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

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Oceanic Fisheries Programme  
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# Scientific Data Available to the Western and Central Pacific Fisheries Commission

Oceanic Fisheries Programme  
Secretariat of the Pacific Community  
Noumea, New Caledonia

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## TABLE OF CONTENTS

Introduction.....	1
Recent Developments .....	1
Data Gaps.....	2
Coverage Rates .....	4
Provision of Annual Catch Estimates and Aggregated Catch and Effort Data.....	5
References.....	7
Appendix 1. Legend for Graphs Showing Coverage .....	8
Appendix 2. Coverage of South Pacific Albacore Data .....	9
Appendix 3. Coverage of WCPO Bigeye Data.....	12
Appendix 4. Coverage of WCPO Skipjack Data.....	18
Appendix 5. Coverage of WCPO Yellowfin Data.....	23
Appendix 6. Coverage of Indonesian and Philippines Domestic Fisheries Data .....	31
Appendix 7. Coverage of Data – Summary By Gear, 1999–2004.....	32

## 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>.

## RECENT DEVELOPMENTS

The following summarises recent developments concerning the data gaps identified at SC1 (Williams & Lawson 2005):

- The units of effort in aggregated catch and effort data covering the purse-seine fleets of the Republic of Korea that have been provided by Korea are ‘days on which a set was made’, rather than ‘days fished or searched’. The effort data were adjusted by applying the annual proportion of ‘days fishing and searching’ to ‘days fishing’ obtained from logsheet data provided by coastal states covering the Korean fleet.
- Operational catch and effort data compiled by the OFP covering the purse-seine fleet of Chinese Taipei prior to 1993 were under-reported (Lawson 1992, 1994). The catch data were adjusted by assuming that the trends in catch rates for this fleet (by set type) were similar to the Korean purse-seine fleet, which operated over a similar area and were in a similar developmental stage of their fishery. The CPUE for target tunas determined from the Korean data, stratified by year/month, geographic area and school association, was applied to the Chinese Taipei effort to estimate the catch for the latter fleet over the period 1983–1992.
- Catches stratified by gear type, species, year/month and geographic area, covering the domestic fisheries of the Philippines were determined from annual catch estimates provided by the Bureau of Agricultural Statistics 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 2005–2006 has been provided by the Commission through the Indonesia and Philippines Data Collection Project (IPDCP).

- 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. Longline, handline, pole-and-line and purse seine catches of skipjack, yellowfin and bigeye represented 4%, 2%, 53% and 8% in 1990, with the remaining 33% from unclassified gear types. For 2005, longline, pole-and-line and purse seine represented 13%, 16% and 71% of the catch of all species; handline and unclassified were not reported. The estimate of the catch of bigeye in 2005, 26,636 tonnes, is much greater than the estimate for 2004, 9,335 tonnes. 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.
- For the first time, aggregated catch and effort data for the Chinese-Taipei domestic longline fleet, covering 2004, were provided by Chinese Taipei.
- Data collected during the Pelagic Fisheries Oceanic Investigations (POFI) longline surveys of the United States in the 1950s were provided in November 2005.
- An analysis of the proportion of bigeye in ‘yellowfin plus bigeye’ caught by purse seiners (Lawson 2005) was updated with recent observer data and expanded to estimate adjustment factors for all types of school association. The updated estimates of the proportion of bigeye in the combined catch of ‘yellowfin plus bigeye’ were applied to the aggregated purse-seine catch data for certain fleets.

## DATA GAPS

Appendix 1 contains the legend to graphs showing the coverage of aggregated catch and size composition data by species, gear and fleet, which are presented in Appendices 2–6. 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, 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.

- 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 and Vanuatu, 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.
- 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.

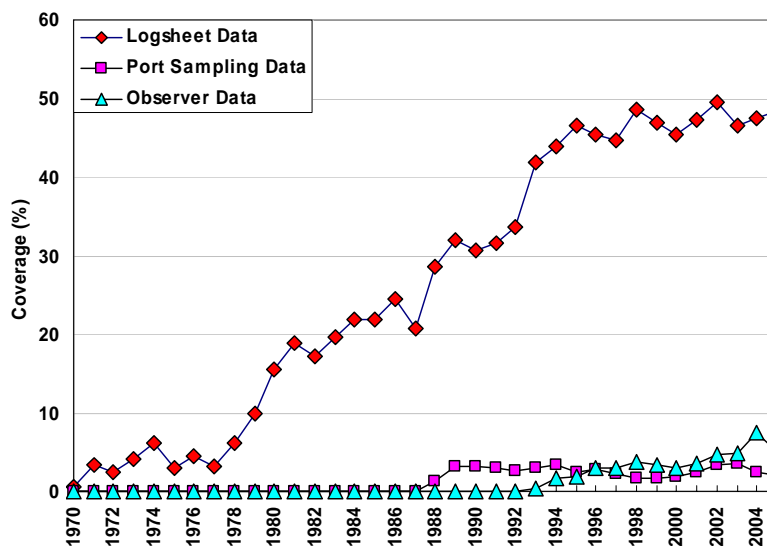
## Ecosystem approach to fisheries

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



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

## 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 2006. Table 1 lists the dates on which catch estimates for 2005 were provided; the dates for the provision of annual catch estimates for 2003 and 2004 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 2003–2005**

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

*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.
- 3 Total annual catches were provided by the Bureau of Agricultural Statistics; the breakdown by gear type and species was done by the OFP with port sampling data provided by National Fisheries Research and Development Institute.

**Table 2. Provision to the OFP of aggregated catch and effort data covering 2001–2005**

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

*Notes to Table 2:*

- 1 The catch data are in units of tonnes only, rather than both numbers of fish and kilograms.
- 2 The units of effort are unknown.
- 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 The unit of effort is "days on which a set was made", rather than "days fished or searched".
- 6 The unit of effort is "sets" rather than "days fished or searched".



**REFERENCES**

- Anonymous. 2005a. Report of the First Regular Session of the Scientific Committee of the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, Noumea, New Caledonia, 8–19 August 2005. Western and Central Pacific Fisheries Commission, Pohnpei, Federated States of Micronesia.
- Anonymous. 2005b. Summary Record of the Second Session of the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, Pohnpei, Federated States of Micronesia, 12–16 December 2005. Western and Central Pacific Fisheries Commission, Pohnpei, Federated States of Micronesia.
- Lawson, T.A. 1992. Non-reporting and under-reporting of catches by Western Pacific purse seiners in data collected by coastal states. Working Paper 6. Fifth meeting of the Standing Committee on Tuna and Billfish, Honolulu, Hawaii, United States of America, 17–19 June 1992. Tuna and Billfish Assessment Programme, South Pacific Commission, Noumea, New Caledonia.
- Lawson, T.A. 1994. Coverage and accuracy of catches reported on logbooks provided to coastal states by distant-water purse-seine fleets in the tropical western Pacific Ocean. OFP Internal Report No. 26. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.
- Lewis, A.D. 2005. The Tuna Fisheries of Vietnam — An Overview of Available Information. Information Paper ST IP-5. First Meeting of the Scientific Committee of the Western and Central Pacific Fisheries Commission, 8–19 August 2005, Noumea, New Caledonia. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.
- Williams, P.G. & T.A. Lawson. 2005. A summary of aggregate catch/effort and size composition data available to the WCPFC Scientific Committee, highlighting the main data gaps Information Paper ST IP-2. First meeting of the WCPFC Scientific Committee, 8–19 August 2005, Noumea, New Caledonia. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

## APPENDIX 1. LEGEND FOR GRAPHS SHOWING COVERAGE

The following descriptions apply to the graphs presented in APPENDICES 2–6.

The graphs show trends in the coverage of aggregated catch and effort and size composition data by species, gear type and fleet, covering the Western and Central Pacific Fisheries Commission Convention Area (WCP–CA) for bigeye, skipjack and yellowfin, and the South Pacific for albacore.

In each graph, the GREEN line represents the years where annual catch estimates are available, and therefore, should reflect the periods when respective fleets caught that species.

The GREY line shows the trend in annual catches according to the WCPFC Tuna Fishery Yearbook (Lawson, 2005), and refers to the left-hand Y-AXIS. This is used to give some indication of the relative importance of the coverage of aggregate catch and size composition data for each year.

The BLUE histograms represent the total catch according to the available Aggregated Catch data for that species, and refers to the left-hand Y-AXIS.

The RED Histograms represent the coverage of the Size composition data with respect to the Annual catch estimate (from Lawson, 2005), and refers to the right-hand Y-AXIS. Note that the value for size composition is either (i) the coverage of length samples, or (ii) the coverage of weight samples, depending on which has the highest coverage value.

The following descriptions apply to the graphs presented in APPENDIX 7.

The GREEN histograms represent the total catch estimate (Lawson, 2005) for each flag, and refers to the left-hand Y-AXIS.

The BLUE histograms represent the total target catch according to the available Aggregated Catch data for each flag, and refers to the left-hand Y-AXIS.

The RED Histograms represent the coverage of the Size composition data with respect to the Annual catch estimate (from Lawson, 2005) for that flag, and refers to the right-hand Y-AXIS. Note that the value for size composition is either (i) the coverage of length samples, or (ii) the coverage of weight samples, depending on which has the highest coverage value.

**APPENDIX 2. COVERAGE OF SOUTH PACIFIC ALBACORE DATA**

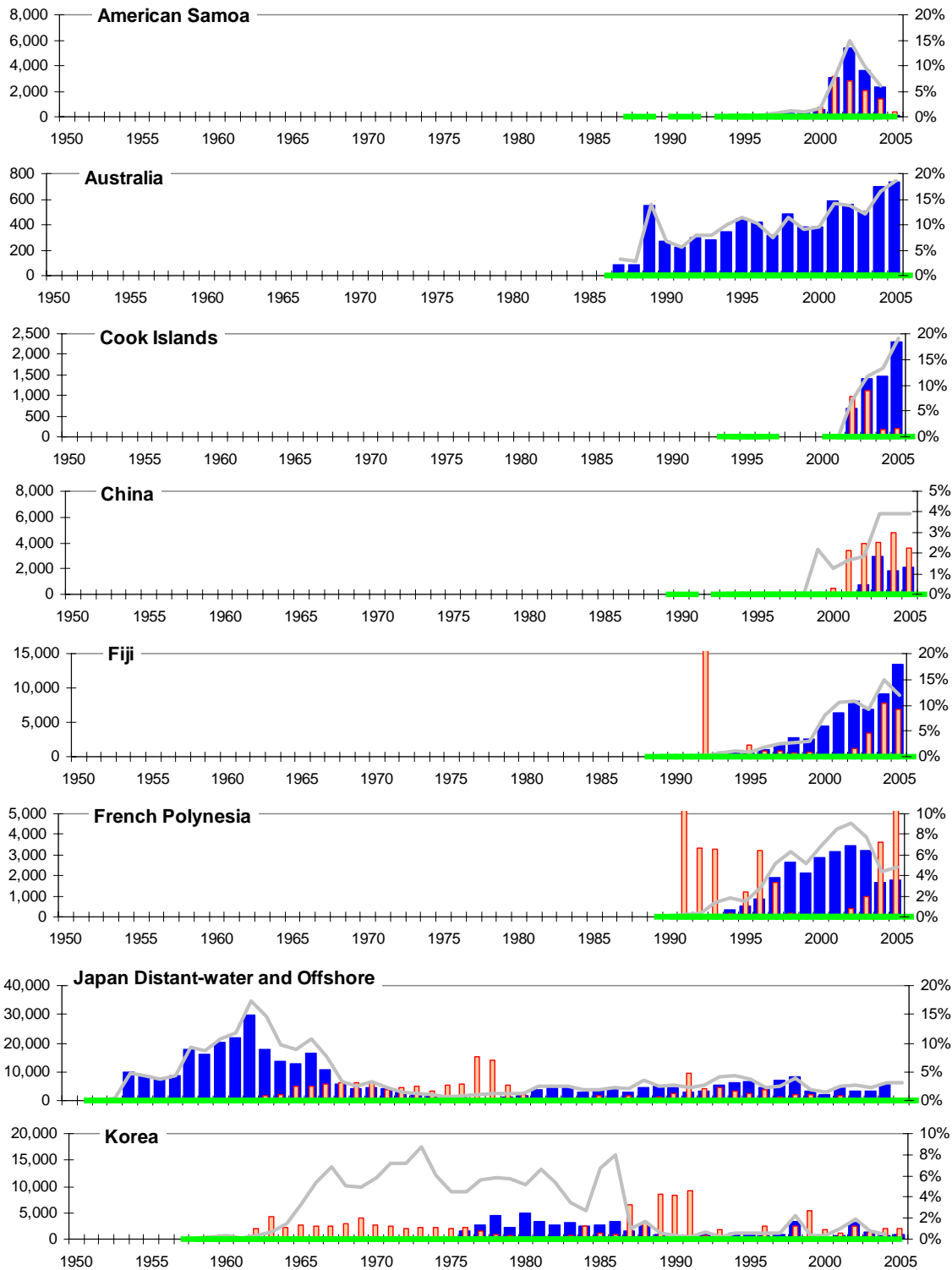


Figure 2. Coverage of ALBACORE catch and size composition data in the SOUTH PACIFIC LONGLINE FISHERY, by year and fleet

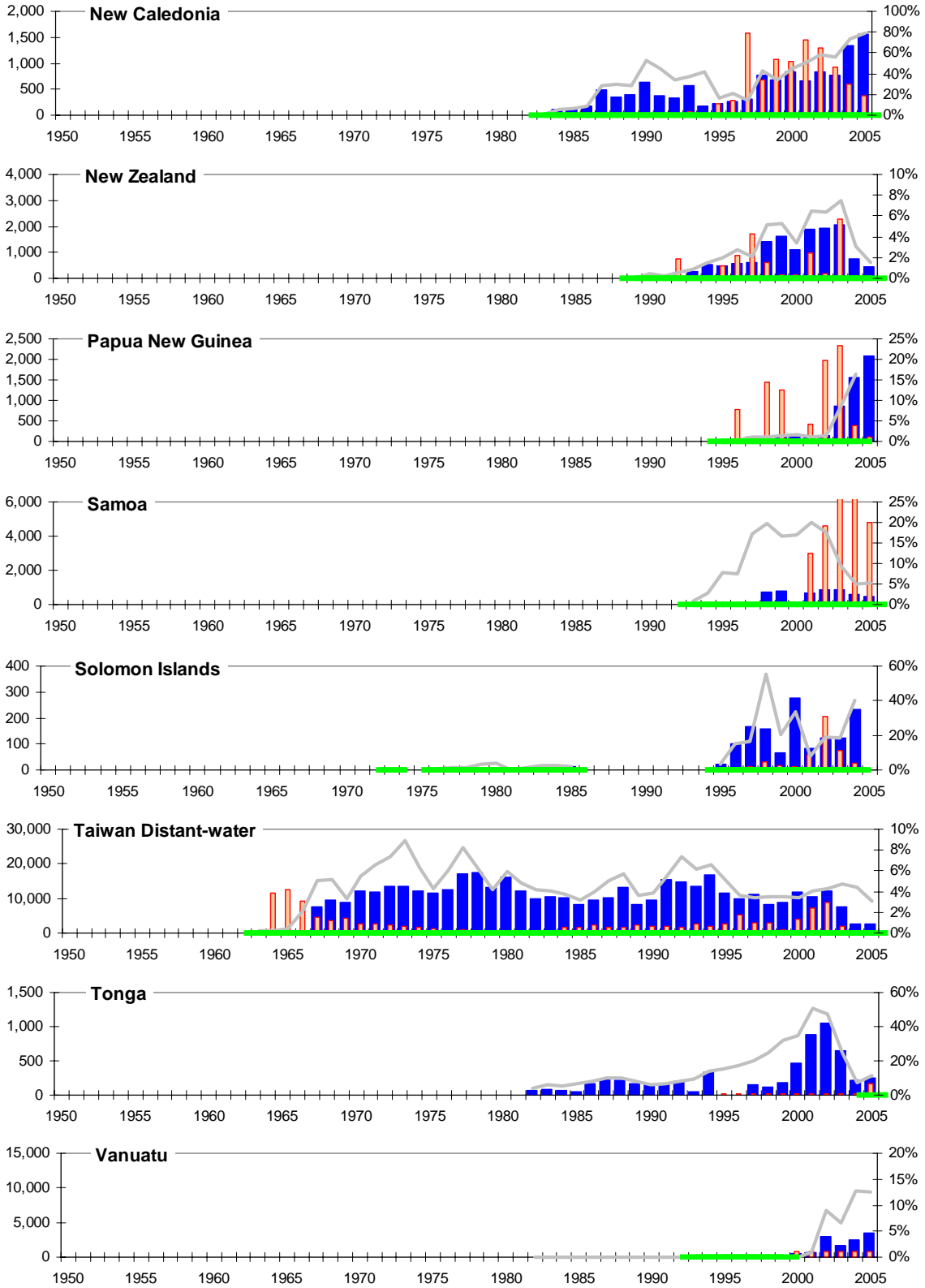
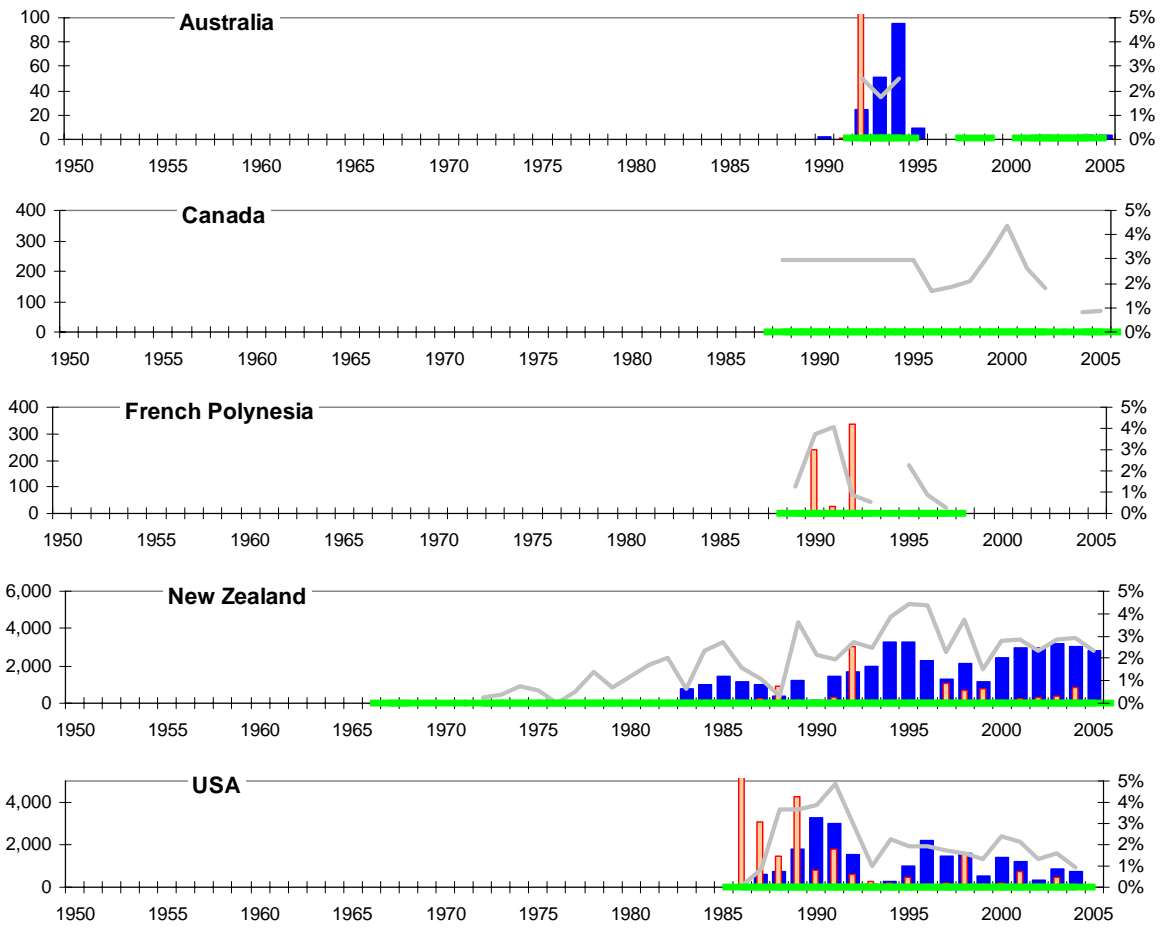
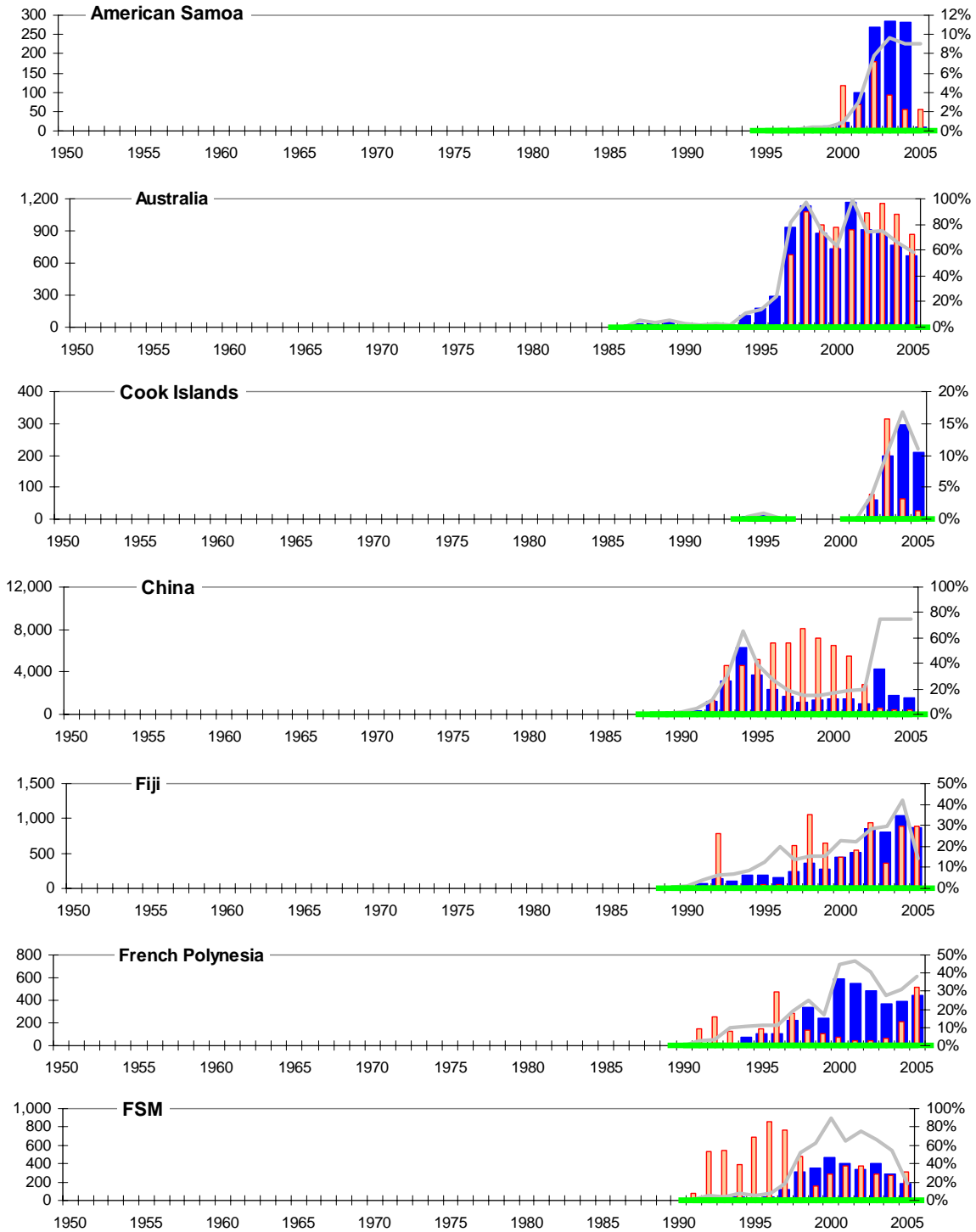


Figure 1. (continued)



**Figure 3. Coverage of ALBACORE catch and size composition data in the SOUTH PACIFIC TROLL FISHERY, by year and fleet**

**APPENDIX 3. COVERAGE OF WCPO BIGEYE DATA**



**Figure 4. Coverage of BIGEYE catch and size composition data in the WCPO LONGLINE FISHERY, by year and fleet**

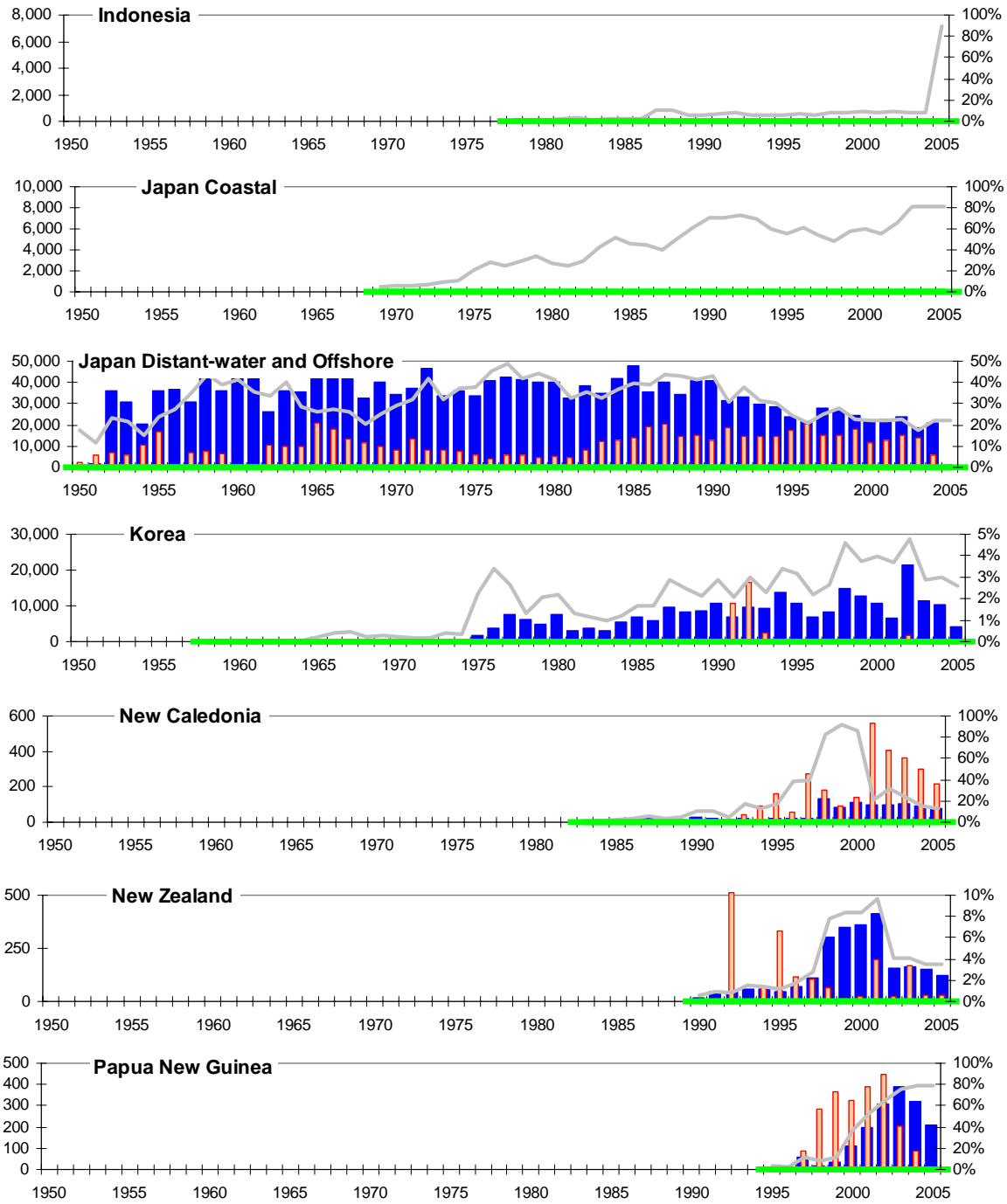


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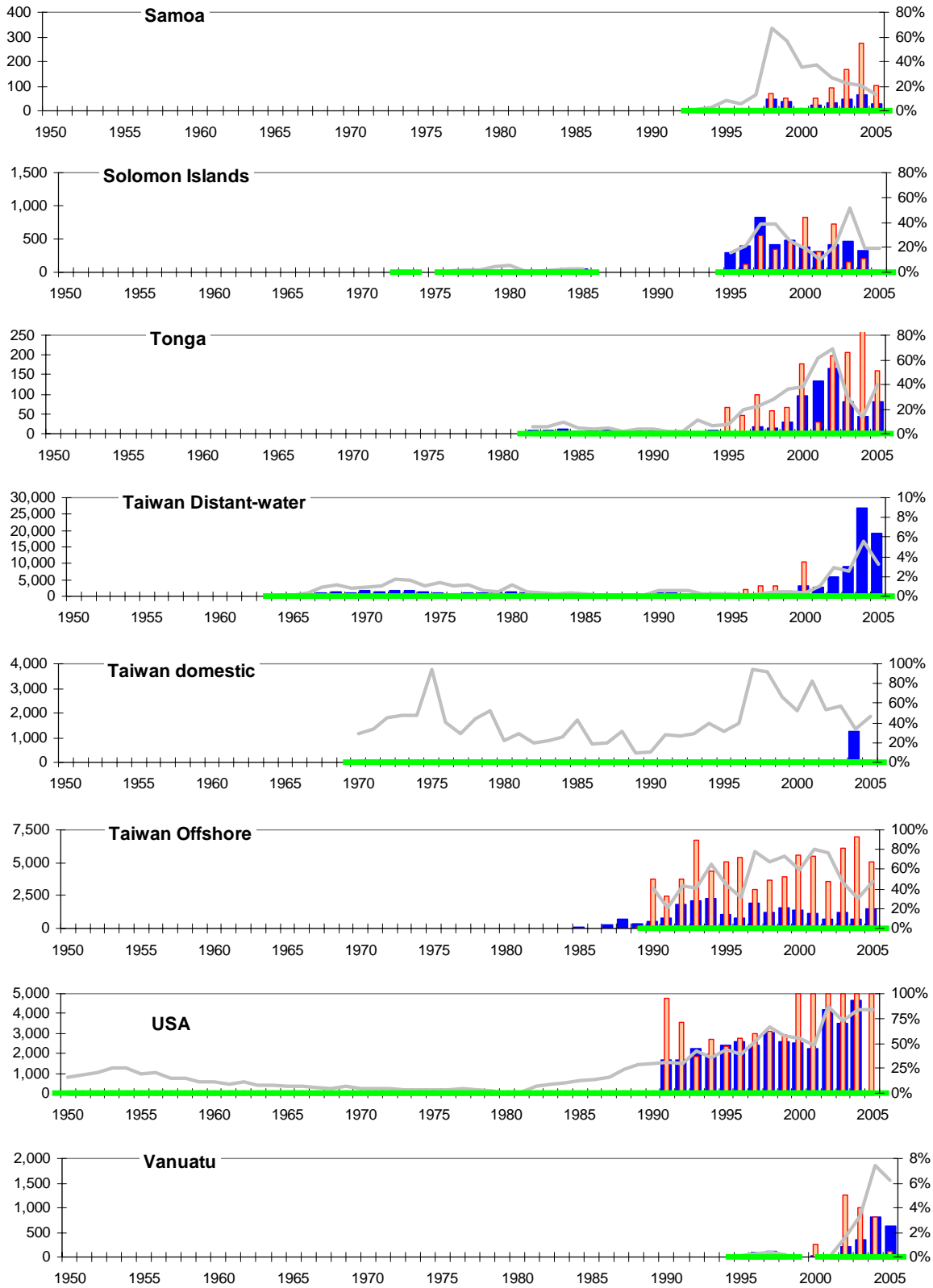
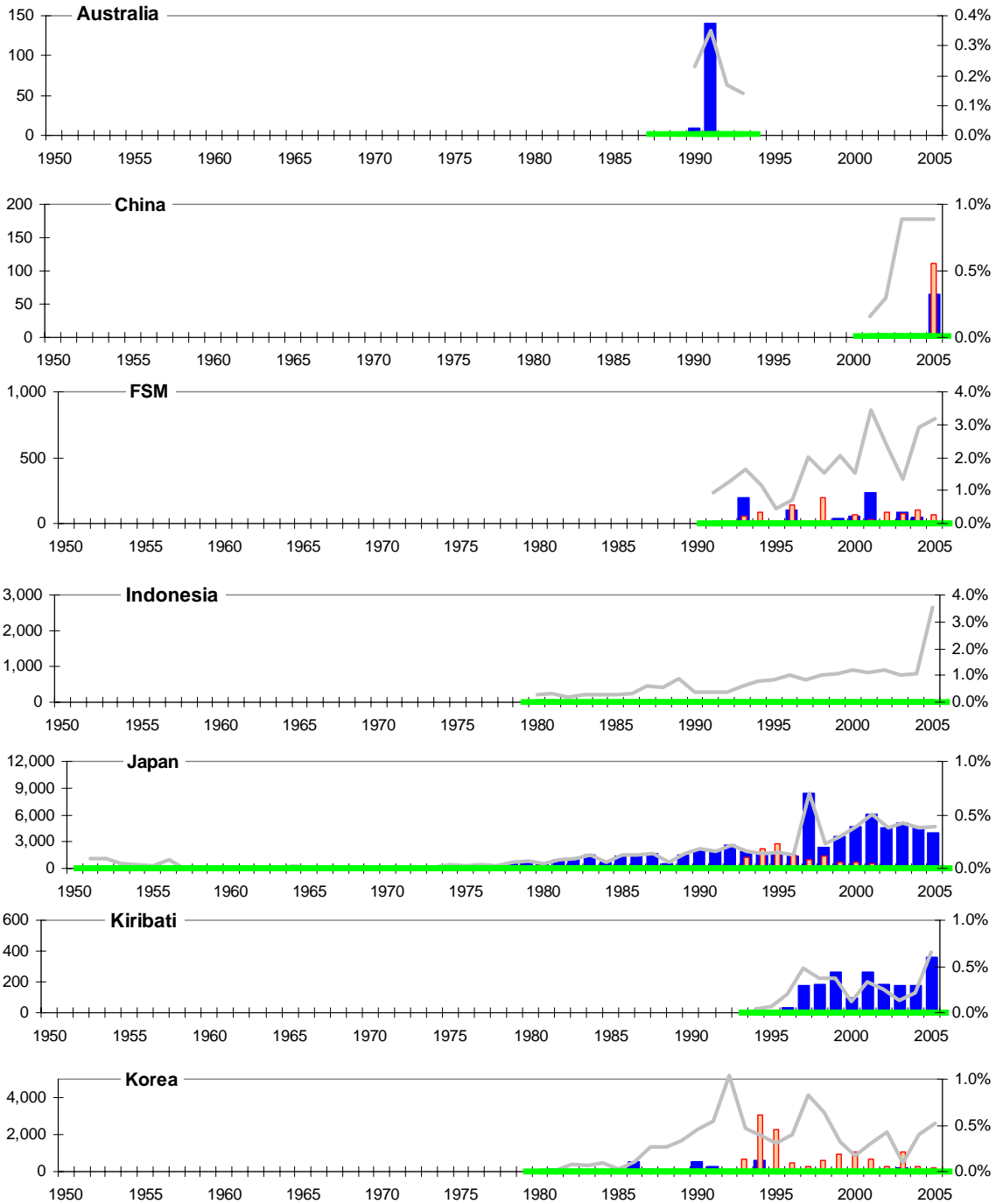


Figure 3. (continued)





**Figure 5. Coverage of BIGEYE catch and size composition data in the WCPO PURSE SEINE FISHERY, by year and fleet**

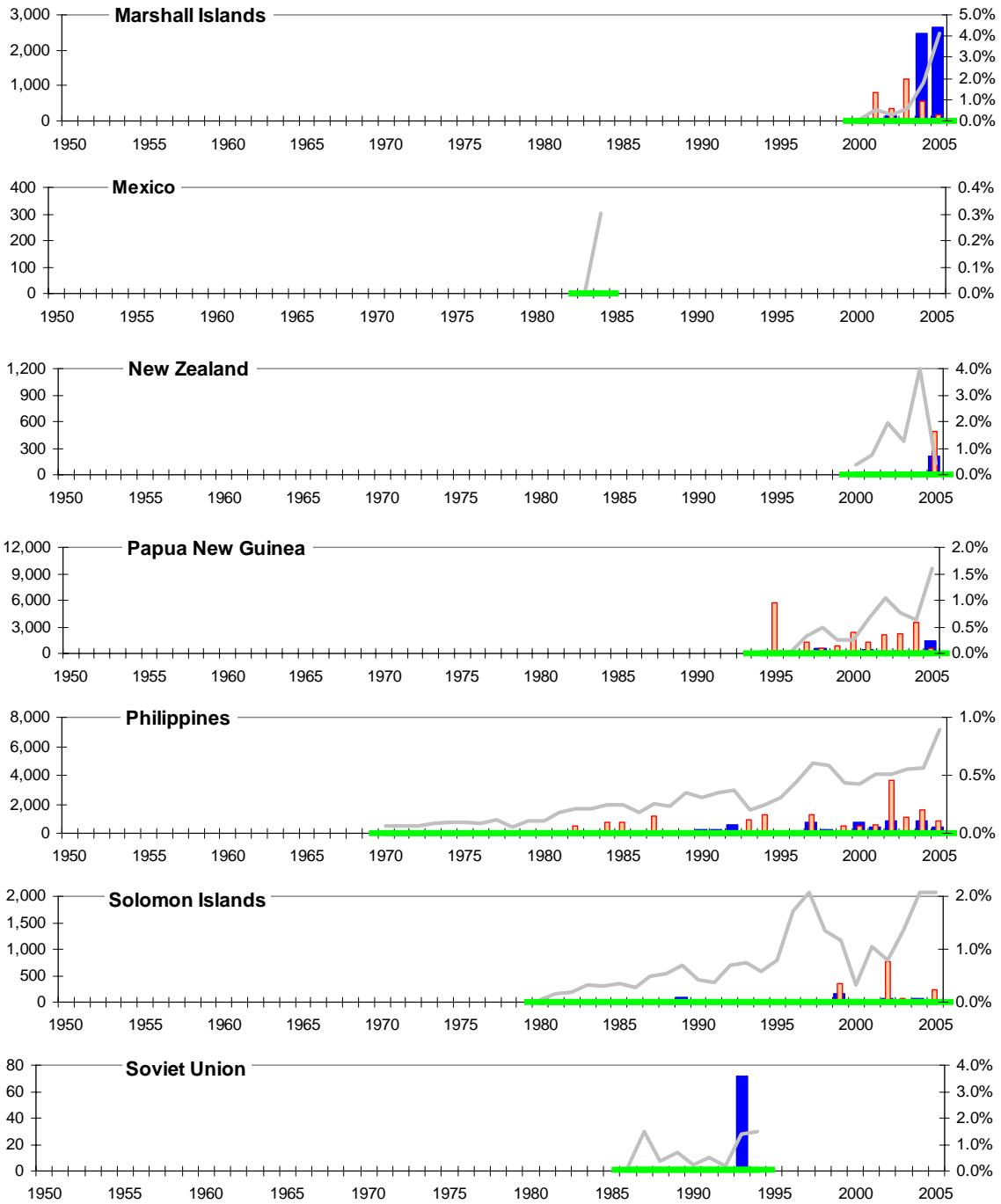


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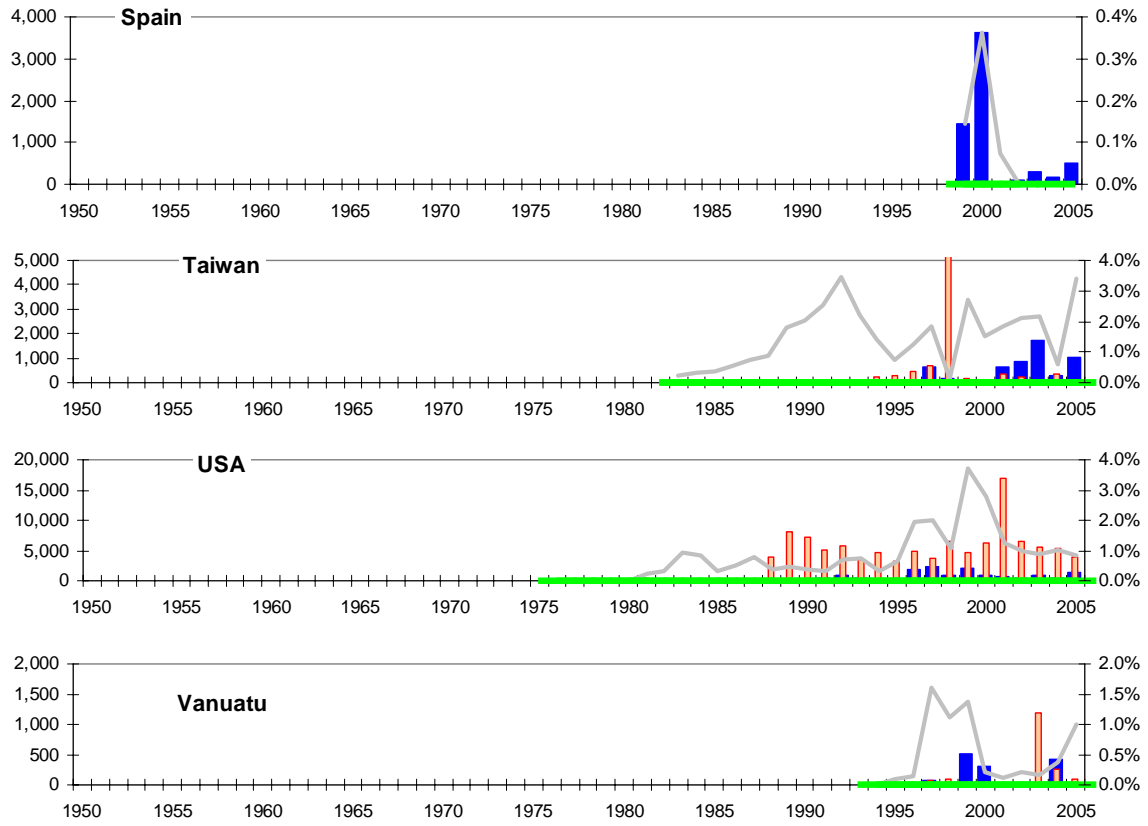
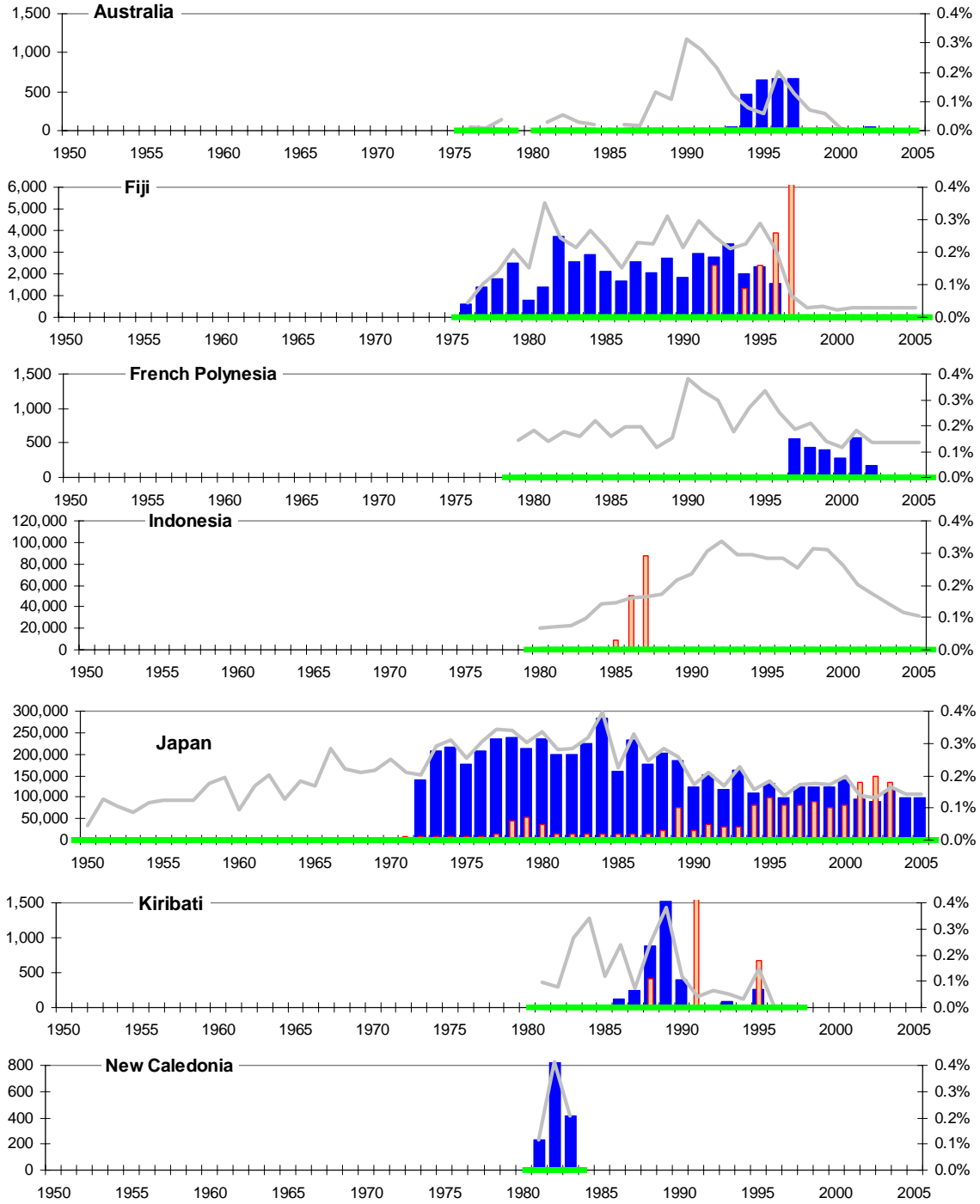


Figure 4. (continued)

**APPENDIX 4. COVERAGE OF WCPO SKIPJACK DATA**



**Figure 6. Coverage of SKIPJACK catch and size composition data in the WCPO POLE-AND-LINE FISHERY, by year and fleet**

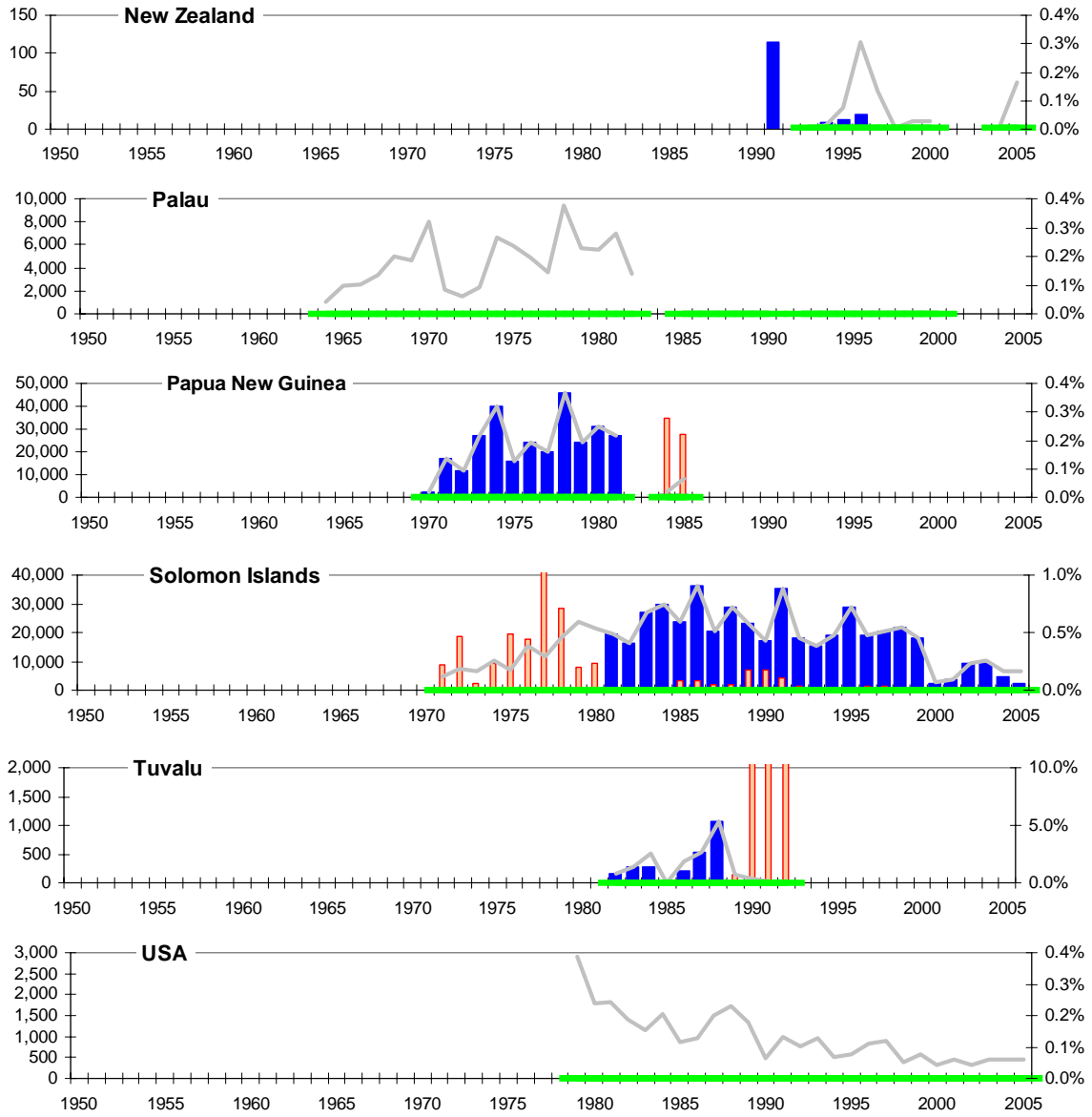
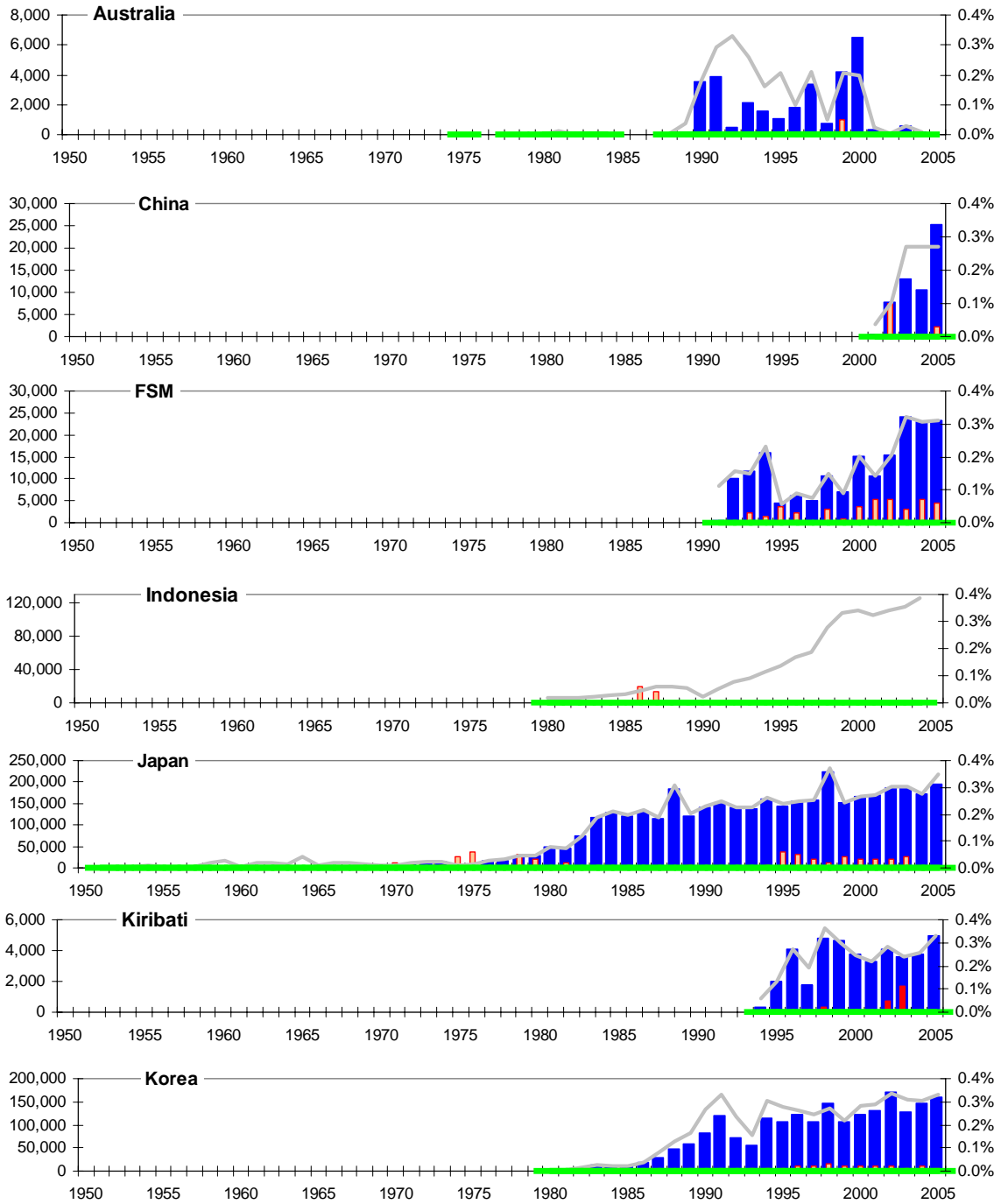


Figure 5. (continued)



**Figure 7. Coverage of SKIPJACK catch and size composition data in the WCPO PURSE SEINE FISHERY, by year and fleet**

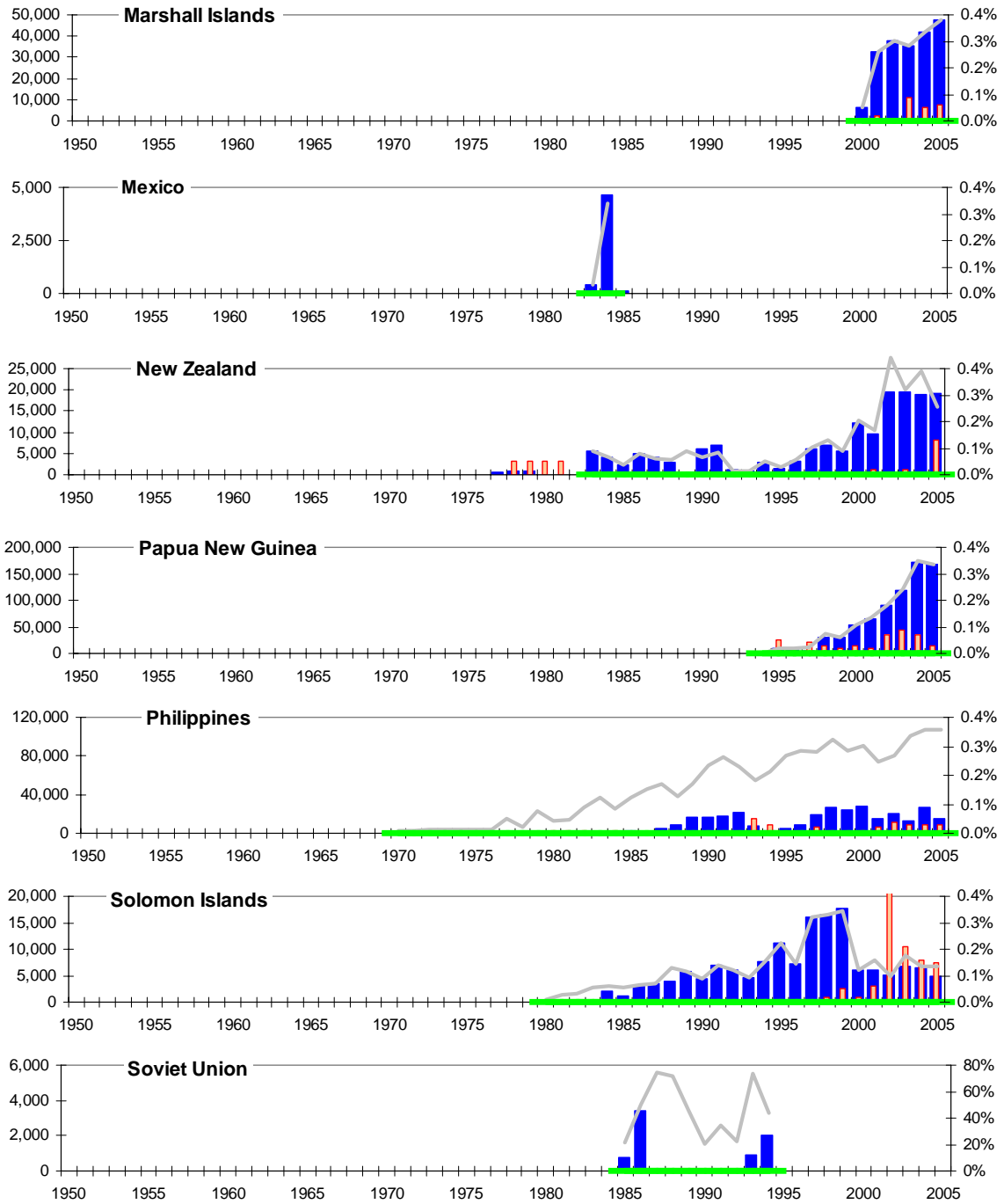


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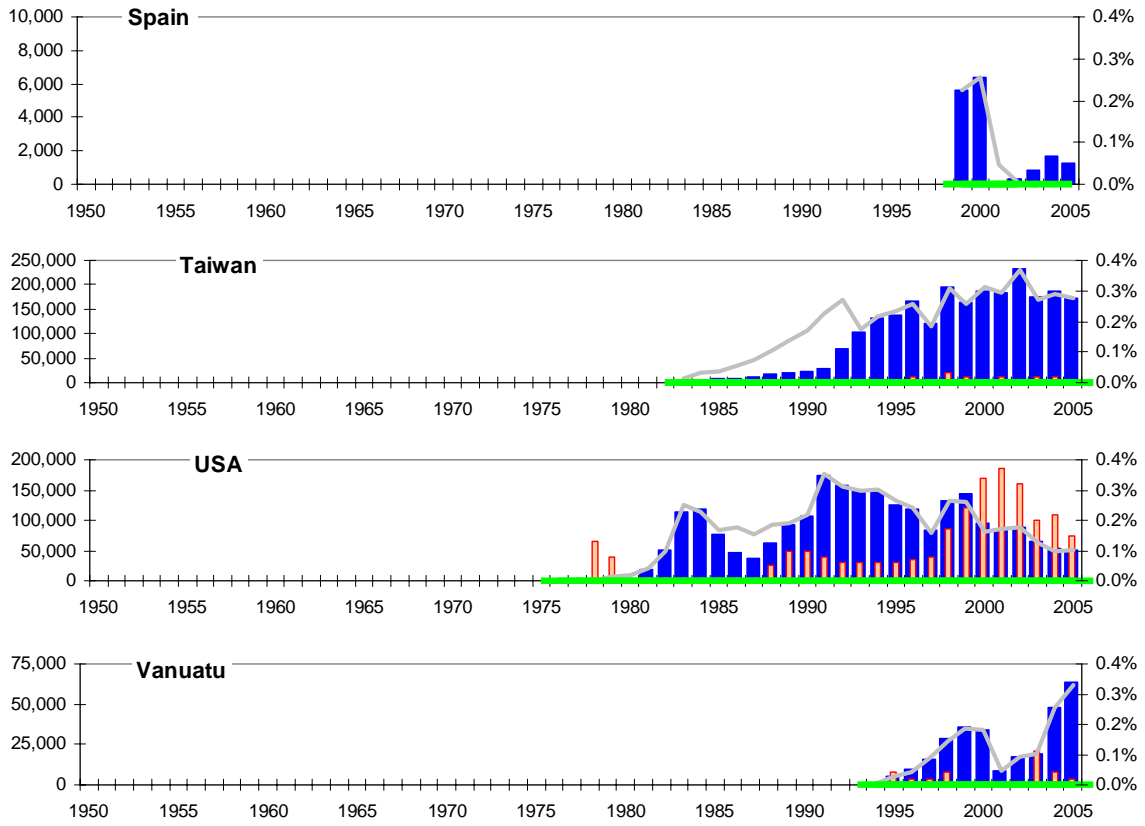
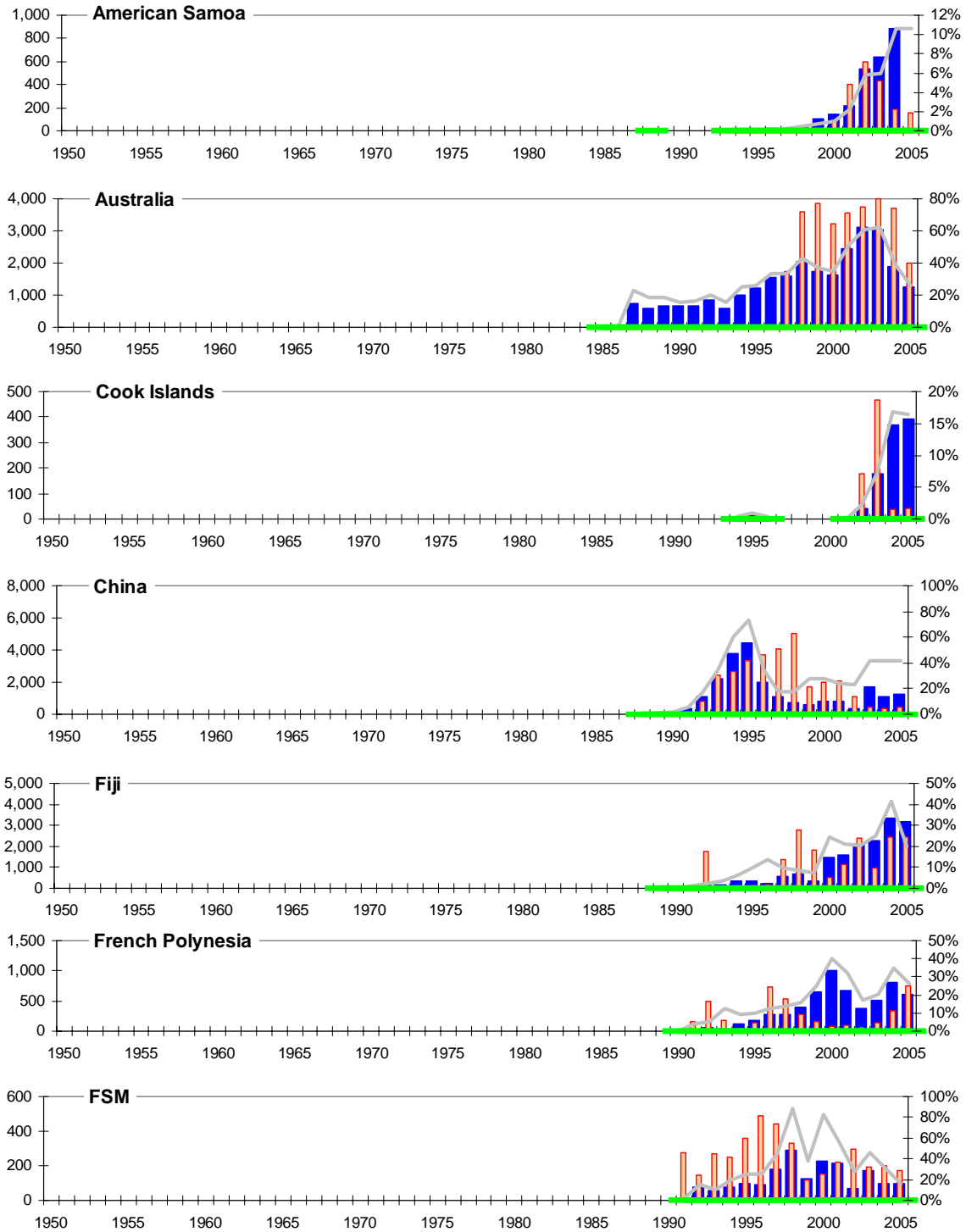


Figure 6. (continued)



**APPENDIX 5. COVERAGE OF WCPO YELLOWFIN DATA**



**Figure 8. Coverage of YELLOWFIN catch and size composition data in the WCPO LONGLINE FISHERY, by year and fleet**

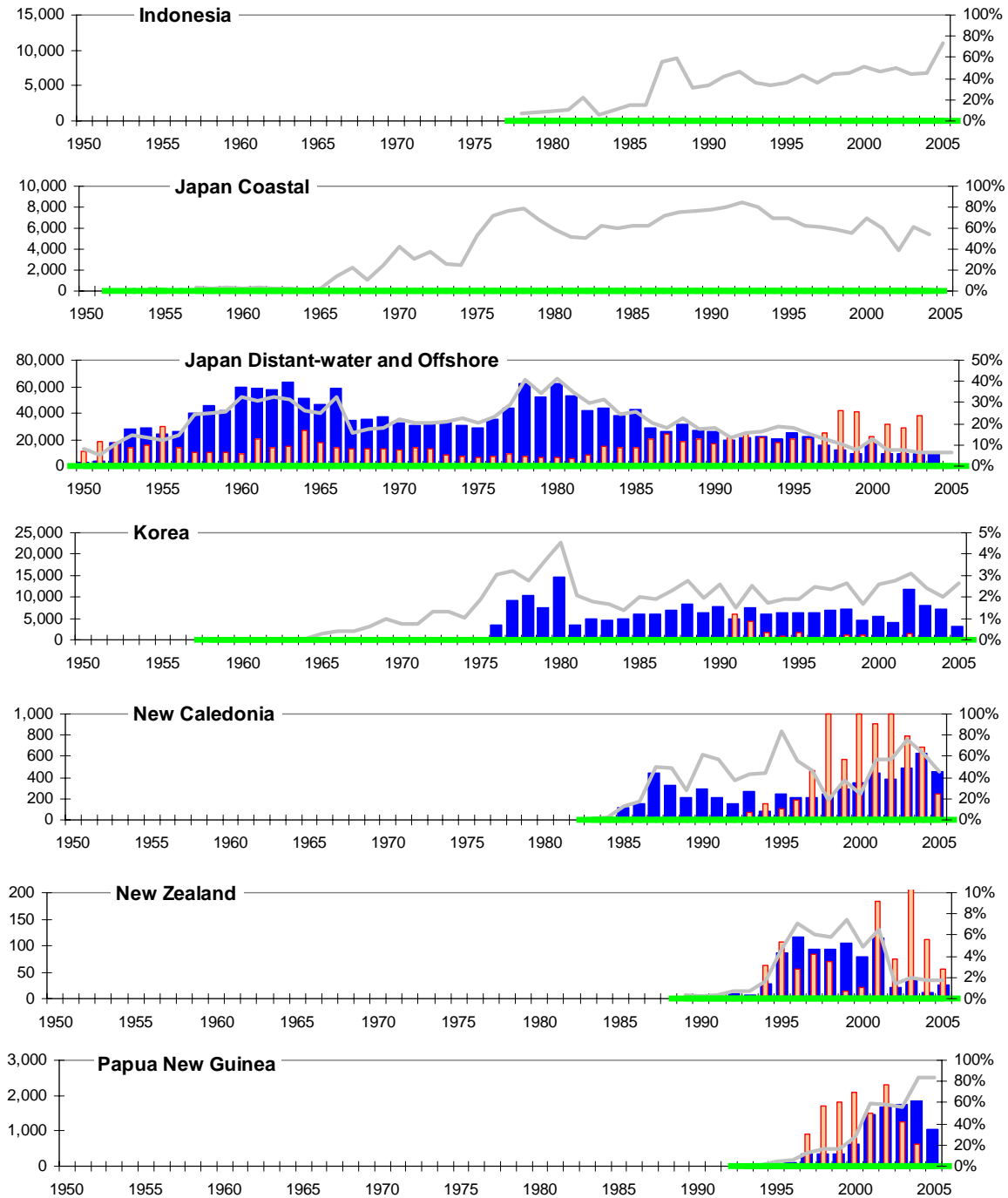


Figure 7. (continued)

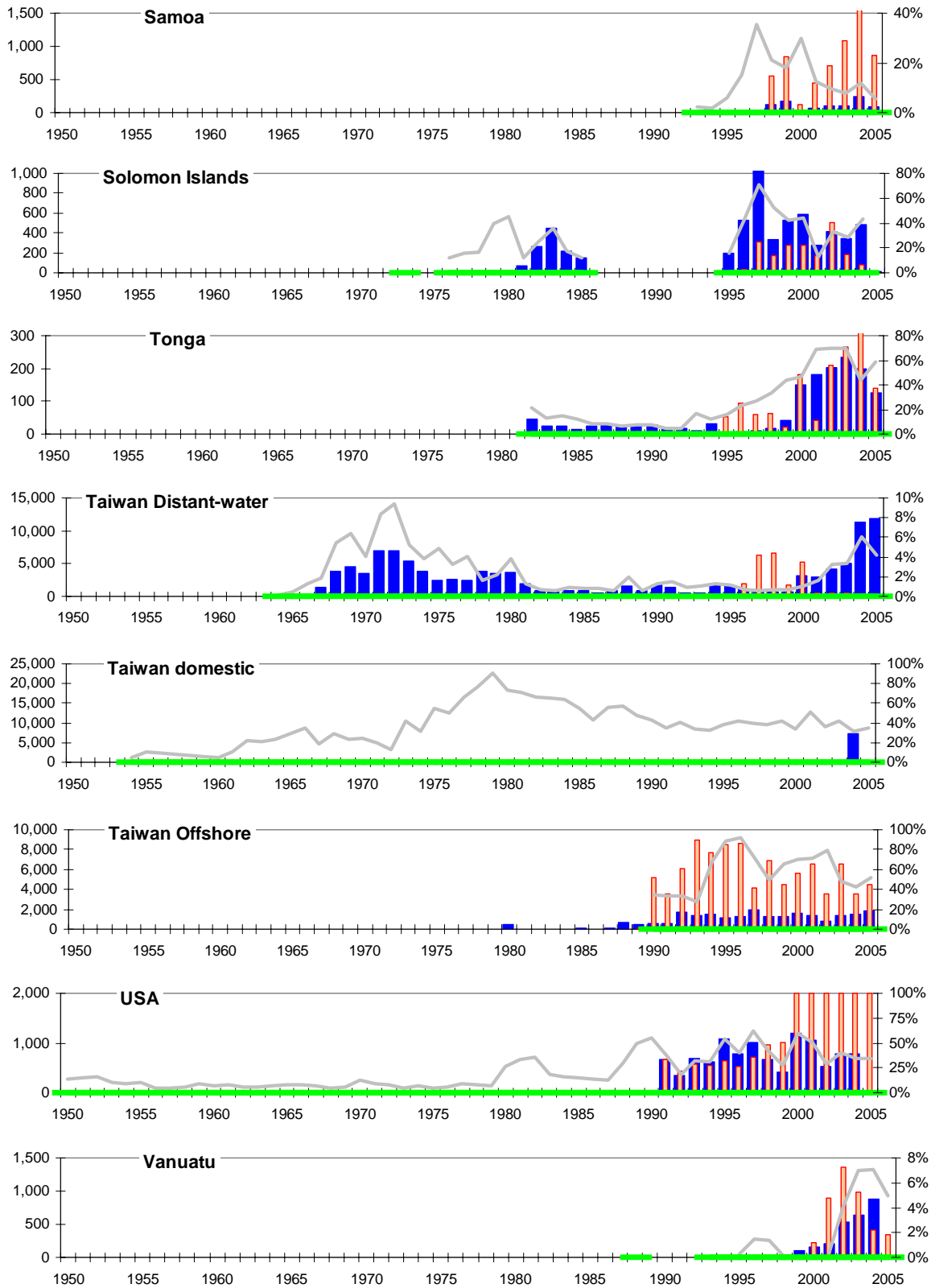
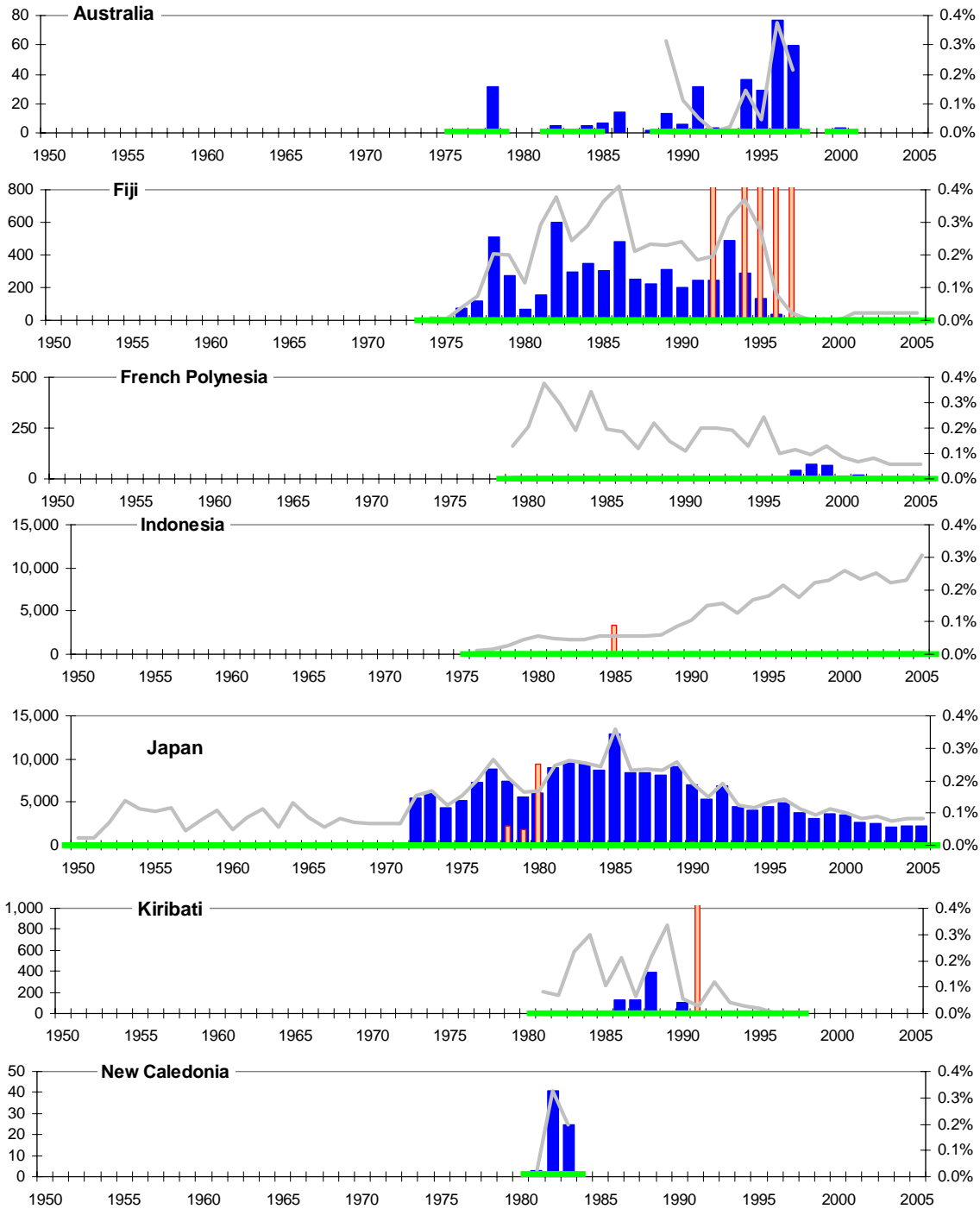


Figure 7. (continued)



**Figure 9. Coverage of YELLOWFIN catch and size composition data in the WCPO POLE-AND-LINE FISHERY, by year and fleet**

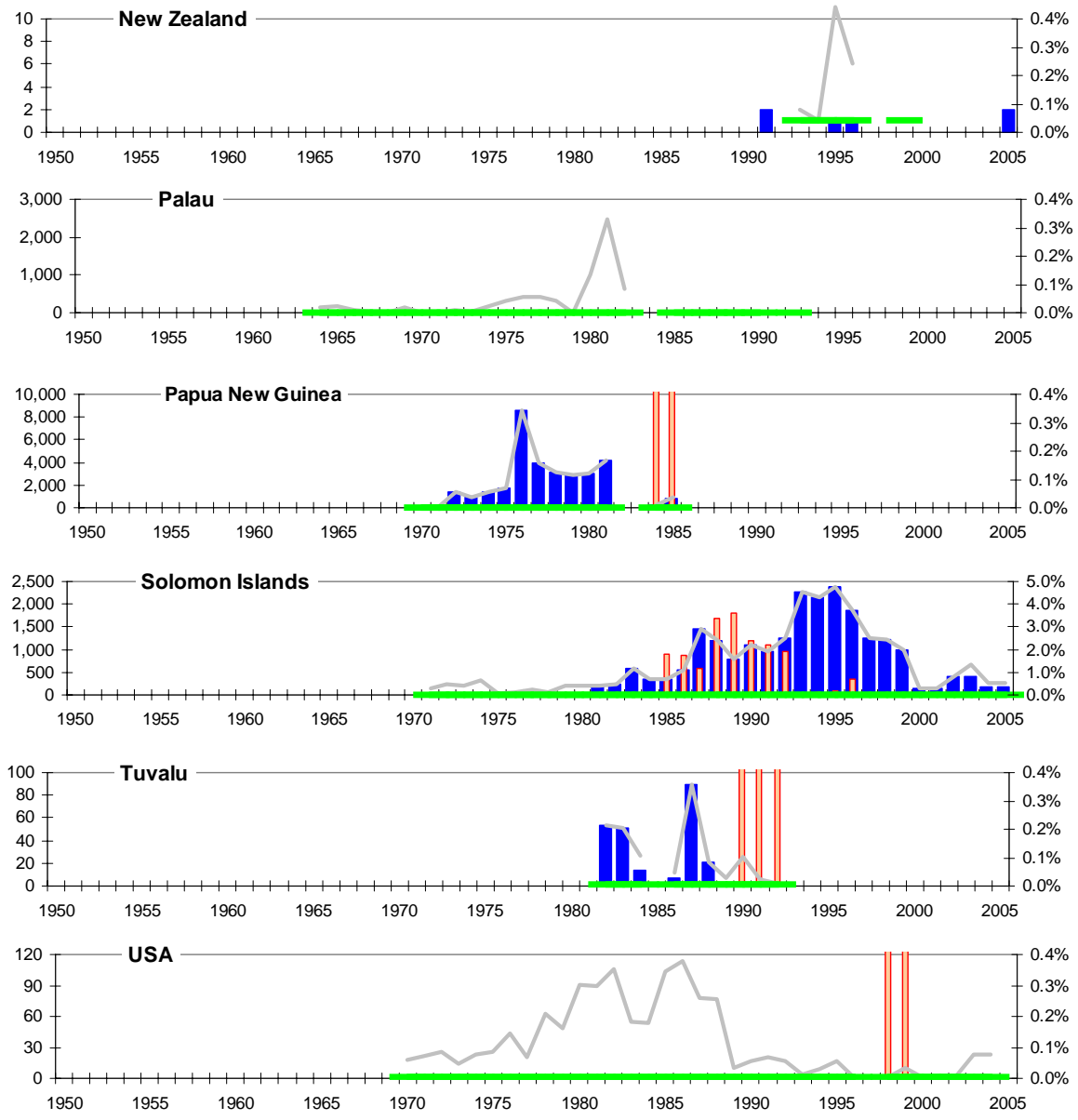
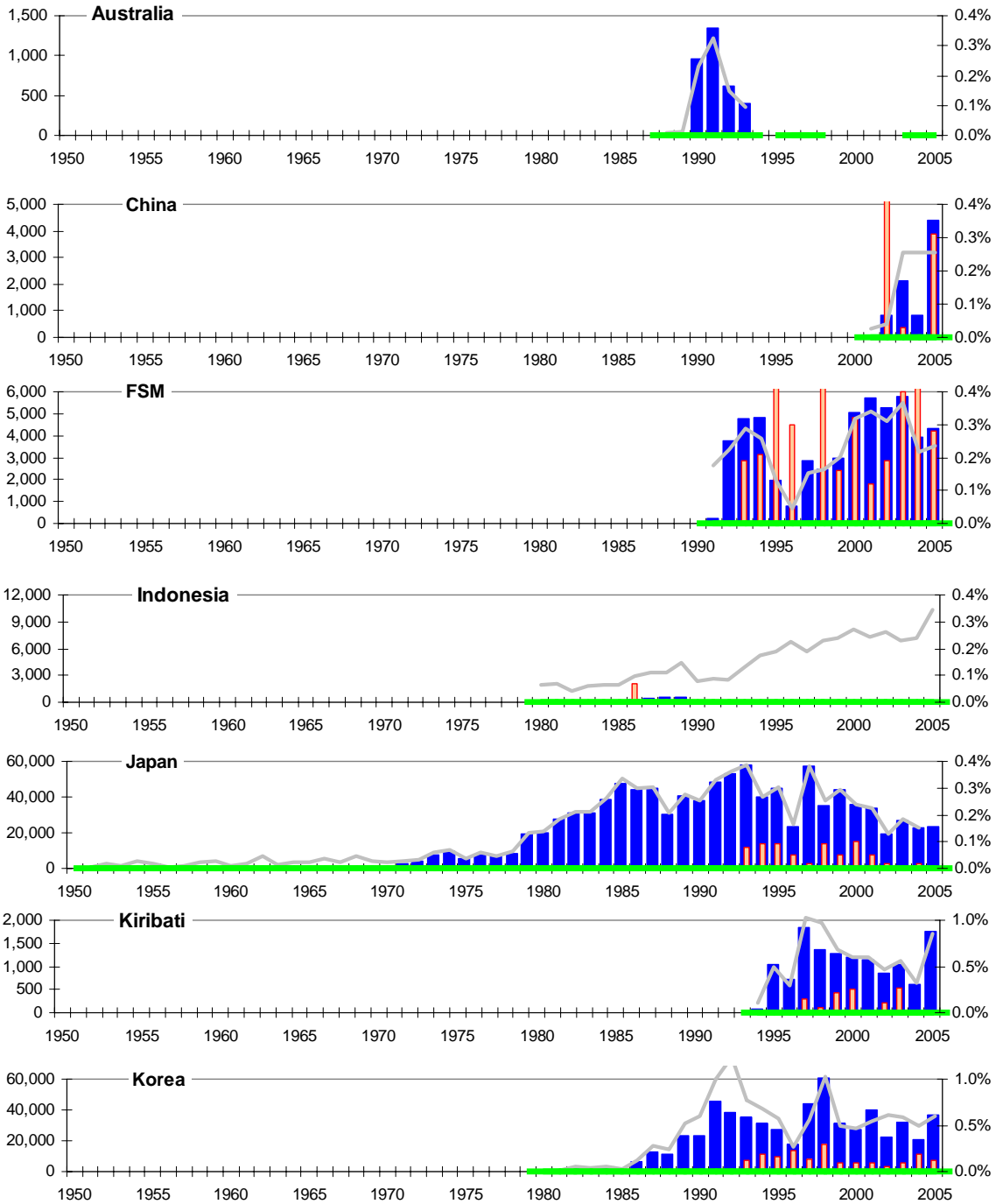


Figure 8. (continued)



**Figure 10. Coverage of YELLOWFIN catch and size composition data in the WCPO PURSE SEINE FISHERY, by year and fleet**

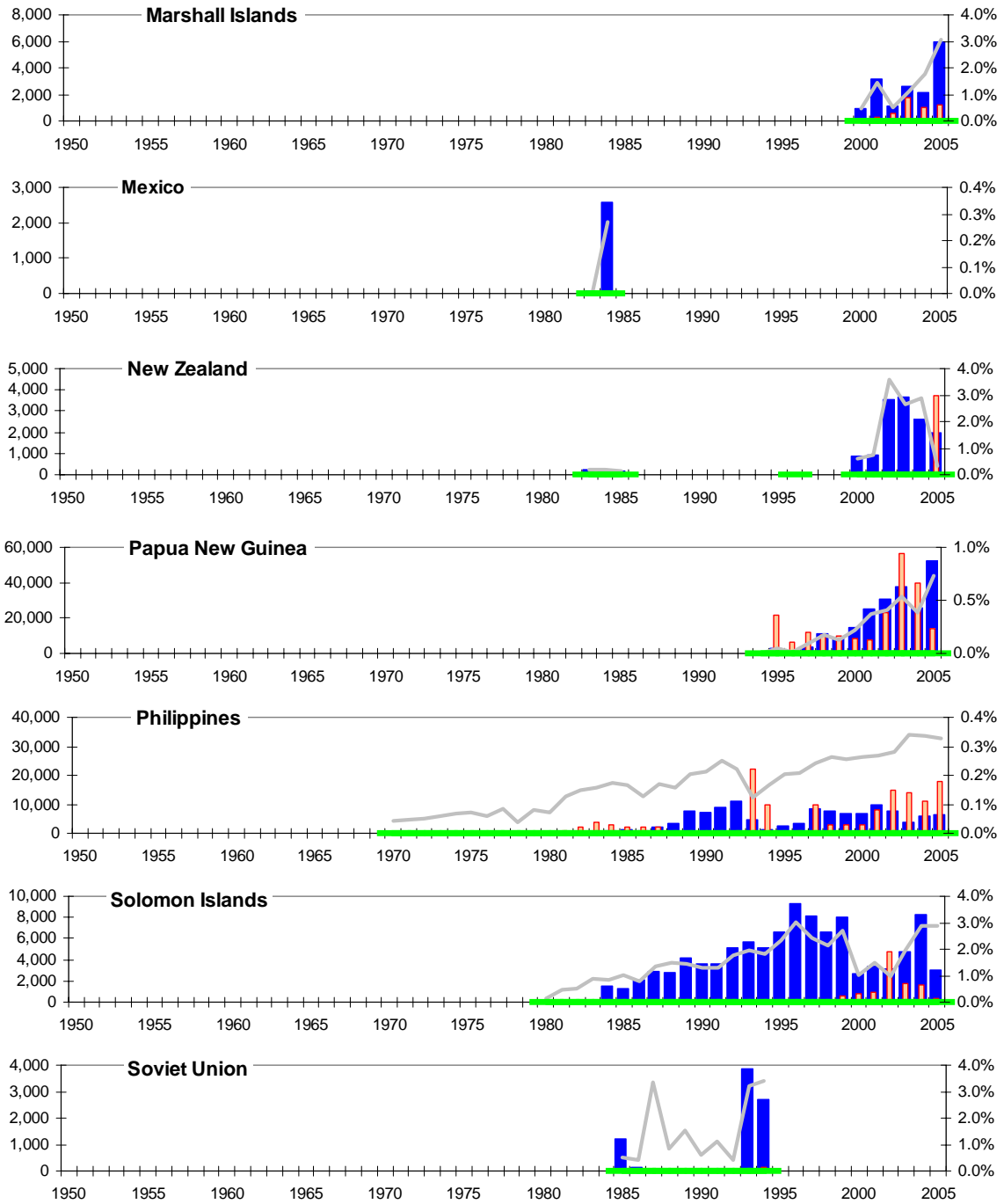


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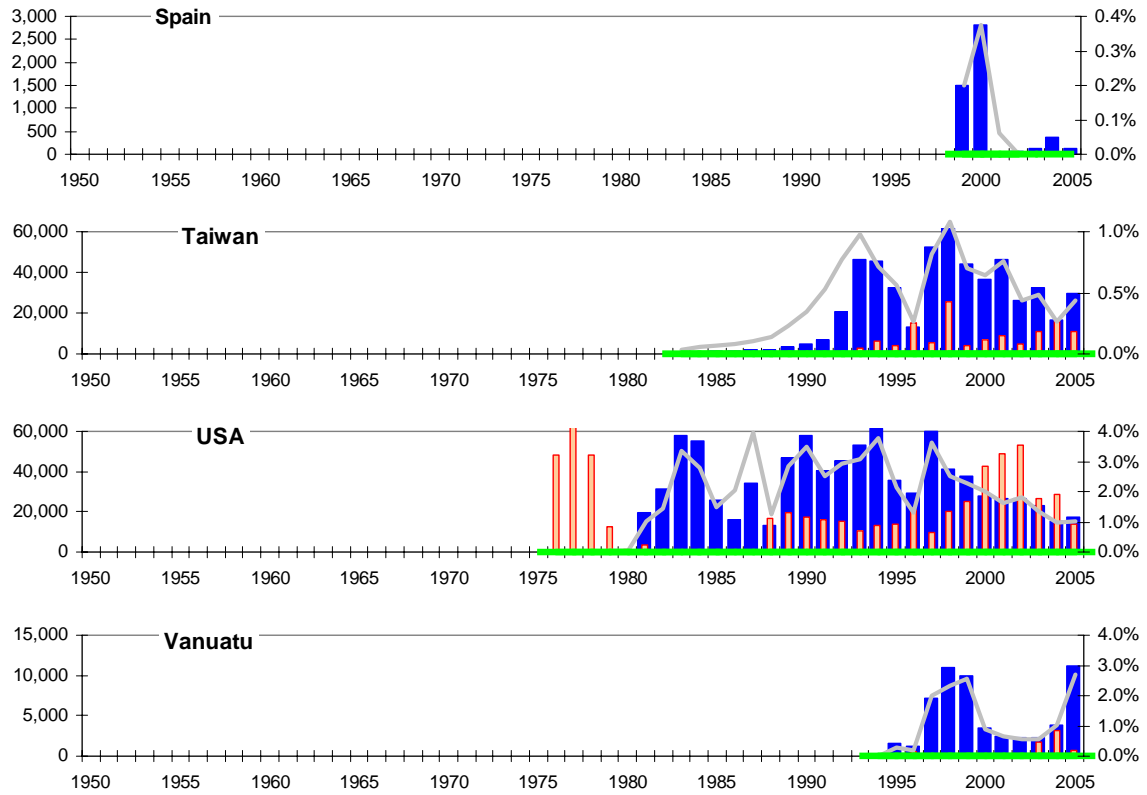
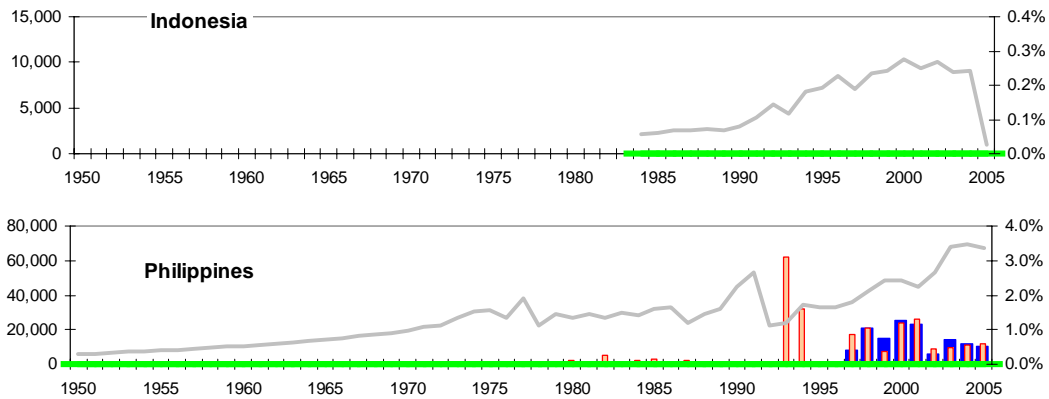


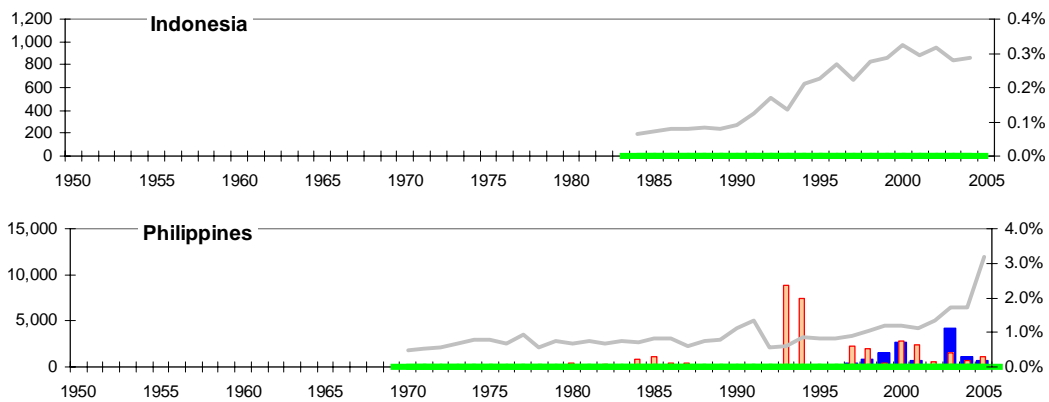
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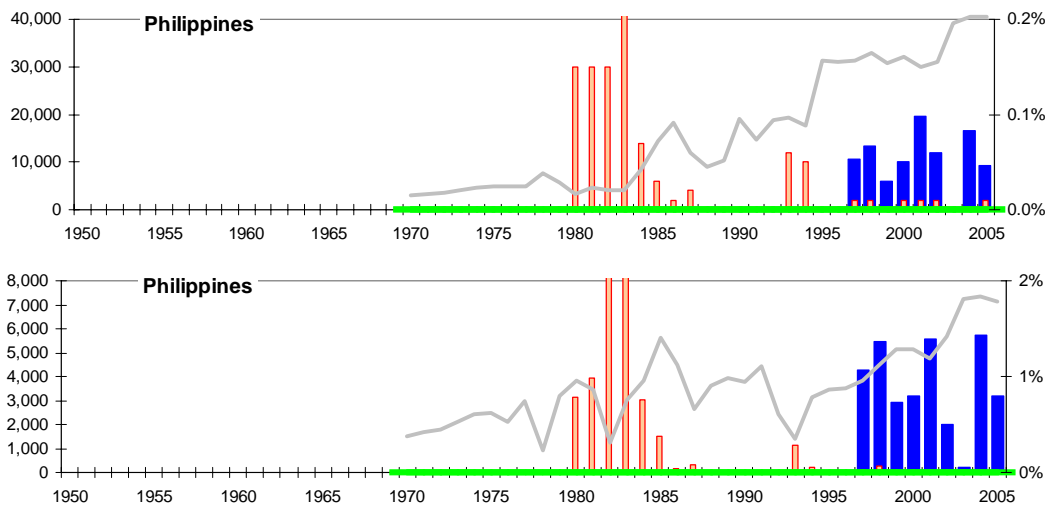
**APPENDIX 6. COVERAGE OF INDONESIA AND PHILIPPINES DOMESTIC FISHERIES DATA**



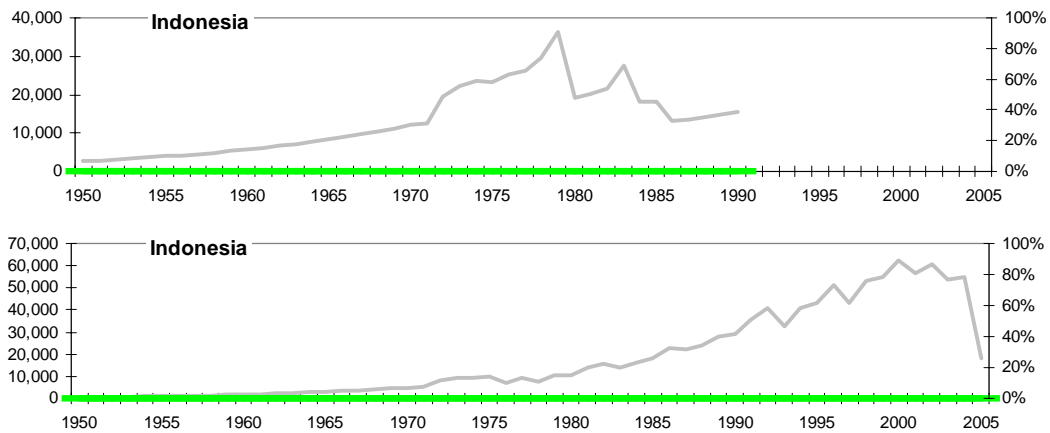
**Figure 11. Coverage of YELLOWFIN catch and size composition data in the WCPO HANDLINE FISHERY, by year and fleet**



**Figure 12. Coverage of BIGEYE catch and size composition data in the WCPO HANDLINE FISHERY, by year and fleet**

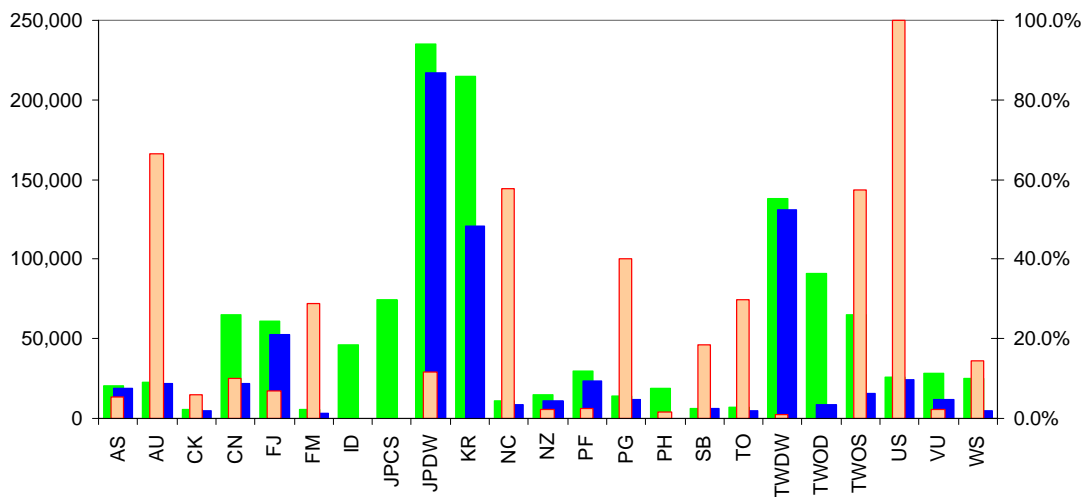


**Figure 13. Coverage of SKIPJACK and YELLOWFIN catch and size composition data in the PHILIPPINES RINGNET FISHERY, by year**

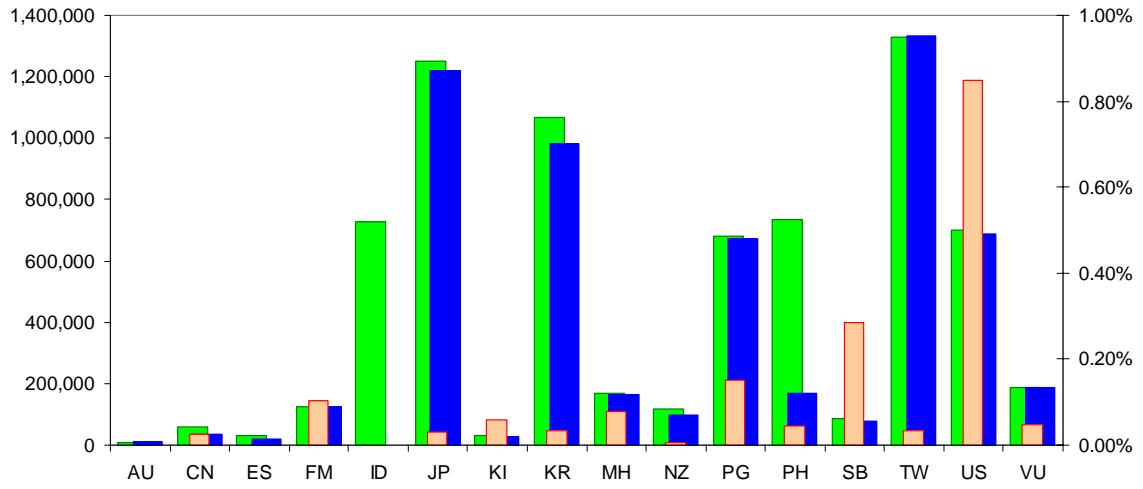


**Figure 14. Coverage of SKIPJACK and YELLOWFIN catch and size composition data in the INDONESIAN “UNCLASSIFIED” FISHERY**

**APPENDIX 7. COVERAGE OF DATA – SUMMARY BY GEAR, 1999–2004**



**Figure 15. Coverage of target catch and size composition data in the WCPO LONGLINE FISHERY, 1999–2004**



**Figure 16. Coverage of target catch and size composition data in the WCPO PURSE SEINE FISHERY, 1999–2004**