

# Analysis of Port Based Outreach Port of Suva 2019–2023

Implemented by BirdLife International, Suva, Fiji.  
Stephanie Borrelle, James Nagan, and Mark O'Brien



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## List of abbreviations

ABNJ	Areas beyond national jurisdiction
ACAP	Agreement on the Conservation of Albatrosses and Petrels
BIEM	By-catch and Integrated Ecosystem Management
CMM	Conservation and Management Measures
EEZ	Exclusive Economic Zone
FFA	Forum Fisheries Agency
GFW	Global Fishing Watch
HSBI	High seas boarding inspection
PBO	Port Based Outreach
PEUMP	Pacific-European Union Marine Partnership
RFMO	Regional Fisheries Management Organisation
SPREP	Secretariat of the Pacific Regional Environment Programme
SSI	Species of Special Interest
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	Western Central Pacific Ocean
WWF	Worldwide Fund for Nature

## BACKGROUND

BirdLife International has led a Port Based Outreach (PBO) programme in Fiji since 2017. The PBO targets the longline fisheries sector, focusing on best practices to mitigate the impact of fishing on seabirds and addressing relevant Conservation and Management Measures (CMM) of Regional Fisheries Management Organisations (RFMOs), specifically in the convention area of the Western and Central Pacific Fisheries Commission (WCPFC). The initial objective of the study was to raise awareness of the requirements for utilising seabird mitigation measures by vessels fishing in the high seas (areas beyond national jurisdiction; ABNJ) south of 30°S, and to introduce the measures that applied to vessels fishing in the high seas south of 25°S, which came into force on 1 January 2020. Spatial overlap studies using seabird tracking and fisheries vessel location data had indicated that a high proportion of the vessels fishing in this area<sup>1</sup>, and potentially interacting with highly threatened seabird species, notably the endangered Antipodean albatross<sup>2</sup> (*Diomedea antipodensis*), were using the Port of Suva to offload catch and restock supplies.

In 2021, BirdLife International were sub-contracted by Worldwide Fund for Nature (WWF), to continue the PBO programme under the PEUMP BIEM project, but with an expanded scope. The scope was extended to include by-catch mitigation and safe handling and release methods for other species of special interest (SSIs), such as turtles, cetaceans and sharks. This extension was funded through the By-catch and Integrated Ecosystem Management (BIEM) Initiative led by the Secretariat of the Pacific Regional Environment Programme (SPREP). The BIEM Initiative is Key Result Area 5 of the Pacific-European Union Marine Partnership (PEUMP) Programme funded by the European Union and the Government of Sweden.

WWF provided training to the BirdLife PBO officer on best practice mitigation and handling practices for SSIs with the aim of delivering the expanded programme to visiting vessels docking at Port Suva. Disruption of port-based activities due to COVID-19 related lockdowns limited engagement with vessels during 2021. However, BirdLife International staff worked remotely to improve their contacts/liaisons with the locally based fishing industry and were able to restart vessel engagement in early 2022, with a significantly enhanced network of contacts.

This report summarises the results against the defined reporting measures from four years of PBO activities undertaken by BirdLife International through the SPREP-led By-catch and Integrated Ecosystem (BIEM) Initiative<sup>3</sup> from 2019 to 2023. This fulfils reporting requirement: *3.2 Draft data analysis report: Undertake analyses of data, prepare report for BirdLife/SPREP to disseminate information and results of the project to appropriate internal and external fora (e.g., SPC, FFA, WCPFC)*. The work reported on here is on behalf of a range of funding organisations during the period of 1 January 2019 to 30 November 2023, hereafter the 'project period'. Statistical methods for analysing the data collected during the project period are limited due to the change in scope of the project in 2021, that is, the expansion of the engagement work to included other SSIs in addition to seabirds. Summary statistics of the 256 vessels visited and discussion are provided.

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1 Bose and Debski 2022. Antipodean albatross spatial distribution and fisheries overlap. WCPFC-SC18-2022/EB-IP-10. <https://meetings.wcpfc.int/node/16338>

2 <http://datazone.birdlife.org/species/factsheet/antipodean-albatross-diomedea-antipodensis>

3 The By-catch and Integrated Ecosystem Management (BIEM) Initiative is KRA 5 of the Pacific-European Union Marine Partnership (PEUMP) Programme funded by the European Union and the Government of Sweden.

## RESULTS BY REPORTING MEASURE

Measure 1. The number of vessels visited in each year from 2019 to 2023.

During the project period the PBO officer made 631 visits to a total of 256 individual vessels at Port Suva. The number of vessels visited has followed an increasing trend annually, apart from an anomalous year in 2021 (due to afore-mentioned COVID-19 related lockdowns) (Figure 1). Of the 256 vessels visited, 170 (66%) were flagged to China. This proportion has remained consistent over the four years of the study, with between 53% and 74% of all vessels flagged to China visited annually. The Chinese flagged vessels visited through the PBO work over the project period represent more than half of the total 383 Chinese flagged vessels registered to fish in the high seas of the Western and Central Pacific Fisheries Commission (WCPFC) convention area.



Figure 1: Number of vessels visited by flag state and year.

28% (74 of 256) of the vessels visited were operating under the Fiji flag. Annually, between 31% and 42% of all vessels visited were Fiji-flagged vessels. According to 2018 data, the Fiji national longline fleet comprises of 95 vessels; thus, at least 77% of Fiji-flagged longline vessels were visited over the project period. The 2022 WCPFC dataset identifies 22 Fiji-flagged vessels with licences that have not yet been visited. Another 8 Fiji-flagged vessels were visited that are not on the current WCPFC dataset (as of December 2022). This may be because the WCPFC list is not updated regularly. There are 61 licenced vessels flagged to Vanuatu in the WCPFC dataset, of which only 13% (8) were visited by the PBO officer as the others offload elsewhere. An additional three vessels flagged to Vanuatu were visited through the Vanuatu port based



outreach programme<sup>4</sup>. Opportunistic visits to vessels docked at Port Suva included Chinese Taipei and Cook Islands flagged vessels. This includes two WCPFC licenced longline vessels with a Cook Islands flag and one vessel flagged to the Republic of Korea. Only a few Chinese Taipei (5 of 256) vessels were visited, representing a fraction of the fleet licenced to fish in the WCPFC-controlled waters. This is because they return to Taiwanese ports to offload and resupply.

Three vessels were visited by the Vanuatu PBO officer, all flagged to Vanuatu. The PBO officer advised the captains about seabird by-catch mitigation and their obligations under the WCPFC CMMs. None of the vessels were fishing south of 25°S, therefore seabird by-catch mitigation measures are not required. None of the captains were aware of the seabird mitigation requirements. By-catch mitigation and best practice handling of turtles, sharks and rays, and cetaceans was also discussed with the crew. De-hooking of turtles was demonstrated to the crew and information sheets provided. All three vessels use circle hooks to reduce turtle captures and had knives and bolt cutters available to free any caught animals. None of the vessels use offal management practices; it is unclear what discussions were had with the crew about best practice offal management. The captains stated that when there are cetaceans around the vessel they stop operating because the cetaceans impact catch rates by predated on caught fish.

### Measure 2. The number of visits per vessel.

The PBO officer visited nearly 60% of all vessels more than once in the project period (155 out of 256). He visited more than one third twice (38%, 98 of 256), and one quarter of vessels three or more times during the project period (Figure 2).

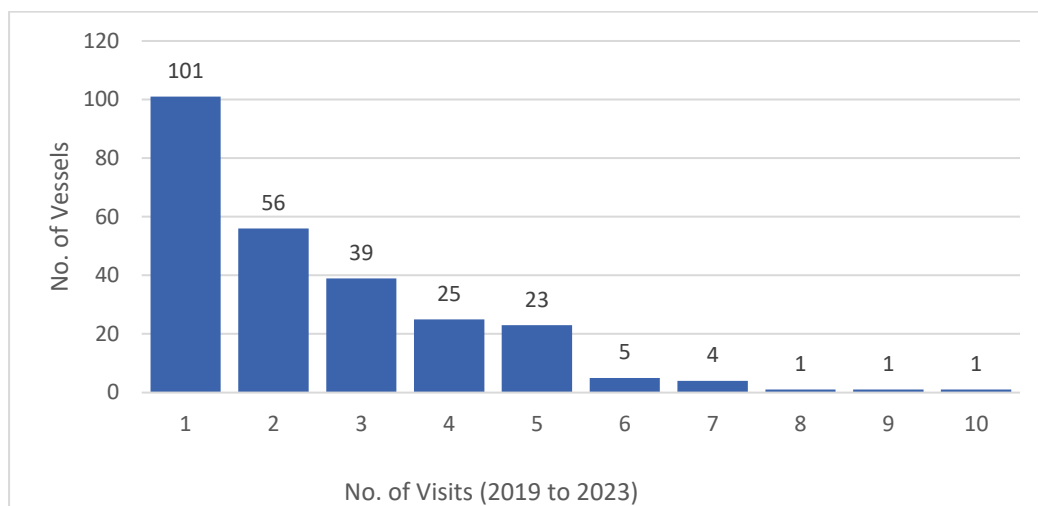


Figure 2: Variation in number of visits to vessels.

### Measure 3. Variation in number of visits to vessels, by flag state

Fijian flagged vessels have a higher rate of repeat visits than to Chinese flagged vessels (Figure 3a and 3b). Generally, Chinese-flagged vessels return to Port of Suva less frequently than the Fijian-flagged vessels due to the length of trips, latitude of fishing efforts, and whether the vessels visit ports other than Suva. The PBO targeted Fijian-flagged vessels more frequently in 2022 and 2023. This is a reflection of the expansion of emphasis from seabirds to include other SSIs (turtles, sharks and cetaceans) in 2021 and prior to that (in 2019), the inclusion of vessels travelling at latitudes greater than 25°S. Fijian-flagged vessels fish in more tropical latitudes, where they interact with turtles, sharks and cetaceans more frequently than with seabirds, which are more abundant in lower latitudes.

<sup>4</sup> The three Vanuatu flagged vessels visited through the Vanuatu based PBO were carried out in Port Suva, because Port Vila was not being used due to damage from two cyclones that hit the country in March of 2023.

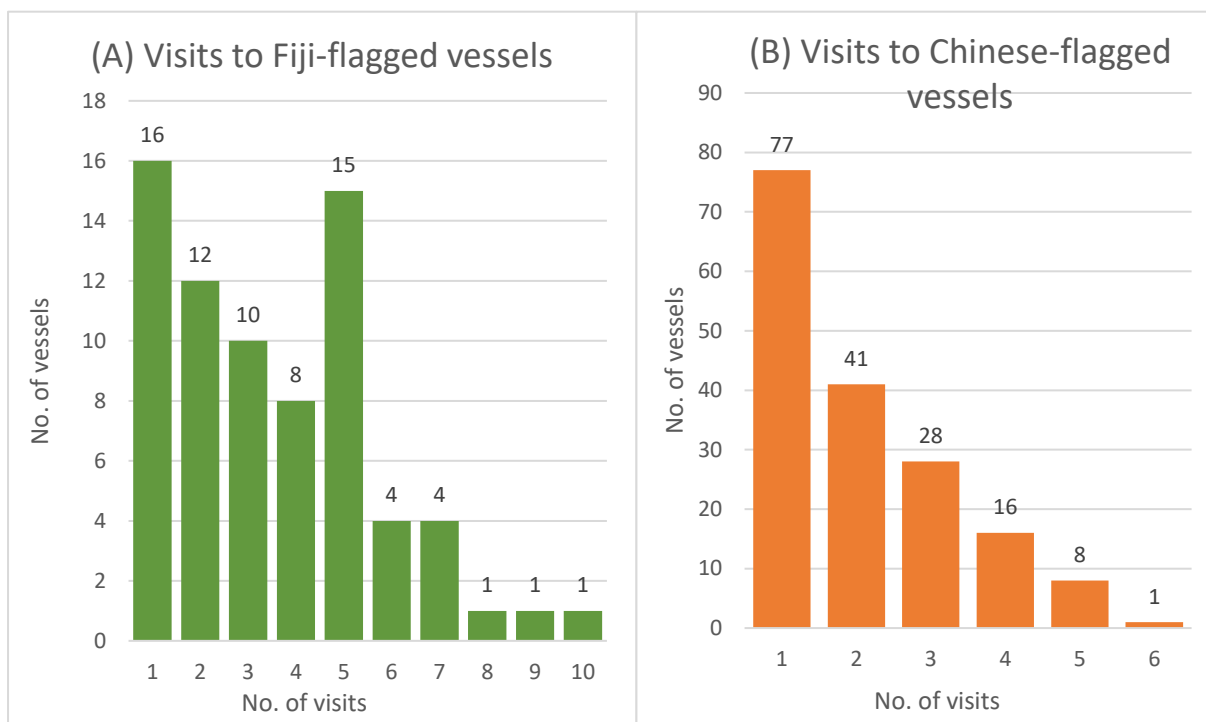


Figure 3. Number of vessels and visits for the (A) Fiji and (B) Chinese flagged fleets for the project period

#### Measure 4. Variation in the size of vessels visited at Port of Suva.

Measures 4 and 5 are to evaluate if the PBO visits were representative of the Fijian flagged vessels fishing in the high seas. To assess these measures, the size (length in metres) was compared against the registered vessel list in the WCPFC.

**Measure 4:** The Fijian Ministry of Fisheries Annual Report 2018–2019<sup>5</sup> categorises the size of vessels in the Fiji longline fleet as: short <21 m, medium 21 m–30 m, long >30 m. The Ministry of Fisheries report lists a total of 95 vessels: 13 short, 36 medium, and 46 long. For this analysis, vessel length is taken from the 61 vessels currently registered as licenced under a Fiji flag on the WCPFC website together with a further 11 vessels for which information was extracted in previous years prior to their removal from the site.

During the project period, 68 (58 in 2022) Fiji-flagged vessels were visited: 4 (3) short, 11 medium and 40 (36) long (Figure 4). The average length of the 50 vessels visited was 31.5 m (32.4 m in 2022) (range 14.0 m–42.6 m, Std Dev = 6.7 m (6.6 m in 2022)). Figure 4 shows that a higher proportion of larger vessels was visited of those registered compared to small and medium sized vessels. This is because in 2019 and 2020 the focus of the project was seabird by-catch mitigation targeting vessels that were travelling south of 25°S. It should be noted however, that currently we have no information on the length of 13 (8) vessels.

<sup>5</sup> <https://www.parliament.gov.fj/wp-content/uploads/2021/07/46-Ministries-of-Fisheries-Fiji-Annual-Report-20182019.pdf>

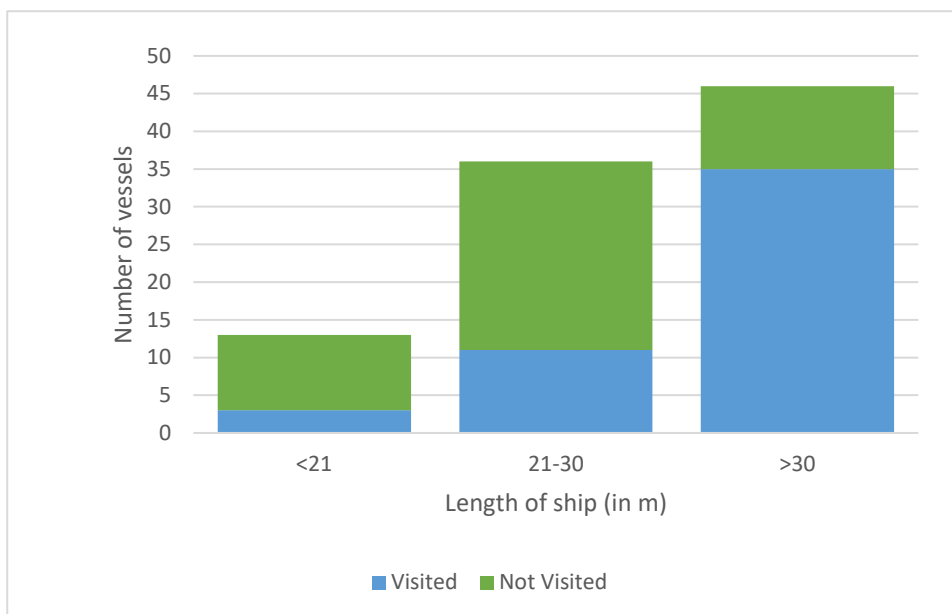


Figure 4: Total number of vessels categorised by length: short <21 m, medium 21 m–30 m, and long >30 m, and the number of vessels in those categories visited during the project period.

#### Measure 5. Assessing whether visited vessels with a Fiji flag represent the Fiji fleet.

To evaluate if the vessels visited during the project period were representative of Fijian-flagged vessels operating on the high seas, we compared the size of the vessel and the WCPFC registered vessel lists. In 2018, approximately 70% of the 90 Fijian flagged longline vessels were known to operate in the Fijian exclusive economic zone (EEZ) and 30% on the high seas. Of these, 50 have been visited through the PBO project for which there is, or has been, information on the WCPFC. Forty-two (84%) of these vessels also held a licence to fish in the high seas.

We have not visited 22 Fiji flagged vessels on the WCPFC Vessel Registry. Four (18%) of these have Fijian government licences to fish in the high seas; that means most vessels that have not been visited are likely fishing in the Fijian EEZ rather than the high seas. The average length of these 22 vessels is 28.7 m (range 14.9 m–39.6 m, Std Dev=5.6 m) (Figure 5). Of the 8 vessels with licences to fish only within the Fiji EEZ, three were visited in 2020 for the first time, the remaining 5 were visited in 2022. The number of vessels visited through the PBO provides a good representation of the Fijian fleet, with a focus on the larger vessels that travel south of 25°S (Figure 4). These vessels have also had a greater proportion of repeat visits by the PBO officer (Figure 3a).

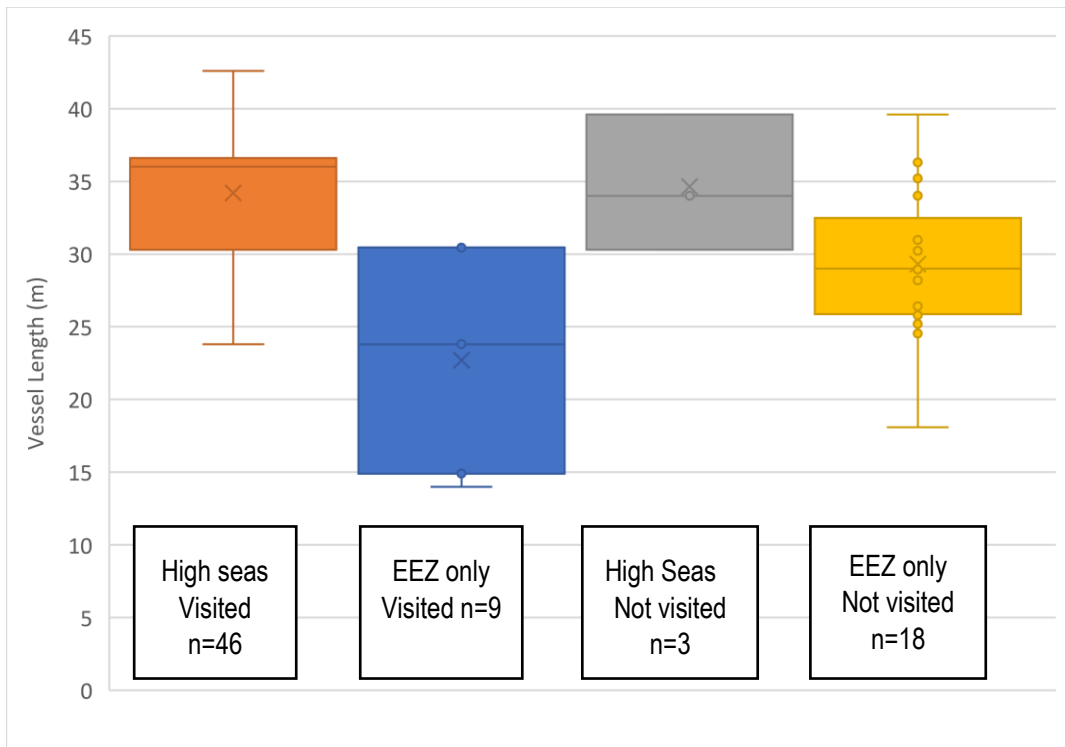


Figure 5: Vessel size and WCPFC listed vessels visited and not visited by fishing area, the high seas or the EEZ. The horizontal line in this Box and Whisker plot indicates the median, or middle vessel length in the sample. The X represents the mean. The bottom line of the box represents the 1st quartile (where 25% of vessels are below the line), the top line of the box is the 3rd quartile (where 25% of vessels are above the line). The whiskers extend from the end of the box to the minimum and maximum values. The dot at the bottom of the graph for the non-visited vessels is an outlier as it exceeds 1.5 times the inter-quartile range below the 1st quartile.

## Measure 6. Mitigation Measures – uptake and impact of awareness-raising – turtles

From 2021, the PBO expanded the remit of engagement on seabird by-catch mitigation to also include best practice handling and release of turtles, sharks and rays, and cetaceans (species of special interest SSIs). Training on the relevant requirements for best practice handling and release of these SSIs was provided by WWF to the PBO Officer (see Measure 7 for the PBO results on sharks and cetaceans).

Information about the availability and use of tools to extract hooks from by-caught turtles was collected from the beginning of 2022. During the vessel visits, the PBO officer would request to see the de-hooker and record if the de-hooker was present. Crew understanding of how to use the equipment and handling of by-caught turtles was discussed and advice provided when knowledge was lacking. If there was no de-hooker on board, the acquisition of one would be recommended. From the beginning of 2022 until 30 November 2023, 209 vessels were visited, and talks given about turtle mitigation. Of these, 108 (82%) had a de-hooker on board. In subsequent visits to four of the vessels that did not have a de-hooker, one (25%) had obtained a de-hooker on the second visit. From discussions with the crew, there was a clear impression that the crew was aware of the WCPFC requirements for mitigation measures and for handling and release of by-caught turtles. However, the crew also indicated that by-catch interactions with turtles was very rare.

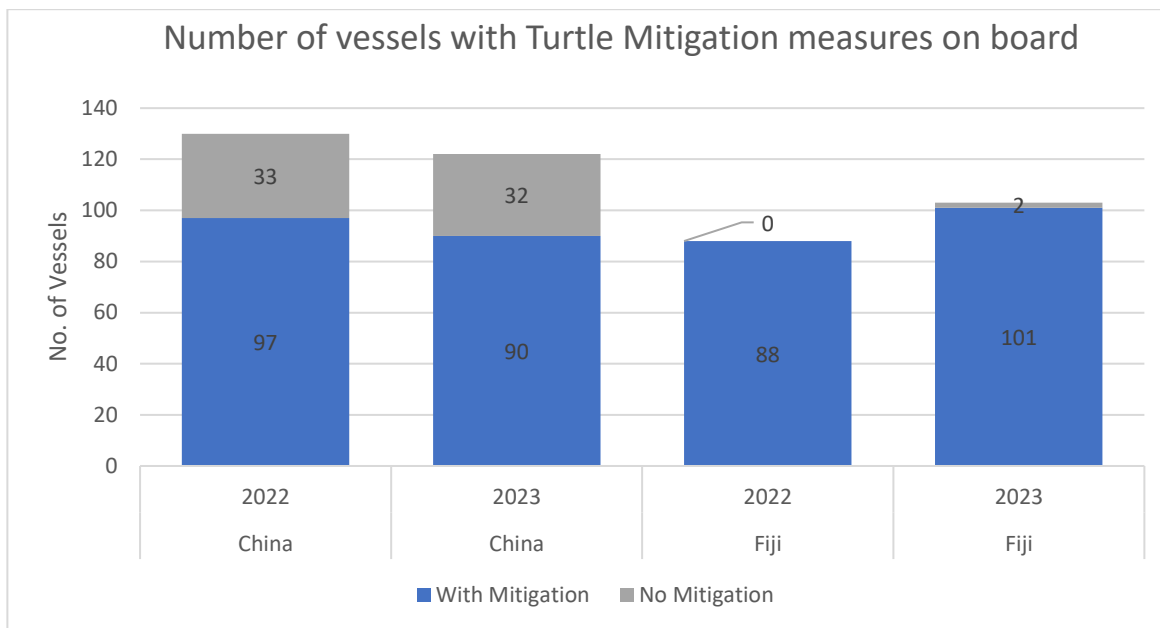


Figure 6: Number of vessels where turtle by-catch awareness and de-hookers were present by flag and year.

### Measure 7. Mitigation Measures – uptake and impact of awareness-raising – sharks and cetaceans.

Training on the handling and release of by-caught sharks and cetaceans was also provided by WWF. This included information on the use/availability of a sharp knife to cut the line as close to the caught animal as possible. Data on the experience of the crew in shark and ray interactions was collected from the beginning of 2022. Discussions were had with the crew members to see if they understood the best practices for handling (i.e., avoid bringing sharks/rays/cetaceans on board) and releasing sharks, rays and cetaceans using the guides provided through the WCPFC. This included specific information on the use of wire-leaders and shark lines and the prohibition of shark finning. The PBO officer also requested to see the equipment that would be used to cut the line if a shark was caught. Informational material on the best practice methods for dealing with shark and cetacean by-catch has been made available, by WWF, to vessels, prioritising Fiji-flagged vessels. The information is either posted in a public area of the vessel or held by the ship's captain. The availability of this information on other flagged vessels is more haphazard – in this situation we go through the one set that WWF provided to us with the captain and/or the crew. During the FAO contract we were able to provide flash-drives, with the full set of information, for each of the captains. From the beginning of 2022 until 30 November 2023, 337 visits were made to a total of 209 vessels. All vessels were able to show that they had the capacity to effectively cut the line should a shark/cetacean get caught.

### Measure 8. Mitigation Measures – uptake and impact of awareness raising – seabirds. Use of bird-scaring, tori lines.

Since prior to 2019, we have collected information on the presence of mitigation measures for seabirds on all vessels visited. Seabird by-catch mitigation measures are required only for vessels fishing south of 25°S since 1 January 2020, and only for vessels fishing 30°S prior to this. The mitigation measures are the simultaneous use of two of the following: bird scaring lines or tori lines, weighted branch lines, and setting at night, or the stand-alone measure of hook shielding devices. Between 2019 and 2021, we targeted vessels travelling 25°S – to raise awareness regarding the change in regulations in 2020 and to assess the extent to which vessels had adequate mitigation measures on board. The masters and crew were shown the best place to attach the tori pole on their vessel, and when and ways to deploy and haul were discussed. Future work plans include at-sea practical engagement to troubleshoot deployment and configurations of tori lines on different vessels.

The PBO officer found that 56 of the 256 vessels (22%) were carrying tori lines on the first visit to the vessel (Figure 7). Of the 155 vessels that had no tori lines on the first visit, 14 (9%) had obtained tori lines prior to the second visit. Of the 99 vessels that had no tori lines on the second visit, 4 (4%) had obtained tori lines prior to the third visit. Of the 60 vessels that had no tori line on previous visits, 7 (12%) had gained a tori line. Of the 37 vessels that had no tori line on the 4<sup>th</sup> visit, 3 (9%) had obtained a tori line (Figure 7).

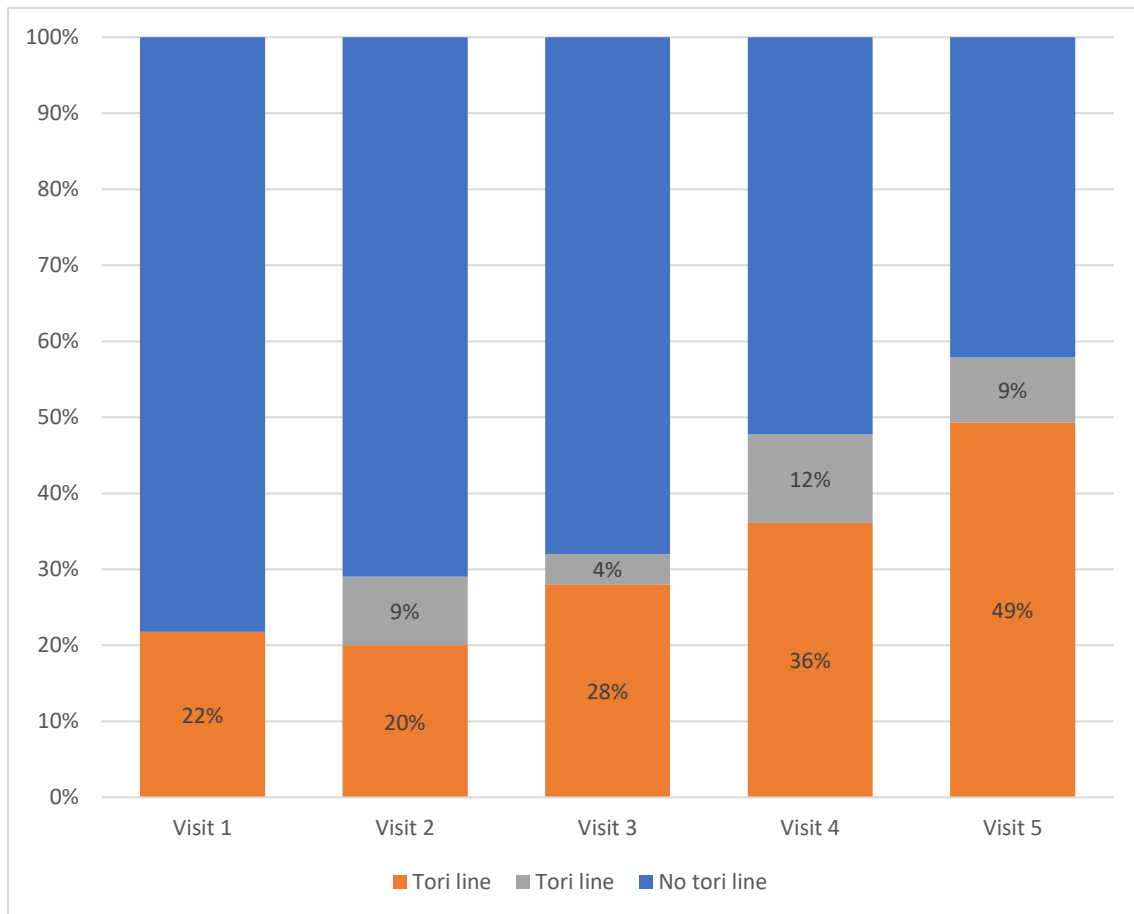


Figure 7: Change in the presence of tori lines over multiple visits. The blue sections of the bars combined are vessels that have tori lines present. The light blue sections of the bars represent the vessels that gained a tori line following a visit from the PBO officer. These include vessels to which the PBO programme provided tori lines.

The proportion of Fiji-flagged vessels where we recorded tori lines on board was 29%; this is similar to the proportion of Chinese-flagged vessels, 27%. Not all vessels require tori lines – these are only required when fishing 25°S or below. Some vessels offload their tori lines to other vessels if they are not going south for their next trip, however, this leads to loss of tori lines and is an issue the PBO officer will discuss with crew in the future.

We do not yet have precise information on the proportion of vessels that require tori lines – a rough guide would suggest that around 20% of all vessels that use Port of Suva travel below 25°S. In the last quarter of 2022, we worked with the New Zealand High Seas Boarding and Inspection compliance team to cross reference their data on vessels that are fishing in the high seas below 25°S against our list of vessels to which we have provided tori lines. We identified a small number of vessels from both lists and additional vessels to prioritise engagement with in 2023. We are working with the New Zealand Compliance team to encourage them to prioritise those vessels. To date, there are other priorities for the New Zealand government.

## Measure 9. Construction and distribution of tori lines

In 2018, BirdLife established a women's group in Makoi, Nasinu to construct tori lines for the PBO project at Port Suva. BirdLife Pacific, and then later New Zealand Government staff, provided funding, training, equipment, and support to get the project started.

Between 2018 and September 2022, 62 tori lines were constructed:

- 19 tori lines were constructed as part of the 2018/2020 FAO project.
- 17 tori lines were constructed as part of the 2020 MFAT grant.
- 12 tori lines were constructed thanks to a small grant from Southern Seabird Solutions Trust in 2021.
- 14 tori lines were constructed in 2022 as part of the PEUMP/BIEM project.
- 12 tori lines were constructed in 2023 as part of the PEUMP/BIEM project.

To-date, 55 tori lines have been distributed to companies:

- 5 were distributed in 2018.
- 12 in 2020
- 17 in 2021
- 14 in 2022
- 12 in 2023
- Additional tori lines have been requested, and we will continue to seek funds for their construction to ensure we can equip as many vessels as possible.

Initial attempts to charge the companies to purchase the tori lines meant that very few were purchased because the cost was cited as a prohibitive factor. To address this resistance, we raised funds to cover the costs of the lines and the construction, and so, from 2020 the lines have been freely available to captains of vessels who indicated that they were planning to fish south of 25°S. While it is a requirement for vessels to use seabird by-catch mitigation when fishing south of 25°S in the high seas of WCPO, vessel operators often cite cost as being a prohibitive factor in obtaining tori-lines. Further, there are no easily accessible sources of pre-made tori lines and fashioning a tori line from available materials on the vessel generally does not result in a compliant tori line. Materials to make compliant tori lines are not always available in Fiji, therefore this is a barrier for vessels to repair or make their own tori lines. Currently, BirdLife are importing materials for the women's group from New Zealand. Compliance monitoring of CMMs, in general is difficult because observer coverage of the longline fleet is low. The expectation in the WCPFC is that at least 5% of hooks will be observed and that the observation will be spatially representative of fishery effort. In reality, fleets often fail to meet the 5% benchmark, nor is the coverage spatially representative of effort. Compliance of these fleets is challenging due to observer availability, working conditions, length of fishing trips, the size of the vessels (for example, not having capacity to accommodate an observer), among other issues. Work is ongoing in the WCPFC to implement electronic monitoring and increase observer coverage, including to ensure compliance with CMMs related to species of special interest.

## Measure 10. Mitigation Measures – uptake and impact of awareness raising – seabirds. Use of weighted lines.

Another of the mitigation measures recommended by the WCPFC to minimise the risk of catching a seabird on the line is to use weighted lines to increase the speed with which the hooks descend below where they are available to foraging seabirds. During the PBO visits, we asked vessel captains about the use of weighted lines – and inspected the lines to identify which vessels were supplied with weighted lines.

Of the 256 vessels, only 1 (3%) was equipped with weighted lines in 2019. In 2020, the new regulations for seabird by-catch mitigation in the WCPFC came into force, and we saw an increase to 11% of vessels being equipped with weighted lines. The proportion of vessels with weighted lines decreased in 2021, however, that is likely due to the small sample size because of restrictions due to COVID-19. In 2022 and 2023, 23% and 17% respectively had line weighting on board. All vessels visited with line weighting were flagged to China. Crews are informed about the specifications for weighted lines to meet sink rates outlined in ACAP best practice, including factsheet and posters to place on the vessel.

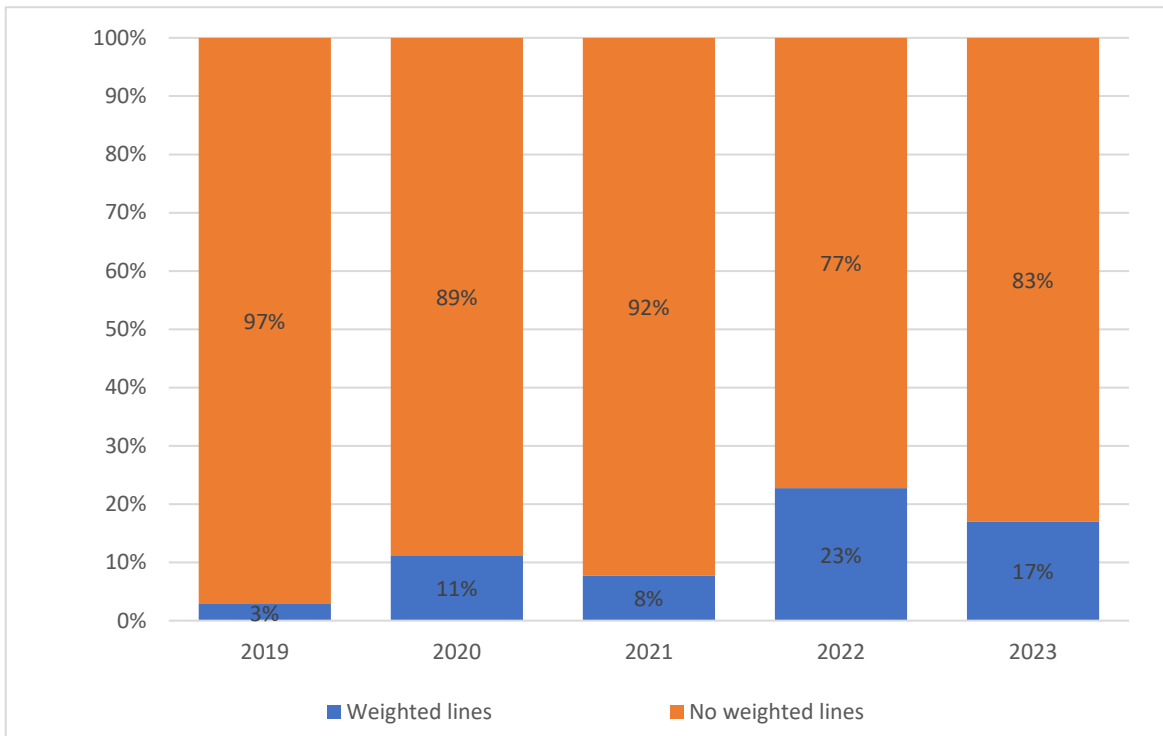


Figure 8: Proportion of visits where weighted lines were present from 2019–2023. Note that these may include data from repeat visits to vessels and also there are discrepancies among years for vessels primarily fishing north of 25°S that do not have to use any mitigation measures.

## DISCUSSION AND FUTURE ACTIVITIES

Between 1 January 2019 and 30 November 2023, port-based engagement visits to 256 vessels that use the Port of Suva were conducted. These vessels are either unloading catch or picking up supplies prior to the next fishing expedition. Most vessels visited were either Chinese-flagged or Fiji-flagged. We believe that this is an accurate estimate of the proportion of vessels of different flags that use the Port of Suva. We are aware that some vessels off-load catch at Levuka in Ovalau. However, our understanding is that these vessels spend just 24 hours or less at Levuka and then travel to Suva to pick up supplies, thus are included in the visit prioritisation lists.

We have limited information on 20 of the vessels that we have visited – 12 of these are Chinese-flagged and 8 are Fiji-flagged vessels. The vessel names appear not to correlate with vessel names on the WCPFC vessel licence registry. All but four of the vessels were visited for the first time in 2022, so it could be that the vessels had not yet been added to the publicly accessible database by the WCPFC Secretariat. The misalignment between the WCPFC vessel registry, GFW tracking data, and call sign of the vessel is not something that we can resolve easily. However, we make best efforts to reconcile the information sources of where vessels are operating. As we are collaborating more closely with the Fijian Ministry of Fisheries in 2024, further opportunities exist to formally reconcile the discrepancies.

Several Fiji flagged vessels, which are licenced to fish only in Fiji's EEZ according to WCPFC, were de-activated during the pandemic and have yet to be brought back into service, and with an updated Maritime Safety Certificate. When these vessels are back in operation, we aim to visit them and bring them into future assessments. These vessels were low priority during the pre-COVID period of work as the objective at that time was to target vessels fishing in the high seas south of 25°S.

Our understanding is that all crews are aware of the mitigation measures and best practice for dealing with hooked turtles and sharks (with cetaceans treated the same as sharks). This is perhaps because simplified graphics of handling and release of turtles, for example<sup>6</sup>, have been promoted to fleets. All crews have access to line cutters for use in everyday

<sup>6</sup> <https://www.wcpfc.int/doc/supplcmm-2008-03/wcpfc-guidelines-handling-sea-turtles-graphics>



fishing operations and to minimise the time spent dealing with hooked sharks and cetaceans. Most crews have access to turtle de-hookers but sometimes the de-hookers get misplaced. This may be because turtle by-catch events are rare and so the equipment and practice of de-hooking is not regularly practiced by new crew, thus there is an attrition of knowledge as crew move among fleets or leave the industry. When the crew doesn't know the location of the de-hooker, the PBO officer advises that this is non-compliant. This usually results in a replacement being obtained rapidly. The crew is also reminded of how to use the de-hooker.

At the outset of the 2022 portion of this project period funded through the SPREP BIEM Initiative, we found that fewer captains of vessels were aware of the seabird by-catch mitigation measures compared with turtle, shark and cetacean by-catch mitigation, as set out in relevant WCPFC Conservation and Management Measures (CMMs). Awareness-raising has been a key objective of the PBO officer role. Clarity for understanding the requirements that vessels are obligated to follow is impeded by the fact that the seabird by-catch mitigation measures only apply to vessels operating 30°S – or 25°S (in the high seas) from 2020. Between 2019 and 2021 vessels were targeted that we knew were fishing 25°S or below, although we couldn't be sure whether they had fished in this area in the immediate trip.

We have previously 'eye-balled' Global Fishing Watch (GFW) to view the movement of vessels that we have identified and/or visited – but have not captured this information in a standard manner. As the programme continues into 2024 and beyond, work will be done to capture the spatial movements and analyse whether the vessels needed to deploy seabird by-catch mitigation measures around the time that we visited the vessel. This would change the graph in Measure 8 – if 50% of the vessels were not fishing 25°S then the increase in uptake by the remaining vessels would be significant. As mentioned in the results, we are in discussions with the New Zealand government to ascertain if any of the vessels to which we have provided tori lines have been inspected by their High Seas Boarding Inspection (HSBI) team or detected using compliance overflights. Further, Fijian flagged vessels are required to have cameras on board; while our efforts to date have been unsuccessful in obtaining footage from fishing activities, we are working towards accessing that information through collaboration with the Fijian Ministry of Fisheries that will serve to verify the deployment of some mitigation measures, particularly tori lines.

We noted that vessels offload their tori lines if they plan not to go below 25°S on a fishing trip. Tori lines can be passed from vessel to vessel within the company, which may result in tangling, damage, or loss. We also note that many of the vessels had not fished below 25°S immediately prior to visit and didn't plan to fish below 25°S immediately after the visit. In such cases, there is no requirement to use seabird by-catch mitigation measures during this time. Most captains were happy to take tori lines if they were freely available. However, we do not yet know whether the tori lines are being used because some of these vessels have not been revisited yet. We requested photographs of the lines in action but, to date, have only received images of 'self-made' and not industry standard, tori lines. One company indicated that they felt that the tori lines, as constructed by the women's group, are too bulky and declined to take any sets. Subject to funding, next steps are to:

- Survey masters' and crew on the challenges of using the tori lines and work with them to find solutions to operational challenges of deploying mitigation measures – this work will be funded through the BirdLife International Marine Programme, working closely with experts from the Albatross Task Force (based in African and South American fleets).
- Trials of biodegradable materials for tori line construction (French Polynesia).
- Continue to request photographs of tori lines in operation from the masters and crew.
- Continue to liaise with colleagues in New Zealand comparing information on vessels equipped with tori lines and those utilising tori lines, in waters considered High Risk for Antipodean Albatross and other seabirds.

Employing the women's group to construct the tori lines has proved to be an effective way of ensuring that Seabird Mitigation Measures are available, at no cost, to ship captains – thus removing one of the reasons for not using these measures. Continuing to construct tori lines and making them freely available to protect albatrosses and other seabirds, would appear to be an effective way forward.

We are aware that trials on tori lines that do not include the streamers have been undertaken in the north Pacific. We are somewhat sceptical of the effectiveness of streamer-less tori lines and would be surprised if the lines, being less visible, were not hazardous to birds flying past. However, we would be open to trials of this type of line, or alternative designs for

mitigating seabird interactions that are specifically tailored for the Pacific longline fishing fleet if the trials could be monitored effectively.

Weighted lines are not transferable among vessels. The time taken and cost of switching to and from weighted lines would preclude their removal and reduce the ease with which they can be taken up. To date, 20% of vessels visited were using full sets of weighted lines. There is evidence that vessels are slowly switching to weighted lines – whenever sets get lost then the replacements are weighted lines. Many lines used by vessels that fish south of 25°S are now hybrid lines. This means, that part of the set includes weighted lines, and part does not have weighted lines. While this is non-compliant with the measures, the stepwise adoption of weighted lines is considered progress, and the PBO officer reminds vessels of the requirements for full line weighting during visits.

There are some safety issues with the use of weighted lines and flybacks, which can injure and, in some cases, cause fatalities of crew depending on the set up of the gear. Methods to mitigate flyback involve using swivel weights and hauling modifications that utilise the vessel structure to create a shield for where the flyback is likely to occur. During PBO, the officer discusses these safety concerns with the crew where possible, and how to minimise safety risks. Addressing the concerns about weighted lines is a key priority for future PBO in Suva, and in other ports when programmes are established.

The issue of time spent in port affixing the weighted lines would also be a factor if the use of hook shielding devices/Hookpods was promoted. Several vessel captains did express interest in using one or the other of these devices at some stage in the future – dependent on the support of the ship's company. We hope that the long-awaited Hookpod trial will be undertaken soon – as, while this will require some considerable time in port, in addition to reducing seabird by-catch, it will provide another effective by-catch mitigation measure to protect turtles from being hooked.

This analysis has identified several issues with the database, such as data fields added during the programme and the change in approach from seabirds to all protected species, used to maintain a record of interactions with vessels and vessel captains. Future work priorities will include addressing these issues and developing a more complete dataset for further analysis. Priority actions for future PBO include but are not limited to:

- Summarise the responses from ship captains to capture their understanding and experience with application of the range of mitigation measures as well as their efficacy, as captured in the Visit reports.
- Developing a method for determining where vessels are fishing in the immediate period around when visits are made to determine the proportion of vessels that fish south of 25°S. This may include asking to see logbooks.
- Record the presence of posters/booklets highlighting key mitigation methods for turtles, sharks, etc on vessels during PBO activities.
- Generate short videos about implementing best practice mitigation and handling techniques to show crew during visits.
- Investigate whether it is realistic to use 'selfie images' to confirm conversations with ship captains, crew, etc regarding the deployment of seabird by-catch mitigation and the de-hooking/release of turtles and cetaceans.



*The BirdLife Port-Based Outreach team handing over tori lines to Mr Ma (middle), vessel owner in Suva Port, 2022.*



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