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SCIENTIFIC DATA AVAILABLE TO THE WESTERN AND CENTRAL PACIFIC FISHERIES COMMISSION

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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. 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 the 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 has recently been made available on the WCPFC web site (http://www.wcpfc.int/wcpfc-data-catalogue). 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 is currently a work-in-progress and will continue to be enhanced in the coming years. 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/Html/Statistics/Coverage/index.asp. 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. RECENT DEVELOPMENTS IN RESOLVING 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) and SC6 (Williams, 2010). The following sub-sections summarise some of the major recent developments concerning the data gaps.

2.1 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 are amongst the most significant gaps in the provision of data to the WCPFC. 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 will support 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 third and fourth Philippines Annual Catch Estimates Review Workshops (Anon, 2010c, Anon, 2011c) were convened and attended by important stakeholders with knowledge and information on the tuna fisheries in the Philippines (government, industry and NGOs). The outcome of these workshops 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. The various types of data now collected from the domestic purse seine fishery (logsheets, port sampling, cannery receipts and observer data) provide a very good basis for determining annual catch estimates for this gear type. However, estimates for the significant small-scale artisanal fisheries continue to be a source of concern and will be a challenge for the future work of these meetings.
- The second review of the species composition and size data collected under the National Stock Assessment Project (NSAP) was conducted in a workshop held in Manila in May 2011 (Anon, 2011b). These data provide fundamental information for tuna stock assessments and for the annual catch estimation process, and the workshop identified potential problems in the data collected in the past 2 years (e.g. handline size data from General Santos City in 2010) and areas where better information could be provided in the future.
- The collection of operational logsheet data from the domestic purse seine fishery continues to improve. The data collected and processed for 2008 and 2009 represents 70–80% coverage of activities. Availability of processed logsheet data for 2010 is currently low but is expected to be at least as high as the coverage for 2008 and 2009 in due course, with strong compliance now in force with reporting in line with EU catch documentation requirements.
- The Philippines national observer programme conducted more than 90 trips during 2010 (of which data for 69 trips have already been analysed by BFAR – see Ramiscal et al, 2011). 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.

2.2 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. 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 Indonesian (WCPFC Area) Annual Catch Estimates Review Workshop was held in Jakarta during April 2011 (see Anon, 2011a). The workshop was attended by staff from the

[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

Directorate General of Capture Fisheries (DGCF), the Research Centre for Fishery Management and Conservation of Fishery Resources (RCCF) and other important stakeholders. The outcome of this workshop was (i) the review of Indonesian catch estimates by gear and species produced in the first workshop (2000-2009) and (ii) the production of annual catch estimates by gear and species for 2010. While significant progress has been made to produce estimates by gear and species, the estimates current exclude catches from archipelagic waters, which remain an important data gap. The workshop noted that more work is required, but acknowledged that this process is very important and is now established as an annual event which should ultimately result in reliable catch estimates from the Indonesian tuna fisheries in the future.

- The implementation of the national logbook system in Indonesia continues to expand with several completed logbooks for all tuna fisheries (longline, purse seine and pole-and-line) received in 2011, although coverage remains very low. A trial of logbook data entry using the SPC/OFP-developed TUFMAN system was undertaken in April 2011 and it was evident that further work is required to improve the quality of the data provided through planned "socialization" visits to provinces to explain to the industry how the data should be recorded. There will be an attempt to compile the available logbook data for the 2012 annual catch estimates review workshop, but it was acknowledged that improving the quality and coverage of data will be challenging and expected to be long-term objectives.
- The first WPEA/Indonesia port sampling data review workshop was conducted in Bitung, North Sulawesi during November 2010 (see Anon, 2010d). This workshop was convened to review the data collection by new enumerators based in Bitung and Kendari ports during 2010. The workshop noted that significant progress had been made in collecting and processing size data, which were subsequently made available to the WCPFC. A feature of the work undertaken by RCCF in the past year has been the development of a database system to process and report on the landings and size data collected by enumerators. Future work in this area will include consideration for expanding port sampling to other key landing sites in Indonesia (Pacific-side) and a plan to use the Bitung enumerators to conduct trial observer trips in 2012.

2.3 Vietnamese tuna fishery data

The lack of annual catch estimates and other data for stock assessments for the Vietnamese domestic fisheries is acknowledged to be an important gap in the provision of data to the WCPFC. During the past year the WCPFC Secretariat and the SPC/OFP commenced working with their Vietnamese counterparts to improve the data available from these fisheries. Significant developments in the past year, include:

- The second Vietnam Tuna Data Collection workshop (Anon, 2010b) was convened and attended by important stakeholders with knowledge and information on the tuna fisheries in Vietnam in November 2010. The workshop reviewed the longline data (logsheets and port sampling data) that had been collected to date and provided recommendations for improving data collection. The workshop also reviewed potential protocols for data collection in the purse seine and gillnet fisheries and a plan for conducting observer trips on longline vessels in 2012 as a WPEA project activity.
- The SPC Database Analyst/Developer visited Vietnam in February 2011 to install the TUFMAN database system and provide training in using the system. The processed data (logsheets and port sampling data for 2010) have since been provided to SPC/OFP and will be potentially available for stock assessments in the future.
- The hard-copy data for six observer trips on Vietnamese longline vessels were provided to SPC/OFP in June 2011. These data were not recorded on the Regional SPC/FFA standardized observer data collection forms, but the essential data fields have been recorded, so these data will be processed and will be potentially available for stock assessments in the future.

2.4 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 in this document), 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.

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 and 2010 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.
- Spain has yet to provide information on the number of vessels per stratum with their aggregate longline data, but the expected provision of their operational logsheet data will resolve this issue.

At this stage, there is insufficient information provided to change the current method of compiling the WCPFC public domain data[4] (see http://www.wcpfc.int/science-and-scientific-data-functions/public-domain-data).

2.5 Collection of observersSpill sampling data

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. In the past year, paired sampling was undertaken during six trips; data have been processed for two of those trips. 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).

[4] 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

3. STATUS OF DATA GAPS

The following sections describe the most important 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.

3.1 The main data gaps related to Stock assessment of target tunas

The following are considered the main data gaps in the historical aggregated catch and effort, and size composition data, used in stock assessments for the target tuna species:

3.1.1 Important data gaps from key fleets

Chinese-Taipei domestic (based in Chinese Taipei) offshore (STLL) longline fleet

- There are no operational (logsheet), aggregated catch and effort, nor size data available for years prior to 2004.

Chinese distant-water and offshore longline fleet

- There are several issues related to the provision of annual catch estimates and aggregate catch and effort data by China that are described in Williams (2011a). These issues include:
    - The catch of 4,133 t. of bigeye tuna taken by Chinese longline vessels in 2009 in the waters of Kiribati does not appear to be accounted for since (i) China notified the WCPFC Secretariat that this catch was not included in their annual catch estimates for 2009, and (ii) Kiribati (as coastal state for which China indicated the catch should be attributed to) has also not included this catch in their fleet's estimates;
    - The provision of annual catch estimates and aggregate data for years 2004–2008 and 2010 cover the WCPO area (the Pacific Ocean west of 150°W) and not the WCPFC Statistical area, as per the requirements for scientific data provision to the WCPFC.

Indonesian tuna fisheries

- 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, aggregated catch and effort, and size composition data.
- The most recent catch estimates for 2000-2010 have been provided for the Indonesian fisheries by gear and species, but exclude archipelagic waters catches. The requirements for submission of scientific data to the WCPFC stipulates that annual catch estimates should cover the WCPFC Convention Statistical Area, which includes the archipelagic waters of Indonesia north of 8°S.
- 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.

Some of the data gaps listed in previous years have been resolved to some extent over the past 2-3 years through the work of the following initiatives:

(i) the annual Indonesian/WCPFC Tuna Data Collection Review Workshops conducted from 2007–2010, reported in previous versions of this paper;
(ii) the establishment of a national logbook data collection system;
(iii) the establishment of port sampling in key ports;
(iv) the Indonesian Data Rescue Project (2009), reported in last year's paper;
(v) the Indonesian/WCPFC Annual Catch Estimates Workshops conducted in 2010 and 2011.

The most important data gaps remain:

(i) the exclusion of archipelagic waters catch in the annual catch estimates for 2000-2010;
(ii) an adequate review of annual catch estimates prior to 2000.

Japanese coastal fleets

- There are no operational or aggregated catch and effort data, nor size composition data, available.

Japanese pole-and-line fleet

- There are no operational or aggregated catch and effort data, nor size composition data, available for the period prior to 1972.

Philippines tuna fisheries

- 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.
- For the period from 1970 to 2007, significant 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. The catches of 'unclassified' gear types have been mostly allocated to the municipal 'hook-and-line' fishery, but catches in some regions appear to be unrealistically high for yellowfin and bigeye tuna.

Some of the data gaps listed in previous years have been resolved to some extent over the past 2-3 years through the work of the following initiatives:

(i) the Annual Catch Estimates Review Workshops conducted in 2008, 2010 and 2011 have helped resolve the issues related to the large "unclassified" gear catches and led to more reliable bigeye tuna catch estimates;
(ii) the establishment of purse-seine logsheet data collection since 2008;
(iii) the ongoing work of the NSAP in providing important size and species composition data;
(iv) the establishment of data collection from other sources (e.g. cannery receipts, observers, VMS) which has contributed to the catch estimation process.

The most important data gap is understood to be the reliability of catch estimates for the complex small-scale hook-and-line fishery in the Philippines which is currently estimated to take about 70,000 t of juvenile skipjack, yellowfin and bigeye tuna.

Vietnamese tuna fisheries

- 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).

Some of the data gaps have been resolved in the past year with an expectation of further improvements in the coming years under the WPEA OFM project. Significant milestones in the past year include:

(i) for the first time, the provision of an official estimate for the longline fishery for 2010;
(ii) the establishment of a national logbook data collection system for the longline fishery;
(iii) the establishment of port sampling in the longline fishery.

The most important data gaps remain:

(i) the reconstruction of historical annual catch estimates for each of the domestic Vietnamese fisheries;

(ii) the establishment of logbook and port sampling data collection for the purse seine and gillnet fisheries;

(iii) review of observer data collection to ensure it is in line with observer data collected elsewhere.

3.1.2 Historical coverage rates

- 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.

3.1.3 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 earlier this year of a WCPFC Conservation Management Measure (CMM) on chartering, 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.

A number of coastal states have provided notifications over the past three years that locally-based foreign fleets should be considered as charter vessels and the data assigned to the coastal state. However, several issues remain to be resolved before the data can be re-assigned (from flag-state to coastal-state), in particular, confirmation from the "flag" state that they have removed the data corresponding to the chartered vessels from their aggregate data to ensure "double-counting" does not occur.

The latest example of this issue relates to the notification by the Solomon Islands to the WCFPC Secretariat (detailed in WCPFC Circular 2010/20) that a number of foreign-flagged vessels licensed to fish in the Solomon Islands waters should be considered as chartered to the Solomon Islands. In June 2011, the latest list of foreign-flagged longline vessels that should be considered as chartered to the Solomon Islands during 2010 was provided to the WCPFC data manager.

The WCFPC data manager then contacted the relevant flag state CCMs (Chinese Taipei, Korea and China) on the 1 July 2011:

> *"We have recently received annual catch estimates and operational catch/effort logsheet data on behalf of the WCPFC from the Solomon Islands which contain catch by <your> Longline vessels licensed to fish under a charter arrangement to the Solomon Island, and the catch by these vessels in 2010 has been attributed to the Solomon Islands according to their instructions. The attribution of the catch from these vessels to the coastal state (i.e. Solomon Islands) in 2010*

is consistent with the information provided in the WCPFC Circular 2010-20 on Charter Notifications, which was sent out to CCMs on 20th September 2010.

In order to avoid double-counting with the annual catch estimates of the Solomon Islands chartered longline fleet, could you please advise whether the catches of <your> Longline vessels listed in the attached file have been included in your annual catch estimates for <your> Longline fleet for 2010"

Initial responses were received from Chinese Taipei and Korea, but confirmation on whether double-counting is occurring, or not, is yet to be received from any of these CCMs. Responses are urgently requested from these CCMs since the catch of 170 vessels is substantial and would therefore represent a significant difference to the actual catch level, if double-counting is occurring.

3.1.4 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 two years (see Section 4.3 below and Tables 7 and 8). There are now only four CCMs with active fleets operating in the WCPFC area which have yet to notify of their intent to provide operational catch/effort data to the WCPFC.

3.1.5 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.

  The requirements for the provision of scientific data to the WCPFC cater for the voluntary submission of data covering the Pacific Ocean:

  > *"Catch and effort data aggregated by periods of month and areas of 5° longitude and 5° latitude that have been raised to represent the total catch and effort, and unraised longline catch and effort data stratified by the number of hooks between floats and the finest possible resolution of time period and geographic area, covering distant-water longliners may also be provided for the Pacific Ocean east of the eastern boundary of the WCPFC Statistical Area"*

  Previous SC meetings considered that this issue could also be resolved through the data exchange MOU with IATTC whereby WCPFC could obtain the balance of the Pacific Ocean data (i.e. EPO data) from IATTC and combine it with the WCPFC data to cover the Pacific Ocean. WCPFC6 (December

[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.

2009) approved the data exchange arrangement with IATTC which was signed as a Memorandum of Understanding (MOU) at WCPFC7 (see http://www.wcpfc.int/node/2684).

- 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 2010 aggregate longline data provided for the distant-water longline fleets of Japan, Korea and Chinese Taipei are lacking data for the latter months of 2010, which has ramifications for the stock assessment projections (see Harley et al., 2011).

- 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 are in units of "kilograms" only, and the stock assessments require the catch to be in "numbers of fish" by species.

This problem has been rectified in the data provided for recent years (2008–2010), but is still a problem with the Chinese longline data provided for 2003–2007.

3.1.6 Species composition data for purse seiners

- Species composition data collected by observers and port samplers are needed to improve estimates of the catches of yellowfin and bigeye for purse-seine fleets, other than vessels fishing under the United States Treaty, the FSM Arrangement and the domestic PNG fleet.

This problem is being addressed through (i) the establishment of 100% observer coverage since January 2010, (ii) the WCPFC project on spill sampling, and (iii) initiatives related to the collection of landings data and cannery receipts.

3.1.7 Size composition data for longliners

- Size composition data are not available for the Vanuatu fleet targeting bigeye and yellowfin in the eastern tropical areas of the WCPFC Statistical Area;
- Swordfish weight frequency data for Australia longline fishery are apparently available and would be a useful addition to the WCPFC size data holdings for the proposed swordfish stock assessment;
- Size composition data provided for albacore tuna taken by Chinese Taipei longline fleets are stratified at 2cm size intervals but are required at 1cm intervals to be consistent with data used in the stock assessments provided for other fleets.

This year, for the first time, China provided size data for albacore, bigeye and yellowfin tuna covering their longline fleet. These size data were stratified by year, month, 5°x5° cells and 2cm interval. Further clarification on the source of data is required – for example, has length been estimated from weight and have these samples been taken from distant-water and offshore vessels (since size data from the offshore vessels are also collected by port sampling and observer programmes in Pacific Island countries).

3.2 The main data gaps related to 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.

Annual catch estimates and aggregated catch data by shark species were provided by a number of CCMs this year and a summary is described in Sections 4.1 and 4.2, and accompanying tables. The main shark species data provisions in the past year include:

- *Aggregated catches for Blue shark, Mako shark and Porbeagle shark for the Japanese longline fleet for the years 1994-2009;*
- *Operational logsheet catches of all key shark species taken by the Australian longline fleet, now covering years 1991–2010;*
- *Operational logsheet catches of all key shark species taken by the New Zealand longline fleet, now covering years 1989–2010;*
- *Aggregated catches for all key shark species taken by the Chinese Taipei longline fleet for the years 2008-2010.*

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.

3.3 The main data gaps 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.

3.4 Hidden changes in fisheries operations and data collection

Sections 1 and 4 of the *Scientific data to be provided to the Commission* require CCMs to provide information on the way the aggregated fisheries data were produced, for example:

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, and similar text covers the production of the aggregate catch/effort data, 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. For this reason, addition of the following text under Section 5 of the *Scientific data to be provided to the Commission* is recommended:

The statistical and sampling methods that are used to derive the size composition data shall be reported to the Commission. (Should also state which details of the methods are needed).

However, there are other areas that have potential ramifications to stock assessments. These areas appear to be covered in two broad categories:

(i) **Hidden changes in fisheries operations** represent changes in the way fishing takes place that are not captured in the available data. An example is where there has been a change in the gear used that potentially results in improved catches, or changes in the sizes of fish caught, but the gear attributes have not been recorded, documented or accounted for. Another example is when aggregate data may not have the resolution to indicate discrete differences in catch that the operational-level data provide.

(ii) **Hidden changes in data collection** represent instances when subtle changes occur in the way data are collected that are not provided in the metadata. For example, if a loining plant (where sampling is conducted) changes the minimum size of the fish to receive and process, this will have important ramifications to the stock assessments, if this information is not known.

In order to avoid any biases in the data available for stock assessments, any potential impacts likely to be covered by these two categories should be investigated and then reported by CCMs when they submit their annual data provisions. The Commission may consider the addition of appropriate text to the *Scientific data to be provided to the Commission* to cover these instances.

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 2009 and 2010, respectively, were provided, and include notes on the data that have been provided, highlighting gaps or problems in those data.

Annual catch estimates for 2009 have been provided by all CCMs, except two countries (Mexico and Panama). Annual catch estimates for 2010 have been provided by all but two CCMs (after excluding Mexico, DPRK and Panama) – Vietnam has yet to provide estimates for their purse seine and gillnet fleets and Senegal has yet to confirm whether or not their fleet was active in the Convention Area for 2010.

For 2009 annual catch estimates, there were 26 out of 32 CCMs (81%) that had provided estimates by the 30 April 2010 deadline. For 2010 annual catch estimates, excluding Senegal fleet which may not have been active during 2010 and the Vietnam purse seine and gillnet fleets, all CCMs (100%) had provided estimates within a week of the deadline, which indicates a clear improvement in the timeliness of the provision of estimates.

The quality of estimates provided continues to improve with a reduction in the number of notes assigned to the annual catch estimates for 2010 compared to 2009 estimates. Notes indicating whether annual catch estimates for the key shark species were submitted, have been added to the table describing the provision of 2010 annual catch estimates (see Table 2).

Work in the coming year will include:

- Reconciliation of the historical annual number of vessels by size category with each CCM;
- Requests for provisions of historical estimates of shark species from relevant CCMs;
- Reconciliation of North Pacific species annual catch estimates with ISC data.

4.2 Aggregate Catch/Effort data

Tables 3, 4 and 5 list the dates on which aggregated catch and effort data were provided for 2008, 2009 and 2010, 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 2011) since they are available at that time.

The notable gaps in the provision of 2008, 2009 and 2010 aggregate data include:

- The China longline aggregate data for 2008 and 2010 only cover the WCPO area (the Pacific Ocean west of 150°W) instead of the WCPFC Convention Area (see also Williams, 2011a);
- Incomplete longline data for the latter months of 2010 (the most recent year) for a number of fleets' data meant that certain adjustments had to be made for use in the stock assessments;
- 2010 catches of key shark species were not provided for a number of 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 probably be estimated from available observer data in the future. 2010 catches for shark species were provided by Australia, China, Chinese Taipei, Japan, New Zealand and USA. Korea provided shark catches for only three months in 2010 and coverage appears to be very low at this stage;
- 2010 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;
- The lack of tuna-species catches from the Spanish longline fleet aggregate catch data.

In general, the timeliness of the provision of aggregate catch/effort data continues to improve with the nearly all CCMs providing data by the deadline of 30th April 2011. 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.

4.3 Historical operational catch/effort data

The WCPFC Executive Director sent out a circular on data-related issues to Commission members, cooperating non-members and Participating Territories on March 14, 2008. Concerning the provision of historical data to the WCPFC, the circular requested that -

- *"…in regard to **operational catch and effort data**, please advise me if operational catch and effort data provided to the OFP prior to December 2005 should be considered as also having been provided to the Commission. Unless such authorization is given to me, these data will **not** be considered as having also been provided to the Commission."*

Table 7 shows the schedule for the submissions of 2010 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 2011, 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, 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 data for previous years are being compiled and will be submitted in the coming months;
- In 2010, the United States National Marine Fisheries Service (NMFS) promulgated a regulation under the US WCPFC Implementation Act authorizing NMFS to disclose confidential information to the Commission collected on or after January 12, 2007, the date the WCPFC Implementing Act was enacted. This action now clears the way for the provision of operational catch and effort data for the US LL fleet to the WCPFC;
- Operational catch and effort data for the EU Spanish longline fleet are being compiled and will be submitted 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 two 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., 2010a). Williams (2011b) describes the recent developments and future work and initiatives with respect to ROP data management; this paper also shows the current coverage of available, processed observer data.

As reported in last year's paper, the provisions of ROP data to the WCPFC (via SPC/OFP) continue to be hampered by delays due to the following reasons:

- The overwhelming stress on the resources of national and regional observer programmes as a result of the CMM 2008-01 requirement for 100% coverage in the purse-seine fishery has meant that countries have been severely delayed in sending their data to SPC for processing;
- Delays in the recruitment of data entry staff and supervisors dedicated to ROP data management.

However, there has been a notable improvement in the provision of observer data in recent months and SPC/OFP will continue to work with the respective Pacific Island national observer programmes to resolve any problems with the provision and processing of observer data.

There has been a significant improvement in the authorisations and notifications to provide ROP data to the Commission in the past year (see Table 9). The most notable developments in the past year have been:

- The authorization for SPC/OFP to release all ROP data to the WCPFC has now been provided by all Pacific Island countries (that hold ROP data);
- The authorization for the release of FSM Arrangement and US Multilateral treaty purse seine observer data, defined as ROP data, to the WCPFC;
- The provision of ROP trip data for a Chinese Taipei longline vessel fishing in 2009/2010;
- The provision of ROP trip data for US longline vessel fishing in 2010;
- The provision of observer data to the SPC/OFP for 30+ trips conducted on Philippines purse seine vessels operating in Philippine waters (non-ROP trips) in 2010;
- The provision of observer data to the SPC/OFP for 6 trips conducted on Vietnamese longline vessels operating in Vietnam waters (non-ROP trips);

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 2010, December 2010, March 2011, April 2011 and June 2011.

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

- During two visits to the WCPFC Secretariat offices in March 2011 and June 2011, WCPFC staff were trained in using 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);
- The provision of the CES database system with the WCPFC data updates (in August 2010, December 2010, March 2011, April 2011 and June 2011);
- 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 2010, December 2010, March 2011, April 2011 and June 2011);

5. COVERAGE RATES

Figure 1 presents coverage rates since 1970 for operational (logsheet) catch and effort data, port sampling data and observer data for all gear types combined[6]. The coverage rates for logsheet catch and effort data refer to catch and effort data for individual fishing operations (longline sets, pole-and-line days fished or searched, purse-seine sets and troll days fished) that are held by the OFP. Coverage rates for observer data refer to the catch of target tunas that was observed. Coverage rates for port sampling data refer to the catch of target tunas from longline trips that were sampled and the catch of target tunas from purse-seine sets that were sampled.

Figure 2 shows coverage rates for available aggregate and operational catch and effort data by fleet for the longline fishery covering recent years (2000–2010). Figure 3 shows coverage rates for available aggregate and operational catch and effort data by fleet for the purse-seine fishery covering recent years (2000–2010).

Figure 4 shows coverage rates for available size composition data by fleet for the longline fishery covering recent years (2000–2010). Figure 5 shows coverage rates for available size composition data by fleet for the purse-seine fishery covering recent years (2000–2010).

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

[6] 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 2009 annual catches estimates to the WCPFC

COUNTRY / TERRITORY / ENTITY	GEAR(s)	Date submitted	see NOTES
Australia	LL, PS, PL, HL,TR	1 May 2010	
Belize	LL	16 Mar 2010	
Canada	TR	30 Mar 2010	(9)
China	LL, PS	27 Apr 2010	
Cook Islands	LL, TR	2 Jun 2010	
DPRK	LL, GN, PS	26 Aug 2010	(3)
Ecuador	PS	30 Jul 2010	
El Salvador	PS	30 Apr 2010	(4)
Federated States of Micronesia	LL, PS	30 Apr 2010	
Fiji Islands	LL, PL	29 Apr 2010	
French Polynesia	LL, PL, OT	30 Apr 2010	
Indonesia	LL, PS, OT	5 Apr 2010	(16)
Japan	PS	30 Apr 2010	
	LL, PL, TR, OT	30 Apr 2010	
Kiribati	PS, OT	30 Apr 2010	
Republic of Korea	LL, PS	28 Apr 2010	
Marshall Islands	LL, PS	26 Apr 2010	
Mexico	PS, PL		
New Caledonia	LL	28 Apr 2010	
New Zealand	LL, PS, TR, PL	30 Apr 2010	
Niue	LL	28 Apr 2010	
Palau	LL, PL	30 Apr 2010	(9)
Panama	PS		
Papua New Guinea	LL, PS	30 Apr 2010	
Philippines	PS, HL, RN, OT	28 Apr 2010	
Samoa	LL	30 Apr 2010	
Senegal	LL	30 Jul 2010	(9)
Solomon Islands	LL, PS, PL	29 Apr 2010	
Spain	LL	30 Apr 2010	(5)
	PS	30 Apr 2010	
Chinese Taipei	LL, PS	28 Apr 2010	
Tokelau	OT	14 Apr 2010	
Tonga	LL	16 Apr 2010	
United States	LL, PS, TR, PL	11 Jun 2010	
Vanuatu	LL, PS	28 Apr 2010	
Vietnam	LL, GN, PS	22 Apr 2011	(15)

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

Table 2. 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	(18)
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	(15), (16), (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		(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 3. Provision of 2008 Aggregated catch and effort data to the WCPFC

COUNTRY / ENTITY	GEAR TYPE	Date Submitted	see NOTES
Australia	LL, PL, PS, TR	30 Apr 2009	(17), (25)
Belize	LL	8 Apr 2009 28 Apr 2009	
Canada	TR	3 Apr 2009	(21)
China	LL (DWFN)	14 Aug 2009	(12)
	LL (offshore)	14 Aug 2009	(12)
	PS		
Chinese Taipei	LL (DWFN)	30 Apr 2009 28 Apr 2010	(10), (24)
	LL (small)	30 Apr 2009 28 Apr 2010	(13), (23), (24)
	PS	30 Apr 2009	(15)
Cook Islands	LL, TR	30 Apr 2009	(20)
Ecuador	PS		
El Salvador	PS	8 May 2009	(17)
Federated States of Micronesia	LL, PS	30 Apr 2009	(20)
Fiji Islands	LL, PL	30 Apr 2009	(20)
French Polynesia	LL	30 Apr 2009	(20)
Indonesia	LL, PS, OT		
Japan	LL	17 Sep 2009 30 Apr 2010	(2), (10), (25)
	PL	30 Apr 2010	
	PS	11 May 2009 30 Apr 2010	
Kiribati	PS	30 Apr 2009	(20)
Marshall Islands	LL, PS	30 Apr 2009	(20)
New Caledonia	LL	30 Apr 2009	(20)
New Zealand	LL, PL, HL, PS	1 May 2009	(17), (25)
Niue	LL	30 Apr 2009	(20)
Palau	LL, PL	30 Apr 2009	(20)
Panama	PS		
Papua New Guinea	LL, PS	30 Apr 2009	(20)
Philippines	PS	26 Jun 2009	(13), (17)
	HL, RN, OT		
Republic of Korea	LL	22 Jun 2010 30 Apr 2009	(12), (18)
	PS	30 Apr 2009	(6), (15), (18)
Samoa	LL	30 Apr 2009	(20)
Senegal	LL	30 Jul 2010	(21)
Solomon Islands	LL, PS	30 Apr 2009	(20)
	PL	30 Apr 2009	(20)
Spain	LL	24 Jun 2010	(3), (12)
	PS	9 Jun 2009	
Tonga	LL	30 Apr 2009	(20)
United States	LL (American Samoa)	9 Oct 2009	(11), (25)
	LL (Hawaii)	9 Oct 2009	(11), (25)
	PS (Treaty)	30 Apr 2009	(17)
	TR (North Pacific)	9 Oct 2009	(11)
	TR (South Pacific)	9 Oct 2009	(11)
Vanuatu	LL, PS	30 Apr 2009	(20)

Table 4. 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		

Table 5. 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	(12), (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), (26)
	PS	29 Apr 2011	(6), (15)
Samoa	LL	30 Apr 2011	(20)
Senegal	LL		(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		

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	Catches of shark by species provided, but coverage of these catches is very low

Table 7. Provision of 2010 Operational catch and effort data to the WCPFC

FLAG STATE / ENTITY	GEAR(s)	Date Submitted	see NOTES
Australia	LL, PL, PS, TR	29 Apr 2011	(12)
Belize	LL		
Canada	TR	16 Mar 2011	(7)
China	LL, PS		
Cook Islands	LL, TR	30 Apr 2011	(10)
Ecuador	PS		
El Salvador	PS	29 Apr 2011	
Federated States of Micronesia	LL, PS	30 Apr 2011	(10)
Fiji Islands	LL, PL	30 Apr 2011	(10)
French Polynesia	LL	30 Apr 2011	(10)
	PL	30 Apr 2011	(10)
	TR	30 Apr 2011	(10)
Indonesia	LL, PS, OT		
Japan	PS		
Japan	LL, PL		
Kiribati	PS	30 Apr 2011	(10)
Republic of Korea	LL, PS		
Marshall Islands	LL, PS	30 Apr 2011	(10)
New Caledonia	LL	30 Apr 2011	(10)
New Zealand	LL, PL, HL, PS	29 Apr 2011	(12)
Niue	LL	30 Apr 2011	(10)
Palau	LL, PL	30 Apr 2011	(10)
Panama	PS		
Papua New Guinea	LL, PS	30 Apr 2011	(10)
Philippines	PS, HL, RN, OT		
Samoa	LL	30 Apr 2011	(10)
Senegal	LL		
Solomon Islands	LL, PS, PL	30 Apr 2011	(10)
Spain	LL (Source: IEO)		
	PS	30 Apr 2011	
Chinese Taipei	LL, PS		
Tonga	LL	30 Apr 2011	(10)
United States	LL, TR, PL		
United States	PS	30 Apr 2011	(9)
Vanuatu	LL, PS	30 Apr 2011	(10)
Vietnam	LL, PS, GN		

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		No	Not Applicable		
El Salvador	PS	15 Oct 2007	El Savador	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		No	Not Applicable		
Solomon Islands	LL, PS, PL	4 Dec 2010	SPC-OFP			SPC authorised to release
Spain	LL		No	Not Applicable		
	PS	*7 Jul 2011*	EU **(Partial)**	Not Applicable		Provided to WCPFC (2010 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, 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 Yellow fin Tuna in the Western and Central Pacific Ocean (CMM 2008-1).

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

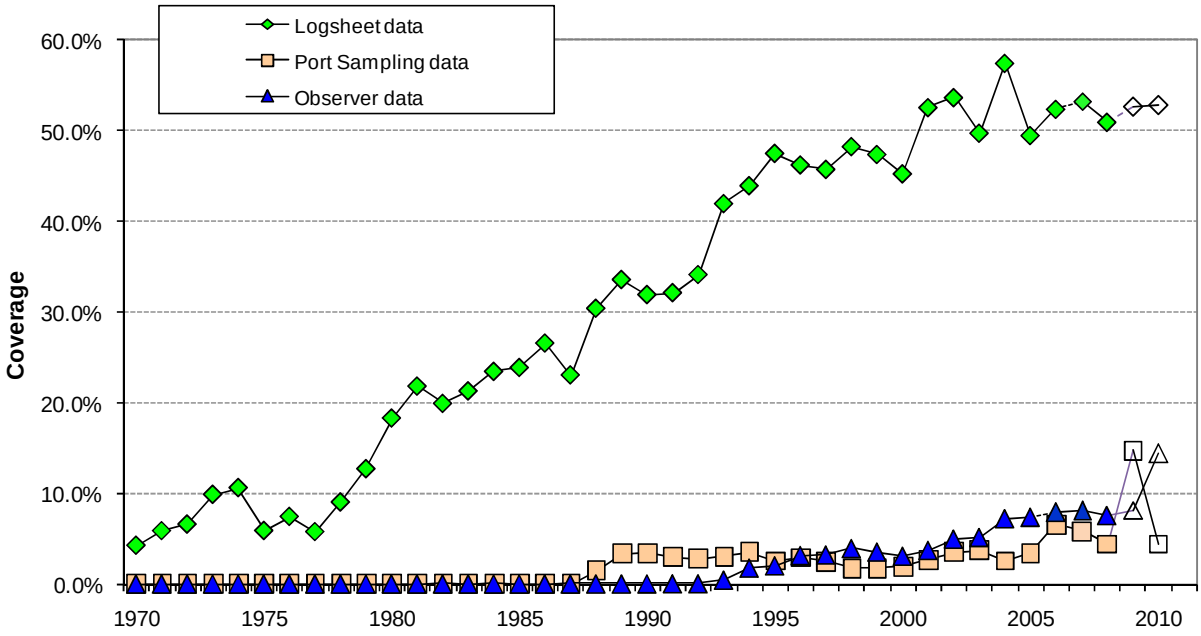

Figure 1. Coverage of operational (logsheet) data, port sampling data and observer data compiled by the OFP

(Data held by SPC/OFP, some of which are provided to the WCFPC;
2009 and 2010 data are provisional)

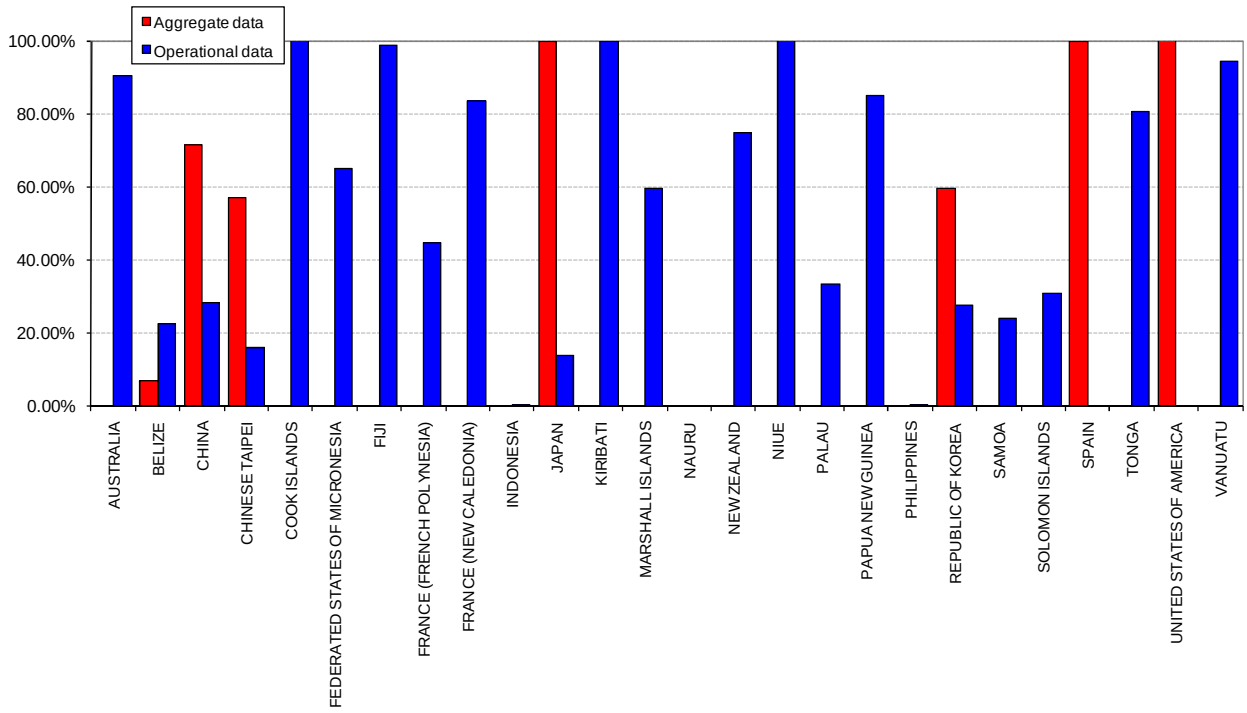

Figure 2. Coverage of (i) aggregate and (ii) operational catch/effort data by fleet from the LONGLINE FISHERY

(Aggregate data provided to the WCPFC; operational data held by SPC/OFP, some of which are provided to the WCFPC; covers 2000–2010)

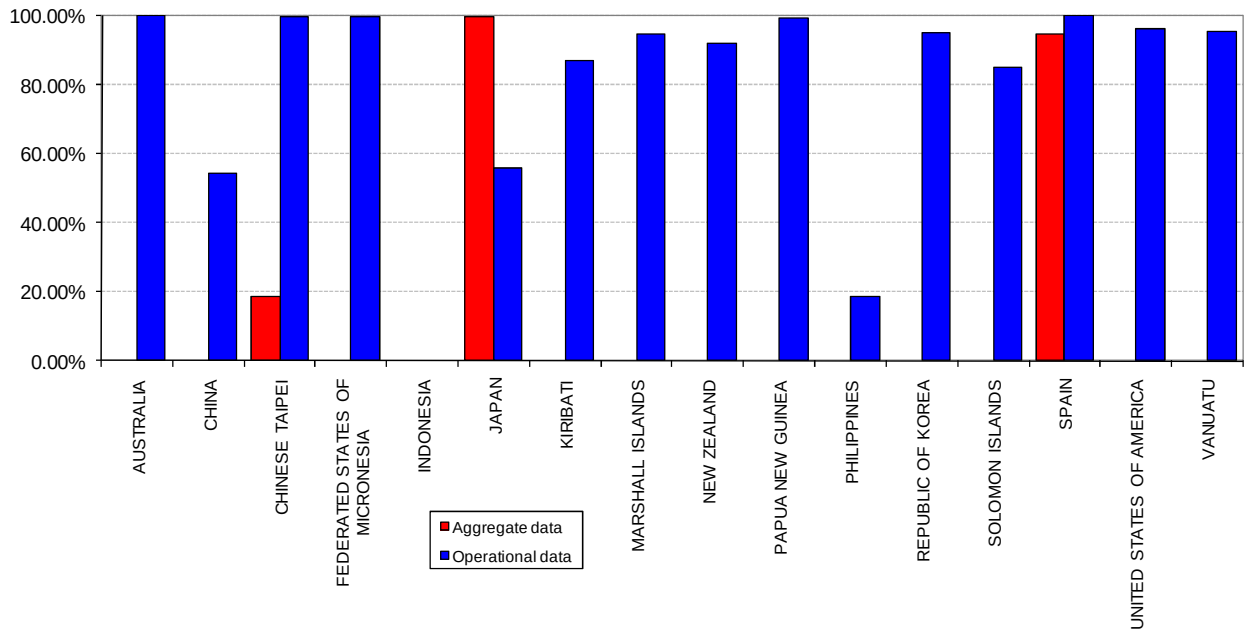

Figure 3. Coverage of (i) aggregate and (ii) operational catch/effort data by fleet from the PURSE-SEINE FISHERY

(Aggregate data provided to the WCPFC; operational data held by SPC/OFP, some of which are provided to the WCFPC; covers 2000–2010)

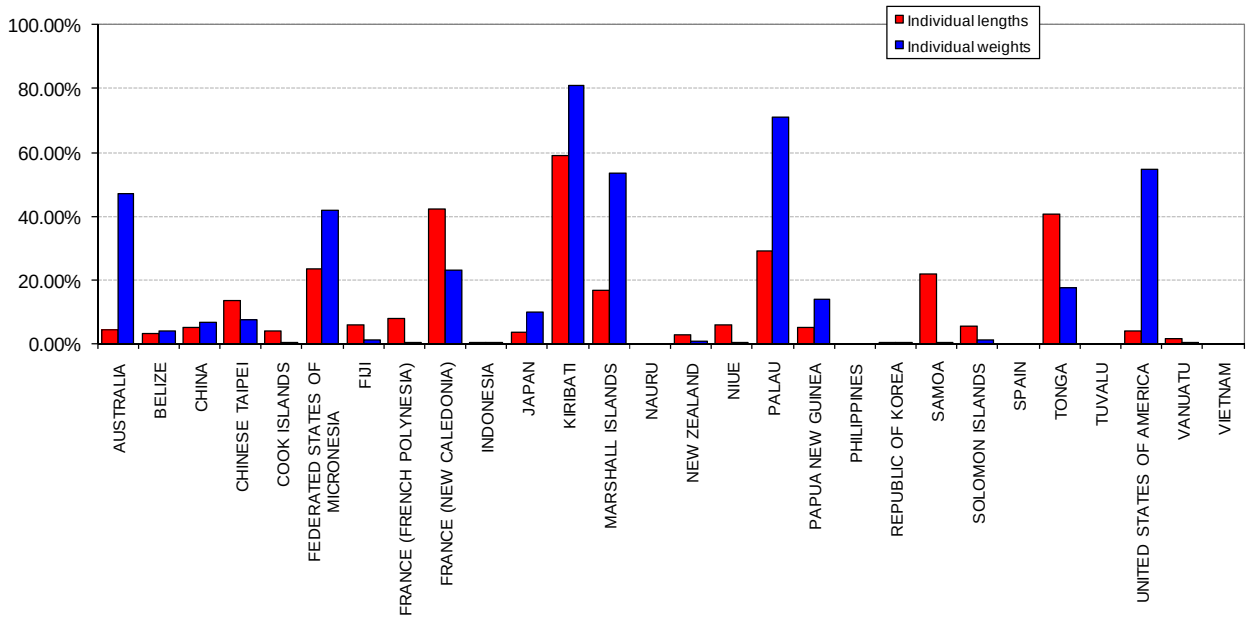

Figure 4. Coverage of size composition data by fleet from the LONGLINE FISHERY

(Data provided to the WCPFC; covers 2000–2010)

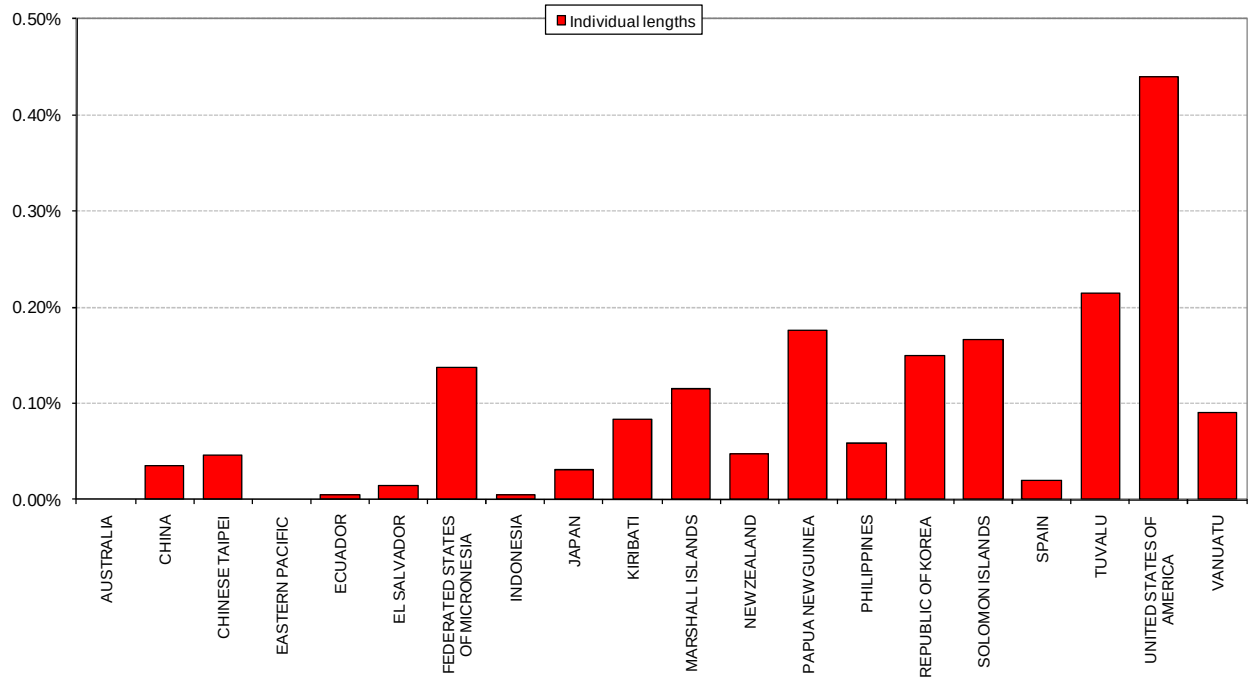

Figure 5. Coverage of size composition data by fleet from the PURSE-SEINE FISHERY
(Data provided to the WCPFC; covers 2000–2010)