

PACIFIC TUNA TAGGING PROJECT WP 5

REPORT of CRUISE No.3 In FSM waters

19 August to 20 September 2019

INTRODUCTION

This report summarizes activities of the third and last cruise of the 2019 Pacific Tuna Tagging Project (PTTP) Phase 2, named hereafter WP5-3, during a 33-day period, following departure from Palau/Koror on 19 August, fishing in FSM waters between the 20 August and the 17 September. The vessel fished respectively 11 days in Yap State, 4 days in Chuuk State and the remaining 14 days were spent fishing (except for the full moon break on the 14 and 15 Sep) around Pohnpei. After clearance out of FSM on 16 September, the vessel steamed south, fishing on the way to Solomon Islands. The cruise finished, back to its homeport, Noro in Solomon Islands, on 20 September.

Scientific SPC and in-country personnel onboard the vessel Soltai 105 during the cruise are listed in **Table 1**.

Table 1. SPC and In-Country personal onboard during cruises 3

Name	Title	Affiliation	Period
Valerie Allain	Cruise leader	SPC	19/08/19 – 02/09/19
Bruno Leroy	Cruise leader	SPC	02/09/19 – 20/09/19
Jed Macdonald	Fisheries Scientist	SPC	02/09/19 – 20/09/19
Annie Portal	Tagging technician	SPC	06/09/19 – 20/09/19
Joe Scutt Phillips	Fisheries Scientist	SPC	19/08/19 – 06/09/19
Lauriane Escalle	Fisheries Scientist	SPC	21/08/19 – 02/09/19
Jeff Muir	Tagging technician	SPC contractor	19/08/19 – 20/09/19
Marion Boutigny	Tagging technician	SPC contractor	19/08/19 – 20/09/19
Anthansio Emaengilpy	FSM observer	NORMA	21/08/19 – 13/09/19

GENERAL DESCRIPTION OF SEARCHING and FISHING ACTIVITY

The vessel departed Koror after clearance out of Palau on the early morning of August 19, and fish on the way to Yap. Good number of skipjack were tagged on the 20 August close to Yap. After clearance in FSM and agreement granted by the Council of Tamol for baiting access in the outer islands, the vessel spent one day fishing around Yap with limited success before heading to Ulithi atoll. Two baiting nights occurred in Ulithi for the first time in SPC tagging project history. Then S105 fished on the way to Wolei Island where 4 nights were spent collecting baits in its lagoon. The relatively good quality of these baitfish allowed the release of good numbers of tagged tuna during 3 fishing days. On the 30 August, the vessel fished to Lamotrek and spent one night baiting in the lagoon before

fishing on the way to Chuuk where provision and scientific personal change occurred on 2 September. Two very poor baiting nights in the north of this big lagoon did not provide enough bait to successfully fish the tuna schools encountered around the island and on the way to Pohnpei. Tight schedule prevented any stop in the Mortlock Islands for trying to collect bait there. Clearance in Pohnpei state happened on 6 September, along with refuel and personal change. Then, taking advantage of the Pohnpei productive baitgrounds, one full week was spent fishing around the island. Unfortunately, no many tuna schools were found with over 2/3 of the releases made in association with a lost Philippino raft acting as a drifting Fad. Fishing was also hampered by bad weather during the 2 days before the full moon break. However, close to 3700 releases were made around Pohnpei, representing almost half of the FSM total number of tuna tagged. The three fishing days following clearance out of FSM and on the way back to Solomon Islands were not very productive although numerous logs were investigated.

The track of the cruise, based on school and 1800 hrs positions, is found below in **Figure 1** and a summary of general movements and tag releases follows as **Table 2**. A compilation of the daily log extracts, detailing daily activities, is provided as **Appendix 2**.

Figure 1: Cruise track during WP5-3

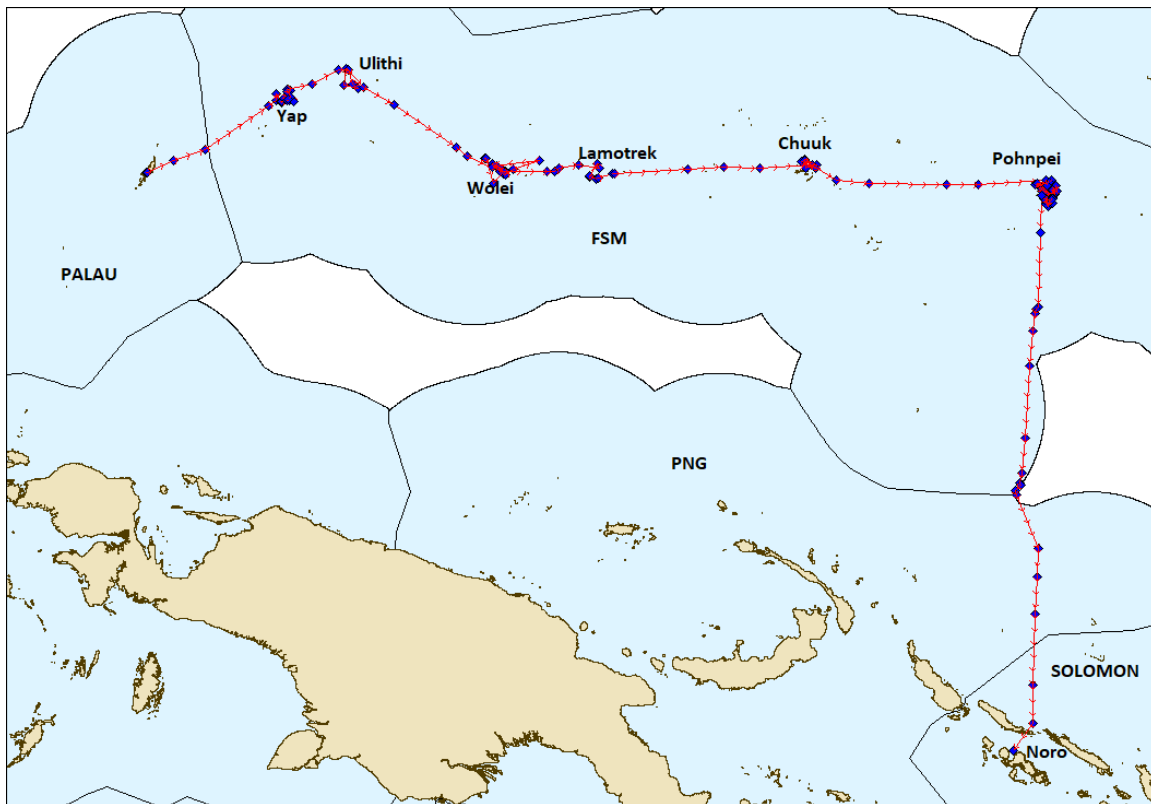


Table 2. Summary of Cruise 3 activity, with the number of conventional (no archival) tag releases per day per species

Date	Activity	Conventional releases			Total releases
		SJ	YF	BE	
Aug 19	Baiting NW Urukthapel, S&F on the way to Yap	-	-	-	-
Aug 20	Searching and fishing on the way to Yap	1166	2	0	1168
Aug 21	In port Yap, baiting Tamil harbor	-	-	-	-
Aug 22	S&F around Yap, baiting Tamil harbor	32	32	26	90
Aug 23	S&F on the way to Ulithi, baiting Ulithi	0	0	0	0
Aug 24	S&F around Ulithi, baiting Ulithi	244	16	0	260
Aug 25	S&F on the way to Wolei	0	0	0	0
Aug 26	S&F on the way to Wolei, bait Wolei	9	0	0	9
Aug 27	S&F around Wolei, bait Wolei	307	1	-	308
Aug 28	S&F around Wolei, bait Wolei	434	-	0	434
Aug 29	S&F around Wolei, bait Wolei	624	1	0	625
Aug 30	S&F on the way to Lamotrek, bait Lamotrek	161	0	0	161
Aug 31	S&F on the way to Chuuk	549	9	0	558
Sep 01	S&F on the way to Chuuk	0	0	0	0
Sep 02	In port Chuuk, personal change, bait north lagoon	-	-	-	-
Sep 03	S&F around Chuuk, bait north lagoon	0	0	0	0
Sep 04	S&F on the way to Pohnpei	54	6	0	60
Sep 05	Steaming to Pohnpei-no bait	0	0	0	0
Sep 06	In port Pohnpei, refuel, personal change, bait	-	-	-	-
Sep 07	S&F around Pohnpei, baiting outer harbor	373	128	0	501
Sep 08	S&F around Pohnpei, baiting outer harbor	1654	207	1	1862
Sep 09	S&F around Pohnpei, baiting outer harbor	393	0	0	393
Sep 10	S&F around Pohnpei, baiting Ronkiti	476	218	0	694
Sep 11	S&F around Pohnpei, baiting Matalanim	222	20	0	242
Sep 12	S&F around Pohnpei, baiting Matalanim	0	0	0	0
Sep 13	S&F around Pohnpei, in port evening	0	0	0	0
Sep 14	In port Pohnpei, full moon break	-	-	-	-
Sep 15	In port Pohnpei, full moon break	-	-	-	-
Sep 16	Clearance out of FSM, S&F toward Noro	0	0	0	0
Sep 17	S&F on the way to Noro	108	6		114
Sep 18	S&F on the way to Noro	4	31	25	60
Sep 19	S&F on the way to Noro	3	18	8	29
Sep 20	Steaming to Noro, no bait, arrival 7pm	0	0	0	0
	CRUISE TOTAL	6813	695	60	7568

TAG RELEASES

Of the 33 days of the cruise, 26 full or partial days were spent searching and fishing, 5 full or partial days in port and 2 day steaming without bait.

A total of 7628 fish (including 60 archivals) was tagged and released during the cruise at an average of 282 fish tagged per fishing day (result very similar to WP1 cruise 2, in July/August 2008, where 279 fish were tagged per fishing day during a 28 day cruise following a similar cruise track).

The species composition in total was 90% skipjack, 9% yellowfin with only 63 bigeye tuna tagged. The size distribution of those fish are displayed in **Figure 3**

Only 13 smaller 11 cm tags were released.

37% of releases were in association with drifting FADs, 10% with logs, whereas the free school releases represented 51%. The rest of the tags were released in association with islands or marine mammals.

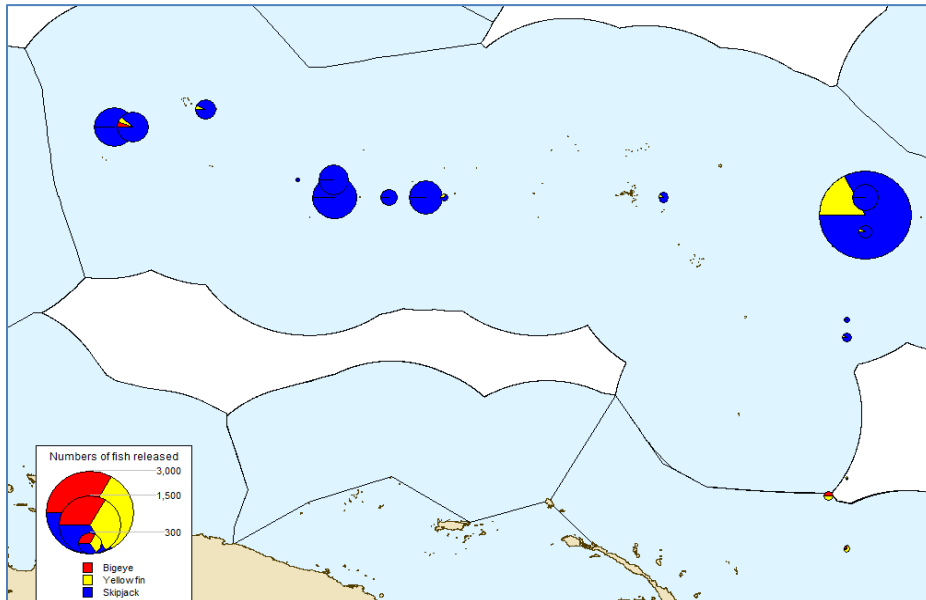
329 white conventional tags (327 skipjack and 2 yellowfin) were released on strontium chloride (SrCL) injected fish (see **Picture 1**) for further age validation on recaptured individuals.

Picture 1: SrCl injection on a skipjack tuna



The releases are summarized by school, location, school type day and area in **Appendix 1**, whereas **Figure 2** below shows the spatial distribution of releases during the cruise. **Picture 2** showing the fishing & tagging action at the bow of S105

Figure 2: WP5-3 distribution of tag releases by species



Picture 2: Tagging tuna at the bow of FV Soltai-105

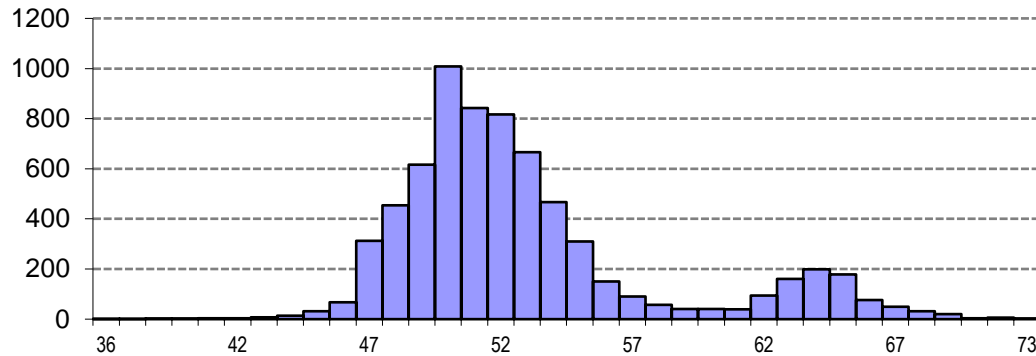


SIZE DISTRIBUTION OF TAGGED FISH

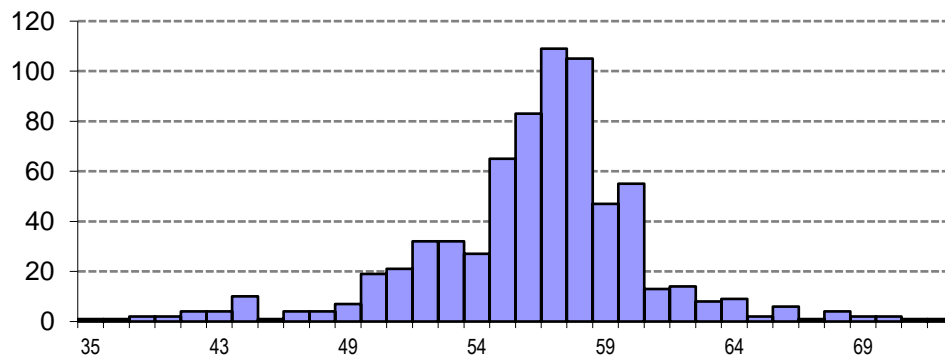
Figure 3 shows the size distribution of all fish tagged during WP5-3. The skipjack size distribution shows 2 modes, the principal centered on 50 cm whereas the yellowfin sizes were centered on 57cm with small amounts of with under 50cm or over 60 cm. The small number of bigeye tagged averaged ~ 58cm.

Figure 3: Size distribution of fish tagged during Cruise 3

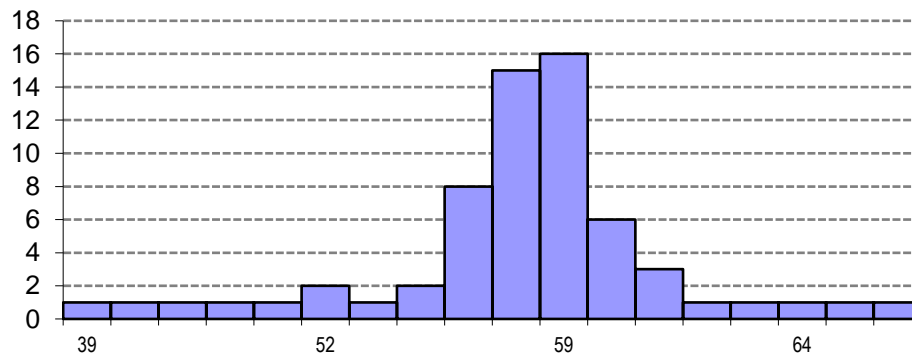
Skipjack **n = 6866**



Yellowfin **n = 699**



Bigeye **n = 63**



ARCHIVAL TAG SUMMARY

One of the WP5 tagging experiment objectives was to deploy archival tags in skipjack to increase our knowledge about the species behavior. 110 ARCGEO-9TS from Lotek were available for the purpose. Twenty MK9 from Wildlife Computers were also brought onboard to be opportunistically deployed in suitable size (larger) bigeye or yellowfin tuna (see **Picture 3**).

All tags were configured to sample all likely depths, ambient sea and internal fish temperatures and light intensity every 30 seconds. Archival-tagged tuna were externally marked with an orange 13 cm conventional tag.

Deploying archival tags in skipjack is challenging due to the rapid deficit in oxygen the animal experiences as soon as it is out of the seawater. The induced stress often prevent the fish from staying calm enough to safely undertake surgery. Suitable individuals need to be inserted with the tag and released if possible within 30 seconds. This requires a good helper to assist the tagger and the use of a staple gun to quickly close the incision (See **Picture 4**). Choice of the individual is crucial, with selection of animals with minimal injury and handled with great care after their capture. Even with severe selection, only about 20 % of the animals brought to the cradle are tagged and released with success. We observed that the bigger size (>58 cm FL) skipjack are very difficult to handle probably due to rapid muscle heating, increasing the oxygen deficit even more quickly. Most of the skipjack tagged with archival were therefore under 55 cm FL. (See **Figure 4**)

53 skipjack were tagged and released with ARCGEO-9TS tags during the WP5-3 cruise and 7 MK9 tags were inserted in 4 yellowfin and 3 bigeye.

Picture 3: Archival tags (ARCGEO-9TS left, MK9 right)

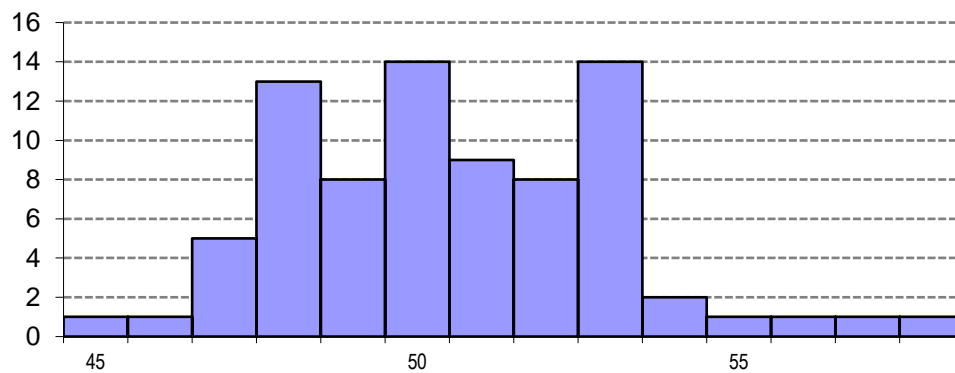


Picture 4: A staple gun is used to close incision on archival inserted skipjacks



Figure 4: Size distribution of skipjack tagged with archival during WP5 (whole cruise)

Skipjack, n = 79



BIOLOGICAL SAMPLING

Biological sampling is conducted after tagging sessions on tuna unsuitable for tagging and release and on bycatch species.

Biological sampling involves collecting information on fish (species, length, weight, fat content) and tissue samples (dorsal spine, otoliths, muscle, liver, stomach, gonads, fin clips). Biological sampling during tagging cruises complements the work conducted by fisheries observers on board tuna fishing vessels, and allows to increase the number of samples collected in the region during the year. This collection contributes to the WCPFC Tuna Tissue Bank by providing biological information and samples that become available to the scientific community to conduct biological and ecological studies of interest to the region.

Studies in progress and potential studies that use data and samples collected during the tagging cruise are:

- Age and growth determination and validation (otoliths, spines)
- Reproduction period, fecundity (gonads)
- Condition index (fat content using fat-meter -see **Picture 5**-measurement)
- Length-weight relationships need to be updated for tuna and established for bycatch species (length and weight measurements)
- Diet studies (stomach)
- Trophic level determination (muscle, liver)
- Stock structure (fin clips, muscle, otoliths)

Picture 5: Fat-meter measurements on bigeye tuna



Table 3 summarizes the nature and number of collected biological samples

Table 3: Summary of biological samples collected during WP5-3

Species	Fish sampled	Gonads	Dorsal Spines	Livers	Stomachs	Muscles	Otoliths	Fin clips	Fat Meter
BET	5	5	5	5	5	5	5	0	5
RRU	19	19	0	19	19	19	0	0	0
SKJ	152	107	108	108	108	108	106	54	73
BUM	4	2	0	4	4	4	0	0	0
YFT	60	28	28	28	28	28	28	32	16
TOTAL	240	161	141	164	164	164	139	86	94

BAITING, a critical factor...

As expected from previous tagging cruises implemented in FSM waters, obtaining a sufficient amount of the appropriate bait species has been challenging within the Yap and Chuuk states.

Yap Tamil harbor and Ulithi atoll produced important proportion of large species like scads and sardines with few sprats and anchovies. Wolei Island, especially in the western side of its lagoon, provided a better ratio of right species (anchovies, sprats and hardy heads) mixed with multiple young stages of reef fish (notably goatfish). Quantities, although not plentiful, were sufficient for a fishing day. Lamotrek lagoon, on the one night try, produced similar results.

Chuuk huge lagoon baiting results have been disappointing, to say the least, but this seems to be a consistent situation...The tight cruise schedule did not permit a visit to the Mortlock Islands (Satawan).

Pohnpei large island, with numerous easily accessible harbors closed to mangroves and rivers is a reliable good baitfish provider. The proximity of the full moon period did not hamper too much the bait fishing success, thanks to encountered cloudy (and rainy) situation most of the time. The outer harbor, west of Jokaj, was unfortunately the anchorage for an important tuna transshipment activity. The numerous bright lights of the carrier and purse seine boats are no doubt fading the attractiveness efficiency of our own lights (See **Pictures 6 and 7**). The presence of all these large boats is also limiting the anchorage possibilities.

Nevertheless, we managed to get ample quantities of gold anchovies from this baitground at the beginning of our activities around the island. Proximity of tuna schools in the south incited us to try baitfishing in Rontiki inside harbor on one night. Tricky, narrow and not well-marked entrance prevented any previous visits during the previous RTTP cruise in

absence of good electronic chart plotter at that time. Experience revealed the cautiousness that needs to be taken in anchoring inside this small muddy place. It is recommended to attempt baiting in Ronkiti inside harbor only in calm weather conditions. To be noted that good sign of the presence of gold anchovies were observed. Matalanim harbor, on the east coast provide excellent baitfish species in ample quantities. These baits, caught on the 11 and 12 September, survived to the full moon break in the harbor (with not much attention...) and until we used them all on 19 September.

Notes on bait-ground access in-country requests:

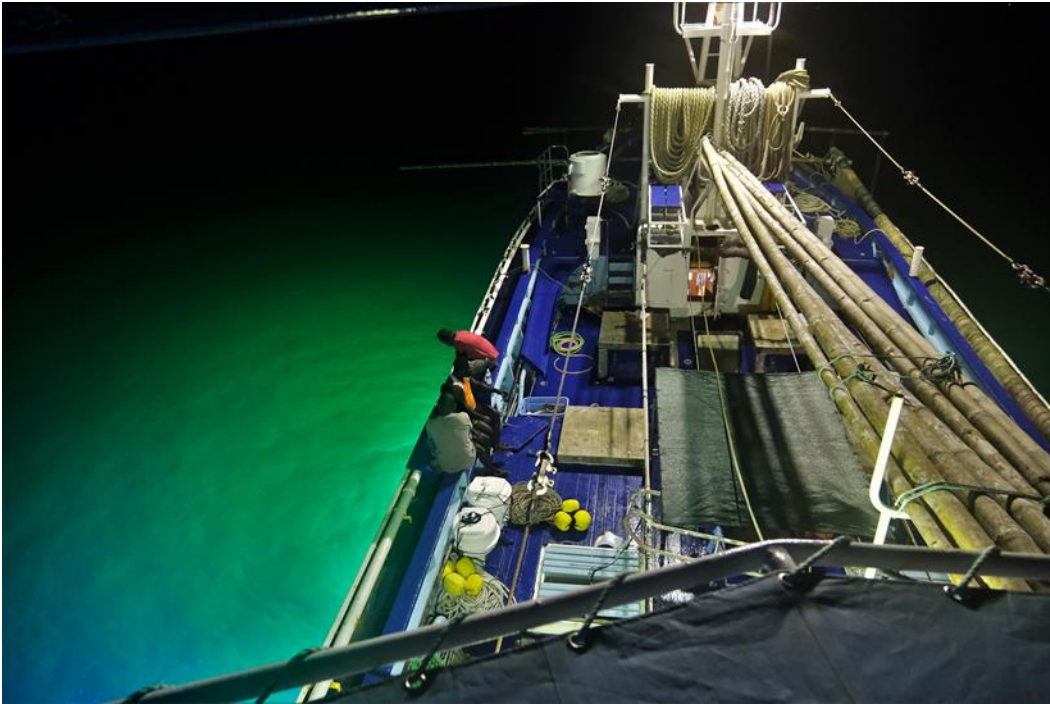
It is important to note that access to bait-grounds has to be requested and, if contacts by email are made in advance to request the permit, it is difficult to obtain access grant in advance. The obtaining of the permit is facilitated when there is a meeting in person with the fisheries authorities which only happens when the boat arrives in port. Alternatively, it might be worthwhile to have a staff member travelling to the different countries a few months ahead of the trip to meet the authorities and obtain the national/state permits in advance. After obtaining the national permit, discussions with the customary/local authorities on the bait-ground itself are also required. For each bait-ground visited, at least half a day and sometimes a full day is needed to conduct those official requests.

Table 4 documents the amount and species of baitfish collected during the cruise

Table 4 Summary of bait fishing activity during WP5 Cruise 3

Date	Location	Catch (bkts loaded, hauls)	Species
18 Aug	NW Urukthapel	137 (4)	Anch. (blue & gold), r/sardine
21 Aug	Tamil harb. south	131 (2)	Gold anchovies, r/sardine, scads
22 Aug	Tamil hb South2	138 (2)	Gold anchovies, r/sardine, scads, sprats
23 Aug	Ulithi, south Momog	195 (2)	Sard, decapt, sprats, hh
24 Aug	Ulithi, south Momog	59 (2)	Sardines, sprats
26 Aug	Wolei, east lagoon	53 (3)	Blues sprats , anchov, rainbow sard
27 Aug	Wolei, western lag	99 (3)	Blues sprats , anchov, rainbow sard
28 Aug	Wolei, western lag.	98 (3)	Blue spr, hh, goatfish, reef sps
29 Aug	Wolei, western lag.	77 (3)	Sprats, hh, cardinals, reef sp
30 Aug	Lamotrek east	89 (3)	Hh, sprats, goatfish, fusiliers
02 Sep	Chuuk north pass	31 (3)	Cardinals, sprats, S sirm
03 Sep	Chuuk NW lagoon	2 (3)	Sard. sirm
06 Sep	Pohnpei outer harb.	76 (2)	Gold anch, sard
07 Sep	Out. hb. Sokeh point	294 (4)	Gold anch., Hq, sard, blue sprats
08 Sep	Out. hb. Sokeh point	138 (2)	Gold an., blue spr, hq, scads
09 Sep	Out. hb. Sokeh point	59 (3)	Gold an., blue spr, hq, scads
10 Sep	Ronkiti inside harb.	31 (1)	Anchovies, Hq, hh
11 Sep	Matalanim	214 (3)	Anch (dev, ind), Hq, hh, sard
12 Sep	Matalanim	120 (1)	Anchovies, blue sprats, Hq
15 Sep	Out. hb. Sokeh point	42 (3)	Hq, hh, anchovies, sard , scads
Total		2083 (52)	

Picture 6: LED sub-marine lights used to attract baitfish at night



Picture 7: Pohnpei outer-harbor at night: transshipment activity lights...

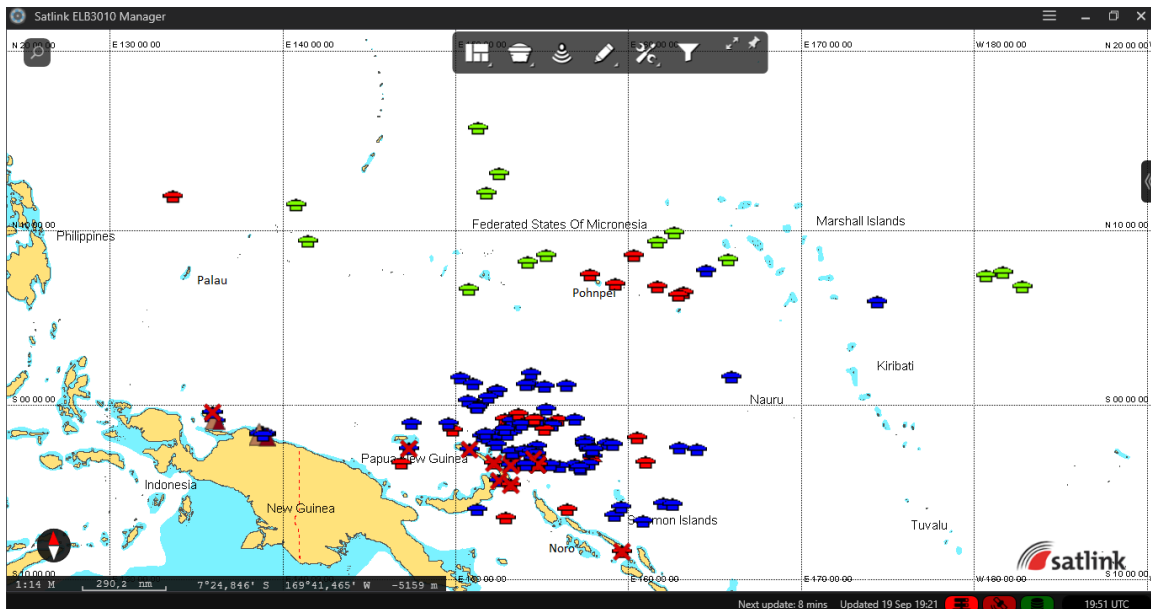


DRIFTING FAD USAGE DURING WP5

To increase our tagging opportunities, we signed prior to the cruise an agreement with two purse seine fishing companies (Caroline Fisheries Corporation and the Cape Fleet/NFD). 120 Satlink buoys from these companies were shared on our Satlink account for the cruise duration. Unfortunately, only few FADs were available in Palau and FSM waters (see **Picture 8** from the screen of our dedicated laptop)

Only a couple of dFADs were visited during WP5, also due to the fact that this type of cruise has a too tight schedule with too much of water to cover at the same time. This restrained the boat from diverting outside the scheduled cruise track.

Picture 8: Distribution of drifting FADs available during WP5 cruise



CONCLUSIONS

The WP5 cruise results, in terms of total tag releases, slightly exceed the expected target (15,000 releases) set prior the experiment. Close to 7,000 fish (98% skipjack) were tagged in Palau waters and over 7,500 (90% skipjack) in FSM. The future recovery data from these fish should bring valuable information to their next stock assessment. The expected recoveries of some of the skipjacks tagged with archival tags will no doubt enhance our knowledge on their behavior.

Notes on cruise implementation:

Having conducted this additional tagging experiment across those large oceanic countries, we could probably envisage redesigning this type of cruise to enhance its efficiency. For example, concentrating the tagging effort around the places with good bait grounds and facilities like Pohnpei. The nowadays-high charter costs impose to maximize the “effectiveness” of the experiment and, although sometimes unavoidable in the big Pacific Ocean, it become difficult to spend time in well-known “non-productive” areas.

As in the past, the presence onboard of a national observer proved to be useful, particularly at the bait-ground to conduct discussions in the local language. We had opportunities to take onboard some local observers from the outer islands for fishing days, which allowed to better communicating on our work.

APPENDIX1. Releases of all tagged fish by date, location, school type and species
REPORT 3: TAG SCHOOL SUMMARY

Project PTPP Phase 2-Western Pacific #5						Cruise		3 To	3	Vessel Soltai 105			
Event no	Tagged sch no.	Date	Lat	Lon	Sch type	Assoc.	Start	Stop	YFT	TAG TOTALS			
										BET	SKJ	OTH	TOTAL
1	1	20-Aug-2019	0914.688N	13751.566E	1	1	0753	0811	0	0	120	0	120
2	2	20-Aug-2019	0924.182N	13750.677E	1	1	0916	0930	0	0	58	0	58
3	3	20-Aug-2019	0910.850N	13759.222E	1	1	1220	1230	0	0	78	0	78
4	4	20-Aug-2019	0912.342N	13759.353E	1	1	1243	1256	0	0	314	0	314
5	5	20-Aug-2019	0911.809N	13759.093E	1	1	1310	1324	0	0	190	0	190
6	6	20-Aug-2019	0914.113N	13808.523E	1	1	1428	1450	2	0	406	0	408
11	7	22-Aug-2019	0917.314N	13802.490E	1	2	1300	1400	32	26	32	0	90
12	8	24-Aug-2019	0932.968N	14000.358E	1	1	1606	1643	16	0	244	0	260
13	9	26-Aug-2019	0745.832N	14254.584E	1	4	0833	0855	0	0	9	0	9
14	10	27-Aug-2019	0725.547N	14405.621E	1	4	1037	1100	1	0	0	0	1
15	11	27-Aug-2019	0730.166N	14334.716E	2	1	1553	1618	0	0	307	0	307
16	12	28-Aug-2019	0725.527N	14348.761E	4	1	1000	1109	0	0	273	0	273
17	13	28-Aug-2019	0733.854N	14332.829E	1	1	1220	1354	0	0	161	0	161
20	14	29-Aug-2019	0703.272N	14336.020E	2	2	1337	1415	1	0	624	0	625
22	15	30-Aug-2019	0727.101N	14519.548E	1	1	0827	0904	0	0	161	0	161
25	16	31-Aug-2019	0710.707N	14620.954E	1	1	1405	1514	0	0	530	0	530
26	17	31-Aug-2019	0718.013N	14644.455E	1	5	1746	1804	9	0	19	0	28
29	18	04-Sep-2019	0707.150N	15238.740E	4	9	1240	1318	6	0	54	0	60
30	19	07-Sep-2019	0632.000N	15811.600E	1	1	0957	1012	28	0	87	0	115
31	20	07-Sep-2019	0631.130N	15814.000E	4	1	1035	1105	100	0	286	0	386
34	21	08-Sep-2019	0636.000N	15815.555E	1	4	1055	1337	202	1	1594	0	1797
35	22	08-Sep-2019	0626.040N	15813.440E	1	1	1718	1735	7	0	85	0	92
37	23	09-Sep-2019	0707.460N	15819.150E	4	1	1204	1244	0	0	392	0	392
39	24	10-Sep-2019	0638.601N	15820.370E	1	4	1305	1456	219	0	492	0	711
40	25	11-Sep-2019	0636.475N	15820.120E	1	4	1042	1125	20	0	232	0	252
44	26	17-Sep-2019	0337.230N	15754.180E	1	2	0748	0829	0	0	38	0	38
45	27	17-Sep-2019	0309.400N	15749.900E	4	1	1158	1215	6	0	73	0	79
47	28	18-Sep-2019	0055.640S	15730.600E	1	2	1433	1459	7	1	2	0	10
48	29	18-Sep-2019	0103.500S	15722.100E	5	5	1612	1700	25	26	2	0	53
49	30	19-Sep-2019	0234.600S	15758.350E	1	4	0625	0725	18	9	3	0	30
CRUISE 3 TOTALS									699	63	6866	0	7628
PROJECT TOTALS									699	63	6866	0	7628

APPENDIX 2

DAILY LOG EXTRACTS

logdate	Activity_Desc	Notes
18/08/2019	In port. Departed 17:45 toward baiting ground; 4 sets during the night finishing at 5:00.	In port doing the last shopping, fuel. Start of WP5-cruise 3. Departed 17:45 toward baiting ground. Arrived at baitground 18:19, put 1 light with a buoy and then lights under the boat at 18:28. First set finished at 21:00 (17 buckets of rainbow sardines and anchovies). Second set finished at 22:00 (56 buckets of mainly anchovies and some sardines). Third set at 2:50 (50 buckets of anchovies and some rainbow sardines). Fourth set at 4:15 (14 buckets of anchovies).
19/08/2019	Clearance out of Palau and departure from port at 6:10 towards Yap.	Left bait ground at dawn, after 4 sets and 137 buckets of mainly anchovies, to go back to Malakal wharf where we arrived at 6:00 and left 10 minutes later as clearance out had been sorted out the previous night by the efficient agent. Started searching for schools around 9:20 with seabirds around and a few fish sighted but fishing master considered it was not worth spending bait. Three bites of marlin at the back on the trolling gear but no luck. No school baited. Bait in good condition still. Moderate sea condition with 20 knots of wind.
20/08/2019	Searching and fishing with success south of Yap.	At dawn, we were at 32 nmi south-west of Yap. Useful start of the day with a blue marlin caught on the trolling gear at 6:30. Two schools of large skipjack (65 cm) baited and tagged before lunch. Four more schools tagged in the afternoon and we finished the Palau baits on fast moving schools at the end of the day. A total of 1168 tags were released (1166 SKJ, 2 YFT) including 8 SKJ with Strontium. We had no time to come to port before sunset and entry permit was still not granted. Drifting during the night and plan to be at the entrance of Yap Channel at 7:00am.
21/08/2019		After drifting all night, we steamed to arrive at the entrance of Yap channel at 6:20. We started entering the channel at 7:30. Boat was tied up to the Yap Fishing authority dock a little bit before 8:00. Everybody confined on board until customs/immigration/quarantine... arrived and all paperwork was finished by 9am. Meeting with the chiefs (7 of them) of the council of Tamol at 2pm to explain the work and obtain their support and agreement for the access to the baiting grounds of Ulithi, Wolei and Lamotrek. Distributed a few reward posters. Finally got the fishing and research permit for Yap State 12 nmi which imposes to visit the chief in every island where baiting is planned and to have a local observer on board if required by the chief. Left dock at 17:30 with the FSM observer and the Yap island observer. Anchored to bait in Tamil harbour in a new

		location compared to previous tagging in 2008. First set completed at 23:15 with 90 buckets of mainly rainbow sardines, golden anchovies and some ocean scads and large pony fish. Second set completed at 4:30 with 41 buckets of the same mix including 10cm long anchovies.
22/08/2019	Searching and fishing south of Yap.	After 2 bait sets and 130 buckets of rainbow sardines, anchovies and ocean scads we started steaming out of Tamil harbour, Yap around 4:45 toward the fishing ground left 2 days ago in the south-east of Yap. No birds in the morning going south, we changed course to go back toward the successful schools 2 days ago in the south of Yap and we found birds but the large bait did not attract the attention of the fish. Finally at 13:00 we spotted some birds and a log where we spent the rest of our bait on a mixed school of YFT, BET and SKJ that we managed to tag very slowly for a total of 90 tags (36% SKJ, 34% YFT, 29% BET). We decided to try another baitground just south of the bait ground from last night, but we also put a light on this previous baitground. First set at 21:35, 73 bkts with some rainbow sardines, anchovies and sprats; end of the set 22:20. Second set starts at 22:40, 65 bkts with the same bait species than the previous one; the set ends at 23:20. Customs clearance and immigration conducted at 1:00 before heading to Ulithi.
23/08/2019	Fishing with no success, arrival, and discussions on Ulithi for the access to the baitgrounds.	The 2 bait sets from the previous night brought 138 buckets of mixed small (anchovies and sprats) and mainly large (rainbow sardines and Decapodus) bait. Left Yap dock at 1:30 to steam toward Ulithi. Searching for seabirds but no success until approaching Ulithi but birds moving fast. No school was baited. We entered Ulithi lagoon at 12:50 and anchored in front of Mogmog island at 13:40. Presentation of the work we are conducting to the chiefs (supposedly including Ignathio Waithog and Arthur Yolwa) in the men's house and we got the agreement of the chiefs to do the baiting; we left one unused tag (P323414) to show what it looks like and 2 small reward posters. We were then invited to visit the island by Stanley. We left anchorage in front of Mogmog at 16:20 to go to Asor island (arrived at 16:45) of which depends the area where we will be baiting. We went onshore to meet the chief Isaac and discuss with our contact there (Rosendo Haleng) ; after a quick visit on the island we were back on board at 18:05 with 2 observers (Kevin and Robin) from Mogmog for the baiting. In prevision of the baiting of the night, the large bait were moved into 2 tanks to leave 4 tanks free to receive the new bait. First set started late at 4:30 because of the strong wind all night long, 80 buckets of large bait, mainly Decapodus and sardines. Second set started at 5:50, 115 buckets of large sardines with a little bit of sprat (blue?) and hardyhead (a bag of bait has been frozen for proper identification in the lab).
24/08/2019		It was extremely windy during the night and we could not

		<p>proceed with the baiting before 4:30. The 2 sets brought 185 buckets of mainly sardines, decapтерus with a little bit of sprat and hardyhead. We dropped the 2 observers back in Mogmog with the skiff and started steaming at 7:15 to exit the lagoon through a pass on the eastern side (Mugai channel). Around 9:00, sampled a blue marlin outside the atoll. No sightings of bird before 15:30; we chased schools for a while and finally a mixed schools of SKJ and YFT responded with a total of 260 tags released (94% SKJ, 6% YFT) including 21 SKJ injected with strontium. Back in the lagoon of Ulithi at night around 21:00 and considering it was late already and dark we did not explore other areas and set the lights in the same bait ground as yesterday. The 2 observers from Mogmog came back onboard to give some coconuts and breadfruits but did not stay to observe the baiting. Again a lot of wind, first set finished at 4:20 for 6 buckets of sardines and second set finished at 5:20 for 53 buckets of sardines (rainbow?) and some sprat (blue?)</p>
25/08/2019	Steaming from Ulithi to Wolei	<p>Two baiting sets last night only brought about 60 buckets of mainly sardines (rainbow). We left the baiting ground around 5:30 to go to Asor to drop some fish and say goodbye to our contact there (Rosendo). We left Ulithi lagoon at 7:50 to steam toward Wolei (300 nmi away) and looking for fish on the way. We approached a flock of birds around lunchtime but running too fast we did not spent baits. Long day with more than 20 knots of wind and starboard swell. Steaming all day and all night to Woleia.</p>
26/08/2019	steaming to Woleai	<p>Weather slightly better this morning but still some wind and starboard swell. Found a detached anchored FAD at 8:30 and spent all of our poor bait on it to catch and tag 9 large skipjack. Kept steaming to Woleai where we arrived at 15:20. We anchored in the eastern lagoon and went onshore to visit the chiefs of Woleai-Falalop with Eddie the FSM observer onboard introducing us to the chiefs (Francisco and Francisco). Weather slightly better this morning but still some wind and starboard swell. Found a detached anchored FAD at 8:30 and spent all of our poor bait on it to catch and tag 9 large skipjack. Kept steaming to Woleai where we arrived at 15:20. We anchored in the eastern lagoon and went onshore to visit the chiefs of Woleai-Falalop with Eddie the FSM observer onboard introducing us to the chiefs (Francisco and Francisco). First set finished at 23:45 with 19 buckets of blue sprat/ocean anchovies and some rainbow sardines. Second set finished at 00:35 with 31 buckets of the same mix. Third set finished at at 5:00 with 3 buckets only.</p>
27/08/2019	Searching for fish around Woleai	<p>Last night 3 sets of baiting brought only 50 buckets of good sprat mainly with some anchovies and few rainbow sardines. We left Woleai lagoon at 5:30 in search for tuna. Around 10:30 we found a detached anchored FAD that was drifting but despite copious</p>

		<p>amount of sprat chummed, only 1 YFT was caught and tagged at the stern. Finally in the afternoon we came across a nice free school that responded favorably and we managed to tag 307 skipjack, but we run short of bait. Back to Woleai around 18:00 and thanks to Eddie, the FSM observer onboard, talking on VHF with Falalis and Utagal, we obtained the authorisation to enter the western lagoon and bait that night on the condition that we go and visit the chiefs of Utagal the following morning. First set of baiting started at 22:15 and finished at 22:45 with 22 bckt of blue sprats, golden anchovies et some sardines. Second set finished at 23:40 with 42 buckets of the same. Third set in the morning started at 4:30, finishing at 5:00, and brought 35 buckets of again mainly blue sprat with some golden anchovies.</p>
28/08/2019	fishing around Woleai	<p>Woleai western lagoon was better in terms of quantity of baits with close to 100 buckets of blue sprats, golden anchovies and a little bit of rainbow sardines. We had to wait until 8:00 before having the authorisation to go onshore to pay a visit to the chiefs of Utagal as agreed the previous night; one of them joined us for the day and we departed the lagoon at 8:45. He guided us to their fishing ground for tuna north west of the island where they go fishing on their traditional canoes. Of course, it is forbidden to fish there for anybody else but considering we are releasing the fish he was willing to let us fish there. And, sure enough there was fish. Later we went back to the fishing spot from the previous day, further west and found another school. We spent all of our baits and total of the day was 434 skipjack and we were back in the western lagoon at 17:00. The chief enjoyed his day and went back home with some fish and gave us the right to bait for an extra night. First set finished at 2:00 with 60 buckets of mainly blue sprat, hardyhead, goatfish and various reef/lagoon species but also 1 Myctophidae found on deck (lanternfish coming at the surface at night from 500m depth, not expected in lagoons). Second set finished at 2:45 with 17 buckets. Third set finished at 3:30 with 21 buckets of a similar mix including a number of small Myctophids.</p>
29/08/2019	searching and fishing west of Woleai	<p>Last night brought us 98 buckets of mainly blue sprat with some hardyhead and goatfish and a mix of reef/lagoon species and more surprisingly some Myctophids (at 500m depth during the day and at the surface at night but I did not thought they were coming into lagoons). We left the lagoon at 3:45 after the last baiting to reach fishing ground west of Woleai before dawn. Onboard with us during the baiting and the coming day of fishing are 2 obsersrvers from the island of Saliap. A first school was approached and chummed with no success at midday. Early afternoon we found a nice log that saved the day with 626 SKJ and 1 YFT tagged. We came back to Woleai western lagoon just before 18:00. Three early sets in row last night (21:10, 21:50 and 22:30) provided respectively 16, 15 and 46 buckets of bait</p>

		(mostly sprats, with some hardyhead, cardinalfish and other reef species), before we left Wolei at 23:00 for the steam to Lamotrek.
30/08/2019	Steamed to Lamotrek and searched for fish on the way	Three early sets in row last night provided 77 buckets of bait (mostly sprats, with some hardyhead, cardinalfish and other reef species), before we left Wolei at 23:00 for the steam to Lamotrek. We found a detached anchored FAD in the morning but apart a pile of RRU, it did not bring anything good for us. At 8:30 some birds took us to a nice free school of large SKJ (>60cm) that allowed us to tag 161 fish. The school stopped biting and we could have spent all of our bait for probably little result so we decided to keep steaming and try our luck later when getting closer to Lamotrek. Alas, apart from one supposedly marlin that took a bite to the lure and left, we did not see other fish for the day. We arrived in Lamotrek at 15:45. Eddie, the FSM observer, made contact with Lamotrek island with the VHF and we went onshore to present the work to the chiefs and have authorisation to bait in the lagoon. Discussions were a little bit tense but Eddie did a great job and we finally got the OK for the baiting. After a little walkabout around the island, when we came back to the men's house it was time for cultural exchanges around tuba bowls. Several observers came onboard for the night's baiting. First set finished at 23:00, bringing 40 buckets of hardyhead, sprats, goatfish and slender fusiliers. Also many platex and pompano-like fish in the net, much to Max's disgust. Second set finished at 23:45 bringing 16 buckets of the same mix. Third set at 4:30, which caught 33 buckets of hardyhead, sprats and goatfish again, as well as some large platex released, the set finished at 5am.
31/08/2019	Searching and fishing in Lamotrek and Satawal vicinity	Last night's three bait sets brought us 89 buckets of mainly hardyhead with a good mix of goatfish, sprat, fusilier. We left Lamotrek lagoon around 5:00 after the last set in search for our last fish before heading to Chuuk. We found a school of large yellowfin around 7:30, north of Lamotrek, but did not bother to chum. Nothing happened in the morning but we found 2 schools around midday that did not responded to baiting. We were luckier around 14:00 with a free school of SKJ with more than 500 tags, and at sunset with a SKJ/YFT school associated to a spermwhale bringing close to 30 tags. Total of the day is 558 including 549 SKJ and 9 YFT. Fishing lasted till sunset and the night was spent steaming toward Chuuk.
1/09/2019	Steaming towards Chuuk and fishing on the way	At dawn this morning we are about 200nmi away from the north-east pass of Chuuk where we have to be in 24 hours, leaving us 4 hours of fishing today. Unfortunately no birds on the radar, no FAD, no log sighting meaning no tag today, however a blue marlin sacrificed himself for biological sampling around 17:00. At 18:30 we were 86 nmi away from Chuuk North-east pass with

		ETA planned at 6:00 on 2nd Sept.
2/09/2019	Enter Chuuk lagoon, change of crew, supply and baiting in Chuuk	Since 4:00 we have been drifting in front of the north-east pass of Chuuk lagoon waiting for dawn and for establishing contact with port to have entry permission into the lagoon and potentially a pilot. Communication impossible directly with Chuuk (nobody on the VHF or on the phone) and we finally had to have Cynthia in Noro to call the agent in Chuuk. It seems our arrival had not been prepared despite communicating and informing the agent the previous week by email. Finally pilot was supposed to meet us at 10:00 at the north-east pass, but arrived at 10:25. We touched port at 11:50. Bruno and Jed were waiting for us. Clearance, immigration and quarantine. Handover of the cruise leadership to Bruno. Packing samples and Valerie and Lauriane left to catch their flight at 15:15. Shopping with help of Jenny (Transco). All list bought. Left the wharf at 1630, just in time to go to baitground at the North Pass. Anchored at 1830 about 0.7 nm SW of the small Onaf island in 43 m of water, not far from one of the Te TauTai positions in 1991...Good detection at echosounder at 23h but rain and wind postpone the net till 1h20. Current perturbed the hauling resulted in only 4 bkts of cardinal and sprats. Same thing at 2h30 on the auxilliary light. Last set to the first position for 28 bkts of big sardines and an a bit of sprat
3/09/2019	Fishing and baiting Chuuk	Out of the lagoon by the North Pass at 0610. Follow Chuuk contours clockwise at about 10 nm from the reef. Birds scattered. Met some dolphin pods. Chummed a school just before 11am but only large YF (they loved our big sardines). Could not find decent school before having to come to Weno wharf for the clearance out at 15h. Arrived at the dock at 14h10. Clearance done quickly and left the dock at 1440 to try finding a better baiting ground in the North lagoon. Went on the NW part closed to small Falalu island in 42/44 m of water. After anchoring the auxiliary light, at anchor in 44 m at 17:20. Looks a much better place than yesterday. Alas, the first set only get 2 bkts of sardines and second set was null. Third set at 0430 for the same depressing result...
4/09/2019	Fishing toward Pohnpei	Went out the lagoon by the North Pass at 0615. Took the direction of Losap atoll (60nm). Missed one marlin on the troll at about 07am, then another one 2h later. Found schools at about 1 pm, five nm in the NE of Nama island and tagged 60 fish before the poor bait supply was exhausted. Started the long 320 nm haul to Pohnpei at 1320.
5/09/2019	steaming to Pohnpei	Awake in Pohnpei State (clock back to Solomon time), with not so good weather, hopefully in our back. S105 doing good speed, averaging 10.5 knts, with an ETA in front of Pohnpei hrb of about 2230h.
6/09/2019	In pohnpei for fuel,	Arrived close to pilot station at 23h30 last night and drift for the

	crew change, bait in outer harbour	<p>night. Come back to the point at 6h30. Busy time with a Chinese research vessel , a carrier and a LL vessel at the same time. Also our VHF radio seems not reliable and reception not good. Weather not helping with heavy rain and no visibility. Called the agent by Satphone and she warned the pilot station that we were in Standby. 9am, waiting...Finally took pilot on board at 1030; Docking at busy main wharf with anchor help at 10:50. Then many things to be arranged as always. Pohnpei State fishing permit delivered at the last minute with CL going to Dpt of Resources and Development to explain our project to Scotty who gave us the State Research permit. A small problem appears with immigration as FA didn't FW SPC letter for Annie arriving on one way ticket. Fuel delivery postponed until Chinese big RV could be moved and a long enough fuel hose found. Also discussed with port authority to get a pilot exemption for going in and out outer-harbor for baiting...Finally left the dock at 19:00 after getting 36,000 litres of fuel and all good to go...Hard to pass between the PS boat and the carrier and the reef patches for going in outer harbour (one baiting position taken by a f....g huge carrier) . At anchor at 19:40 in 43 meters in the middle of "Las Vegas" ...First set for 65 bkts of mainly gold anch. Second set at 0420 for only 11 bkts of sardines</p>
7/09/2019	Fishing to Ant atoll	<p>Wait for daylight (0603) to start steaming out of harbour. Arrived at Ant east side at 8:00. few showers but not too annoying, a bit of swell. Weather deteriorated around 9am under squalls. Found some free schools at 10am about 14 nm in the south of Pohnpei and tagged 2 schools in about 1 hour for 501 fish (26% YF for a change...) before running out of our 70 bkts of anchovies. Started steaming back to baitground at 1110 about 30nm away. Sent message to ask authorization to bait in Rontiki hrb but no answer (Saturday bien sur...). Inside outer harbour at 1510. Dropped two anchors+floats to later attach the auxiliary lights , then at anchor at 1550 close to the mangrove in front of Role (so called Sokeh point). First set at 0030 for 90 bkts of a mixed bag with high % of devisi. Second set on first light with 26 bkts; third set for 45 bkts. Put the boat lights for a last set at 5h that provided 133 bkts of almost pure anchovies...You beauty!</p>
8/09/2019	Fishing west and south Pohnpei	<p>Came out of Jokaj passage at 0620; chummed one school at 0735 in front of Tauak passage but no takers. More schools chummed later between 9 and 10am , seemed to be mostly YF highly moving schools. Then found a lost anchored Phillipino fad (classic 3 x200l drums) with a long length of floating rope that almost went in the propeller. Big school associated; we released 1797 tagged fish (1594 S, 202 Y and 1 B) including 27 archival (25 S and 2 Y) in about 2 hours, having to pause to reload the blocks...Stopped when we started to get too many recoveries (12). After some engine problem, we tagged another 92 fish before heading back to baitground. In the outer harb at 21h30, at</p>

		<p>anchor in front Sokeh point at 2215 along with one auxiliary light. First set for 80 bkts at 3h30. Second set at 0500 for 58 bkts. POSSIBLY DAX RELEASED 100 TAGS WITH NO RECORDS (SERIE P329101)</p>
9/09/2019	Fishing to Pakin atoll and north Pohnpei isl	<p>Left the baitground at 06am, front wind to Pakin. Weather picking up to 20knts WNW making the ride uncomfortable. Found fast moving school about 4nm ESE of Pakin at 8h15. Chased them for 30 min before we discovered it was Kaw and RRU... Started then to search further north Pohnpei. Found a school of large SJ at noon, about 6 nm north of NE point of the island, and tag 392 fish in 40 min; useful but not for archival, impossible to handle those fish for surgery...Another school chased at 13h30 but no success. One just before 15h revealed to be large YF. Weather not helping, 15-20+rain. Chase another school at about 16h but could not catch-up so we called it a day and steamed back to Jokaj passage. Inside at 19h, at anchor at 19:20. First set at 2h30 for 20 kbs of mostly scads and large Hq...Second set 10 bkts of the same. Third set at 0520 for 29 bkts of mixed sardines, hq and some anchovies</p>
10/09/2019	Fishing south and east Pohnpei	<p>Out of the lagoon at 6h20, follow the reef toward the south west with the idea to go on the east coast. Weather fine, 10-15 knt from the WSW, tried to chum a few schools but our available baits (few anchovies, large scads and sardines) are not really efficient on the fast moving skj. Before mid-day we got approval from marine resources for baiting in Ronkiti harbor. With that in mind, we started to steam in that direction at 1230 when we were about 20nm in the SW. At 13 h we found again the lucky philippino raft that have drifted only about 6nm in the NW in 2 days. Making the most of our remaining bait, we tagged 711 (476 S, 218Y) fish, including 16 archival (1y). Few recaptures were seen (5) and re-released... At Ronkiti outer harbor entrance at about 16h30. Tricky narrow passage for going inside the end of the bay. Muddy waters and not a large place...At anchor in 32 m at 17h20 but have to relocate 30 min later due to current placing the boat not where we were expected it to be with the wind... No space for auxiliary light. Drama at midnight with strong wind under squall that made the boat drifted on the mud fringe of the island in our east. Stern touched it with no damage but we lost our bait when repositioning the boat. Then have to stop the net haul at 4am with anchor not holding in the current (soft mud bottom). Managed to save part of the bait under one auxiliary light and do one set at 5h45 in almost daylight...</p>
11/09/2019	Fishing south Pohnpei, bait Matalanim	<p>Came out of Ronkiti at 0630 with only 30 bkts of baits but happy to escape the little trap. Only obvious option was to try finding the philippino raft again to get good size skipjacks for archival. We spent quite a big amount of time trying to look for it with an estimated drift direction false from the beginning... the thing</p>

		drifted in the opposite direction compare to its yesterday drift...Finally found at 10h40 and we tagged 252 fish (10 archival) in 40 minutes with our 31 bkts . Then we tow the raft for 10 nm to disperse the aggregation. Entered in Matalanim harbor at 1340 and anchored in 42 m one hour later after dropping one anchor line for the auxiliary light. No many clouds...first set at 23h for 20 bkts. Problem of air leak in the engine control postponed the second set on auxiliary light. Second set at finally at 0430 under heavy rain...145 bkts of mostly anchovies (dev and indicus). Last set at 0530 on the small light for 49 bkts of same mixed bag
12/09/2019	Fishing east Pohnpei, bait in Matalanim	Left Matalanim at 0630 under pouring rain with a solid load of bait and high expectations for the day. At 8h45 found the torpedo fad that strangely drifted 7 nm South during the night (with westerly winds...?). Hard to find schools in this rain. Wind increase at the end of the morning, reaching 20 knts . Found schools of RRU, dolphin and yellowfin but no joy. Lost all the monofilament on the unattended trolling reel.... Long painful day punching in the waves with plenty baits but no fish...Back to Matalanim at 19h. The final word is : that's fishing...Peaceful night in the harbor with weather improvement, the only set at 0440 brought 120bkts of nice anchovies, sprat and g.s. herrings. Loaded for bears would say Yoda...
13/09/2019	Fish south Pohnpei and Ant atoll, then north island. Start of full moon break	Came out Matalanim harbor at 0545, loaded for bears and decided to go south toward Ant. West wind 10/15 knt, some remains of the yesterday WSW swell. Better weather but still no sign of Skj school; met some YF at 9, caught a small 178 cm BUM at about 950 between Ant and the main island. Prospected between Ant and Pakin islands but no luck. In the north, same thing. Only encountered some dolphin pods. Throw the towel at 15h30 and steamed to Jokaj passage to be ETA 17h at the dock. No space so we had to park alongside a quite recent local cargo boat (japan donation). 6,300 USD for crew advances distributed to the impatient crowd. Huge rain at 1730, hopefully Bradley came to pick-up the team and drove us to our hotel (Hide Away). Let's the howling begin...!
14/09/2019	Full moon break day 1	Howling started full speed last night for all the boat. Some very tired faces in the morning. Nice evening at Ocean View Plaza 6 to 9 provided by Norma with ample food and beers. Early night for some, howling carried-on for others.
15/09/2019	Full moon break day 2	CL visited briefly the boat early morning and escaped quickly to the creatures still alive at the end of their metamorphose...After a big breakfast at James and Lara's place, the scientific team went to a Nan Madol cultural tour. After last shopping we left the Kolonia wharf at 1744 for going in the outer-harbor baiting ground. Moon rise 19h20. First set at 1950 for 23 bkts of mixed species; second set at 2040 for 9 bkts with more scads. Last set

		0430 for 10 bkts of mostly Hq.
16/09/2019	Clearance out of FSM, SF toward Solomon islands	Back from baitground at 0715. Went to see the agent for organising the clearance-out as we never received confirmation of the arrangement requested 5 days ago.. Immigration onboard at 0850, cleared at 0920. Get rid of rubbish after Quarantine inspection. Let go the ropes at 0930, bye Bye Pohnpei...Weather improved along the day. No school sighted, plenty birds but no feeding action...
17/09/2019	S&F toward dFADs	Calm seas for the night. The bait situation looks fine apart the front starboard that experience air bubble problem causing some mortality. Found a nice looking log at 0640 but nothing associated. 15 min later 1 group of lurking birds but no fish. Around 9am, a large log provided 38 tags including 3 AT in S. Looked like remains of a school that has been recently fished (different sizes and Sp present). At noon, managed to catch a free school of large SJ (55+) and few YF but at high bait cost. Stop after 79 tagged with 2 full tank left and around 30 bkts left between the others.... Stop fishing to wait for the Dfads that are still about 300 nm away. Started to feed the baits
18/09/2019	S&F in IW and SE corner of FSM, on the way towards some dFADs in NE PNG	Another hot and calm night steaming south. Passed Equator at 0815 Solomon time, but where is King Neptune? Getting ready for possible jigging action tonight at the Fad. Crossed the path at 2pm of a big old log with good detection but revealed to be only RRU. Another big log briefly chum before 15h provided 10 tagged, once again too many rru. Just after 16h we encountered a large area with multiple groups of skj actively feeding plus YF and BET associated with at least 4 or 5 sei (one mother and calve) and 1 or 2 minky whales plus at last 1 whale shark (4 m) and large silky sharks. Amazing sight but not effective in term of tag number that could possibly be released in that kind of figure. In about 45 min we released 53 fish (32 B) including 2 B and 1 Y with archival. Stop the bait waste at 17h and started steaming to the best-looking dFAD (marking 59 tons) about 90 nm away. Plan is to jig on arrival at 3am and pole and line at sunrise. More likely the last school of the cruise...
19/09/2019	Fish dFad and steam	Arrived at dFAD ISL+249158 (Topaz) at about 3am. The area is surrounded by purse seine boats (10 drifting in a 20 nm radius...).Tie-up the fad rope to the stern and tried to jig for 1 hour but sharks prevented any catch. After x lost jigs we waited for daylight. Started chumming in pouring rain at 0625 with good mark under the boat. Unfortunately, the school was composed mostly by RRU and few juvenile YF and BET. Almost no skipjack...Used our remaining dying one-week-old bait from Matalanim harbor to tagged only 30 YF and B (one archival). Full time at 0730 and start running for the 350 nm road to Noro-ETA between 6 to 7pm tomorrow. At 0930 we passed close to PS boats in setting action; we counted 14 boats at the

		binoculars...Steamed all day in bad weather with lots of rain and wind in the afternoon.
20/09/2019	Steaming to Noro	Bumpy road all night. Wind direction changed from SW to SE, back to trade wind country...Numerous showers not helping for equipment cleaning and storing. This will have to wait for tomorrow in port. ETA 8pm causing discussion between NFD and immigration office in Noro for our clearance on Friday late evening arrival... Arrived at the northern passage between Choiseul and Isabel at about 12. No visibility...Finally alongside Noro dock at 19h30