

**PACIFIC TUNA TAGGING PROJECT**  
**Phase 2 (Central Pacific)**  
**Cruise CP-9: November 15<sup>th</sup> to 7<sup>th</sup> December 2013**  
**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 tag and release of tropical tunas throughout the WCPO and concentrated in the latitudes where the tuna stocks are mostly harvested, approximately between 10° N and 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, the CP tagging cruises have improved the overall spatial coverage of the 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.

Eight CP cruises have already been achieved, using Hawaii and Tonga-based fishing vessels; these have allowed the tag and release of over 33,000 tuna, mostly bigeye (94%), on the TAO buoys anchored along the meridians 140°W, 155°W, 170°W and 180°W and between 5°N and 5°S latitudes.

This report summarizes activities during a ninth CP cruise, named hereafter CP-9, during a 22 day cruise on the Tonga-based FV Pacific Sunrise. This longliner was chartered during CP-5, CP-6 and CP-8 to extend tag release coverage westward from the preceding Hawai'i based CP cruises, targeting the TAO buoys deployed along the 170° and 180° W meridians. CP-9 has followed the same track as the 3 previous cruises i.e. ascending the 170W meridian (south to north) and descending the 180W meridian.

Crew and scientific personnel onboard Pacific Sunrise during CP-9 is listed in Table 1.

**Table 1: Personnel onboard Pacific Sunrise during CP-9**

<b>Name</b>	<b>Title/affiliation</b>	<b>Nationality</b>
Etimoni Palu	Captain	Tonga
Bruno Leroy	Cruise Leader/SPC	France
Francois Rounsard	Biological Technician/SPC	France
Hopoate Fakatoumafi	Crew	Tonga
Kristian Palu	Cook	Tonga
Ataisi Oe Moui Taufa	Crew	Tonga
Siosifa Kaho Pomana	Crew	Tonga

## **GENERAL DESCRIPTION OF VESSEL**

The F.V. Pacific Sunrise is a 22 metre fibreglass multi-purpose commercial fishing vessel built in 2003 by Westcoaster International, Australia. Owned and skippered by Etimoni Palu, it is equipped with longline gear used for fishing pelagic fishes (mainly tuna, swordfish) and deep dropline gear for demersal fishes (deep sea bluenose and snapper) around the Tongan EEZ. The vessel is fitted with one 600hp main engine (Detroit), one 57 KVA generator, one water maker (116 l/h) and a hydraulic system which powers the longline winch, the dropline reels and the main davit. Electronic equipment includes VHF and HF radios, Furuno radar and sounder (Picture 5), autopilot, two Furuno GPS, a vessel monitoring system, a water temperature gauge, a longline master system, a Taiyo radio direction finder and one desktop computer for navigation. For email communication the scientific team brought onboard an Iridium phone linked to the Skyfile software. Complete boat specifications are detailed in Appendix 1.

The operational range of Pacific Sunrise is 2,500 nm with a 14 ton fuel tank capacity. This range was increased for the 3,600 nm (Tonga to Tonga) CP-9 cruise by refueling tanks in Pago Pago after the first 500 nm and also by taking sixty 200 litre drums which were stored in the vessel's fish holds.

## **FISHING GEAR**

For the purpose of this tagging cruise the vessel was fitted with four "danglers". This gear consists of galvanized steel davits which extend at right angles from the hull for 1.5 meters and deploy two short trolling lines skipping the surface. This type of gear has been successfully used during the eight previous CP cruises as well as in Hawaii for other tagging programs and initially for commercial fishing of offshore seamount tuna aggregations.

Three danglers were placed on the starboard side (two fore and one aft) and one on the aft 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 lure, one 45g lead weight and a 7.0 Mustad galvanized barbless hook.

Three conventional troll lines were also attached from the stern of the vessel. These consisted of a 12m by 6mm rope spliced with a loop at one end 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.

One hydraulic reel was rigged on the starboard stern corner with a trolling line equipped with a jet-head type lure but was only occasionally used.

The spray system that was rigged for the previous cruises was also used and even improved during CP-9. This consisted of a 50mm (instead of 40 mm before CP-9) diameter PVC pipe attached on the outside of the hull at deck level and drilled with 1mm holes facing downwards directly beneath the danglers. Sea water was circulated through the pipe using a big water pump. The use of this powerful spray system has probably increased the efficiency of dangler fishing significantly.

## TAGGING OPERATIONS

Three tagging stations were set up on the deck of the vessel. The fish holds protrude from the floor and take a large part of the aft deck, restricting the choices for tagging cradle placement. Two cradles were dedicated to conventional tagging and were of the same design although slightly different dimensions to those previously used for pole-and-line tagging. One was placed at the stern of the vessel (behind the fish holds) while the other one was positioned in the centre of deck (between the fish holds and the cabin). The third cradle was set up specifically for archival tagging and supplied with a saltwater hose for irrigating the tuna during surgery. The archival cradle was placed directly in front on the fish holds. All cradles were marked with one cm graduations from 30cm to 120cm.

Each crew member was assigned to a dangler station. Two crewmen were hauling fish for the port and starboard stern dangler stations as well as taking care of two to three stern troll lines. Fish were handed to Francois (FER) manning the stern tagging cradle. Two other crews were hauling fish from the two forward starboard danglers to feed the other conventional tagging cradle manned by cruise leader (BML) or the captain (ETP). The crewman at the first starboard dangler station was also in charge of the chumming. The captain was driving or, if CL was deploying archival tags, tagging from the centre deck cradle. In the latter case the boat was circling the aggregation on its autopilot. Suitable size fish for archival tagging were sourced from all four dangler stations.

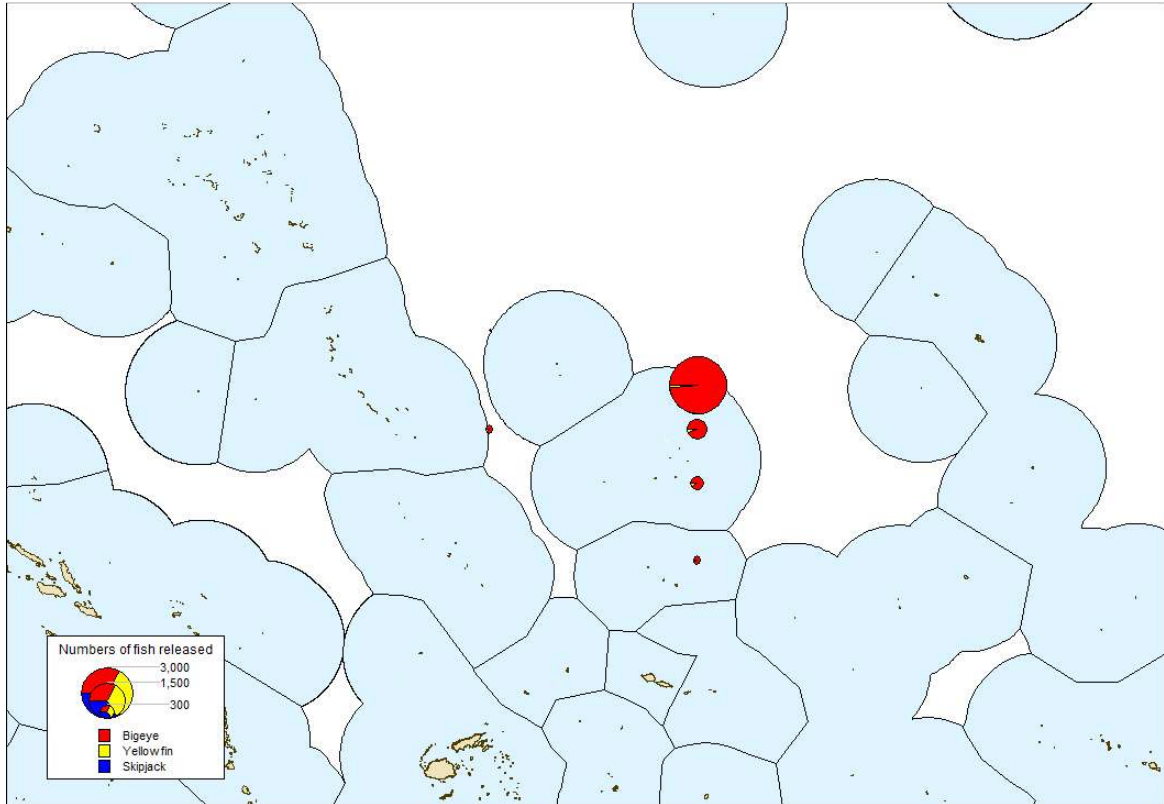
### *Conventional tagging*

Conventional tagging (CT) consisted of using the 13cm yellow dart tag manufactured by Hallprint Ltd. After checking if fish did not present any severe injury<sup>1</sup>, the tag was inserted between the pterygiophores of the second dorsal fin of fish using a sharp stainless steel applicator tube. Used applicators were collected then immersed in a bucket containing 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 seven 100 tag blocks in total. Conventional tagging was performed by BML, FER and ETP. Having the captain able to tag with CTs was a big asset, allowing BML to deploy archival tags (ATs) during the fast biting schools without impacting the CT operations (see Table 2, which shows the number of tags released by taggers).

A total of 4460 tropical tunas was tagged and released during the cruise, comprising 4296 bigeye (96%), 29 skipjack (1%) and 135 yellowfin tuna (3%). Spatial distribution of tag releases is shown in **Figure 1**.

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<sup>1</sup> Typical injuries, incurred by the quite large hooks and the wrench 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 releases during CP-9**

**Table 2: Number of tags per tagger**

Tagger	Archival	Conventional	Total
BML	42	1636	1678
ETP	-	530	530
FER	-	2252	2252
<b>Total</b>	<b>42</b>	<b>4418</b>	<b>4460</b>

***Comparison with previous cruises***

The current cruise deployed a similar number of tags to CP-6, with most fish on the 170W meridian, and few on the 180. Table 3 displays a comparison of the number of fish tagged per buoy. The greater number of fish tagged on the 00/170W TAO is due to the presence of 2 anchored buoys (separated by 2 nautical miles) on this location. To be noted that the 2N/170W and 00/180 buoys had gone adrift and were consequently missing for CP-9 cruise. On all four cruises, releases along the 170W predominated, though with some success on 180 during CP-6.

**Table 3: Number of tags deployed per buoy**

<b>TAO buoys</b>	<b>CP-5</b>	<b>CP-6</b>	<b>CP-8</b>	<b>CP-9</b>
8S/170W	2	0	0	104
5S/170W	0	0	0	334
2 S/170W	1918	530	2215	586
00/170W	2081	2121	3084	3340
2N/170W	1760	-	855	No buoy
2N/180	568	-	-	4
00/180	29	946	14	No buoy
2S/180	-	332	6	92
<b>170 line</b>	5759	2651	6154	4364
<b>180 line</b>	597	1278	20	96

### **Tuna aggregation dispersion**

During CP9, attempts were made to move tuna aggregation away from the 00/170w buoys after tagging operation. Strong current and unfavorable weather conditions prevented the action to be undertaken using boat lights at night as it had been done during some previous cruises. But on each buoy, a good part of aggregation was successfully drifted away during early morning fishing session. Fish were then kept under the vessel using the sea anchor to slow down wind effect on the drift and possibly increase fish retention. This seemed to work well with the larger size (>70 cm) bigeye. Fishing has been successfully carried (although with moderate numbers - <100 - of fish tagged) on the boat aggregation further in the day and on the following morning. The boat steamed away from the fish after having drifted the school between 18 and 25 nautical miles from the TAOs.

### **Archival tagging**

52 Wildlife Computers MK9 archival tags and 1 Lotek Lat2810 were available for deployment during the cruise. 41 tags were deployed in bigeye tuna and 1 on yellowfin. Mk9 tags were configured to sample all likely depths, sea and internal fish temperatures and light intensity every 30 seconds (10 seconds for the Lat2810). Archival tagged tuna were externally marked with an orange 13 cm conventional tag. Suitable size tuna (generally > 60 cm) 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. All archival tagging was conducted by the cruise leader (BML).

In the same way as on the 2 previous cruises, the large numbers of suitable size fish being caught on the dangles/troll lines and the captain being able to deploy conventional tags allowed archival tags to be deployed during the day and not during jigging fishing at night as it was found necessary during previous CP cruises.

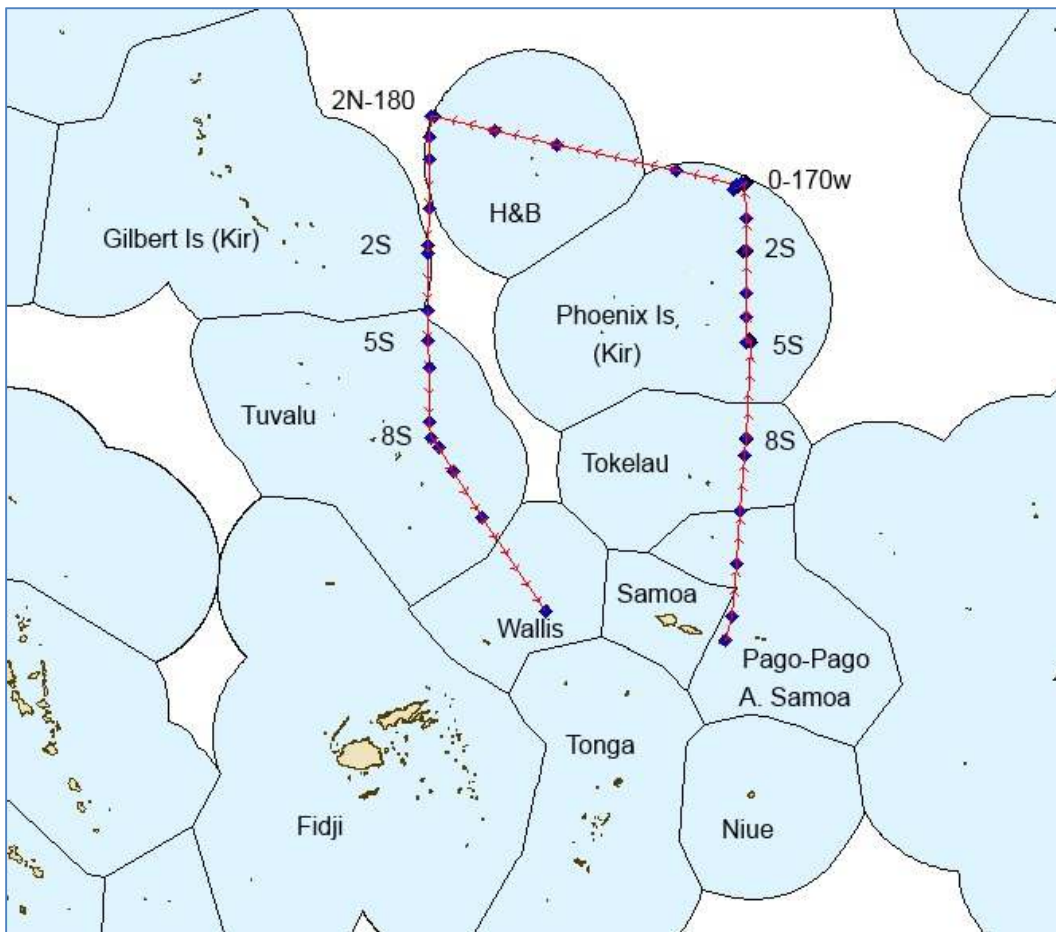
### Data recording

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'.

### GENERAL DESCRIPTION OF CRUISE TRACK AND FISHING ACTIVITY

The track of Cruise CP-9 is shown below in **Figure 2** and can be summarized by the following schematic:

*Pago Pago → 170W TAO line (8S, 5S, 2S, 00) → 180W TAO line (2N, 2S, 5S, 8S) → Wallis*



**Figure 2: Cruise track during CP-9**

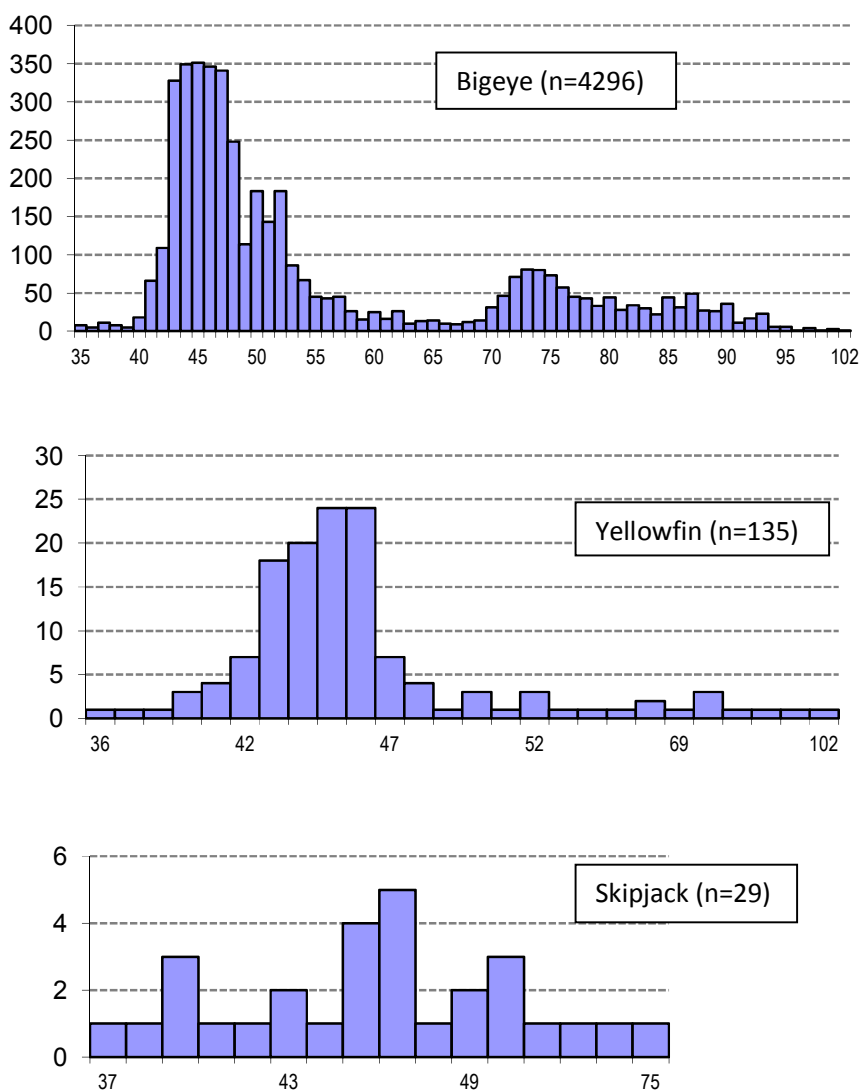
A summary of general movements during the cruise and daily tag releases by area/buoy is given in Appendix II

Daily log extracts providing detailed written descriptions of daily activities are provided in Appendix III. Of the 22 days of charter during CP-9, 8 days were spent steaming and/or checking buoys with no fish, 1 day was spent in Pago Pago to take fuel and provisions, and part or all of 13 days were spent fishing and tagging.

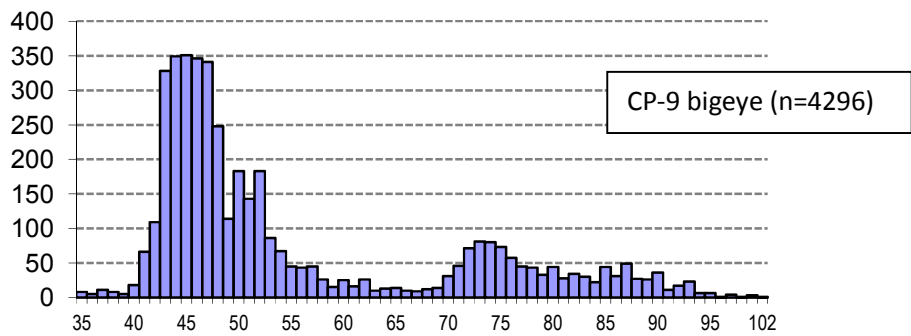
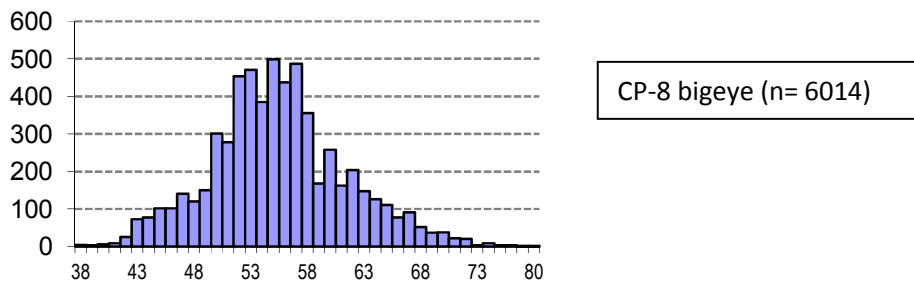
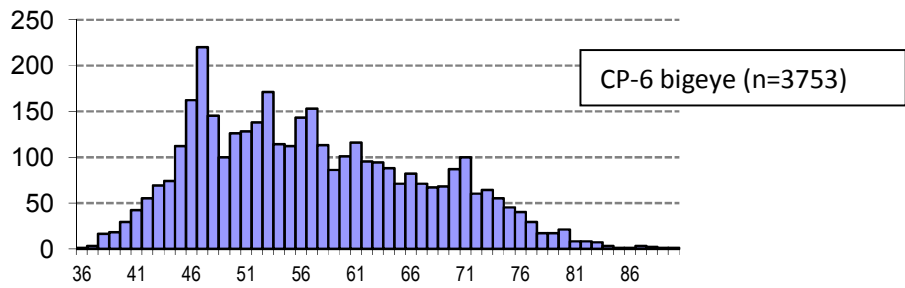
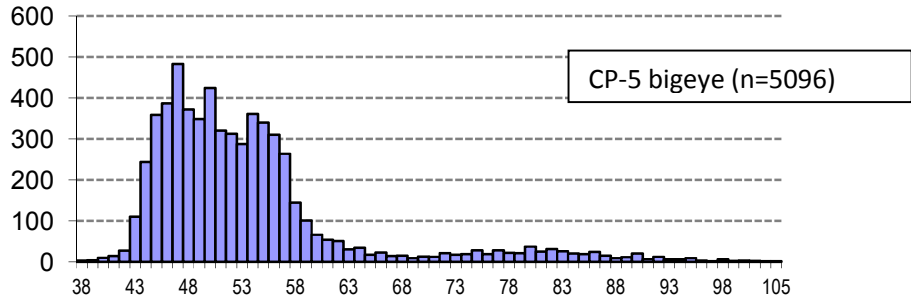
### SIZE DISTRIBUTION OF TAGGED FISH

The size distribution of bigeye and yellowfin tuna conventionally tagged during the cruise is shown in **Figure 3** below. For comparison, the size distribution of bigeye tagged during CP-5, CP-6 and CP-8 is also displayed with the CP-9 size distribution on the following page (**Figure 4**).

**Figure 3** Size distribution of fish conventionally tagged during CP-9



**Figure 4: Length frequency of bigeye conventionally tagged during CP-5, CP-6, CP-8 and CP-9 for comparison.**



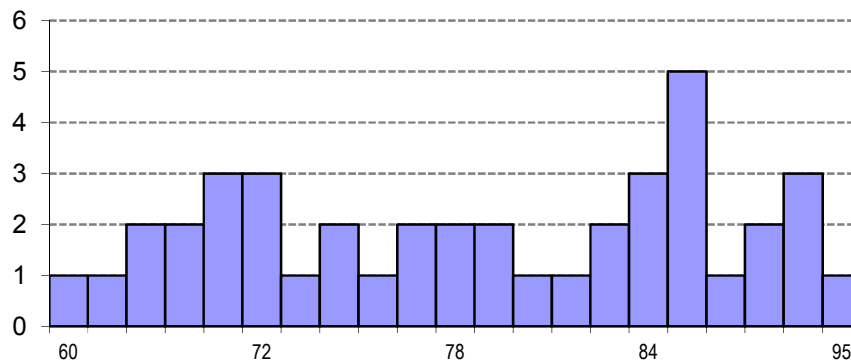


The size range of bigeye tagged during CP-9 cruises was similar to CP-5, with comparable size distributions, although with fewer fish between 50 and 60 cm and a bigger proportion (23%) of larger fish (70cm plus).

**ARCHIVAL TAGS**

The 41 bigeye tuna tagged with archival tag size range was 60 to 95cm as displayed in Figure 5.

**Figure 5: Length frequency of bigeye tagged with archival tags**



**BIOLOGICAL SAMPLING**

As part of a large study undertaken at SPC to describe the trophic interactions of the pelagic ecosystem, 62 fish across three species were sampled (stomach, muscle, liver, gonads) during this cruise (see Table 4). Otoliths were also taken for age and growth studies. Sampling was conducted after tagging operations. Fish that were unsuitable for tagging were put aside in the shade on the port side of the aft deck. Once sampling operations were over, the samples were placed in the freezer located in the galley as this one was more efficient at freezing the samples than the freezers on the aft deck.

As part of the collaboration with Anne Lorrain from the Institut de Recherche pour le Developpement (IRD), 22 blood samples (matching SPC sampled fish) were also collected for stable isotopes and mercury biomagnifications studies.

Table 5 resume longitude and buoys sampled.

**Table 4: Summary of biological samples collected during CP-9 (O: otolith, S: stomach; M: muscle; L: liver, G: gonad, B: blood).**

Species	Number	O	S	M	L	G	B
BET	55	51	55	55	54	54	21
YFT	4	4	4	4	4	3	1
SKJ	3	3	3	3	3	3	0
<b>Totals</b>	<b>62</b>	<b>58</b>	<b>62</b>	<b>62</b>	<b>61</b>	<b>60</b>	<b>22</b>

**Table 5: Summary of predators sampled during CP-9 per longitude and per buoy.**

		Longitude: 170W			
Latitudes	8S	5S	2S	0	
BET	9	12	19	16	
YFT	1	1	2	0	
SKJ	0	0	2	0	
<b>Totals</b>	<b>10</b>	<b>13</b>	<b>23</b>	<b>16</b>	

## CONCLUSION

This ninth in the series of Central Pacific (CP) cruises saw a good number of releases (4460) during the 22 days of the cruise. The cruise was hampered again with the lack of fish along the 180 meridian, and no other options available to expand fishing opportunities.

The professionalism of the crew was once again on display, and the Pacific Sunrise has proved to be a very successful platform for this and other types of fishing.

#### **APPENDIX I: F.V. PACIFIC SUNRISE specifications**

Built:	2003
Designer:	Westcoaster (Australia)
Length:	22 m (72 feet)
Beam:	6.2 m
Draft:	2.3 m
Gross tonnage:	80 tonnes
Hull:	Fibreglass
Main Engine:	John Deere 600 hp
Cruising:	10 knots
Auxiliary:	ISUZU 57.5 KVA
Steering Stations:	2
Fuel Capacity:	14,000 litres (2500 nm range)
Radios:	ICOM IC-M45 VHF 57 channels ICOM IC-M710 HF 160 channels
Satellite communications:	Iridium linked to a computer
Chart plotter:	Max Sea
Water:	9,000 litres capacity
Desalinator:	116 litres per hour
Electronics:	Radar, sounder, computer, radio direction Finder, Inmarsat, stereo, plotter, GPS, Auto pilot
Survey:	USL Class 3B

**APPENDIX II: Summary of cruise activities, with number of fish released per day. EEZ abbreviations: TK (Tokelau), PX (Phoenix Islands – Kiribati), IW (International Waters), HB (Howland and Baker – US), GL (Gilbert Islands-Kiribati) and TV (Tuvalu).**

Date	General area	Principal activity	Conventional tags			Archival tags		Total tagged
			BET	SKJ	YFT	BET	YFT	
<b>2012</b>								
15-Nov	Pago Pago	Fuel, provisions						
16-Nov	Am Samoa EEZ	Leave port mid-day- gear prep						<b>0</b>
17-Nov	Tokelau EEZ	Steaming, gear preparations						<b>0</b>
18-Nov	TAO 8S/170W-TK	Fishing	2	2	0			<b>4</b>
19-Nov	TAO8S/170W- TK	Fishing & steaming	92	3	5			<b>100</b>
20-Nov	TAO5S/170W-PX	Fishing	223	8	21			<b>252</b>
21-Nov	TAO5S/170W-PX	Fishing & steaming	75	1	6			<b>82</b>
22-Nov	TAO 2S/170W-PX	Fishing	231	10	22	4		<b>267</b>
23-Nov	TAO 2S/170W-PX	Fishing & steaming	305	2	4	8		<b>319</b>
24-Nov	TAO 0/170W-PX	Fishing	746	0	15	20		<b>781</b>
25-Nov	TAO 0/170W-PX	Fishing	166	1	23	3		<b>193</b>
26-Nov	TAO 0/170W-PX	Fishing	1711	1	15	5		<b>1732</b>
27-Nov	TAO 0/170W-PX	Fishing, drifting & steaming	626	0	8			<b>634</b>
28-Nov	IW and US EEZ	Steaming (date change 00h)	-	-	-	-	-	<b>0</b>
30-Nov	US EEZ	Steaming	-	-	-	-	-	<b>0</b>
1-Dec	TAO 2N/180-IW	Fishing buoy-steaming			4			<b>4</b>
2-Dec	IW- 2S/180-GL	Steaming- fishing buoy			2		1	<b>3</b>
3-Dec	TAO 2S/180-GL	Fishing buoy-drift and steam	78		10	1		<b>89</b>
4-Dec	TAO 5S/180-TV	Steaming- check buoy						<b>0</b>
5-Dec	TAO 8S/180-TV	Checking buoy-steaming						<b>0</b>
6-Dec	TV and WF EEZ	Steaming to Wallis						<b>0</b>
7-Dec	WF EEZ	Steaming, arriving in Wallis						<b>0</b>
<b>Total</b>			<b>4255</b>	<b>29</b>	<b>135</b>	<b>41</b>	<b>1</b>	<b>4460</b>

**APPENDIX III: Daily activities summary from Daily Log entries**

logdate	Notes
15/11/2013	The scientific team arrived in Pago as scheduled by the 08:00 am flight from Apia but without any luggage...got the reserved rental car from Avis and went to met Pacific Sunrise at the main dock. The clearance was already done, thanks to the agent. Time for big shopping at Cost-U-Less...Back to the airport to check Polynesian Airline cargo but no luck at the 10:30 flight. Finally they said that there will be no luggage in the two following planes with a little chance for the 16:00 plane...back to the boat that moved to the fuel dock and finished to load its tanks and the 60 drums around 16h. Another unsuccessful trip to the airport where we learned that the 18h plane has been cancelled and that luggage might arrive by the 20:30...The boat moved back to the main dock where a technician installed a new aircond unit in the galley to replace the poor quality one purchased last year in Fidji...After a good dinner at Saddies, the last trip to the airport brought only another disappointment...the PA agents looked embarrassed and told us that the first flight in the morning (10:00) will be only freight...
16/11/2013	Wait 1h and 40 minutes at the airport before getting our luggages. Back to the boat at 12H and cast the ropes at 12:15. Started steaming to the 8S/170W TAO anchored in Tokelau waters. Weather fine with a 10 knt SE breeze. After installing the Iridium (the external antenna and cable that stayed on place for 3 years are still working even if communication cable connection at the satphone looks a bit rusted...) we started to sort the gear that have been in storage in Tonga since last year; set the tagging craddles with their vinyl covers, checked the lures ... Moon almost full.
17/11/2013	Quiet passage overnight, long ESE swell, set-up tag blocs and fish troll lines; start to transfer oil drums into main tanks. Calm weather all day, no complain...
18/11/2013	Good weather continues with 2 crossed long NE and ESE swell. Good detection about 1 NM south of the TAO 8S, but no success in chumming it. Arrived to the TAO 8S at 09:20 and good sign again under the buoy, caught one small shark on a long troll line that went tangle in the mooring....small tuna started to come to the chum and one small 41 cm was caught and tagged. But we were a bit too late and they stop biting immediately. Decided to let them alone and drift till 4pm. Small S to N tide current and lighth ESE wind made us drift NNW just a couple of Nm in 6 h.. Large school of skj associated with the buoy; the detection seen this morning under the buoy was gone; only tagged 2 sj and 1 B; had a last try at 17:40 but no success; possibly the tuna will aggregate again during the night..
19/11/2013	Started steaming back to the buoy at 04:15; we've been drifting a bit over 6 NM pushed by some SE breeze that increase a bit overnight. Fish detection around the 50-80 m, slightly up current the buoy. Started chumming at 05:10 and got first fish 10 min later. They stop biting, staying in the deep (80-150 m), at about 05:50. Aggregation is modest and seemed to comprise only small fish under 60 cm and mostly under 50. We stopped fishing for 30 min and tried again at 06:25 but without any success. Not really worth to wait another24h to maybe get 50 fish, decided to hit the road to be on the next buoy at the right time of the day.
20/11/2013	Arrived at the TAO position at 05 am but no sign of the buoy on the radar...after turning a bit around, realized that the NOAA given position is from April, and 20 miles east of the last year position. We then steamed to check this one. The buoy was there and fish started to bite right away at 07:15. Good run for 40 minutes with 167 tagged then fish stopped to bite. Start again one hour later but fish mainly stayed in the deep and we only got 28 tagged. Steamed into the wind for 1.5 h and drift (at 1.7 knt...) till 15:30. Did two fishing attempt one at 04

	that provided 54 tags and the other one hour later that only gave 3 tags. Decided to stay and try the buoy tomorrow morning. Total for the day is 252.
21/11/2013	Start engine at 04:20 to retrieve the drift; start fishing at 05:10, a bit too early for the fish that didn't bite before 5:30. We got confirmation that the school was a very small one. We stopped fishing at 06:12 after 82 tagged and started steaming to the 2S in expectation to be there at the right time of the day. The total tagged on the 5S buoy is 334 (298 B, 27 Y and 9 S)
22/11/2013	after a relatively quiet passage overnight, we arrived at the buoy at 05:05; only a small aggregation seemed to be there looking at the echosounder. Fish started to bite around 5:20 only on the troll lines at the back, first at the dangles 15 minutes later; good run of 70 cm fish with 4 Ats deployed then we stopped at 06:30 after 263 fish tagged. Started again at 07:04 but fish not biting anymore and we stopped about 45 min later after only 1 tagged. Drifted (at about 1.7 knts) till 14:30 then steamed back to the buoy. No sign on the echosounder at 16:20, we just got 3 small fish on the long troll lines. Decided to have another try in the morning. Total for the day was 267 (235 B, 22Y and 10S) including 4 Ats in bigeye.
23/11/2013	After experiencing a problem of auto-pilot yesterday evening, it was miraculously working in the morning. We started fishing at 05:28 till 6:57 for a very good run with large fish that allowed us to tag 319 CT including 8 AT. Started again at 07:32 but no bite. Decided to steam to the equator to check the double TAO, having in mind that it's easy to come back if need it. The weather had deteriorate a bit with wind up to 20 knt from the NE (Murphy's law...). Of course auto-pilot decided to stop working again and we then had to manually steer the boat...
24/11/2013	Arrived at position at about 4:30 and wait closed to the buoy until good time of the day; started at 0532 and bigeye bite straight away, small size first and quickly larger one came and didn't stop biting till 0655, staying with the boat. We were at 1.5 NM south west from the south TAO. We tagged 495 (98% B) fish including 18 Ats. I decided to deploy the sea anchor to more easily keep the school with us; we let the parachute attached to some big balloons and started fishing around at 08:05 till 09:15 tagging another 213 fish, including 2 Ats. We were at about 4NM from the TAO; we tie-up to the chute and started drifting at about 1 knt. After jiggging a couple of 80-90 cm B, we started fishing around the sea anchor at 16:15 and tagged 71 fish between 74 and 102 cm before they stopped biting and stayed in the deep. We attached again to the chute and started our drift for the night (about 12 Miles from the TAO) Total for the day is 781 (98% B) including 20 Ats.
25/11/2013	At 05 am we were about 23 nm from the TAO, with the school under the boat. Let the chute go and start fishing at 05:30 but not bite for 15 min and only few fish came. The bulk of the school stayed under the boat between 20 and 80 meters not any more interested by our sardines. Stopped at 06:40 after only 77 fish tagged, mainly small sizes, including 2 Ats. Decided to let them go and we lost them running North before heading to the equator- 170 w TAO to check what's left there. Checked after 9 nm, seems fish are gone... We arrived at the TAOs at 11:25 and 12:00; some fish school under both of them. Started drifting to wait for 4pm. Unsuccessful attempt to repair the auto-pilot made us arrive at 16:30 and we quickly fish the 2 buoys in about 1 hour for 116 fish (1 AT), showing good perspectives for tomorrow morning. Total for the day: 193 (169 B, 23Y and 1S), only 2 fish short from the 2000 cruise mark...
26/11/2013	After an heavy drift of nearly 16 miles in 8 hours during the night we were at 2 miles from the buoy at 04:30... Not bad... We started at the north TAO at 0532 and had a continuous tagging bonanza for 1 and a half hour before finishing all tag blocs; 667 fish tagged including 5 Ats. Re-started at 0738 for about one hour and tagged another 486 fish. A visit to the south TAO

	provided 492 tags and brought the morning total to 1646. Drift till 4pm and the usual small evening bite provided 86 tags from the 2 buoys. Total for the day was and healthy 1732 tags (99% B)
27/11/2013	Heavy drift full west during the night and passed the buoy pos by 6 nm...Started at 0538 at the north buoy and fish came to bite immediately. Tried to drift away the fish during fishing but only got the small sizes following us. Came back to the buoy and finished the tag blocks for 580 tagged. Fish aggregated under the boat during block reload and lucky enough it was the large size fish... Tagged 54 of them before dropping the sea anchor and started to drift away with the school at 07:45; heavy current brought our speed to 1.6 knt...We were at 14 nm from the TAO at 4pm. Decided to start steaming toward the 2N/180 at 6pm to be there at the good time of the day, Sunday morning. Started steaming at 18 nm from the buoy.
28/11/2013	Steam in easy conditions, current with us bringing our speed between 9.5 and 10 knts. Entered H&B eez at mid-day
30/11/2013	After a peaceful night during which we lost 24 h, another long day steering WNW toward the TAO 2N/180 across the H&B eez
1/12/2013	Arrived at the TAO at 0625 but no school under it; just small patchy detection, caught 4 small YF after turning around the buoy mad-dog style for 40 min. A situation we've seen before...Again no choice except to run to the next buoy, the 2 S, 240 nm away with the equator buoy missing...
2/12/2013	Steaming south all night in fair weather; wind increased during the day to 15 knts but its ENE direction kept the ride quite comfortable. Arrived at the 2S buoy at 15:45. A school of small SKJ and YF was active half a mile up-wind from the buoy. Some patchy detection under and a more compact small school seem to stay between 100 and 150 m deep. Three ~ 15kg YF caught on the troll lines, one missed, one AT, one CT plus a smaller one ...3 tagged; will drift under the chute till the morning.
3/12/2013	After a 11 nm drift on the chute, steamed back to the buoy and started fishing at 0620; slow small YF bite on the troll lines followed by small Bet and a quick 8 min rush of bigeye at 0640. There is a small school associated with the mooring; 45-60 cm fish plus a few larger one. We tagged 79 B (1AT) and 9 Y. They stayed between 100 and 150 after that. We stopped for 30 min and tried again during 40 min but no luck. Decided to drift and try again this afternoon and tomorrow morning hoping to deploy a couple more archival. Drift-passed closed to the buoy at 2 pm and caught-CT one 102 cm Y with rod&jigg (too tired for AT). Started fishing at 16h but no bite; finally decided to not wait anymore at this mooring and start steaming toward the 5S
4/12/2013	Rolling ride with sea on the side all night. Wind increase during the day but hopefully turned from east to ENE...Arrived at the TAO 5S at mid-day; nothing at the echosounder, caught a small Y too damaged to be tagged. Started steaming toward 8S
5/12/2013	Checked the TAO 8S at 09:20, nothing there. Started the 2 day steaming to Wallis; weather improving around mid day. Stored and listed equipment that will be left with ETP.
6/12/2013	Calm passage overnight; Finished fishing report. Wind turned SE and had to face 1.5 meter waves. Painful road all day.
7/12/2013	Arrived at Mata'utu brand new dock at about 8:30 local time; entrance formalities quickly done because the Tongans are not disembarking...A traditional welcome from the local fishermen association arrived with beers, wine, fruits and a roasted little piggy... The boat finally left the dock at 13h with a well fed crew...