

PACIFIC TUNA TAGGING PROJECT

Phase 2 (Central Pacific)

Cruise CP-11, first leg: 9th September to 6th October 2015

SUMMARY REPORT

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INTRODUCTION

The Central Pacific (CP) tagging cruises are part of the Pacific Tuna Tagging Programme (PTTP) that started in August 2006 with the objective of releasing tagged tropical tunas throughout the WCPO and concentrated in the latitudes where the tuna stocks are mostly harvested, approximately 10° N to 10° S. These CP cruises were designed to catch and tag tuna in areas where pole-and-line fishing gear is not efficient due to the absence of suitable bait grounds. Using specific trolling gears developed in Hawaii and targeting the NOAA TAO oceanographic buoys anchored east of the Date Line, and more recently drifting FADs, the CP tagging cruises have improved the overall spatial coverage of PTTP tag releases and increased the number of tagged bigeye tuna that are not commonly caught by pole-and-line gear in the western part of the WCPO.

Ten CP cruises have already been achieved, using Hawaii and Tonga-based fishing vessels; these have tagged and released close to 38,000 tuna, mostly bigeye (90%), on the TAO buoys anchored along the meridians 140°W, 155°W, 170°W and 180°W and between 5°N and 5°S.

This report summarizes activities during the 28 days of the first leg of an eleventh CP cruise, named hereafter CP-11, on the Hawaii-based FV Gutsy Lady 4. This longline vessel was chartered for the first time but the captain previously had the charter for Hawaii based CP cruises CP3, CP4 and CP7 on his old vessel, FV Ao Shibi Go.

Following the CP-10 experiment, CP-11 was designed to augment data collection for studies on tuna movements, exploitation rates and fish aggregation device (FAD) association dynamics. This study was made possible by the cooperation between SPC, Tri Marine purse seine company and International Seafood Sustainability Foundation (ISSF) and will be detailed in a later chapter in this report (see Acoustic Tagging).

Crew and scientific personnel onboard Gutsy Lady 4 during CP-11-Leg 1 are listed in **Table 1**.

Table 1: Personnel onboard Pacific Sunrise during CP-11

Name	Title/affiliation	Nationality
Tim Jones	Captain	U.S.
Bruno Leroy	Cruise Leader/ SPC	France
Jeff Muir	Scientist/ ISSF	U.S.
Beth Vanden Heuvel	Scientist/ Tri Marine	U.S.
Macarthur Malakai	Crew-bosom	U.S.
Bryan Materne	Crew	U.S.
Centriko Lucios	Crew	U.S.

GENERAL DESCRIPTION OF VESSEL

The FV Gutsy Lady 4 (named hereafter GL4) is a 30 meter steel vessel (see **Picture 1**) previously outfitted for prawn trawling in the Gulf of Mexico. Bought by Brian Hara in 2014, it is now equipped with longline gear used for fishing pelagic fish (mainly tuna, with bigeye as the main target) in Hawaii EEZ. The vessel is fitted with two 600hp Cummins engines, two 70 KVA Cummins generators, and one water-maker (80 l/h). The vessel is fully equipped with Furuno electronics including 3 VHF and 1 SSB radios, radar and dual frequency sounders (FCV 295 + 3KW transducer), autopilot, AIS, a vessel monitoring system (CLS), 2 water temperature gauges, a longline LP system, one desktop computer for navigation (HighPlot, custom-made by an ex-fisherman) and the OrbMap oceanography information package. GL4 is also equipped with an Iridium satphone linked with Skyfile software for email communication.



Picture 1: FV Gutsy Lady 4 at Pier 38, Honolulu.

Prior to CP-11 departure, GL4 was equipped, by Tri Marine technician Rene Camacho, with a Fleet Broad Band 250 satellite communication system coupled with an “oceanbox” data compression server (Thalos). This communication set-up allowed access to oceanographic and weather data (Catsat), as well as to several buoy monitoring systems (Satlink, Marine Instruments and Iris) which provided the dFAD targets to supplement the trip. The systems were used by Beth to monitor the Tri Marine satellite buoys and to direct GL4 to the associated dFADs that were fished during Leg 1 of the cruise. In addition to this, the scientists benefited from WiFi e-mail access which facilitated work with the onshore collaborators of the project. Beth was also able to continue her usual duties to Tri Marine, mainly by providing oceanography-based fishing recommendations to the Cape Fleet.

Complete boat specifications are detailed in **Appendix 1**.

The operational range of GL4 is over 10,000 nm and 60 days at 8 knots with a 110,000 litre fuel tank. The boat also has a fresh water tank of 30 m³ capacity and an ice-maker. The fish hold is divided into two parts, one dedicated to preserve fish in ice (about 22 ton capacity) and one freezer compartment, mainly used to store frozen bait (about 15 tons).

FISHING GEAR

For the purpose of this tagging cruise the vessel was fitted with 9 “danglers”. This gear consists of galvanized steel davits which extend at right angles from the hull for 2 meters and deploy two short trolling lines skipping at the surface. This type of gear has been successfully used during the ten previous CP cruises as well as in Hawaii for other tagging programs and initially for commercial fishing of offshore seamount and FAD tuna aggregations.

Six danglers were placed on the starboard side and 3 on the port side. The troll lines hanging from the danglers consisted of a 2m length of 6mm rope spliced with loops at both ends to which a 80cm length of 2mm monofilament line was fitted with tube squid-like lures, one 45g lead weight and a 7/0 Mustad galvanized barbless hook.

Three troll lines were also fit on hydraulic reels attached from the stern of the vessel. These consisted of a 400 lbs mono to which a 5m by 2mm monofilament line was attached and rigged with a tube squid jig bearing three 45g lead weights and a 7/0 Mustad galvanized barbless hook.

Before departure, the captain decided to also equip the boat with a “green stick”, a trolling technique developed in Japan. This gear consists of a 13m vertical fiberglass outrigger pole linked to a long mainline ending with a large wooden teaser and longline float, which creates tension at the end on the entire length of the mainline. Six squid lures with increasing leader lengths are attached to the mainline with longline clips, and are adjusted so that they skip on the surface with the leader out of the water. The mainline is retrieved with a hydraulic line puller on the stern of the boat. Due to time constraints, this equipment was only deployed around dFADs twice, and no fish were captured. This method is very effective in various tuna fisheries worldwide, including Japan, East Coast US bluefin, and Hawaii yellowfin, and also features a very short fight time which is attractive for tagging purposes.

Rods and reels equipped with heavy metallic jigs and hand lines have also been used to capture tuna and the different species that were equipped with sonic tags for the ISSF project and/or archival tags for PTTTP goals.

With the idea of catching larger fish, 2 short (120 and 240 hooks) sets of long line were made close to dFADs during the cruise. These attempts were unsuccessful.

TAGGING OPERATIONS

Four tagging stations were set up on the deck of the vessel. Three cradles were dedicated to conventional tagging and were of the same design to those previously used for pole-and-line tagging. One was placed at the stern of the vessel while the other two were positioned on the starboard side (see Picture 2). The fourth cradle was set up specifically for archival/sonic tagging and supplied with a saltwater hose for irrigating the tuna during surgery. This tagging station was also used to deploy the sonic tags in the species targeted by the ISSF project. The archival cradle was placed in a central location on the deck. All cradles were marked with one cm graduations from 30cm to 120cm.



Picture 2: Archival tagging cradle (first plan) and 2 starboard side conventional cradles. Part of the dangler gear and the stern hydraulic reels can also be seen in the picture.

FISH TAGGING DETAILS

Table 2 summarises the number of fish tagged per tag type and per species.

Table 2: Numbers of tags deployed by tag type and species (note that 2 bigeye and 7 yellowfin received an archival + a sonic tag)

Tag type	BET	YFT	SKJ	others	Total
Sonic	23	21	10	5	59
Archival	40	35	0	0	75
satellite		1			1
Conventional Y13	1526	275	73	0	1874
Total fish tagged	1587	325	83	5	2000

Data recording

Each tagger was equipped with a digital voice recorder enclosed in a waterproof sleeve. The first and last tag in each new block was read out before commencing tagging, and tag numbers were intermittently recorded and checked. After each fish was tagged, its length was recorded from the graduations on the cradles. Data were later transcribed onto hard copy release log sheets at the end of each tagging session. Data were subsequently entered into the Microsoft SQL Server data base "TagDager".

- **Conventional tagging:**

Conventional tagging (CT) consisted of using the 13cm yellow dart tag manufactured by Hallprint Ltd. After checking if fish did not present any severe injuries¹, the tag was inserted between the pterygiophores of the second dorsal fin using a sharp stainless steel applicator tube. Used applicators were collected and immersed in a bucket containing a solution of fresh water and bleach, rinsed in fresh water and dried for re-use. Prior to each tagging operation, tags were placed inside the applicators and mounted in numbered tagging blocks each holding 100 loaded applicators. There were eleven 100 tag blocks in total. A total of 1995 tropical tunas were tagged and released during the cruise, comprised of 1587 bigeye (80%), 83 skipjack (4 %) and 325 yellowfin tuna (16 %). Their size distributions are shown in **Figure 5**. The spatial distribution of all tuna tag releases is shown in **Figure 1**.

¹ Typical injuries, incurred by large hooks and the shock/trauma of hookset, included mouth/lower jaw damage, eye damage (from inside the mouth cavity) and bleeding from various locations, and ranging from superficial to heavy. Bites from cookie cutter sharks and wounds from sharks and billfish were also noted.

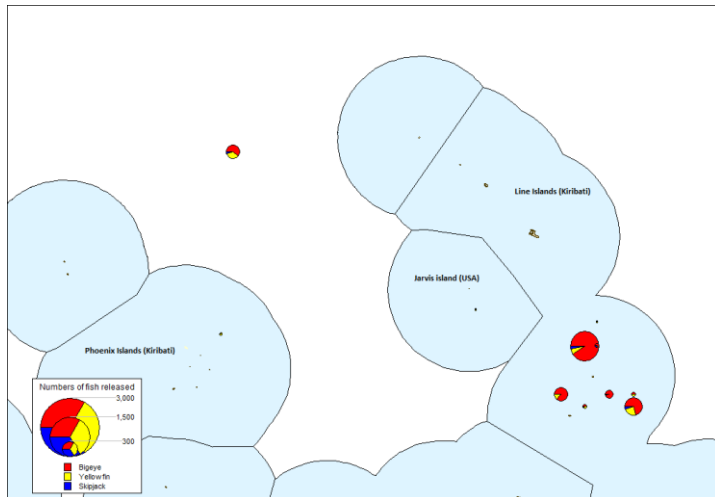


Figure 1: Distribution of tag released in tropical tunas during CP-11 Leg1

- **Archival tagging:**

Seventy five Wildlife Computers MK9 and 33 Lotek Lat2810 archival tags were available for deployment during the first leg of the cruise. Forty tags were deployed in bigeye tuna and 35 on yellowfin. All tags were configured to sample all likely depths, sea and internal fish temperatures and light intensity every 30 seconds. Archival tagged tuna were externally marked with an orange 13 cm conventional tag. Suitable sized tuna (generally > 55 cm for MK9 and > 45 cm for LAT2810, see the length frequencies for further details) were placed belly up on the V-shaped central tagging cradle, the eye covered with a synthetic chamois and irrigated via the mouth by a seawater hose. All archival tags were implanted into the peritoneal cavity and secured with one or two sutures. Two bigeye and 7 yellowfin tuna also received a sonic tag in addition to the archival. All archival tagging was conducted by the cruise leader (Picture 3).



Picture 3: Surgery to implant an archival tag in a yellowfin tuna

- **Acoustic Tagging:**

ISSF's component of the CP-11 cruise consisted of instrumenting 3 drifting fishing aggregating devices (dFADs) with VR4 Global satellite communicating acoustic receivers manufactured by Vemco. Coded, pressure sensitive acoustic tags were implanted in tuna (SKJ, YFT, BET) and non-tuna species (silky shark: FAL (see **Picture 4**), spotted oceanic trigger fish: CNT) at these dFADs to investigate:

1. Vertical behavior of species at dFADs to improve processing of echo sounder buoy data, in order to better distinguish different species from echo sounder buoy data
2. The behavior of tuna and non-tuna species at dFADs to better understand the effects of dFADs on these species, including residency, vertical behavior, and daily presence/absence patterns.

Table 3 summarizes the number of acoustic tags implanted per species and per receiver

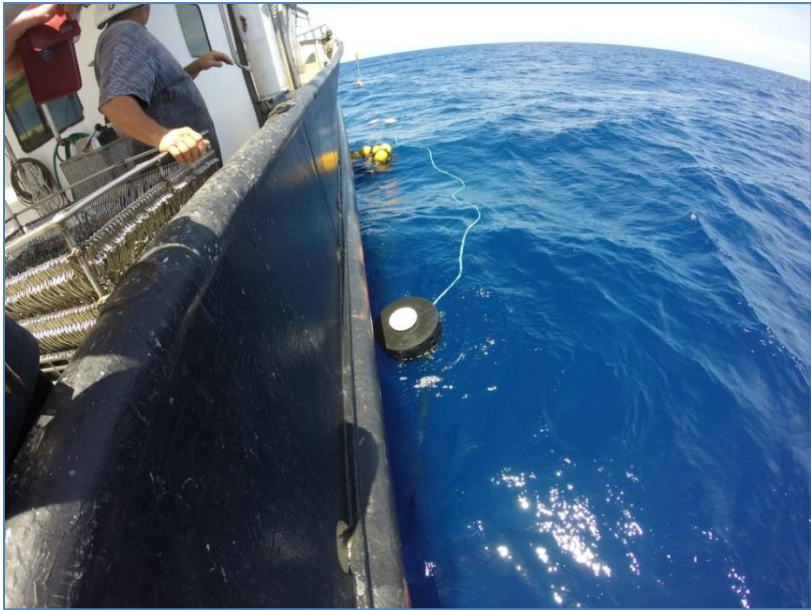
Figure 2 shows the length frequencies of bigeye and yellowfin implanted with acoustic tags



Picture 4: Juvenile silky shark implanted with an acoustic tag and ready to be released.

VR4 Global Description:

Vemco’s VR4 Global unit allows the user to remotely monitor tagged fish, and eliminates the need to retrieve the receiver after the study has finished. The unit utilizes Iridium satellite communication to relay detection logs, status updates, and error messages to the user. This part of the unit is housed in aluminum housing, floated by a doughnut shaped float collar which bolts around the housing. The unit utilizes a hydrophone attached to a 5 meter rope, suspended under the main body of the unit.



Picture 5: dFAD with VR4 attached

Access to dFADs and satellite buoy data information used during the cruise:

Tri Marine provided positions of dFADs linked to satellite IRIS, Satlink and Marine Instruments buoys owned by them in the areas that the tagging vessel operated during the cruise. A total of 9 different dFADs (8 Tri Marine and one supposed Spanish) were visited and fished (See **Figure 4** for an overview of dFAD locations) and three of them were instrumented with VR4 acoustic receivers and abandoned (see **Picture 5**).

The associated Satlink buoy echo-sounder histogram figures for the Tri Marine dFADs are displayed in **Appendix IV**). Indication of the approximate amount of fish under a buoy has been used to direct the boat to the best available dFAD in range of the tagging vessel. Demonstration of the FAD school association dynamic has been observed on a couple of occasions where the detected biomass on a particular day was gone the next day (see DSL+94896 histograms between 26th and 27th Sep). It should be noted that the observed fishing pressure exerted by the Korean PS fleet near the tagging vessel in the Line Islands EEZ was quite high (eg 7 fishing vessels seen on the radar screen in our surrounding 15 Nm on one morning).

Detail of acoustic tagging work:

Experiment 1 (associated with Trimarine dFAD DSL+93486)

Tagging and deployment of the VR4 Global unit no. 200081 commenced on 25th September in the Line Island EEZ. Twenty-one animals were implanted with V13 coded pressure sensing acoustic tags (**Table 3**).

At the time of this report, one tag deployed in a triggerfish continues to be detected at this station. Between 4 and 6 days after tags were deployed at this station, the aggregation appears to have abandoned the FAD as all detections besides the triggerfish ceased.

Experiment 2 (associated with Trimarine dFAD DSL+94135)

Tagging and deployment of the VR4 Global unit no. 200086 commenced on 28th September in the Line Islands EEZ. Seventeen animals were implanted with V13 coded pressure sensing acoustic tags (**Table 3**).

At the time of this report, height of the transmitters, 2 yellowfin and 6 bigeye, remain on the FAD. This means these animals will have remained associated with the FAD for a minimum of 14 days.

Experiment 3 (associated with Trimarine dFAD DSL+93218)

Tagging and deployment of the VR4 Global unit no. 200066 commenced on 29th September in the Line Islands EEZ. Twenty-one animals were implanted with V13 coded pressure sensing acoustic tags (**Table 3**). At the time of this report, five of the transmitters were detected. These were comprised of 2 bigeye, 1 triggerfish, and 2 yellowfin (one of the yellowfin was double tagged with a Lotek archival). This means these animals will have remained associated with the FAD for a minimum of 13 days.

Table 3: Summary of animals implanted with acoustic tags at each receiver station. In brackets the number of fish that also received an archival tag.

Species	Exp.1	Exp.2	Exp.3	Total
YFT	10 (3)	6 (1)	5 (3)	21
SKJ	0	3	7	10
BET	8	8 (1)	7 (1)	23
FAL	2	0	0	2
CNT	1	0	2	3
Total	21	17	21	59

Remarks and observations on the observed fish species around the visited dFADs

The observed number and diversity of non-tuna species associated with the dFADs visited during this cruise has been quite poor. Very few rainbow runners and wahoo were observed and none could be caught to be equipped with a sonic tag. Even trigger fish were scarce and surprisingly hard to catch. The observed silky sharks were all of juvenile sizes (mostly under 1 meter).

The tagged tuna species composition we obtained on those dFADs (B-82%, Y-14%, S-4%) was a bit different from the average observed species composition (B-94%, Y-4%, S-1%) on previous TAO tagging experiments.

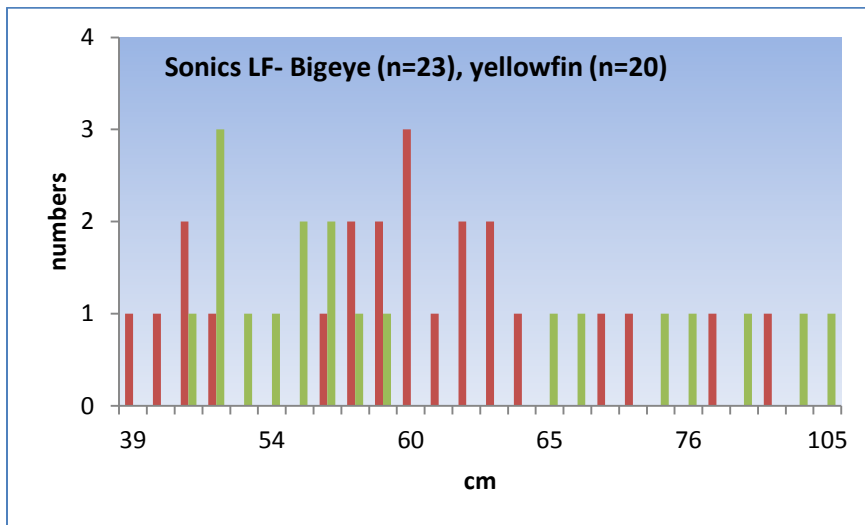


Figure 2: length frequencies of bigeye and yellowfin (green bars) tuna equipped with sonic tags

GENERAL DESCRIPTION OF CRUISE TRACK AND FISHING ACTIVITY

The track of Cruise CP-10 is shown below in **Figure 3**. The 8N, 5N, 2N, equator, 2S and 5S TAOs on the 170W line, and the 5S, 2S and equator on the 155W line were visited along with 8 dFADs in Jarvis and Line Islands waters.

A summary of general movements during the cruise and daily tag releases by area/buoy is given in **Appendix II**. Daily log extracts providing detailed written descriptions of daily activities are provided in **Appendix III**.

Of the 27 days of charter during CP-11, 12 days were spent steaming and/or checking buoys with no fish, and part or all of 15 days were spent fishing and tagging.

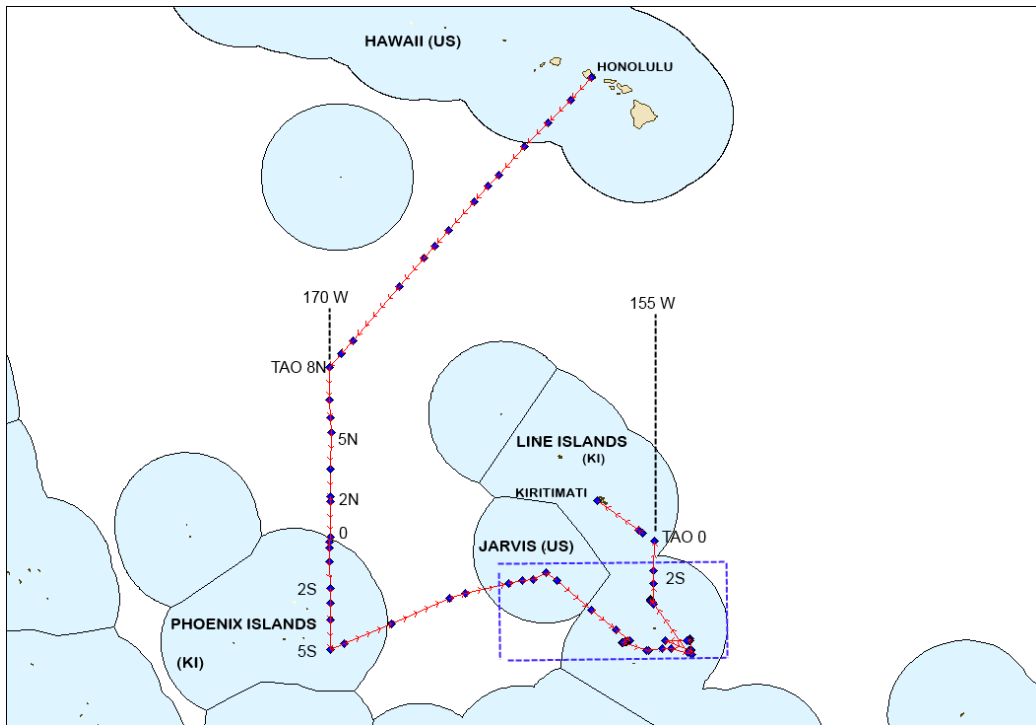


Figure 3: Cruise track during CP-11. Drifting Fads were fished inside the dashed blue line delimited area. This is detailed in Figure 4 below.

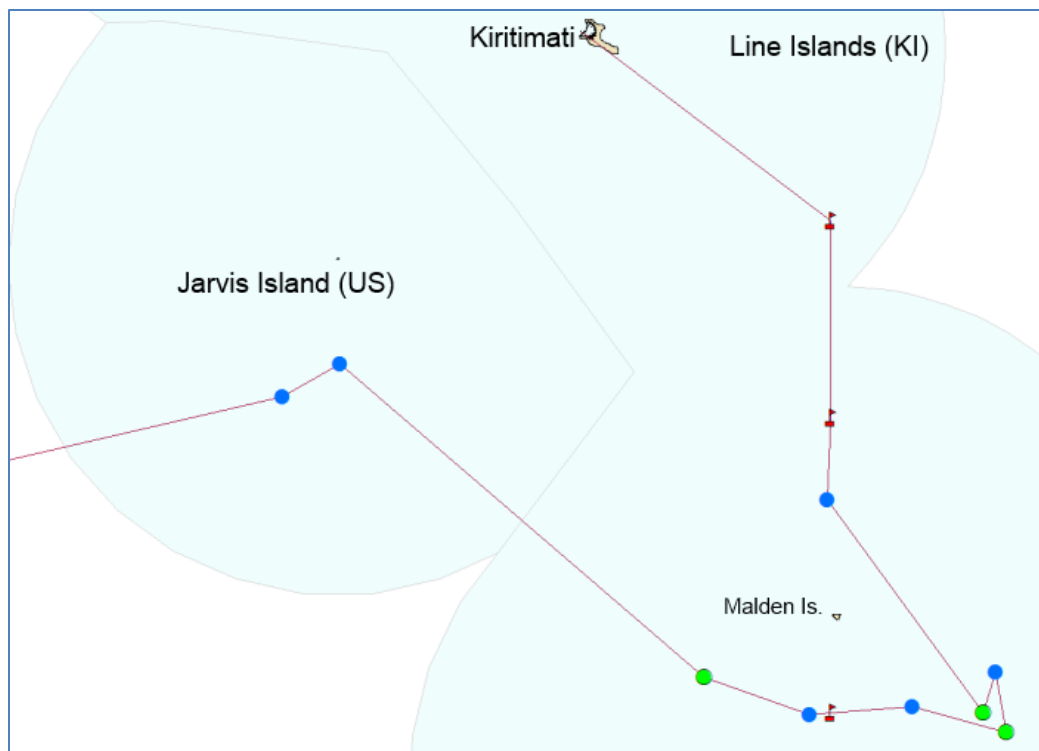
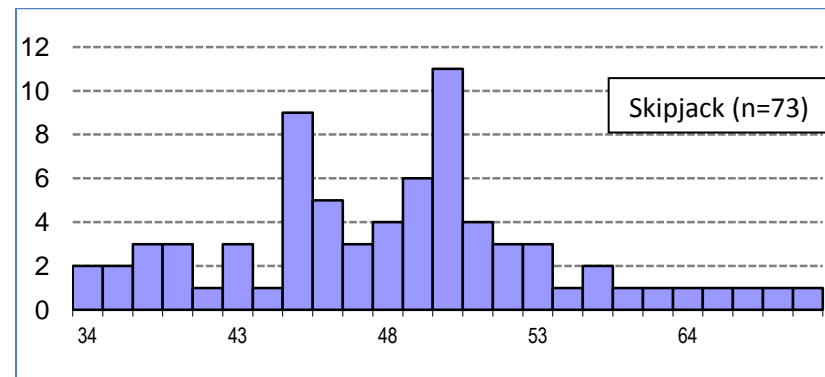
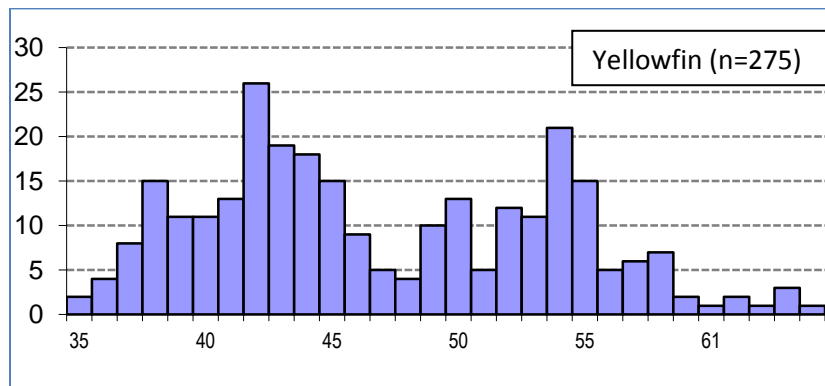
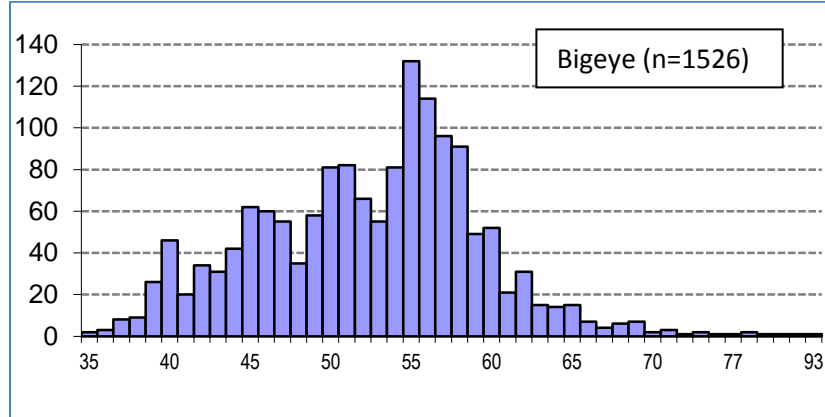


Figure 4: Vessel track while visiting drifting fads (blue dots). The green dots are dFADs equipped with VR4. The red flags are TAO buoys.

SIZE DISTRIBUTION OF TAGGED FISH

The size distribution of tuna conventionally tagged during the cruise is shown in **Figure 5** below.

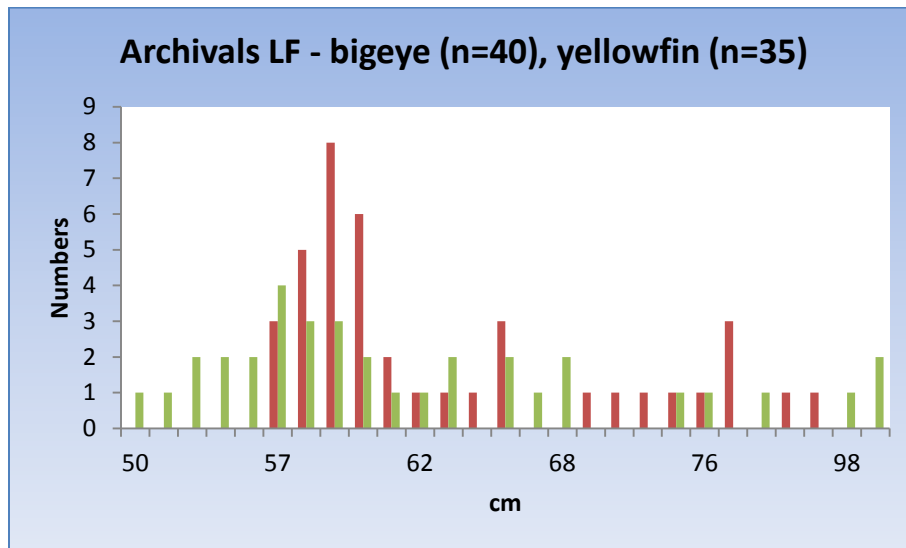
Figure 5: Size distribution (cm) of fish conventionally tagged during CP-11



ARCHIVAL TAGS

Seventy five fish were released archival tags. The size range for the 40 bigeye was 57 to 84 cm and 50 to 105 cm for the 35 yellowfin. The length frequencies for both species are displayed in **Figure 6**.

Figure 6: Length frequency of bigeye (brown) and yellowfin (green) tagged with archival tags



BIOLOGICAL SAMPLING

The low number of fish caught didn't allow us to collect large quantities of biological samples. **Table 4** summarizes the nature and number of collected biological samples.

Table 4: Summary of biological samples collected during CP-11-leg1 (O: otolith, S: stomach; M: muscle; L: liver, G: gonad, DS: dorsal spine, B: blood).

Species	Number	O	S	M	G	DS	B	L
BET	9	8	9	9	6	9	1	9
YFT	2	2	2	2	2	2		2
SKJ	3	2	3	3		3		3
DOL	1		1	1				1
RRU	1		1	1				1
BUM	3		3	3	2	3		3
WAH	3							
Total	22							

CONCLUSION

The CP11 Leg1 cruise was hampered with the lack of large bigeye aggregations under the TAOs along the 170 W meridian. The “El Nino phase” induced oceanographic conditions that prevailed during the cruise could explain this result; at the time of this report, no associated fish schools were observed on the 155W line by the CP-11 Leg2 cruise team. On the other hand, the release of tagged fish around drifting fads during Leg1 has been successful. We were able to catch, tag and release a good number of bigeye tuna in the same way we did on previous cruises on TAO associated tuna aggregations. The collaboration between SPC, Tri Marine and ISSF proved to be working well. This proof of concept is useful for future tagging endeavors as it gives the tagging vessel more tagging options beyond the typical TAO mooring line checks. This ability has been particularly crucial for the success of this CP11 cruise.

We hope the coming data will help to gain a better understanding of the drifting object associated fish aggregation dynamics in order to improve the sustainability of the tuna fishery currently crucially reliant on the use of these dFADs. The captain and crew of the GL4 performances were outstanding and contributed greatly to the success of this trip.

APPENDIX I: F.V. GUTSY LADY4 specifications

Name of Vessel	GUTSY LADY 4
Owner of Vessel	Gutsy Lady 4 LLC
Port of Registration	Honolulu, Hawaii
Vessel Type	Fishing vessel
Flag	USA (US)
Hull Type/year built	Steel / 2001
WCPFC registration	1120347
IMO	8970469
MMSI	367571490
Length (LOA)	26.15m /
Beam	7.92m
Draft	4.5m
Tons Gross	170
Engines Make and Model	2x Cummins KTA 19 (600hp)
Call Sign	WDG 7854
Address of company owner	<p>Gutsy Lady 4 LLC</p> <p>350 Ward Avenue, Ste 106-315</p> <p>Honolulu, HI 96814, USA</p> <p>Tel: +1 808 217 4539</p>

APPENDIX II: Summary of cruise activities, with number of fish released per day (dates are displayed on Hawaii time). EEZ abbreviations: IW: International Waters, PX (Phoenix Islands – Kiribati), PIPA: Pacific Island Protected Area

Date	General area	Principal activity	Conventional tags			Archival (red) or sonic (green) tags			Total tagged
			BET	SKJ	YFT	BET	YFT	OT H	
2015									
9-Sep	Honolulu	Leave port at 7 :30am-steam							0
10-Sep	US EEZ	Steaming- gear prep							0
11-Sep	IW	Steaming- gear prep							0
12-Sep	IW	Steaming- gear prep							0
13-Sep	IW	Steaming- gear prep							0
14-Sep	IW	Fish TAO 8N/170W-steam			1				1
15-Sep	IW	Fish Tao 5N/170W-steam	128	12	67				207
16-Sep	IW	Fish TAO 2N/170W-steam							0
17-Sep	Phoenix EEZ	Fish TAO equator-steam			2				2
18-Sep	Phoenix /PIPA	Fish TAO 2S/170 W- steam	3		9				12
19-Sep	Phoenix/PIPA	Fish TAO 5S/170W-steam							0
20-Sep	IW	Steam							0
21-Sep	IW	Steam							0
22-Sep	Jarvis EEZ	Fish dFAD 94315-steam		1					1
23-Sep	Jarvis EEZ	Fish dFAD 93887-steam	3		8				11
24-Sep	Line Island EEZ	Steam							0
25-Sep	Line Island EEZ	Fish dFAD	175	1	15	8	6	1	206
26-Sep	Line Island EEZ	Fish dFAD	11		10	3	7	2	33
27-Sep	Line Island EEZ	Fish dFAD	123	3	9		2		137
28-Sep	Line Island EEZ	Fish dFAD	140	6	38	12	15	3	214
29-Sep	Line Island EEZ	Fish dFAD	150	10	46	8	19	8	241
30-Sep	Line Island EEZ	Fish dFAD	9		4	4	1	1	19
1-Oct	Line Island EEZ	Fish dFAD	119	24	34	18			195
2-Oct	Line Island EEZ	Fish dFAD	642	5	23	6			676
3-Oct	Line Island EEZ	Fish dFAD and TAO 2	23	11	9	2			45
4-Oct	Line Island EEZ	Check TAO 00/155W-steam							0
5-Oct	Line Island EEZ	Arrive in Kiritimati							0
Total			1526	73	275	61	50	15	2000

APPENDIX III: Daily activities summary from Daily Log entries

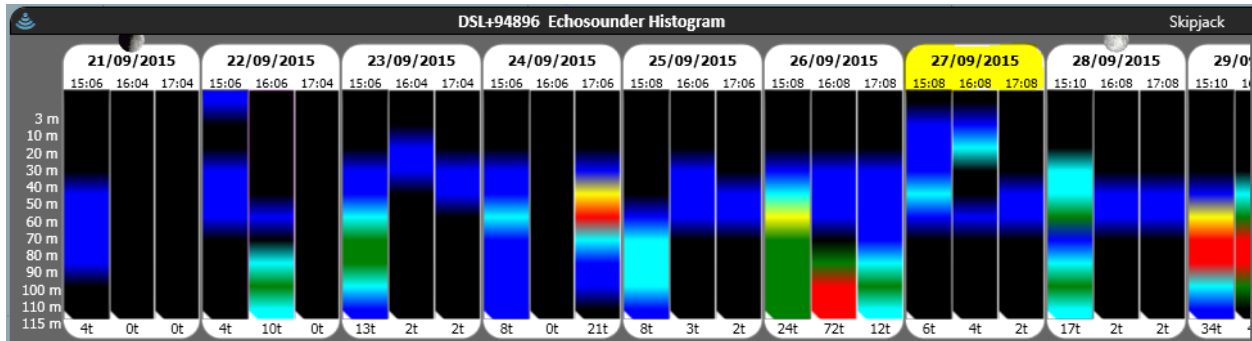
log date	Notes
9/09/2015	After the usual hectic last days of preparation, we left Kewalo basin at 7:30 in calm weather condition, heading toward the TAO 8N/170W something like 1,060 nm away. Send messages to all persons involved, started to organise the huge pile of gears...boxes all over the boat...set up cradles, starting to load tag blocs. At 17:20 CL spotted a floating object with birds sitting on it. This appeared to be a small upside-down fiberglass dinghy. Managed to catch 5 mahi with troll lures before the crew decided to keep the little boat that was still in good condition. Started steaming again at 06:15.
10/09/2015	Good weather still with us all night. A bit of NNW swell in the morning. Spent the day finishing loading the available tagging blocs (11) with CTs. Started to set-up the archivals, leadering the Psat. Current slow-down the boat to 6.7 knt for a while in the morning then speed increase to 8.2 knt in the end of the afternoon.
11/09/2015	Another good night of calm , current in our favour giving us a speed of 8.5 knt at 6:30; CL spent 5 h setting archival tags and entering numbers into TagDager data base. Jeff and crew setting dangler and jigging lures. Speed increased in the afternoon to 9.4kt Caught a small blue marlin (150lbs) on a trolling lure around 16h that brought a bit of entertainment.
12/09/2015	Good passage overnight. Boat deck still too busy with fuel totes to install the tagging cradles. Worked on fishing gear and cruise plan possibilities with the updated dfad positions. Wind started to pick-up in mid-afternoon, blowing about 15 knt SSE at 16h. At 17h we passed nearby a lost Dfad (no buoy, square bamboo frame with netting, probably Spanish) and spent 20 minutes catching small (50-60 cm) YF for Beth to practice CT. Good exercise, worth the time spent on it.
13/09/2015	In second part of the night, passage became a bit less comfortable with some rain coming from the South bringing 2 m waves in front. Move our clock backward for one hour as we are moving west. We are now on Pago time. Fuel transfer from the totes to the boat tanks was the main activity for the day highlighted with the catch of another small blue marlin (50kg). Weather improved in the evening
14/09/2015	Good passage overnight even with 1 meter front sea. The big fuel tote out of the way allowed us to set-up the cradles at their proper place. At 10:00 caught a ~60kg blue marlin on the starboard hydraulic reel; biological samples were taken. ETA for TAO 8N is just past 18h Pago time. We start trolling around the buoy at 18:05 and stop 16 min later with a small YF tagged and 3 mahi and a couple of small RRU caught. The usual desert at this latitude...Stopped for a while for engine check, then started steaming to the south, towards the 5N.
15/09/2015	Wind turned to the NW in the night, making the course quite comfortable. Crossed some squalls in the morning with SW winds associated. Transferring fuel operation had to be postponed due to rain and choppy seas. At 14h 30 caught a female BUM of 244cm (about 120kg) -samples taken (P-352). Arrived at the TAO 5N just before 17h and had the good surprise to tag 207 fish (62% bet). The small size fish and the small detection at the echo sounder was not in favour of spending more time there, so we start steaming again to the south.

16/09/2015	Wind and sea decreased over night to calm conditions in the morning. Finished to transfer the fuel from the totes with great relief, now the working deck is clear...Meet some free school with skj feeding and whales around 11:15. Arrived at the 2N at 15:25. Started fishing at 15:29 but nothing there, no detection at the echo sounder, no bird. Tried to jig with no result. Left at 16:20, steaming toward the equator buoy. ETA 08:30
17/09/2015	Arrived at the TAO at 0730, alas nothing there, few scattered spots at echo sounder... caught 3 YF , 2 on troll line, 1 jigged. Stopped fishing at 0815 and checked if 2nd TAO was really gone as per NOAA information. No 2nd TAO...started steaming to the TAO 2S at 0840 at 6knt to arrive before sunrise. Set-up the "green-stick" to troll on the way. Just caught a skj...
18/09/2015	Arrived at the buoy at 0450 am; The echo sounder revealed that no aggregation was associated with the buoy, only small patch of fish. Wait till first lights and started fishing at 05:41. Mostly RRU and few YFt and very few BET; Stop dangles at 06:20 and tried jigging with no success (only RRU); made decision to run to the 5S at 06:50
19/09/2015	Arrived at TAO 5S at 05:25. Strong current made it drift a bit south from the NOAA given position. No fish under the buoy, not even a mahi. Started steaming towards dFADs located in Jarvis EEZ at 06:30. ETA in 3+ days... Caught a 214 cm marlin at 0930 on a troll line. Crossed FV Maomari (PS, KI flag) doing opposite route at 12:40 just inside PX EEZ
20/09/2015	Choppy ride even with low wind. Caught and released small blue marlin (~80lbs) at about 09:30.
21/09/2015	Seas decreased a bit overnight. A long no event day steaming; set-up one sonic VR4 receiver; entered inside Jarvis EEZ at about 21h
22/09/2015	Changed time today back to Hawaii time. Arrived at Dfad 94315 a bit before 17h; no detection around, only mahi and small wahoo. The raft had no more tail, only the floats. A small fish school with bird on top at about 1 nm from the Fad but quickly disappeared. Tried chumming, trolling, jigging; caught a small bet too damaged to be tagged, 1 mahi, 2 wahoo (sampled) and one skj tagged. Wait till dark time and decided at 19h to steam towards next fad, 35 nm away.
23/09/2015	Arrived at the Fad at 05:50 and fished for about 1:30 hour. No detection on echo sounder apart just few spots. A small school of juvenile yf is associated with small mahi and wahoo; we untangled from the raft a small alive hawkbill turtle. No fish came to the dangles. A few on the troll lines yf and be; jigging revealed no bigger fish was there. 8 Yf and 3 Be tagged. Decided to leave at 07:25 towards a group of dfads about 300 nm away in the SE
24/09/2015	Steam all day in moderate front seas. Crossed PS Ocean Master (KR Flag). Decreased the speed to 5 knts in the evening to arrive at about 5 am to the next dFAD
25/09/2015	Arrived at dFAD 93486 estimated position at 0430. Satellite communication problem prevent us to get an updated pos. Beth called the boat Cape Ferrat (the buoy is from it) to ask for position. Got finally the position at 0620 and start fishing dangles at 0650. Got a good 50 min session with 112 tagged mainly Bet; we set the LL (120 hooks) then jig for 1:50 for 6 sonics. Then haul the LL and set it again and jig for another 1:50 for 11 sonic+ AT. Started dangler again at 15:13 for 30 min to get 77 Tags. Total for the day: 206 tags (183b, 21Y and 1S) including 3AT B, 4AT Y (3 double tagged) 6 B sonics, 2 Y sonics and one Trigger sonic. Second LL set was as well unsuccessful (240 hooks). After another jig and dangler sessions unsuccessful, we stopped at 18h and dropped the parachute for the night.

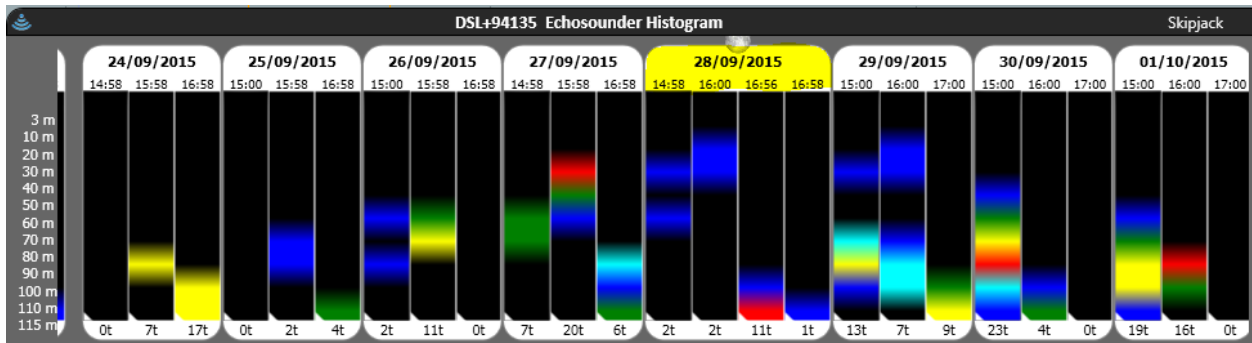
<p>26/09/2015</p>	<p>At 4:30 we were at 03.2 nm from the dFad 93486. After retrieving the chute, arrived at 04:40. Started jigging at 0450, 2 Y At and 1 Silky with sonic. Then tried the dangles between 0538 to 0623 but no success. Start jigging again with not much success and decided to troll small lures that allowed the release of 4 Yf with sonics. Then started jigging again from 0830 to 0906 when all sonics dedicated to this Fad were deployed. Total for the morning: 2 silky, 5y and 3 B with sonics, 2Y with L2810 and 16 CT. Started steaming towards dFAD 94896 about 60 nm away in the ese. Arrived at the fad at 2007. Nothing at echosounder. Attached our flag and radio buoy to the fad and dropped the sea anchor. Jigged for 30 min just CT tagged 5 small yellowfin.</p>
<p>27/09/2015</p>	<p>Two Kr PS vessels drifted around for the night (ocean master and Sanwa Fontaine) Started engine at 3:30 (no fish under the boat) and steamed to the fad at about 3.2 nm away. Started jigging at 4:30 but only got few small yf (mostly) and bet. Started dangling at 0535 and stopped at 6 after just a few small fish at the troll lines. No detection at echosounder apart small patches. For sure the estimated 70 tons from the Satlink buoy are gone! Started steaming to the TAO 5S at 06:05. Arrived there at 0838. nothing there. Piloted by one Trimarine PS we started to steam to fad 93157 about 50nm in the east. FBB sat com still blocked; after quite a few message exchanges with Rene c. it seemed that we had no more com time allocation...some human error somewhere...at 11am we had 7 PS boats in the 12 nm around us...arrived at 1548, although almost no detection, have a decent dangler session for more than 110 releases until 1630 then fish stopped biting. Tried jigging then dangler and jigging again with no success; decided to leave for 2 good looking fads closed together about 60 nm away</p>
<p>28/09/2015</p>	<p>Our communication system came back during the night; we could now see the fads without the need of the Trimarine PS boats! Arrived at first fad 94135 at 05am and fished for 4 hours a mixed of dangles/trolling and jigging; released 165 tags including 16 sonics and 3 Archivals. Stopped at 0921 and steamed to the nearby dFAD 93456 at 4.6 nm. Started to fish on this one at 10:10 till 12:30 with the mixed dangling/jigging. Deployed 31 tags including 11 Ats. Seems a small school of bet at 50-80 fathoms and some smaller yf 10 to 30. Started again dangles at 15:30 but the fish didn't show up to the chum, staying in the deep (6 tags on troll lines). Back to the first fad were we wanted to finish the sonic work; spent some time to find it as Satlink software was not working. Finally arrived and started dangling at 17:30 but fish not came up; stopped fishing after a last jigging session that brought only 9 fish (1AT, 2 sonics). Start steaming to dFAD 93218 about 30 nm away and marking 60+ tons. Fingers crossed...</p>
<p>29/09/2015</p>	<p>Awaked at 04 and waited for buoy position update from Satlink. After some delay, arrived at the dFAD 93218 just after 6am. Started dangling but just got YF on the troll lines at the stern. Some big size came and this allowed the release of a 116 cm fish with the MiniPat new version. Bigeye finally showed-up at around 7:30 till 8:10 allowing the release of more than 150 fish. Quite useful...Jigg for some more fish then tried the green stick but no success. After a pause with jigged again around 11:30 till 13 h when fish stopped biting. Started to fish again at 15:15 and finished at 18h; dropped the chute for the night. Total tagged for the day was 208 including 21 AT plus 19 sonics.</p>

30/09/2015	Awake at 3 am, some fish under the boat. Retrieved the sea anchor and steamed back to the fad 2.3 nm away, hoping for fish to follow. Started jigging at 0421 but with small success. Started dangles at 05:33 but no luck either. Did another try of jigging and dangling before throwing the towel at 0727 and started steaming to the next fad (93341) about 200 nm in our NNW, marking this morning 130 tons...
1/10/2015	Found a (probably)Spanish Dfad when steaming at 06h00. Nice detection at echosounder and big school of skj feeding all around. Started dangling at 0620 for one hour that gave about 100 tags. Then jig until 11h00 for archival (11 AT Bet). Start dangling at 16:10 but nothing. Try jigging without successes then try again dangle sessions at 17h then 18h but no joy. Possibly school gone. Dropped the parachute at 19h for diner and tried jigging at 20h30. Have a useful session till 24h with 67 CTs and 7 Ats deployed.
2/10/2015	Awake at 5am with school under the boat. Started dangles at 05:50 and fish came quickly. Have a useful morning with 619 tags including 5 Ats. Stopped at 11:20 and drift in calm waters. Came back at slow speed to the fad in the afternoon and start fishing at 1735 for 57 tags (including 1AT). The fish seems to be less cooperative and we started to get some recoveries. Drift for the night hoping some new fish to come attracted by the boat lights...
3/10/2015	Awake at 5am; School seems smaller at echo-sounder...Started fishing at 05:50 , fish all around the boat and under , following but not biting; might have enough of the anchovies... also started to get more recaptures; only ...fish tagged including 2 Ats. Decided to let go this one and check the TAO 2S/155 about 50 nm north of us. Arrived at 13:15 and made a small trolling survey. Just a small aggregation was present. Tagged 9 fish before steaming again towards the equator TAO
4/10/2015	We arrived at the equator/155W TAO at about 4am and did an echo sounder survey that unfortunately revealed the total absence of fish under the buoy. Started steaming toward Kiritimati about 195 nm away. Report writing, boat cleaning for most of the day...
5/10/2015	Arrival in Kiritimati, end of CP-11 Leg1

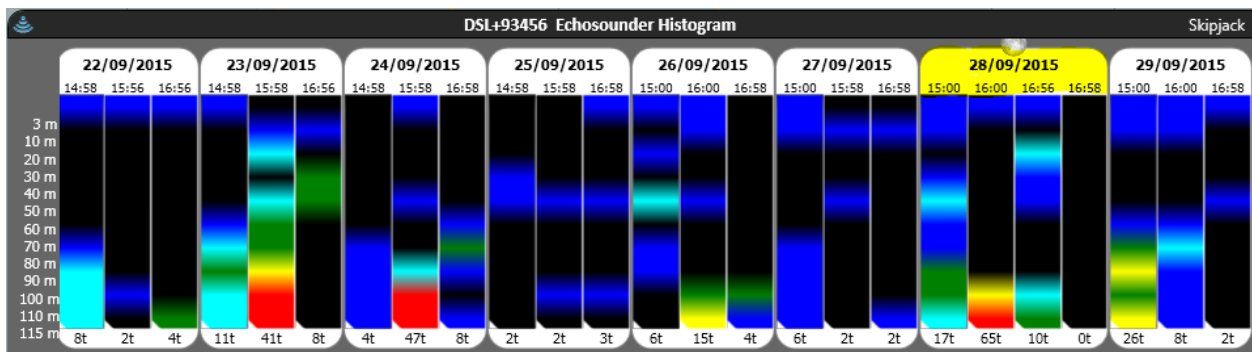
- September 27th - DSL+94896, 4°56S, 154°10W



- September 28th -
o DSL+94135, 5°12S, 153°12W, VR4 attached



o DSL+93456, 4°34S, 153°19W



- September 29th, DSL+93218 **VR4 attached** (5'01S, 153'15W), 30th - (5'08S, 153'24W)

