FAD TRACKING RESEARCH

What Do We Know About FADs And Their Impact On Our Fishery? - The Need For FAD Research, And The Potential Opportunities From FAD Data In Tuna Management

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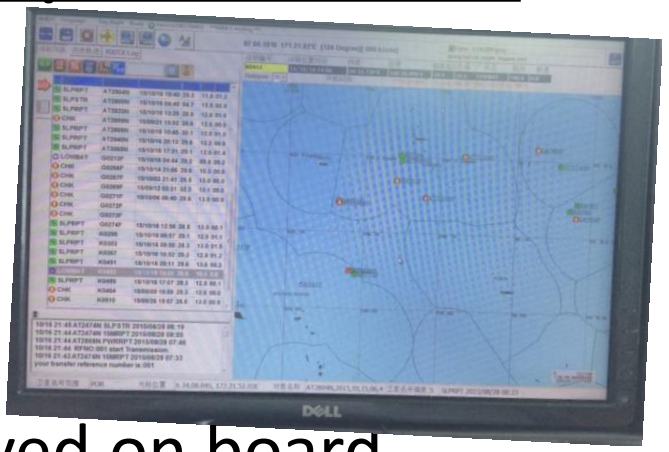
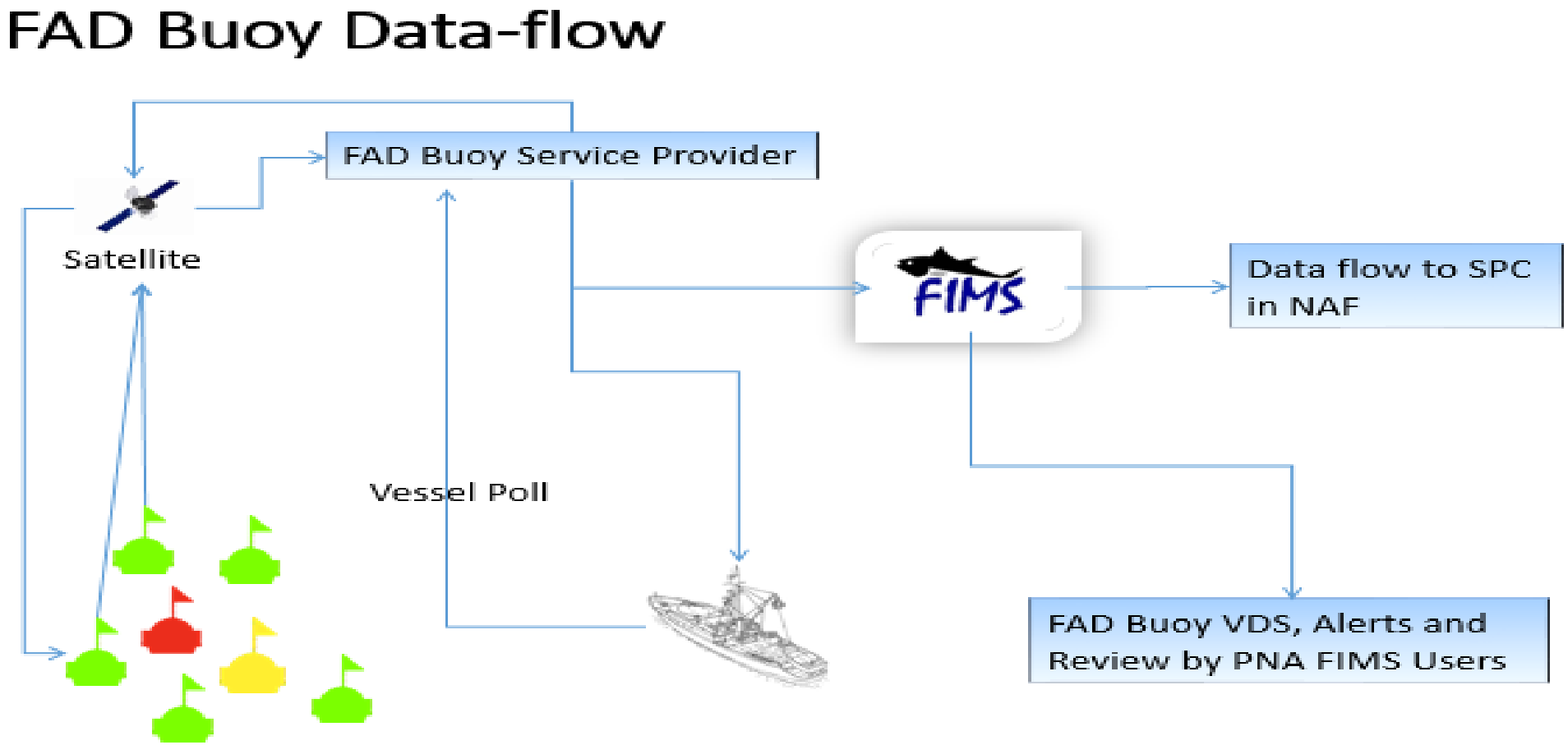
What Do We Know about FADs and the impact on our fishery?



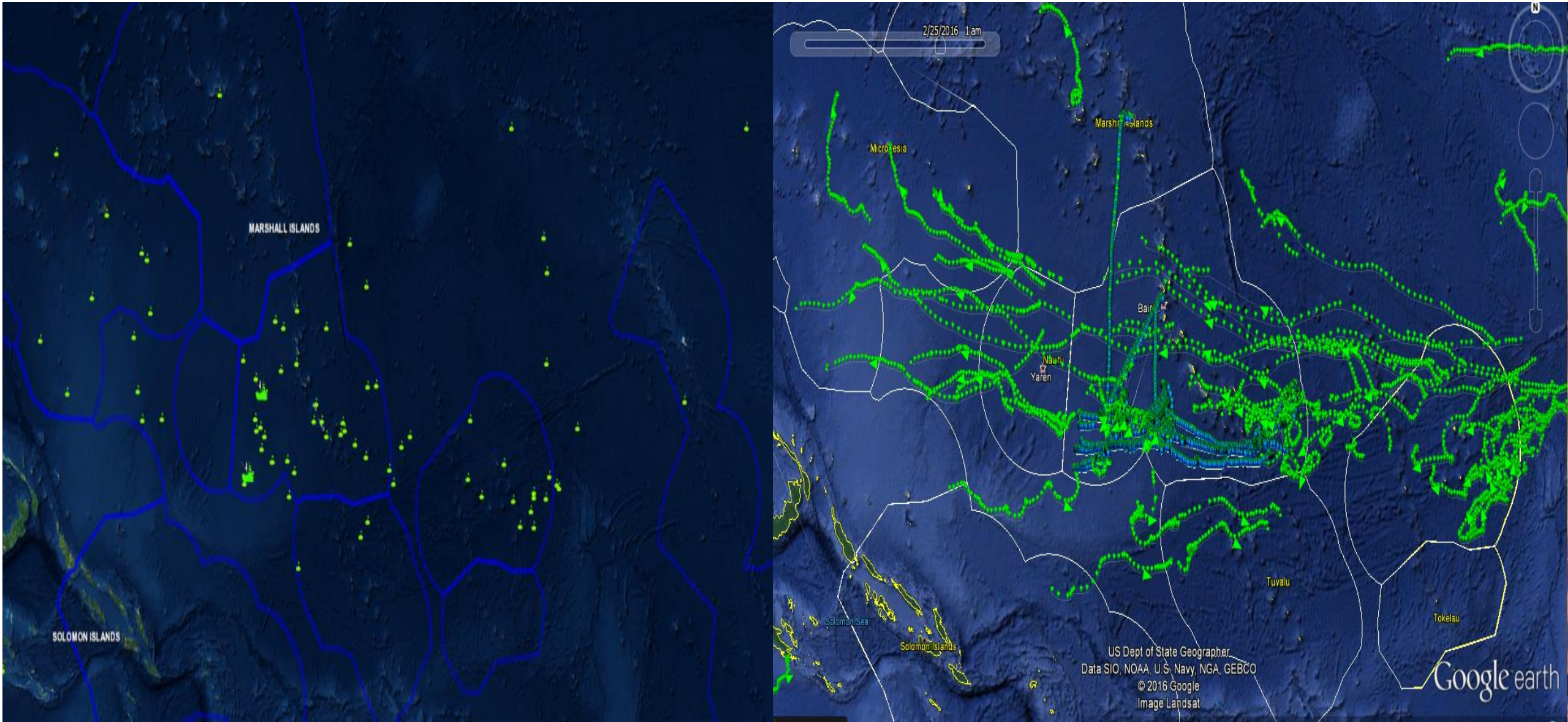
- Basically not much !!!
- We know technology is rapidly evolving
- Clearly industry has “rafts” of tracking data on displayed on board,
- FAD numbers deployed are clearly increasing, as is sonar capability,
- FADs are considered disposable, switched off and left to drift.
- Observers collect very detailed data on catch and FAD sets, but there is a limit on what they can see and record from the deck
- Economic data on FADs and FAD life expectancy is poorly understood
- **Previously no one consolidated all the data on one platform for research - PNA [SPC]**

FAD TRACKING / FIMS DATA BASE



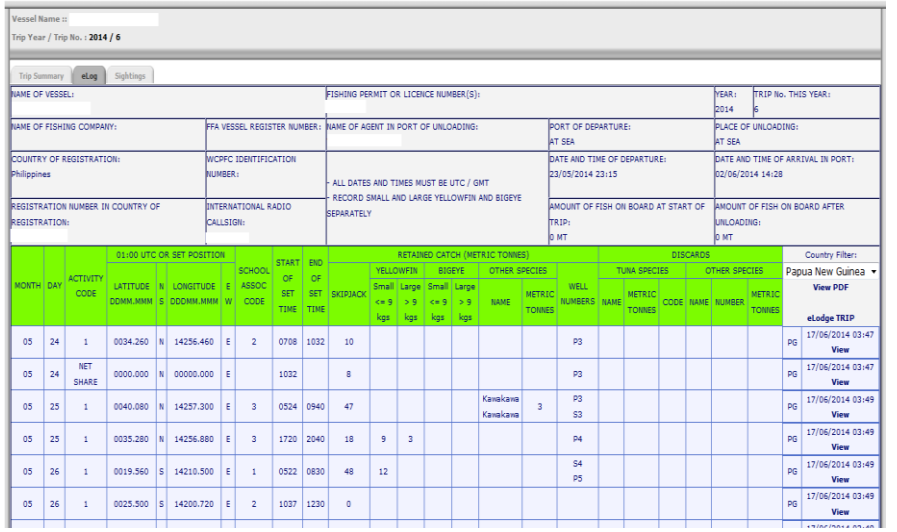
MTU Timestamp (dd/mm/yyyy)	Latitude	Longitude	Zone	Speed	Course	Ref Id
27/04/2016 18:47	7.719	153.397	EEZ - Federated States of Micronesia	0.4	341	(960308)
27/04/2016 06:47	7.639	153.424	EEZ - Federated States of Micronesia	0.5	333	(956698)
26/04/2016 18:47	7.549	153.468	EEZ - Federated States of Micronesia	0.3	320	(950624)
26/04/2016 06:48	7.504	153.505	EEZ - Federated States of Micronesia	0.3	287	(947138)
25/04/2016 18:47	7.484	153.569	EEZ - Federated States of Micronesia	0.4	283	(941249)
25/04/2016 06:47	7.465	153.649	EEZ - Federated States of Micronesia	0.3	270	(937770)
24/04/2016 18:48	7.464	153.71	EEZ - Federated States of Micronesia	0.1	213	(931848)
24/04/2016 06:47	7.48	153.721	EEZ - Federated States of Micronesia	0.2	212	(928483)
24/04/2016 01:26	7.499	153.732	EEZ - Federated States of Micronesia	0.2	331	(925416)
23/04/2016 18:47	7.476	153.744	EEZ - Federated States of Micronesia	0.2	309	(922746)
23/04/2016 06:47	7.457	153.768	EEZ - Federated States of Micronesia	0.2	302	(919341)

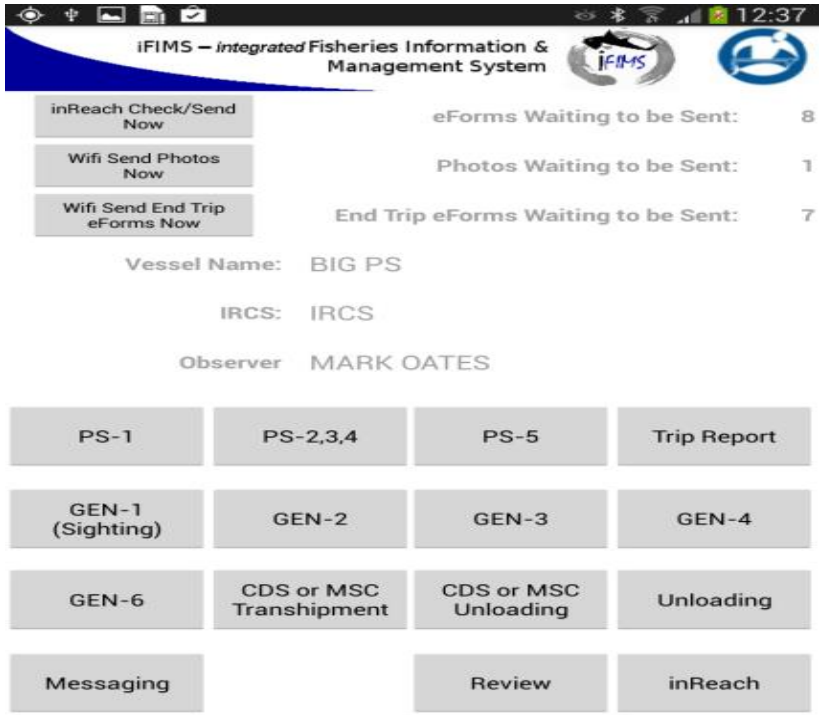
Example of 2 boats with associated FADs, and tracks of FADs [Green] and 2 vessels [Blue] over time on FIMS.



We need to know the FAD's life history (FAD design, where they have been, how long, current speeds, how often they have been set on, etc.)

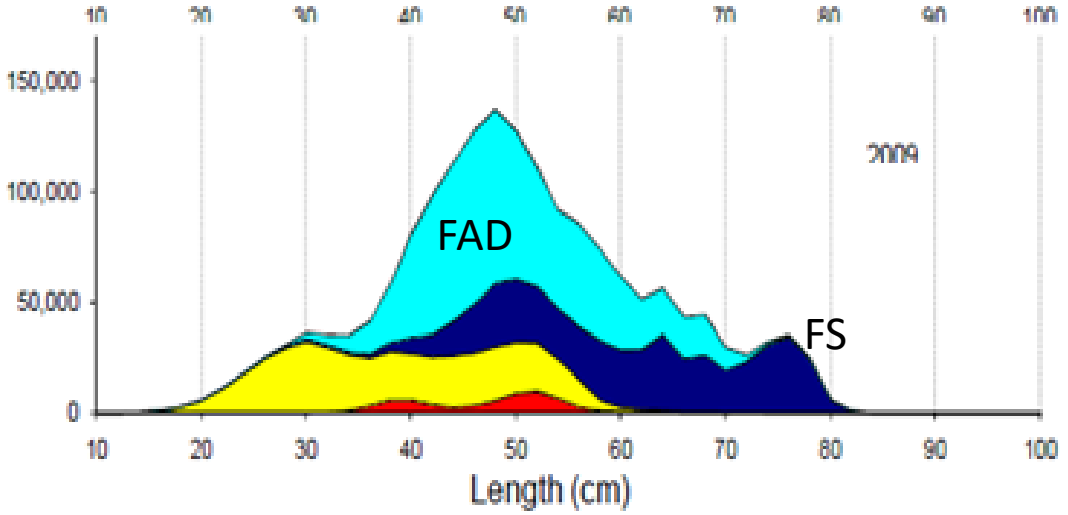
- FAD tracking provides real time data, to the vessel and PNAO, - SPC
- Buoy swapping is an issue for FAD life history; so maybe sonar tagging is also required for remote FAD ID trial, as a secondary back up
- Captains can report on FAD designs, deployments etc to WCPFC / SPC
- Observers can monitor and report by eLOG on FIMS the catches, FAD and Buoy data to help better understand how the types of FAD and their history affect catches of target species and bycatch and much more





Monitor school structures on FADs vs free school and better monitor tagged tuna behavior with FADs, FAD/FAD migrations

- Research shows tuna move from anchored Fad to anchored Fad eg Hawaiian research. But unclear if this applies to drifting FADs, the FAD dependency of schools and the range which to which FADs are associated.
- Catches show differing size structures and condition of the fish between Free school and FAD catch.
- Differing catch and bye catch composition by area eg eastern high seas, other hot spots, by fleet and by vessel, etc
- Impact of fleet based FAD operations [declarations range <50 to 800 per boat.]
- FAD / Free school interactions and influences are poorly understood



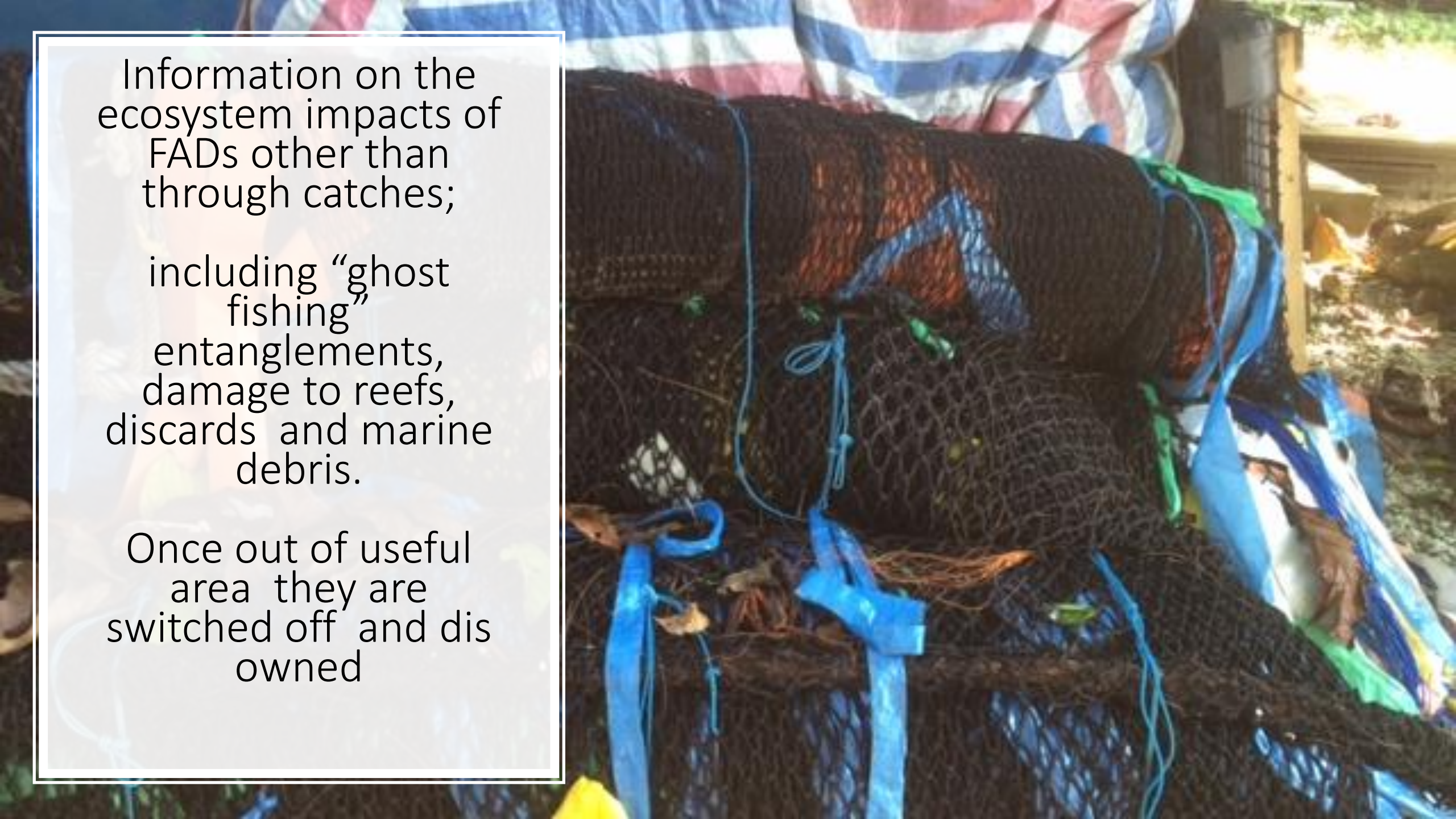
Philippines vessels reportedly use Anchored Fads to “fence, hold and steer tunas” eg PNG AW.

Lights/ Light boats are used to pull fish from multiple Fads together to make a single set.

We need information on how the numbers / densities of FADs in an area impacts catch rates of both FAD and free school sets.

The impact of this is critical for stock assessment and for managing optimal patterns of FAD use

what are the economics involved in FAD fishing, FAD catch, FAD management and FAD discards.?



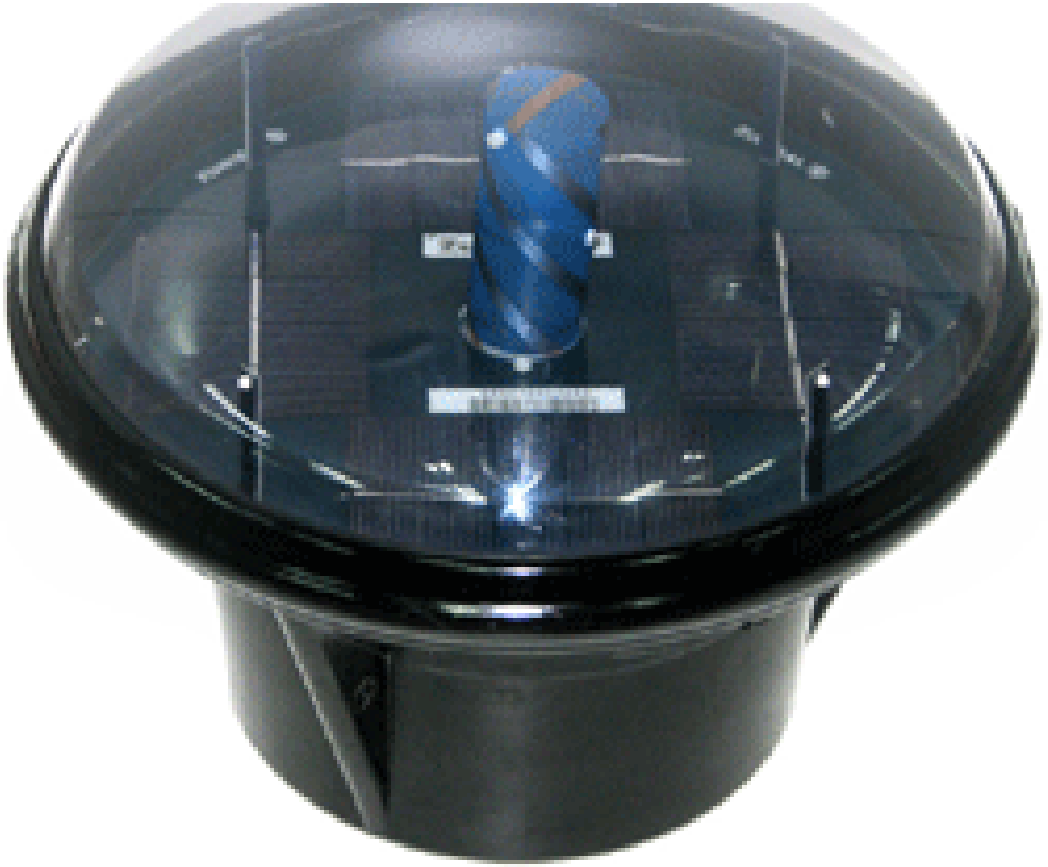
Information on the ecosystem impacts of FADs other than through catches;

including “ghost fishing” entanglements, damage to reefs, discards and marine debris.

Once out of useful area they are switched off and dis owned

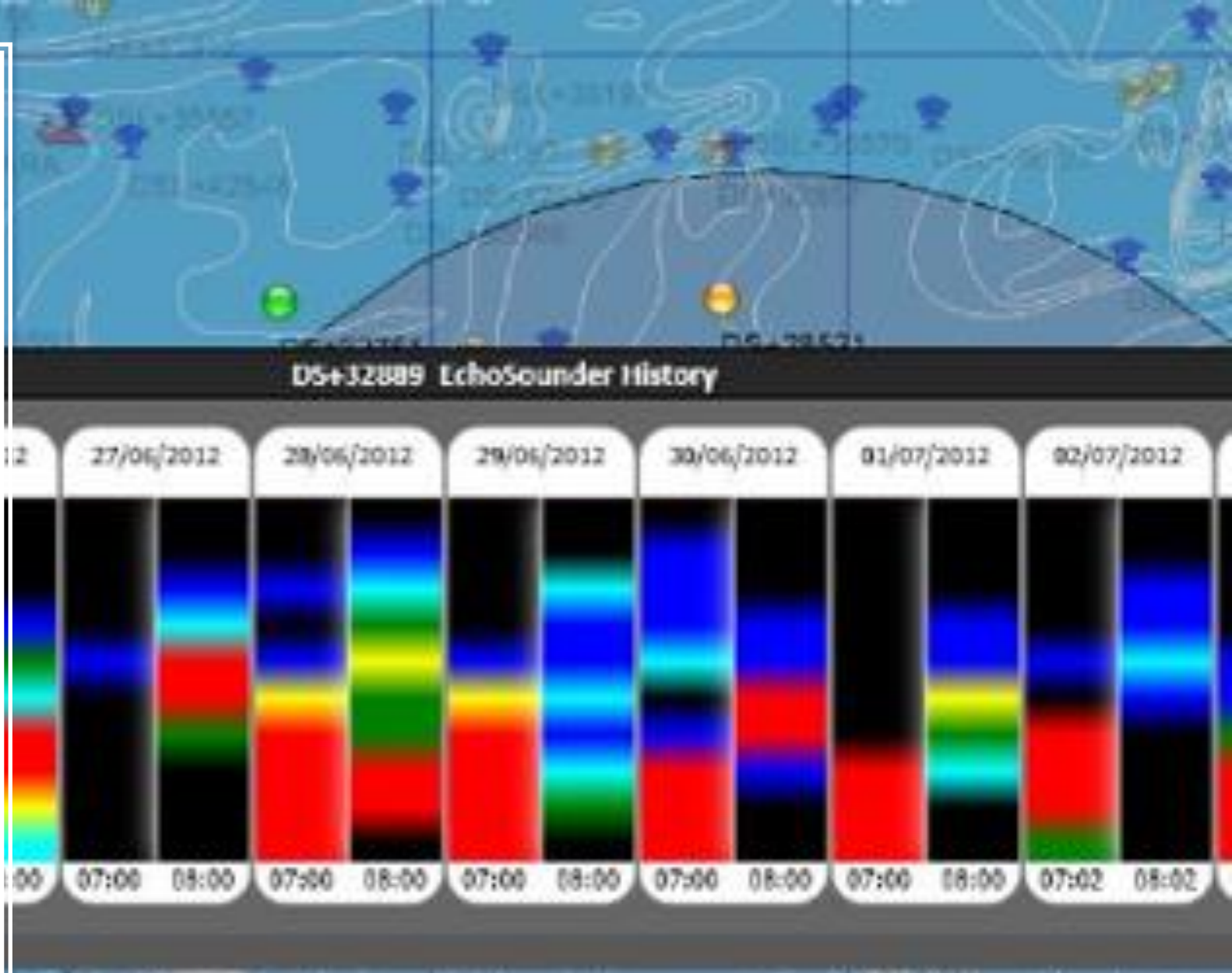
oceanographic information, including sea surface temperature SST and currents;

- Besides fishery data, every satellite tracking buoy collects sea surface temperature data twice daily.
- Potential to increase SST data many fold over traditional data sources, eg NOAA
- This can be important, not just for fisheries management but metrological eg Typhoon generation and environmental eg sea level, stock recruitment and coral bleaching
- Fad tracks can be used to deduce drift speeds and thus currents, [differing FAD skirts may impact drift speeds?],



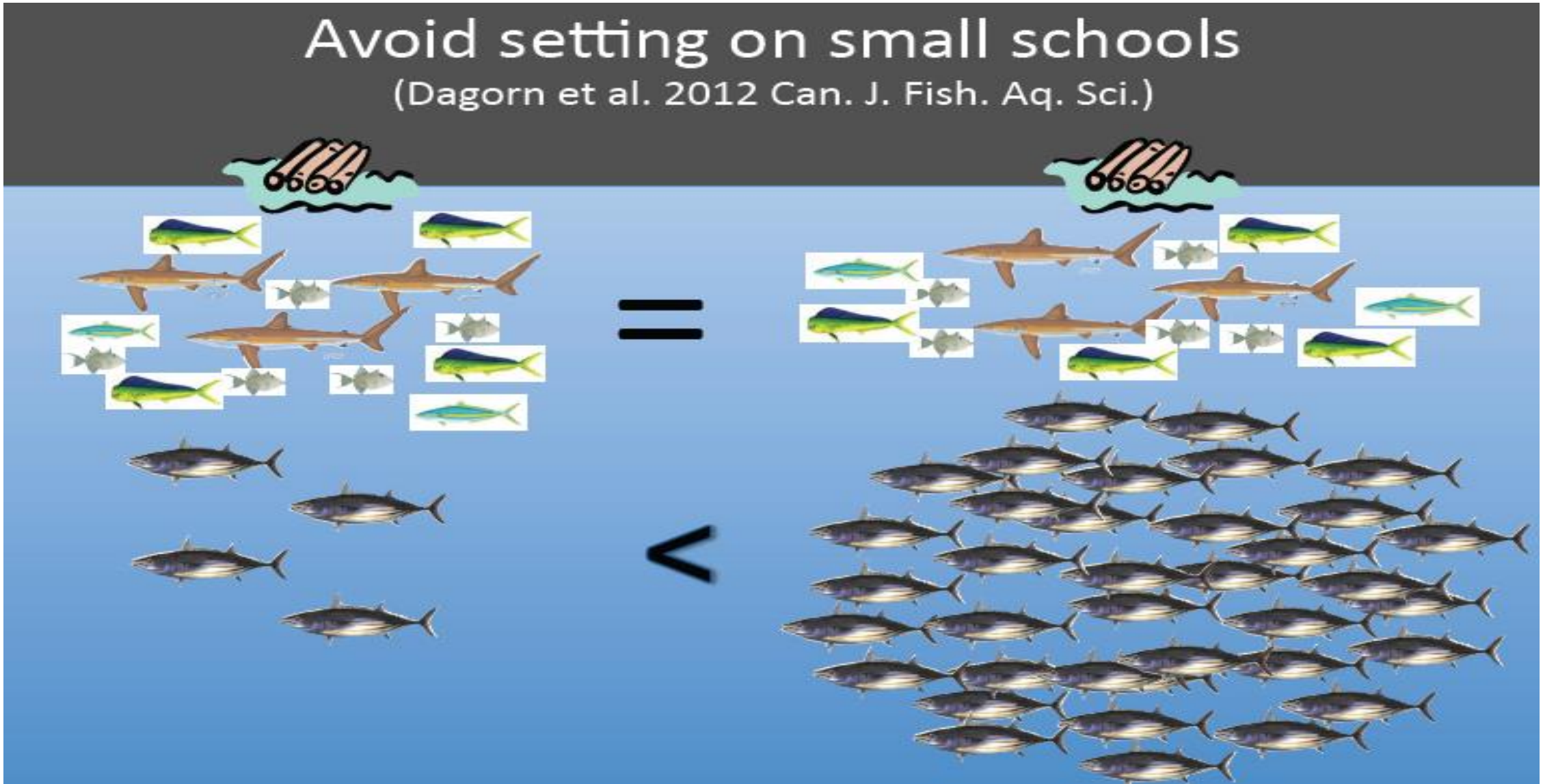
Potential role of sonar FAD buoy data to feed directly in stock assessments.

- The sonar data can give additional marine biological data including indicative biomass, tuna aggregations by depth, species and sizes at any one time. With technology improving all the time.
- Monitoring the FAD life and changing aggregations under the FAD over time.
- We can learn more on the impact of FADs on the fishery and the environmental impacts on FADs eg drift speeds
- Additionally monitor the extent Fads "drag" tuna from zone to zone, distorting distributions and fishing effort
- This all compliments and enhances the data from tuna tagging and log sheets
- Much of this data can be used to improve SPC stock assessments in future



Perhaps “Cherry Picking” only high yielding FADs using sonar buoys and limited sets could be a solution to the WCPFC FAD closures ?

- as % bycatch is reduced relative to total catch.



The Life of a FAD buoy # **M3I151998**

The FAD gets stuck on the reef for weeks. The buoy gets found and taken home. There are many such stories !

In Summary: PNA FAD research aims at improving scientific and economic information on the impacts of FADs and fishing on them.

- Improved understanding of the use of various FAD designs and their impact on the fishery,
- Quantifying the numbers and types of FADs deployed,
- Impacts and operational patterns of each fleet on FADs and numbers of FADs
- the impact in zones they transit, whether fished on or just aggregating, and any seasonality
- Impact on FAD density on target species catch [FAD and Free school]
- the technology trends eg Sonar capability,
- the numbers of FADs deployed, Vs numbers set on, Why are many non productive?
- the numbers lost or disowned and scale / impact of marine debris and ghost fishing
- information from tracking and monitoring FADs, eg currents, SST, etc.
- Evolution of a productive FAD - Catches linked to FAD history through real time e-monitoring
- Potential for byecatch mitigation
- Impact of other factors on FAD fishing eg growing global MSC free school demand in the market and premiums, making FAD catch sales harder in the market.
- Potential uses for FAD data [eg sonar and Fad/FS tagging returns] inputs into SPC stock assessments