



**SCIENTIFIC COMMITTEE
TENTH REGULAR SESSION**

Majuro, Republic of the Marshall Islands
6-14 August 2014

Annual WCPFC Report: Joint Tuna RFMO Bycatch Technical Working Group

WCPFC-SC10-2014/EB-WP-03

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Recommendation

1. SC10 is requested to note the progress made towards completing the work plan of the Joint Tuna-RFMO By-catch Technical Working Group as outlined in the report.
2. SC10 is requested to note the incorporation of the future work schedule of this Technical Working Group into the GEF-ABNJ Tuna Project (see Table1, Appendix 1).
3. SC10 is requested to note the revised project reporting arrangements specified in “Other Matters”.

Background

The Joint Tuna-RFMO By-catch Technical Working Group (By-catch TWG) was established in 2009 and its work plan endorsed by the Kobe III meeting in July 2011 and the Scientific Committee of WCPFC in August 2011. This report documents the progress on the following elements of this work plan:

1. Harmonisation of t-RFMO fishing data;
2. Harmonisation of identification guides;
3. Updating of by-catch research priorities and promotion of collaborative work;
4. Improved Information sharing through the BMIS;
5. Facilitation of Risk Assessments (sharks as the priority);
6. Identification of Funding Sources; and
7. Enhanced compliance with data reporting requirements.

The Global Environment Facility project titled “Areas Beyond National Jurisdiction Tuna Project” (GEF-ABNJ) has reached implementation phase with financial resources to support by-catch related activities to become available in 2015. To expedite the implementation of the work plan of the By-catch TWG several of its activities were written into this project. Appendix 1 details the integration of the By-catch TWG work plan into the GEF-ABNJ Tuna Project Shark and Bycatch work plan.

Achievements over the 2013-2014 period

Since reporting to WCPFC-SC9 the following activities have been completed:

1. Harmonisation of t-RFMO fishing data
A meeting of technical experts from tuna long-line fisheries observer programs has been organised for January 2015 to harmonize data collection systems and variable definitions to improve research on by-catch mitigation, stock assessment and other topics that utilise observer data collected from long-line fisheries. This will include discussion on the most useful fields for evaluating by-catch mitigation and provide guidance for the data standards for electronic monitoring of bycatch. This meeting is sponsored by ISSF.
2. Harmonisation of identification guides
The FAO is preparing an electronic guide for the identification of shark species using the morphometrics of shark fins which is scheduled for release in 2014.
3. Updating of by-catch research priorities and promotion of collaborative work
A revised list of Research Priorities (Appendix 2) has been prepared by the By-catch TWG as part of preparations for the implementation of the GEF-ABNJ Tuna Project.
4. Improved Information sharing through the BMIS
The functionality of the BMIS database has been maintained.

5. Facilitation of Risk Assessments

Risk assessments (including stock assessments) for sharks in the WCPO are being progressed under the direction of the WCPFC approved Shark Research Plan. WCPFC-SC10-2014/EB-WP-XX documents the achievements of the last 12 months for this component.

There has been no progress on the following activities since reporting to WCPFC-SC9:

1. Harmonisation of identification guides for seabirds or turtles
2. Identification of Funding Sources
3. Enhanced compliance with data reporting requirements.

Other Matters

The incorporation of Joint Tuna-RFMO By-catch TWG activities into the GEF ABNJ Tuna Project will add further requirements for reporting and work plan guidance. To remove duplication of activities and to maximise efficiency of WCPFC members the following modifications to reporting upon the Joint Tuna-RFMO By-catch TWG will be implemented for the WCPFC.

1. The annual report of activities of the Joint Tuna-RFMO By-catch TWG will be presented to the WCPFC Scientific Committee as an Information Paper rather than Working Paper. This will include a concise summary of activity since the last report and proposed activities for the following year. The SC will be invited to make modifications to the proposed work schedule and these will be appropriately incorporated.
2. This document will then be incorporated into the annual work plan(s) of the WCPFC components of the GEF-ABNJ Tuna Project. At least 4 weeks prior to the Regular Session of the WCPFC Commission this will be circulated to WCPFC members, the IATTC and the members of Joint Tuna-RFMO By-catch TWG for comment.
3. The annual work plan will be presented to a GEF-ABNJ Tuna Project-Sharks and Bycatch Consultative Committee held within the margins of the WCPFC Regular Session. The annual work plan will then be finalised with the inclusion of written and verbal comments from WCPFC members, the IATTC, and the Joint Tuna-RFMO By-catch TWG received before or during the meeting of the Consultative Committee.

Appendix 1. Description of the WCPFC administered component of the GEF ABNJ

Description of the GEF-ABNJ Tuna Project; Outputs 3.1.1 – 3.1.3

Output 3.1.1 *Shark Data Improvement and Harmonization:* *Harmonized and integrated bycatch data collection on sharks from WCPFC and IATTC regions, including a t-RFMO shark data inventory; and data improvement field studies including tagging.*

1. What will be achieved?

This component will develop a practical and consistent approach to monitoring the status of sharks caught by ABNJ tuna fisheries. It focuses on identifying the data deficiencies which inhibit management and proposes strategies to obtain more data through field studies and better information return from fisheries.

2. Structure of the process towards achievement

An inventory will be conducted via the five t-RFMOs to determine the status of data holdings, management arrangements and risks for shark species in each area. Priority data improvement activities will then be identified and may include:

- **Minimum standards** for shark data collection and management, and programmes to promote the uptake of these standards for national/regional logsheets and databases (catch, size, biological, data verification, RFMO submission formats).
- **Data mining** and/or processing of historical and alternative data sets to produce usable data (unsubmitted data, duplicated data, filtering/rectification of logsheet data, trade data to cross-check catch data).
- **Harmonization of datasets** and training for observer recording of shark condition and fate (improved mortality estimates).
- **Tagging studies of post-release mortality** of sharks, including whale sharks, for which t-RFMO “no-retention” management measures exist.
- Improved **identification of priority shark species** (observers, fishermen, port samplers) through field guides and training materials.

Existing and proposed mechanisms for filling various types of data gaps (e.g. via project-based, national (NPOAs), multilateral, or t-RFMO initiatives) will be explored and evaluated.

3. Intermediate targets

A data inventory and assessment of harmonization opportunities will be prepared. Using this document as a basis, priority data improvement activities will be identified. Data improvement activities will be initiated based on their priority and the support (budget, partnerships) available.

4. Why it is important for the entire project and the achievement of the outcomes?

The completed inventory will be used to identify priority assessment and management activities under Output 3.1.2. These products then lead to the formulation of new conservation and management measures to maintain biodiversity in ABNJ tuna fisheries.

5. Partners involved, roles and responsibilities in terms of supervision, coordination, implementation of the activities and monitoring

Data improvement activities will be focused in the two partner t-RFMOs for the shark elements of the ABNJ Tuna Project (WCPFC and IATTC). The Technical Coordinator-Sharks and Bycatch will have the lead for implementing the activities in WCPFC, and ICCAT, IOTC and CCSBT (depth of coverage will depend on each t-RFMOs desire to participate). The IATTC Shark Data Analyst will lead all IATTC activities under this task. Supervision will be provided by the Executive Directors of the WCPFC and IATTC, through a joint Steering Committee, and by the ABNJ Tuna Project Coordinator.

Opportunities to stimulate potential partners to improve shark data should also be explored, e.g. the three other t-RFMOs (ICCAT, IOTC, CCSBT), national authorities through existing or new NPOA-Sharks; regional research programmes; regional fisheries management bodies (e.g. Forum Fisheries Agency, Parties to the Nauru Agreement, Western Pacific Fisheries Management Council, Te Vaka Moana); industry bodies (e.g. International Seafood Sustainability Foundation, Pacific Island Tuna Industry Association); and others.

Summary Task 1: Collaborative arrangements and work planning (supported by Annex 3, line items 2-4)

- Meet with key partners FAO, IATTC and WCPFC/SPC to develop a detailed project plan including specific activities under Shark Data Inventory Studies, Shark Data Improvement Studies (minimum standards, data mining, data harmonization, identification guides and post-release mortality tagging)
- Introduce the project and consult on member, industry and NGO needs at each t-RFMO (in conjunction with Output 3.1.2, Task 1)
- Establish a pan-Pacific shark Steering Committee with representation from WCPFC and IATTC Secretariats (in conjunction with Output 3.1.2, Task 1)
- Establish an annual ABNJ Tuna Project-Sharks and Bycatch Consultative Committee, to be held in the margins of the WCPFC Annual Meeting, to consult WCPFC and IATTC member countries and territories on shark and bycatch activities (in conjunction with Output 3.1.2, Task 1)

Summary Task 2: Baseline shark inventory (supported by Annex 3, line items 2-4, 7)

- Develop and catalogue available shark data holdings at WCPFC (and ICCAT, IOTC and CCSBT as practical) and regional/national institutions (IATTC will be responsible for the IATTC catalogue and these two products will then be merged)
- Make recommendations for harmonization of data types and formatting
- Identify and prioritize gaps and inconsistencies in data holdings by species, fishery and region
- Prepare a composite global inventory incorporating the products delivered by IATTC
- Report on t-RFMO responses to the recommendations (will inform Summary Task 3)

Summary Task 3: Identify and initiate data improvement activities for WCPFC (currently no scope to involve the other three t-RFMOs in this task but this could change if there is interest/resources; IATTC will conduct their own data improvement activities) (supported by Annex 3, line items 8-10)

- Explore needs and opportunities for WCPFC data improvement under existing programmes, e.g. logsheet reporting, observers, port sampling, trade data, etc., then identify and initiate activities in the areas of minimum standards, data mining, harmonization of data, and/or preparation of field identification materials (line items 8 & 10)
- Plan and undertake WCPFC field studies designed to improve data for stock status assessments, in particular post-release mortality studies (line item 9)
- Assist with identifying, planning and undertaking IATTC activities as requested by IATTC through the joint Steering Committee (line items 2-4)

Summary Task 4: Reporting to FAO Project Management Unit (supported by Annex 3, line items 2-4)

- Provide half-year progress reports for Jan-Jun and Jul-Dec for all years of the project.

Output 3.1.2 *Shark Assessment and Management:* *Assessment methods catalogue prepared for one ocean basin with results made available globally; four additional species assessments (including species risk assessments); and results used for priority setting and development of robust pan-Pacific Conservation and Management Measures*

1. What will be achieved?

The objective of this component is to identify risks and priorities for shark conservation through assessment, using new data generated under Output 3.1.1 and improved tools developed under this component as appropriate. After evaluating whether the existing management framework is sufficient, measures to strengthen shark management by t-RFMOs will be proposed.

2. Structure of the process towards achievement

Assessment methods and results used for sharks by the t-RFMOs will be catalogued as metadata, along with any management measures in place and any available evaluations of their effectiveness. The completed inventory will be used to identify where further assessment is needed and which methods are best suited to each circumstance. Common minimum standards for assessments will be proposed, in particular for species whose range spans more than one t-RFMO area. Four new assessments will be conducted: these may include previously unassessed species, species for which recent data improvements warrant a re-assessment of their status, or species for which the effects of mitigation measures on stock status require re-evaluation. Methods may include ecological risk assessments, indicators, full stock assessments, or other methods including those designed to support non-detriment findings under CITES. Evaluation of the sustainability of current mortality rates, for example through the development and application of reference points, may also be undertaken. In cases where management needs to be strengthened, new conservation and management measures will be developed.

3. Intermediate targets

A compendium of existing and best practice assessment methodologies will be developed across all t-RFMOs describing data requirements, practicality, effectiveness and history of application. This will form the basis for recommendations for common standards amongst t-RFMOs particularly for cross-boundary stocks. Four new assessments will be produced, using new data or methods as appropriate. Where management shortfalls are identified, new conservation and management measures will be developed in support of t-RFMO member-led policy-making processes.

4. Why it is important for the entire project and the achievement of the outcomes?

This component supports a priority tasks agreed by the Kobe TWG-Bycatch involving standardization of ecological risk assessment methodologies, in this case for sharks. It also facilitates the adoption of new, effective shark conservation and management measures, primarily in the Pacific (WCPFC and IATTC) but also potentially in other t-RFMOs.

5. Partners involved, roles and responsibilities in terms of supervision, coordination, implementation of the activities and monitoring

This work will be led by the Technical Coordinator—Sharks and Bycatch, drawing upon consultants where necessary, and with the support of expert consultants and scientists based at the other t-RFMOs, in particular IATTC. The Technical Coordinator—Sharks and Bycatch will be responsible for the identification and development of new conservation and management measures which will be coordinated with participating t-RFMO staff, and potentially, national partners acting as proponents

in the two partner t-RFMOs (WCPFC and IATTC). Results can also be transmitted into the other t-RFMOs through WCPFC and IATTC members acting as proponents in other t-RFMOs.

Summary Task 1: Collaborative arrangements and work planning (supported by Annex 3, line items 2-4)

- Meet with key partners FAO, IATTC and WCPFC/SPC to develop a detailed project plan
- Introduce the project and consult on member, industry and NGO needs at each t-RFMO (in conjunction with Output 3.1.1, Task 1)
- Establish a pan-Pacific shark Steering Committee with representation from WCPFC and IATTC Secretariats (in conjunction with Output 3.1.1, Task 1)
- Establish an annual ABNJ Tuna Project-Sharks and Bycatch Consultative Committee, to be held in the margins of the WCPFC Annual Meeting, to consult WCPFC and IATTC member countries and territories on shark and bycatch activities (in conjunction with Output 3.1.1, Task 1)

Summary Task 2: Compile methods for assessing shark populations including their data requirements, ease and effectiveness of application, history in t-RFMOs, etc. and produce a global compendium (supported by Annex 3, line items 2-4, 13)

- Work with WCPFC/SPC and IATTC to develop format and specifications for the assessment methods catalogue
- Explore potential for harmonization between methodological approaches by different t-RFMOs as well as with other assessment programmes such as NDFs for CITES
- Produce compendium on methods and global status of shark species caught in t-RFMO fisheries

Summary Task 3: Conduct four new shark stock status assessments (supported by Annex 3, line items 14-15)

- Priority shark stocks will be identified at a later stage of the project
- Data and methods to be applied in the stock status assessments will be identified at a later stage of the project but initially two traditional stock assessments and two, innovative approaches to assessing stock status are planned.

Summary Task 4: Formulate new conservation and management measures reflecting the technical progress delivered by the project (supported by Annex 3, line items 2-4 and 16-17)

- Types and format of measures to be identified at a later stage of the project
- A strategy for seeking support and consensus in t-RFMO forums will be identified at a later stage of the project

Summary Task 5: Reporting to FAO Project Management Unit (supported by Annex 3, line items 2-4)

- Provide half-year progress reports for Jan-Jun and Jul-Dec for all years of the project.

Output 3.1.3. *Management decision making processes enhanced and accelerated through all t-RFMOs, their Members, the fishing industry and other stakeholders having access to all relevant material on bycatch management measures and practices in tuna fisheries available through a global Bycatch Management Information System (BMIS).*

1. What will be achieved?

This component will collate, catalyze and disseminate new information that will direct effective management to mitigate impacts on bycatch species including sharks, seabirds, sea turtles and cetaceans. The global BMIS aims to reduce technical uncertainties across a range of stakeholders, allowing t-RFMO discussions to focus on management issues such as cost and feasibility. This is expected to lead to an increase in the effectiveness of biodiversity conservation in the ABNJ. This output encompasses mitigation-themed tasks for all bycatch, and, where necessary to support better decision-making, provides for data improvement/harmonization and enhanced assessment methods for seabirds, sea turtles and cetaceans (as sharks are covered in Outputs 3.1.1 and 3.1.2).

2. Structure of the process towards achievement

This component focuses on expanding and facilitating access to existing information and engendering collaborations to produce new information on bycatch interactions and mitigation techniques. Work is proposed as three tasks: (i) enhancing the existing data platform and updating it with the latest existing information; (ii) using the platform as a vehicle to identify and promote improved data standards and harmonisation; and (iii) convening workshops which draw together holders of non-public domain data for collaborative analysis producing new findings which can be made publicly available through the BMIS.

The first task will include entry of new information that has become available since the BMIS was last updated as well as re-designing the BMIS to broaden the scope of information it can contain. This may include modules for risk assessment information, spatial information, summary statistics and/or inclusion of cost-benefit information on mitigation techniques. The BMIS interface will be re-designed based on feedback from users based in a range of countries and backgrounds to enhance its accessibility. Data to be loaded or linked will include datasets, reports or static maps sourced from t-RFMO or other papers, observer programmes, tracking and tagging studies, and other ABNJ Tuna project results.

The second task will identify the extent to which the bycatch information collected across the five t-RFMOs is consistent and compatible, as well as effective in addressing bycatch management information needs. This task will primarily focus on seabirds, sea turtles and cetaceans, with ideas for sharks being progressed under Outputs 3.1.1 and 3.1.2. This task works toward one of the goals of the Kobe TWG-Bycatch of facilitating the inter-operability of bycatch information. This will involve not only the harmonization of data fields but identification of the most useful types, formats and specifications for the data to be collected. Where identified as necessary to improve data quality, identification guides and field manuals will be enhanced and standardized. Specific tasks may include harmonization of longline observer data fields, data standards for electronic monitoring of bycatch and/or the identification of key data gaps (e.g. fishing gear characteristics) and recommendations to remedy them. Beyond the collection and storage of appropriate bycatch data, this task will aim to demonstrate how basic calculated data fields (e.g. interaction rates, soak times

or traded product conversion factors), can be produced as standardized building blocks for more complex assessments.

The third task will focus on synergizing new collaborations to add to the body of knowledge on all bycatch organisms. As one of the common stumbling blocks to analysis of bycatch data is their confidential nature, a workshop format is proposed under which owners will be allowed to maintain control of their data while the group jointly draws conclusions from a range of datasets. Workshop topics will be identified from the gaps emerging from the first and second tasks above but are expected to focus on mitigation issues including documenting rates of implementation, identifying optimal mitigation measures under varying conditions, and/or quantifying the actual effectiveness of particular mitigation measures across fleets and areas. Workshops are likely to be held in pairs with a data preparation session designed to focus on objectives and data quality/availability and a results and evaluation session designed to produce joint findings. It is anticipated that at least one workshop will be held in the Pacific and will focus on sharks. The inter-session period may be used to progress analyses of any unrestricted or summarized data. Each workshop will identify ways that the resulting information can be disseminated through BMIS to inform the drafting or amendment of bycatch-related CMMs.

3. Intermediate targets

The BMIS will be updated and re-designed to prepare it for holding new data (of existing types) and new types of data for all bycatch organisms. Key data gaps will be identified and remedied, and opportunities for harmonization across t-RFMOs will be identified, particularly for seabirds, sea turtles and cetaceans. Guidance for standardizing calculated data fields which can serve as building blocks for more complex assessments will be produced. New data will be sourced, including planning for workshops designed to generate new findings from data which are currently held on a confidential basis. All products will be loaded or linked in the BMIS to promote the development of more comprehensive and/or effective policies.

4. Why it is important for the entire project and the achievement of the outcomes

Expansion of the system to include a broader range of data will provide opportunities for a) the members of the Kobe TWG-Bycatch to develop specific recommendations, potentially in the form of new Conservation and Management Measures (CMMs) to harmonize data collection and improve bycatch management among the t-RFMOs; and b) focus the efforts of each t-RFMO on filling the most important data gaps hampering its effective bycatch mitigation and management.

5. Partners involved, roles and responsibilities in terms of supervision, coordination and implementation of the activities and monitoring

This work will be jointly led by SPC (Kobe TWG-Bycatch Chair) and WCPFC (the Technical Coordinator-Sharks and Bycatch). It is expected that several consultant specialists in database design, mitigation information and website development will be contracted under Task 2. Consultants may also be required to assist with the workshop analyses under Task 4. T-RFMO bycatch coordinators will assist with identifying regional data needs, sources of information, convening workshops and any necessary permissions to use the data. The BMIS is currently hosted by WCPFC but its long-term hosting situation should be reviewed as part of this project.

Summary Task 1: Collaborative arrangements and work planning (supported by Annex 3, line items 2-4)

- Introduce the project and consult on member, industry and NGO needs at each t-RFMO (in conjunction with Output 3.1.1 and Output 3.1.2)
- Key partners WCPFC, SPC and FAO to develop a project implementation plan for consultation at a ABNJ Tuna Project-Shark and Bycatch Consultative Committee meeting planned to be held in conjunction with the WCPFC Annual Meeting in December 2014. The Kobe TWG-Bycatch will be consulted in parallel.

Summary Task 2: Re-design of the Bycatch Mitigation Information System and update of existing information (supported by Annex 3, line items 21-24)

- Enter new information into the BMIS (Annex 3, line item 21);
- Develop new modules to store new types of information in the BMIS (Annex 3, line item 22);
- Enhance the BMIS interface for a range of users (e.g. some interfaces translated into key languages, more efficient screen appearance and flow), including new ways of displaying information such as mapping of spatial information (Annex 3, line item 23-24).

Summary Task 3: Harmonize and improve existing data fields, standards and quality and progress guidance and tools for calculated fields (supported by Annex 3, line item 28 and for sharks under Output 3.1.1 (Data Improvement), line items 8 & 10)

- Harmonize existing data fields and/or standardize the information being collected;
- Produce or advise on modified field guides and data collection manuals;
- Produce guidance and/or tools for calculating basic data fields for use in more complex analyses.

Summary Task 4: Hold at least two paired regional workshops (one Pacific, one non-Pacific; one shark, one non-shark) for joint analysis and evaluation of confidentially-held bycatch data (supported by Annex 3, line items 26-28)

- Plan for and hold the first data prep workshop in Year 2; the first findings workshop and the second data prep workshop in Year 3; and the second findings workshop in Year 4.
- Workshop topics, dates, locations and attendees will be identified at a later stage of the project.

Summary Task 5: Reporting to FAO Project Management Unit (supported by Annex 3, line items 2-4)

- Provide half-year progress reports for Jan-Jun and Jul-Dec for all years of the project.

Integration of the By-catch TWG work plan into the GEF-ABNJ Tuna Project

Figure 1 illustrates the integration of the various activities of the By-catch TWG into each of the outputs of the GEF-ABNJ Tuna Project. Note the wording for the “Compliance with data reporting requirements” sub-heading has been revised to “Evaluation of Mitigation Measures” to better reflect the purpose of this aspect of the By-catch TWG work plan. Table 1 describes the intended activities to be completed as part of the GEF-ABNJ Tuna Project.

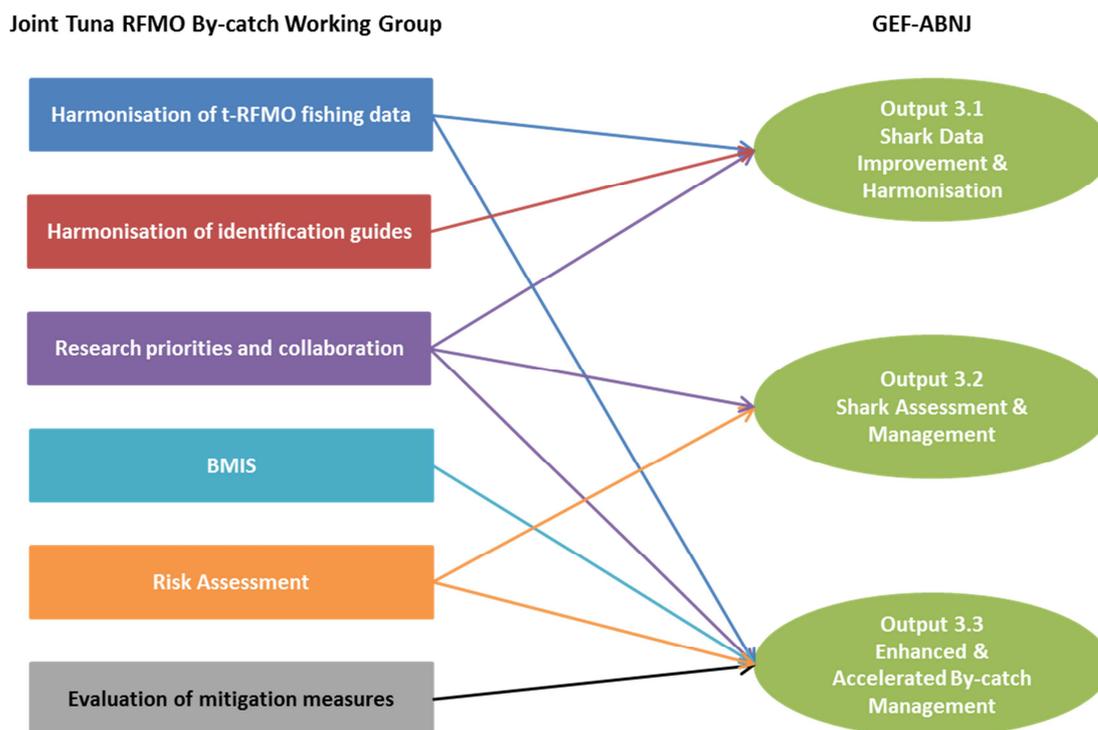


Figure 1. An illustration of the integration of the various activities of the By-catch TWG into each of the outputs of the GEF-ABNJ Tuna Project.

Table 1. Draft work plan for the GEF-ABNJ supported tasks of the By-catch TWG (2015-2018)

By-catch TWG Sub Heading	GEF ABNJ Tuna Project Activities that would support By-catch TWG tasks
Harmonisation of t-RFMO fishing data	<ol style="list-style-type: none"> 1. Harmonization of Long-line observer data for all by-catch 2. Standards and training for observer recording of shark condition and fate 3. Minimum standards for shark data collection and management to promote the uptake of these standards for national/regional logsheets and databases
Harmonisation of identification guides	<ol style="list-style-type: none"> 1. Improvement of materials and training for identification of priority shark species
Research Priorities Evaluation of mitigation measures	<ol style="list-style-type: none"> 1. At least two Bycatch-TWG workshops to synergize new collaborations to add to the body of knowledge on all bycatch organisms. Proposed workshop topics include: <ol style="list-style-type: none"> a. Review of and other analytical methods for global analyses including indicators for data poor species, risk assessments and priority data fields for analyses.

	<ul style="list-style-type: none"> b. Multi-taxa impacts of particular bycatch mitigation measures (e.g. gear modification-based methods), including economic and crew safety issues. Priority taxa would include market species, elasmobranchs, seabirds, sea turtles, odontocetes). c. By-catch species interaction mapping including identification of hotspots and gear/operational vulnerabilities. d. Evaluation of seabird interactions in the presence and absence of mitigation (in collaboration with CCSBT) <p>2. Primary Research Activities may include:</p> <ul style="list-style-type: none"> a. Tagging studies of post-release mortality of sharks, for which t-RFMO “no-retention” management measures exist. b. Gap filling life-history information on sharks for risk assessments c. Techniques for shark product ID (including post-landing and in trade)
BMIS	<ul style="list-style-type: none"> 1. Entry of newly available information. 2. Re-designing the BMIS to broaden the scope of information it can contain. This may include modules for: <ul style="list-style-type: none"> a. risk assessment information b. spatial information c. summary statistics d. cost-benefit information. 3. Re-design of the BMIS interface based on feedback from users based in a range of countries and backgrounds to enhance its accessibility.
Risk Assessment (Preparatory Elements)	<ul style="list-style-type: none"> 1. Mining and processing of historical and alternative data sets to produce usable data for risk assessments. 2. Catalogue assessment methods and results used for sharks by the t-RFMOs.

Appendix 2. Research List

The following lists the current priorities identified by the Joint Tuna RFMO Bycatch Working Group

Cetaceans, marine mammals and whale sharks

1. Analyses of the prevalence of cetaceans, marine mammals and whale sharks in the sets of purse-seine fishing vessels.
2. Development/modification of existing whale shark handling guidelines based on best available evidence for maximising post release survival rates.

3. Analyses of marine mammal depredation and entanglement in longline fisheries, including identification of hotspots and risk assessments for species that frequently engage in depredation.
4. Analyses of marine mammal bycatch in drift and set gillnet fisheries and artisanal fisheries.

Shark

5. Risk assessment processes to develop RFMO priorities for shark species which may need further assessment or mitigation.
6. Analysis of ways to improve data collection on sharks and manta and devil rays in targeted industrial and artisanal fisheries.
7. Study of post-release survival of sharks in longline fisheries in relation to all relevant factors including hook type and duration of set.
8. Study to further develop shark by-catch mitigation strategies for longline fisheries.
9. Analyses of costs and benefits of banning the use of wire leaders in tuna longline fisheries taking into account the safety of the crew.
10. Develop handling and release protocols for all sharks and manta and devil rays, taking into consideration the safety of the crew.

General Risk Assessment

11. Risk assessments at the global and RFMO level. This should consider applying PSA (e.g. Arrizabalaga et al 2011), hybrid ERA (Gilman et al 2013), SAFE (Zhou & Griffiths 2008), data-limited (Moore et al 2013), ICCAT ERA (Turtles) methods.
12. Estimation of gear loss/abandonment/discarding rates and developing methods to estimate ghost fishing mortality rates for passive gears (longline and drift gillnet) including an evaluation of the levels of bycatch and the type of mitigation measures that could be implemented to reduce bycatch catch rates.

Long line

13. An evaluation of seabird interactions in the presence and absence of mitigation. The purpose being 2 fold; firstly to ascertain from a global perspective which mitigation measures are most commonly applied and secondly to ascertain whether there is evidence on their effectiveness. This should include, but is not limited to, seabird bycatch mitigation in artisanal fisheries. Action in this area should liaise with the intersessional technical working group that the Ecologically Related Species Working Group of CCSBT has established.
14. Replicate point 4 for turtles and key shark species. Consideration should also be given to relating sea turtle tracking data with fishing effort to assess overlaps. i.e. similar to the overlap analyses for seabirds done through www.seabirdtracking.org. The www.seaturtle.org website has tracking data and has started this process (<http://rspb.royalsocietypublishing.org/content/281/1780/20133065.short>; <http://rspb.royalsocietypublishing.org/content/281/1777/20132559.full>).
15. Multi-taxa impacts of bycatch mitigation measures. This may be feasible through pooling the tuna RFMOs observer databases and selected domestic observer program databases. Priorities would include analyses to understand the effect of hook design, hook depth bait

type and leader material on standardized catch rates across priority taxa (market species, elasmobranchs, birds, turtles, odontocetes).

16. Analyses of longline gears, including:

- a. Produce catalogs of longlines in all tuna fisheries with the degree of detail needed to standardize CPUE and BPUE. Also hook catalogs;
- b. Map fishing areas for artisanal fisheries. Effort quantification, annual changes, modalities;
- c. Develop standardized forms to collect gear data to be used across oceans ;
- d. Bait type/size/condition (thawed vs frozen)/threading technique vs bycatch rates;
- e. Continue tests on different hook types and sizes (hooks with wire appendices, weak hooks, etc.);
- f. Define the equipment needed to release bycatch and produce program to supply to vessels;
- g. Study how to increase availability and reduce costs of bycatch mitigation equipment (elimination of export tariffs, taxes, subsidies);
- h. Feasibility of replacing buoyant materials in artisanal fisheries to reduce surface entanglements; program to implement change;
- i. Train crews in the use of better handling procedures;
- j. Development of artificial baits;
- k. Implementation of seabird mitigation modifications of gear: how to facilitate the adoption of recent developments;
- l. Promotion of use of fish bait or artificial bait;

17. Analyses of longline operational information, including:

- a. Duration of sets vs catches and bycatch;
- b. Define better practices for fisheries; develop educational materials; train fishers;
- c. Study spatial/temporal strategies to minimize bycatch/catch ratios (including vertical and horizontal, diel and seasonal);
- d. Effects of day/night effort switches on bycatch;
- e. Produce an optimal offal discard strategy: how to treat the discards prior to release, and how to release;
- f. Closures in coastal interesting habitats (sea turtles) and foraging areas near nesting colonies (seabirds);
- g. Island and seamount effects on bycatch rates;
- h. Electronic means to record bycatches without observers;

Purse Seine

18. Analyses of purse seine gear issues, including FADs

- a. Documentation of the nets, satellite and sonic buoys used, FAD construction details, for analyses and standardization;
- b. Impacts of drifting speed and trajectories in amounts, types, sizes of target and bycatch species;
- c. Comparison of effectiveness of sonic buoys to detect bycatch levels, tuna sizes/species;
- d. Impact of large mesh panels in lower parts of the net on catches and bycatch;
- e. Impact of net sinking speed on catches and bycatch;

- f. Development of highly instrumented FAD for research (cameras, acoustic systems, at different levels, etc.);
 - g. Systematic study of sorting grids (design, location, etc.).
19. Analyses of purse seine operational issues, including
- a. Bycatch vs thermocline depths-net depths;
 - b. Seamount effects (some oceans);
 - c. Spatial-temporal strategies to reduce bycatch (e.g. MPAs, seasonal closures, etc.);
 - d. Instrumentation of seines to observe sink patterns, depth fished vs current patterns, thermocline depths, etc.);
 - e. Use of backdown maneuver to reduce bycatch (current idea for ISSF exploration);
 - f. Methods for handling captured individuals (harpooning inside seine, different types of brailers, pumps, handling for releases from seine or deck-manta rays, large sharks);
 - g. Providing effective communication techniques and developing materials for the purpose of training skippers and crews in bycatch mitigation techniques.
20. Analyses of economic approaches to minimize bycatch in purse seine, including
- a. Full utilization: how to implement it, marketing, etc.;
 - b. Non purchase approaches (e.g. canneries not to buy bigeye);
 - c. Area permits based on vessel bycatch rates and other performance-based approaches;
 - d. Individual vessel limits;
 - e. Awards for Innovation: large economic prizes;
 - f. Other economic incentives e.g. in GJERTSEN, H., HALL, M.A. and D. SQUIRES. 2009. Chapter 14: Incentives to address bycatch issues. In Conservation and Management of Transnational Tuna Fisheries. Allen, R., Joseph, J and D. Squires (eds.). pp. 225 – 248, J. Wiley.
21. Analyses of purse seine ecological issues, including
- a. Balanced harvest approaches; gradual implementation;
 - b. Ecosystem models under current harvest strategies: projections;
 - c. Impacts of FADs on horizontal and vertical distributions of tunas and other species;
 - d. Impacts on ecosystem of selective removal of species and sizes associated to FADs;
 - e. What proportion of the biomass in an area is associated with FADs? Are biomass removals affecting pelagic communities?;
 - f. Impact of ghost fishing by lost or abandoned FADs;
 - g. Impacts of discard on deep water benthic communities;
 - h. Impacts of FADs on schooling behavior and characteristics (e.g. school size) and effects on feeding, predation, etc.;
 - i. Impact of different FAD construction materials/techniques on the ecosystem, including through bycatch.
22. Analyses of climatic issues, including
- a. Impacts of expansion of minimum oxygen regions on FAD fisheries;
 - b. Impacts of global warming on FAD fisheries;
 - c. Impacts of ocean acidification on FAD fisheries.

23. An evaluation of the levels of bycatch by drift gillnet fisheries in the Indian Ocean and in other areas using drift gillnets to capture tuna and tuna-like species.
24. Analyses of potential mitigation measures to be implemented to reduce bycatch.
25. Analyses of driftnet gears, including:
 - a. Produce catalogs of driftnets in all tuna fisheries with the degree of detail needed to standardize CPUE and BPUE;
 - b. Map fishing areas for artisanal fisheries. Effort quantification, annual changes, modalities;
 - c. Develop standardized forms to collect gear data be used across oceans;
 - d. Evaluate various available bycatch mitigation measures;
 - e. Define the equipment needed to release bycatch and produce program to supply to vessels;
 - f. Study how to increase availability and reduce costs of bycatch mitigation equipment (elimination of export tariffs, taxes, subsidies);
 - g. Feasibility of replacing gillnet in artisanal fisheries with other more selective gear to reduce entanglements; program to implement change;
 - h. Train crews in the use of better handling procedures.
26. Analyses of driftnet operational information, including:
 - a. Duration of sets vs catches and bycatches;
 - b. Define better practices for fisheries; develop educational materials; train fishers;
 - c. Study spatial/temporal strategies to minimize bycatch/catch ratios (including vertical and horizontal, diel and seasonal);
 - d. Effects of day/night effort switches on bycatch;
 - e. Produce an optimal offal discard strategy: how to treat the discards prior to release, and how to release;
 - f. Closures in coastal habitats and foraging and mating areas;
 - g. Electronic means to record bycatch without observers.