The Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean

SCIENTIFIC COMMITTEE
THIRD REGULAR SESSION

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DRAFT WORK PROGRAMME OF THE SCIENTIFIC COMMITTEE FOR 2008-2010 (UPDATED)

The Convenors of the SWGs met to consider the size of the indicative research budget for 2009 and 2010. Consideration was given to the scope of the Work Programme adopted by the SC (which itemises 59 substantive research projects) and the commensurate management issues for which scientific advice is required. Taking account of these issues, the Convenors therefore recommended that the 2008 budget be seen as a minimum budget level to fund research in the WCPO. They recommended that the Commission give consideration to significantly increasing this budget over future years.

The SWG Convenors request that the SC give consideration to also endorsing this recommendation.

DRAFT WORK PROGRAMME OF THE SCIENTIFIC COMMITTEE FOR 2008-2010

(Indicative budget in USD)

Strategic Research Activity or Project with priority identified at SC3		2008		2009		2010	
		Core	Other	Core	Other	Core	Other
1. Collection, compilation and verification of data from the fishery							
SPC-OFP Services	**Project 1.** **(Priority = High)** **Incorporate data provided by Members, Cooperating Non-Members and Participating Territories (CCMs) under the Commission's data provision policy into existing databases and facilitate access of Commission secretariat staff to those data as appropriate.**						**On-going**
SPC-OFP Services	**Project 2.** **(Priority = High)** **Compile estimates of annual catches by species, gear type and flag, as specified in the procedures for Scientific Data to be Provided to the Commission**						**On-going**
SPC-OFP Services	**Project 3.** **(Priority = High)** **For catches for which estimates are not otherwise available, conduct statistical analyses to estimate catches, particularly in regard to (a) purse-seine catches of bigeye tuna and yellowfin tuna, (b) discards of target tuna species, and (c) catches of non-target species.** • Includes estimating seabird interaction, bycatch and mortality as requested by CMM 2006-02: EB-SWG Priority						**On-going**
SPC-OFP Services	**Project 4.** **(Priority = Medium)** **Produce and publish on the Commission's website two issues of the Regional Tuna Bulletin, containing estimates of monthly catch rates for WCPO fleets, based on the most recent data available.**						**On-going**
SPC-OFP Services	**Project 5.** **(Priority = Medium)** **Produce and publish on the Commission's website the Tuna Fishery Yearbook 2006, containing annual catch estimates by gear type, flag and species.**						**On-going**
SPC-OFP Services	**Project 6.** **(Priority = High)** **Compile estimates of catch and effort in support of the functions of the Commission and its subsidiary bodies, such as (a) estimates of annual catches by vessel flag, EEZ, and archipelagic waters, for use in determining the catch component of the Commission's assessed contributions, and (b) estimates of catch and effort in support of Conservation and Management Measures.**						**On-going**
SPC-OFP Services	**Project 7.** **(Priority = High)** **Disseminate public domain catch, effort and size data on the Commission's website at agreed level of resolution.**						**On-going**
SPC-OFP Services	**Project 8.** **(Priority = High)**						**On-going**

	Participate in the Indonesia and Philippines Data Collection Project (Projects 15 and 16) and the compilation of information on the tuna fisheries of Vietnam.	
SPC-OFP Services	**Project 9. (Priority = Medium)** **Develop data standards for port sampling and observer programmes in association with WCPFC Secretariat** • Subject to the progress of the observer program, and requires on-going periodic monitoring. • This may be handled by the WCPFC Secretariat (rather than by SPC).	**Ongoing**
SPC-OFP Services	**Project 10. (Priority = High) - Completed** **Advise the Executive Director regarding the development of (a) Rules and Procedures for the Access to and Dissemination of Data and (b) the Information Security Policy** • Will require on-going periodic monitoring as the information and data management policies and procedures of the Commission evolve. • This has been in each annual work plan for many years. There has not been much year-to-year progress. It would be better to engage in this process only periodically (e.g. once every 3 years). Also need legal advice beyond the expertise of SPC.	**As required**
SPC-OFP Services	**Project 11. (Priority = High) - NEW** **Identify known data / information gaps in the current stock assessment, particularly in relation to operational level CPUE data** • The ST-SWG noted that the timely provision of data was a very important issue for the work of the Scientific Committee, and in particular for the stock assessments. A number of potential explanations for different data gaps were identified, including the time and resources required to access and collate historical records, the long voyage times for some distant-water longline fleets and the large and dispersed nature of small boat fleets in Indonesia and the Philippines. A number of members cited specific issues with the summary of data gaps presented in the paper and SPC-OFP undertook to revise the information accordingly in consultation with the relevant members	**2008** **and updated annually**
SPC-OFP Services	**Project 12. (Priority = High) - Completed** **Within the next 12 months deploy on the WCPFC website a prototype computer programme that would allow gaps in data to be easily identified.** • ST-SWG priority: To be undertaken in 2008 jointly with WCPFC Secretariat	**2008**
SPC-OFP Services	**Project 13. (Priority = High) - Completed** **Review current unloadings data forms used in the region, and the proposed WCPFC transhipment reporting form, to determine their adequacy for scientific purposes.** • ST-SWG priority	**2008**

Project 14. (Priority = High) **Indonesia and Philippines Data Collection Project (IPDCP)**						
Background information (Refer to SC3-GN-WP-7 Report of the Steering Committee on IPDCP)						

One of the biggest sources of uncertainty in stock assessment comes from data gaps in the Philippine and Indonesian waters. Since 2004, the Commission supported this program through the voluntary contribution from members and from core budget of the Commission since 2007. Though data reporting is a member's responsibility, the Commission agreed to financially support the establishment of infrastructure for fishery data collection system in the Philippines and Indonesia. The Philippines has finished two year full implementation of the IPDCP and the Commission supported basic cost in 2007 to continue data collection in the Philippines. Indonesia hosted the first Workshop to consider the implementation of the IPDCP in Indonesia, January 2007, and currently it implements preliminary research to prepare a full IPDCP proposal in Indonesia.

1. Indonesia
   - A full project proposal for the IPDCP 2008-2010 in Indonesia will be submitted in November 2007. An outline of the proposal and an indicative budget was introduced at the fourth Steering Committee meeting on the IPDCP, 14 August 2007. A preliminary research was commenced in June 2007 with a support of USD 30,000 from the Commission. Its progress report was provided at the Steering Committee.
   - The IPDCP in Indonesia is a [three]-year project to establish the infrastructure of data collection for tuna fishery in the eastern part of Indonesia. The IOTC has supported data collection in the western side of Indonesia to cover tuna fishery in the Indian Ocean side. Fisheries in the eastern Indonesia are known to be far more complicated than those in the western side of Indonesia.
   - An average of [$100,000] is estimated each year for 2008-2010 to be funded from the Commission.
2. Philippines
   - The Philippines has successfully finished two-year IPDCP in the country. It focused on the establishment of data collection system. The Commission considered the importance of the continuity of data collection in Philippines and supported Philippines basic funds to run the established system. The proposed budget each year for 2008-2010 was USD88,896.
   - If core budget in addition to the indicative budget of USD100,000 for 2008 is not available, an average of [$90,000] should be funded from other sources.
3. GEF
   - A possibility of GEF funding

Project 15. (Priority = High) **Rescue of historical commercial catch data from countries in the western Pacific Ocean, including Vietnam.**						

- This research was identified as the highest priority to minimize data gaps in stock assessments.

Project 16. (Priority = Medium) **Publication and distribution of Commission's training and educational materials.**						

- SWG conveners may recommend items to be published and distributed for the Commission's work. For example, during 2007 additional guides were developed by the FT-SWG on longline and purse seine bycatch species. Funding support to provide colour reprints of these guides as well as tuna guides in languages deemed useful for Commission objectives.
- Includes development of training materials and the production of material to facilitate the identification of target and non-target species by fishermen, observers, and port samplers with the objective of improving data quality.

Project 17. (Priority = High) – Selected **Draft list of minimum data fields for the regional observer program be annotated with explanations of what each field is**						

and why it is needed and detail describing the format (units of measure, codes etc) to be used when collecting each field.						
• ST-SWG priority: To be undertaken by WCPFC Secretariat during 2008						
Project 18. (Priority = High) – NEW **Determine appropriate sample sizes for length frequency sampling strategies.**						
• SA-SWG priority, relates to all target species but SA-SWG work program for 2008 identified yellowfin tuna as priority species.						
Project 19. (Priority = High) – NEW **Identification and description of operational characteristics of the major WCPO fleets and identification of important technical parameters for data collection.**						
• FT-SWG priority. • Includes characterization of operational features at both vessel and set/operational levels useful for effort standardization and the evaluation of fishing efficiency, targeting and bycatch mitigation. • Includes use of simple proxies and other means as tangible indicators of increasing fishing power, i.e. individual or fleet landings per annum, and/or estimates of the number of FADs deployed each year. • Includes monitoring of operational features related to depths fished by longline hooks and depths of purse-seine nets. • Includes monitoring and reporting on new developments in fishing gear and practices, fishing modes and related shore side developments as they relate to changes in fishing power. <u>Includes</u> • Supply TDRs and hook timers to regional observer programs undertaken by SPC-OFP.						
Project 20. (Priority = Low) **Examine and review the technical aspects of capacity measurement and monitoring of fisheries within the WCPFC-CA.**						
• Ongoing FT-SWG priority; will seek input at no additional cost to the Commission. • This project may be undertaken by the TCC, but the FT-SWG terms of reference were modified in 2006 to accommodate capacity work.						
Project 21. (Priority = Low) **Investigate and promote studies on socio-economic influences on fishing strategies, spatio-temporal fishing patterns and influences on effective fishing effort.**						
• Ongoing FT-SWG priority; will seek input at no additional cost to the Commission.						

2. Monitoring and Assessment of Stocks		
2a. Stock assessment and modeling		
Assessment of stock status		
SPC-OFP Services	**Project 22.** **(Priority = High)** **Undertake stock assessment for target and non-target species as requested by the Commission.** **Includes:** • Undertake full stock assessment for target and non-target species as requested by the Commission (bigeye, SP albacore and skipjack in 2008). Includes: - Refinement of data and data structure used for stock assessment - Quantification of changes in fishing efficiency due to changes in fishing gears and fish finding technologies – Medium Priority. (Used to model changes in selectivity over time required in MFCL assessment models - Cross-reference with Project 27 for non-OFP project work) - Quantification of changes in longline selectivity due to changes in gears and patterns of deployment – Medium Priority. (Used to model changes in selectivity over time required in MFCL assessment models. SPC-OFP services as time allows.)	**On-going**
SPC-OFP Services	**Project 23.** **(Priority = High)** **Undertake standardisation of longline catch and effort data, including where appropriate operational-level data, and the construction of indices of stock abundance for species of interest to the Commission.** • There are many issues to explore relating to CPUE standardization. Need to develop a specific work programme on this with funding support.	**On-going**
SPC-OFP Services	**Project 24.** **Priority = Medium)** **Development and reporting of stock indicators for those key species not formally assessed.** • SA-SWG priority; required to assist formulate most-up-to-date management advice to Commission if full assessment not undertaken.	**On-going**
SPC-OFP Services	**Project 25.** **(Priority = High)** **Continued exploration of sensitivity of stock assessment outcomes to structural assumptions in models and data issues, including the comparison of various stock assessment models.** • ME-SWG Priority. • This work also includes the development of better diagnostics to more objectively determine plausible model structure. • Work program for 2008 includes a comparison of MFCL, SS-2 and other stock assessment models for	**On-going**

	yellowfin or bigeye tuna. • This will be more routinely incorporated into the assessments if it is felt to be informative.	
Project 26. **(Priority = High) – NEW** **Completed** **Revised Stock assessment on southern swordfish**		
• SA-SWG priority. • CMM 2006-03 states that "The Commission will review this measure in 2008 on the basis of advice from the scientific committee following their consideration of an updated swordfish stock assessment…" This species is not one of the principal target species assessed by OFP but is an important target species for a number of CCMs. Australian and New Zealand scientists are proposing to undertake this work but are seeking some funds from the Commission as the research is directly addressing a request from the Commission and will have broader regional benefits. Funding from the Commission would also help secure funds from funding sources from Australia and New Zealand. • Total budget AUD147,000 over 1 year.		
Project 27. **(Priority = Medium) - NEW** **Investigation and quantification of changes in catchability of target and non-target species, including bycatch and incidental species, over time not included in the CPUE standardization.**		
• SA-SWG priority (cross-reference Project 23). • Many factors not reported on logbooks influence catchability. The comparison of catch rates obtained by individual research projects where details of gear and fishing practices have been extensively documented may allow changes in catchability to be investigated and possibly quantified. • Process needs to be made clear and transparent.		
Project 28. **(Priority = Medium) - NEW** **Development of procedures and decision rules to assist the interpretation of stock assessment results and the formulation of management recommendations.**		
• SA-SWG priority. SC participants should prepare ideas for discussion at SC4.		
Model development and refinement		
SPC-OFP Services	**Project 29.** **(Priority = High)** **Further refinement of the stock assessment model, MULTIFAN-CL, including simulation testing of new developments as appropriate and refinement of models for CPUE standardization.** • ME-SWG and SA-SWG Priority. • Work program for 2008 includes designing a more efficient recruitment parameterization (High priority) and incorporation of length-based selectivity (Medium priority). • There are a number of other matters that need to be addressed, including a long-term project to re-	**On-going**

	write the software to make it more transparent, better documented, and include new features (multi-sex, species, and stock options).	
SPC-OFP Services	**Project 30.** **(Priority = Medium) Deleted as requested by the SC4** **Development of recruitment indices independent of the MFCL model, including the investigation of recruitment and oceanographic trends.** • SA-SWG and ME-SWG Priority. • Required to index recruitment in stock assessment models. Major advances made in 2007 need to be followed up and formally incorporated into assessments.	**On-going**
Project 31. **(Priority = High) – NEW** **Improve existing, and explore alternative, models for standardization of effort and the construction of indices of stock abundance.**		
• SA-SWG and ME-SWG Priority. • Includes tasks identified by the ME-SWG at SC3 – the continued identification of factors which influence CPUE, understanding and quantification of the changes in catchability over time not included in the CPUE standardisation models, and identification of alternative catchability trends for inclusion in stock assessment models, and the calculation of regional weighting factors.		
Project 32. **(Priority = Medium) – NEW** **Further consideration of how to reflect uncertainty in projections.**		
• ME-SWG Priority.		
Project 33. **(Priority = Medium) – NEW** **Development of new stock assessment models and associated software.**		
• ME-SWG Priority.		
Evaluation of management options as requested by the Commission		
SPC-OFP Services	**Project 34.** **(Priority = High)** **Further review of spatio-temporal aspects of catches of juvenile bigeye and yellowfin tuna caught in association with fish aggregating devices (FADs) by updating the analysis presented in WCPFC 3-2006-16. Refine the assessment of management options presented in the paper on the basis of the latest available fishery information.** • Research items to be considered over the 3 year planning horizon: 1) With new SKJ and BET assessments and YFT 2007 assessment, conduct multi-species	**On-going**

	management options analyses, including economic outcomes of options on each sector. 2) PS fishery characterisation – as a first step in developing an operational model of the fishery and more formal management strategy evaluation (MSE) work. 3) More spatial analysis – perhaps adopting the statistical approach of estimating lat/long/season effects on associated set (small juvenile) YFT and BET catches.	

2b. Biological Studies

Project 35. **(Priority = High)** **Refinement of bigeye parameters Pacific-wide: A comprehensive review and study of bigeye tuna reproductive biology.**						

- Though this is a high priority project, there appears to be no expectations of SPC-OFP support here.

Objectives

To obtain accurate scientific information on maturity, spawning locations, sex ratios, and fecundity for inclusion in stock assessments of bigeye tuna in the Pacific Ocean.

Items to be considered as a joint research between IATTC and WCPFC

Based on tagging studies to date, the movements of bigeye are geographically restricted. The limited amount of mixing across the Pacific Ocean can create differences in life history characteristics as a function of differences in oceanography and genetic structure. Therefore, obtaining size and age based estimates of bigeye reproductive characteristics from spatial strata across the Pacific Ocean would be useful for inclusion in bigeye stock assessments, since current estimates are based on inadequate spatial strata and limited sample sizes to have much confidence for inclusion in Pacific-wide assessments.

Funding

The level of required budget may depend on the scope and duration of such biological researches in a joint proposal. The anticipated duration for bigeye biological study is [3] years with a rough amount of [USD 430,000]. Budget can be shared with IATTC, a preliminary study for feasibility in 2008 ($30,000) and two-year project $200,000 each year for 2009 and 2010.

In addition, obtaining adequate numbers of bigeye samples may require a collaborative sampling effort by scientists from China, Japan, Korea, and Taiwan from their nation's commercial and research long-line vessels.

Other comments

It is important to address some of the outstanding issues related to the biological parameters for BET, but we also need to ensure work is done on other species for which much less data are available. Hopefully, the priority species will identify themselves through the Ecological Risk Assessment process. In the WCPO, we have a range of similar or even more critical issues related to YFT and ALB.

Project 36. **(Priority = High)** **Age and growth of the target tuna species.**						

- An initial project within this category is regional differences in growth from length-frequency data for YFT and BET.
- This has strong assessment implications.

• Budget level: 150K over 2 years (SPC proposal).						
Project 37. **(Priority = High)** **Analysis of FAD impacts on trophic dynamics.**						
• This work is required for a better understanding of the biological impacts of FADs. • Budget level: 70K over 2 years (SPC and University of Hawaii proposal).						
Project 38. **(Priority = Low)** **Feasibility study to determine the effectiveness of otolith microchemistry to estimate stock mixing and large-scale tuna movement.**						
• Recent advances in extraction of microchemistry samples from fish otoliths provide the potential for observing regional water chemistry differentiation in the otoliths of pelagic species – hence a natural tag for estimating stock mixing and large-scale tuna movement. • The feasibility of this requires investigation. • Budget level**:** 60K over 1 year (SPC and University of Hawaii proposal).						
Project 39. **(Priority = High) - NEW** **Regional study of the stock structure and life-history characteristics of South Pacific albacore.**						
• BI-SWG Priority. • A proposal to undertake this work is being developed by Australia and conjunction with New Zealand, SPC-OFP and other CCMs (e.g. New Caledonia, French Polynesia, FFA countries). The project is seeking some funding from the WCPFC as the research directly addresses stock assessment needs for one of the principal target species in the WCPO and will be of direct benefits to a range of CCMs. Funding from the Commission would also help secure funds from funding sources from Australia and New Zealand. • This has strong assessment implications with wide-spread benefits to a number of fisheries active in the WCPO. • Total Budget: AUD820K over 3 years. • This project may require a better description of the work and justification for the funding requested from WCPFC. It may be possible for nations with an interest in the South Pacific albacore fishery to fund this work.						
Project 40. **(Priority = Medium) - NEW** **Life-history characteristics of non-target species identified by the ERA as high risk.**						
• BI-SWG Priority. • On-going (Scholarships for tertiary study).						
Project 41. **(Priority = Medium) - NEW** **Development of a biological database for inclusion on the**						

WCPFC website. .						

- BI-SWG Priority.

2c. Tagging studies

Project 42. (Priority = High) **Pacific-wide tagging project.**						

Background information (Refer to GN WP-10: Regional tuna tagging – Phase 2 proposal)

Objectives

The main objectives of these tuna tagging experiments are to obtain information on movement, stock structure, growth, mortality, behaviour, habitat utilization, and vulnerability for use in stock assessments for yellowfin, bigeye and skipjack tuna.

Pacific-wide tagging project (Joint tagging between IATTC and WCPFC)

- Review of Phase-1 tagging project in PNG waters and presentation of Phase-2 tagging project proposal at SC3
- IATTC are holding a tagging workshop in October 2007.

Level of budget and funding

- Funding is a limiting factor for Pacific Ocean tuna tagging experiments and should be sought from a broad range of sources, including member and non-member countries with substantial financial interests in these fisheries, GEF, and non-governmental organizations, particularly foundations interested in supporting scientifically based tuna conservation efforts.
- The budget required for a 2 year pan-Pacific tagging project would need at least USD 9 million to do a wide coverage project in the WCPFC-CA alone. Approximately USD 2.4 million has been identified through SPC projects. To provide some additional perspective, the IOTC tagging project over 3 years in a much smaller area than the Pacific (or even the WCPFC-CA) cost USD 19 million.

Include the following sub-projects

- Undertake a preliminary analysis of the vertical distribution of skipjack, yellowfin and bigeye tuna associated with fish aggregation devices, as indicated by acoustic tagging data. This item is related to the analysis of data from the PNG Tagging Project and scientists from other CCMs will participate in this project. Future work will be in the context of Phase 2 tagging.
- Ongoing and newly funded research with sonic and archival tags in Hawaii, PNG and other areas. On-going. **(**Currently funded SPC-OFP and Univ. of Hawaii projects).

3. Monitoring and assessment of the ecosystem

Project 43. **(Priority = High)** **Ecological Risk Analysis, including PSA.**						
• On-going ERA Work Program submitted to SC-3 and endorsed (cf. EB-WP-3). • Includes $30,000 for identifying areas of spatial and temporal overlap of seabird and sea turtle interactions with tuna fisheries in the WCPO (ACAP). • This project is allocated a large portion of the available research funds ($130K of the available $300K). More details on the project should be provided and fuller discussion of the priority of this project relative to other projects needs to be engaged. Perhaps the CCMs and NGOs can fund this work rather than using the limited WCPFC research funds.						
Project 44. **(Priority = High)** **Seabird and turtle education and extension of fishers (Promotion of mitigation methods to fishers)**						
• On-going (Includes travel and publication costs).						
Project 45. **(Priority = High)** **Education and dissemination of information relating to Turtle de-hooking devices.**						
• On-going (Half of these funds are for personnel costs, half for equipment).						
Project 46. **(Priority = Medium)** **Development / review of models, such as full development of an ECOSIM model, for evaluation of fishery and environmental impacts on ecosystem, including development of reference points.**						
• On-going (Required modeling and assessing fishery impacts on the ecosystems). • This is separate from the ERA work. SPC-OFP will be undertaking work under SCIFISH project on continued development of SEAPODYM model and application to WCPO pelagic ecosystems. • WCPFC may wish to consider contributing to this work if it wishes to request specific analyses using this model. • Estimated Budget for the ECOSIM model: 100K over 2 years (SPC proposal).						
Project 47. **(Priority = Medium)** **Turtle population assessments.**						
• On-going (Three year project to continue into 2009, involving collation of data eventually leading to quantitative assessments).						
Project 48. **(Priority = Medium)** **Survival of hooked and released seabirds.**						

• On-going (Will require sourcing external funding for satellite/archival tags).						
Project 49. **(Priority = Medium)** **Turtle tagging and associated materials.**						
• On-going. (Will require sourcing external funding for satellite/archival tags. Conventional tags can probably be obtained at little or no cost from SPREP)						
Project 50. **(Priority = Low)** **Offal discards and haul-back mitigation studies.**						
• Not sure if it fits in here, but there is nothing anywhere else on the bycatch and bycatch mitigation database development. • If any use is to be made of this database, there would be considerable ongoing work required to populate the various database tables. Some of this, but not all, could be done under other OFP service items (bycatch estimation). • There is also a concern that the additional components added on (e.g. ERA attributes, non-target catch estimates and species utilisation) probably weren't envisaged at the start and the work involved will go beyond the time/funds originally envisaged in the contract. • So some funding would need to be allocated in future budgets if this work is to be ongoing.						
Project 51. **(Priority = High)** **Extension services to member countries for within EEZ ERA.**						
• ERA methods can value add to EAFM approaches being adopted by WCPFC member countries for fisheries planning and management at the EEZ scale. • The extension services will capacity build ERA skills within these countries. • Possibly appropriate for JTF and/or SRF. • Budget level: 50K over 1 year (SPC).						
Project 52. **(Priority = High) - NEW** **Shark Research Program.**						
• EB-SWG Priority. • CMM 2006-05 requested that shark stock assessments be undertaken for key shark species. • Scoping study required to identify areas and key species for priority research and assessment. • Review the feasibility of a regional shark tagging program. • Review the development and implementation of NPOAs						
Project 53. **(Priority = Medium) - NEW** **Investigation into the fishing activities and catch composition of small vessels (e.g. longliners<24m) should be undertaken.**						

- EB-SWG Priority.
- To create a better understanding of the catch and effort and operational activities of small high seas vessels so that appropriate management measures (e.g. sharks and seabirds) can be considered for these vessels.

Project 54. **(Priority = Medium) - NEW** **Review scientific data to assess in a holistic manner the effects of bycatch management measures using the different longline gears and mitigation measures on the catch of turtle, shark and other target and non-target longline species.**						

- EB-SWG Priority.

Project 55. **(Priority = Medium) - NEW** **Undertake studies on the behaviour and distribution of target and non-target species around FADS, and on the various specifications and use of FADs and fishing gears in influencing purse seine catches taken in association with FADs, with a view to identifying their impact in relation to mitigation measures to reduce catches of juvenile tuna and non-target species by purse seine gear.**						

- FT-SWG Priority
- Includes seeking collaboration with industry to Design of industry -associated studies related to selectivity and avoidance of small tunas and bycatch on floating objects. Assistance of the commission in promoting industry cooperation with in kind contribution of vessel time is requested.
- Ongoing, will seek input at not additional cost to the Commission.

Project 56. **(Priority = Medium) – Extended** **Utilize underwater videos and other tools to characterize species, size composition and spatial distribution of tunas aggregating around floating objects.**						

- FT-SWG Priority
- The unit used in the EPO by IATTC cost approximately $3000. On advice from IATTC, it will likely be necessary that gear be suitable to depths of at least 100 m due to deeper thermocline and mixed layer depth in the WCPO. This will require greater pressure ratings and length of cables.

4. Evaluation of management options

Project 57. Identifying Provisional Limit Reference Points for the key target species in the WCPFC **(Priority = High)**						

- Identify candidate indicators (e.g. $B_{current}/B_o$, SB/SB_{MSY}) and related limit reference points (e.g. $B_{current}/B_o$,=X, SB/SB_{MSY}=Y), the specific information needs they meet, the data and information required to estimate them, the associated uncertainty of these estimates, and the relative strengths and weaknesses of using each type within a management framework.
- Using past assessments, evaluate the probabilities that related performance indictors exceed the values associated with candidate reference points.
- Evaluate the consequences of adopting particular limit reference points based on stochastic projections using the stock assessment models.
- Undertake a literature review / meta-analyses to provide insights into levels of depletion that may serve as appropriate limit reference points and other uncertain assessment parameters (e.g. steepness).

Project 58. **(Priority = Medium)**
Evaluation of reference points and decision rules.

- Undertake a formal evaluation (e.g. Management Strategy Evaluation and robustness of stock assessments) of reference points and decision rules to guide the long term management of the key target species in the WCPFC.
- The work program recommended in the second consultancy report and at SC4 would provide some guidance on progressing this task.
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Project 59. **(Priority = Medium)**
Management Strategy Evaluation for non-target and protected species using semi-quantitative models.

- ERA will identify species at risk from to the effects of fishing. For some of these species the information available will be insufficient for a robust statistical stock assessment approach. However a need to evaluate management options for these species will remain.
- Loop modelling, information gap theory, fuzzy set theory provides methods for modelling management under severe data uncertainty.
- Budget level: 100K (SPC, CSIRO, IATTC, others).

NEW PROJECTS FROM SC4

Project 60. (Priority = High)
Collection and evaluation of purse-seine species composition data

- Collection of fish weight data onboard longliners and purse seiners using “at sea” scales
- Continued study into sampling regimes for size and species composition of purse-seine catches

Port sampling programmes to determine the accuracy of cannery receipts in Noro, SI and possibly other ports

- Collaboration with other tuna RFMOs to examine factors affecting the sampling of purse-seine species composition

Project 61. (Priority =High)
N. Pacific striped marlin mitigation methods

- Analyze catch rates with regard to gear and operational modifications, spatio-temporal and oceanographic considerations.
- Modelling to incorporate gear and spatio-temporal effects to identify potential factors contributing to striped marlin catch reductions in N. Pacific longline fisheries.

NEW PROJECTS FROM SC5

Project 62. Project: SEAPODYM simulation modelling (Priority=Medium)						
• Development of a Pacific swordfish application • Simulation experiments to improve the model calibration for tuna species, using higher resolutions of fishing data and oceanic environmental data • Model calibration for albacore with a basin-scale application including both north and south populations. • Incorporation of conventional and archival tagging data in the model calibration. • Projection of impact of global climate change on distribution and abundance of tuna stocks Collaboration between CLS, Space Oceanography Division and SPC-OFP						
Project 63. Identifying Provisional Decision Rules (Priority=High)						
• For the key target species in the WCPFC, develop candidate harvest strategies (decision rules) based on present stock status. • Define and/or quantify assessment uncertainty and articulate how this is to be incorporated within decision rules.						
Project 64. Revised stock assessment of SW Pacific Striped Marlin (Priority=High)						
• A project to undertake this work is being developed by Australia in conjunction with New Zealand, SPC-OFP and other CCMs. • This species is not one of the principal target species assessed by the SPC-OFP but is an important target species for a number of CCMs. Australian and New Zealand scientists are proposing to undertake this work and are seeking the endorsement of the Commission as the research will have broader regional benefits. Support from the Commission would help secure funds from funding sources from Australia and New Zealand.						
Sub-total (non SPC-OFP services)						
Sub-total (SPC-OFP services)						
GRAND TOTAL						