



**SCIENTIFIC COMMITTEE
TWENTY-SECOND REGULAR SESSION**
11-19 August 2026
Apia, Samoa (Hybrid)

TERMS OF REFERENCE FOR PROPOSED PROJECTS FOR 2027 - 2029

WCPFC-SC22-2026-GN-WP04 [Rev01](#)

17 August 2026

Secretariat

Terms of Reference for Proposed Projects for 2027 – 2029

Summary Table (Priority ranking required: **No** / **Yes**)

No.	I. Project priority ranking – NOT required	
1	Project 35B	WCPFC Pacific Marine Specimen Bank (PMSB)
2	Project 42	Pacific Tuna Tagging Programme (PTTP)
4	Project 130	Joint bycatch assessment workshop for billfish and sharks
5	Project 131	Southwest Pacific swordfish management strategy evaluation
6	Project P22X09	Global and regional environmental niche and favourable feeding habitat of silky shark (<i>Carcharhinus falciformis</i>) by size and sex: a step towards bycatch assessment and mitigation
7	Project P22X10	Characterisation of vessel gear interactions, stock trend evaluation and spatially explicit bycatch risk assessment for false killer whales (<i>Pseudorca crassidens</i>), short- (Globicephala macrorhynchus) and long-finned pilot whales (Globicephala melas), rough-toothed dolphins (<i>Steno bredanensis</i>), and melon-headed whale (Peponocephala electra) in the South Pacific
8	Project P22X01	Stock assessment of southwest Pacific blue shark
No.	II. Project priority ranking – Required	
1	Project 100d	Application of CKMR methods to SP albacore and cost-benefit evaluation and prioritisation of CKMR to WCPFC stocks (tuna, billfish, sharks)
2	Project 120	Updated reproductive biology of tropical tunas
3	Project 121	Ecosystem and Climate Indicators
4	Project P128a	Initial analyses to support investigations of the connectivity of key tuna species between the Western Pacific and East Asia (WPEA) region and the broader WCPFC-CA
5	Project 129	Building an age-length data stream for tuna assessments
6	Project P22X02	Data characterisation of low information sharks and mobulids
7	Project P22X03	Bycatch Mitigation Information System
8	Project P22X04	Technical workshop on approaches to utilising tagging data within regional stock assessments to support best available science
9	Project P22X05	Data characterisation of black marlin, sailfish and shortbilled spearfish
10	Project P22X06	Mitigation of the adverse environmental effects of FADs in the WCPO
11	Project P22X07	Monitoring of the dFAD fishery to guide management
12	Project P22X08	Mitigating the environmental impacts of industrial aFAD loss
13	Project P22X11	WCPO skipjack external tagging analysis: phases 2 and 3 analyses for abundance indices and biomass estimation

NO PRIORITY RANKING PROJECTS

Project 35B Ongoing	WCPFC Pacific Marine Specimen Bank (PMSB) Essential project – No Priority Ranking
Objectives	The objective of the project is to maintain and develop the Pacific Marine Specimen Bank with particular emphasis on WCPO bigeye, yellowfin, albacore and skipjack tunas, and swordfish, and, to facilitate transmission of samples to specified researchers with due cognizance of the WCPFC Pacific Marine Specimen Bank (PMSB) Access Protocol.
Scope	The scope of ongoing work will include, but not limited to, the following: 1. Maintain and develop: ○ the collection of samples to further develop the PMSB and contribute to relevant research projects; ○ the public SPC webpage (www.spc.int/ofp/PacificSpecimenBank) informing interested parties of the Pacific Marine Specimen Bank (PMSB), including the rules of procedure to access samples from the PMSB; ○ a secure web-accessed database holding non-public data; ○ a relational database that catalogues the samples to include sampling metadata; ○ the Noumea (SPC) storage site including expansion as required; and ○ the Brisbane (CSIRO) storage site. 2. Tissue sample utilisation and a record of outcomes/outputs will also be detailed in the relational database. 3. Subject to approval by the WCPFC Executive Director: ○ metadata will be made available to institutions or organizations responsible for providing scientific advice in fisheries through the web-accessible component of the database, and subsequently, and ○ SPC-OFP will facilitate the transmission of requested samples to specified researchers/organisations, and the return of unused and/or processed samples to the relevant storage facility. 4. Australia has provided access to their quarantine and sample storage infrastructure through CSIRO. Under current funding, samples are curated at the Brisbane site on an ongoing basis. CSIRO has committed to the in-kind contribution of maintaining space and transfer of specimens. The specific work is to: ○ Sort specimens on arrival and reconcile with quarantine data; ○ Enter data describing specimens received into the PMSB database; ○ Store specimens systematically so that they can be retrieved when requested; and ○ Laboratory and storage materials to complete curation. 5. As agreed at the annual project steering committee meeting (SC22-RP-P35b-02), in addition to maintaining and operating the WCPFC PMSB, the Scientific Services Provider will: ○ continue to support initiatives to increase rates of observer biological sampling, noting that this contribution is essential to the ongoing success of WCPFC's work; and ○ pursue the proposed work listed in Section 5 <i>Work Plan 2026-2027</i> in the <i>Report of the Pacific Marine Specimen Bank Steering Committee</i> (WCPFC-

	SC22-2026/RP-P35b-02).
Timeframe	January – December 2027
Budget	USD 113,945

Project 42 Ongoing	Pacific Tuna Tagging Programme (PTTP) Essential project – No Priority Ranking
Objectives	• Tag: run cruises generating mark-recapture and electronic tagging data for stock assessments, harvest strategies and monitoring, SEAPODYM, and independent parameter estimation (skipjack, yellowfin, bigeye) • Recover: maintain the regional tag-recovery network (rewards, stakeholder engagement, training, tag seeding) to sustain high, well-characterised reporting rates • Curate: collect, validate and quality-control all tagging data, and prepare it for assessment and analysis • Estimate: support estimation of key parameters: movement, growth, habitat use, mixing, mortality, abundance, fishing effects • Share the platform: use cruises as a shared sampling capability (tissues, protocol development, at-sea experiments) for other WCPFC projects, where core tagging isn't compromised • Publish: contribute technical reports and peer-reviewed science on tropical tuna biology, ecology and fisheries
Scope	The project will maintain a programme of dedicated tagging cruises, with target species, region, timing and fishing mode determined by management priorities and the advice of the steering committee. Reflecting current scientific needs, the schedule has moved from strict annual alternation between skipjack- and bigeye-focused cruises toward a more continuous tagging effort throughout the year, with a greater emphasis on skipjack. This is anticipated at approximately 60 days of charter-time per year, across 3-4 separate periods of the year, where possible. Yellowfin and bigeye tuna tagging will be undertaken complementarily to these cruises, where possible. The steering committee will keep the cruise schedule under review and adjust it as management and scientific priorities evolve. Tagging research cruises are anticipated to be undertaken on either the NFD pole&line vessel <i>Solomon Searcher</i> or the multipurpose fishing vessel <i>Gutsy Lady 4</i>, depending on region, species and fishing mode requirements. The WCPFC Science Manager may require alternate vessels to be used given the availability of these preferred vessels and the specific requirements of the tagging cruise. The type and number of tags required to obtain these data will be determined prior to each cruise, but typically conventional and/or electronic tags from manufacturers Hallprint, Wildlife Computers, Vemco, Lotek or Biologging Solutions are required. The WCPFC Science Manager may add manufacturers to this list of preferred suppliers. The project will, where necessary, support the identification of solutions for ensuring regional capability for implementing tuna tagging experiments and tag-recovery in the longer

	term. Maintenance of the tag recovery network will include cash or merchandise rewards, and where necessary require engagement of third-parties such as WCPFC member fisheries authorities, industry associations, and other fisheries service providers to act as agents in this regard. This includes third-party providers who are responsible for the administration of the US Treaty and Parties to the Nauru Agreement Observer Programmes (currently MRAG Asia Pacific Pty Ltd).
Timeframe	January – December 2027
Budget	USD 950,000

Project 130 No cost extension	Joint bycatch assessment workshop for billfish and sharks
Part A: Administrative Summary	
1. Project Title	Joint bycatch assessment workshop for billfish and sharks
2. Organization	<i>Submitted by the BRP</i>
3. Administrative Contact	<i>TBD - SPC</i>
4. Principal Investigator (PI) and CV	<i>TBD - SPC</i>
5. Commencement and Completion Date	<i>1 March 2026 - 31 August 2027</i>
6. Project Budget Summary	<i>Overview of major cost categories:</i> ○ Costs for invited experts and facilitator - \$50,000 ○ Travel to SC22 \$10,000 ○ Operating Costs (e.g., equipment, supplies) - NA ○ Other Costs (e.g., sub-contracts, dissemination) - NA
Part B: Project Proposal Description	
1. Project Title	<i>As above</i>
2. Background and Need	<i>See Rationale</i>
3. Objectives and Benefits	<i>See scope of work</i>
4. Note	<i>NA</i>
5. Rationale	<i>The BRP and the SRP have both highlighted the need for a workshop to standardise and find the most appropriate stock assessment model types to evaluate bycatch billfish shark stocks. Furthermore, for low information stocks some guidance would be useful for outputs for fishery characterisations.</i> The BRP suggested that Stock assessment project 6 be repurposed as a ToR for a stock assessment methods workshop. Given the difficulty in running billfish assessments the BRP indicated that there would be value in conducting a review of stock assessment methods for billfish. This should include low and high information stocks as well as multi-model approaches (low and high information for the same stock) and Bayesian assessment methods as is done in the shark assessments. This would preferably be done as an in-person workshop and would benefit

	from including people who have successfully completed this type of approach for sharks. The review should be Pacific wide and include participation from IATTC and ISC. There would be most value in having the workshop as a joint bycatch assessment workshop for billfish and sharks. The focus should be pan-Pacific but could also invite experts from other tuna RFMOs.
6. Assumptions	<i>Personnel are available to undertake this work. A venue can be found to host the workshop.</i>
7. Scope of Work	1. <i>Host a workshop to assess the best approaches for assessing lower information bycatch species.</i> 2. <i>Invite experts who have undertaken successful stock assessments of billfish and sharks, and those involved in the assessment of these stocks in other RFMOs particularly the IATTC.</i> 3. <i>Review assessments that are considered to be successful for billfish and sharks in tuna RFMOs, including CKMR possibilities.</i> 4. <i>Evaluate successes and failures.</i> 5. <i>Recommend assessment methods for bycatch billfish and sharks.</i> 6. <i>Summarise the best practice for these assessments and list potential reference points for reporting stock status for these species.</i> 7. <i>Note that not all stocks would have the same level of information available to them and as such a tiered approach based on the certainty of the data available for the assessment may be required.</i> 8. <i>Include low information characterisations and provide information as to what information would be useful for inclusion in these fishery characterisations.</i> 9. <i>Provide input to the stock assessment schedule including any commentary on aligning north and south Pacific assessments.</i>
8. Activity Schedule	<i>Identify experts and venue (March 2026)</i> <i>Run the workshop (April/May 2026)</i> <i>Compile the report and submit to SC22 (June/July 2026)</i>
9. Project Outcomes	<i>Report document and presentation to SC22.</i>
10. Forms of Results	<i>Report document and presentation to SC22.</i>
11. Methods	<i>TBD</i>
12. Data Management Plan / Data Sets Required	<i>NA</i>
13. Other Related Projects	<i>NA</i>
14. Collaborations	<i>TBD</i>
15. Project Staff and CVs	<i>TBD</i>
16. Risks of Project Not Achieving Objectives	<i>Not all experts may be available for the workshop.</i>
17. Timeframe	<i>As above</i>
18. Budget	<i>As above</i>
19. References	SC21-SA-IP-17 SC21-SA-IP-18

Project P131 Ongoing	Southwest Pacific swordfish management strategy evaluation No priority ranking
Objectives	To develop a management strategy evaluation framework for Southwest Pacific swordfish and to develop and evaluate candidate management procedures.
Rationale	This new project scope responds to the following decisions and guidance provided by WCPFC21 in December 2024: <i>458. The Commission agreed to develop a management strategy evaluation framework to evaluate candidate management procedures for Southwest Pacific swordfish and to consider developing a Harvest Strategy. This will commence following the 2025 stock assessment and be conducted in a transparent and inclusive manner.</i> <i>459. The Commission requested in accordance with the SC’s Billfish Research Plan, Australia and the EU to develop a project scope and workplan for the consideration of SC21. That project shall be considered as a formal project of the Commission and shall be managed by the SSP and supervised by the SC. The research scope and workplan will include explicit consideration of the existence of bycatch and target fisheries with differing impacts on the stock and the need to consider the implications when developing a future Harvest Strategy for SPSWO, as well as the resources needed.</i> <i>460. The Commission noted that this should not distract from the critical work progressing the development of harvest strategies for key tuna stocks and is therefore not included in the indicative Harvest Strategy Workplan for key tuna stocks at this stage. The Commission noted that Australia and the EU are considering funding options to support this work of the Commission, and as noted in the Billfish Research Plan, no funding for this work is sought in 2025.</i>
Assumptions	• an updated stock assessment for Southwest Pacific swordfish is provided to SC21 for review. • Relevant stock assessment data and models can be provided to the research providers. • Suitable software is available to undertake MSE using stock synthesis 3 as the operating model basis (the NOAA tool “Management Strategy Evaluation for SS3 – SSMSE” may be appropriate). • Funding is made available, and research providers are available and able to undertake this work.

Scope/Plan	It is proposed that the project be managed through the Scientific Services Provider (SSP), acknowledging that the work may be commissioned to an external provider in accordance with usual SSP practice and process. It is proposed that the work to develop the 2025 SW Pacific swordfish stock assessment be used to inform the development of the operating model reference set. Additional axes of uncertainty or one-off sensitivities may be incorporated as needed (in the reference or robustness set) with a view to properly representing uncertainty but also constraining the model count for tractability. SW Pacific swordfish is taken in both targeted longline fisheries and also as an important (and generally retained) economic bycatch in longline fisheries targeting tuna. The catch level in bycatch fishery generally exceed the level in targeted fisheries. The design of candidate management procedures, and ultimately the design of the Commission management/implementing arrangements, will need to account for both of these sectors. No specific target reference point (TRP) has been adopted for SW Pacific swordfish, while noting that the WCPFC Convention requires that all WCPFC stocks should be maintained at least at levels that can produce MSY. The MSE process will serve to evaluate alternative candidate TRPs through their incorporation into alternative candidate MPs as has been the case in since 2025 for albacore and bigeye tunas. At project commencement it is proposed that candidate targets be based on a variety of biomass depletions relative to a reference period (including that which corresponds to the MSY level), pending Commission guidance. Consideration of an appropriate monitoring strategy would occur in the latter half of the project. A draft overall indicative workplan for the development of a Southwest Pacific swordfish is provided in Attachment 1. It contains a broader set of items required for developing the harvest strategy, some of which are beyond the project scope. The Commission has noted that the development of this management procedure should not distract from the critical work progressing the development of harvest strategies for key tuna stocks. Further, noting that swordfish is a byproduct for most fleets, it is desirable that the workload of the Commission and its subsidiary bodies is efficient and constrained to a reasonable level. It is also desirable that candidate MPs be simple in design, avoid excessive management intervention, and be simple to run and translate directly into management implementation. It is suggested that, subject to MSE, the MP be run in a four-year cycle in appropriate synchronisation with the stock assessment. MSE Project Plan
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	2026	Year1. Project commencement. OM Development and initial development of candidate MPs for evaluation. • Provide analysis to allow SC to consider the operating models for MSE. • Provide analysis to allow SC and Commission to consider and advise on candidate management procedures to evaluate.																												
	2027	Year 2. Evaluation of candidate MPs. • Provide analysis to allow SC to provide advice on performance of candidate management procedures. • Provide analysis to allow Commission to consider and refine a candidate set of management procedures.																												
	2028	Year 3. Adoption (finalising) of MSE operating models and provision of candidate MPs to Commission. • Provide analysis to allow SC to formally agree the operating models for MSE. • Provide analysis to allow SC to provide advice on performance of candidate management procedures. • Provide analysis to allow Commission to consider and refine a candidate set of management procedures.																												
	2029	Pending																												
	2030	Pending																												
Indicative Time frame	3-5 years staring from 2026. There is the potential for extension to support Commission decision making as needed.																													
Indicative Budget	<table><tr><td></td><td>Staffing</td><td>SC attendance</td><td>Overheads</td><td>Total USD</td></tr><tr><td>2026</td><td>\$99,000</td><td>\$6,000</td><td>\$15,750</td><td>\$120,750</td></tr><tr><td>2027</td><td>\$101,970</td><td>\$6,180</td><td>\$16,223</td><td>\$124,373</td></tr><tr><td>2028</td><td>\$104,940</td><td>\$6,365</td><td>\$16,696</td><td>\$128,001</td></tr><tr><td></td><td></td><td></td><td>TOTAL</td><td>\$373,124</td></tr></table> <i>Budget covers stock assessment scientist together with SC travel costs and SPC overheads.</i> <i>Australia, EU and French Polynesia are considering funding options to support this work. Support from other interested CCMs and fishery participants is appreciated.</i>						Staffing	SC attendance	Overheads	Total USD	2026	\$99,000	\$6,000	\$15,750	\$120,750	2027	\$101,970	\$6,180	\$16,223	\$124,373	2028	\$104,940	\$6,365	\$16,696	\$128,001				TOTAL	\$373,124
	Staffing	SC attendance	Overheads	Total USD																										
2026	\$99,000	\$6,000	\$15,750	\$120,750																										
2027	\$101,970	\$6,180	\$16,223	\$124,373																										
2028	\$104,940	\$6,365	\$16,696	\$128,001																										
			TOTAL	\$373,124																										
References	WCPFC SC21-SA-WP-05, Stock assessment of Southwest Pacific swordfish WCPFC19-2022-IP08, Catch and effort data summaries to support discussions on the new South-west Pacific SWORDFISH CMM. WCPFC19-2022-IP09, Southwest Pacific swordfish stock projections.																													

Attachment 1

Indicative Workplan for Developing a Southwest Pacific Swordfish Harvest Strategy

- This attachment provided a draft workplan developed in accordance with CMM 2022-03). It sets out a schedule of technical work and Commission decision making for the development from 2026 to 2020. The workplan is a living document and will be updated as needed to reflect actual progress as well as other needs and developments. It is acknowledged that delays in the execution of the workplan may occur, noting the complexity of developing harvest strategies for multiple species within the multilateral WCPFC environment.
- This workplan simply schedules decisions noting that it is the Commission's decision as whether they may be 'interim' in nature.
- The term "Management Procedure" is defined as a formal specification of data collection, the associated estimation model (e.g. the estimation of stock status through an analytical or empirical method) together with a Harvest Control Rule. Together these clearly define what management actions are to be made in response to changes in the stock or fishery condition.
- Note: The table below refers to the elements contained in CMM 2022-03 (a. Objectives, b. Reference Points, c. Acceptable Levels of Risk, d. Monitoring, e. Harvest Control Rules/Management Procedure and f. MSE). Items in brackets are related to harvest strategy development and so are part of the plan but are not one of these six elements.

Broader indicative Workplan for Developing a Southwest Pacific Swordfish Harvest Strategy. Note some items (in blue) are outside of the MSE project scope so will need to be progressed separately.

2025	[Scheduled SW Pacific swordfish stock assessment]
2026	SC consider the operating models for use in Management Strategy Evaluation (MSE). SC provide any advice on potential Management Procedures (MP) to evaluate. Commission consider Objectives for the management of the stock. Commission provide advice on candidate management procedures to evaluate.
2027	SC consider a set of Performance Indicators for evaluating candidate MPs. SC consider the performance of candidate MPs and provide technical advice for subsequent work. SC consider candidate Limit Reference Point or set of reference points for southwest Pacific swordfish. Commission record the set of Objectives for the management of the stock and a set of Performance Indicators for evaluating candidate MPs. Commission consider candidate TRPs to be evaluated within candidate MPs.
2028	SC formally agree the operating models for MSE. SC provide advice to the Commission on performance of candidate MPs including their associated candidate TRP. Commission consider and refine candidate set of MPs including their associated candidate TRP.

	Commission consider adopting a Limit Reference Point or set of reference points for Southwest Pacific swordfish together with acceptable levels of risk.
2029	SC provide advice to the Commission on performance of candidate management procedures. SC consider appropriate monitoring strategy elements. Commission consider adopting a MP together with required implementing arrangements. [Scheduled SW Pacific swordfish stock assessment]
2030	SC provide advice to the Commission the monitoring strategy. Commission consider adopting a MP together with required implementing arrangements.

Project P22X09 New project	Global and regional environmental niche and favourable feeding habitat of silky shark (<i>Carcharhinus falciformis</i>) by size and sex: a step towards bycatch assessment and mitigation No priority ranking
Part A: Administrative Summary	
1. Project Title	Global and regional environmental niche and favourable feeding habitat of silky shark (<i>Carcharhinus falciformis</i>) by size and sex: a step towards bycatch assessment and mitigation
2. Organization	Submitted by IATTC & JRC. In collaboration with the Pacific Community (SPC)
3. Administrative Contact	Jon Lopez Email: jlopez@iattc.org Jean-Noël Druon Email: jean-noel.druon@ec.europa.eu
4. Principal Investigator (PI) and CV	Jon Lopez (IATTC) — Head and Senior Scientist in the Ecosystem and Bycatch Program, with expertise in tropical tuna and FAD-associated fisheries, pelagic-shark bycatch, and the translation of habitat predictions into spatial management; co-author, among others, of the blue shark niche analysis (Druon et al., 2022) and of the tuna-RFMO bycatch-mitigation framework (Bowlby et al., 2024). Jean-Noël Druon (JRC, EC) — lead developer of the ecological-niche / favourable feeding habitat modelling framework applied to highly migratory species, including blue shark, skipjack tuna and Atlantic bluefin tuna, and of the operational fish-habitat products disseminated through the European Commission's sustainable-fisheries portal and the JRC Data Catalogue.
5. Commencement and Completion Date	1 January 2027 - 31 December 2027
6. Project Budget	No funding is requested from the WCPFC

Summary	
Part B: Project Proposal	Description
1. Project Title	As above
2. Background and Need	See Rationale
3. Objectives and Benefits	a. Identify the common environmental envelope (feeding and physical predictors) associated with silky shark presence globally and across the WCPO. b. Derive size- and sex-specific niches (e.g. juveniles vs. adults; males vs. females) subject to data availability and identified differences in the niches. c. Produce daily/8-day and climatological (monthly, seasonal) maps of favourable habitat since 2002, with associated statistics on habitat extent and variability. d. Explore candidate thresholds delineating “essential” habitat and illustrate the benefits of potential spatiotemporal mitigation options for special areas of interest, following the framework demonstrated for blue shark. e. Provide habitat layers usable as spatio-temporal covariates and silky shark essential habitat by eventual distribution priors for stock assessment and for the interpretation of observer data. Benefits for WCPFC: improved understanding of overlap between fishing effort and sensitive life stages; and inputs that strengthen assessment and ecosystem-based advice.
4. Note	The project delivers a deterministic, presence-based ecological-niche / favourable-feeding-habitat model for silky shark. It is not a stock assessment and does not estimate abundance; rather, it characterizes potential habitat from environmental conditions, by sex and size, and can complement the regional silky shark assessments, especially in the context of environmental change. Outputs depend on access to silky shark presence data with date, position and, ideally, size and sex; original data will be used to extract environmental conditions and shown only to produce aggregated analyses, while the derived habitat outputs will be made publicly available. Set level data are required but no vessel or flag details are needed.
5. Rationale	The approach extends a method already validated for highly migratory species, for example: skipjack tuna in the Atlantic and Indian Oceans (Druon et al., 2017), Atlantic bluefin tuna by size class (Druon et al., 2016) and, most directly, the global blue shark niche by size and sex (Druon et al., 2022). For blue shark, Bowlby et al. (2024) showed how such habitat predictions can be turned into a publicly accessible spatial bycatch-mitigation options for tuna RFMOs. The mechanistic method is particularly appropriate for the silky shark because: the species presence is likely linked to ecologically meaningful predictors near the sea surface - chlorophyll-a fronts as a proxy for productive feeding areas, together with a thermal and physical envelope (surface and subsurface temperature, mixed-layer depth, sea-surface-height anomaly and currents). Compared to purely correlative methods, this makes the model transferable across regions and periods, robust in data-poor

	settings, and independent of the catch-rate biases that limit conventional indices for a data-poor retention-prohibited species. The blue shark - a somehow ecologically comparable oceanic carcharhinid - provides a near-direct template for parameterization and validation.	
6. Assumptions	• Sufficient silky shark presence data (satellite-tag and/or observer capture positions) can be assembled for the WCPO, ideally resolved by size and sex. • Satellite ocean-colour (since ~2002) and physical reanalysis/operational products (Copernicus Marine) remain available and comparable over the study period. • Data-providing institutes and the WCPFC/SPC cooperate in supplying and, where needed, jointly interpreting the data. Data from other regions is already available: Eastern Pacific Ocean, Indian and Atlantic Oceans. • The environmental drivers identified for ecologically similar species are relevant to the silky shark and can be re-estimated for it.	
7. Scope of Work	1. Compilation and quality control of silky shark presence data (tagging and fishery observations) with date, position, and size/sex where available. 2. Extraction and harmonization of environmental predictors at presence locations and over the WCPO grid. 3. Identification of the environmental niche and feeding-habitat envelope, overall and by size/sex class. 4. Modelling and mapping of favourable habitat (daily/8-day, monthly, seasonal and interannual) since 2002, with habitat-variability statistics. 5. Independent validation against withheld presence data and potential comparison with fishing-effort distributions. 6. Definition of essential-habitat thresholds and illustration of benefits for potential spatiotemporal mitigation options, eventually using overlap with target species. 7. Support to assessment efforts by identifying special areas of interests, with potential developments in real-time for bycatch mitigation. 8. Reporting: a Scientific Committee working paper, a peer-reviewed publication, and public maps/datasets.	
8. Activity Schedule	Activity / milestone	Months
	Data-sharing agreements; compilation and quality control of data	1–3
	Environmental data acquisition and processing	2–4
	Niche identification; size/sex classes	5–7
	Habitat modelling and time-series mapping (since 2002)	7–8
	Validation and essential-habitat thresholds	7-8
	Mitigation scenarios; public maps and datasets	8–9
	SC working paper and peer-reviewed manuscript	10–12

9. Project Outcomes	Report document and presentation to SC24.
10. Forms of Results	Report document and presentation to SC24.
11. Methods	An ecological-niche modelling favourable-feeding-habitat approach is used, as developed, for example, for blue shark, skipjack and bluefin tuna: • Presence data (satellite tags and fishery observations) are matched to environmental predictors at the date and location of occurrence. • A feeding proxy is built from chlorophyll-a horizontal gradients (productivity fronts) derived from satellite ocean colour, capturing mesoscale features that concentrate prey; in oligotrophic areas, mesopelagic/micronekton indicators are considered, as for blue shark, for testing. • A physical envelope is defined from sea-surface temperature and a subsurface temperature reference (e.g. temperature ~100 m below the mixed layer depth), mixed-layer depth, sea-surface-height anomaly and current velocity, to exclude unsuitable abiotic conditions. • A common environmental envelope is identified from the distribution of predictors at presence points; regional, size- and sex-specific envelopes are estimated where data allow and different niches are identified. • Favourable habitat is mapped over the globe and the WCPO at daily/8-day resolution and aggregated to monthly, seasonal and interannual climate data (since 2002, the start of consistent ocean-colour records). • Models are validated against withheld presence data, including electronic tagging (fisheries independent) data, and compared, where possible, with the distribution of existing fishing effort; essential-habitat thresholds are then derived and translated into potential mitigation options with associated protection-efficiency proxies and metrics. • Environmental inputs are drawn from the EU Copernicus Marine Service (physical reanalysis/operational products) and from satellite ocean-colour archives. Models are independently validated using withheld presence data.
12. Data Management Plan / Data Sets Required	Data needed from WCPFC / SPC: • Silky shark observer records (presence data; purse-seine and longline) with date, precise position and, where available, size and sex; associated effort for overlap analysis, if possible. • Any available silky shark electronic-tagging data held or coordinated by the Secretariat or partners. Data access is intended to be formalized through the project's inclusion in the Shark Research Plan. Storage, security and sharing: • Confidential original data are stored securely by the IATTC/JRC Senior Scientists, used only to produce aggregated analyses, and not

	redistributed, consistent with the data-use agreements with each provider. Data will be erased after the analysis. • No confidential data will be published. Only derived, aggregated outputs (habitat maps, statistics) are published; these are made openly available via the EC portal and the JRC Data Catalogue and the associated publications. Data are handled following the strictest confidentiality principles (e.g., IATTC rules of confidentiality) and EC data-protection and confidentiality rules.
13. Other Related Projects	• WCPFC Shark Research Plan (2021–2030) (SRP) and its project list (Brouwer and Hamer, 2020; SC19-EB-WP-06; SC21-SA-IP-19); this project is proposed for inclusion in the SRP and is designed to complement, not duplicate, existing SRP tasks. • WCPFC silky shark stock assessment (Project 108; WCPFC-SC20-2024) and earlier WCPO/Pacific-wide assessments (Rice and Harley, 2013; Clarke et al., 2018). • Complementary to mitigation and survival work, including silky shark post-release survival studies and the bycatch release-device trials on purse-seiners tabled at SC21; exploration of spatiotemporal habitat avoidance offers a preventive complement to at-vessel handling measures. • The illustrative example of the global blue shark niche by size and sex and its operational habitat products (Druon et al., 2022) and the associated tuna-RFMO bycatch-mitigation framework (Bowlby et al., 2024). • Other similar examples of target species: feeding-habitat models for skipjack tuna (Druon et al., 2017) and Atlantic bluefin tuna (Druon et al., 2016). • Parallel t-RFMO interest (IATTC, ICCAT, IOTC) in exploring options for spatiotemporal management of pelagic sharks, ensuring synergy and avoiding duplication
14. Collaborations	• IATTC and JRC (EC) — joint leads: bycatch, FAD-fishery and spatial-management expertise and cross-RFMO coordination (IATTC); model development, environmental processing, mapping and dissemination (JRC). • Pacific Community (SPC) – Oceanic Fisheries Program — data provision and assessment and mitigation linkage. • Data-providing institutes and tagging programs — presence data and ecological expertise; co-authorship of the resulting publication. Collaborators from the eastern Pacific Ocean, as well as the Indian and Atlantic Oceans have been confirmed. • T-RFMO and academic scientists from the tuna and tuna-like fisheries network — cross-validation and management framing.

	Other national and regional observer programs — fishery observation data and interpretation.	
15. Project Staff and CVs	Jon Lopez (IATTC); Jean-Noël Druon (JRC); and SPC-OFP assessment and bycatch scientist(s)	
16. Risks of Project Not Achieving Objectives	Risk	Mitigation
	Delays in data provision or restrictive sharing terms	Early data-use agreements; use of aggregated/secured data; phased analysis starting with available presence data
	Sparse size/sex information	Begin with a pooled niche; add size/sex classes as data allow; leverage blue shark priors where possible
	Limited validation data in some areas	Cross-validation, withheld-data testing and effort-overlap checks; clear uncertainty reporting
17. Timeframe	As above	
18. Budget	As above	
19. References	[1] Bowlby H, Druon JN, Lopez J, Juan-Jordá MJ, Carreón-Zapiain MT, Vandeperre F, Leone A, Finucci B, Sabarros PS, Block BA, Arrizabalaga H, Afonso P, Musyl MK, Coelho R, Cortés E, Cardoso LG, Mourato B, Queiroz N, Fontes J, Abascal FJ, Zanzi A, Hazin HG, Bach P, Sims DW, Travassos P (2024). Global habitat predictions to inform spatiotemporal fisheries management: initial steps within the framework. <i>Marine Policy</i> 164: 106155. DOI: 10.1016/j.marpol.2024.106155. [2] Druon JN, Campana S, Vandeperre F, Hazin FHV, Bowlby H, Coelho R, Queiroz N, et al. (2022). Global-scale environmental niche and habitat of blue shark (<i>Prionace glauca</i>) by size and sex: a pivotal step to improving stock management. <i>Frontiers in Marine Science</i> 9: 828412. DOI: 10.3389/fmars.2022.828412. [3] Druon JN, Chassot E, Murua H, Lopez J (2017). Skipjack tuna availability for purse seine fisheries is driven by suitable feeding habitat dynamics in the Atlantic and Indian Oceans. <i>Frontiers in Marine Science</i> 4: 315. DOI: 10.3389/fmars.2017.00315. [4] Druon JN, Fromentin JM, Hanke AR, Arrizabalaga H, Damalas D, Tičina V, et al. (2016). Habitat suitability of the Atlantic bluefin tuna by size class: an ecological niche approach. <i>Progress in Oceanography</i> 142: 30–46. DOI: 10.1016/j.pocean.2016.01.002. [5] Rice J, Harley S (2013). Updated stock assessment of silky sharks in the western and central Pacific Ocean. WCPFC-SC9-2013/SA-WP-03. Western and Central Pacific Fisheries Commission.	

	[6] Clarke S, Langley A, Lennert-Cody C, et al. (2018). Pacific-wide silky shark (<i>Carcharhinus falciformis</i>) stock status assessment. WCPFC-SC14-2018/SA-WP-08. Western and Central Pacific Fisheries Commission. [7] WCPFC-SC20 (2024). Stock assessment of silky shark in the Western and Central Pacific Ocean: 2024 (Project 108). WCPFC-SC20-2024/SA-WP-04. [8] WCPFC (2013). Conservation and Management Measure for silky sharks. CMM 2013-08. Western and Central Pacific Fisheries Commission. [9] Brouwer S, Hamer P (2020). 2021–2025 Shark Research Plan. WCPFC-SC16-2020/EB-IP-01 Rev1 (subsequently extended as the 2021–2030 Shark Research Plan). [10] WCPFC-SC19 (2023). Shark Research Plan 2021–2025 mid-term review (Project 97b). WCPFC-SC19-2023/EB-WP-06. [11] Brouwer S, Hamer P (2025). Progress against the 2021–2030 Shark Research Plan — 2025. WCPFC-SC21-2025/SA-IP-19. [12] Rigby CL, Sherman CS, Chin A, Simpfendorfer CA (2017, amended 2021). <i>Carcharhinus falciformis</i>. The IUCN Red List of Threatened Species: e.T39370A117721799. (Vulnerable). CITES Appendix II. [13] Online resources — EC sustainable-fisheries fish-habitat maps and animations; JRC fish-habitat datasets (JRC Data Catalogue).
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Project P22X10 New project	Characterisation of vessel gear interactions, stock trend evaluation and spatially explicit bycatch risk assessment for false killer whales (<i>Pseudorca crassidens</i>), short- (<i>Globicephala macrorhynchus</i>) and long-finned pilot whales (<i>Globicephala melas</i>), rough-toothed dolphins (<i>Steno bredanensis</i>), and melon-headed whale (<i>Peponocephala electra</i>) in the South Pacific No priority ranking required
Part A: Administrative Summary	
1. Project Title	<i>Characterisation of vessel gear interactions, stock trend evaluation and spatially explicit bycatch risk assessment for false killer whales (<i>Pseudorca crassidens</i>), short- (<i>Globicephala macrorhynchus</i>) and long-finned pilot whales (<i>Globicephala melas</i>), rough-toothed dolphins (<i>Steno bredanensis</i>), and melon-headed whale (<i>Peponocephala electra</i>) in the South Pacific</i>
2. Organization	<i>Submitted by PNA Members</i>
3. Administrative Contact	<i>TBD – SPC</i>
4. Principal Investigator (PI) and CV	<i>TBD – SPC</i>
5. Commencement and Completion Date	<i>1 January 2027 - 31 August 2027</i>
6. Project Budget	<i>Overview of major cost categories:</i>

Summary	○ 0.3 FTE \$30,000 ○ Operating Costs (e.g., equipment, supplies) - NA ○ Other Costs (e.g., sub-contracts, dissemination) – NA No funding request from the Commission
Part B: Project Proposal Description	
1. Project Title	<i>As above</i>
2. Background and Need	<i>See Rationale</i>
3. Objectives and Benefits	<i>See Scope of work In summary:</i> <i>1. Characterise vessel and gear interactions and the fate of encountered individuals.</i> <i>2. Develop species distribution models for the three species.</i> <i>3. Compile purse seine and longline fishing effort layers</i> <i>4. Assess spatial bycatch risk and identify hotspots and priority management areas.</i> <i>5. Evaluate trends in encounter rates and distribution, and propose mitigation options.</i> <i>Benefits: shows where risk is concentrated and which areas to prioritise for mitigation, and produces reusable spatial layers and code.</i>
4. Note	<i>NA5.</i>
5. 5. Rationale	<i>Cetaceans are occasionally, inadvertently, encircled during purse seine fishing operations and get entangled in longline fishing gear. False killer whales (<i>Pseudorca crassidens</i>), short- (<i>Globicephala macrorhynchus</i>) and long-finned pilot whales (<i>Globicephala melas</i>) and rough-toothed dolphins (<i>Steno bredanensis</i>) are five of the odontocetids that are the most regularly encountered. Some of these encounters result in mortalities, particularly for rough-toothed dolphins. The reasons for these mortalities and the impacts on the populations are currently unknown.</i> <i>This analysis will investigate trends in the populations over time as well as assess any trends in the species-fishery interactions with longline and purse seine fishing gear.</i> <i>Trend analyses do not indicate where interactions occur, or which areas should be prioritised for mitigation. A spatially explicit risk assessment combines species distribution, fishing effort and interaction likelihood to identify high-risk areas. Set-level observer and logsheet data held by SPC support this at a resolution that publicly available, aggregated effort data cannot, and provide the condition-on-capture information needed for the consequence component of the assessment.</i>
6. Assumptions	<i>Sufficient existing fisheries and biological data are readily available from the WCPO or other sources.</i> <i>Personnel are available to undertake this work.</i> <i>Set-level purse seine and longline observer and logsheet data can be accessed from the SPC database at the resolution required for spatial analysis.</i> <i>Species occurrence records and remotely sensed environmental predictors are sufficient to support species distribution models.</i> <i>Encounter rates are a proxy for relative abundance, and risk outputs are relative rather than absolute mortality.</i>

7. Scope of Work	1. Reviewing any previous work in the WCPO and elsewhere to assess and improve on methods to evaluate the stock trends of rough-toothed dolphins, false killer whales and short-finned pilot whales, including previous applications of spatially explicit bycatch risk assessment. 2. Summarise the biological information for these three species, including the life history traits needed for the risk assessment. 3. Summarise the fate of encountered individuals and assess the condition information from all three species in both fisheries, and derive gear-specific interaction and mortality parameters. 4. Compile species occurrence data (observer records, OBIS, GBIF, published literature) and environmental predictors (bathymetry, distance to coast, sea surface temperature, chlorophyll-a, currents, productivity and fronts). 5. Develop species distribution models for the three species and produce gridded habitat suitability layers for the South Pacific. 6. Compile purse seine and longline fishing effort layers from set-level observer and logsheet data, reclassified into intensity categories. 7. Develop models to assess trends in rough-toothed dolphin, false killer whale and short-finned pilot whale populations using all available South Pacific and wider WCPFC Convention Area purse seine and longline observer data. 8. Evaluate trends in encounter rates and trends in distribution changes for the three species, by gear and set type. 9. Run a spatial risk assessment model using the distribution and effort layers with gear-specific interaction parameters, to estimate exposure, consequence and relative risk by gear and cumulatively. 10. Map bycatch risk, hotspots, priority management areas and areas of high uncertainty. 11. Develop a plan to assess the reasons leading to their mortality in purse seine and longline operations, if possible, informed by the risk maps and condition-on-capture information; 12. Propose strategies to mitigate mortality, prioritised using the risk assessment outputs, if possible. 13. Prepare a report containing the above results for SC23.
8. Activity Schedule	<i>Indicative schedule: Month 1 – data requests and method review; Months 2–3 – occurrence, environmental and effort data; Months 3–4 – species distribution models and trend analyses; Month 5 – RA runs and risk maps; Month 6 – reporting and presentation to SC23.</i>
9. Project Outcomes	<i>Report document and presentation to SC23, together with species distribution and fishing effort layers, bycatch risk maps, identified hotspots and priority management areas, and documented analysis code</i>
10. Forms of Results	<i>Report document and presentation to SC23. Deliverables: cleaned and documented datasets; species distribution model outputs with documentation; purse seine and longline effort layers; bycatch risk maps, RA outputs and analysis scripts; and the final</i>

	<i>report. Spatial outputs will be supplied at a resolution consistent with data confidentiality requirements.</i>
11. Methods	<i>Encounter per unit effort standardised in log space following WCPFC-SC21-EB-IP-07, together with trends in occupied 1×1 degree cells and spatial extent. Effort-corrected species distribution models using static and dynamic environmental predictors, with the modelling method selected at inception.</i> <i>Spatial risk model: exposure from the distribution and effort layers, consequence from life history traits and condition on capture. Analysis in R, with code supplied as a deliverable.</i>
12. Data Management Plan / Data Sets Required	1. <i>WCPFC data extract of all longline and purse seine marine mammal catch and effort as well as interaction data, at set level, for the South Pacific and wider WCPFC Convention Area, including gear, set type and condition-on-capture codes.</i> 2. <i>These data exist in the observer data base.</i> 3. <i>Also required: species occurrence records (OBIS, GBIF, published literature) and remotely sensed environmental products.</i> 1. <i>Include how data will be stored, secured, and shared - raw non-public data held only on SPC or custodian-approved systems and not redistributed; published outputs aggregated to a non-disclosing resolution; code and documentation shared openly.</i>
13. Other Related Projects	<i>WCPFC-SC16-ST IP-12</i> <i>WCPFC-SC17-ST IP-10</i> <i>WCPFC-SC21-ST-WP-08</i> <i>WCPFC-SC21-EB-IP-07</i> <i>WCPFC-SC19-2023/EB-WP-08</i> <i>Peatman et al. (2023)</i>
14. Collaborations	<i>TBD.</i>
15. Project Staff and CVs	<i>TBD.</i>
16. Risks of Project Not Achieving Objectives	<i>Preliminary analysis if data held by the PNA members suggest that the data exist and the methods used in WCPFC-SC21-EB-IP-07 can be replicated.</i> <i>Access to set-level observer data beyond PNA waters may be delayed or restricted, which would reduce spatial coverage; the fallback is PNA member EEZs and Tokelau.</i> <i>Encounters are rare events (fewer than 2% of observed sets contain species of special interest), which limits the precision of the distribution models and trend estimates; uncertainty will be reported and mapped.</i>
17. Timeframe	<i>Eight months to complete the work including report writing and presentation to the SC (1 January– 31 August 2027).</i>
18. Budget	○ <i>As above</i>
19. References	<i>WCPFC-SC16-ST IP-12</i> <i>WCPFC-SC17-ST IP-10</i> <i>WCPFC-SC21-ST-WP-08</i> <i>WCPFC-SC21-EB-IP-07</i> <i>WCPFC-SC19-2023/EB-WP-08</i> <i>Peatman et al. (2023)</i> <i>Zhou, S. and Griffiths, S.P. (2008). Fisheries Research 91: 56–68.</i>

Project P22X01 New Project	Stock assessment of southwest Pacific blue shark No priority ranking required
Part A: Administrative Summary	
1. Project Title	Stock assessment of southwest Pacific blue shark
2. Organization	Submitted by the SRP
3. Administrative Contact	Dr Graham Pilling (Deputy Director, Fisheries Aquaculture and Marie Ecosystems Division, graham.p@spc.int)
4. Principal Investigator (PI) and CV	TBD - SPC
5. Commencement and Completion Date	1 March 2027 - 31 August 2027
6. Project Budget Summary	Data preparation, catch reconstruction and CPUE standardisation, and stock assessment ○ 0.6 FTE (\$75,000) ○ SC23 travel (\$10K) Operating Costs (e.g., equipment, supplies) - NA Other Costs (e.g., sub-contracts, dissemination) - NA
Part B: Project Proposal Description	
1. Project Title	As above
2. Background and Need	See Rationale
3. Objectives and Benefits	Undertake appropriate stock assessment of SW Pacific blue shark.
4. Note	
5. Rationale	This stock was last assessed in 2021 (WCPFC-SC17-SA-WP-03) using data from 1995-2020. Since the last assessment, more catch and effort data as well as observer data are available. The observer data will be an important component of this assessment. This project is designed to assess the stock status of south Pacific blue sharks using the most informative approach with respect to the available data, following advice to be developed under P130. The assessment should assess the stock status against conventional stock assessment metrics as well as those suggested in the WCPFC 2021-2025 Shark Research Plan (SC16-EB-IP-01 rev1). <i>The proposed project changes the shark assessment schedule from two years to one year for a number of reasons:</i> • <i>Project 130 will provide transparent guidelines for choice of stock assessment methods in the context of data quality and management requirements. IT is therefore not necessary anymore to bring the data-preparation step to SC for endorsement of a particular assessment methods ahead of applying these methods; the Project 130 guidelines will fulfil</i>

	<i>this role.</i> • <i>A single year assessment cycle reduces cost by cutting meeting time (1 PAW and SC compared with 2 of each), reducing cost.</i> • <i>Avoids re-running data preparation in year 2, avoiding duplication of effort.</i> • <i>Allows collaboration with ISC on an aligned assessment schedule, likely improving outcomes and allowing further efficiencies.</i>
6. Assumptions	• Much of the existing fisheries and biological data are readily available from the WCPO. • Assessment personnel are available to undertake this work.
7. Scope of Work	1. Review the previous SW Pacific blue shark and other subsequent shark assessments in the WCPO to assess whether improved methods have been developed and can be applied, and to increase the understanding of data strengths and weaknesses. 2. Review and describe challenges and methods to deal with the input data for SW Pacific blue shark (presented to a dedicated agenda item at the 2026 PAW), including key uncertainties that will need to be considered. 3. Provide a data and fishery characterisation, data compilation and catch reconstruction analyses. 4. Update WCPO catch reconstruction estimates and abundance indices using recent observer data (noting these may be preliminary and be further refined in Phase 2). 5. Conduct a stock assessment, following guidelines to be developed under Project 130 for SW Pacific blue shark stock. 6. Present the stock status in terms of the metrics outlined in the 2021-2030 Shark Research Plan. 7. Prepare a report containing the stock assessment/risk analysis results for SC23. 8. Present the outcomes of the assessment and/or risk analysis to SC23 (in person or online if physical attendance is not possible).
8. Activity Schedule	• 1) Data compilation, fishery characterisation and catch reconstructions. 2) Stock assessment. The key outputs of the assignment will be: • Submission of a progress presentation for discussion at SPC's PAW meeting (March 2027); • Submission of a report for the Project (<i>SW Pacific blue shark stock assessment in the WCPO</i>) to the WCPFC Secretariat (SungKwon.Soh@wcpfc.int; Elaine.Garvilles@wcpfc.int) by 25 days before the start of SC23; and Presentation of the Project report to SC23 (travel cost for one presenter included in the project budget).

9. Project Outcomes	Report document and presentation to SC23.
10. Forms of Results	Report document and presentation to SC23.
11. Methods	TBD
12. Data Management Plan / Data Sets Required	SPC held set level logsheet and observer data.
13. Other Related Projects	Joint billfish shark assessment methods workshop (Project 130)
14. Collaborations	TBD
15. Project Staff and CVs	TBD
16. Risks of Project Not Achieving Objectives	• SPC staff or consultant availability • Not enough fish will get sampled to provide informative results
17. Timeframe	As above
18. Budget	As above
19. References	SC18-SA-WP-03 SC20-SA-WP-04 SC20-SA-WP-11 SC21-SA-WP-08

PRIORITY RANKING REQUIRED

Project 100d Ongoing	Application of CKMR methods to SP albacore and cost-benefit evaluation and prioritisation of CKMR to WCPFC stocks (tuna, billfish, sharks) Priority ranking		
Part A	Administrative Summary		
Project Title	Application of close-kin-mark-recapture methods to South Pacific albacore and Cost-benefit evaluation and prioritisation of close-kin-mark-recapture to WCPFC stocks (tuna, billfish, sharks)		
Organization	Pacific Community		
Administrative Contact	Dr Graham Pilling (Deputy Director, Fisheries Aquaculture and Marine Ecosystems Division, graham.pilling@spc.int)		
Principal Investigator	Dr Giulia Anderon (SPC), Dr Pierre Feutry (CSIRO)		
Commencement and Completion Date	1 January 2026 – 30 November 2027		
Project Budget Summary (USD)			
	WCPFC	Co-finance	Total
Salaries	75,000	305,000	380,000
Travel		20,000	20,000
Operating Costs	30,000	195,000	225,000
Other Costs	120,000	1,105,000	1,225,000
Total	190,000	1,660,000	1,850,000
Part B	Project Proposal Description		
Project Title	Project 100c (continued) (i) Application of close-kin-mark-recapture methods to south Pacific albacore (ii) Cost-benefit evaluation and prioritisation of close-kin-mark-recapture to WCPFC stocks (tuna, billfish, sharks)		
Background and Need	Project 100c (P100c) established the foundations for the application of Close-Kin-Mark-Recapture to WCPFC stocks with a focus on south Pacific Albacore (see SA-WP-09). (i) P100c demonstrated that the logistics of sample collection and identification of kin are feasible for applying CKMR to this species. This		

	continuance of the P100c will provide the CKMR estimates for the next south Pacific albacore assessment (scheduled for 2027). (ii) Following discussions at SC21, a second activity of this continuance to P100c will be to provide WCPFC with a detailed cost-benefit evaluation of CKMR application for WCPFC stocks (tuna, billfish, sharks) that will guide future SC discussion on which species, when and approximate costs associated with its application to each species.
Objectives	Provide CKMR estimated demographic parameters for use in the 2027 south Pacific Albacore stock assessment. Provide guidance to WCPFC-SC on future CKMR applications to WCPFC stocks.
Note	There are no caveats for WCPFC to consider
Rationale	(i) The foundation work for south Pacific albacore has been completed allowing for a straightforward application for South Pacific albacore. (ii) The assessments for WCPFC stocks, plus the design studies (P117,P118, P125,P126) provide sufficient information on the number of samples likely required, logistics of sampling together with the findings of P100c allows for an evaluation of the cost-benefits of CKMR application for each WCPFC stock.
Assumptions	(i) The capacity for sample collection established in P100c is maintained. Co-finance contributions to the proposal require a contribution by WCPFC. (ii) CKMR remains an approach WCPFC considers applicable to reducing uncertainty in stock assessment outputs
Scope of Work	(i) A further 50,000 tissue samples of south Pacific albacore are required to meet the 84,000 maximum estimated by SC20-SA-IP-24. Genotyping of up to 69,000 samples is required to identify the number of kin for CKMR estimation with a CV of 15% (ie . 15,000 have already been genotyped by P100c). Bioinformatics for the genotyped samples is required to identify kin which will then be embedded into a population dynamics model and used to estimate absolute adult abundance, mortality rates, and connectivity. The CKMR population dynamics model will need to be adapted to fit the life-history of south Pacific albacore. The genotyping will also allow conformation of the number of genetic groups (see SC21-SA-10). (ii) the collection of otoliths (representative for south Pacific albacore fisheries) to inform the age composition of the population within the CKMR population model. (iii) The second part of P100c continuance requires a desktop evaluation of future potential CKMR application. The study will draw on the global experience to provide WCPFC-SC with a guide on the approximate number of samples that need to be collected per WCPFC stock, the number of years of collection needed to obtain a first estimate, the logistical issues with

	collection, any genomic assay development needed, and expected costs to achieve the first estimate and then subsequent estimates.		
Activity Schedule	2026		2027
	January-March	- Collection of 50,000 samples - Confirmation of Genetic Groups - Evaluation of CKMR priorities	- Sequencing of remaining 35500 samples (or less depending on number of kin previously identified) - Kin Bioinformatics - CKMR demographic parameter estimates
	April-June	- Sequencing of 35,500 samples - Kin bioinformatics - SC22 review of CKMR data - SC22 review on future CKMR priorities	(April) Delivery of final CKMR derived estimates for the stock assessment
	July-September	- Preparation of SP Alb CKMR model - Collection of otoliths	SC23 Review
	October-December	- Collection of remaining 21,000 samples - Testing of SP Alb CKMR model - Collection of otoliths	Final Report to WCPFC Secretariat
Project Outcomes	(i) CKMR population estimate of absolute adult abundance, mortality rates, and connectivity for application in the 2027 south Pacific albacore stock status assessment (ii) Provide SC22 with a document to guide its discussion on CKMR applications to wider WCPFC stocks.		
Forms of Results	(i) Dataset, parameter estimates, SC presentation (ii) Report, SC presentation		
Methods	(i) dataset (ii) Report		
Data Management Plan / Data Sets Required	(i) No specific data requests. Datasets produced will be stored by the SSP for WCPFC application (ii) No data requests		
Other Related Projects	WCPFC Stock Assessments		

Collaborations	SSP, CSIRO																																																	
Project Staff and CVs	SSP and CSIRO technical experts																																																	
Risks of Project Not Achieving Objectives	2027 south Pacific albacore does not include CKMR derived data or priors to inform population scale																																																	
Timeframe	The key outputs of the assignment will be: • Submission of a progress report to the WCPFC Secretariat for review at SC22 and SC23 by 30 days prior to the start of each SC meetings; • Presentation of the progress report to SC22 and SC23 (no travel cost required for the contractors’ presentation); • Submission of the final project report to the WCPFC Secretariat by 30 November 2027.																																																	
Budget	<table><tr><td rowspan="2"></td><td colspan="2">Yr 2026</td><td></td></tr><tr><td>WCPFC</td><td>Co-finance</td><td>Total</td></tr><tr><td>Salaries</td><td>25,000</td><td>215,000</td><td>240,000</td></tr><tr><td>Travel</td><td></td><td>10,000</td><td>10,000</td></tr><tr><td>Operating Costs</td><td>10,000</td><td>120,000</td><td>130,000</td></tr><tr><td>Other Costs</td><td>40,000</td><td>630,000</td><td>670,000</td></tr><tr><td colspan="4">Yr 2027</td></tr><tr><td>Salaries</td><td>50,000</td><td>90,000</td><td>140,000</td></tr><tr><td>Travel</td><td></td><td>10,000</td><td>10,000</td></tr><tr><td>Operating Costs</td><td>20,000</td><td>75,000</td><td>95,000</td></tr><tr><td>Other Costs</td><td>45,000</td><td>510,000</td><td>555,000</td></tr><tr><td>Total</td><td>190,000</td><td>1,660,000</td><td>1,850,000</td></tr></table>				Yr 2026			WCPFC	Co-finance	Total	Salaries	25,000	215,000	240,000	Travel		10,000	10,000	Operating Costs	10,000	120,000	130,000	Other Costs	40,000	630,000	670,000	Yr 2027				Salaries	50,000	90,000	140,000	Travel		10,000	10,000	Operating Costs	20,000	75,000	95,000	Other Costs	45,000	510,000	555,000	Total	190,000	1,660,000	1,850,000
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References	Bravington, M.V., Skaug, H.J. and Anderson, E.C. (2016). Close-Kin Mark-Recapture. Statistical Science 2016, Vol. 31(2), 259–274. DOI: 10.1214/16-STS5522. SC21-SA-WP-09. Project 100c: Progress towards a Close-Kin-Mark-Recapture application to South Pacific Albacore																																																	

Project 120 Ongoing	Updated reproductive biology of tropical tunas Priority Ranking
Objective	1. Provide updated estimates on the reproductive biology of tropical tunas in the WCPO to improve WCPFC stock assessments. 2. Explore the potential for new methods in identifying maturity and spawning regimes from hard and soft tissues 3. Establish baselines, drivers and spatiotemporal variability of the reproductive potential for tropical tunas in the WCPO for monitoring the impacts of climate change.
Rationale	A significant challenge for WCPFC tropical tuna stocks assessments is the estimation of spawning potential. Uncertainty in estimates of the parameters used to define spawning potential can decrease the precision of spawning biomass estimates that are used to assist management decision making. Spawning potential for tropical tuna is affected by a number of intrinsic factors, including size-related, age-related, and spatial changes in: sex ratio, annual fecundity per kg (spawning fraction x batch fecundity), and egg viability. Previous studies on the reproductive biology of tropical tunas have been limited in their geographic coverage, but a compilation of these studies indicates that the parameters used to estimate spawning potential vary with longitude and latitude. The last study to examine the reproductive biology across a broad spatial range for yellowfin tuna was published in 2000 (Itano, 2000). No such study has been undertaken for bigeye or skipjack tuna in the WCPO. Spawning potential is also expected to be strongly influenced by climate change, however, without baseline estimates the ability to detect and attribute change is limited.
Assumptions	1. Gonads stored in the Pacific Marine Specimen Bank are suitable for histological analyses. 2. Gaps in geographic locations * fish size * species can be filled through additional observer and port sampling in the first year of the study.
Scope	Phase One Year 1 • QC the gonads held in the PMSB for histological analyses and identify key gaps in spatial representation. • Quantify and resolve uncertainties associated with maturation staging from frozen samples (multiple-reader quality assessment). • Sample collection to fill key gaps. • Commence histological and laboratory analyses. Year 2 • Histological and laboratory analyses. Year 3 • Updated estimates of reproductive biology. Phase Two Year 4 • Develop spatiotemporal methods to quantify variability in maturity across the WCPO • Develop methods for identifying reproductive histories through blood and otolith hormone levels Year 5 • Synthesis of all project data for updated parameters of yellowfin tuna reproductive biology, its variability in space and time, and implications for stock structure, in time for 2029 WCPO yellowfin tuna assessment

Timeframe	2024-2026 (Phase 1) 2027-2028 (Phase 2)
Budget	Euro40,000 (WCPFC co-finance contribution to access Euro200,000 via the European Maritime, Fisheries and Aquaculture Fund) for Phase 1 Euro 60,000 (WCPFC co-finance contribution to SPC co-financing of 200,000 via GCF Regional Tuna Programme) for Phase 2 2027 Budget: USD 70,000
Reference	SC19-SA-WP-17

Project 121 Ongoing	Ecosystem and Climate Indicators Priority Ranking
Objectives	• Develop and test candidate ecosystem and climate indicators to track the impact of climate and ecosystem changes on WCPFC fisheries and ecosystems. • Provide technical advice to the Scientific Committee on the suitability of criteria used for testing and evaluating the performance of candidate indicators. • Support the Scientific Committee in developing tools to communicate ecosystem and climate change impacts to WCPFC and external stakeholders and interest group.
Note	
Rationale	Fisheries management decisions are, at their simplest, informed risk management. Data describing fisheries are collected. Scientists, economists, compliance analysts, and the like derive information from the data and bring their respective knowledge to bear to put that in front of fisheries managers. Those managers are then able to use that knowledge and make decisions which minimise risk – on many issues including for example stock sustainability, the population status of species of special interest, and fishers’ incomes. But tuna do not live in isolation from the ecosystem which supports them. At its simplest, if the system in which they live is sick, the tuna population cannot thrive despite the wisest decisions based on single-species stock assessment. To make truly wise decisions we need to consider the ecosystem with the stock. Even in their simplest implementation ecosystem indicators should enable more precise specification of the range of decisions leading to desired or effective outcomes, and reduce the risk of bad outcomes from those decisions through better understanding of the cause of potential stock assessment biases. Especially for the longer-lived tunas, ecosystem indicators should increasingly provide early warning of when issues may arise. Such forecasts allow time for management response in near real-time rather than trying to catch up years later. This will be particularly important as we move to making decisions in a Harvest Strategy framework and detecting when climate and ecosystem changes fall outside the ranges of uncertainty against which a management procedure was tested, and whether broader ecosystem objectives are being met. WCPFC has already recognised the importance of preparing the region to adapt to the emerging impacts of climate change (see Resolution 2019-01 “Resolution on Climate Change as it relates to the Western and Central Pacific Fisheries Commission”). Well-designed climate indicators should provide information on the pace at which physical properties of the WCPO are approaching climate change-induced tipping points. This will not only be important for adapting the region’s tuna fisheries to the impacts of climate

	change but also provide necessary information for WCPFC members to voice the impact of climate change on tuna fisheries at global forums such as UNFCCC. In addition to the role that ecosystem and climate indicators play in assisting with the formulation of management advice and decisions, they can also be effective in communicating information within WCPFC's membership and to external stakeholders and interest groups.					
Assumptions	- WCPFC and the Scientific Committee continue to require the development of ecosystem and climate indicators. - External funds remain available to support the development, testing and analyses of ecosystem and climate indicators.					
Scope	- Technical analyses to develop and test candidate indicators. - WCPFC member and expert workshops to refine indicators. - Scientific Committee Reporting. - Routine preparation of adopted indicators - Development of tools for communication to WCPFC and wider stakeholders					
Activities	Task	Activity	Schedule			
			SC20	SC21	SC22	SC23
	Initial screening of candidate indicators	Apply criteria endorsed at SC12 to candidate indicators that are relevant for monitoring impacts on purse seine and long-line fisheries and tuna species productivity				
	Test candidate indicators	Fully develop methodology for developing and testing candidate indicators				
		Test candidate indicators				
		Expert Workshop				
		Adoption Workshop				
	Indicator validation	SC review and evaluation that adopted				
	Communication tools	Report cards				
		Dashboards				
		TFAR1				
Timeframe	A timeframe of five-years is proposed for this project, after which preparation of adopted indicators should be regularised into the work of the Scientific Committee or an alternative approach will need to be considered to progress the work (if minimal progress has been achieved).					
Budget	This is a no-cost project for 2023. Any budgetary support required by the SSP or members beyond 2023 is subject to approval once specific workplans and proposal are reviewed and prioritised by the Scientific Committee. A budget of US\$20,000 per year is required for 2024 and 2025 to support participation in workshops by WCPFC experts. A further budget of US\$15,000 per year is required for 2026 and 2027 to support SSP work to validate adopted indicators and support communication tools.					
References	SC19-EB-WP-01					

¹ Tuna Fisheries Assessment Report

Project P128a Ongoing	Initial analyses to support investigations of the connectivity of key tuna species between the Western Pacific and East Asia (WPEA) region and the broader WCPFC-CA Priority ranking								
Part A: Administrative Summary									
7. Project Title	Initial analyses to support investigations of the connectivity of key tuna species between the Western Pacific and East Asia (WPEA) region and broader WCPFC-CA								
8. Organization	CSIRO, Indonesia, Philippines, Vietnam, SPC								
9. Administrative Contact	Bradley Moore, Senior Research Scientist, CSIRO bradley.moore@csiro.au Ph +61 3 6232 5222 Jessica Farley, Research Group Leader, CSIRO Jessica.farley@csiro.au Ph +61 3 6232 5189								
10. Principal Investigator (PI) and CV	CSIRO								
11. Commencement and Completion Date	30 January 2027 – 30 December 2027								
12. Project Budget Summary	This TOR would require a budget of 125k USD from the Commission. <table border="1"> <thead> <tr> <th>Component</th><th>Cost (USD)</th></tr> </thead> <tbody> <tr> <td>Stock assessment modelling</td><td>\$10,000</td></tr> <tr> <td>Low Coverage Whole Genome Sequencing and analysis</td><td>\$90,000</td></tr> <tr> <td>Stakeholder workshop¹</td><td>\$25,000</td></tr> </tbody> </table> ¹ Budgeted as an in-person, 3-day workshop occurring in Australia with two participants from each of IDN, PHL, VNM, and SPC attending.	Component	Cost (USD)	Stock assessment modelling	\$10,000	Low Coverage Whole Genome Sequencing and analysis	\$90,000	Stakeholder workshop ¹	\$25,000
Component	Cost (USD)								
Stock assessment modelling	\$10,000								
Low Coverage Whole Genome Sequencing and analysis	\$90,000								
Stakeholder workshop ¹	\$25,000								
Part B: Project Proposal Description									
20. Project Title	Initial analyses to support investigations of the connectivity of key tuna species between the Western Pacific and East Asia (WPEA) region and broader WCPFC-CA.								
21. Background and Need	The WPEA region supports valuable fisheries for skipjack tuna (<i>Katsuwonus pelamis</i>; SKJ) and yellowfin tuna (<i>Thunnus albacares</i>; YFT), collectively accounting for over 30% of the annual catch of tuna species in the WCPFC-CA. These fisheries are assumed to form part of a larger Western and Central Pacific Ocean (WCPO) stock for assessment and management purposes. However, evidence suggests SKJ and YFT in at least some areas of the WPEA region may represent separate demographic stocks from those in the broader WCPO (see Proctor et al. 2019, Moore et al. 2020, Hamer et al. 2023). Dedicated studies are required to address this hypothesis. In 2025, WCPFC Project 128 (SC21-SA-WP-13) presented a Terms of Reference to SC21 for a project designed to improve understanding of								

	connectivity of the SKJ and YFT stocks between the WPEA region and the broader WCPFC Convention Area (WCPFC-CA) using a novel genetics approach – Low Coverage Whole Genome Sequencing (LCWGS). SC21-SA-WP-13 recommended that before embarking on a costly field sampling project, preliminary analyses should be undertaken to 1) understand the influence of different connectivity scenarios between the WPEA region and the broader WCPFC-CA under the current stock assessment framework and resulting management advice for SKJ and YFT in the WCPO, and 2) assess the feasibility of using the proposed genetics approach for detecting connectivity based on existing samples (including sample size and analytical requirements) to ensure the suggested sampling program is robust.
22. Objectives and Benefits	The aim of this project is to undertake analyses to: 1) understand the influence of different connectivity scenarios for YFT, and possibly SKJ, between the WPEA region and the broader WCPFC-CA on regional stock assessments in the WCPO and 2) assess the feasibility of using a novel genomic approach – Low Coverage Whole Genome Sequencing (LCWGS) – for assessing connectivity (including minimum sample size and analytical requirements). The specific objectives are to: - Undertake modelling to assess the impact of different connectivity assumptions between the WPEA region and broader WCPFC-CA on the results of regional stock assessments for YFT (and possibly SKJ). - Undertake a preliminary examination of the utility and sample size requirements of using LCWGS for investigating connectivity of YFT as a test species within the WPEA region and adjacent waters using existing genetic samples.
23. Note	This proposed TOR is a recommendation from WCPFC Project 128: Understanding connectivity of key tuna species in the Western Pacific and East Asia region with the WCPFC-CA (see SC21-SA-WP-13; https://meetings.wcpfc.int/node/26654).
24. Rationale	The waters of the WPEA region, i.e. those surrounding Indonesia, Philippines, and Vietnam, support valuable fisheries for SKJ and YFT. Millions of people in coastal communities across Indonesia, Philippines, and Vietnam are involved with tuna fisheries for food security, a source of employment and livelihood, or social endeavours (McDonald 2021). Collectively, catches from the three countries represent around 30% of the annual catches of key tuna species in the WCPO, including 40% of the total YFT catch (McDonald 2021). However, a lack of understanding of the degree of connectivity between the WPEA region and broader WCPFC-CA has been highlighted as a key area of uncertainty in WCPO stock assessments for several years. At present, YFT and SKJ in the WCPO are considered to represent single biological stocks for assessment and management purposes (Castillo Jordán et al 2022; Magnusson et al. 2023). However, there is some

	evidence to suggest YFT, SKJ and BET in at least some areas of the WPEA region may exhibit more spatial structure than is currently assumed. Differences in genetic markers have been observed between YFT and BET from within Indonesia's archipelagic waters and the adjacent WCPO (Proctor et al. 2019), suggesting long-term reproductive isolation. Biological differences between Indonesia/Philippines and the broader WCPO have also been reported (Itano 2000, Farley et al. 2018), suggesting populations in these regions are demographically disconnected. Tagging data from the WCPO, largely restricted to smaller fish, indicate that while individual SKJ and YFT are capable of long-range movement, most individuals are generally recaptured within the region in which they were initially tagged (Moore et al. 2020a). An improved understanding of connectivity among the WPEA region and the broader WCPO would greatly help to reduce uncertainty in WCPO stock assessments and resulting management advice, including the development and testing of management procedures for harvest strategies. Such knowledge would also help to further develop spatial management and harvest strategies in each of the three WPEA countries and address open questions on whether collaborative management among them is required. An improved understanding of connectivity would also help to improve modelling work designed to estimate the impacts of climate change on tuna ecology and distribution in the WCPO and better inform the design of studies planned to mitigate the impacts of climate change on tuna stocks. The proposed analyses constitute the necessary first steps recommended by SC21-SA-WP-13 to support further proposal development and external funding acquisition for work on connectivity of key tuna species in the WPEA region with the WCPFC-CA, including: 1) understanding the influence of different connectivity scenarios on regional stock assessments; 2) examining of the feasibility of LCWGS as an approach for assessing connectivity in Pacific tuna species, including refinement of minimum sample size requirements for genetic analyses and the resulting cost estimates involved with sample processing.
25. Assumptions	Personnel are available to undertake this work.
26. Scope of Work	The proposed activities include: (i) Modelling to assess the impact of different connectivity hypotheses on the results of the regional YFT (and potentially SKJ) stock assessments and subsequent management advice. (ii) LCWGS sequencing and analysis of resulting data from a subset of existing YFT samples, collected at key locations during ACIAR project FIS/2009/059, using LCWGS (up to 50 samples from each of Maldives, Palabuhanratu (IDN), Kendari (IDN), Ambon (IDN), Bitung (IDN), Jayapura (IDN), and Noro (SLB)). (iii) An in-person stakeholder workshop involving participants from each of IDN, PHL, VNM, SPC, and CSIRO to discuss results of (i) and (ii) above and progress full project proposal development. (iv) Preparation and presentation of project results to SC23 in the

	form of a Working Paper and presentation, and submission of a final report to the WCPFC Secretariat.																																												
27. Activity Schedule	<table><tr><th rowspan="2">Activity</th><th colspan="4">2027</th></tr><tr><th>Q1</th><th>Q2</th><th>Q3</th><th>Q4</th></tr><tr><td>i. Stock assessment modelling</td><td></td><td></td><td></td><td></td></tr><tr><td>ii. Low Coverage Whole Genome Sequencing trials</td><td></td><td></td><td></td><td></td></tr><tr><td> a. Processing of samples</td><td></td><td></td><td></td><td></td></tr><tr><td> b. Analysis</td><td></td><td></td><td></td><td></td></tr><tr><td>iii. In-person workshop</td><td></td><td></td><td></td><td></td></tr><tr><td>iv. Presentation of project results to SC23</td><td></td><td></td><td></td><td></td></tr><tr><td>v. Final report to WCPFC Secretariat</td><td></td><td></td><td></td><td></td></tr></table>	Activity	2027				Q1	Q2	Q3	Q4	i. Stock assessment modelling					ii. Low Coverage Whole Genome Sequencing trials					a. Processing of samples					b. Analysis					iii. In-person workshop					iv. Presentation of project results to SC23					v. Final report to WCPFC Secretariat				
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28. Project Outcomes	The expected outputs from this work will be a Working Paper and presentation to SC23, with a final report delivered to the WCPFC Secretariat. The expected outcomes from this project are: 1. Improved understanding of the impact of different connectivity scenarios on the regional stock assessment for YFT (and possibly SKJ). 2. Improved understanding of the use of LCWGS for assessing connectivity in Pacific tuna species, using YFT as a test case. 3. Improved direction, scope, and budget to help further proposal develop for work examining connectivity of YFT and SKJ between the WPEA region and broader WCPFC-CA to support external funding acquisition.																																												
29. Forms of Results	Results will be presented to SC23 as a Working Paper and presentation. A final project report will be provided to the WCPFC Secretariat in December 2027.																																												
30. Methods	Stock assessment modelling: Sensitivity scenarios exploring assumptions of movement between the WPEA and the rest of the WCPO will be performed based on the 2026 regional YFT stock assessment. Possible scenario examples include modifying assumptions about recruitment and movement between the assessment regions. Genetic analyses: YFT samples collected under ACIAR project F/S/2009/059 from Maldives (as an out-group), Indonesia (up to 5 locations) and Solomon Islands (1 location) will be sequenced using LCWGS using relevant laboratory practices. The sequencing data will be quality filtered, and genotype likelihood estimated prior to performing population structure analyses, which will be conducted using purpose-built analytical pipelines.																																												
31. Data Management Plan / Data Sets Required	This project will utilize existing data and samples. Input assessment files from the 2026 YFT stock assessment available from SPC will be used to run sensitivity scenarios. YFT samples used for the genetic analyses are stored at CSIRO Marine Laboratories, Hobart.																																												

32. Other Related Projects	This proposed TOR is a recommendation from WCPFC Project 128: Understanding connectivity of key tuna species in the Western Pacific and East Asia region with the WCPFC Convention Area (see SC21-SA-WP-13; https://meetings.wcpfc.int/node/26654). The work builds upon samples collected and lessons learned by CSIRO and Indonesia under the Australian Centre for International Agricultural Research (ACIAR) project FIS/2009/059 (Proctor et al. 2019), discussions at the 2018 workshop on the stock structure of Pacific tuna species (Moore et al. 2020a,b), and recent advances in genetic analyses of Pacific tuna species by CSIRO (e.g. SC21-SA-WP10, SC21-SA-WP-14).								
33. Collaborations	This project will be implemented by CSIRO, SPC, Indonesia, Philippines, Vietnam, and the WPEA project coordinator.								
34. Project Staff and CVs	Staff for this proposed project: CSIRO: Brad Moore, Pierre Feutry, Peter Grewe, Jessica Farley and Campbell Davies Indonesia: Fayakun Satria and Lilis Sadiyah Philippines: Suzette Barcoma and Casiano Choresca Vietnam: Vu Duyen Hai WPEA: Lars Olsen SPC: Paul Hamer, Giulia Anderson, stock assessment scientist TBD								
35. Risks of Project Not Achieving Objectives	The main risk associated with the stock assessment modelling component of this work is a lack of model convergence under different movement coefficients. The LCWGS analyses are considered low risk with respect to delivery, as this component is based on existing samples that have been shown to be of high DNA quality and free of cross-contamination.								
36. Timeframe	Please refer to the Gantt chart provided in Item 8: Activity Schedule for details on timeframes of the activities.								
37. Budget	This TOR would require a budget of 125k USD from the Commission. <table border="1"> <thead> <tr> <th>Component</th><th>Cost (USD)</th></tr> </thead> <tbody> <tr> <td>Stock assessment modelling</td><td>\$10,000</td></tr> <tr> <td>Low Coverage Whole Genome Sequencing and analysis</td><td>\$90,000</td></tr> <tr> <td>Stakeholder workshop¹</td><td>\$25,000</td></tr> </tbody> </table> ¹ Budgeted as an in-person, 3-day workshop occurring in Australia with two participants from each of IDN, PHL, VNM, and SPC attending.	Component	Cost (USD)	Stock assessment modelling	\$10,000	Low Coverage Whole Genome Sequencing and analysis	\$90,000	Stakeholder workshop ¹	\$25,000
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38. References	Castillo Jordán C, Teears T, Hampton J, Davies N, Scutt Phillips J, McKechnie S, Peatman T, Macdonald J, Day J, Magnusson A, Scott R, Scott F, Pilling G, Hamer P (2022). Stock assessment of skipjack tuna in the western and central Pacific Ocean: 2022 – Rev.05. Working paper WCPFC-SC18-2022/SA-WP-01 (Rev 5) presented to the 18 th Regular Session of the Scientific Committee of the Western and Central Pacific Fisheries Commission, online meeting, 10–18 August 2022. https://meetings.wcpfc.int/node/16242 . CSIRO, Indonesia, Philippines, Vietnam, and SPC (2025). Understanding								

	connectivity of key tuna species in the Western Pacific and East Asia region with the WCPFC Convention Area: results of Project 128. Working Paper WCPFC-SC21-2025/SA-WP-13 presented to the 21st Regular Session of the Scientific Committee of the Western and Central Pacific Fisheries Commission, Nuku'alofa, Tonga. https://meetings.wcpfc.int/node/26654 Farley J, Krusic-Golub K, Clear N, Eveson P, Smith N (2018). Progress on yellowfin tuna age and growth in the WCPO – WCPFC Project 82. Working Paper WCPFC-SC14-2018/SA-WP-13 presented to the 14th Regular Session of the Scientific Committee of the Western and Central Pacific Fisheries Commission, Busan, Republic of Korea. https://meetings.wcpfc.int/node/10726. Hamer P, Macdonald J, Potts J, Vidal T, Teears T, Senina I. (2023). Review and analyses to inform conceptual models of population structure and spatial stratification of bigeye and yellowfin tuna assessments in the Western and Central Pacific Ocean. Working Paper WCPFC-SC19-SA-WP-02 presented to the 19th Regular Session of the Scientific Committee of the Western and Central Pacific Fisheries Commission, Koror, Palau. https://meetings.wcpfc.int/node/19350 Itano DG (2000). The reproductive biology of yellowfin tuna (<i>Thunnus albacares</i>) in Hawaiian waters and the western tropical Pacific Ocean: project summary. SOEST 00–01, JIMAR Contribution 00–328. Pelagic Fisheries Research Program, JIMAR, University of Hawaii, HI, USA. https://www.soest.hawaii.edu/PFRP/biology/itano/itano_yft.pdf. Magnusson A, Day J, Teears T, Hampton J, Davies N, Castillo Jordán C, Peatman T, Scott R, Scutt Phillips J, McKechnie S, Scott F, Yao N, Natadra R, Pilling G, Williams P, Hamer P (2023). Stock assessment of yellowfin tuna in the western and central Pacific Ocean: 2023. Working Paper WCPFC-SC19-2023/SA-WP-04 (Rev 2) presented to the 19th Regular Session of the Scientific Committee of the Western and Central Pacific Fisheries Commission, Koror, Palau, 16–24 August 2023. https://meetings.wcpfc.int/node/19352 McDonald A (2021). WPEA-ITM project update. Research project report WCPFC-SC17-2021/RP-WPEA-01(Rev.01) presented to the 17th Regular Session of the Scientific Committee of the Western and Central Pacific Fisheries Commission. Moore BR, Bell JD, Evans K, Farley JH, Grewe P, Hampton J, Marie AD, Minte-Vera CV, Nicol S, Pilling G, Scutt Phillips J, Tremblay-Boyer L, Williams A, Smith N (2020a). Defining the stock structure of key commercial tunas in the Pacific Ocean I: Current knowledge and main uncertainties. <i>Fisheries Research</i> 230: 105525. https://doi.org/10.1016/j.fishres.2020.105525 Moore BR, Adams T, Allain V, Bell JD, Bigler M, Bromhead D, Clark S, Davies C, Evans K et al. (2020b). Defining the stock structure of key
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	commercial tunas in the Pacific Ocean II: Sampling considerations and future directions. <i>Fisheries Research</i> 230: 105524. https://doi.org/10.1016/j.fishres.2020.105524. Proctor C, Lester RJG, Clear NP, Grewe PM, Moore B, Eveson JP, et al. (2019). Population structure of yellowfin tuna (<i>Thunnus albacares</i>) and bigeye tuna (<i>T. obesus</i>) in the Indonesian region. Final Report as output of ACIAR Project FIS/2009/059. Australian Centre for International Agricultural Research, Canberra, 139 pp. https://www.aciar.gov.au/sites/default/files/project-page-docs/fis-2009-059_popstructurestudy_final_report.pdf
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Project 129 Ongoing	Building an age-length data stream for tuna assessments Priority ranking												
Part A: Administrative Summary													
1. Project Title	Building an age-length data stream for tuna assessments												
2. Organization	Pacific Community (SPC)												
3. Administrative Contact	Dr Paul Hamer, Principal Scientist, Stock Assessment and Modelling												
4. Principal Investigator (PI) and CV	Dr Corey Wakefield, Senior Fisheries Scientist, Sclerochronology												
5. Commencement and Completion Date	Year 2: January 2027 – December 2027 <i>Potential multi-year development program across 4 years (50-100K per year depending on annual TOR reviews).</i>												
6. Project Budget Summary	<i>Overview of major cost categories:</i> ○ Salaries ○ Travel ○ Operating Costs (e.g., equipment, supplies) ○ Other Costs (e.g., sub-contracts, dissemination) ○ Microscopes and associated imaging equipment Costing for year 2 (2027) (year's 3, 4 – minimum 60K/year) This TOR would require a budget of 90K USD from the Commission. <table border="1"> <thead> <tr> <th>Component</th><th>Cost (USD)</th></tr> </thead> <tbody> <tr> <td>Salary</td><td>15K</td></tr> <tr> <td>Travel</td><td>15K</td></tr> <tr> <td>Operating</td><td>15K</td></tr> <tr> <td>Consultants</td><td>15K</td></tr> <tr> <td>Microscopes and imaging equipment</td><td>30K</td></tr> </tbody> </table>	Component	Cost (USD)	Salary	15K	Travel	15K	Operating	15K	Consultants	15K	Microscopes and imaging equipment	30K
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Part B: Project Proposal Description													
1. Project Title	Building an age-length data stream for tuna assessments												

2. Background and Need	Stock assessment of bigeye, yellowfin, albacore and skipjack tuna presented to SC routinely include recommendations to improve information on growth and age composition. The assessments typically note the very limited historic collections of hard parts (i.e. otoliths) for growth and age composition and the lack of strategic ongoing sampling programs for collecting age-at-length data for assessments. The reason why the assessment teams make these recommendations is that the stock assessment models attempt to reconstruct the population age structures but mostly based on size data and an assumed ‘static’ growth model to relate size compositions of catches to ages. However, external growth curves are almost certainly biased due to the sampling processes and fisheries selectivity that is not accounted for with external growth curves. Further, growth is variable in space and time, and a better way to relate size compositions of catches to age compositions is within the stock assessment model use internal age-length keys based on regular collections of age-length data for the model regions and key fisheries. This is typical practice for many groundfish species, but not routinely done for tunas, and is recognized as a major deficiency in tuna assessments that apply length-based age structured population models. Growth is a key uncertainty in all tuna assessments, and applying static, likely biased, growth information can be influential on estimation of management quantities. SPC is in the process of developing rapid tuna aging methods based on whole otolith biometric measurements, with current research focused on yellowfin, bigeye and albacore tuna species. A validated ageing protocol for skipjack tuna to provide an age-based reference dataset for biometric age prediction modeling will also be investigated. While progress is being made towards epigenetic aging for albacore, this approach is species specific, and while it has the advantage in terms of ease of sample collections (once validated only requires tissue samples and length from individuals), rapid whole otolith aging is incredible fast and cheap, but has the disadvantage that paired otolith and length data are required, and large scale otolith collections from tuna is difficult in practice. We envisage that multiple methods will be important in building a program to collect ongoing age-length data across the key tuna species. We believe that increased inclusion of paired age-length data (referred to as conditional age at length (CAAL) data) will have considerable benefits for reducing uncertainty and increasing the reliability of management quantities from tuna stock assessments. Ongoing age-length data collections will also contribute to increased understanding of spatial and temporal growth variation, including influences of oceanographic dynamics and climate variation/change.
3. Objectives and Benefits	1. To further develop rapid aging methods for key WCPFC managed tuna species.

	2. To develop sampling strategies and a feasible program design to provide ongoing age-length data for WCPFC tuna assessments 3. To implement a sample collection program within 4 years. Benefits will be to improve the reliability of stock status advice for the key tuna stocks managed by WCPFC (yellowfin, bigeye, south Pacific albacore, potentially skipjack pending development of validated ageing methods)
4. Note	Inclusion of skipjack in the implementation of a sampling program depends on a suitably reliable rapid aging method being developed.
5. Rationale	Methods for rapid aging have been a key barrier to large scale data collection on age-length of tuna, but these barriers appear likely to be removed in the coming years with new methods such as whole otolith morphometrics and epigenetic aging. The background section explains the importance of age-length data for improving reliability of stock status information from stock assessments. This project will provide the important role of taking these new methods from the 'proof of concept laboratory stage' to a meaningful scale to impact stock assessments and management advice.
6. Assumptions	Ongoing work on otolith morphometrics and epigenetics will deliver the suitably precise rapid aging methods. WCPFC CCMs will support the ongoing collection of paired otoliths/tissues and length data at a much-expanded level than currently being conducted and will be prepared to implement and follow structured sampling protocols.
7. Scope of Work	Phase 1: 2026 1. Support increased resources to fast-track work on rapid aging from otolith morphometrics, yellowfin and bigeye focus (noting albacore is progressing with epigenetics under WCPFC project 100c – morphometrics could be considered later, skipjack still needs a validated aging methodology.) 2. Feasibility of validated ageing protocol for skipjack tuna and application for rapid age prediction methods. 3. Conduct analysis and review of sampling capabilities and requirements for an age-length data sampling program of a suitably meaningful scale. Will require discussions with Distant Water Fishing Nations, other CCMs (AU/NZ/USA/EU) and Regional Observer Program coordinators. Note: this could be a stop/go, if key CCMs are unable/unwilling to support sample collections on a meaningful scale, we would review the continuation of the project. Phase 2: 2027 1. Regional application and demonstration of rapid age prediction using South Pacific albacore as a test case. Rapid ageing methods expected to be at a stage where peer reviewed, and aging error well characterized. Albacore will be used to demonstrate the application

	of otolith-biometry-based age prediction at a regional scale and to define appropriate sampling numbers by species. 2. Develop training programs and conduct training workshops, supported by written sampling guides and protocols in multiple languages, to enable consistent collection of age, biological and otolith samples across the region. 3. Development of sample pipeline logistics (i.e. data recording and sample transport logistics to SPC tissue bank) 4. Estimate costs of regular sampling programs by species. Phase 3: 2028 1. Trial implementation – conduct a trial implementation year. Phase 4: 2029 1. Refinements and full implementation phase.																																							
8. Activity Schedule	For 2027 only: <table><tr><th rowspan="2">Activity</th><th colspan="4">2027</th></tr><tr><th>Q1</th><th>Q2</th><th>Q3</th><th>Q4</th></tr><tr><td>Finalise rapid age prediction models using otolith biometrics for yellowfin and bigeye</td><td>x</td><td>x</td><td>x</td><td></td></tr><tr><td>Complete age validation protocol for skipjack</td><td>x</td><td>x</td><td>x</td><td></td></tr><tr><td>Finalise ageing precision assessment between transverse and oblique otolith sections</td><td>x</td><td>x</td><td>x</td><td></td></tr><tr><td>Regional application and demonstration of rapid age prediction using South Pacific albacore as a test case.</td><td>x</td><td>x</td><td>x</td><td>x</td></tr><tr><td>Conduct analysis and review of sampling capabilities and requirements, scoping workshops with DWFNs, ROP coordinators and other CCMs regarding sampling capabilities and willingness to commit to a longer-term program.</td><td></td><td>x</td><td>x</td><td>x</td></tr><tr><td>Progress report to SC23, and year 3 TOR.</td><td></td><td></td><td>x</td><td></td></tr></table>	Activity	2027				Q1	Q2	Q3	Q4	Finalise rapid age prediction models using otolith biometrics for yellowfin and bigeye	x	x	x		Complete age validation protocol for skipjack	x	x	x		Finalise ageing precision assessment between transverse and oblique otolith sections	x	x	x		Regional application and demonstration of rapid age prediction using South Pacific albacore as a test case.	x	x	x	x	Conduct analysis and review of sampling capabilities and requirements, scoping workshops with DWFNs, ROP coordinators and other CCMs regarding sampling capabilities and willingness to commit to a longer-term program.		x	x	x	Progress report to SC23, and year 3 TOR.			x	
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Progress report to SC23, and year 3 TOR.			x																																					
9. Project Outcomes	2027 only 1. Published peer reviewed paper(s) on rapid aging methods using whole otolith morphometrics for tropical tunas (yellowfin, bigeye and perhaps also skipjack and albacore) 2. Understanding sampling requirements and feasibility of sampling at a meaningful scale.																																							
10. Forms of Results	Results will be presented to SC23 as a Working Paper. Peer review journal articles. Workshop records.																																							

11. Methods	Written reports and journal papers.												
12. Data Management Plan / Data Sets Required	All data required is available within SPC, additional data may be sort from CCMs to consider potential sampling capabilities/rates for their sampling programs.												
13. Other Related Projects	Project 117 “WCPFC Tuna Biological Sampling Plan” – has conducted analysis regards samples size for growth curves – could be some synergies with this work in relation to estimating sample requirements age-length data. Project 35b “Pacific Marine Specimen Bank”, SC Project 117 “WCPFC Tuna Biological Sampling Plan” – provide the facility for sample collection archiving and storage.												
14. Collaborations	<i>Potential collaborators could include tuna aging expertise</i> (i.e. Fish Ageing Services, CSIRO etc., other). Selected CMMs who are willing to collaborate and commit resources to sampling, support workshops etc.												
15. Project Staff and CVs	Corey Wakefield (SPC) Paul Hamer (SPC) Joe Scutt Phillips (SPC) Thom Tears (SPC) Technical assistant												
16. Risks of Project Not Achieving Objectives	The 2027 objectives build on the significant progress and foundations of validated age-based reference datasets developed during Phase 1, and thus the development and application of this approach for albacore in phase 2 have low risk of not being achieved.												
17. Timeframe	Described above – planned as a staged 4-year project. The 2027 year builds on the significant progress and foundations developed during Phase 1.												
18. Budget	Costing for year 2 (2027) (year 2 – 90K; year’s 3, 4 – minimum 60K/year) This TOR would require a budget of 90K USD from the Commission. <table border="1"> <thead> <tr> <th>Component</th><th>Cost (USD)</th></tr> </thead> <tbody> <tr> <td>Salary</td><td>15K</td></tr> <tr> <td>Travel</td><td>15K</td></tr> <tr> <td>Operating</td><td>15K</td></tr> <tr> <td>Consultants</td><td>15K</td></tr> <tr> <td>Microscopes and imaging equipment</td><td>30K</td></tr> </tbody> </table>	Component	Cost (USD)	Salary	15K	Travel	15K	Operating	15K	Consultants	15K	Microscopes and imaging equipment	30K
Component	Cost (USD)												
Salary	15K												
Travel	15K												
Operating	15K												
Consultants	15K												
Microscopes and imaging equipment	30K												
19. References	Wakefield, C, Widdrington, J, Krusic-Golub, K, Pons, A, Reis-Santos, P, Gillanders, B, Farley, J, Nicol, S, Hamer, P. (2026) Project 129 update:												

	Building an age-length data stream for tuna assessments. Working Paper WCPFC-SC22-2026-SA-WP12_Rev01 presented to the 22 nd Regular Session of the Scientific Committee of the Western and Central Pacific Fisheries Commission, Apia, Samoa, 11–19 August 2026. https://meetings.wcpfc.int/node/19352
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Project P22X02 New project	Data characterisation of low information sharks and mobulids Priority ranking
Part A: Administrative Summary	
1. Project Title	Data characterisation of low information sharks and mobulids
2. Organization	Submitted by the SRP
3. Administrative Contact	TBD - SPC
4. Principal Investigator (PI) and CV	TBD - SPC
5. Commencement and Completion Date	1 March 2027 - 31 August 2027
6. Project Budget Summary	Overview of major cost categories: ○ Project budget - \$30,000 ○ Travel to SC23 \$10,000 ○ Operating Costs (e.g., equipment, supplies) - NA ○ Other Costs (e.g., sub-contracts, dissemination) - NA
Part B: Project Proposal Description	
1. Project Title	As above
2. Background and Need	See Rationale
3. Objectives and Benefits	See scope of work
4. Note	This project was given a medium score by SC21, it was not funded in 2025 and is being tabled again. It could be conducted in 2027 in place of blue shark if that assessment was delayed until after SC23 pending the report for the Project 130 workshop.
5. Rationale	1. <i>Some general characterisations of the data have been undertaken (WCPFC-SC12-2016/EB-WP-08) and methods for assessment have been proposed (WCPFC-SC16-2020/SA-IP-12). Some species are all listed on CITES Appendix II and mantas are considered to be globally endangered by IUCN. There are relatively high observed longline catches of mantas and mobulids and some whale shark unintended interactions with the purse seine fishery.</i> Other species such as hammerheads have unknown trends and fishery interactions.
6. Assumptions	1. Sufficient existing fisheries and biological data are readily available from the WCPO or other sources. • Personnel are available to undertake this work.

7. Scope of Work	10. This work should include all threshers, hammerhead sharks and manta rays. 11. Reviewing any previous work in the WCPO on these species. 12. Present a characterisation of the data and fisheries interacting with or catching these species. 13. Attempt to develop WCPO abundance indices using observer data. 14. Attempt to present the stock status or trends in terms of the metrics outlined in the 2021-2025 Shark Research Plan. 15. Provide a report containing the above results for SC23.
8. Activity Schedule	Access the SPC data (March 2027) Undertake the analysis (April-June 2027) Compile the report and submit to SC23 (June/July 2027)
9. Project Outcomes	Report document and presentation to SC23.
10. Forms of Results	Report document and presentation to SC23.
11. Methods	TBD
12. Data Management Plan / Data Sets Required	SPC held set level logsheet and observer data.
13. Other Related Projects	NA
14. Collaborations	TBD
15. Project Staff and CVs	TBD
16. Risks of Project Not Achieving Objectives	SPC staff or consultant availability
17. Timeframe	As above
18. Budget	As above
19. References	WCPFC-SC09-2013/EB-WP-01 WCPFC-SC11-2015/EB-WP-03 WCPFC-SC12-2016/EB-WP-08 WCPFC-SC14-2018/SA-WP-12 (rev.1) WCPFC-SC16-2020/SA-IP-12

Project P22X03	Bycatch Mitigation Information System
New project	Priority ranking
Part A: Administrative Summary	
1. Project Title	Bycatch Management Information System
2. Organization	SPC-OFP
3. Administrative Contact	Graham Pilling (grahamp@spc.int)
4. Principal Investigator (PI) and CV	Valerie Allain (SPC)
5. Commencement and Completion Date	1/1/2027 to 31/12/2027
6. Project Budget Summary	Salary - Information curation and validation 32,000 USD Operational - Portal and database maintenance, 10,000 USD Total: <u>42,000 USD</u>

Part B: Project Proposal Description	
1. Project Title	Bycatch Management Information System
2. Background and Need	The Bycatch Management Information System (BMIS; bmis-bycatch.org) was launched online in 2011. It was developed by WCPFC to support its responsibilities under international agreements to sustainably manage bycatch in the WCPO fisheries targeting tuna and billfish. After seed funding provided by WCPFC, various donors have supported its development and operations since through resources provided to the SSP. Unfortunately these resources are not available for 2027. The BMIS provides equitable access to bycatch science information for WCPFC CCMs and other stakeholders with limited science capacity. It ensures WCPFC CCMs and participating territories with limited dedicated bycatch mitigation and management capacity can access the same curated evidence base as well-resourced delegations, supporting more substantive engagement in WCPFC Commission processes. Most recently it provides a resource for WCPFC participants to use AI tools (Large Language Models) to search and summarise BMIS content with the confidence that the material sourced is robust and scientifically supported. Without such a curated source of information users are more reliant on the user having expert knowledge of the subject area to appropriately prompt and review AI derived information.
3. Objectives and Benefits	• Ensure the BMIS remains curated and available for WCPFC members to access as they progress their review of work for the Ecosystem and Bycatch Theme
4. Note	Detailed above
5. Rationale	Provides a resource for WCPFC participants to use AI tools (Large Language Models) to search and summarise BMIS content with the confidence that the material sourced is robust and scientifically supported. Without such a curated source of information users are more reliant on the user having expert knowledge of the subject area to appropriately prompt and review AI derived information.
6. Assumptions	• CCMs use the BMIS
7. Scope of Work	This project will support: 1. Curation and validation of the information held in the BMIS 2. Complete urgent upgrades and maintenance of the BMIS portal and database.
8. Activity Schedule	1. Activity 1 (12 months): Curation and validation of the information held in the BMIS. 2. Activity 2 (3 months): BMIS portal and database upgrade
9. Project Outcomes	• Functional and reliable BMIS for use by CCMs
10. Forms of Results	Report to SC23.
11. Methods	See #7
12. Data Management Plan / Data Sets Required	Led by SPC under existing data policies and agreements

13. Other Related Projects	NA.
14. Collaborations	SPC CCMs Relevant NGOs
15. Project Staff and CVs	SPC Preferred Suppliers
16. Risks of Project Not Achieving Objectives	Low
17. Timeframe	See details above
18. Budget	Salary - Curation and information validation: 32,000 USD Operational - Portal and database maintenance, 10,000 USD Total: <u>42,000 USD</u> Co-funds sought - ISSF have offered to provide 10,000 USD to the total budget cost if WCPFC approves the project (i.e. WCPFC contribution of 32,000 USD).
19. References	SC22-EB-WP-05

Project P22X04	Technical workshop on approaches to utilising tagging data within regional stock assessments to support best available science
New project	Priority ranking
Part A: Administrative Summary	
1. Project Title	Technical workshop on approaches to utilising tagging data within regional stock assessments to support best available science
2. Organization	SPC-OFP
3. Administrative Contact	Graham Pilling (grahamp@spc.int)
4. Principal Investigator (PI) and CV	Paul Hamer (SPC)
5. Commencement and Completion Date	1/1/2027 to 31/12/2028
6. Project Budget Summary	Salary - The project requires a key technically proficient person (independent consultant, preferably external to the WCPO) to oversee and coordinate the production of the synthesis/review paper, and support the co-ordination and development of the technical inputs to the workshop: 65 K USD - Logistical organisation of the workshop will be provided in-kind through science staff supported by RFMOs and host venue support organisation. Operational - Catering for the meeting, 10K USD Contingency - Unforeseen operating expenses 10K USD Travel

	- Flights and subsistence for at least 4 independent experts: 40 K USD Publication fees - Publication costs: 10K USD Travel costs for the RFMO analysts would be expected to be covered from their own budgets. In-person attendance is essential, but hybrid sessions could be considered. Total: <u>135K USD</u> Co-funds sought Some SPC-OFP attendance would be supported through non-WCPFC funds.
Part B: Project Proposal Description	
1. Project Title	Technical workshop on approaches to utilising tagging data within regional stock assessments to support best available science
2. Background and Need	Tagging information is a critical data input to many WCPO tuna assessments, harvest strategy estimation methods, and models of climate impacts on tuna distribution, where they provide information on growth, mortality and movement, amongst other demographic parameters. Scientific work in the western and central Pacific Ocean benefits from a unique and extensive time series of tagging information for tropical tuna. A range of decisions must be made during the development of integrated stock assessments for tropical tuna on how data from these tagging programmes are dealt with, as a function of the structural assumptions of the assessment model being considered. This includes decisions on the length of assumed mixing periods, the level of tagging-induced mortality effects, tag reporting rates, recaptures occurring outside the model area, use of the tagging data in release-recapture or recapture-conditioned modes, etc. Many of these are defined through external analyses that develop the data sets being provided to the model. In turn, settings relating to the interpretation of tagging data must be defined within the model itself. Recent assessments have developed and refined approaches to the incorporation of tagging data and model settings. This work has identified key uncertainties such as tag mixing and the degree of potential overdispersion in the distribution of tag recaptures through time, to name two, which are either estimated or captured as key uncertainties within model uncertainty grids, particularly where they have implications for stock assessment outcomes. These decisions and settings will interact. Following focussed work on CPUE and size data inputs into regional assessment in the last few years and following the features identified in 2026 assessments, it is now important to bring a comparable level of

	focus on the tagging data – both the development and processing of these data sets to be introduced into the integrated model, and the model settings used.
3. Objectives and Benefits	• Conduct a comprehensive evaluation of the approaches and key decision points in the development of tagging data sets. • Review current practices and identify alternative approaches for the inclusion of tagging data sets within integrated models. • Review approaches that utilise tagging data external to integrated models. • Develop good practice approaches to the use of tagging data within regional tuna stock assessments.
4. Note	Detailed above
5. Rationale	Tagging data are a key input into a range of WCPFC assessments, as well as assessments for tuna and other species worldwide. Bringing together global experts and practitioners to discuss how to improve how these data are dealt with is timely and should benefit all relevant assessments.
6. Assumptions	• Relevant RFMOs commit and support the participation of their analysts • Relevant external experts are able to attend • Travel restrictions permit international participation • Co-funding partners can be found Suitable Timing: To be determined, but it is appropriate for this workshop to occur in 2027 prior to work being undertaken on the 2028 skipjack stock assessment.
7. Scope of Work	This project will support: 3. Convening a 5-day technical workshop on the development of tagging data sets and their incorporation within assessment models, attended by analysts involved in the modelling of tagging across relevant RFMOs, with invited experts in relevant modelling methods. 4. The workshop would cover key themes: ○ The nature and key uncertainties present in tagging data sets ○ Development of tagging data inputs for integrated assessments ○ Consideration of the assumptions that typically need to be made for tagging data to be used in integrated stock assessment models, and how those assumptions relate to tagging programme realities ○ ‘External’ methods to develop information from tagging data to input into integrated assessments (e.g. SEAPODYM, DTU Aqua spatiotemporal model) ○ Implementation, application, and strengths/weaknesses of these methods in stock assessment models, with a focus on the key sources of uncertainty and the role of assumptions (e.g.,

	overdispersion (estimation or fixed), and including recapture rates in the mixing period calculations) 5. The outcomes of the workshop would include: ○ Synthesis paper reviewing current practices across relevant RFMOs ○ Good practice guidelines specific to the development and implementation of these data sets for tropical tuna assessments ○ Workshop report with actionable recommendations ○ Journal article/special edition (tbd) In a more general sense, the workshop's discussions on potential future analyses will help inform the necessary logistics, experimental design and project management of tagging programmes. It will therefore feed into the discussions initiated considering SC22-SA-WP-04. A small informal steering committee of SPC and non-SPC personnel will be arranged to help develop and guide the workshop logistics and details and support development of outputs.
8. Activity Schedule	Phase 1 (5 months): Preparation and coordination • Literature review and RFMO consultation • Participant selection and workshop planning • Venue confirmation and logistics Phase 2 (Workshop): (potentially post SC23) Phase 3 (6 months): Follow-up and deliverables • Guidelines development • Implementation of key developments within the framework of the 2028 skipjack stock assessment Reporting to SC24
9. Project Outcomes	The outcomes of the workshop would include: ○ Synthesis paper reviewing current practices across relevant RFMOs ○ Good practice guidelines specific to the development and implementation of these data sets for tropical tuna assessments ○ Workshop report with actionable recommendations ○ Journal article/special edition (tbd)
10. Forms of Results	Report to SC24, relevant SPC PAW and consideration within 2028 SKJ assessment. Scientific publication.
11. Methods	See #10
12. Data Management Plan / Data Sets Required	Led by SPC under existing data policies and agreements
13. Other Related Projects	Following the same approach as P122a workshop on longline CPUE.
14. Collaborations	SPC IATTC Other RFMOs (e.g. CCAMLR, ICCAT, IOTC) CCMs

	Relevant NGOs
15. Project Staff and CVs	SPC staff External experts to be identified by small project steering committee (through correspondence)
16. Risks of Project Not Achieving Objectives	Sourcing of venue for workshop Non-funded parties have sufficient resources to cover their attendance (hybrid option not costed)
17. Timeframe	See details above
18. Budget	Salary - The project requires a key technically proficient person (independent consultant, preferably external to the WCPO) to oversee and coordinate the production of the synthesis/review paper, and support the co-ordination and development of the technical inputs to the workshop: 65 K USD - Logistical organisation of the workshop will be provided in-kind through science staff supported by RFMOs and host venue support organisation. Operational - Catering for the meeting, 10K USD Contingency - Unforeseen operating expenses 10K USD Travel - Flights and subsistence for at least 4 independent experts: 40 K USD Publication fees - Publication costs: 10K USD Travel costs for the RFMO analysts would be expected to be covered from their own budgets. In-person attendance is essential, but hybrid sessions could be considered. Total: <u>135K USD</u> Co-funds sought - Some SPC-OFP attendance would be supported through non-WCPFC funds.
19. References	SC22-SA-WP-04 SC22-SA-WP-05 SC22-SA-WP-06

Project P22X05	Data characterisation of black marlin, sailfish and shortbilled spearfish
New project	Priority ranking
Part A: Administrative Summary	
1. Project Title	Data characterisation of black marlin, sailfish and shortbilled spearfish
2. Organization	Submitted by the BRP

3. Administrative Contact	TBD - SPC
4. Principal Investigator (PI) and CV	TBD - SPC
5. Commencement and Completion Date	1 March 2027 - 31 August 2027
6. Project Budget Summary	Overview of major cost categories: ○ Project budget - \$30,000 ○ Travel to SC23 \$10,000 ○ Operating Costs (e.g., equipment, supplies) - NA ○ Other Costs (e.g., sub-contracts, dissemination) - NA
Part B: Project Proposal Description	
1. Project Title	As above
2. Background and Need	See Rationale
3. Objectives and Benefits	See scope of work
4. Note	Prior to any form of assessment there is value in evaluating and characterising the data available and overall trends in those data. These analyses will inform the type of assessment that may be possible prior to the assessment being planned.
5. Rationale	There has been little to no focused evaluations on these three species. These species are reported in logsheets and by observers, but the level of catch and trends in catch and effort have not been evaluated there is also little information on the extent of the biological data. Some data characterisations were undertaken as part of the original BRP (SC19-2023/SA-WP-16), these data should be evaluated in more detail and there would be value updating that analysis specifically for these three species.
6. Assumptions	1. Sufficient existing fisheries and biological data are readily available from the WCPO or other sources. • Personnel are available to undertake this work.
7. Scope of Work	16. Reviewing the previous work in the WCPO to assess and improve on methods and update the information on stock trends. 17. Present a characterisation of the fisheries catching these species. 18. Prepare a report containing the above results for SC23.
8. Activity Schedule	Access the SPC data (March 2027) Undertake the analysis (April-June 2027) Compile the report and submit to SC23 (June/July 2027)
9. Project Outcomes	Report document and presentation to SC23.
10. Forms of Results	Report document and presentation to SC23.
11. Methods	TBD
12. Data Management Plan / Data Sets	SPC held set level logsheet and observer data.

Required	
13. Other Related Projects	NA
14. Collaborations	TBD
15. Project Staff and CVs	TBD
16. Risks of Project Not Achieving Objectives	SPC staff or consultant availability
17. Timeframe	As above
18. Budget	As above
19. References	SC21-SA-IP-18

Project P22X06 New project	Mitigation of the adverse environmental effects of FADs in the WCPO Priority ranking
Part A: Administrative Summary	
1. Project Title	Mitigation of the adverse environmental effects of FADs in the WCPO
2. Organization	The Pacific Community (SPC)
3. Administrative Contact	Paul Hamer
4. Principal Investigator (PI) and CV	Dr. Lauriane Escalle (senior fisheries scientist)
5. Commencement and Completion Date	<i>1 March 2027 - 31 December 2029</i>
6. Project Budget Summary	<i>Overview of major cost categories:</i> ○ Salaries: 206,000 ○ Travel: 36,000 ○ Other Costs: 108,000
Part B: Project Proposal Description	
1. Background and Need	This project aims to provide guidance to WCPFC and its members on mitigation options to reduce the environmental effects of drifting FAD use. This will include continuing to support the industry to transition to non-entangling and biodegradable dFADs; quantify and evaluate the impacts of dFAD loss, abandonment and stranding; and assess option to develop dFAD recoveries. In particular, SC21 has requested that: • additional work on the definition of biodegradable materials be conducted, including on the standards of biodegradable materials in the marine environment. And that a TOR for a project to be considered by SC22. • SC21 recommended that additional work should be conducted to better understand the impacts of stranded FADs on different habitats, including using FAD tracking data, and recognized the importance of the availability of historical data.
2. Objectives and Benefits	1. Reviewing definitions and international standards linked to biodegradable materials; 2. Evaluating the current monitoring framework and its ability to adequately monitor biodegradable materials and designs;

	including assessment of the current materials and designs used in the construction of dFADs; 3. Continue supporting the industry to transition to the use of biodegradable dFADs, including capacity building in implementation processes and requirements imposed by the WCPFC. 4. Better understand the impacts of stranded FADs on different habitats 5. Further assess options to increase dFAD recovery, including through investigation of feasibility for pilot projects.
3. Rationale	The project will build on the findings from the WCPFC projects 110/110a. These projects demonstrated that materials supply and construction of biodegradable dFADs are feasible and sufficient in the Pacific region and that the performance of non-entangling and biodegradable dFADs in terms of drift speed, tuna aggregation and catch rates are similar to conventional dFADs. Considerable industry engagement has been carried out during these previous projects, including education on the concepts and design considerations for biodegradable dFADS, and hands on training in their construction. However, additional support and guidance is needed to facilitate transition to biodegradable dFADs at the scale of the WCPO purse fishing industry. This is not only in relation to the biodegradable dFADs but also capacity building of the industry to follow an implementation process and meet requirements of Conservation and Management Measures that will control the materials, usage and reporting on biodegradable dFADs. Monitoring of dFADs and their fate has advanced in the last few years, however additional work is still needed to better quantify and assess dFAD fates and the related environmental impacts, and perhaps more importantly, to focus in and further evaluate potential mitigation options that have been identified from recent work.
4. Assumptions	SPC has the personnel available to undertake this work and or suitable consultants are available to support SPC to conduct the work. Travel in the region remains open to run workshops, if necessary. The industry continues to work with biodegradable materials, identify suppliers, shipment routes, companies to build non-entangling and biodegradable dFADs, and test designs and materials adapted to their fishing practices.
5. Scope of Work	Support and monitor the industry to transition to biodegradable dFADs: - review of definitions and international standards, advice to SC and TCC on how to define, categorise and monitor biodegradable materials use in dFADs. - updated analyses of material used in bioFADs - enhance the monitoring framework to assess the transition - provide guidance and desktop analyses to scientifically assess performance of bioFADs that would be entirely constructed and deployed by the industry. - industry capacity building workshops and materials for supporting transition and understanding/meeting WCPFC

	timelines and requirements. Better understand the impacts of stranded FADs on different habitats, including using FAD tracking data: - Support the continued monitoring of dFAD stranding through in situ data collection (training, coordination, data processing, desktop analyses) Source funds and administer grants for countries to continue the stranded FAD data collection and pilot recovery programs - Analyses of FAD tracking data to assess and monitor hotspots of stranding to provide target area for field studies of habitat impacts (desktop analyses). Assessment of options to increase dFAD recovery: - Further refine the feasibility and economic analyses of dFAD recovery programmes (desktop analyses). - Support for recovery programmes (desktop analyses; training; consultation/workshop). - Monitor buoys attached to dFAD outside fishing grounds and support developing recovery programs (remote monitoring, and desktop analyses; satellite communication fees)						
6. Activity Schedule	TBD						
7. Collaborations	Fishing industry, National managers and fisheries departments, Buoy manufacturers, ISSF						
8. Project Staff and CVs	Dr Lauriane Escalle (Senior fisheries scientists) Jennyfer Mourot (Research assistant)						
9. Timeframe	1 March 2027 - 31 December 2029						
10. Budget	Salary: (SPC scientific and technical) 206,000 Euro Grant for countries: 74,000 Operational (satellite communication fees): 34,000 Euro Travel (training workshops, communications): 36,000 Euro Total: 350,000 Euro Corresponding to ~115,000 Euro per year in 2027, 2028 and 2029 (USD) <table><tr><th>2027</th><th>2028</th><th>2029</th></tr><tr><td>133,000</td><td>133,000</td><td>133,000</td></tr></table>	2027	2028	2029	133,000	133,000	133,000
2027	2028	2029					
133,000	133,000	133,000					

Project P22X07	Monitoring of the dFAD fishery to guide management
New project	Priority ranking
Part A: Administrative Summary	
1. Project Title	Monitoring of the dFAD fishery to guide management
2. Organization	The Pacific Community (SPC)
3. Administrative Contact	Paul Hamer
4. Principal Investigator (PI) and CV	Dr. Lauriane Escalle (senior fisheries scientist)
5. Commencement and Completion Date	<i>1 March 2027 - 31 December 2027</i>

6. Project Budget Summary	Overview of major cost categories: Salaries: 75,000		
Part B: Project Proposal Description			
1. Background and Need	Monitoring the number of dFADs deployed annually, and other dFAD fishery indicators is important for assessing the influence of dFADs on the tuna fisheries and other environmental and ecological risks. Estimates of the number of deployments and active dFADs per vessel and at the scale of the WCPO has been performed previously. These estimates should be re-evaluated to assess potential changes in dFAD use and provide advice to WCPFC on the effectiveness of the limit on the number of active dFADs that can be monitored at any given time, as set out in paragraph 21 of the CMM 2023-01. This, along with other dFAD fishery indicators, might be particularly important with the recent reduction in the FAD closure periods, which have encouraged increased dFAD deployments.		
2. Objectives and Benefits	- Re-assessment of dFAD use per vessel: deployment and active FAD numbers - Develop a set of FAD fishery related indicators		
3. Rationale	This project aims to provide increase knowledge of the dFAD fishery, including a set of dFAD fishery indicators, to guide the management of dFADs in the WCPFC Convention Area.		
4. Assumptions	SPC has the personnel available to undertake this work and or suitable consultants are available to support SPC to conduct the work.		
5. Scope of Work	Desktop analyses of satellite buoy data, and other fishery data, to guide the management of the WCPO dFAD fishery. This includes the assessment of number of deployments and active number of dFADs, to provide guidance related to the 350 active buoy limit in the tropical tuna CMM review scheduled for 2027. And also the development of a set of dFAD fishery related indicators. This could include indicators such as annual dFAD deployments, catches and set numbers; numbers of active buoys; numbers of strandings and lost dFADs; entanglements of SSI; and any other relevant indicators. The project will provide results to SC23, in order to guide the review of the tropical tuna CMM in 2027.		
6. Activity Schedule	TBD		
7. Collaborations	-		
8. Project Staff and CVs	Dr Lauriane Escalle (Senior fisheries scientists) Jennyfer Mourot (Research assistant)		
9. Timeframe	1 March 2027 - 31 December 2027		
10. Budget	Salary: (SPC scientific and technical) 75,000 Euro Total: 75,000 Euro		
	(USD)		
	2027	2028	2029
	86.000	0	0

Project P22X08 New project	Mitigating the environmental impacts of industrial aFAD loss Priority ranking
Part A: Administrative Summary	
1. Project Title	Mitigating the environmental impacts of industrial aFAD loss
2. Organization	The Pacific Community (SPC)
3. Administrative Contact	Paul Hamer
4. Principal Investigator (PI) and CV	Dr. Lauriane Escalle (senior fisheries scientist)
5. Commencement and Completion Date	<i>1 March 2027 - 31 December 2029</i>
6. Project Budget Summary	Salary: (SPC scientific and technical) 68,000 Euro Travel (training workshops, communications): 30,000 Euro Other: 25,000
Part B: Project Proposal Description	
1. Background and Need	Anchored FADs have been used by some fleets of the WCPO for decades. While there is a lack of assessment of aFAD loss, their environmental impacts in case of detachment can be high, in particular for certain types such as the large metal or fiberglass payao styles. While the need for materials to last as long as possible is required in the case of aFADs, the use of biodegradable materials or alternative designs in some components could be considered to reduce these impacts. In addition, monitoring aFAD tracks in case of loss, through data from satellite buoys attached to it, could help mitigate their impacts when reaching coastal areas. SC21 has also requested that: • similar work should be considered for materials used in the construction of anchored FADs and that the SSP develop a TOR for a project to be considered at SC22.
2. Objectives and Benefits	1. Investigate ways to better monitor and mitigate anchored FAD loss
3. Rationale	This project aims to investigate ways to increase use of biodegradable materials in aFAD construction and better monitor and mitigate aFAD loss.
4. Assumptions	SPC has the personnel available to undertake this work and or suitable consultants are available to support SPC to conduct the work. Travel in the region remains open to run workshop, if necessary. Industry engages in training activities.
5. Scope of Work	Consider and assess materials that could be used in the construction of anchored FADs. This would first include literature review and expert discussions; collaboration with PNG, Solomon Islands, ID and PH to conduct some testing or materials. Second, it would include guidance and desktop analyses, to scientifically assess performance of biodegradable materials on aFADs that would be constructed and deployed by the industry (desktop work; procurement and at-sea work not carried out by SPC), with position tracking devices attached. -Deploy satellite buoys or other position tracking devices fixed on to

	aFADs rafts to monitor loss (procurement, monitoring, desktop analyses), drift and stranding.		
6. Activity Schedule	TBD		
7. Collaborations	-		
8. Project Staff and CVs	Dr Lauriane Escalle (Senior fisheries scientists) Jennyfer Mourot (Research assistant)		
9. Timeframe	1 March 2027 - 31 December 2029		
10. Budget	Salary: (SPC scientific and technical) 68,000 Euro Travel (training workshops, communications): 30,000 Euro Other: 25,000 Total: 123,000 Euro		
	(USD)		
	2027	2028	2029
	47,000	47,000	47,000

Project P22X11 New project		WCPO skipjack external tagging analysis: phases 2 and 3 analyses for abundance indices and biomass estimation Priority ranking	
Part A: Administrative Summary			
1. Project Title		WCPO skipjack external tagging analysis: phases 2 and 3 analyses for abundance indices and biomass estimation	
2. Organization		• SPC (with subcontract to Technical University of Denmark - DTU)	
3. Administrative Contact		Paul Hamer/Graham Pilling (SPC)	
4. Principal Investigators (PIs) and CVs		Tobias Mildenberger and Anders Neilsen (DTU) Joe Scutt Phillips (SPC)	
5. Commencement and Completion Date		Planned duration: 2 years Commencement: [01/02/2027] · Completion: [31/12/2028]	
6. Project Budget Summary		Approx. 0.5 FTE Senior Research for 2 years, plus operating USD: Year 1: \$110,000, Year 2: \$110,000 Total over 2 years: \$220,000	
Part B: Project Proposal Description			
1. Project Title		WCPO skipjack external tagging analysis: phases 2 and 3 analyses for abundance indices, biomass estimation and preliminary test on skipjack assessment	
2. Background and Need		WCPO assessments currently fit tagging data within an integrated model, which requires assuming that tagged fish are well mixed across broad regions, which is an assumption that is hard to meet and to which the	

	assessments are sensitive. Following promising work in the Eastern Pacific Ocean (EPO), the WCPFC requested a proof-of-concept study (as part of WCPFC Project 123) on estimating movement by analysing WCPO SKJ tagging data externally to the assessment, using the fine-scale movement model admove. By modelling the redistribution of tagged fish in continuous space or on a fine grid, the approach relaxes the critical region-level mixing assumption. With limited resourcing available under project 123 the work so far has made good progress on the tag movement model, but this only the first phase, of three phases required to develop the external tagging analysis to the point where it could be utilised in an assessment. The full framework to provide movement, mortality, and biomass estimates for an assessment, requires two more phases; - Relative abundance estimation - Biomass estimation Trialling on a test case assessment such as the 2028 skipjack MFCL assessment would then be required to compare the fully tag data integrated assessment with an alternative using the external tag analysis approach. This proposal is to request funding support to complete these next two phase of external tag analysis and testing with the 2028 skipjack assessment, as a full test of the external tagging analysis approach compared to the MFCL tag integrated modelling. Also noting the general difficulties in modeling tag data within integrated assessment are not unique to skipjack. External tag analysis is important to cross-check external tag-based biomass scales against the influence on tag data on population scaling within the integrated assessments (skipjack, yellowfin and bigeye). Further, the current skipjack CPUE abundance indices derived from the equatorial free school purse seine would benefit from cross-checking against a tag-based index. The free school purse seine index also can only start from 2010 as it depends on VMS travel distance as an effort metric, whereas external tag base index could extend back to the early 2000's. External tag analysis can provide estimates of mortality, relative abundance and biomass, albeit at more restricted spatial areas, that could be used as indicators independent of the full stock assessment, i.e. in MP monitoring strategies. Finally, the capability to use the external tag analysis to provide external derived parameters or priors greatly simplifies the complexity required with the next generation assessment software, and will further fast track the implementation of that new software on WCPFC assessments.
3. Objectives and Benefits	1. Complete external skipjack tag analysis phase 2 – develop abundance indices 2. Complete external skipjack tag analysis phase 3 – develop biomass estimation 3. Test the use of external tag analysis outputs on the 2028 skipjack assessment

	Benefits discussed in Background and Needs - increased confidence in the use of tag data to inform status, increased flexibility with modelling options (including software development needs), provides stock indicators independent of a full stock assessment.																		
4. Note																			
5. Rationale	Improved use of tagging data in stock assessment is important to make best and appropriate use of these valuable data and increase confidence in the influence of tag data on stock status indicators for monitoring and management advice.																		
6. Assumptions	DTU PIs Mildenberger and Neilsen remain available, sufficient funding is provided, the required data can be provided by SPC.																		
7. Scope of Work	1. Complete external skipjack tag analysis phase 2 – develop abundance indices 2. Complete external skipjack tag analysis phase 3 – develop biomass estimation 3. Test the use of external tag analysis outputs on the 2028 skipjack assessment Provide writing progress reports on each of the above, and a final report, all provided to WCPFC SC, regular meetings with SPC co-PI and administrative contact.																		
8. Activity Schedule	<table border="1"> <thead> <tr> <th>Activity / milestone</th><th>Months</th></tr> </thead> <tbody> <tr> <td>Year 1 - 2027:</td><td></td></tr> <tr> <td>- Develop abundance indices</td><td>6</td></tr> <tr> <td>- Progress report to SC23</td><td></td></tr> <tr> <td>Year 2 – 2028:</td><td></td></tr> <tr> <td>- Jan-August - develop biomass estimation</td><td>3</td></tr> <tr> <td>- Progress report to the SC24</td><td></td></tr> <tr> <td>- August – Dec - Test the use of external tag analysis outputs on the 2028 skipjack assessment</td><td>3</td></tr> <tr> <td>- December: Final report (also delivered to SC25)</td><td></td></tr> </tbody> </table>	Activity / milestone	Months	Year 1 - 2027:		- Develop abundance indices	6	- Progress report to SC23		Year 2 – 2028:		- Jan-August - develop biomass estimation	3	- Progress report to the SC24		- August – Dec - Test the use of external tag analysis outputs on the 2028 skipjack assessment	3	- December: Final report (also delivered to SC25)	
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9. Project Outcomes	Completion of the full framework for external tag data analysis to provide movement, mortality, and biomass estimates for the WCPO skipjack assessment. Test the application of the external tag analysis on the next (2028) skipjack assessment for comparisons against the benchmark MFCL tag integrated model.																		
10. Forms of Results	Reports, papers, presentations, GitHub repository.																		

11. Methods	See SC22 paper – WCPFC-SC22-2026-SA-WP-03 pages 3-6, for background and higher-level summary of the methods/approaches.				
12. Data Management Plan / Data Sets Required	SPC holds all the required data and will be collaborating on this with DTU analysts. All the work can be tracked and will be available on a GitHub repository.				
13. Other Related Projects	Pending funding, the development of the next generation tuna assessment stock assessment software – i.e. opal project – will have close linkage with this project. The WCPFC funded PTPP – Pacific Tuna Tagging Programme is directly linked to this proposal as the key data source for the analysis and the future data source for application of the methods/models developed. There are linkages with projects by the IATTC also collaborating with DTU – a joint research initiative/collaboration on this work area needs to be explored to see if cost-efficiencies can be increased.				
14. Collaborations	The main collaboration is between DTU and SPC, but we would explore a wider collaboration with IATTC – SPC – DTU.				
15. Project Staff and CVs	Tobias Mildenerger https://www.researchgate.net/profile/Tobias-Mildenerger-2 Anders Nielsen https://www.researchgate.net/profile/Anders-Nielsen-25 Joe Scutt Phillips https://www.researchgate.net/profile/Joe-Scutt-Phillips				
16. Risks of Project Not Achieving Objectives	<table border="1"> <thead> <tr> <th>Risk</th><th>Mitigation</th></tr> </thead> <tbody> <tr> <td>Modeling approach fails</td><td>Proof-of-concept already provided and examples of application in the EPO skipjack assessment.</td></tr> </tbody> </table>	Risk	Mitigation	Modeling approach fails	Proof-of-concept already provided and examples of application in the EPO skipjack assessment.
Risk	Mitigation				
Modeling approach fails	Proof-of-concept already provided and examples of application in the EPO skipjack assessment.				
17. Timeframe	Total duration 2 years				
18. Budget	Indicative budget: Year 1 Salaries/consultants 0.5 x FTE Senior Science level = 70K USD Operating (travel and administrative overheads) = 40K USD Year 2 Salaries/consultants 0.5 x FTE Senior Science level = 70K USD Operating (travel and administrative overheads) = 40K USD Total \$220,000 USD				
19. References	Tobias K. Mildenerger, Anders Nielsen, Arni Magnusson, Joe Scutt Phillips, Paul Hamer (2026) Skipjack tagging data preliminary analysis,				

	review and recommendations for further development and application. WCPFC-SC22-2026-SA-WP-03
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