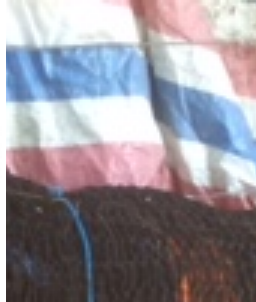




TWELFTH REGULAR SESSION
Bali, Indonesia
3-8 December 2015

ISSF side event Bali PNA FAD Tracking -WCPFC12

WCPFC12-2015-OP18e
4th December
0900



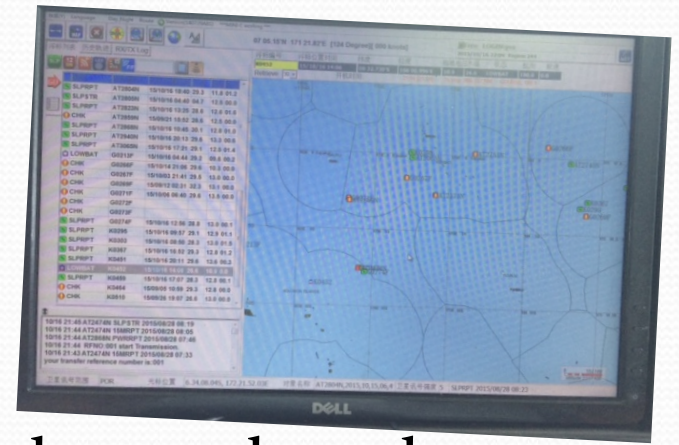
PNA -FAD Tracking And Management Trial- 2016

FAD Management
Technology Side Event
Bali, 3rd December 2015



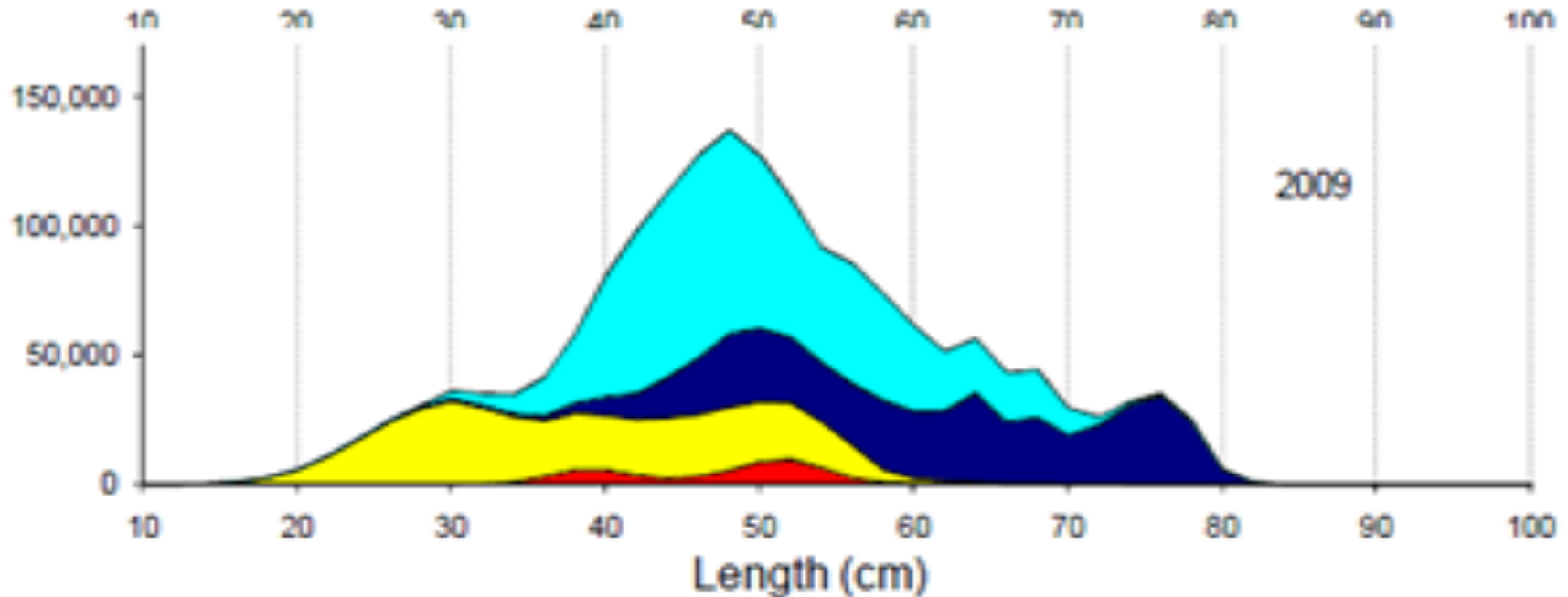
What Do We Know about FADs and the impact on our fishery?

- Basically not much !!!
- We know technology is evolving
- Clearly industry has rafts of tracking data on board,
- FAD numbers deployed are clearly increasing also and FADs are considered disposable, switched off and left to drift.
- Observers collect very detailed data on catch and FAD sets, but there is a limit on what they can record from the deck
- **No one consolidates all the data on one platform for management or compliance.**



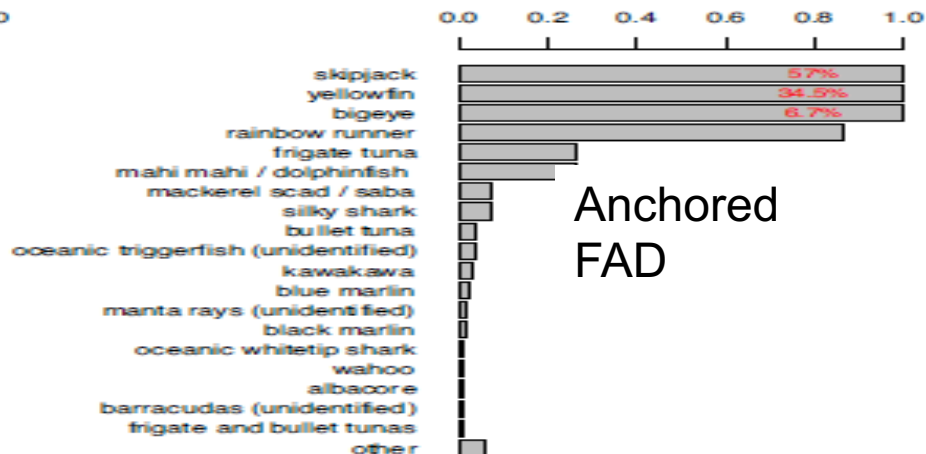
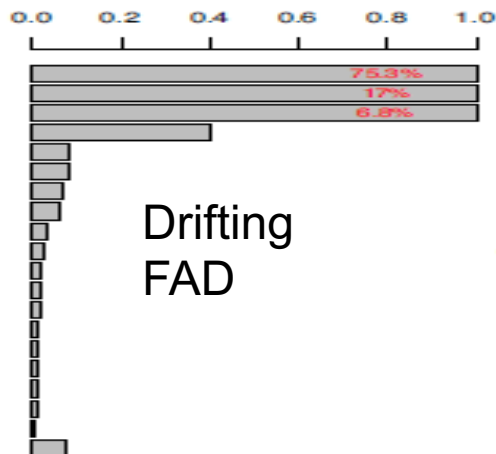
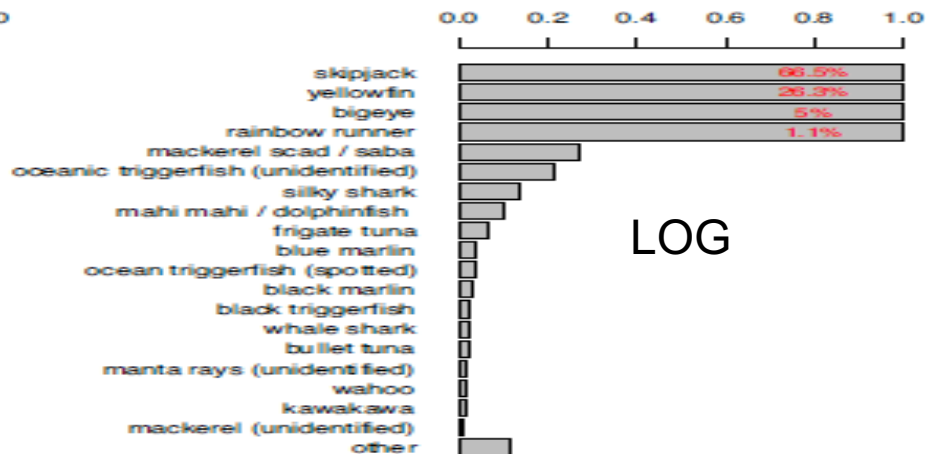
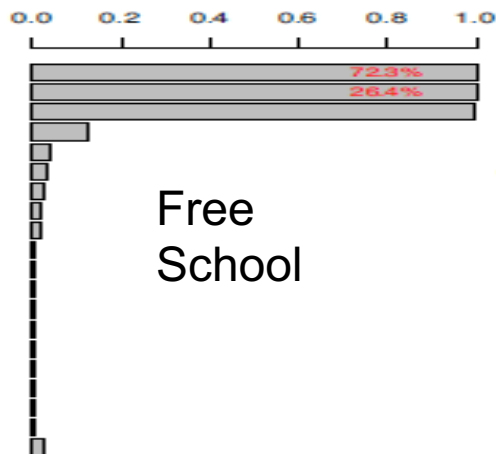
We know FADs tend to aggregate smaller, and lower value fish and depresses the fishery value and processing economics in our region

Annual catches (metric tonnes) of skipjack tuna in the WCPO by size and gear type,



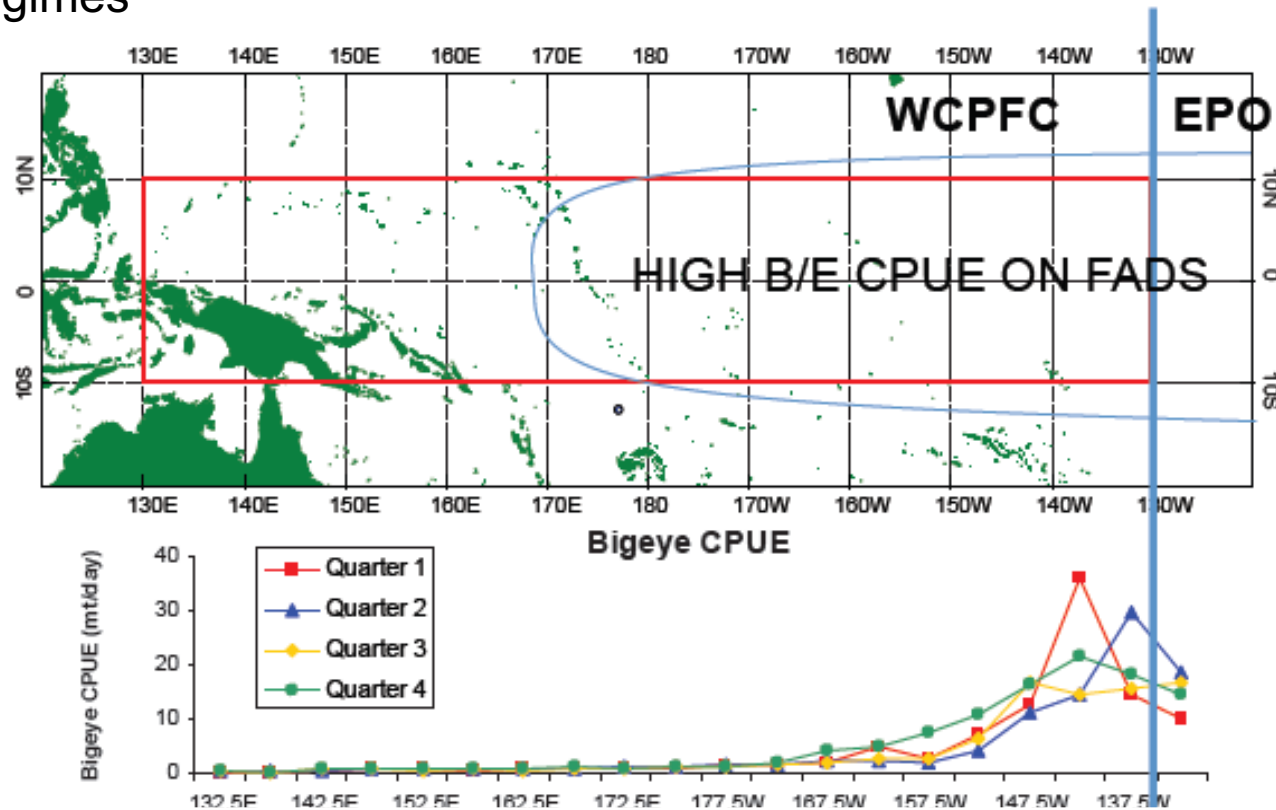
Free school skipjack [dark blue] are larger than Phil-indo [yellow] catch, Pole and Line [red] and PNA FAD catch [light blue],

Catch & Bycatch in the Purse Seine Fishery. Free school is cleaner than Associated sets [Logs, D/Fad, A/FAD]



Purse Seine Spatial & Seasonal Patterns Bigeye (FAD sets),

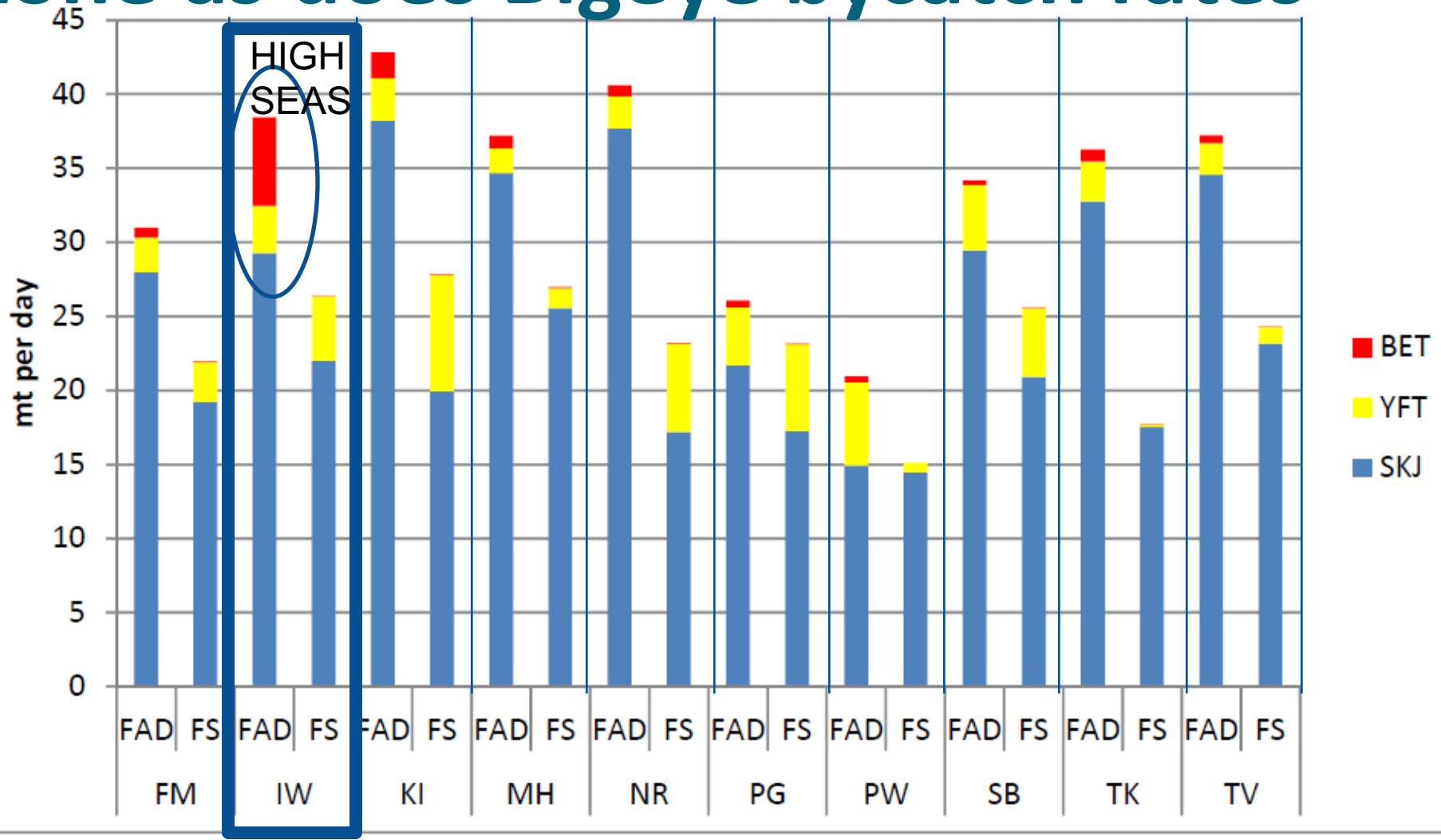
Regional nature of the problem, compounds the impact of FAD dependent fishing regimes



- Subject to where the PS effort is, the bigeye impact can be significant.
- Recent increased effort in Eastern High Seas is significantly compounding BE conservation problems due high CPUE in EHS
- Long line catches about 50% of BE, yet poor data, no evidence of new conservation contribution, or effort cuts, and limited observer coverage / compliance?



Catch rates on FADs and FS vary by zone as does Bigeye bycatch rates



Fad catch varies per zone. FAD cpue / \$ ranges from +8 to +110% over Free school
 With current prices / small fish discounts, even double catch on fads may be less \$

How big is the problem?

PNA has surveyed declared FADs deployed since 2010

- Annual estimates were 30,000 a year. Up to 2013/14
 - - this based on annual company declarations on VDS registry
 - - verification based upon supplier invoices

Trend “phasing out radio buoys and shift to Satellite buoys”

- In 2014 - 2015 estimates 80,000 Fads deployed a year
 - based upon company declarations.
 - “Trend from Satellite to Sonar capable buoys”

What do we know about FADS ? What changed?? What impact?

PNA FAD sets remain largely constant year to year, - LIMITED NOT BY FAD NUMBERS IN THE WATER, BUT BY BOATS AND DAYS / YEAR AS LIMITED UNDER PNA VDS LIMITS.

FADs see no borders - Don't respect National laws where FADs are Fishing gear, FADs in the water are fishing -IUU Fishing in each zone

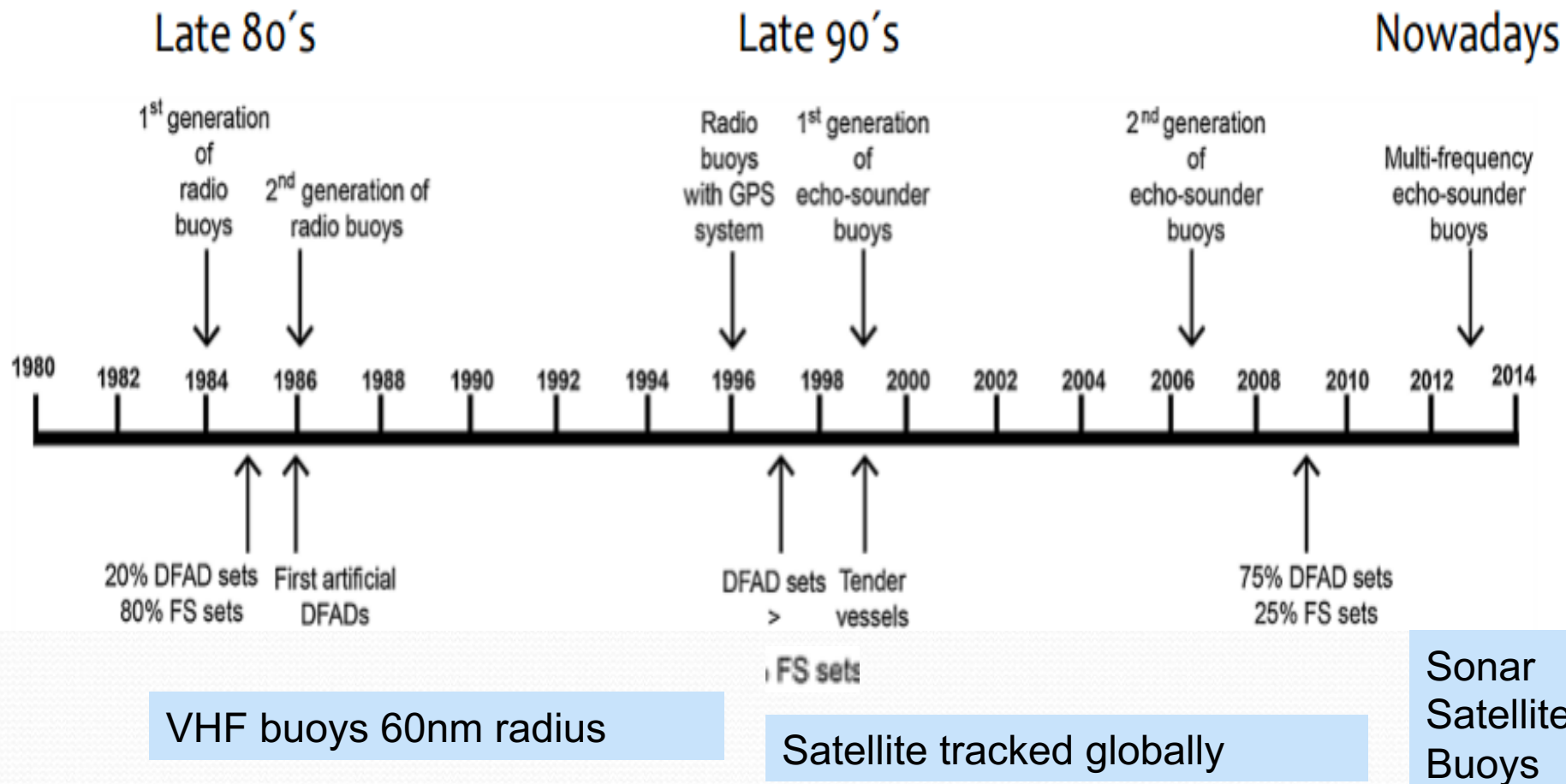
6 months track data for 3 boats FADs

1/60th of the annual picture based on 30,000 FADs

Current estimate based on declarations are 80,000 are mass deployed a year , so this 1/160th of the issue today

FAD tracking Technology Evolution

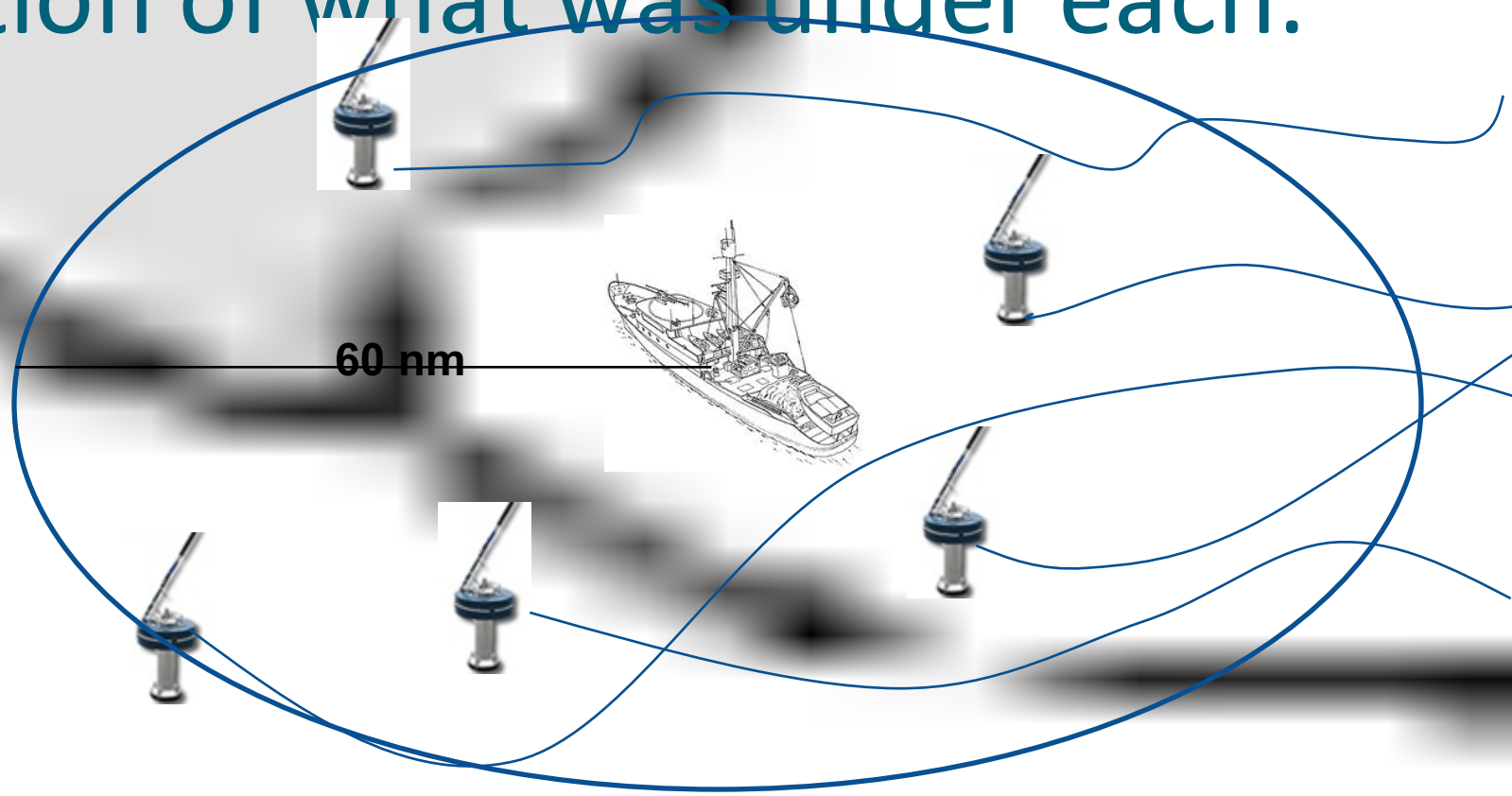
Searching for FADs



Anchored FADs ready to deploy



VHF Radio Buoys on drifting FADs, -
historically limited numbers, tracked
within 60 nm radius of vessel, and no
indication of what was under each.

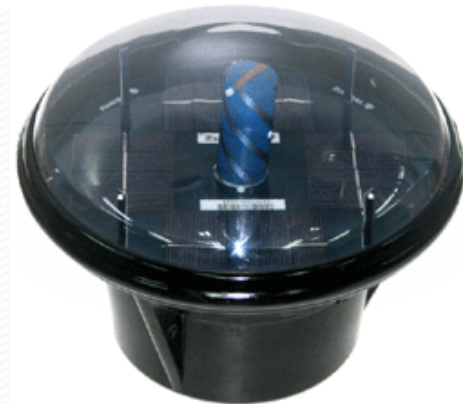
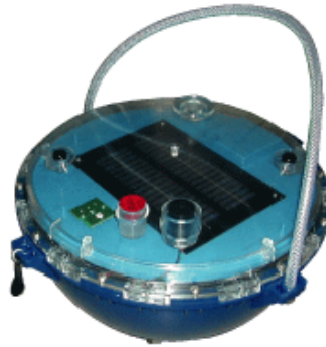


Anchored FADs basically the same issues, but checked by support vessels

Drifting FADs- a float /raft and old netting and coconuts fronds as attractors. Note VHF buoy



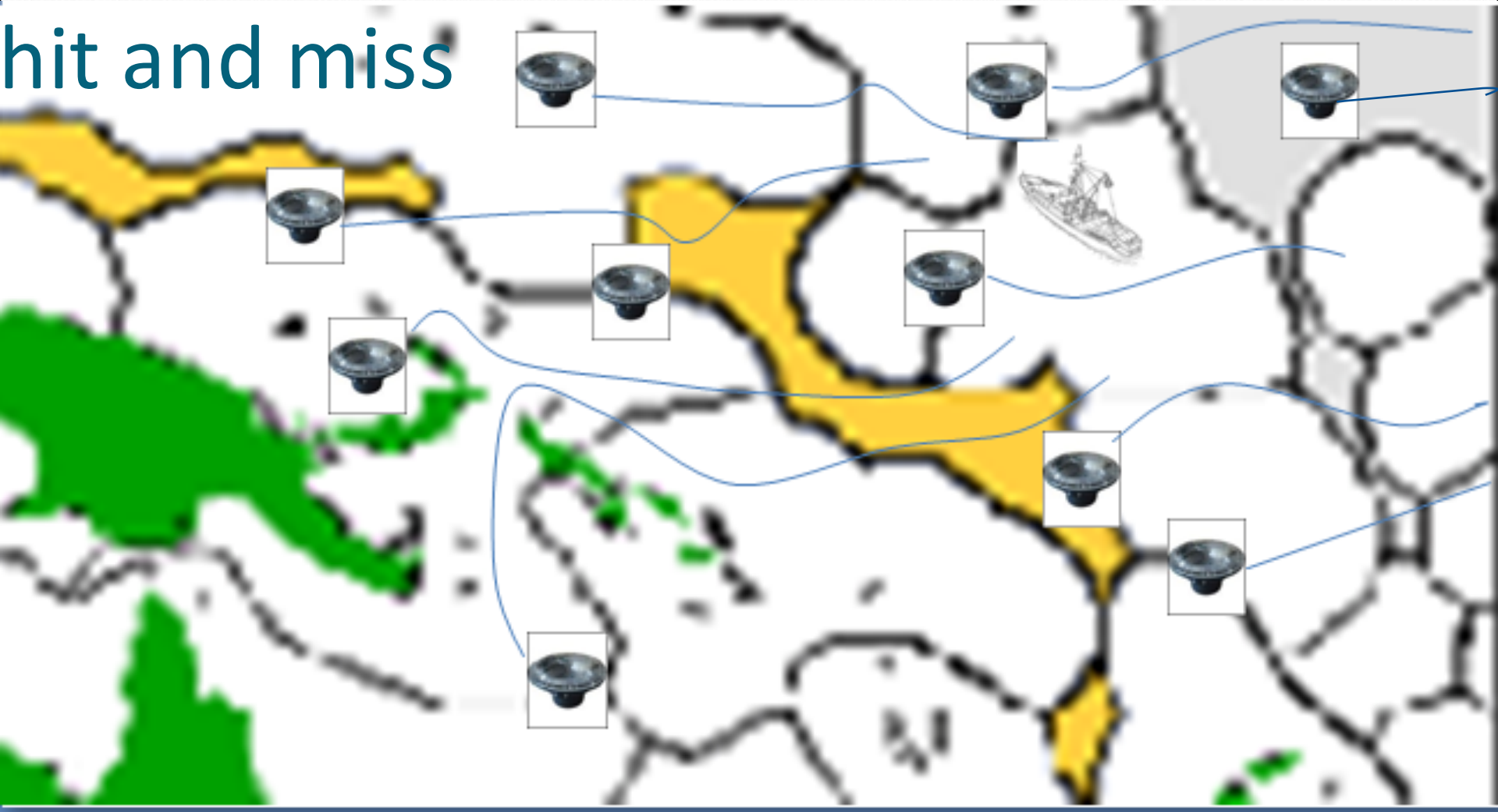
TYPICAL SATELLITE FAD BUOYS



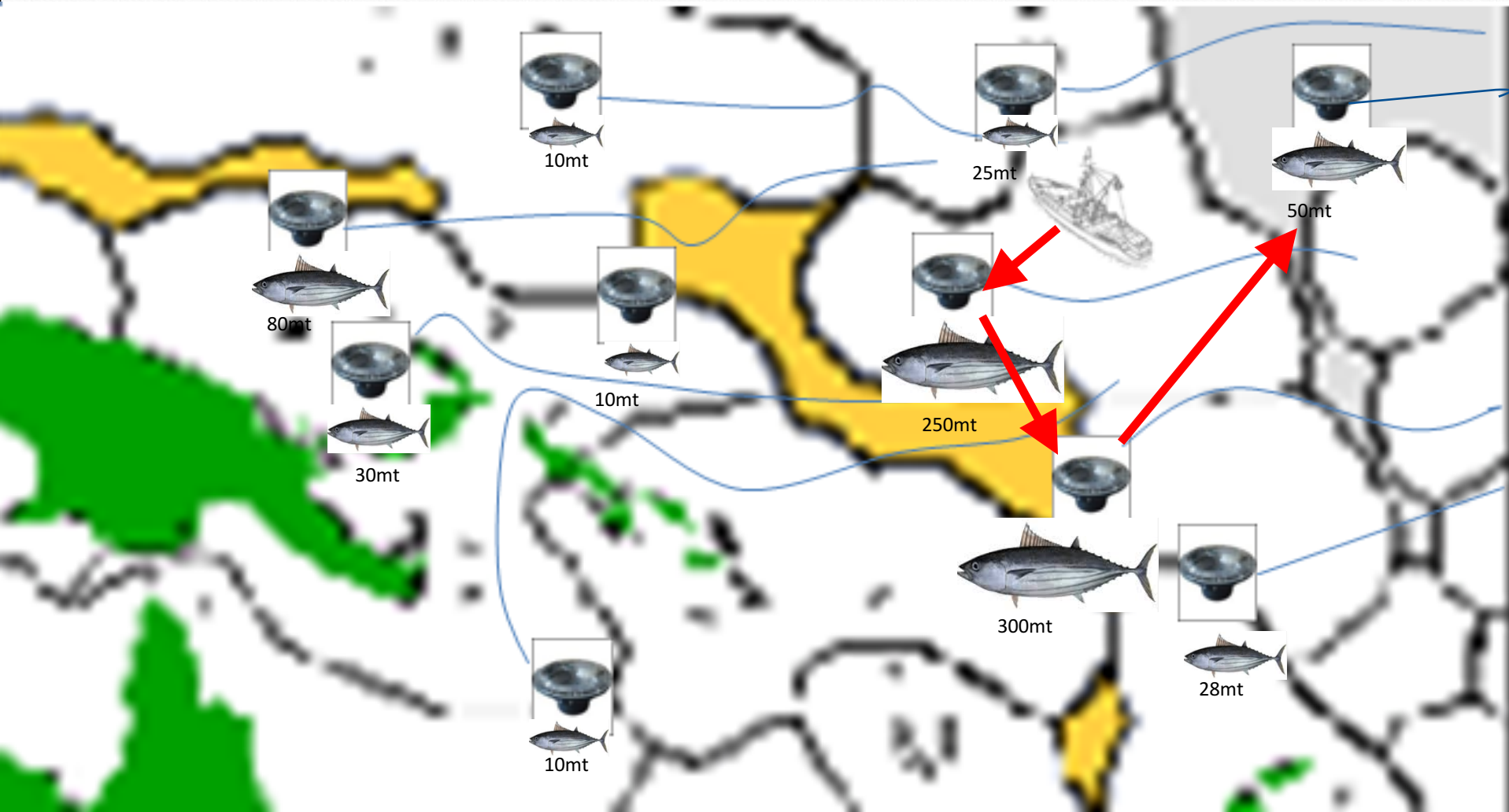
Today FADs are more synthetic and smaller, often still with coconut fronds, and increasingly tracked by satellite. Are FADs evolving too??



Introduction of satellite buoys allows more FADs and global tracking, but NO indication what is under each FAD, so hit and miss



Introduction of SONAR satellite buoys allows targeting; with biomass and species known under 100 + FADs and sets targeted with some confidence.



Impact of Sonar Buoys

- Full impact of sonar technology is yet to be seen and technology is improving. A few fleets are actively using it.
- Those that do; tend to strategically control operation centrally, no longer the captain. More like a video game!
- “Cherry pick” most productive FADs, with very high CPUE, ignoring non productive FADs.
- Quoted as “A game changer”
- Limiting FAD sets, may not control the impact on the resource as expected, as FAD deployment is not limited.
- FAD closures are also a crude tool with serious economic seasonal impacts perceived in many PNA zones. - DB
- Also impacts industry, who need also propose solutions

satlink

ELB 3010 Echosounder System

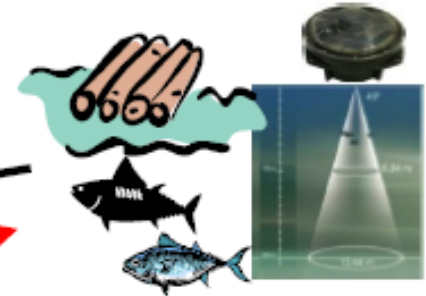
Sustainable tuna fishing



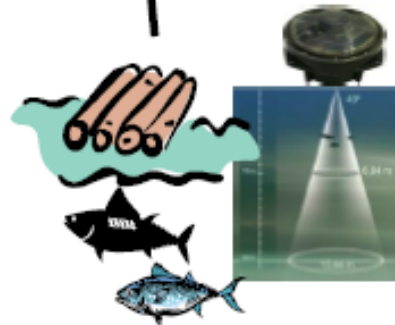
INFORMATION ABOUT
QUANTITY, SPECIES AND SIZE



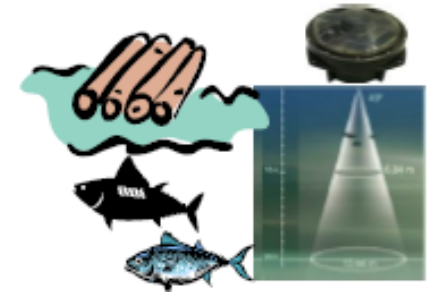
Allow fishers to remote selectivity
and to decide the most efficient
strategy



75 Tons Skipjack
10 Tons bigeye
80 milles

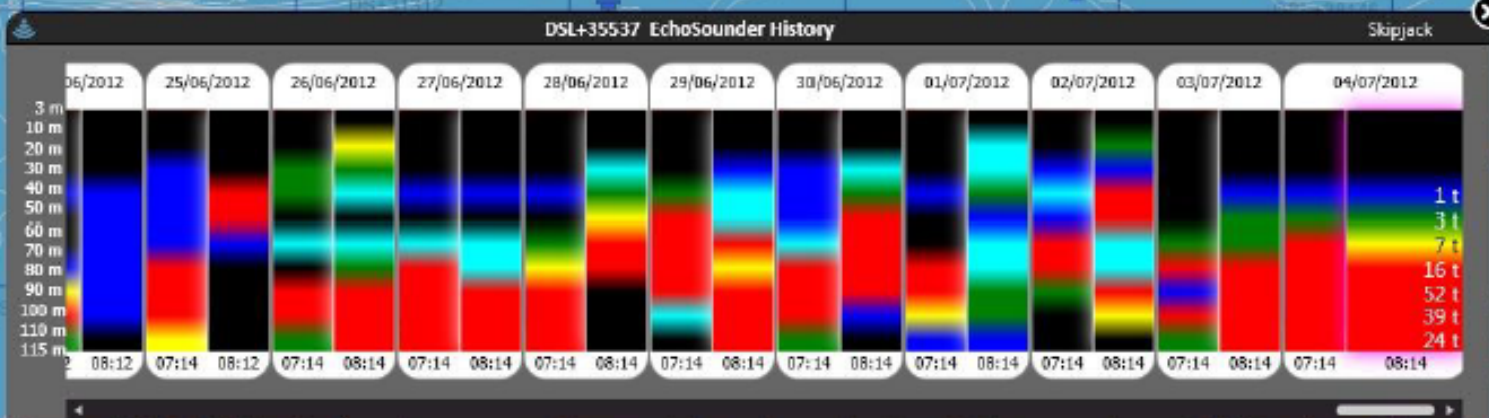
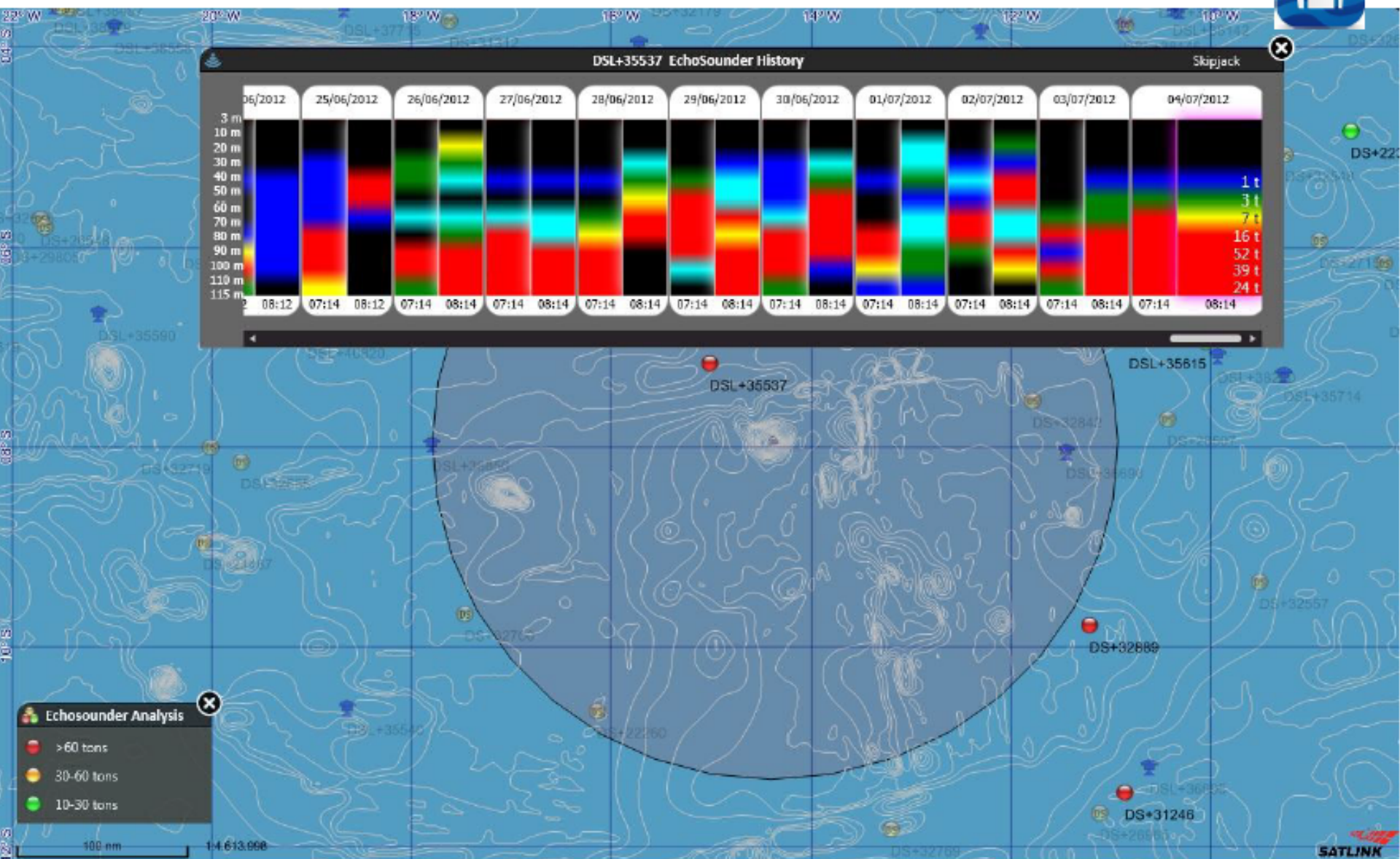


40 Tons Skipjack
10 Tons juvenile bigeye
40 milles



75 Tons Skipjack
50 Tons juvenile bigeye
120 milles

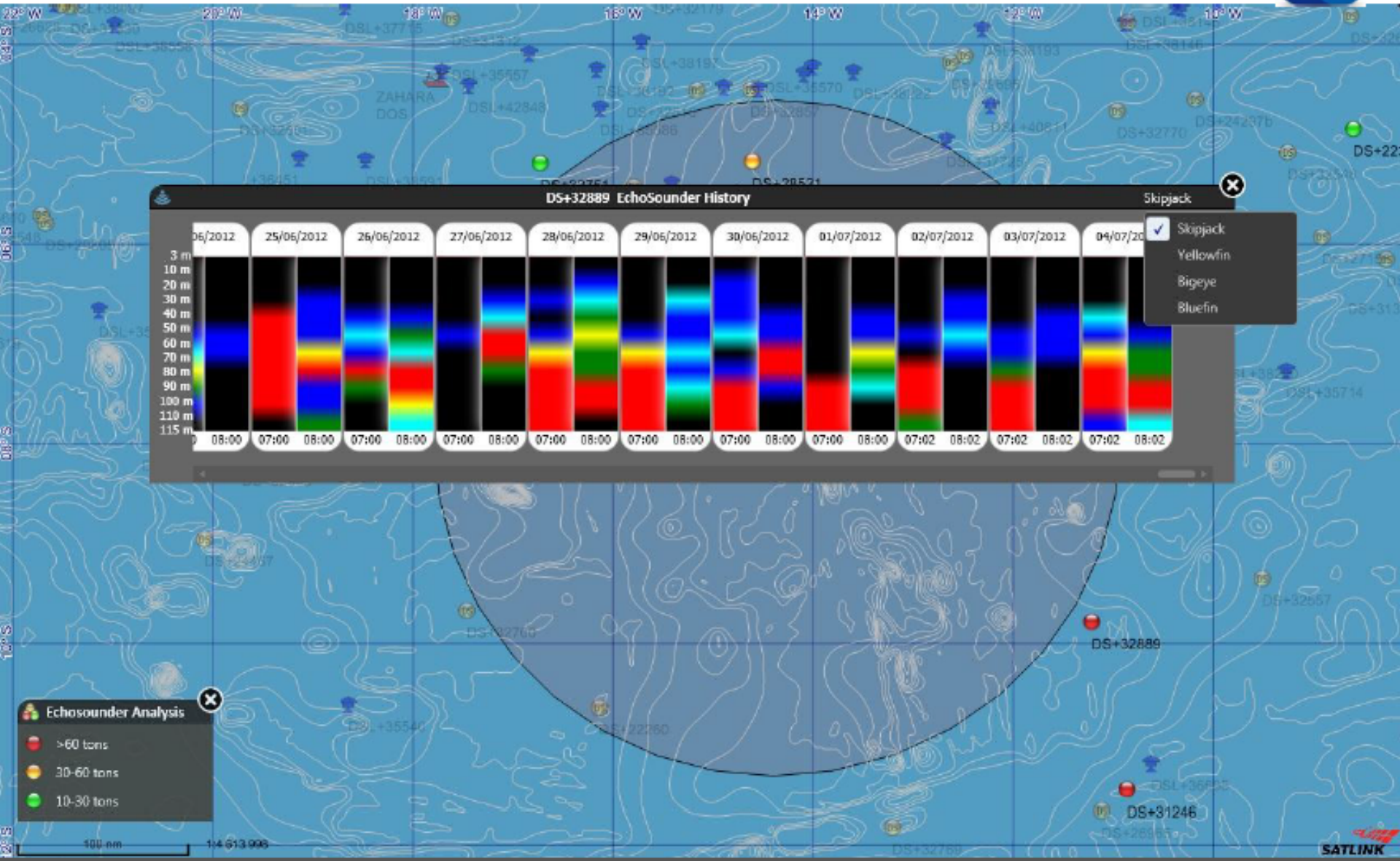
Buoy Echosounder History



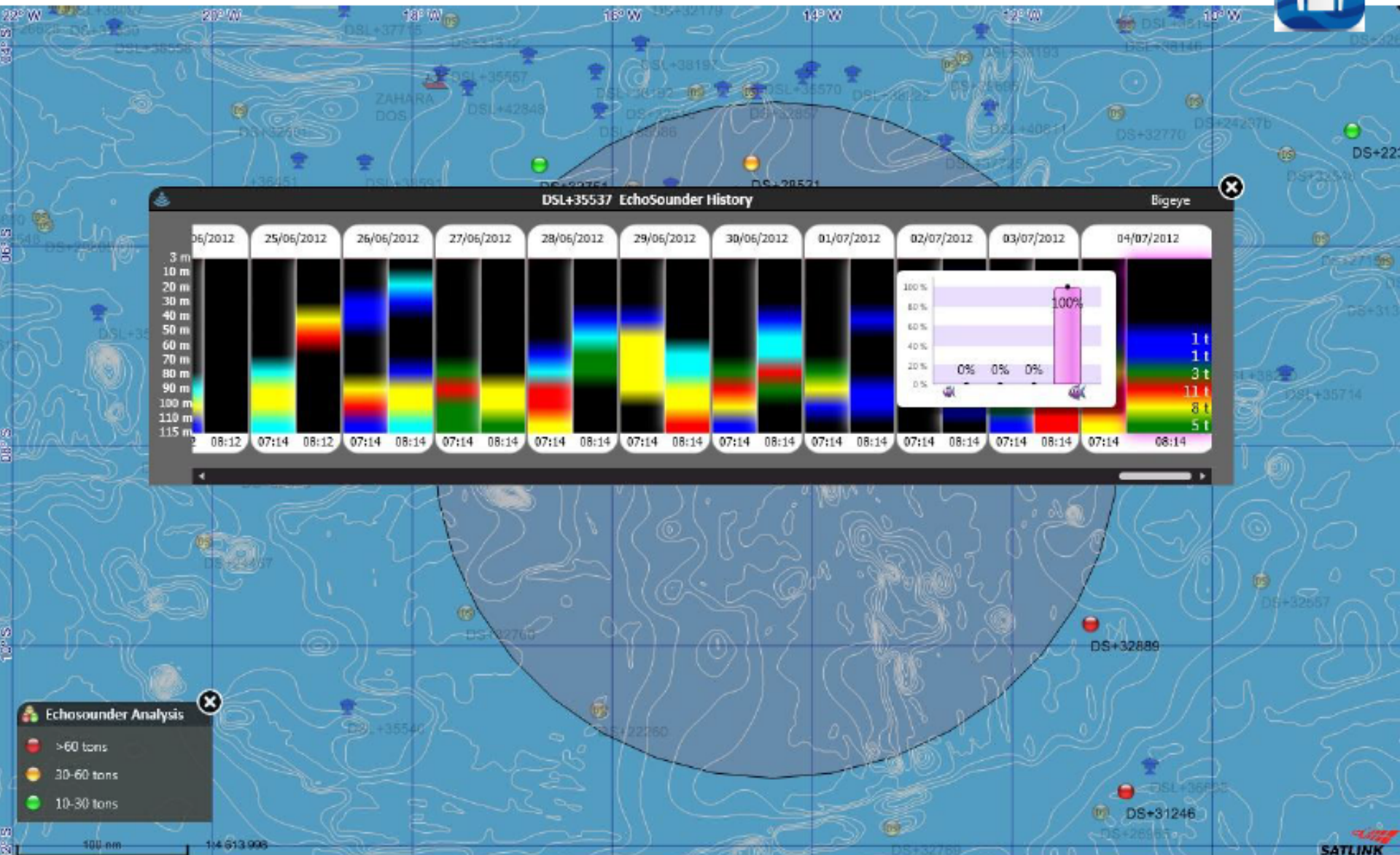
Echosounder Analysis

- >60 tons
- 30-60 tons
- 10-30 tons

Analysis by Tuna Species



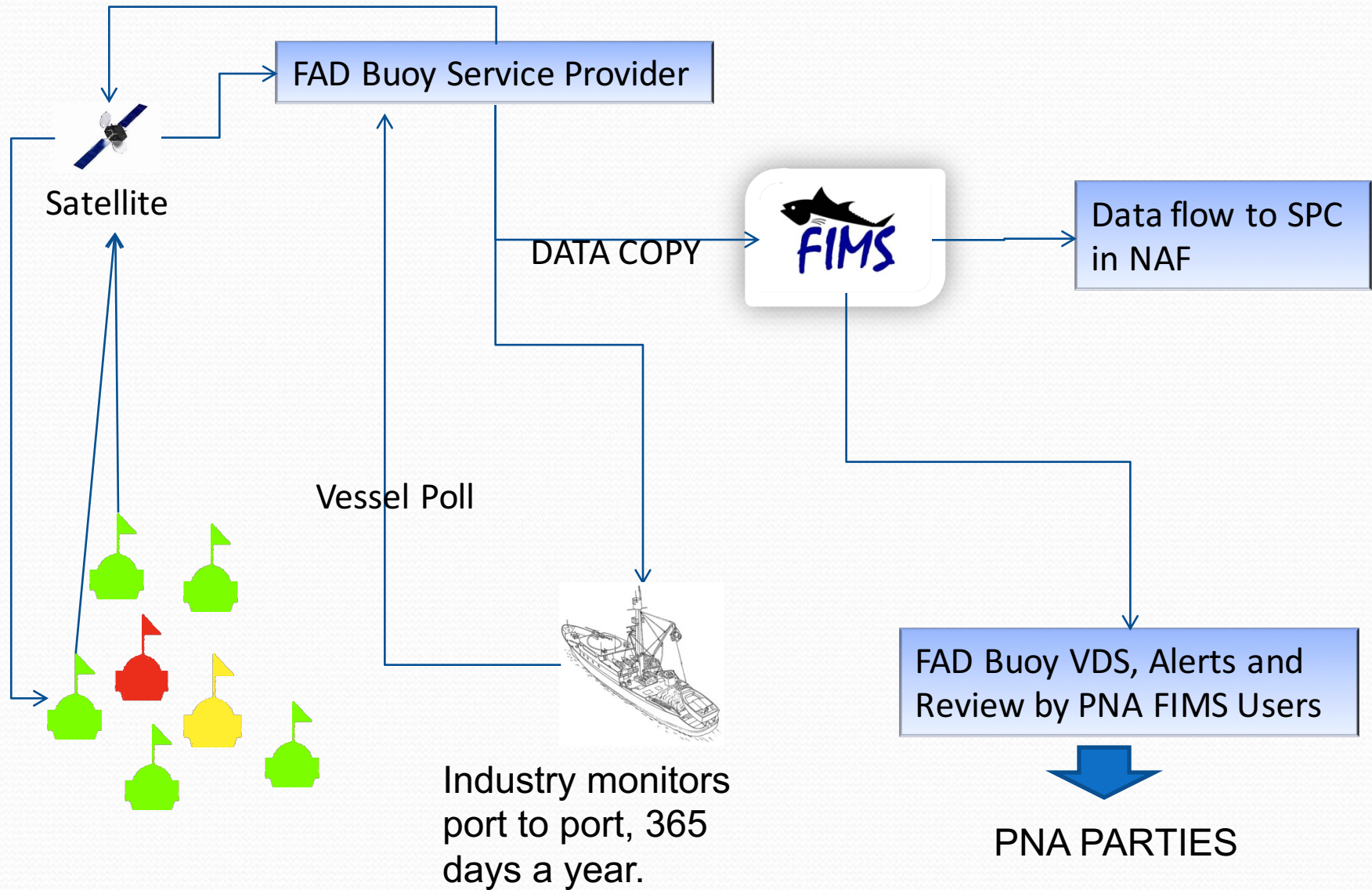
Analysis by Tuna Species and Size



PNA FAD Registry - 2016 trial

- Mandatory registering all FAD buoys gives opportunity to better monitor FADS and understand their impact and compliance in PNA waters.
- Note different levels of dependence among fleets
- Interfaced with e Reporting to build better catch, composition and FAD data at national / PNA level
- Any FADs found, must now have a tracking buoy added before set upon in PNA waters [industry already has incentive to track productive FADs found].
- Incentive to recover and redeploy FADs and limit FAD debris in oceans.
- Proximity alert- a tool to monitor FAD closure and other compliance in National waters

FAD Buoy Data-flow





FAD data entry can be reviewed and updated as needed. NOTE: also AUTO REGISTRY, with agreed NAF data chains and unique buoy ID

FAD Number :: 4701727

Details

Positions

** FAD Number:

** FAD Tracking / Serial #:

** Status:

** FAD Type:

FAD Make:

FAD Model:

Owner:

Current assigned Vessel:

(Note: ** - Mandatory fields)

FAD Manual Position Entry

** Date of Position:

Year (YYYY) Month (MM) Day (DD)

** Time of Position (UTC):

Hour (HH) Minute (MM)

** Latitude (Decimal Deg):

** Longitude (Decimal Deg):

Speed (knots):

Course (bearing):

Informed by:

Reason:



Automatically counts FAD days in each zone

FIMS - Fisheries Information & Management System



Back

You are logged in as maurice.brownjohn

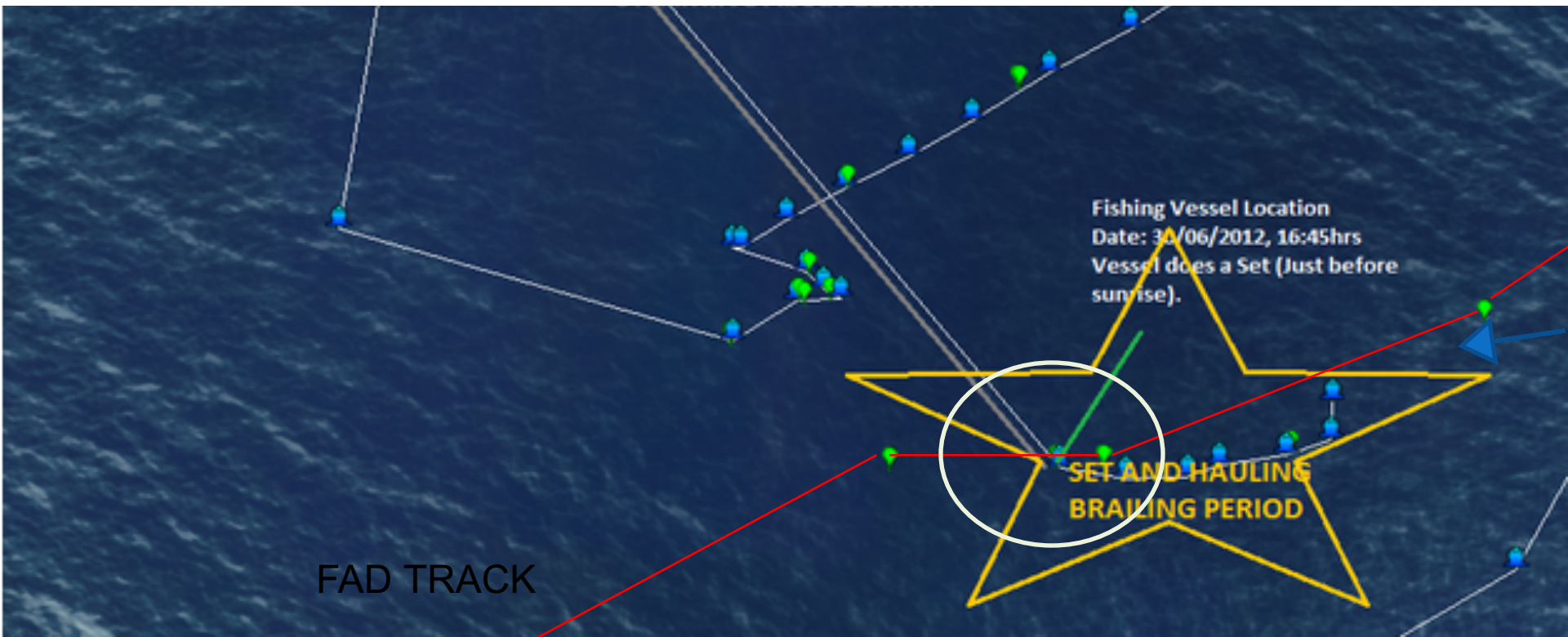
FAD Number :: 4701736

Details Alerts Notes Positions **FDS**

Reporting Period: 2013 ▾

Trip Start (dd/mm/yyyy)	Trip End (dd/mm/yyyy)	Zone		Trip Days	FDS Calculated Days
31/03/2013 22:36	08/08/2013 08:06	Port - Majuro	View Email	129.4	0
08/08/2013 08:06	08/08/2013 20:36	EEZ - Republic of Nauru	View Email	0.52	0.52
08/08/2013 20:36	20/08/2013 13:36	EEZ - Gilbert Group Kiribati	View Email	11.71	11.71
20/08/2013 13:36	22/08/2013 07:36	EEZ - Republic of Nauru	View Email	1.75	1.75
22/08/2013 07:36	23/08/2013 17:36	EEZ - Marshall Islands	View Email	1.42	1.42
23/08/2013 17:36	23/08/2013 21:36	TS - Marshall Islands	View Email	0.17	0
23/08/2013 21:36	06/09/2013 23:36	Port - Majuro	View Email	14.08	0
06/09/2013 23:36	07/09/2013 03:36	TS - Marshall Islands	View Email	0.17	0
07/09/2013 03:36	07/09/2013 06:36	EEZ - Marshall Islands	View Email	0.13	0.13
07/09/2013 06:36	07/09/2013 08:36	TS - Marshall Islands	View Email	0.08	0
07/09/2013 08:36	07/09/2013 15:36	EEZ - Marshall Islands	View Email	0.29	0.29
07/09/2013 15:36	11/09/2013 23:36	EEZ - Gilbert Group Kiribati	View Email	4.33	4.33
				164.04	20.15

Proximity Alert, based on time of day .
Fad buoy dawn report and proximity of
vessel over x hourly dawn poles gives
an indicative FAD set count / charge,
Can be verified by e reports/logs .



Fishing Vessel Location
Date: 30/06/2011, 15:46hrs
Vessel began to steam to FAD
Location to Investigate before
doing a set.

DRIFTING

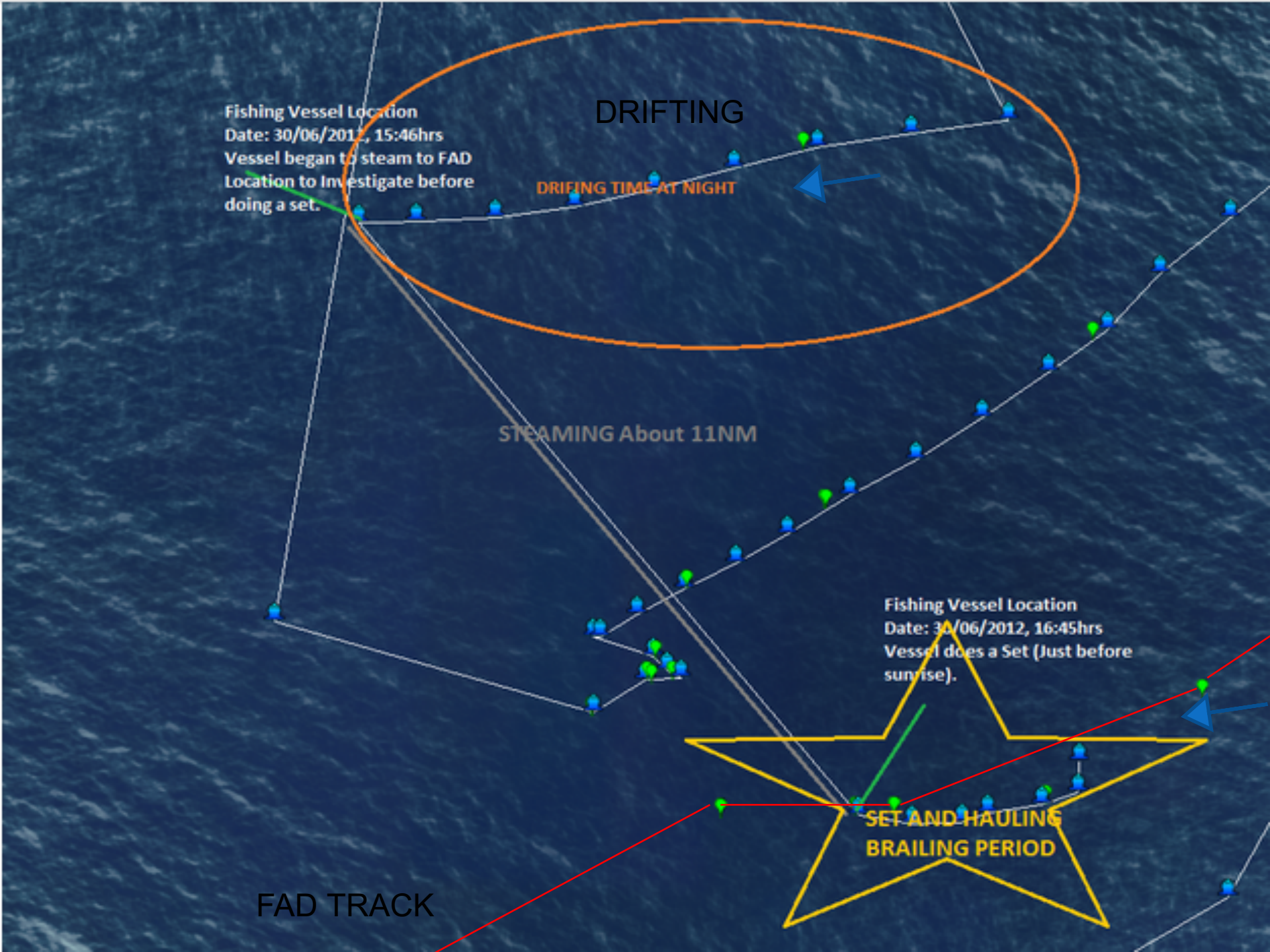
DRIFTING TIME AT NIGHT

STEAMING About 11NM

Fishing Vessel Location
Date: 30/06/2012, 16:45hrs
Vessel does a Set (Just before
sunrise).

SET AND HAULING
BRAILING PERIOD

FAD TRACK



Where to from here?

- Clearly technology is going to continue to advance,
- FAD closures create a disproportionate burden to the SIDs where fishing occurs. Yet we still see no measures being applied and enforced in other commission member zones or the HS.
- The Commission MUST ensure compliance with CMMs
- Perhaps we need rethink the issues looking forwards to maintain healthy stocks, not playing catch up after the event
- It is believed juveniles tunas and bycatch do not move with large mature free schools .
- Therefore per fad the bycatch may be relatively stable??
- Premised on this, current mass deployment of FADs with Sonar capability may be part of the solution.
- Coupled with a hard limit on sets per year per boat could this incentivize only setting on big schools and reduced bycatch

What Do We really Know about FADs ? How do they work? What is the true impact?

Basically we don't know enough. But industry has some insight.

- Are too many Fads leading to too many small aggregations and the perceived problems of FADs are compounded ?

or

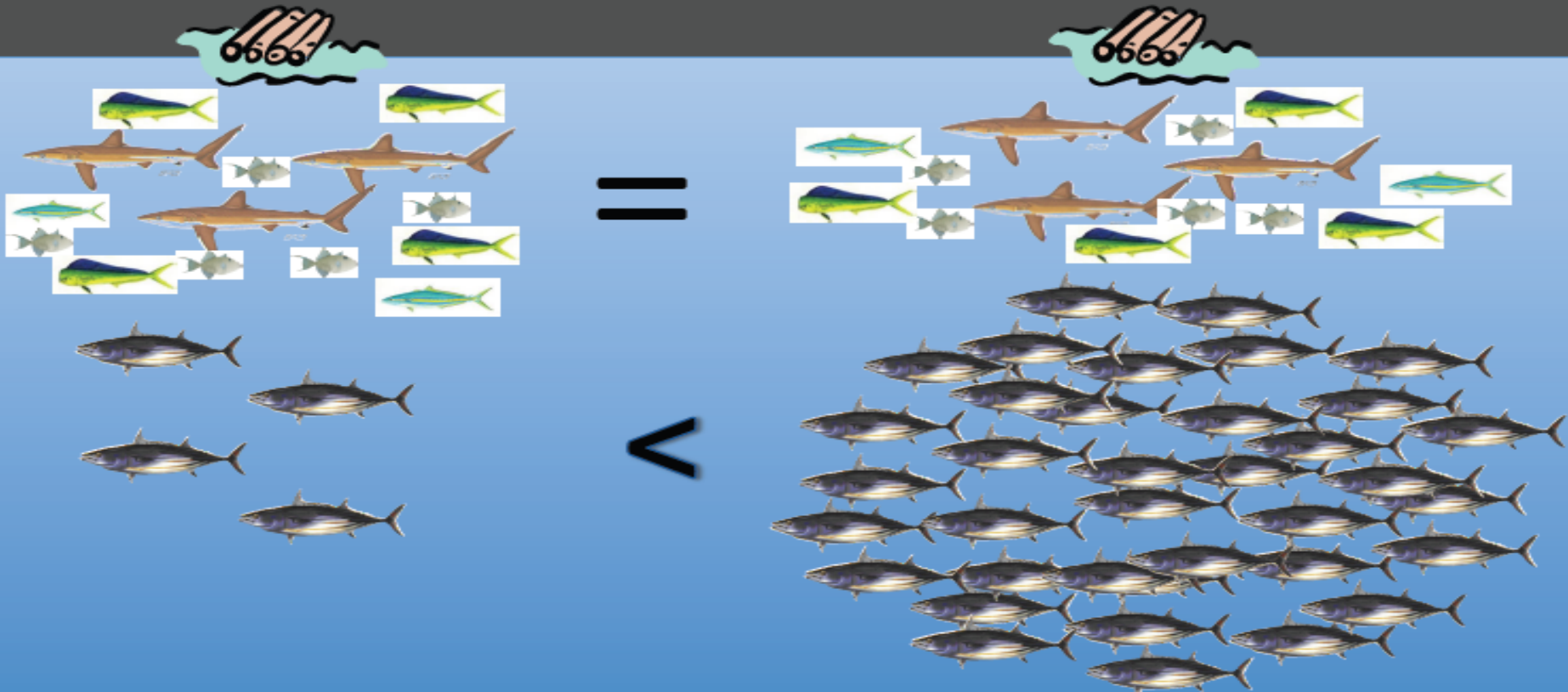
- Does it just give the large schools more options and most FADs are NOT holding tuna ? Thus driving the need for Sonar capability for targeting?
 - BUT does targeting only big tuna aggregations contributes to conservation and economic efficiency and bycatch maybe relatively reduced?

managed “Cherry Picking” with sonar buoys and limited sets targeting only large skipjack schools may be a solution to closures ?

- as % bycatch is reduced relative to total catch.

Avoid setting on small schools

(Dagorn et al. 2012 Can. J. Fish. Aq. Sci.)



PNA is now rolling out FAD tracking trials for 2016 in PNA waters.

2016 PNA FAD Registration in progress.



PNA is grateful for ongoing PEW / Moore Foundation / NFA/ QAC support for this project to date and in future seeing it rolled it out and disseminating near real time management and compliance data

INDUSTRY ALWAYS HAD THE LIVE INFO ON OUR FISHERY.

**Now real time genuine FAD and fishery management data can be gathered as a reality.
- But we have much to learn and must use every resource for better management.**