PACIFIC TUNA TAGGING PROJECT
STEERING COMMITTEE

Electronic Meeting
03 August 2021 (from 14:00-15:00 hours Pohnpei time (UTC+11 hours))

PROJECT 42: PACIFIC TUNA TAGGING PROJECT REPORT AND WORK-PLAN FOR 2021-2024

WCPFC-SC17-2021/RP-PTTP-01

SPC-OFP

1 INTRODUCTION

This Pacific Tuna Tagging Programme (PTTP) report provides information on the PTTP to date with a focus on the tagging activities undertaken in 2020-21 including research voyages, tag recoveries, tag recovery and seeding activities. Issues arising in 2021 for consideration by the PTTP Steering Committee are highlighted and the PTTP work planned for 2021-2024 is outlined.

1.1 Programme objectives

The PTTP is a joint research project, implemented by the Oceanic Fisheries Programme (OFP) of the Pacific Community (SPC). The goal of the Pacific Tuna Tagging Programme is to provide data and knowledge for stock assessment and management of skipjack, yellowfin and bigeye tuna in the Pacific Ocean. The objectives of the PTTP, originally specified in WCPFC-SC6-2010/GN-IP-04, and revised in 2016 (PTTP Steering Committee, 2016), are:

1. To obtain data that will contribute to, and reduce uncertainty in, WCPO tuna stock assessments including estimation of overall and local exploitation rates, extent of mixing and appropriate spatial strata for use in assessments.

2. To obtain information to better understand the interactions between tropical tuna species and major fishing gears to support development of mitigation measures (where appropriate) and better interpret fisheries data (e.g., CPUE).

Under these objectives, information collected includes age-specific rates of movement and mixing, movement between this region and other adjacent regions of the Pacific basin, species-specific vertical habitat utilisation by tunas, and the impacts of FADs on behaviour.

1.2 Programme funding

Since its commencement in 2006, funding support for the PTTP has been provided by the

- PNG National Fisheries Authority;
- New Zealand Aid Agency;
- the Government of the Republic of Korea;
- Australian Centre for International Agricultural Research;
- European Community 8th European Development Fund;
- European Community 9th European Development Fund;
- European Community 10th European Development Fund;
- the French Pacific Fund;
- the Government of Taiwan;
- Heinz Australia;
- the Global Environment Facility;
- the International Seafood Sustainability Foundation;
- the European Union (through voluntary contributions to WCPFC);
- and the WCPFC itself.

In 2011, SPC and the PNG National Fisheries Authority (NFA) also began a three-year tag release programme in the PNG EEZ, funded by NFA. This project, referred to here as the PNG Tagging Project (PNGTP) is considered under the umbrella of the PTTP and where relevant is reported on in this report.

In 2016 the PTTP steering committee recommended that SC normalise the tagging programme as part of the ongoing work of the SC (WCPFC-SC 2016). Ideally this would include research voyages every year alternating between skipjack via pole and line in one year and bigeye via handline and dangler fishing in the next, starting with skipjack in 2017 (noting that yellowfin would be adequately covered by both surveys).

1.3 Operational structure

The overall operational structure of the PTTP to date is given in Table 1, with the work completed since the last PTTP reported highlighted and the scheduled work for 2021 also shown. The spatial distribution of these research voyages in the Western and Central Pacific Ocean is shown in Figure 1.

Table 1: Period, area and vessel used in PTTP tagging research voyages since the inception of the programme. Work completed since the last PTTP report to SC16 in 2020 in **bold** and the scheduled work for 2021 shown in ***italics***.

	Time period	Operational area	Tagging vessel
Phase 1	Aug – Nov 2006	PNG	*Soltai 6*
	Feb – May 2007	PNG	*Soltai 6*
	Oct – Nov 2007	Solomon Islands	*Soltai 6*
	Feb – Mar 2008	Solomon Islands	*Soltai 6*
	Apr 2008	Solomon Islands	*Soltai 105*
Phase 2 (to date)	May – Jun 2008	Central Pacific (CP1)	*Double D*
	Jun – Nov 2008	Western Pacific (WP1)	*Soltai 105*
	Mar – Jun 2009	Western Pacific (WP2)	*Soltai 105*
	May – Jun 2009	Central Pacific (CP2)	*Double D*
	Jul – Oct 2009	Western Pacific (WP3)	*Soltai 105*
	Oct – Nov 2009	Central Pacific (CP3)	*Aoshibi Go*
	May – Jun 2010	Central Pacific (CP4)	*Aoshibi Go*
	Oct – Nov 2010	Central Pacific (CP5)	*Pacific Sunrise*
	Oct 2011	Central Pacific (CP6)	*Pacific Sunrise*
	Nov – Dec 2011	Central Pacific (CP7)	*Aoshibi Go*
	Sep – Oct 2012	Central Pacific (CP8)	*Pacific Sunrise*
	Nov – Dec 2013	Central Pacific (CP9)	*Pacific Sunrise*
	Aug 2014	Central Pacific (CP10)	*Pacific Sunrise*
	Sep - Nov 2015	Central Pacific (CP11)	*Gutsy Lady4*
	Sep-Oct 2016	Central Pacific (CP12)	*Gutsy Lady4*
	Sep-Oct 2017	Western Pacific (WP4)	*Soltai 105*
	Jul-Aug 2018	Central Pacific (CP13)	*Gutsy Lady4*
	Jul-Sep 2019	Western Pacific (WP5)	*Soltai 105*
	Aug-Sep 2020	**Central Pacific (CP14)**	***Gutsy Lady4***
	Jul-Aug 2021	*Central Pacific (CP15)*	*Gutsy Lady4*
PNGTP	Apr – Jul 2011	PNG (PNGTP1)	*Soltai 105*
	Jan – Mar 2012	PNG (PNGTP2)	*Soltai 105*
	Aug 2012	PNG (TAO trial)	*FTV Pokajam*
	Apr – Jun 2013	PNG (PNGTP3)	*Soltai 101*
	July 2016	PNG (TAO trial)	*FTV Pokajam*

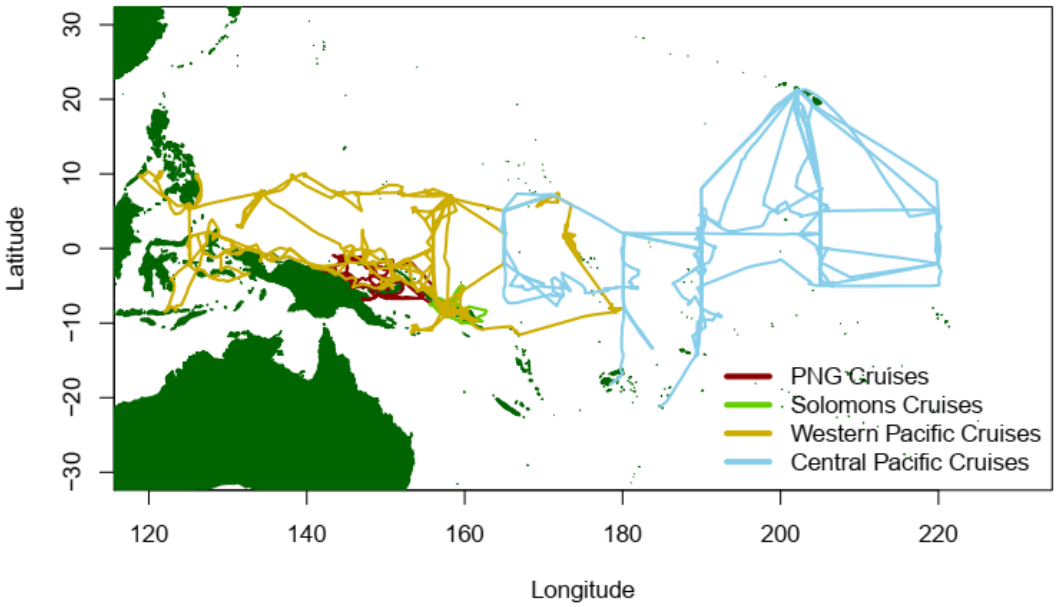


Figure 1: Tagging vessel tracks for all voyages for all PTTP research voyages. Legend relates to the groups of operational areas described in Table 1.

2 SUMMARY OF PTTP ACTIVITIES IN 2020-2021

Since the electronic meeting SC16, PTTP activities have included one Central Pacific voyage, CP14, focussed on bigeye tuna in the waters of Kiribati, Line and Phoenix Islands including the PIPA, and the nearby International Waters, one commercial-longline voyage focussed on trialling tagging of large bigeye and yellowfin tuna and collection of biological samples in the Hawai'ian EEZ, and continued implementation of tag recovery processes.

2.1 CP14 tagging voyage

CP-14 was designed to augment data collection, focussed on bigeye tuna for studies on movement, exploitation rates and fish aggregation device (FAD) association dynamics in the WCPO.

To achieve this work, SPC chartered the San-Diego based FV Gutsy Lady 4. The research voyage started from Honolulu on the 15th of August for a total duration of 49 days (see voyage track in Figure 2). Due to the COVID 19 pandemic, the cruise was designed with a chiefly Hawaii-based science crew sampling in a geographic area suited to a Hawaii arrival and departure that maximized working days at sea (vs. steaming) and involved no intermediate port stops for reprovisioning or crew change.

The WCPFC and Korea jointly funded the cruise. Two fishing entities (Cape Fisheries and the US Tuna Group fisheries improvement program) voluntarily supported the cruise by providing positions of drifting FADs in the working area of the cruise.

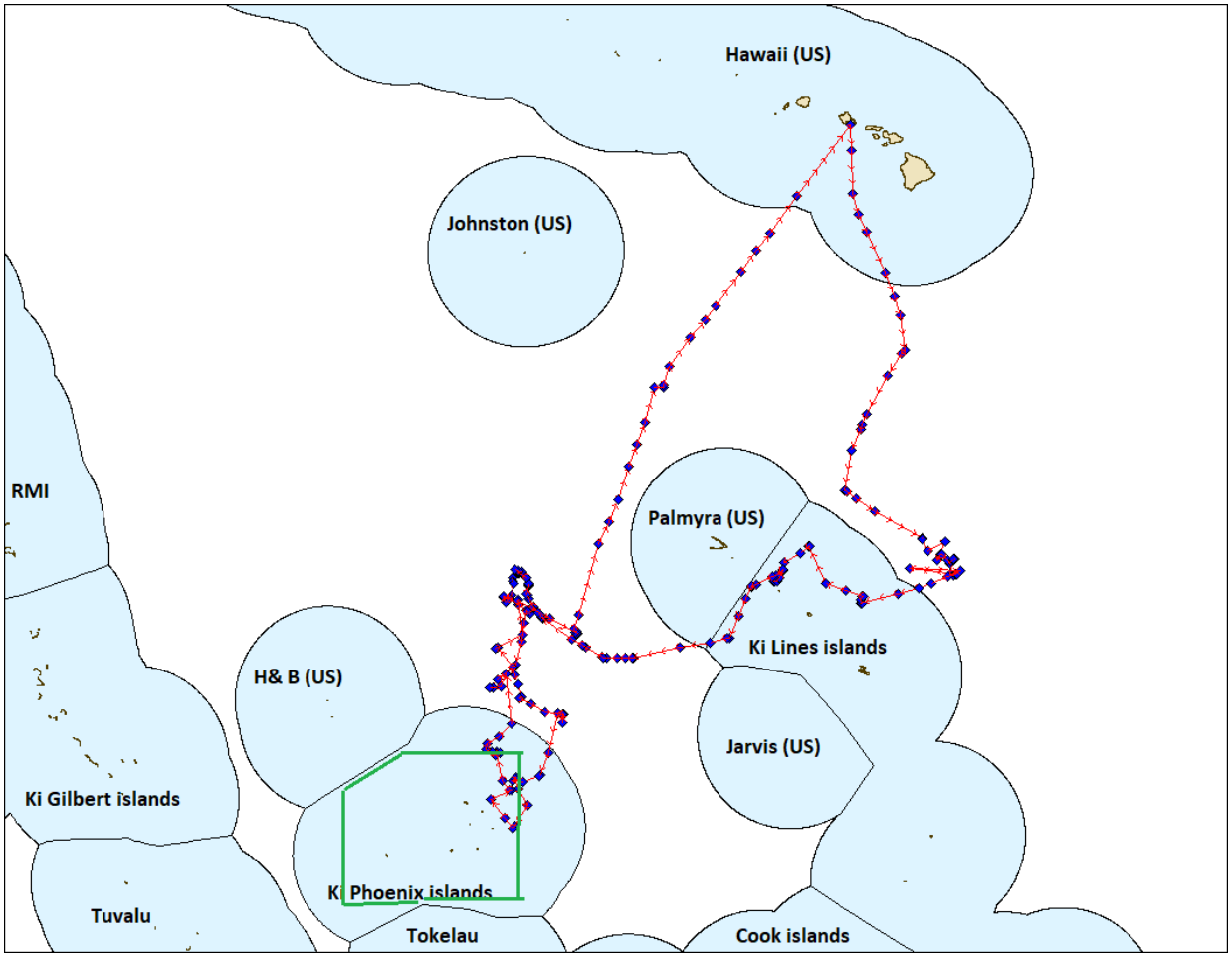


Figure 2: Voyage track during CP14 with daily positions for the vessel

2.1.1 CP14 tag releases

Of the 49 days of charter during CP14, 15 days were spent fishing in Kiribati waters including 9 days in the PIPA. Twenty seven fishing days were spent in the surrounding international waters); remaining days were spent steaming to and from the fishing grounds. A total of 6,395 fish were tagged and released during the cruise (figure 3), comprising 4,318 bigeye (68%), 1,751 yellowfin (27%) and 318 skipjack (5%). From those fish, 44 bigeye tuna, and 20 yellowfin were also tagged with an archival tag. Table 2 summarizes the number of fish tagged per species and tag type. The length frequency of tagged tuna is shown in figure 4.

Table 2: Numbers of fish tagged during CP14, by tag type and species

Tag type	BET	YFT	SKJ	others	Total
Sonic	32	-	-	-	**32**
Archival	44	20	-	-	**64**
Satellite (miniPAT)	-	-	-	8	**8**
Conventional W13	155	89	14	-	**258**
Conventional Y13	4087	1642	304	-	**6033**
Total fish tagged	**4318**	**1751**	**318**	**8**	**6395**

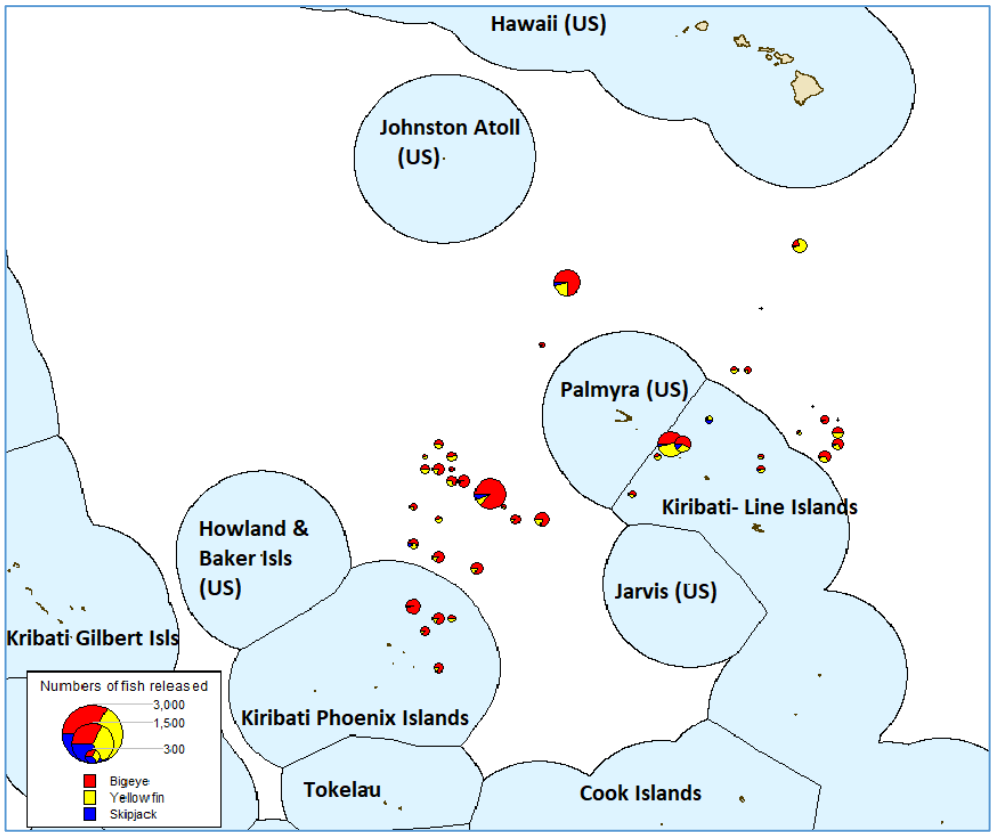


Figure 3. Distribution of tag releases during CP14.

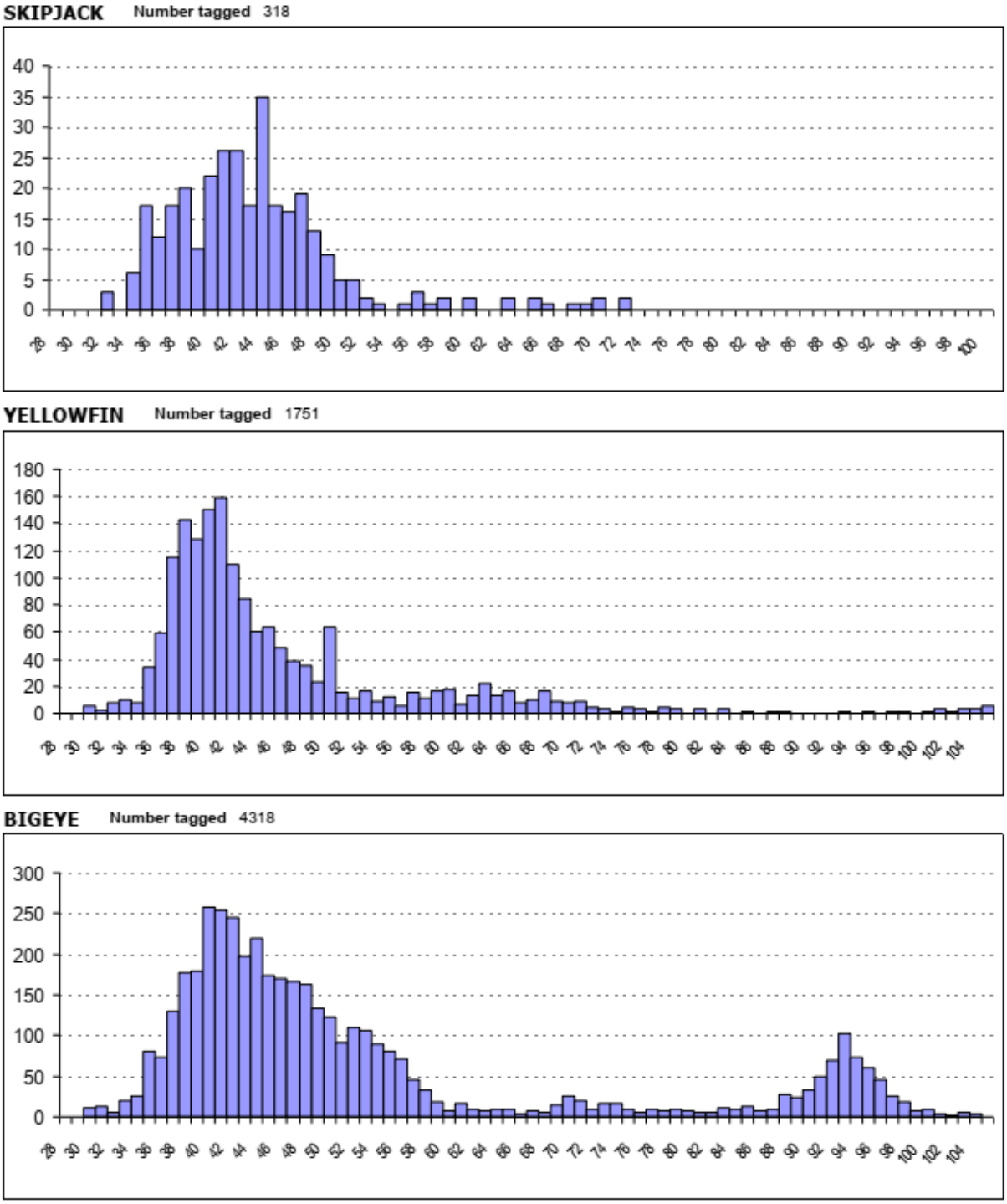


Figure 4: Size distribution (cm) of conventionally tagged tuna during CP14

272 tagged tuna were also injected with Strontium Chloride, depositing a mark in their otolith supporting improved growth rate estimations. These fish were tagged with a white conventional tag.

Acoustic tagging was a secondary objective of CP14 after the redesign of the cruise plan due to the COVID 19 pandemic. Following some acoustic receiver range testing in Hawaii, an acoustic experiment trial was implemented with an array of receivers deployed and let it drift to record school movement around one dFAD. 32 bigeye from the associated school were tagged with acoustic transmitters, using several different parameter settings and two different technologies. This trial allowed a preliminary examination of the potential for using acoustic tagging to further understand school cohesion, mixing and fragmentation around drifting FADs. Results indicated that digitally-coded acoustic transmitters with high pinging rates did allow a finer temporal resolution of fish detection, but appeared to associated with a higher rate of tag failure than traditional models used in the past. Free-swimming fish were detected by a receiver drifting nearly two miles from their FAD of association. Apparent high failure rates were difficult to disentangle from abandonment of the FAD or post-tagging mortality

2.1.2 Biological sampling

Table 3: Number of samples taken during CP14, per species and sample type

CP14 – samples

Species	Fish sampled	Fin	Gonads	Liver	Muscle	Otolith	Spine	Stomach	Fatmeter	Live biopsy
BET	184	0	182	181	184	169	175	179	125	268
BUM	6	0	6	6	6	1	5	6	0	0
CFW	7	0	7	7	7	0	0	7	0	0
CNT	1	0	1	1	1	0	0	1	0	0
DOL	53	0	46	53	53	25	0	53	0	0
FAL	50	50	0	0	10	0	0	0	0	0
GBA	1	0	1	1	1	0	0	1	0	0
KAW	1	0	1	1	1	1	0	1	0	0
OCS	5	5	1	0	3	0	0	0	0	0
RRU	14	0	9	14	14	8	0	14	0	0
SKJ	25	0	25	25	25	20	24	24	19	0
WAH	51	0	48	51	51	43	0	51	0	0
YFT	132	0	127	127	131	113	122	128	97	78
Total	530	55	454	467	487	380	326	465	241	346

Table 4: Number of samples taken during the 2020 Hawaiian longline trip, per species and sample type

Hawaiian longline trip - samples

Species	**Fish sampled**	Fin	Gonads	Liver	Muscle	Otolith	Spine	Stomach	Fatmeter
BET	98	0	96	98	122	84	98	98	0
BUM	1	0	1	1	1	0	1	1	0
CFW	1	0	1	1	2	0	1	1	0
DOL	15	0	12	14	18	1	15	15	0
EBS	2	0	2	2	2	0	2	2	0
LAG	2	0	1	2	2	1	2	2	0
LEC	7	0	7	7	8	5	7	7	0
MLS	10	0	7	8	12	2	8	8	0
SKJ	10	0	10	10	13	9	10	10	0
SSP	3	0	3	3	4	1	3	3	0
TST	2	0	2	2	3	2	2	2	0
WAH	13	0	13	13	17	9	12	13	0
YFT	18	0	18	18	19	16	18	18	0
Total	182	0	173	179	223	130	179	180	0

As part as its planned activities, the CP14 voyage provided a significant number of biological samples and data as identified in Table 3. In addition, many samples from larger size fish were collected during the 2020 Hawaiian longline trip (Table 4). Biological sampling during tagging cruises complements the work conducted by fisheries observers on board tuna fishing vessels, increasing the number of samples collected in the region during the year. This sampling effort contributes significantly to the WCPFC Marine Specimen Bank by providing biological information and samples that are available to the scientific community to conduct biological and ecological studies of interest to the region (SC17-RP-P35b-01).

CP14 voyage was a record in terms of fish sampled. It was also the first-time tissue biopsies have been taken from tagged fish during a PTTP cruise. The tissue sample from the tagged tuna (and especially the collection on fish from the same school) provides an additional source of information for interpreting the tagging data and tuna school cohesion and behaviour. Standard Operating Procedures (SOP) for tissue collection from dead fish were also trialled in preparation for a greater need for such material for molecular analyses. The developed SOP provide options for "at-sea" observers to avoid genetic contamination of material when undertaking biological sampling.

2.2 Longline tagging and sampling voyage

After the completion of CP14 cruise there remained 10 unused days in the charter agreement for the Gutsy Lady 4 (due to Covid-19 alterations to the CP14 cruise plan). These additional days were used to charter the Gutsy Lady 4 to undertake longline fishing targeting bigeye tuna in and around the Hawaii EEZ. The charter was embedded within a commercial longline trip of the Gutsy Lady 4.

The scientific component of this charter had two primary objectives:

1. To assess the recovery rate of large tuna caught by longline gears (during commercial operations) for potential tagging, using deployment of pop-up satellite survival tags (sPATs) in adult-size bigeye and yellowfin tuna.
2. To augment sample collection of the Marine Specimen Bank, taking as many biological samples as possible from retained catch to increase the number of samples from larger BET and YFT.

Secondary objectives included:

1. Deploy pop-up satellite archival tags (miniPATs) in pelagic sharks
2. Assess overall effectiveness and efficiency of conducting directed fisheries research during a commercial longline trip

Table 5 summarize the number of deployed tags and collected samples during this 25-day trip (18th Nov to 12th Dec 2020)

Table 5: Number of tags deployed and samples taken during the 2020 Hawaiian longline trip, over cruise duration

Date	Area	Activity	Conventional tagged			Satellite tagged			Biosamples							
			BET	YFT	Total	BET	YFT	Total	BET	YFT	SKJ	DOL	WAH	OPA	Others	Total
18/11/20	Honolulu	Depart port														
19/11/20	Hawaii eez	Steaming-Gear prep														
20/11/20	Hawaii eez	Steaming-Gear prep														
21/11/20	IW	Setting/hauling	2	1	3		1	1	5	1	3	2	1	1	1	14
22/11/20	IW	Hauling/steaming	1		1	1		1								0
23/11/20	IW	Steaming-short set														0
24/11/20	IW	Setting/hauling	2	1	3	2	1	3	17	1			1		3	22
25/11/20	IW	Setting/hauling	1	1	2	1	1	2	6	4	3		1		2	16
26/11/20	IW	Setting/hauling	1		1	1		1	12		2		1		2	17
27/11/20	IW	Hauling/steaming	1		1	1		1								0
28/11/20	IW	Setting/hauling	2		2	1		1	3	3			1		7	14
29/11/20	IW	Setting/hauling	5		5	5		5	3	4		1	1		4	13
30/11/20	IW	Setting/hauling	1	1	2	1	1	2								0
1/12/20	IW	Hauling/steaming							2	1	1	4		1	5	14
2/12/20	IW	Setting/hauling	2	2	4	1	1	2	16	2		1	3		1	23
3/12/20	IW	Setting/hauling	3		3	3		3	6	1	1		1		1	10
4/12/20	IW	Setting/hauling	2		2	2		2								0
5/12/20	IW	Hauling/steaming	1		1	1		1	5		1					6
6/12/20	IW	Setting/hauling	2		2	2		2	12				3		4	19
7/12/20	Hawaii eez	Setting/hauling	3	1	4	2	1	3	2							2
8/12/20	Hawaii eez	Setting/hauling														0
9/12/20	Hawaii eez	Setting/hauling	2		2	2		2	6	1		1			1	9
10/12/20	Hawaii eez	Setting/hauling							3							3
11/12/20	Hawaii eez	Hauling/steaming														
12/12/20	Hawaii eez	Steaming-arrival														
Total			31	7	38	26	6	32	98	18	11	9	13	2	31	182

2.3 CP15 tagging voyage planning for July-August 2021

Travel restrictions and uncertainties associated with the ongoing global pandemic severely impacted the original 2021 cruise plan to implement a Western Pacific (WP) cruise targeting skipjack and yellowfin onboard a chartered pole and line tuna vessel. As a result of discussions during the now quarterly PTTP planning advisory committees (27th Oct 2020, 16 Feb and 28 Apr 2021, meeting minutes attached in Appendix A), it was decided to plan another CP research cruise for 2021. The release of skipjack tags for inclusion in the 2025 skipjack tuna stock assessment must be undertaken by 2022, which will not be hindered by the delay caused this year.

CP15 will consist of a 40-day cruise operating, again, out of Honolulu and the research area will approximately be located between the Line and the Phoenix Islands EEZ (see figure 5). The cruise will follow a similar strategy to the previous years' CP14, transecting TAO buoys in the EEZs of Kiribati and international waters, whilst opportunistically targeting drifting FADs shared through industry-science partnerships.

The tagging voyage will be crewed by one SPC Fisheries Geneticist, for whom US passport and Hawaiian residency greatly facilitated travel requirements, and a scientific team consisted of COVID-19 vaccinated, Hawai'i based personnel lead by Jeff Muir, who successfully filled the position of cruise leader in 2020 during CP14.

This research voyage is scheduled to depart on the 15 July and be completed on the 23 August using the same chartered vessel as all recent CP cruises, *F.V. Gutsy Lady 4.*

The objectives for CP15 are:

1. Conventional tag releases of bigeye tuna and yellowfin tuna associated with TAO moorings and dFADs

2. Archival tag releases of bigeye and yellowfin tuna in association with dFADs

3. Biological sampling, including genetic material, of all tuna species and bycatch for complement the Pacific Marine Specimen Bank.

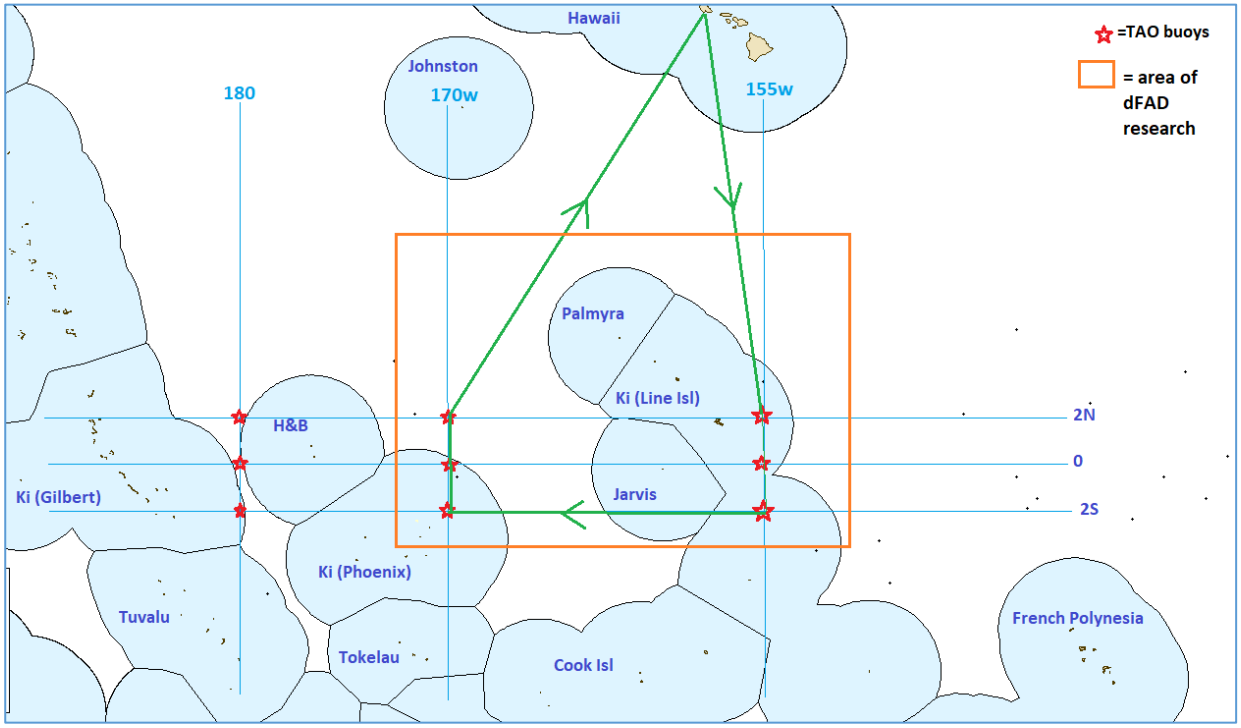


Figure 5. CP15 cruise plan

3 PTTP RESULTS

The Pacific areas covered by the different tagging voyages implemented since 2006 are shown in Figure 1. While there are noticeable gaps in coverage in the extreme east, west and southern latitudes, these are a direct result of the PTTP focus on the tropical tunas, and undertaking research voyages in areas and with methods allowing maximal catch rates for tagging.

The release numbers and recovery percentages to date of conventional and archival tags made during the 14 Central Pacific (CP) voyages, the PNGTP and PTTP Phase 1 voyages, and the ongoing PTTP Phase 2 voyages, are detailed in Table 6.

Table 6: Central Pacific, PTTP Phase 1 (PNG and Solomon Islands-based), Phase 2 Western Pacific, and total PTTP (including all other cruises) tag release numbers, and % of recoveries to date (June 2021) of conventional and archival tags.

Project	Tag Type	Release numbers				Recapture rate (%)			
		SKJ	YFT	BET	Total	SKJ	YFT	BET	Total
Central Pacific	Archival	32	343	852	1,227	0	7	18.1	14.5
	Conventional	1,159	4,644	43,360	49,163	3.4	8.9	26	23.9
Phase 1 & PNGTP	Archival	2	328	68	398	50	18	26.5	19.6
	Conventional	143,689	65,426	4,103	213,218	17.6	18	22.7	17.8
Western Pacific	Archival	174	91	123	388	2.9	3.3	13.8	6.4
	Conventional	143,497	42,268	5,390	191,155	17.3	15	19.4	16.8
Total PTTP	Archival	208	768	1,069	**2,045**	2.9	11.2	17.7	**13.7**
	Conventional	288,345	112,356	52,860	**453,561**	17.4	16.5	25.1	**18.1**

3.1 Tag recoveries for the PTTP

As at the 25th June 2021, a total of 82,183 tagged tuna had been recaptured and the data reported to SPC. The numbers of conventional tag recoveries by species and by main tagging voyage are given in Tables 7 and 8.

The reduction in bigeye conventional tag recovery rate from CP9 onwards continues. These changes from ~30+% up to voyage CP8, fall to 14% for CP9, between 3 to 16% for CP10 to CP13, when release began to be focussed on drifting FADs. The rate for the CP14 cruise carried out last year currently rests at 1.6% (Table 7).

The current return rate for skipjack tuna targeted during WP5 remains low after almost two years (Table 8). However, it is important to note that WP5 was chiefly focussed in the oceanic waters north of the areas targeted during other recent WP research cruises, where fish are likely to experience very different drivers of movement and fishing-induced probability of recapture. Releases in these areas have, in general, been associated with lower recaptures (Table 9).

Twenty-three white tag fish injected with strontium chloride have been recaptured and reported since WP5. Otoliths were extracted from seven fish, two pair of otoliths were lost during the extraction, 1 fish was misplaced and three fish are still in country and waiting to be sampled.

No new albacore tags were recovered during the period 2020-2021.

Table 7: Tag releases and recaptures for PTTP Central Pacific cruises to date (as at 15/06/2021).

Cruises	Release numbers				Recapture numbers and rate (%)			
	SKJ	YFT	BET	Total	SKJ	YFT	BET	Total
CP1 May-Jun 2008	57	116	1,736	1,909	4 (7%)	25 (21.6%)	575 (33.1%)	604 (31.6%)
CP2 May-Jun 2009	169	205	2,309	2,683	5 (3%)	27 (13.2%)	573 (24.8%)	605 (22.5%)
CP3 Oct-Nov 2009	66	237	4,802	5,105	2 (3%)	64 (27%)	1,772 (36.9%)	1,838 (36%)
CP4 May-Jun 2010	7	120	2,284	2,411	1 (14.3%)	13 (10.8%)	514 (22.5%)	528 (21.9%)
CP5 Nov-Dec 2010	40	228	6,090	6,358	7 (17.5%)	46 (20.2%)	1,964 (32.2%)	2,017 (31.7%)
CP6 Oct-Oct 2011	2	123	3,804	3,929	0 (0%)	29 (23.6%)	1,036 (27.2%)	1,065 (27.1%)
CP7 Nov-Dec 2011	52	245	4,212	4,509	1 (1.9%)	21 (8.6%)	1,455 (34.5%)	1,477 (32.8%)
CP8 Sep-Oct 2012	20	140	6,014	6,174	2 (10%)	32 (22.9%)	2,318 (38.5%)	2,352 (38.1%)
CP9 Nov-Dec 2013	29	135	4,296	4,460	2 (6.9%)	11 (8.1%)	631 (14.7%)	644 (14.4%)
CP10 Aug-Aug 2014	12	98	195	305	0 (0%)	6 (6.1%)	4 (2.1%)	10 (3.3%)
CP11 Sep-Nov 2015	231	775	1,966	2,972	6 (2.6%)	32 (4.1%)	215 (10.9%)	253 (8.5%)
CP12 Sep-Oct 2016	109	371	1,575	2,055	3 (2.8%)	84 (22.6%)	268 (17%)	355 (17.3%)
CP13 Jul-Aug 2018	79	443	611	1,133	3 (3.8%)	27 (6.1%)	41 (6.7%)	71 (6.3%)
CP14 Aug-Oct 2020	318	1,751	4,318	6,387	3 (0.9%)	18 (1%)	80 (1.9%)	101 (1.6%)
Totals	**1,191**	**4,987**	**44,212**	**50,390**	**39 (3.3%)**	**435 (8.7%)**	**11,446 (25.9%)**	**11,920 (23.7%)**

Table 8: Tag releases and recaptures for PTTP Pole & Line cruises to date (as at 15/06/2021).

Cruises	Release numbers				Recapture numbers and rate (%)			
	SKJ	YFT	BET	Total	SKJ	YFT	BET	Total
PG1 Aug-Nov 2006	13,948	7,806	562	22,316	2,646 (19%)	1,806 (23.1%)	230 (40.9%)	4,682 (21%)
PG2 Feb-May 2007	26,493	12,845	129	39,467	2,509 (9.5%)	1,720 (13.4%)	8 (6.2%)	4,237 (10.7%)
SB1 Oct-Nov 2007	7,479	3,565	139	11,183	1,976 (26.4%)	784 (22%)	18 (12.9%)	2,778 (24.8%)
SB2 Feb-Apr 2008	15,327	14,405	414	30,146	1,765 (11.5%)	2,422 (16.8%)	62 (15%)	4,249 (14.1%)
WP1 Jun-Nov 2008	37,691	17,647	1,467	56,805	6,378 (16.9%)	2,061 (11.7%)	363 (24.7%)	8,802 (15.5%)
WP2 Mar-Jun 2009	34,207	13,919	3,145	51,271	4,613 (13.5%)	2,356 (16.9%)	490 (15.6%)	7,459 (14.5%)
WP3 Jul-Oct 2009	30,722	7,340	735	38,797	6,699 (21.8%)	1,432 (19.5%)	197 (26.8%)	8,328 (21.5%)
PNGTP1 Apr-Jul 2011	28,730	11,571	355	40,656	5,774 (20.1%)	2,485 (21.5%)	60 (16.9%)	8,319 (20.5%)
PNGTP2 Jan-Mar 2012	28,312	9,607	2,008	39,927	7,289 (25.7%)	1,718 (17.9%)	525 (26.1%)	9,532 (23.9%)
PNGTP3 Apr-Jun 2013	23,402	5,955	564	29,921	3,327 (14.2%)	891 (15%)	46 (8.2%)	4,264 (14.3%)
PG6 Jul-Jul 2016	0	17	2	19	0 (NA%)	3 (17.6%)	0 (0%)	3 (15.8%)
WP4 Sep-Nov 2017	25,456	2,376	20	27,852	5,950 (23.4%)	449 (18.9%)	0 (0%)	6,399 (23%)
WP5 Jul-Sep 2019	15,595	1,077	146	16,818	1,163 (7.5%)	37 (3.4%)	11 (7.5%)	1,211 (7.2%)
Totals	**287,362**	**108,130**	**9,686**	**405,178**	**50,089 (17.4%)**	**18,164 (16.8%)**	**2,010 (20.8%)**	**70,263 (17.3%)**

Table 9: Recapture rate by gear, tag, and selected cruise-focus types. Equatorial releases consist of tags released in the EEZs of Palau, Fed. States of Micronesia, the Marshall Islands, Nauru, Kiribati and Tuvalu.

Gear	Category	Tag Type	Releases	Recapture Rate			
				SKJ	YFT	BET	All
Central Pacific Mixed Fishing Gears	Pre- Drifting-FAD Access Cruises 2008-2013	Conventional	36,826	5.8	18.2	30.6	29.9
		Archival	712	0	8.7	22.4	18.5
	Drifting FAD Focussed Cruises 2014-Present	Conventional	12,017	2.2	4.8	7	6.1
		Archival	515	0	5.7	10.9	8.9
		Sonic	372	0	7.1	9.6	7.3
Pole & Line Fishing Gear	Archipelagic Solomon Islands and PNG EEZ Releases 2006-2015	Conventional	266,683	17.8	17.7	23.7	17.9
		Archival	481	6.9	17.6	29.7	19.8
		Sonic	222	4.3	9.6	38.9	10.4
	Archipelagic Solomon Islands and PNG EEZ Releases 2016-Present	Conventional	29,285	23.1	18	0	22.6
		Archival	17	11.1	0	0	5.9
	Indonesian Releases	Conventional	40,383	20.8	16.1	24.5	19.9
		Archival	33	6.9	0	0	6.1
	Equatorial, Oceanic Releases	Conventional	67,212	11.2	11.2	17.1	11.5
		Archival	255	0.9	2.9	2.6	2

3.3 Tag Recovery Network

New Tag Recovery Officers (TROs) have now been appointed under contract in Honiara, Noro, Madang, Rabaul, Pohnpei, and Majuro. Five contracts for other TROs were renewed, and new collaboration has been established with industries to collect directly tags onboard fishing vessel or in port and provide reward when necessary (Coastal shipping, RD fishing, Kiribati & Sajo Fisheries, Starkist).

Visits in countries, as well as meetings held at SPC were not possible due to the regional Covid-19 travel restriction measures but constant contacts with the existing network were maintained. In addition, an increased effort in producing videos, TV and Radios interviews, facebook and twitters messages to raise awareness on the tagging program prior to, and at the end of research voyages were part of the awareness program during the pandemic. The PIRFO website is used as a portal for awareness among observers, and the messaging application "Slack" remains actively used to enhance the TRO network, allowing rapid exchanges of information between officers, feedback on tag recovery information, and any issues encountered with the TROtag Database.

Regional Covid-19 travel restrictions have resulted in most observer programs being suspended, as well as fishing vessels not being boarded in the major ports where central Pacific catches are unloaded. However, fishing industries and associations were directly contacted and demonstrated excellent collaboration by distributing tagging posters onboard their fishing vessels and contacting their fleet to request that tags be reported to their fleet manager. Positive feedback and support were received from Cape Fisheries, Caroline Fisheries Corporation, Yap Purse Seine Fishing Corporation, Kiribati & Sajo Fisheries, Atunera Dularra S.L., Pan Pacific Fishing, Chern Lung Fishery, Yu Yow Fishing, American Tuna boat Association and Korea Overseas Fisheries Association.

In anticipation of the apparent recent reduction in tag recaptures from central Pacific research cruises, the potential for new software tools to more efficiently target fleets, ports and canneries is being explored. An early version of a 'Maxitag' system has been put in place in preparation for returns from the upcoming CP15 cruise. This tool integrates VMS data along with historical and real-time tag recovery information to identify fishing vessels with a potentially greater probability of having recaptured tags that have not yet been identified. Data extractions are made regularly to allow Maxitag to identify such vessels heading to or arriving in port, allowing the appropriate fishing industries to be subsequently contacted to encourage finding and reporting tags during unloading. Developing this approach to a full network analysis of tuna product flow from catch to sale is also now in its early stages.

To encourage more returns at point of capture, greater effort is being made to develop communications with vessel-level tag finders. For each tag recovered in this way, a letter is now generated and sent to the fleet manager with feedback on the migration pattern of the fish, the school type it was tagged on, the number and type of tagged fish associated with the school, as well as growth information of the tagged fish. It is hoped that this will encourage greater engagement and more accurate return information.

A special reward scheme for those fleets collaborating in the buoy-sharing programme for PTTP cruises was also trialled. The new reward scheme includes rewards at vessel- and fleet-levels as well as for the individual tag finder, including rewards for all crew of the vessel reporting the most tags during a season and a special raffle for all vessels participating in the programme. Two seasons are run a year, and posters and promoting materials were distributed to vessels and fleet managers.

Two raffles were organised with a total of USD1,000 prices, one in Pago Pago at the premises of Starkist cannery with the support of NOAA and CIFFO, and a second under the above "Buoy-sharing Vessels Season Prizes". Another raffle was planned to be organised in Thailand, however due to the complexity of the Covid-19 measures and increased waves of lockdown in Thailand, the raffle has been postponed to later time this year.

In order to retrieve whole tagged fish released with strontium chloride or with an archival tag, the new reward system remains in place. On board purse seine vessels, observers are rewarded USD 50 to place the fish aside, to keep the fish frozen at all times, to coordinate the collection of biological samples

onshore and to collect associated data. On board longline vessels, recaptured tagged fish are still purchased whole at a rate of USD 10 /kg.

Noting that the tag reward fee had not increased since the start of the program in 2006, the fee for tag finders was increased to USD20 for conventional tags. To encourage observers at sea to support tag finders and the tagging program during the suspension of the 100% coverage onboard fishing vessels, the observers are now rewarded USD20 to report tags directly and immediately to SPC with a picture of the tagged fish as well as accurate length measurement. New Posters for observers, for canneries, longline vessels and purse seine vessels were translated into ten languages and were circulated across the tag recovery network.

3.4 Tag Seeding

To date nearly 56.5% of seeded tag have been returned to SPC. In addition to allowing estimation of tag reporting rates, the tag seeding data also allow the error rate in tag return information to be determined (Peatman 2020). From February 2007 to July 2021, a total of 584 tag seeding kits (consisting of seeding tags, applicators, guide books and data forms) for a total of 14,635 tags have been given to observer coordinators and TROs in Tonga, Ecuador, PNG, Solomon Islands, Fiji, FSM, Marshall Islands, Kiribati, New Zealand and American Samoa for deployment on purse seine vessels by senior observers. When a kit is not completely deployed during a trip, the kit is either kept aside or used in another kit for deployment. Table 10 details the number of seeded tags deployed per observer programme each year.

Tag Recovery Officers in the ports of, Honiara, Rabaul, Madang, Lae, Pago Pago, Port Moresby and Majuro continue to liaise closely with observer coordinators, observer debriefers and observers to implement tag seeding experiments and to recover the tag seeding logs for deployed kits, however, due to the regional Covid-19 travel restriction measures, only PNG observers programs could deploy observers with tag seeding kits in their EEZ. Of the 584 kits distributed to observer coordinators, 437 have been given to observers for deployment, of which 370 tag seeding datasheets have been received for observer trips.

Since June 2020, five kits have been deployed and distributed, using a total of 120 tags. This is the lowest annual deployment of seeded tags since the beginning of the PTTP, and far below the 32 experiments per year (1200 tags) that was recommended to capture any temporal changes in reporting rate (Peatman et al. 2019 WCPFC-SC15-2019/SA-IP-06). Since 2017, the number of seed tags deployed has remained lower than at any other time during the PTTP (Figure 6). As at 12th July 2021, there have been 9,223 reported tags that have been seeded and 5,216 (56.5%) of these have been returned to SPC.

Figure 6: Number of seeded tags deployed per year since the beginning of PTTP.

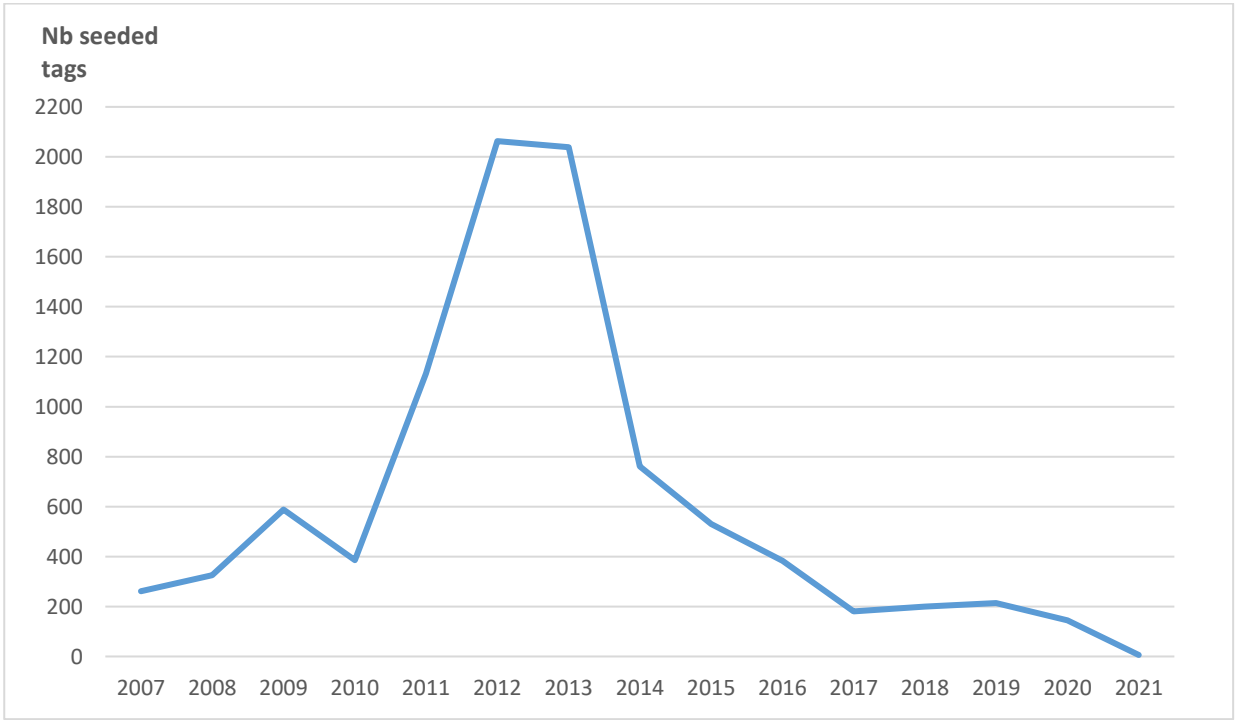


Table 10: Number of seeded tags deployed per observer programme since the beginning of the PTTP.

Years	PNA	FJOB	FMOB	IATTC	KIOB	MHOB	PGOB	SBOB	TOOB	FFA
2007			12				200			49
2008						25	250	50		
2009		25				51	317	75		120
2010	23	20				59	120	48		115
2011		75	44		25	60	212	519		198
2012		78	144		209	60	282	1178	25	87
2013			192		169		927	720		30
2014		30			240		329	132	30	
2015	30	30			140		150	120	60	
2016				126	95	24	90	48		
2017							30	120	30	
2018	30						60	50		60
2019	30						184			
2020							144			
2021							18			

4 ISSUES ARISING

The PTTP continues to be a highly successful programme. The significant commitment from the Commission to ongoing funding recognises tagging as a high priority and a strong component of WCPFCs science for the medium term, particularly given the increasingly varied experiments undertaken during these research cruises, aiding studies of growth, genetics, movement and tuna-FAD interactions.

However, significant issues remain that undermine the effectiveness of both implementation of tagging experiments, and the use of tagging data for stock assessment and other analyses under the objectives of the PTTP.

1. As with many other programmes in the region, the ongoing Covid19 pandemic severely impacts the degree to which science can be undertaken as part of the PTTP. Travel restrictions and related uncertainties mean that the planning of large-scale tagging experiments is extremely difficult. This is particularly apparent for the now planned 2022 skipjack-focussed pole & line research cruise, where vessel and bait ground access remain highly uncertain. Alongside the increased concerns over the safety and functionality of the few available pole and line vessels in the region, the case for identifying a longer-term, multi-purpose research vessel for Pacific tuna science remains critical.

2. The near total suspension of the observer programme during the global pandemic further diminishes the ability to estimate tag reporting rates through tag seeding experiments. The number of deployed tag seeding kits continues to fall, and is well below the minimum number recommended through simulation studies (Peatman et al. 2020). It is critical to increased deployment or explore alternative methods of tag seeding, such as allowing tags found at capture to be reported without removal, and tagged fish returned to wells to provide an equivalent and crew-deployed tag with known capture to provide this information.

3. The late granting of necessary rights and permits to undertake tagging voyages in WCPFC member state EEZs is resulting in difficulties with voyage planning. This has occasionally led to expensive losses in fishing days for the programme. Assuming that travel restrictions will to some degree remain in the future, obtaining travel permissions and/or quarantine placement may for scientific crew is likely to also become increasingly important. Ways in which such permitting can be finalised earlier and further streamlined should be explored to limit inefficient use of programme funding.

5 PTTP 2021-2024 work-plan

The work-plan identified in 2020 (SPC-OFP, 2020) has been completed. The proposed work-plan for the PTTP for 2021-2024 is highlighted in Table 11 below. The work-plan recognises the decisions of SC in 2016 to normalise the tagging programme (WCPFC SC, 2017), and the decisions of SC in 2017 where this rolling medium-term research work-plan was endorsed (WCPFC-SC 2017), though on-going travel restrictions due to the ongoing Covid19 pandemic have required a temporary change to alternating western Pacific and central Pacific cruises.

6 RECOMENDATIONS

SC17 is invited to note the report of ongoing progress in implementation of the PTTP. In particular we recommend that SC:

- Note the successful 2020 CP14 tagging voyage, despite the unfolding Covid19 pandemic.
- Note the critical importance of effective tag seeding to informing stock assessment, and support an urgent increase (when feasible) in deployment, fleet coverage of tag seeding experiments and assist with developing alternative approaches to understand the flow of tags through tuna product networks.
- Note the need for continued member participation and support in tag reporting;
- Support the 2022 tagging programme, and associated budget;
- Support the 2023-2024 tagging programme, and associated indicative budget; and
- Consider and support the PTTP work-plan for 2021-2024;

Table 11: Proposed PTTP work-plan for the period 2021-2024.

Activity	2021	2022	2023	2024
Tagging				
Pole and line tagging research cruise ▪ Skipjack-focussed ▪ Yellowfin secondary	Continue to evaluate options for a potential regional research vessel	WP6 cruise in time for inclusion of data in 2025 skipjack tuna assessment		Continued skipjack-focussed research cruise
Dangler trolling/rod & reel tagging research cruise ▪ Bigeye-focussed ▪ Yellowfin secondary	Contingency CP15 bigeye-focussed cruise departing Hawaii mid-July, in light of ongoing Covid19		CP16 bigeye-focussed cruise with increased electronic tagging	
Tag Seeding ▪ Deployment of seeding kits via regional observer programmes	Suspension of observer programme causing disruption to seeding kit deployment	Ongoing deployment of tag seeding experiments		
Tag Recovery				
Support and development of tag recovery network ▪ Establishment of new TRO positions ▪ Development of tools to increase tag recovery efficacity	Initial integration of Tagdager and VMS data for targeted tag recovery effort using Maxitag TRO positions subcontracted through MRAG	Continued Maxitag development Exploration of tuna product flow using network analysis		
Implementation and revision of tag reward schemes	Development of new tag reward schemes for fleets collaborating in buoy-sharing	Further revision of tag reward schemes		
Data management				
Tagging data validation using VMS, logbook, and cannery data				
Maintain and develop PTTP databases and related tools	Preliminary work on update of PTTP to TUFMAN platform	Development of updated PTTP database		
Data Analyses				
Provide tagging data for inclusion in stock assessment		Provision of skipjack tagging data for stock assessment	Provision of yellowfin and bigeye tagging data for stock assessments	
Reduce uncertainty in WCPO stock assessments	Analysis of longline caught bigeye and yellowfin electronic tagging data for post-release mortality estimates	Skipjack tagging simulation for alternative mixing scenarios used in stock assessment and MSE		
Increase understanding of tuna-fishing gear interactions and interpretation of fisheries data	Analysis of acoustic tagging array trial experiment during CP14			

7 ACKNOWLEDGEMENTS

We gratefully acknowledge the voluntary contributions from all the entities listed in *1.2 Programme Funding*. We acknowledge the support of national fisheries administrations, observer programmes and the tuna fishing industry in assisting with the project, in particular the recovery of recaptured tags. The contribution of both vessel and scientific crew to the successful implementation of the PTTP is gratefully acknowledged. Particular thanks to Jeff Muir for logistics and implementation of tagging cruises operating out of Hawaii during the Covid19 pandemic.

This report was provided by J. Scutt Phillips, B. Leroy, C. Sanchez, M. Ghergariu and F. Roupsard

8 REFERENCES

Peatman, T. 2020. Analysis of tag seeding data and reporting rates. WCPFC-SC16-2020/SA-IP-04, Online, 11-20 August 2020.

PTTP Steering Committee. 2016. Report of the Pacific Tuna Tagging Programme Steering Committee. WCPFC-SC12-2016/RP-PTTP-01, Bali, Indonesia, 3–11 August 2016.

SPC-OFP. 2020. Project 42: Pacific Tuna Tagging Project Report and Workplan for 2020-2023. WCPFC-SC16-2020/RP-PTTP-02, Online meeting, 11-20 August 2020.

Appendix A. 2020-2021 PTTP Planning Advisory Committee Minutes

PTTP ADVISORY COMMITTEE MEETING

Pacific Community Headquarters, Noumea, New Caledonia

2021 Cruise Planning

27 October 2020
10:00-11:00
Virtual: Microsoft Teams

Participation: Brad Philip, Berry Muller, Ludwig Kumoru, David Itano, SungKwon Soh, Elaine Garvilles, Hide Kiyofuji, Joe Scutt Phillips, Bruno Leroy, Simon Nicol

1. The meeting was unfortunately not able to link to Ren-Fen Wu during the meeting who was stuck in the meeting lobby.

Welcome and Preliminaries

2. The Chair Simon Nicol welcomes all participants and presented the Standing Agenda (Annex 1) and Terms of Reference for the committee (Annex 2)

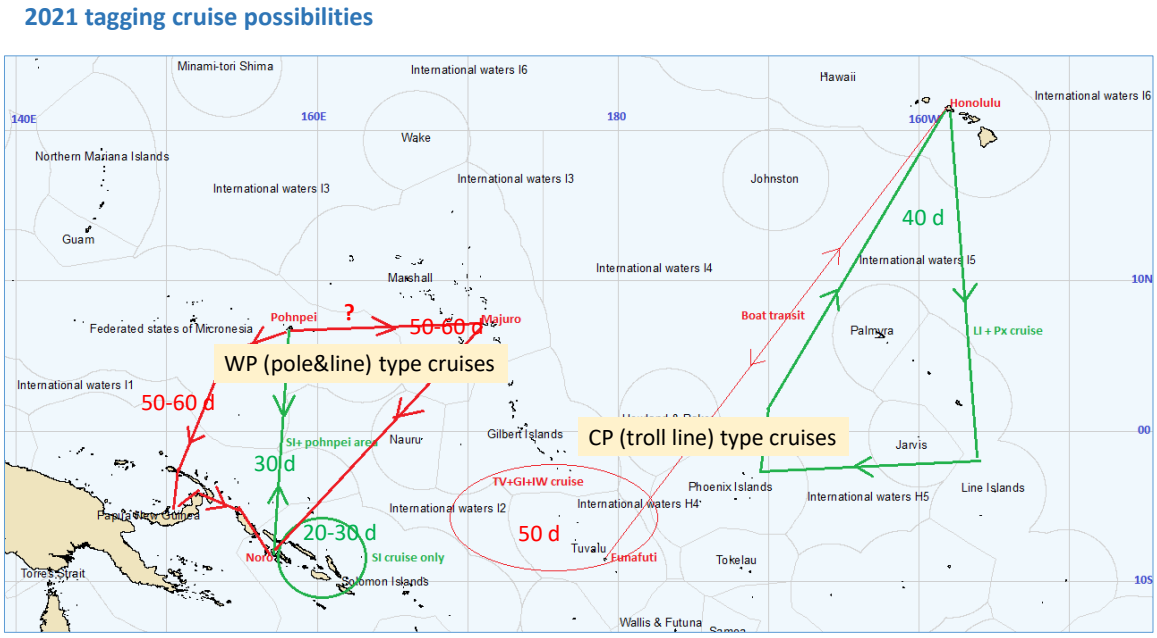
Current PTTP Resources & Tagging Cruise Plan Options

3. Bruno Leroy outlined the current options for PTTP cruises in 2021. He noted that planning at this stage has been complicated by uncertainties associated with COVID-19 travel restrictions. Options being considered are:

Area	Maximum days	Vessel	Species	Comment
SB only	30	Pole and Line	SKJ, YFT	COVID implications
SB & FM	30	Pole and Line	SKJ, YFT	COVID implications
SB, FM & PNG	60	Pole and Line	SKJ, YFT	COVID implications
SB, FM & MI	60	Pole and Line	SKJ, YFT	COVID implications
KI & IW	40	Dangler	BET, YFT	NO COVID implications
TV & surroundings	50	Dangler	BET, YFT	COVID implications
TV, KI, IW	80	Dangler	BET, YFT	COVID implications

Without the travel restrictions imposed by COVID-19, in 2021 it may be possible to implement up to 2 cruise options with the available budget; One of these cruises would be chosen from the 2 shorter Pole & Line (WP cruises) options, and the other would be a 40 days Dangler option (CP cruise). These short duration cruise options are displayed in green in the above table and in

the below map. The number of days to implement those options in red would impose the restriction of a single cruise for the year.

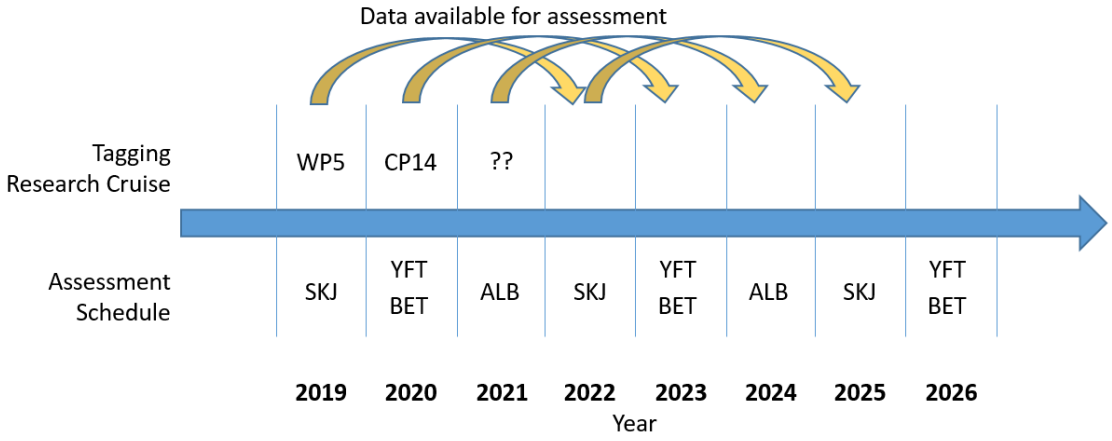


GREEN options allow 2 cruises for 2021 – RED only one cruise

4. The Committee was informed that under the Scientific Committee agenda for PTTP cruises, a western Pacific cruise was planned for 2021. However, given the possible access restriction due to COVID-19, plans were also being prepared for a central Pacific cruise. The Committee was also advised that shortened western and central Pacific cruises could operate in 2021, potentially simultaneously, should logistics allow.

Objectives specific to the cruise

5. Joe Scutt Phillips provided a summary of the nominal cruise schedule for the PTTP with the nominal objectives (in terms of tags released by species). A summary is provided in the tables below.



Cruise Type	Typical Regions	Typical # SKJ	Typical # YFT	Typical # BET
Western Pacific	SB,PNG,FSM	10,000 /mon	3,000 /mon	300 /mon
Central Pacific	TV, KI	80 /mon	400 /mon	1000-3,000 /mon
???				

6. The Chair noted that as an advisory group we have the option to discuss this schedule in coming committee meetings to inform the PTTP SC on the appropriateness of this schedule.

Cruise Implementation: Vessel Availability

7. SPC noted that they will contact the National Fisheries Development in Solomon to confirm the availability of the Soltai vessels in 2021. SPC will also contact the owners of the Gutsy Lady 4 the preferred vessel for undertaking central Pacific cruises on its availability for 2021.

Cruise Implementation: formalities and permitting

8. To assist with preparing cruise plans under each of the options described above, SPC requested focal points for each of the countries. FSM and RMI focal points will be Brad Philip and Beau Bigler, respectively. Solomon Islands, Papua New Guinea, Tuvalu, Kiribati will need to be contacted separately to this Committee meeting to nominate a focal point. Ludwig Kumoru offered assistance from the PNA Office for facilitating communication with these contacts where practical.

9. It was recommended that SPC and particular countries also ascertain if any difficulty gaining access to bait-grounds is due to COVID-19 or due to other resource access reasons. If it is COVID-19 related, then it would be possible to prepare a COVID-19 safe plan.

Cruise Participation

10. Discussion deferred until the next meeting when there is likely greater clarity of which cruise options are possible

Tag Recovery Issues

11. Discussion deferred until the next meeting on 2 February 2021, when there is likely greater clarity of which cruise options are possible

Other Business

12. The Committee was advised of Japan's implementation of two skipjack tagging cruises in 2020-2021. The first has just completed operating in the region of 40N and 150E. Over 2000 skipjack were tagged, including many with PTTP tags provided by SPC

13. A second cruise will depart Japan in mid-December2020 and return in mid-January 2021. The cruise will tag between Palau and Marshall Islands and target smaller size classes of skipjack for the purposes of assisting stock assessment and understanding connectivity between equatorial area and the EEZ of Japan.

14. Budgeting for Japanese tagging activities will not be confirmed before March 2021. SPC and Japan noted to keep each other informed on plans beyond the current Japan cruises to coordinate activities between Japan and the PTTP to the extent possible.

15. No other business was raised.

2nd PTTP ADVISORY COMMITTEE MEETING

Location: Virtual meeting (Microsoft Teams), led from SPC Headquarters, Noumea, New Caledonia

Date & time: 16th February 2021, 11:00 to 12:30

Theme: 2021 Cruise Planning

Attendees online: David Itano, SungKwon Soh, Elaine Garvilles, Hide Kiyofuji, Chris Wilson, Russell Dunham, Ren Fen Wu, Juliette Kon Kam King, Jeff Muir, CK Rui David, Ludwig Kumoru, Brian Kumasi, Aketa Taanga, Beau Bigler, Berry Muller, Tiare-Renee Nicholas, Kathryn Gavira O'Neill, Beth Vanden Heuvel, Il-kang Na, Chloe-Ane Wragg

Attendees in Noumea: Giulia Anderson, Bradley Phillip, Joe Scutt Phillips, Bruno Leroy, Lauriane Escalle, Jed Macdonald, Simon Nicol

1. Welcome and Preliminaries

The chair, Simon Nicol, opens the meeting, welcomes all participants and introduces Bruno Leroy and Joe Scutt Phillips to go through the agenda.

2. Agenda

Joe briefly outlines the purpose of, and schedule for the meeting. These were:

- Chance for overview of regional partners tagging activities
- Brief presentation of 2020, CP14 tagging research cruise
- Outline and discuss logistics for cruise planning for the upcoming 2021 PTTP research cruise
- Anticipate administrative and technical requirements in good time
- Outline current and planned tag recovery activities
- Coordination of potential research objectives with regional partners

Kiyofuji-san was invited to speak on the outcomes of the recent Japanese tagging cruises.

3. Presentation on Japanese tagging cruises in 2020

Kiyofuji-an provided an overview of the Japanese tagging cruises conducted between October 2020 and February 2021.

Two tagging cruises took place:

1) Offshore PL
   Ran from 12th to 29th October 2020, targeting adult skipjack (> 50 cm) in waters off Japan.
   Two legs: Leg 1 – 12th to 19th Oct. 2020; Leg 2 – 22nd to 29th Oct. 2020.
   Releases – dart tag: 2774, archival: 160, size range 34-47 cm. Few larger fish captured.

2) Distant water PL
   Ran from 15th December 2020 to early February 2021, targeting juvenile (<40 cm) SKJ in more equatorial waters south of Japan.
   Again, two legs.

Releases: dart tags: 7300, archivals: 331, size range 31-63 cm, with the vast majority of archivals in < 45 cm SKJ.

Japan hopes to run similar cruises in late 2021.

4. Presentation on PTTP cruises in 2020

Bruno presented a summary of the 14th Central Pacific cruise (i.e. CP14), which ran between 15th August 2020 to 2nd October 2020, and the planning and modifications that were necessary to handle the COVID-19 situation.

The tagging platform was the Gutsy Lady 4, chartered from Honolulu, with cruise departing from and returning to Honolulu with no port calls en route.

Multiple purse seine fishing companies shared access to their drifting FADs (dFADs).

Hawaiian-based consultants used for the fishing and scientific aspects of the work onboard.

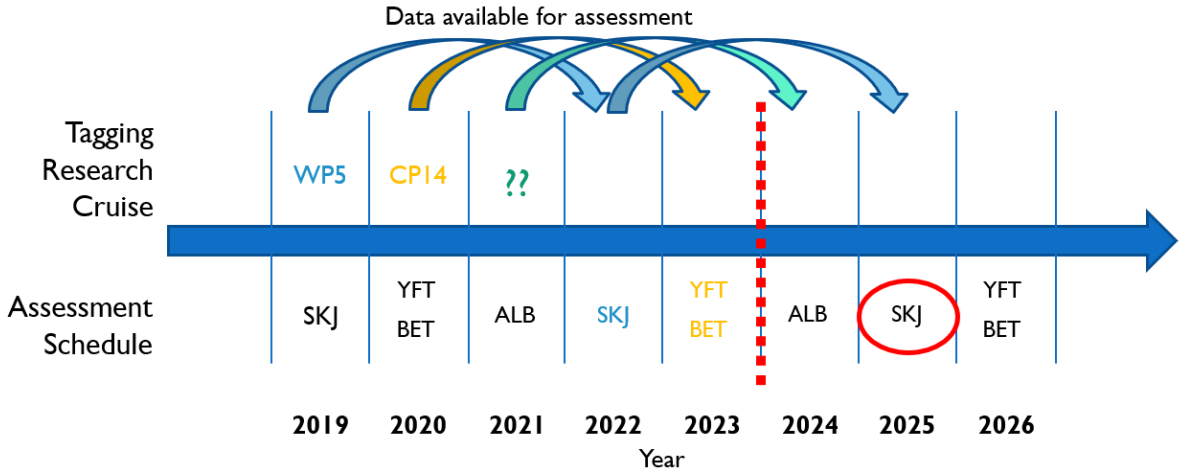
CP14 was of 49 days' duration. Normal conventional and archival tagging activities were a focus, and for this, the number of dFADs available to target tripled compared to the previous CP cruise. New genetic sample collection methods were tested, and a large, successful effort was made to publicize the cruise through SPC media and broader outlets (i.e. BBC) and to boost the profile of research cruises.

5. Tagging data requirements

Joe provided overview of tagging data requirements. There is a 3-year cut-off for tagging data integration into the stock assessments. Consequently, there is no benefit of the currently available tagging data for the stock assessments until 2023.

CP14 releases will contribute to 2023 YFT and bigeye assessments.

With SKJ assessment planned for 2025, it is of key importance to continue tagging time series in time for that 2025 assessment.



6. Current situation and 2021 cruise implementation

The current situation, cruise implementation timeline and risk assessment was summarised by Bruno.

It was noted that the planned Western Pacific (WP) pole and line cruise is now highly unlikely for 2021, given ongoing travel restrictions, with SPC not in a position to implement this cruise at this time. Bruno presented a risk assessment table.

Cruise option	Key risks	Potential Impact	Risk profile	Measures to put in place to reduce the risks
1 to 4	NFD P&L vessel status can't be externally assessed prior to the cruise due to travel restriction	Lack of access to vessel by expert consultant or SPC staff prevents WP6 implementation.	Likelihood: Likely Consequence: Critical **RISK PROFILE: HIGH**	Consultant/SPC staff accept to endure quarantine periods (prior and post boat expertise) if that is a possible option for travel
1 to 4	Vessel defect list can't be fixed due to absence of parts	Lack of parts and repair prevents WP6 implementation.	Likelihood: Likely Consequence: Critical **RISK PROFILE: HIGH**	Early Identification of defects and early ordering of parts
1	Foreign scientists can't join the vessel due to C19 travel restrictions	Lack of access to vessel by scientific crew prevents WP6 implementation.	Likelihood: Likely Consequence: Critical **RISK PROFILE: HIGH**	Solomon based crew selected to avoid travel restrictions Foreign scientists accept to endure quarantine periods (prior and post cruise) if that is a possible option for travel
3 to 4	Tagging vessel is vector for C19 transmission to C19 free Pacific Island Countries.	Reputational damage to SPC WCPFC and NFD company	Likelihood: Likely Consequence: Critical **RISK PROFILE: HIGH**	Vessel crew to undertake COVID19 test 14 days prior to departure and vessel-isolate except for essential preparations. Further COVID19 test to be undertaken 3 days prior to departure. No vessel departure if any tests return positive until medical clearance given.
3 to 4	COVID19 test to be undertaken 14 and 3 days prior to departure are not available in Noro	No oversea cruise option possible	Likelihood: Likely Consequence: Critical **RISK PROFILE: HIGH**	COVID19 tests and medical expertise sent to Noro
1 to 4	Crew member(s) become sick	Reduced capacity to complete objectives of the cruise tagging objectives. Vessel denied entry in countries.	Likelihood: Unlikely Consequence: High **RISK PROFILE: MODERATE**	**If COVID19 symptoms**: Vessel crew to undertake COVID19 test 14 days prior to departure and vessel-isolate except for essential preparations. Further COVID19 test to be undertaken 3 days prior to departure. No vessel departure if any tests return positive until medical clearance given. Contact register for all essential cruise preparation activities. Vessel is medically equipped. Isolation bunk on vessel.

The chair reiterated the complexities and infeasibility of implementing a WP cruise at this time, noting thattravel restrictions are unlikely to end before the end of this year. Based on the latest advice from SPC, even with vaccinations for the whole crew, quarantining would still be required at each port.

Given the timing of the next SKJ stock assessment, there is still some contingency with regard to implementing the next WP cruise in 2022,

Bruno advised that, given the current situation, the only option available is to implement another CP cruise later this year (i.e. CP15).

Plans at the moment consist of a 40-day cruise out of Honolulu. This requires a fishing permit for Kiribati, and we will once again require increased access to dFADs to optimise cruise outcomes and tagging opportunities.

7. Objectives specific to the CP15 cruise

Joe outlined the potential aims of such a CP15 research cruise.

These include continued conventional tagging of BET, YFT. Electronic tagging of FAD-associated BET, YFT, including archival tagging, acoustic tagging for school cohesion and FAD density effects, Sr:Cl marking and biological sampling with updated genetic protocols (all species).

SK asked for some clarification around the timing of this CP 15 cruise and target species.

Joe responded that bigeye and yellowfin tuna will be the primary target, as is normal with CP cruises. SPC hoped to participate with Japan over Christmas to deploy electronic tags on SKJ, but this was not possible given COVID-19 travel restrictions.

No ALB tagging is planned. ALB occur in different regions and are captured using different gears. Added logistical difficulties

Timing for CP15 cruise is during the FAD closure period (July to October).

Simon reiterated that the current advice suggests that even with vaccination, there's likely to be continued travel restrictions into the regions we wish to target for the WP cruise – i.e. FSM, PNG – without any capacity to quarantine. Even if a vessel was cleared to depart from a particular port, and then entered a bait ground, if there's any contact with locals the vessels would no longer be classified as COVID-free. It is deemed unfeasible to block access of local people to the vessel. So, the practicalities of implementing the WP are untenable this year. Hence the plan is for CP15 this year, and a WP cruise next year in 2022.

Dave Itano asked if there were any plans for gathering tagging data for the South Pacific ALB stock.

Simon replied that South Pacific ALB have proven difficult to tag at a level that warrants inclusion in the stock assessment. The historical tagging data on ALB has not been included in the stock assessment. However, this data has been used to help define stock assessment regional boundaries.

Close-Kin Mark-Recapture (CKMR) is a potential alternative to provide information similar to what conventional tagging might give us. A collaborative project on South Pacific ALB with CSIRO has already commenced on this topic.

SK asked about the composition and type of the available tags, as this is mentioned in the WCPFC contract.

Bruno replied that it is intended to deploy as many conventional tags in BET and YFT as possible (with a target of about 5000 conventional releases for CP15). There are also 50 archival tags destined for BET and YFT, and an additional 100 small archivals that were scheduled to be deployed in SKJ with Japanese colleagues, before this collaboration was halted due to travel restrictions. The plan will be to deploy some (~ 50) of the latter during the upcoming CP15 cruise, but the fishing gear used will not be optimal for this purpose.

In addition, we hope to deploy between 50 and 100 sonic (i.e. acoustic) tags in BET, YFT and SKJ to aid our understanding of their movements and behaviour around dFADs.

Simon highlighted that CP15 objectives are dependent on the information received from industry on the drift trajectories of their dFADs. This information allows for much more efficient cruise planning and targeting of regions with high FAD densities.

Joe continued the presentation in detailing how critical is the access to drifting FADs for the success of, in particular, CP cruises.

Joe noted that this year it will be critical to maintain, and further increase, the buoy sharing programme to include vessels from more fleets – in particular Asian and EU fleets as well as domestic fleets. Provides mutual benefits and collaborative opportunities, facilitates engagement between science and industry, may increase tag returns using specialised tag reward schemes, as has been trailed in late 2020.

Kathryn Gavira O'Neill commented that Satlink was happy to contribute last year and will continue to help this year. Satlink hope that we will be able to replicate last year's success again and noted that the leaflet we put together was super helpful.

Il-Kang Na from Korea commented that they are really interested in industry engagement and confirmed that he would transmit any provided information to their industry, this hopefully would allow some progress in connecting with this project.

8. Tag recovery

Joe provided an overview of the work and efforts made to engage the industry during 2020.

Tag rewards doubled to US$20 per tag. Aims to further increase industry engagement this year, through:

- New rewards aimed at the group rather than the individual level, for those vessels supporting the tagging programme through buoy-sharing.
- Anticipatory alerts and targeting of vessels with high probability of carrying tags.

Joe noted that SPC need good points of contact connections with fleet managers, port agents and canneries. Identifying the best contacts is critical for SPC. Requested that any of the meeting participants with good information on points of contact, particularly for China, Taiwan, please let us know.

SK commented that his experience is that local fisherman finds it difficult to contact the programme coordinators. It is important to liaise with the fleet managers. If SPC can send updates on posters / prize information, he can distribute to fleet managers in country. He can help in that context.

SPC confirmed that they will definitely send promotional information to him.

Simon agreed with SK, that the education component is critical. SPC has learnt that there can be some inertia regarding tag recovery. Timing is crucial. There is currently work focussed on predicting where the likely recipients of tags can be, so that specific and targeted advertising can be undertaken for when tags are likely to be found in specific ports.

Dave Itano asked if, following the FAD closure, there were a spike in recaptures coming into Pago or Majuro?

Simon replied that SPC did a lot of work during CP14 with vessels that participated in buoy sharing during the cruise. This has demonstrated the one to two months lag in when we see fish arriving in particular ports. That spike is beginning to be seen in Pago. The effect is not immediate, a lag of one to two months seems the norm and is not overly surprising given how fishing operations work. There is significant and ongoing work here to target specific vessels and then notify agents in port about high probability vessels (incl. fishing and carrier vessels) for tag returns.

Beau Bigler from Majuro asked if tag recovery had been woven into COVID-19 protocols, at both FFA level and national levels. In RMI, it's currently challenging to contact people at port

and on vessels. It is proving very difficult for them to engage in this work at present due to COVID-related restrictions.

Simon replied that it is an important point, as access to most of our ports is not possible. The latest advice from SPC on how transmission can be avoided can be provided, and SPC have been working with a few companies that have contact with their vessels to keep an eye out for tags, and if found, to identify the tag number.

Simon stressed that the best information on tag recovery is when tags are found by observers on board, then at port, then lastly at the cannery. Traceability deteriorates rapidly once on the production line in the cannery.

His perspective is that he hopes that SPC can work closely with the observer programmes and national programmes through the next period, to be able to notify you when high probability vessels are coming into port. While frustrating at the moment, we are learning much and once COVID passes SPC will be in a much better position to manage tag recovery.

9. Other business

Questions:

Simon Nicol:

We have capacity, given the CP cruise this year, to do pursue other aspects of tuna research apart from tagging. Would be great to gain some understanding of WCPFC members' ideas on what they would like achieved during the CP15 cruise. We have about two to three weeks' planning time to incorporate this. Ideas and input welcome.

-Following on, under our COVID safe practices, we are looking for a crew for CP15 departing and returning to Honolulu, with no port calls. This does give us some capacity to allow participation by members. If anyone has a particular interest in joining the cruise, again we need to know about this within the next month, to see how feasible this may be. Note also the 14 days of quarantine is enforced and a number of COVID-19 tests would be required before boarding the research vessel. These rules are likely to apply even if we have vaccination certificates. Please let us know within the next 3 to 4 weeks.

SK:

- SK had a question to Kiyofuji San regarding the Japanese tagging cruises: As we know, one goal of the cruise is to identify and understand the migration of SKJ. How many times has Japan undertaken this tagging cruise?

Kiyofuji San replied that they started this tagging survey in 2011. They are now moving to the tropical region, and the distant water vessel cruise started from 2017. Hopefully they can continue these cruises for two or three more years. Benefit the tagging dataset and stock assessments.

12:20 – Meeting closed and thanks all.

PTTP 2021 Cruise Planning Advisory Committee Meeting

28th April 2021
10:00-11:00
Virtual: Microsoft Teams

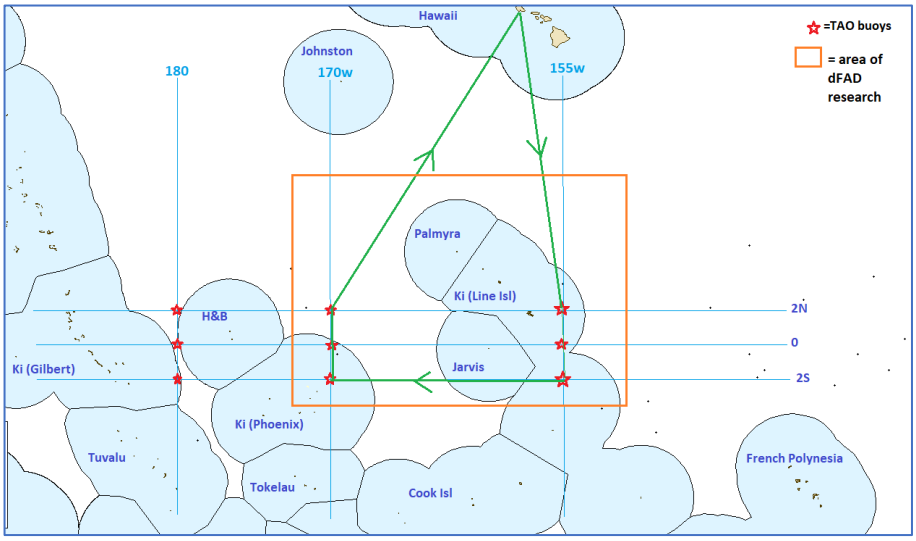
Participation: SungKwon Soh, Elaine Garvilles, Russell Dunham, Beau Bigler, Yuichi Tsuda, Yoshinori Aoki, Naoto Matsubara, Kathryn Gavira O'Neill, Beth Vanden Heuvel, Il-kang Na, Chloe-Ane Wragg, Joe Scutt Phillips, Bruno Leroy

Welcome and Preliminaries

The chair welcomed all participants and presented the Standing Agenda (Annex 1). No additions or alterations to the agenda were requested.

2021 CP15 Cruise Plan Outline

Bruno Leroy outlined the plan for the forthcoming CP15 cruise. He noted that travel restrictions and uncertainties associated with the ongoing global pandemic had severely impacted original cruise planning options, as had been discussed during previous meetings of the advisory committee. While the minimal required scientific crew has been secured to carry out the core objectives, it was noted that uncertainties still existed for sending additional personnel, and this would limit the ability of the cruise to fulfil secondary objectives.



The 2021 CP15 research cruise will be a 40-day charter onboard the Gutsy Lady 4, departing the 15th of July and returning the 24th of August. The cruise will follow a similar strategy to the previous years' CP14, transecting TAO buoys in the EEZs of Kiribati and international waters, whilst opportunistically targeting drifting FADs shared through industry-science partnerships. Scientific crew will consist of COVID-19 vaccinated, Hawai'i based personnel, though no port calls will be made to any Pacific Island countries, ensuring no possibility of virus transmission.

Joe Scutt Phillips asked if any of the planning committee participants had information on potential travel exemptions for vessel crew entering into the USA, to please contact the SPC team.

SungKwon-Soh asked if travel restrictions were likely to result in an inability to deliver on the PTTP project this year.
Bruno Leroy emphasised that the minimal Hawai'ian crew would allow the core objectives of the PTTP to meet.

Beth Vanden-Heuvel suggested that the cruise planning team might contact the American Tuna Boat Association for advice regarding any potential travel exemptions that might exist for crew entry into Hawai'i.

CP15 Objectives
Bruno Leroy outlined the planned objectives for CP15, again noting that the degree to which secondary objectives could be completed remained a function of crewing options, considering the current travel restrictions.
Primary objectives:

1. Conventional tag releases of bigeye and yellowfin tuna, associated with TAO moorings or drifting FADs, with a target of 5000 releases.
2. Archival tag releases of bigeye tuna and, fishing conditions permitting, skipjack tuna associated with drifting FADs. Equipment has been provisioned for up to 150 releases, noting this may be a difficult target if only a minimal crew are available.

Secondary objectives:

3. Biological sampling, including genetic material, of all tuna species and bycatch for additions to the Pacific tissue bank. Degree of biological sampling possible will, again, depending on final crewing, with priority given to tuna species if only a minimal crew are available.
4. Strontium-chloride marking of tagged tuna for growth validation studies. This will not be possible with the current, minimal scientific crew.
5. Sonic tagging- not possible with current minimal crew

Cruise Implementation: Vessel Availability

The same tagging platform as for last CP14 cruise, FV Gutsy Lady4, has been contracted for CP15 duration to conduct tuna tagging and biological sampling in the targeted area.

Cruise Implementation: formalities and permitting
Joe Scutt Phillips emphasised the critical importance of drifting FAD buoy-sharing to success of CP15, highlighting the valued contribution of last year industry partnerships for CP14. The anticipation for continued collaboration with these partners for the upcoming cruise was noted, alongside further increased numbers of partners. The official communications for these industry-science partnerships will be distributed during May, allowing a two-month lead up for the cruise departure. He also reminded the participants of the extended rewards scheme that was trialled for buoy-sharing fleets last year, and this would continue during 2021.

Katheryn Gavira O'Neill expressed that Satlink were still happy to collaborate in the distribution of industry-science partnership promotional material to their customers and facilitate buoy-sharing for those vessels who wished to support the research cruise.

Other Business

Russel Dunham asked whether plans for the 2022 PTTP research cruise, anticipated to be a western Pacific and skipjack focussed tagging cruise, had become any clearer since the previous planning committee meeting.
Joe Scutt Phillips responded that, while a western Pacific cruise was still the objective for 2022, to ensure a continued time-series of tag recaptures in time for inclusion in the scheduled 2025 stock assessment of skipjack tuna, there were still many uncertainties associated with the planning of the cruise. In light of the requirement for bait ground access during pole & line fishing, contact with Pacific Island countries and coastal communities will be inevitable. It is hard to know what restrictions will likely be in place in the member countries visited during western Pacific cruises (typically Solomon Islands, PNG and potentially FSM) by 2022.
Considering the potential for, at least some impact on PTTP cruises, he emphasised how important continued collaboration with Japanese colleagues from FRA to continue this critical time-series of skipjack tagging data.

No other business was raised

Next meeting: It is proposed that next meeting happen at a date to be determined around mid-October to report on CP15 activities and start planning 2022 PTTP research cruise.

Annex 1. Standing Agenda

1. Welcome, Preliminaries
2. 2021 CP15 cruise planning
3. Choices of objectives for the cruise
4. Cruise Implementation: Vessel and crew availability
5. Cruise Implementation: formalities and permitting
7. PS fishery drifting FAD access
8. Tag Recovery
9. Other Business

Annex 2. Terms of Reference WCPFC Pacific Tuna Tagging Programme Cruise Planning Advisory Committee

Purpose

This is a voluntary advisory committee established to assist SPC and WCPFC members with undertaking yearly PTTP Research Cruise planning and implementation. The committee role in this context is advisory only. Participants are expected to assist with setting cruise objectives (e.g. location, tagging targets, biological sampling targets), facilitating permits and access to bait grounds, and organising participation by national officers and observers.

Committee Process

The advisory committee will meet electronically
The advisory committee will report annually to the PTTP steering committee
Membership of the committee is open to all members of WCPFC and invited experts
The advisory committee will work within the annual mandate of the PTTP set by the PTTP steering Committee and WCPFC SC