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

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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 accepted by the Western and Central Pacific Fisheries Commission (WCPFC) at its second session in December 2005 (Anon. 2005b, par. 25).

As specified in those recommendations, 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, particularly in regard to the important data gaps, and to present information on the coverage of data held by the OFP.

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 be viewed at <http://www.spc.int/oceanfish/Html/Statistics/Coverage/index.asp>. This query facility is a new addition to the OFP web site and is expected to be enhanced over the coming year to include detailed notes on data gaps covering all fleets and time periods, with consideration of transferring this facility to the Commission’s web site.

RECENT DEVELOPMENTS

The following summarises the major recent developments concerning the data gaps reported at SC1 (Williams and Lawson, 2005) and SC2 (OFP, 2006):

- Catches stratified by gear type, species, year/month and geographic area, covering the domestic fisheries of the Philippines have been refined by using survey sampling data from key tuna landing centers and tuna catches broken down by region provided by the Bureau of Agricultural Statistics (BAS) and port sampling data collected through the National Stock Assessment Project (NSAP) of the Bureau of Fisheries and Aquatic Resources. [Funding for BAS surveys and BFAR sampling during 2005–2007 has been provided by the Commission through the Indonesia and Philippines Data Collection Project (IPDCP)].
- The Eastern Indonesia Tuna Fishery Data Collection Workshop, held in Jakarta, Indonesia (30–31 January 2007) reviewed information obtained from recent reviews of key tuna unloading ports in Eastern Indonesia, and came up with a set of recommendations, primarily focused on establishing a port sampling programme in key Eastern Indonesian ports. It is hoped that port sampling activities can start in 2008, dependent on funding and once preliminary work scoping out the requirements have been undertaken in late 2007. The report of this workshop can be viewed at http://www.wcpfc.int/EITFDC/pdf/EITFDC_Report.pdf.
- The analysis of the proportion of bigeye in ‘yellowfin plus bigeye’ caught by purse seiners was updated with recent observer data and expanded to examine the effect of latitude and longitude on the proportion of bigeye in the combined catch of ‘yellowfin plus bigeye’ (Lawson 2007 – can be viewed at <http://www.wcpfc.int/sc3/pdf/ST%20IP-5.pdf>). The updated estimates of the proportion of bigeye in the combined catch of ‘yellowfin plus bigeye’ have now been applied to the aggregated purse-seine catch data for most fleets.
- Continuing on from [2004] data provided last year, aggregated catch and effort data for the Chinese-Taipei domestic longline fleet, covering 2005, were provided by Chinese Taipei.
- For the first time, operational (logsheet) catch and effort data were provided to the OFP by the Inter-American Tropical Tuna Commission (IATTC) covering activities by Eastern Pacific Ocean (EPO) purse-seine fleets in the WCPO, under the Agreement for the Exchange of Tuna Fisheries Data Between IATTC and SPC of April 2003.
- Comprehensive operational (logsheet) catch and effort data for the Vanuatu distant-water longline fleet for 2005 were provided by Vanuatu. These data have been used to distinguish logsheet data from vessels that were thought to be reporting under other flags (e.g. Chinese Taipei and Belize).

DATA GAPS

The following summarises the most important data gaps.

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:

- Chinese-Taipei domestic longline fleet
 - Except for the provision of aggregated catch and effort data covering 2004 and 2005, 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.
 - 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 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 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.
 - 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 2005, 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.
- 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).

- 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.
- Information on vessels covered by annual catch estimates and catch and effort data
 - For certain fleets, such as those of Belize, it is suspected that catches by some vessels are also being reported under other flags. Information on the vessels covered by annual catch estimates and aggregated catch and effort data are required to determine whether double-counting or omissions are occurring.
- 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.
- Aggregate catch and effort data
 - Certain stock assessments require aggregate catch and effort data that cover the extent of the stock for that species. In the case of yellowfin and bigeye, stock assessments cover the Pacific Ocean and therefore the provision of aggregated longline data is required to cover the Pacific Ocean. In recent years, the provisions of aggregated longline data for the Korean and Chinese Taipei longline fleets have only covered 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. This is the case with the most recent year of aggregate longline data provided by Chinese Taipei and Korea.
 - In some instances, it is not possible to reconcile the aggregate longline catch data with annual catch estimates. 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.
- 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 and the FSM Arrangement.
- Size composition data for longliners
 - Size composition data from longliners have been provided, but at a resolution that is not useful for stock assessment analyses. For example, Chinese Taipei longline size data have been provided for the period 2004–2006, covering north and south Pacific albacore, yellowfin, bigeye, striped marlin, swordfish and skipjack, and stratified by year, quarter and 2cm intervals, but do not include a breakdown by area, so are not useful for stock assessments.
 - Size composition data are not available for Vanuatu and Chinese fleets targeting bigeye and yellowfin in the eastern tropical areas of the WCPFC Statistical Area.

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 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 is currently being increased.
- 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.

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. 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 presents coverage rates for available aggregate and operational catch and effort data by fleet for the longline fishery covering recent years (2000–2005). Figure 3 presents coverage rates for available aggregate and operational catch and effort data by fleet for the purse-seine fishery covering recent years (2000–2005).

Figure 4 presents coverage rates for available size composition data by fleet for the longline fishery covering recent years (2000–2005). Figure 5 presents coverage rates for available size composition data by fleet for the purse-seine fishery covering recent years (2000–2005).

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

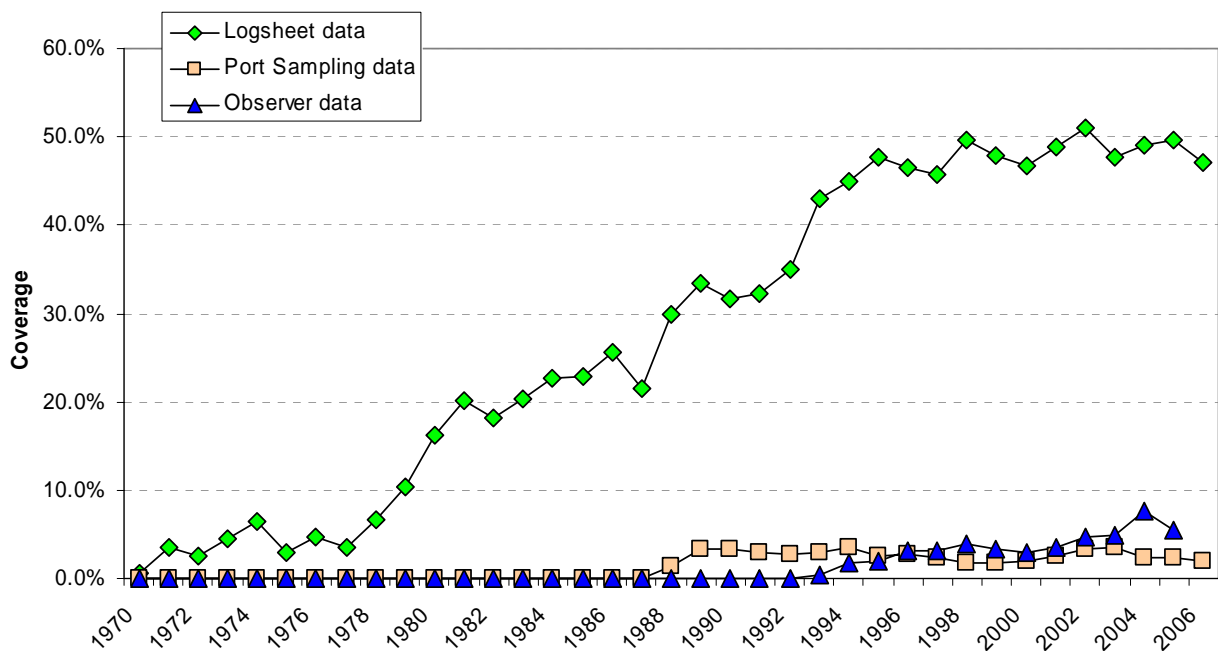


Figure 1. Coverage of tuna fisheries in the WCPFC Statistical Area by operational (logsheet) catch and effort data, port sampling data and observer data compiled by the OFP

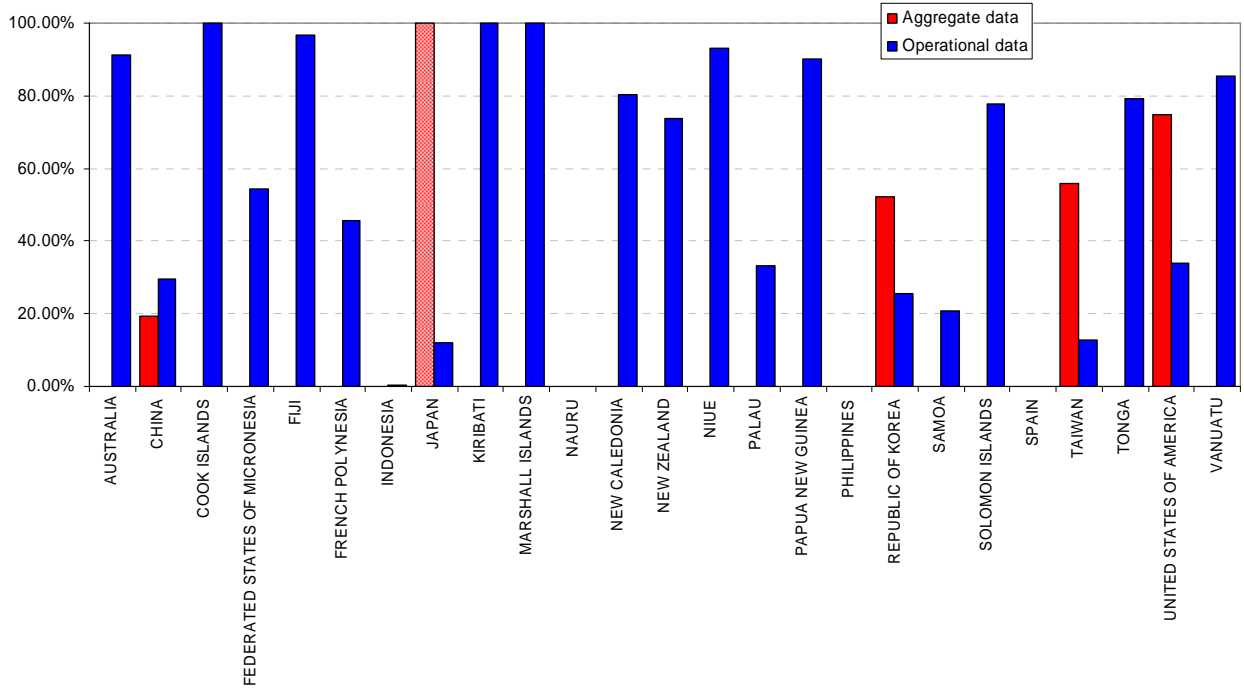


Figure 2. Coverage of available (i) aggregate and (ii) operational (logsheet) data, by fleet, in the WCPFC Convention Area LONGLINE FISHERY, 2000–2005

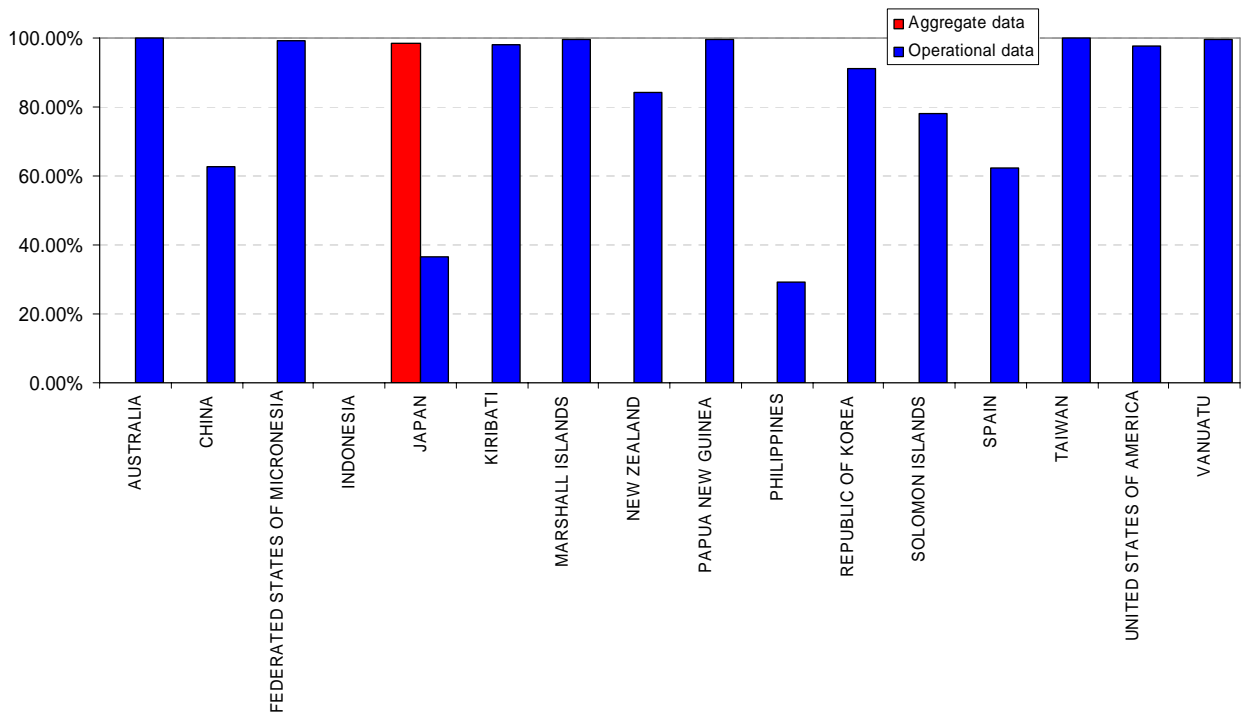
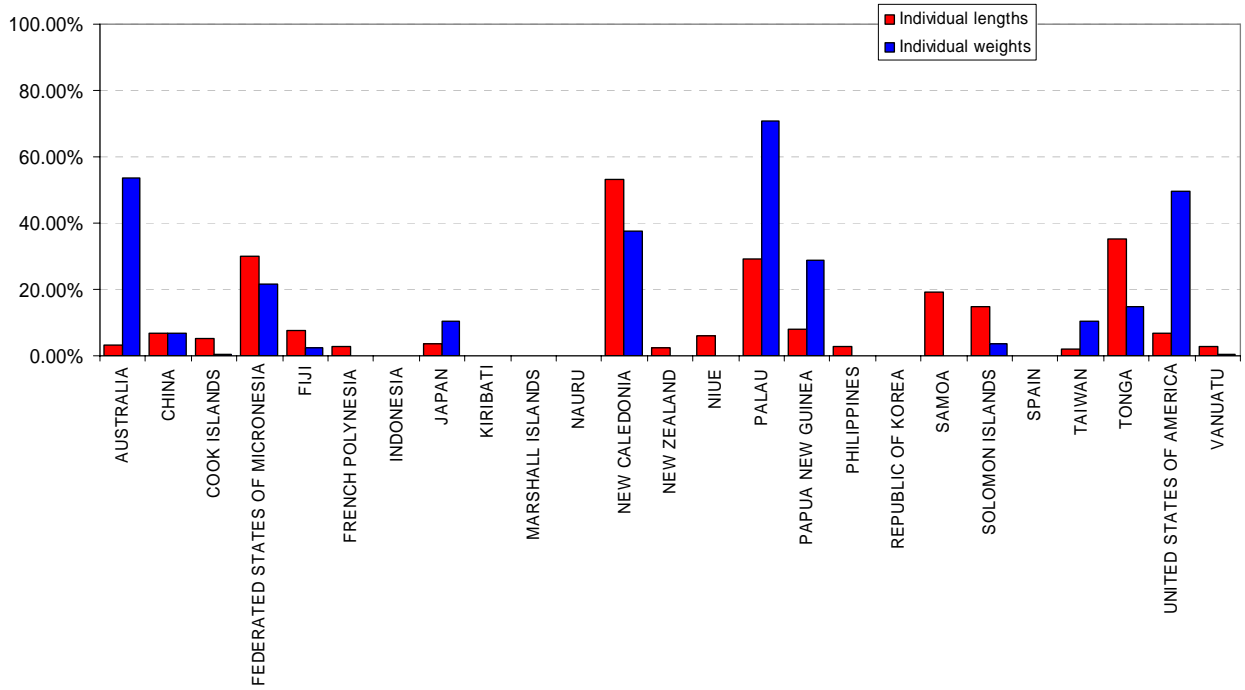
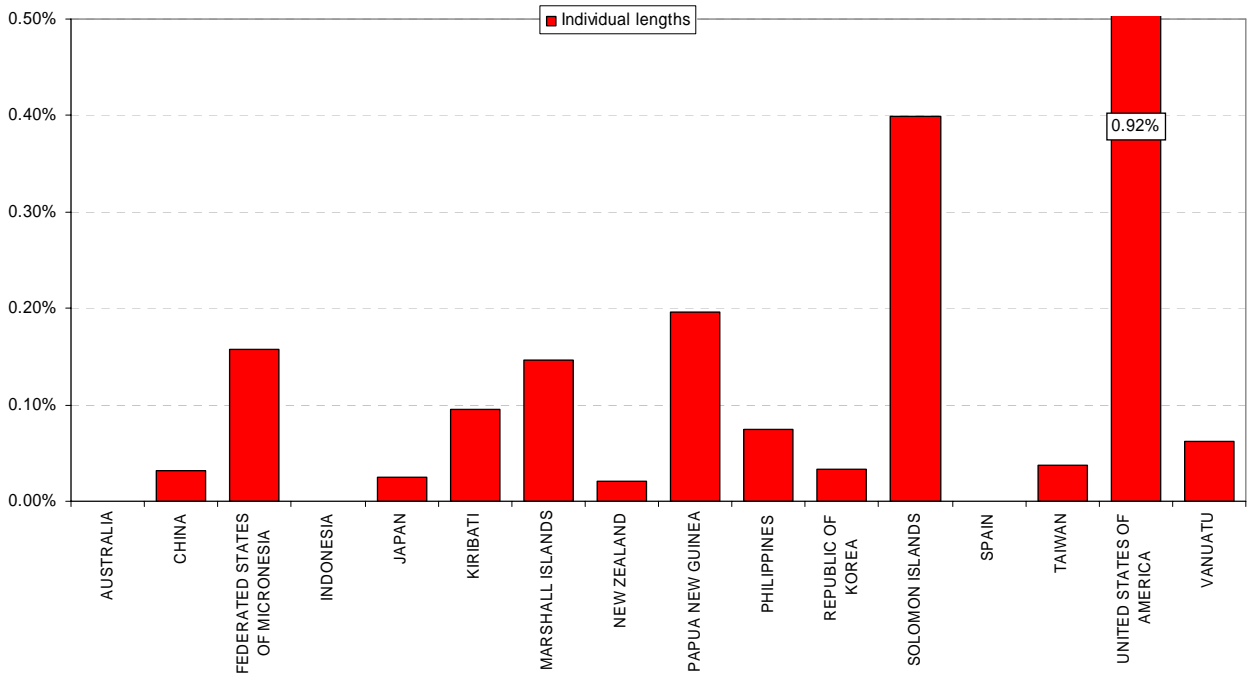


Figure 3. Coverage of available (i) aggregate and (ii) operational (logsheet) data, by fleet, in the WCPFC Convention Area PURSE-SEINE FISHERY, 2000–2005



**Figure 4. Coverage of available size composition data, by fleet, in the WCPFC Convention Area
LONGLINE FISHERY, 2000–2005**



**Figure 5. Coverage of available size composition data, by fleet, in the WCPFC Convention Area
PURSE-SEINE FISHERY, 2000–2005**

PROVISION OF ANNUAL CATCH ESTIMATES AND AGGREGATED CATCH AND EFFORT DATA

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 2007. Table 1 lists the dates on which catch estimates for 2006 were provided; the dates for the provision of annual catch estimates for 2003, 2004 and 2005 are given for comparison.

Table 2 lists the dates on which aggregated catch and effort data were provided by those fleets for which operational catch and effort are not provided.

Most sources that provide operational catch and effort data to the OFP do so throughout the year.

Table 1. Provision to the OFP of estimates of annual catches estimates for 2003–2006

COUNTRY / TERRITORY / ENTITY	2003	2004	2005	2006
Australia	30 Apr 2004	5 May 2005	28 Apr 2006	30 Apr 2007
Belize		13 Sep 2006	14 Dec 2006	
Canada	21 May 2005	21 May 2005	28 Jun 2006	9 May 2007
China	9 Aug 2004 (2)		7 Aug 2006 (2)	
Cook Islands	6 Jul 2004 (1)	15 Jul 2005 (1)	2 Jun 2006 (1)	7 Jun 2007
European Union (Spain)		28 Jul 2005	7 Aug 2006 (2)	6 Jun 2007
Federated States of Micronesia	15 Jul 2004 (1)	15 Jul 2005 (1)	2 Jun 2006 (1)	
Fiji Islands	21 Jul 2004	25 May 2005	13 Jul 2006	1 May 2007
French Polynesia	29 May 2004	28 Jul 2005	20 May 2006	1 May 2007
Indonesia	27 Apr 2004	13 May 2005	28 Apr 2006	12 Jun 2007
Japan	9 Aug 2004 (2)	31 May 2005	10 Jul 2006 (4)	24 May 2007 (5)
Kiribati	15 Jul 2004 (1)	15 Jul 2005 (1)	9 Jun 2006 (1)	17 Jul 2007
Republic of Korea	7 Jul 2004	30 Apr 2005	28 Apr 2006	1 May 2007
Marshall Islands	15 Jul 2004 (1)	15 Jul 2005 (1)	13 Jul 2006 (1)	4 Jul 2007
New Caledonia	16 Mar 2004	18 May 2005	28 Apr 2006	14 Mar 2007
New Zealand	23 Jul 2004	9 May 2005	4 May 2006	2 May 2007
Niue			13 Jul 2006	
Palau	15 Jul 2004 (1)	15 Jul 2005 (1)	13 Jul 2006	1 May 2007
Papua New Guinea	2 Jul 2004 (2)	15 Jul 2005	7 Aug 2006 (2)	11 Jul 2007
Philippines	17 May 2004 (3)	29 Apr 2005 (3)	30 Apr 2006 (3)	
Samoa	18 Jul 2004 (2)	7 Jun 2005	13 Jul 2006	1 May 2007
Senegal			13 Sep 2006	
Solomon Islands	9 Aug 2004 (2)	8 Aug 2005 (2)		21 May 2007
Chinese Taipei	21 Apr 2004	31 May 2005	1 May 2006	30 Apr 2007
Tonga	15 Jul 2004 (1)	11 May 2005	13 Jul 2006	28 Jun 2007
United States	21 May 2004	4 Aug 2005	28 Jul 2006	30 Apr 2007
Vanuatu	15 Jul 2004 (1)	15 Jul 2005 (1)	8 Jun 2006 (1)	6 Jun 2007

Notes to Table 1:

- 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 BAS; the breakdown by gear type and species was done by the OFP with port sampling data provided by NFRDI.
- 4 Catch estimates for longline in 2005 were not provided.
- 5 Catch estimates for longline and pole-and-line in 2006 were not provided.

Table 2. Provision to the OFP of aggregated catch and effort data covering 2001–2006

COUNTRY / ENTITY	GEAR TYPE	2001	2002	2003	2004	2005	2006
CANADA	Troll						9 May 2007 (4)
CHINA	Longline (1)			13 Aug 2004	28 Jul 2006	28 Jul 2006	
	Longline stratified by hooks between floats						
	Purse seine (2)			13 Aug 2004	28 Jul 2006	28 Jul 2006	
EU (SPAIN)	Longline, distant-water (3)				7 Feb 2006	1 Dec 2006	
JAPAN	Longline (4)	14 Apr 2003	27 May 2004	27 May 2004	1 Jun 2005	24 May 2007	
	Longline stratified by hooks between floats (5)	14 Apr 2003	27 May 2004	27 May 2004	1 Jun 2005	9 Jun 2007	
	Pole and line, nominal effort	15 Apr 2003	13 Apr 2004	4 Apr 2006	4 Apr 2006	24 May 2007	
	Purse seine, nominal effort	28 May 2002	14 Apr 2003	24 Feb 2004	22 Feb 2005	9 Mar 2006	5 Mar 2007
REPUBLIC OF KOREA	Longline	17 Jul 2002	8 Jun 2005	8 Jun 2005	28 Apr 2006	28 Apr 2006	
	Longline stratified by hooks between floats						
	Purse seine (6)	17 Jul 2002	13 May 2005	13 May 2005	13 May 2005		
CHINESE TAIPEI	Longline, distant-water	29 May 2003	21 Jul 2004	31 May 2005	1 May 2006	1 May 2006	30 Apr 2007
	Longline, offshore, west of 150E				1 May 2006		30 Apr 2007
	Longline stratified by hooks between floats						
	Purse seine (7)					1 May 2006	30 Apr 2007
UNITED STATES OF AMERICA	Longline - American Samoa (4)(8)	26 Jun 2003	26 Jun 2003	21 May 2004	22 Aug 2006	22 Aug 2006	30 Apr 2007
	Longline - Hawaii (4)(8)	6 Jun 2003	6 Jun 2003	21 May 2004	4 Aug 2005	22 Aug 2006	30 Apr 2007
	Longline stratified by hooks between floats						
	Troll - North Pacific					30 Apr 2007	30 Apr 2007
	Troll - South Pacific (8)	20 Nov 2001	17 Jun 2003	2 Jun 2004	4 Aug 2005	30 Apr 2007	30 Apr 2007

Notes to Table 2:

- 1 The catch data are in units of kilograms only, rather than both numbers of fish and kilograms.
- 2 The units of effort are unknown; the data are not stratified by school association; the data are aggregated by 5x5 instead of 1x1.
- 3 The catch data are for swordfish only.
- 4 The catch data are in units of numbers of fish only, rather than both numbers of fish and kilograms.
- 5 These data are stratified by 1x1, month and hooks between floats, and cover bigeye and yellowfin only.
- 6 The unit of effort is "days on which a set was made", rather than "days fished or searched".
- 7 The unit of effort for 2005 is "sets" rather than "days fished or searched".
- 8 In accordance with NOAA Administrative Order 216-100, strata with less than three vessels were deleted.

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