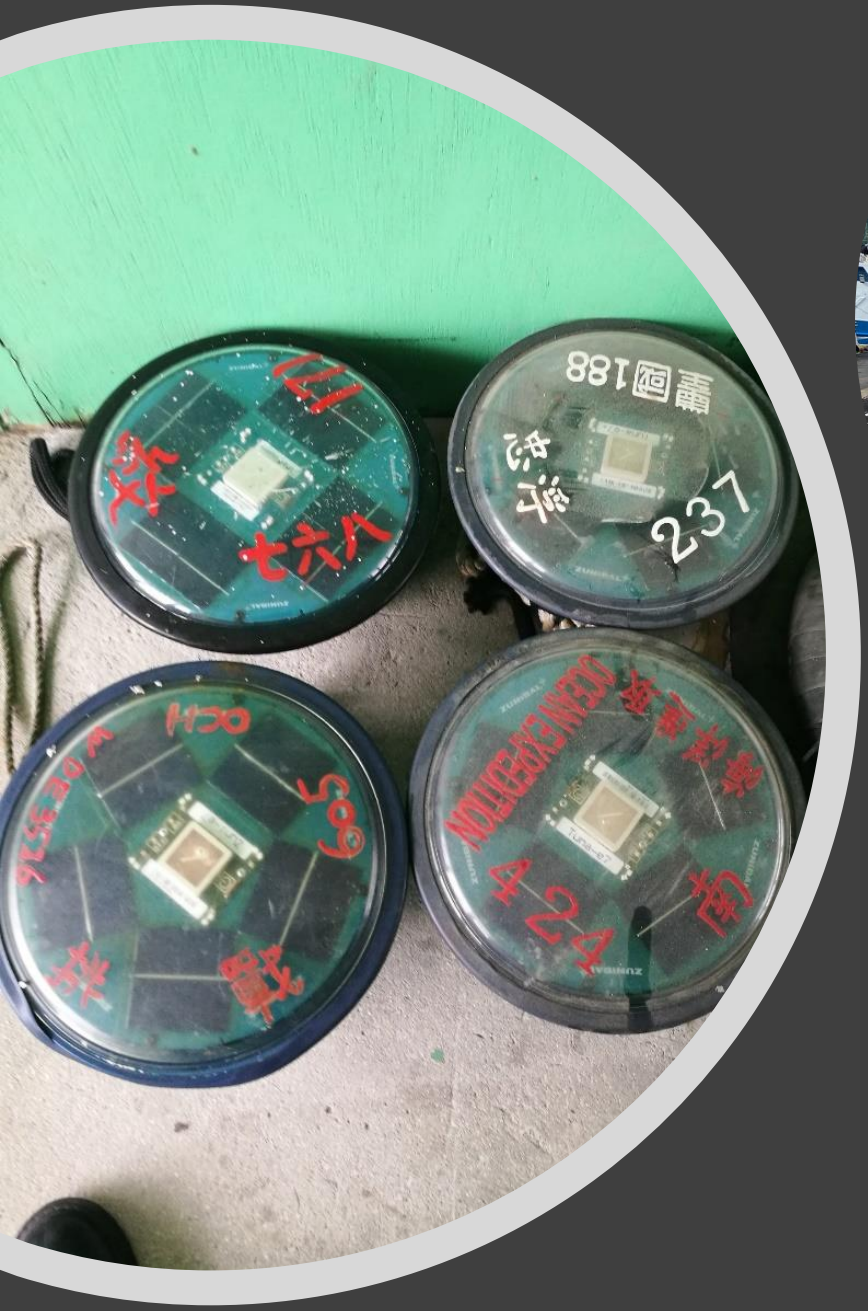


Fish Aggregating Devices [FADs] and Cetaceans in the PNA purse seine fishery

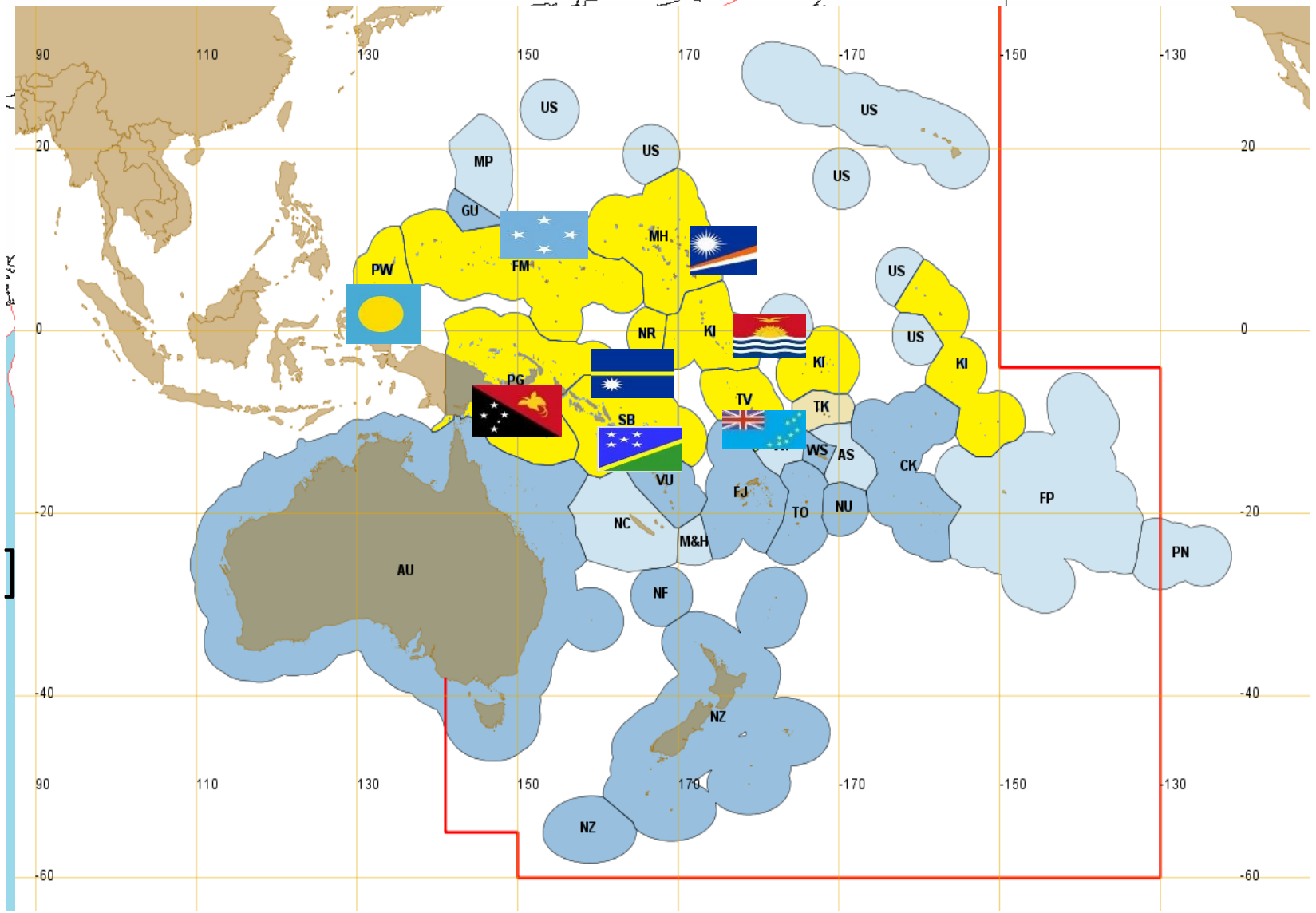
SPREP Zoom Forum.

Maurice Brownjohn OBE
Commercial Manager
PNA Office, Majuro, RMI.

5th August 2021

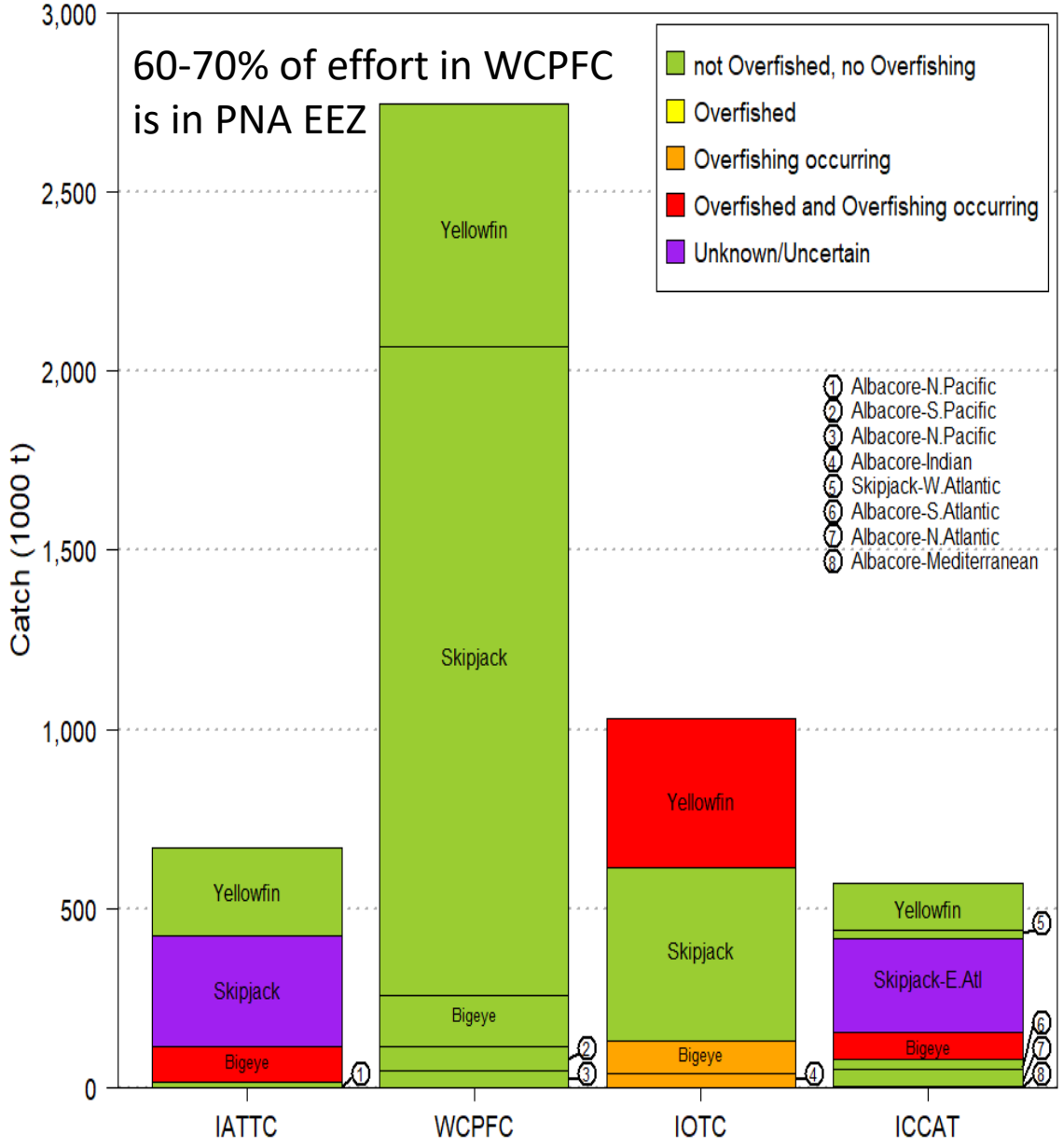
PNA Parties, smallest economies globally, but **8 large ocean states**.

- Kiribati [110,000]
- FSM [105,000]
- Marshall Islands [53,000]
- Nauru [10,000]
- Palau [21,000]
- Papua New Guinea[8.5m]
- Solomon Islands [600,000]
- Tuvalu [10,000]
- *Tokelau [1,500]*
  - *working under VDS*



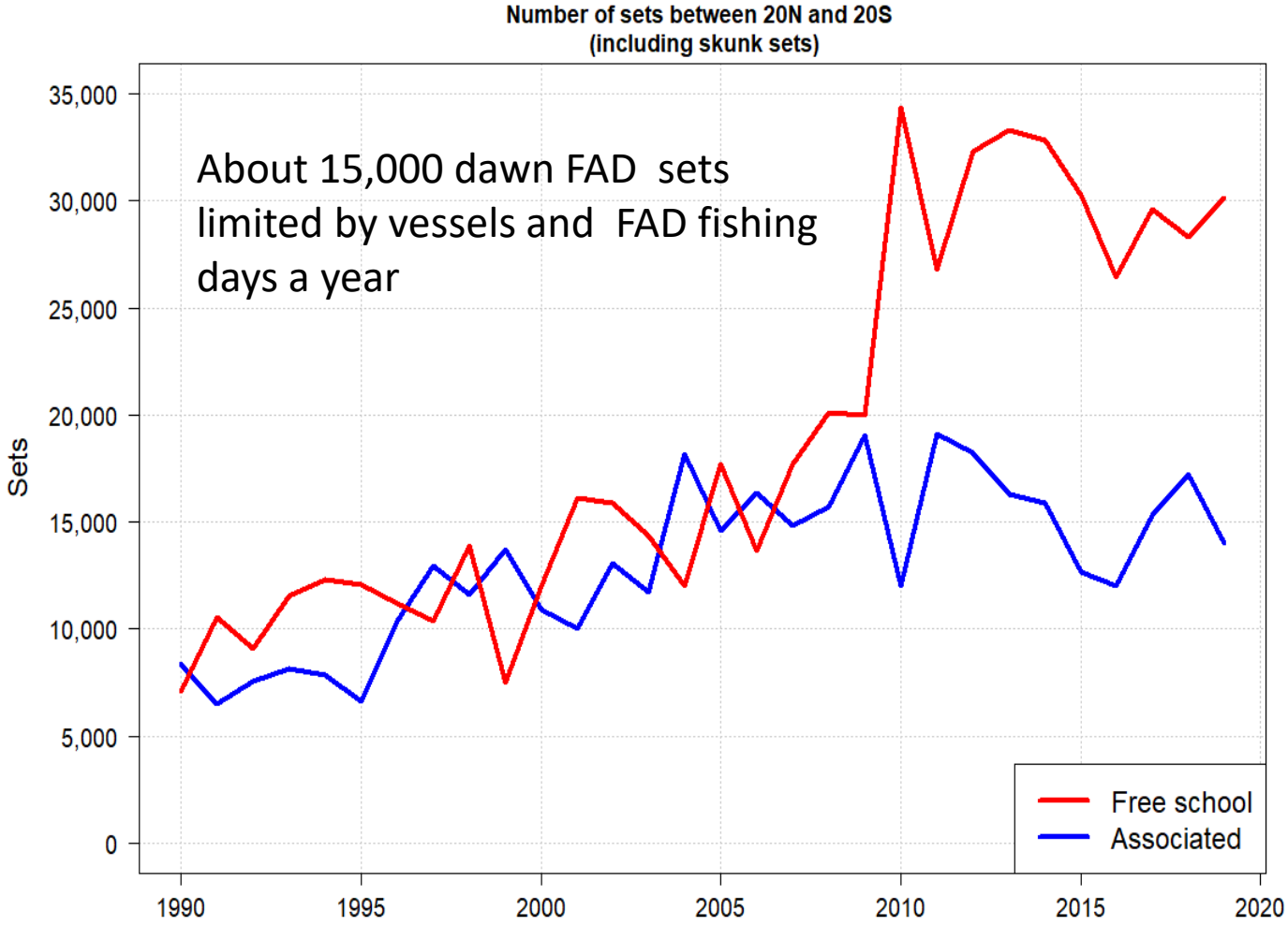
PNA EEZ - 14.3 million Km^2, plus territory of Tokelau

Today ALL WCPO stocks are in GREEN



WCPO delivers >50% of global tropical tunas, with all 4 stocks in the green- **this reflects management, not policies on paper.!**

All other RFMO are heavily FAD dependent and the impact of FAD dependency is a concern



How do we manage the fishery ?

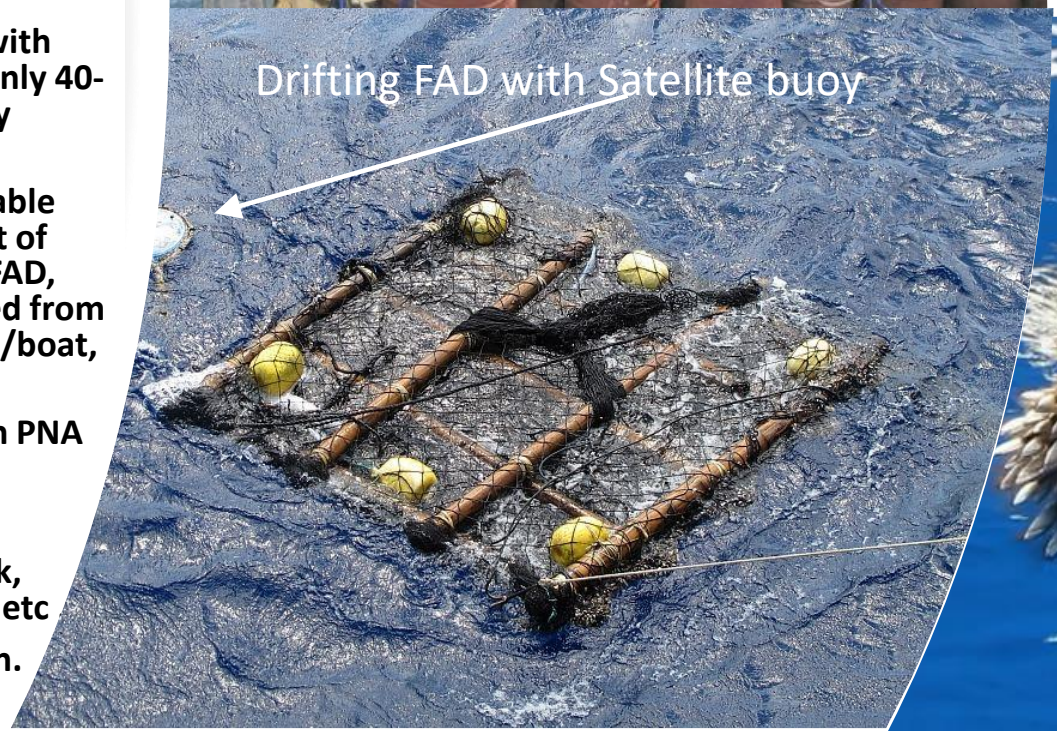
- 8+1 Nations manage through IA [implementing arrangements] where all have common agreed policies which are reflected in national laws.
- Effort is limited by days to 45,000 a year, not by catch or vessel numbers - so no incentive to mis declare. Also seasonal FAD closures limiting FAD effort.
- 100% registry of vessels, 100% Log books [daily eLOG], 100% VMS tracking [60/30 min], 100% physical observers on board, 100% in port transshipping, MHTC, etc
- Current initiative makes mandatory new expanded FAD log sheets, FAD registration and tracking`, and bans FAD discards in PNA waters.
- FIMS tools include FAD proximity alerts and entry /exit alerts eg with vessel or TS/reef.
- A range of PNA driven WCPFC conservation and management measures, including mitigation and safe release of incidental catch.

CMM 2011-03	Conservation and Management Measure to address impact of purse seine fishing activity on cetaceans
CMM 2018-04	Conservation and Management Measure of Sea Turtles
CMM 2019-04	Conservation and Management Measure for Sharks
CMM 2019-05	Conservation and Management Measure on Mobulid Rays
CMM 2020-01	Conservation and Management Measure for bigeye, yellowfin and skipjack tuna [includes FADs]

What is a FAD?

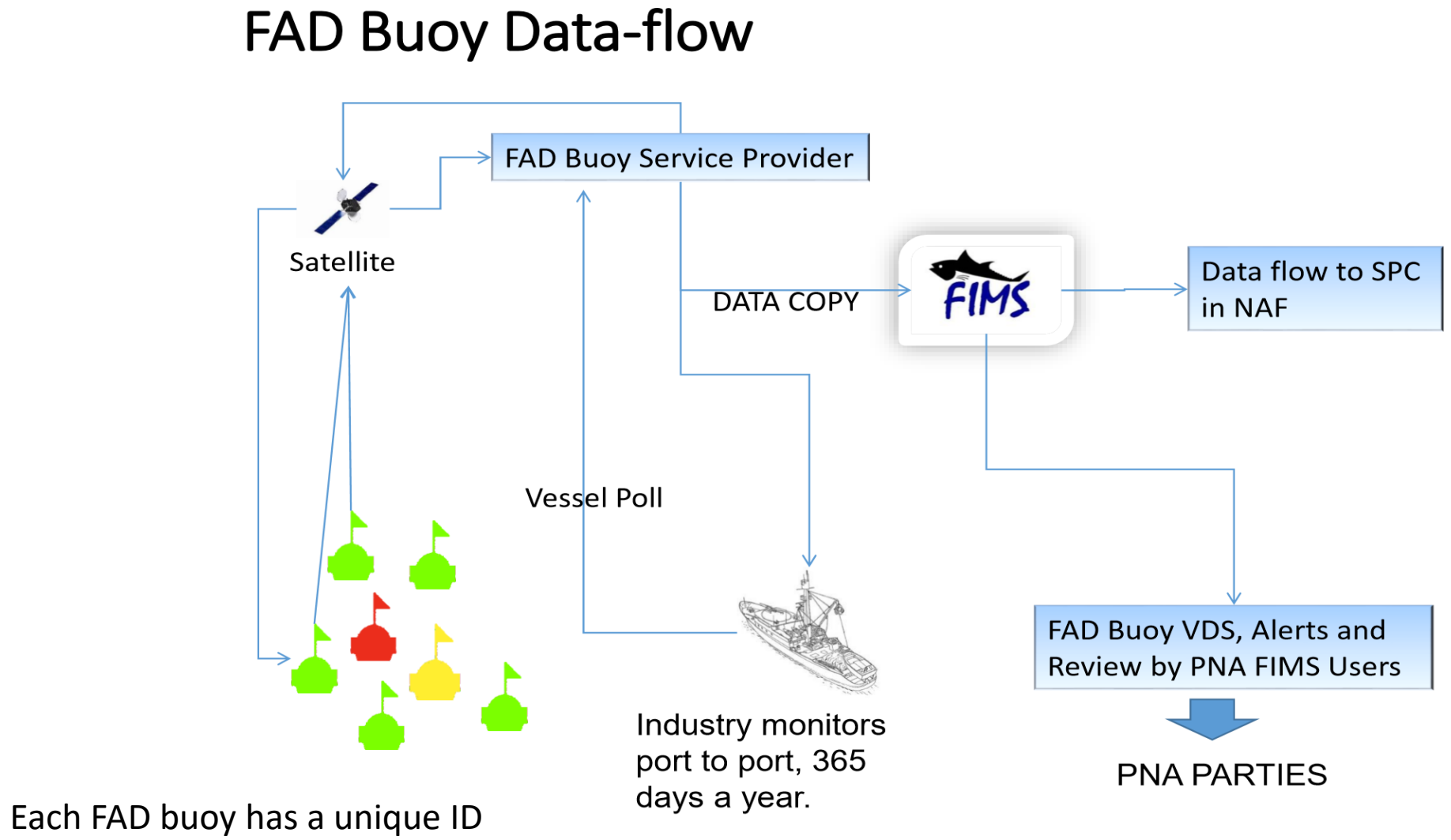
- **Traditionally naturally occurring logs, a coconut, a dead animal carcass, a whale shark, or in fact any thing floating that tunas could aggregate around**
- **Today man -made rafts, are anchored near shore or drift ocean wide and are tracked,**
- **Traditional anchored FADs typical Philippines to Solomon Islands use lights to assess aggregations and set pre dawn.**
- **Late 1990s man made drifting FADs emerged, and were tracked with VHF buoys, 60nm range, FAD numbers therefore limited. Again hit or miss at dawn using lights to hold the tuna.**
- **Up to about 2012 VHF were replaced with standard satellite buoys , tracked globally, only 40-100 per boat manageable. Still no idea if any aggregations pre set at dawn using lights**
- **Last decade the emergence of sonar capable satellite buoys meant , remote assessment of biomass, species and fish size, under each FAD, and targeted "cherry picking" often managed from fleet HQ. FAD numbers reported up to 350/boat, [some eg EU reported 800 initially.]**
- **Total 40-60,000 thought to track through PNA waters annually.**
- **<u>Every FAD buoy has a unique ID.</u>**
- **We know very little about how FADs work, impact on tuna stocks, ghost fishing , VME, etc**
- **PNA/SPC lead the world on FAD research.**

Anchored FADS, ready to deploy

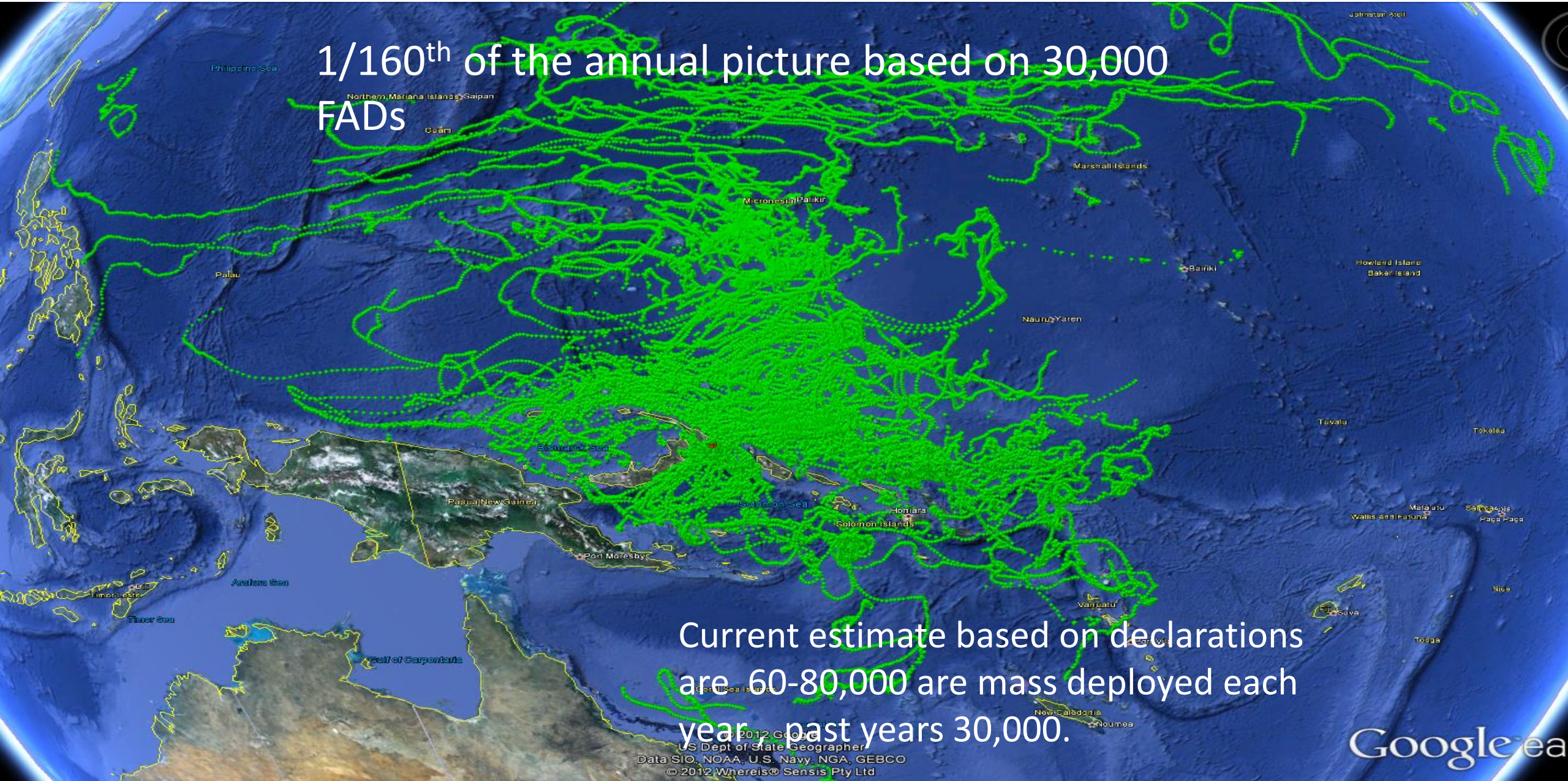


Drifting FAD with Satellite buoy

FADS and FAD tracking – in simple terms



6 months track data for 3 boats FADs



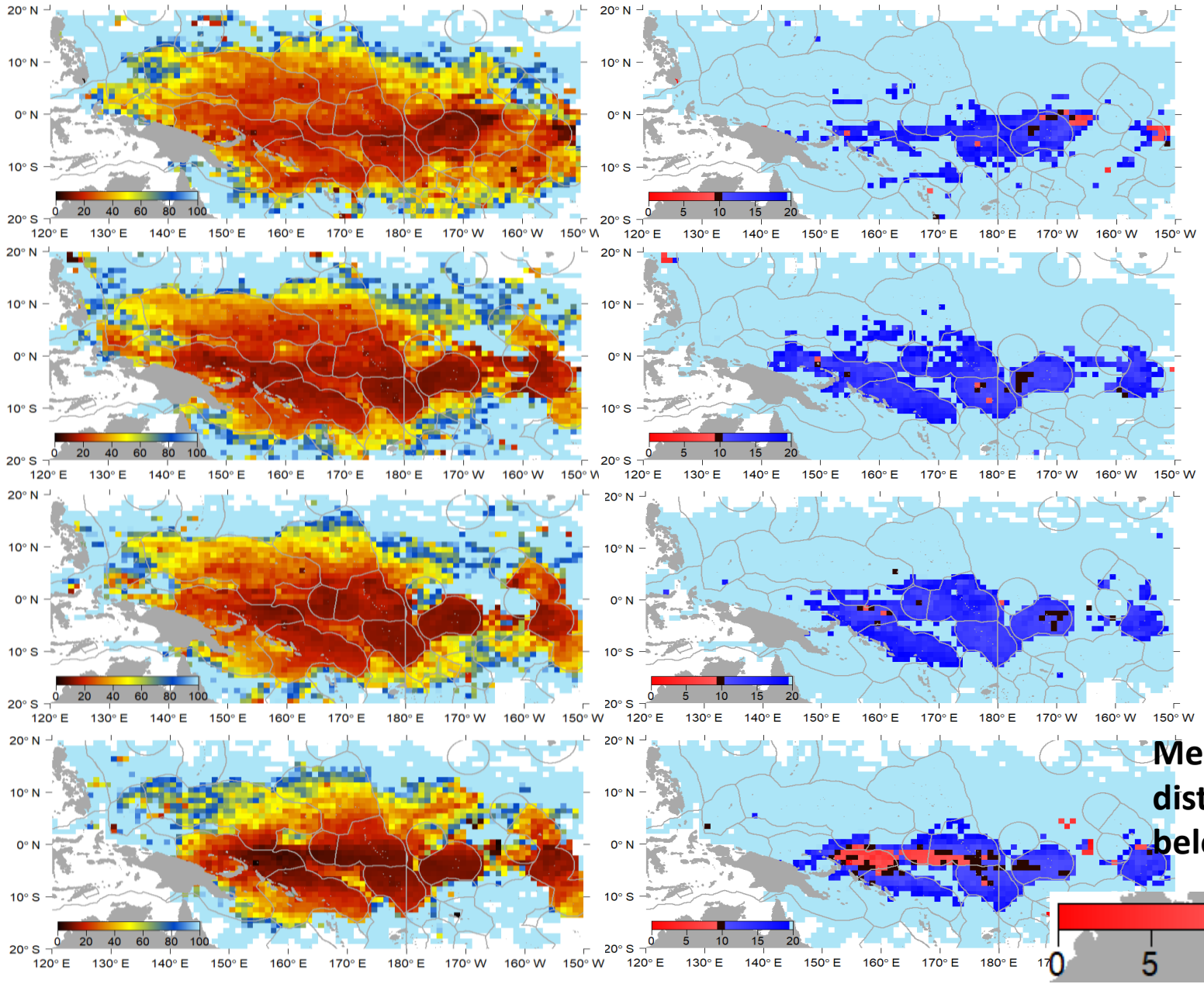
FAD densities and inter-FAD distances

2016

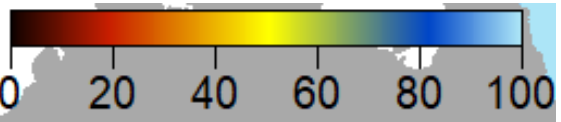
2017

2018

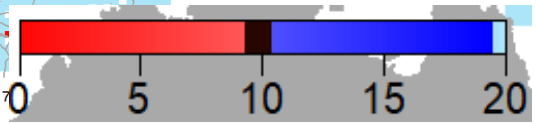
2019



Median daily inter-FAD distances (km) per cell

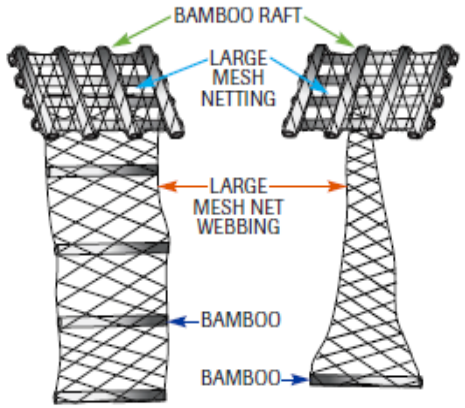


Median daily inter-FAD distances (km) per cell below 20km



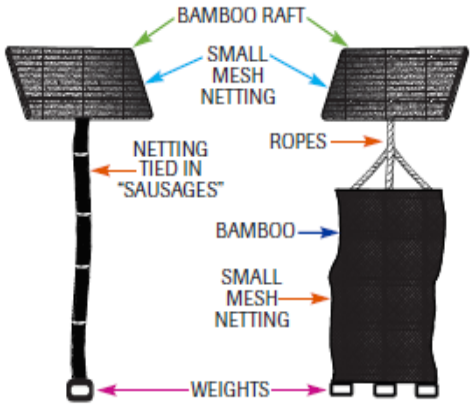
CMM -limits FADs deployed per vessel to 350 and shift to low entanglement design. This is shifting to biodegradable

HIGHEST ENTANGLEMENT RISK FADs:



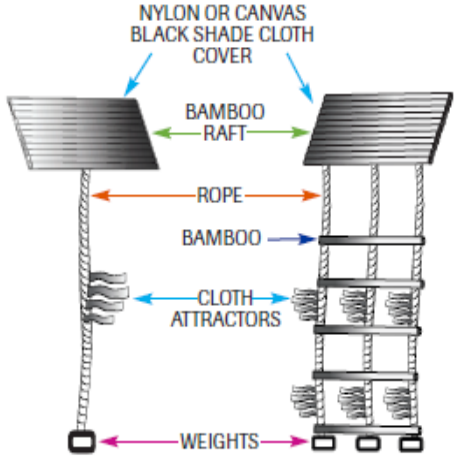
- Constructed with any netting materials, including old purse seine netting, used to cover rafts or suspended beneath in open panels
- These DFADs are known to cause entanglements with turtles and sharks

LOWER ENTANGLEMENT RISK FADs:



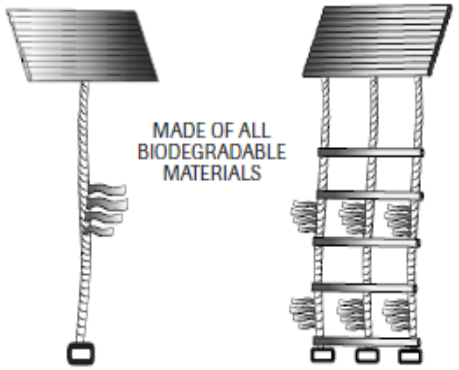
- Only small mesh netting used (e.g. < 2.5 inch (7 cm) stretched mesh)
- Rafts are tightly wrapped with small mesh netting, with no loose netting hanging from it
- The underwater structure is tightly tied into bundles (sausages)
- A single panel can be used instead of bundles, but the panel must be weighted to keep it taut
- The panel should consist of either netting with a stretched mesh of 2.5 inches (7 cm) or less, or a solid sheet (e.g., canvas or nylon)
- Despite using netting, these design elements reduce the risk of entanglement events

NON-ENTANGLING FADS:



- No netting is used in their construction
- The raft is not covered or covered with shade cloth or canvas
- The subsurface structure is made with ropes, canvas or nylon sheets, or other non-entangling materials
- These FADs are expected to have minimum risk of causing entanglement

BIODEGRADABLE NON-ENTANGLING FADS:



- In addition to having minimal risk of entanglement, they are constructed exactly like other non-entangling FADS, but using only natural and/or biodegradable materials, further reducing the environmental impact of DFADs on the oceans

HIGHEST RISK → LOWEST RISK

Local biodegradable FAD trials

Whale / FAD and other interactions

- Whale interactions in a purse seine fishery are typically recorded as the lowest of any gear type eg purse seine < Long line < trawl < gill net .
- Globally whale entanglement is relatively common with buoy lines on static gear, most typically near shore where often excess floating ropes are on the surface at slack tide.
- **Whale interactions with drifting or anchored FADs in WCPFC / PNA waters , based upon decades of observer reports and SPC analysis , <u>are totally unknown !.</u>**
- Non target whale [and whale shark] interaction with purse seine nets [including toothed whales entering a net to feed] do occasionally occur, and are fully documented along with sightings.
- **Mortality with purse seine net interaction [encirclement] are extremely rare in WCPFC.**
- Targeting cetaceans and whale sharks is an offence in WCPFC, unlike IATTC – dolphins.
- Protocols for safe release when accidentally encircled are well established and strictly monitored eg releasing the set in the case of accidental encirclement.
- Protocols for safe release, are also in place for mobulas, sharks and turtles

For our people

“ SUSTAINABILITY “

is not AN OPTION !

For PNA, It is purely a matter of SURVIVAL !!

WCPFC - ROP DATA

Table 14 Total Cetaceans caught from 2012-2019

Year	Total caught or interacted each year		Retained		Escaped, Cut-off, Assisted Escape Alive before Landing		Interacted or landed (Discarded Alive)		Interacted or landed Dead		Unknown Condition when Discarded	
Gear Type	PS	LL	PS	LL	PS	LL	PS	LL	PS	LL	PS	LL
2012	**2527**	**49**	0	0	0	1	2241	15	224	6	62	27
2013	**4009**	**76**	0	13	8	2	3362	42	556	8	83	11
2014	**3373**	**86**	0	1	0	4	3077	70	159	3	137	8
2015	**2219**	**97**	0	0	0	0	1995	70	181	7	43	20
2016	**1453**	**44**	0	0	14	0	1308	39	99	2	32	3
2017	**841**	**89**	0	0	130	16	587	22	89	7	35	28
2018	**887**	**56**	0	0	266	0	303	34	179	13	139	9
2019	**1042**	**86**	0	0	395	17	282	50	286	17	79	2
Totals 2012-2019	**16351**	**567**	**0**	**14**	**813**	**40**	**13155**	**342**	**1773**	**63**	**610**	**108**

* Data entered as of August 31st, 2020 **Figures for each previous year's report have been adjusted as data is entered

Table 10. Cetacean interactions (number of individuals) with the purse seine gear, by type of interaction, as reported by observers in the tropical WCPF Convention Area purse seine fishery, 1995–2020

Species name	*Scientific name*	Broke through net	Crew released through net	Entangled in gear	Jumped out (over net)	Roped, pulled from net	Interaction details not provided
AQUATIC MAMMALS NEI	*Cetartiodactyla*	21	6	0	2	0	858
BALEEN WHALES NEI	*Mysticeti*	82	17	4	1	1	66
BEAKED WHALES NEI	*Mesoplodon spp*	63	16	1	0	1	49
BLAINVILLE'S BEAKED WHALE	*Mesoplodon densirostris*	7	2	0	0	0	32
BLUE WHALE	*Balaenoptera musculus*	11	3	0	1	1	14
BOTTLENOSE DOLPHIN	*Tursiops truncatus*	20	317	34	23	3	1,486
BRYDE'S WHALE	*Balaenoptera Edeni*	285	100	14	12	2	266
COMMON DOLPHIN	*Delphinus delphis*	19	76	1	20	6	748
CUVIER'S BEAKED WHALE	*Ziphius cavirostris*	5	1	0	0	0	44
DOLPHINS NEI	*Delphinidae*	0	21	0	0	0	128
DUSKY DOLPHIN	*Lagenorhynchus obscurus*	0	0	0	0	0	1
DWARF SPERM WHALE	*Kogia simus*	1	0	0	1	0	21
FALSE KILLER WHALE	*Pseudorca crassidens*	741	666	124	26	54	5,785
FIN WHALE	*Balaenoptera physalus*	16	3	9	1	1	5
FRASER'S DOLPHIN	*Lagenodelphis hosei*	0	0	3	0	0	37
GINKGO-TOOTHED BEAKED WHALE	*Mesoplodon ginkgodens*	20	9	3	0	0	30
HUMPBACK WHALE	*Megaptera novaeangliae*	23	6	0	1	0	46
INDO-PACIF. BOTTLENOSE DOLPHIN	*Tursiops aduncus*	24	225	6	0	22	734
KILLER WHALE	*Orcinus orca*	0	3	1	0	0	32
LONG-BEAKED COMMON DOLPHIN	*Delphinus capensis*	3	5	9	0	0	92
MELON-HEADED WHALE	*Peponocephala electra*	30	38	3	2	0	162
MINKE WHALE	*Balaenoptera acutorostrata*	50	7	1	4	5	23
NORTHERN RIGHT WHALE DOLPHIN	*Lissodelphis borealis*	0	0	1	0	0	4
PACIFIC WHITE-SIDED DOLPHIN	*Lagenorhynchus obliquidens*	0	0	0	0	0	15
PANTROPICAL SPOTTED DOLPHIN	*Stenella attenuata*	0	28	20	0	5	88
PILOT WHALES NEI	*Globicephala spp*	0	0	0	0	0	6
PYGMY KILLER WHALE	*Feresa attenuata*	44	7	1	1	1	140
PYGMY SPERM WHALE	*Kogia breviceps*	88	17	0	0	1	59
RISSO'S DOLPHIN	*Grampus griseus*	20	96	10	0	8	644
ROUGH-TOOTHED DOLPHIN	*Steno bredanensis*	18	391	55	0	4	1,637
SEI WHALE	*Balaenoptera borealis*	194	78	7	9	3	248
SHORT-FINNED PILOT WHALE	*Globicephala macrorhynchus*	119	69	13	3	0	1,010
SPERM WHALE	*Physeter macrocephalus*	19	3	3	0	0	22
SPINNER DOLPHIN	*Stenella longirostris*	16	146	14	0	0	969
SPOTTED DOLPHINS NEI	*Stenella spp.*	0	5	0	0	0	50
STRIPED DOLPHIN	*Stenella coeruleoalba*	5	37	34	0	0	143
TOOTHED WHALES NEI	*Odontoceti*	9	3	0	0	0	49
WHALE (UNIDENTIFIED)	*Cetacea*	4	9	0	0	0	23

Table 13. Whale, Dolphins, Seals reported by observers,

Species	PS	LL	Escaped, Cut-off, Assisted Escape Alive before Landing		Interacted or landed (Discarded Alive)		Interacted or landed Dead		Unknown Condition when Discarded	
Antarctic Fur Seals		32				25		7		
Beaked Whales Unidentified		1		1						
Blue Whale	3				3					
Bottle Nose Dolphin	65		24		16		25			
Brydes Whale	97		43		34		3		17	
Common Dolphin	29				19		10			
Cuvier Beaked Whale	1		1							
Dolphins unidentified	6	1	2				4			1
Fin whale	3		1		1				1	
False Killer Whale	328	13	113	9	117	4	60		38	
Ginko Toothed Beak Whale	4		4							
Humpback Whale	4		1		3					
Ind/Pac Bottle Nose Dolphin	70	2	36	1	6	1	19		9	
Melon Headed Whale	24	1	7		2		4	1	11	
Pan Tropical Spotted Dolphin	18	3	11	1			7	2		
Pygmy Sperm Whale	6		5						1	
Pygmy Killer Whale		1				1				
Rough Tooth Dolphin	220	8	65	5	19	1	136	2		
Risso's Dolphin	4	2	3		1			2		
Sei Whale	60		30		27		2		1	
Seals unidentified		1				1				
Short Finned Pilot Whale	41	1	16		23	1	1		1	
Spinner Dolphin	47		25		11		11			
Striped Dolphin	9		5				4			
Toothed Whales	3	16	3			14		2		
Unidentified Whales		4				2		1		1
Totals	1042	86	395	17	282	50	286	17	79	2

* Data entered as of August 31^{d}, 2020

Table 9. Life status of cetaceans (number of individuals) that interacted with the purse seine gear, as reported by observers in the tropical WCPF Convention Area purse seine fishery

Species name	FAO Code	Taxonomic level	*Scientific name*	1995-2009			2010-2014			2015-2019			2020-2024		
				Alive	Dead	Unk.	Alive	Dead	Unk.	Alive	Dead	Unk.	Alive	Dead	Unk.
AQUATIC MAMMALS NEI	MAM	ORD	*Cetartiodactyla*	231	520	62	40	0	2	29	2	0	1	0	0
BALEEN WHALES NEI	MYS	ORD	*Mysticeti*	4	1	0	123	3	0	31	2	1	5	1	0
BEAKED WHALES NEI	MEP	GEN	*Mesoplodon spp*	10	0	0	69	13	0	29	0	1	8	0	0
BLAINVILLE'S BEAKED WHALE	BBW	SPS	*Mesoplodon densirostris*	2	0	0	16	2	2	13	6	0	0	0	0
BLUE WHALE	BLW	SPS	*Balaenoptera musculus*	0	0	0	2	0	4	19	2	1	2	0	0
BOTTLENOSE DOLPHIN	DBO	SPS	*Tursiops truncatus*	102	109	75	451	401	32	406	169	68	39	24	7
BRYDE'S WHALE	BRW	SPS	*Balaenoptera edeni*	3	2	1	199	12	7	355	14	31	54	1	0
COMMON DOLPHIN	DCO	SPS	*Delphinus delphis*	131	293	29	198	29	10	88	47	0	37	8	0
CUVIER'S BEAKED WHALE	BCW	SPS	*Ziphius cavirostris*	0	0	0	4	0	0	46	0	0	0	0	0
DOLPHINS NEI	DLP	FAM	*Delphinidae*	25	7	15	43	4	5	31	15	0	4	0	0
DUSKY DOLPHIN	DDU	SPS	*Lagenorhynchus obscurus*	0	0	0	0	0	0	0	0	1	0	0	0
DWARF SPERM WHALE	DWW	SPS	*Kogia simus*	0	0	0	14	0	0	9	0	0	0	0	0
FALSE KILLER WHALE	FAW	SPS	*Pseudorca crassidens*	157	147	36	3586	298	122	2171	277	383	141	26	52
FIN WHALE	FIW	SPS	*Balaenoptera physalus*	0	0	0	0	0	0	32	0	0	3	0	0
FRASER'S DOLPHIN	FRD	SPS	*Lagenodelphis hosei*	0	0	0	11	23	1	3	2	0	0	0	0
GINKGO-TOOTHED BEAKED WHALE	TGW	SPS	*Mesoplodon ginkgodens*	0	0	0	38	7	0	15	0	0	2	0	0
HUMPBACK WHALE	HUW	SPS	*Megaptera novaeangliae*	22	0	0	16	5	3	27	2	0	1	0	0
INDO-PACIF. BOTTLENOSE DOLPHIN	DBZ	SPS	*Tursiops aduncus*	19	141	33	331	167	5	155	83	1	39	33	4
KILLER WHALE	KIW	SPS	*Orcinus orca*	3	0	14	1	0	0	8	0	10	0	0	0
LONG-BEAKED COMMON DOLPHIN	DCZ	SPS	*Delphinus capensis*	5	3	32	8	27	1	18	2	12	1	0	0
MELON-HEADED WHALE	MEW	SPS	*Peponocephala electra*	3	6	1	120	5	10	74	5	2	1	0	8
MINKE WHALE	MIW	SPS	*Balaenoptera acutorostrata*	0	0	0	25	0	0	63	0	0	2	0	0
NORTHERN RIGHT WHALE DOLPHIN	RNW	SPS	*Lissodelphis borealis*	0	0	0	3	0	2	0	0	0	0	0	0
PACIFIC WHITE-SIDED DOLPHIN	DWP	SPS	*Lagenorhynchus obliquidens*	0	0	0	15	0	0	0	0	0	0	0	0
PANTROPICAL SPOTTED DOLPHIN	DPN	SPS	*Stenella attenuata*	1	7	0	28	7	0	31	66	0	0	1	0
PILOT WHALES NEI	GLO	GEN	*Globicephala spp*	0	0	0	1	0	0	0	0	5	0	0	0
PYGMY KILLER WHALE	KPW	SPS	*Feresa attenuata*	0	2	0	76	9	2	88	1	13	3	0	0
PYGMY SPERM WHALE	PYW	SPS	*Kogia breviceps*	0	0	3	114	1	2	38	0	7	0	0	0
RISSO'S DOLPHIN	DRR	SPS	*Grampus griseus*	13	64	2	455	49	19	128	24	0	23	1	0
ROUGH-TOOTHED DOLPHIN	RTD	SPS	*Steno bredanensis*	23	73	11	341	377	29	506	462	15	120	145	3
SEI WHALE	SIW	SPS	*Balaenoptera borealis*	3	0	0	134	4	2	300	7	2	79	1	7
SHORT-FINNED PILOT WHALE	SHW	SPS	*Globicephala macrorhynchus*	22	14	0	677	7	14	374	32	60	5	5	4
SPERM WHALE	SPW	SPS	*Physeter macrocephalus*	0	0	0	19	1	5	20	1	0	0	1	0
SPINNER DOLPHIN	DSI	SPS	*Stenella longirostris*	12	70	10	272	301	6	307	98	19	30	20	0
SPOTTED DOLPHINS NEI	DSP	GEN	*Stenella spp.*	4	13	0	25	6	5	2	0	0	0	0	0
STRIPED DOLPHIN	DST	SPS	*Stenella coeruleoalba*	0	8	0	34	47	23	16	83	0	4	4	0
TOOTHED WHALES NEI	ODN	ORD	*Odontoceti*	21	21	0	7	0	0	11	1	0	0	0	0
WHALE (UNIDENTIFIED)	WLE	ORD	*Cetacea*	1	1	8	19	2	0	5	0	0	0	0	0