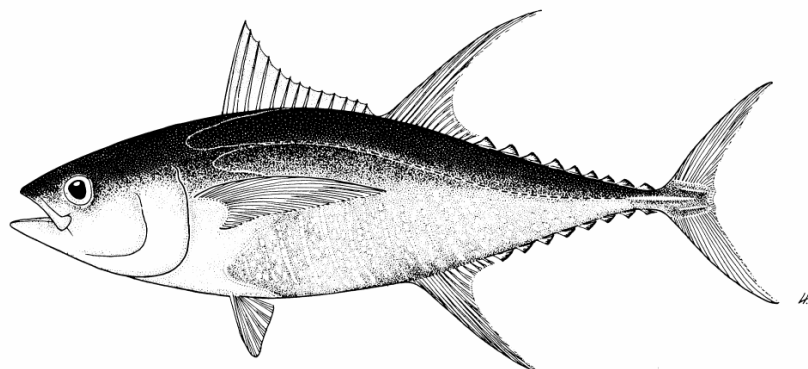




WCPFC-SC1 **ST IP-2**

A summary of aggregate catch/effort and size composition data available to the WCPFC Scientific Committee, highlighting the main data gaps

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July 2005

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INTRODUCTION

The Secretariat of the Pacific Community (SPC) has compiled tuna fisheries data for the Western and Central Pacific Ocean since 1977. Initially, tagging data and associated size and biological data were collected by the Skipjack Survey and Assessment Programme (1977–1981). Catch and effort data, aggregated by time-area strata, covering primarily the distant-water tuna fleets of Chinese Taipei, Japan and Korea, were compiled by the Skipjack Programme and used to analyse the tagging data. SPC began compiling operational catch and effort data, which were provided by SPC member countries and territories, in 1982, with the commencement of the Tuna and Billfish Assessment Programme. Other types of data – including port sampling data, observer data and unloadings data – have been compiled by SPC since the early 1990s, through the Oceanic Fisheries Programme (OFP).

The OFP Data Catalogue (available at <http://www.spc.int/oceanfish/Html/Statistics/DataCat/DATACAT.htm>) provides, *inter alia*, a summary of the available aggregate catch/effort and size composition data used in the stock assessments presented to Western Central Pacific Fisheries Commission (WCPFC) Scientific Committee (SC). The OFP Data Catalogue contains quantitative information for each type of data, broken down by year, gear, vessel nationality, source of data and species. Specifically, the OFP Data Catalogue includes the following tables:

- Catch and effort data held by the SPC Oceanic Fisheries Programme
- Tag release data held by the SPC Oceanic Fisheries Programme
- Tag recapture data held by the SPC Oceanic Fisheries Programme
- Size composition data held by the SPC Oceanic Fisheries Programme
- Unloadings data held by the SPC Oceanic Fisheries Programme
- Observer data held by the SPC Oceanic Fisheries Programme

Aggregate catch and size composition data have been made available in two forms, (i) aggregated data provided by fishing nations and (ii) data held by the OFP at the fishing operation level that have been aggregated for inclusion in the overall data holdings made available for regional stock assessments. The distinction between data provided at the aggregate or operational level is made in the OFP Data Catalogue.

While the data currently held by the OFP are extensive, there are important gaps. Some data sets have been compiled by fishing nations, but not provided to SPC (e.g., operational catch and effort data covering the distant-water tuna fleets of Chinese Taipei, Japan and Korea). Others have been compiled by SPC, but are known to be unreliable (e.g., operational catch and effort data covering the purse-seine fleets of Chinese Taipei and Korea prior to 1993). The data compiled by SPC cover the period from 1950 onwards; data covering the period prior to 1950 may exist (e.g., Japanese coastal and offshore/distant-water fleets), but they have not been identified and compiled. Some data are provided to SPC after a delay (e.g., annual catch estimates for Japanese pole-and-line fleets) and constitute temporary data gaps, while other data have never been collected (e.g., size data covering the tuna fisheries of Indonesia and the Philippines prior to 1980) and constitute permanent data gaps.

The purpose of this paper is to present an indication of the coverage of available aggregate catch and size composition data through a series of graphs, and to then list the data gaps, based on the information presented and experiences with the data, for the benefit of future work in improving data coverage. The missing sets of data are listed according to the type of data and the type of gap. Missing data sets that can potentially be rescued are highlighted. This list of data gaps remains in draft form and is presented here as an example of how data gaps might be summarised for the Scientific Committee of the Commission.

SUMMARY OF THE MAIN 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. Appendix 7 shows a summary of the coverage of aggregated catch and size composition data by gear and fleet for recent years (1999–2003). Appendix 8 lists the gaps in tuna fishery data that have been identified, by type of data and the type of gap.

The following are considered the main data gaps in the aggregated catch/effort and size composition data holdings used in stock assessments –

- Indonesian tuna fisheries.
 - General lack of aggregated catch/effort and size composition data in all fisheries;
 - The “unclassified” fisheries of Indonesia take significant amounts of skipjack and yellowfin tuna (Lawson, 2004), but (i) there is no information on the method of fishing, (ii) there are no catch/effort data available from these fisheries and (iii) there are no size composition data available from these fisheries;
- Philippines tuna fisheries.
 - General lack of aggregated catch/effort and size composition data in all fisheries, although there has been more data collected than in the Indonesian tuna fisheries, particularly in recent years;
 - Data collected from the Philippines National Stock Assessment Programme (NSAP, 1997–2003) are included in the graphs.
- Vietnamese tuna fisheries.
 - There are no annual catch estimates, aggregated catch/effort or size composition data currently available from this fishery, despite reports that the longline fishery has taken an estimated 20,000 t. annually in recent years (Anon., 2003a and Lewis, 2005).
- Catch data for the Chinese-Taipei and Korean purse seine fleets prior to 1993 has been under-reported (see Lawson, 1994) and therefore inadequate for stock assessment purposes.
- There are no aggregated catch/effort data, nor size composition data, available for the Chinese-Taipei domestic longline fleet, despite this fleet taking a significant amount of catch over a number of years (Lawson, 2004).
- There are no aggregated catch/effort data, nor size composition data, for the Japanese Coastal longline fleet.
- Aggregate bigeye catch data is under-reported for most purse seine fleets. This is due to vessels tending to include the catch of bigeye in the reported catch of yellowfin tuna, since there is no economic incentive for reporting bigeye separately.

There are several instances where the annual catch, according to the aggregate data, exceed the annual catch estimate for that fleet. The following are examples where this might occur:

- There has been a delay in receiving all logsheets for a fleet and the annual catch estimate was therefore provisional;
- The annual catch estimate provided by the fishing nation is lower than what SPC has according to catch logsheets. In such cases, every effort is made to reconcile the data and eventually correct the annual catch estimate.
- The aggregate catch data provided for the Japanese distant-water longline fleet is in numbers of fish only. While this is useful for stock assessment work, it has been necessary to apply an estimate of average weight by species (based on size composition data, where this is available) to come up with an estimate of catch in weight. In some instances, therefore, the

annual catch estimate provided by Japan may in fact be less than the estimated annual catch (weight) according to the aggregate data.

REFERENCES

- Anonymous. 2003a. Report of the Fifteenth Meeting of the Standing Committee on Tuna and Billfish (SCTB15), 22–27 July 2002, Honolulu, Hawaii. Pelagic Fisheries Research Programme, Joint Institute for Marine and Atmospheric Research, University of Hawaii. 143 pp.
- Anonymous. 2003b. Proposal for Monitoring the Catches of Highly Migratory Species in the Philippines and the Pacific Ocean Waters of Indonesia. Prepared for the Preparatory Conference for the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. 44 pp.
- Anonymous. 2004. Report of the Philippines Tuna Fishery Data Collection Workshop, 20–21 October 2004, Quezon City, Metro Manila, Philippines. Information Paper ST IP–4. First meeting of the WCPFC Scientific Committee, 8–19 August 2005, Noumea, New Caledonia. Secretariat of the Pacific Community, Noumea, New Caledonia. http://www.wcpfc.org/pdf/sc1_st_ip_4.pdf
- Barut, N. & E. Garvilles. 2005. Philippines Fishery Report. National Fisheries Research and Development Institute (NFRDI). Bureau of Fisheries and Aquatic Resources. Philippines. First Meeting of the WCPFC Scientific Committee (WCPFC–SC1). Noumea, New Caledonia. 8–19 March 2005.
- Lawson, T. 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, SPC, Noumea, New Caledonia.
- Lawson, T. 1997. Review of catch estimates for Taiwanese distant-water longliners. Internal Report No 31 (revised May 1997). Oceanic Fisheries Programme, South Pacific Commission, Noumea, New Caledonia. 16 pp.
- Lawson, T.A. (editor) 2004. Secretariat of the Pacific Community Tuna Fishery Yearbook 2003. Secretariat of the Pacific Community, Oceanic Fisheries Programme. Noumea, New Caledonia.
- Lewis, A.D. 2004. Review of tuna fisheries and the tuna fishery statistical system in the Philippines. 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. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. First Meeting of the WCPFC Scientific Committee (WCPFC–SC1). Noumea, New Caledonia. 8–19 March 2005.
- Matsuda, Y. & K. Ouchi. 1984. Legal, political and economic constraints on Japanese strategies for distant-water tuna and skipjack fisheries in Southeast Asian seas and the Western Central Pacific. Memoirs of the Kagoshima University Research Center for the South Pacific, Vol. 5, No. 2. English translation in: Reprint No. 89, East-West Environmental and Policy Institute, East-West Center, Honolulu. 232 pp.

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 Ocean (WCPO) 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 SPC Tuna Fishery Yearbook (Lawson, 2004), 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, 2004), 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, 2004) 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, 2004) 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

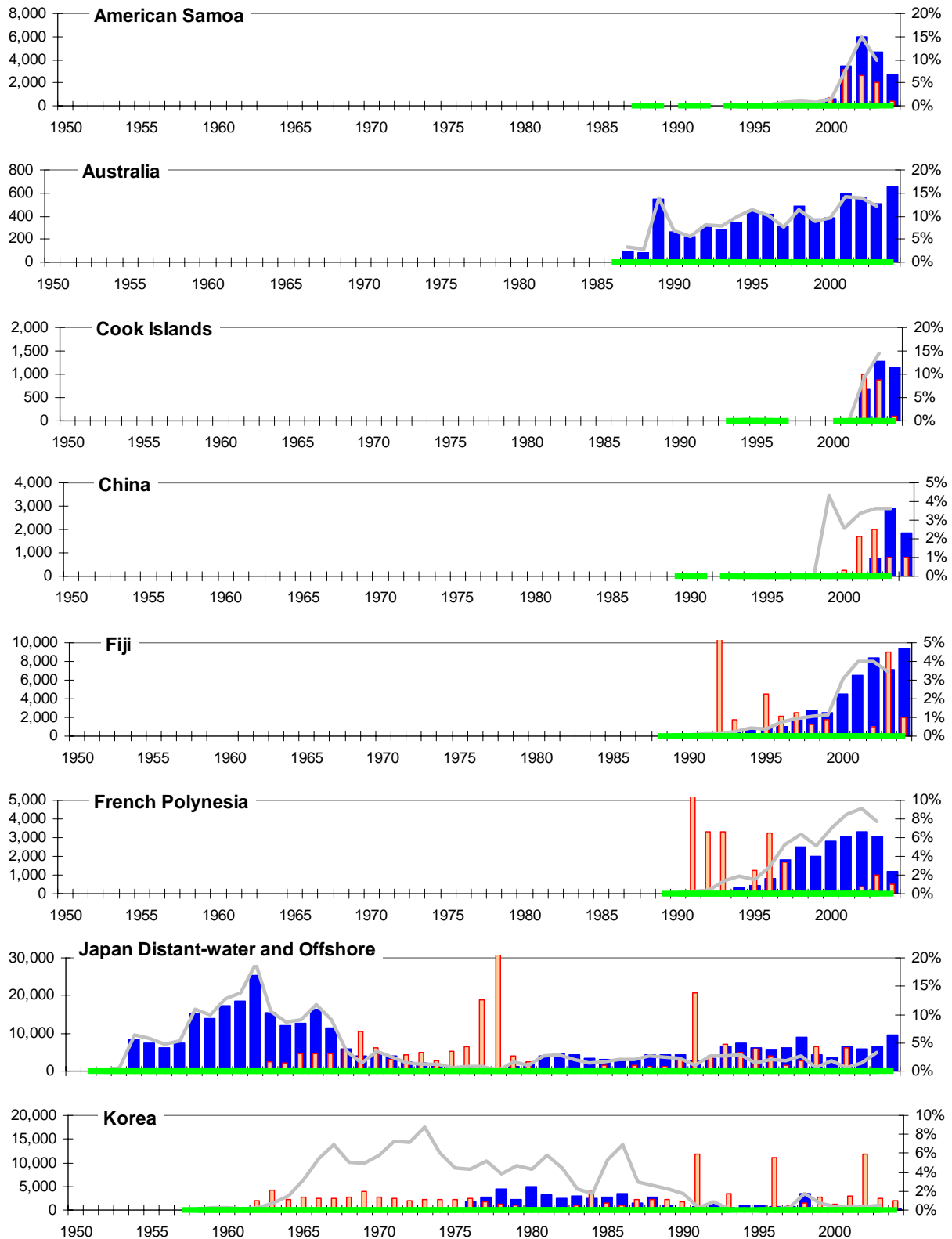


Figure 1. Coverage of ALBACORE catch and size composition data in the SOUTH PACIFIC LONGLINE FISHERY, by year and fleet

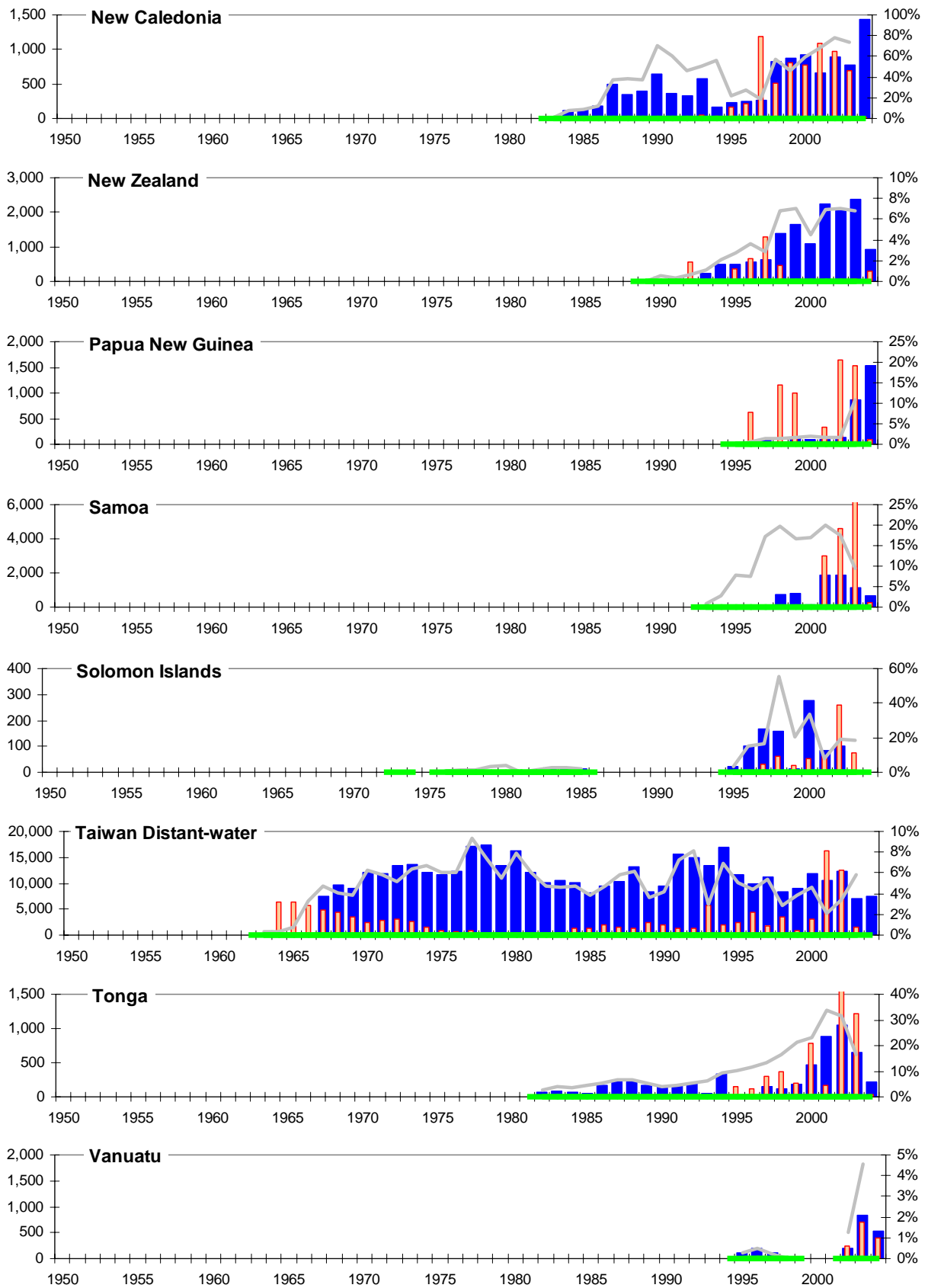


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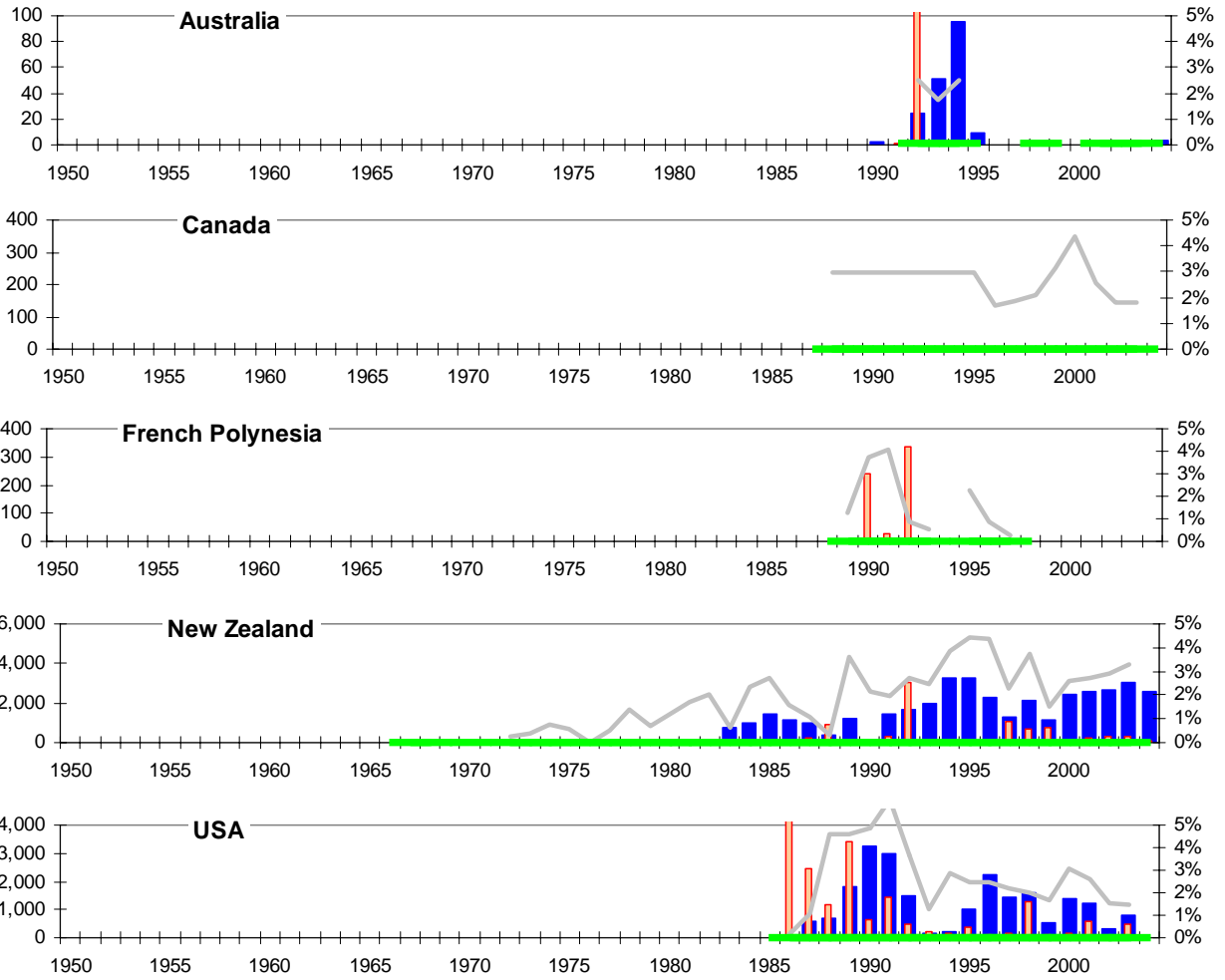


Figure 2. Coverage of ALBACORE catch and size composition data in the SOUTH PACIFIC TROLL FISHERY, by year and fleet

APPENDIX 3. COVERAGE OF WCPO BIGEYE DATA

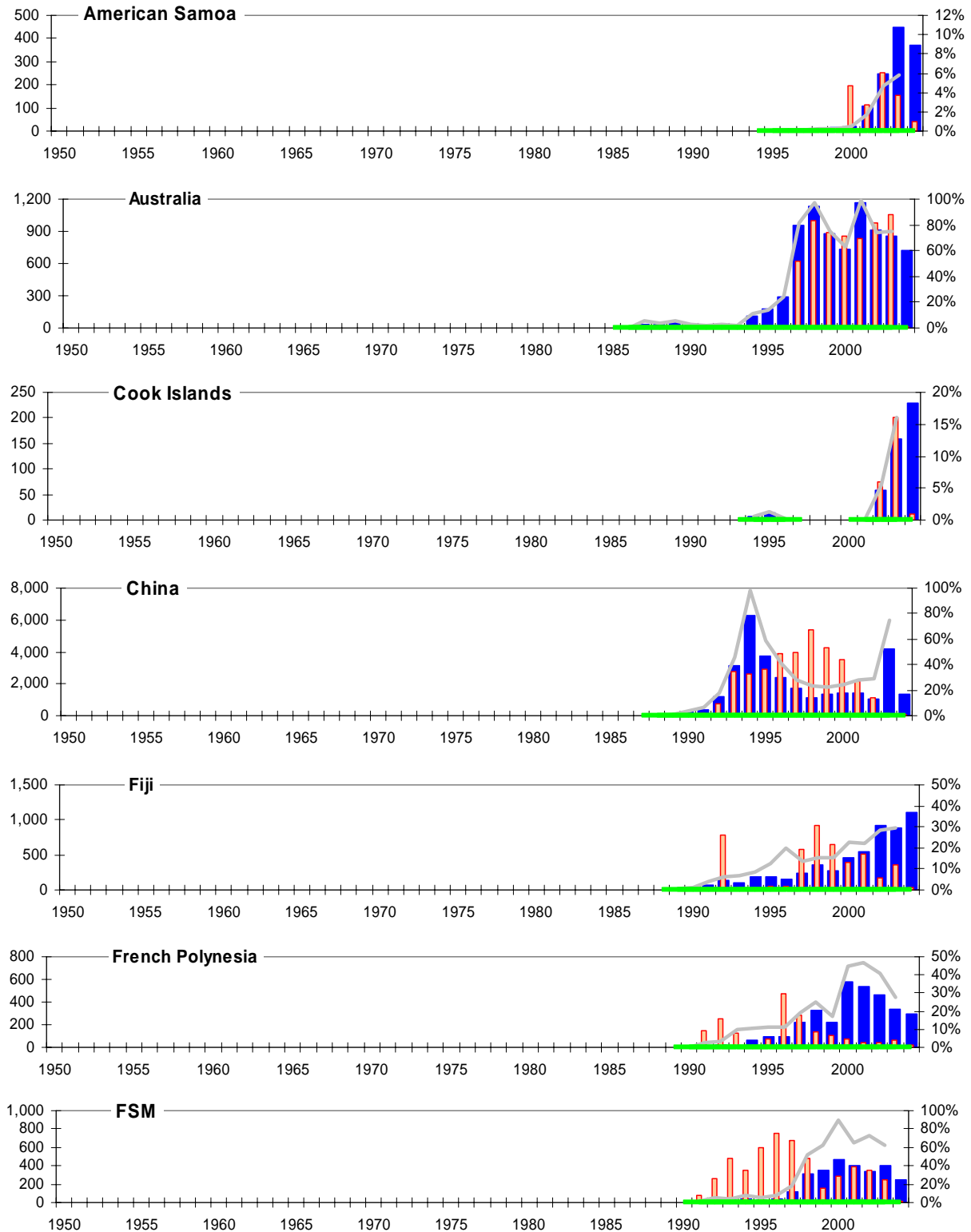


Figure 3. Coverage of BIGEYE catch and size composition data in the WCPO LONGLINE FISHERY, by year and fleet

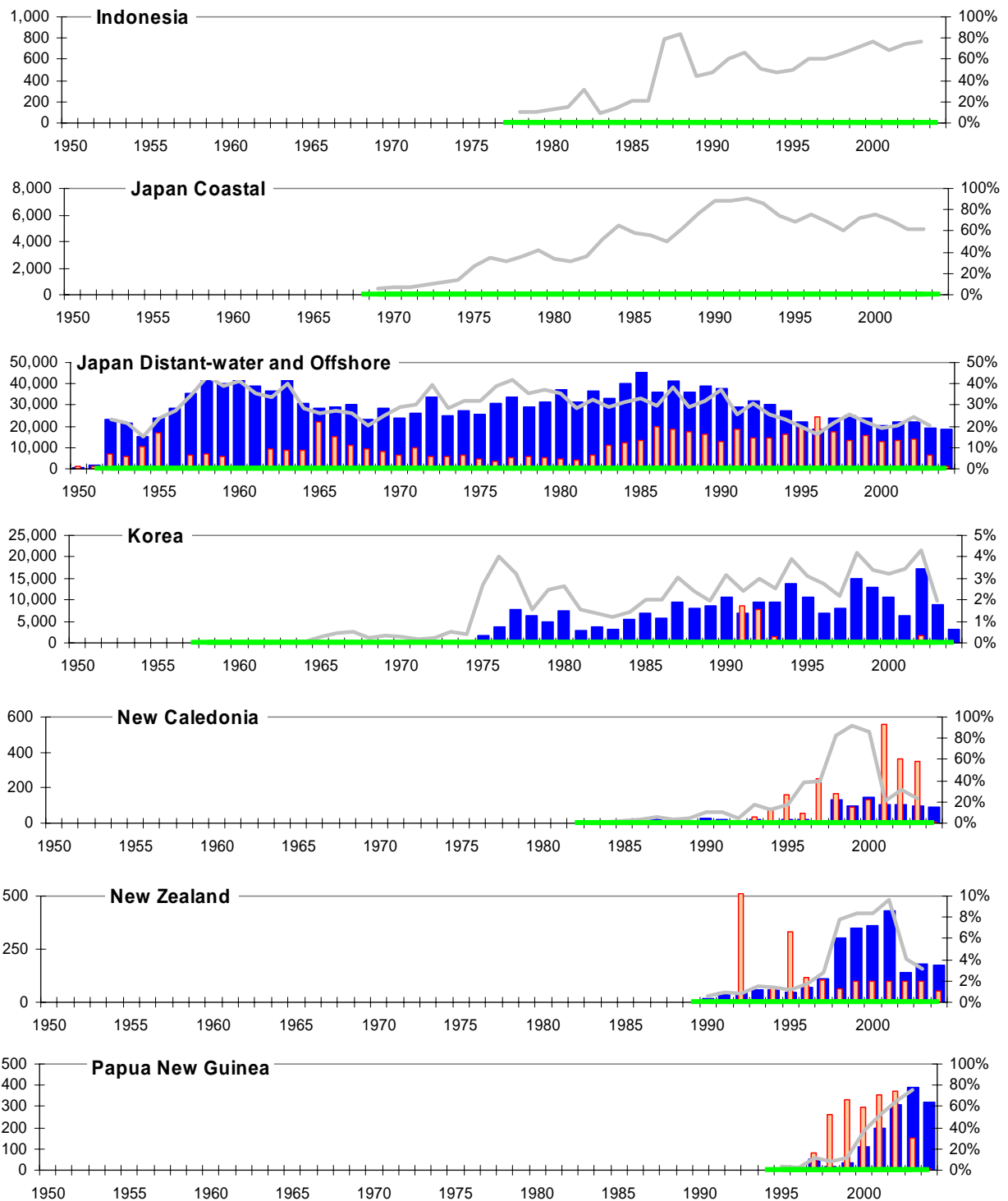


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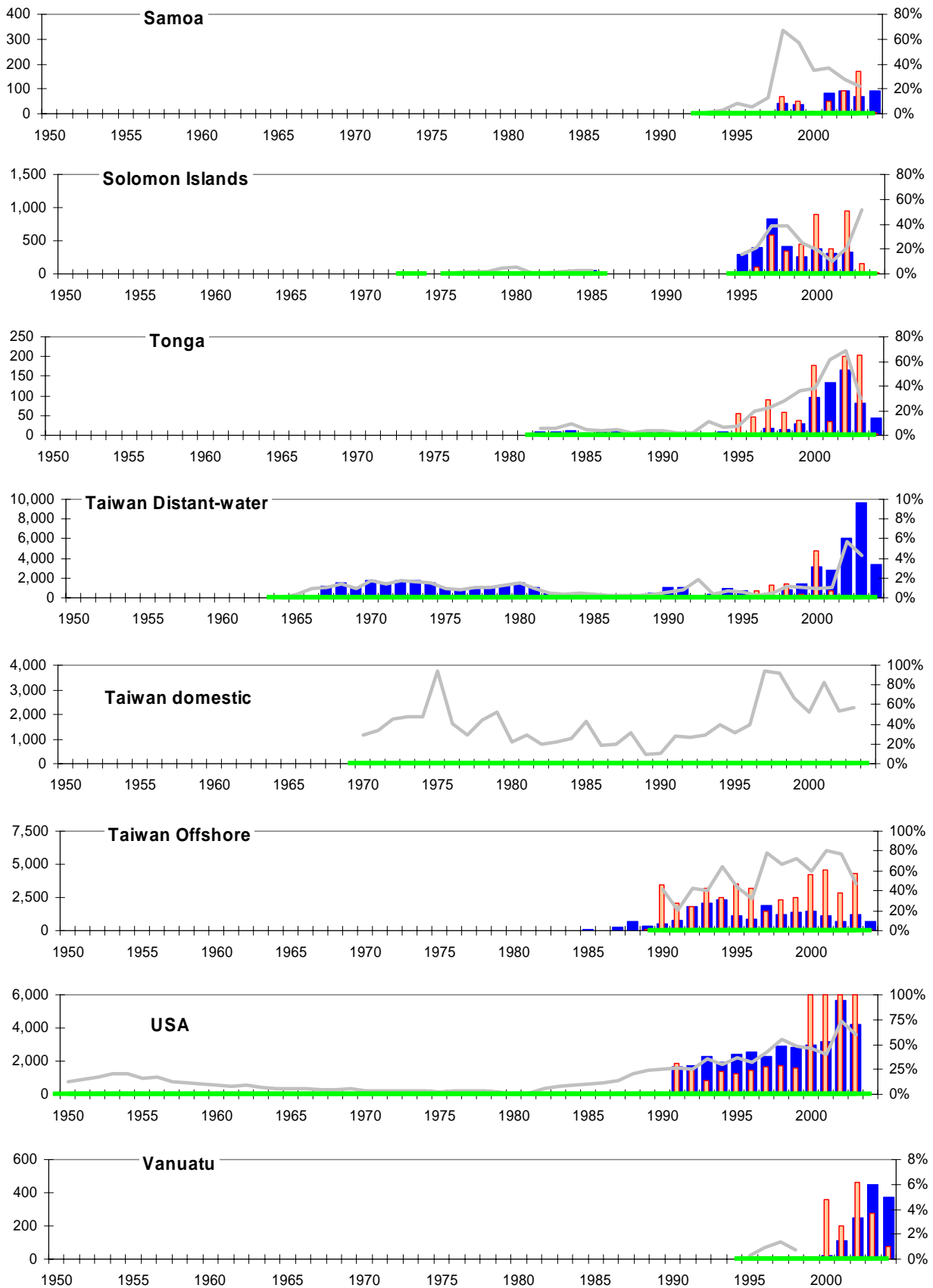


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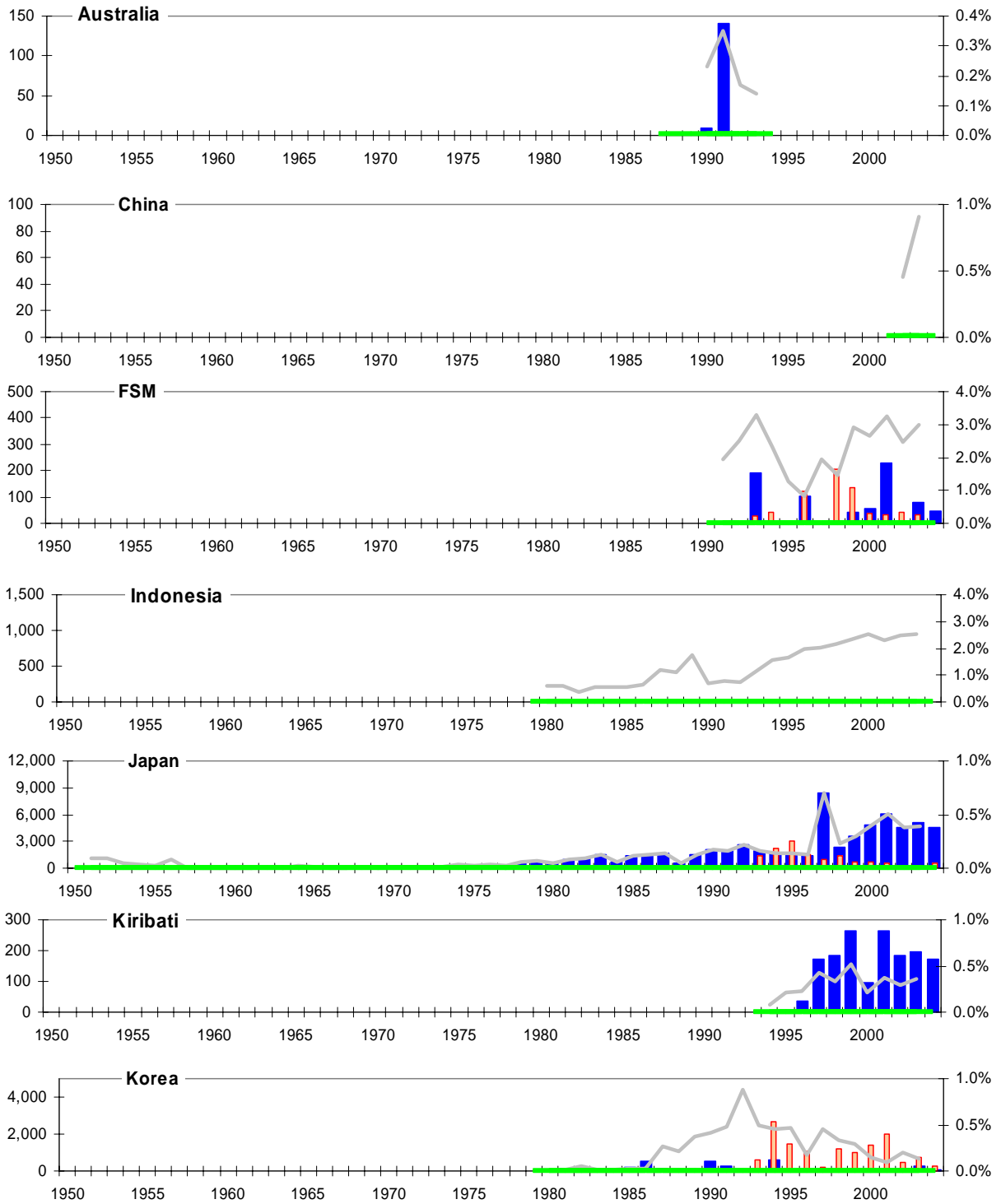


Figure 4. Coverage of BIGEYE catch and size composition data in the WCPO PURSE SEINE FISHERY, by year and fleet

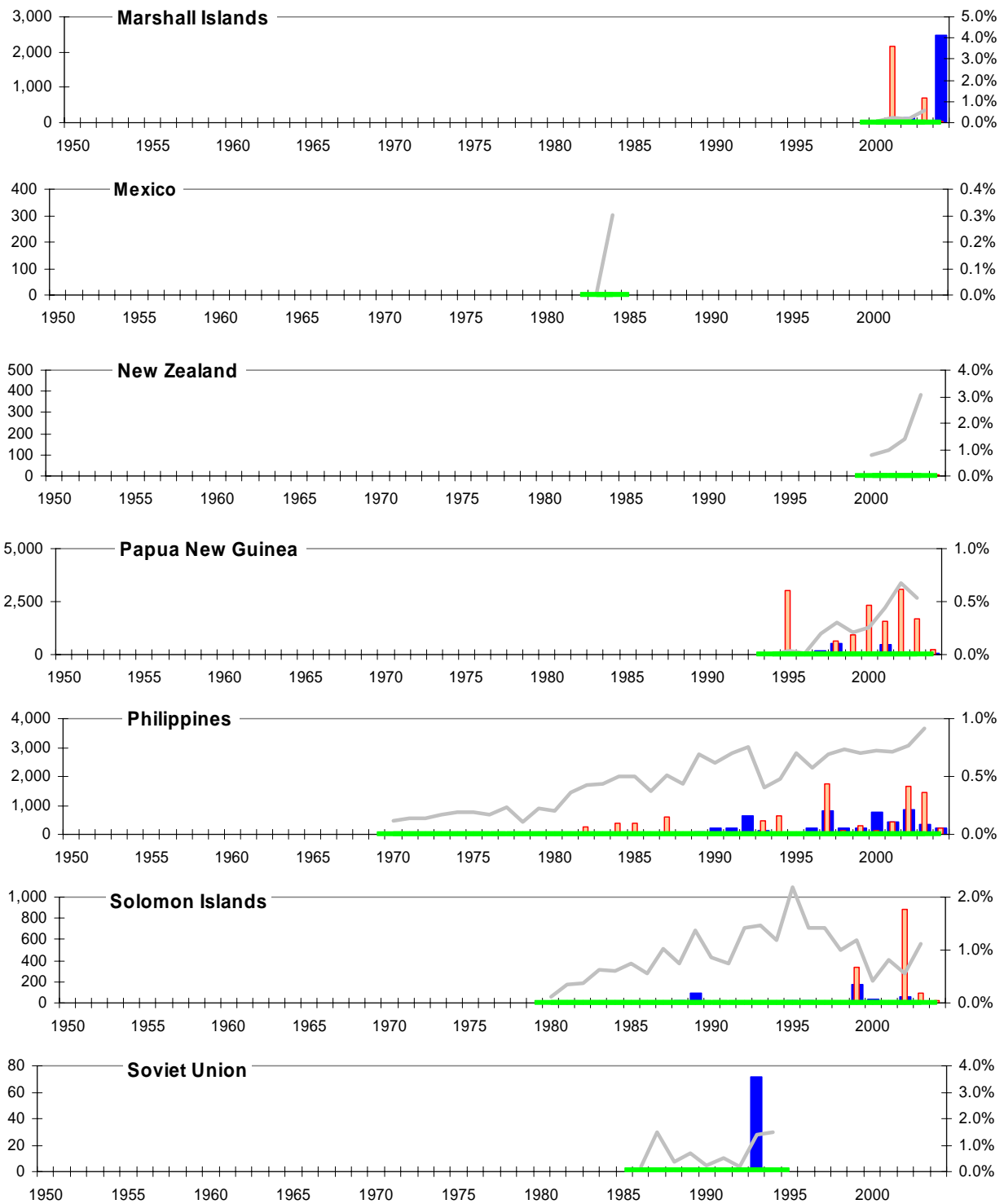


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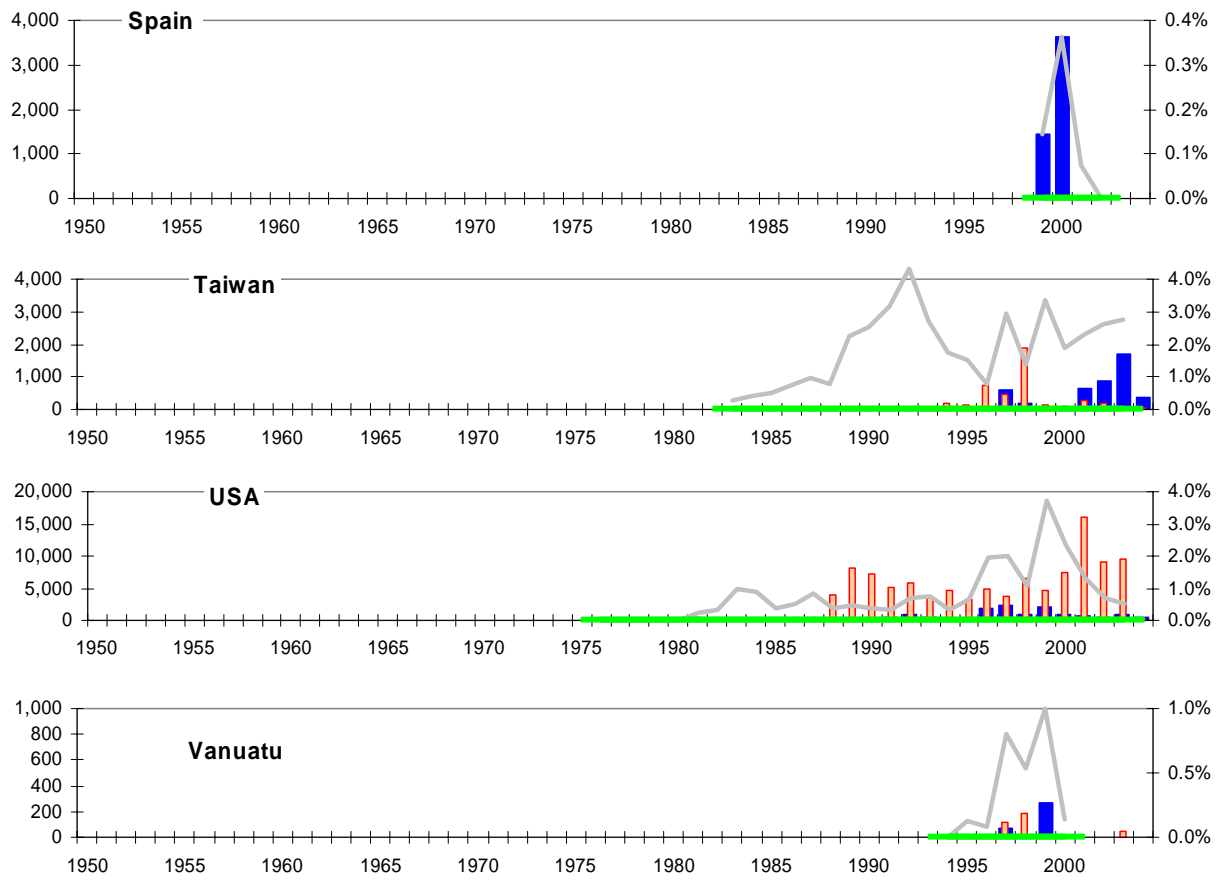


Figure 4. (continued)

APPENDIX 4. COVERAGE OF WCPO SKIPJACK DATA

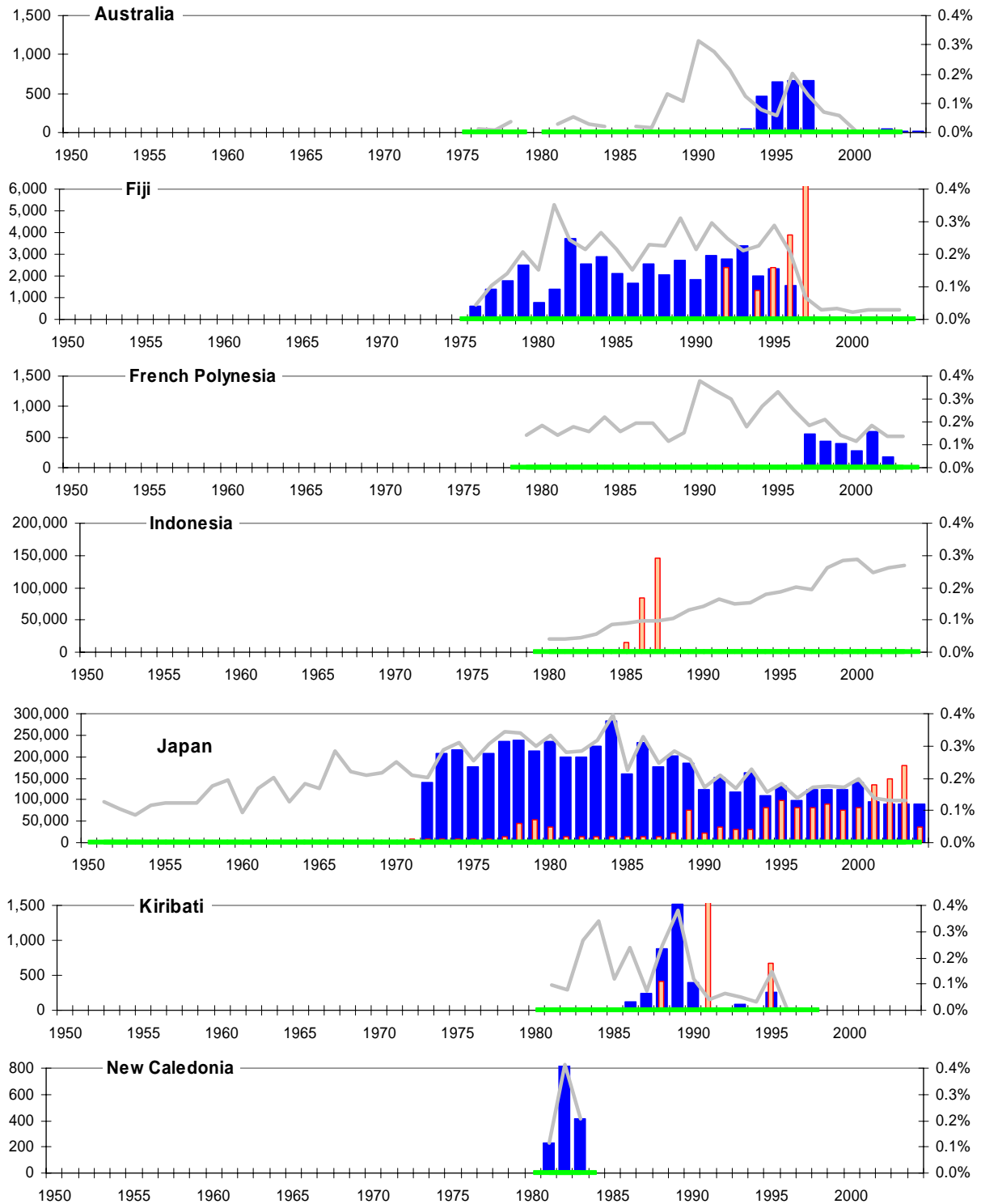


Figure 5. Coverage of SKIPJACK catch and size composition data in the WCPO POLE-AND-LINE FISHERY, by year and fleet

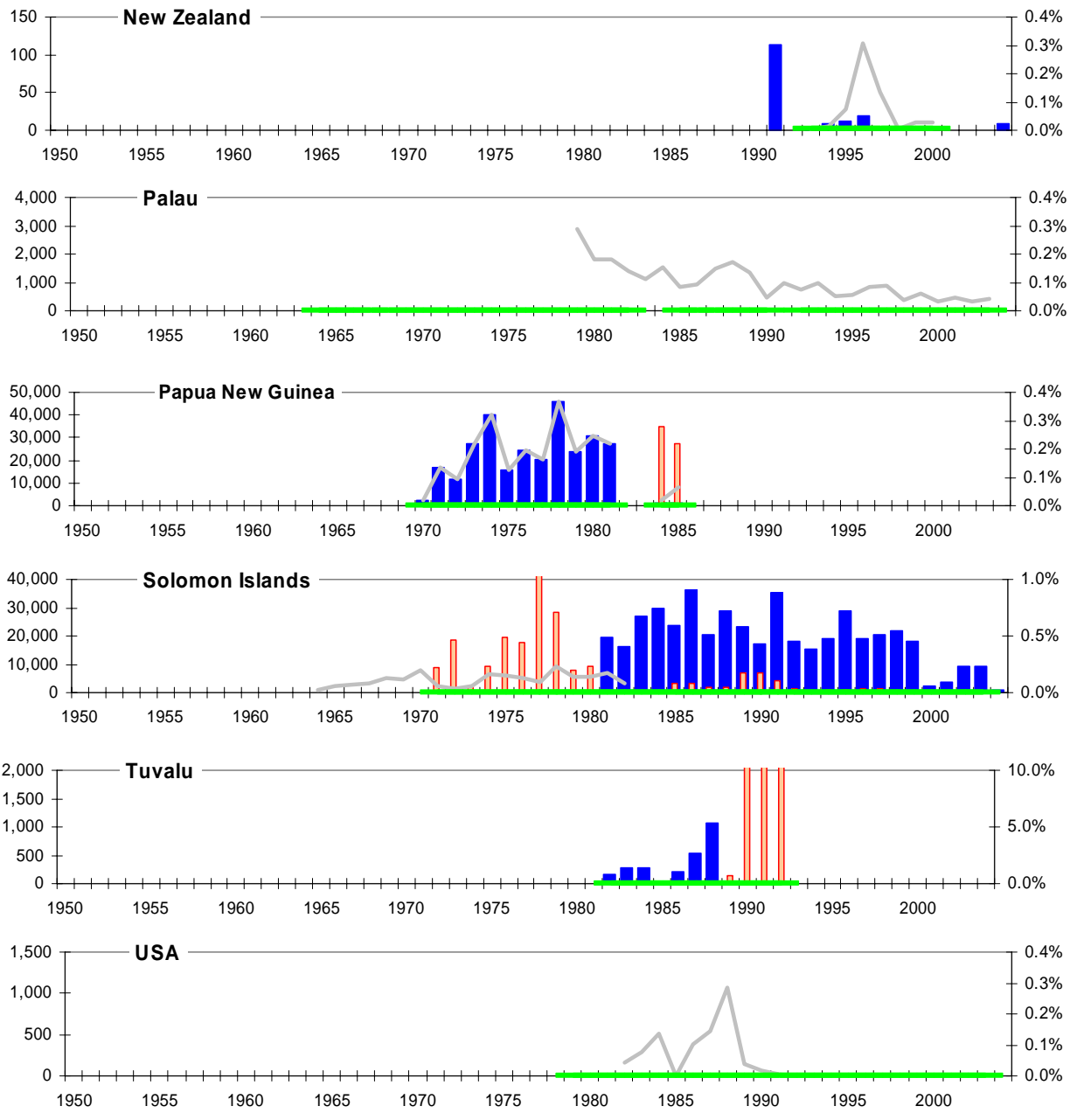


Figure 5. (continued)

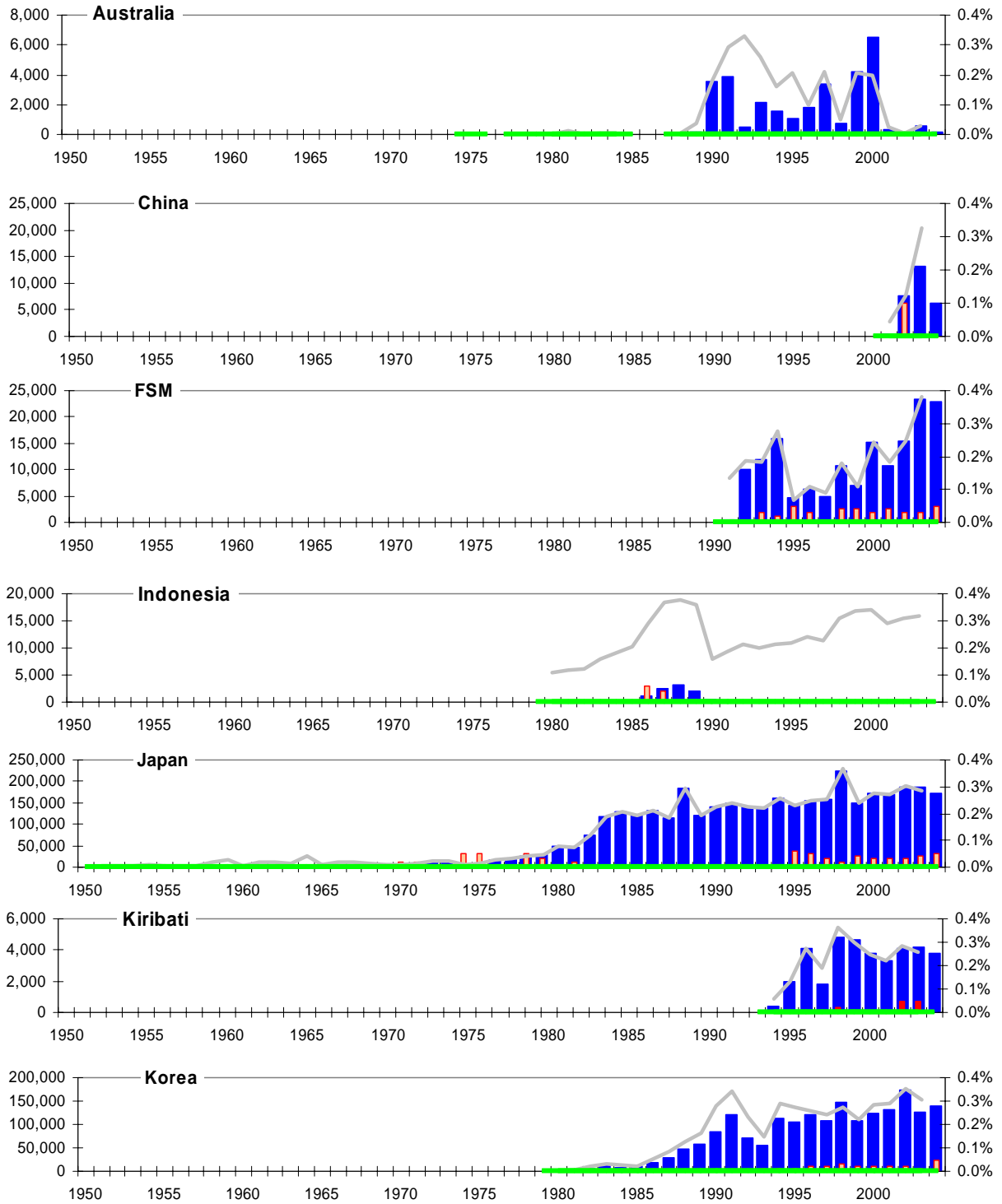


Figure 6. Coverage of SKIPJACK catch and size composition data in the WCPO PURSE SEINE FISHERY, by year and fleet

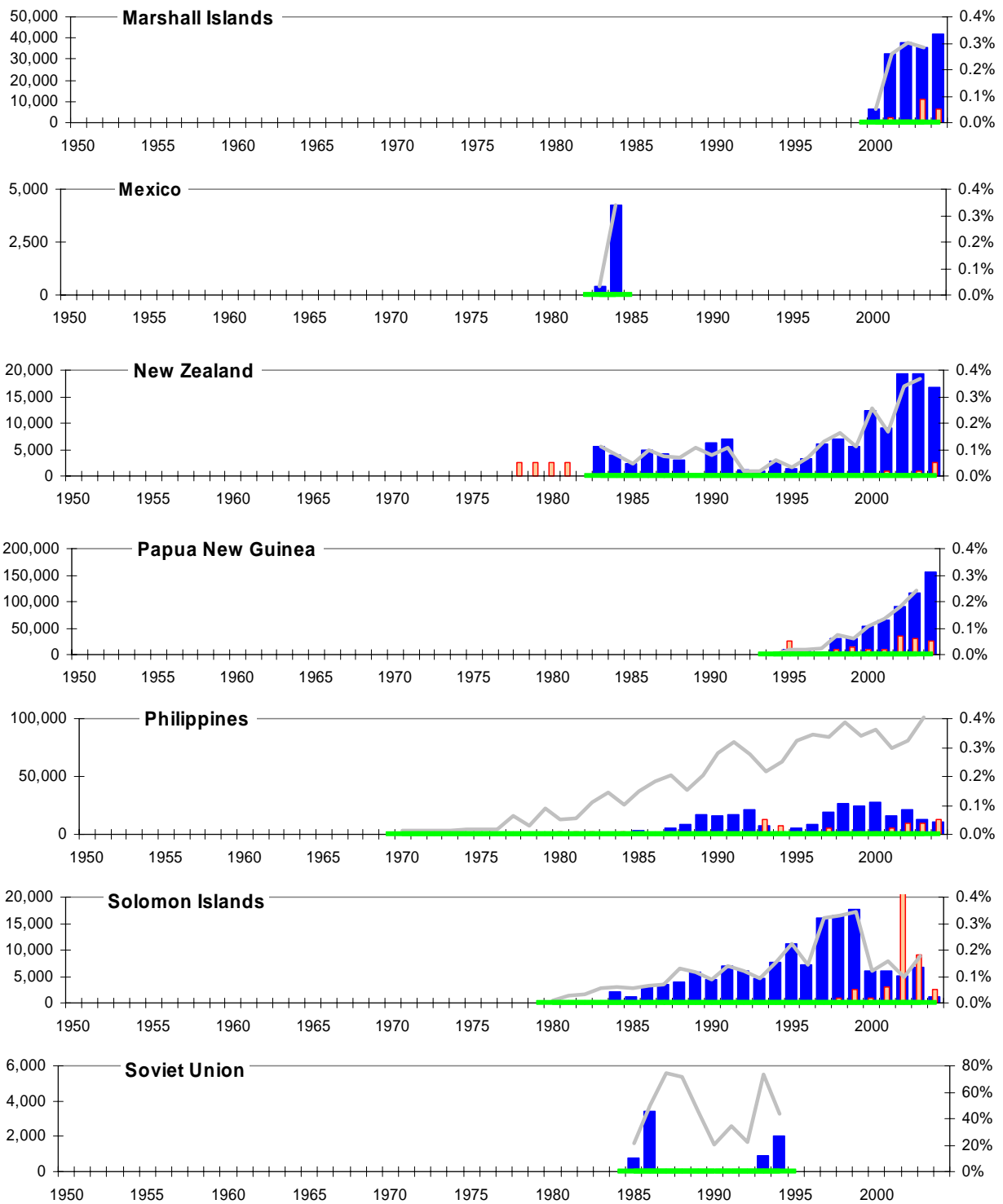


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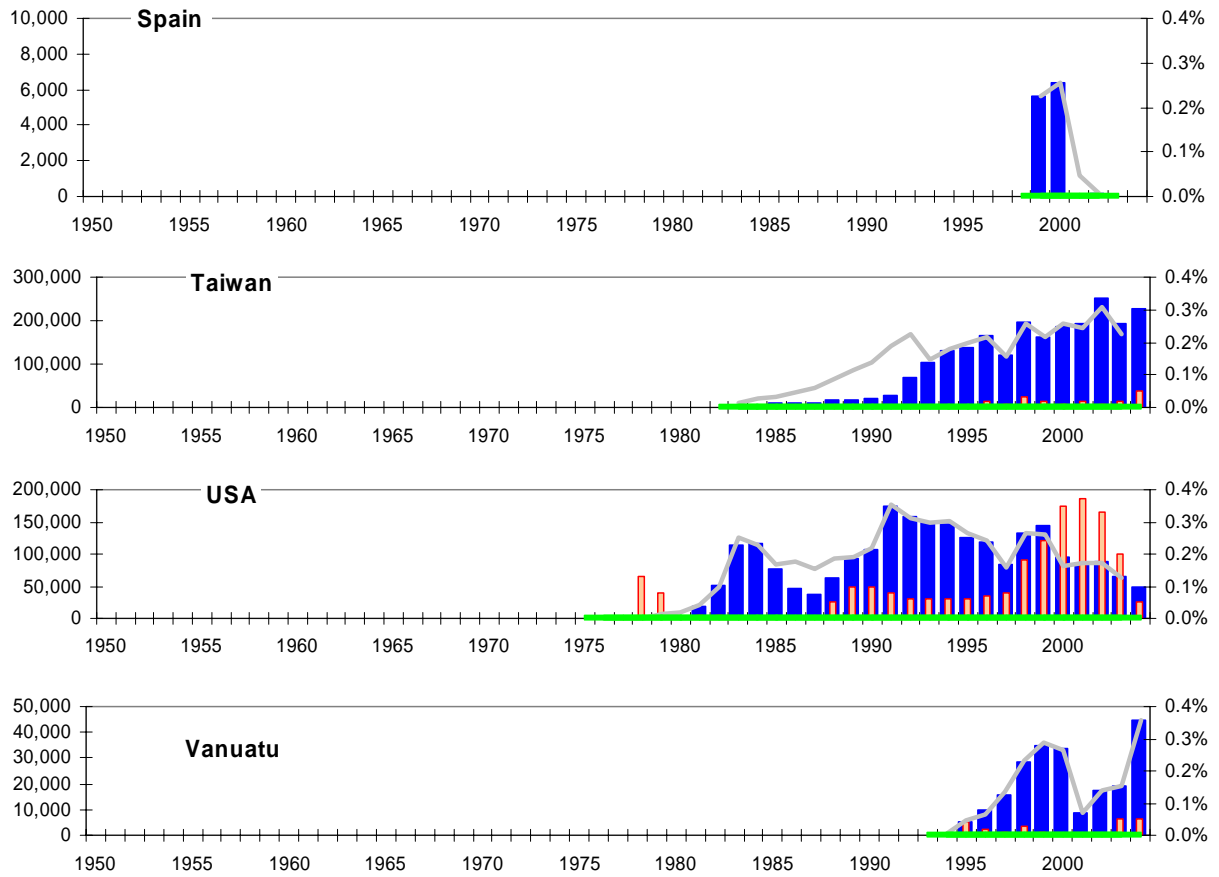


Figure 6. (continued)

APPENDIX 5. COVERAGE OF WCPO YELLOWFIN DATA

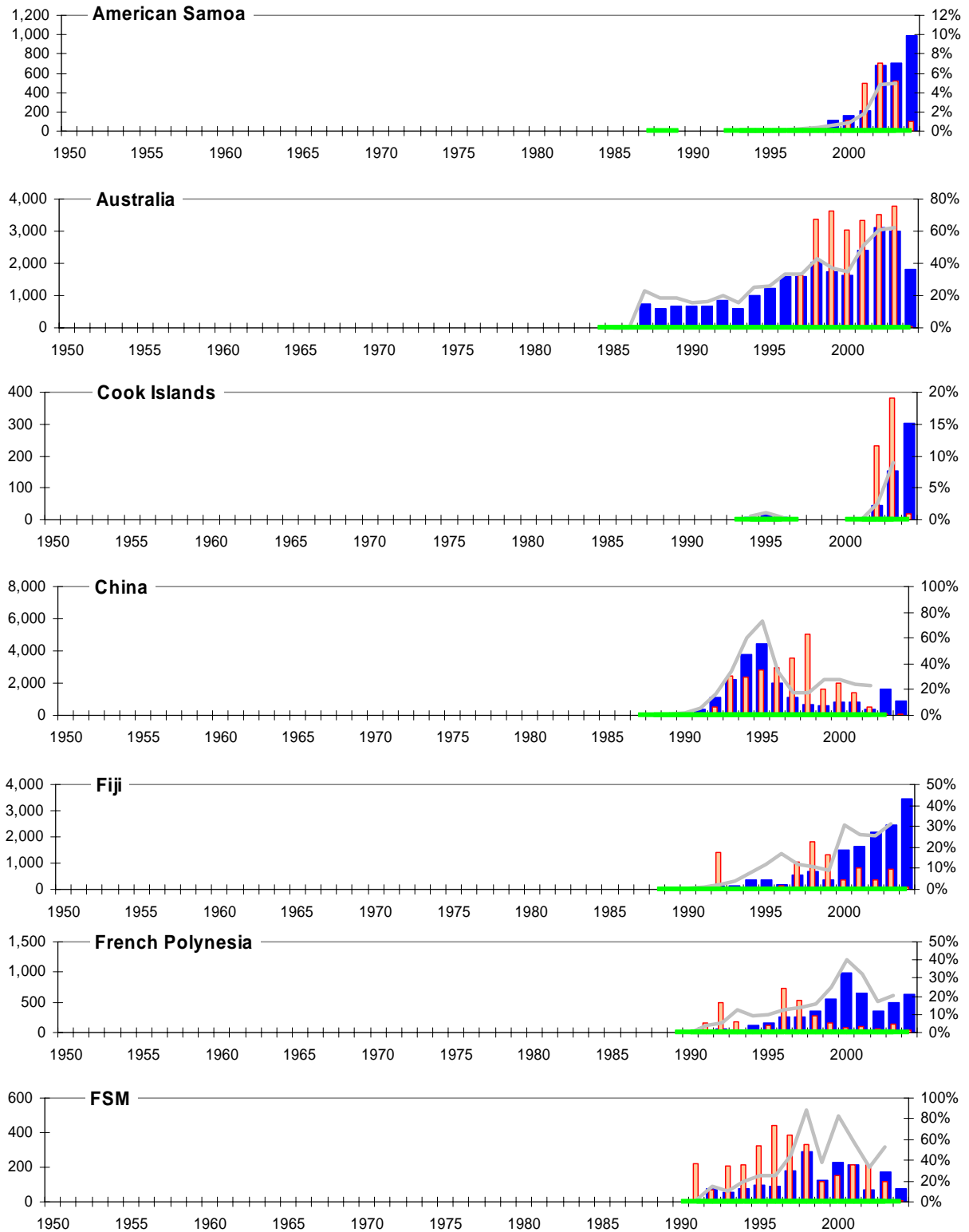


Figure 7. Coverage of YELLOWFIN catch and size composition data in the WCPO LONGLINE FISHERY, by year and fleet

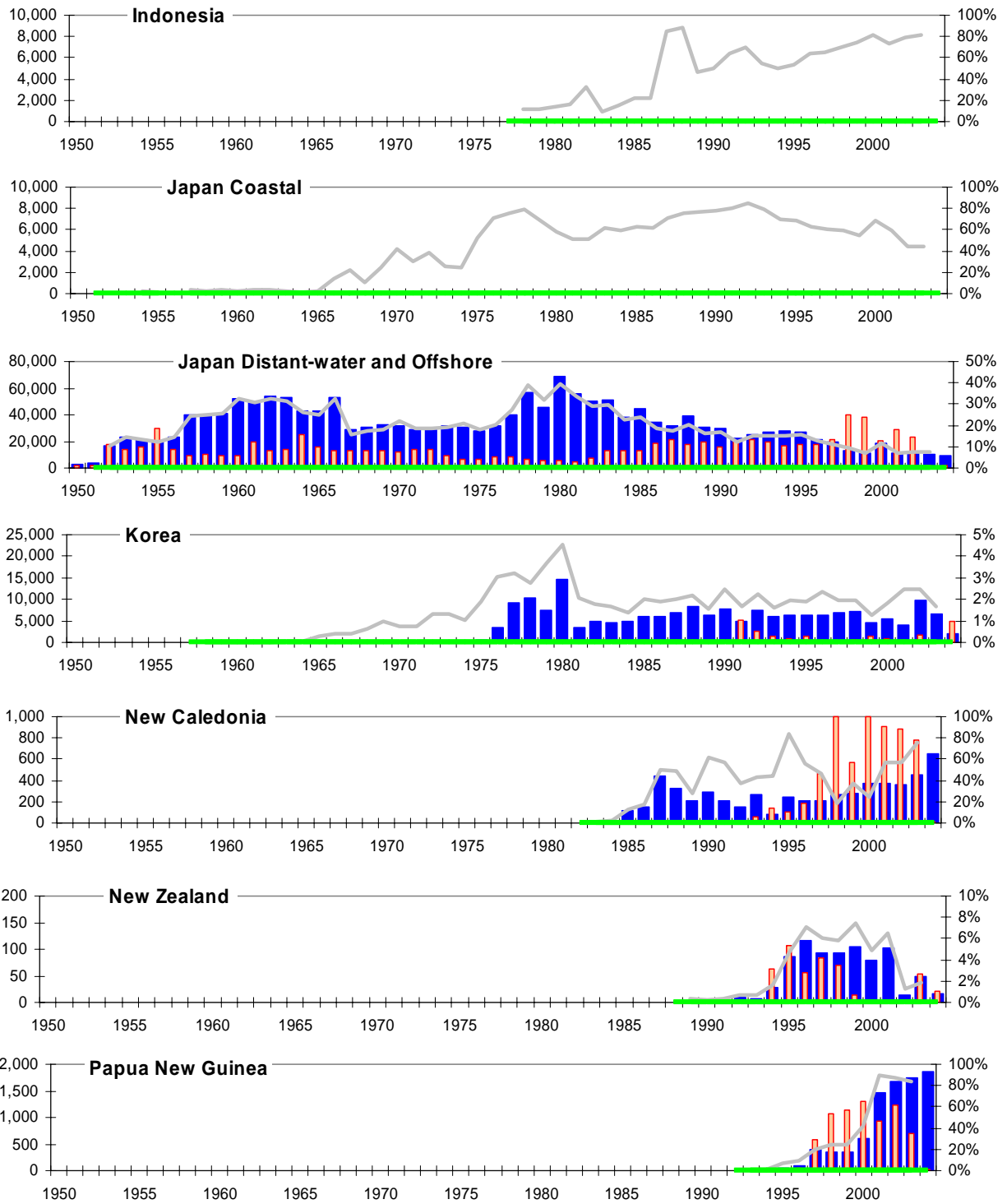


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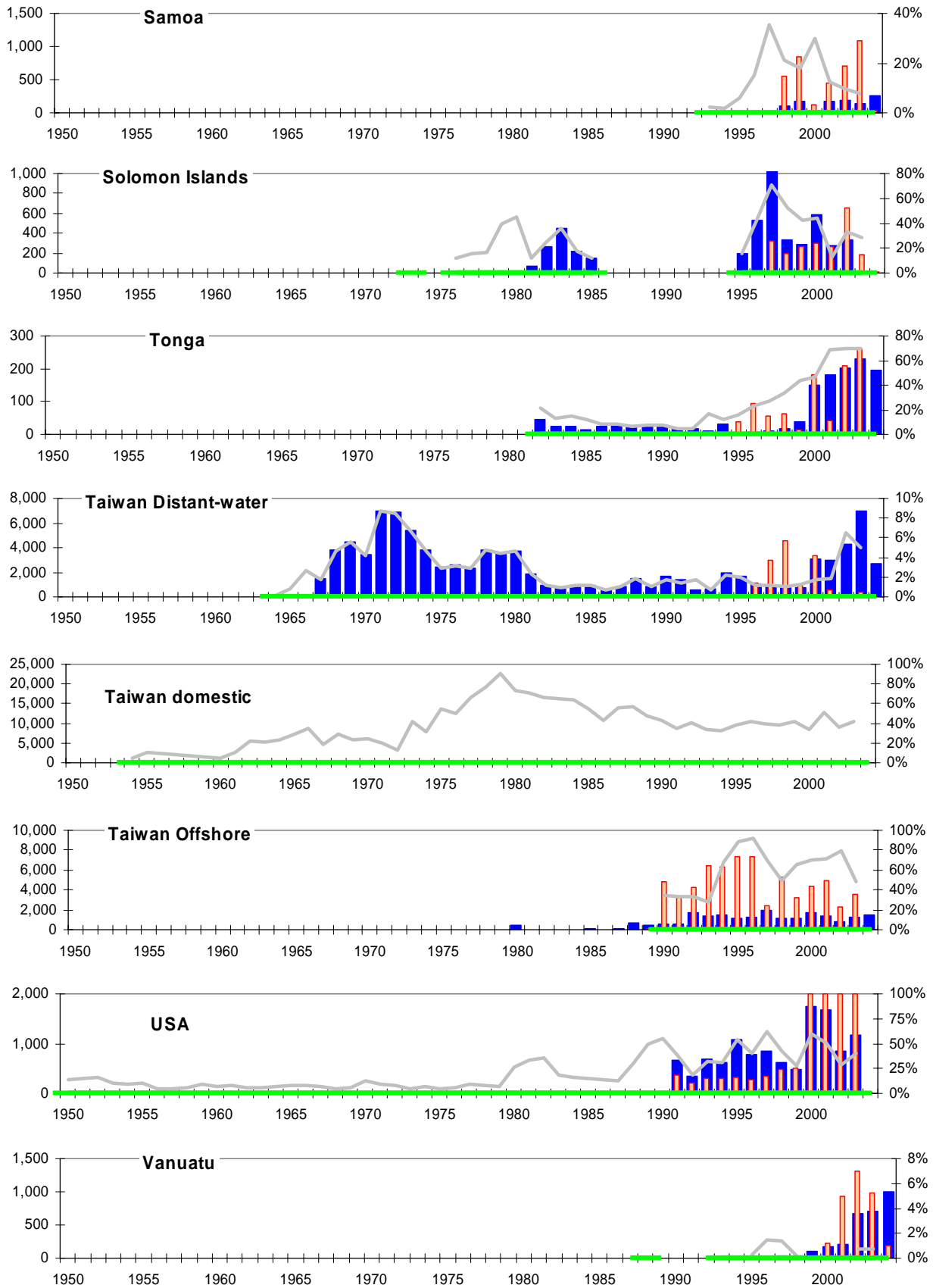


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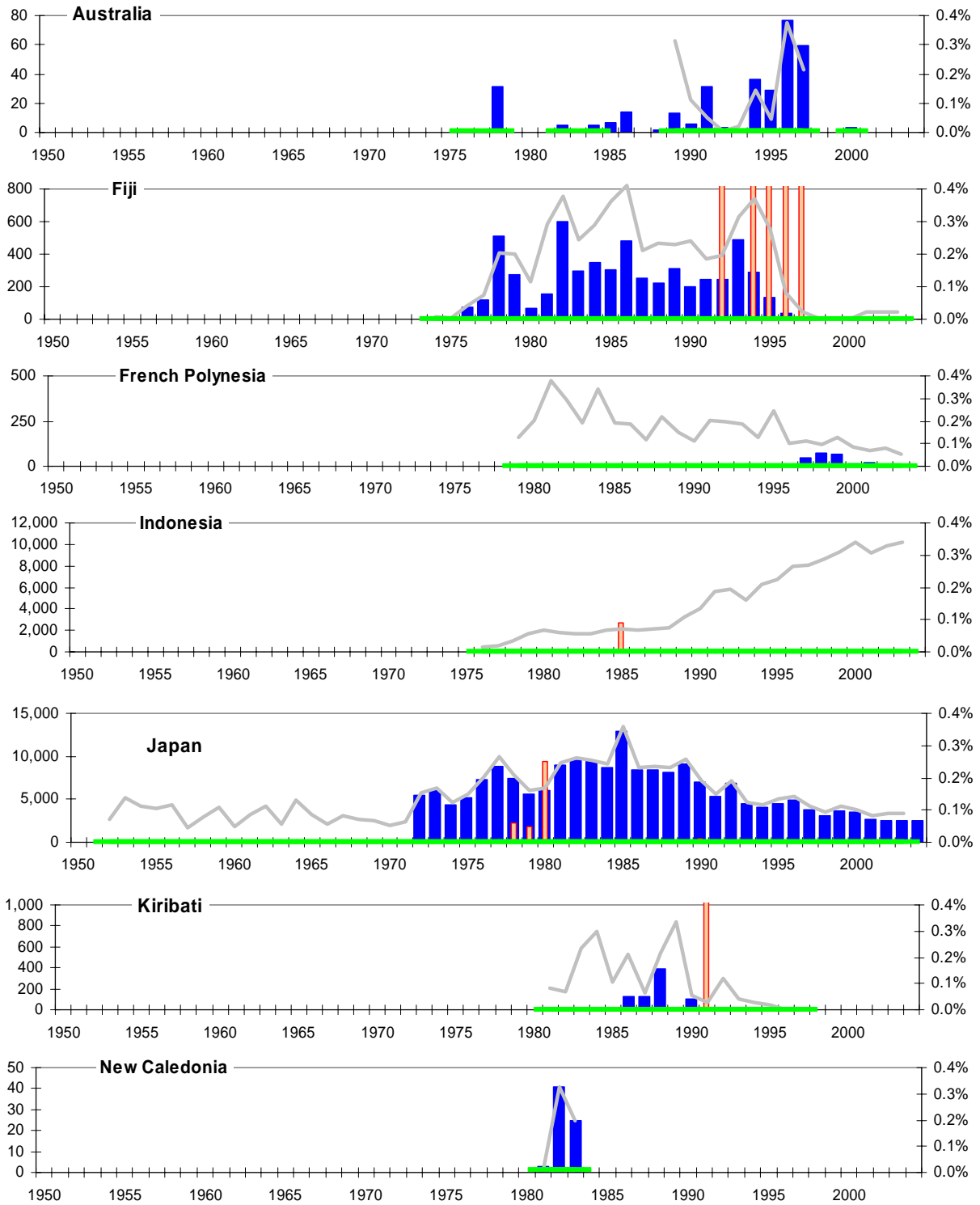


Figure 8. Coverage of YELLOWFIN catch and size composition data in the WCPO POLE-AND-LINE FISHERY, by year and fleet

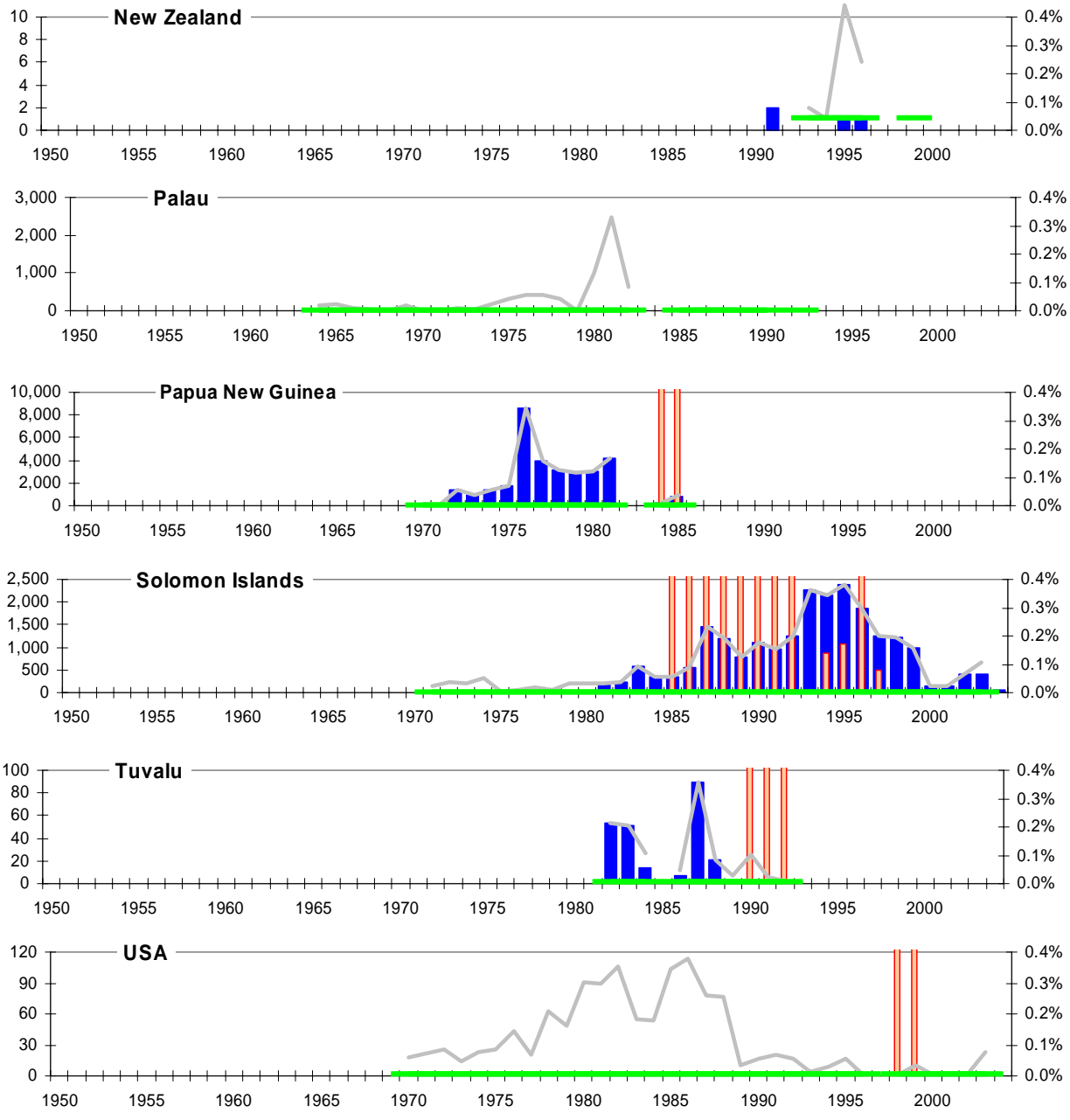


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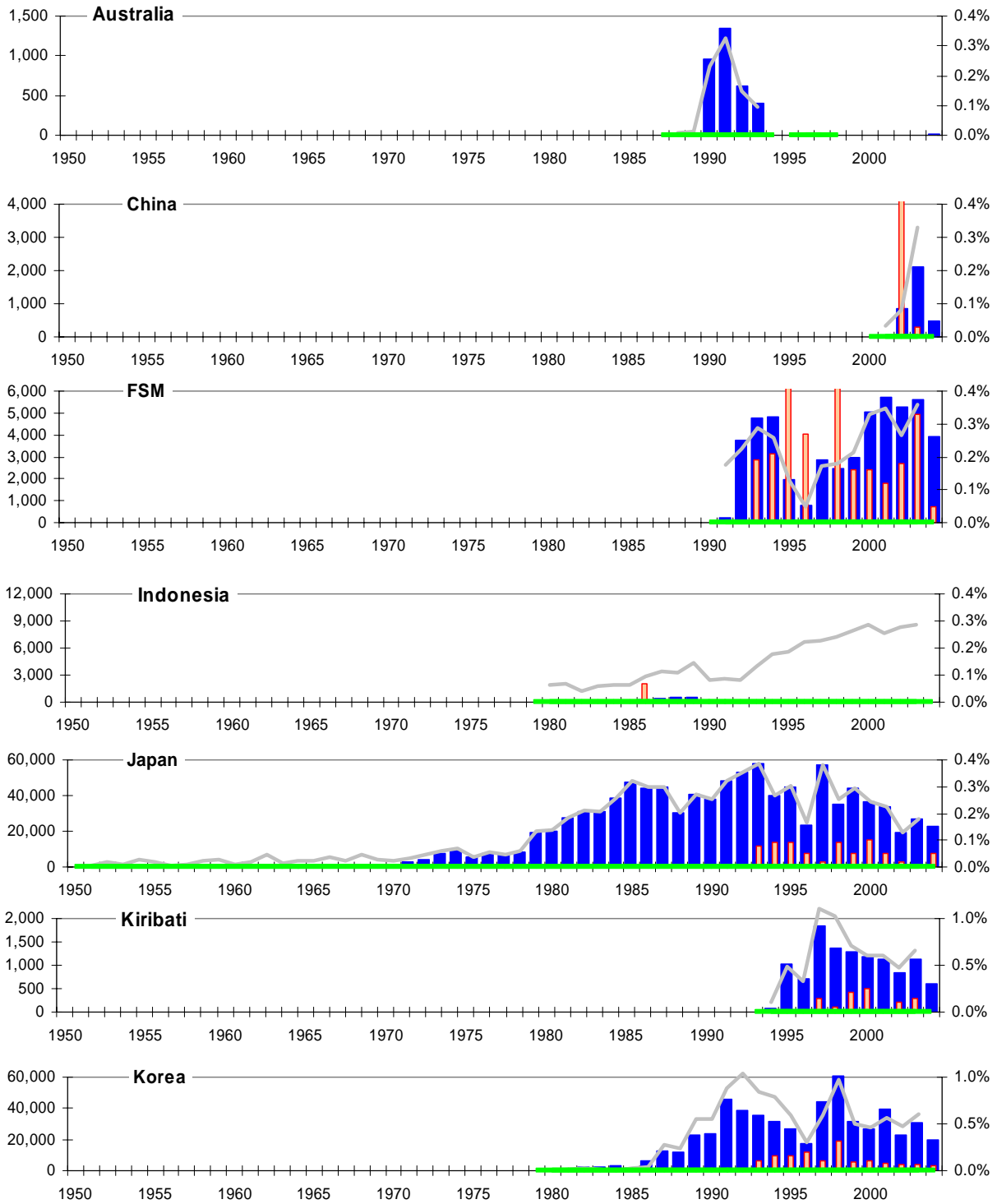


Figure 9. Coverage of YELLOWFIN catch and size composition data in the WCPO PURSE SEINE FISHERY, by year and fleet

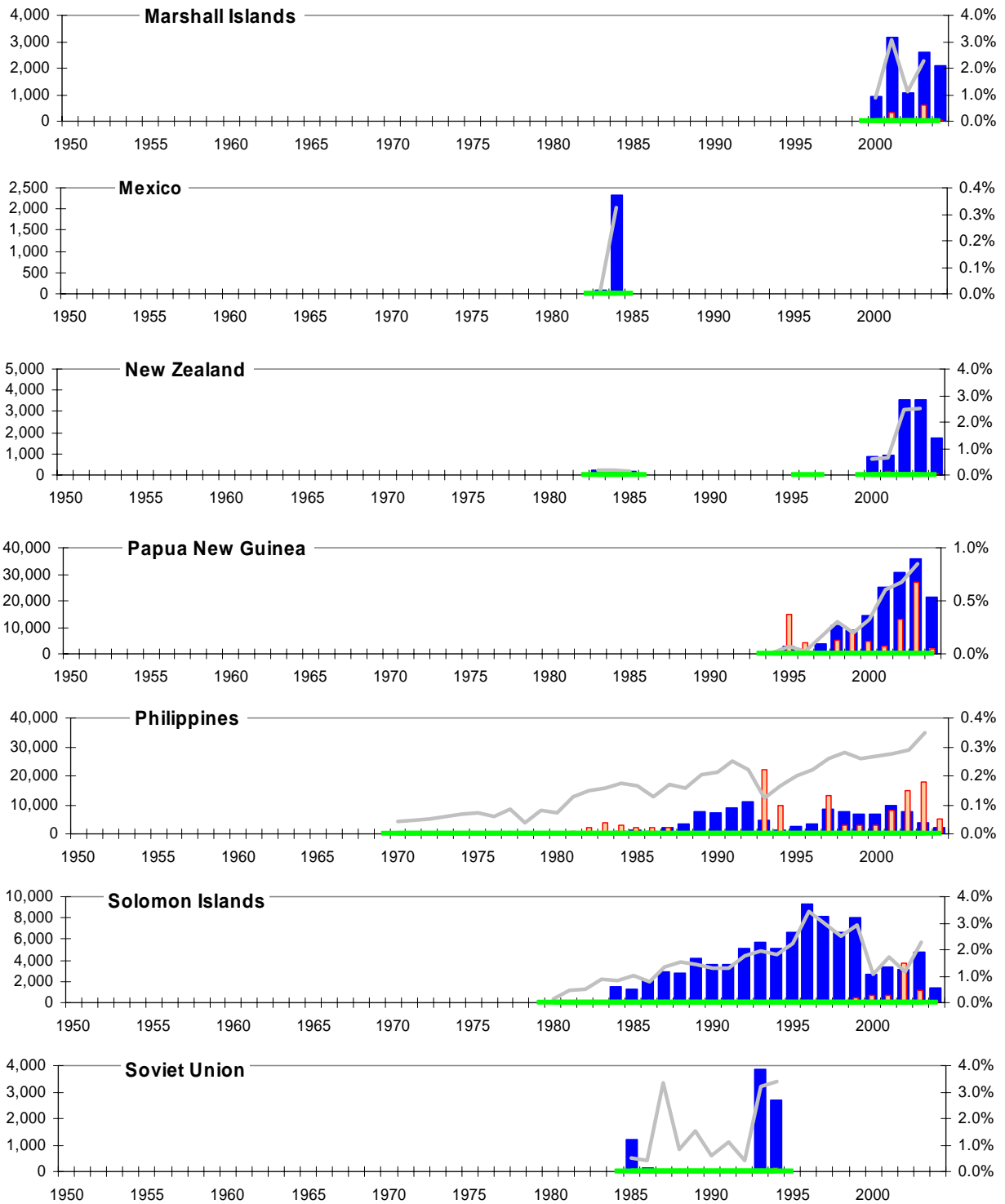


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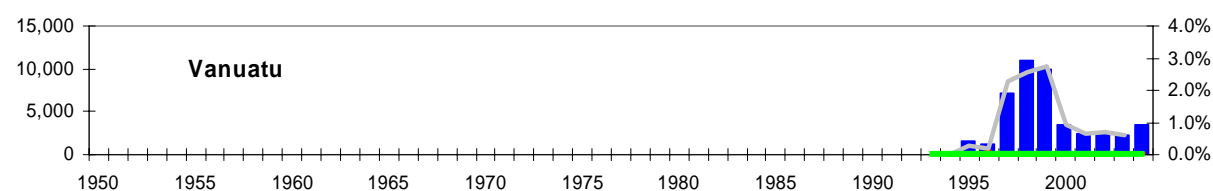
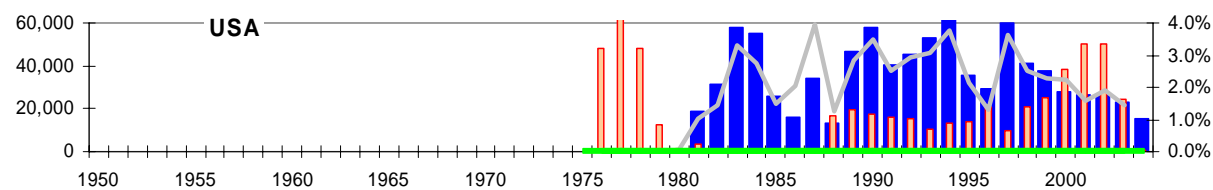
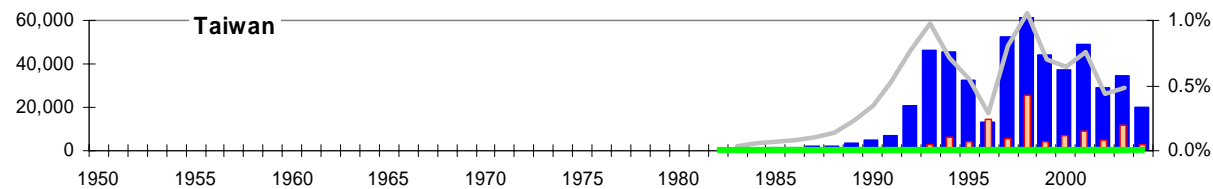
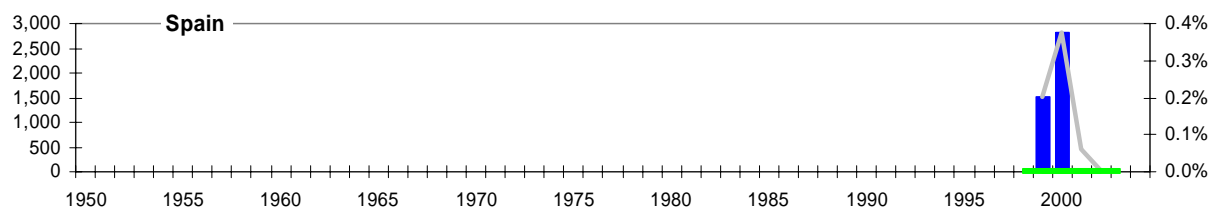


Figure 9. (continued)

APPENDIX 6. COVERAGE OF INDONESIA AND PHILIPPINES DOMESTIC FISHERIES DATA

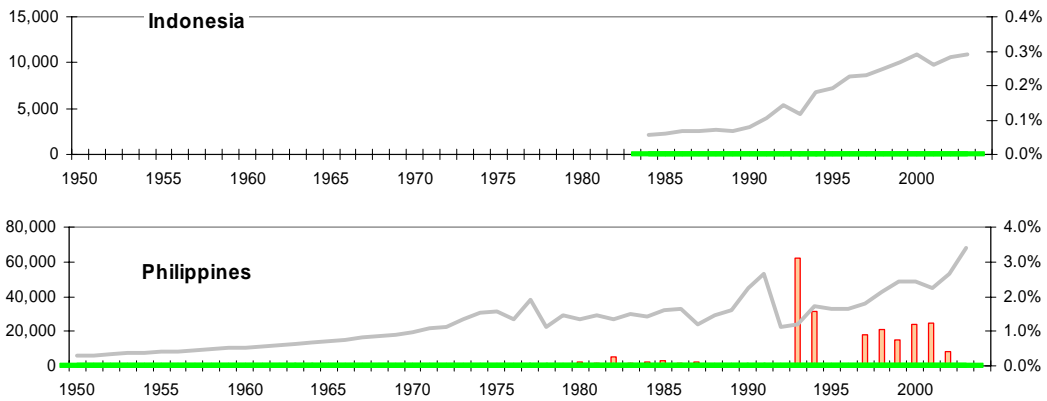


Figure 10. Coverage of YELLOWFIN catch and size composition data in the WCPO HANDLINE FISHERY, by year and fleet

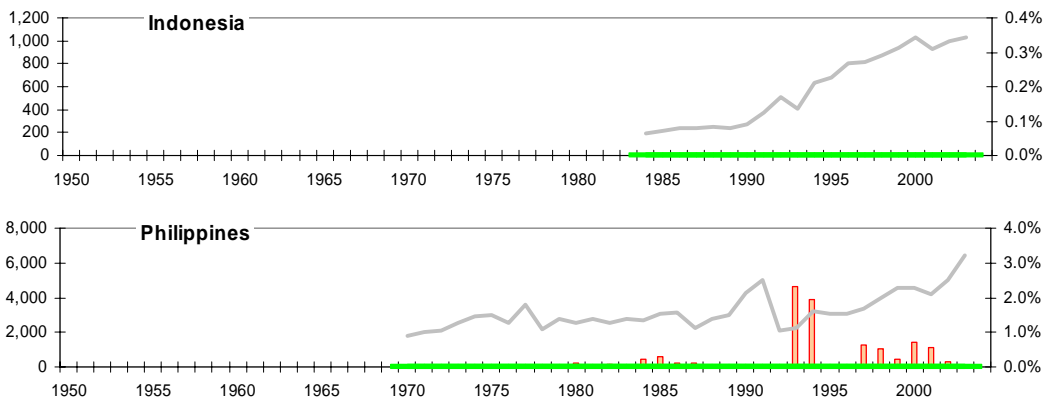


Figure 11. Coverage of BIGEYE catch and size composition data in the WCPO HANDLINE FISHERY, by year and fleet

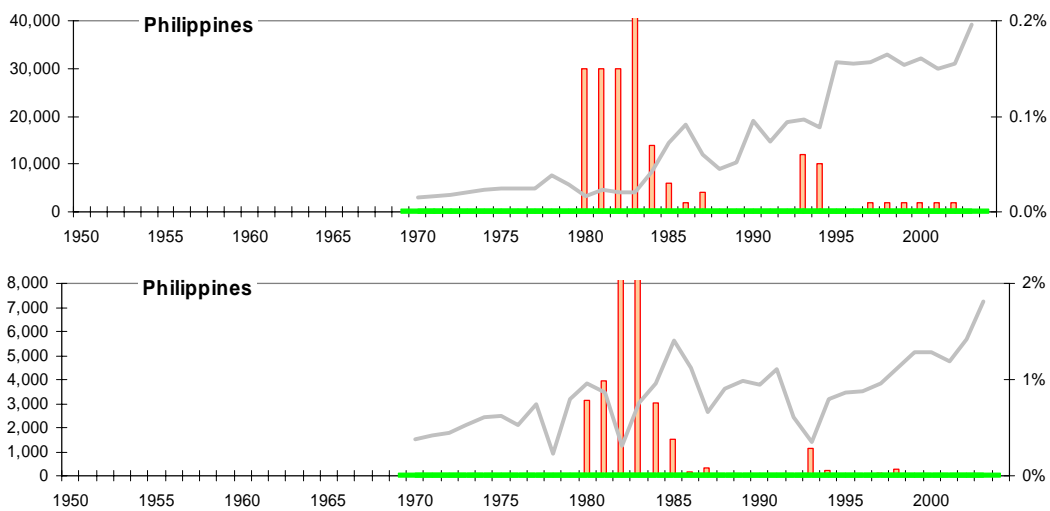


Figure 12. Coverage of SKIPJACK and YELLOWFIN catch and size composition data in the PHILIPPINES RINGNET FISHERY, by year

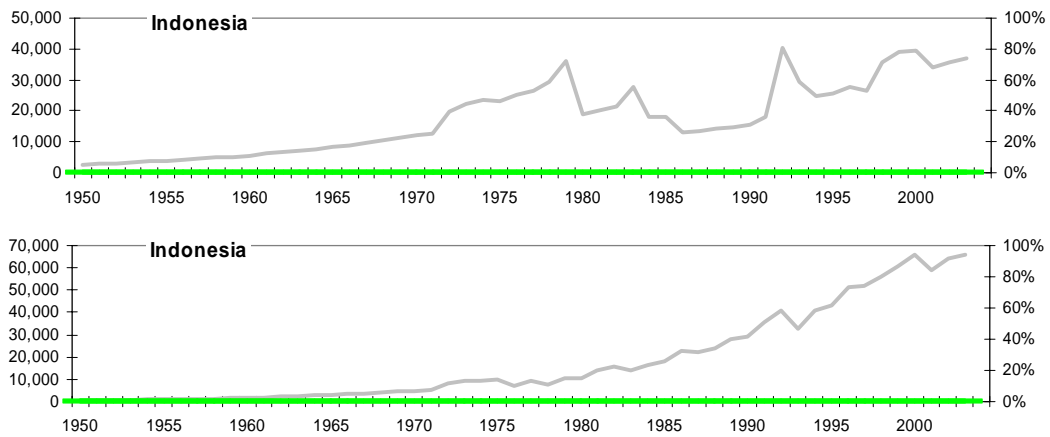


Figure 13. Coverage of SKIPJACK and YELLOWFIN catch and size composition data in the INDONESIAN "UNCLASSIFIED" FISHERY

APPENDIX 7. COVERAGE OF DATA – SUMMARY BY GEAR, 1999–2003

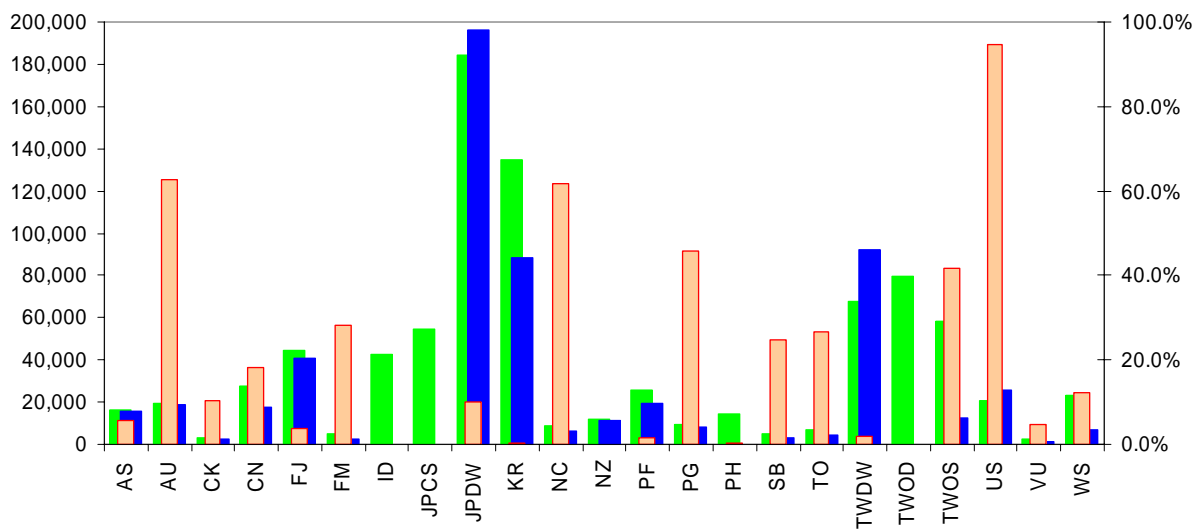


Figure 14. Coverage of target catch and size composition data in the WCPO LONGLINE FISHERY, 1999–2003

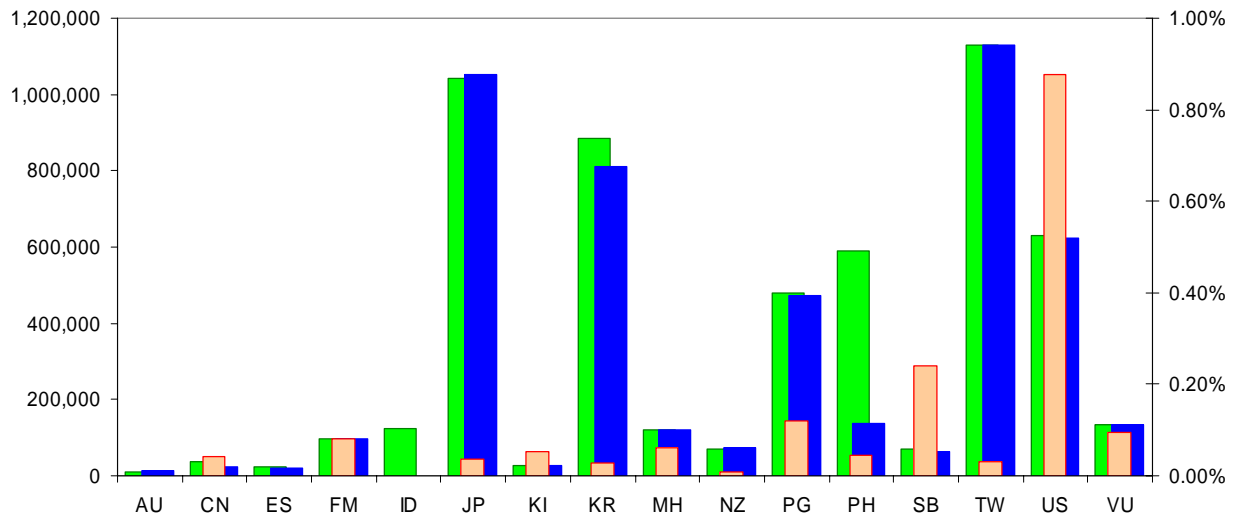


Figure 15. Coverage of target catch and size composition data in the WCPO PURSE SEINE FISHERY, 1999–2003

APPENDIX 8. GAPS IN ANNUAL CATCH ESTIMATES

Type of Gap	Description of fleets, gears and period covering the gap	Status
Annual Catch Estimates Provided by the Fishing Nation, But Not Stratified by Gear Type and/or Species	<ul style="list-style-type: none"> Indonesian industrial and artisanal fleets and Philippines commercial and municipal fleets <p><i>Estimates of annual catches for the domestic fleets of Indonesia and the Philippines have been provided on a timely basis; however, annual catch estimates in recent years (1992–2002 for Indonesia and 1997–2002 for the Philippines) have not been broken down by gear type and estimates of annual bigeye and yellowfin catches for all years have been reported as a combined catch of ‘tuna’.</i></p>	Work in Progress (Refer to Lewis, 2004; Anon, 2003b; Anon, 2004; Barut & Garvilles, 2005)
Untimely Provision of Annual Catch Estimates by the Fishing Nation	<ul style="list-style-type: none"> Untimely Provision of Annual Catch Estimates by the Fishing Nation Japanese pole-and-line fleets <p><i>In recent years, estimates of the annual catches of the target tuna species have been provided to SPC within six months following the end of the calendar year for all fleets, except those covering the pole-and-line fleets, both coastal and offshore / distant-water, of Japan.</i></p>	
Annual Catch Estimates Not Provided by the Fishing Nation and Determined by SPC With Unknown Accuracy	<ul style="list-style-type: none"> Tonga longline, 1996–2000 <p><i>Catches for 1996–2000 were determined assuming each vessel caught an average of 100 tonnes per annum and applying the average species composition determined from logsheet data held by the OFP for 1993–2001.</i></p>	
Annual Catch Estimates Neither Provided by the Fishing Nation Nor Determined by SPC	<ul style="list-style-type: none"> Vietnamese longline fleet <p><i>No annual catch estimates covering the recently-developed Vietnamese longline fleet have been provided by Vietnam or determined by SPC. No information is available regarding the current status of tuna fisheries statistics at the Fisheries Information Centre of the Ministry of Fisheries. Catch and effort data have been compiled for several years through the DANIDA-funded Fisheries Sector Programme Support, under the Strengthening of the Fisheries Administration component, in collaboration with the Ministry of Fisheries and the Hai Phong Research Institute of Marine Fisheries; however, this information has not been provided to SPC.</i></p>	Recently reviewed (Refer to Lewis, 2005)

APPENDIX 9. GAPS IN CATCH AND EFFORT DATA

Type of Gap	Description of fleets, gears and period covering the gap	Status
Status of Collection and Compilation Unknown	<ul style="list-style-type: none"> • Japanese offshore and distant-water longliners prior to 1952 <p><i>In the period after the World War I, pole-and-line was the dominant gear type; however, by 1926, almost all Japanese longliners were converted to engine power, which resulted in an expansion of the fishing grounds (Matsuda & Ouchi 1984). In 1932, the Japanese government conducted the first tuna longline mothership operation in the area from the Nicobar Islands to Timor. By 1939, there were 72 longliners catching yellowfin, bigeye and swordfish in the tropical and sub-tropical waters of the WCPO. Longlining ceased in 1942, recommenced after World War II, and expanded rapidly when restrictions on vessel movements were lifted in 1952. The status of the collection and compilation of operational catch and effort data for Japanese offshore and distant-water longliners prior to 1952 is unknown.</i></p>	
	<ul style="list-style-type: none"> • Japanese offshore and distant-water pole-and-line vessels prior to 1952 <p><i>Offshore tuna fishing in the WCPO was developed by the Japanese during the Meiji Era, 1868–1912 (Matsuda & Ouchi 1984). Prior to World War I, traditional tuna fisheries had gradually expanded from coastal to offshore areas and then to distant waters. The expansion of skipjack pole-and-line fishing accelerated during the 1920s with the construction of katsuobushi processing plants on Saipan, Chuuk, Pohnpei and Koror. The highest catch of skipjack prior to World War II was recorded as 28,688 tonnes in 1937. In 1940, 128 vessels were licensed. By 1942, bases for Japanese pole-and-line vessels had been established on several islands in the Japanese trusteeship established at the end of World War I. The fishing grounds expanded to almost all areas under the trusteeship and to Papua New Guinea, Solomon Islands and Southeast Asia. Japanese fishing vessels came under government control in 1942 and as a result of World War II, 60% of the vessels were lost. Pole-and-line fishing recommenced after the war and expanded when restrictions on vessel movements were lifted in 1952. The status of the collection and compilation of operational catch and effort data for Japanese offshore and distant-water pole-and-line vessels prior to 1952 is unknown.</i></p>	
	<ul style="list-style-type: none"> • Japanese coastal longline, pole-and-line and purse-seine fleets 	
	<ul style="list-style-type: none"> • Japanese distant-water/offshore pole-and-line fleet prior to 1972 	
	<ul style="list-style-type: none"> • Korean distant-water longliners prior to 1975 	
	<ul style="list-style-type: none"> • Chinese Taipei offshore and distant-water longliners prior to 1967 	

Type of Gap	Description of fleets, gears and period covering the gap	Status
	<ul style="list-style-type: none"> Chinese Taipei domestic longline fleet 	
	<ul style="list-style-type: none"> Operational data covering the industrial and artisanal fleets of Indonesia and the commercial and municipal fleets of the Philippines <p><i>Investigation into the status of the collection and availability of operational data in Indonesia and the Philippines has been proposed in Anon. (2003b).</i></p>	<p>Work in Progress</p> <p>(Refer to Lewis, 2004; Anon, 2003b; Anon, 2004; Barut & Garvilles, 2005)</p>
	<ul style="list-style-type: none"> New Zealand Troll fleet prior to 1983 	
	<ul style="list-style-type: none"> Operational data covering Chinese Taipei purse seiners, 1983–1992, and Korean purse seiners, 1980–1993 <p><i>Lawson (1994) showed that operational data provided to coastal states covering Chinese Taipei purse seiners during 1980–1993 and Korean purse seiners during 1983–1993 were mis-reported. No information is currently available regarding the status and availability of accurately reported operational data for these fleets and periods.</i></p>	
Operational or Trip Data Compiled by Fishing Nations, But Not Provided to SPC	<ul style="list-style-type: none"> American Samoa troll and handline, from 1982 onwards. <p><i>Data have been collected by the Department of Marine and Wildlife Resources through the Commercial Catch Monitoring System from 1982 to 1985 and through the Offshore Creel Survey System since October 1985; these data were requested by SPC in June 2002.</i></p>	
	<ul style="list-style-type: none"> Canadian troll (South Pacific albacore), from 1987 (?) onwards. <p><i>Data have been collected by the Department of Fisheries and Oceans; these data were requested by SPC in August 2003.</i></p>	
	<ul style="list-style-type: none"> Chinese Taipei fleets: distant-water longline, from 1967 onwards; offshore longline, from 1987 onwards; and purse-seine, from 1983 onwards. <p><i>Data for the offshore longline fleet based in SPC member countries and the purse-seine fleet, covering both the EEZs of SPC member countries and territories and the high seas, have been provided to SPC by SPC members. No data covering the offshore longline fleet based in Chinese Taipei have been provided.</i></p>	
	<ul style="list-style-type: none"> Guam troll and handline, from 1982 onwards. <p><i>The Division of Aquatic and Wildlife Resources, in collaboration with the National Marine Fisheries Service and the Guam Fishermen's Co-op, has collected commercial landing invoices, which include catch and effort data, since 1982; these data were requested by in June 2002.</i></p>	

Type of Gap	Description of fleets, gears and period covering the gap	Status
	<ul style="list-style-type: none"> Japanese offshore and distant-water fleets: longline, from 1952 onwards; pole-and-line, from 1972 onwards; and purse seine, from 1967 onwards. <p><i>Data covering the EEZs of SPC member countries and territories have been provided to SPC by SPC members.</i></p>	
	<ul style="list-style-type: none"> Korean distant-water fleets: longline, from 1975 onwards; and purse-seine, from 1980 onwards. <p><i>Data for the purse-seine fleet, covering both the EEZs of SPC member countries and territories and the high seas, have been provided to SPC by SPC members.</i></p>	
	<ul style="list-style-type: none"> Northern Marianas troll, from 1982 onwards. <p><i>The Division of Fish and Wildlife, in collaboration with the National Marine Fisheries Service, has collected fish dealer invoices since 1982; these catch per trip data were requested by SPC in June 2002.</i></p>	
	<ul style="list-style-type: none"> United States (POFI) longline surveys in the 1950s 	
Untimely Compilation of Operational Data by Fishing Nations, then Aggregated Data Provided to SPC	<ul style="list-style-type: none"> Japanese distant-water pole-and-line fleets. 	
	<ul style="list-style-type: none"> Chinese Taipei distant-water longline fleet. 	
Aggregated Data Provided to SPC by Fishing Nation, But Inaccurately Raised	<ul style="list-style-type: none"> Aggregated data covering Chinese Taipei distant-water longliners, 1967–1993 <p><i>The catch and effort data aggregated by 5° longitude, 5° latitude and month, covering Chinese Taipei distant-water longliners during 1967–1993, which have been provided by Chinese Taipei to SPC, were derived from operational data that were raised on the basis of independent estimates of total effort. For 1967–1987, estimates of total effort were determined from radio reports, while for 1988–1993, they were based on estimates of the number of vessels fishing in the Pacific, which in turn were determined from departure reports provided to the Kaohsiung Fisheries Administration. Lawson (1997) compared the aggregated data to landings data and showed that the aggregated data for 1966–1977 are positively biased, while the aggregated data for 1978–1979 and 1981–1987 are negatively biased. SPC has converted the aggregated data for 1967–1993 such that they have been raised on the basis of landings data, rather than effort data. The aggregated data provided for 1994 onwards have been raised by Chinese Taipei on the basis of landings.</i></p>	

Type of Gap	Description of fleets, gears and period covering the gap	Status
Operational Data Compiled by Coastal States and Provided to SPC, But With Low Coverage Due to Non-Reporting and/or Mis-Reporting	<ul style="list-style-type: none"> • Operational data covering the following fleets and time periods: Fiji longline, 1993–2001; Papua New Guinea longline, 1991–1997; Tonga longline, 1990–2000; <p><i>For 2001, the most recent year for which all or most data have been compiled, the OFP holds catch and effort logsheet data covering 44.3% of the catch of target species in the WCPO. These data cover catches taken by the domestic fleets of SPC member countries and territories, catches by distant-water fleets fishing with the EEZs of SPC members, and catches of certain distant-water fleets on the high seas (such as the purse-seine fleets of Korea and Chinese Taipei, but not their distant-water longline fleets or any Japanese fleets). Excluding the domestic fisheries of Indonesia and the Philippines, for which no catch and effort data have been collected, and the coastal fisheries of Japan, the coverage by logsheet data held by the OFP is 64.3%.</i></p>	
	<ul style="list-style-type: none"> • Operational data covering Chinese Taipei purse seiners, 1983–1993 	
Aggregate Data Compiled by Coastal States and Provided to SPC, But the data are Incomplete	<ul style="list-style-type: none"> • Operational data covering Chinese fleets: longline, from 1988 onwards; and purse-seine, from 2001 onwards. <p><i>Aggregate data have been provided for the Chinese purse seine and longline distant-water fleets covering 2003 only. For the purse seine fleet, effort is in “days fishing” only, with no breakdown of catch and effort by set type, and for the longline fleet, catch in numbers has not been provided.</i></p> <p><i>Data for the offshore longline fleet based in SPC member countries and the purse-seine fleet have been provided to SPC by SPC members.</i></p>	

APPENDIX 10. GAPS IN SIZE COMPOSITION DATA

Type of Gap	Description of fleets, gears and period covering the gap	Status
No Port Sampling Data Collected by Port State	<ul style="list-style-type: none"> Purse-seine fleets unloading in Thailand 	
	<ul style="list-style-type: none"> Coastal fleets of Japan 	
	<ul style="list-style-type: none"> Indonesian industrial and artisanal fleets <p><i>A port sampling programme for the Pacific Ocean waters of Indonesia have been proposed in Anon. (2003) and will be established depending on the availability of funding.</i></p>	
	<ul style="list-style-type: none"> Vietnamese longline fleet 	Recently reviewed (Refer to Lewis, 2005)
Low Coverage by Port Sampling Data	<ul style="list-style-type: none"> Philippines commercial and municipal fleets <p><i>Port sampling was conducted in the Philippines by the FAO/UNDP Indo-Pacific Tuna Programme from 1978 to 1992 and by the Landed Catch and Effort Monitoring Programme of the Tuna Research Project of the Bureau of Fisheries and Aquatic Resources during 1993–1994. Further port sampling was conducted by BFAR during 1996–1997. Since 1997, port sampling in the Philippines have been conducted under the National Stock Assessment Project. NSAP sampling covered more than 200 landing centres in 2002; however, sampling has been reduced considerably since August 2002 due to funding constraints. Increased port sampling has been proposed in Anon. (2003b) and will be established depending on the availability of funding.</i></p>	Work in Progress (Refer to Lewis, 2004; Anon, 2003b; Anon, 2004; Barut & Garvilles, 2005)
	<ul style="list-style-type: none"> Chinese distant-water longline fleet (Targeting Bigeye and Yellowfin) 	
	<ul style="list-style-type: none"> Chinese-Taipei distant-water longline fleet (Targeting Bigeye and Yellowfin) 	
	<ul style="list-style-type: none"> Korean distant-water longline fleet (Targeting Bigeye and Yellowfin) 	
	<ul style="list-style-type: none"> French Polynesian longline fleet, 2000–2004 	
Port Sampling Data Compiled by Port State, But Not Provided to SPC	<ul style="list-style-type: none"> Chinese Taipei offshore longliners sampled in Chinese Taipei 	
Port Sampling Data Compiled by Port State and Provided to SPC, But Not Stratified by School Association Nor Geographic area	<ul style="list-style-type: none"> Korean purse seiners sampled in Korea 	

APPENDIX 11. GAPS IN OBSERVER DATA

Type of Gap	Description of fleets, gears and period covering the gap	Status
Not Covered by Observer Data	<ul style="list-style-type: none"> <li data-bbox="703 268 1713 292">Indonesian industrial and artisanal fleets and Philippines commercial and municipal fleets <p data-bbox="748 331 1713 419"><i>Observer programmes for the Pacific Ocean waters of Indonesia and the Philippines have been proposed in Anon. (2003b) and will be established depending on the availability of funding.</i></p>	Work in Progress (Refer to Lewis, 2004; Anon, 2003b; Anon, 2004; Barut & Garvilles, 2005)
	<ul style="list-style-type: none"> <li data-bbox="703 427 1025 451">Vietnamese longline fleet 	Recently reviewed (Refer to Lewis, 2005)
Low Coverage by Observer Data	<ul style="list-style-type: none"> <li data-bbox="703 523 1713 547">All fleets except United States purse-seiners and United States longliners based in Hawaii. <p data-bbox="748 587 1713 794"><i>Observer data are the primary source of data used to estimate the catches of the highly migratory species covered by the WCPF Convention, other than the target tuna species. However, observer coverage in the WCPO is currently (2001) 0.5% for longline and 6.4% for purse seine (2.8% excluding the US purse-seine fleet). Most offshore longline fleets and purse-seine fleets fishing in tropical waters are covered by observers, although at a low level of coverage. Distant-water longline fleets, however, are not currently being covered by observers.</i></p>	
Observer data Collected and Compiled by Fishing State, But Not Provided to SPC	<ul style="list-style-type: none"> <li data-bbox="703 802 1480 826">Chinese-Taipei, Japanese and Korean longline and purse seine fleets <p data-bbox="748 866 1713 922"><i>Observer cruises have been conducted on these vessels under national programmes/projects, but data have yet to be made available.</i></p>	