should continue its work in 2024 and 2025. One priority is to focus on revising current knowledge and establishing minimum standards for simplified EMS systems for smaller vessels that are also ICCAT fleets (e.g., coastal LL, gillnets). The Subcommittee recommended that the Sub-group on Technical Gear Changes continue the work and meet intersessionally in 2024 and 2025. The Subcommittee reiterated that the Sub-group on Technical Gear Changes should continue to report to the Subcommittee on its progress addressing the different tasks.

With financial implications

- The Subcommittee recommends holding a Workshop to continue with the work to evaluate the impact of ICCAT fisheries on sea turtles in the Mediterranean in 2025. For this workshop, funds are requested to finance the participation of 6-7 scientists (€20,000).

- The Subcommittee recommended that the Secretariat increase the supply of tags dedicated to marking of bycatch species, including *Mola mola*. Accordingly, different types of spaghetti tags should be purchased and made available (€3,000).

Pertaining to ecosystems

Without financial implications

- The hybrid format of the meetings has resulted in much information being contributed in the chat with the expectation that some of it will be included in the report. It is recommended that the SCRS remind the Working Groups and Subcommittees of the protocol regarding content placed in the chat.

- The Subcommittee recommended that the SCRS discuss the potential need for additional resources to address climate change.

With financial implications

- Recognizing the need for climate and oceanographic indicators to expand the spatial extent of these indicators beyond the Mediterranean Sea to the Atlantic Ocean, it is recommended that the Commission provide funds to advance this work (€15,000).

16. Workplan

Subcommittee on Ecosystems and Bycatch Workplan

Consistent with the ongoing exercise of developing an EcoCard and implementing an Ecosystem Approach to Fisheries Management (EAFM) framework for ICCAT a workplan was drafted considerate of the limited capacity of the Subcommittee and the highest priority items. Where there is limited capacity to progress on a task, it is identified as being a low priority.

1. Pertaining to the work of the Sub-group on the Ecosystem Report Card (active, high priority)

The Sub-group will meet twice prior to the 2025 Meeting of the Subcommittee on Ecosystems and Bycatch in order to facilitate the development of indicators for selecting components of the EcoCard. The first meeting will allow EcoCard teams to review their objectives, data sources and plan. A consideration for all components is how the proposed indicator informs science advice and management advice. The second meeting is intended to allow teams to meet and review their progress on indicator development in the weeks prior to the 2025 Meeting of the Subcommittee on Ecosystems and Bycatch.

2. Pertaining to Ecoregion delineation process (low priority)

3. Pertaining to the development of a Risk Screening Tool (high priority)

Given that risk scores were estimated for marine fish species vulnerable to ICCAT fishery impacts and that little time was available to validate the scores and incorporate estimates of uncertainty, work will continue exploring the relationship of the scores to the supporting data. To facilitate this process a small group will meet to develop a plan for the work.

4. Pertaining to the progress on case studies (low priority)

It was recognized that the case studies are providing valuable support to the development of the EcoCard, however review of their progress must be postponed. Participation in the teams working on the EcoCard indicators was encouraged.

5. Pertaining to Ecosystems Report Card development (high priority, active)

It was agreed that advancing the work on the EAFM framework and the EcoCard would be the top priority for the coming years. However, it was also recognized that the Subcommittee may not have the capacity to advance the development on all the components. Consequently, development of some components, while welcome, would not be a priority for the coming year.

State	Component	Task
on hold	Retained Species: assessed	Update B_{RATIO} and/or F_{RATIO} values from recent assessments and deal with $F_{0.1}$ issue.
on hold	Retained Species: not assessed	Perform Productivity Susceptibility Assessment (PSA) for select retained unassessed species.
on hold	Non retained sharks	Increase the scope of the data used in the analysis. Include other gear types.
active	Turtles	Perform risk assessment for loggerhead and leatherback turtles and indicator development and identify impediments to advancing the work.
active	Seabirds	Create indicator based on the total interactions, total mortality or alternatives and identify impediments to advancing the work.
on hold	Mammals	Discuss collaborations with the International Whaling Commission (IWC) and the International Council for the Exploration of the Sea (ICES).
active	Trophic structure, community and diversity	Continue work developing indicators to monitor the biomass structure, size structure and trophodynamics of the ecological communities in response to fishing pressure and environment (detailed workplan in Andonegi *et al.*, 2020).
active	Habitat	Create indicators to monitor climate-induced and fishing-induced habitat changes in ICCAT species.
active	Socio economic	Develop a process to extract the socio-economic data and update previous work.
active	Fishing pressure	Develop an indicator based on fishing effort or capacity. Develop indicator based on marine debris. Develop indicator based on tropical tunas fishing pressure and capacity.
active	Environmental pressure	Develop indicators that are generic.
active	Marine debris, Food webs and Trophic relationship	Informal discussion of the elements of the plans and potential indicators.

6. Pertaining to other ecosystem items (active, high priority)

  a. Support EcoTest development

      -   In order to progress on the development of the EcoTest framework a technical team composed of Subcommittee participants will be formed to support the work of the contractor.

      -   Dialogue with Commission at Climate Change Meeting.

      -   Support was given to provide guidance on the implications of providing climate conditioned advice in order to illicit Commission feedback.
  b. Review contract on providing Climate Conditioned Advice

  c. Respond to ICCAT requests

Bycatch

  a. Conduct a five-day workshop focused on bycatch of sea turtles in the Mediterranean Sea.

      The workshop will allow determination of activities developed during the 2024-2025 intersessional period related to the impact of ICCAT fisheries on Mediterranean sea turtles.

  b. Continue with the review process of the new mitigation measures for seabird bycatch.

  c. Continue collaborative work on bycatch with the Shark Species Group.

      The bycatch species of sharks are integral to both groups and therefore there is a need for coordination.

  d. Continue work in the Sub-group on Technical Gear Changes.

      Within the objectives of this Sub-group, activities of interest for bycatch can be framed.

  e. Continue to review and refine the list of bycatch species

      The ICCAT databases contain a list of different taxa that must be reviewed by specialists.

  f. Develop a research programme

      During the intersessional period, in consultation with the members of the Subcommittee, an agenda for a virtual meeting will be proposed to lay the foundations of a Research Programme for the Subcommittee on the bycatch component.

17. Adoption of the report and closure

After the report was adopted and the agenda was completed, the meeting was closed.

References

Andonegi E., Juan-Jordá M.J., Murua H., Ruiz J., Ramos M.L., Sabarros P.S., Abascal F., Bach P., MacKenzie B. 2020. In support of the ICCAT Ecosystem Report Card: Advances in monitoring the impacts on and the state of the "foodweb and trophic relationships" ecosystem component. Collect. Vol. Sci. Pap. ICCAT, 77(4): 218-229.

Alvarez-Berastegui D., Tugores M.P., Juza M., Hernandez-Carrasco I., Sanz-Martín M., Reglero P., Macías D., Balbín R., Lázaro G., Antoine L., Mavruk S., Cuttitta A., Russo S., Patti B., Torri M., Reyes E., Moure B., Orfila A., Gordoa A., Abascal C., Laiz R., Amengual J., Hidalgo M., Cabanellas-Reboredo M., Báez J.C., Juan Jordà M.J., Kell L., Hanke A., Die D., Tintoré J., Cardin V. 2023. Terms of Reference for the Mediterranean Tuna Habitat Observatory Initiative. Col. Vol. Sci. Pap. ICCAT, 80(7): 155-161.

Cortés E., Arocha F., Beerkircher L., Carvalho F., Domingo A., Heupel M., Holtzhausen H., Santos M.N., Ribera M., Simpfendorfer C. 2010. Ecological risk assessment of pelagic sharks caught in Atlantic pelagic longline fisheries. Aquatic Living Res., 23, pp. 25-34.

Cortés E., Domingo A., Miller P., Forselledo R., Mas F., Arocha F., Campana S., Coelho R., Da Silva C., Hazin F.H.V., Holtzhausen H., Keene K., Lucena F., Ramirez K., Santos M.N., Semba-Murakami Y., Yokawa K. 2015. Expanded Ecological Risk Assessment of Pelagic Sharks Caught in Atlantic Pelagic Longline Fisheries, Col. Vol. Sci. Pap. ICCAT, 71(6): 2637-2688.

FAO 2024. FAO Main water areas. https://www.fao.org/cwp-on-fishery-statistics/handbook/general-concepts/main-water-areas/es/

Griffiths C.A., Winker H., Bartolino V., Wennhage H., Orio A., Cardinale M. 2024. Including older fish in fisheries management: A new age-based indicator and reference point for exploited fish stocks. Fish and Fisheries, 25(1), pp.18-37.

Kell L.T., Nash R.D., Dickey-Collas M., Mosqueira I., Szuwalski C. 2016. Is spawning stock biomass a robust proxy for reproductive potential? Fish and Fisheries, 17(3), pp.596-616.

Morrison W.E., Nelson M.W., Howard J.F., Teeters E.J., Hare J.A., Griffis R.B., Scott J.D., Alexander M.A. 2015. Methodology for assessing the vulnerability of marine fish and shellfish species to a changing climate. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OSF-3, 48 p.

NOAA, 2024a. Highly Migratory Species Management-Based Research Needs & Priorities: https://www.fisheries.noaa.gov/s3//dam-igration/atlantic_highly_migratory_species_management-based_research_needs_and_priorities.pdf

NOAA, 2024b. Atlantic Highly Migratory Species Fishery Management Plan and Amendments. https://www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-hms-fishery-management-plans-and-amendments.

Peterson C.D., Walter J.F. 2023. Southeast Fisheries Science Center Management Strategy Evaluation Plan Strategic Plan. NOAA technical memorandum NMFS-SEFSC; 766 https://doi.org/10.25923/khnf-vh41.

Appendix 1

Agenda

1. Opening, adoption of the agenda and meeting arrangements Pertaining to Ecosystems

2. Review the progress on developing status indicators, pressure indicators and reference levels for the components of the Ecosystem Report Card

    2.1 Review progress on the development of methods for prioritizing species at risk and validating indicators

    2.2 Review progress on case studies and ecoregion

    2.3 Discuss content of Evergreen document

3. Review the intersessional work of the subgroup working on the applicability and functionality of the Ecosystem Report Card (EcoCard) as a tool for monitoring the impacts of ICCAT fisheries

4. Review work of work related to incorporating climate change impacts in management decisions

    4.1 Discuss potential collaborative work with other RFMOs on climate change
    4.2 Discuss reporting of climate change and ecosystem impacts in SCRS annual report
    4.3 Review ToRs for project to trial providing climate conditioned advice
    4.4 Review impacts of offshore wind farms on ICCAT fisheries, stocks and science advice

5. Review requests from the Commission and contents of the SCRS strategic plan Pertaining to Bycatch

6. Sea turtles

    6.1 Review progress on collaborative work of sea turtle and presentation of the next steps

7. Update about seabirds and their interaction with fisheries

    7.1 Review of the Rec. 11-09

8. Effect of the mitigation measures: intra and inter taxa

    8.1 Factors affecting bycatch and interactions

9. Present the progress made by the Sub-group on Technical Gear Changes

10. Update on Common Ocean Program (formerly ABNJ) project(s)

11. Explore the use of scientific reference points as a tool for assessing and managing ICCAT fisheries with respect to bycatch species

12. Investigate available information on hotspots and/or areas with high BPUE to aid in the management of ICCAT fisheries with respect to bycatch species

13. Other matters

14. Adoption of the report and closure

<div align="right">**Appendix 2**</div>

<div align="center">

List of participants[1] *

</div>

CONTRACTING PARTIES

ALGERIA
Ouchelli, Amar *
Sous-directeur de la Grande Pêche et de la Pêche Spécialisée, Ministère de la pêche et des productions halieutiques, Route des quatre canons, 16000 Alger
Tel: +213 550 386 938, Fax: +213 234 95597, E-Mail: amarouchelli.dz@gmail.com; amar.ouchelli@mpeche.gov.dz

Benounnas, Kamel
Chercheur, Centre National pour le développement de la Pêche et de l'Aquaculture - CNRDPA, 11 boulevard colonel Amirouche, 42000 Tipaza Bou-Ismail
Tel: +213 243 26410, Fax: +213 243 26412, E-Mail: kamel_benounnas@yahoo.fr

Oualikane épouse Brahmi, Assia
Sous Directrice du Suivi des Milieux de la Pêche et de l'Aquaculture, Direction du Contrôle des Activités de la Pêche et de l'Aquaculture et de la Régulation du Marché, Ministère de la Pêche et des Productions Halieutiques, Route des quatre canons
Tel: +213 559 387 897, E-Mail: brahmiassia66@gmail.com

Tamourt, Amira[1]
Ministère de la Pêche et des Ressources Halieutiques, 16100 Alger

ANGOLA
Alves Inácio da Costa, Luísa
Complexo Administrativo, Clássico de Talatona, Rua do Mat 5º Edificio, 2 Andar, Luanda
Tel: +244 933 887 119, E-Mail: lunara.inacio7@gmail.com

Dos Santos Gourgel, Ana Patricia
Head of Fisheries Data Management Department, Ministry of Fisheries and Marine Resources of Angola, Complexo Administrativo, Clássico de Técnica, Rua do Mat 5 Edificio, 3 andar, Luanda
Tel: +244 916 633 799, E-Mail: patcristal2@gmail.com

BRAZIL
Almeida de Camargo, Joao Luiz
Centro TAMAR/ICMBio/MMA, 88063078 Florianópolis, Santa Catarina
Tel: +55 489 918 11423, E-Mail: joao.camargo@icmbio.gov.br

Neves, Tatiana
Projeto Albatroz, Rua Marechal Hermes, 35, CEP:11.025-040 Santos Sau Paulo
Tel: +55 13 996 331 100, E-Mail: tneves@projetoalbatroz.org.br

CANADA
Hanke, Alexander
Research Scientist, Fisheries and Oceans Canada, 531 Brandy Cove Road, St. Andrews, NB E5B 2L9
Tel: +1 506 529 5912, E-Mail: alex.hanke@dfo-mpo.gc.ca

Schleit, Kathryn
Oceans North, 1459 Hollis Street, Unit 101, Halifax, NS B3L1Y1
Tel: +1 902 488 4078, E-Mail: kschleit@oceansnorth.ca

CHINA, (P.R.)
Feng, Ji
Shanghai Ocean University, 999 Hucheng Huan Rd, 201306 Shanghai
Tel: +86 159 215 36810, E-Mail: fengji_shou@163.com; fji13_shou@yeah.net; 276828719@qq.com; f52e@qq.com

---

* Head Delegate
[1] Some delegate contact details have not been included following their request for data protection.

EGYPT
Sayed Farrag, Mahmoud Mahrous
Associate Professor of Marine Biology, Zoology Department, Faculty of Science, Al-Azhar University, Assiut, 71511
Tel: +20 100 725 3531, Fax: +20 882 148 093, E-Mail: m_mahrousfarrag@yahoo.com

EL SALVADOR
Vásquez Jovel, Antonio Carlos
Jefe de Oficina de Pesca Internacional, Centro para el Desarrollo de la Pesca y Acuicultura (CENDEPESCA), Final 1º Ave. Norte y Ave. Manuel Gallardo, Santa Tecla, La Libertad
E-Mail: antonio.vasquez@mag.gob.sv

EUROPEAN UNION
Álvarez Berastegui, Diego
Instituto Español de Oceanografía, Centro Oceanográfico de Baleares, Muelle de Poniente s/n, 07010 Palma de Mallorca, Spain
Tel: +34 971 133 720; +34 626 752 436, E-Mail: diego.alvarez@ieo.csic.es

Andonegi Odriozola, Eider
AZTI, Txatxarramendi ugartea z/g, 48395 Sukarrieta, Bizkaia, Spain
Tel: +34 661 630 221, E-Mail: eandonegi@azti.es

Báez Barrionuevo, José Carlos
Instituto Español de Oceanografía, Centro Oceanográfico de Málaga, Puerto Pesquero de Fuengirola s/n, 29640, Spain
Tel: +34 669 498 227, E-Mail: josecarlos.baez@ieo.csic.es

Chapela Lorenzo, Isabel
Centro Oceanográfico de Santander (COST-IEO), Instituto Español de Oceanografía, Consejo Superior de Investigaciones Científicas (IEO- CSIC), C/ Severiano Ballesteros 16, 39004 Santander Cantabria, Spain
Tel: +34 662 540 979, E-Mail: isabel.chapela@ieo.csic.es

Coelho, Rui
Researcher, Portuguese Institute for the Ocean and Atmosphere, I.P. (IPMA), Avenida 5 de Outubro, s/n, 8700-305 Olhão, Portugal
Tel: +351 289 700 508, E-Mail: rpcoelho@ipma.pt

Di Natale, Antonio
Director, Aquastudio Research Institute, Via Trapani 6, 98121 Messina, Italy
Tel: +39 336 333 366, E-Mail: adinatale@acquariodigenova.it; adinatale@costaedutainment.it

Erauskin-Extramiana, Maite
AZTI, Herrera Kaia, Portualdea z/g, 20110 Pasaia, Gipuzkoa, Spain
Tel: +34 634 210 341, E-Mail: merauskin@azti.es

Fernández Costa, Jose Ramón
Instituto Español de Oceanografía, Ministerio de Ciencia e Innovación - CSIC, Centro Costero de A Coruña, Paseo Marítimo Alcalde Francisco Vázquez, 10 - P.O. Box 130, 15001 A Coruña, Spain
Tel: +34 981 218 151, Fax: +34 981 229 077, E-Mail: jose.costa@ieo.csic.es

Gabasa, Paola
Unitat de Zoologia Marina Parc Cientific de la Universitat de Valencia, Calle Catedrático José Beltrán, 2, 46980 Valencia, Spain
Tel: +34 963 543 685, E-Mail: paola.gabasa@uv.es

González-Solís, Jacob
University of Barcelona - REDUCE Project "Reducing bycatch of threatened megafauna in the East Central Atlantic", Avenida Diagonal 643, 08028 Barcelona, Spain
Tel: +34 617 650 415, E-Mail: jgsolis@ub.edu

Jaranay Meseguer, María
Centro Oceanográfico de Santander (COST-IEO). Instituto Español de Oceanografía, Consejo Superior de Investigaciones Científicas (IEO-CSIC), C/ Severiano Ballesteros 16, 39004 Santander Cantabria, Spain
Tel: +34 942 291 716, E-Mail: maria.jaranay@ieo.csic.es

Juan-Jordá, María José
Instituto Español de Oceanografía (IEO), C/ Corazón de María, 8, 28002 Madrid, Spain
Tel: +34 671 072 900, E-Mail: mjuan.jorda@ieo.csic.es; mjuanjorda@gmail.com

Kotrotsou, Eirini
150, Syggrou Avenue, 17671 Athens, Attiki, Greece
Tel: +30 201 928 7184, E-Mail: eikotrotsou@minagric.gr

Landreau, Antoine
IFREMER, Avenue Jean Monnet, 34200 Sète, France
Tel: +33 749 212 700, E-Mail: antoine.landreau@ifremer.fr

Lopetegui Eguren, Leire
AZTI, Herrera Kaia. Portualdea z/g, 20110 Pasaia, Gipuzkoa, Spain
Tel: +34 667 126 943, E-Mail: llopetegui@azti.es

Males, Josip
Institute of Oceanography and Fisheries, Šetalište I. Meštrovića 63, 21000 Split, Croatia
Tel: +385 214 08000, Fax: +385 213 58650, E-Mail: josip-males@hotmail.com; males@izor.hr

March, David
Unitat de Zoologia Marina Parc Científic de la Universitat de València, Calle Catedrático José Beltrán, 2, 46980 Valencia, Spain
Tel: +34 963 543 685, E-Mail: david.march@uv.es

Meléndez Arteaga, Josu
AZTI, Txatxarramendi Ugartea z/g, 48395 Sukarrieta, Bizkaia, Spain
Tel: +34 667 143 565, E-Mail: jmelendez@azti.es

Mollier, Esther
IRD, 9 rue Colbert, 34200 Sète, Occitanie, France
Tel: +33 628 366 482, E-Mail: esther.mollier@ird.fr

Murua, Jefferson
AZTI - Tecnalia/Itsas Ikerketa Saila, Txatxarramendi Ugartea s/n, 48395 Bizkaia Sukarrieta, Spain
Tel: +34 946 574 000; +34 667 174 426, Fax: +34 946 574 000, E-Mail: jmurua@azti.es

Patrocinio Ibarrola, Teodoro
Instituto Español de Oceanografía-CSIC, 15001 A Coruña, Spain
Tel: +34 981 218 151, E-Mail: teo.ibarrola@ieo.csic.es

Ramos Alonso, Mª Lourdes
Instituto Español de Oceanografía (IEO), Centro Oceanográfico de Canarias, C/ Farola del Mar, 22 Dársena pesquera, 38180 Santa Cruz de Tenerife, Spain
Tel: +34 922 549400, Fax: +34 922 549 400, E-Mail: mlourdes.ramos@ieo.csic.es

Reglero Barón, Patricia
Centro Oceanográfico de las Islas Baleares, Instituto Español de Oceanografía, Muelle de Poniente s/n, 07015 Palma de Mallorca, Islas Baleares, Spain
Tel: +34 971 13 37 20, E-Mail: patricia.reglero@ieo.csic.es

Rodríguez-Marín, Enrique
Centro Oceanográfico de Santander (COST-IEO), Instituto Español de Oceanografía (IEO), Consejo Superior de Investigaciones Científicas (CSIC), C.O. de Santander, C/ Severiano Ballesteros 16, 39004 Santander, Cantabria, Spain
Tel: +34 942 291 716, Fax: +34 942 27 50 72, E-Mail: enrique.rmarin@ieo.csic.es

Rueda Ramírez, Lucía
Instituto Español de Oceanografía IEO CSIC. C.O. de Málaga, Puerto pesquero s/n, 29640 Fuengirola Málaga, Spain
Tel: +34 952 197 124, E-Mail: lucia.rueda@ieo.csic.es

Sabarros, Philippe
IRD, UMR MARBEC, Ob7, Avenue Jean Monnet, CS 30171, 34203 Cedex, France
Tel: +33 625 175 106, E-Mail: philippe.sabarros@ird.fr

Talijancic, Igor
Institute of Oceanography and Fisheries Split, Setaliste Ivana Mestrovica 63, 21000 Dalmatia, Croatia
Tel: +385 214 08047; +385 992 159 26, E-Mail: talijan@izor.hr

Thasitis, Ioannis
Department of Fisheries and Marine Research, 101 Vithleem Street, 2033 Nicosia, Cyprus
Tel: +35722807840, Fax: +35722 775 955, E-Mail: ithasitis@dfmr.moa.gov.cy; ithasitis@dfmr.moa.gov.cy

Tolotti Travassos, Mariana
Institut de Recherche pour le Développement UMR MARBEC, Avenue Jean Monnet CS 30171, 34200 Sète, France
Tel: +33 04 99 57 32 18, E-Mail: mariana.travassos@ird.fr

Torreblanca Estrada, Davinia
Centro Oceanográfico de Málaga, Puerto Pesquero s/n, 29640 Fuengirola, Málaga, Spain
Tel: +34 655 412 743, E-Mail: davisdof@hotmail.com

Wain, Gwenaëlle
ORTHONGEL, 5 rue des Sardiniers, 29900 Concarneau, France
Tel: +33 631 045 147, E-Mail: gwain@orthongel.fr

GUATEMALA
Chavarría Valverde, Bernal Alberto
Asesor en Gestión y Política pesquera Internacional, DIPESCA, Bárcena
Tel: +506 882 24709, Fax: +506 2232 4651, E-Mail: bchavarria@lsg-cr.com

Martínez Valladares, Carlos Eduardo
Encargado del Departamento de Pesca Marítima, Kilómetro 22, Ruta al Pacifico, Edificio la Ceiba 3er Nivel, 01064 Bárcena, Villa Nueva
Tel: +502 452 50059, E-Mail: carlosmartinez41331@gmail.com

GUINEA (REP.)
Kolié, Lansana
Chef de Division Aménagement, Ministère de la Pêche et de l'Economie maritime, 234, Avenue KA 042 - Commune de Kaloum BP: 307, Conakry
Tel: +224 624 901 068, E-Mail: klansana74@gmail.com

Soumah, Mohamed
Centre National des Sciences Halieutiques de Boussoura (CNSHB), 814, Rue MA 500, Corniche Sud Madina, Boussoura, 3738 Conakry
Tel: +224 622 01 70 85, E-Mail: soumahmohamed2009@gmail.com

JAPAN
Kawano, Masataka
Technical Official, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries, International Affairs Division, Tokyo Kasumigaseki, Chiyoda-ku 100-8907
Tel: +81 335 028 460, Fax: +81 335 042 649, E-Mail: masataka_kawano320@maff.go.jp

Ochi, Daisuke
Chief Scientist, Highly Migratory Resources Division, Fisheries Stock Assessment Center, Japan Fisheries Research and Education Agency, 2-12-4 Fukuura, Kanazawa, Yokohama 236-8648
Tel: +81 45 788 7930, Fax: +81 45 788 7101, E-Mail: ochi_daisuke36@fra.go.jp; otthii80s@gmail.com; otthii@affrc.go.jp

Tsuji, Sachiko
Technical Advisor, Highly Migratory Resources Division, Fisheries Stock Assessment Center, Fisheries Resources Institute, Japan Fisheries Research and Education Agency, 2-12-4 Fukuura, Kanazawa-ku, Yokohama, Kanagawa 236-8648
Tel: +81 45 788 7931, Fax: +81 45 788 5004, E-Mail: sachiko27tsuji@gmail.com; tsuji_sachiko30@fra.go.jp

Uozumi, Yuji[1]
Advisor, Japan Tuna Fisheries Co-operation Association, Japan Fisheries Research and Education Agency, Tokyo Koutou ku Eitai 135-0034

MEXICO
Ramírez López, Karina
Instituto Mexicano de Pesca y Acuacultura Sustentables (IMIPAS), Centro Regional de Investigación Acuícola y Pesquera - Veracruz, Av. Ejército Mexicano No.106 - Colonia Exhacienda, Ylang Ylang, C.P. 94298 Boca de Río, Veracruz
Tel: +52 5538719500, Ext. 55756, E-Mail: karina.ramirez@imipas.gob.mx; kramirez_inp@yahoo.com

MOROCCO
El Monfaloti, Najat
Chef de service Elaboration des plans d'aménagement et de gestion, Direction des Pêches Maritimes et de l'Aquaculture, Ministère de l'Agriculture et de la Pêche Maritime, Nouveau Quartier Administratif, BP 476 Haut Agdal, Rabat
Tel: +212 537 688 118, E-Mail: elmonfaloti@mpm.gov.ma

Haoujar, Bouchra
Cheffe de Service des Espèces Marines Migratrices et des Espaces Protégés, Département de la Pêche Maritime, Nouveau Quartier Administratif, BP 476, 10150 Haut Agdal, Rabat
Tel: +212 253 768 8115, Fax: +212 537 688 089, E-Mail: haoujar@mpm.gov.ma

Hassouni, Fatima Zohra
Chef de la Division de Durabilité et d'Aménagement des Ressources Halieutiques, Département de la Pêche Maritime, Nouveau Quartier Administratif, B.P.: 476, 10150 Haut Agdal, Rabat
Tel: +212 537 688 122/21, Fax: +212 537 688 089, E-Mail: hassouni@mpm.gov.ma

PANAMA
Pino, Yesuri
Jefa encargada del Departamento de Evaluación de Recursos Acuáticos, Ministerio de Desarrollo Agropecuario, Autoridad de los Recursos Acuáticos de Panamá, Evaluación de los Recursos Acuáticos, Edificio Riviera, Ave. Justo Arosemena, Calle 45 Bella Vista, 05850
Tel: +507 511 6036, E-Mail: yesuri.pino@arap.gob.pa

Torres, Modesta
Autoridad de los Recursos Acuáticos de Panamá, Calle 45 Bella Vista, Edificio La Riviera, 7096
Tel: +507 511 6000, E-Mail: mtorres@arap.gob.pa

SENEGAL
Kwabena, Adams Blegnan[1]
Chef d'équipe pêche, CAPSEN, 10200

TUNISIA
Hajjej, Ghailen
Maître assistant de l'Enseignement Supérieur Agricole, Laboratoire des Sciences Halieutiques, Institut National des Sciences et Technologies de la Mer (INSTM), Port de pêche, 6000 Gabès
Tel: +216 75 220 254; +216 972 77457, Fax: +216 75 220 254, E-Mail: ghailen3@yahoo.fr; ghailen.hajej@instm.rnrt.tn

UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND
Bell, James
Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Lowestoft Suffolk NR33 0HT
Tel: +44 1 502 521 377, E-Mail: james.bell@cefas.gov.uk

Bella, Carlo
DEFRA, Horizon House, Deanery Road, Bristol, BS31 2UD
Tel: +44 739 526 8009, E-Mail: carlo.bella@defra.gov.uk

Heraghty, Nikki
DEFRA, Foss House, 1-2 Peasholme Green, York YO1 7PX
Tel: +44 744 336 7507, E-Mail: Nikki.Heraghty@defra.gov.uk

Wright, Serena
Fisheries Scientist, Centre for Environment, Fisheries and Aquaculture Science (Cefas), ICCAT Tagging Programme, St Helena, Pakefield Road, Lowestoft NR33 0NG
Tel: +44 1502 52 1338; +44 797 593 0487, E-Mail: serena.wright@cefas.co.uk

UNITED STATES
Carlson, John
NOAA Fisheries Service-Sustainable Fisheries Division, 3500 Delwood Beach Road, Florida Panama City 32408-7403
Tel: +1 850 624 9031, Fax: +1 850 624 3559, E-Mail: john.carlson@noaa.gov

Cudney, Jennifer
Atlantic Highly Migratory Species Management Division National Marine Fisheries Service, 263 13th Ave South, St. Petersburg, FL 33712
Tel: +1 727 209 5980, E-Mail: jennifer.cudney@noaa.gov

Díaz, Guillermo
NOAA-Fisheries, Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, Florida 33149
Tel: +1 305 361 4227; +1 305 898 4035, E-Mail: guillermo.diaz@noaa.gov

Die, David
Research Associate Professor, Cooperative Institute of Marine and Atmospheric Studies, University of Miami, 4600 Rickenbacker Causeway, Miami, Florida 33149
Tel: +1 305 421 4607, E-Mail: ddie@earth.miami.edu; dddejean@kutaii.com; ddie@rsmas.miami.edu

Fernández, Michelle
4600 Rickenbacker Causeway, Key Biscayne, FL 33149
Tel: +1 305 582 9112, E-Mail: maf45257@miami.edu

Henton, Read
NOAA Fisheries, 3209 Frederic Street, Pascagoula, MS 39567
Tel: +1 601 568 1802, E-Mail: read.hendon@noaa.gov

Keller, Bryan
Foreign Affairs Specialist, Office of International Affairs, Trade and Commerce (F/IATC), NOAA, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, Maryland 20910
Tel: +1 202 897 9208; +1 301 427 7725, E-Mail: bryan.keller@noaa.gov

Loughran, Tyler
Sea Grant Knauss Fellow, NOAA, Herbert C. Hoover Building 1401 Constitution Avenue NW, Washington 20230
Tel: +1 206 920 4847, E-Mail: tyler.loughran@noaa.gov

Peterson, Cassidy
Fisheries Biologist, NOAA Fisheries, Southeast Fisheries Science Centre, 101 Pivers Island Rd, Miami, Florida 28516
Tel: +1 910 708 2686, E-Mail: cassidy.peterson@noaa.gov

URUGUAY
Domingo, Andrés*
Dirección Nacional de Recursos Acuáticos - DINARA, Laboratorio de Recursos Pelágicos, Constituyente 1497, 11200 Montevideo
Tel: +5982 400 46 89, Fax: +5982 401 32 16, E-Mail: dimanchester@gmail.com

Forselledo, Rodrigo
Investigador, Dirección Nacional de Recursos Acuáticos - DINARA, Laboratorio de Recursos Pelágicos, Constituyente 1497, CP 11200 Montevideo
Tel: +598 2400 46 89, Fax: +598 2401 3216, E-Mail: rforselledo@gmail.com

VENEZUELA
Gómez, David
Analista DGPI
E-Mail: mathias110390@gmail.com

Narváez Ruiz, Mariela del Valle
Lab. 34, Edif. Instituto Oceanográfico de Venezuela, Universidad de Oriente, Departamento de Biología Pesquera, Av. Universidad, Cerro Colorado, DBP-31 Laboratory, 6101 Cumaná Estado Sucré
Tel: +58 412 085 1602, E-Mail: mnarvaezruiz@gmail.com

Novas, María Inés
Directora General de la Oficina de Integración y Asuntos Internacionales, Ministerio del Poder Popular de Pesca y Acuicultura - MINPESCA
Tel: +58 412 606 3700, E-Mail: oai.minpesca@gmail.com; asesoriasminv@gmail.com

Padrón Vega, Johan Alejandro
Ministerio del Poder Popular de Pesca y Acuicultura, Dirección General de Pesca Industrial, Torre Este, Piso 17, Oficina de Integración y Asuntos Internacionales, Parque Central, 1040 Caracas
E-Mail: hawkergenius@gmail.com; dgpi.minpesca@gmail.com

OBSERVERS FROM INTERGOVERNMENTAL ORGANIZATIONS

AGREEMENT ON THE CONSERVATION OF ALBATROSSES AND PETRELS - ACAP
Jiménez Cardozo, Sebastián
Vice-Convenor of ACAP's Seabird Bycatch Working Group, Constituyente 1497, 11200 Montevideo, Uruguay
Tel: +598 997 81644, E-Mail: jimenezpsebastian@gmail.com; sjimenez@mgap.gub.uy

FOOD AND AGRICULTURE ORGANIZATION - FAO
Stobberup, Kim
FAO, Viale di Terme Caracalla, 00153 Rome, Italy
Tel: +39 065 705 4817, E-Mail: kim.stobberup@fao.org

GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN - GFCM
Carpentieri, Paolo
GFCM, Via Vittoria Colonna 1, 00193 Rome, Italy
Tel: +39 328 873 1537, E-Mail: paolo.carpentieri@fao.org

INDIAN OCEAN TUNA COMMISSION - IOTC
Fu, Dan
Stock Assessment Expert, IOTC, Victoria, Mahe, Republic of Seychelles
Tel: +248 252 5471, E-Mail: dan.fu@fao.org

Nelson, Lauren
Fishery Officer, IOTC, Le Chantier Mall (2nd Floor), PO BOX 1011, Victoria, Mahe, Republic of Seychelles
Tel: +248 264 4683, E-Mail: lauren.nelson@fao.org; nelsonlauren@hotmail.com

SARGASSO SEA COMMISSION
Kell, Laurence
Visiting Professor in Fisheries Management, Centre for Environmental Policy, Imperial College London, Henstead, Suffolk SW7 1NE, United Kingdom
Tel: +44 751 707 1190, E-Mail: laurie@seaplusplus.co.uk; l.kell@imperial.ac.uk; laurie@kell.es

Luckhurst, Brian
Sargasso Sea Commission, 2-4 Via della Chiesa, Acqualoreto, 05023 Umbria, Italy
Tel: +39 339 119 1384, E-Mail: brian.luckhurst@gmail.com

OBSERVERS FROM NON-GOVERNMENTAL ORGANIZATIONS

ASSOCIAÇAO DE CIENCIAS MARINHAS E COOPERAÇAO - SCIAENA
Abril, Catarina
Incubadora de Empresas da Universidade do Algarve, Campus de Gambelas, Pavilhão B1, 8005-226 Faro, Portugal
Tel: +351 912 488 359, E-Mail: cabril@sciaena.org

BIRDLIFE INTERNATIONAL - BI
Wade, Helen
Birdlife International - RSPB, The Lodge, Sandy, Bedfordshire, SG19 2DL, United Kingdom
E-Mail: Helen.Wade@rspb.org.uk

INTERNATIONAL SEAFOOD SUSTAINABILITY FOUNDATION – ISSF
Murúa, Hilario
Senior Scientist, International Seafood Sustainability Foundation (ISSF), 3706 Butler Street, Suite 316, Pittsburgh PA 15201-1802, United States
Tel: +34 667 174 433; +1 703 226 8101, E-Mail: hmurua@iss-foundation.org

Restrepo, Víctor
Chair of the ISSF Scientific Advisory Committee, International Seafood Sustainability Foundation, 3706 Butler Street, Suite 316, Pittsburgh PA 15201-1802, United States
Tel: + 1 305 450 2575; +1 703 226 8101, Fax: +1 215 220 2698, E-Mail: vrestrepo@iss-foundation.org; vrestrepo@mail.com

MANTA TRUST
Barros, Nuno
Fisheries & Policy Assistant Manager, MANTA TRUST - Conservation through Research, Education & Collaboration, Catemwood House, Norwood Lane, Corscombe, Dorset, DT2 0NT, United Kingdom
E-Mail: fisheriespolicy@mantatrust.org; info@mantatrust.org; nuno.barros@mantatrust.org

PEW CHARITABLE TRUSTS - PEW
Wozniak, Esther
Pew Charitable Trusts, 901 E Street, NW, Washington DC 20004, United States
Tel: +1 202 540 6588, E-Mail: ewozniak@pewtrusts.org

SHARKPROJECT INTERNATIONAL
Ziegler, Iris
SHARKPROJECT International, Rebhaldenstrasse 2, 8910 8910 Affoltern am Albis, Switzerland
Tel: +49 174 3795 190, E-Mail: i.ziegler@sharkproject.org; int.cooperation@sharkproject.org; dririsziegler@web.de

OTHER PARTICIPANTS

SCRS CHAIRMAN
Brown, Craig A.
SCRS Chairman, Sustainable Fisheries Division, Southeast Fisheries Science Center, NOAA, National Marine Fisheries Service, 75 Virginia Beach Drive, Miami, Florida 33149, United States
Tel: +1 305 586 6589, E-Mail: craig.brown@noaa.gov

EXTERNAL EXPERT
Carruthers, Thomas
Blue Matter, 2150 Bridgman Ave, Vancouver Columbia V7P 2T9, Canada
Tel: +1 604 805 6627, E-Mail: tom@bluematterscience.com

Nieblas, Anne-Elise
Company for Open Ocean Observations and Logging (COOOL), 61 rue Haute, 97436 Saint Leu La Reunion, France
Tel: +262 693 707 653, E-Mail: coool.research@gmail.com; anne.elise.nieblas@company-coool.io

Ortuño Crespo, Guillermo
Avenida Los Girasoles, 29660 Marbella, Málaga, Spain
Tel: +34 613 261 568, E-Mail: gortunocrespo@gmail.com

Palma, Carlos
ICCAT Secretariat, C/ Corazón de María, 8 - 6 Planta, 28002 Madrid, Spain
Tel: + 34 91 416 5600, Fax: +34 91 415 2612, E-Mail: carlos.palma@iccat.int

*****

ICCAT Secretariat
C/ Corazón de María 8 – 6th floor, 28002 Madrid – Spain
Tel: +34 91 416 56 00; Fax: +34 91 415 26 12; E-mail: info@iccat.int

Manel, Camille Jean Pierre
Neves dos Santos, Miguel
Ortiz, Mauricio
Kimoto, Ai
Taylor, Nathan
Mayor, Carlos
Fiorellato, Fabio
De Andrés, Marisa
García, Jesús

ICCAT INTERPRETERS
Baena Jiménez, Eva J.
Calmels, Ellie
Hof, Michelle Renée
Liberas, Christine
Linaae, Cristina
Pinzon, Aurélie

List of papers and presentations

Doc. Ref.	Title	Authors
SCRS/2024/010	Report of the Second ICCAT Workshop on the identification of regions in the ICCAT Convention area for supporting the implementation of the ecosystem approach to fisheries management	Anonymous
SCRS/2024/040	Information available on Mobulid rays in the Atlantic Ocean and the need for conservation	Cronin M., Moreno G., Restrepo V.
SCRS/2024/048	Ongoing projects to understand and mitigate bycatch from the longline bluefin tuna fishery in the French Mediterranean	Landreau A., Nieblas A., Bonhommeau S., Boyer A., Chanut J., Derridj O., Brisset B., Evano H., Wendling B., Cosnard N., Boguais A., Bernard S., Kerzerho V., Rouyer T.
SCRS/2024/071	A comparison of statistical methods for modeling the spatiotemporal patterns of silky shark (*Carcharhinus falciformis*) bycatch in the European tropical tuna purse seine fishery in the Atlantic Ocean	Lopetegui-Eguren L., Arrizabalaga H., Murua H., Lezama-Ochoa N., Lopez J., Ruiz Gondra J., Sabarros P.S., Carlos Báez J., Lourdes Ramos Alonso M., Griffiths S., Juan-Jordá M.J.
SCRS/2024/079	Effectiveness of conservation and management measures for reducing seabird bycatch on pelagic longlines in the South Atlantic	Bell J., Bertoldi Carneiro A., Bielli A., Jiménez S., Oppel S., Phillips R., Wade H., Yates O., Griffiths S., Reeves S.,
SCRS/2024/081	Incorporating climate considerations into fisheries assessments and management advice at ICCAT	Taylor N.G., Walter J.
SCRS/2024/085	Pilot product to test the utility of ICCAT ecoregions for supporting the development of ecosystem-based advice product	Ortuño-Crespo G., Andonegi E., Murua H., Juan-Jordá M.J.
SCRS/2024/087	EcoTest Phase III: Identifying indicators	Carruthers T., Huynh Q., Taylor N.G.
SCRS/2024/088	Incorporating bycatch release devices in guidelines for best bycatch handling and release practices in tropical tuna purse seiners	Murua J., Ferarios J.M., Grande M., Ruiz J., Cuevas N., Krug I., Onandia I., Zudaire I., Salgado A., Erauskin-Extramiana M., Lopetegui-Eguren L., Santiago J.
SCRS/2024/089	Review of the ICCAT Rec. 07-07 and Rec. 11-09 Against ACAP Best Practice Advice for Reducing the Impact of Pelagic Longline Fisheries on Seabirds	Agreement on the Conservation of Albatrosses and Birdlife International
SCRS/2024/090	ACAP Best Practice Advice for Reducing the Impact of Pelagic Longline Fisheries on Seabirds	Agreement on the Conservation of Albatrosses and Petrels
SCRS/2024/091	Extending the Ecosystem Report Card: An example of including demographic indicators	Kell L., Cardinale M., Griffiths C., Mosqueira I., Wright S.
SCRS/2024/092	Offshore wind energy development and highly migratory species: ecological, fishery and management implications	Hendon R., Serafy J., Walter J., Lipsky A., Curtis T., Di Natale A., Rouyer T., Hanke A., Alvarez-Berastegui D., Orbesen E., Lauretta M., Stelzenmüller V.
SCRS/2024/093	Integrated ocean observing systems for dynamic ocean management (IOS4DOM)	March D.
SCRS/2024/094	Report on seabird bycatch in small-scale fisheries in Brazil	Canani G., Neves T., Marques C.
SCRS/2024/096	Do we need the ecoregions in the ICCAT Convention area for supporting the implementation of ecosystem-based fisheries management? A critical reflection	Czerwinski I.A., Domingo A., Baez J.C.

SCRS/2024/099	Development of risk screening tool to support ICCAT EAFM based on machine learning	Tsuji S., Tanaka T., Hasegawa T., Nishimoto M., Ochi D.
SCRS/2024/100	Report of the 2024 Meeting of the Sub-group on the Ecosystem Report Card	Anonymous
SCRS/2024/101	Interacción de tortugas marinas en la pesca del atún con palangre en el golfo de México y mar Caribe	Ramírez-López K., Rojas-González R.I., Wakida-Kusunoki A.T., Vallarta-Zárate J.F.
SCRS/P/2024/061	Update on sunfish tagging activity in Spanish tuna fisheries, year 2023	García-Barcelona S., Macías D., Gómez-Vives M., Puerto M., Rodríguez E., Navarro J., Báez J.
SCRS/P/2024/062	Advancing ecosystem modelling capabilities in the tropical Atlantic ecoregion to support the implementation of the ecosystem approach to fisheries management	Meléndez-Arteaga J., Zudaire I., Andonegi E., Juan Jordá M.J., Corrales X.
SCRS/P/2024/064	Atlantic highly migratory species climate vulnerability assessment	Loughran T., Cudney J.
SCRS/P/2024/065	Strengthening the stewardship of an economically and biologically significant high seas area – the Sargasso Sea	Vousden D.
SCRS/P/2024/066	Exploring options and developing a framework for an ecosystem-based approach to fisheries management for internationally shared forage fish in the Northeast Atlantic	Kell L., Bentley J., Wakeford R.
SCRS/P/2024/068	Report of the SCRS Technical Sub-group on Electronic Monitoring	Anonymous
SCRS/P/2024/069	Reducing bycatch of threatened megafauna in the East Central Atlantic	González-Solís J.
SCRS/P/2024/070	Taller para continuarla evaluación del impacto de las pesquerías de ICCAT en las tortugas marinas en el mar Mediterráneo	Anonymous
SCRS/P/2024/071	Advances on the collaborative work to assess sea turtle bycatch in pelagic longline and tuna purse seine fleets (Atlantic and Indian Oceans and Mediterranean Sea - ICCAT/IOTC)	Anonymous
SCRS/P/2024/072	Actions in place to mitigate incidental catch of vulnerable species in the Mediterranean and Black Sea	Carpentieri P.

Appendix 4

SCRS documents and presentation abstracts as provided by the authors

SCRS/2024/010 - In 2022, the Subcommittee on Ecosystems and Bycatch (SC-ECO) recommended convening a Second ICCAT Ecoregion Workshop to advance the identification of regions (ecoregions) balancing ecological relevance and operational feasibility to support the implementation of the ecosystem approach to fisheries management (EAFM). During this workshop, the Group discussed the potential benefits and uses of ecoregions in the context of ICCAT species and fisheries, and provided feedback on the technical aspects, the data and methodologies used in the derivation of ecoregions. The workshop resulted in a refined ecoregion proposal with five large scale ecoregions and twelve subregions nested within them. The Group recommends that SC-ECO (i) review and comment on the ecoregion delineation process and the proposed candidate ecoregions within the ICCAT Convention area and invites the SC-ECO to provide future directions, (ii) identifies clear objectives for the use of ecoregions and the type of advice products that will be generated using ecoregions and (iii) considers endorsing the proposed candidate ecoregions to develop practical examples (e.g., regional case studies, regional Ecocard) to demonstrate their benefits as a tool to progress on EAFM implementation in ICCAT.

SCRS/2024/040 - In 2023, ICCAT adopted Recommendation 23-14 on mobulid rays. The Commission decided that a retention prohibition would not enter into force unless the SCRS provided information to confirm that these species were of conservation concern. This document provides background information on mobulid ray life history and interaction with fisheries. These species represent a taxon of greatest biological vulnerability and conservation concern. Although they are impacted by multiple anthropogenic activities, target fisheries and bycatch pose the greatest threat to mobulid populations. Despite international recognition and conservation efforts, limited data availability hampers effective management strategies. Concerted action is needed, such as management measures in RFMOs, to address the impact of fisheries on mobulids and ensure their long-term persistence. This document aims to help SCRS to make a recommendation to the Commission in this regard.

SCRS/2024/048 - Understanding and mitigating bycatch is a major issue for the management of interactions between fisheries and marine ecosystems. In the context of biodiversity loss and climate change that impact marine fauna, research actions are needed to provide solutions for a sustainable future. The French longline fishery for Atlantic bluefin tuna in the Gulf of Lion reports bycatch for different species. In order to provide solutions, several initiatives in collaboration with professional fishermen have been carried out since the beginning of this fishery in 2011. In the present paper, the different projects and programs developed in the Gulf of Lion are listed and explained. Different observation approaches were designed to characterize the fishery, collect data on bycatch, study the ecology and the post-release survival of these species, while other projects focused on innovative mitigation solutions. Preliminary results and work perspectives are presented.

SCRS/2024/079 - The ICCAT Subcommittee for Ecosystems and Bycatch (SC-ECO) has been tasked to review Conservation and Management Measures (CMMs) designed to reduce incidental seabird bycatch on pelagic longlines in the South Atlantic, following ICCAT Recs. 07-07 and 11-09. Here we evaluate the evidence for different combinations and specifications of the currently accepted CMMs between current ICCAT specifications and best practice guidance from the Agreement on the Conservation of Albatrosses and Petrels (ACAP)'s seabird bycatch working group. We also consider the efficacy of hook shielding devices (HSDs) as an alternative to the existing measures for reducing seabird bycatch. We apply an ecological risk assessment approach (EASI-Fish), reviewed previously in SC-ECO, and applied elsewhere, to five populations of four at-risk albatross and petrel species in the Atlantic. Seabird fisheries bycatch rates are believed to be underreported, and so we adopted a risk-based approach to understand patterns in bycatch rates between different combinations and specifications of conservation measures, and implications for threatened seabird populations. We concluded that updating the CMMs for pelagic longlining in the South Atlantic to reflect current best practice guidelines was likely to reduce seabird mortality by 43-75% when maintaining the current approach where operators are allowed to select two of three possible CMMs. Mandating that all three CMMs be applied simultaneously to ACAP best practice guidelines, or the use of hook shielding devices, was likely to reduce seabird mortality by 83-96% compared with existing measures. None of the proposed amendments to CMMs are expected to significantly affect catch rates of target species or other non-retained bycatch species.

SCRS/2024/081 - Climate change impacts on fish stocks may include changes in ecological interactions, spatial redistribution, and changes in productivity. Predicting precisely what will happen to fish stocks with any future climate changes is challenging. Climate change science could be used in the assessment process a) using indicator-based approaches to provide qualitative context; b) explicitly including climate change in stock assessments and using resulting forecasts to derive TAC advice; and/or c) explicitly including climate change in Management Strategy Evaluation to develop climate-ready management procedures. Among other conclusions, we argue that developing management procedures, tested and communicated through MSE, may be the best approach to addressing future uncertainties. Incorporation of climate linkages in operating model reference grids will allow for MPs to be tuned and selected specifically for climate-change readiness. Operating model climate linkages can be implicit (simply allowing for changes in the spawner-recruit relationship) or explicit (clear mechanistic link to a process). Linking directly to mechanistic processes will be more intensive and may involve an expanded set of collaborations with physical and ecosystem scientists.

SCRS/2024/085 - The implementation of the Ecosystem Approach to Fisheries Management (EAFM) requires identifying a spatial framework to characterize, monitor, and report on different ecosystems. This study aims to contribute to the development of a pilot product to assess the general applicability of ICCAT candidate ecoregions as a spatial framework to support the development of integrated and ecosystem-based advice products. We started the development of an Ecosystem-Fishery Overviews (EFO) as a proof of concept for the tropical Atlantic ecoregion and the southern subtropical Atlantic ecoregion. The EFO addresses: i) Who is fishing in the ecoregion? ii) What species are being caught in the ecoregion? iii) What is the state of the fishery resources in the ecoregion? and iv) What are the effects of fisheries on bycatch species in the ecoregion? Finally, a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was performed to evaluate the potential role of EFOs as an advice product and the integration of EFOs into existing ICCAT practices. This study contributes to the ongoing efforts to enhance the provision of integrated advice to the Commission, facilitating EAFM implementation in ICCAT.

SCRS/2024/086 - This scientific article critically examines the necessity, within of the process of adapt the ecosystem-based approach in fisheries management of the International Commission for the Conservation of Atlantic Tunas (ICCAT) Convention area, of integrating ecoregions. Specifically, we compare the proposed ecoregions with the existing Food and Agriculture Organization (FAO) major fishing areas, as well as ICCAT areas for the different species. We argue that the FAO subareas and ICCAT areas align well with proposed ecoregions, providing a comprehensive and data-rich foundation for effective ecosystem-based fisheries management. Finally, we conclude that the proposed ecoregion areas may cloud the objectives of the ecosystem group and the species groups, rather than provide practical solutions.

SCRS/2024/087 - A multi-species, multi-fleet operating model was developed for the North Atlantic longline fishery including two primary species (swordfish and bigeye tuna) and four secondary species (blue shark, shortfin mako shark, white marlin, blue marlin). The operating model was used to generate a wide range of future exploitation scenarios for the various species. Posterior predicted data were generated from data series typically available for secondary species such as length composition data, catch data and recent nominal catch rate data. These data series were processed to generate quantities that could be correlated against known simulated target variables such as spawning biomass relative to MSY levels. Artificial neural networks were trained on posterior predicted data to identify whether the data contain sufficient information to estimate spawning biomass relative to MSY levels. Early evaluations suggest that typical data contain sufficient information to reliably estimate stock status even for secondary species if data types such as catch ratios and catch correlations are provided across multiple species A multi-species, multi-fleet operating model was developed for the North Atlantic longline fishery including two primary species (swordfish and bigeye tuna) and four secondary species (blue shark, shortfin mako shark, white marlin, blue marlin). The operating model was used to generate a wide range of future exploitation scenarios for the various species. Posterior predicted data were generated from data series typically available for secondary species such as length composition data, catch data and recent nominal catch rate data. These data series were processed to generate quantities that could be correlated against known simulated target variables such as spawning biomass relative to MSY levels. Artificial neural networks were trained on posterior predicted data to identify whether the data contain sufficient information to estimate spawning biomass relative to MSY levels. Early evaluations suggest that typical data contain sufficient information to reliably estimate stock status even for secondary species if data types such as catch ratios and catch correlations are provided across multiple species.

SCRS/2024/088 - New bycatch release devices (BRDs) are being developed in the tropical tuna purse seine fishery to assist with on deck release of bycatch species. Research shows these tools can increase crew safety and accelerate vulnerable species release for improved post-release survival (PRS). Such equipment is especially important for elasmobranchs, which may be difficult to release in some cases due to their large size and dangerousness. These BRDs have been designed and perfected through trial-and-error tests at sea with the assistance of skippers and deck crew and several fleets have been adopting them on a voluntary basis. Here we present a new updated best practice guideline for handling and release of bycatch in tuna purse seiners which includes past practices proven to work and incorporates new ones employing novel BRDs. The simpler BRDs are low-cost and implementable in almost any vessel. We recommend that management bodies consider including in their recommendations the use of BRDs and crew training programs. This being especially important in the eastern Atlantic Ocean due to the higher incidence of vulnerable bycatch species in sets.

SCRS/2024/089 - The Recommendations Rec. 07-07 and Rec. 11-09 outline seabird bycatch mitigation and other measures that ICCAT longline vessels are required to implement. In 2024, the SC-ECO has been tasked to review these Recommendations. Here, we reviewed these Recommendations against the latest ACAP best practice advice for reducing the impact of pelagic longline fisheries on seabirds. Rec. 11-09 establishes that vessels operating longlines south of 25°S shall use two of the following three mitigation measures: night setting, bird scaring line (BSL; with specifications for vessels =35m and <35m) and branch line weighting (45g, 60g or 98g within 1m, 3.5m or 4m from the hook, respectively). Between 20° and 25°S, vessels will continue applying the previous Rec. 07-07, where longline vessels shall use BSL, and when they target swordfish with a monofilament longline gear, vessels can be exempt from this measure as long as night setting and branch line weighting (=60g within 3m from the hook) are used. ACAP recommends that the most effective way to reduce seabird bycatch in pelagic longline fisheries is to use the following three best practice measures simultaneously: night setting, BSL (with specifications for vessels =35m and <35m) and branch line weighting (40g, 60g or 80g within 0.5m, 1m or 2m from the hook, respectively). The definition of night setting in both ICCAT Recommendations coincides with that of ACAP. The BSL specifications vary in a few details between Rec. 11-09 and the ACAP advice, but the previous Rec. 07-07 does not make differences between vessel sizes. Both ICCAT Recommendations specify branch line weighting options that differ between them and that have been proven to be less effective at sinking baited hooks beyond the reach of seabirds, in comparison to those recommended by ACAP. Three hook-shielding devices and one underwater bait setting device have also been assessed and incorporated into ACAP's Best Practice Advice as alternative stand-alone mitigation measures. We conclude that mitigation measures from Rec. 07-07 and Rec. 11-09 should be consistently specificized. This could be achieved by harmonised seabird bycatch mitigation measures in a single Recommendation for ICCAT vessels. To achieve greater effectiveness, the definition and specifications of each single measure should be aligned with the ACAP advice. The branch line weighting specifications are those that show the greatest discrepancy with ACAP advice. The SC-ECO should note that the most effective combinations to reduce seabird bycatch in ICCAT pelagic longline vessels is the simultaneous use of night setting, BSL and branch line weighting. It is advisable that the Recommendations be reviewed considering the updated and newly available mitigation measures.

SCRS/2024/090 - The Agreement on the Conservation of Albatrosses and Petrels (ACAP) through its Seabird Bycatch Working Group (SBWG), routinely reviews and updates the best practice mitigation advice for industrial fishing gear types (principally pelagic and demersal longline, and trawl gear). The most recent review took place in May 2023, at the 11th Meeting of the Seabird Bycatch Working Group (SBWG11), with updates endorsed by the 13th Meeting of ACAP's Advisory Committee (AC13). This document presents the ACAP Review of mitigation measures and Best Practice Advice for Reducing the Impact of Pelagic Longline Fisheries on Seabirds. The ACAP review process recognises that factors such as safety, practicality and the characteristics of the fishery should also be considered when assessing the efficacy of seabird bycatch mitigation measures. ACAP's best practice advice is that the simultaneous use of weighted branch lines, bird scaring lines and night setting is the most effective approach to mitigate seabird bycatch in pelagic longline fisheries. Three hook-shielding devices, the 'Hookpod-LED', 'Hookpod-mini' and the 'Smart Tuna Hook', and one underwater bait setting device, the 'Underwater Bait Setter (Skadia Technologies)' have recently been assessed and on the basis of this assessment have been included in the list of best practice measures for mitigating seabird bycatch in pelagic longline fisheries. These best practice bycatch mitigation measures should be applied in areas where fishing effort overlaps with seabirds vulnerable to bycatch to reduce the incidental mortality to the lowest possible levels.

SCRS/2024/092 - Little scientific information is available on the potential effects of offshore wind energy (OSW) development on Highly Migratory Species (HMS), including those that inhabit the Atlantic Ocean and connected seas. Here, we draw from recent syntheses and related scientific literature to summarize possible interactions of HMS with OSW infrastructure and development activities. Ecological responses by HMS to OSW may include aggregation around novel structure, altered trophic dynamics, and behavioral responses to physical effects. Concerns surrounding possible changes to HMS fisheries including impacts to fishing grounds, shifts in fishing practices, safety, dockage and socioeconomic aspects. Implications of OSW on HMS population assessments and fisheries management include likely impacts on fishery-dependent and fishery-independent monitoring programs. Warranted is early investment in research and monitoring activities that aim to quantify species, ecosystem and fisheries responses to OSW development and how those changes affect management strategies. Sound science applied at appropriate spatial, temporal and taxonomic levels will provide the means by which negative impacts can be identified and mitigated to the greatest extent possible.

SCRS/2024/093 - Dynamic Ocean management (DOM) is emerging as a new frontier in operational ecology for marine resource management, as a means of protecting dynamic features and species in the ocean by enabling protected areas to move in time. IOS4DOM project aims to advance marine biodiversity observing systems, supporting adaptive management of marine resources. It adopts a multidisciplinary approach, integrating recent advances in quantitative methods, such as movement analysis, with new molecular techniques like DNA metabarcoding, and technological innovations including underwater drones, earth observations, and bio-logging. These tools offer unprecedented opportunities to simultaneously monitor marine animal movement and biodiversity, ship-based activities, and the marine environment. Unlike previous studies, this project also considers the vertical dimension to analyze the effects of the marine environment and cumulative human pressures on marine vertebrates. The results will link key ocean observation technologies to their application in assessing anthropogenic impacts and promoting sustainable maritime industries. Overall, the project provides an innovative, cost-effective, non-invasive approach to monitoring marine ecosystems using autonomous underwater vehicles, contributing to the sustainable development of the blue economy and improved marine management.

SCRS/2024/094 - This report investigates the impact of seabird bycatch in small-scale fisheries across southeastern Brazil, highlighting significant bycatch rates and the urgent need for enhanced monitoring and mitigation measures. The findings suggest that current practices could be leading to a high number of seabird mortalities annually. Mitigation measures need to be tested and adapted to the fleet characteristics. Night setting can potentially be an effective and inexpensive option.

SCRS/2024/096 - This scientific article critically examines the necessity, within of the process of adapt the ecosystem-based approach in fisheries management of the International Commission for the Conservation of Atlantic Tunas (ICCAT) Convention area, of integrating ecoregions. Specifically, we compare the proposed ecoregions with the existing Food and Agriculture Organization (FAO) major fishing areas, as well as ICCAT areas for the different species. We argue that the FAO subareas and ICCAT areas align well with proposed ecoregions, providing a comprehensive and data-rich foundation for effective ecosystem-based fisheries management. Finally, we conclude that the proposed ecoregion areas may cloud the objectives of the ecosystem group and the species groups, rather than provide practical solutions.

SCRS/2024/099 - The paper reported the progress in the development of a machine-learning tool to facilitate prioritization in implementation of ecosystem-based approach to the fisheries management (EAFM). The information available in the IUCN Red List web page was incorporated into the supporting database. Descriptive information was disaggregated into categories and transformed into numeric form that would be easier to handle with the machine learning algorithm. Specialists in machine learning technology independently developed a model predicting i) potential of each species to be subject to the ICCAT longline, purse seine, and other ICCAT fisheries, ii) potential of population of each species being vulnerable to human disturbance including fishery, and iii) general similarity in distribution and biology among species. The results were combined and examined against the existing ICCAT management framework to identify its potential loopholes and weakness. The work was conducted with the support of the ICCAT.

SCRS/2024/100 - A total of 17 participants met online on May 18th, 2024 for 4 h to discuss agenda items that related to assessing the functionality and applicability of ICCAT's preliminary Ecosystem Report Card. Main outcomes stemming from those discussions are contained herein for review by the Subcommittee on Ecosystems and Bycatch.

SCRS/2024/101 - En el golfo de México y mar Caribe se tiene documentada la presencia de cinco especies de tortugas marinas: la tortuga blanca o verde (*Chelonia mydas*), la tortuga carey (*Eretmochelys imbricata*), la tortuga caguama (*Caretta caretta*), la tortuga lora (*Lepidochelys kempii*) y la tortuga laúd (*Dermochelys coriacea*), las cuales cuentan con características biológicas, abundancia y distribución geográfica muy particulares. Los cambios en su abundancia y distribución se ven afectados por factores antropogénicos, como la realización de actividades pesqueras inadecuadas y captura incidental. El Programa Regional de Pelágicos Mayores del Instituto Mexicano de Investigación en Pesca y Acuacultura (IMIPAS) ha proporcionado un marco para identificar y reforzar la investigación para alcanzar los objetivos de gestión para las pesquerías de pelágicos mayores en el golfo de México y mar Caribe y las especies asociadas a la pesca con palangre. El programa de observadores a bordo de FIDEMAR ha recopilado datos sobre las tortugas marinas en los viajes de pesca de la flota palangrera mexicana, a través de dos formatos: el Registro de Tortugas Marinas (RTM) y el Registro de Avistamiento de Tortugas Marinas (RATM). Esta investigación proporciona un marco de referencia sobre la interacción de tortugas marinas en la pesca del atún aleta amarilla (*Thunnus albacares*) por la flota palangrera mexicana en el golfo de México y mar Caribe, durante el periodo 2017-2022.

SCRS/P/2024/061 - Presented an update on sunfish tagging activity in Spanish tuna fisheries, year 2023 in the Spanish trap fishery in the Western Mediterranean Sea. The tagging activity (started in 2021) had its origin on the need to estimate more precisely the real number of fish affected by the fishery. Authorization for tagging was requested to the Ecosystems Subcommittee, and since then, 348 Mola mola and 1 Mola alexandrini have been tagged, mainly in the Mediterranean. There have been no recaptures yet, possibly because sunfish are not a target species for any fishery here, but we will study other possible causes that may affect recaptures, and we will improve the tagging system with another type of anchor. In addition, a campaign will be carried out to disseminate the activity among the fishing sector to increase the probability of recapture.

SCRS/P/2024/062 - Summarized the advances developing an Ecopath with Ecosim model for the tropical Atlantic ecoregion to support the implementation of the ecosystem approach to fisheries management. The model aims to represent the average characteristics of the oceanic ecosystem in 2000-2003. It comprises (i) 34 functional groups, including specific groups for tropical tuna species and vulnerable species; and (ii) 15 fleet categories describing the major fisheries in the study region. The model will integrate available data on the abundance of the species (e.g., from stock assessments and from literature), total catches (i.e., official landings and bycatch estimates from scientific observers) and information on the trophic ecology of the species.

SCRS/P/2024/064 - Describes how the Atlantic Highly Migratory Species (HMS) Climate Vulnerability Assessment (CVA) was conducted in the US. The HMS CVA evaluates the vulnerability of 58 federally managed species/stocks to climate change using life history or behavioral characteristics ("sensitivity attributes") combined with the results of a climate projection model ("exposure analysis"). The results of the sensitivity analysis, informed by panelist scoring, were combined with the results of an exposure analysis to develop final vulnerability rankings for HMS. Relevant outcomes of the HMS CVA may help identify information gaps, research needs (NOAA 2024a), contribute to management strategy evaluation (Peterson and Walter 2023), and domestic management actions to encourage sustainable management (NOAA, 2024b). Detailed information on NOAA Fisheries CVAs are accessible through various web products including: the NOAA Fisheries CVA website https://www.fisheries.noaa.gov/national/climate/climate-vulnerability-assessments, the CVA Visualization Tool, https://www.fisheries.noaa.gov/data-tools/climate-vulnerability-assessment-tool and the Northeast US Atlantic Habitat and Fish CVAs Crosswalk: https://nrha.shinyapps.io/dataexplorer/#!/crosswalk

SCRS/P/2024/065 - Described a Socio-Ecosystem Diagnostic Analysis conducted in the Sargasso Sea. The approach examines environmental status, socio-economic status, connectivity within and beyond ABNJ system boundary, management, policy and, summary of threats and impacts, socioeconomic and ecosystem quality objectives and targets, monitoring indicators, potential marine spatial planning & area based management tools, and knowledge and data gaps.

SCRS/P/2024/066 - Describes how to develop a framework for an ecosystem-based approach to fisheries management (EAFM) for shared stocks of forage fish in the Northeast Atlantic. The motivation for the work was to address the broad call to develop Ecological Reference Points (ERPs) as parameters in Harvest Control Rules (HCRs) or performance statistics as part of Management Strategy Evaluation (MSE). An EAFM approach may be more important for forage fish, given the contributions of such species to fisheries and ecosystem function. The authors explore the feasibility of developing ERPs for forage fish in the Northeast Atlantic, which are prey for ICCAT stocks. In particular, ecosystem models and a single species MSE were used to develop a case study for Northeast Atlantic mackerel, an important prey species for bluefin tuna. The MSE was conducted as a stress test of the current ICES advice rule based on a stock assessment where natural mortality was assumed to be equal to 0.15 at all ages in all years, despite evidence of changes in distribution, size-at-age, and predator populations.

SCRS/P/2024/068 – It provided an update on the progress of the Subgroup on Electronic Monitoring Systems (EMS) in ICCAT fisheries. The Subgroup convener noted that following the work over the last few years, a new recommendation was adopted by ICCAT last year (Rec. 23-18) that establishes the minimum standards for EMS in ICCAT fisheries, addressing at this stage specifically the pelagic longlines and purse seines (targeting tropical tunas).

SCRS/P/2024/069 - REDUCE will unify stakeholder efforts and utilize an interdisciplinary scientific approach to reduce bycatch of marine megafauna and inform sustainable fishery management in the Eastern Central Atlantic Ocean. The diagnosis and integration of bycatch data across all industrial European fleets in the region, linked with fishing effort and the spatiotemporal distribution of the species, will provide a systematic approach to jointly assess and tackle policy challenges. The expansion and improvement of the observer programmes and the advances in electronic monitoring and automated machine learning systems will enable species-specific and high-resolution data of marine megafauna bycatch. Fine-scale GPS tracking of selected species combined with AIS fishery data in concurrent time will allow understanding key drivers of interactions and infer political responsibilities. New fine-scale tracking data of carefully selected species in the region will allow for a better understanding of their abundance and distribution and post-release mortality. Sightings, fishery catches and tracking data on marine megafauna will be combined to provide a step-changes in predictive habitat mapping approaches to understand overlap and bycatch risk from local to basin-scales. The combination of timeseries of sightings, fishery catches, GPS and GLS tracking and capture-mark-recapture studies, will provide an unprecedented view on megafauna hotspots and the risks and impacts of bycatch, boosting marine spatial planning or pelagic waters. Assessment and testing of mitigation measures will identify key approaches to significantly reduce bycatch in the region. Innovative and efficient data handling, sharing and publishing will establish an integrated approach to the bycatch data community. Capacity and cooperation between science, fishery industry and policymakers bordering Eastern Central Atlantic Ocean will be boosted by joint multi-disciplinary workshops, scientific training and monitoring events.

SCRS/P/2024/070 - This presentation reviewed participants and progress on the workshop to evaluate the impact of ICCAT fisheries on sea turtles in the Mediterranean Sea. It further summarized the data on the number of sets observed, the catches by species, the catch per unit effort (CPUE), and temporal trends in CPUE.

SCRS/P/2024/071 - This presentation reviewed the progress on the collaborative work to assess sea turtle bycatch in pelagic longline and tuna purse seine fleets (Atlantic and Indian Oceans and Mediterranean Sea) by ICCAT and IOTC scientists. It reviewed the meta data, the turtle species being considered, and their corresponding IUCM status, as well as the analytical approach for characterizing spatial estimates of turtle bycatch.

SCRS/P/2024/072 - The General Fisheries Commission for the Mediterranean (GFCM) has as main objective to ensure the conservation and the sustainable use of living marine resources as well as the sustainable development of aquaculture in the Mediterranean and in the Black Sea. As fisheries and the marine environment and ecosystems in this region face growing pressure from a range of anthropogenic sources, it is critical that actions are taken to manage their long-term sustainability. The GFCM seeks therefore to monitor and reduce negative interactions and impacts on biodiversity and ecosystems, also when it comes to vulnerable species and habitats, improving data collection, testing mitigation measure, reinforcing scientific grounding to adaptive conservation strategies. Following these issues, the GFCM issued several

recommendations (https://www.fao.org/gfcm/decisions/en/) stressing the need to introduce mitigation measures to limit the incidental catch of vulnerable species in Mediterranean and Black Sea fisheries. Furthermore, with the aims to develop and implement efficient, standardized data collections and monitoring systems, a series of protocols and reviews (reporting historical and current trends both for the bycatch of different groups of vulnerable species and for dolphin depredation) have been recently published. The GFCM Secretariat, in collaboration with countries and several partner organizations (such as ACCOBAMS, SPA/RAC, WWF, BirdLife, etc.) has already identified areas and fishing gear with a high risk of interactions between fishing activities and vulnerable species. Pilot studies applying technical mitigation measures are currently ongoing in these areas. The GFCM Commission, also, has recently adopted the Resolution GFCM/46/2023/4 on a regional plan of action to monitor and mitigate interactions between fisheries and vulnerable species in the Mediterranean and the Black Sea, with the main objectives to develop, by 2030, adequate monitoring, testing and development of mitigation measures to reduce, and where possible eliminate, a) the incidental captures and the related fishing mortality of elasmobranchs, sea turtles, seabirds and marine mammals, as well as b) dolphin depredation activity on nets. These actions are operative instruments in the collective effort to meet the targets of the GFCM 2030 Strategy related to the incidental catch of vulnerable species and dolphin depredation. Finally, to enhance the management and conservation of sea turtles and address the threats posed by incidental captures in tuna fisheries (as well as small-scale fisheries, trawlers, and longliners), a joint ICCAT/GFCM Working Group in the Mediterranean Sea is planned to facilitate the exchange of relevant information and data collection.