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**SCIENTIFIC DATA AVAILABLE TO THE WESTERN AND CENTRAL PACIFIC  
FISHERIES COMMISSION**

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**WCPFC-SC5-2009/ST WP-1**

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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*”<sup>1</sup> which was further refined and subsequently adopted at the Fourth Regular Session of the Commission, Tumon, Guam, USA, 2-7 December 2007.

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 data held by the OFP.

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 has been further enhanced over the past year, and 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 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.

Detailed quantitative information on the catch and effort data, size composition data, tagging data, unloadings data and observer data held by the OFP is presented in the OFP Data Catalogue, which can be viewed at <http://www.spc.int/oceanfish/Html/Statistics/DataCat/DATACAT.htm>.

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 this facility will be transferred to the Commission’s web site at some stage in the future.

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<sup>1</sup> Can be viewed at <http://www.wcpfc.int/system/files/documents/guidelines-procedures-and-regulations/Scientific%20Data%20to%20be%20Provided%20to%20the%20Commission%20%28as%20revised%20by%20WCPFC4%29.pdf>

## 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) and SC4 (OFP, 2008). The following sub-sections summarise some of the major recent developments concerning the data gaps.

### 2.1 *Philippines tuna fishery data*

The 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, and there have been several significant developments in the past year, including :

- Operational purse-seine logsheet data for 2004 have been provided and are currently being evaluated by the WCPFC for use in determining historical high-seas purse-seine effort for the domestic Philippine fleet in related to requirements under the *Conservation and Management Measure for Bigeye and Yellowfin Tuna in the Western and Central Pacific Ocean* [CMM 2008-01] (see *SC5 GN Working Paper 16*).
- Operational purse-seine logsheet data for 2008 have been collected, processed and provided to the WCPFC. The 2008 operational logsheet data provided are estimated to cover about 60% of activities during 2008.
- Annual catch estimates by gear and species covering 2008 activities were provided this year. This provision is a significant improvement on the annual catch estimates provided in previous years which were only broken down by species. However, there remains more work to do to reconcile the high yellowfin and bigeye catches in some of the minor domestic (municipal) fisheries.
- The Philippines Bureau of Fisheries and Aquatic Resources (BFAR) have collected detailed purse-seine catch receipt data from domestic canneries covering 2008 activities which have proved useful in determining annual catch estimates and validating the operational logsheet data.

### 2.2 *Indonesian tuna fishery data*

The 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, and there have been several significant developments in the past year, including :

- The convening of an Indonesian Tuna Fishery Logbook Workshop, held in Jakarta during May 2009. This workshop was attended by participants (49) from the Indian Ocean Tuna Commission (IOTC), the WCPFC, Japan National Research Institute for Far Seas Fisheries (NRIFSF), several Indonesian government fisheries and port authority departments, fishing associations and the fishing industry. The outcome of this workshop was a set of agreed standardized logbooks to be used in the domestic tuna fisheries throughout Indonesia. This initiative was a significant step in resolved the data gap related to the provision of operational logsheet data to the WCPFC in the future.
- The WCPFC IPDC-funded Indonesian Tuna Fishery Data Rescue project was completed in recent months. The Indonesian Research Centre for Capture Fisheries (RCCF) provided the WCPFC with the entire set of original data they had compiled under the data rescue project on the 22nd May 2009. The original data provided comprise some 3,600 files in 387 directories and are in a variety of formats; most of the data are related to tuna fisheries but some data cover non-tuna fisheries. The sources of the data are primarily company records, port authority records and data collected during research projects (port sampling and tagging). A considerable amount of the data represent landings, which are useful, but the operational and aggregate data will be the most valuable for the stock assessment scientists and will therefore have the highest priority for import into the WCPFC databases. The historical data include :
  - Longline operational data (1978–1993) (already loaded into the WCPFC databases)
  - Pole-and-line operational and aggregate data
  - Purse seine operational and aggregate data
  - Longline, pole-and-line and purse seine size data

- The Third Eastern Indonesia Tuna Fishery Data Collection Workshop (EITFDC-3) was held in Manado, Indonesia (January 2009) with the aim of reviewing the progress with port sampling data collection to ensure the WCPFC requirements for data collection are satisfied. The main outcome of this workshop was the revision of the data collection forms which would better deal with the variety of gears and landings that take place in Indonesia. The report of this workshop can be viewed at <http://www.wcpfc.int/system/files/documents/statistics-and-data/indonesia-and-philippines-dcp/reports/WCPFC-SC5-2009-GN-IP-18%20%5BREPORT-EITFDC-3-WORKSHOP%28May%202009%29%5D.pdf>. A subsequent visit to Bitung port by WCPFC staff and consultants was conducted in May 2009 to audit the success of the new data collection forms and provide suggestions for improved data collection. The outcome of this visit was to confirm that data collection was proceeding well, with only minor recommendations for improvement suggested. The port sampling data collected will ultimately resolve the gap in the provision of size data and provide useful input to the determination of annual catch estimates in the future.

### 2.3 Provisions of historical operational catch and effort data

The WCPFC Executive Director sent out a circular on data-related issues to Cooperating Commission Members (CCMs), Cooperating Non-members (CNMs) and Participating Territories on March 14, 2008. In regards to 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.”

At the time of writing this paper, authorization that considered operational catch and effort which was provided to the SPC-OPF prior to December 2005 to also have been provided to the Commission had been received from :

Flag	Gear(s)	Notes
New Zealand	All	
United States of America	Purse seine (1988 onwards)	Notification received from the Forum Fisheries Agency (FFA), who manage the US purse-seine operational catch/effort data covered under the US Multi-lateral Purse-Seine treaty
Vanuatu	Purse seine & Longline	Notification received December 2008
Cook Islands	Purse seine & Longline	Notification received June 2009
Fiji	Pole-and-line & Longline	Notification received June 2009
Republic of the Marshall Islands	Purse seine & Longline	Notification received July 2009

Authorisations have been given only for data covering their national fleet (i.e. domestic vessels) and not for data covering foreign vessels that these sources may hold.

Operational logsheet data was provided by the Philippines in relation to CMM 2008-01 (see subsection 2.1 above). In April 2009, Japan also provided operational purse-seine catch and effort data for the period of 2001–2004 in accordance with paragraph 15 and 16 of CMM 2008-1. The WCPFC had not received any operational catch and effort data for this fleet in the past, which had been listed a data gap, so the provision of these data is a significant step towards resolving the gap.

### 2.4 Reconciliation of swordfish catch data by the EU longline fleet

The meeting of the Fifth Regular Session of the Commission (WCPFC5), held in December 2008, deliberated on discrepancies in the annual catch estimates of swordfish taken by the EU-Spanish longline fleet and annual catch estimates obtained from aggregate data previously provided to the WCPFC data

service provider (SPC). The outcome of these deliberations was the inclusion of Paragraph 5 in the CMM 2008-05 (Conservation and Management of Swordfish), which required a detailed data verification of the operational data for this fleet. However, on the 14<sup>th</sup> February 2009, the WCPFC Secretariat received a communication from the European Union which included the following explanation regarding the discrepancy :

*-- the Spanish Institute have indeed submitted all their [aggregate] data regarding the WCPO to SPC and the data presented by SPC in Busan is the correct one (i.e. the catch data for 2005 is the lower figure, not the so called 2-4 times higher figure).*

*-- the reason for all this confusion was that the data that they sent to us and the Spanish administration (which covers the entire pacific ocean, not only WCPO) was different from the one sent to SPC. This was due to the fact that the catches from the EPO and the overlapping area by error had been labelled as being from the overlapping area only, which lead us to include them in the accounts for the WCPO. The difference between the SPC figure (some 1200 tonnes) and the so called 2-4 times higher figure (some 5.000 tonnes) represents in other words our catches in the IATTC Area excluding the overlapping zone.*

While the explanation was deemed by the WCPFC Secretariat to have resolved this issue, the Executive Director has requested a formal written explanation (on letterhead) describing how this situation occurred in detail. The WCPFC Secretariat is waiting for a response to this request. The annual catch estimates determined by SPC from aggregate data provided by Spain is listed below – these estimates reconcile with the latest estimates provided by Spain-EU for this fleet.

Year	Aggregate data		Annual Catch estimates	
	WCP-CA	PACIFIC OCEAN	WCP-CA	PACIFIC OCEAN
2004	701	6,286	699	6,250
2005	1,323	6,212	1,323	6,133
2006	3,107	8,259	3,104	8,256
2007	4,191	8,430	4,191	8,430
2008	N/A	N/A	3,410	7,846

## 2.5 Nationality of catch data (“charter, lease or other similar mechanisms”)

The WCPFC recognizes the existence of “charter, lease or other similar mechanisms” in WCPFC tuna fisheries. In order to ensure that the attribution of the catch is appropriate to all parties involved in an arrangement of “charter, lease or other similar mechanisms”, the following process has been recommended by the WCPFC Secretariat to ensure that “double-counting” in catch and effort data provided by the flag and chartering entities does not occur.

*To ensure that the WCPFC can compile data consistent with the expectations of CCMs and allow the WCPFC to correctly allocate the catch in annual catch estimates/aggregate data/operational data to a CCM/CNM, the following information will be required by the WCPFC in order to acknowledge “charter, lease or other similar mechanisms” arrangements and before catch can be attributed to the CCM responsible for the “chartering” party (e.g. locally-based nationally-owned fishing company):*

1. *CCMs are requested to provide a list of the vessels that they were in a “charter, lease or other similar mechanisms” arrangement in the past - the following information must be provided:*

*Vessel, Gear, Registration Number, Flag of vessel, Chartering CCM, Local Company, Start date of Charter, End Date of Charter*

*The Start and End dates of the “charter, lease or other similar mechanisms” arrangement might typically refer to start and end licensing dates. “Local Company” may not be required, but is useful to complete the information.*

2. *The “charter, lease or other similar mechanisms” arrangement will be formally acknowledged by the WCPFC on confirmation/acceptance by both the CCM responsible for the “charter” party and the flag state (CCM) of details above, and the WCPFC will then proceed to correctly allocate catch in their databases to the CCM responsible for the “charter” party. Confirmation is required by the flag state to ensure there is no double counting in the data provided to the WCPFC.*

In the past year, notifications for “charter, lease or other similar mechanisms” arrangements with respect to the attribution of catch have been received from the following CCMs:

- **Niue** : for Cook Islands flagged longline vessels chartered by Niue during 2007. (STATUS: formally acknowledged by both parties and catch attribution in the data completed).
- **Fiji** : for Chinese-flagged longline vessels that are managed and operated by Fiji-owned fishing companies and should be considered to be a part of the domestic Fiji longline fleet during 2008. (STATUS: Awaiting response from the flag state).
- **FSM** : for locally-based Chinese-flagged longline vessels that are managed and operated by FSM-owned fishing company(s). (STATUS: Awaiting more detailed information on the vessels chartered).

The WCPFC Secretariat and data managers will continue to work with CCMs to refine this process to ensure the allocation of catch to nationality is systematic and unambiguous, thereby avoiding ‘double-counting’.

### 3. STATUS OF 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 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 longline fleet*

- Except for the provision of aggregated catch and effort data covering 2004–2008, there are no operational or aggregated catch and effort data, nor size composition data, available.

###### *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 from 1991 onwards.
- Estimates of annual catches of ‘yellowfin’ covering the period from 1970 to 2004 also include bigeye.
- No operational or aggregated catch and effort data, nor size composition data, are available.

*This significant data gap has been resolved to some extent through the work of (i) the East Indonesian Tuna Data Collection Workshops (EITFDC), (ii) the establishment of a national logbook data collection system and (iii) the Indonesian Data Rescue Project (see Section 2.2 above).*

- For the period from 1970 to 2004, large annual catches have been reported for ‘unclassified’ gear types; information is required regarding the types of gear types included in ‘unclassified’ and the size composition of catches taken by ‘unclassified’ gear types.

- In the past, annual catch estimates provided by Indonesia were not stratified by gear type and bigeye was included in the catch estimate for 'yellowfin'. Estimates of catches for 2005–2007 were provided for yellowfin and bigeye separately, and catch estimates for all species combined were provided by gear type. The proportion caught by gear type appears to have changed considerably from 1990, previously the most recent year for which the catch by gear type was available (OFP, 2006). The estimate for 2005–2007 was reported separately by Indonesia, while the estimate for 2004 was estimated by the OFP from the annual catch of 'yellowfin plus bigeye', and a limited amount of sampling data; the large increase is probably a statistical artifact which needs to be resolved.

#### *Japanese coastal longline fleet*

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

#### *Japanese pole-and-line fleet*

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

#### *Philippines tuna fisheries*

- Total catch estimates for the period prior to 1970 are missing.
- No operational or aggregated catch and effort data are available.

*This data gap has been addressed to some extent for recent years with the collection and provision of operational logsheet data from the domestic purse seine fishery (see Section 2.1 above).*

- Only limited size composition and species composition data are available for the period prior to the National Stock Assessment Programme, 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 types of 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 (Anon., 2008b).

#### *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).

### 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 is required.

### 3.1.3 Nationality of the catch

- There have been difficulties in certain circumstances in assigning the nationality to the catch to one 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, have listed some situations in which difficulties in assigning a nationality might exist. The CWP also provides guidelines for how the nationality of the catch might 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. A suggestion for provision of information on “charter” arrangements is provided in Section 2.5 of this paper. This information is required to ensure that “double-counting” in catch and effort data provided by the flag and chartering entities does not occur.

#### 3.1.4 Operational catch and effort data

- Operational catch and effort data are not available for Japanese fleets outside the EEZs of FFA member countries, the Korean distant-water longline fleet and Chinese and Chinese Taipei distant-water longliners 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.

*Progress has been made with the provision of historical operational data over the past year (See Section 2.3 above)*

#### 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<sup>2</sup>. 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, stock assessments cover the Pacific Ocean, south of the equator. The following lists the vessel nations and years where aggregate longline catch/effort data does not cover the Pacific Ocean :
- Chinese distant-water longline fleet for all years;
  - Chinese Taipei distant-water longline fleet for years 2002, 2004-2007;
  - Korean distant-water longline fleet for years 1998–1999
  - Japan distant-water longline fleet for years 2005–2007;

*Given the importance of aggregated distant-water longline data from the entire Pacific Ocean in certain WCPFC stock assessments, a review of the relevant text in the guidelines for the provision of Scientific Data to the Commission (Paragraph 4 of Section 4 – see below) is strongly recommended. The suggestion is to change the word “may” to “should” in this paragraph.*

*“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”*

- In some instances, the aggregated catch and effort data provided represent low coverage of activities and may therefore be biased spatially and/or towards activities that target one particular tuna species over another. For example, this is the case with the most recent year (2008) of aggregate longline data provided by Chinese Taipei and Korea.

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<sup>2</sup> 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.

- 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.
- 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.

### 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.

### 3.1.7 Size composition data for longliners

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

## ***3.2 The main data gaps related to ecosystem approach to fisheries***

Data gaps 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. Exceptions to the need for increased coverage are the longline fleets of New Zealand, Papua New Guinea and the United States (based in Hawaii), the purse seine fleet of Papua New Guinea and purse seiners fishing under the United States Treaty and the FSM Arrangement. Coverage of the Australian longline fleet has increased in recent years.
- 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.

#### **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 2008 (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 2007 and 2008, respectively, were provided, and include notes on the data that have been provided, highlighting gaps or problems in the data provided.

Annual catch estimates for 2007 have yet to be provided by two countries (one CNM and one country seeking application for Cooperating Non-member (CNM) status), and for 2008 annual catch estimates were not provided by any of the fleets from one CCM (China), for certain gears only by another CCM (Japan-2007 estimates were carried over for 2008 for these gears), two CNMs and two countries seeking CNM status. For 2007 annual catch estimates, there were 18 out of 30 entities (60%) that had provided estimates prior to the 30 April 2008 deadline, with 22 out of 30 entities (73%) having provided estimates by 15 May 2008. For 2008 annual catch estimates there were 13 out of 30 entities (43%) that had provided estimates prior to the 30 April 2009 deadline, with 21 out of 30 entities (70%) having provided estimates by 15 May 2009, which indicates a decline in the timeliness of the provision of estimates this year.

However, the quality of estimates provided has improved with a reduction in the number of notes assigned to the annual catch estimates for 2008 compared to 2007 estimates.

##### ***4.2 Aggregate Catch/Effort data***

Tables 3, 4 and 5 list the dates on which aggregated catch and effort data were provided for 2006, 2007 and 2008, 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.

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) since they are available at that time.

The notable gaps in the provision of 2008 aggregate data include data for the Chinese longline and purse seine fleets, the Japanese distant-water longline and pole-and-line fleets, the Spanish longline fleet and the US longline and troll fleets.

In general, the timeliness of the provision of aggregate catch/effort data has improved over time, but there remain certain important gaps in the data provided. The quality of aggregate data provided has also improved with a reduction in the number of notes assigned to the aggregate data for 2008 compared to the 2006 and 2007 estimates.

**Table 1. Provision of 2007 annual catches estimates to the WCPFC**

COUNTRY / TERRITORY / ENTITY	GEAR(s)	Date submitted	see NOTES
Australia	LL, PS, PL, HL	29 Apr 2008	
Belize	LL	30 Apr 2008 30 Sep 2008	
Canada	TR	29 Apr 2008	
China	LL, PS	10 Jun 2008	(5)
Cook Islands	LL, TR	30 Apr 2008	(10)
Ecuador	PS	30 Sep 2008	
El Salvador	PS	8 Sep 2008	(4)
Federated States of Micronesia	LL, PS	13 Jun 2008	(10), (13)
Fiji Islands	LL, PL	2 May 2008	
French Polynesia	LL, PL, OT	30 Apr 2008	
Indonesia	LL, PS, OT	2 May 2008	(3), (6), (7), (8)
Japan	PS	5 Jun 2008	(10)
	LL, PL, TR, OT	1 May 2009	(10)
Kiribati	PS, AR	29 Apr 2008	
Republic of Korea	LL, PS	29 Apr 2008	
Marshall Islands	LL, PS	24 Apr 2008	
New Caledonia	LL	5 Mar 2008	(5)
New Zealand	LL, PS, TR, PL	24 Apr 2008	
Niue	LL	6 May 2006	
Palau	LL, PL	24 Apr 2008	(9)
Panama	PS		
Papua New Guinea	LL, PS	30 Apr 2008	
		6 May 2008	
Philippines	PS, HL, RN, OT	11 April 2008	(3), (6), (7), (8)
Samoa	LL	24 Apr 2008	(10)
Senegal	LL		
Solomon Islands	LL, PS, PL	29 Apr 2008	
Spain	LL	13 May 2008	(6), (7), (8), (11)
	PS	13 May 2008	
Chinese Taipei	LL, PS	30 Apr 2008	
Tonga	LL	11 Apr 2008	
United States	LL, PS, TR, PL	7 Jun 2008	
		28 Sep 2008	
Vanuatu	LL, PS	28 Apr 2008	

**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
- 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
- 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

**Table 2. Provision of 2008 annual catches estimates to the WCPFC**

COUNTRY / TERRITORY / ENTITY	GEAR(s)	Date submitted	see NOTES
Australia	LL, PS, PL, HL,TR	30 Apr 2009	
Belize	LL	8 Apr 2009	
Canada	TR	3 Apr 2009	
China	LL, PS		
Cook Islands	LL, TR	1 Jul 2009	
Ecuador	PS		
El Salvador	PS	8 May 2009	(4)
Federated States of Micronesia	LL, PS	30 Apr 2009	
Fiji Islands	LL, PL	1 May 2009	(10)
French Polynesia	LL, PL, OT	30 Apr 2009	
Indonesia	LL, PS, OT		
Japan	PS	1 May 2009	(10)
	LL, PL, TR, OT		
Kiribati	PS, OT	30 Apr 2009	
Republic of Korea	LL, PS	30 Apr 2009	
Marshall Islands	LL, PS	22 Apr 2009	
New Caledonia	LL	24 Apr 2009	(5)
New Zealand	LL, PS, TR, PL	1 May 2009	
Niue	LL	5 May 2009	
Palau	LL, PL	30 Apr 2009	(9)
Panama	PS		
Papua New Guinea	LL, PS	30 Apr 2009	
Philippines	PS, HL, RN, OT	15 Jun 2009	
Samoa	LL	29 Apr 2009	
Senegal	LL		
Solomon Islands	LL, PS, PL	3 May 2009	
Spain	LL	2 Jul 2009	
	PS	9 Jun 2009	
Chinese Taipei	LL, PS	30 Apr 2009	
Tonga	LL	25 Feb 2009	
United States	LL, PS, TR, PL	1 May 2009	
Vanuatu	LL, PS	16 Jul 2009	

**NOTES**

- 1 Catches were estimated by the OFF 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
- 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
- 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

**Table 3. Provision of 2006 Aggregated catch and effort data to the WCPFC**

COUNTRY / ENTITY	GEAR TYPE	Date Submitted	see NOTES
Australia	LL, PL, PS, TR	20 Apr 2007	(17)
Belize	LL		
Canada	TR	9 May 2007	(2)
China	LL (DWFN)	16 Aug 2007	(1), (12), (14), (18)
	LL (offshore)	16 Aug 2007	(1), (12), (14) (18)
	PS	16 Aug 2007	(6), (8), (9), (15) (18)
Chinese Taipei	LL (DWFN)	30 Apr 2007 30 Apr 2008 30 Apr 2009	(19), (22)
	LL (small)	30 Apr 2008	(12), (18)
	PS	30 Apr 2007	(6), (15)
Cook Islands	LL	30 Apr 2007	(20)
Ecuador	PS		
El Salvador	PS	8 Sep 2008	(17)
Federated States of Micronesia	LL, PS	30 Apr 2007	(20)
Fiji Islands	LL, PL	30 Apr 2007	(20)
French Polynesia	LL	30 Apr 2007	(20)
Indonesia	LL, PS, OT		
Japan	LL	5 Jun 2008 11 May 2009	(2), (10), (22)
	PL	5 Jun 2008	
	PS	5 Mar 2007 16 Apr 2007 24 Apr 2007 5 Jun 2008	
Kiribati	PS	30 Apr 2007	(20)
Marshall Islands	LL, PS	30 Apr 2007	(20)
New Caledonia	LL	14 Mar 2007	(20)
New Zealand	LL, PL, HL, PS	2 May 2007	(17)
Niue	LL	30 Apr 2007	(20)
Palau	LL, PL	30 Apr 2007	(20)
Panama	PS		
Papua New Guinea	LL, PS	30 Apr 2007	(20)
Philippines	PS, HL, RN, OT		
Republic of Korea	LL	16 Aug 2007 29 Apr 2008	(12), (18)
	PS	16 Aug 2007	(5), (6), (15), (18)
Samoa	LL	30 Apr 2007	(13), (20)
Senegal	LL	21 Nov 2008	(12), (17)
Solomon Islands	LL, PS	30 Apr 2007	(20)
	PL		
Spain	LL	02 Oct 2007 20 Dec 2007 11 Dec 2008	(3), (12)
	PS	7 Dec 2008	
Tonga	LL	30 Apr 2007	(20)
United States	LL (American Samoa)	30 Apr 2007 7 Jun 2008	(11)
	LL (Hawaii)	30 Apr 2007 7 Jun 2008 28 Sep 2008	(11)
	PS (Treaty)	30 Apr 2007	(17)
	TR (North Pacific )	30 Apr 2007 7 Jun 2008	(11)
	TR (South Pacific)	30 Apr 2007 7 Jun 2008	(11)
Vanuatu	LL, PS	30 Apr 2007	(20)

**Table 4. Provision of 2007 Aggregated catch and effort data to the WCPFC**

COUNTRY / ENTITY	GEAR TYPE	Date Submitted	see NOTES
Australia	LL, PL, PS, TR	29 Apr 2008	(17)
Belize	LL	30 Apr 2008	(12)
Canada	TR	24 Apr 2008	(11)
China	LL (DWFN)	10 Jun 2008	(1), (12), (14), (18)
	LL (offshore)	10 Jun 2008	(1), (12), (14) (18)
	PS		
Chinese Taipei	LL (DWFN)	30 Apr 2008	(19), (22)
		22 Aug 2008	
		30 Apr 2009	
	LL (small)	8 Aug 2008 30 Apr 2009	(13), (23)
	PS	30 Apr 2008	(6), (15)
Cook Islands	LL, TR	30 Apr 2008	(20)
Ecuador	PS		
El Salvador	PS	8 Sep 2008	(17)
Federated States of Micronesia	LL, PS	30 Apr 2008	(20)
Fiji Islands	LL, PL	30 Apr 2008	(20)
French Polynesia	LL	10 Apr 2008	(20)
Indonesia	LL, PS, OT		
Japan	LL	11 May 2009	(2), (10), (22)
	PL	11 May 2009	
	PS	5 Jun 2008	
Kiribati	PS	30 Apr 2008	(20)
Marshall Islands	LL, PS	30 Apr 2008	(20)
New Caledonia	LL	18 Mar 2008	(20)
New Zealand	LL, PL, HL, PS	16 Apr 2008	(17)
		1 May 2009	
Niue	LL	30 Apr 2008	(20)
Palau	LL, PL	30 Apr 2008	(20)
Panama	PS		
Papua New Guinea	LL, PS	30 Apr 2008	(20)
Philippines	PS, HL, RN, OT		
Republic of Korea	LL	29 Apr 2008 30 Apr 2009	(12), (18)
	PS	29 Apr 2008 30 Apr 2009	(6), (15), (18)
Samoa	LL	30 Apr 2008	(20)
Senegal	LL	21 Nov 2008	(12), (17)
Solomon Islands	LL, PS	30 Apr 2008	(20)
	PL		
Spain	LL	11 Dec 2008	(3), (12)
	PS	13 May 2008 7 Dec 2008	
Tonga	LL	30 Apr 2008	(20)
United States	LL (American Samoa)	7 Jun 2008	(11)
	LL (Hawaii)	7 Jun 2008	(11)
		28 Sep 2008	
	PS (Treaty)	30 Apr 2008	(17)
	TR (North Pacific )	7 Jun 2008	(11)
TR (South Pacific)	7 Jun 2008	(11)	
Vanuatu	LL, PS	30 Apr 2008	(20)

**Table 5. 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)
Belize	LL	8 Apr 2009 28 Apr 2009	
Canada	TR	3 Apr 2009	(21)
China	LL (DWFN)		
	LL (offshore)		
	PS		
Chinese Taipei	LL (DWFN)	30 Apr 2009	(19), (22)
	LL (small)	30 Apr 2009	(13), (23)
	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		
	PL		
	PS	11 May 2009	
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)
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, HL	26 Jun 2009	(13), (17)
	RN, OT		
Republic of Korea	LL	30 Apr 2009	(12), (13),(18)
	PS	30 Apr 2009	(6), (15), (18)
Samoa	LL	30 Apr 2009	(20)
Senegal	LL		
Solomon Islands	LL, PS	30 Apr 2009	(20)
	PL	30 Apr 2009	(20)
Spain	LL		
	PS	9 Jun 2009	
Tonga	LL	30 Apr 2009	(20)
United States	LL (American Samoa)		
	LL (Hawaii)		
	PS (Treaty)	30 Apr 2009	(17)
	TR (North Pacific )		
	TR (South Pacific)		
Vanuatu	LL, PS	30 Apr 2009	(20)



**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
- 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 yellow fin-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

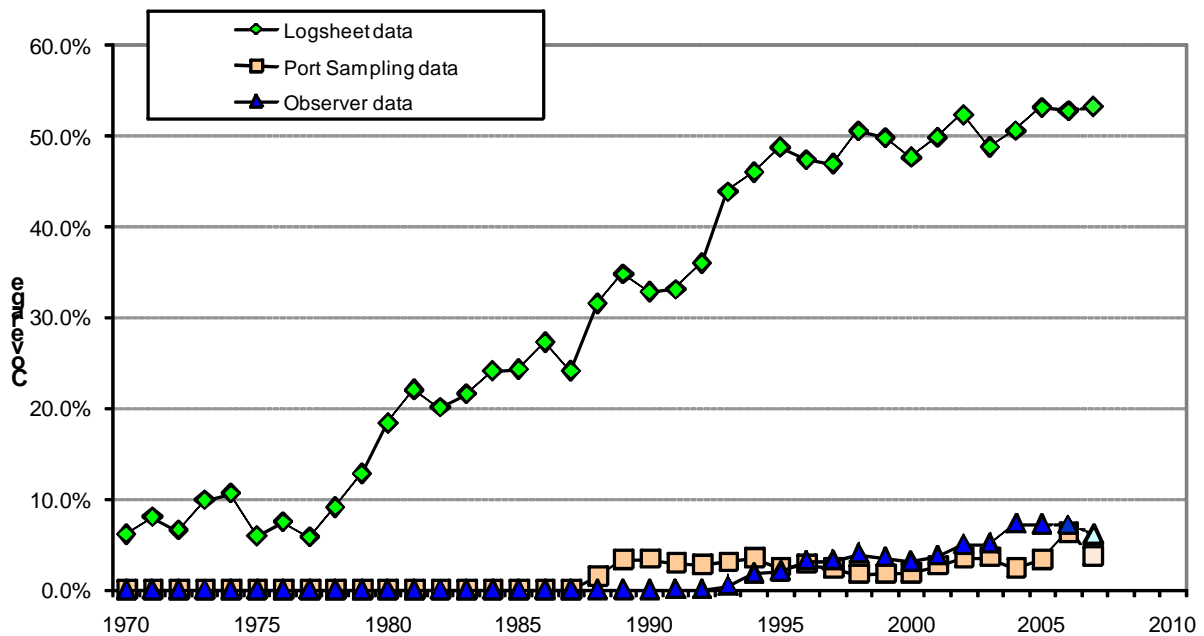
## 5. COVERAGE RATES

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<sup>3</sup>. 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 longliner 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 (2000–2007). Figure 3 shows coverage rates for available aggregate and operational catch and effort data by fleet for the purse-seine fishery covering recent years (2000–2007).

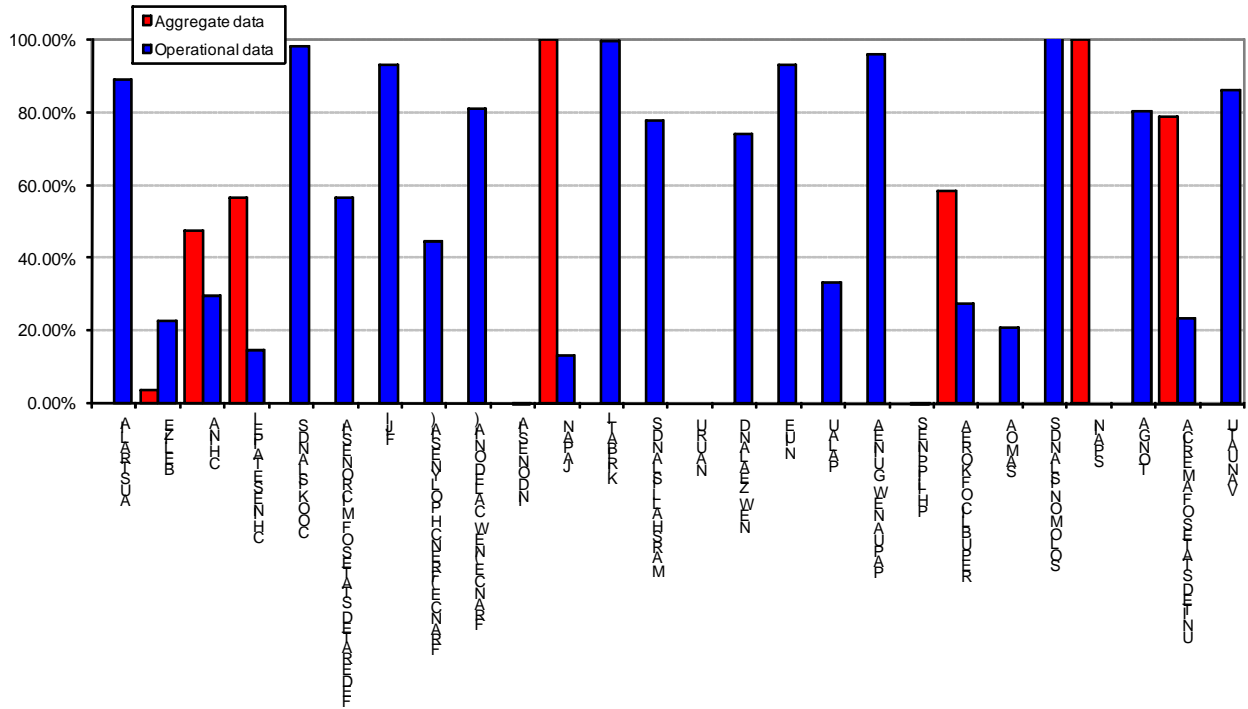
Figure 4 shows coverage rates for available size composition data by fleet for the longline fishery covering recent years (2000–2007). Figure 5 shows coverage rates for available size composition data by fleet for the purse-seine fishery covering recent years (2000–2007).

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

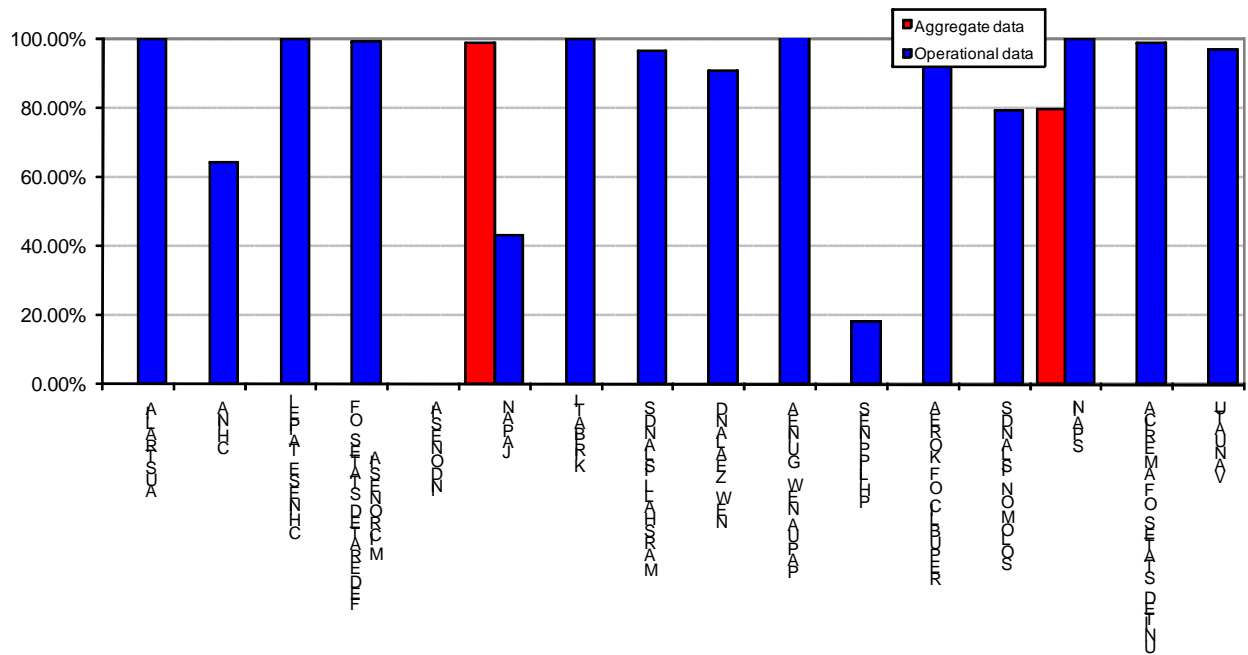


**Figure 1. Coverage of tuna fisheries in the WCPFC Statistical Area by operational (logsheet) catch and effort data, port sampling data and observer data compiled by the OFP**

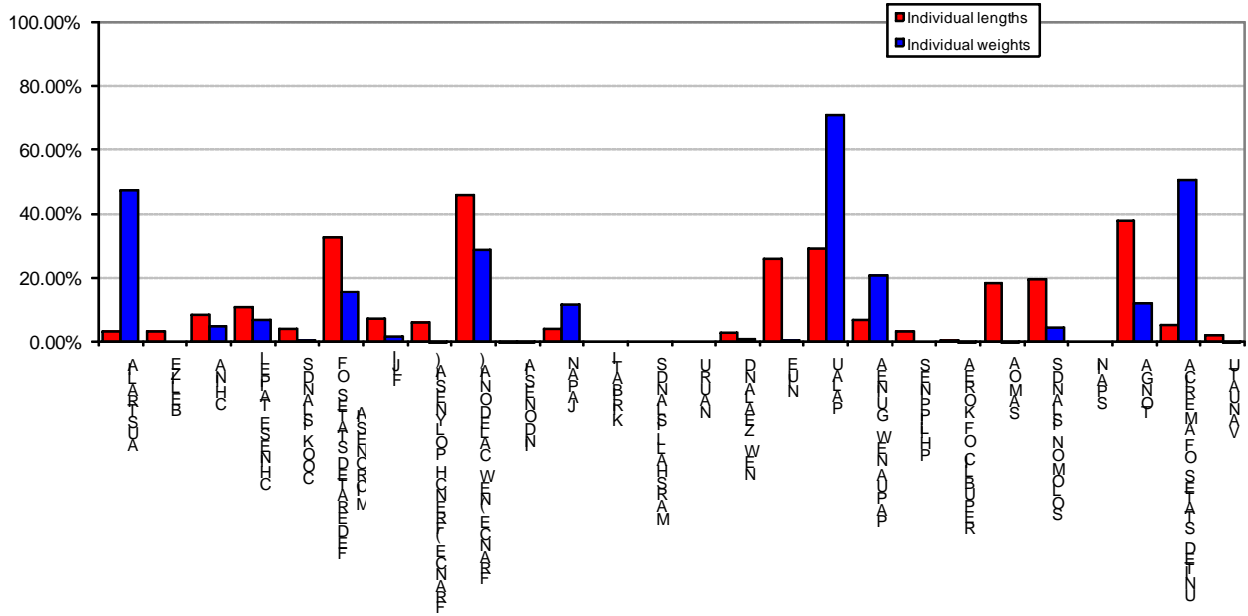
<sup>3</sup> Refer to <http://www.spc.int/oceanfish/Html/Statistics/Coverage/index.asp> for an explanation of how coverage is determined.



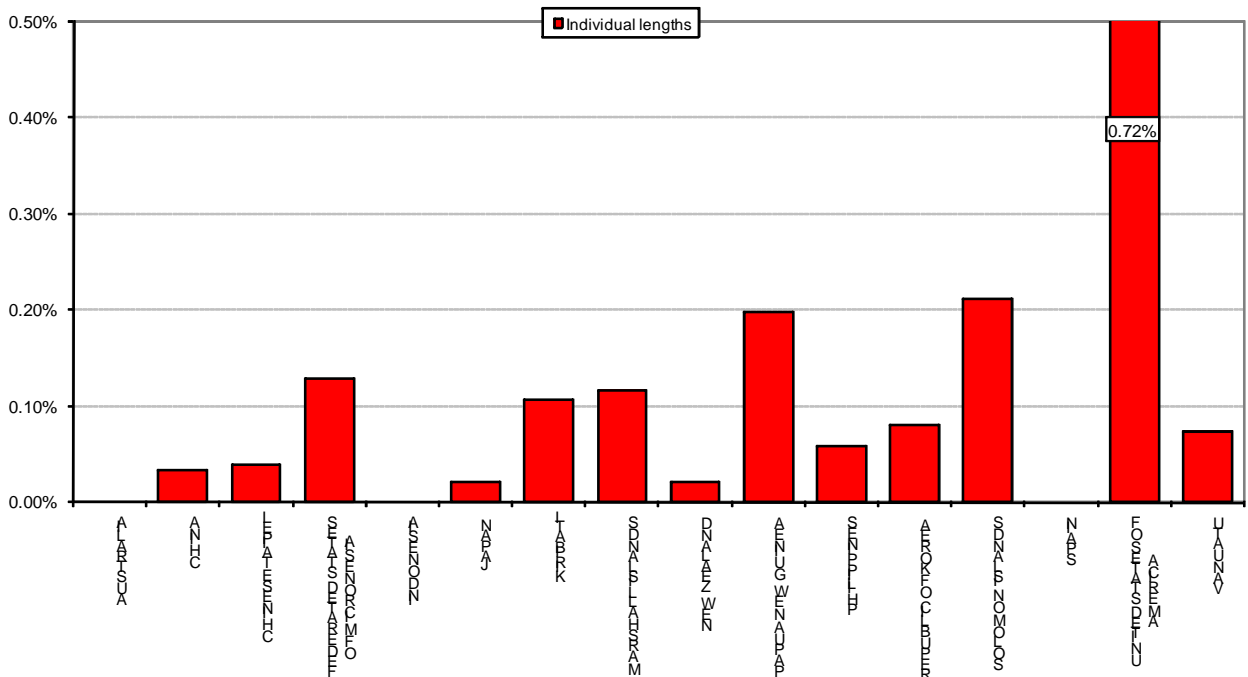
**Figure 2. Coverage of available (i) aggregate and (ii) operational (logsheet) data, by fleet, in the WCPFC Convention Area LONGLINE FISHERY, 2000–2007**



**Figure 3. Coverage of available (i) aggregate and (ii) operational (logsheet) data, by fleet, in the WCPFC Convention Area PURSE-SEINE FISHERY, 2000–2007**



**Figure 4. Coverage of available size composition data, by fleet, in the WCPFC Convention Area LONGLINE FISHERY, 2000-2007**



**Figure 5. Coverage of available size composition data, by fleet, in the WCPFC Convention Area PURSE-SEINE FISHERY, 2000-2007**

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