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Project 90: Better data on fish weights and lengths for scientific analyses
(Final Project 90 Report)

WCPFC-SC21-2025/ST-IP-03.1
17 February 2026

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FINAL REPORT to the WCPFC

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1. Background and purpose

WCPFC Project 90 was motivated by discussions at the Thirteenth Regular Session of the WCPFC Scientific Committee (SC13) at which the Scientific Services Provider (SPC) was directed to review the status and future requirements for 'conversion factor' (CF) data to assist the scientific work of the Commission. The rationale for Project 90 was then outlined at SC14 by Williams and Smith (2018), and the project was subsequently approved at the Fifteenth Regular Session of the WCPFC (WCPFC15) with an initial workplan agreed upon (SPC-OFP 2019 – ANNEX 1 [SC15/ST-WP-03]). In essence, the work proposed under the project focussed around three objectives:

- **a.** Identify priority gaps (in CF data), address those gaps which can be resolved with existing information, and develop the sampling plan and protocol to resolve remaining gaps.
- **b.** Explore innovative methods to obtain length-to-length CF data.
- **c.** Systematically collect representative samples of length measurements of bycatch species; and systematically collect length-to-length, length-to-weight and weight-to-weight CF data on all species to better inform future estimation of fish bycatch in the WCPO.

These objectives have shaped the work undertaken within Project 90 since its inception in 2019. In addition, the scope of work has expanded over the life of the project to incorporate analyses and modelling of the length and weight data where needed, particularly for the purposes of updating key CF relationships for WCPFC tuna and billfish stock assessments.

As the final deliverable of Project 90, the report serves as a compilation of, and reference to, all work completed within the project over the past seven years. Detailed descriptions of project activities are provided in the annual papers submitted to the SC, accessible via the following links:

2019 (SC15): SC15/ST-WP-03
2020 (SC16): SC16/ST-IP-06
2021 (SC17): SC17/ST-IP-05
2022 (SC18): SC18/ST-IP-04
2023 (SC19): SC19/ST-IP-04
2024 (SC20): SC20/ST-IP-04
2025 (SC21): SC21/ST-IP-03

While Project 90 concluded at the end of 2025, it should be noted that several outcomes link closely with WCPFC Project 127: 'Review and reconciliation of size data collected in the WCPFC-CA for stock assessment purposes'. Project 127 commenced in 2025 and continues in 2026 under Project 127a. These projects are discussed further in section 4.

2. Key achievements (2019 – 2024)

In working towards objectives a. to c., outlined above, some notable Project 90 achievements include:

- **i.** The establishment, refinement and regular updating of the CF database and associated tables, and the incorporation of new CFs as they are developed and/or published.
- **ii.** Scoping and gap analyses to determine the priority areas for collecting CF data.
- **iii.** Engagement with CCMs regarding data requirements for generating accurate CFs.
- **iv.** Development and refinement of a web-based tool for accessing SPC's CF database, available with login at: www.spc.int/ofp/preview/login.php?redirect=species_conv_factor.php or through the 'Tufman2' database portal accessible here.
- **v.** Initiation and continuation of port sampling activities coordinated through SOCSKSARGEN Federation of Fishing and Allied Industries, Inc. (SFFAII) in the Philippines from 2019 onwards,

targeted towards the collection of length-to-length, length-to-weight and weight-to-weight CF data, biological samples and tag recovery information for key tuna species. These data continue to contribute importantly to the CF database for tropical tunas (i.e. skipjack tuna – *Katsuwonus pelamis*, yellowfin tuna – *Thunnus albacares*, bigeye tuna – *T. obesus*), augmenting other CF data collected across the region (including for albacore tuna – *T. alalunga*).

vi. The publication of training material during 2023 relevant to Project 90 tasks including a revised biological sampling manual entitled 'Biological Sampling Manual – Guide for samplers at sea and at port' (Sanchez et al. 2023) (available here) and a series of training videos (available on SPC's YouTube channel: https://www.youtube.com/@spcnc1/videos). Together, these materials demonstrate techniques for best-practice biological sampling and collection of length and weight data on tunas, mahi mahi, wahoo and billfish. The materials are designed for scientists, observers, fisheries officers, fishing captains, crew and port samplers, and as teaching tools for high school and university students.

vii. Establishment of a dialogue with the Solomon Islands Ministry of Fisheries and Marine Resources (MFMR) and the Solomon Islands National Observers programme (SBOB) in response to a June 2021 request to SPC regarding alternative employment opportunities for Solomon Islands' observers unable to work due to COVID-19 related travel restrictions.

viii. Development of a sampling plan to address the request outlined in **vii**. The draft plan was circulated in 2021 and adapted to include onboard-observer and/or port-based collection of gilled-and-gutted (GG) to whole weight (WW) CF data and other biological samples for bigeye and yellowfin tuna in the Solomon Islands. An analysis of recent catch composition revealed that Solomon Islands purse seiners were not capturing the size classes needed to fill the current GG-WW data gap in the numbers required, so data collection opportunities in other regions were explored (see **ix**).

ix. This led to the drafting (in early 2023) and signing (late 2023 and early 2024) of Letters of Agreement with Tonga, Cook Islands and RMI that set out an alternative approach for collecting coupled length-to-length and weight-to-weight CF data for longline-caught bigeye and yellowfin in the central Pacific (see Appendix 1 in SC20/ST-IP-04 for details).

x. An update of the GG-WW CF relationships and the length-weight relationships (LWRs) (i.e. upper jaw to caudal fork (UF)-WW relationships for WCPO bigeye and yellowfin for input into the 2023 stock assessments (Day et al. 2023; Magnusson et al. 2023). A pipeline was created in R (R Core Team 2023) for data extraction, screening, filtering and modelling of these LWRs that is repeatable and can be applied consistently in future updates as new data comes to hand (see SC19/ST-IP-04 for details).

xi. An update of the LWR (i.e. UF-WW relationship) for south Pacific albacore for use in the 2024 stock assessment (Teears et al. 2024) (see SC20/ST-IP-04 for details).

xii. Confirmation of the lower jaw fork length (LJFL) - eye fork length (EFL) relationship for southwest Pacific striped marlin (*Kajikia audax*), an update of the LWR (i.e. EFL-WW relationship) for the stock for use in the 2024 stock assessment (Castillo-Jordán et al. 2024) (see SC20/ST-IP-04 for details).

xiii. Creation of processes and R code for the exchange of length and weight data with WCPFC members and other international fisheries agencies, noting also the establishment of the WCPFC public domain size data (available here: https://www.wcpfc.int/sustainability/scientific-data).

xiv. Completion in 2023 of modelling to explore spatial and temporal variability in the bigeye tuna LWR across the WCPO using Taiwanese observer data (see SC19/ST-IP-04 Appendix 1 for details). A manuscript based on this work is currently under review at the scientific journal *Fish and Fisheries* and a preprint is available here.

xv. Commencement in 2022 and continuation through 2023 of a comparative study of length measurements recorded by electronic monitoring (EM), onboard observers and port samplers for tunas and billfish captured by longliners in French Polynesia (see SC19/ST-IP-04 for details).

xvi. Efforts to improve links between the data collected as part of Project 90 and other WCPFC projects (i.e. Project 35b: WCPFC Pacific Marine Specimen Bank; Project 42: Pacific Tuna Tagging Project;

Ecosystem and climate Indicators; Project 100c: Progress towards a Close-Kin Mark-Recapture application to south Pacific albacore; Projects 127 and 127a).

3. Progress against the 2024-25 workplan

Most recently, significant progress was made against the 2024-2025 workplan items 1 to 5. Full details are documented in SC21/ST-IP-03, but in summary:

i. Additional analyses were undertaken to address questions raised at SC20 on the representativeness of the sex-aggregated LWR used for the 2024 southwest Pacific striped marlin assessment (Castillo-Jordán et al. 2024).

ii. Sex-specific LWRs were estimated for input into the 2024 assessment revision presented to SC21 (Castillo-Jordán et al. 2025).

iii. New sex-aggregated and sex-specific LWRs were estimated for input into the 2025 southwest Pacific swordfish (*Xiphias gladius*) assessment (Day et al. 2025).

iv. The payment strategy for observer-based CF data collection was defined in collaboration with MRAG.

v. Further coupled GG and WW measurements were collected for bigeye tuna across the WCPO which could be used to update the GG-WW relationship ahead of the 2026 stock assessment.

vi. A data collection plan was designed and implemented to estimate a new length-to-length CF (i.e. a 'finlet-to-fork' relationship) for south Pacific albacore tuna to support age estimation for the ongoing Close-Kin Mark-Recapture study (WCPFC Project 100c).

4. Future work and integration with WCPFC Projects 127 and 127a

Clear overlaps exist between the objectives of WCPFC Projects 90, 127 and 127a. In a working paper to SC21, Hamer et al. (2025) [SC21/ST-WP-02] presented results from Project 127 and set out the objectives for 'phase 2' (i.e. Project 127a), scheduled for completion this year. The paper reviewed the size composition data available for WCPO tunas, billfish and sharks and the CFs available to SPC-OFP's Stock Assessment and Modelling (SAM) team, noting their importance in the generation of reliable size data for WCPFC stock assessments. The review also highlighted the need for further scrutiny of several length-length and weight-weight CFs currently in use, particularly those for billfish. The Project 127a workplan focuses on further exploration of historical data quality/suitability, technical analysis of data coverage deficiencies, an appraisal of current data collection sources, and the improved statistical treatment of size data for use in assessments.

Whilst supporting the Project 127a plan throughout the latter part of 2025 and early 2026, Project 90 also supports broader recommendations set out in Hamer et al. (2025) to improve documentation around reporting of size data collections for assessed stocks. These recommendations also emphasise the importance of establishing standardised data collection protocols to obtain the most representative data possible for the species/stock of interest, and in promoting best practices for data exploration in the estimation of LWRs and other CFs.

To this end, we recommend the integration of Project 90 data and results into Project 127a throughout 2026, actioned through the following **four** tasks:

1. In relation to item 3 in the 2024-25 Project 90 workplan, finalise updates to the CF tables housed in SPC's 'Tufman2' database for bycatch and target species, and improve public access to the CF database through refinements to the web-based dashboard.

2. Integrate Project 90 datasets and estimated LWRs into Project 127a. For example, by using coupled length and weight data collected and filtered during Project 90 to estimate models that convert weight compositions to length data for the 2026 bigeye and yellowfin tuna WCPFC assessments.

3. Finalise data collection and analysis for the bigeye tuna GG-WW relationship ahead of the 2026 stock assessment.
4. Finalise data collection and analysis for the 'finlet-to-fork' relationship for south Pacific albacore tuna in support of WCPFC Project 100c.

5. Acknowledgements

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