

ISSF research cruises in the Indian Ocean



INTERNATIONAL SEAFOOD
SUSTAINABILITY FOUNDATION

ISSF Cruises and MADE cruises

- * June 2011: MV Dugong (11 days)
- * April 2012: PS Torre Giulia (40 days)
- * EU funded project MADE:
- * Several cruises onboard non fishing vessels and PS vessels (2009-2011)

Specificity of the IO

- * Somali pirates!
- * Need security onboard & some areas are not suitable



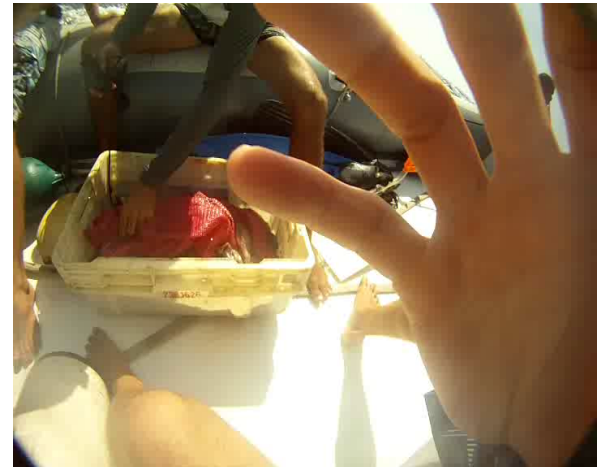
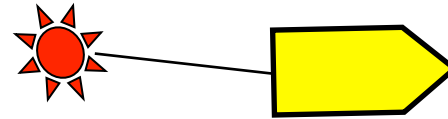
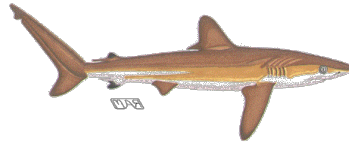
MV Dugong



11-day IO cruise

Objectives	Activities	Results
1. Natural behavior of fish at FADs	53 fish tagged at 3 FADs (SKJ, YFT, BET, sharks, triggerfish, rainbow runner)	Excursions away from FADs Vertical behavior (echosounder buoys)
2. Attraction of sharks away from FADs	Experiments on 5 FADs	Variable results (no attraction → 500 m attraction) CL: Combined stimuli would make a good strong one
3. FAD design and entanglement	2 ecoFADs and 7 traditional FADs	6 FADs (incl. 1 ecoFAD) had sharks entangled

Attraction



39-day PS cruise (Torre Giulia, CFTO)



Map

Almost 50 FADs visited



Pre-set estimates

DATE	N° Set	Skipper's estimates	Catch estimates (tons)
02/04/12	1	5 - 10	5
03/04/12	2	<5	2
06/04/12	3	?	0.5
08/04/12	4	10	6
18/04/12	5	6 - 7	10
19/04/12	6	10	6
25/04/12	7*	50	0
27/04/12	8*	15	0
28/04/12	9	10	1
29/04/12	10	15	28
30/04/12	11	15 - 20	40
02/05/12	12	10	14
02/05/12	13	15	13
03/05/12	14	10	15
03/05/12	15	10 - 15	18
04/05/12	16	5 - 10	5
06/05/12	17	?	0.5
08/05/12	18	10 - 15	15



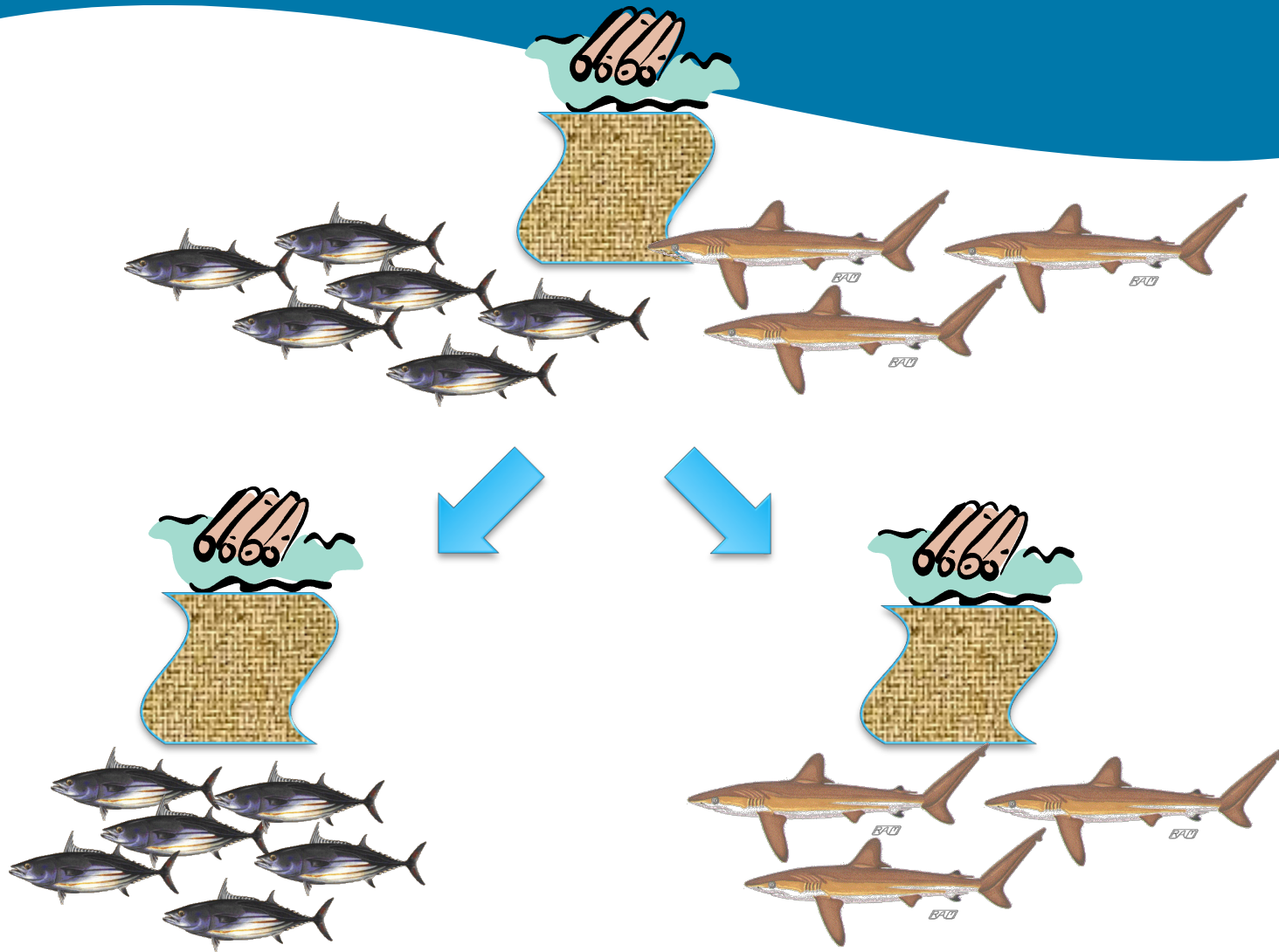
No estimate fo catch composition

Animals entangled in FADs (44 underwater observations)

34% of FADs had dead sharks entangled
8% had turtles entangled (released alive)
+ Similar % from observations under MADE
→ Need to use non entangling FADs



Double FADs



Double FADs



Experiment 1

12 Species

1 Species

Experiment 2

8 Species

4 Species

3 Species

Spaghetti tagging of bycatch (Pilot study)

- More than 200 individuals of bycatch species (silky sharks, rainbow runners, triggerfish) were tagged with spaghetti tags
- A few sharks were recaptured, 1 rainbow runner recaptured this week (4 months, 250 nmi)

Behavior of fish around FADs

MADE (2009-2011) : 82 fish tagged (5 FADs)	}	182 fish
ISSF June 2011 (11 days) : 53 fish tagged (3 FADs)		
ISSF April 2012 (40 days) : 47 fish tagged (3 FADs)		

6 Species:

- Skipjack
- Yellowfin
- Bigeye
- Silky Shark (1 Oceanic white tip)
- Oceanic triggerfish
- Rainbow runner



Residence times

Usually few days for tunas

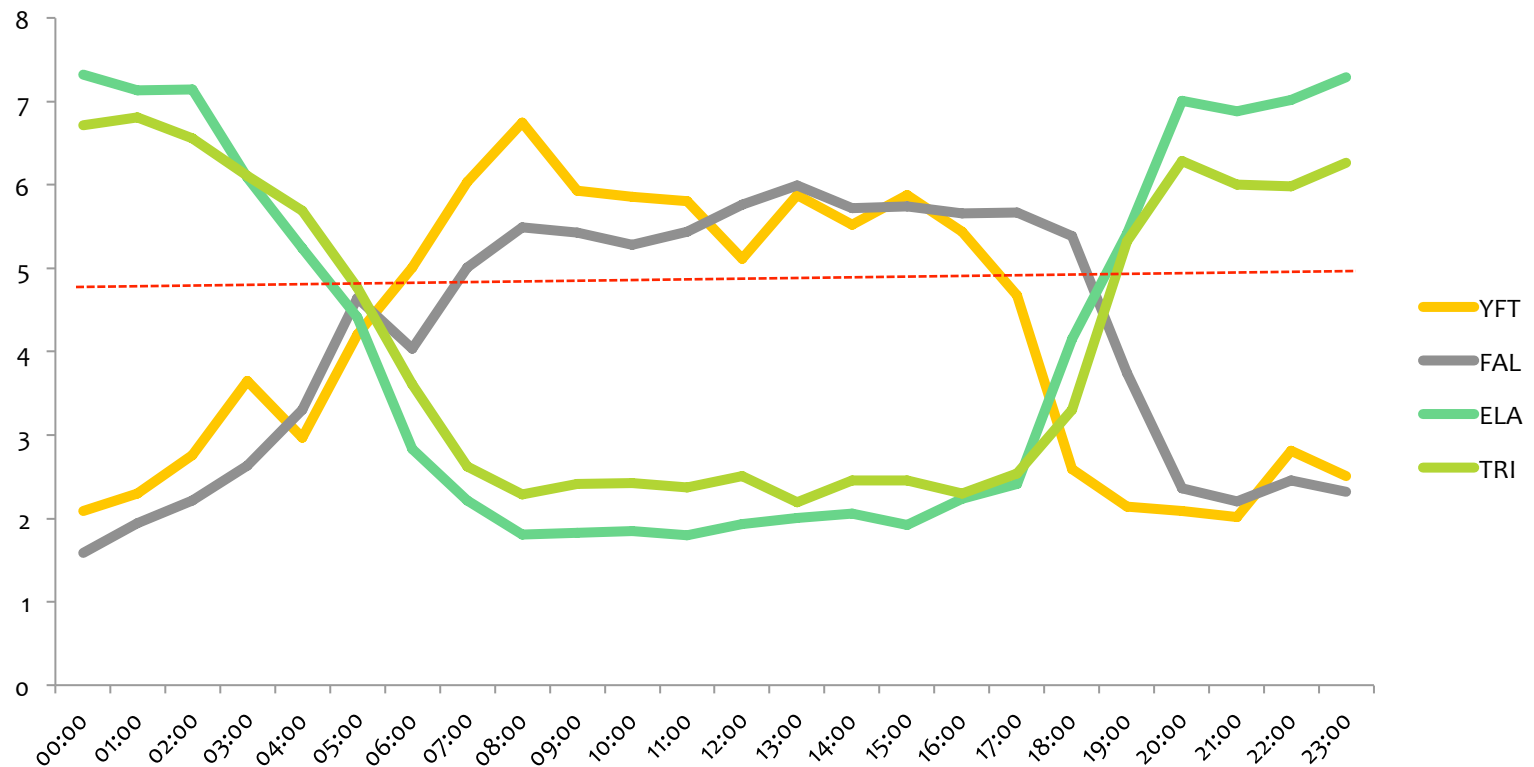
Longer for sharks

Very long stays by rainbow runners and triggerfish

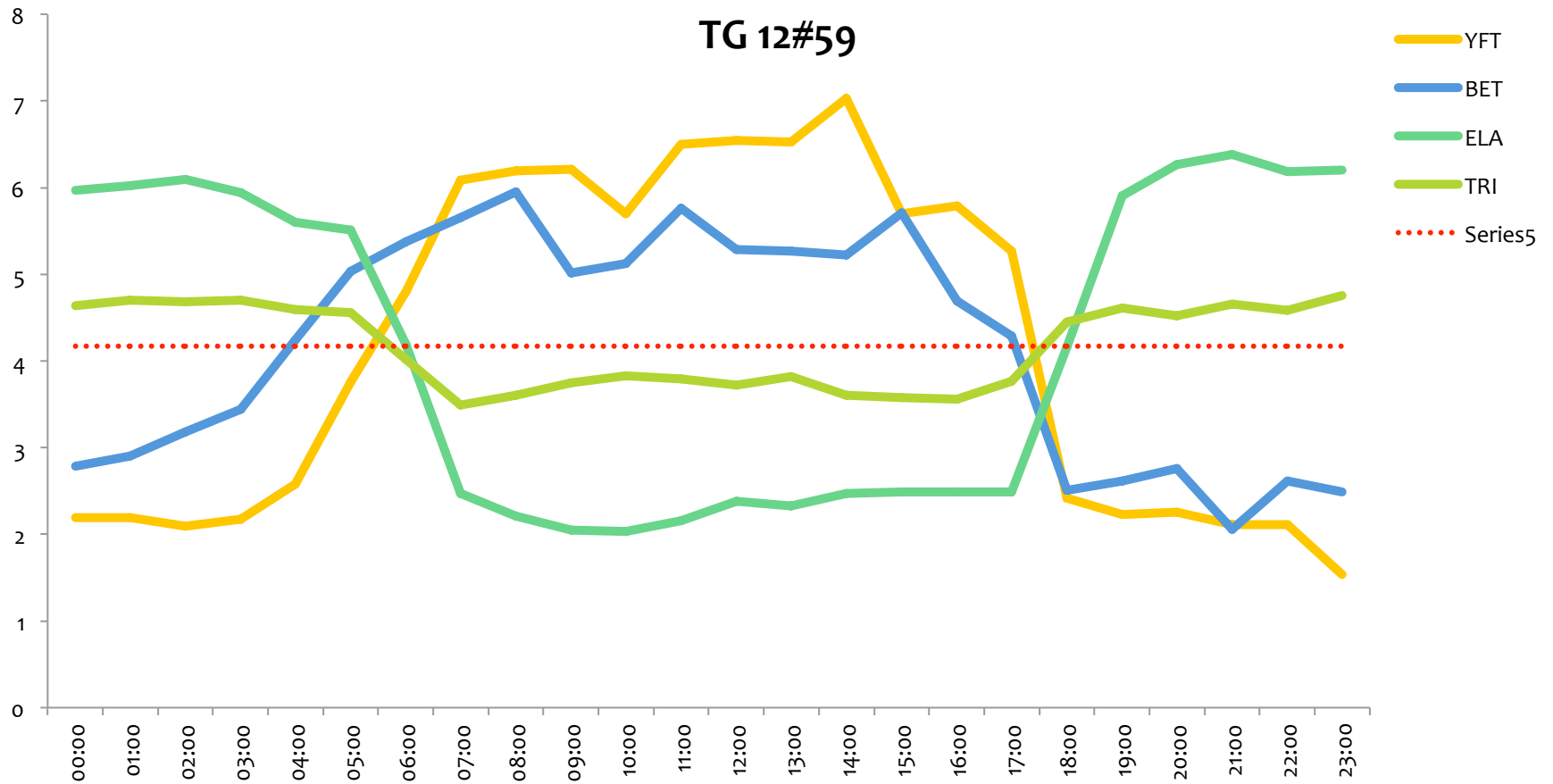


Probability of presence at FAD

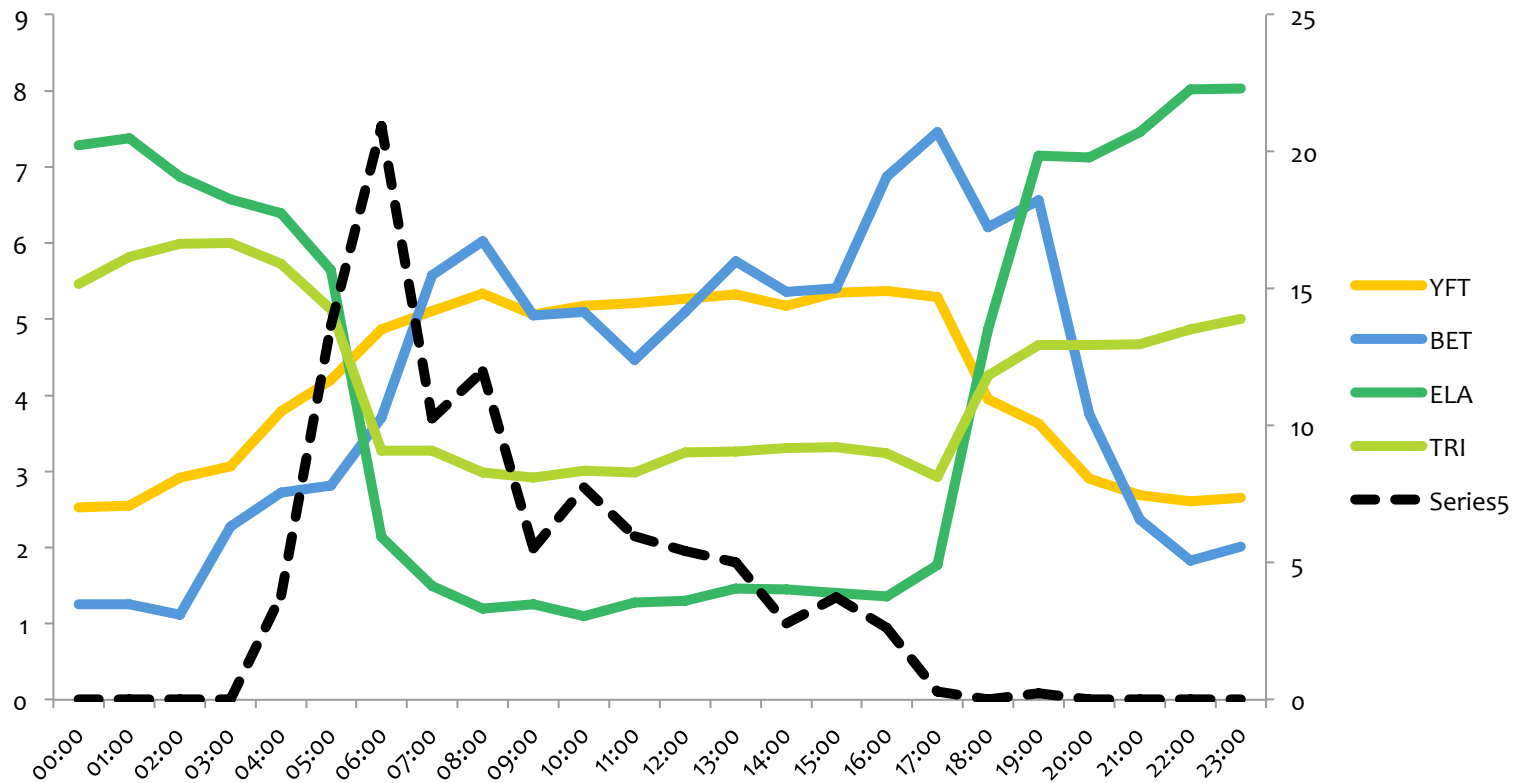
TG 12 #41



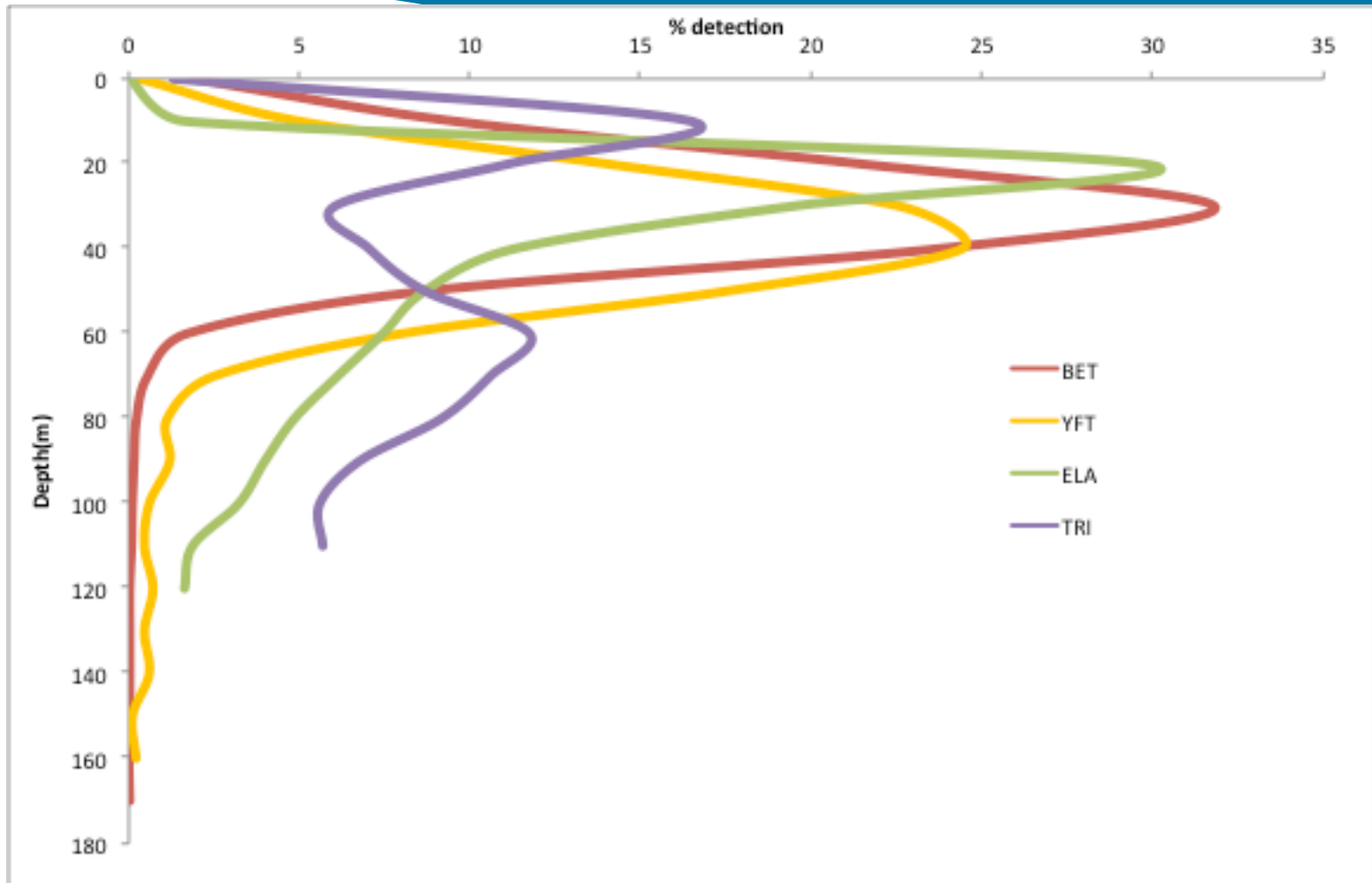
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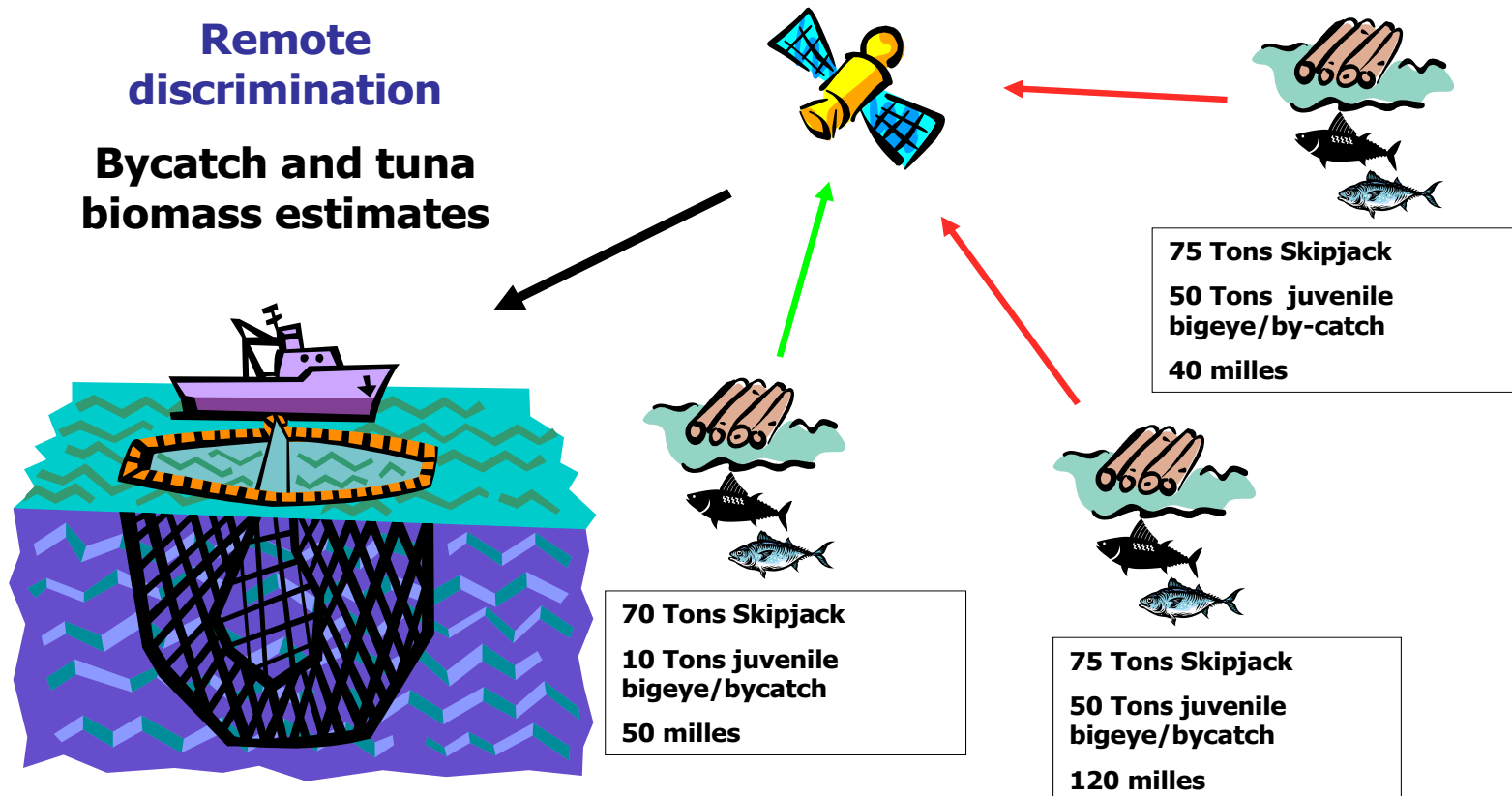
MOZ #34 + 3200 calee entre 2005-2009



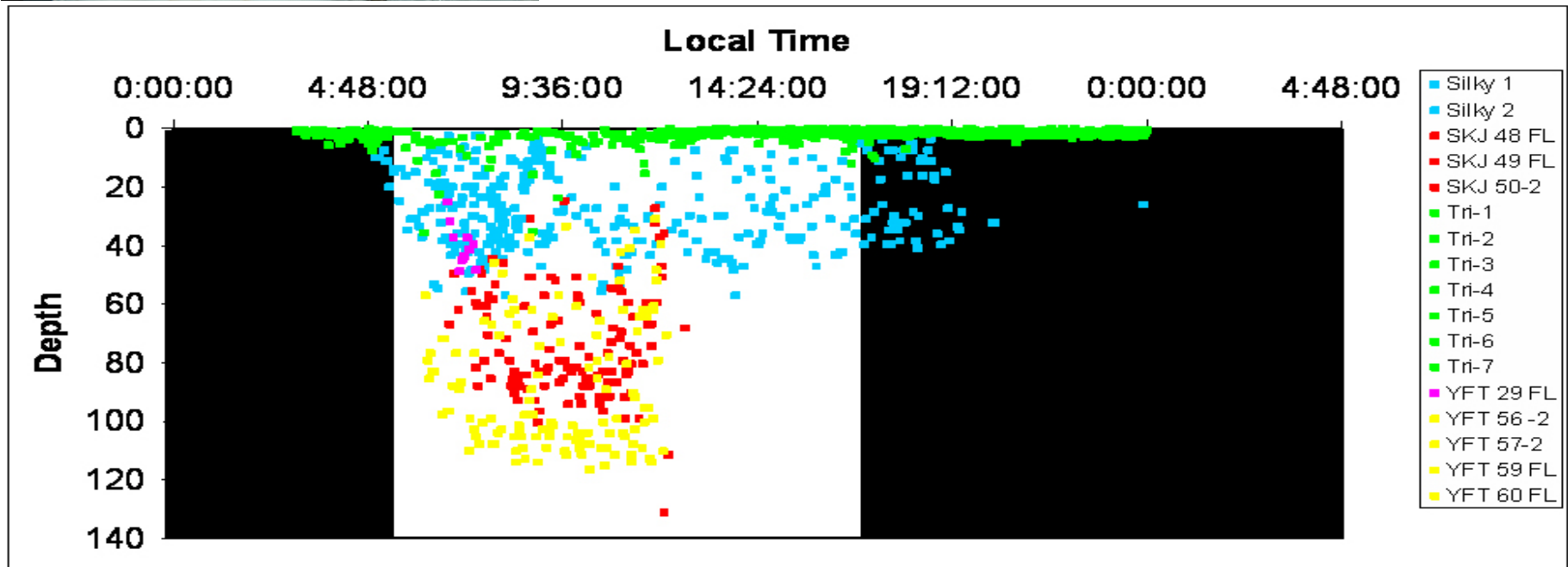
Vertical segregation (South Seychelles)



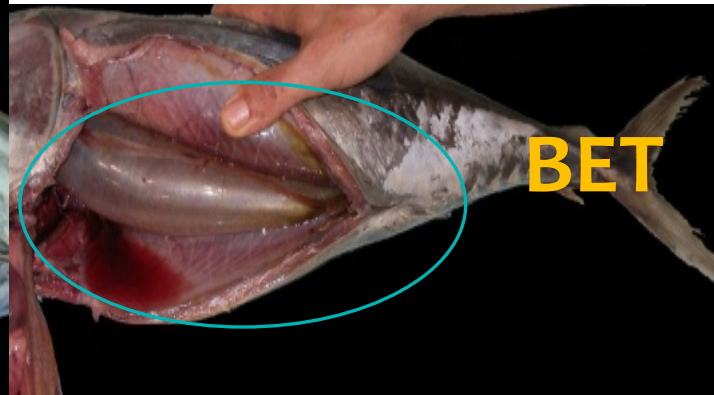
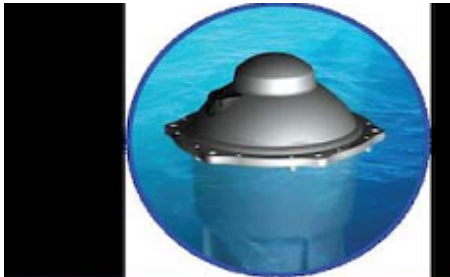
Echosounder buoys



Knowledge on vertical behavior of different species



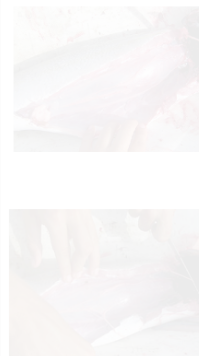
Echosounder buoys



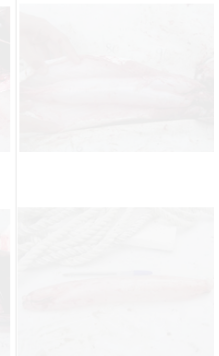
Trigger fish / Pinchudd



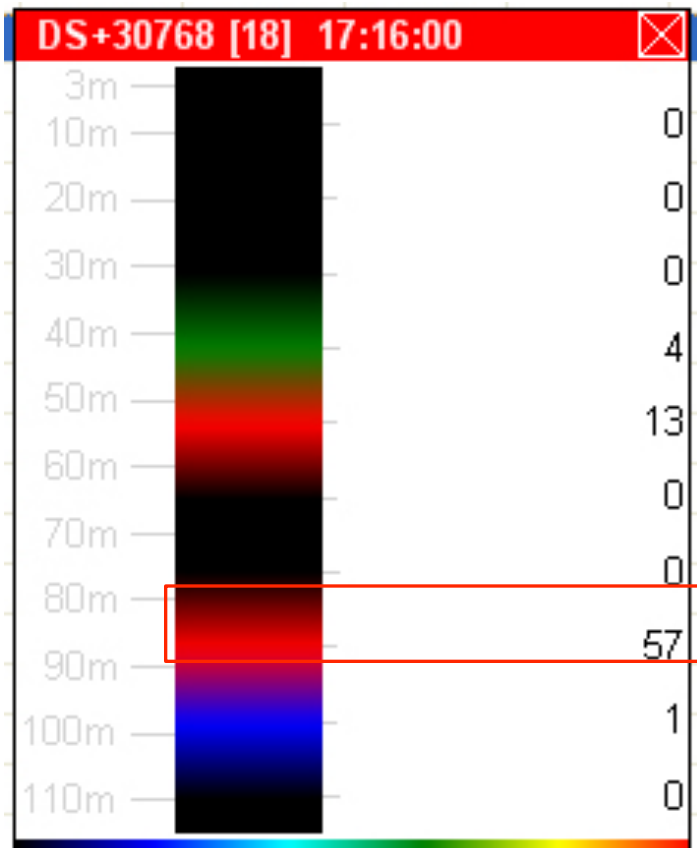
Rainbow runner /
Banana



Wahoo / Peto



Post-processing of data



Layer	Buoy estimate	Adjusted estimate
L1	0	0
L2	0	0
L3	0	0
L4	4	4
L5	13	13
L6	0	0
L7	0	0
L8	57	6
L9	1	0
L10	0	0
TOTAL (t)	75	23

Survival of sharks released from the PS

Regular fishing cruises (2):

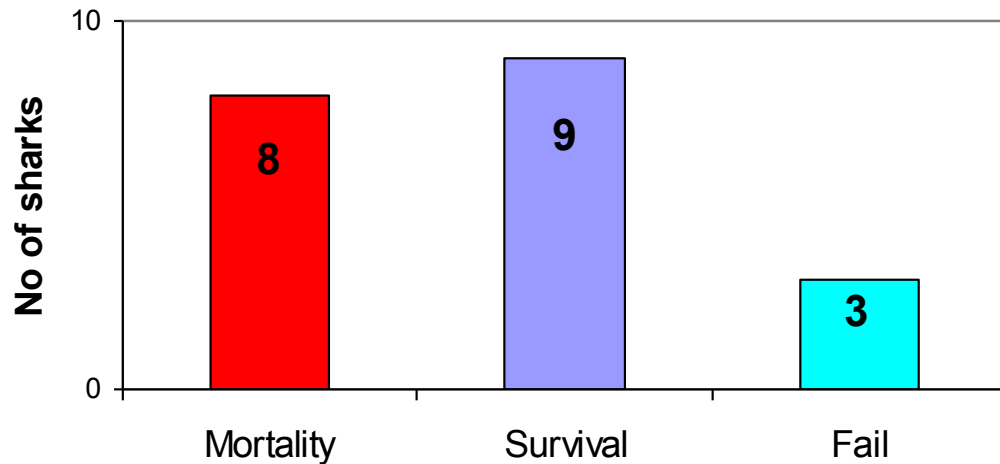
- 135 silky sharks caught, 84 dead (**62%**)
- 75% immediate mortality from the lower deck
- 25% immediate mortality from the upper deck
- 20 sharks released and tagged with miniPATs

ISSF Chartered cruise (1):

- 86 silky sharks caught, 64 dead (**74%**)
- 12 sharks released and tagged with miniPATs
- 10 sharks released and tagged with spaghetti tags

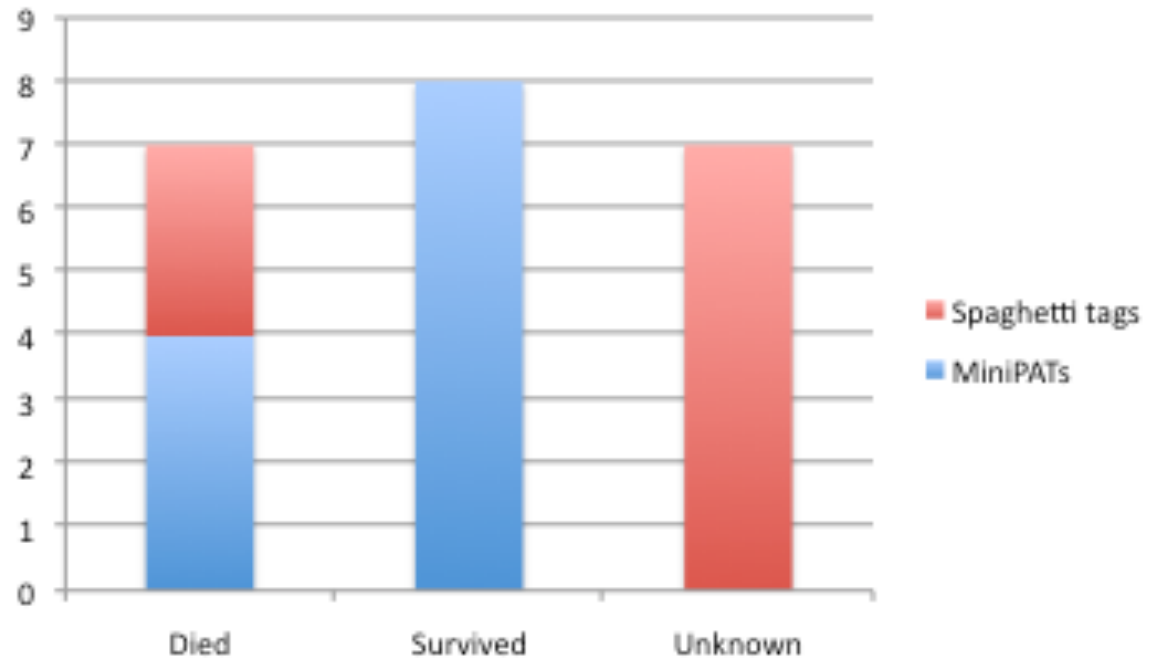


Survival of released sharks

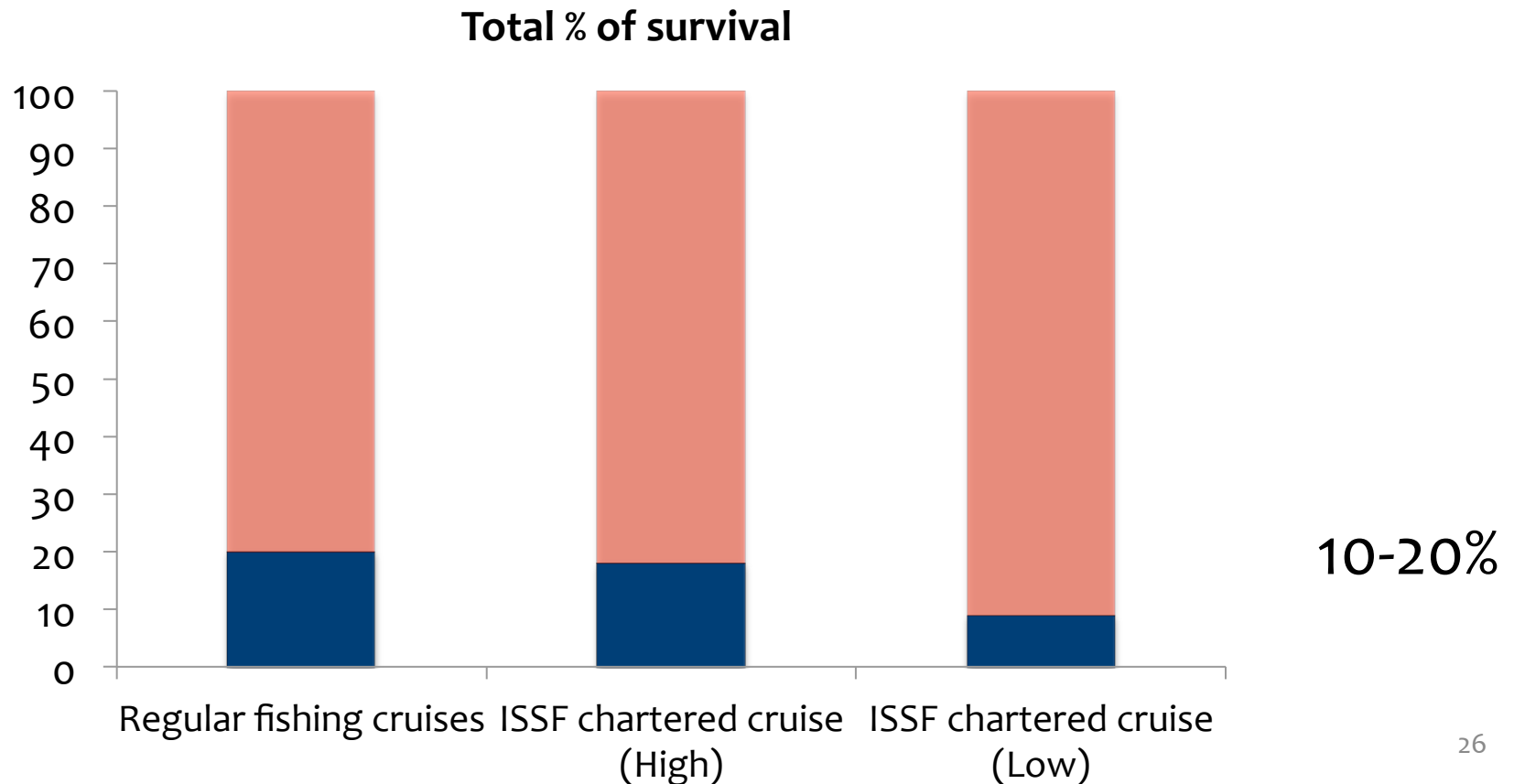


ISSF chartered cruise

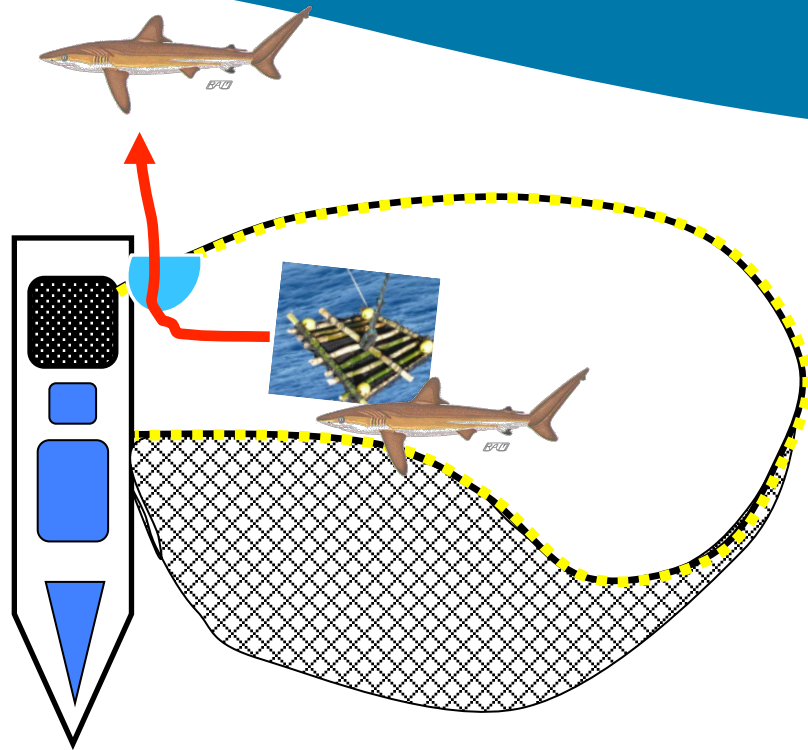
Regular fishing cruises



How many sharks can survive following the best practice of releasing sharks alive?



Tow FAD outside the net (with bucket of chum)



Conclusions & Recommendations

Conclusions:

Passive drifts were more efficient to attract sharks than when the FAD was actively towed (even slowly)

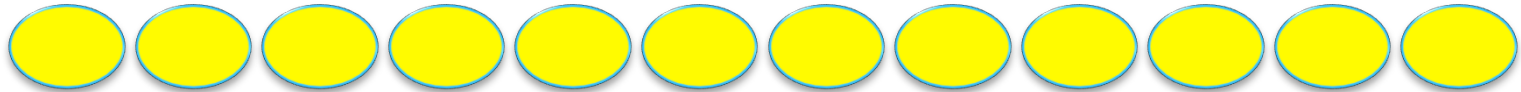
Fish are scared by the side thrusters or the hull and very few escaped through the gap at the bow

Recommendations:

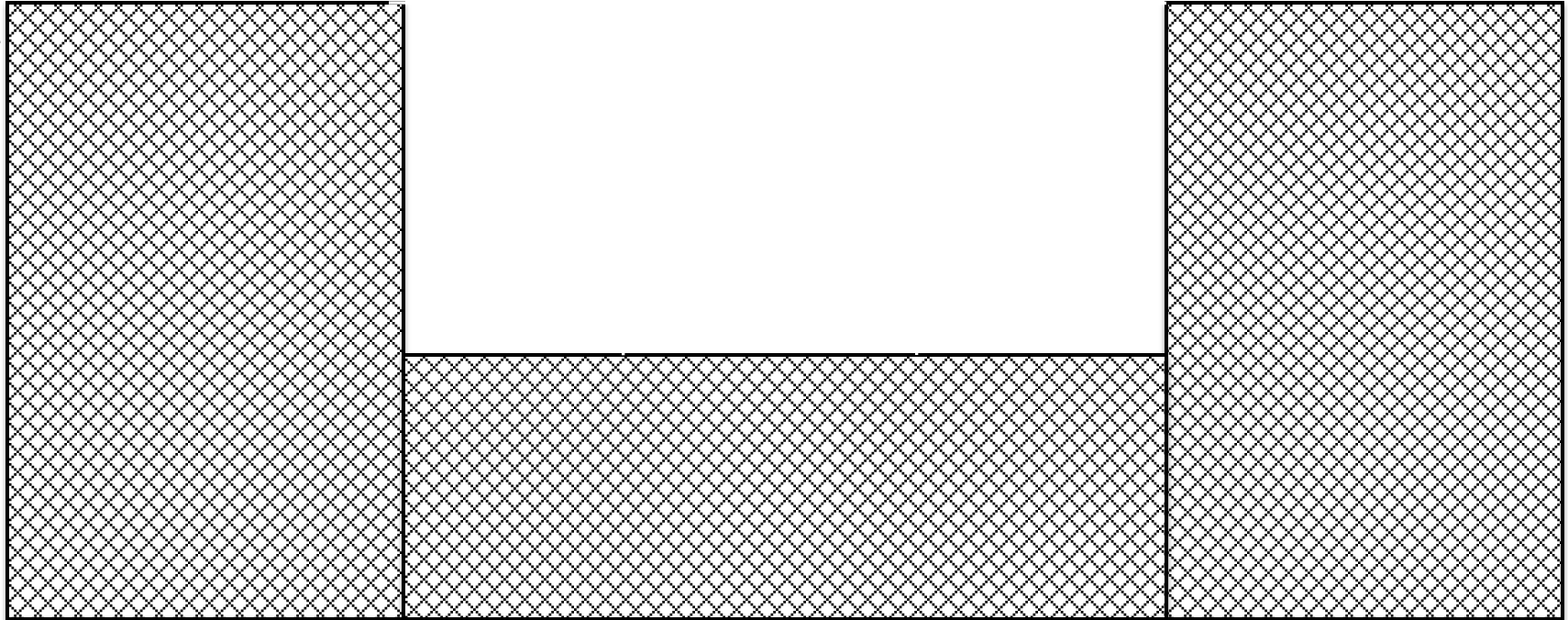
To make a window in the middle of the net (the part of the net that is further away from the vessel) and pass the FAD through this window.

Escape panel

15 – 50 m



15 m



Proposal for an escape panel

