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Trends in the South Pacific albacore longline and troll fisheries

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1 Executive Summary

This paper presents a compendium of fishery indicators for South Pacific albacore tuna, as requested at previous WCPFC-related meetings. These indicators include: total catch; catch by gear; and longline effort and nominal troll and longline CPUE trends, along with their spatial patterns. Commentary provided includes comparisons of 2019 values to 2018 and to the average over 2014-2018. Information provided includes data loaded into databases as of 6th July 2020. Note that catch levels and their distribution amongst areas may change as more data become available. This paper complements the information provided by ? that summarises the latest trends for the main target species for the fisheries of the Western and Central Pacific Fisheries Commission (WCPFC).

Transshipment data are available over the period from the inception of transshipment reporting (July 2010) to May 2020. Data presented represent high seas transshipments only; they do not include in-port or in-zone transshipments. Monthly reported transshipment levels fluctuate notably, and may reflect logistical/operational factors in addition to fishing activity. There is a notable peak in transshipment activity in October 2017 (4,186 mt) of which 57% was reported by China (2,404 mt), and 27% by Vanuatu (1,122 mt) fleets. It should be noted that transshipment levels are unlikely to be fully reported for the most recent 18 months.

The average stock status in 2016 (the last year of the assessment) across the 72 model runs was $SB_{latest}/SB_{F=0} = 0.52$, below the interim target reference point ($SB/SB_{F=0} = 0.56$) established by the WCPFC in 2018 (?). Due to the complex interactions between the major species-specific fisheries, it is difficult to correctly interpret the stock status-related implications from the trends in any indicators in isolation from other data sets and a population dynamics model. Therefore, we summarise the stock status from the most recent assessment (2018), and update an analysis of the potential long-term stock consequences of recent fishing patterns on the South Pacific albacore stock relative to the agreed biomass limit reference point assuming 2019 status quo catch. This analysis uses stochastic stock projections and incorporates the recommendations on inclusion of uncertainty from WCPFC-SC14. Based upon the 2018 stock assessment, assuming 2019 catch levels through 2020-2035, the stock is projected to decline from 2016 ($SB_{latest}/SB_{F=0} = 0.52$) to $SB_{2035}/SB_{F=0} = 0.36$ at the end of the projection period. When compared to the biomass Limit Reference Point (SB_{LRP}) the risk of $SB_{2035}/SB_{F=0} < SB_{LRP}$ is 26%. Overall, vulnerable biomass (biomass vulnerable to longline fisheries; a CPUE proxy) is estimated to decrease by 36% relative to 2013 levels (a year where some CCMs considered the longline fishery to have an adequate catch rate to meet economic fishery objectives) (?).

2 Introduction

At the 7th Technical and Compliance Committee, some members requested a paper on South Pacific albacore be prepared by the Western and Central Pacific Fisheries Commission (WCPFC) Secretariat. That request indicated the paper should contain all available catch and transshipment data available, and should highlight trends. The paper was first prepared by the Secretariat for WCPFC8 in March 2012. It has since been updated frequently, taking into consideration further requests from members.

This paper presents trends in catch, effort and catch per unit effort (CPUE) both spatially and temporally for the South Pacific albacore (SPA) fishery. Depending on the context, summaries are computed for the South Pacific (all waters south of the equator), for the albacore target longline fishery region (Pacific waters south of 10°S), and also for Exclusive Economic Zones (EEZs) and High Seas regions (HS) within the WCPFC-Convention Area (WCPFC-CA). In addition, information on transshipment patterns is presented, consistent with ?. Following the request for further information to assist in the interpretation of key observations, and noting that it is difficult to correctly interpret the stock status-related implications of trends in any indicators in isolation of other data sets and population dynamics models, the potential consequences of recent fishing levels for future South Pacific albacore stock status are evaluated using stochastic projections.

The analyses presented are based on data available to SPC as of 6th July 2020. The overall catch, and its distribution amongst spatial areas, may change as more data becomes available. Please note that the figures may include or exclude specific fleets that are included in summaries made for other purposes (e.g. CMM tables) and therefore the reported values (catch, effort, CPUE, etc.) may not be identical to those presented in other documents. Additional information by latitudinal zone, requested at WCPFC9, are

posted as Microsoft Excel files annexed to this paper (SC16-SA-WP-XXa and SC16-SA-WP-XXb). The vessel number data are for south of 20°S.

3 Patterns of longline and troll fishing

Two groups of commercial fleets exploit South Pacific albacore: longline and troll vessels. In this section we examine trends in their catch, effort and CPUE. Catch and effort information come primarily from logsheet returns or, for the high seas, from the provision of aggregate data from distant water fishing nations.

3.1 Catch

Annual catch estimates for albacore in the South Pacific (south of the equator) as a whole peaked in 2017 at 97,202 mt (all gears) (Figure 1). Catch by longliners represented 96% of the catch weight in 2019 at 77,367 mt. The 2019 longline catch was 6% lower than 2018. Provisional other catch (3,297 mt - the majority being troll catch) was 15% higher than 2018. Over the past 10 years, the annual contribution of the EPO catch south of the equator ranged from 15-36% of the total catch. The provisional estimate for the 2019 EPO share is 17% of the total catch, but it is likely the EPO data are still incomplete.

By comparison, the 2019 total albacore catch within the southern part of the WCPFC-CA¹ (Table 1) was 72,221 mt and the longline catch was 68,795 mt. High seas longline catch estimates represent 42% of the 2019 total, and have ranged from 29-51% of the total over the last 10 years. By flag (or attributed nationality based on charter agreements), China and Chinese Taipei had the highest catch estimates of South Pacific albacore in 2019 (22,637 mt and 9,239 mt respectively), representing 46% of the total catch (Table A1-1), with 63% of their catch taken on the high seas (Table A1-2).

Four flag states reported troll catch within the WCP-CA during the period 2000 to 2019, namely Canada, the Cook Islands, USA and New Zealand (Table A1-3) with catch totalling 3,426 mt. Troll activity has been reported only in the New Zealand EEZ and on the high seas in 2019 (Table 2). Catch estimates for 2019 were 790 mt for the high seas and 2,635 mt for the New Zealand EEZ. The total troll catch in 2019 was 26% higher than the 2018 catch.

The spatial pattern of South Pacific albacore catch over the long-term (1950-2014), the last 5 years (2015-2019) and 2019 alone, are shown in Figure 2. In recent years, catch has been concentrated in the 10-20°S latitudinal band. Note that while 2019 estimates remain provisional, the geographic distribution of catch is generally consistent with that seen in recent years.

3.2 Effort

It is challenging to identify the specific species being targeted by longline vessels, particularly within the aggregate data received from particular fleets fishing on the high seas. To more directly relate the patterns seen in effort to the declared South Pacific albacore catch, we have considered fishing effort south of 10°S to approximate South Pacific albacore targeting (noting that this will include longline effort targeting swordfish) and to attempt to exclude tropical longline fishery effort.

Raised effort data for the southern WCPFC-CA south of 10°S were available up to 2019 (Figure 3). We note there is considerable uncertainty in 2019 effort estimates. The number of deployed hooks in 2019 within the WCPFC-CA south of 10°S was 20% higher than in 2018, and 6% lower than the peak seen in 2012. The longline effort in this region was estimated at 300 million hooks in 2019.

Effort data from VMS provides the more 'up to date' information than raised logsheet data, given that logsheet effort for recent years may be incomplete, and the uncertainty in raised annual logsheet effort estimates for 2019 is high. The VMS data reported here are for the WCPFC-CA waters south of 10°S, as for the raised hooks data above. The VMS data represents days-at-sea and includes fishing and transit activity, but excludes data close to port. As for the aggregate longline data, it does not allow information on the species targeted by vessels during fishing to be assessed. In addition, some trends over time may be influenced by increased coverage of VMS across longline vessels in the South Pacific, while data for

¹Note that these annual catch estimate-based tables approximate the southern area of the WCPFC-CA as far as possible, given that some EEZs and high seas areas span the equator.

certain EEZs may be incomplete or not available. A list of notes on the VMS data and a table of effort by high seas area are provided in Appendix 2. To overcome the absence of VMS data for some EEZs, data were augmented with logsheet information in these locations.

Effort south of 10°S (VMS days-at-sea, augmented by logsheet days) both within EEZs and on the high seas generally increased through to the 2013 peak, then declined to a lower average level until rebounding in 2019. Around 28% of the VMS days occurred within the high seas in 2019 (Table 3). Overall effort has increased in the EEZs and had been decreasing on the high seas until a sharp upturn in 2019 (Table 3). Of the VMS days in 2019 within the international waters 34% was in Region I5 east of the Line Islands and French Polynesia, and 46% from the region north and northeast of New Zealand (I7) (Figure 4; Figure A2-1; Table A1-1).

3.3 Catch per unit effort

Figure 5 presents nominal longline South Pacific albacore CPUE series by key fleets south of 10° south. Note, the values presented in ? are south of the equator and will therefore differ from those presented here. Some key changes in CPUE in the recent periods were:

- Japanese longline CPUE in 2019 (11.04 Kg per 100 hooks) was a 2% decrease on 2018, the 2014-2018 average was 13.84 Kg per 100 hooks;
- Fiji longline CPUE in 2019 (16.21 Kg per 100 hooks) was a 12% decrease on 2018, the 2014-2018 average was 18.18 Kg per 100 hooks;
- Chinese longline CPUE in 2019 (18.62 Kg per 100 hooks) was a 33% decrease on 2018, the 2014-2018 average was 25.36 Kg per 100 hooks;
- Chinese Taipei longline CPUE in 2019 (22.95 Kg per 100 hooks) was a 26% decrease on 2018, the 2014-2018 average was 26.11 Kg per 100 hooks.

Examining longer-term trends, the average nominal CPUE for the Fiji fleet was 23.67 Kg per 100 hooks between 1991 and 2000, while that for the Chinese Taipei fleet was 34.85 Kg per 100 hooks. In contrast, the Japanese fleet averaged 17.96 Kg per 100 hooks over that time.

The relative spatial pattern of CPUE is presented in Figure 6 for two time periods, and for 2019. In the period 1950-2000, catch rates were relatively high across much of the southern WCPFC-CA, in particular within high seas areas and the EEZs of New Caledonia, Vanuatu and Tonga. Catch rates in the recent period (2001-2019) are generally lower across the region. It is notable that increases in effort within particular 5°x5° squares are generally matched by declines in CPUE. The CPUE in the high seas east of New Zealand was high in 2019.

Figure 7 presents nominal South Pacific albacore CPUE series for two troll fleets. The CPUE of the US fleet generally declined over the period 1987 to 2006, with catch rates in the most recent years of activity being comparable to that in the mid-2000s. By comparison, the nominal CPUE of the New Zealand fleet has generally been lower, but relatively stable.

4 Transshipment information

High seas transshipment data are available from July 2010 to March 2020; no in-port or in-zone transshipment data are presented. Fluctuations in reported transshipments may reflect logistical/operational factors rather than fishing activity. It is noted that historically South Pacific albacore would have been offloaded directly to canneries (e.g. Pago Pago, American Samoa, or Levuka, Fiji) rather than being transshipped on the high seas. There is a notable peak in transshipment activity in September of each year. Vanuatu has had the highest transshipment volumes in the past, averaged over the whole period. The highest peak in the time series was in October 2017 (4,186 mt) (Figure 8), of which 2,403 mt was by China and 1,122 mt by Vanuatu. Further transshipment information by flag and month is presented in Appendix 3. It should be noted that transshipment levels are unlikely to be fully reported for the most recent 18 months. Transshipment data for 2019 to 2020 should, therefore, be considered preliminary and subject to change.

5 Albacore stock status

The most recent South Pacific albacore stock assessment was conducted in 2018 (?) and used data up until the end of 2016. The Scientific Committee 2014 meeting (SC14) provided advice to the Commission based upon the structural uncertainty grid that was used to characterize uncertainty in the assessment. This included different levels of natural mortality, stock recruitment relationship steepness, and weighting of the input length data. Estimates are presented in Table 5, and the Majuro plot in Figure 9.

As noted in previous papers (e.g. ?), it is difficult to correctly interpret the stock status-related implications of trends in any indicators in isolation from other data sets and a population dynamics model. To examine the potential consequences of recent fishing levels relative to the agreed biomass limit reference point for South Pacific albacore ($20\% SB_{recent}/SB_{F=0}$), stochastic 20-year catch-based projections were performed under different assumptions of population dynamics (defined by 72 stock assessment runs from the 2018 Multifan-CL stock assessment, as selected by SC14 to present key uncertainties within SC14 advice), and future conditions (variability in future recruitment around the stock-recruitment relationship), consistent with the recommendations on inclusion of uncertainty within projections from WCPFC-SC9 and in ?.

After a sizeable decline from 2017 to 2018, the southern longline catch for 2019 increased over the 2018 catch level (Table 1). We therefore update the status quo projection. Actual catches for 2017, 2018 and 2019 are used to project through those years and future southern longline and troll fishery catches continue into the future at levels equal to those seen in 2019 (based on the information available to SPC as at 6th July 2020). Potential future adult (spawning) biomass levels relative to unfished levels were examined, and the probability that the South Pacific albacore stock may fall below the biomass Limit Reference Point (SB_{LRP}) was calculated (Figure 10).

Across the 72 stock assessment models used within the analysis, the average stock status in 2016 (the last year of the assessment) was $SB_{recent}/SB_{F=0} = 0.52$, below the interim target reference point ($SB_{recent}/SB_{F=0} = 0.56$) established by the WCPFC in 2018 (?). If 2019 catch levels continue into the future, however, the stock is predicted to continue to decline on average, falling to $SB/SB_{F=0} = 0.36$ in 2035. When compared to the biomass Limit Reference Point (SB_{LRP}) the risk of $SB_{2035}/SB_{F=0} < SB_{LRP}$ is 26%. Overall, vulnerable biomass (biomass vulnerable to longline fisheries; a CPUE proxy) is estimated to decrease by 36% relative to 2013 levels (a year where some CCMs considered the longline fishery to have an adequate catch rate to meet economic fishery objectives) (?).

Acknowledgments

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7 Tables

Table 1: Annual southern WCP-CA albacore longline catch estimates (excluding archipelagic waters) by EEZ and High Seas, for the most recent 10 years. Note: Available operational and aggregate logsheet data raised to annual catch estimates. EEZ are approximate 200-mile boundaries; High seas is the high seas in the WCPFC Convention Area, south of the equator. Allocation of flag catch to EEZ is approximate due to the lack of operational logsheet data in some cases.

EEZ	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
American Samoa	2,838	1,784	2,416	1,769	1,377	1,760	1,511	1,511	1,553	1,024
Australia	745	652	702	757	728	945	910	830	751	796
Cook Islands	4,819	5,559	10,414	5,985	4,483	4,556	3,899	3,310	4,715	6,595
Fiji	5,771	4,165	4,287	3,639	3,916	5,824	4,880	5,871	5,466	5,374
High seas	36,933	23,028	29,665	29,442	20,260	21,130	16,537	35,218	26,819	28,835
Jarvis (USA)	0	0	0	0	0	0	0	0	0	0
Kiribati	1,263	550	1,213	826	1,259	2,595	4,937	423	72	1,144
Matthew and Hunter	15	6	9	0	0	2	1	2	1	2
New Caledonia	1,932	1,734	1,711	1,713	1,628	1,578	1,745	1,719	1,742	2,009
Niue	196	0	0	362	208	206	90	14	364	446
New Zealand	460	418	266	302	311	223	233	181	239	116
French Polynesia	3,482	3,224	3,591	3,495	3,744	3,418	3,276	2,148	3,058	3,455
PNG	795	294	801	237	310	462	1,185	1,613	1,452	722
Solomon Islands	7,271	6,424	8,112	9,002	14,163	10,844	4,859	5,565	7,679	8,712
Tokelau	0	108	250	0	7	1,435	2,122	1,712	632	1,463
Tonga	57	36	760	1,471	264	710	1,105	605	716	1,286
Tuvalu	675	467	927	1,491	475	412	1,520	1,426	944	1,438
Vanuatu	2,907	6,077	4,257	6,819	5,475	4,516	6,845	8,047	5,602	4,678
Wallis and Futuna	0	3	0	0	0	0	0	0	0	0
Samoa	2,529	1,415	2,038	1,642	800	840	823	1,638	1,364	700
Total	72,688	55,944	71,419	68,952	59,408	61,456	56,478	71,833	63,169	68,795
EEZ Percent	49	59	58	57	66	66	71	51	58	58
HS percent	51	41	42	43	34	34	29	49	42	42

Table 2: Annual southern WCP-CA albacore troll catch estimates by EEZ and High Seas, for the most recent 10 years. Note: Available operational and aggregate logsheet data raised to annual catch estimates. EEZ are approximate 200-mile boundaries (excluding archipelagic waters); High seas is the high seas in the WCPFC Convention Area, south of the equator.

EEZ	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
High seas	307	472	235	390	466	177	166	860	442	790
New Zealand	1,832	2,787	2,727	2,836	1,937	2,425	1,969	1,959	2,272	2,635
Total	2,139	3,259	2,962	3,226	2,403	2,602	2,135	2,819	2,714	3,425
EEZ Percent	86	86	92	88	81	93	92	69	84	77
HS percent	14	14	8	12	19	7	8	31	16	23

Table 3: Total VMS days-at-sea (augmented by logsheet information) by year and geographic area in the WCPFC-CA south of 10°S.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
EEZ	72,291	76,743	79,637	81,968	68,909	69,747	75,690	76,266	72,745	81,870
High seas	20,777	23,242	23,217	31,788	27,231	23,463	20,956	26,072	24,268	31,065
Total	93,068	99,985	102,854	113,756	96,140	93,210	96,646	102,338	97,013	112,935
Percent EEZ	78	77	77	72	72	75	78	75	75	72
Percent High seas	22	23	23	28	28	25	22	25	25	28

Table 4: Annual total and monthly average transshipment in mt (July 2010 to May 2020).

Year	Annual total	Monthly average
2010	4,091	682
2011	9,454	788
2012	5,532	461
2013	9,321	777
2014	9,583	799
2015	9,943	829
2016	18,597	1,550
2017	18,193	1,516
2018	23,168	1,931
2019	23,230	1,936

Table 5: Estimates of reference points and stock status from the last (2018) South Pacific albacore tuna stock assessment (southern WCPFC-CA only), based upon 72 model runs used to capture uncertainty (10th percentile, median and 90th percentile); 'recent' refers to 2013-2016 for SB and 2012-2015 for F (Tremblay-Boyer et al. 2018).

Management quantity	10 th percentile	Grid median	90 th percentile
MSY (mt)	70,856	98,080	130,220
SB _{latest} /SB _{F=0}	0.37	0.52	0.69
SB _{recent} /SB _{F=0}	0.37	0.52	0.63
SB _{recent} /SB _{MSY}	1.96	3.3	6.56
SB _{MSY}	39,872	68,650	100,773
SB _{F=0}	407,792	462,633	534,040
F _{recent} /F _{MSY}	0.08	0.2	0.41

8 Figures

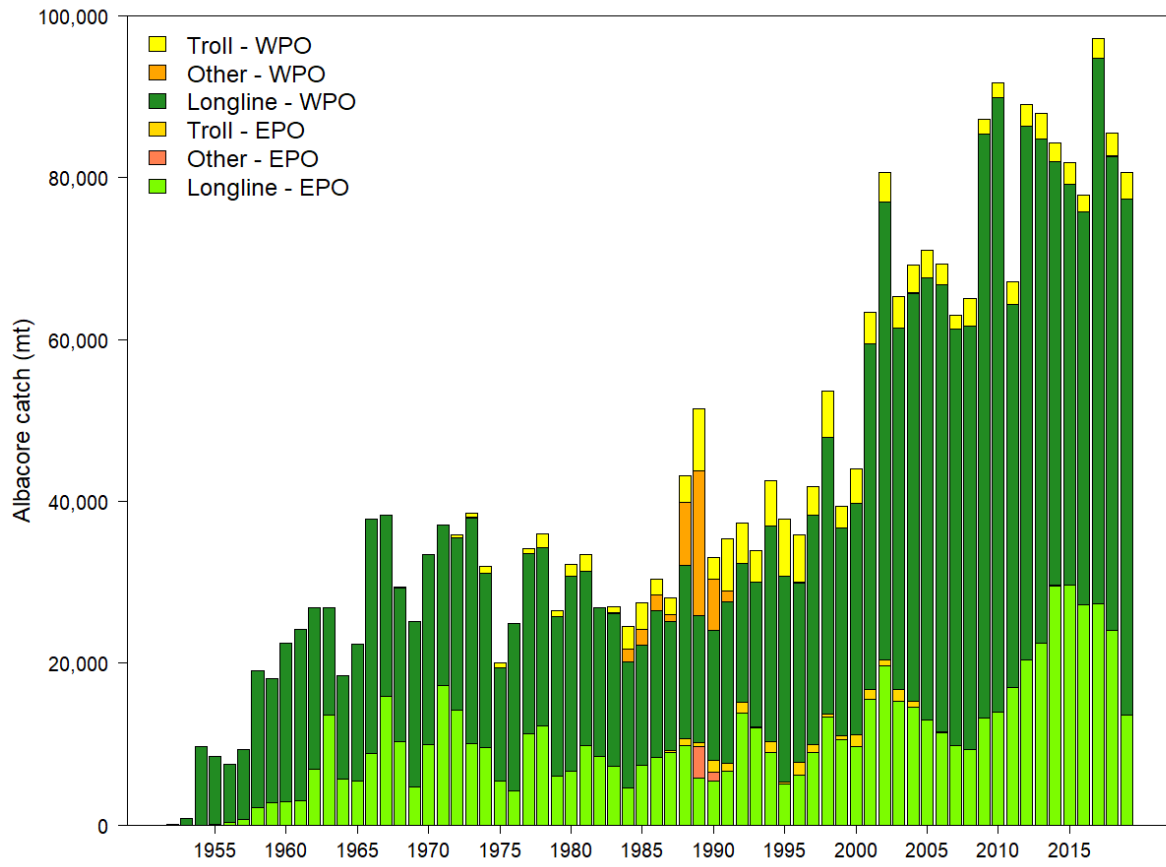


Figure 1: South Pacific albacore catch by gear (all Pacific Ocean waters south of the equator, including archipelagic waters).

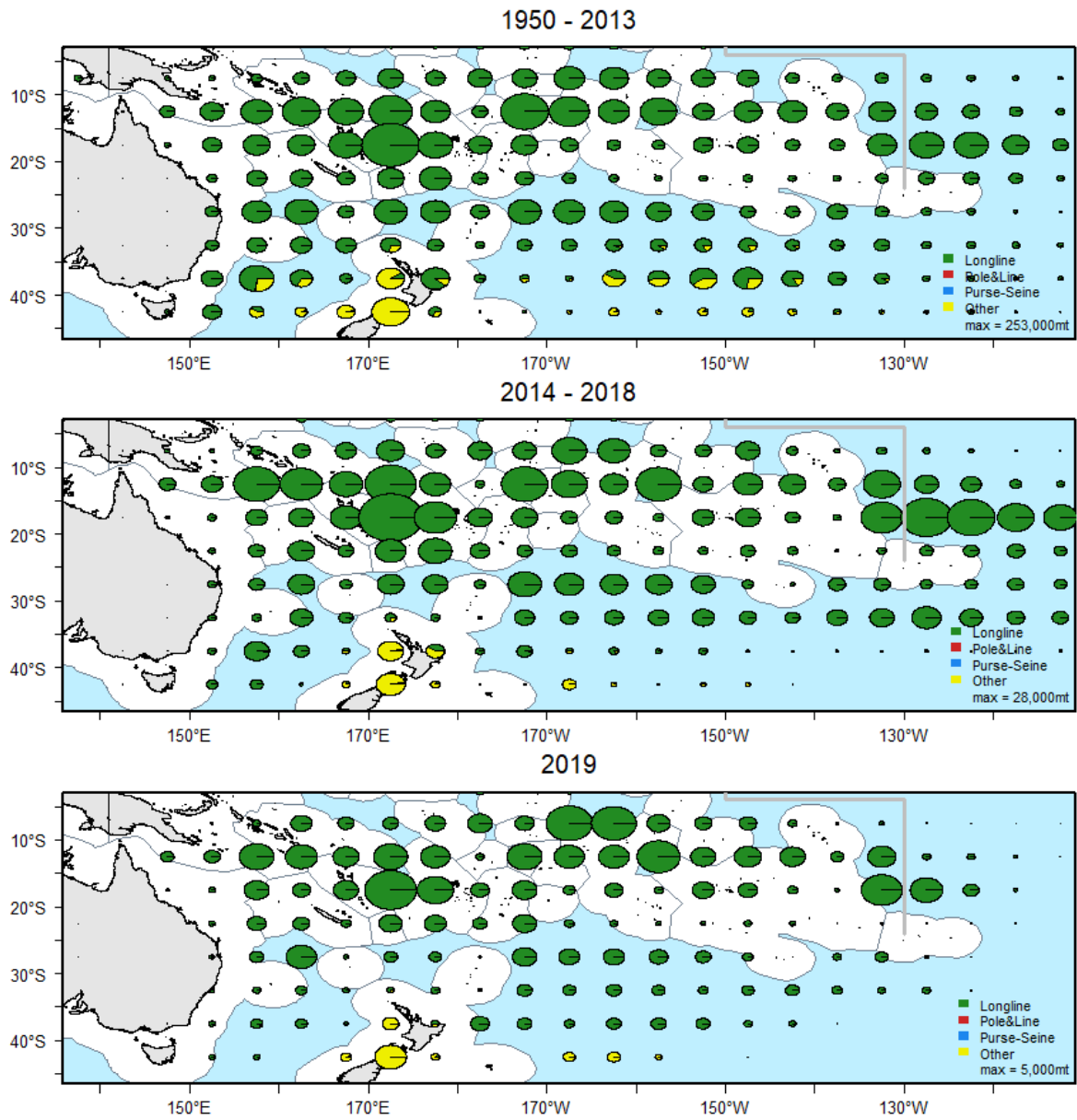


Figure 2: Albacore tuna catch distribution by gear type and 5°x 5° degree region in the south Pacific ocean for the period 1950-2013 (top), 2014 -2018 (middle) and 2019 (bottom). Circle size represents total catch volume with maximum circle size presented in the legends.

Longline effort (millions of hooks) south of 10°S in the WCPFC-CA

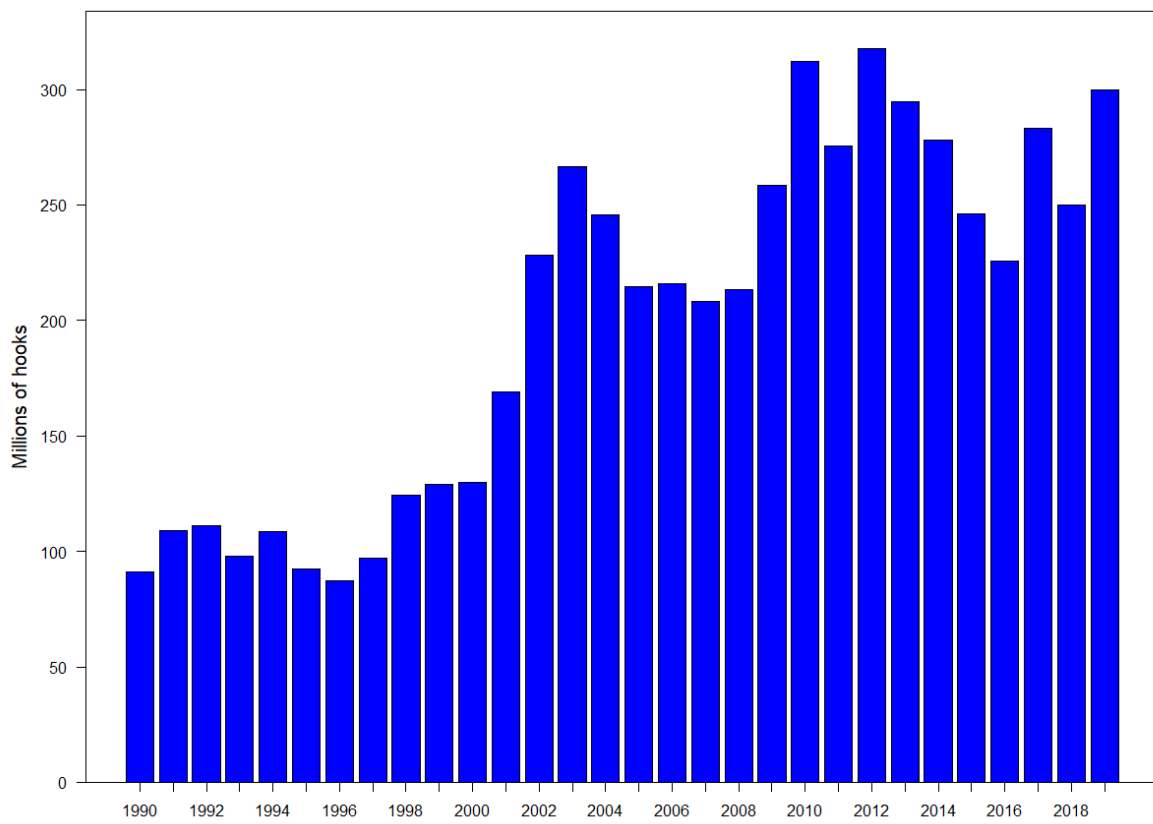


Figure 3: Temporal trends in effort (millions of hooks) in the southern longline fishery (WCPFC-CA south of 10°S).

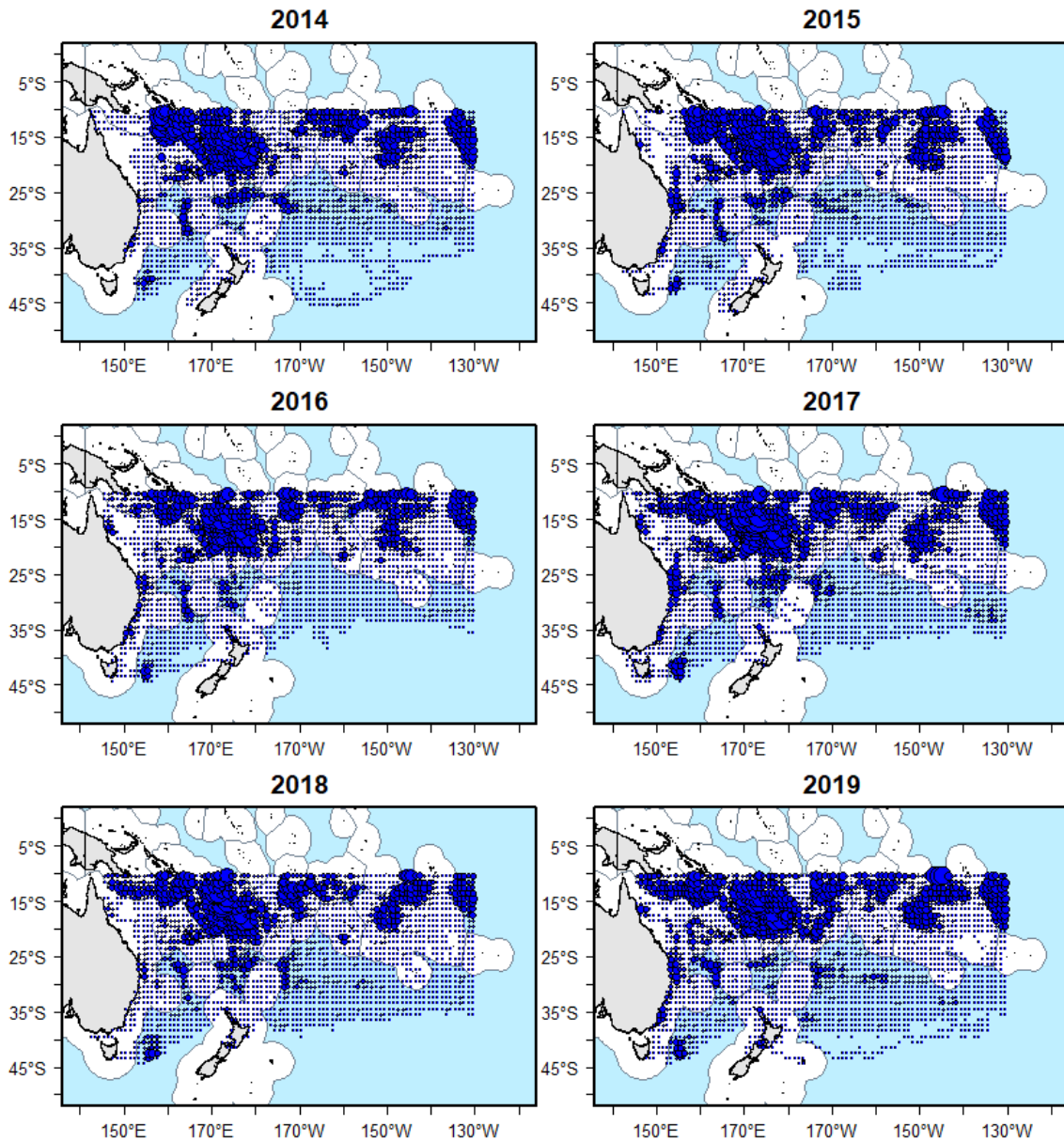


Figure 4: Longline VMS days-at-sea (augmented by logsheets) within the southern WCPFC-CA at $1^\circ \times 1^\circ$ south of 10° S. Maximum circle size = 1,190 days.

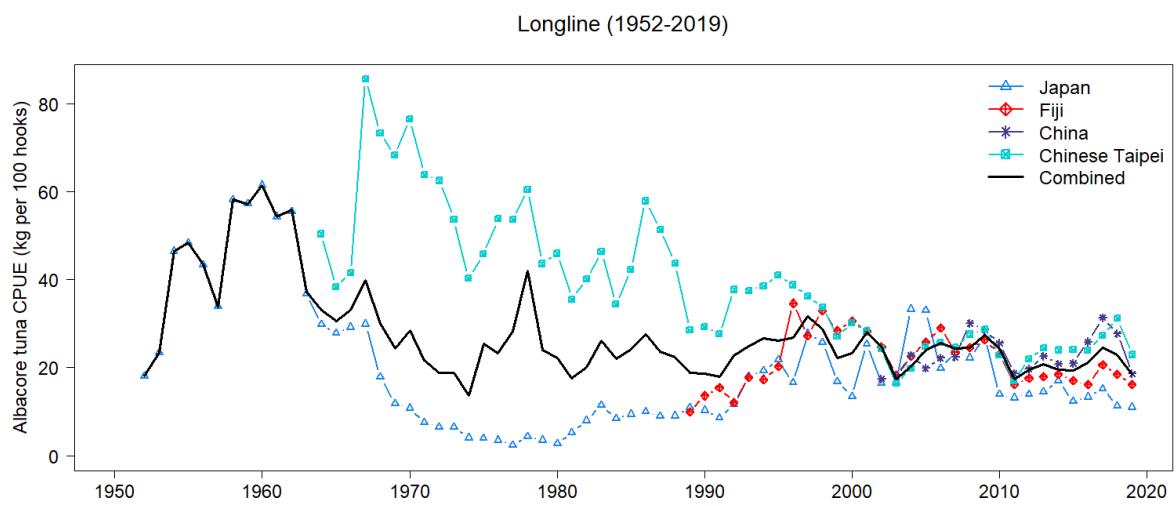


Figure 5: Trends in the nominal CPUE (Kg per 100 hooks) over time for key fleets in the southern WCPFC-CA south of 10°S.

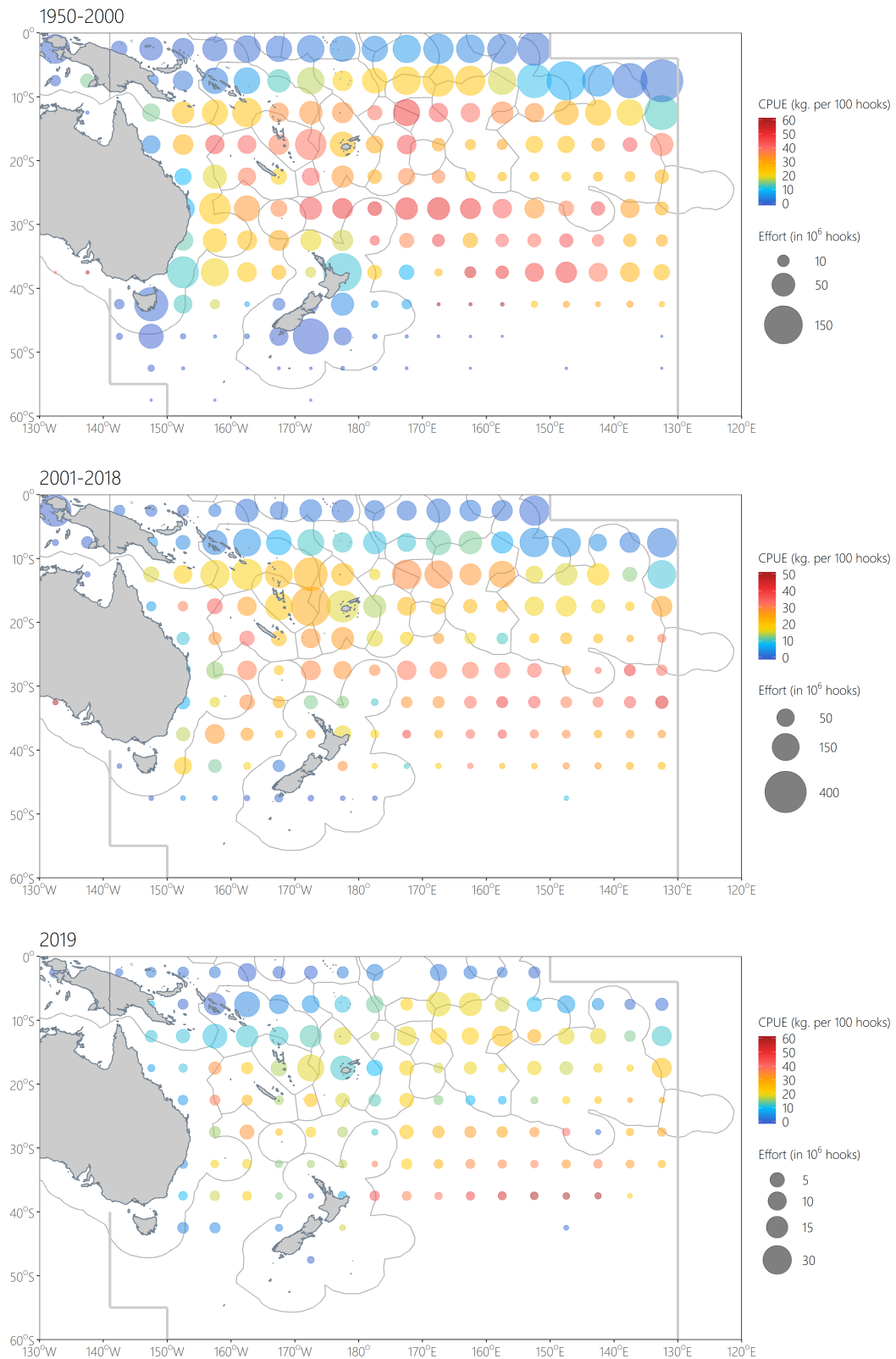


Figure 6: Albacore tuna longline CPUE distribution for the period 1950-2000 (top), 2001-2018 (middle) and 2019 (bottom). CPUE (kg/100 hooks) for a given 5° x 5° square is indicated by the colour of the circle, while the relative size of the circle give an indication of the underlying effort over the period (millions of hooks). Note the change in scales between plots.

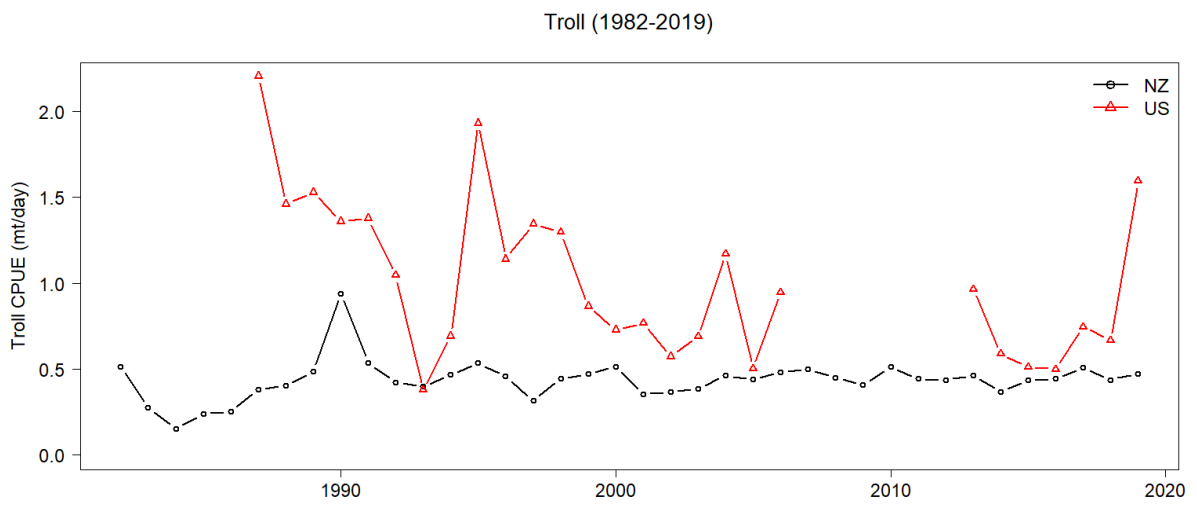


Figure 7: Trends in troll CPUE (albacore mt/day) over time for two troll fleets.

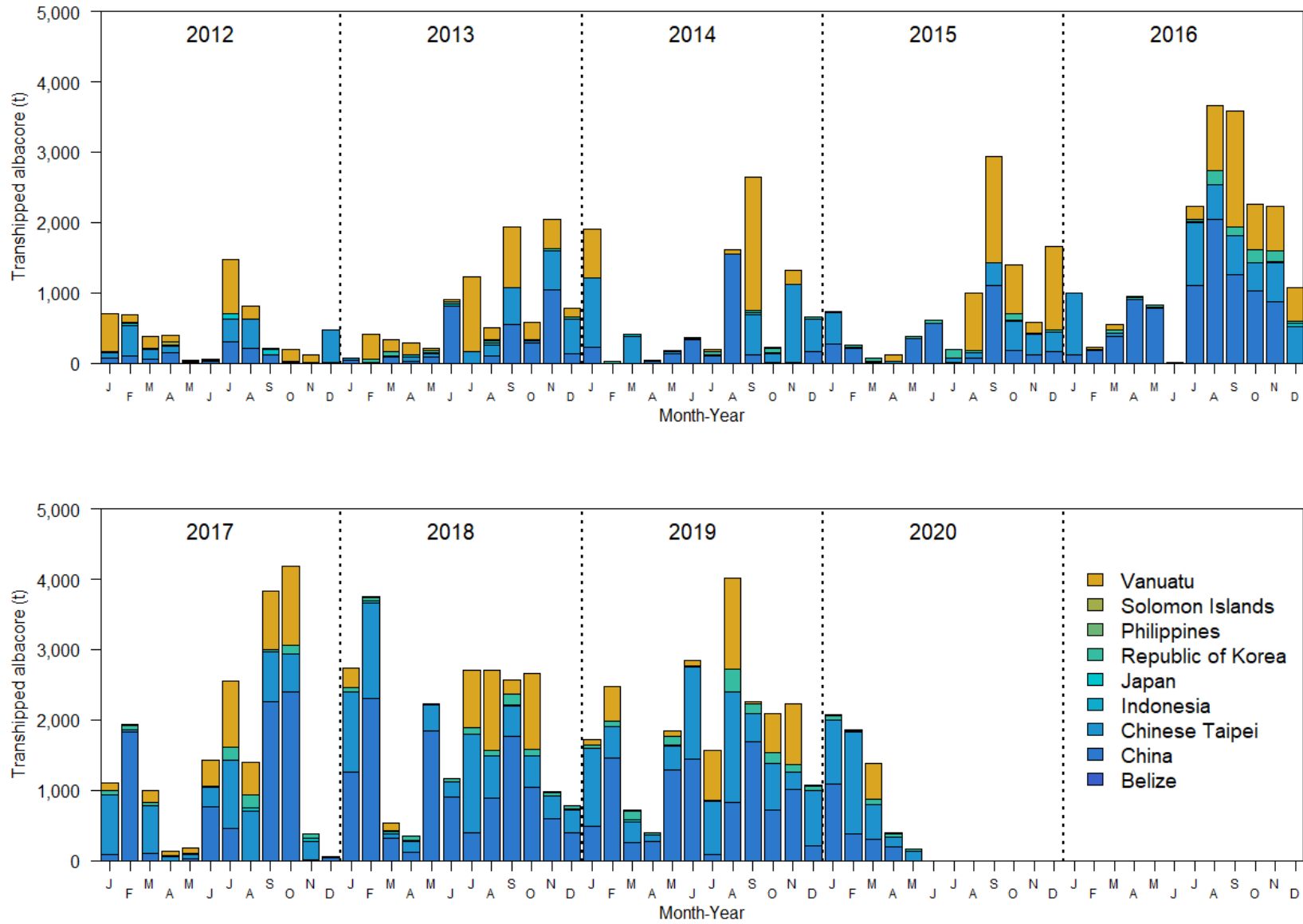


Figure 8: Reported transshipment (t) by flag and month for 2012 to 2016 (top) and 2017 to 2020 - bottom). Source: WCPFC Transshipment Events Database (26 May 2020).

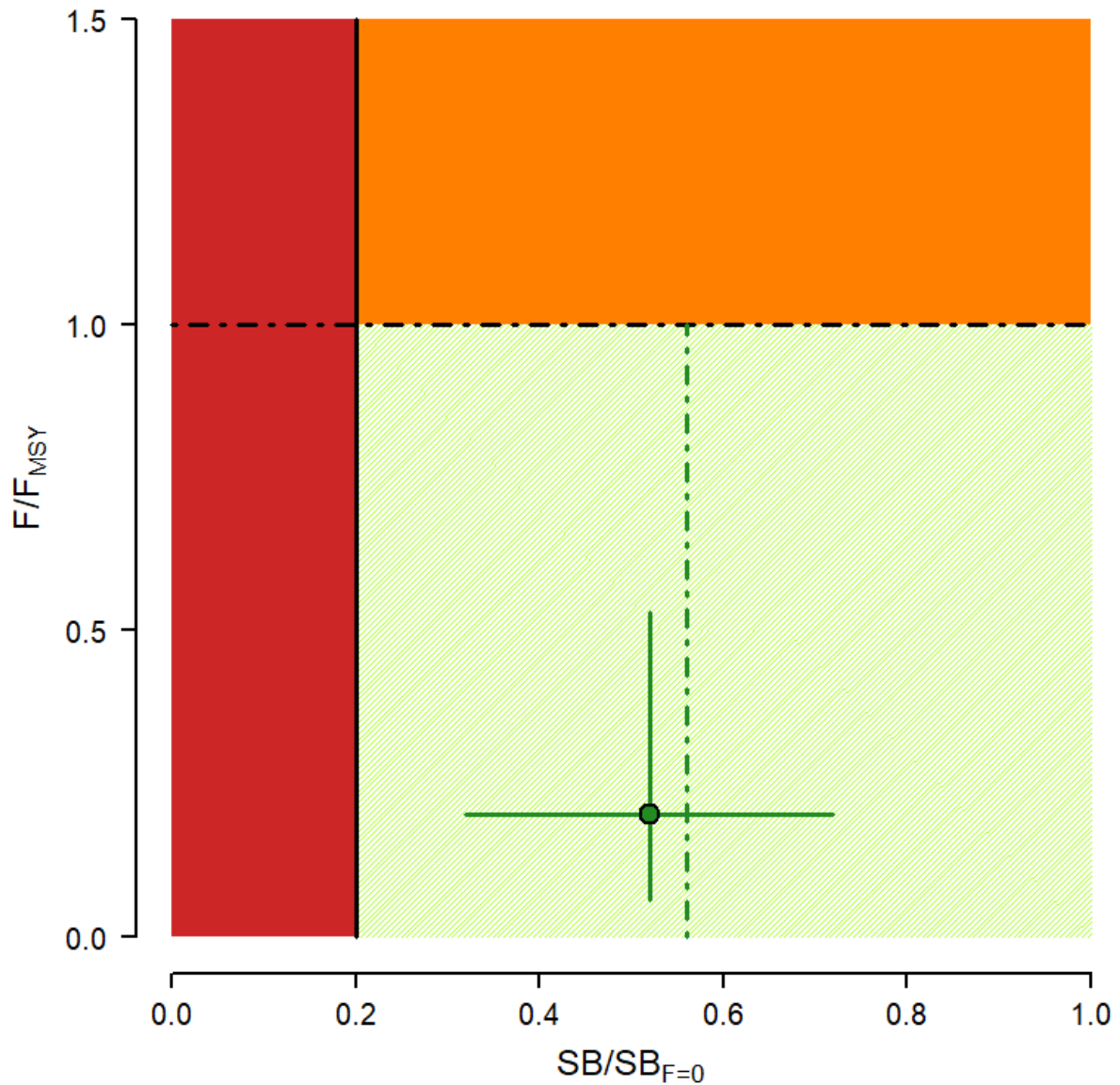


Figure 9: Assessed South Pacific albacore stock status relative to $SB_{F=0}$ (x-axis) and F_{MSY} (y-axis). The red zone represents spawning potential levels lower than the agreed LRP which is marked with the solid black line ($0.2SB_{F=0}$). The orange region is for fishing mortality greater than F_{MSY} ($F=F_{MSY}$; marked with the black dashed line). The green point is the median stock status for the ‘recent’ period (2013-2016 for SB, 2012-2015 for F) and the vertical and horizontal error bars indicate range of uncertainty in stock status from other runs in the structural uncertainty grid. The green dashed line represents the WCPFC agreed target reference point ($SB/SB_{F=0} = 0.56$)

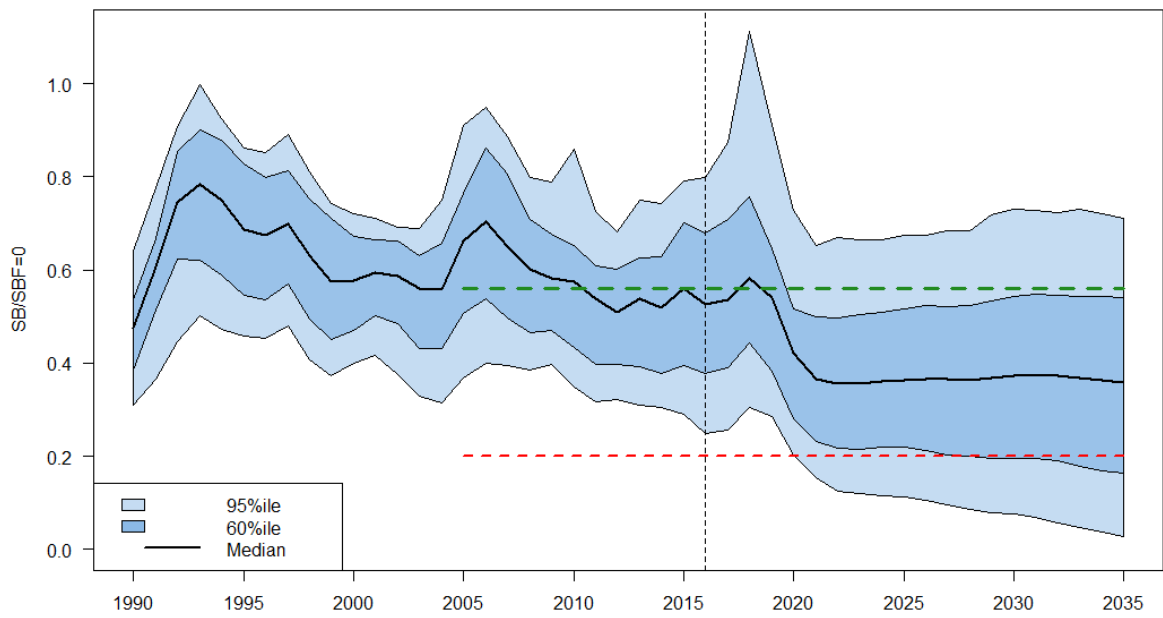


Figure 10: Stochastic projections of adult stock status under 2019 longline and troll catch levels. The limit reference point (20% $SB_{F=0}$) is indicated by horizontal dashed red line and the target reference point (56% $SB_{F=0}$) is indicated by horizontal dashed green line. Note: uncertainty after 2016 represents both structural uncertainty and stochastic recruitment (7200 simulation runs).

Appendix 1: Summaries of south Pacific albacore longline and troll catch, by flag/geographic region

Table A1-1: Annual southern WCPFC-CA albacore longline catch estimates by Vessel Nation, 2010 - 2019. Note: Available operational and aggregate logsheet data raised to annual catch estimates (ACE). Differences in annual totals between this table and Table 1 result from rounding errors. Southern WCP-CA approximated - some EEZ and high seas areas span the equator.

Flag	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Australia	745	653	709	773	737	949	916	831	752	798
Belize	5	52	18	7	0	0	0	0	0	0
Cook Islands	2,423	2,182	2,757	1,354	1,186	1,167	1,352	2,562	3,083	2,637
China	12,926	11,846	24,523	23,789	14,471	14,486	16,215	29,154	21,130	22,637
Spain (EC)	6	3	2	2	1	0	1	1	1	1
Fiji	8,603	9,947	9,369	8,708	7,016	6,977	7,263	9,763	8,854	8,657
FSM	1	1	159	634	401	1,224	1,972	250	1,455	3,621
Japan	2,639	2,170	2,084	1,818	1,284	930	1,634	1,813	1,190	1,113
Kiribati	66	200	349	40	7	358	508	643	340	1,121
Republic of Korea	1,027	488	892	767	691	1,013	1,387	1,134	1,064	1,524
Marshall Islands	0	0	0	0	0	0	0	0	0	0
New Caledonia	1,939	1,736	1,715	1,714	1,630	1,583	1,747	1,734	1,752	2,011
Niue	97	0	0	0	0	0	0	0	0	0
New Zealand	460	418	266	302	311	223	233	181	239	116
French Polynesia	3,483	3,225	3,594	3,512	3,744	3,418	3,277	2,148	3,058	3,456
PNG	791	245	693	235	308	336	48	627	92	0
Portugal (EC)	0	4	1	67	1	0	0	0	0	0
Solomon Islands	7,708	899	0	0	14,241	11,216	1,702	0	1,921	5,665
Senegal	0	0	0	0	0	0	0	0	0	0
Tonga	57	34	20	13	25	29	42	26	23	30
Tuvalu	0	184	432	169	78	97	52	175	121	86
Chinese Taipei	13,004	12,956	11,619	13,387	7,367	7,954	11,804	12,505	9,289	9,239
USA	4,082	2,555	3,461	2,213	1,543	1,961	1,655	1,539	1,567	1,054
Vanuatu	10,095	4,726	6,718	7,805	3,568	6,698	3,723	4,374	5,554	3,696
Wallis and Futuna	0	3	0	0	0	0	0	0	0	0
Samoa	2,529	1,415	2,038	1,642	800	840	947	2,374	1,684	1,333
Total	72,686	55,942	71,419	68,951	59,410	61,459	56,478	71,834	63,169	68,795

Table A1-2: Annual southern WCPFC-CA albacore longline catch estimates by Vessel Nation, 2010 - 2019. Note: Available operational and aggregate logsheet data raised to annual catch estimates (ACE). Differences in annual totals between this table and Table 1 result from rounding errors. Southern WCP-CA is approximated - some EEZ and high seas areas span the equator.

EEZ	Flag	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AS	US	2,838	1,784	2,416	1,769	1,377	1,760	1,511	1,511	1,553	1,024
AU	AU	745	652	702	757	728	945	910	830	751	796
CK	BZ	0	0	0	0	0	0	0	0	0	0
	CK	2,229	2,178	2,726	1,223	1,073	1,040	1,267	2,370	2,299	1,386
	CN	0	148	2,970	2,223	3,186	2,239	1,542	687	940	3,735
	FJ	140	396	329	80	0	0	0	0	0	0
	FM	0	0	134	573	174	1,198	1,087	248	1,437	1,464
	KI	0	0	244	29	0	0	0	0	0	5
	KR	0	0	0	0	0	1	0	0	0	0
	PF	0	0	0	0	0	0	0	0	0	0
	TW	193	163	311	0	0	0	0	6	38	1
	US	971	576	650	267	40	75	0	0	0	0
	VU	1,286	2,098	3,050	1,590	10	3	3	0	0	4
	WS	0	0	0	0	0	0	0	0	0	0
FJ	CK	0	0	0	0	0	0	0	0	0	0
	CN	152	298	433	305	201	639	838	214	20	11
	FJ	5,606	3,763	3,852	3,253	3,715	5,177	4,040	5,656	5,443	5,363
	KR	11	69	0	38	0	0	2	0	0	0
	NZ	0	0	0	0	0	0	0	0	0	0
	TV	0	0	0	0	0	0	0	0	0	0
	TW	1	5	0	3	1	1	0	0	3	0
	VU	1	30	1	41	0	6	0	1	0	0
HS	AU	0	1	7	16	9	4	6	1	1	2
	BZ	5	52	14	7	0	0	0	0	0	0
	CK	50	4	23	28	0	1	6	110	270	190
	CN	11,468	7,768	16,262	12,940	5,880	5,803	1,963	18,341	11,138	11,629
	ES	6	3	2	2	1	0	1	1	1	1
	FJ	1,328	2,467	2,468	1,891	1,791	1,097	1,116	1,466	1,512	1,061
	FM	1	1	25	61	227	25	884	2	18	2,155
	JP	906	1,645	1,127	1,247	1,222	719	635	722	392	444
	KI	0	193	16	3	1	218	289	248	283	101
	KR	422	226	427	425	163	272	464	639	499	1,138
	MH	0	0	0	0	0	0	0	0	0	0
	NC	7	2	3	1	2	4	2	14	10	0
	NU	0	0	0	0	0	0	0	0	0	0
	NZ	0	0	0	0	0	0	0	0	0	0
	PF	1	1	3	17	0	0	1	0	0	1
	PG	0	0	0	0	0	0	33	139	0	0
	PT	0	4	1	67	1	0	0	0	0	0
	SB	2,497	72	0	0	1,055	511	292	0	17	103

Table A1-2: (continued)

EEZ	Flag	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	TO	0	0	0	0	1	0	0	1	0	0
	TV	0	10	15	10	1	1	1	52	15	5
	TW	11,868	8,612	6,542	8,883	6,592	7,052	8,584	9,806	7,583	8,577
	US	274	195	395	177	125	126	144	28	15	30
	VU	8,100	1,771	2,336	3,666	3,190	5,297	2,110	3,617	4,958	3,388
	WS	0	0	0	0	0	0	5	34	107	11
KI	BZ	0	0	5	0	0	0	0	0	0	0
	CN	399	209	293	225	308	1,356	3,529	234	4	46
	FJ	0	16	41	29	176	147	147	4	0	51
	FM	0	0	0	0	0	0	1	1	0	2
	JP	19	13	45	8	6	0	0	0	0	0
	KI	66	7	46	3	1	0	99	140	57	1,015
	KR	359	99	335	187	351	612	416	11	9	28
	TV	0	3	48	0	0	0	0	0	0	0
	TW	49	130	328	351	263	261	668	33	3	1
	US	0	0	0	0	0	0	0	0	0	0
	VU	372	73	73	24	153	218	78	0	0	0
MA	FJ	14	6	9	0	0	1	1	0	1	0
	NC	0	0	1	0	0	1	0	1	0	2
	VU	1	0	0	0	0	0	0	1	0	0
NC	NC	1,932	1,734	1,711	1,713	1,628	1,578	1,745	1,719	1,742	2,009
NU	CK	99	0	0	85	33	0	0	0	362	446
	FJ	0	0	0	277	157	204	90	14	0	0
	NU	97	0	0	0	0	0	0	0	0	0
	PF	0	0	0	0	0	0	0	0	0	0
	TW	0	0	0	0	18	3	0	0	2	0
NZ	NZ	460	418	266	302	311	223	233	181	239	116
PF	KR	0	0	0	0	0	0	0	0	0	0
	PF	3,482	3,224	3,591	3,495	3,744	3,418	3,276	2,148	3,058	3,455
PG	CN	0	0	0	1	3	2	101	0	559	20
	JP	0	0	0	0	0	105	998	1,091	796	668
	PG	791	245	693	235	308	336	14	488	92	0
	TW	4	49	108	2	0	19	72	32	5	33
SB	BZ	0	0	0	0	0	0	0	0	0	0
	CK	0	0	5	18	79	0	0	0	0	0
	CN	69	985	1,737	2,903	239	0	1,717	3,321	3,875	2,874
	FJ	92	1,129	1,305	1,783	130	0	579	163	558	221
	JP	1,471	506	855	563	55	106	0	0	1	0
	KI	0	0	0	5	0	0	0	0	0	0
	KR	34	43	111	96	57	34	2	39	11	15

Table A1-2: (continued)

EEZ	Flag	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	PG	0	0	0	0	0	0	0	0	0	0
	SB	5,211	827	0	0	13,187	10,704	1,410	0	1,903	5,562
	TV	0	12	0	0	0	0	0	0	0	0
	TW	378	2,737	3,239	2,424	278	0	1,152	1,922	1,107	3
	VU	17	185	860	1,210	137	0	0	119	223	37
TK	CK	0	0	0	0	0	125	78	82	152	615
	CN	0	0	0	0	0	0	5	57	6	2
	FJ	0	75	89	0	1	1	0	0	0	0
	KI	0	0	26	0	5	140	120	255	0	0
	TV	0	16	134	0	0	0	0	0	0	0
	TW	0	17	0	0	0	0	267	132	0	0
	US	0	0	0	0	0	0	0	0	0	0
	VU	0	0	0	0	0	1,168	1,532	483	262	224
	WS	0	0	0	0	0	0	119	702	212	622
TO	CN	0	0	12	155	107	61	1	7	13	0
	FJ	0	0	29	123	1	3	1	0	131	631
	TO	57	34	20	13	24	29	42	25	23	30
	TW	0	2	700	1,179	133	618	1,061	573	549	625
TV	CK	35	0	3	0	0	0	0	0	0	0
	CN	0	77	0	3	129	150	271	475	153	200
	FJ	183	164	548	192	149	68	694	383	140	784
	JP	243	5	57	0	0	0	0	0	0	0
	KI	0	0	17	0	0	0	0	0	0	0
	KR	201	52	19	21	120	94	504	445	545	343
	TV	0	144	234	159	77	95	51	123	106	81
	TW	12	3	0	87	0	0	0	0	0	0
	US	0	0	1	0	0	0	0	0	0	0
	VU	1	23	48	1,029	0	6	0	0	0	30
VU	BZ	0	0	0	0	0	0	0	0	0	0
	CK	10	0	0	0	0	0	0	0	0	0
	CN	839	2,361	2,817	5,034	4,419	4,236	6,249	5,818	4,423	4,117
	FJ	1,241	1,930	698	1,080	896	280	596	2,077	1,070	546
	JP	0	0	0	0	0	0	0	0	0	0
	KR	0	0	0	0	0	0	0	0	0	0
	TW	500	1,237	392	459	83	1	0	0	0	0
	VU	317	548	350	246	77	0	0	152	110	14
WF	PF	0	0	0	0	0	0	0	0	0	0
	WF	0	3	0	0	0	0	0	0	0	0
WS	WS	2,529	1,415	2,038	1,642	800	840	823	1,638	1,364	700

Table A1-3: Annual south Pacific albacore troll catch estimates by flag, 2000 - 2019.

Year	Canada	Cook Islands	New Zealand	USA	Total
2000	351	335	3,336	2,433	6,455
2001	206	202	2,736	2,107	5,251
2002	144	166	3,012	1,337	4,659
2003	0	688	3,721	1,574	5,983
2004	63	376	3,212	960	4,611
2005	72	89	2,855	576	3,592
2006	135	121	2,043	587	2,886
2007	27	53	1,736	272	2,088
2008	0	0	3,352	151	3,503
2009	0	0	1,794	237	2,031
2010	0	0	1,832	307	2,139
2011	1	0	2,787	471	3,259
2012	0	0	2,727	235	2,962
2013	0	0	2,836	390	3,226
2014	0	21	1,937	445	2,403
2015	0	21	2,425	156	2,602
2016	0	21	1,969	145	2,135
2017	55	0	1,959	805	2,819
2018	0	1	2,272	441	2,715
2019	0	0	2,635	790	3,426

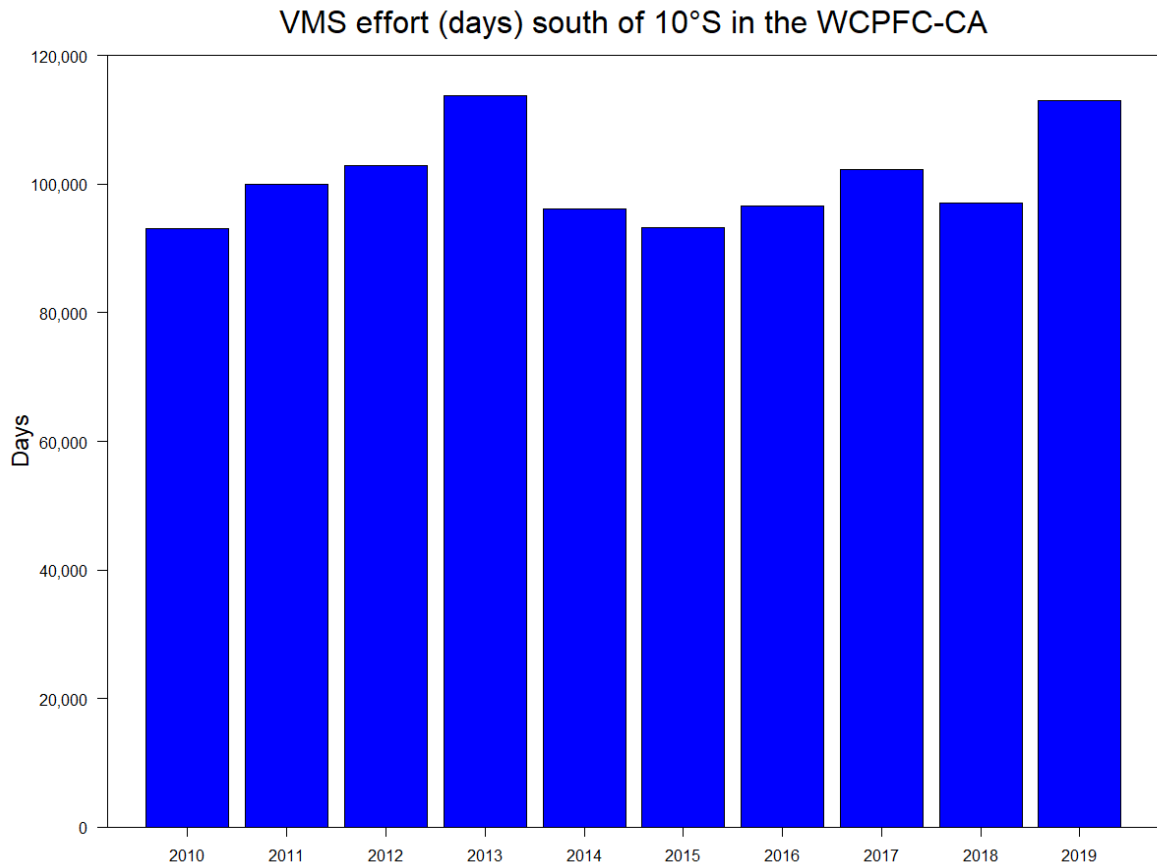


Figure A1-2: Longline VMS days-at-sea (augmented by logsheets for French Polynesia) within the southern WCP-CA at 1° x 1°, south of 10°S.

Appendix 2: Notes on the time series of longline VMS information in the South Pacific

The analysis summarises the longline VMS information available to SPC through the FFA and WCPFC over the period 2010-2019, by geographic region of the southern WCPFC-CA. Effort in that database corresponds to days-at-sea (i.e. includes fishing and transiting). Please note:

- This analysis uses annual VMS data available up to and including 6th July 2020;
- Effort represents total longline effort, not just that targeted at South Pacific albacore;
- VMS effort presented for EEZs includes that in archipelagic waters;
- Effort data for some countries (e.g. those with domestic longliners not on FFA VMS) will not be included within EEZ patterns;
- Effort for some countries (e.g. New Caledonia; French Polynesia) may be incomplete;
- Some trends may result from improved VMS coverage of vessels over time;
- EEZ effort excludes the Indonesian EEZ.

Table A2-1: Total VMS days-at-sea by year for all EEZs and the High Seas (HS), south of 10°S (Figure A2-1)

EEZ	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
American Samoa	1,795	1,481	1,940	1,791	1,288	1,039	1,446	2,477	2,468	2,634
Australia	787	1,566	1,337	1,285	1,608	3,705	3,749	4,516	2,037	4,386
Cook Islands	4,443	5,537	9,436	7,650	5,462	3,926	5,021	5,421	4,004	4,823
Fiji	14,168	16,808	18,333	15,106	14,029	14,807	13,312	14,037	14,361	15,168
High seas	20,777	23,242	23,217	31,788	27,231	23,463	20,956	26,072	24,268	31,065
International waters	565	731	960	896	788	750	1,036	1,314	1,217	1,288
Kiribati	2,115	1,885	2,304	3,582	1,289	1,643	4,163	499	37	1,031
Matthew and Hunter	87	107	66	61	95	91	82	64	74	80
New Caledonia	938	488	395	432	350	341	404	415	270	249
Niue	218	31	65	439	412	349	614	450	821	925
New Zealand	364	608	656	327	289	424	348	302	359	899
French Polynesia	8,754	9,490	10,150	12,162	12,219	12,821	12,898	12,198	12,802	13,974
PNG	1,199	680	456	170	55	253	2,014	2,318	3,088	3,858
Pitcairn Islands	23	22	36	51	25	4	14	62	24	12
Solomon Islands	20,802	17,828	15,353	19,259	17,756	14,508	10,331	8,604	13,851	12,613
Tokelau	25	69	53	75	106	1,181	1,536	1,067	472	851
Tonga	192	393	2,064	4,991	1,270	1,790	2,339	2,093	987	3,201
Tuvalu	596	830	484	276	316	324	1,063	1,243	315	531
Vanuatu	15,067	17,853	14,992	12,579	11,012	9,761	11,794	15,451	11,105	11,922
Wallis and Futuna	104	231	312	327	374	435	397	250	227	294
Samoa	48	108	246	508	165	1,594	3,126	3,485	4,229	3,130
Total	93,067	99,988	102,855	113,755	96,139	93,209	96,643	102,338	97,016	112,934
EEZ Percent	78	77	77	72	72	75	78	75	75	72
HS percent	22	23	23	28	28	25	22	25	25	28

Table A2-2: Total VMS days-at-sea by year in International Waters, south of 10°S (Figure A2-1) Note: IW = International Waters.

IW code	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
H4	0	0	0	0	0	0	0	0	0	0
I2	169	182	250	293	244	371	639	593	596	264
I5	5,417	4,462	4,999	10,769	8,082	6,923	7,528	8,112	4,897	10,612
I7	10,650	12,628	10,532	13,459	13,153	11,511	8,295	10,724	13,351	14,177
I8	2,778	3,358	2,376	2,914	2,762	3,075	3,434	5,188	4,527	4,099
I9	1,764	2,612	5,060	4,352	2,989	1,582	1,060	1,455	898	1,913
Total	20,778	23,242	23,217	31,787	27,230	23,462	20,956	26,072	24,269	31,065

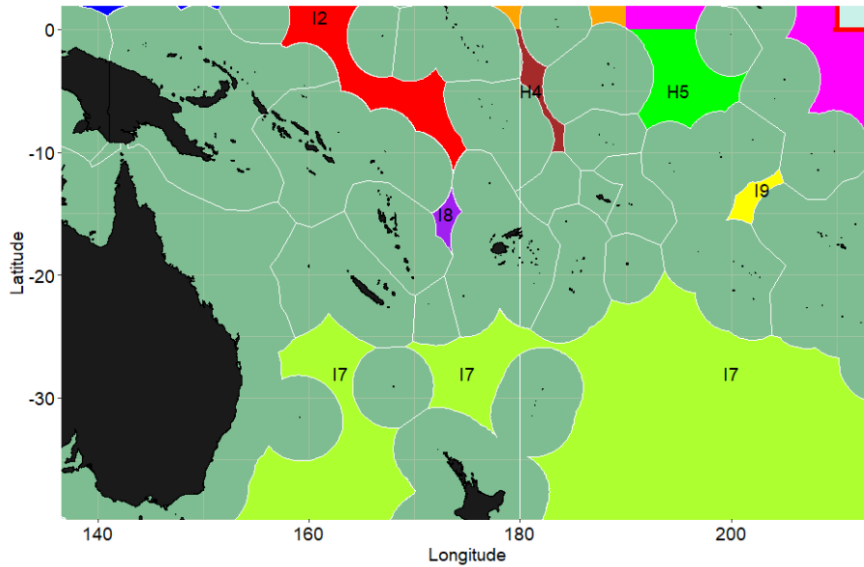


Figure A2-1: Map of International Waters in the southerly WCPFC-CA.

Table A2-3: Map key (Figure A2-1).

Code	Area	Color
H4	International waters between Tuvalu, Phoenix and Tokelau	Brown
H5	International waters between Phoenix and Line groups	Bright green
I2	Doughnut hole between FSM, Solomon Islands, Kiribati, RMI, Nauru and Tuvalu	Red
I5	International waters between Phoenix and Line groups and east of Line group	Pink
I7	High seas area to the east of Australia and New Zealand	Light green
I8	High seas pocket between Fiji and Vanuatu	Purple
I9	High seas pocket between the Cook Islands and French Polynesia	Yellow

Appendix 3: High Seas transshipment data for albacore based on CMM 2009-06 reporting

The tables below show high Seas transshipment data for albacore, by flag, year and month from July 2010 - May 2020.

Notes:

1. Responsible CCM is the country responsible for reporting for the Fishing Vessel
2. The requirement to report (within 15 days of transshipment) high seas transshipment activities commenced in July 2010.
3. The data refer to high seas transshipments inside and outside the WCPFC Convention Area, and it should be noted that a proportion of the catch will likely have been caught within EEZs in the Convention Area and the IATTC Convention area.
4. Weights are in kg.

Table A3-1: 2010.

Responsible CCM	Jul	Aug	Sept	Oct	Nov	Dec
Belize	0	0	0	0	2,837	0
China	0	0	166,000	210,668	247,192	17,091
Chinese Taipei	0	115,000	165,552	125,298	147,809	20,582
Indonesia	0	0	0	0	44,170	869
Japan	0	900	0	53,543	35,437	30,000
Korea (Republic of)	16,984	0	22,303	41,890	0	6,389
Philippines	0	0	0	7,500	0	4,848
Solomon Islands	0	0	0	0	0	0
Vanuatu	0	1,435,000	270,600	232,293	521,630	148,835
Total	16,984	1,550,900	624,455	671,192	999,075	228,614

Table A3-2: 2011.

Responsible CCM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Belize	2,015	0	0	36,000	0	0	710	0	0	0	0	0
China	5,073	101,989	24,854	31,588	31,987	29,524	61,905	748,608	34,656	82,198	63,458	28,013
Chinese Taipei	818,356	182,858	898,650	14,806	52,060	193,654	712,740	465,695	346,645	94,959	320,851	406,940
Indonesia	0	0	0	794	8,277	0	0	0	8,322	29,668	0	7,220
Japan	10,850	79,731	22,475	0	1,850	5,777	822	2,900	0	32,364	57,286	4,687
Korea (Republic of)	42,584	3,017	45,988	33,941	5,622	16,595	3,678	0	1,225	13,768	98,599	6,360
Philippines	0	0	0	400	0	500	17,303	2,284	0	10,346	0	6,723
Solomon Islands	0	0	0	0	0	0	0	0	0	0	0	0
Vanuatu	100,000	110,000	1,020,165	290,970	597	13,700	816,794	313,038	62,000	12,857	0	341,175
Total	978,878	477,595	2,012,132	408,499	100,393	259,750	1,613,952	1,532,525	452,848	276,160	540,194	801,118

Table A3-3: 2012.

Responsible CCM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Belize	0	0	0	0	0	0	841	0	0	0	0	0
China	67,701	95,807	61,927	149,477	8,055	20,149	305,884	216,568	118,390	6,507	0	11,276
Chinese Taipei	87,183	438,492	127,178	91,510	12,089	0	326,644	406,037	0	18,305	0	457,106
Indonesia	1,894	4,820	1,900	0	0	11,505	0	0	0	0	0	4,656
Japan	0	31,016	1,774	12,999	1,575	13,449	66,858	2,597	72,544	0	3,281	0
Republic of Korea	3,777	13,163	14,234	5,454	12,710	16,829	6,312	0	0	0	4,920	0
Philippines	1,500	0	4,684	0	0	0	0	0	19,278	0	0	0
Solomon Islands	0	0	0	45,500	0	0	0	0	0	0	0	0
Vanuatu	544,933	108,000	161,242	90,280	1,657	0	764,900	185,000	0	165,000	105,000	0
Total	706,988	691,298	372,939	395,220	36,086	61,932	1,471,439	810,202	210,212	189,812	113,201	473,038

Table A3-4: 2013.

Responsible CCM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Belize	0	0	0	0	0	0	0	0	0	0	0	0
China	42,364	7,376	84,590	24,498	90,383	805,828	0	110,513	542,675	282,996	1,048,906	127,757
Chinese Taipei	33,541	0	5,000	59,423	50,711	0	157,174	140,100	532,164	39,331	543,864	498,889
Indonesia	0	0	6,891	286	5,800	0	0	0	0	0	0	2,403
Japan	0	0	9,481	38,422	3,100	39,089	13,602	42,460	147	14,639	10,539	2,765
Republic of Korea	0	45,342	53,797	0	29,523	26,676	0	20,268	0	0	24,377	18,848
Philippines	0	0	4,959	0	7,982	0	0	15,527	0	0	2,798	0
Solomon Islands	0	0	0	0	0	0	0	0	0	0	0	0
Vanuatu	0	361,951	175,489	165,000	28,228	28,496	1,062,757	174,754	864,995	249,017	412,360	130,000
Total	75,905	414,669	340,207	287,629	215,727	900,089	1,233,533	503,622	1,939,981	585,983	2,042,844	780,662

Table A3-5: 2014.

Responsible CCM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Belize	0	0	0	0	0	0	0	0	0	0	0	0
China	224,998	875	26	31,578	138,573	331,788	102,822	1,551,373	115,965	6,825	12,505	171,219
Chinese Taipei	985,503	636	386,115	8,688	31,399	529	0	0	576,390	129,558	1,109,509	449,172
Indonesia	0	0	0	0	0	3,728	0	0	0	0	0	0
Japan	3,626	0	27,308	0	2,000	200	20,533	0	23,693	8,005	0	0
Republic of Korea	0	22,285	0	8,844	3,393	13,958	46,724	6,004	37,687	74,214	0	37,621
Philippines	0	1,162	0	0	0	0	0	0	0	0	0	0
Solomon Islands	0	0	0	0	0	0	0	0	0	0	0	0
Vanuatu	691,021	0	2,620	0	0	12,639	17,935	49,549	1,895,708	578	205,667	0
Total	1,905,148	24,958	416,069	49,110	175,365	362,842	188,014	1,606,926	2,649,443	219,180	1,327,681	658,012

Table A3-6: 2015.

Responsible CCM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Belize	0	0	0	0	0	0	0	0	0	0	0	0
China	273,169	215,527	3,889	16	350,861	557,865	5,512	70,724	1,102,161	181,347	122,120	168,716
Chinese Taipei	449,399	7,915	12,663	19,320	0	6,246	61,526	80,938	329,500	419,241	294,284	274,693
Indonesia	0	0	0	0	0	0	0	0	0	0	0	0
Japan	1,515	5,101	5,645	2,221	119	0	647	1,466	0	5,587	6,566	0
Republic of Korea	2,444	22,212	43,063	3,759	25,975	50,251	127,526	26,143	0	100,741	4,395	21,934
Philippines	0	0	0	0	0	0	0	0	0	0	0	0
Solomon Islands	0	0	0	0	0	0	0	0	0	0	0	0
Vanuatu	9,294	5,049	409	90,697	4,265	4,601	0	817,041	1,508,373	687,413	160,944	1,190,359
Total	735,821	255,804	65,669	116,013	381,220	618,963	195,211	996,312	2,940,034	1,394,329	588,309	1,655,702

Table A3-7: 2016.

Responsible CCM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Belize	0	0	0	0	0	0	0	0	0	0	0	0
China	115,400	187,463	385,696	898,315	783,017	370	1,098,679	2,046,259	1,258,269	1,028,406	869,370	0
Chinese Taipei	873,578	407	47,290	6,081	17,946	0	901,867	484,572	555,906	399,841	561,586	521,253
Indonesia	0	0	0	0	0	0	0	0	0	0	0	0
Japan	2,560	0	331	0	134	1,988	13,900	12,000	4,830	0	9,639	46,529
Republic of Korea	2,821	3,631	37,070	29,140	20,184	7,152	26,756	188,441	118,212	187,865	151,934	29,322
Philippines	0	0	0	0	0	0	0	0	0	0	0	0
Solomon Islands	0	0	0	0	0	0	0	0	0	0	0	0
Vanuatu	9,871	28,238	71,941	20,172	352	3,084	188,895	937,255	1,654,204	642,294	635,085	469,531
Total	1,004,230	219,739	542,328	953,708	821,633	12,594	2,230,097	3,668,527	3,591,421	2,258,406	2,227,614	1,066,635

Table A3-8: 2017.

Responsible CCM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Belize	0	0	0	0	0	0	0	0	0	0	0	0
China	91,280	1,822,209	108,552	526	28,601	771,543	453,820	1,879	2,253,152	2,403,932	10,212	38,636
Chinese Taipei	840,630	39,726	664,783	49,596	60,490	263,585	971,775	709,197	707,535	526,328	265,325	6,421
Indonesia	0	0	0	0	0	0	0	0	0	0	0	0
Japan	0	0	0	1,095	0	0	0	34,153	0	4,934	43,106	13,858
Republic of Korea	72,225	56,070	48,649	18,069	8,269	27,823	193,395	189,097	34,395	129,594	65,785	79
Philippines	0	0	0	0	0	0	0	0	0	0	0	0
Solomon Islands	0	0	0	0	0	0	0	0	0	0	0	0
Vanuatu	101,369	13,198	178,822	57,754	80,000	370,842	932,147	461,393	837,433	1,122,039	2,641	4,945
Total	1,105,504	1,931,203	1,000,806	127,040	177,360	1,433,793	2,551,137	1,395,719	3,832,515	4,186,827	387,069	63,939

Table A3-9: 2018.

Responsible CCM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Belize	0	0	0	0	0	0	0	0	0	0	0	0
China	1,252,107	2,304,154	317,004	118,276	1,846,264	907,129	390,208	885,532	1,768,175	1,043,146	590,837	388,821
Chinese Taipei	1,145,930	1,363,445	69,267	161,974	367,380	212,544	1,413,752	611,576	428,995	439,241	321,620	335,765
Indonesia	0	0	0	0	0	0	0	0	0	0	0	0
Japan	639	30,499	18,542	7,977	0	1,678	0	0	9,437	112	63	9,486
Republic of Korea	67,650	45,182	24,074	56,270	15,247	47,629	87,007	73,972	153,958	106,635	55,637	39,503
Philippines	0	0	0	0	0	0	0	0	0	0	0	0
Solomon Islands	0	0	0	0	0	0	0	0	0	0	0	0
Vanuatu	270,596	4,528	107,290	1,300	0	1,201	813,700	1,136,559	212,318	1,074,314	11,643	323
Total	2,736,922	3,747,808	536,177	345,797	2,228,891	1,170,181	2,704,667	2,707,639	2,572,883	2,663,448	979,800	773,898

Table A3-10: 2019.

Responsible CCM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Belize	0	0	0	0	0	0	0	0	0	0	0	0
China	483,118	1,465,419	252,798	278,248	1,292,854	1,440,764	95,214	825,237	1,687,039	724,407	1,016,074	213,275
Chinese Taipei	1,117,643	433,219	302,616	92,812	336,404	1,313,720	739,814	1,578,346	404,638	657,557	249,298	787,104
Indonesia	0	0	0	0	0	0	0	0	0	0	0	0
Japan	0	0	31,436	0	18,048	0	0	0	0	0	0	0
Republic of Korea	49,371	80,609	110,097	20,966	119,799	14,573	18,330	318,108	130,168	148,982	98,460	52,723
Philippines	0	0	0	0	0	0	0	0	0	0	0	0
Solomon Islands	0	0	0	0	0	0	0	0	0	0	0	0
Vanuatu	72,080	494,329	27,415	1,863	73,622	74,905	716,460	1,293,000	30,157	557,616	871,246	17,975
Total	1,722,212	2,473,576	724,362	393,889	1,840,727	2,843,962	1,569,818	4,014,691	2,252,002	2,088,562	2,235,078	1,071,077