

# Back to the ocean

*Going to sea to collect new scientific information is part of the core business of the Pacific Community (SPC), and despite the challenging COVID-19 situation, SPC is soon embarking on two expeditions to learn more about tunas.*

## Tuna tagging

The Pacific Tuna Tagging Programme (PTTP) was launched in 2006 and, since then, at least one cruise per year has been implemented in the western and central Pacific Ocean (WCPO) by SPC. The relevance of tagging large quantities of tagged tunas on an annual basis to better monitor their stocks was standardised in 2016<sup>1</sup> by the Western and Central Pacific Fisheries Commission (WCPFC).

After the 2019 Western Pacific pole-and-line cruise, which successfully released over 16,600 tagged tunas in waters of Papua New Guinea, Palau and the Federated States of Micronesia,<sup>2</sup> the PTTP had planned to organise in 2020 a central Pacific (CP) cruise<sup>3</sup> to depart from Funafuti in Tuvalu. Tuvalu's waters are traversed by a very high density of drifting fishing aggregating devices (dFADs), deployed by the tuna purse-seine fishery (Fig. 1). As the present principal goal of the CP cruise research is to focus on tuna aggregating around those dFADs, the choice of Funafuti as an embarking/disembarking point for scientists would save many

steaming days compared to previous central Pacific (#12 and #13) cruises<sup>4</sup> that started from Majuro in the Marshall Islands (Fig. 1).

Alas, this plan was ruined by the COVID-19 pandemic and the unprecedented travel restrictions that were imposed by Pacific Island nations to protect their populations from the virus. As with the vast majority of Pacific Islands, Tuvalu closed its borders to both non-essential air and boat access. To maintain the continuity of the long-recorded series of tuna monitoring, SPC has modified the cruise design (Fig. 2) to minimise the potential for homeport infection rates and onboard incidence, as well as ensuring avoidance of port calls to any Pacific Island country or territory. The vessel will depart from Honolulu and head south to the equator, undertaking research in the high seas and exclusive economic zone of Kiribati (Line and Phoenix Islands). All persons (five scientists and five crew) will isolate for 14 days prior to departure and must present a negative COVID-19 test before departure. The vessel will return to Honolulu after 50 days at sea with no port calls to other locations.

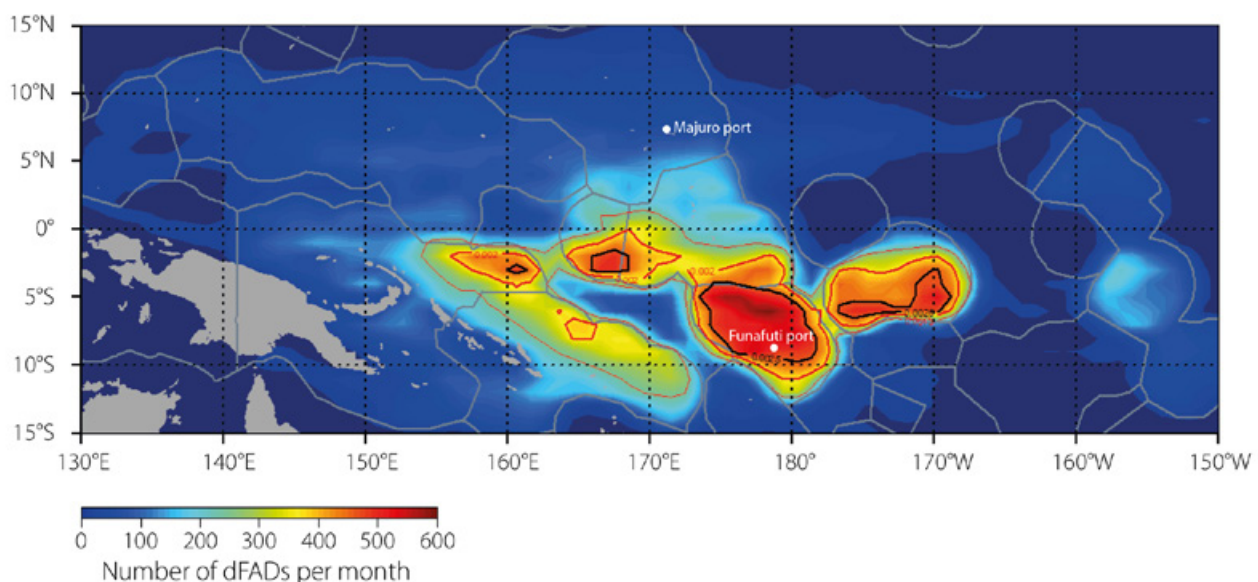


Figure 1. 2018 FAD density per month per 1 x 1 degree. From: Escalle L., Muller B., Hare S., Hamer P., Pilling G. and PNAO. 2020. Report on analyses of the 2016/2020 PNA FAD tracking programme. WCPFC Scientific Committee. WCPFC-SC16-2020/MI-IP-14.

<sup>1</sup> See: <http://purl.org/spc/digilib/doc/kgmrk>

<sup>2</sup> See: <http://purl.org/spc/digilib/doc/ek462>

<sup>3</sup> See: <http://purl.org/spc/digilib/doc/waw9f>

<sup>4</sup> CP12 and CP13 cruise reports are available from: <https://tagging.spc.int/en/publications/tagging-publications/viewcategory/12-phase-2-central-pacific>

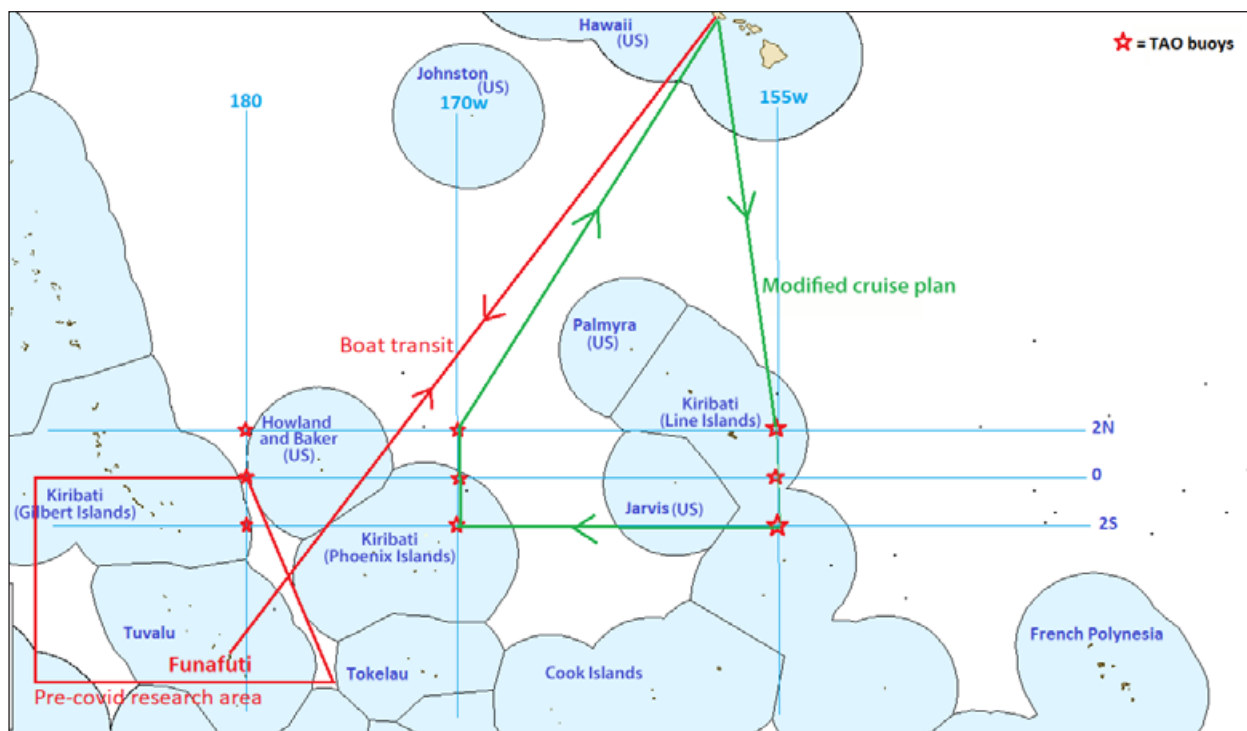


Figure 2. CP14 cruise plan; red indicates the previous scheduled research area, green indicates the modified cruise plan.

The current main goals of the CP cruises are to augment data collection for studies on tuna movements, exploitation rates and FAD association dynamics. The CP14 research cruise, in addition to continuing routine tuna tagging activities, will test innovative sampling methods for enhanced molecular analyses that can be used to quantify the structure and behaviour of tuna populations. The research cruise will also visit the Phoenix Islands Protected Area (PIPA) to

collect information on tuna residence time and movements in relation to this large marine reserve.

Thirteen CP cruises have already been conducted, resulting in over 44,000 tags placed on tunas that were caught and released, including 1162 archival tags mostly placed on big-eye tuna (Fig. 3), which were caught on schools associated with dFADs and the Tropical Atmosphere Ocean (TAO)

Figure 3. Target species for the central Pacific tagging experiments: the bigeye tuna. Here, a nice specimen is ready to be released after being inserted with an archival tag. The blue circle indicates the antenna of the archival tag implanted in the fish's abdomen. (image: ©SPC)







Figure 4. Docked at Kewalo Basin in Honolulu, the FV *Gutsy Lady 4* is in full preparation for CP14 adventures. Note the full fuel totes on the deck, their content will be transferred to the boat tanks during the transit time to the fishing grounds. (image: ©SPC)

buoys anchored along the meridians 140°W, 155°W, 170°W, 180° and 165°E, mainly between 5°N and 5°S.

From cruise CP1 to CP9, tagging results only relied on the presence of bigeye aggregations around the TAO buoys.

Since CP10 (2014), agreements with purse seine (PS) fishing companies provided, during FAD fishing closure period, full access to their FADs in areas where the tagging vessel operated during the cruise. It should be noted that the success of the last four cruises was dependent on these dFADs, as no major tuna school was observed around the visited TAO buoys.

Multiple purse-seine companies agreed this year to share their dFADs to facilitate the research in the targeted area. Fishing on these dFAD, which are dispersed among multiple exclusive economic zones and international high-seas pockets in the western Pacific, requires tagging platforms with a very large autonomy.

The FV *Gutsy Lady 4* (Fig. 4) can carry over 100 tonnes of fuel, which allows the vessel to safely cover the huge distances this voyage will require (estimated to be 5000 nautical miles).

As usual, the SPC will soon alert the tag recovery network of the WCPO (and beyond...) to draw its attention to the search for tagged tuna in the catches of the commercial tuna fishery. During CP14, the scientific team will send us weekly reports to be posted on SPC's website: stay tuned!

## Tuna ecosystem

Another important part of the work conducted by SPC at sea is the monitoring of the pelagic ecosystem, and since 2011, SPC has conducted or participated in a dozen scientific cruises. During those cruises onboard research vessels, samples and data on temperature, currents, nutrients, phytoplankton, zooplankton and micronekton are collected. The samples allow SPC to characterise the physical and biological ecosystem in which tuna evolve to better relate variations in tuna abundance to physical and biological parameters, and to ultimately be able to forecast changes in tuna abundance or movement. The research campaign named WARMALIS2020, the first regional cruise of a series of three was planned for this year. It was supposed to start in September and travel from Noumea, New Caledonia to Pohnpei, Federated States of Micronesia within three weeks (Fig. 5).

As with the CP14 tagging cruise, the COVID-19 pandemic had made impossible to travel across the region in 2020; WARMALIS2020 cruise had to be postponed to 2021. If the research vessel *Alis*, based in New Caledonia, cannot touch port outside of New Caledonia's EEZ, it is still possible to work inside it. The scientific team decided to conduct a short four-day technical trial cruise off the coast of New Caledonia. The objective of this short cruise is to develop a new standardised sampling method to collect micronekton from 600-m depth up to the surface, in preparation for the WARMALIS cruises (Fig. 6). This short cruise will be co-organised by SPC and the French Institute for Development Research. Six scientists will participate, including five from SPC, all women.

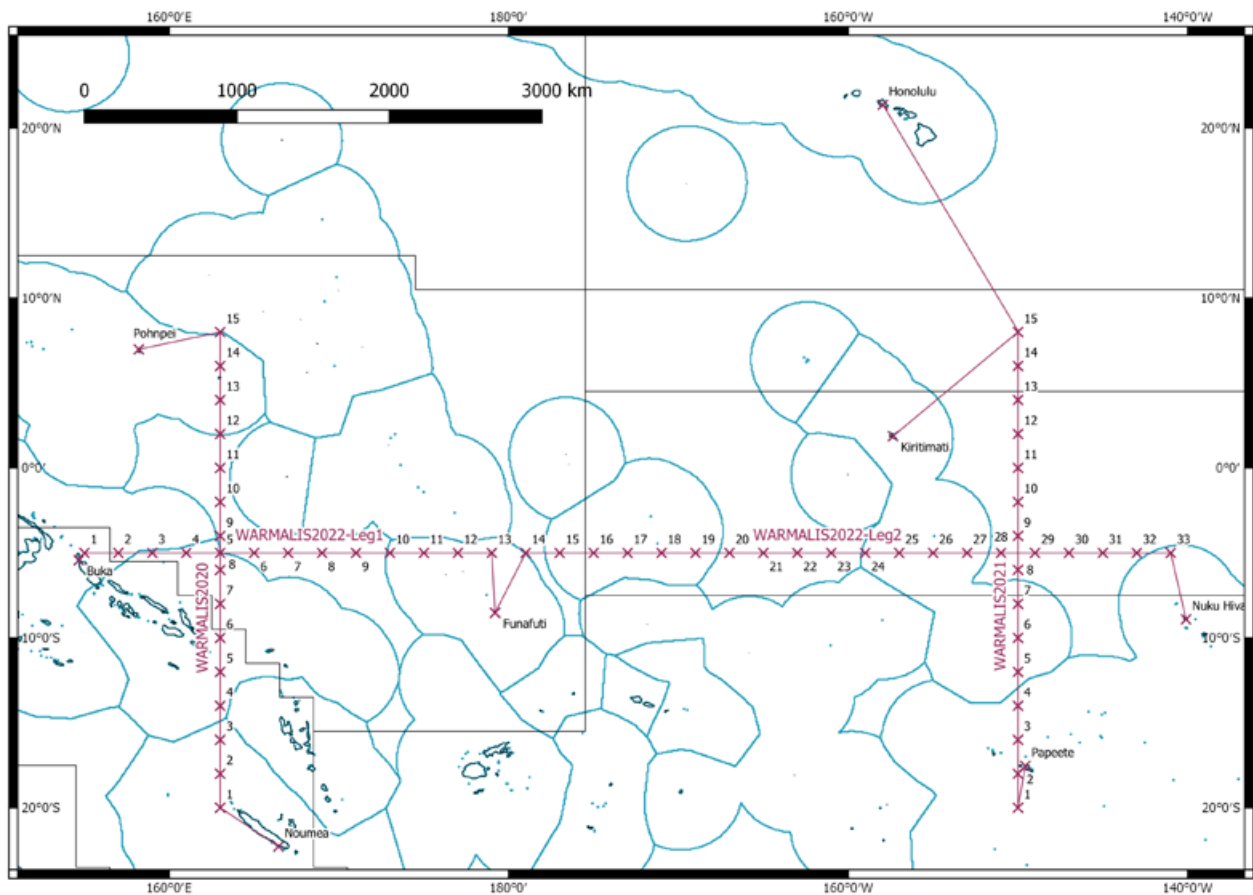


Figure 5. The WARMALIS cruises originally planned for 2020, 2021 and 2022.



Figure 6. Onboard the R/V *Alis*, the crew hauls in the large micronekton net, and specimens collected are then sorted in the small onboard laboratory. (images: ©Valérie Allain, SPC)



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