Biodegradable FADs and on low entanglement risk FADs

Lauriane Escalle

Fisheries scientist, purse seine and dFAD dynamics

Stock Assessment and Modelling (OFP – SPC)

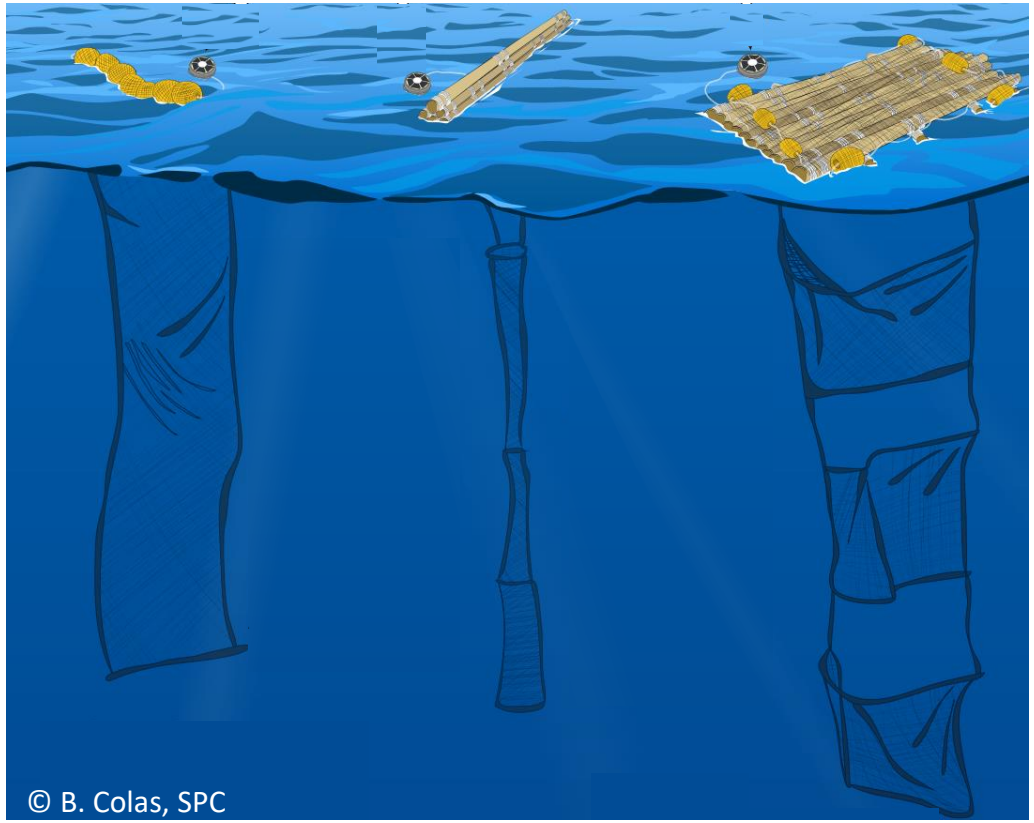
OUTLINE

- FADs in the WCPO

- What is a non-entangling FAD / What is a biodegradable FAD

- How to record information on low/non-entangling & biodegradable FADs ?

- Satellite Buoy serial number



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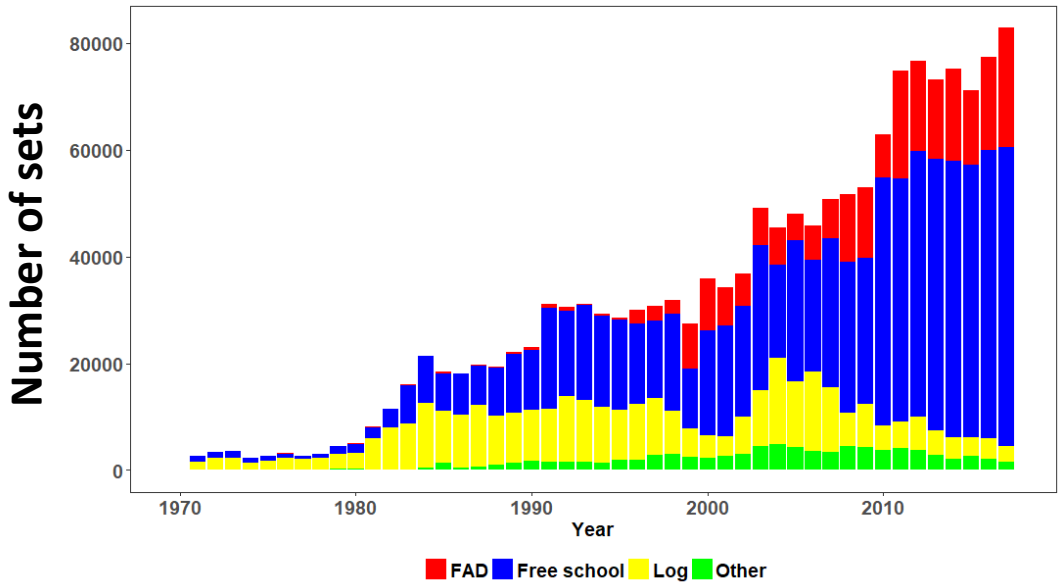
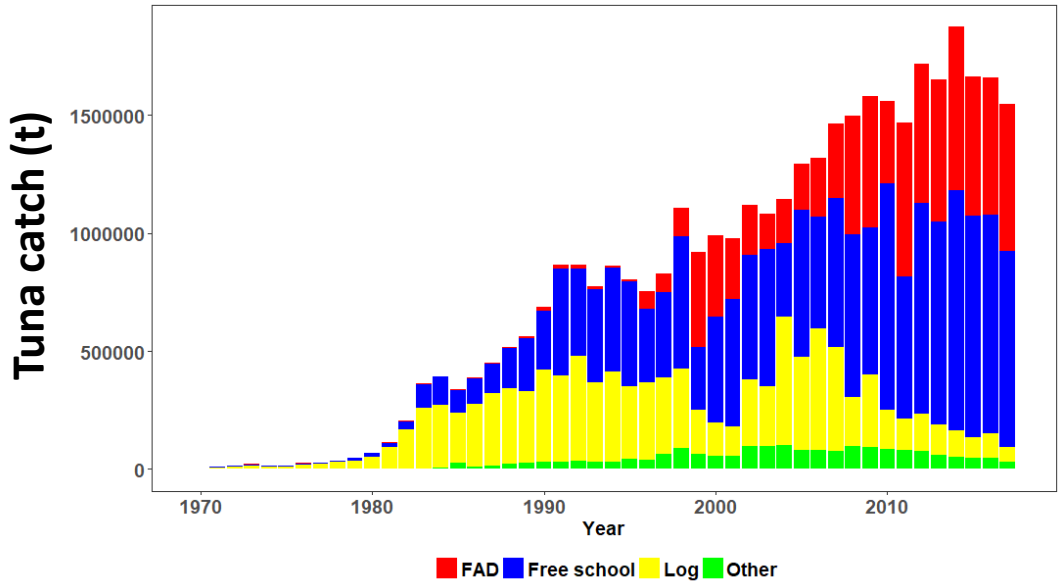
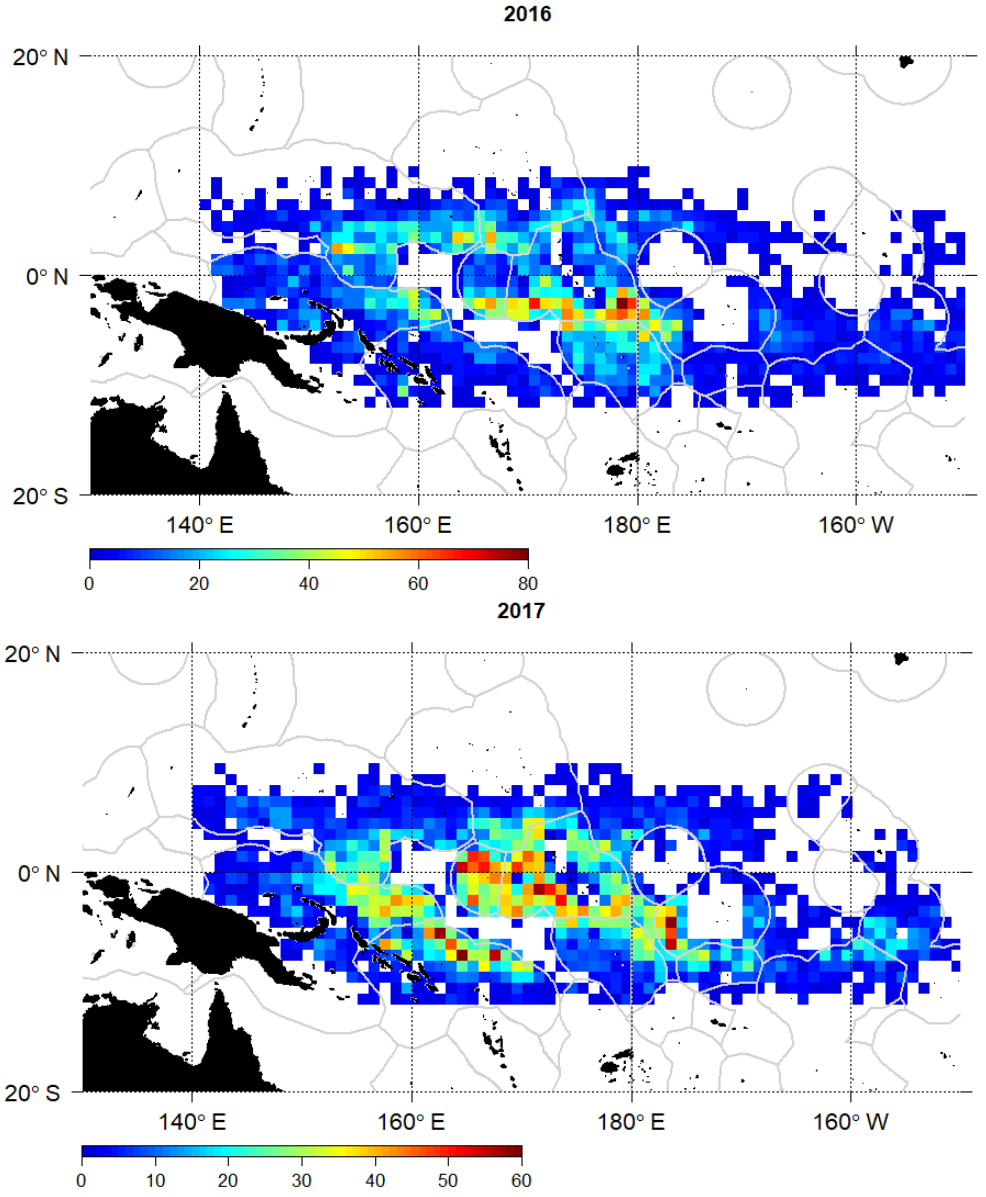
WCPO purse seine fishery





dFAD sets



dFAD designs in the WCPO – observer records

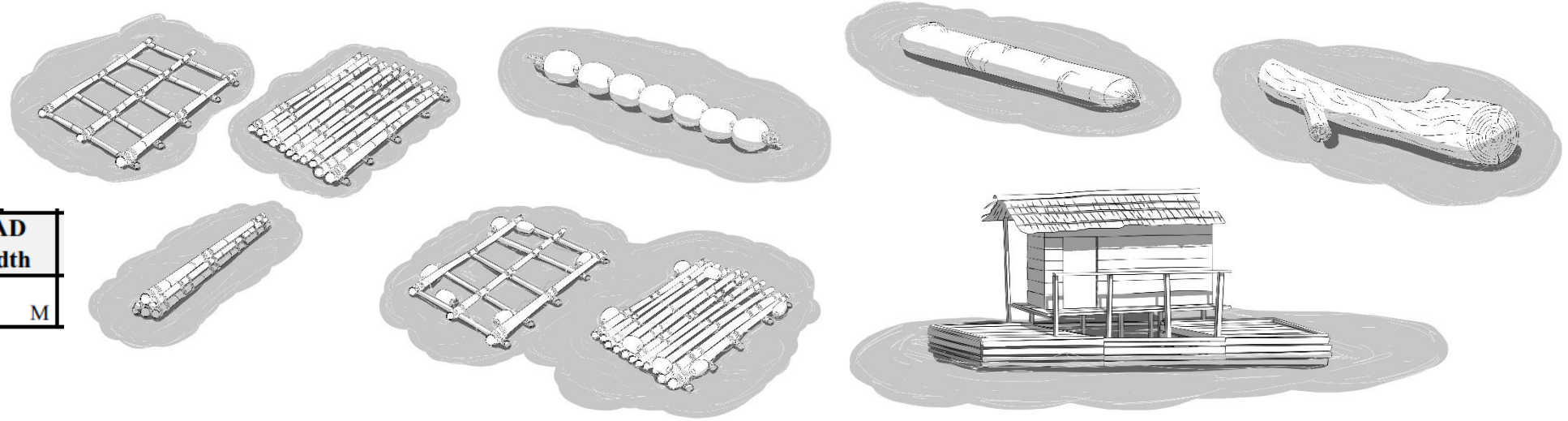
Form GEN-5

RAFT

FAD materials Main materials	net/mesh size
	cm

FAD length	FAD width
M	M

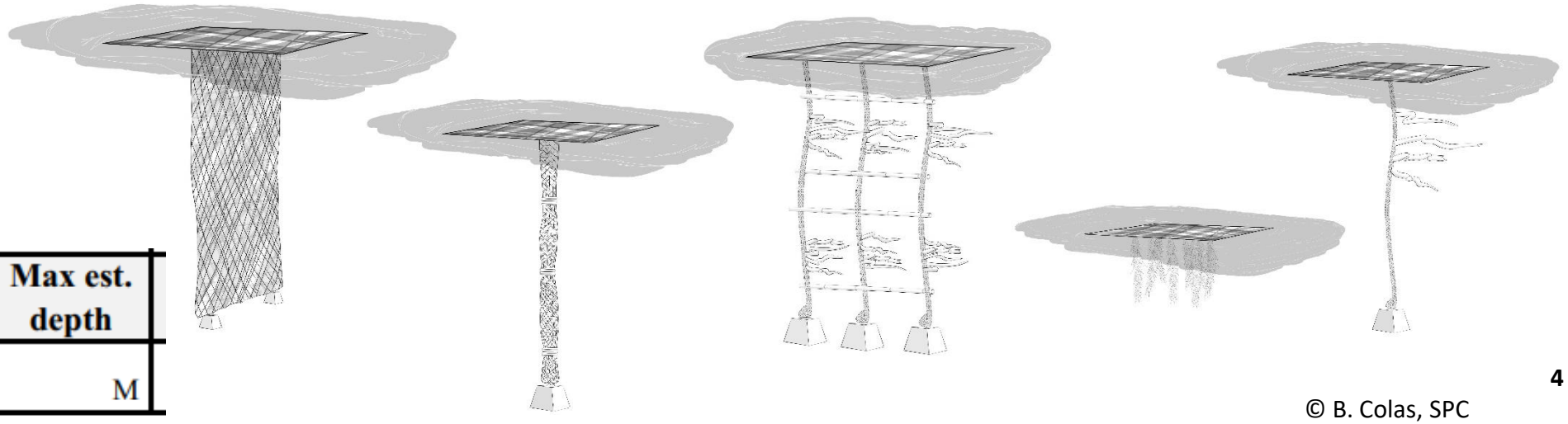
Diagrams- *label with 'Object*



Submerged APPENDAGES

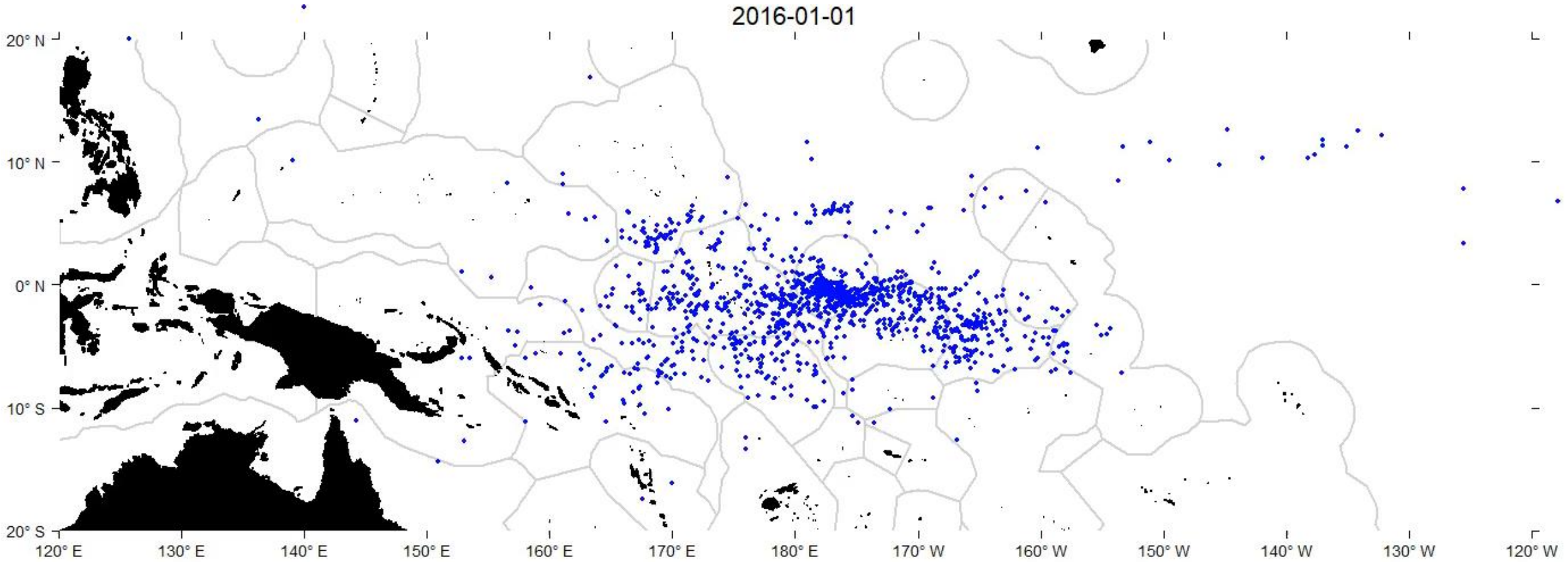
Attachments	net/mesh size
	cm

Max est. depth
M



Overview

- Parties to the Nauru agreement (PNA) **FAD tracking programme initiated in 2016**



Objectives: Better understanding of FAD dynamics and fleet behavior to inform management option

Data: Access date/time & position of transmissions from satellite buoys deployed on dFADs from each purse seiners fishing in PNA waters

Impact on tuna stocks and on the ecosystem:

- High capture of juvenile bigeye tuna on FAD associated sets
- Higher bycatch rates
- Entanglement of species of special interest (shark, rays)
- dFAD loss: marine pollution, beaching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© A.Durbano , Association Hô-üt


© I. Bertram, SPC


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WCPFC management measures regarding FADs (CMM-2018-01)

- **3 months FAD closure**
- **Limit in the number of active satellite buoy on dFADs monitored: 350 at any given time (2018)**
- **Use of low entanglement risk FADs (January 2020)**
- **Use of non-plastic and biodegradable materials in the construction of FADs is encouraged**

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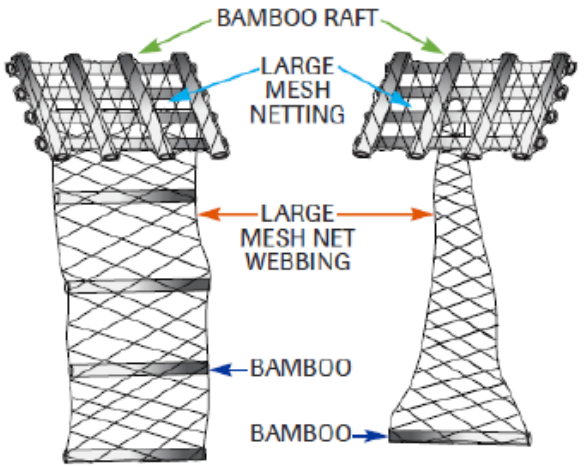
Non-entangling FADs (WCPFC CMM 2018-01) JANUARY 2020

1. To reduce the risk of entanglement of sharks, sea turtles or any other species, as from 1st January 2020, CCMs shall ensure that the design and construction of any FAD to be deployed in, or that drifts into, the WCPFC Convention Area shall comply with the following specifications:
   • The floating or raft part (flat or rolled structure) of the FAD can be covered or not. To the extent possible the use of mesh net should be avoided. If the FAD is covered with mesh net, it must have a stretched mesh size less than 7 cm (2.5 inches) and the mesh net must be well wrapped around the whole raft so that there is no netting hanging below the FAD when it is deployed.
   • The design of the underwater or hanging part (tail) of the FAD should avoid the use of mesh net. If mesh net is used, it must have a stretched mesh size of less than 7 cm (2.5 inches) or tied tightly in bundles or "sausages" with enough weight at the end to keep the netting taut down in the water column. Alternatively, a single weighted panel (less than 7 cm (2.5 inches) stretched mesh size net or solid sheet such as canvas or nylon) can be used.

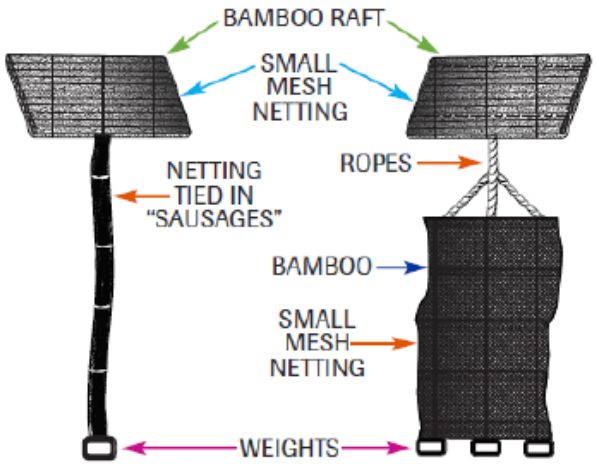
2. To reduce the amount of synthetic marine debris, the use of natural or biodegradable materials for FADs should be promoted. The use of non-plastic and biodegradable materials in the construction of FADs is encouraged.

Non-entangling & biodegradable FADs

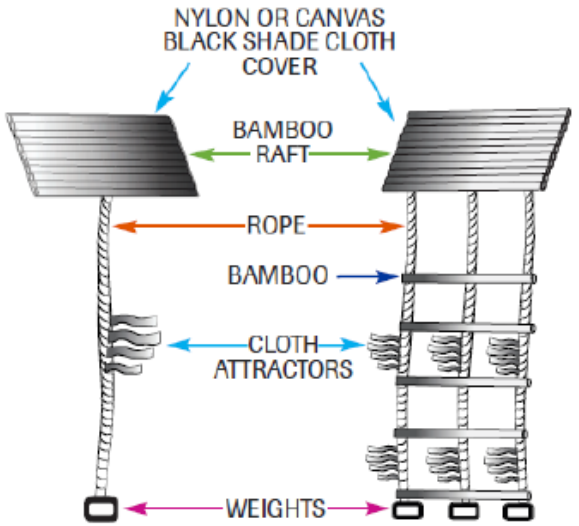
HIGHEST ENTANGLEMENT RISK FADs:



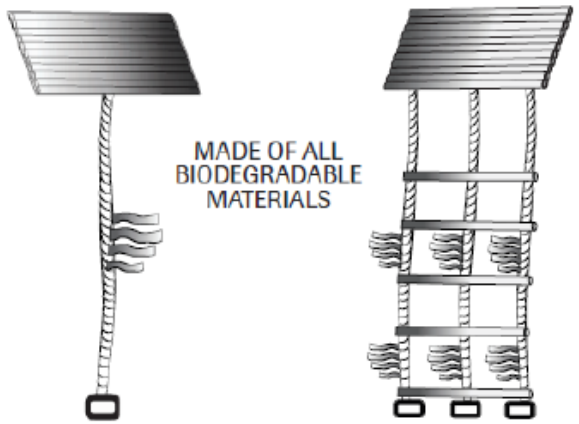
LOWER ENTANGLEMENT RISK FADs:



NON-ENTANGLING FADS:



BIODEGRADABLE NON-ENTANGLING FADS:

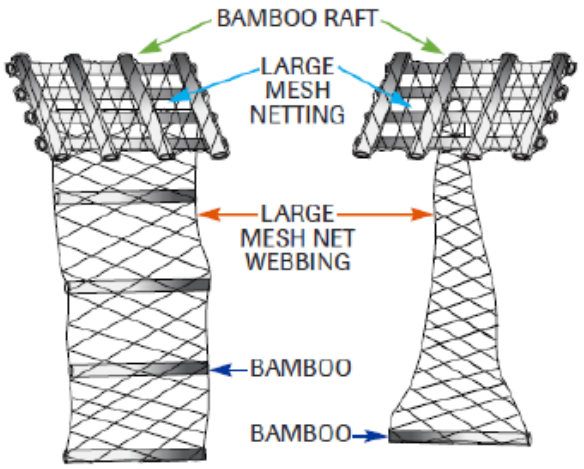


HIGHEST RISK ← → **LOWEST RISK**

© ISSF guide for non-entangling FADs (2015)

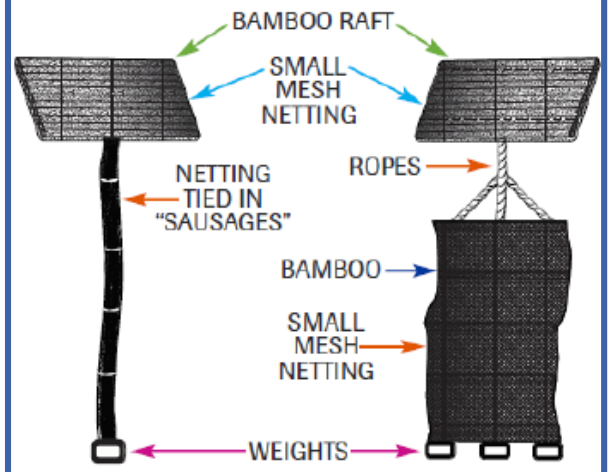
Non-entangling & biodegradable FADs

HIGHEST ENTANGLEMENT RISK FADs:



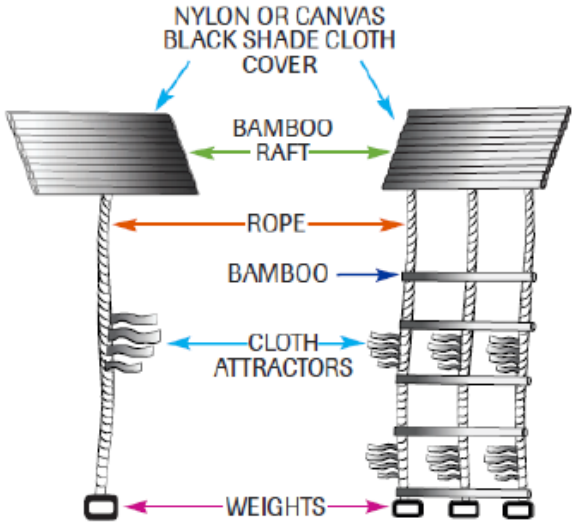
- Constructed with any netting materials, including old purse seine netting, used to cover rafts or suspended beneath in open panels
- These DFADs are known to cause entanglements with turtles and sharks

LOWER ENTANGLEMENT RISK FADs:



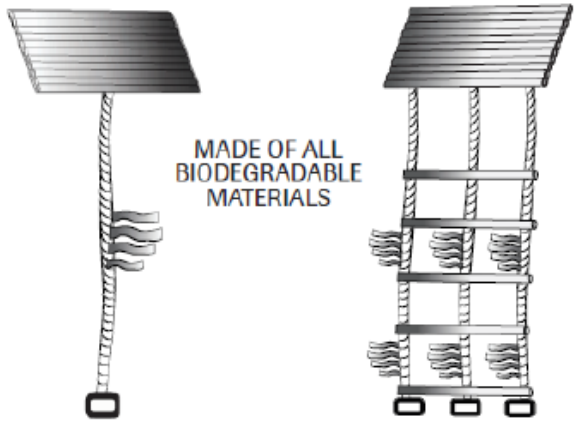
- Only small mesh netting used (e.g. < 2.5 inch (7 cm) stretched mesh)
- Rafts are tightly wrapped with small mesh netting, with no loose netting hanging from it
- The underwater structure is tightly tied into bundles (sausages)
- A single panel can be used instead of bundles, but the panel must be weighted 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:

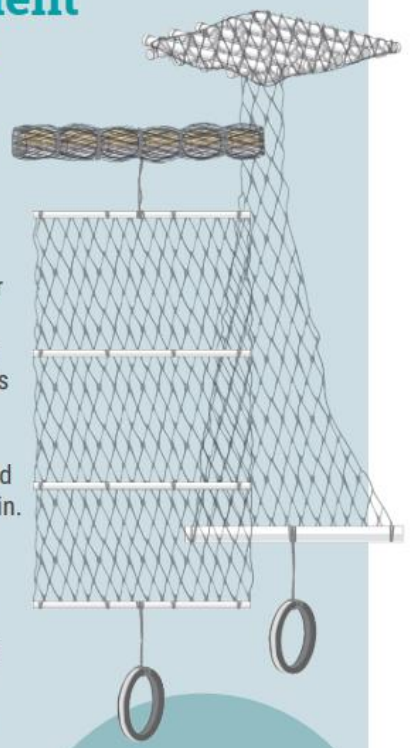


- In addition to having minimal risk of entanglement, they are constructed exactly like other non-entangling FADS, but using only natural and/or biodegradable materials, further reducing the environmental impact of DFADs on the oceans

HIGHEST RISK ← → **LOWEST RISK**

Non-entangling & biodegradable FADs

HIGH Entanglement Risk FADs



RAFT

- Covered with large mesh netting (e.g. > 2.5-inch mesh).*
- If mesh size is larger than 2.5 inches (both in the upper or submerged part), it is high entanglement, whether the net is tightly tied or covered by canvas or tarpaulin.

TAIL

- Submerged part of the FAD constructed with open panels of large mesh netting (> 2.5-inch mesh).

*Accounting for mesh sizes available in the market, 2.5 inch (7 cm) mesh size offers the lowest likelihood of entanglements across species and body parts.

These FADs are known to cause entanglements with turtles and sharks.

Non-entangling & biodegradable FADs

→ Examples

Raft

The surface structure should not be covered with netting or meshed materials (to reduce entanglement of turtles).

Bio-degradable

Construct with bamboo, balsa wood or other natural materials that degrade without causing impact on the ecosystem.

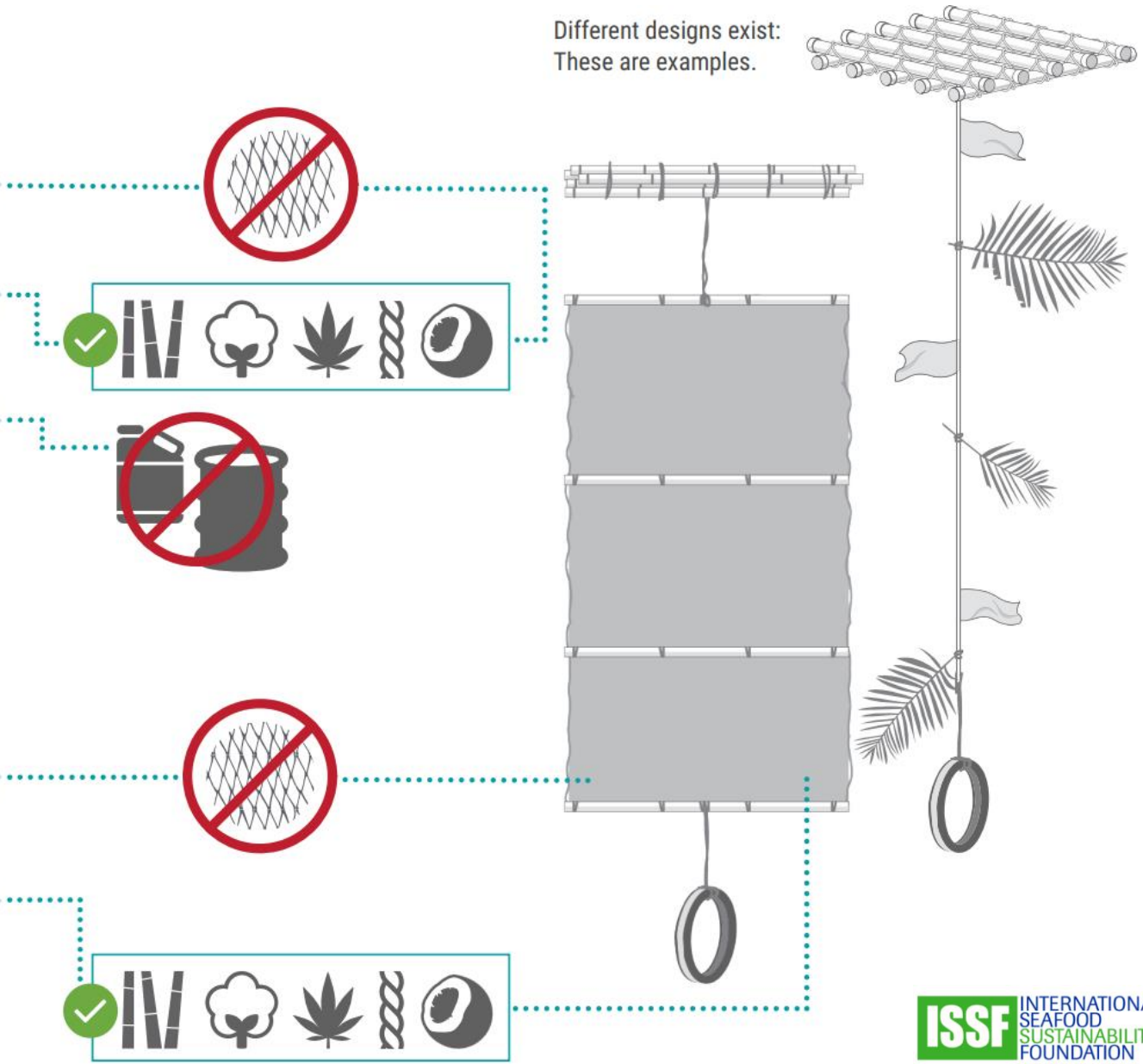
Use of plastic buoys and containers for flotation should be reduced as much as possible; for instance, reduce the weight and volume of the FAD structure.

Tail

Only FADs constructed without netting can completely eliminate the entanglement of turtles, sharks and finfish species.

Bio-degradable

Use only natural and/or biodegradable materials—cotton ropes and canvas, manila hemp, sisal, coconut fiber—so that they degrade without causing ecosystem impact.



Observer record of low/non-entangling & biodegradable FADs

- **Low entanglement risk** → **Compulsory January 2020**

Net present <u>but</u> :
Net mesh <7cm
Net in attachment: mesh any size
but tied tightly in bundles (comments)

<u>To do</u>:
Record net presence
Net = mesh size need
If large mesh, tied in bundles ?
Note the type of FADs in comments

CODE	MATERIALS
1	Logs, Trees or debris tied together
2	Timber/planks/pallets/spools
3	PVC or Plastic tubing
4	Plastic drums
5	Plastic Sheeting
6	Metal Drums (i.e. 44 gallon)
7	Philippines design drum FAD
8	Bamboo/Cane
9	Floats/Corks
10	Unknown (describe)
11	Chain, cable rings, weights
12	Cord/rope
13	Netting hanging underneath FAD
14	Bait containers
15	Sacking/bagging
16	Coconut fronds/tree branches

Net present ?

FAD/PAYAO and FLOATING OBJECTS INFORMATION RECORD — Form GEN-5

REVISED 2018

OBSERVER NAME:	VESSEL NAME:	OBSERVER TRIP ID NUMBER:	PAGE OF

Date Time (from PS-2)	Set No.	Object number	Origin of FAD	Deployment date	latitude dd°mm.mmm'	N S	and longitude ddd°mm.mmm'	E W	FAD as found	Beacon/ FAD lifted	FAD as left	Comments / Change details
										Beac/FAD/ NO		Low entanglement FAD

FAD materials Main materials	net/mesh size	Attachments	net/mesh size	Max est. depth	FAD length	FAD width	Buoy serial number	Beacon/FAD ID markings	SSI seen	SSI trapped	
	cm		cm	M	M	M			Y / N / U	Y / N / U	Attachment net tied in bundles

Observer record of low/non-entangling & biodegradable FADs

- **Non entangling** → **Encouraged**

No net

To do:
Record net absence
Note the type of FADs in comments

CODE	MATERIALS
1	Logs, Trees or debris tied together
2	Timber/planks/pallets/spools
3	PVC or Plastic tubing
4	Plastic drums
5	Plastic Sheeting
6	Metal Drums (i.e. 44 gallon)
7	Philippines design drum FAD
8	Bamboo/Cane
9	Floats/Corks
10	Unknown (describe)
11	Chain, cable rings, weights
12	Cord/rope
13	Netting hanging underneath FAD
14	Bait containers
15	Sacking/bagging
16	Coconut fronds/tree branches

No net

FAD/PAYAO and FLOATING OBJECTS INFORMATION RECORD — **Form GEN-5**

REVISED 2018

OBSERVER NAME:	VESSEL NAME:	OBSERVER TRIP ID NUMBER:	PAGE OF

Date / Time (from PS-2)	Set No.	Object number	Origin of FAD	Deployment date	latitude dd°mm.mmm'	N S	and longitude ddd°mm.mmm'	E W	FAD as found	Beacon/ FAD lifted	FAD as left	Comments / Change details
										Beac/FAD/ NO		Non entangling FAD

FAD materials Main materials	net/mesh size	Attachments	net/mesh size	Max est. depth	FAD length	FAD width	Buoy serial number	Beacon/FAD ID markings	SSI seen	SSI trapped
	cm		cm	M	M	M			Y / N / U	Y / N / U

Observer record of low/non-entangling & biodegradable FADs

ECOLOGICAL

- **Biodegradable FAD**

No specific fields
Note any new designs/materials detected: comments + drawing

→ **Encouraged**
Several fishing company trials (marked or not)
Important to have information regarding the condition of the FAD, sets made on it, reason for not setting during visits, etc.

To do:
New FAD designs/materials seen during the trip
→ Description in comments + Drawing

CODE		MATERIALS
1		Logs, Trees or debris tied together
2		Timber/planks/pallets/spools
3		PVC or Plastic tubing
4		Plastic drums
5		Plastic Sheeting
6		Metal Drums (i.e. 44 gallon)
7		Philippines design drum FAD
8		Bamboo/Cane
9		Floats/Corks
10		Unknown (describe)
11		Chain, cable rings, weights
12		Cord/rope
13	?	Netting hanging underneath FAD
14		Bait containers
15		Sacking/bagging
16		Coconut fronds/tree branches

Natural only

FAD/PAYAO and FLOATING OBJECTS INFORMATION RECORD — Form GEN-5

REVISED 2018

OBSERVER NAME:	VESSEL NAME:	OBSERVER TRIP ID NUMBER:	PAGE OF

Date (from PS-2)	Time	Set No.	Object number	Origin of FAD	Deployment date	latitude dd°mm.mmm'	N S	and longitude ddd°mm.mmm'	E W	FAD as found	Beacon/ FAD lifted	FAD as left	Comments / Change details
											Beac/FAD/ NO		Biodegradable FAD → details … + Any marking on the FAD (ecological or biodegradable) ??

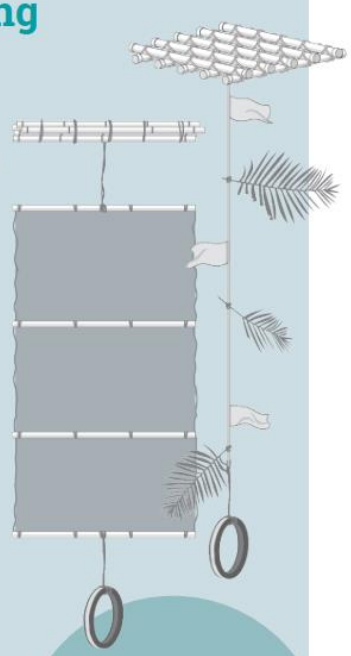
FAD materials Main materials			net/mesh size	Attachments			net/mesh size	Max est. depth	FAD length	FAD width	Buoy serial number	Beacon/FAD ID markings	SSI seen	SSI trapped
			cm				cm	M	M	M			Y / N / U	Y / N / U

Discussion

© B. Climpson

Discussion

NON-Entangling FADs



RAFT

- Not constructed or covered with canvas, tarpaulin or shade clothes.

TAIL

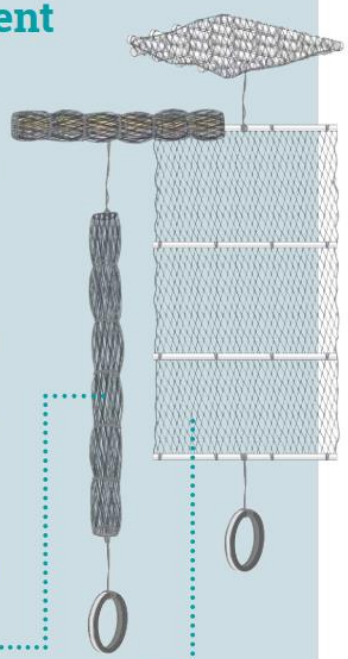
- Subsurface structure is made with ropes, canvas or nylon sheets, or other non-entangling materials.

More detail on the previous page.

No netting is used in any components (raft and tail)

These FADs are expected to have no risk of causing entanglement.

LOWER Entanglement Risk FADs



RAFT

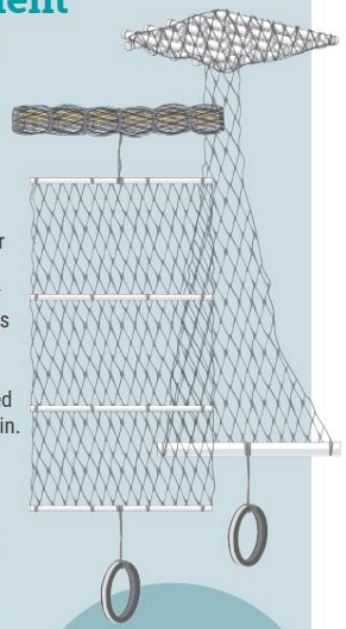
- Use only small mesh netting (< 2.5 inch / 7 cm stretched mesh) if covering with net (both upper and submerged parts).
- If small mesh netting is used as cover, it is tightly wrapped, with no loose netting hanging from the raft.

TAIL

- If net is used as submerged tail, could be of any mesh size if tightly tied into sausage-like bundles.
- If open panel netting is used, only small mesh size (< 2.5 inch [7 cm] stretched mesh) can be used, but weight the panel to keep it taut.

Despite using netting, these design elements reduce the risk of entanglement events.

HIGH Entanglement Risk FADs



RAFT

- Covered with large mesh netting (e.g. > 2.5-inch mesh).*
- If mesh size is larger than 2.5 inches (both in the upper or submerged part), it is high entanglement, whether the net is tightly tied or covered by canvas or tarpaulin.

TAIL

- Submerged part of the FAD constructed with open panels of large mesh netting (> 2.5-inch mesh).

*Accounting for mesh sizes available in the market, 2.5 inch (7 cm) mesh size offers the lowest likelihood of entanglements across species and body parts.

These FADs are known to cause entanglements with turtles and sharks.

Satellite Buoy serial number

FAD/PAYAO and FLOATING OBJECTS INFORMATION RECORD — **Form GEN-5**

REVISED 2018

OBSERVER NAME:	VESSEL NAME:	OBSERVER TRIP ID NUMBER:	PAGE OF

Date (from PS-2)	Time	Set No.	Object number	Origin of FAD	Deployment date	latitude dd°mm.mmm'	N S	and longitude ddd°mm.mmm'	E W	FAD as found	Beacon/ FAD lifted	FAD as left	*Comments / Change details*
											Beac/FAD/ NO		

FAD materials Main materials			*net/mesh size*	Attachments			*net/mesh size*	Max est. depth	FAD length	FAD width	Buoy serial number	Beacon/FAD ID markings	SSI seen	SSI trapped
			cm				cm	M	M	M			Y / N / U	Y / N / U

* Recently changed from "Buoy number only"

Rarely well recorded: absent or not the number expected. But very important to link with FAD trajectories

Buoy serial number recorded	All FAD activities (%)	Sets (%)	Deployments (%)
2015	8.5	5.2	20.4
2016	10.5	5.8	27.1
2017	15.6	5.9	27.7
2018	17.0	4.0	35.0
2019	8.8	5.3	19.3

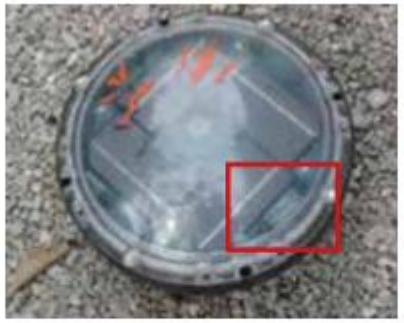
Satellite buoy serial number : what are they and how to find them

ISL+123456

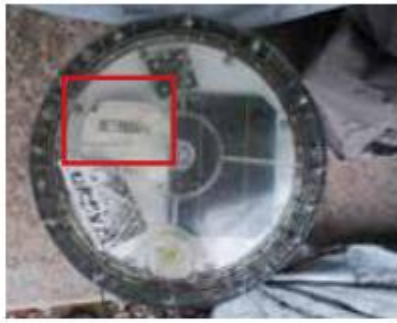
DSL+123456

M3I123456

T7+123456789
or Ze0123456789



P1234NF



123456

List of format not exhaustive …

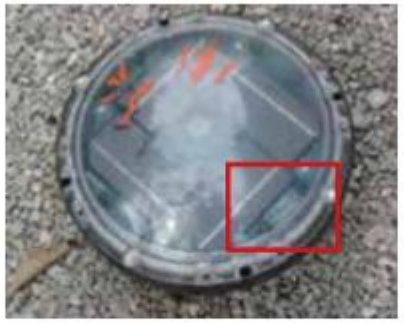
Satellite buoy serial number : what are they and how to find them

ISL+123456

DSL+123456

M3I123456

T7+123456789
or Ze0123456789



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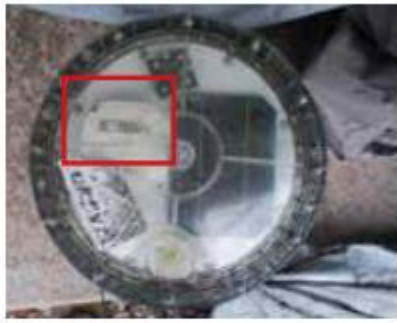

123456

Buoy serial number	Beacon/FAD ID markings

Observers should:

Carefully copy the buoys serial number exactly as found on the buoy

Not to do :

Forget the prefix (DSL+ ; ISL+ ; M3I, T7+ etc.)
Add other markings painted on the buoy, e.g. vessel name

Any other marking painted on the beacon, or marking on the FAD

A number, a vessel name or an abbreviation of a vessel name

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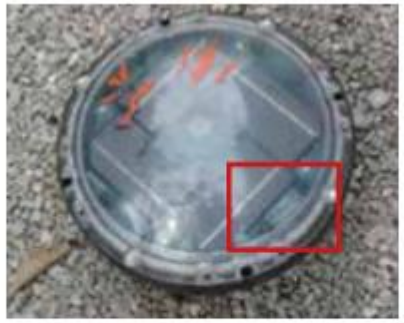
Satellite buoy serial number : what are they and how to find them

ISL+123456

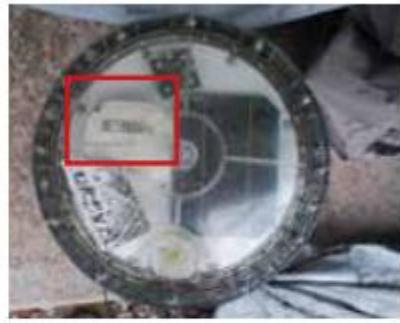
DSL+123456

M3I123456

T7+123456789
or Ze0123456789



P1234NF



123456

Buoy serial number should be recorded for :

All deployment the observer witnesses
Other activities → If the beacon lifted
Other activities → If beacon belongs to the vessel

<u>To do</u>:
All these activities, the buoy serial number should be recorded

Double check the format of the buoy number:
The prefix is present & it is only the buoy serial number

Satellite buoy serial number : what are they and how to find them

Satlink

ISL+123456

DSL+123456

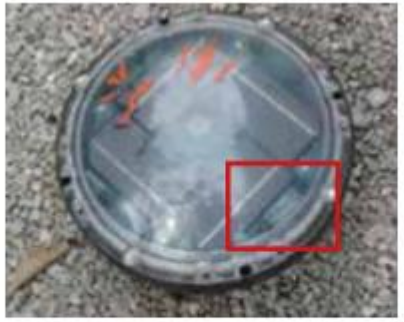
Marine Instrument

M3I123456

Zunibal

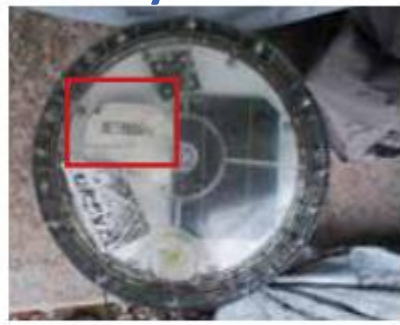
T7+123456789
or Ze0123456789

Kato



P1234NF

Ryokusei



123456

Buoy serial number	Beacon/FAD ID markings
141554	

→

Buoy serial number	Beacon/FAD ID markings
ISL+141554	

Buoy serial number	Beacon/FAD ID markings
CAPE MAY DSL+125945	

→

Buoy serial number	Beacon/FAD ID markings
DSL+125945	CAPE MAY

To do:
All these activities, the buoy serial number should be recorded

Double check the format of the buoy number:
The prefix is present & it is only the buoy serial number

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Questions ??


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Open discussion

Modification to the data collection – GEN-5 ?

- **Field to choose:**
  - **Non-entangling**
  - **Lower entanglement risk**
  - **High entanglement risk**
  - **(Biodegradable)**

  Gen-5 well completed : FAD materials and mesh size,
  → Not needed, could be derived from the data

- **List of materials to be modified:**
  - **Low entanglement risk, non entangling : net (main material); attachment net tied in bundles**
  - **Biodegradable material (natural fibber cord, naturel fibber wrapping / sacking)**

  Likely needed if biodegradable FADs start to be more common

- **Brand of the satellite buoy to double check the serial number?**

- **Others ???**

Pacific Community
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Thanks for your attention