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Progress on Kobe III bycatch technical working group

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Executive Summary

Background

The Kobe By-catch Joint Technical Working Group 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 towards achieving this plan:

- Harmonisation of t-RFMO fishing data
- Harmonisation of identification guides
- By-catch research priorities and collaborative work
- Information sharing through the BMIS
- Facilitation of Risk Assessments (sharks as the priority)
- Funding Sources
- Compliance with data reporting requirements

The Scientific Committee is invited to both note the report, but also to provide guidance on the future of this By-catch Joint Technical Working Group.

Harmonisation of tuna RFMO fishing data

A meeting of technical experts from tuna purse-seine fisheries observer programs was convened 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 purse-seine fisheries. The report for this meeting is attached as Appendix 1.

The outcomes from this workshop identify that the minimum standard data fields specified for the WCPFC Regional Observer Programme allow for interoperability with the other tuna RFMOs for all fields excluding cetaceans. The IATTC currently record the applications of cetacean mitigation in more detail and additional fields would need to be included in the WCPFC minimum standard data fields to be fully interoperable with the IATTC data on this issue. The harmonization of long-line observer data is planned to commence in September 2012. The participation of the WCPFC Secretariat (or its delegates) will be required to complete this activity.

Harmonisation of identification guides

Activities associated with this task have been led by ACAP for seabirds. Progress on this task is reported in WCPFC-SC8-EB-IP-04. No progress report on shark and sea turtle identification guides is provided.

Research priorities

No action undertaken. The provisional list of Research Priorities remains as specified in SC7-EB-WP-14.

BMIS

The progress of the BMIS as reported in EB-IP-01. Visitation statistics suggest that it is becoming a commonly used resource across the region. A business case for the expansion of the BMIS to a t-RFMO wide database is provided in Appendix 2.

The development of protocols for sharing bibliographic information stored in the ICCAT by-catch database and the BMIS delayed until the expanded BMIS is functional. There is also data security issues associated

with other information stored on the ICCAT database that will require resolution before databases can be synchronised.

Risk Assessments

No progress on this activity.

Funding Sources

The FAO is currently coordinating the preparation of a new project (jointly with the tuna RFMOs, ISSF, Birdlife International and WWF) to be funded by the Global Environment Facility for Areas Beyond National jurisdiction (ABNJ). If the project is successful in obtaining funding support, it will address the following research priorities:

Longline

- Testing the effectiveness of line weights, night setting and bird-scaring lines to minimise seabird interactions in Asian fleet operations, with a focus on identifying the most effective gear set up for the specific characteristics of these vessels and their fishing operations.
- Testing the effectiveness of safe release techniques for sea turtles.

Purse-Seine

- Characterize the numbers and behaviours of by-catch under FADs to develop practical techniques for the reduction of by-catch, including best practices for handling and release.
- Tagging studies of post-release mortality of sharks, including whale sharks, for which t-RFMO "no-retention" management measures exist
- 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) for shark assessments.

BMIS

- The expansion of the WCPFC BMIS into a tuna RFMO wide database including training and development workshops.

Harmonisation

- The harmonisation of shark identification guides

The inclusion of key parts of the Technical Working Group's work-plan in the proposed GEF "Areas Beyond National Jurisdiction" project should significantly reduce the time-frame for completion of the workplan.

Compliance with data reporting requirements

The purpose of this activity in the work plan was to facilitate comparison of the effectiveness of particular mitigation measures. Summary data can be prepared, with appropriate confidentialities maintained, however this would require agreement for access to Part 2 Annual report information or for the WCPFC Secretariat to provide this summarized information. Advice from the SC is requested on the usefulness of activity for assessing the effectiveness of mitigation measures prior to proposing this activity to the TCC.

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Introduction

The Kobe By-catch Technical Working Group was established as an outcome of the Kobe II Workshop on By-catch held in Brisbane between June 23rd and 25th in 2010. The Terms of Reference are:

The By-catch Joint Technical Working Group (TWG) should be small in nature so as to work more efficiently (e.g. 2-3 representatives from each Tuna RFMO). The WG will support, streamline, and seek to harmonize the by-catch related activities of Ecosystems/By-catch working groups. The TWG will have the ability, where necessary, to consult and work with other experts including those from fishing industry, IGOs and NGOs. The findings/recommendations of the TWG will be considered by each RFMO, including, as appropriate, their technical bodies, in accordance with the procedures of each RFMO. The RFMOs may provide feedback to the TWG as necessary. To the extent possible, the BWG will meet electronically.

Terms of Reference:

1) Identify, compare and review the data fields and collection protocols of logbook and observer by-catch data being employed by each Tuna RFMO. Provide guidance for improving data collection efforts (e.g., information to be collected) and, to the extent possible, the harmonization of data collection protocols among Tuna RFMOs.
2) Identify species of concern that, based on their susceptibility to fisheries and their conservation status, require immediate action across Tuna RFMOs. Review all available information on these species and identify their data needs.
3) Review and identify appropriate qualitative and quantitative species population status determination methods for by-catch species.
4) Review data analyses to identify all fishery and non-fishery (e.g. oceanographic and physical) factors contributing to by-catch, taking into account the confidentiality rules of each RFMO.
5) Review existing by-catch mitigation measures including those adopted by each Tuna RFMO and consider new mitigation research findings to assess the potential utility of such measures in areas covered by other Tuna RFMOs taking into consideration differences among such areas.
6) Review and compile information on by-catch research that has been already conducted or is currently underway to delineate future research priorities and areas for future collaboration.
7) The duration of the WG will depend on the needs and requests of the Tuna RFMOs.

The first meeting of the TBWG was held in La Jolla on July 11, 2011 in the margins of the Kobe III meeting. The TWG agreed to meet electronically every 3 months and to meet in person whenever possible in conjunction with Kobe meetings or in the absence of Kobe meeting every three years. Over the next several years the Working Group proposes the following work plan:

- Harmonization of data collection
- Development of harmonized identification guides and release protocols
- Identify and recommend research priorities
- Prioritization of collaborative work
- Progress BMIS information sharing website
- Funding sources
- Compliance with data reporting requirements

This report provides the first annual report of the TWG's progress to achieving this work plan to the WCPFC Scientific Committee.

Work Plan Progress

Work-plan Activity	Progress
Harmonization of data collection	
The working group will identify the minimum data standards and data fields that should be collected across all RFMOs with a view to allowing interoperability.	*Purse Seine* A meeting of technical experts from tuna purse-seine fisheries observer programs was convened from 5 - 9 March 2012, in Sukarrieta, Spain. The objective of this meeting was 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 purse-seine fisheries. The meeting was organized by Martin Hall from IATTC with financial support from International Seafood Sustainability Foundation and held at the AZTI facility in Sukarrieta. The report for this meeting is attached as Appendix 1. The minimum standard data fields specified for the WCPFC Regional Observer Programme allow for interoperability with the other tuna RFMOs for all fields excluding cetaceans. The IATTC currently record the applications of cetacean mitigation in more detail and additional fields would need to be included in the WCPFC minimum standard data fields to be fully interoperable with the IATTC data on this issue. *Long-line* Dr Shannon Cass-Calay (ICCAT) has proposed to lead the harmonization of long-line observer data, with planning of activities to commence in September 2012. To progress the harmonization of long-line observer data the WCPFC Secretariat (or its delegates) should participate in proposed activities.
Harmonized identification guides and release protocols	
1. Seabird identification: the tuna Secretariats will provide ACAP with existing seabird identifications, and ACAP will develop a standardized identification guide. The drafts of	*Seabirds* ACAP has made substantive progress on the harmonized guide for seabirds for use at sea by fisheries observers to assist in the identification of seabirds killed in longline operations. A detailed report is provided in EB-IP-04. The intention is to develop a 'pocket' guide for use on deck which will be complemented by a more

the identification guide will be reviewed by the Working Group working group and Tuna RFMO working groups.	comprehensive guide and possibly a web-based key. The pocket guide will be small in size with as few pages as possible and contain the minimum of information and photos required for species identification. The larger guide will contain more information and more photos. The pocket guide is still being developed but an indicative draft of the larger guide is included in EP-IP-04. ACAP has referred a number of questions to the WCPFC-SC for its advice that need to be answered before the guide can be completed, these being: Are there any species not included in the list which should be? Are there any species on the list which don't need to be? Is there information missing from the guide which would be of use? Is there information included in the guide which is unnecessary? Is the species identification information accurate? Are there any characteristics which would not be useful at sea? Where there are insufficient physical characteristics available to be confident about the identification of the seabird, should an alternative method be used to achieve this, such as DNA analysis?
2. Shark identification: the Working Group, with WCPFC and ICCAT taking the lead, will harmonize guidance for shark identification, in collaboration with the IUCN shark specialist group and others. (Note-- IATTC shark ID guide is available in its website, and it provides a useful model for observer use).	No action undertaken The harmonisation of shark guides is an identified activity within the project that the FAO is currently coordinating the preparation of a new project (jointly with the tuna RFMOs, ISSF, Birdlife International and WWF) to be funded by the Global Environment Facility (GEF) for areas beyond National jurisdiction (ABNJ).
3. Sea Turtle identification: The Secretariats will provide the Working Group Chair with the materials currently in use for turtle identification so these can be harmonized and distributed to all tuna RFMOs.	No action undertaken
4. The Working Group should consider a process to develop harmonized marine mammal identification guides for the fisheries for which they are not available.	No action undertaken
Identify and recommend research priorities & prioritization of collaborative work	
Research Priorities Provisional list of research activities has been identified. All RFMOs to review and revise the	*Research Priorities* No action undertaken. The provisional list of Research Priorities remains as: Sea turtle by-catch mitigation and distribution

draft list by 31 December 2011. The BMIS to be modified to include this list. The list should also include current and upcoming research conducted or supported by tuna RFMOs. This would help to avoid overlap and ensure the efficient use of limited research resources. The list might include an outline, timetable and contacts for the research program, i.e. who is doing what, where and when. Such information would also be useful for scientists in government and academia, as well as NGOs.	Post-release survival of sharks, manta and devil rays, sea turtles, and seabirds Best practices for handling and release techniques of all taxa listed above Shark by-catch mitigation, primarily in longlines and also purse seines and gillnets Seabird by-catch mitigation in artisanal fisheries Sorting grids for small fish, tunas and other species Economic benefits of reducing by-catch Multi-taxa impacts of by-catch mitigation measures Assess impacts of gillnets/driftnet fishing on by-catch species Rate of marine mammal depredation and its relation to by-catch in longline fisheries Review of Ecological Risk Assessment methods Research to improve life history parameters, including biological parameters on all by-catch species. Evaluate the feasibility of video and other electronic monitoring and other technology is the context of tuna RFMO. Pursue observer coverage and adequate sampling of artisanal fisheries
Collaboration Each RFMO should designate/employ a dedicated bycatch staff person to work collaboratively with other RFMOs to promote bycatch related work. The Working Group should consider meeting in person every three years to prioritize research in line with the TOR of the Working Group. The Working Group in consultation with experts should undertake a review of ecological risk assessments used by the RFMOs and provide recommendations to standardize these assessments across RFMOs	*Collaboration* The FAO is currently coordinating the preparation of a new project (jointly with the tuna RFMOs, ISSF, Birdlife International and WWF) to be funded by the GEF for areas beyond National jurisdiction (ABNJ). If the project is successful in obtaining funding support, it will address the following research priorities: Longline • Testing the effectiveness of line weights, night setting and bird-scaring lines to minimise seabird interactions in Asian fleet operations, with a focus on identifying the most effective gear set up for the specific characteristics of these vessels and their fishing operations. • Testing the effectiveness of safe release techniques for sea turtles. Purse-Seine • Characterize the numbers and behaviours of by-catch under FADs to develop practical techniques for the reduction of by-catch, including best practices for handling and release. • Tagging studies of post-release mortality of sharks, including whale sharks, for which t-RFMO "no-retention" management measures exist • 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) for shark assessments.
Progress BMIS information sharing website	A business case for the expansion of the BMIS to a t-RFMO wide database is provided in Appendix 2. The development of protocols for sharing bibliographic information stored in the ICCAT by-catch database and the

The Working Group agreed to meet to develop a centralized bibliographic bycatch database that includes information on mitigation, bycatch conservation and management measures adopted by the RFMOs and past assessments undertaken by RFMOs; with the effort will be led by ICCAT, IOTC, and WCPFC.	BMIS delayed until the expanded BMIS is functional. There is also data security issues associated with other information stored on the ICCAT database that will require resolution before databases can be synchronised.
Sharks	
The working group will also examine if there is commonality in the incidence of whale and marine mammal interactions with purse seine fisheries across RFMOs.	No action undertaken
The Working Group is concerned with the practice of intentional sets on whale sharks, in RFMOs where there is evidence of the practice occurring, and recommends that tuna RFMOs initiate research to determine the impact and outcome of this practice.	See EB-WP-03 and EB-WP-04
RFMOs should conduct risk assessment processes to develop their priorities for shark species which may need further assessment or mitigation. RFMOs may wish to consider the WCPFC key shark nomination processes.	No progress on this activity. The attention of the SC is directed to a current project funded by Lenfest Ocean Program, to improve approaches for assessing impacts of fisheries by-catch on marine megafauna populations (marine mammals, sea turtles, seabirds and sharks). The project's leaders (Jeff Moore, Alex Curtis, Peter Dillingham, and Rebecca Lewison) and collaborators have led development and synthesis of estimators for by-catch reference points for these taxa, most of which are modeled on a PBR-like approach originally developed to limit marine mammal by-catch under the U.S. Marine Mammal Protection Act. A workshop at NOAA Southwest Fisheries Science Center, La Jolla, in March 2012 was used to review risk assessment methods for marine megafauna taxa in fisheries (justification, data requirements, similarities and differences, limitations, etc.) and to exchange ideas concerning how best to apply the methods, facilitate update by fisheries managers, effectively communicate assessment results, and identify pressing data gaps and assessment needs. Workshop participants are experts working on domestic and international by-catch issues for a range of taxa. A review paper resulting from this workshop is forthcoming. In response to the first La Jolla workshop, the project and collaborators are working on developing improved methods for estimating intrinsic productivity (rmax) for elasmobranch populations, based on combined allometric and population modeling approaches. This should yield productivity estimates that will permit improved productivity-susceptibility analyses or other types of impact assessments. A second expert working group devoted to this topic will convene for a workshop in La Jolla in December 2012. This project will be completed by mid-2013.

RFMOs should take action to improve data collection on sharks and manta and devil rays in targeted industrial and artisanal fisheries. As an example, the Working Group noted that a fins naturally attached requirement would improve species identification and enforcement and should be considered as part of existing shark finning bans.	No action undertaken
RFMOs should consider supporting studies to investigate post-release survival of sharks in longline fisheries in relation to hook type and duration of set, among other factors.	See description of the ABNJ project described in collaboration above
RFMOs should consider supporting studies to further develop shark bycatch mitigation strategies for longline fisheries.	See description of the ABNJ project described in collaboration above
RFMOs should evaluate the costs and benefits of banning the use of wire leaders in tuna longline fisheries.	No action undertaken
RFMOs should develop handling and release protocols for all sharks and manta and devil rays, taking into consideration the safety of the crews.	See EB-WP-13 and EB-WP-14
Funding sources	See description of the ABNJ project described in collaboration above. The ABNJ also includes resources for the expansion of the WCPFC BMIS into a tuna RFMO wide database including training and development workshops and the harmonisation of shark identification guides.
Compliance with data reporting requirements	No action undertaken. Advice from the SC is requested for this activity. Summary data can be prepared, with appropriate confidentialities maintained) however this would require agreement for access to Part 2 Annual report information or for the WCPFC Secretariat to provide this summarized information.

APPENDIX 1 Progress Report on Harmonisation of Bycatch Data Collected by Tuna RFMOs

Background

The second Kobe meeting of the tuna RFMOs established a joint technical working group on bycatch with the first 12 month work-plan for this group approved at the third Kobe meeting in July 2011. Included in this work-plan is the "harmonisation of bycatch data collected by tuna RFMOs" with the intended purpose of identifying the minimum data standards and data fields that should be collected across all RFMOs with a view to allowing interoperability. In establishing the minimum standards it is recognised that these should maximise the detail recorded (where practical) so that data users can aggregate information to suit the questions asked. Harmonisation of data across tuna RFMOs is desired to allow for more comprehensive reporting on the status of bycatch species, to assist with the identification of factors that cause or increase bycatch, and to evaluate the performance of mitigation methods. At the same time, improvements in quality of the data collection should help stock assessments and other functions of t-RFMOs.

The Inter American Tropical Tuna Commission (IATTC) is the only tropical tuna RFMO that employs its own observers. They are managed by its secretariat to undertake duties in the Eastern Pacific Ocean (EPO). If vessels cross the RFMO boundary between the IATTC and Western and Central Pacific Fisheries Commission (WCPFC) they also undertake observer duties that contribute to the WCPFC Regional Observer Programme (ROP). National observer programmes also operate in the EPO. All recognized observer programmes in the EPO collect common data fields which are specified by the IATTC. In the Western and Central Pacific Ocean (WCPO) the secretariat of the WCPFC supervisors its ROP. The ROP is based on the use of existing regional, sub-regional and national observer programmes that were already in place when the 'Conservation and Management Measure for the Regional Observer Programme CMM 2007-01 entered into force on 15 February 2008. The WCPFC provides minimum data fields, observer programme standards, facilitates the use of authorized observers in the ROP as required by CMMs in the WCPO, and that the ROP addresses the data and monitoring requirements of the Commission's CMMs. The International Commission for the Conservation of Atlantic Tunas (ICCAT) and the Indian Ocean Tuna Commission do not currently administer observer programs and have not yet develop minimum data fields or standards for observer programs operating in the Atlantic and Indian Ocean. Observer programs operating in these oceans are National Observer Programmes (eg. Spain and France).

A meeting of technical experts from tuna purse-seine fisheries observer programs was convened from 5 - 9 March 2012, in Sukarrieta, Spain, and provided the first opportunity for progress towards completion of this task for purse-seine fisheries. The meeting was organized by Martin Hall from IATTC with financial support from International Seafood Sustainability Foundation and held at the AZTI facility in Sukarrieta. The abbreviated name given to the meeting was Sukarrieta II. The objective of this meeting was to harmonize data collection systems and variable definitions to improve research on bycatch mitigation, stock assessment and other topics. The report of this meeting is provided in Appendix 1.1 to this report.

In this progress report to the Joint Technical Working a summary of the discussions at Sukarieta II that were directly relevant to the working group is provided along with a first draft of the minimum data standards and data fields for purse-seine fisheries for revision by the technical working group. This includes identification of areas where some uncertainty in data definitions remains. Attendees at the Sukarrieta II meeting that are also members of the Joint Technical Working Group were Martin Hall, Shannon Cass-Calay, Pilar Pallares, Josu Santiago and myself.

Issues pertinent for interoperability of observer data collected in the purse-seine fisheries of tuna-RFMOs.

1. OBSERVER COVERAGE

A number of studies (Lawson, 1997; Hall, 1999; Lennert-Cody, 2001; Babcock et al., 2003; Lawson, 2006a; Sánchez et al., 2007; Amandè et al., 2010) show that biases and precision are minimised when observer coverage exceeds 20%. When coverages are below this level appropriate statistical designs are necessary for the placement of observers to minimise the introduction of bias. Placement designs should include stratifications based on characteristics of vessel, gear and other factors.

There is potential for bias in the historical data of t-RFMOs. The observer coverage of purse seine effort in the EPO has been 100% for vessels with greater than 363 mt capacity (noting that these vessels represent over 90% of the catch of tunas in the EPO) for over two decades. In the WCPO 100% coverage has only been required for the last 2 years. The coverage rates varied by observer program prior to the introduction of the 100% requirement but has been >20% for all programs for the last decade. For ICCAT and IOTC the coverage is lower, but has been increasing in recent years.

When coverage rates are less than 100%, biases due to the placement of observers on vessels should also be checked. Observed and unobserved trips by vessels should be compared with regards to duration, catch rates, species composition, etc., to verify that there are no changes in vessel activity or fishers behavior in the presence of the observer.

2. Definitions of TRIP

There are differences in the definition of trips between observer programs. WCPFC/IOTC/ICCAT define the conclusion of a trip when unloading occurs (regardless of % unloaded) whereas IATTC define a trip as 20 days and/or when at least 50% of the catch is unloaded. The IATTC definition of trip is defined under the requirements for the multilateral Agreement of the International Dolphin Conservation Program (AIDCP).

IATTC assign a sequential trip number to every observed trip at its commencement as they have a central role in coordinating observer activities. This is not currently the situation for the other t-RFMOs. The trip number in the WCPO is a combination of the observer_code + year + sequential_trip_number_of_observer. In the Indian Ocean and Atlantic Ocean the observer programs of France and Spain the trip number is a combination of the landing_date + boat_code. Although the assignment method and format differs between t-RFMOs all observer trip numbers are unique in each observer program.

3. Definitions of ZERO CATCH SETS

The reporting of skunk sets (Zero catch sets) can differ between the t-RFMOs. In some cases, the catch per set based in all sets made regardless of their catch, is used, while other analyses use catch per successful set, excluding the zeroes. When comparisons between data already

summarized by t-RFMOs are made, how the skunk sets were treated should be checked to ensure comparability of data.

4. VESSEL REGISTER

Vessel Number

Vessel characteristics strongly influence the catch of purse seine vessels and in many statistical analyses of catch data the "vessel effect" is explicitly included in these models to interpret results (e.g. standardisation of effort, tracking of performance with regard to bycatches, characterising tuna fisheries). Such analyses can be compromised if vessels change flag or name and this is unknown to the data analyst (resulting in bias and psedo replication). The t-RFMOs currently have vessel registers of various forms to track vessel name and flag for compliance and other reasons. Movements of vessels between t-RFMOs also occur and explicitly including such movements in inter T-RFMO comparisons would make them more statistically powerful. Consequently, standardisation or interoperability in these RFMO registers is desirable. The unique vessel identifier system (TUVI - see http://www.tuna-org.org/vesselpos.htm) that list all authorized vessels for all T-RFMOs provides an opportunity for standardisation and interoperability. On the basis that t-RFMO continue to fully participate in TUVI then this number could be recorded on observer forms and vessel logsheets allowing association of data to vessels.

Vessel/Well capacity

The variation between vessel capacities is a significant determinant of vessel catch and operational strategy and it is desirable that this be included in the vessel registry to further help with the interpretation of data analyses. Currently capacity is measured either in metric tonne or in cubic meters depending on the country of vessel registration. Measurement in cubic meters is more common and standardising to this unit in the vessel register would be more efficient. The use of a conversion formula from metric tonne to cubic meters is required to facilitate comparison with historical data.

How wells are used during each trip can also vary (e.g. sealed, for non-tuna spp) and it is desirable that this be included in the details that observers record.

Vessel Nets

There are differences in the nets used by vessels that are likely to influence the presence and quantity of bycatch. Information on net characteristics is desirable for both standardisation of information and for identifying net types that may minimise interactions with bycatch. Establishing a catalog of net types is needed and could be established from port inspections or manufacturers. The IAATC have drafted a data form suitable for collecting the relevant net information. Changes in nets are infrequent on purse-seine vessels and the net-type could be included in the information stored on TUVI. Observers currently record an estimate of net size and depth and this information could be used to assist with updating TUVI information and identify when alterations to vessel nets are made.

5. Vessel Captain/Fishing Master Name

The experience of the vessel captain/fishing master influences the fishing strategy adopted and catch of purse seine vessels and the explicit inclusion of this effect in statistical models benefits the

interpretation of results. As vessel captains/fishing masters change vessel a unique identifier similar to TUVI for captains/fishing masters would be desirable. This would require additional collaboration amongst the t-RFMOs to establish such a standardised register.

6. Fishing Location Information

Observers are currently asked to collect information of the detection equipment used to determine fishing locations (such as bird radar capabilities etc). The inclusion of such information is also likely to assist with the interpretation of results and trends from statistical analyses. Rather than observers recording equipment capacity information it would be preferable that equipment manufacturer and model is recorded as the capability information can be collected from the supply companies.

Vessels are often provided with advice on where to fish through 3rd party analyses of real-time oceanography which is then relayed to the vessel. The inclusion of this information in statistical models may also assist with interpretation of results. The recording of whether 3rd party information was provided would be beneficial for analyses.

7. Observer Placement

Placement meetings that specify the roles, obligations and responsibilities of observers and vessel staff should be adopted by all t-RFMO as this helps ensure the collection of higher quality information. The exchange of information used in the placement meetings by the different t-RFMOs will help in adding consistency and completing the list of issues addressed. This is particularly important for vessels that may fish across the jurisdictions of t-RFMOs (e.g. Pacific) on a trip where RFMO requirements may differ.

8. Data Confidentiality

There is no homogenous policy regarding the right of captains/fishing masters to review and make comments regarding the data that the observer collects. Some RFMO observer programs are bound by the requirements of their organization, like the IATTC/AIDCP observer programs, but others do not have these requirements. It is advisable that when such review occurs that this is recorded so that data analysts are aware of differences in data collection procedures. This information is likely to be particularly pertinent where independence between vessel logbook and observer data is assumed.

9. Environmental Data

Environmental data is currently collected on observer forms with some consistency in data collected across RFMOs (e.g. wind speed, SST). These have been collected to help inform analyses on catchability (e.g. currents, wind strength that may affect set malfunction), and to better understand aggregation rates and/or species assemblages under FADs (eddy activity, frontal conditions, thermocline depth, etc.). The availability of high resolution environmental data from satellites, moorings, and oceanic general circulation models has increased significantly in recent times and it may be more efficient to obtain this information from this source in the future.

10. Data Quality and Management

Auditing systems are critical to ensure the highest quality of observer data is available for users. Inter RFMO analyses would benefit from the application of consistent quality control measures to all data. In this respect, the auditing/editing system developed by IATTC is very comprehensive and could easily be adopted by the other t-RFMO's. This would assist with all t-RFMOs achieving data standards.

There recording of vessel activity TIME in UTC format is preferable for data consistency. IATTC observers collect the time of sunrise/sunset which is used to synchronise ship's time with the time in the area of operation. WCPFC observers synchronise UTC time with ship's time at the start of each day, which enables the ship's time recorded for activities during each time to be converted to UTC time. While both methods are different, there was enough information collected to determine UTC time in each database. The French and Spanish observer programs report time in UTC.

11. Length Measurement of tuna discards

IATTC observers collect an estimate of target tuna discard weight in size range (weight) bins but WCPFC observers take length measurements from a random sample of the discards to get size distribution and species composition of the discards and estimate the overall tuna discards. Despite differences in the methodology, the general requirement (i.e. the catch by species estimate and size distribution of discards) is consistent between these two RFMOs. The size bins approach may however restrict the application of length increment based analyses (eg. cohort) if the bin range is too large.

12. Definition of Set types

The language used to describe set types varies between t-RFMOs. Documentation is required that specifies definitions of set types for each t-RFMO to avoid the potential for incorrect assignment of set type for cross t-RFMO comparison. The Sukarrieta II meeting identified the following broad thesaurus of terms:

Preferred term and preliminary definition	IATTC	WCPFC	IRD IEO AZTI
School set *Sets on schools were there are no indications of association with floating objects, marine mammals or whale sharks*	1. Boilers 2. Breezers 3. Finners 4. Foamers 5. Jumpers 6. Rippler 7. Shiners 8. Splasher 9. Subsurface	1. Unassociated 2. Feeding on baitfish 3. Free School	Free School
Drifting FAD set *Sets on floating objects constructed and deployed or encountered and modified by the fishers to attract fish to facilitate their aggregation and capture. This may include using*		1. Drifting raft 2. Drifting FAD 3. Drifting payao	FAD set

the vessel (or its support boats) to act as the FAD.			
Log set *Sets on encountered floating objects, including natural, man-made objects, dead animals, etc., as far as they are not intentionally deployed or modified by human intervention*		1. Drifting log 2. Drifting debris 3. Dead animal	FAD set
Payao set *Sets on encountered man-made floating object that are anchored*		1. Anchored FAD 2. Anchored raft 3. Payao	
Whale set *Sets are made very close or encircling the live whale(s).*		1. Live whale	
Whale shark set *Sets are made very close or encircling the live whale shark.*		1. Live whale shark	
Dolphin set *Common only in the eastern Pacific. There is a clear association, and the set is preceded by a chase of the dolphin herd.*			
Baitboat set *Sets occur in association with a baitboat. The baitboat drifts or sails slowly, attracts a tuna school, and may keep it by chumming the water. They are left as a separate class because of the potential effect of chumming that makes it different from a regular floating object.*		8 Other floating object	
Seamount set			

To aid in establishing solid statistical basis for pooling data it would also be desirable for analyses be undertaken to ascertain the differences in catch and assemblage composition between the difference set types within and across t-RFMOs.

13. FAD Records

FAD sets are easily identified when the FAD is encircled, but occasionally the sets may happen in the vicinity of the FAD. There is some uncertainty in these circumstances on how to define the set type. The Sukarrieta II meeting suggested that if a FAD was observed within a small distance (e.g. 0.5 to 1 nm) from the area encircled then the presence of the FAD should be recorded. This information would allow the classification of the set type to be determined by the data analyst.

It is also desirable that the material used to construct encountered FADs be recorded as this influence the longevity of FADs and the assemblage associated. Recording of FAD dimensions including the depth of the submerged material is also highly desirable.

14. Mitigation Measures

Understanding the performance of mitigation measures work is a priority activity for most T-RFMOs. To facilitate analyses to inform t-RFMOs on performance the recording of the type of mitigation measures (if any) that were used on observer forms in addition to the fate of the animal would be beneficial.

15. Revision of draft standards

Revision of the standard data fields should occur after the upcoming ISSF workshop on standardizing purse seine cpue to ensure that the collection of data relevant for developing indices of abundance for use in stock assessment are appropriate and well defined.

Other issues identified that are pertinent to the "Kobe Process" and bycatch

1. Observer Programs

The internationalization of tuna fisheries is resulting in observers from multiple programs working in many RFMOs (e.g. IATTC and Spanish observer working on vessels that cross into WCPFC jurisdictions). Presently, the observer programs in the EPO, Indian Ocean and Atlantic Ocean require that their observers have a University degree. In the WCPO different regional programs only require that they have completed a high school level education and that they can have the capability to write clear reports in English. The adoption of "competency based standards" for observers and observer training that are coherent within the t-RFMO's would avoid potential differences in observer qualifications and assist with ensuring consistency in data recording. Coherent standards within the RFMOs would also help ensure that observers are aware and capable of the specific data collection needs associated with each RFMO. The "Kobe process" provides the opportunity to develop these standards and could be included in agenda of future "Kobe" meetings

To avoid potential biases in observer data the "Kobe process" provides the opportunity for developing joint RFMO policy that "placement of observers on vessels should be based on scientific principals and not on the willingness of vessels to accept observers".

"Safety on board" vessels are an increasingly important issue for observers and Agencies/Organizations responsible for observer placement. Future "Kobe meetings" should promote that the RFMOs members provide safe and sanitary conditions to observers so these can perform their duties with the desired level of competence.

Current developments in electronic equipment should enhance the observer's duties. This includes current initiatives in on-board observer data processing (i.e. IRD-Sete system which can be used on "tablet" units) and the application of video camera technology to assist with the estimation of bycatch composition and biomass. The application of this technology should help reduce the burden of monitoring and free the observer to collect more scientific information. Pilot projects for such initiatives should continue as a matter of priority, with information shared between the t-RFMOs. The technology currently has limitations and until the technology is improved, the Sukarrieta II meeting cautioned against full-scale implementation until complete testing had been undertaken and adequate resources are allocated, including comprehensive technical support in all areas.

The preliminary review of t-RFMO observer training activities held during the Sukarrieta II meeting indicates that they are consistent across the RFMOs. A desired aspect of training, other than the

obvious information about the fishery and species identification, should include instructions to observers on the different issues related to culture and what was called 'etiquette' onboard the vessels. Furthermore, as the captain/master determines the fishing strategy it is desirable that specific training/extension/outreach is provided to these persons on bycatch mitigation measures. As the observer is often viewed by the captain/master as a source of information on mitigation it is also desirable that observers are provided with suitable information that can be provided to fishing masters on mitigation measures.

2. Data Quality and Management

The Sukarrieta II meeting provided a rare opportunity for those responsible for data quality and management to discuss shared issues. A more regular meeting (eg 2 years) where t-RFMO data managers meet to maximise information sharing and system development would be highly beneficial to maintaining coherence between the data management systems of each t-RFMO. Similar harmonization meetings should be planned for longline observer programmes.

3. Environmental Variables

The environmental data collected by observers provides an additional source of independent data for the validation of Oceanic General Circulation Models (OGCM). Oceanographic institutions responsible for developing these models should be advised on the existence of these environmental data and the data made available to improve the OGCMs if requested.

Observer Purse-Seine Data Harmonisation

Inter-operability in the data collected on bycatch on purse-seine vessels is required for undertaking global analyses on bycatch prevalence and mitigation methods beyond the most rudimentary level. Developing indices of abundance and interpreting catch per unit effort data derived from purse-seine fisheries is difficult due to the frequent and rapid changes in vessels and fishing equipment and strategies. The more detailed information that is collected on vessel and effort characteristics aids the standardisation of purse seine data. Standardising data forms across established observer programs is also difficult as many collect information beyond that required for t-RFMO/Country specific reasons. Consequently we do not focus this harmonization review on changes required to existing data forms. Instead we examine inter-operability between t-RFMOs observer data by listing the data fields collected by each t-RFMO and provide a qualitative evaluation of interoperability based on the similarity and level of detail reported in each t-RFMO. A ranking of 'HIGH' meaning most data fields and details are the same, 'INTERMEDIATE' meaning some similarity in data fields and detail and 'LOW' meaning little similarity in data fields and details that would result in restricted inter-operability. The Table below summarises this evaluation. The more detailed list of data fields is provided below this Table.

Data category	**Rank**
Harmonisation of Effort Data	
Vessel Identification *(Information to uniquely identify vessels)*	HIGH
Vessel Trip Information *(Information to calculate trip duration, location and time)*	HIGH
Observer Information *(Information to uniquely identify captain/fishing master)*	HIGH

Crew Information *(Information to calculate crew number)*	HIGH
Vessel and Gear Attributes *(Information to detail vessel specification and equipment)*	HIGH
Daily Activities *(Information characterise vessel fishing and non-fishing activities during a trip allowing effort to be examined in finer resolution)*	INTERMEDIATE
School and Set Information *(Information to characterise school type and detection method)*	HIGH
Harmonisation of catch data	
Catch Information *(weight and or numbers of target and bycatch species)*	INTERMEDIATE
Length Information *(weight and or numbers of target and bycatch species)*	LOW
Species of Special Interest *(weight, length, fate and description of interaction)*	INTERMEDIATE

OBSERVER PURSE-SEINE DATA HARMONISATION

Harmonisation of Effort Data

Part 1. Vessel Identification

The current "Minimum Data-field Standards" specified by each of the t-RFMOs are outlined in the Table below. However, if each t-RFMO fully participates in the TUVI database then the TUVI number is all that is required to uniquely identify vessels for inter-operability.

IATTC	IOTC & ICCAT (IRD IEO AZTI)	WCPFC
Full Name of Vessel **Vessel Code (provided by IATTC)** **Vessel Flag (provided by IATTC)**		**Full Name of vessel** (including any numbers). **Flag State Registration Number** (sourced from the vessel papers). **International Radio Call Sign** (ICRS; issued to the vessel by the flag State in accordance with IMO regulations). **Vessel Owner/Company** **Hull markings consistent with CMM 2004-03**. **WCPFC identification number (WIN) markings consistent with CMM 2004-03**. **WIN format for markings consistent with CMM 2004-03.**

Part 2. Vessel Trip Information

The current "Minimum Data-field Standards" specified by each of the t-RFMOs are outlined in the Table below. Currently IAATC define a purse-seine vessel trip differently to the other t-RFMOs with a trip concluding at 20 days and/or when at least 50% of the catch is unloaded. The clear reporting of when a trip commences and concludes is required to reduce the potential for inappropriate representation of trip data when inter-t-RFMO comparisons are undertaken.

IATTC	IOTC & ICCAT (IRD IEO AZTI)	WCPFC
Trip Number (unique 4-digit number assigned by IATTC) **Date (YYMMDD) of departure from port.** **Name of the port of departure** **Date (YYMMDD) of return to port** **Name of the port of return**		**Date and time of departure from port.** **Name of the port and country of departure** **Date and time of return to port** **Name of the port and country of return**

Part 3. Observer Information

The current "Minimum Data-field Standards" specified by each of the t-RFMOs are outlined in the Table below. The most important data are those that identify the duration of the observers trip and information that can be used to uniquely identify the observer for the purpose of interoperability. The creation of a joint t-RFMO observer register may be an efficient way to achieve the "unique observer identity" (ie similar principal to TUVI).

IATTC	IOTC & ICCAT (IRD IEO AZTI)	WCPFC
Observer name (First and Last name) **Observer code** (provided by IATTC)		**Observer name** (First name(s) First and Last name Last – no abbreviations or initials) **Nationality of observer** (Passport Country) **Name of Observer Programme** -country and or organization **Date, time and location of embarkation** **Date, time and location of disembarkation**

Part 4. Crew Information

The current "Minimum Data-field Standards" specified by each of the t-RFMOs are outlined in the Table below. The most important data are those that identify the total crew number and uniquely identify the captain/fishing master. The creation of a joint t-RFMO captain/fishing master register may be an efficient way to achieve the "unique observer identity" (ie similar principal to TUVI).

IATTC	IOTC & ICCAT (IRD IEO AZTI)	WCPFC
Name of fishing captain 1 (Last name(s) and First name) **Name of fishing captain 2** (Last name(s) and First name) **Date (YYMMDD) for change of captain (if occurred)** **Captain 1 code (provided by IATTC)** **Captain 1 code (provided by IATTC)**		**Name of captain** (First name(s) First and Last name Last – no abbreviations or initials) **Nationality of captain and type of Identification document** (e.g. Passport nationality of the captain). **Name of fishing master** (First name(s) First and Last name Last – no abbreviations or initials). **Nationality of fishing master and type of Identification document** **Total number of other crew and nationalities** (eg. 8 Philippines 6 Samoans 4 Taiwanese) **Total number of Crew** (total number of persons on the vessel excluding the observer).

Part 4. Vessel and Gear Attributes

The current "Minimum Data-field Standards" specified by each of the t-RFMOs are outlined in the Table below. The characteristics of the vessel and gear assist with standardizing effort and the over-riding principal for data collection should be to maximize the detail to the better the standardization. If the t-RFMOs fully participate in TUVI then much of the required information could be collected during registration and stored in the TUVI database.

IATTC	IOTC & ICCAT (IRD IEO AZTI)	WCPFC
Vessel Attributes		
Capacity (provided by IATTC) **Number of Speedboats** (the number that are functional) **Bow Thruster** (yes/no, equipped & operable) **Helicopter** (yes/no, equipped) **Ring stripper** (yes/no, equipped & used) **Number of screws** (number of propellers powering the vessel) **Power Block Diameter** (inches) **Inflatatble Raft** (yes/no, equipped & operable for dolphin rescue) **High Intensity Floodlights** (yes/no, equipped & operable and capable of producing 140,000 lumens) **Diver**		**Vessel cruising speed** (defined as the speed the vessel travel, which allows it to optimize its fuel usage but also gets the vessel along at a good speed). **Vessel fish hold capacity** (The total maximum amounts in metric Tons (mT.) that the vessel freezers, wells and other fish storage areas on a vessel can hold). **Length** (taken from the vessel plans or from other paper work that indicates the LOA). **Tonnage** (specify unit. The vessel may be registered using Gross Tonnage (GT) or in (GRT) this will be indicated on the vessel registration papers). **Engine power** (Specify unit. Usually be found in the vessel plans or from the engineer). **Number of onboard support vessels** (How many vessels on board other than the net skiff, i.e. speedboats light boats, tow boats). **Aircraft Make/Model,/Colour/Call- sign/Registration**
Gear Attributes		
Maximum depth of net (observer estimated in fathoms) **Maximum depth of net** (observer estimated by reporting no. of panels) **Maximum length of net** (observer estimated in fathoms) **Net mesh size** (inches, measured by observer) **Dolphin Safety Panel Depth** (observer estimated in fathoms)		**Maximum depth of net** (obtained from engineer) **Maximum length of net** (obtained from engineer) **Net mesh size** (measured by observer) **Brailer(s) capacity sizes** (recorded in MT)

Dolphin Safety Panel Depth (observer estimated by reporting no. of panels) **Dolphin Safety Panel length** (observer estimated in fathoms) **Dolphin Safety Panel mesh size** (inches, measured by observer)		
Vessel electronics (preference for make(s) and model(s) to be specified for each piece of equipment		
Sonar (yes/no, used to locate schools during cruise) **Bird Radar** (yes/no, equipped & operable)		**Radars** **Depth Sounder** **Global Positioning System (GPS)** **Track Plotter** **Weather Facsimile** **Sea Surface Temperature (SST) gauge** **Sonar** **Radio/ Satellite Buoys** **Doppler Current Meter** **Expendable Bathythermograph (XBT)** **Fishery information services** **Satellite Communications Services** (Phone/Fax/Email numbers, and record Satellite numbers) **Vessel Monitoring System** (Indicate the type of systems used on a vessel).

Part 5. Daily Activities

The t-RFMOs require that a log/journal of daily activities is completed by the observer. This information is required to characterise effort data at resolutions finer than the trip (eg. set level). For inter-operability date, time, duration and location of activities is required. Activities can be classified into those that describe: the set; searching; transiting; FAD maintenance, deployment and retrieval; drifting; seamount; transshipment; and other non-fishing activities (such as breakdowns, sheltering from bad weather). There is considerable variation in the detail currently collected under these headings by each of the t-RFMOs but fishing activities can be clearly determined which is the critical requirement.

When floating objects are encountered the details for collection specified by each t-RFMO also vary, however information is collected on the type and detection method, and if the object is a FAD information is collected on its origin, construction and attachment materials, disposal, associated electronics/markers and size. The information collected by each t-RFMO appears sufficient to differentiate floating objects into FAD and non FAD and catergorize differences in FADs providing an intermediate level interoperability between t-RFMOs.

The current "Minimum Data-field Standards" specified by each of the t-RFMOs are outlined in the Table below.

IATTC	IOTC & ICCAT (IRD IEO AZTI)	WCPFC
Time of Sunrise and Sunset **On effort** (Yes/No whether on or near bridge to observe vessel operations) **Date of a particular event/activity** (ships time) **Time of event/activity** (ships time) **Latitude and longitude of activity** (record position of each activity) **Searching method** **Sighting method** **Bearing from Ship to sighting** (in degrees) **Distance from ship to sighting** (nearest 10th nautical mile) **Vessel speed** (search and run events) **Water temperature** (every set) **Weather** (cloud cover, beaufort No, visibility for every search or run)		**Date and time of start of daily activities** (both ships time and UTC recorded) **Time of activity** (Record ships time for each activity) **Latitude and longitude of activity** (record position of each activity) **Numbers of school sighted per day** (How many free or associated schools of fish were sighted during the day)

Aerial Assistance (yes or no if helicopter or plane used) **Catch per set** (metric tons) for YFT, SKJ, Others (with codes) **Wells used** (well number catch was loaded in)		
Activities codes provided are	**Activities codes provided are**	**Activities codes provided are**
To describe the set	*To describe the set*	*To describe the set*
End set Mammal set Unassociated tuna set Floating object set	Start of set (skiff on water) (Début pêche largage du skiff)) End of set (retrieve skiff) (Fin de pêche (remontée du skiff))	Set Setting on FAD Net cleaning set
To describe searching	*To describe searching*	*To describe searching*
The vessel is searching Log sighted	Searching (general) Searching exclusively for floating objects (Recherche exclusive d'objets flottants) End of searching (Fin de veille)	Searching Investigate free school Investigate floating object Helicopter takes off to search Helicopter returned from search
To describe transiting	*To describe transiting*	*To describe transiting*

Departed from a port Arrived at a port Depart at sea Arrive at sea Running to another area or to a port (no crew member is looking for signs of fish for 5 mins or more)	Transit (steaming) (route sans recherche) Transit to favourable oceanographic area (Route vers le système observe) Boat arriving on favourable oceanographic area (Thonier arrivant sur le système détecté) Steaming at night towards an object (Route de nuit vers objet) Continued steaming towards favourable area (as per code 04) and write what the observed system is (Poursuite de la route vers le système observé (cela suppose que l'activité de la ligne précédente ait été codée 04). Les systèmes observés la première fois doivent donc être répétés dans la ou les lignes suivantes)	Transit
To describe other non fishing activities	*To describe other non fishing activities*	*To describe other non fishing activities*
	Breakdown at sea (Avaries en mer) Bad weather (sheltering with engine on) (A la cape) In Port (Au port)	No fishing - Breakdown No fishing - Bad weather In port No fishing - Other reason
To describe FAD activities	*To describe FAD activities*	*To describe FAD activities*
	Deploy or modify floating object (Pose ou modification d'une épave) Retrieve a floating object belonging to the boat (Récupération d'une épave appartenant au bateau) Retrieve a floating object not belonging to the boat (Récupération d'une épave n'appartenant pas au bateau) Retrieve the object (Récupération d'une épave)	Deploy - raft, FAD or payao Deploy locating buoy Servicing FAD or floating object Retrieve - raft, FAD or payao Retrieve locating buoy Investigate floating object using sonar/sounder Vessel drifting beside FAD attracting fish away from FAD before carrying out a Set Vessel setting close to FAD (specify estimated distance) Vessel using lights of boat or light boat to attract fish from FAD during night
To describe drifting activities	*To describe drifting activities*	*To describe drifting activities*

The vessel is drifting	Drifting at night with engine shutdown (En dérive la nuit (moteur stoppé)) Drifting close to school or floating object (En dérive près d'un banc ou d'un objet flottant)	No fishing - Drifting at day's end No fishing - Drifting with floating object Drifting -With fish aggregating lights
To describe seamount activities	*To describe seamount activities*	*To describe seamount activities*
	At anchor on seamount (Mouillage au dessus d'un mont sous-marin)	
To describe transshipping activities	*To describe transshipping activities*	*To describe transshipping activities*
	Transshippment at sea (Transbordement en pleine mer)	Transshipping or bunkering
To describe other activities	*To describe other activities*	*To describe other activities*
	Other (Autres (à préciser dans les notes))	
When the activity is associated with a floating object or the sighting of a floating object the following information is also collected		
Type of Floating Object	**Type of Floating Object*****means I am not sure if this is a non FAD category	**Type of Floating Object**
To describe Non-FAD floating Objects	*To describe Non-FAD floating Objects*	*To describe Non-FAD floating Objects*
Non FAD Tree Dead animal	Tree (or branch) Palm of coconut/palm tree Dead animal Box, drum or large board Rope, cable Net or piece of net Plastic Object Metal object Artificial object (without locating beacon)*** Experimental object*** Drifting Raft or buoy***	Tree or log (natural, free floating) Dead Animal Manmade object (Non FAD)
To described FADs	*To described FADs*	*To described FADs*

FAD Artificial light for attracting fish Construction material Chain / cable / rings Cane / bamboo Bait container / bait Cord / rope Floats / corks Net material Sacks / bags Planks / pallets / plywood Metal drum / plastic drum PVC or other plastic tubes Plastic sheeting	Drifting raft (line and net) with beacon/buoy DCP anchored (purpose of attracting fish) Tuna boat (or skiff) Support boat (supply) Bundled straw Dead animal with beacon/buoy Manmade object (box, drum, board, rope, cable, net (or piece), plastic) with a beacon/buoy	Manmade object (Drifting FAD) Anchored Raft Fad or Payao Anchored Tree or Logs Tree or logs (converted into FAD) Debris (flotsam bunched together) Construction material Logs, trees, debris tied together Timber/planks/pallets/spool PVC or plastic tubing Plastic drums Plastic sheeting Metal drums Philippines design drum FAD Bamboo/cane Floats/cork Other Attachments Chain, cable rings, weights Chord/rope Netting hanging underneath FAD Bait containers Sacking/Bagging Coconut fronds/tree branches Other
Other Unknown		Other
How Floating Object is detected	**How Floating Object is detected**	**How Floating Object is detected**
By Visual Observation	*By Visual Observation*	*By Visual Observation*

Visual - the object itself Visual – Flag, Buoy, cork, etc Lights Visual - birds		Seen from vessel by crew Helicopter report Lights Flock of Birds sighted from vessel Discovered in pursed net
By Electronic/Remote Observation	*By Electronic/Remote Observation*	*By Electronic/Remote Observation*
Radio transmitter / beeper Radar reflector Radar Satellite	Radio direction finder (Radiogoniomètre) Satellite with various additions Radiogoniomètre + GPS GPS Serpe Satellite + échosondeur indéterminé Satellite sans échosondeur Satellite + sonar Satellite + échosondeur Zunibal Satellite + échosondeur Satlink Satellite + échosondeur Nautical Satellite + échosondeur autre (à préciser dans les notes)	Found using vessel radio buoy Bird radar Sonar / depth sounder Information from other vessel Navigation Radar Anchored (GPS) Marked with GPS buoy
Other Method	*Other Method*	*Other Method*
		Being deployed (so not detected)
Other	Autre type (à préciser dans les notes)	Other (please specify in comments)
Unknown		Unknown
IF a FAD then the following is also collected		
Origin of the FAD	**Origin of the FAD**	**Origin of the FAD** (** PIRFO addition)
Your vessel – this trip Your vessel – previous trip	Belonging to this boat or the company	Your Vessel
Other vessel– owner consent Other vessel– no owner consent	Belonging to another boat or another company	Other vessel's- with permission Other vessel's- without permission Other vessel's- consent unknown**

	Drifting Object found	Drifting and found by your vessel
	Seeded	Deployed by FAD auxiliary vessel
	Other	Other (describe)
Unknown	Unknown	Unknown (describe)
Disposal of the FAD	**Disposal of the FAD**	**Disposal of the FAD**
	Attach a beacon/buoy	Deploy - raft, FAD or payao Deploy radio buoy
Left in water with description of FAD component (as above)	Left in water Remain in water with the same beacon/buoy Replace the beacon/buoy	Manmade object (Drifting FAD)- changed Servicing FAD or floating object Retrieve radio buoy
Removed	Retrieve on vessel Destroyed Sink	Retrieve - raft, FAD or payao
	Other	
Electronics associated with FAD	**Electronics associated with FAD**	**Electronics associated with FAD**
Direction to the object		Radio buoy (with identification)
		Radio buoy -unidentified
Geographic position of the object		GPS buoy (with identification)
		GPS buoy - unidentified
Tuna quantity		Sounder buoy (with identification)
Tuna species		Sounder buoy - unidentified
		Light buoy
Water Temperature		Other (describe)
		Unknown (describe in comments)
Estimated size of FAD	**Estimated size of FAD**	**Estimated size of FAD**
Simple Diagram of FAD to be drawn indicating dimensions.		Simple Diagram of FAD to be drawn indicating dimensions.
Dimensions (in m)		

Netting hanging from the object (yes/no/unknown), estimated area of hanging netting (m^2), predominant mesh size (inches)		Record depth of Netting and or other materials hanging from FAD
Tag number		FAD Markings or numbers
Maximum depth of object (m)		
		Describe condition of the FAD when first and any attachments.
		Describe any changes or additions to the FAD by the vessel.
Other Data	**Other Data**	**Other Data**
Bait container refilled (yes/no/unknown)		
Fauna entrapped		
Water clarity (clear/turbid/very turbid)		
% epibiota		

Part 6 School and Set Information

Each of the t-RFMOs currently collects information on how the school was detected (with categories under the sub-headings of by observation and by the use of electronics), the type of school, and reasons why a set did not occur or was only partially completed. The level of detail varies between t-RFMOs, however the essential information to define school type which is required for inter-operability is collected by all t-RFMOs. WCPFC may wish to include a data category for breakdowns that occur during a set to allow differentiation of these malfunctions. Preferred definitions of school type are outlined in the preceding sections of this document. The current "Minimum Data-field Standards" specified by each of the t-RFMOs are outlined in the Table below.

IATTC	IOTC & ICCAT (IRD IEO AZTI)	WCPFC
		Method of detection of school (How the vessel first detected the fish) Codes are:
By Observation	*By Observation*	*By Observation*
Birds sighted Mammal sighted Other cue sighted Splashes sighted Breezer sighted Log sighted Chase	School (no precision on type of school) (Matte (pas de précision sur le type de banc)) Need to complete translation… , Splasher (Balbaya, Sardara, Brisant ou rouge, Saut) Birds (Oiseaux) Object no beacon (Épave non balisée) Dead animal (Charogne) Small cetacean (dolphin, pilot whale) (Petits odontocètes (Dauphins, globicéphales, etc.)) Big cetacean (sperm whale) (Grands odontocètes (Cachalots)) Whale (eg Baleine) (Mysticètes (Baleines)) Whale shark (Requin baleine) Shark (Requin) Other tuna boat (Autre thonier) Supply vessel (Navire auxiliaire ("supply")) School that have escaped from previous set (Même banc échappé d'un encerclement antérieur)	Seen from vessel Seen from helicopter

	Boat school (Banc sous le thonier) Tuna in deep (Thons en profondeur) Fishing on seamount (Pêche sur haut-fond (guyot)) Fishing on drop off of continental shelf (Pêche sur rupture du plateau continental)	
Using Electronics	*Using Electronics*	*Using Electronics*
	Object with beacon (Épave balisée) Dead animal with a beacon (Charogne balisée)	Marked with beacon Bird radar Sonar / depth sounder Anchored FAD / payao (recorded)
Other Method	*Other Method*	*Other Method*
	No system (Aucun système) Other (Autres (à préciser dans les notes))	Info. from other vessel
	Code specified when analysing data (non codé à la saisie mais après traitement)	**Type of school association** (Noting that fish feeding on bait fish with no floating objects around is considered unassociated). Codes are:
Unassociated tuna set	Free school (Banc libre)	Unassociated Feeding on Baitfish
Floating object set Live Whale set Dolphin set	School object (Bonc objet) Whale set (Coup sur baleine) Whale shark set (Coup sur requin baleine)	Drifting log, debris or dead animal Drifting raft, FAD or payao Anchored raft, FAD or payao Live whale Live whale shark Other floating object (please specify)
Accidental set		No tuna associated
Malfunction	**Malfunction**	
Roll-up Main engine failure	Unknown (Inconnue) Fish escape by diving (Poisson ayant coulé) Fish escape as travelling to quick (Poisson allant trop	

Main vessel hydraulic failure Skiff failure (mechanical or hydraulic) Speed boat failure Winch failure (mechanical) Power block failure Bow thruster failure Ripped net (not caused by roll-up) Broken purse cable Fouled or broken bunchline Fouled or broken corkline Broken leadline Broken skiff towline Broken vang guy line Broken topping winch cable Webbing in the rings Webbing caught on the stern Other	vite) Current to strong (Courant trop fort) Too many fish (Trop de poisson) Net damage (Filet déchiré) Winch failure (Panne de treuil) Bad weather (Mauvais temps) Whale escape and school follow (Échappement de la baleine et le poisson la suit) Other (Autre (à préciser dans les notes))	
Reason no set	**Reason no set**	
Tuna separated from the dolphin school Dolphin running to a rain squall Other reason Voluntary aborted set	Nothing to report (Rien à signaler (pas d'observations) Captains decision (Décision du capitaine) School to small (Banc trop petit) Fish to small (Poissons trop petits (poids, taille)) Company decision (eg for spp composition reasons) (Par décision de l'armateur (ex.: banc de listao détecté, alors que l'armateur à ce moment là n'est intéressé que par de l'albacore)) School behaviour (Comportement du banc) Moving to quick (Se déplace trop rapidement) Fish dive before making set (Le poisson plonge avant la calée)	

	Too deep (detected by sounder/sonar) (Trop profond (détecté par le sonar)) Other (Autres) Sighting without fish (Observation sans poisson) Strong current (Forts courants) Mechanical failure (Avarie mécanique) Another boat is setting on the school (Un autre bateau encercle le banc)	

Harmonisation of catch data

Part 7 Catch Information

Each of the t-RFMO require that the observer estimate the weight of the catch and/or numbers of bycatch species. The weight categories differ between the t-RFMOs and this places restriction on the inter-operability of the data collected. Information on whether the catch is retained or discarded is collected by each t-RFMO and although there are differences in the levels of detail the information is reasonably coherent allowing for inter-t-RFMOs comparison. The current "Minimum Data-field Standards" specified by each of the t-RFMOs are outlined in the Table below.

IATTC	IOTC & ICCAT (IRD IEO AZTI)	WCPFC
Trip number, Set number, Date **Let go time** (time when the skiff, with the net attached, hits the water) **Ringsup time** (the time when all the purse rings break the surface of the water) **Endset time** (the time when the skiff is secured on deck after completing the set) **Tunaset or logset** **Evidence of strong currents during set & how determined** **Malfunctions during the set** (rime occurred, time repair completed, delay in the set)		**Observer's record of date and time of start of set** (usually recorded when the pelican hook is released and net skiff slides in to the water taking the net with it) **Observers record of date and time of end of set** (Record when the net skiff is hauled on board after the set) **Vessel's record of date and time of start of set** (Record what time and date the vessel has entered in the Log sheet for the same set) **Retained catch and Discards, by species** (Record all species that are retained using the FAO codes.
		PIRFO forms request an estimated breakdown down of total tuna catch (MT) by % in the following categories SKJ, YFT<9kgs, YFT>9Kgs, BET<9kgs, BET>9Kgs and number for YFT>9Kgs and BET>9Kgs).
		An estimate of the catch by fate code is also requested for target tuna and bycatch according to the following codes:
For retained catch	*For retained catch*	*For retained catch*

Human consumption Mixed (some catch consumed, some discarded)	retained (in well) (Mis en cuve) Partially kept (shark fin, dry fish etc) (Partiellement conservé (Ex. : ailerons de requin, poisson séché, etc.)) Crew consumption (Utilisé en cuisine du bord)	Retained – whole weight Retained – headed and gutted (billfish only) Retained – gilled and gutted (kept for sale) Retained – partial (eg. fillet, loin) Retained trunk – fins retained(shark only) Discarded trunk – fins retained (shark only) Retained – crew consumption Retained – other reason (specify)
For discarded catch	*For discarded catch*	*For discarded catch*
Discarded Species/size undesirable for market Catch lost due to ripped sack Vessel full Well limitation (wells not ready to receive fish) Condition undesirable for market Other	Discard in sea alive (Rejeté vivant à la mer) Discard in sea dead (Rejeté mort à la mer) Wrong size (Taille) Wrong species (Espèce) Wells full (Cuve pleine) Damage fish (Poisson abîmé) Other (Autre (préciser dans les notes))	Discarded – too small (tuna only) Discarded – unwanted species Discarded – gear damage (tuna only) Discarded – vessel fully loaded Discarded – shark damage Discarded – whale damage Discarded – poor quality Discarded species of special interest – alive Discarded species of special interest - dead Discarded species of special interest – unknown condition Discarded - other reason (specify)
		Tag recovery information

Part 8 Length Information

IATTC currently do not require length measurements to be undertaken on the vessel and have implemented port sampling for these data. The diversity of unloading locations for the IATTC is believed to be low and the traceability of tuna catch high. Consequently length based information collected in port can be related back to the set. The traceability of catch in the WCPFC is more complex due to the occurrence of well sorting and high diversity of unloading locations and observers are required to undertake length measurements on the vessel. This includes measurement of discarded species and those of special interest which provides the opportunity to raise the catch data into finer resolution size increments. This is not possible for discarded species in the IATTC and inter-operability with the IATTC is poor for this data field. The current "Minimum Data-field Standards" specified by each of the t-RFMOs are outlined in the Table below.

IATTC	IOTC & ICCAT (IRD IEO AZTI)	WCPFC
		Species code (FAO).
		Length measurement code (as per the measurement methods given in the codes) Upper jaw to fork in tail Upper jaw to second dorsal fin Lower jaw to fork in tail Pectoral fin to fork in tail Pectoral fin to second dorsal fin Total length (for sharks)
Tuna **Metric Tons captured by species code & size category** (small <2.5kg; medium 2.5-15 kg; large >25kg; Total) **Billfish by species and number** Post-orbital Length (cm, up to 12 individuals) Collective number of individuals by category small <90cm; medium 90-150cm; large >150cm; Total)		**Length (cm)**

Part 9 Species of Special Interest

The information collected by the t-RFMOs provides for some inter-operability between the datasets. General information describing the type of interaction and set details along with information on the species and fate when landed on the deck and when released is collected (with level of detail varying between t-RFMO). The IATTC, IOTC and ICCAT also collect specific information on turtle interaction. The current "Minimum Data-field Standards" specified by each of the t-RFMOs are outlined in the Table below.

IATTC	IOTC & ICCAT (IRD IEO AZTI)	WCPFC
General Information	*General Information*	*General Information*
Trip Number		**Type of interaction** (eg. caught on line - tangled in net, swimming around outside of net, etc).
Set Number		**Date and time of interaction** (ship date & time)
		Latitude and longitude of interaction
Species (using code table or specified)		**Species FAO code of marine reptile, marine mammal, or seabird**.
Landed on deck	*Landed on deck*	*Landed on deck*
Rays and Manta Rays **Estimated number of individuals by species code & size category** (small <90cm; medium 90-150cm; large >150cm; Total) and **Density** (Small, Medium, Large, Total) **Other Big and Medium Fish** **Code & Estimated number of individuals by species code & size category** (small <30cm; medium 30-60cm; large >60cm; Total) and **Density** (Small, Medium, Large, Total) **Seabird species code & number** **Other Fish, invertebrates, other fauna species code, number & density** **Sharks by species and number** Length (cm, up to 12 individuals) Collective number of individuals by category small <90cm; medium 90-150cm; large >150cm; Total) **Cetaceans by species**		**Length** (cm)

Length (cm) and girth (cm) Fetus length (cm)		
		Length measurement code (as above for codes)
Sharks Sex (Male/Female/Unknown) **Cetaceans** Sex (Male/Female)		**Gender** (Male/Female/Indeterminate/Unknown)
		Estimated shark fin weight by species
		Estimated shark carcass weight by species
		Condition when landed on deck (Codes are:)
Cetaceans Lactating (yes/no) Fetus & its sex		Alive but unable to describe condition Alive and healthy. Alive, but injured or distressed. Alive, but unlikely to live. Entangled, okay. Entangled, injured. Hooked, externally, injured. Hooked, externally, injured. Hooked, unknown, injured. Dead Entangled, dead Hooked, externally, dead. Hooked, internally, dead. Hooked, internally, dead. Condition unknown. Entangled, unknown condition. Hooked, externally, condition unknown Hooked, internally, condition unknown. Hooked, unknown, condition unknown.
Tuna **Code & Metric Tons discard to sea by category** (small <2.5kg; medium 2.5-15 kg; large >25kg; Total) plus reason (as above for codes) **Sharks**	**Condition when released** (same codes as above)	**Condition when released** (same codes as above)

Fate (human consumption, discarded, released alive, other , unknown) **Billfish** Fate (human consumption, discarded, released alive, other , unknown		
	Escape from net (for whaleshark and cetacean) (Échappe du filet (pour requin-baleine et cétacés)) Released from net alive (whale shark and cetacean) (Sorti vivant du filet (pour requin-baleine et cétacés)) Released but dead (whale sharks and cetacean) (Sorti mort du filet (pour requin-baleine et cétacés)) Other Autre (à préciser dans les notes)	
		Tag recovery information
		Tag release information
		Interactions with Vessel or Gear only
		Vessel's activity during interaction (PIRFO options are: setting, hauling, searching, transiting, other)
		Condition of species observed at start of interaction (as above)
		Condition of species observed at end of interaction (as above)
		Description of interaction
		Number of animals sighted
Turtles	**Turtles**	
Species Olive Ridley Leatherback Hawksbill Loggerhead Unidentified		
Activity Alive & immobile		

Swimming Copulating Feeding Dead Other/Unkown		
Number of turtles Various sighting One group of multiple turtles Found trapped/entangled in floating object Passed alive through the power block		
Association Marine mammals Tuna (breezer) Unassociated Other Floating object Distance of the association (m)		
Condition upon leaving the Turtle Entangled alive in flotsam Previously dead Released unharmed Light injuries Grave injuries Killed Escaped/evaded net Consumed Not involved in set Other/Unknown	Tangled but alive (Maillée et vivante) Tangled but dead (Maillée et morte) Free (Libre)	

Appendix 2 BMIS Terms of Reference and Concept Plan

Background

The workplan for the Kobe III Bycatch technical working group includes the progression of the WCPFC BMIS information system to a t-RFMO wide system. The purpose of this document is to outline the Terms of Reference for this expanded BMIS. The document:

a. describes the Bycatch Mitigation Information System (BMIS);
b. explains what resources and benefits it offers other tuna Regional Fisheries Management Organisations (tuna RFMOs);
c. describes functionalities that will be added to the database;
d. outlines work required to maintain and develop the database; and
e. details budgetary requirements.

The Bycatch Mitigation Information System (BMIS)

Overview

The Bycatch Mitigation Information System (BMIS) is a fully functional, online database. It is the result of a Western and Central Pacific Fisheries Commission (WCPFC) project to centralise and make readily available, information on the mitigation and management of bycatch in the Western and Central Pacific Ocean (WCPO). The database is a reference and educational tool that supports the Commission's Conservation and Management Measures (CMMs) regarding the sustainable management of bycatch species of special interest, such as sharks, seabirds and sea turtles.

The BMIS can be accessed at: http://bmis.wcpfc.int/index.php

Much of the information in the BMIS is relevant to bycatch mitigation and management in similar oceanic fisheries around the world (those dealing with tuna and billfish caught on longline, purse seine, troll or pole and line fishing gear). Research into these issues is conducted not only in the WCPO, but around the globe in the management areas of other tuna RFMOs. The t-RFMO wide application of the BMIS was endorsed by the Kobe III Joint tuna RFMO meeting La Jolla, July 2011.

A Unique Database

The focus of the BMIS is different from other bycatch databases. The design of the database and the delineation of material included in it are based on particular objectives. These include that the BMIS act as a repository of information about:

a) bycatch mitigation and management in oceanic tuna and billfish fisheries.

b) mitigation methods relevant to longline, purse seine, pole and line, and troll fishing (in the fisheries mentioned above) shown to reduce, or with the potential to reduce, bycatch of seabirds, sea turtles and sharks.

The BMIS does not include information on traps, trawl, dredge, gillnet or surrounding net fishing gear, nor recreational fisheries. While it focuses on oceanic fisheries, information is in the BMIS is frequently applicable to nearshore fisheries as well, e.g., circle hooks are useful in both. References are selected with objectives a) and b) in mind and include published and grey literature on mitigation methods and bycatch, including summary information on risk assessments. To aid discussion on the application of mitigation methods the use of wiki technology is also planned for the BMIS. Additionally, the BMIS has a charter to make available Decisions (regulations, resolutions, conservation and management measures etc) of tuna RFMOs that mention or require the use of mitigation methods as described above.

These RFMOs include:
CCAMLR - Commission for the Conservation of Antarctic Marine Living Resources
IOTC - Indian Ocean Tuna Commission
IATTC - Inter-American Tropical Tuna Commission
ICCAT - International Commission for the Conservation of Atlantic Tunas
NAFO - Northwest Atlantic Fisheries Organisation
SEAFO - South East Atlantic Fisheries Organisation
IOSEA (Indian Ocean South East Asian Marine Turtle Memorandum of Understanding) is also included.

It is also possible to use the BMIS to search a list of target and bycatch species derived from the WCPO Observer Database.

The Links section facilitates the inclusion of useful information which might not otherwise fit in the References section of the database, for example, species identification guides or lists of bycatch mitigation research institutions or details of the annual Smart Gear competition.

Reasons for a Global Tuna RFMO Bycatch Mitigation Database

There are significant benefits and efficiencies to be gained from the development of a single bycatch mitigation and management database for tuna RFMOs.

a. Support for Decisions/Regulations - A bycatch database consolidates information useful for demonstrating the science behind regulations. The BMIS includes reviews of existing knowledge (including differing viewpoints) about mitigation methods and their application. 'Virtual links' are made between these reviews and regulations. Compiling useful information is time consuming and often difficult, which leads to point b) below.
b. Avoid duplication - It saves time and money to centralise information that supports the bycatch mitigation and management responsibilities of tuna RFMOs.
c. Avoid confusion - With a 'one-stop-information-shop' for bycatch mitigation and management in oceanic tuna/billfish fisheries, it is easier for potential users of this information to find what they are looking for.
d. Coordination - A central database provides another avenue for tuna RFMOs to coordinate on bycatch issues, including research into bycatch mitigation measures.
e. Cost - Substantial resources are required to maintain a bycatch database. Costs can be shared among tuna RFMOs.

Expanding the BMIS - Additional Functionalities

Existing sections of the BMIS include:

a. References
b. Decisions/Regulations
c. Descriptions of Mitigation Methods
d. List of Target and Bycatch species
e. Other Information - Links.

Additional functionalities will enhance the BMIS as follows:

a. References

Species - Literature in the BMIS currently deals with seabirds, sharks and marine turtles. Marine mammals are an issue for most tuna RFMOs and will be added in. Reference collection, collation and database entry for new species groups represents a significant workload.

Language - Tuna RFMOs operate in English, but also in other languages. The BMIS will be modified to accommodate non-English literature with the addition of filters to enable searching by language.

To establish and keep current the non-English literature component of the BMIS, individual tuna RFMOs need to nominate a staff member to be responsible for collating and forwarding non-English technical reports and other reference material to the BMIS coordinator.

"Google translate" will be investigated to gauge how successfully it can be used in the BMIS (For example, it is used on the International Sustainable Seafood Foundation [ISSF] website at http://iss-foundation.org/science/projects/bycatch-reduction/fieldwork/ and look for the software at the bottom of the page).

ICCAT bycatch database - Relevant references from the ICCAT database will be loaded into the BMIS (as approved by ICCAT).

b. Decisions/Regulations

These will be kept up to date for all tuna RFMOs as well as some other organisations e.g. IOSEA.

c. Descriptions of Mitigation Methods

These explain how a mitigation method works and provide a summary of recent research. Existing descriptions will be revised in light of new research and new methods and descriptions added as necessary. A moderated wiki is proposed that allows communication bycatch specialist, fishers and fisheries managers to be stored for reference by others.

d. List of Target and Bycatch species.

A filter will be added to enable the list of target and bycatch species to be searched by RFMO management area. Target and bycatch species data for other tuna RFMOs will be integrated as it is received. Information on the level of data harmonization between tuna RFMO will be provided to facilitate cross RFMOs comparisons of issues and effectiveness of mitigation methods and interpretation of bycatch summaries. Links to distribution maps of bycatch (e.g. Bridlife International, ACAP) will be provided.

e. Other information

Other bycatch mitigation information is accessible via the BMIS. We will build upon existing sections, which include Seabirds, Sharks, Turtles, Gear, General, Identification and Handling Guides, Other Bycatch Databases, Pacific Island Fisheries, Research, RFMOs and Videos.

With regard to Research, we will add further links to organisations involved in bycatch mitigation research. However, we will also create a summary of bycatch mitigation and management research projects that tuna RFMO and other institutions are involved in. The success of this will depend upon the input of other RFMOs.

New sections will be investigated and information added as appropriate:

i. Ecological risk assessments;
ii. Economic benefits of bycatch reduction techniques;
iii. Meeting reports of ecosystem working groups and symposium.
iv. BMIS maintenance and development Progress Reports including an analysis of website traffic.

BMIS Administration

a. Location

The BMIS is currently accessible via the WCPFC website. Agreement will be needed to keep it thus located, at least in the interim. Support will be recognised through the use of text and logos. RFMOs can create a link to the BMIS from their websites.

b. Access database changes

The Access database behind the BMIS will be modified to accommodate changes, including the addition of marine mammals, integration of non-English literature and new lists of target and bycatch species.

c. Website reorganisation

Reorganisation and some redevelopment of the website will occur to accommodate the outlined changes to the BMIS. Text and appearance (e.g. logos) changes will be made. Changes will be made to accommodate and meet specific regional needs, i.e., to ensure there are areas devoted to idiosyncratic issues of each oceanographic region/ tuna RFMO management area.

d. Other

Administration guides and the online User Help guide will be updated.

Resources

a. Maintenance and Development

The BMIS can be regarded as a 'living document', one which requires continual updating. The tasks which must be completed for basic maintenance include:

- new reference material collected and added to the database;
- mitigation method descriptions revised to reflect new research findings; new methods added as appropriate;
- decisions/regulations monitored to ensure new and updated tuna RFMO decisions are included;
- links managed to provide useful, up-to-date information to BMIS users, e.g. species identification and handling guides, National Plans of Action for seabirds and sharks;
- website traffic analysis;
- ongoing promotion (newsletter articles, links to BMIS from other websites, RSS feeds)
- update of administration guides;
- IT updates of website - links, new references, revised or new decisions etc; and
- creation/revision of explanatory material e.g. factsheets.

The development of additional functionalities, such as inclusion of marine mammals, requires resources over and above what is required for maintenance.

b. Staff

- BMIS coordinator (currently Secretariat of the Pacific Community - SPC)
- BMIS Information Technology officer (currently SPC)
- Tuna RFMOs. Each RFMO would need to nominate a staff member to liaise with the BMIS coordinator. The duties of this role include:
  - articulating the needs of each RFMO re the BMIS
  - collecting and forwarding RFMO reference material (e.g. Bycatch Working Group meeting papers), particularly non-English language documents that are not easily sourced through journals
  - forwarding details of RFMO research programmes
  - advising the BMIS coordinator of updates to RFMO Decisions/ Regulations
  - advising the BMIS coordinator of changes to RFMO websites

Budget

This budget covers 12 months of a full time position and Information Technology support.

Technical Assistance	Unit	Quantity	Unit Cost*#	Total/yr
Data Sourcing & Synthesis	person-month	1	7,000	7,000
Data Analysis	person-month	4	7,000	28,000
Database Population	person-month	2	7,000	14,000
Database Review & Moderation	person-month	2	7,000	14,000
Database Design	person-month	8	7,000	56,000
Web Access & Maintenance	person-month	4	7,000	28,000
Sub-total				**147,000**
Technical Services				

Translation	person-day	50	400	20,000
Sub-total				**20,000**
TOTAL				**167,000**

* technical Assistance based on Band 8 CROP salaries, # based on current SPC translation rates