



Pacific
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ARCHIVAL TUNA TAGGING IN THE WESTERN AND CENTRAL PACIFIC OCEAN

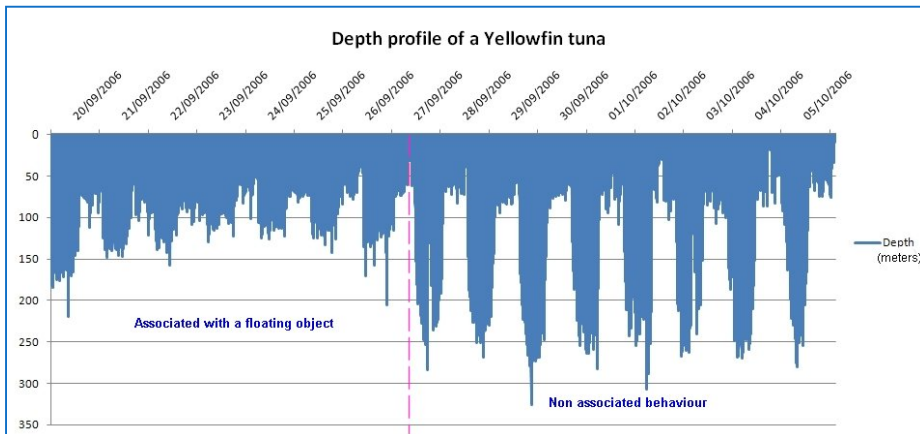
Bruno Leroy – brunol@spc.int

IATTC TAGGING WORKSHOP

JANUARY 28-30 2019- LA JOLLA

ACHIVAL TAGGING: WHAT ARE WE LOOKING FOR ?

1. Determine fish **behavioural** aspects that influence its catchability
 - Preferential depth- species /daily/seasonal/spatial variability
 - Behaviour relative to the fishing gears (especially FADs)
2. Learn about fish **movements** / influence of the environment
 - Movements between region, fishing impacts
 - Movement predictions in front of cyclic environment events (ENSO) or global warming / ocean acidification



ACHIVAL TAGGING: WHAT ARE WE LOOKING FOR?

1. Behaviour

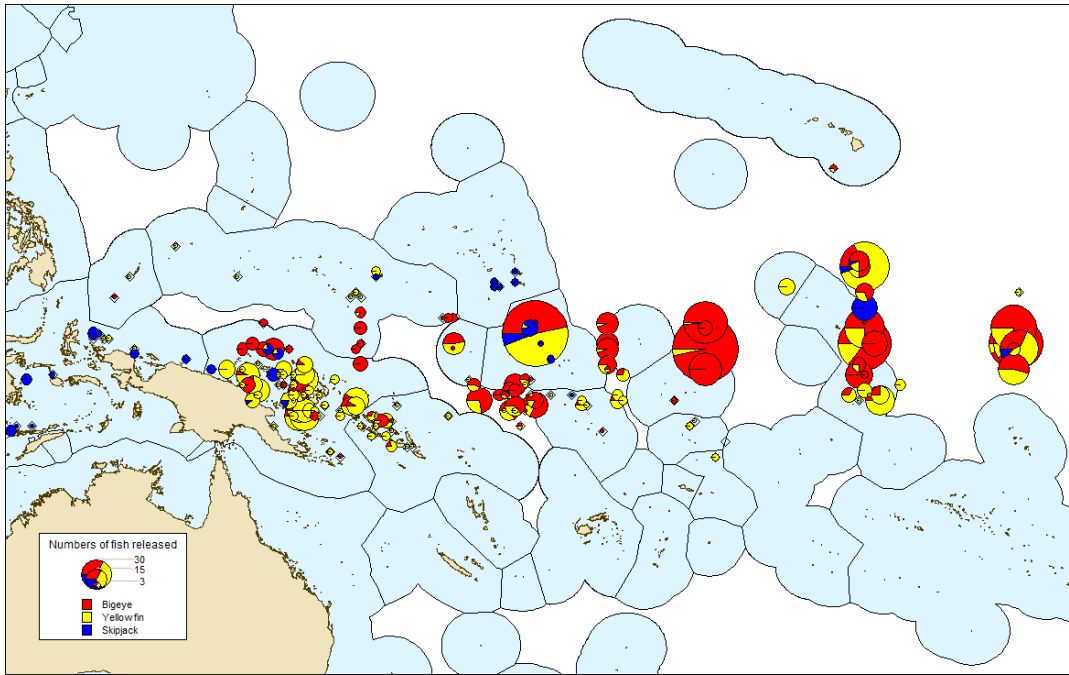
- About 50% of the PS tuna are caught under FADs
- Fish catchability/vulnerability ?
- Avoid catch of juvenile tuna and vulnerable species (sharks)

2. Fish movements

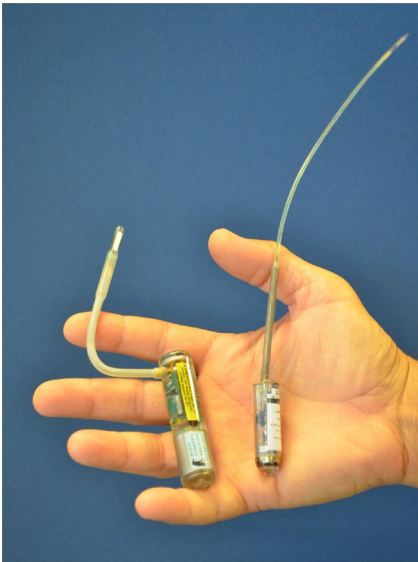
- Ecosystem monitoring – time series critical in the Pacific (e.g. climate change)



ACHIVAL TAG DEPLOYMENTS IN THE WCPO: THE BIG PICTURE



1862 archival, 655 sonics, 60 PSATs



School associations	Releases				Recaptures							
	SKJ	YFT	BET	TOTAL	SKJ	%	YFT	%	BET	%	TOTAL	%
Island or reef	24	28	0	52	0		2	7.1	0	-	2	3.8
Seamount	11	63	53	127	0		5	7.9	0	-	5	3.9
Current line	0	3	0	3	0		0	-	0	-	0	-
Tagging vessel	1	3	28	32	0		0	-	6	21.4	6	18.8
Marine mammal or whale shark	0	10	1	11	0		3	30.0	0	-	3	27.3
Drifting FAD	4	123	157	284	0		6	4.9	19	12.1	25	8.8
Anchored FAD	47	374	740	1161	1	2.1	34	9.1	120	16.2	155	13.4
Log	8	15	2	25	1	12.5	1	6.7	0	-	2	8
Free school	34	118	15	167	2	5.9	20	16.9	0	-	22	13.2
Total	129	737	996	1862	4	3.1	71	9.6	145	14.6	220	11.8

ACHIVAL TAG DEPLOYMENTS IN THE WCPO POLE AND LINE

- Archival tags deployed during most of the cruises since 2006
 - Limitations for P&L experiments
 - Need a dedicated additional tagging cradle (+ a tagger)
 - Average size fish (B&Y) often too small for MK9
 - Low availability of bigeye in the WPO



Species	P&L releases	Recov	%
SKJ	97	4	4.1
BET	188	35	18.6
YFT	415	56	13.5
Total	700	95	13.6

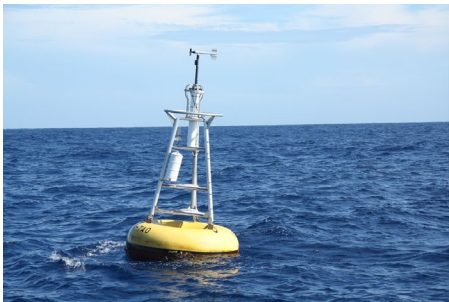
ACHIVAL TAG DEPLOYMENTS IN THE WCPO CENTRAL PACIFIC

➤ Archival tags deployed during Central P. cruises since 2008

- Limitations for CP experiments
 - Fish presence not guaranteed around TAOs and FADs
 - Low availability of skilled personal (taggers and fishermen)
 - Low availability of skipjack (due to the gear)



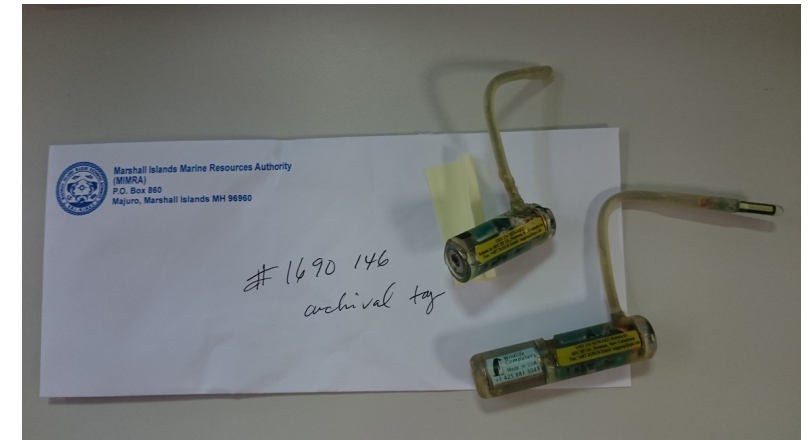
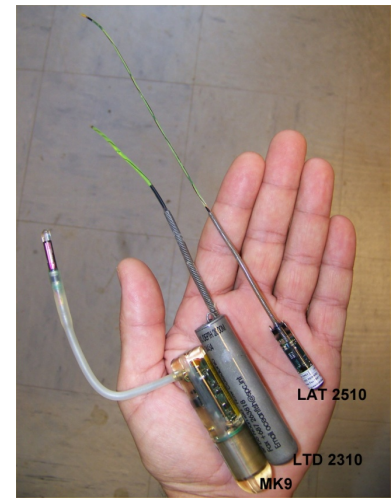
Species	CP releases	Recov	%
SKJ	32	0	0
BET	808	110	13.6
YFT	323	15	4.6
Total	1162	125	10.7



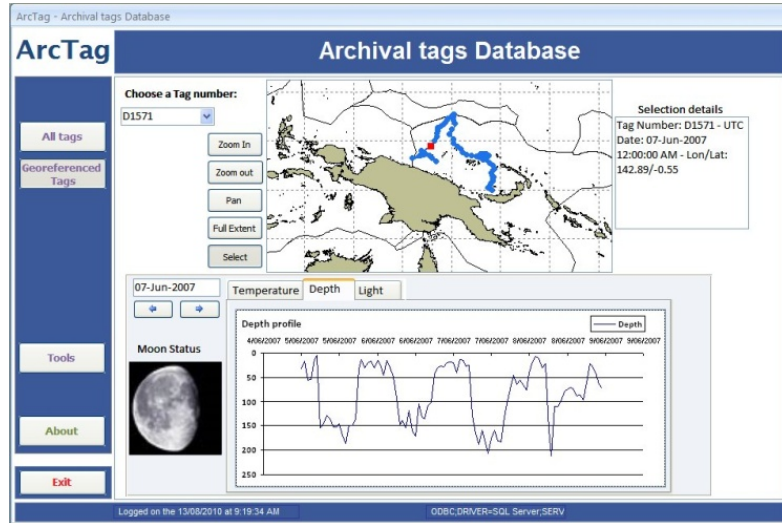
ACHIVAL TAG DEPLOYMENTS IN THE WCPO

LESSON LEARNED

- The tagger is the “beta tester” for tag manufacturers...
 - New tags have to be used with cautious (up to 50% failures in early models >> battery, sensors, clock, ...)
- Industrial fishing is hard on archival tags
 - Negative temp (-20 C) in fish wells/cold storages
 - Tag finders
- The very low reporting rate from Longline gear is a real limiting factor for getting long time data sets



ACHIVAL TAG DEPLOYMENTS IN THE WCPO DATA ANALYSIS



Over 26,000 data-days in data base

➤ **To come:** WS on sonic and archival data analysis to try reducing FAD-related bigeye mortality

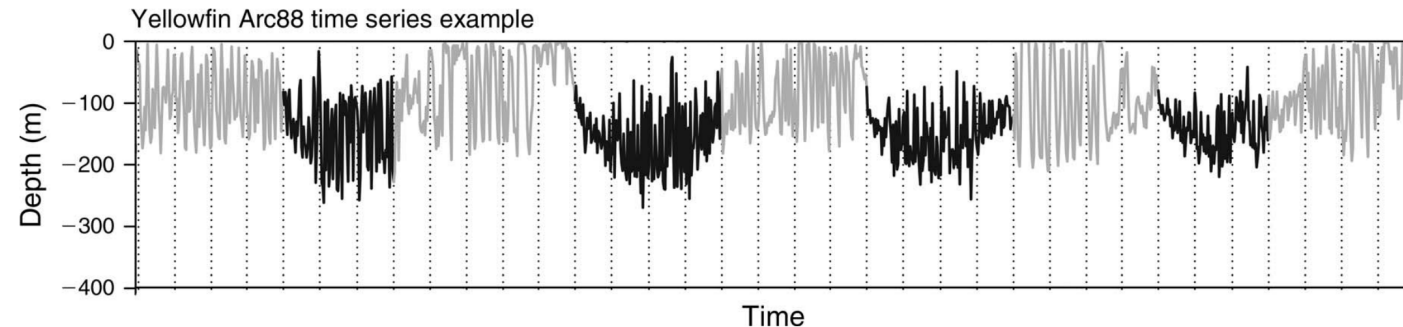
➤ **Movements** : Geolocation

- Precision limited (method, fish behaviour, area, pos. of recapture?)

➤ **Behaviour:**

- Average depth preference change with fish size and thermocline depth
- Behaviour differences associated/free school
- Sonic tagging experiments to add/precise information

Using HMMs to predict behavioural changes



ACHIVAL TAG DEPLOYMENTS IN THE WCPO FUTURE DEVELOPMENTS

- All tropical tuna species
- Large scale acoustics to be envisaged
- Own equipped dFADs for fisheries independent research



In a dream world...

Integrated studies like BioPelagos

Autonomous drifters collecting ecosystem and tuna data

