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SCIENTIFIC DATA AVAILABLE TO THE WESTERN AND CENTRAL PACIFIC FISHERIES COMMISSION

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Peter Williams[1]

[1] Oceanic Fisheries Programme (OFP), Secretariat of the Pacific Community (SPC), Noumea, New Caledonia.
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ABSTRACT

This paper reports on the major developments over the past year with regard to filling gaps in the provision of scientific data to the Commission.

All CCMs with fleets active in the WCPFC Convention Area have now provided 2011 annual catch estimates. Several CCMs continue to provide estimates for the key shark species (which is in accordance with the change in the requirements to include the key shark species catches) and some coastal states have begun using the new extended longline logsheets which has the provision for reporting shark at the species level.

In general, the timeliness of the provision of aggregate catch/effort data continues to improve with nearly all CCMs providing data by the deadline of 30th April 2012. The quality of aggregate data provided has also improved with a reduction in the number of notes assigned to the aggregate data in recent years. Operational data for the EU Spanish longline fleet (2004-2011) was provided for the first time, and catch estimates for four new fleets were provided for the first time (Tuvalu longline, Wallis and Futuna longline and Vietnam purse seine and gillnet). The IATTC-WCPFC Memorandum of Cooperation (MOC) on Data Exchange has resolved the issue of gaps in aggregate longline data for the entire South Pacific Ocean which is the area of interest for the stock assessments of albacore tuna and swordfish.

The key gaps in aggregate catch and effort data include:

- Missing shark species data for most CCMs;
- Missing aggregate catch/effort data from Indonesia.

With respect to operational catch/effort data, only four main fleets are not covered by provisions of this type of data, and these CCMs therefore need to provide estimates of catch and effort broken down by year and EEZ/high seas areas, according to the rules for WCPFC scientific data provision.

The backlog in ROP data provision and processing has improved with observer service providers and ROP data management team becoming more settled in dealing with the requirements for 100% coverage in the purse-seine fishery. Some of the shortfall in submission of observer data to SPC is due to, *inter alia*, the rejection of problematic data for some first-time observers during the post-trip debriefing process.

The Western Pacific East Asia Oceanic Fisheries Management Project (WPEA OFM) which provides support to the Philippines, Indonesia and Vietnam with respect to establishing tuna fishery data collection and management systems is now into the last of a three-year term. Over the past year, the main developments include:

- Improved estimates of catch from the Philippines municipal hook-and-line fishery;
- For the first time, Annual catch estimates for the Vietnam tuna fisheries for 2000-2011;
- For the first time, Annual catch estimates for Indonesia tuna fisheries, including catches in archipelagic waters.

However, there remains significant work to improve the coverage and quality of logsheet, port sampling and observer data, and the reliability of annual catch estimates for certain gears. For Indonesia, the main data gap continues to be the lack of aggregate catch/effort data. For the Philippines, the main data gap is the reliability of the historical estimates for their small-scale artisanal hook-and-line fisheries. For Vietnam, the main data gap is the complete lack of historical annual catch estimates prior to 2000.

Progress was made in the past year with the attribution of catch under chartering arrangements, with a new database established to facilitate the assignment of charter nation to the catch. However, information is still sought from some flag states to ensure that double-counting of catches for chartered vessels is not occurring.

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1. INTRODUCTION

Recommendations from the Scientific Committee (SC) entitled "*Scientific Data to be Provided to the Commission*" and "*Standards for the Provision of Operational Catch and Effort Data to the Commission*" (Anon. 2005a, Annex VII) were adopted by the Western and Central Pacific Fisheries Commission (WCPFC) at its second session in December 2005 (Anon. 2005b, par. 25). The "*Standards for the Provision of Operational Catch and Effort Data to the Commission*" have been incorporated as ANNEX 1 of "*Scientific Data to be Provided to the Commission*[2]" which was further refined and subsequently adopted at the Fourth Regular Session of the Commission, Tumon, Guam, USA, 2-7 December 2007 (Anon, 2007). The most recent revision (covering the inclusion of vessel numbers in the provision of aggregate data) was adopted at the Sixth Regular Session of the Commission, Papeete, Tahiti, 7–11 December 2009 (Anon. 2009, par. 188).

As specified in the recommendations for the provision of data, the SPC Oceanic Fisheries Programme (OFP), which has been engaged by the Commission to provide scientific services (including the collection, compilation and dissemination of fisheries data) under Article 13 of the Convention, has compiled annual catch estimates, operational (logsheet or logbook) catch and effort data, aggregated catch and effort data, and size composition data on behalf of the Commission. In conducting scientific research and analyses in support of the work of the Commission, the OFP has also compiled other types of data, such as reports of unloadings, observer data, port sampling data, tagging data, oceanographic data and various types of biological data.

While the catch and effort data and size composition data currently available are extensive, there are important gaps. The purpose of this paper is to review recent developments concerning the compilation of data by the OFP, on behalf of the Commission, particularly in regard to these important data gaps, and to present information on the coverage of scientific data held by the WCPFC.

A system to review the provisions of scientific data to the WCPFC and highlight data gaps on the Commission's web site was developed prior to SC4 (refer to http://www.wcpfc.int/statprov). This system serves to provide the following functions:

- Provide the WCPFC Secretariat, the Scientific Committee and data managers with a broad indication of the status of data collected and provided to the WCPFC (i.e. identify data gaps);
- Provide Commission members and co-operating non-members (CCMs) with a concise summary of what data have/have not been provided to the WCPFC, and any deficiencies with the data provided;
- Serve as a reference for WCPFC Secretariat and data managers when following up with CCMs on any outstanding issues with respect to the collection/provision of data to the WCPFC (identify data gaps which may prompt 'data rescues', for example);
- Provide the users (e.g. researchers) with a concise summary of what data are available and inform them of any problems that are apparent in data provided.

CCMs have been encouraged to use this tool to ensure their data provisions have been registered with the Commission and review where data provisions are outstanding.

The WCPFC Data Catalogue was made available on the WCPFC web site (http://www.wcpfc.int/wcpfc-data-catalogue) during 2011. This facility provides a description of the WCPFC data holdings by gear, species and data type (annual catch estimates, aggregate catch and effort data, operational catch/effort data and aggregated size data). The WCPFC Data Catalogue will continue to be enhanced in the coming years, as required. An indication of the coverage of aggregate catch and effort data, operational logsheet (catch and effort) data, unloadings data, port sampling data and observer data held by the OFP can also be viewed at http://www.spc.int/oceanfish/en/ofpsection/data-management/wcpfc/213/146-wcpo-tuna-fishery-data-coverage. It is expected that the data coverage facility will be enhanced and transferred to the Commission's web site at some stage in the future.

[2] Can be viewed at http://www.wcpfc.int/doc/data-01/scientific-data-be-provided-commission-revised-wcpfc4-wcpfc6

2. STATUS OF DATA GAPS

Data gaps and other issues related to the provision of data have been reported at SC1 (Williams and Lawson, 2005), SC2 (OFP, 2006), SC3 (OFP, 2007), SC4 (OFP, 2008), SC5 (OFP, 2009), SC6 (Williams, 2010) and SC7 (Williams, 2011).

The following sections describe the most important current gaps in the WCPFC scientific data holdings. These sections are carried over from previous versions of this paper until the data gap issue is considered to be resolved. The text in *blue italics* reflects the recent work and/or developments to resolve the respective data gaps.

2.1 Major data gaps for key fleets

2.1.1 Philippines tuna fishery data

The absence of a breakdown of catch estimates by gear type, and the lack of operational logsheet data for the Philippines domestic fisheries have been amongst the most significant gaps in the provision of data to the WCPFC, specifically,

- Total catch estimates for the period prior to 1970 are missing.
- There is a general lack of operational and aggregated catch and effort data.
- Only limited size composition and species composition data are available for the period prior to the National Stock Assessment Programme (NSAP), which commenced in 1997.
- The estimates from the municipal fisheries, particularly the small-fish hook-and-line fishery are considered unreliable with catches in some regions unrealistically high for yellowfin and bigeye tuna.

During the past year, the WCPFC Secretariat and the SPC/OFP continued to work with their Philippine counterparts to improve the data available from these fisheries. The UNDP/GEF-funded West Pacific East Asia Oceanic Fisheries Management (WPEA-OFP[3]) project is supporting this work over three years (2010-2012), with an expectation of continued support to follow. Significant developments in resolving data gaps in the Philippines' domestic fisheries over the past year include:

- *The fifth Philippines Annual Catch Estimates Review Workshop (Anon, 2012c) was convened and attended by important stakeholders with knowledge and information on the tuna fisheries in the Philippines (government, industry and NGOs). This workshop now follows a well-established process and the outcome was agreement on more reliable annual catch estimates for the Philippines tuna fisheries and a plan for further improvement in the data collection and estimation processes in the coming years. Some progress was made this year on producing more reliable estimates for the municipal hook-and-line fishery, although more work in this area is required.*
- *The third review of the species composition and size data collected under the National Stock Assessment Project (NSAP) was conducted in a workshop held in General Santos City in May 2012 (Anon, 2012b). These data provide fundamental information for tuna stock assessments and for the annual catch estimation process, and the workshop confirmed the problems identified in previous workshops had been resolved. The workshop also identified new issues that have come up in the NSAP data collection.*
- *A WPEA study on catches from the municipal hook-and-line fishery in one of the Philippine regional fisheries (Region 8 – Eastern Samar) was conducted by BFAR/NFRDI in the past year (BFAR/NFRDI, 2012). The study showed that previous estimates for this fishery were about an order of magnitude higher than they should be and the results were used during the annual catch estimates workshop to produce more reliable estimates for this fishery at the national level.*
- *The collection of operational logsheet data from the domestic purse seine fishery continues to progress with comprehensive data now available for 2008-2011. Strong compliance with logsheet submission is ensured mainly through the EU catch documentation requirements.*

[3] Refer to http://www.wcpfc.int/doc/2009/wpea-ofm-project-document; significant co-financing is included with this project in supporting the work in Indonesia, Philippines and Vietnam

- *The Philippines national observer programme continues to collect important data from the domestic purse seine fishery. These data are not defined as ROP data but provide fundamental information on the fishery which feed into the annual catch estimates and stock assessment processes.*

2.1.2 Indonesian tuna fishery data

The absence of a breakdown of annual catch estimates by gear type, and the lack of operational logsheet and size data for the Indonesian domestic fisheries are amongst the most significant gaps in the provision of data to the WCPFC, specifically:

- Total catch estimates for the period prior to 1970 are missing.
- Estimates of annual catches have not been stratified by gear type for the period 1991–1999.
- Estimates of annual catches of 'yellowfin' covering the period from 1970 to 1999 also include bigeye.
- There is a general lack of operational and aggregated catch and effort, and size composition data.
- For the period from 1970 to 1999, large annual catches have been reported for 'unclassified' gear types; information is required regarding the gear types included in 'unclassified', and the size composition of catches taken by 'unclassified' gear types.

During the past year, with the assistance provided through the WPEA-OFM project, the WCPFC Secretariat and the SPC/OFP continued to work with their Indonesian counterparts to improve the data available from these fisheries. Significant developments in the past year include:

- *The second WPEA/Indonesia port sampling data review workshop was conducted in Kendari and Bitung, North Sulawesi during November 2011 (see Anon, 2011a). This workshop was convened to review the data collection by enumerators based in Bitung and Kendari ports during 2011. The workshop noted that significant progress had been made in collecting and processing size data, which were subsequently made available to the WCPFC in April 2012. The database system developed by P4KSI[4] has been enhanced over the past year and now provides comprehensive reporting. Future work in this area will include expanding port sampling to Sorong and Ternate in the coming year;*
- *Annual catch estimates including the catches in archipelagic waters were provided in July 2012 for the first time.*

The most important data gaps for Indonesia remain:

i. the lack of an adequate review of annual catch estimates prior to 2000;
ii. Compilation and submission of aggregate and operational catch/effort data for recent years since the logbooks became mandatory in the Indonesian domestic tuna fisheries (2010-2011).

2.1.3 Vietnamese tuna fishery data

The lack of annual catch estimates and other data used for stock assessments in the Vietnamese domestic fisheries is acknowledged to be an important gap in the provision of data to the WCPFC, specifically,

- There are no annual catch estimates, operational or aggregated catch and effort data, nor size composition data currently available, other than anecdotal information on catches (e.g. Lewis, 2005).

During the past year the WCPFC Secretariat and the SPC/OFP continued to work with their Vietnamese counterparts to improve the data available from these fisheries. Significant developments in the past year, include:

[4] Indonesia Research Centre for Fishery Management and Conservation of Fishery Resources (RCFMCFR) or Pusat Penelitian Pengelolaan Perikanan dan Konservasi Sumberdaya Ikan (P4KSI)

- *The third Vietnam Tuna Data Collection workshop (Anon, 2011b) was convened and attended by important stakeholders with knowledge and information on the tuna fisheries in Vietnam in November 2011. The workshop primarily reviewed the longline (observer, logsheets and port sampling data) and purse seine/gillnet data (landings) that had been collected to date and provided recommendations for improving data collection. The workshop also finalized the protocols for implementing port sampling data collection in the purse-seine and gillnet fisheries.*
- *The first Vietnam Tuna Fisheries Annual Catch estimates Workshop (Anon, 2012a) was convened and attended by important stakeholders with knowledge and information on the tuna fisheries in Vietnam, in April 2012. This workshop produced, for the first time, annual catch estimates by GEAR and SPECIES for the Vietnam longline, purse-seine and gillnet fisheries for years 2000-2011.*

The most important data gaps for Vietnam remain:

i. the construction of historical annual catch estimates for each of the domestic Vietnamese fisheries prior to 2000;
ii. the compilation and provision of aggregate and operational catch/effort data from the longline fishery from logbooks collected since 2010;
iii. the establishment of logbook and port sampling data collection for the purse seine and gillnet fisheries;
iv. the continued review of observer data collection to ensure it is in line with observer data collected elsewhere.

2.1.4 Other fleets

Gaps in the provision of historical data for key fleets have been noted in previous papers. In several cases, no specific fishery data were collected during the period mentioned, so data cannot be provided to the WCPFC. However, there may be other information available to construct an historical time series through specific studies.

– There are no operational (logsheet), aggregated catch and effort, nor size data available for years prior to 2004 for the **Chinese-Taipei domestic offshore (STLL) longline** fleet;
- There are no operational or aggregated catch and effort data, nor size composition data, available for the **Japanese Coastal fleet**;
- There are no operational or aggregated catch and effort data, nor size composition data, available for the period prior to 1972 for the **Japanese pole-and-line fleet.**

Developments during the past year include:

– *The issues reported last year with the Chinese longline fleet have been resolved, and the missing data provided to the WCPFC. That is, the missing catches in Kiribati waters and the overlap area have now been accounted for.*

2.2 Coverage rates

Data provided by CCMs which do not represent full coverage may be listed as a data gap, for example:

- For several fleets, particularly those of the small Pacific island countries, better estimates of historical coverage rates of logsheet and unloadings data are required to improve annual catch estimates and aggregated catch and effort data. In this regard, the identification and rescue of historical data are required.

Section 5 of this paper provides a description of the coverage of the scientific data available for the WCPFC stock assessments. Recent developments in the area of data coverage include:

- *Vessel Monitoring System (VMS) data, aggregated to the trip level, are fundamental for determining and improving coverage and have been used with great effect to improve data coverage for years since 2009, inclusive.*

2.3 Nationality of the catch

There have been difficulties in certain circumstances in assigning the catch to one national entity or another. While it is acknowledged that catches should normally be assigned to the country of the flag flown by the fishing vessel, there are sometimes circumstances where this may not be appropriate. The Coordinating Working Party on Fishery Statistics (CWP), convened by FAO, has listed some situations in which difficulties in assigning a nationality might exist. The CWP also provides guidelines for how the nationality of the catch may be assigned in certain situations where it might not be appropriate for the nationality of the catch to be equivalent to the flag flown by the fishing vessel (see http://www.fao.org/fishery/cwp/handbook/C). In the WCPFC fisheries, there are a number of situations where the assignment of the nationality of the catch is not straightforward, for example:

- Foreign-flagged vessels domestically-based in Pacific Island countries, including domestic charter arrangements;
- Vanuatu-flagged purse seine vessels fishing under the FSM Arrangement under the "home party" of Papua New Guinea.

The consistent assignment of "fishing nation" in all types of scientific data has a number of important implications within the SC and other areas of the Commission's work. With the establishment of a WCPFC Conservation Management Measure (CMM) on chartering (CMM 2009-08), procedures for assignment of catch data to national entities are being developed. These procedures are required to ensure that "double-counting" of catch and effort data provided by the flag and chartering entities does not occur.

Developments during the past year include:

- *SPC has now established a CHARTER database table which contains the information contained in the charter notifications submitted by Coastal states to the WCPFC under the requirements of the CMM on Charter Notifications (CMM 2009-08). This database is used to assign the charter nation in the catch and effort data.*
- *In May 2012, China provided a verbal response that their annual catch estimates and aggregate catch effort data provisions for 2011 exclude the catch and effort of chartered vessels listed in the 2011 WCPFC charter notifications (see WCPFC, 2012). Formal confirmation is expected.*

Outstanding issues in this area include,

- Chinese Taipei and other relevant flag states are requested to exclude the catch/effort for their flagged vessels which are listed in the WCPFC Charter notifications from the data (annual catch estimates, aggregate and operational data) they submit to the WCPFC. These CCMs should confirm or otherwise whether this has been done.
- Resolving issues when there is a conflict in the charting arrangement, for example:
  i. when two coastal states charter the same vessel, and
  ii. how the catch should be assigned for activities on the high seas.

2.4 Annual catch estimates by EEZ

Section 4 of the *Scientific Data to be provided to the Commission* (i.e. Catch and effort data aggregated by time period and geographic area) indicates that -

> *"If the coverage rate of the operational catch and effort data that are provided to the Commission is less than 100%, then catch and effort data that have been raised to represent the total catch and effort shall also be aggregated by periods of year and areas of national jurisdiction and high seas within the WCPFC Statistical Area."*

Several CCMs have not provided operational catch and effort data, so they are obliged under this requirement of the data provision rules to provide catch (by species) and effort data aggregated by YEAR and EEZ/High seas areas to the WCPFC. The CCMs that do not yet provide operational data are therefore required to provide these aggregate data (China, Japan, Republic of Korea and Chinese Taipei).

2.5 Operational catch and effort data

Coastal states (which are members of the SPC and FFA) collect operational catch and effort data through bilateral access agreements with foreign fleets fishing in their waters; these data are processed and held by the SPC on behalf of the coastal states. Operational catch and effort data are not available outside the EEZs of FFA member countries for Japanese fleets, the Korean distant-water longline fleet, and the Chinese and Chinese Taipei distant-water longline fleets that target bigeye and yellowfin. (Operational catch and effort data for Chinese and Chinese Taipei distant-water longliners targeting albacore are compiled by port samplers in Pago Pago, American Samoa and Levuka, Fiji).

Operational catch and effort data, together with fine-scale oceanographic data that may affect catch rates, are required for the development of indices of abundance. Operational catch and effort data are also required to determine the spatial distribution of the catch in relation to EEZs, the high seas areas and other management-related areas.

Significant progress has been made with the provision of historical operational data over the past 2-3 years (see Section 4.3 below and Tables 7 and 8). Significant developments during the past year include:

- *Provision of operational data for the EU Spanish longline fleet for 2004-2011;*
- *Provision of operation data for the EU Spanish purse seine fleet for 2010-2011.*

There are now only four CCMs with non-domestic fleets operating throughout the WCPFC area which have yet to notify of their intent to provide operational catch/effort data to the WCPFC. In this respect, the Seventh Regular Session of the Commission (Anon., 2010) requested CCMs with issues in providing data to submit a draft plan of how impairments to the provision of data can be resolved. To date, there have not been any plans submitted by the CCMs yet to provide operational catch and effort data.

> *"Para. 173: WCPFC7 acknowledged the importance of providing complete and accurate data in a timely way and urged CCMs to improve the provision of data to the Commission. WCPFC7 requested that CCMs that have issues in providing accurate and complete data in a timely manner should identify those issues clearly to the Commission. At TCC7 CCMs should provide a draft plan of how impairments to the provision of data will be dealt with as rapidly as possible. CCMs are encouraged to assist others as they are able to do so and the Commission should continue to evaluate methods to assist in this matter."*

2.6 Aggregate catch and effort data

Certain stock assessments require aggregate catch and effort data that cover the extent of the stock for that species[5]. In the case of bigeye tuna, for example, stock assessments cover the Pacific Ocean and therefore the provision of aggregated longline data is required to cover the Pacific Ocean. In the case of south Pacific albacore and swordfish, stock assessments cover the Pacific Ocean, south of the equator.

This data gap has been resolved through the data exchange Memorandum of Cooperation (MOC) with IATTC (see http://www.wcpfc.int/node/2684). *In June 2012, historical aggregate longline data for the Eastern Pacific Ocean (EPO) were provided and the WCPFC now holds aggregate longline data for the main longline fleets for the Pacific Ocean for a period of 1950-2010.*

Outstanding issues in this area include:

- In some instances, the aggregated catch and effort data provided to the WCPFC for the most recent year of activities have not been raised and/or represent incomplete coverage of activities. For example, the 2011 aggregate longline data provided for the distant-water longline fleet of Chinese Taipei are lacking data for the latter months of 2011, which needs to be taken into account for the stock assessment projections.
- In some instances, it is not possible to reconcile the aggregate longline catch data with annual catch estimates. For example, this is the case with the aggregated catch/effort data covering the Japanese distant-water longline fleet, where catch is provided in numbers of fish only. This often occurs when the source of annual catch estimates is unloading data, which is different from the source of data for aggregate catch data (logsheets).
- In some instances, the unit of catch provided in the aggregate longline catch data is not suitable for use in stock assessments. For example,
    - the aggregated catch data provided for the distant-water Chinese longline fleet for 2003-2007 are in units of "kilograms" only, and the stock assessments require the catch to be in "numbers of fish" by species.
    - The catch in the EU Spanish longline operational data (2004-2011) which is used to generate their aggregate data is in "kilograms" only.

2.7 Number of vessels in the aggregate data

The compilation of public domain catch and effort data has been hampered by the lack of key effort information (number of vessels) in the aggregate data provided by CCMs. In acknowledging the difficulties in filtering aggregate data in order to adhere to the Commission's rules for the dissemination of public domain data (see Para. 9 of the rules), WCPFC6 agreed to the following recommendation put forward by the Ad Hoc Task Group for Data (AHTG–Data) :

"188. WCPFC6 agreed, as advised by the AHTG–Data and recommended by TCC5, that the Commission amend its Procedures and Standards for Scientific Data to be Provided to the Commission to include in Section 4 (Catch and effort data aggregated by time period and geographic area) the following new paragraph:

CCMs are to provide, to the extent possible, the number of individual vessels per stratum and area covered by their operational data with the aggregated catch and effort data they submit to the Commission."

CCMs that provide operational logsheet data to the Commission, or the SPC-member countries that provide operational logsheet data to the SPC, are **not** required to provide this additional information since the WCPFC Data Managers (SPC) can undertake the work of filtering out the strata representing the activities of less than 3 vessels in the process of aggregating the operational data.

[5] The provision of distant-water longline data covering the whole Pacific was a change in the guidelines on the Provision on Scientific Data to the Commission that was approved at WCPFC4 in December 2007.

The current status of the provision of "number of individual vessels per stratum" for those CCMs that only provide aggregate data is as follows:

- Chinese Taipei have provided information on the number of vessels per stratum in their provision of 2007, 2008, 2009, 2010 and 2011 aggregate data for their distant-water (DWLL) and offshore (STLL) longline fleets. This information will therefore allow the production of a public domain version of their aggregate data for these years only but not the entire time series of their aggregate data.
- The USA has filtered their aggregated longline data to remove strata which represent the activities of less than 3 vessels because this is a requirement in their national legislation. The aggregate data they provide to the WCPFC are therefore considered to be in the public domain.
- Japan has yet to provide information on the number of vessels per stratum with their aggregate longline data.
- China has yet to provide information on the number of vessels per stratum with their aggregate longline data.
- Korea has yet to provide information on the number of vessels per stratum with their aggregate longline data.

At this stage, there is insufficient information provided to change the current method of compiling the WCPFC public domain data[6] (see http://www.wcpfc.int/science-and-scientific-data-functions/public-domain-data).

2.8 Species composition data for purse seiners

Species composition data collected by observers and port samplers are needed to improve estimates of the catches of skipjack, yellowfin and bigeye tuna for purse-seine fleets. This issue is being addressed through:

(i) the establishment of 100% observer coverage in the purse-seine fishery since January 2010;
(ii) the gradual establishment of observer spill sampling through the WCPFC Project 60; and
(iii) initiatives related to the collection of landings data and cannery receipts.

The collection of paired "spill" and "grab" samples by observers is an important WCPFC project which is fundamental for the estimation of size selectivity bias in grab samples of the purse-seine species and size composition. A description of the estimation of selectivity bias and the use of grab samples corrected for selectivity bias to adjust catch and length data can be found in Lawson (2010, 2011a, 2012), and Lawson & Lasi (2012). In the past year, the annual catch estimates and aggregate data have been adjusted to reflect best estimates of skipjack, yellowfin and bigeye tuna in the WCPFC purse seine fishery based on these analyses.

2.9 Size composition data for longliners

Developments during the past year include:

- *Provision of swordfish and striped marlin weight frequency data for the Australian and New Zealand domestic longline fleets;*
- *Provision of albacore length data at 1cm intervals for the Chinese Taipei longline fleet (they were previously provided at 2cm intervals).*

Outstanding issues in this area include:

- Size composition data are not available for the Vanuatu distant-water fleet targeting bigeye and yellowfin in the eastern tropical areas of the WCPFC Statistical Area.

[6] It is noted that an analysis provided in SC5 ST WP-5 showed that even if the number of vessels per stratum is provided, aggregate catch and effort data for individual flags that have been filtered for less than three vessels will not be accurate. See http://www.wcpfc.int/doc/st-wp-08/timothy-lawson-and-peter-williams-status-public-domain-catch-and-effort-data-held-weste

2.10 Data for stock assessment of shark species

The SC5 *"… requested SPC-OFP to commence work on preliminary stock assessments for key shark species, and to develop a research plan to support further assessment for consideration at SC6 …"*.

There are a number of data-gap issues with respect to shark catches in the WCPFC Convention Area and these were elaborated in Clarke and Harley, 2010 and Clarke et al., 2011, and more recently in Rice et al., 2012. Annual catch estimates and aggregated catch data by shark species continue to be provided by a number of CCMs and an indication of provision of data in recent years is shown in the notes of Tables 1–5 of this paper.

Future work will involve determining annual catch estimates through work such as Lawson 2011b, and collaborating with CCMs to determine whether shark species catch estimates can be determined for years and fleets not yet covered.

2.11 Data related to ecosystem approach to fisheries

Gaps in data collection/provision, sampling design and research related to the implementation of an ecosystem approach to fisheries include the following:

- The coverage of catch data for non-target species, including species of special interest (marine reptiles, marine mammals, sharks and sea birds), collected by observers needs to be increased for most longline and purse-seine fleets, and particularly the distant-water longline fleets, for which observer coverage has been negligible.
- Biological data covering non-target species are lacking; the types of data required include length and weight, length and age at maturity, longevity, growth rate, fecundity, habitat use (vertical and horizontal range), and trophic interactions.
- Other gaps include quality-controlled ocean bathymetry data, especially regarding seamount definitions and locations, oceanographic data products resolving mesoscale features relevant to fisheries, and acoustic data for the validation of models of mid-trophic components of oceanic ecosystems.

The implementation of 100% observer coverage in the purse seine fishery through CMM 2008-01 has essentially resolved any issues with respect to coverage in the purse seine fishery. The requirement under CMM 2008-01 to implement 5% coverage in the longline fishery in 2012 will significantly improve the coverage in this fishery. Future work is expected to also focus on the quality of the observer data related to the ecosystem approach to fisheries.

2.12 Standardising the reporting of data gaps amongst tuna RFMOs

The SC7 encouraged the WCPFC Secretariat to cooperate with other tuna RFMOs to establish a common format for reporting on data gaps, as recommended at the Kobe III meeting. During recent months, informal email exchanges were made between the WCFPC Data Manager and Data Managers from I-ATTC and IOTC. With respect to reporting data gaps, there are similarities amongst the three tuna RFMOs, for example:

- Data Catalogues are produced by each Secretariat;
- Important data gaps are sometimes reported in specific papers for a tuna species;
- Compilation of data gaps is undertaken for respective compliance working groups.

However, there is not a common format for reporting data gaps, *per se*, and ideally, a dedicated meeting would be the best way to deal with this issue.

3. ENHANCEMENTS TO GUIDELINES FOR WCPFC DATA PROVISION

3.1 SC7 recommendation

Sections 1 and 4 of the "*Scientific data to be provided to the Commission*[7]*"* require CCMs to provide information on the way the aggregated fisheries data were produced, that is:

> *The statistical methods used to estimate the annual and seasonal catches shall be reported to the Commission, with reference to the coverage rates for each type of data (e.g. operational catch and effort data, records of unloadings, species composition sampling data) that is used to estimate the catches and to the conversion factors that are used to convert the processed weight of longline-caught fish to whole weight.*

This text covers the estimation of annual catches (Section 1), and similar text covers the production of the aggregate catch/effort data (Section 4), but there is no mention of the requirement for an explanation of how size data were produced (Section 5), which appears to be an oversight and inconsistent with what is required for the other data types. For this reason, addition of the following text under Section 5 of the *Scientific data to be provided to the Commission* was considered at SC7:

> ***[MODIFICATION #1]*** *The statistical and sampling methods that are used to derive the size composition data shall be reported to the Commission, including reference to whether sampling was at the level of fishing operation or during unloading, details of the protocol used, and the methods and reasons for any adjustments to the size data.*

The SC7 also considered adding text in the *Scientific data to be provided to the Commission* to ensure scientists are provided with information on changes in the way fishing takes place that are not captured in the available data. The suggested text considered by SC7 to be added to Sections 3, 4 and 5 in this document was:

> ***[MODIFICATION #2]*** *Information on operational changes in the fishery that are not an attribute in the data provided are to be listed and reported with the data provision.*

The SC7 recommended that CCMs consider the implications of adding the text listed as MODIFICATION #1 and MODIFICATION #2 above to the "*Scientific data to be provided to the Commission*"

3.2 Provision of length data by size class interval

The "*Scientific data to be provided to the Commission"* does not stipulate the level of aggregation of length or weight size class interval to be provided in the size data (Section 5). In most cases, the size class interval in the data provided have been acceptable for stock assessments, although some length data have been provided for skipjack and albacore tuna at 2cm size class intervals which cannot be used in the stock assessments since the size range of the catch for these species is narrower than other tunas (bigeye and yellowfin tuna) and therefore require higher resolution in the size class interval of the aggregated length frequency data.

The recommended length size class intervals required for stock assessments are:

- Skipjack tuna – 1cm
- Albacore tuna – 1cm
- Yellowfin tuna – ideally 1cm, but not more than 2 cm
- Bigeye tuna – ideally 1cm, but not more than 2 cm
- Billfish – ideally 1cm, but not more than 5 cm

[7] Can be viewed at http://www.wcpfc.int/doc/data-01/scientific-data-be-provided-commission-revised-wcpfc4-wcpfc6

4. RECENT PROVISIONS OF SCIENTIFIC DATA TO THE WCPFC

Under the policy for the provision of data to the Commission, annual catch estimates and aggregated catch and effort data must be provided by 30 April of the following year (see "Reporting obligations" at the following web page http://www.wcpfc.int/statprov).

4.1 Annual Catch Estimates

Tables 1 and 2 list the dates on which catch estimates for 2010 and 2011, respectively, were provided, and include notes on the data that have been provided, mainly highlighting gaps or problems in those data.

Annual catch estimates for 2010 have now been provided by all CCMs. Annual catch estimates for 2011 have now been provided by all CCMs. Annual catch estimates for four new fleets (Tuvalu longline, Wallis and Futuna, Vietnam Gillnet and Vietnam purse-seine) were provided for 2011 activities.

For 2010 annual catch estimates, there were 29 out of 32 CCMs (91%) that had provided estimates by the 30 April 2011 deadline last year. For the 2011 annual catch estimates, only three CCMs (Indonesia, Spanish longline and Wallis & Futuna longline) had not provided estimates for their fleets within a week of the deadline, which is in line with the level of timeliness experienced last year.

The quality of estimates provided continues to improve with a reduction in the number of notes assigned to the annual catch estimates for 2011 compared to 2010 estimates. Notes indicating whether annual catch estimates for the key shark species were submitted have been added to Tables 1 and 2.

4.2 Aggregate Catch/Effort data

Tables 3, 4 and 5 list the dates on which aggregated catch and effort data were provided for 2009, 2010 and 2011, respectively, and include notes on the data that have been provided (see Table 6), highlighting gaps or problems in the data provided. The notes in the right-hand column of each table may refer to instances where the data provided do not satisfy criteria specified in the guidelines for the provision of Scientific Data to the WCPFC. Notes indicating whether catches for the key shark species were included in the provision of aggregate catch and effort data have been added to these tables.

Pacific Island countries provide operational catch/effort (logsheet) data [which are aggregated by the OFP] on a regular basis and their provisions of aggregate catch/effort data have therefore been flagged as being provided on the deadline (30 April 2012) since they are available at that time.

The problems in aggregate catch/effort data that have been resolved in the past year include:

- The Chinese longline aggregate data now covers the WCPFC Convention Area for all years;
- The WCPFC received historical aggregate longline data for the Eastern Pacific Ocean from the Inter-American Tropical Tuna Commission (I-ATTC) in June 2012 under the joint WCPFC-IATTC Memorandum of Cooperation for the exchange of data (see http://www.wcpfc.int/node/2684). This provision of data now means the WCPFC hold aggregate longline data for the Pacific Ocean for all of the major fleets up to and including 2010;
- The provision of operational data for the EU Spanish longline fleet means that their catches of tuna, billfish and shark species can be included in the aggregate data.

The notable gaps in the provision of 2009, 2010 and 2011 aggregate data include:

- Incomplete longline data for the latter months of 2011 (the most recent year) for a number of fleets' data meant that certain adjustments had to be made for use in the stock assessments;
- 2011 catches for shark species were provided by Australia, China, Chinese Taipei, Korea, Japan, New Zealand and USA, but the catches of key shark species were not provided by a number of other longline fleets, despite this being a requirement under the Provision of Scientific data to the WCPFC. Catches of shark species for the Pacific Island fleets will be estimated from available

observer data in the future, noting that a number of coastal states are now implementing the new, extended longline logbooks which require foreign and domestic fleets fishing in their waters to report catches of shark to the species level;

- 2011 aggregate catch and effort data for key domestic fleets from the Philippines (purse seine), Indonesian (longline, purse seine and pole-and-line) and Vietnam (longline) were not provided at the time of submitting this paper. However, logsheet data have been collected from these fleets, so aggregated data are expected to be submitted once data processing has been completed and the data provided.

In general, the timeliness of the provision of aggregate catch/effort data continues to improve with nearly all CCMs providing data by the deadline of 30th April 2012. The quality of aggregate data provided continues to improve with a reduction in the number of notes assigned to the aggregate data in recent years.

4.3 Historical operational catch/effort data

Table 7 shows the schedule for the submissions of 2011 operational catch and effort to the WCFPC and Table 8 summarises the authorizations and notifications for the release of historical operational data to the WCPFC. As at July 2012, the status of the provisions of historical operational data to the WCPFC is as follows:

- Authorization for the release to the WCPFC of historical operational catch and effort for their national fleets, held by the SPC-OFP on behalf of their member countries, has been received from **ALL** SPC member countries;
- Operational purse-seine logsheet data have been provided by the Philippines (for 2004 activities) and Japan (for 2001–2004 activities) in relation to CMM 2008-01. For Japan, the provision of these data was in accordance with paragraphs 15 and 16 of CMM 2008-01;
- Operational catch and effort data have been provided for the EU Spanish purse seine fleet for 2010 and 2011, although data for previous years have yet to be submitted;
- Over the past six months, Operational catch and effort data for the EU Spanish longline fleet for the period 2004-2011 have been provided;
- Operational catch and effort data for the US Hawaiian Longline fleet have now been provided for 2007-2010. Data for 2011 and historical operational catch and effort data for the American Samoa longline fleet are expected to be provided in the coming months;
- Operational catch and effort data for the Philippines domestic purse seine fleet covering years since 2005 are expected to be authorized for release to the WCPFC;
- Operational catch and effort data for the Vietnamese domestic longline fleet are expected to be authorized for release to the WCPFC;

Significant progress has been made in the provision of historical operational catch and effort data to the WCPFC over the past three years and it is hoped that the outstanding operational catch and effort data can be provided by relevant CCMs in the near future.

4.4 Regional Observer Programme (ROP) data

The SPC/OFP has been processing observer data on behalf of their member countries for more than 15 years and the Seventh Regular Session of the Commission (6–10 December 2010) approved the continuation of this work in respect of the Regional Observer Programme (ROP) data in the short-medium term (Anon., 2010). Williams and Cole (2012) describes the recent developments, future work and initiatives with respect to ROP data management; this paper also shows the current coverage of available, processed observer data.

Authorisations/notifications to provide ROP data to the Commission have now been received from all major observer service providers (see Table 9). However, there continues to be a backlog in the provision of ROP data to the WCPFC (via SPC/OFP) by some observer service providers. It has become apparent over the past year that one of the reasons ROP data have not been submitted is due to poor quality data supplied by some

first-time observers, which were rejected in the post-trip debriefing process. These data were therefore not sent on to the SPC.

4.5 Transmission of scientific data to the WCPFC Secretariat

The WCPFC scientific data, comprising the historical time series of annual catch estimates, aggregate catch/effort data, size data, and the operational (logsheet) and ROP data (authorized for release) continues to be provided to the WCPFC Secretariat on a regular quarterly basis. Over the past twelve months, the latest versions of each data type have been sent to the WCPFC Secretariat in August 2011, December 2011, March 2012 and April 2012. Since May 2012, the WCPFC Scientific data are updated on a monthly basis and made accessible for download by the WCPFC Secretariat at any time via a secure FTP area.

In addition to the provision of data, the WCPFC Secretariat has been the provided with the following services over the past year:

- Introductory training of the Catch and Effort database Query System (CES) and the Observer Trip Viewer system (systems used to extract summarized tables, graphs and maps of the WCPFC annual catch estimates, aggregate catch/effort and operational data and ROP data) to WCPFC Secretariat staff in October 2011 and March 2012;
- The provision of the CES database system with the WCPFC data updates (in August 2011, December 2011, March 2012 and April 2012);
- The provision of the Observer Trip Viewer system (used to extract summarized tables, graphs and maps of the ROP data which have been authorized for release) with WCPFC ROP data updates (in August 2011, December 2011, March 2012 and April 2012);

5. COVERAGE RATES

Figures 1 and 2 present the coverage rates since 2000 for operational (logsheet) catch and effort data, unloadings data and observer data for the tropical purse seine and longline fisheries, respectively[8]. The coverage rates for operational data refer to the target tuna catches from individual fishing operations reported on logbooks that are held by the OFP. Coverage rates for observer data refer to the catch of target tunas that were reported by observers. Coverage rates for unloadings data refers to the landings of target tuna catch that were monitored and reported.

Figure 3 shows coverage rates for available aggregate and operational catch and effort data by fleet for the longline fishery covering recent years (2000–2011). Figure 4 shows coverage rates for available aggregate and operational catch and effort data by fleet for the purse-seine fishery covering recent years (2000–2011).

Figure 5 shows coverage rates for available size composition data by fleet for the longline fishery covering recent years (2000–2011). Figure 6 shows coverage rates for available size composition data by fleet for the purse-seine fishery covering recent years (2000–2011).

Coverage rates for recent years should increase as additional data are compiled.

[8] Refer to http://www.wcpfc.int/coverage-rates-tuna-fishery-data for an explanation of how coverage is determined.

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TABLES

Table 1. Provision of 2010 annual catches estimates to the WCPFC

COUNTRY / TERRITORY / ENTITY	GEAR(s)	Date submitted	see NOTES
Australia	LL, PS, PL, HL,TR	29 Apr 2011	
Belize	LL	29 Apr 2011	(19)
Canada	TR	16 Mar 2011	(9)
China	LL, PS	29-Apr-2011	(19)
Cook Islands	LL, TR	1 May 2011	(17)
Ecuador	PS	29 Apr 2011	
El Salvador	PS	29 Apr 2011	(4)
Federated States of Micronesia	LL, PS	29 Apr 2011	(17)
Fiji Islands	LL, PL	4 May 2011	(17)
French Polynesia	LL, PL, OT	30 Apr 2011	(17)
Indonesia	LL, PS, OT	22 Apr 2011	(18)
Japan	PS	29 Apr 2011	
	LL, PL, TR, OT	29 Apr 2011 9 Jul 2011	(19)
Kiribati	PS, OT	22 Apr 2011	
Republic of Korea	LL, PS	29 Apr 2011	(18)
Marshall Islands	LL, PS	22 Apr 2011	(17)
New Caledonia	LL	22 Apr 2011	(17)
New Zealand	LL, PS, TR, PL	29 Apr 2011	
Niue	LL	30 Apr 2011	(17)
Palau	LL, PL	30 Apr 2011	(9)
Papua New Guinea	LL, PS	22 Apr 2011	(17)
Philippines	PS, HL, RN, OT	22 Apr 2011	(15)
Samoa	LL	22 Apr 2011	(17)
Senegal	LL	30 Jul 2011	(9)
Solomon Islands	LL, PS, PL	22 Apr 2011	(17)
Spain	LL	29 Apr 2011 9 Jul 2011	(5), (18)
	PS	29 Apr 2011	
Chinese Taipei	LL, PS	29 Apr 2011	
Tokelau	OT	22 Apr 2011	
Tonga	LL	22 Apr 2011	(17)
United States	LL, PS, TR, PL	29 Apr 2011	(19)
Vanuatu	LL, PS	22 Apr 2011	(17)
Vietnam	LL	22 Apr 2011	(15), (18)
	GN, PS		

NOTES

1 Catches were estimated by the OFP while assisting with the preparation of the national fisheries report.
2 Catch estimates were taken from the national fisheries report presented at the meeting of the Scientific Committee.
3 Total annual catches were provided by SPECIES, but not broken down by GEAR.
4 Total annual catches can be determined by aggregating operational data that were provided on this date.
5 Marlin catch estimate not provided to the species level.
6 Coverage of data used to determine estimates not provided
7 Type(s) of data used to determine estimates not provided
8 Methods used to determine estimates not provided
9 Fleet(s) inactive for this calendar year in the WCPFC Convention Area
10 Breakdown of active vessels by GRT size class not provided
11 Swordfish catch estimates only provided
12 National legislation (or policy) requires that time/area strata comprising data for less than three vessels can not be disseminated.
13 Billfish catch estimates not provided for the longline gear
14 Estimates of all main tuna species not provided
15 Provisional estimates provided
16 Estimates exclude archipelagic waters catches
17 Estimates of shark species NOT provided but can potentially be estimated from available observer data
18 Estimates of shark catch by species have NOT been provided
19 Estimates of shark catch provided, but not for all KEY species taken by this fleet

Table 2. Provision of 2011 annual catches estimates to the WCPFC

COUNTRY / TERRITORY / ENTITY	GEAR(s)	Date submitted	see NOTES
Australia	LL, PS, PL, HL,TR	30 Apr 2012	
Belize	LL	2 May 2012	(19)
Canada	TR	29 Apr 2012	
China	LL, PS	30 Apr 2012	(19)
Cook Islands	LL, TR	30 Apr 2012	(17)
Ecuador	PS	9 May 2012	
El Salvador	PS	26 Apr 2012	
Federated States of Micronesia	LL, PS	27 Apr 2012	(17)
Fiji Islands	LL, PL	27 Apr 2012	(17)
French Polynesia	LL, PL, OT	27 Apr 2012	(17)
Indonesia	LL, PS, OT	25 Jul 2012	(18)
Japan	PS	28 Apr 2012	
	LL, PL, TR, OT	28 Apr 2012	(19)
Kiribati	PS, OT	27 Apr 2012	
Republic of Korea	LL, PS	27 Apr 2012	(19)
Marshall Islands	LL, PS	27 Apr 2012	(17)
New Caledonia	LL	25 Apr 2012	(17)
New Zealand	LL, PS, TR, PL	30 Apr 2012	
Niue	LL	30 Apr 2012	(9)
Palau	LL, PL	30 Apr 2012	(9)
Papua New Guinea	LL, PS	13 Apr 2012	(17)
Philippines	PS, HL, RN, OT	30 Apr 2012 18 May 2012	(15)
Samoa	LL	27 Apr 2012	(17)
Senegal	LL	30 Apr 2012	(9)
Solomon Islands	LL	27 Apr 2012	(15)
	PS, PL	27 Apr 2012	(17)
Spain	LL	5 Jul 2012	
	PS	3 May 2012	
Chinese Taipei	LL, PS	30 Apr 2012	
Tokelau	OT	27 Apr 2012	
Tonga	LL	10 Apr 2012	(17)
Tuvalu	LL, PS	27 Apr 2012	(17)
United States	LL, PS, TR, PL	28 Apr 2012	(19)
Vanuatu	LL, PS	27 Apr 2012	(17)
Vietnam	LL	27 Apr 2012	(18)
	GN, PS	27 Apr 2012	
Wallis and Futuna	LL	21 Jun 2012	

NOTES

1 Catches were estimated by the OFP while assisting with the preparation of the national fisheries report.
2 Catch estimates were taken from the national fisheries report presented at the meeting of the Scientific Committee.
3 Total annual catches were provided by SPECIES, but not broken down by GEAR.
4 Total annual catches can be determined by aggregating operational data that were provided on this date.
5 Marlin catch estimate not provided to the species level.
6 Coverage of data used to determine estimates not provided
7 Type(s) of data used to determine estimates not provided
8 Methods used to determine estimates not provided
9 Fleet(s) inactive for this calendar year in the WCPFC Convention Area
10 Breakdown of active vessels by GRT size class not provided
11 Swordfish catch estimates only provided
12 National legislation (or policy) requires that time/area strata comprising data for less than three vessels can not be disseminated.
13 Billfish catch estimates not provided for the longline gear
14 Estimates of all main tuna species not provided
15 Provisional estimates provided
16 Estimates exclude archipelagic waters catches
17 Estimates of shark species NOT provided but can potentially be estimated from available observer data
18 Estimates of shark catch by species have NOT been provided
19 Estimates of shark catch provided, but not for all KEY species taken by this fleet

Table 3. Provision of 2009 Aggregated catch and effort data to the WCPFC

COUNTRY / ENTITY	GEAR TYPE	Date Submitted	see NOTES
Australia	LL, PL, PS, TR	30 Apr 2010	(17), (25)
Belize	LL	16 Mar 2010	
Canada	TR	30 Mar 2010	(21)
China	LL (DWFN)	27 Apr 2010	(12)
	LL (offshore)	27 Apr 2010 12 Jun 2010	(12)
	PS	12 Jun 2010	(6), (8), (9)
Chinese Taipei	LL (DWFN)	28 Apr 2010	(10), (24)
	LL (small)	28 Apr 2010	(13), (23), (24)
	PS	28 Apr 2010	(15)
Cook Islands	LL, TR	30 Apr 2010	(20)
Ecuador	PS		
El Salvador	PS	30 Apr 2010	(17)
Federated States of Micronesia	LL, PS	30 Apr 2010	(20)
Fiji Islands	LL, PL	30 Apr 2010	(20)
French Polynesia	LL	30 Apr 2010	(20)
Indonesia	LL, PS, OT		
Japan	LL	30 Apr 2010	(2), (10), (25)
	PL	30 Apr 2010	
	PS	30 Apr 2010	
Kiribati	PS	30 Apr 2010	(20)
Marshall Islands	LL, PS	30 Apr 2010	(20)
Mexico	PS, PL		
New Caledonia	LL	30 Apr 2010	(20)
New Zealand	LL, PL, HL, PS	30 Apr 2010	(17), (25)
Niue	LL	30 Apr 2010	(20)
Palau	LL, PL	30 Apr 2010	(20)
Panama	PS		
Papua New Guinea	LL, PS	30 Apr 2010	(20)
Philippines	PS	22 May 2010	(13), (17)
	HL, RN, OT		
Republic of Korea	LL	28 Apr 2010	(12), (13),(18)
	PS	28 Apr 2010	(6), (15), (18)
Samoa	LL	30 Apr 2010	(20)
Senegal	LL	30 Jul 2010	(21)
Solomon Islands	LL, PS	30 Apr 2010	(20)
	PL	30 Apr 2010	(20)
Spain	LL	30 Jul 2010	(3), (12)
	PS	30 Apr 2010	
Tonga	LL	30 Apr 2010	(20)
United States	LL (American Samoa)	11 Jun 2010	(11), (25)
	LL (Hawaii)	11 Jun 2010	(11), (25)
	PS (Treaty)	30 Apr 2009	(17)
	TR (North Pacific)	11 Aug 2010	(11)
	TR (South Pacific)	11 Aug 2010	(11)
Vanuatu	LL, PS	30 Apr 2010	(20)
Vietnam	LL, GN, PS		

Refer to Table 6 for notes

Table 4. Provision of 2010 Aggregated catch and effort data to the WCPFC

COUNTRY / ENTITY	GEAR TYPE	Date Submitted	see NOTES
Australia	LL, PL, PS, TR	29 Apr 2011	(17), (25)
Belize	LL	29 Apr 2011	
Canada	TR	16 Mar 2011	(21)
China	LL (DWFN)	29 Apr 2011	(25)
	LL (offshore)	29 Apr 2011	(12)
	PS	29 Apr 2011	(6), (8), (9)
Chinese Taipei	LL (DWFN)	29 Apr 2011	(10), (24), (25)
	LL (small)	29 Apr 2011	(13), (23), (24), (25)
	PS	29 Apr 2011	(15)
Cook Islands	LL, TR	30 Apr 2011	(20)
Ecuador	PS	29 Apr 2011	(5), (6), (9)
El Salvador	PS	29 Apr 2011	(17)
Federated States of Micronesia	LL, PS	30 Apr 2011	(20)
Fiji Islands	LL, PL	30 Apr 2011	
French Polynesia	LL	30 Apr 2011	(20)
Indonesia	LL, PS, OT		
Japan	LL	29 Apr 2011	(2), (10), (25)
	PL	29 Apr 2011	
	PS	29 Apr 2011	
Kiribati	PS	30 Apr 2011	(20)
Marshall Islands	LL, PS	30 Apr 2011	(20)
New Caledonia	LL	29 Apr 2011	(20)
New Zealand	LL, PL, HL, PS	29 Apr 2011	(17), (25)
Niue	LL	30 Apr 2011	(20)
Palau	LL, PL	30 Apr 2011	(20)
Papua New Guinea	LL, PS	30 Apr 2011	(20)
Philippines	PS, HL		
	RN, OT		
Republic of Korea	LL	29 Apr 2011	(12), (13), (27)
	PS	29 Apr 2011	(6), (15)
Samoa	LL	30 Apr 2011	(20)
Senegal	LL	30 Jul 2011	(21)
Solomon Islands	LL, PS	30 Apr 2011	(20)
	PL	30 Apr 2011	(20)
Spain	LL	9 Jul 2011	(3), (12)
	PS	30 Apr 2011	
Tonga	LL	30 Apr 2011	(20)
United States	LL (American Samoa)	30 Apr 2011	(11), (25)
	LL (Hawaii)	30 Apr 2011	(11), (25)
	PS (Treaty)	30 Apr 2011	(17)
	TR (North Pacific)	30 Apr 2011	(11)
	TR (South Pacific)	30 Apr 2011	(11)
Vanuatu	LL, PS	30 Apr 2011	(20)
Vietnam	LL, GN, PS		

Refer to Table 6 for notes

Table 5. Provision of 2011 Aggregated catch and effort data to the WCPFC

COUNTRY / ENTITY	GEAR TYPE	Date Submitted	see NOTES
Australia	LL, PL, PS, TR	30 Apr 2012	(17), (25)
Belize	LL	2 May 2012	
Canada	TR	29 Apr 2012	
China	LL (DWFN)	30 Apr 2012	(12), (25)
	LL (offshore)	30 Apr 2012	(12)
	PS	30 Apr 2012	(6), (8), (9), (15)
Chinese Taipei	LL (DWFN)	30 Apr 2012	(10), (24), (25)
	LL (small)	30 Apr 2012	(13), (23), (24), (25)
	PS	30 Apr 2012	(15)
Cook Islands	LL, TR	30 Apr 2012	(20)
Ecuador	PS	9 May 2012	(17)
El Salvador	PS	26 Apr 2012	(17)
Federated States of Micronesia	LL, PS	30 Apr 2012	(20)
Fiji Islands	LL, PL	30 Apr 2012	(20)
French Polynesia	LL	30 Apr 2012	(20)
Indonesia	LL, PS, OT		
Japan	LL	28 Apr 2012	(2), (10), (25)
	PL	28 Apr 2012	
	PS	28 Apr 2012	
Kiribati	PS	30 Apr 2012	(20)
Marshall Islands	LL, PS	30 Apr 2012	(20)
New Caledonia	LL	25 Apr 2012	(20)
New Zealand	LL, PL, HL, PS	30 Apr 2012	(17), (25)
Niue	LL	30 Apr 2012	(20)
Palau	LL, PL	30 Apr 2012	(21)
Papua New Guinea	LL, PS	30 Apr 2012	(20)
Philippines	PS, HL		
	RN, OT		
Republic of Korea	LL	27 Apr 2012	(25)
	PS	27 Apr 2012	(4), (15)
Samoa	LL	30 Apr 2012	(20)
Senegal	LL	30 Apr 2012	(21)
Solomon Islands	LL	30 Jun 2012	(20)
	PL, PS	30 Apr 2012	(20)
Spain	LL	5 Jul 2012	(3), (12)
	PS	3 May 2012	
Tonga	LL	30 Apr 2012	(20)
Tuvalu	LL, PS	30 Apr 2012	(20)
United States	LL (American Samoa)	28 Apr 2012	(11), (25)
	LL (Hawaii)	28 Apr 2012	(11), (25)
	PS (Treaty)	28 Apr 2012	(17)
	TR (North Pacific)	28 Apr 2012	(11)
	TR (South Pacific)	28 Apr 2012	(11)
Vanuatu	LL, PS	30 Apr 2012	(20)
Vietnam	LL, GN, PS		
Wallis and Futuna	LL		

Refer to Table 6 for notes

Table 6. Notes on the provision of aggregated catch and effort data to the WCPFC

NOTES

1 The catch data are in units of weight (kgs or metric tonnes) only, rather than both numbers of fish and weight.
2 The catch data are in units of numbers of fish only, rather than both numbers of fish and kilograms.
3 The catch data are for swordfish only.
4 The unit of effort is "days on which a set was made", rather than "days fished or searched".
5 The unit of effort is "sets" rather than "days fished or searched".
6 The catch/effort data are not stratified by the required categories of school association
7 The units of effort are unknown, or non-standard
8 No effort data provided
9 The data are aggregated by 5°x5° instead of 1°x1°
10 Unraised data stratified by 5°x5°, month and hooks between floats were also provided
11 National legislation (or policy) requires that time/area strata comprising data for less than three vessels can not be disseminated.
12 The 5°x5°/month Longline catch and effort data are not stratified by "Hooks between Floats"
13 Coverage of data provided is less than 50%
14 No breakdown of Billfish species catch provided
15 The estimation of bigeye in the reported yellowfin-plus-bigeye catch has not been undertaken in these data
16 The spatial aggregation is non-standard (must be 5°x5° for Longline; 1°x1° for surface fisheries)
17 Aggregate data not provided, but have been generated from annual catch estimates and/or operational data submitted to the WCPFC.
18 Data have not been "raised" to represent total catch and effort
19 Species composition of main tuna species catch does correspond to annual catch estimates
20 Aggregate data not provided, but have been generated from annual catch estimates and operational data made available to the SPC by their member countries.
21 This fleet was inactive in the WCPFC Convention Area.
22 Distant-water longline fleet data do not cover the entire Pacific Ocean (required for stock assessments of certain species)
23 Represents a combination of data provided by the flag state (for domestically-based vessels) and coastal states
24 Vessel numbers per Month and Area provided.
25 Catches of shark by species provided
26 Aggregate data provided for the WCPO area (Pacific Ocean west of 150°W) and not the WCPFC Convention Area
27 Catches of shark by species provided, but coverage of these catches is very low

Table 7. Provision of 2011 Operational catch and effort data to the WCPFC

FLAG STATE / ENTITY	GEAR(s)	Date Submitted	see NOTES
Australia	LL, PL, PS, TR	30 Apr 2012	(12)
Belize	LL		
Canada	TR		
China	LL, PS		
Cook Islands	LL, TR	30 Apr 2012	(10)
Ecuador	PS	5 May 2012	
El Salvador	PS	26 Apr 2012	
Federated States of Micronesia	LL, PS	30 Apr 2012	(10)
Fiji Islands	LL, PL	30 Apr 2012	(10)
French Polynesia	LL	30 Apr 2012	(10)
	PL	30 Apr 2012	(10)
	TR	30 Apr 2012	(10)
Indonesia	LL, PS, OT		
Japan	PS		
Japan	LL, PL		
Kiribati	PS	30 Apr 2012	(10)
Republic of Korea	LL, PS		
Marshall Islands	LL, PS	30 Apr 2012	(10)
New Caledonia	LL	30 Apr 2012	(10)
New Zealand	LL, PL, HL, PS	30 Apr 2012	(12)
Niue	LL	30 Apr 2012	(10)
Palau	LL, PL	30 Apr 2012	(10)
Papua New Guinea	LL, PS	30 Apr 2012	(10)
Philippines	PS, HL, RN, OT		
Samoa	LL	30 Apr 2012	(10)
Senegal	LL	30 Apr 2012	(7)
Solomon Islands	LL, PS, PL	30 Jun 2012	(10)
Spain	LL (Source: IEO)	5 Jul 2012	(1), (2), (4), (8), (12)
	PS	30 Apr 2012	
Chinese Taipei	LL, PS		
Tonga	LL	30 Apr 2012	(10)
Tuvalu	LL, PS	30 Apr 2012	(10)
United States	LL		
United States	TR, PL		
United States	PS	30 Apr 2012	(9)
Vanuatu	LL, PS	30 Apr 2012	(10)
Vietnam	LL, PS, GN		
Wallis and Futuna	LL		

NOTES

1 For LONGLINE GEAR - "Branchlines between floats" not provided
2 For LONGLINE GEAR - "Hooks per set" not provided
3 "Activity" not provided
4 "Time of set" not provided
5 For PURSE SEINE GEAR - categories of "School Association" were not provided
6 Coverage of data provided is less than 50%
7 No activity in the WCPFC Convention Area during this year
8 Discard information not included
9 Operational Logsheet data provided by FFA on behalf of their member countries on a regular basis
10 Operational Logsheet data provided to SPC by their member countries on a regular basis
11 Operational Logsheet data provided to SPC by their member countries on a regular basis, but authorisation to pass on to WCPFC yet to be provided.
12 Catches of shark by species have been provided

Table 8. Provision of historical operational catch/effort data to the WCPFC

	Flag State Data (Convention Area)			Coastal State Data (EEZ only)		
ENTITY	GEAR(s)	Date of Notification	Provided by	GEAR(s) / FLEET(s)	Date of Notification	NOTES
Australia	LL, PL, PS, TR	16 Apr 2008	SPC-OFP	ALL	16 Apr 2008	SPC authorised to release
Belize	LL		No	Not Applicable		
Canada	TR		No	Not Applicable		
China	LL, PS		No			
Cook Islands	LL	10 Jun 2009	SPC-OFP			SPC authorised to release
Ecuador	PS	30 Apr 2010	Ecuador	Not Applicable		Provided to WCPFC (for 2010-2011 only)
El Salvador	PS	15 Oct 2007	El Salvador	Not Applicable		Provided to WCPFC
Federated States of Micronesia	LL, PS	13 Jan 2010	SPC-OFP			SPC authorised to release
Fiji Islands	LL, PL	22 Jun 2009	SPC-OFP			SPC authorised to release
French Polynesia	LL, PL, TR	1 Jul 2010	SPC-OFP			SPC authorised to release
Indonesia	LL, PS, OT	*01 May 2009*	Indonesia (Partial)	Not Applicable		Indonesian Data rescue project
Japan	PS	*17 Apr 2009*	Japan **(Partial)**	Not Applicable		(1) [2001-2004 only]
Japan	LL, PL		No	Not Applicable		
Kiribati	PS, LL	11 Oct 2010	SPC-OFP			SPC authorised to release
Republic of Korea	LL, PS		No	Not Applicable		
Marshall Islands	LL, PS	9 Jul 2009	SPC-OFP			SPC authorised to release
Nauru	LL	19 Aug 2009	SPC-OFP	ALL	19 Aug 2009	SPC authorised to release
New Caledonia	LL	2 Aug 2010	SPC-OFP	Not Applicable		SPC authorised to release
New Zealand	LL, PL, HL, PS	20 March 2008	SPC-OFP	ALL	20 March 2008	SPC authorised to release
Niue	LL	3 Sep 2009	SPC-OFP			SPC-OFP
Palau	LL, PL	28 Feb 2011	SPC-OFP			SPC-OFP
Papua New Guinea	LL, PS	10 Dec 2010	SPC-OFP			SPC authorised to release
Philippines	PS	*01 Dec 2008*	Philippines (Partial)	Not Applicable		(1) [2004 only]
	HL, RN, OT		No	Not Applicable		
Samoa	LL	15 Nov 2010	SPC-OFP			
Senegal	LL	21 Nov 2008	Senegal	Not Applicable		Provided to WCPFC (2007-2008)
Solomon Islands	LL, PS, PL	4 Dec 2010	SPC-OFP			SPC authorised to release
Spain	LL	23 March 2012	**EU**	Not Applicable		Provided to WCPFC (2004-2010)
	PS	*7 Jul 2011*	EU **(Partial)**	Not Applicable		Provided to WCPFC (2010-2011 only)
Chinese Taipei	LL, PS		No	Not Applicable		
Tonga	LL	11 Jan 2011	SPC-OFP			SPC authorised to release
Tuvalu	PS	9 Mar 2011	SPC-OFP			SPC authorised to release
United States	LL	27 Aug 2011	NMFS--NOAA (Partial)	Not Applicable		(2) Data provided since enactment of the WCPFC Implementation Act (January 17, 2007)
United States	TR, PL		No	Not Applicable		
United States	PS	30 Apr 2008	FFA / SPC-OFP	Not Applicable		US Multilateral treaty only (since 1988)
Vanuatu	LL, PS	22 Dec 2008	SPC-OFP			SPC authorised to release
Vietnam	LL, PS, GN					

NOTES

1 Flag state data provided in accordance with paragraph 15 and 16 of Conservation and Management Measure for Bigeye and Yellowfin Tuna in the Western and Central Pacific Ocean (CMM 2008-1).

2 Under advice of NOAA General Counsel, NMFS is disclosing to the WCPFC U.S. longline fleet data (Hawaii-based longline fishery) following enactment of the WCPFC Implementation Act (January 17, 2007), consistent with Section 506(d) of the Act and implementing regulations under 50 CFR § 600.220.

Table 9. Status of ROP data provisions to the WCPFC

	ROP Data Provisions			
OBSERVER PROGRAMME	GEAR(s) covered	Date of Notification	Data to be provided by	NOTES
Australia	LL	22 Nov 2010	SPC/OFP	Provided on behalf of Australia; data from 15 Feb 2008 onwards
China	*LL, PS*		—	
Cook Islands	LL	29 Sep 2010	SPC/OFP	Provided on behalf of Cook Islands (MMR)
Federated States of Micronesia	LL, PS	17 Jun 2010	SPC/OFP	Provided on behalf of FSM (NORMA)
Fiji Islands	LL	30 Nov 2010	SPC/OFP	Provided on behalf of Fiji Fisheries
French Polynesia	LL	30 Nov 2010	SPC/OFP	Provided on behalf of French Polynesia
FSM Arrangement (FFA)	PS	May 2011	FFA (SPC)	Provided on behalf of PNA
Indonesia	*LL, PS*		—	
Japan	*PS, LL, PL*		—	
Kiribati	PS, LL	11 Oct 2010	SPC/OFP	Provided on behalf of Kiribati Fisheries
Republic of Korea	*LL, PS*		—	
Marshall Islands	LL, PS	24 Nov 2010	SPC/OFP	Provided on behalf of Rep. Of Marshall Islands
Nauru	LL, PS	7 Jul 2010	SPC/OFP	Provided on behalf of Nauru Fisheries
New Caledonia	LL	12 Jan 2011	SPC/OFP	Provided on behalf of New Caledonia
New Zealand	LL	*1 Jan 2009*	MAF/NZ	Provided with annual data submission
Niue	LL	3 Mar 2011	SPC/OFP	Provided on behalf of New Caledonia
Palau	LL, PS	8 Mar 2011	SPC/OFP	Provided on behalf of Palau
Papua New Guinea	LL, PS	2 Jun 2010	SPC/OFP	Provided on behalf of PNG/NFA
Philippines	PS	30 May 2011	BFAR, Philippines	Processed data for 2010 observer trips provided to SPC. Data represent non-ROP trips.
Samoa	LL		—	No observer data collected as yet.
Solomon Islands	LL, PS, PL	24 Sep 2010	SPC/OFP	Provided on behalf of Solomon Is. Fisheries
Chinese Taipei	*LL, PS*	*11 July 2011*	Fisheries Agency, Council of Agriculture	Data for one longline ROP-defined trip provided
Tonga	LL	12 Jan 2011	SPC/OFP	Provided on behalf of Tonga Fisheries
Tuvalu	PS	9 Mar 2011	SPC/OFP	Provided on behalf of Tuvalu Fisheries
United States	LL	*1 Sep 2010*	NMFS	ROP trip data provided to WCPFC
US Multilateral Treaty (FFA)	PS	May 2011	FFA (SPC)	Provided on behalf of Parties to US MLT
Vanuatu	LL, PS	30 Nov 2010	—	Provided on behalf of Vanuatu Fisheries
Vietnam	LL, PS, GN	*10 June 2011*	DECAFIREP, Ministry of Fisheries	Hard-copy data for 6 trips sent to SPC for processing. Data represent non-ROP trips.

NOTES

1 Table assumes that observer trips collecting ROP-defined data conducted by China, Indonesia, Japan, Korea, Philippines and Chinese Taipei are to be included.

FIGURES

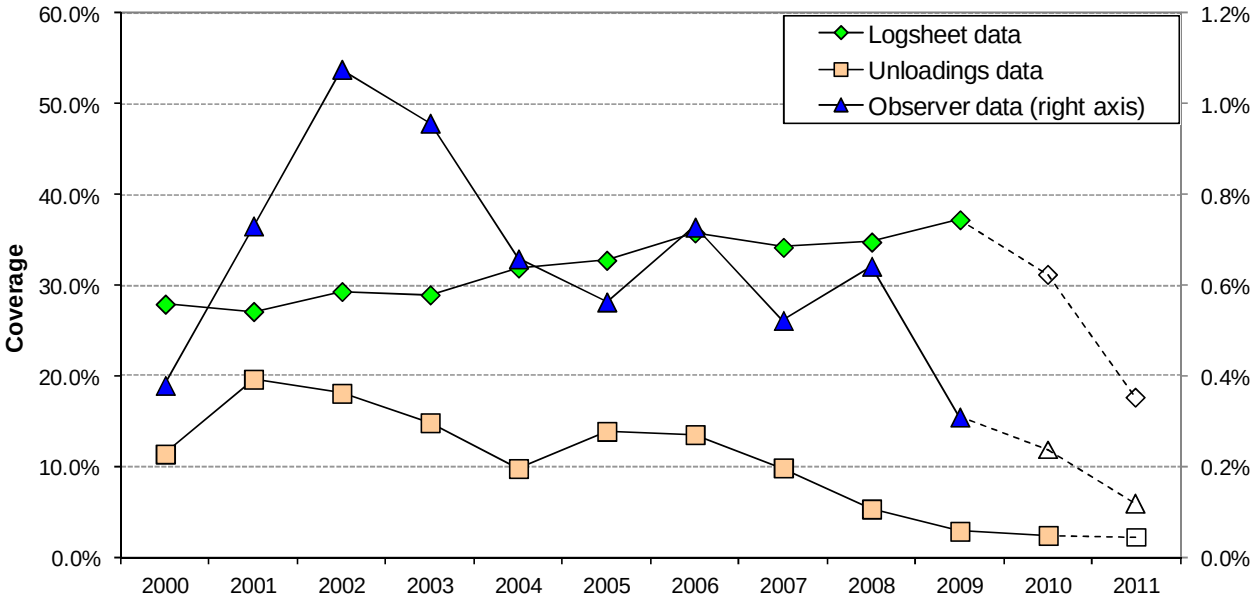

Figure 1. Annual trends in the coverage of WCPO LONGLINE data
Data held by SPC/OFP, some of which are provided to the WCFPC; 2010 and 2011 data are provisional

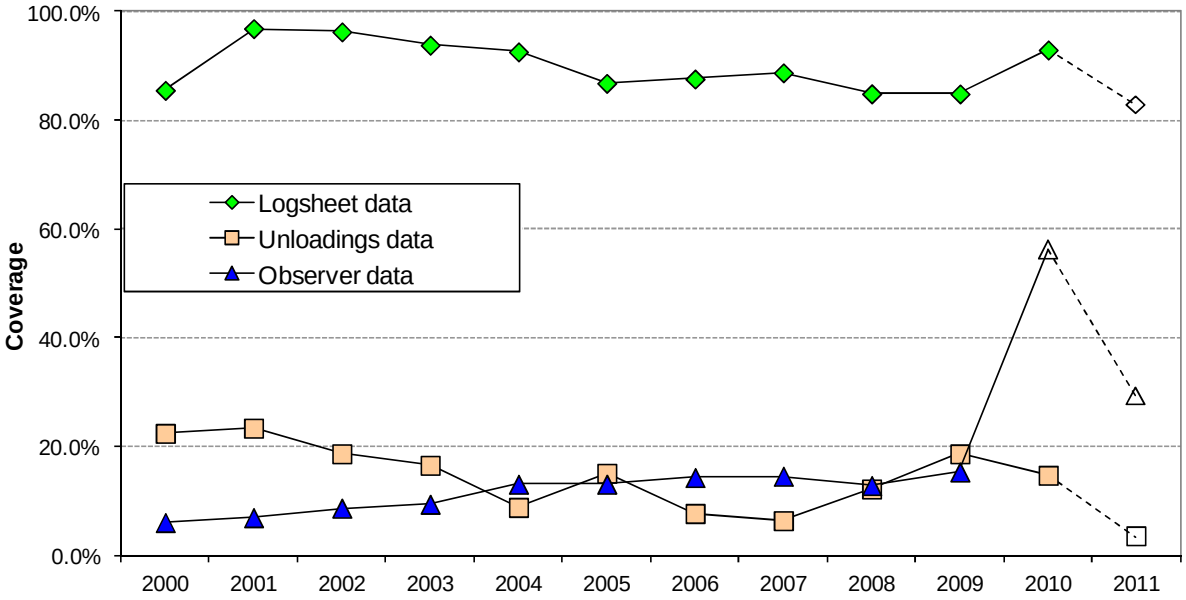

Figure 2. Annual trends in the coverage of tropical WCPO PURSE SEINE
Purse seine tropical fishery: 20°N-20°S, excludes the domestic fisheries of Indonesia and Philippines
Data held by SPC/OFP, some of which are provided to the WCFPC; 2010 and 2011 data are provisional

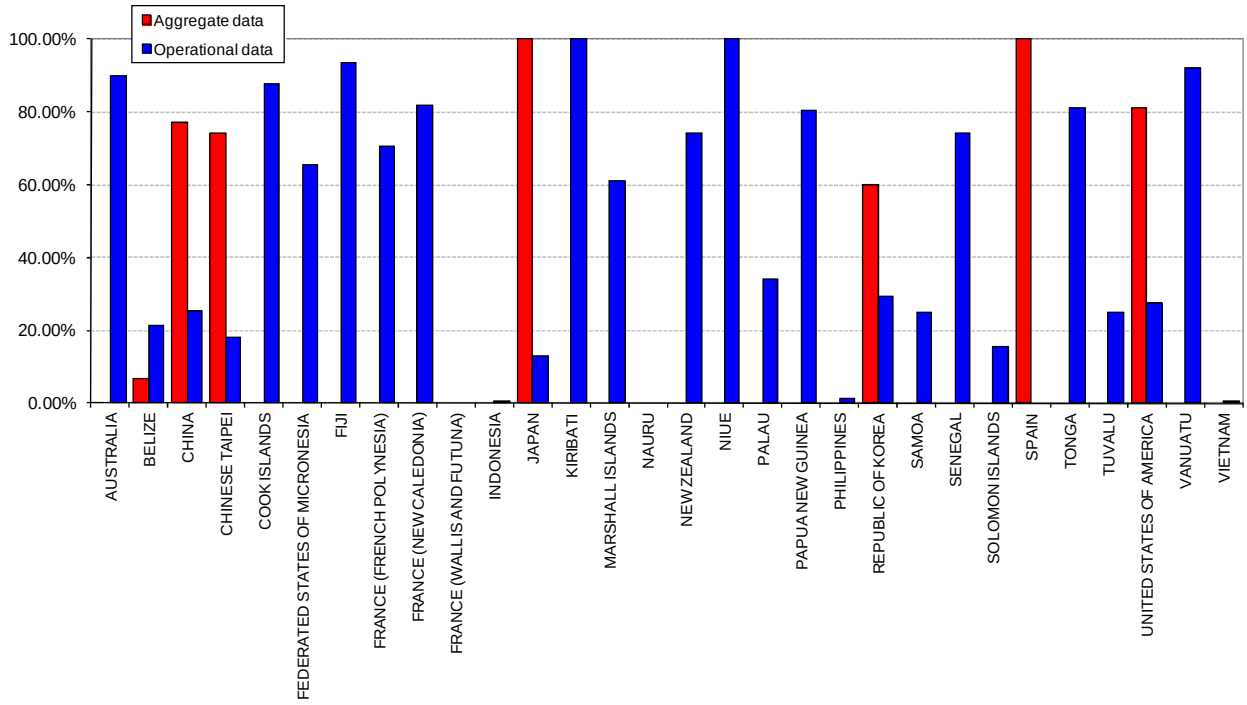

Figure 3. Coverage of (i) aggregate and (ii) operational catch/effort data by fleet from the LONGLINE FISHERY

Aggregate data provided to the WCPFC;
Operational data held by SPC/OFP, some of which are provided to the WCFPC; covers 2000–2011

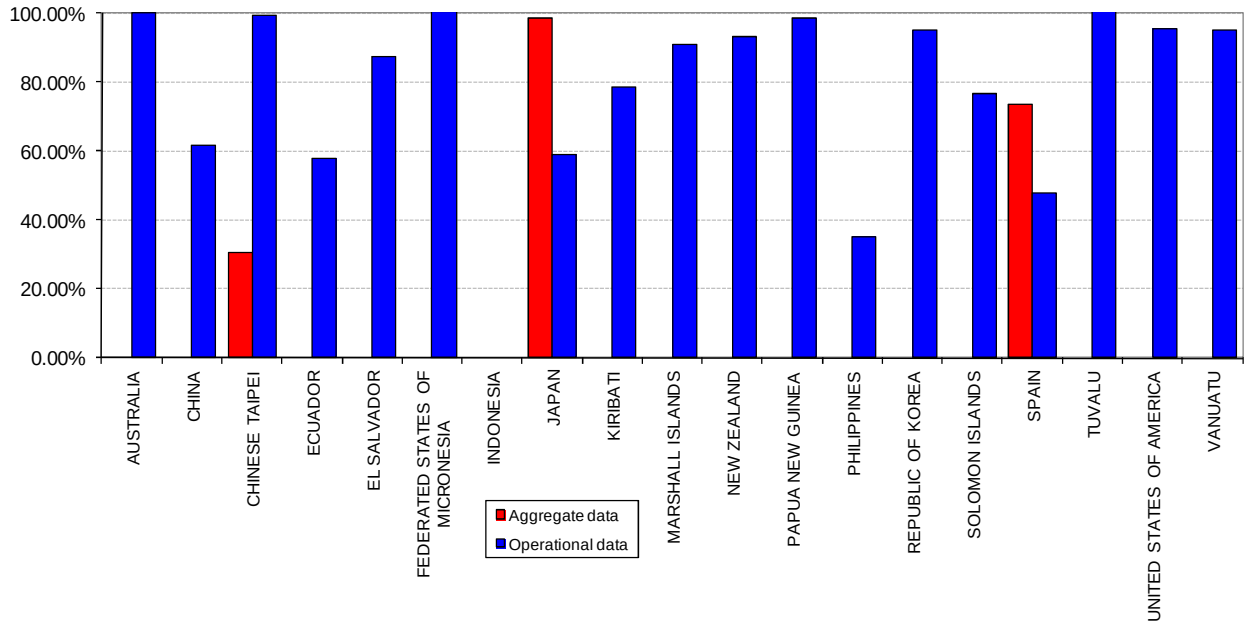

Figure 4. Coverage of (i) aggregate and (ii) operational catch/effort data by fleet from the PURSE-SEINE FISHERY

Aggregate data provided to the WCPFC;
operational data held by SPC/OFP, some of which are provided to the WCFPC; covers 2000–2011

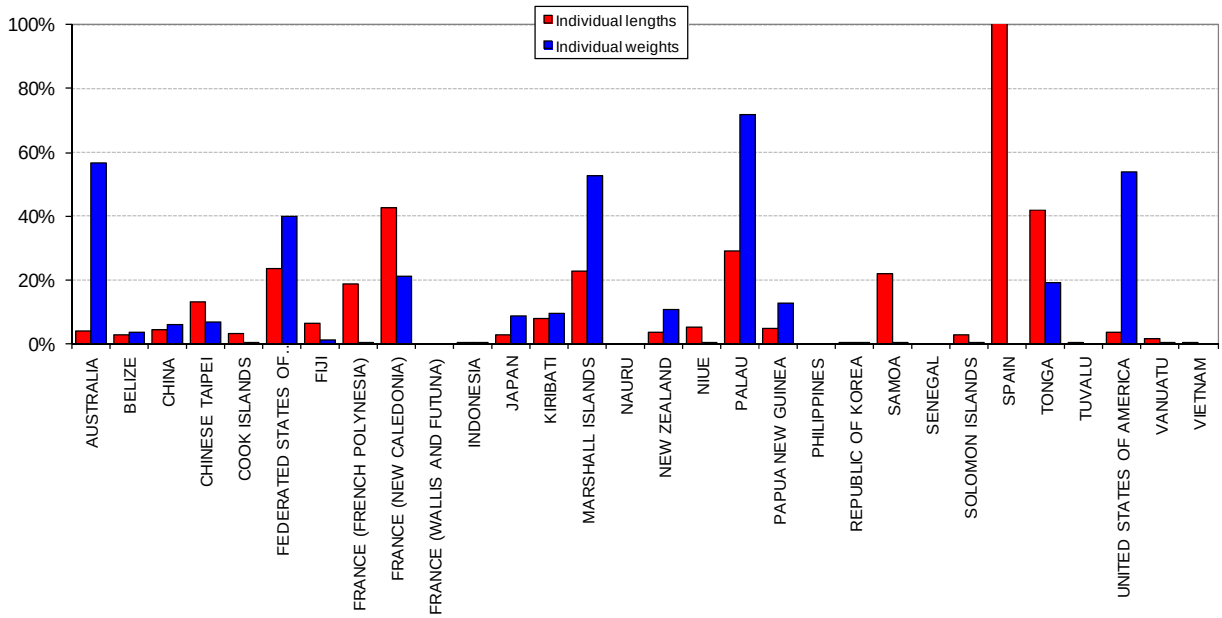

Figure 5. Coverage of size composition data by fleet from the LONGLINE FISHERY
Data provided to the WCPFC; covers 2000–2011

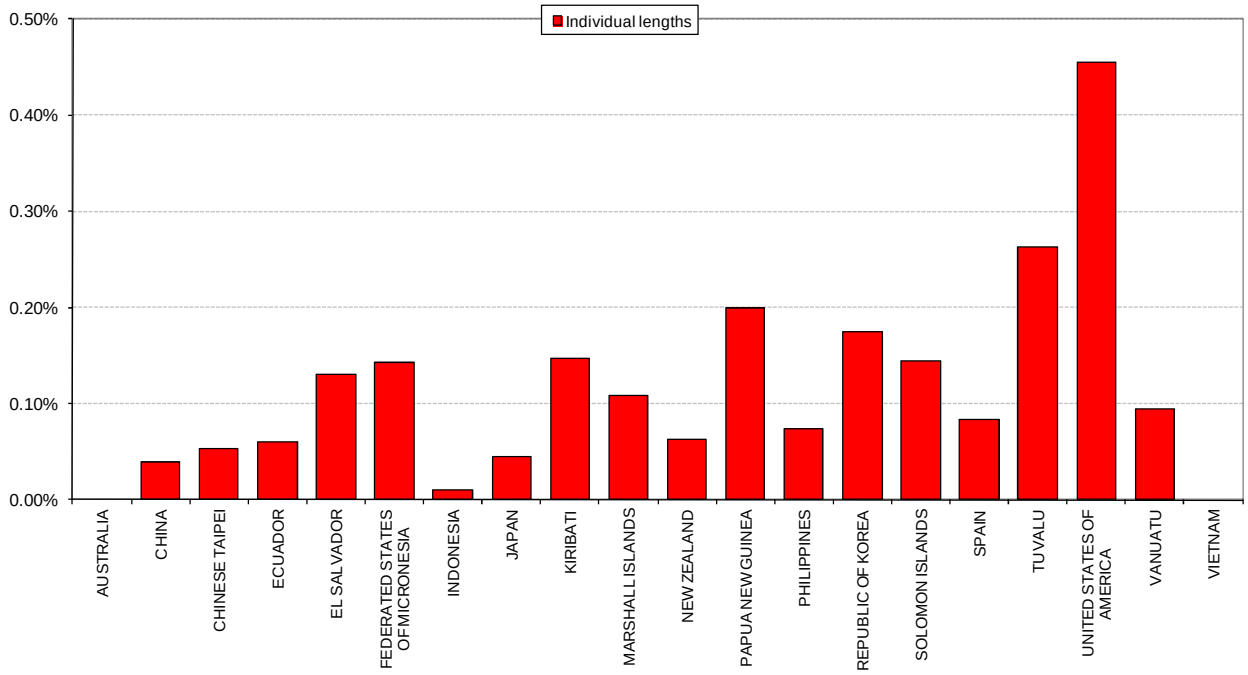

Figure 6. Coverage of size composition data by fleet from the PURSE-SEINE FISHERY
Data provided to the WCPFC; covers 2000–2011