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

DATA IMPROVEMENTS IN THE WEST PACIFIC EAST ASIA (WPEA) REGION OF WCPFC

WCPFC-SC22-2026-ST-IP05
21 July 2026

Submitted by
Tiffany Vidal[1], Freddie Heather[1], Fayakun Satria[2], Vu Duyen Hai[3], Suzette Barcoma[4], Theresa Mutia[4], Nguyen Quy Duong[3], Lilis Sadiyah[2], Muhammad Anas[5], Putuh Suadela[5], Ade Januar[5], Dodiet Rachmadi[5]

[1] Oceanic Fisheries Programme of the Pacific Community
[2] National Research and Innovation Agency (BRIN), Indonesia
[3] Department of Fisheries and Surveillance, Viet Nam
[4] National Fisheries Research and Development Institute, Philippines
[5] Ministry of Marine Affairs and Fisheries, Indonesia

Executive Summary

The West Pacific East Asia (WPEA) region of the WCPFC-Convention Area contributes significantly to regional tuna harvests. Data collection and reporting for the domestic waters of Indonesia, Philippines, and Vietnam in particular has historically been challenging due to the large geographic areas, large human population size, and small-scale nature of many of the fishing vessels. NZ-MFAT continues to support a data-improvement project in this region through the Sustainable Pacific Fisheries programme to improve tuna fisheries data and support the Commission's processes. This paper aims to provide a brief overview of the data improvement progress in the region, some of the key ongoing challenges, and the planned future activities to address key data gaps. This paper serves as a companion to the annual WPEA project report prepared by Olsen (2026).

1 Background

Southeastern Asia (specifically around the countries of Indonesia, Philippines, and Vietnam) is an important region for marine fisheries harvest, including tunas managed under the WCPFC (WCPFC, 2025). Despite the importance of these fisheries, robust data collection systems have historically been lacking, at the scale required to effectively monitor pelagic fisheries managed by WCPFC. The countries of this region have unique challenges and characteristics, but there are also commonalities to the challenges they face including unstable funding, institutional barriers, vast coastal geography, and large sectors of their tuna fisheries composed of small-scale vessels. Many of the challenges faced by these CCMs stem from the large number of small-scale vessels actively fishing for tunas that must be monitored in order to effectively manage their coastal and offshore fishery resources.

In 2005, New Zealand committed to supporting a tuna data improvement project to build capability and systems to enhance the quantity and quality of scientific data from the West Pacific East Asia (WPEA) region to support regional tuna science. The project has evolved over time, but NZ-MFAT remains committed to this project to promote lasting change with tangible benefits to all members of the WCPFC.

Each year, a paper to the SC provides an update on the activities associated with this project (Olsen, 2026). This paper serves as a brief companion to the project's annual report to provide a bit more detail on the progress, challenges, and data-related initiatives, which may be of interest to CCMs of the Commission, especially given the importance of these fisheries for WCPFC-managed stocks.

2 Regional context

When thinking about regional tuna fisheries at the RFMO-level, the focus is often on the activities carried out by large-scale (e.g., industrial) vessels; however, a significant proportion of the fishing activity and tuna harvest from the area managed under the WCPFC comes from small- or medium-scale vessels, primarily from the WPEA region. Monitoring and managing small-scale fishing vessels pose different challenges from their larger counterparts. With smaller vessels there is greater flexibility around how they operate, often landing in informal fishing 'ports' that may be inaccessible or unknown to port samplers. The sheer number of small vessels also means that even if there are sampling programs monitoring their catches, the sample size is likely small and potentially not representative of the entire fleet(s), thereby requiring broad assumptions about catch rates and total fishing activity in order to estimate total catches from similar vessels. The WCPFC currently requires reporting of the number of active vessels for key fisheries (purse seine, longline, pole-and-line, and troll) by size class (SciData), but if we consider the number of active vessels across all gears, especially those that are producing significant catch volumes (e.g., handline) the number of active vessels is estimated to be 17,638 for dedicated handline tuna and 101,376 for dropline that caught tuna in 2025; those numbers are estimates from Indonesia alone (about 78% operating exclusively within archipelagic waters). In Indonesia, Philippines, and Vietnam those monitoring challenges are compounded by the vast coastlines and large human population sizes, two factors that pose real challenges to effective monitoring (Figure 1).

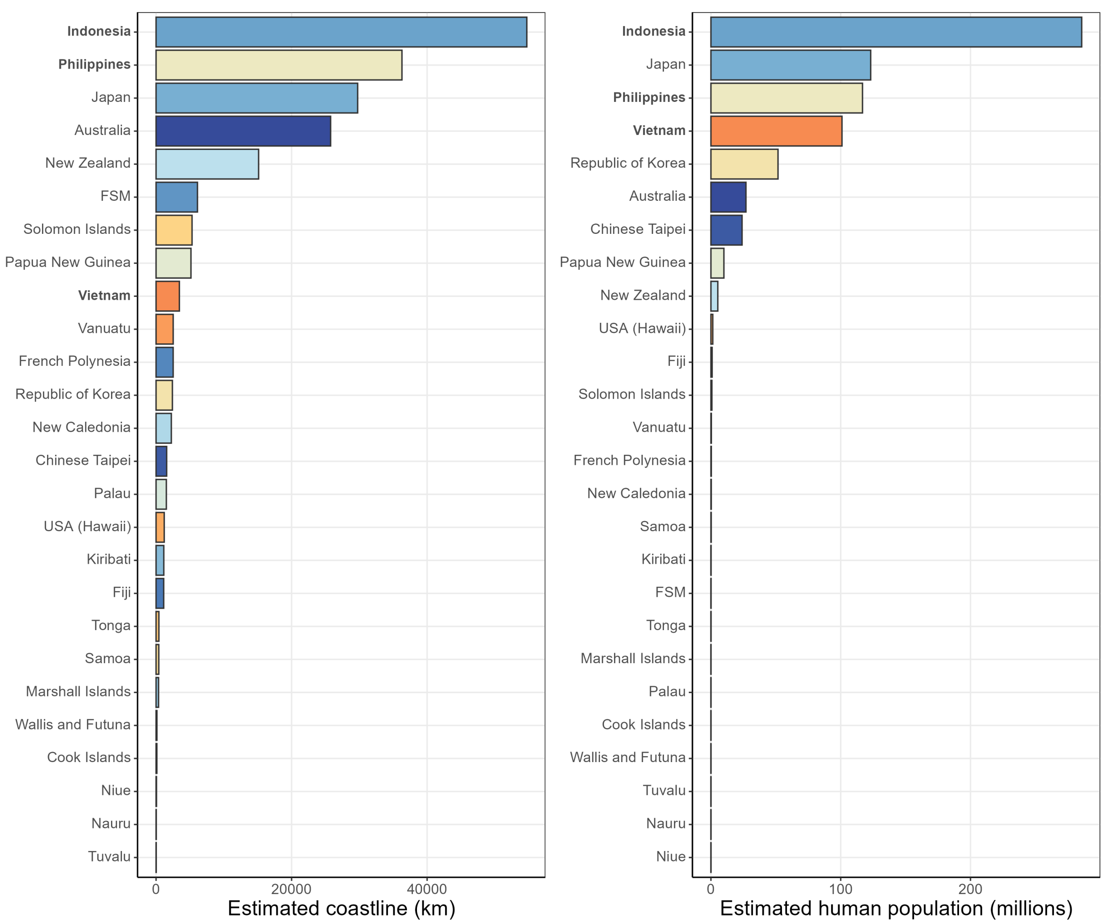

Figure 1: Estimated coastline (km) and population size (millions) of WCPFC CCM coastal states.[6]

With respect to scientific data reporting, the WCPFC has developed gear-specific data reporting requirements for the key SciData submissions. For members with significant small-scale fleets, the level of reporting complexity also increases as there are separate reporting requirements for each gear type. This additional reporting burden can be a challenge for some members. Figure 2 depicts the number of different gear types contributing to the total catch volume of tunas. The top 3 CCMs are not only producing some of the highest catch by volume, but are reporting on between 5 - 7 different gear types[7]. The structure of the reporting requirements is another complicating factors, as given that many of these vessels would generally be considered small-scale, they often employ fishing strategies that don't align neatly into single gear reporting requirements. The SSP is working with relevant CCMs to explore the option of a generic logbook template to potentially improve operational-level reporting from small-scale fisheries.

[6] These values were obtained from various sources for illustrative purposes and may not represent official statistics.

[7] The number of gears reported may be understated as some of the small-scale gears may be combined in the 'Other' gear category

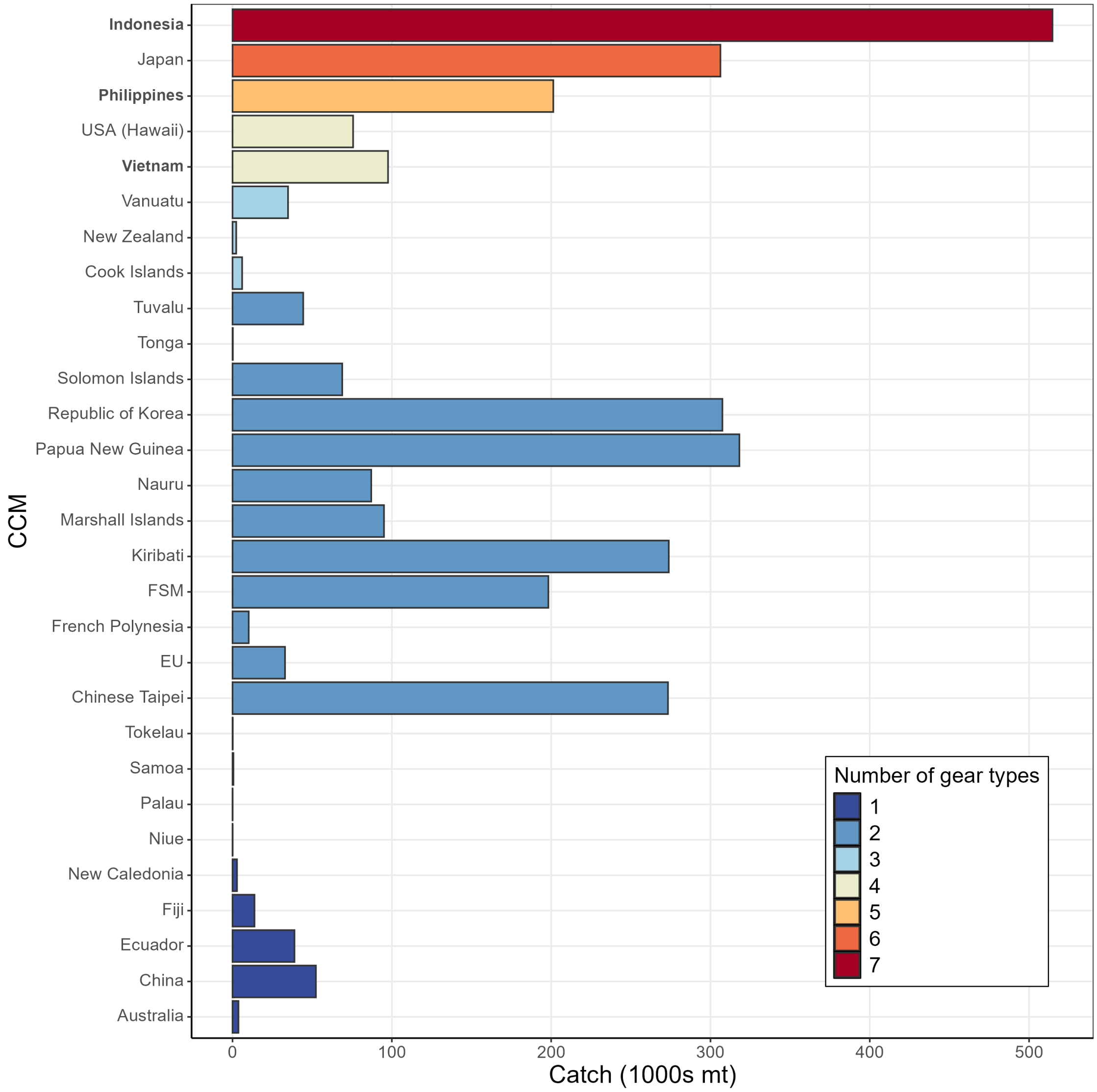

Figure 2: Estimated total tuna catch in 2025 compared with the number of different fishing gear types reported to the WCPFC. It should be noted that the estimates number of gears is generally and underestimate for the top CCMs as some of their small-scale gears are grouped together into the 'Other' gear category.

3 Data collection, progress, and challenges

In the sections below, we briefly describe the key data challenges, progress made toward improving data submissions, and planned activities to address key data gaps for key SciData submissions.

3.1 Annual catch estimates

Among the five key data provisions outlined in the SciData, the WPEA project initially focused on improving total annual catch estimates (ACE) and collecting size composition data through port sampling initiatives. All three countries are monitoring their key landing ports reasonably well in terms of vessel activity and landings; however, a significant portion of catch and effort is attributed to small-scale fishing vessels which are harder to monitor due to their small size and large numbers. Therefore, an estimation methodology based on FAO methodologies is employed. This approach relies on sampling vessels by gear and size class to obtain CPUE estimates, a sense of activity for the sampled vessels (e.g., trips per month), and an estimate of total effort (e.g., active vessels) which is used to raise the sampled catches to a level of total activity. Estimation of total effort remains one of the key uncertainties as simplifying assumptions are typically employed (e.g., all registered vessels are active and all vessels have similar activity levels and CPUE as those sampled).

Each of the countries has continually improved upon their ability to estimate effort. For example, Vietnam requires all vessels >12m in length to submit logbook data, and all vessels >15m to use VMS, thereby refining their estimates of total effort while also improving catch monitoring. As part of the implementation of Indonesia's new quota-based fisheries management policy, the national logbook program is mandatory for all fishing vessels larger than or equal to 5 GT, while a simplified logbook is applied to fishing boats smaller than 5 GT.

In the Philippines, landing sites are monitored every other day (excepting weekends and holidays) using the NSAP methodology for a total of 10-11 landing surveys per month and site. Landing sites are classified as either commercial or municipal. At commercial sites, vessels $\geq$ 3 GT are sampled while at the municipal landing sites, vessels $<$ 3 GT are sampled. Enumerators alternate between these two types of landing sites, where applicable. The Philippines continues to strengthen implementation of its national logsheet reporting system through mandatory catch-and-effort reporting by commercial fishing vessels, integration of logsheet data with observer-collected data, VMS, cannery unloading and port sampling information, and the use of regional and national databases (Tufman2 and NSAP eDGES) for data validation and reporting. Current efforts under the WPEA-SPF Project focus on improving the compatibility of these national datasets with WCPFC operational data requirements, including the potential expansion of logsheet submissions through the annual SciData process.

A regional workshop is planned for early 2027 as part of the WPEA-SPF Project to review the data used to inform these estimation approaches, to refine the methodologies, and to develop recommendations to reduce uncertainty in the future.

The reporting on key tunas has been well established, acknowledging the uncertainties detailed above, but the reporting of sharks and billfishes continue to be raised as potential data gaps (e.g., Vidal, 2025; Vidal et al., 2026). Although the three countries are reporting some level of catches for sharks and billfishes, species identification and improved reporting for these species has been raised as an ongoing challenge and area where capacity assistance may be required. To further strengthen the observer program, support for additional training and enumerators have been requested by countries.

3.2 Aggregate catch and effort

Aggregate catch and effort data are one of the key data sets used to inform the assessment models on removals in space and time. These data are typically prepared by aggregating operational catch and effort data (at least in recent years as operational data is a WCPFC requirement and coverage is nearly 100% for most fleets), given the fine-scale spatial and temporal information. For the three WPEA countries, aggregate data had historically been produced by disaggregating the ACEs given the paucity of representative logbook data. This disaggregation is based on broad assumptions (see Vidal and Williams, 2026 for additional detail) about the spatial and temporal distribution of the catches. Given the lack of data to support this process, these assumptions represented the best scientific information at the time to inform the assessment work. However, in recent years data collection and systems have been improving (at that national level if not at the Commission level), so there was an opportunity to review these assumptions and evaluate whether it was possible for each of the countries to start provisioning aggregate catch and effort data by leveraging all data available to them, at the national level. As noted in Olsen (2026), a regional 'Data Gaps Workshop' was held in Sydney in early 2026 with one of the key aims of the workshop being to review data available to support aggregate catch and effort data and to support members in developing scripts to review and prepare those data.

The workshop was a great success and each CCM left with R scripts designed to prepare their annual SciData submissions including scripts to explore and prepare their aggregate data. All three countries submitted aggregate catch and effort data through the web-portal in the standardized templates in 2026. This is the first year these data have been submitted and it represents an important milestone with respect to the project's progress. As an illustrative example, Figure 3 shows the differences observed between 2024 and 2025 with respect to Indonesia's purse seine aggregate catch and effort data. In 2024, the SSP disaggregated their catches based on broad assumptions about the spatial and temporal characteristics of their fishery and catch rates, and in 2025, Indonesia used their available logbook and annual catch estimates to produce a more informed representation of their catches in space in time.

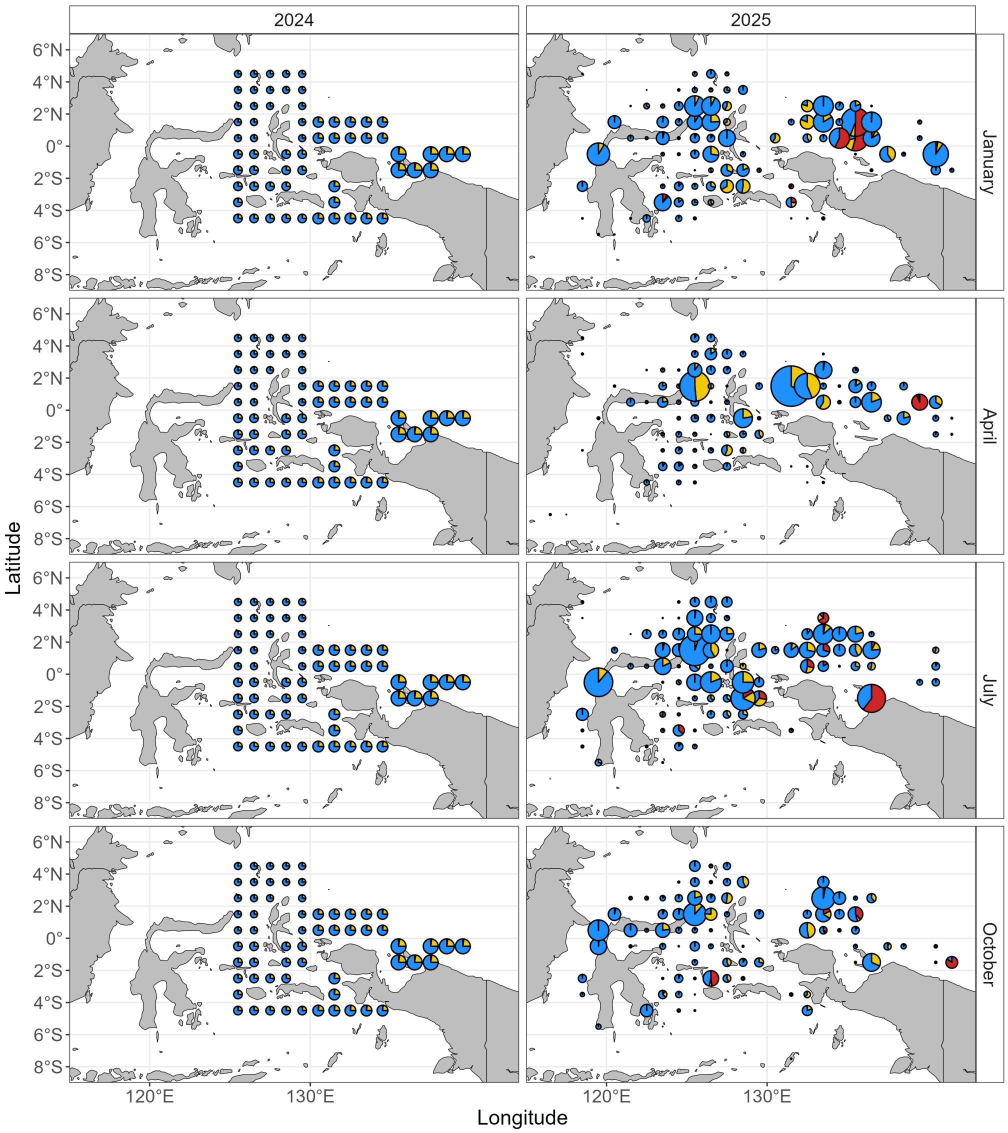

Figure 3: Example of aggregate catch and effort data from the Indonesia purse seine fishery (4 months of the year) from 2024 and 2025. In 2024, their ACE were disaggregated to produce the aggregate data sets whereas in 2025, Indonesia submitted their aggregate data directly.

3.3 Operational catch and effort

Operational data collection represents a well-known challenge for small-scale fleets. The focus of the WPEA project in recent years has been to prioritize efforts to improve operational data for the largest fleets, which largely aligns with national initiatives to expand e-logbook reporting for the larger vessels. Logbook coverage is expanding in each of the three countries, although development of e-reporting has been slow. In Vietnam 100% logbook data is collected for all vessels above (> 12 m), but the resourcing to enter those data into a database is lacking, so historically much of these data remain in paper form, until ultimately discarded (after 3 years). In Vietnam, some logbook data are entered as resources allow, but they must also comply with national reporting requirements which is done through their own data platform. In recent years, it was noted that a subset of the logbook trips were being entered into Vietnam's national reporting system as well as in Tufman2 to comply with WCPFC requirements. To mitigate the inefficiency of this duplication of effort, Vietnam is working with the SSP to develop a data pipeline to extract data from their national system and reformat to submit to the SSP in a more automated manner (dedicated workshop planned for September 2026). This should enable increased logbook reporting with minimal additional resourcing.

In Philippines logbook collections are also increasing, but primarily in paper form as well. In recent years logbook data for the high seas pocket 1 (HSP1) have been sent to SSP for entry into Tufman2, but no information from their EEZ has been provided. Discussions are ongoing with the relevant authorities to explore the possibility of including logbook data collected within the Philippine EEZ, ensuring that these data are compatible with Commission standards and can be submitted as part of the annual SciData process. If possible, the SSP will work with Philippines through technical workshops to develop a streamlined approach for data exchange. The Philippines remains committed to supporting these initiatives, with continued coordination among the concerned institutions to facilitate broader data sharing.

For Indonesia, the SSP will continue to work with Indonesia on formatting vessel id information and developing more streamlined internal data processes to consistently report these data (e.g., consistent vessel id from year-to-year). In 2026, Indonesia introduced new fleet codes into its data submissions to separate out the catch and effort for large-scale (≥30GT) and small-scale (<30GT) vessels. This application of fleet codes is potentially useful to identify data for assessments that are collected with relative certainty, and those that may be more uncertain (small-scale). In addition, Indonesia is able to demonstrate its commitment to the Commission process with higher levels of coverage in their operational data for its larger fleet (e.g., from about 3% (all fleet sizes) in 2024 to 16% (large-scale only) in 2025 for the purse seine fleet; Loganimoce and Heather, 2026).

Logbook data are critical for understanding the spatial and temporal distribution of fishing effort and catches through time, as well as for developing relative abundance indices to support the stock assessment modeling. Historically, the SSP has relied on relative abundance indices derived from longline, purse seine, and pole-and-line. In the WPEA region, longline and pole-and-line fisheries are waning for a variety of reasons including fuel costs, availability and cost of bait, and labour availability. Although the purse seine fisheries remain active, handline has emerged as a dominant fishery in the region and seems to gaining in prevalence. Handline gears are relatively simple and inexpensive and are proving highly effective at catching yellowfin tuna, in particular. Some logbook data are being collected, but the WCPFC does not yet have data reporting requirements nor standards around these 'other' gear types. The SSP is working with these CCMs to understand these fisheries and to develop data collection protocols for them with the aspiration to potentially develop an informative CPUE index (or multiple indices) to monitor trends in abundance from this important region of the fishery.

3.4 Size composition

A significant volume of size data continue to be collected throughout the region, although the spatial representation of sampling remains a challenge (Figure 4). One of the recommendations from the 2026 Annual Data Workshops is to review the size sampling to assess whether some regions and fisheries may be oversampled, and whether that effort could be reallocated to other regions or gear types where data may lacking. Collection of size data is a resourcing challenge for all three countries. Indonesia in particular has begun collaborating with NGOs, fishing associations, and industry groups that are collecting size composition data from areas WPEA enumerators are unable to sample. Data collection requirements are generally increasing to support Marine Stewardship Council (MSC) certifications or Fishery Improvement Programs (FIP); therefore, building a network for data exchange and sharing may have added benefits for this region.

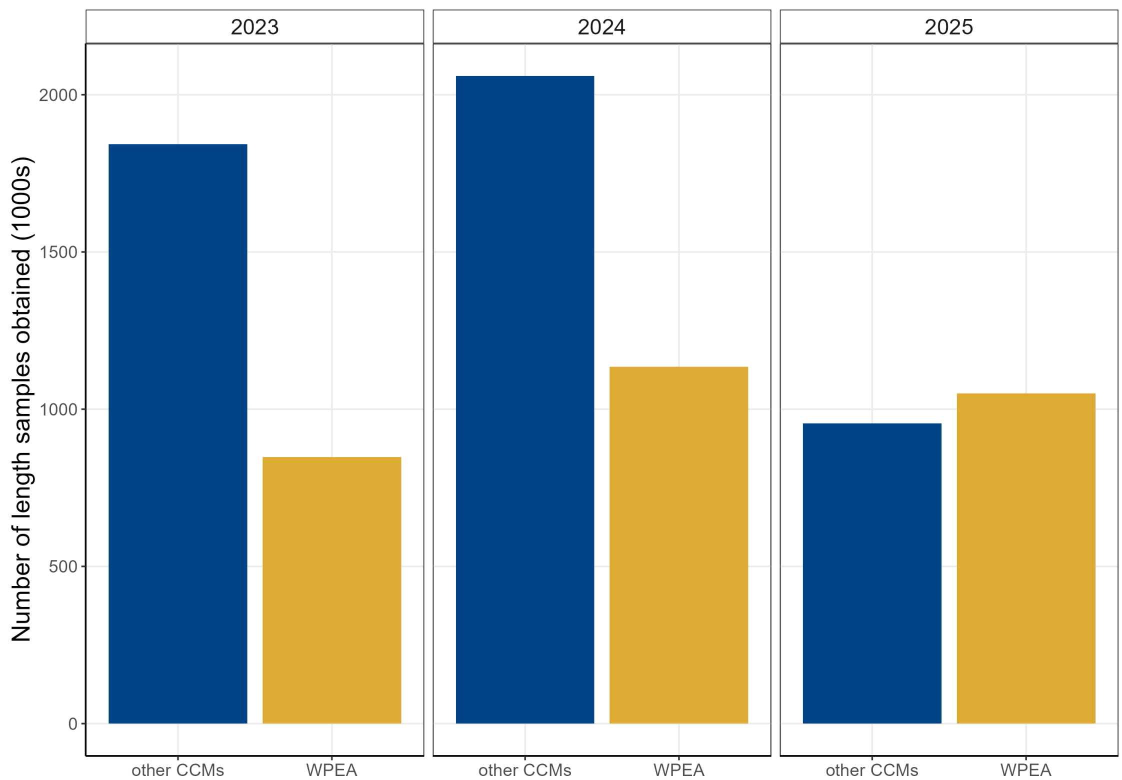

Figure 4: Sample sizes for length data for key tuna species from WPEA countries combined as compared to all other WCPFC CCMs over the past three years. Other CCM data will likely increase in 2025, and potentially for years prior, as additional observer data are received and processed.

Aside from the challenges associated with geographic representation of sampling, other ongoing challenges include logistics associated with certain gear types (e.g., high-value fisheries and reluctance of fishers to allow sampling of their catches) and the ability to retain trained enumerators when alternative employment options may be more attractive. Potential solutions to these challenges will continue to be examined as part of this project.

3.5 Summary

Although this paper highlights many challenges faced in this region, there are notable advancements being made and there are clear signs of momentum in areas that have proven difficult in the past. As data systems and capacity around data systems advance, there are clear opportunities to leverage technology and data exchange capabilities to increase data coverage for the work of the Commission. Some of these key areas are the focus for the upcoming year. In addition, the capacity development opportunities over the past couple of years have had significant benefit relative to SciData reporting, and these will continue as funding allows. Many of the capacity development opportunities are pitched as train-the-trainer (WPEA is also supporting a mentoring program with the SSP for the three countries), which has the added benefit of building communities of practice.

Figure 5 is a simple graphic to summarise overall progress made toward achieving the WCPFC SciData reporting requirements over the past few years. The key areas to note include the provision of aggregate catch and effort data in 2026 (2025 data) and the variable progress towards improving operational data coverage. Continuing to improve these two data provisions are a key aim for the WPEA project in 2026 and 2027, and as indicated above, we are collectively working to develop technological solutions to improved data collection and exchange that doesn't rely heavily on continual increases in human resources.

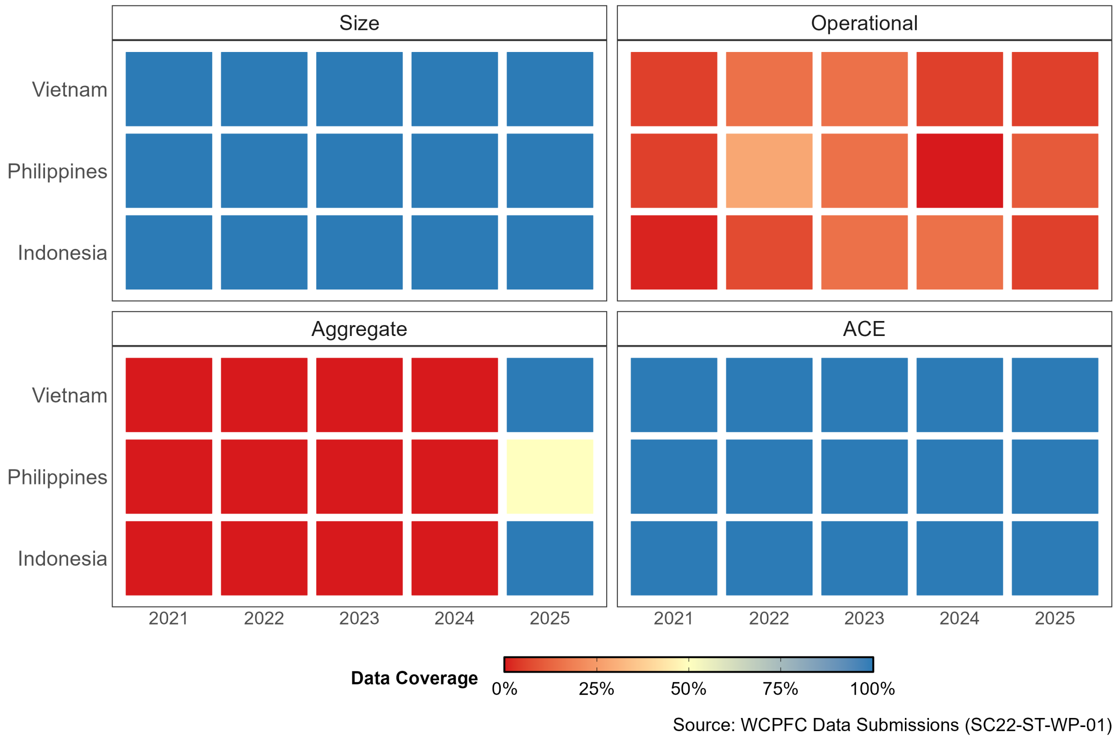

Figure 5: Relative progress toward key WCPFC SciData submissions over the past 5 years. These plots are aggregated across gears, and therefore, represent approximations to coverage across all gear types. The key focus areas for the project include aggregate data, which shifted from low coverage (red) to high coverage (blue) in 2026, and operational coverage which remains low across most of the gear types, but directed efforts are underway to try to enhance the provision of these data for the work of the Commission (see Vidal et al., 2026).

4 Acknowledgments

We thank New Zealand Ministry of Foreign Affairs and Trade for their continued support of this project, which has been instrumental in the progress made to date.

5 References

Loganimoce, E. and Heather, F. (2026). Coverage Levels for Operational Data Fields Submitted to the WCPFC. *WCPFC-SC22-ST-IP-02, Apia, Samoa, 11-19 August.*

Olsen, L. (2026). WPEA-SPF Project Update. *WCPFC-SC22-RP-WPEA-01, Apia, Samoa, 11-19 August.*

Vidal, T. (2025). Scientific data available to the Western and Central Pacific Fisheries Commission. *WCPFC-SC21-2025/ST-WP-01, Nuku'alofa, Tonga, 13-21 August.*

Vidal, T., Bi, S., and Heather, F. (2026). Scientific data available to the Western and Central Pacific Fisheries Commission. *WCPFC-SC22-2026/ST-WP-01, Apia, Samoa 11-19 August.*

Vidal, T. and Williams, P. (2026). Commission scientific data and data products: definitions, applications and nuances. *WCPFC-SC22-ST-IP-04, Apia, Samoa, 11-19 August.*

WCPFC (2025). WCPFC Tuna Fishery Yearbook - 2025. *Western and Central Pacific Fisheries Commission, Pohnpei, Federated States of Micronesia.*

Annex - Indonesia handline catches

In recent years the tuna catch estimates from Indonesia's handline fishery have represented approximately 30% of the total yellowfin catches for the entire WCPFC area. Accounting for these removals is important for the assessment models in capturing the dynamics of the yellowfin stock throughout the region. There are several challenges associated with assessing the impact of these removals including limited port sampling across landing sites where tuna are unloaded and the mixed-gear nature of this fishery. Unlike other large-scale fisheries that tend to specialize in a single gear type, these smaller-scale fisheries tend to employ a mixture of fishing strategies to maximize their catches under variable conditions. As a result, the 'handline' catches reported by the provinces throughout Indonesia for use in preparing the annual catch estimates are generally combined as a generic 'handline' gear category, whereas the reality is these catches often combine catches from different gears, primarily composed of small-fish hook-and-line (gear code = K) and large-fish handline (gear code = H). For several years, it has not been possible for Indonesia to reliably separate these catches into their respective gear types (e.g., K and H), so instead, broad assumptions were made to best estimate the split between these gears based on a general understanding of these fisheries (approximately 20-30% K and 70-80% H).

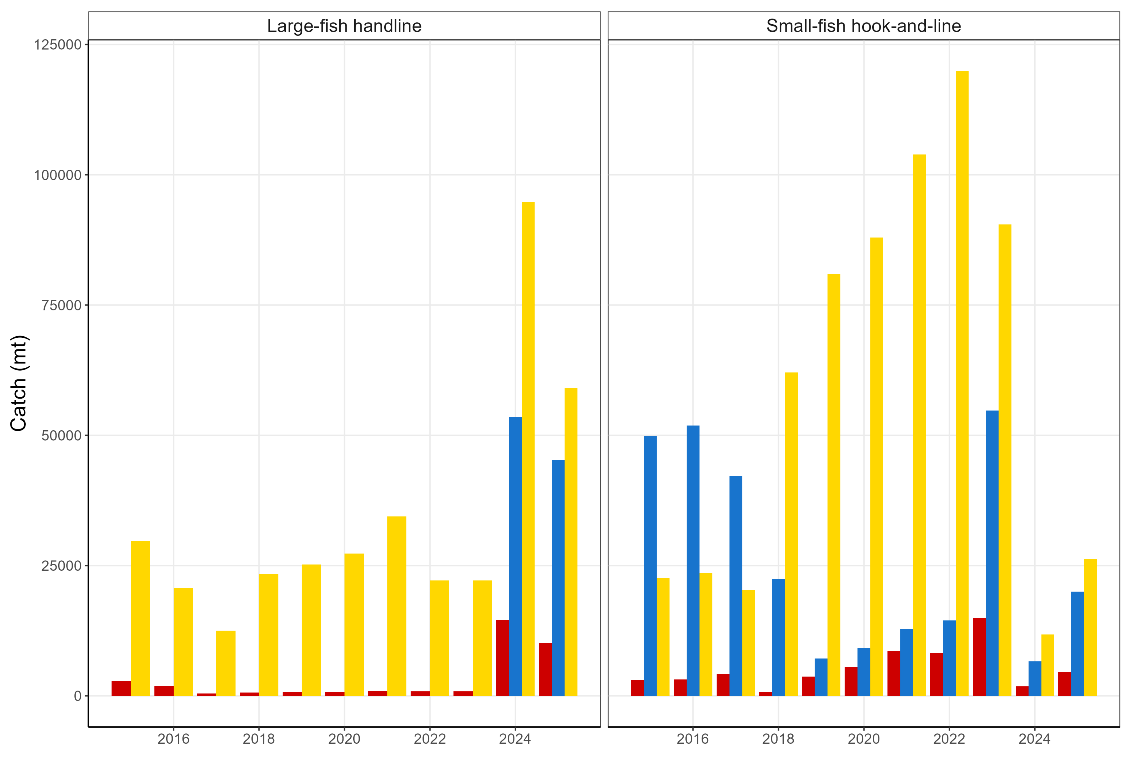

Figure 6: Time series of Indonesia handline and hook-and-line catches of bigeye (red), skipjack, (blue), and yellowfin tuna (yellow) since 2015. The shift in methodology for estimating large-fish handline catches is apparent in 2024 and 2025, at which point the catches of the two gears are almost reversed from the preceding years.

In 2024, as part of the WPEA-ITM project (previous iteration of the WPEA-SPF project), Indonesia held a dedicated handline workshop to specifically address this issue. During that workshop participants reviewed available data and derived a suite of indicators to try to classify landing sites either as primarily large-fish handline (H) or primarily small-fish hook-and-line (K) gears. Those indicators included: proportion of yellowfin in catch; presence of albacore; and size composition of the catch (where available). Given the limited size composition data across provinces and landing sites the proportion of yellowfin and presence of albacore were used as the key indicator to classify a landing site or province as predominantly large-fish or small-fish (classification was not at the trip or vessel level).

The indicator approach had several limitations, well-noted by participants, including the binary classification of sites as either a large-fish handline or a small-fish hook-and-line site. Based on this classification, all catches from those sites were attributed to the respective gear. Although this approach represented a step forward in the estimation of gear-specific catches, there were some undesirable consequences (e.g., large quantities of skipjack attributed to large-fish handline, whereas it is understood that most of these catches come from the surface gears classified as small-fish hook-and-line). In addition to these uncertainties in gear attribution, the resulting catch estimates were wildly different from the previous years. Specifically, the proportion of catch coming from large-fish handline (submitted for the 2024 reporting year) was about 73% (almost the inverse of the years prior). This shift implied that the vast majority of handline catches are in fact large yellowfin ($\geq$70cm) as opposed to a high volume of smaller fish. The resulting change in the size structure of the catch has direct impacts for the assessment and future projections for these stocks (yellowfin in particular).

There was limited time in 2025 following the data submissions for the 2024 reporting year to review this classification, but it was again revisited during the 2026 annual tuna data workshop in Indonesia. During this workshop, participants reviewed the indicator approach and worked with NGOs including MDPI, YKAN, and YII as well as fishing associations (i.e., AP2HI and APSI) to collate additional length frequency data from port sampling efforts. Using these data to calculate the proportion of large yellowfin from landing sites throughout the country, a simple model was developed to predict large yellowfin using the proportion of skipjack in the catch (which is generally inversely related to yellowfin in the catch). The proportion of large yellowfin was used a proxy for large-fish handline catches. Participants adopted this model-based approach as a more reliable interim methodology to estimate these catches.

Initial exploration of the proportion of yellowfin catch that are large ($\geq$70 cm) at the port-level revealed that while many sites were dominated by large ($\geq$70 cm) yellowfin catch, there was a spectrum of the proportion of large yellowfin ranging from 11% to 100% (Figure 7). This supported the need to create a non-binary port characterisation in terms of the proportion of large versus small (<70 cm) yellowfin.

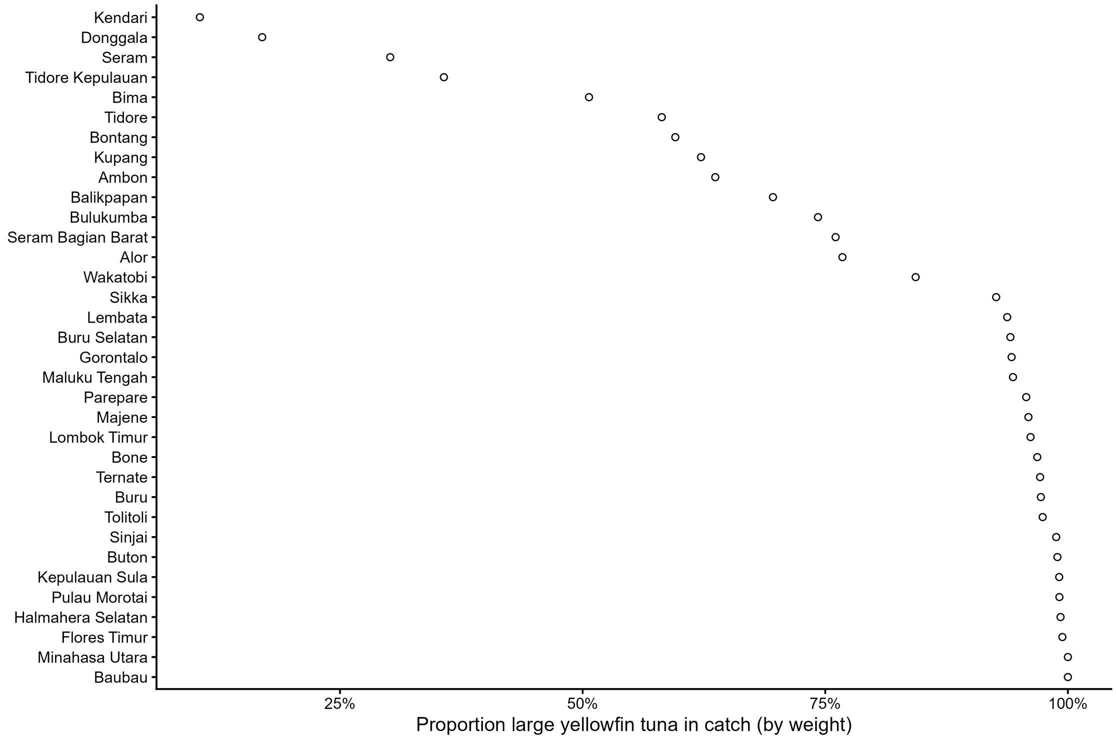

Figure 7: Proportion of the yellowfin catch that is large ($\geq$70cm) at 34 Indonesian ports.

The aim was to predict the proportion of yellowfin that are large (response variable) as a function of port characteristics (predictor variables). Some of the predictor variables that were considered were the presence/absence of albacore in the catch, the proportion of skipjack in the catch, the proportion of yellowfin in the catch, and broad geographical location.

A logistic regression model (Equation 1) was chosen to predict the proportion of large yellowfin in the catch at a given site. Due to the limited data availability (n = 34 sites) and the concern of overfitting the model, only a single response variable (proportion of skipjack in the catch) was chosen as the most informative predictor variable. The proportion of skipjack alone explained a reasonable portion of the variance in the proportion of yellowfin that are large ($R^2 = 60\%$). Note that the proportion of yellowfin in the catch was strongly inversely correlated to the proportion of skipjack in the catch and could have equally been used as the predictor variable.

$$\text{logit}(p_s) = \beta_0 + \beta_1 x_s \tag{1}$$

where, s is the site, p is the proportion of yellowfin in the catch that are large, and x is the proportion of skipjack in the catch (by weight). The fitted model coefficients were $\beta_0 = 2.446$, and $\beta_1 =$ -7.407.

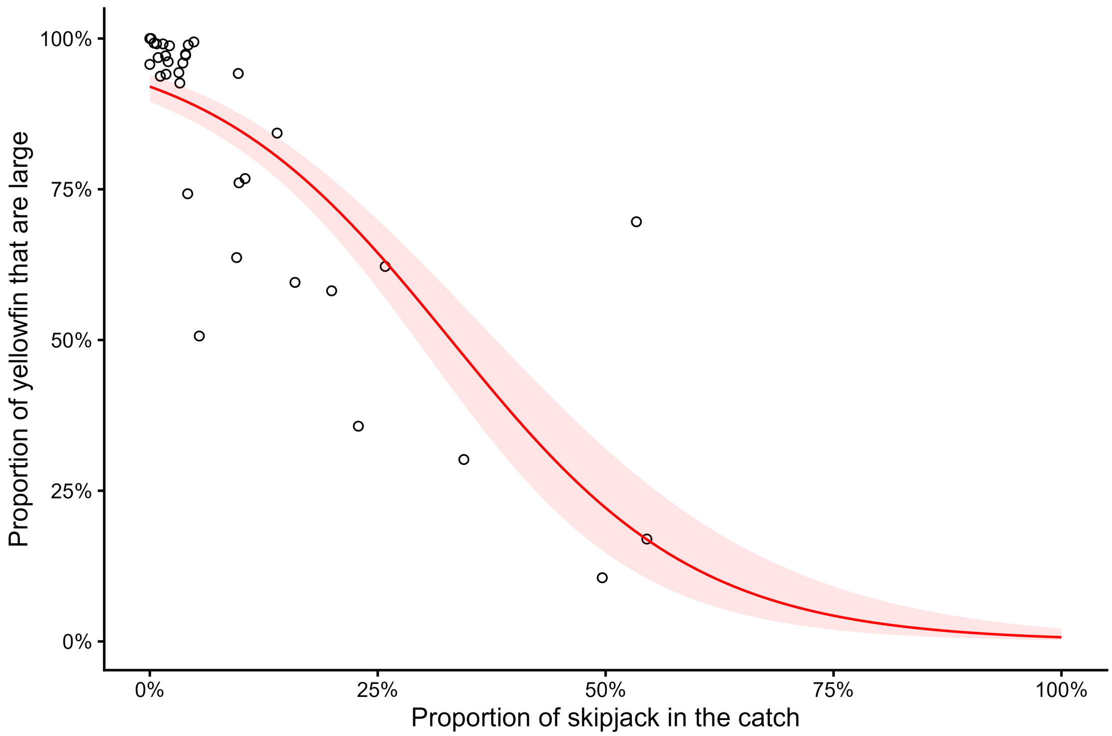

Figure 8: Logistic regression model (Equation 1) fit to the site-level proportion of yellowfin that are large as a function of the proportion of skipjack in the catch. Each datum represents a single Indonesian port (n = 34).

One limitation with this approach is the limited spatial coverage of available data. With sampling at a greater number of sites, it would be possible to explore more complex models, such as the inclusion of other predictor variables (and their interactions). The goal would be to explain more variation in the proportion of large yellowfin. Further, other predictor variables that were not readily available but could be explored include the human population density, or the accessibility of ice-trucks for transportation of larger, high-value yellowfin, for example.

A greater exploration of the site-level characteristics that determine the proportion of large-versus-small yellowfin in the catch would be advantageous, this could involve, for example, someone visiting individual ports with the goal of identifying plausible predictor variables. This work, referred to as a port characterization study, has been proposed as one of the WPEA-SPF activities. The results of this study, which are anticipated to be presented to SC24, will likely be able to offer greater clarity around this important issue.