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Summaries of longline fishing effort and observer coverage within the WCPFC Convention Area with respect to the review of CMM 2018-03

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1   Abstract

This report presents summaries of longline fishing in the southern WCPFC convention area to inform the review of the CMM for seabirds (CMM 2018-03). In particular, the magnitude of fishing effort within EEZs south of 25°S is reported, for those EEZs that straddle that latitude. This activity is compared to the total fishing effort in the 25-30°S latitudinal band, and the convention area south of 25°S. In addition, summaries of recent longline observer coverage rates by latitudinal band are presented to provide context on the utility of updating, or improving, estimates of seabird bycatch in this region.

2   Introduction

This report aims to provide information relevant to proposed changes to the seabird measure CMM 2018-03. New Zealand have requested SPC to provide information on the magnitude and distribution of fishing effort between 25 and 30°S, and south of 25°S, and to provide an update on the status of longline observer coverage levels for fishing activity in the southern WCPFC convention area, below 25°S.

At the 2017 Commission meeting there was discussion about moving the boundary specified in CMM 2017-06 from 30 to 25°S, which would most affect five countries and territories (Cook Islands, CK; Fiji, FJ; New Caledonia, NC[2]; French Polynesia, PF; Tonga, TO) which have part of their EEZ below the 25°S parallel and background analyses were conducted to assess the fishing activity in this zone. The boundary was subsequently shifted to 25°S in CMM 2018-03, and with the ongoing discussions around developing this CMM, the analyses conducted in 2018 are repeated here to provide context for these discussions.

The NZ government has requested that SPC undertake the following four analyses with respect to these EEZs:

- Calculate the proportion of each of the five EEZs south of the 25°S line of latitude.

- Calculate the proportion of the longline fleet operating in the EEZ that fishes in the EEZ south of 25°S.

- Calculate the average fishing effort (days/year, hooks) spent in the EEZ south of 25°S.

- Calculate the average fishing effort (days/year, hooks) on the high seas south of 25°S.

Each of the analyses were conducted over the period 2020–2024. The statistics relating to these individual requests are presented in the sections below.

Additional summaries, closely related to those presented in Panizza *et al.* (2025), are collated to show the coverage rates of longline observer data for the area of the convention area related to the seabird CMM. These are provided to support the discussions around calculating updated bycatch estimates of seabirds and other species of special interest. The most recent estimates are presented by Peatman *et al.* (2019), but these had very high uncertainty due to the rarity

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[2]Note that the EEZ for Mathew and Hunter (MA) is disputed by New Caledonia and Vanuatu but it does contain some waters below 25°S. We therefore make all calculations for New Caledonia twice, with and without the MA EEZ included.

of capture of most species, problems with reliable species identification, and the low observer coverage rates for the longline fishery. Proposals to update these estimates have been made, however there remain concerns that the necessary improvements in data coverage have not occurred. This has been compounded by the reductions in observer coverage over the years of the Covid 19 pandemic.

3 Methods

3.1 Fishing activity below 25°S within EEZs

The first step of the analysis was to determine the proportion of the fishing activity (catch, effort etc.) occurring below 25°S within each of the EEZs, over the period 2020–2024. The longline data for 2025 that were available at the time of analysis were therefore excluded from these analyses.

One of the difficulties of estimating fishing activity within EEZs is that some sources of data are only available at scales that are too coarse (1×1, 5×5) to easily attribute data points within or outside an EEZ. We therefore utilise the operational (set-by-set logsheets) longline data available for each EEZ (for all flags fishing in that EEZ) to calculate the proportion of activity below 25°S. We simply calculate the number of sets, the number of hooks and the aggregated catch of albacore, bigeye and yellowfin (in weight; mt) from the logsheets above and below 25°S, for each year separately. This relies on the proportion of sets below 25°S being a valid representation of overall longline effort. This is reasonable with very high coverage rates of logsheets (which is the case for these countries, in this recent time period) but can not be guaranteed when coverage rates are poor. Despite this, it is our best available means for estimating relative fishing activity above and below 25°S.

While the coverage rates of logsheets over the study period for each of these EEZs are typically very high, it is necessary to raise the catch and effort to obtain a complete estimate of effort to compare to effort levels fished in the high seas south of 25°S (Section 3.2). This involved calculating the ratio of the total catch of the key longline tuna species (albacore, bigeye and yellowfin) from the annual catch estimates, to the total catch of these species over the available logsheets, for each EEZ and year separately. The logsheet catches can then be multiplied by this scalar to obtain a raised estimate.

By way of example, if 2,000 mt (1,700 above and 300 below 25°S) of these tuna were caught over all received logsheets in EEZ X in 2020, but the annual catch estimate for these species together was 3,000 mt, then the raised estimates above and below would be $1,700 \times 3,000/2,000 = 2,550$ and $300 \times 3,000/2,000 = 450$ mt, respectively, and so together $(2,550 + 450 = 3,000)$ they are equivalent to the annual catch estimate for the full EEZ. Unfortunately, the effort estimates associated with the annual catch estimates are less reliable. We therefore raise the effort metrics (hooks and sets) using the same catch-based scalar rather than a specific effort-specific scalar.

It should be noted that throughout we refer to effort as hooks and/or sets fished, which is slightly different to the information requested in section 2. This is because it is difficult to define 'days fished' for longline vessels in many areas. Hooks fished is generally regarded as the best index of longline effort for many applications, and where possible we also make calculations on the number of sets, which is the closest effort variable to days that is widely available. In some cases (e.g. section 3.2), even the number of sets can be difficult to determine.

3.2 Fishing activity in the high seas south of 25°S

We aimed to compare the fishing activity for the area of the EEZs below 25°S that was estimated in section 3.1 above, with the the total fishing activity on the high seas for the 25–30°S latitudinal band (with the longitudinal range determined by the WCPFC-CA boundaries; 140°E to the edge of the overlap area at 130°W). This is again difficult to determine given the scale of the available data (5×5 for raised longline estimates, as coverage rates of operational data in the high seas are lower than within EEZs). We therefore calculate a comparative catch and effort for this band as the aggregate estimates of catch of the focal tuna (albacore, bigeye and yellowfin), and the number of hooks set over vessels for all flags, except for Australia. This was to remove the fishing activity in the Australian EEZ from the estimates. This exclusion potentially removes some fishing effort by that fleet operating in the high seas, although this is expected to be extremely low compared to total effort of other fleets in the high seas over 2020–2024. Note that for this data source we are restricted to effort estimates measured as hooks fished, rather than sets or days.

This process was also repeated for the region from 25–50°S to put the results in the context of the wider southern part of the WCPFC convention area.

4 Results

4.1 Cook Islands

0.36% of the Cook Islands EEZ is situated below 25°S. The majority of longline sets in the Cook Islands are in the northern region of the EEZ with a moderate number also fished around Rarotonga in the southern part of the EEZ (about 21°S). No longline sets were observed below 25°S from the logsheet data and so 0% of catch and effort was estimated below this latitude (Table 1).

4.2 Fiji

The proportion of the Fiji EEZ below 25°S is extremely minor (0.08%) and consequently there were only 7 sets (16,800 hooks) observed below this latitude (Figure 2, Table 2). When the data were raised using the annual catch estimates, we estimate that a total of 8 sets, and 18,045 hooks (0.01% of the total hooks set in the EEZ over 2010–2016) were set below 25°S (Tables 8 and 8).

4.3 New Caledonia

5.87% of the New Caledonia EEZ is situated below 25°S (Figure 2 [3]). Very little longline fishing occurred south of this latitude and between 0 and 6 sets (mean of 3) per year were observed below the line from the logsheets data (Table 3). This amounted to less than 0.2% of the total sets and hooks fished in the full EEZ in any year.

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[3]Note that there have been changes made to the EEZ boundaries of NC over time. Not all of these changes have yet been applied to SPC databases owing to a need for us to be consistent with the accepted WCPFC EEZ boundaries which are currently Marine Regions V10.

When the EEZ associated with Matthew and Hunter was added to the New Caledonia EEZ the proportion of the combined EEZs below 25°S was 6.91%. With the addition of logsheets fished in the Matthew and Hunter EEZ, only 1 extra set was located below 25°S, and so differences in other metrics were negligible (Table 4).

4.4   French Polynesia

Of the 5 countries investigated, PF had the highest proportion of EEZ below 25°S, at 14.7%. However, most of the fishing effort occurred in the north-west around the Society Islands and the Tuamotu Archipelago (Figure 2). There was some longline fishing below 25°S in most years in this EEZ, although it always made up a very small component of the overall effort in the EEZ; always less than 40 sets per year (both observed and after raising), which amounted to less than 0.5% of the total sets (and hooks) in any year (Table 5). It should be noted that most of these sets below 25°S were fished by a small vessel fishing a very low number of hooks per set, and thus the average hooks per set in the summary tables is significantly lower than the more typical number of hooks per set fished by other vessels in the region (often 2-4,500 hooks per set).

4.5   Tonga

3.53% of the Tonga EEZ is situated below 25°S and very little longline fishing occurred below this line (Figure 2). Just 4 sets in total were recorded on logsheets south of 25°S over 2020–2024 giving a total of 8,140 hooks (Table 6). In all years the proportion of hooks set below 25°S was less than 0.1% and in several years no fishing occurred below the line (Table 6).

4.6   Total fishing activity below 25°S over these EEZs

The raised number of sets, hooks and catch (of albacore, bigeye and yellowfin aggregated) fished below 25°S across the five EEZs and Matthew and Hunter, are shown in Table 7, Table 8, and Table 9, respectively. In total, the number of sets fished, below 25°S, across those EEZs ranged from 0 to 45 in any year, with a mean of 20 sets. This corresponds to a mean of 27,728 hooks fished below 25°S, with a maximum value of 55,390 in 2020. The raised catches of the three species were consequently low in all years, ranging between 0 (2024) and 22.3 mt (2020).

4.7   Fishing in EEZs relative to the high seas below 25°S

The overall proportion of the five EEZs (including Matthew and Hunter) that were below 25°S was 8.23%.

Adding together the raised estimates for the individual countries resulted in total estimates within EEZs below 25°S of 99 sets and 138,640 hooks, respectively, for the entire time period. These values can be compared to the total estimates for the 25–30°S thus giving a proportion of fishing effort in this zone that is within PICT (Pacific Islands and Territories) EEZs (Table 10). The total number hooks fished annually in that band ranged from 10.3 to 37.7 million. Therefore, the percentage of hooks in this latitudinal band that were fished in the focal EEZs was always less than 0.3%. Unsurprisingly, the values of the catch estimates showed very similar patterns (Table 10).

The estimates of effort in the wider zone from 25–50°S in the WCPO convention area were obviously much higher, with up to 62.3 million hooks fished annually over the 2020–2024 period. When comparing the hooks fished, and catch taken, in the PICTS EEZs with these wider regional totals, their contribution logically decreased, with the percentage always being lower than 0.2% (Table 11).

4.8   Summaries on longline observer coverage for the southern convention area

Summaries of observer coverage rates in each 10° latitudinal band of the southern WCPFC convention area are presented in Table 12. These summaries are very closely related to those of Panizza *et al.* (2025), except they are calculated at a different spatial scale. These coverage rates are low over all years and latitudinal bands, particularly away from the equator, and at those latitudes dominated by the high seas (south of about 23°S). There appears to be some reduction in observer coverage during the Covid affect years, but this has subsequently recovered, although only to the relatively low levels observed prior to Covid.

5   Summary

These data summaries are presented to inform the discussions of the review of CMM 2018-03. In particular, they provide an indication of the magnitude of fishing in PICTs EEZs below 25°S relative to the effort fished on the surrounding high seas. In all cases, the proportion of effort fished in the EEZs was extremely low, and this provides support for previous proposals for vessels fishing in those zones to be exempt from certain CMM conditions.

The second aspect of this paper was to provide context for proposals to improve bycatch estimates of seabirds in this region. Previous attempts (e.g. Peatman *et al.* 2019) have been difficult due to reliance on observer data, and consequently have been limited due to very low coverage rates. The summaries we present herein indicate that these challenges are ongoing, and point to the probability that improvements to previous estimates will be limited, at best. This might warrant further investigation of alternative methods of assessing bycatch rate,including approaches such as overlap analyses.

6   References

Panizza, A., Vidal, T., Falasi, C., Loganimoce, E., and E. Schneiter. 2025. Status of observer data management. WCPFC-SC21-2025/ST-IP-03. Nuku'alofa, Tonga, 13-21 August, 2025.

Peatman, T., Abraham, E., Ochi, D., Webber, D., and N. Smith. 2019. Project 68: Estimation of seabird mortality across the WCPFC Convention Area. WCPFC-SC15-2019/EB-WP-03. Pohnpei, FSM, 12-20 August, 2019.

Table 1: Distribution of longline sets and hooks set in the CK EEZ with respect to the 25S parallel.

Year	SETSabove	SETSbelow	Perc(SETSbelow)	HOOKSabove	HOOKSbelow	Perc(HOOKSbelow)
2020	7,595			28,448,302		
2021	5,559			20,191,111		
2022	7,283			27,141,831		
2023	6,432			24,565,239		
2024	6,840			26,003,711		
Mean	6,742	0	0.0	25,270,039	0	0.0
Total	33,709	0	0.0	126,350,194	0	0.0

Table 2: Distribution of longline sets and hooks set in the FJ EEZ with respect to the 25S parallel.

Year	SETSabove	SETSbelow	Perc(SETSbelow)	HOOKSabove	HOOKSbelow	Perc(HOOKSbelow)
2020	9,155	7	0.1	27,462,938	16,800	0.1
2021	8,105			25,198,550		
2022	7,551			22,696,165		
2023	7,349			21,768,157		
2024	8,667			25,964,665		
Mean	8,165	1	0.0	24,618,095	3,360	0.0
Total	40,827	7	0.0	123,090,475	16,800	0.0

Table 3: Distribution of longline sets and hooks set in the NC EEZ with respect to the 25S parallel.

Year	SETSabove	SETSbelow	Perc(SETSbelow)	HOOKSabove	HOOKSbelow	Perc(HOOKSbelow)
2020	2,792			6,011,663		
2021	2,711	5	0.2	5,794,550	10,200	0.2
2022	2,572	6	0.2	5,527,354	13,540	0.2
2023	2,629	2	0.1	5,802,971	4,200	0.1
2024	2,225			4,811,291		
Mean	2,586	3	0.1	5,589,566	5,588	0.1
Total	12,929	13	0.1	27,947,829	27,940	0.1

Table 4: Distribution of longline sets and hooks set in the NC EEZ with the inclusion of the MA EEZ with respect to the 25S parallel.

Year	SETSabove	SETSbelow	Perc(SETSbelow)	HOOKSabove	HOOKSbelow	Perc(HOOKSbelow)
2020	2,797			6,022,982		
2021	2,751	5	0.2	5,879,750	10,200	0.2
2022	2,603	7	0.3	5,589,234	15,540	0.3
2023	2,646	2	0.1	5,837,292	4,200	0.1
2024	2,230			4,821,841		
Mean	2,605	3	0.1	5,630,220	5,988	0.1
Total	13,027	14	0.1	28,151,099	29,940	0.1

Table 5: Distribution of longline sets and hooks set in the PF EEZ with respect to the 25S parallel.

Year	SETSabove	SETSbelow	Perc(SETSbelow)	HOOKSabove	HOOKSbelow	Perc(HOOKSbelow)
2020	9,813	37	0.4	17,747,395	36,516	0.2
2021	10,369	32	0.3	19,177,005	36,549	0.2
2022	11,333			21,005,532		
2023	11,029	3	0.0	20,665,504	5,550	0.0
2024	10,386			19,174,612		
Mean	10,586	14	0.1	19,554,010	15,723	0.1
Total	52,930	72	0.1	97,770,048	78,615	0.1

Table 6: Distribution of longline sets and hooks set in the TO EEZ with respect to the 25S parallel.

Year	SETSabove	SETSbelow	Perc(SETSbelow)	HOOKSabove	HOOKSbelow	Perc(HOOKSbelow)
2020	2,484			6,535,710		
2021	2,347			6,439,278		
2022	2,297	1	0.0	6,046,551	3,600	0.1
2023	3,453	3	0.1	9,348,614	4,540	0.0
2024	1,691			4,605,432		
Mean	2,454	1	0.0	6,595,117	1,628	0.0
Total	12,272	4	0.0	32,975,585	8,140	0.0

Table 7: Raised estimates of the number of sets fished below 25S in the EEZs with waters that straddle that latitude.

Year	CK	FJ	MA	NC	PF	TO	Total
2020	0	8	0	0	38	0	45
2021	0	0	0	5	33	0	38
2022	0	0	1	6	0	1	8
2023	0	0	0	2	3	3	8
2024	0	0	0	0	0	0	0
Mean	0	2	0	3	15	1	20

Table 8: Raised estimates of the number of hooks fished below 25S in the EEZs with waters that straddle that latitude.

Year	CK	FJ	MA	NC	PF	TO	Total
2020	0	18,045	0	0	37,345	0	55,390
2021	0	0	0	10,695	37,756	0	48,451
2022	0	0	2,113	14,292	0	3,600	20,006
2023	0	0	0	4,591	5,662	4,540	14,793
2024	0	0	0	0	0	0	0
Mean	0	3,609	423	5,916	16,153	1,628	27,728

Table 9: Raised estimates of the total catch (metric tonnes, rounded) of key tuna (albacore + bigeye + yellowfin) below 25S in the EEZs with waters that straddle that latitude.

Year	CK	FJ	MA	NC	PF	TO	Total
2020	0.0	11.3	0.0	0.0	11.0	0.0	22.3
2021	0.0	0.0	0.0	6.9	8.6	0.0	15.5
2022	0.0	0.0	0.8	11.2	0.0	1.0	13.0
2023	0.0	0.0	0.0	1.1	1.2	1.1	3.4
2024	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mean	0.0	2.3	0.2	3.9	4.2	0.4	10.9

Table 10: Comparison of the total catch (metric tonnes) and hooks set between 25S–30S ('Total Hooks' and 'Total Catch') and the raised catch and number of hooks set in this latitudinal band that are within the PICTS EEZs ('EEZ Hooks' and 'EEZ Catch'). Columns 'Per Hooks' and 'Per Catch' show the percentage of the total hooks and catch caught within the PICTS EEZs. The number of sets fished in EEZs in this band is also displayed ('EEZ Sets')

Year	EEZ Hooks	Total Hooks	Per Hooks	EEZ Sets	EEZ Catch	Total Catch	Per Catch
2020	55,390	37,717,812	0.15	45	22	11,911	0.19
2021	48,451	22,794,612	0.21	38	16	5,428	0.29
2022	20,006	19,072,495	0.10	8	13	8,069	0.16
2023	14,793	10,333,364	0.14	8	3	3,762	0.09
2024	0	17,356,160	0.00	0	0	10,219	0.00
Mean	27,728	21,454,889	0.12	20	11	7,878	0.15

Table 11: Comparison of the total catch (metric tonnes) and hooks set between 25S–30S ('Total Hooks' and 'Total Catch') and the raised catch and number of hooks set in this latitudinal band that are within the PICTS EEZs ('EEZ Hooks' and 'EEZ Catch'). Columns 'Per Hooks' and 'Per Catch' show the percentage of the total hooks and catch caught within the PICTS EEZs. The number of sets fished in EEZs in this band is also displayed ('EEZ Sets')

Year	EEZ Hooks	Total Hooks	Per Hooks	EEZ Sets	EEZ Catch	Total Catch	Per Catch
2020	55,390	62,294,624	0.09	45	22	20,179	0.11
2021	48,451	47,007,390	0.10	38	16	11,302	0.14
2022	20,006	30,839,402	0.06	8	13	12,057	0.11
2023	14,793	22,776,159	0.06	8	3	7,141	0.05
2024	0	24,333,178	0.00	0	0	12,510	0.00
Mean	27,728	37,450,151	0.06	20	11	12,638	0.08

Table 12: Comparison of the number of hooks fished ('Fished'), the number of hooks observed by human observers ('Observed') and the coverage percentage ('Coverage') for each 10 degree latitudinal band in the WCPFC convention area between the equator and 50S. All hook metrics are in hundreds of hooks

| Year	Latitude	Fished	Observed	Coverage
2020	0 to 10S	848,023	38,979	4.6
	10S to 20S	2,052,952	122,073	5.9
	20S to 30S	1,041,412	50,813	4.9
	30S to 40S	555,487	10,471	1.9
	40S to 50S	137,945	2,036	1.5
2021	0 to 10S	824,253	46,789	5.7
	10S to 20S	1,824,524	78,832	4.3
	20S to 30S	978,429	22,150	2.3
	30S to 40S	408,306	5,820	1.4
	40S to 50S	131,965	820	0.6
2022	0 to 10S	1,187,588	68,647	5.8
	10S to 20S	1,926,874	97,709	5.1
	20S to 30S	797,497	23,331	2.9
	30S to 40S	301,268	3,489	1.2
	40S to 50S	73,694	457	0.6
2023	0 to 10S	845,517	70,432	8.3
	10S to 20S	1,609,519	110,371	6.9
	20S to 30S	671,900	37,072	5.5
	30S to 40S	325,455	6,343	1.9
	40S to 50S	93,207	5,869	6.3
2024	0 to 10S	985,514	49,853	5.1
	10S to 20S	1,961,354	87,316	4.5
	20S to 30S	834,524	43,505	5.2
	30S to 40S	246,716	2,004	0.8
	40S to 50S	58,802	18	0.0
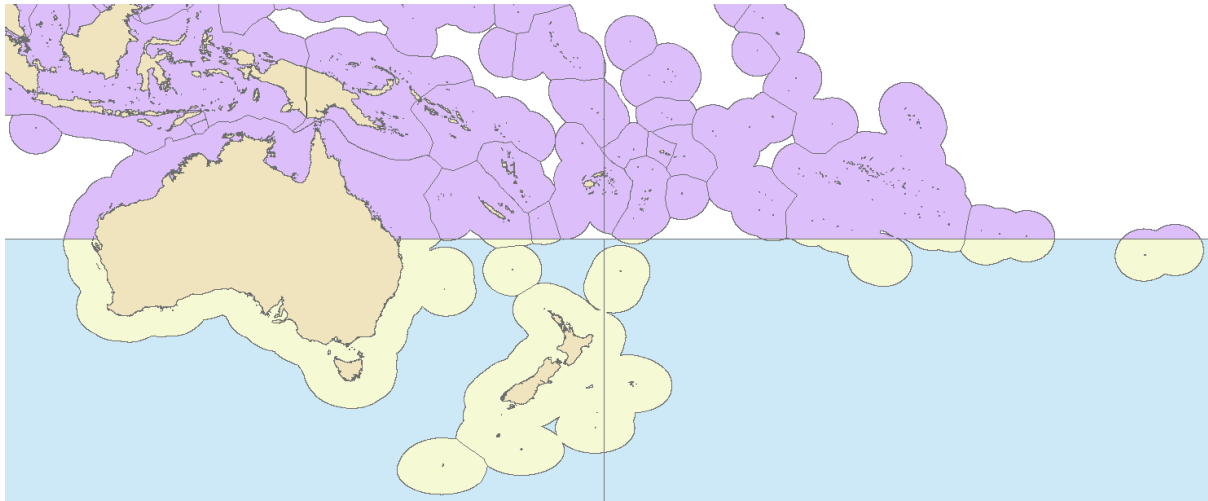
Figure 1: Map showing portions of EEZs above (purple regions) and below (light olive) the 25°S latitudinal line. Note that these are updated EEZ boundaries and were used in the calculation of proportion of area below the line, in the text. Note there are small discrepancies between the NC EEZ here and the EEZ used in the effort calculations (see section 4.3 for further details).
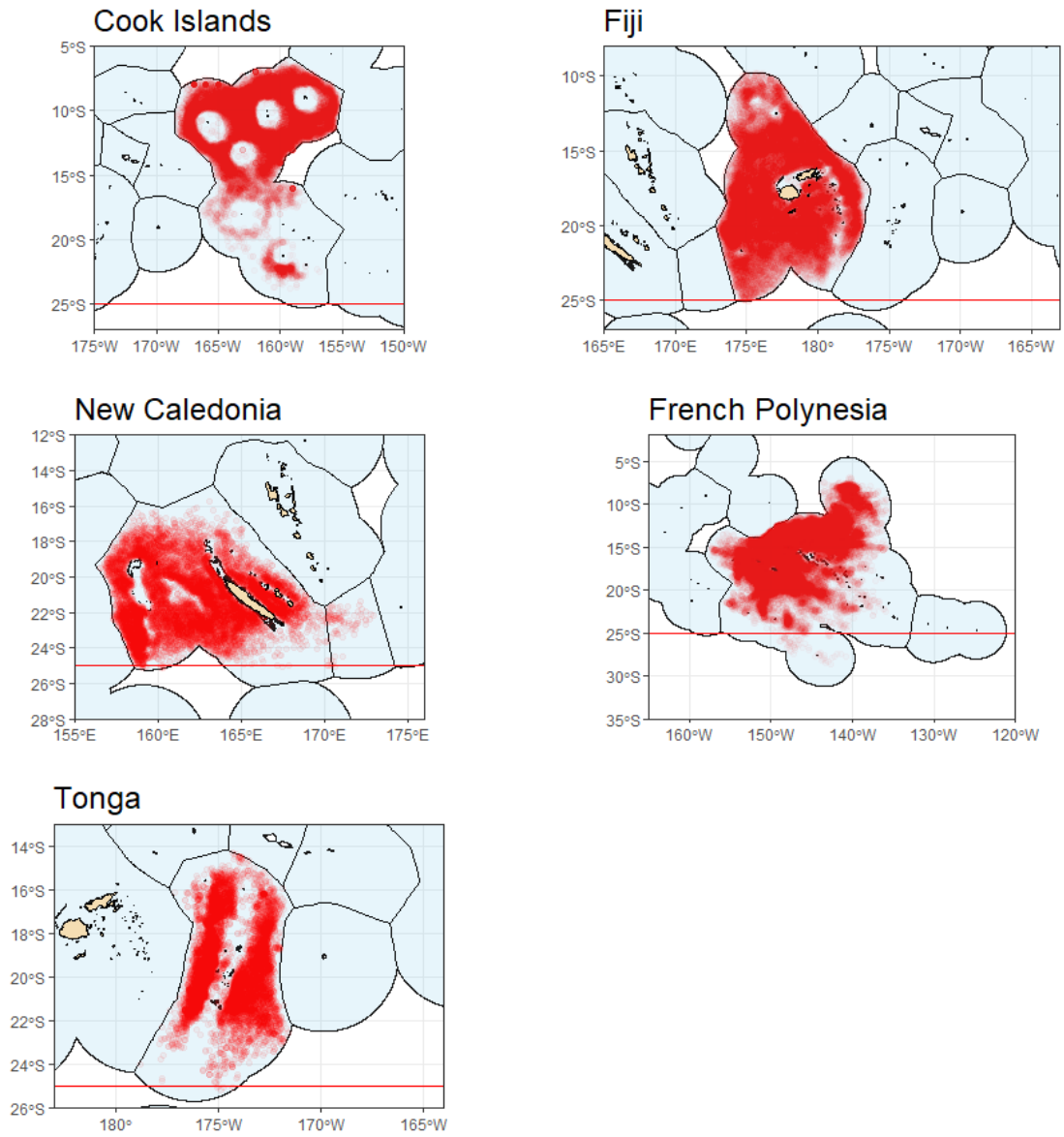
Figure 2: Distribution of longline fishing activity in the five PICTS EEZs for the period 2020-24, as inferred from operational logsheet data. Each red point denotes an individual longline set and the red line denotes the 25°S latitudinal line.