Bycatch mitigation actions on tropical tuna purse seiners: best practices program and bycatch releasing tools

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IATTC, 11 May 2019, San Diego

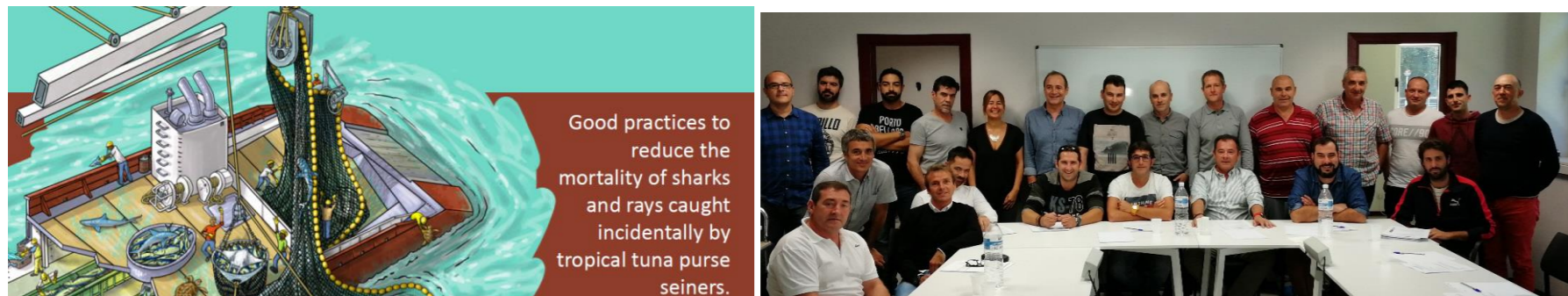# The Code of Good Practices

1. Design and deployment of **non-entangling FADs (NEFADs)** → No meshed material or open net mesh size <7 cm or >7 cm if constructed in sausages

2. Safe fauna **release operations (**species-specific handling procedures for sharks, mantas, rays and turtles).

3. 100% observer coverage (EM or HO) (since 2017 gradually implemented in supply vessels)

4. Harmonization of **FAD logbooks**

5. Training of fishing crew and scientific observers

6. External verification of all fishing activities and Creation of a **Steering Committee** (science-industry members)

The Code of Good Practices:
A dynamic Agreement
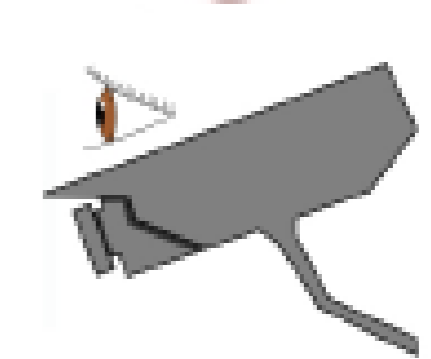
Skippers and observers training

Specific skippers and observer guides
Skipper workshops
Observe training sessions

Monitoring

Specific forms for evaluation on Good practices
Observers on board: IEO, Sea Eye, Ocean Eye, Gabon, CSP, SFA, TAFF, AZTI...
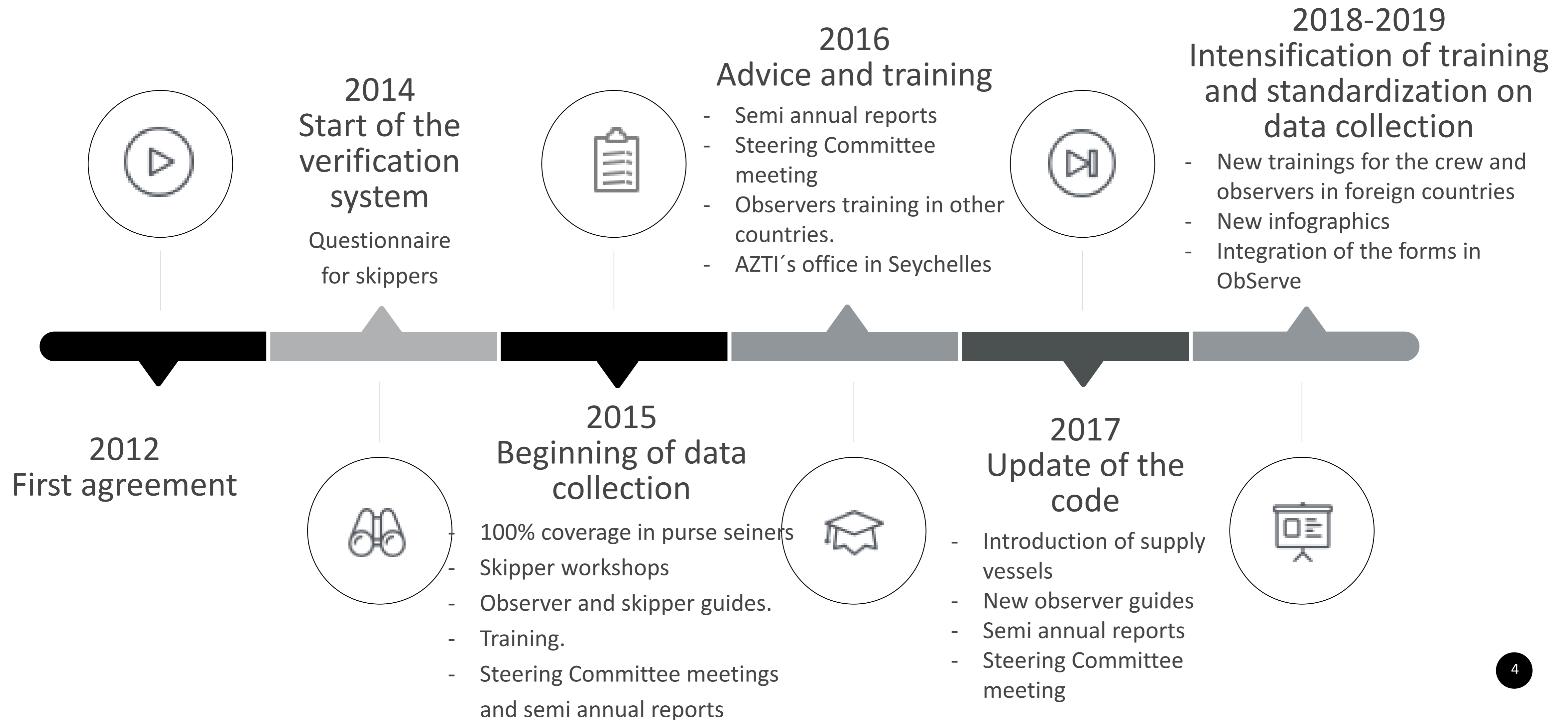Electronic Monitoring: DOS and AZTI

The Code

1

2

4

3

Advice

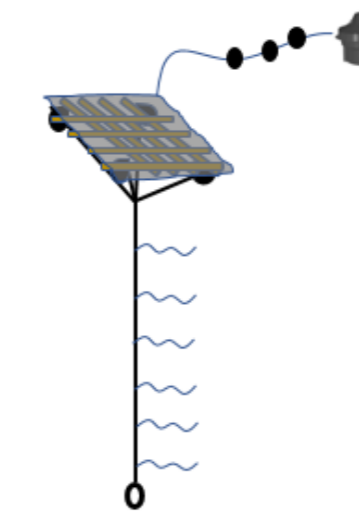Semi annual reports by company
Steering Committee meetings in each semester

Verification

Verification and coordination made by AZTI

Evolution of the Code and the verification System

2016
Advice and training
- Semi annual reports
- Steering Committee meeting
- Observers training in other countries.
- AZTI´s office in Seychelles

2014
Start of the verification system

Questionnaire for skippers

2018-2019
Intensification of training and standardization on data collection
- New trainings for the crew and observers in foreign countries
- New infographics
- Integration of the forms in ObServe

2012
First agreement

2015
Beginning of data collection
- 100% coverage in purse seiners
- Skipper workshops
- Observer and skipper guides.
- Training.
- Steering Committee meetings and semi annual reports

2017
Update of the code
- Introduction of supply vessels
- New observer guides
- Semi annual reports
- Steering Committee meeting

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Data collection on Good Practices: FADs

FAD characteristics in each interaction with FADs (Code of Good Practices Data Collection):
- Raft type
- Mesh size on the raft
- Mesh size on the submerged structure and configuration
- Entangled fauna

OBSERVER: Fishing trip code:

Nº Form D	when arriving	when leaving	own / else 's	DATE	TIME	RAFT												SUBSURFACE STRUCTURE									OTHER COMPONENTS					
						Canes / Vegetal	Metallic or PVC	Superior				Inferior coverage				they modify it	they replace it	net in sausage	open net	single net pieces		rope / no mesh	not visible	no subs. struct.	they modify it	they replace it	plastic	Corks	Bags	Palms, canes…	Color belts	weights	entangled animal
								Net		cov. w/o net	non covered	not visible	Net		cov. w/o net	non covered	not visible																	
								≤ 7cm	> 7cm				≤ 7cm	> 7cm				≤ 7cm	> 7cm	≤ 7cm	> 7cm	≤ 7cm	> 7cm										
45	X		X	14/03/2014	13:22	X	X								X	X	X										X						
45		X	X	14/03/2014	13:22	X		X					X					X									X						

FAD characteristics in each interaction with FADs (IATTC):
- Components on the FADs
- Presence of netting material in the hanging structure.
- Mesh size
- Entangled fauna
- Partial assessment of non-entangling FADs

Inter-American Tropical Tuna Commission
FLOTSAM INFORMATION RECORD (FIR)

Trip Number	Object No.	Count No.	Set No.	DATE YY MM DD	TIME	LATITUDE N/S	LONGITUDE W

A. COMPONENTS (check all that are applicable)

	As found		As left
Tree	[ ]	1	[ ]
Dead animal _____	[ ]	2	[ ]
Chain / cable / rings / weights	[ ]	3	[ ]
Cane / bamboo	[ ]	4	[ ]
Bait container / bait	[ ]	5	[ ]
Cord / rope	[ ]	6	[ ]
Floats / corks	[ ]	7	[ ]
Artificial light for attracting fish	[ ]	8	[ ]
Netting material	[ ]	9	[ ]
Sacks / bags	[ ]	10	[ ]
Planks / pallets / plywood / spools	[ ]	11	[ ]
Metal drum / plastic drum	[ ]	12	[ ]
PVC or other plastic tubes	[ ]	13	[ ]
Plastic sheeting	[ ]	14	[ ]
Unknown	[ ]	15	[ ]
Other _____	[ ]	16	[ ]

B. LOCATING EQUIPMENT (check all that are applicable)

	As found		As left
Flag	[ ]	1	[ ]
Satellite buoy	[ ]	2	[ ]
Buoy, corks, etc.	[ ]	3	[ ]
Lights	[ ]	4	[ ]
Radio transmitter / beeper	[ ]	5	[ ]
Radar reflector	[ ]	6	[ ]
Unknown	[ ]	7	[ ]
Other _____	[ ]	8	[ ]

C. LOCATING METHOD (check only ONE)

Radar	[ ]	1
Direction finder	[ ]	2
Satellite	[ ]	3 check
Visual – the object itself	[ ]	4 only
Visual – birds	[ ]	5 one
Not applicable	[ ]	6
Unknown	[ ]	7
Other _____	[ ]	8

D. IF THERE IS NETTING ON THE OBJECT:

	Yes No Unk
Netting hanging from the object?	[ ] [ ] [ ]
Estimated area of hanging netting (m²)	_____
Predominant mesh size (inches)	___ . ___

E. OTHER DATA

	Yes No NA Unk
Bait container refiled?	[ ] [ ] [ ] [ ]
Fauna entrapped? _____	[ ] [ ] [ ] [ ]
Maximum depth of the object (m)	___ . ___
Dimensions (m)	___ . ___ ___ . ___
Water clarity Clear [ ] Turbid [ ] Very turbid [ ]	
% epibiota _____ Tag number _____	

F. CAPABILITY OF TRANSMITTING EQUIPMENT (check all that are applicable)

	As found		As left
Direction to the object	[ ]	1	[ ]
Geographic position of the object	[ ]	2	[ ]
Water temperature	[ ]	3	[ ]
Tuna quantity	[ ]	4	[ ]
Tuna species	[ ]	5	[ ]
Unknown	[ ]	6	[ ]
Other _____	[ ]	7	[ ]

G. PRIOR ORIGIN OF OBJECT (check only ONE)

Your vessel – this trip	[ ]	1
Your vessel – previous trip	[ ]	2
Deployed	[ ]	3
Other vessel – with owner consent	[ ]	4 check
Other vessel – no owner consent	[ ]	5 only
Drifting object found	[ ]	6 one
Unknown	[ ]	7
Other _____	[ ]	8

H. EXPERIMENTAL EQUIPMENT (continue on back)

Data collection on Good Practices: fauna

Fauna releasing operations (Code of Good Practices):

- Species, size and sex
- Releasing mode
- Time from the detection to the release
- Conformity with good practices
- State of the animal

Fauna releasing operations (IATTC):

- Species, size and sex
- Destiny
- Time from the detection to the release is not included
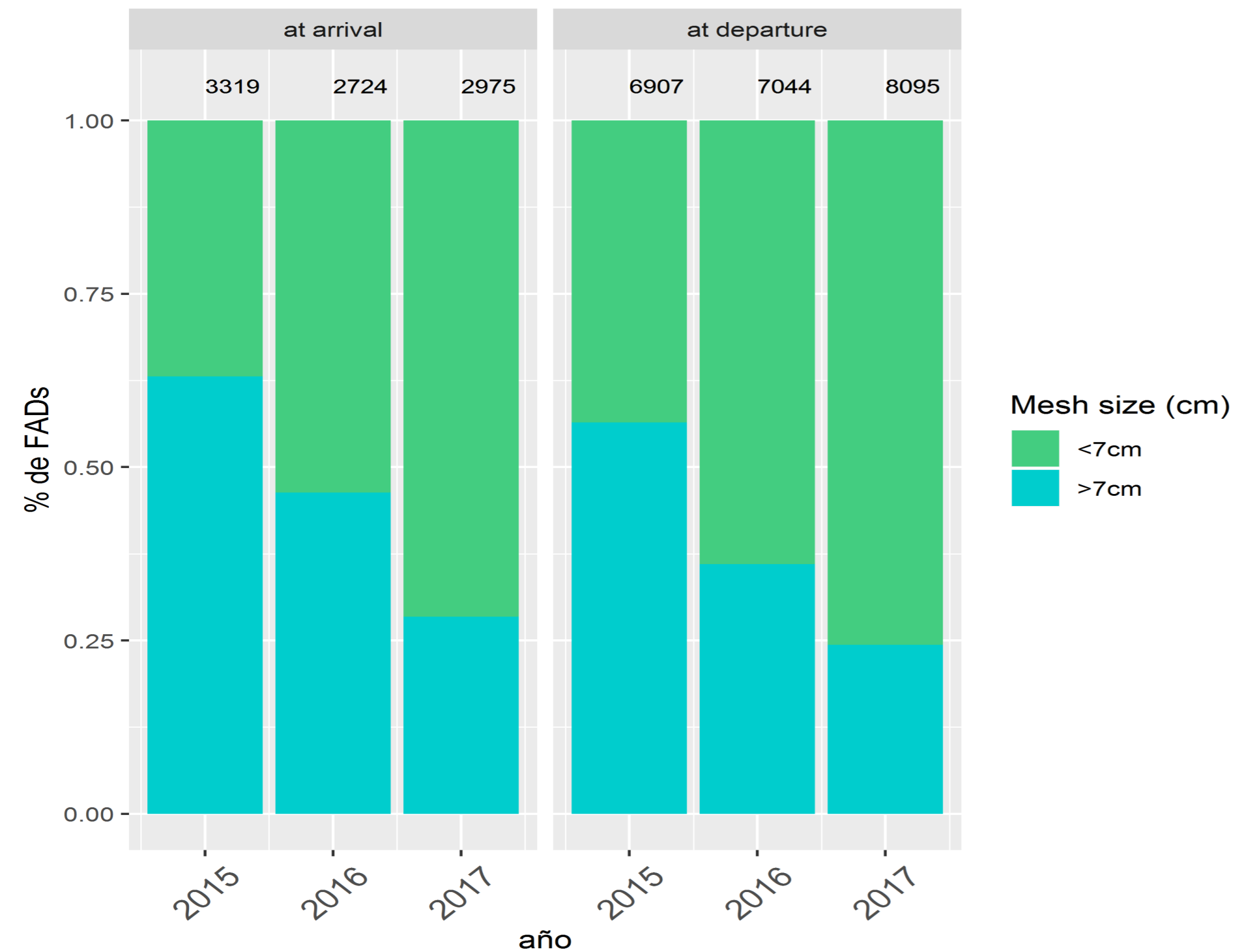- Releasing mode is not included
- Partial assessment of the good practices

Results on Good Practices: Evaluation on FADs

IATTC Observer Program

| at arrival			at departure		
3319	2724	2975	6907	7044	8095

% de FADs — año

Mesh size (cm)
- <7cm
- >7cm

Code of Good Practices
(Opportunistic data collection)

| at.arrival			at.departure		
153	91	230	193	217	386

% by FAD type — year

FAD Type
- Ind_1
- Ind_2
- Ind_3
- Ind_5
- Ind_6
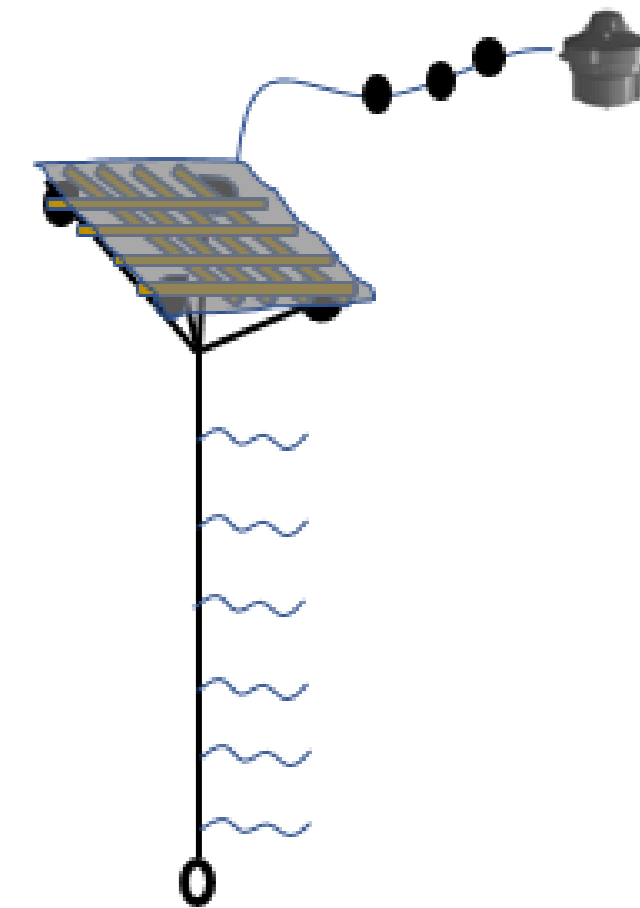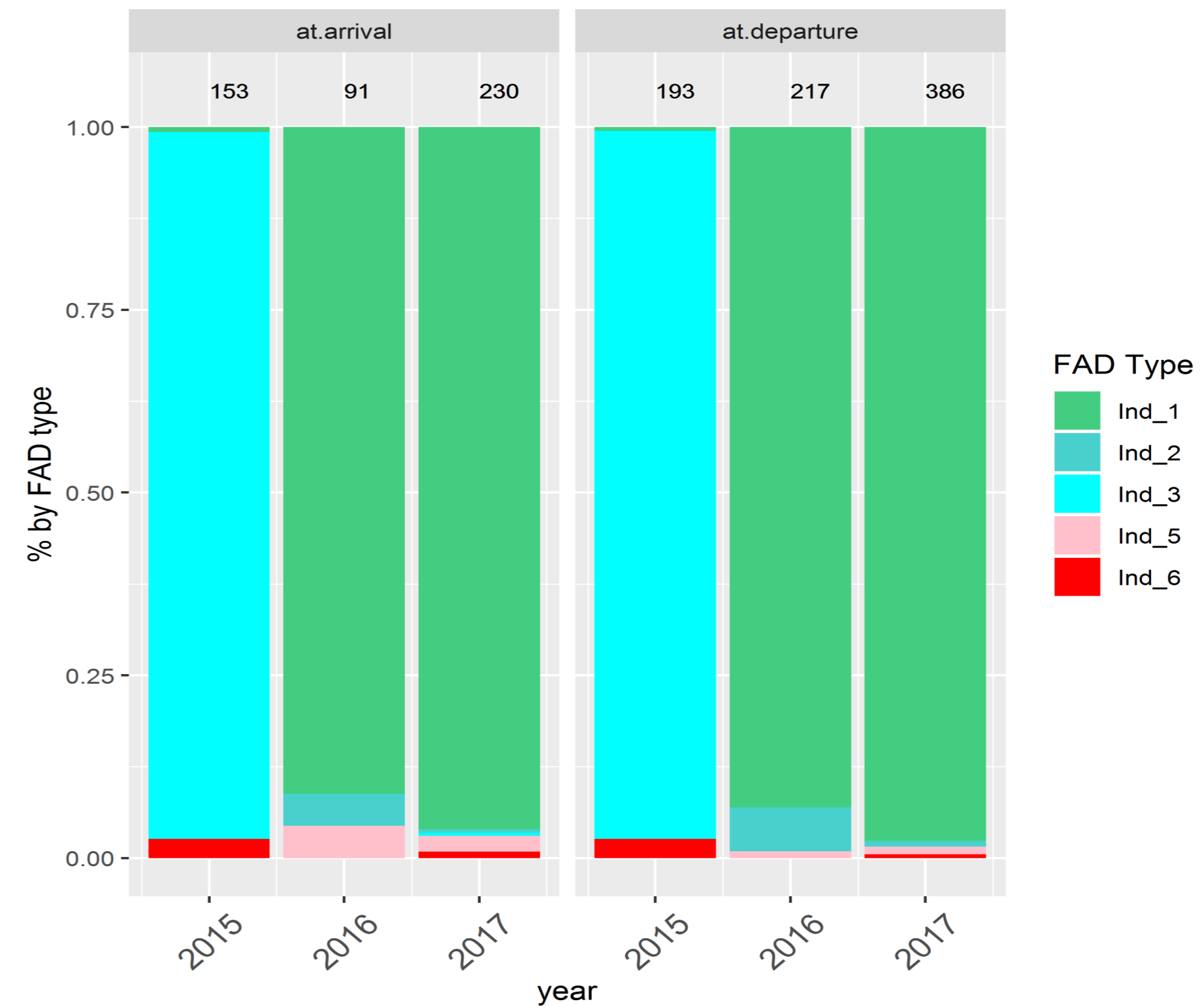
Ind 1 - totally non-entangling;
Ind 2 - net of >7 cm in the bottom part of the raft;
Ind 3- net of >7cm in the upper part of the raft;
Ind 4: pieces of net >7cm in the underwater part;
Ind 5: underwater part with open net >7cm;
Ind 6: raft and underwater part with net >7cm.

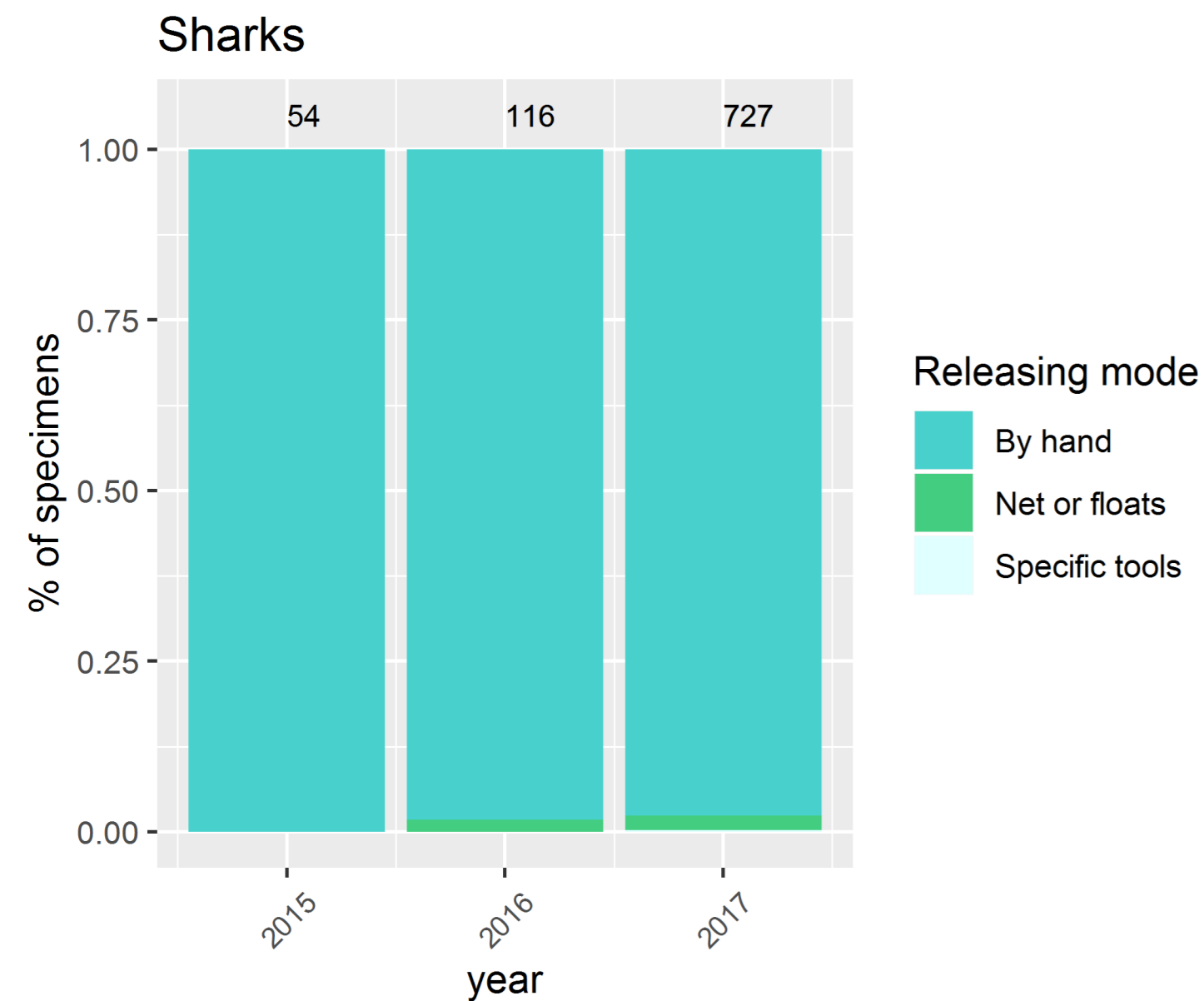# Results on Good Practices: Evaluation on FADs
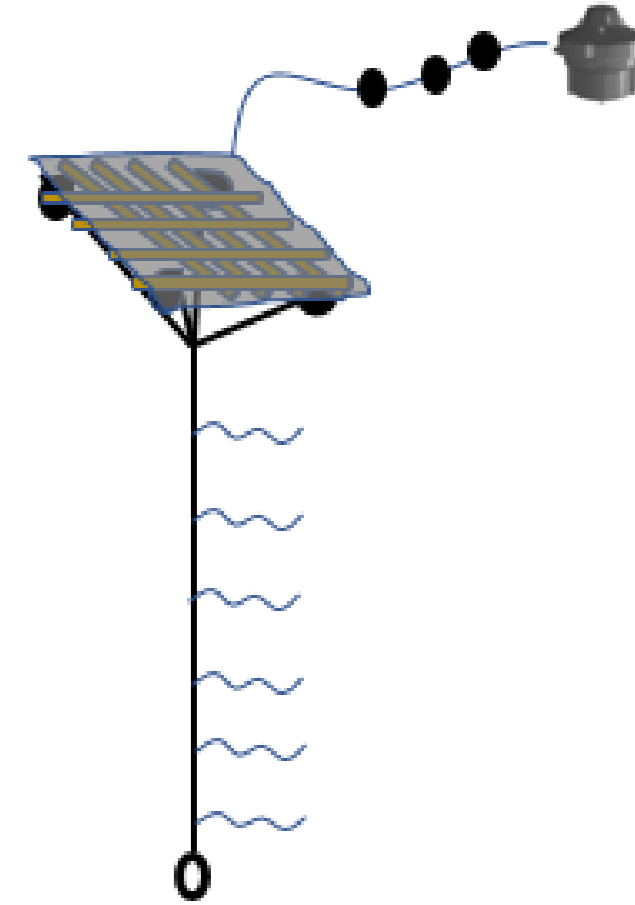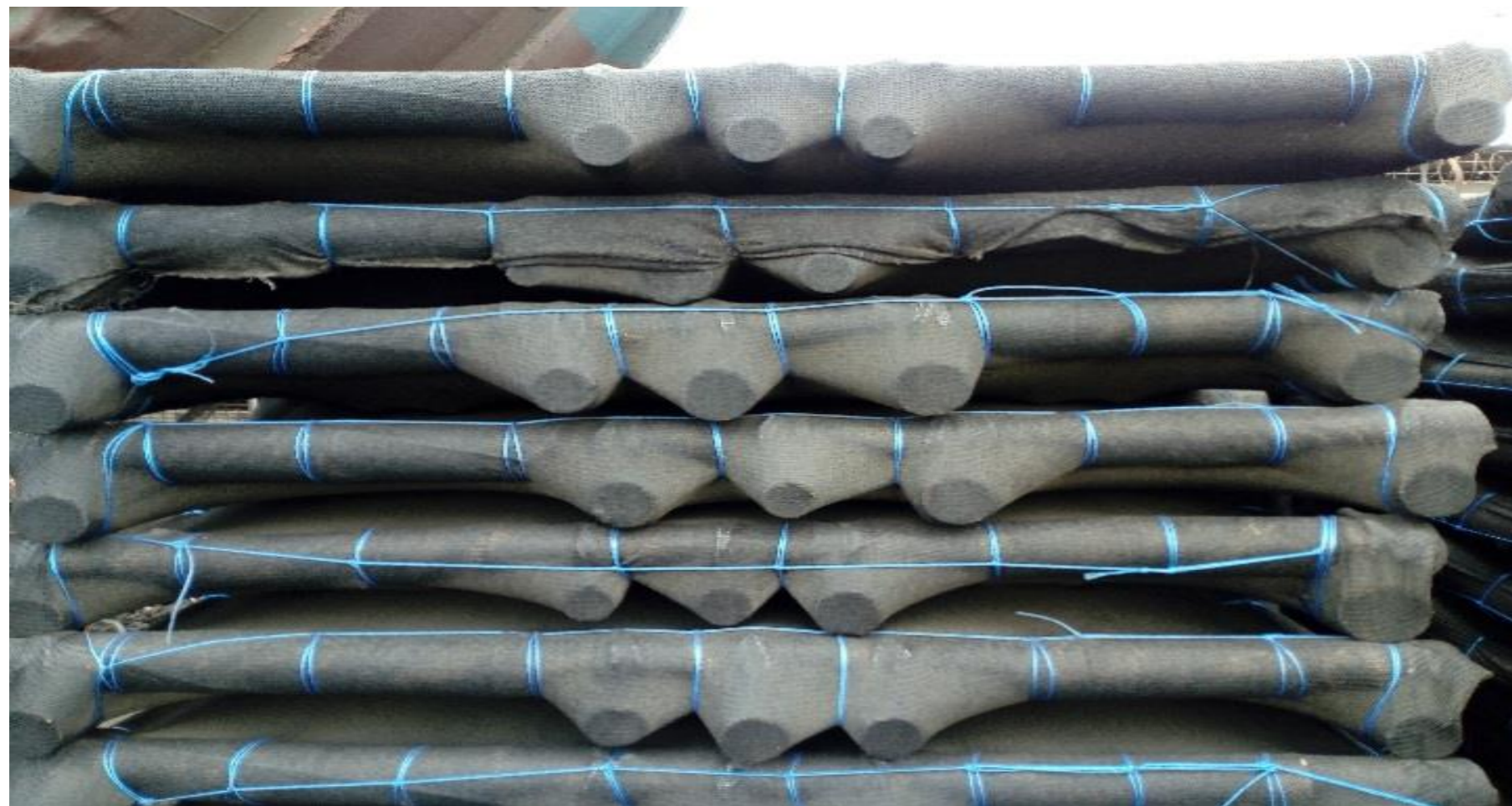
Results on Good Practices: Fauna release

- 98% of interactions correspond to sharks

- The % of fauna released alive has increased or has maintained high during the study period
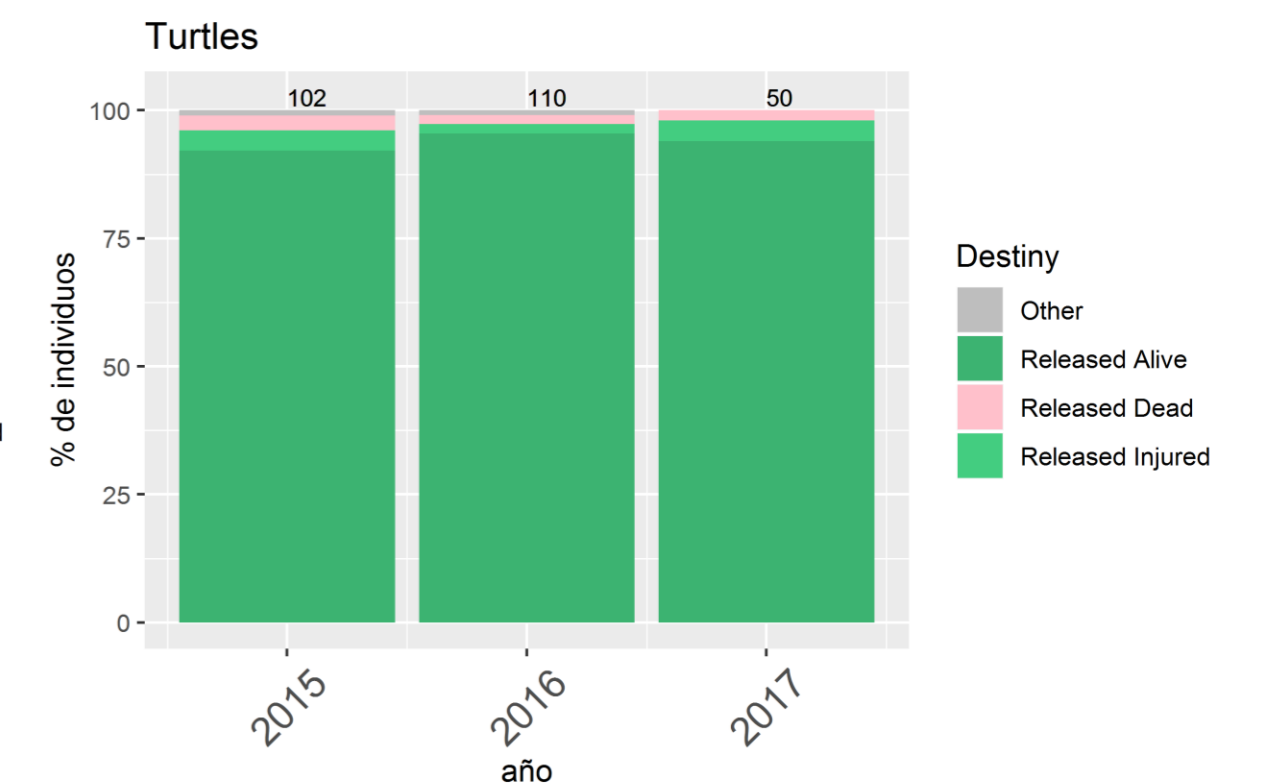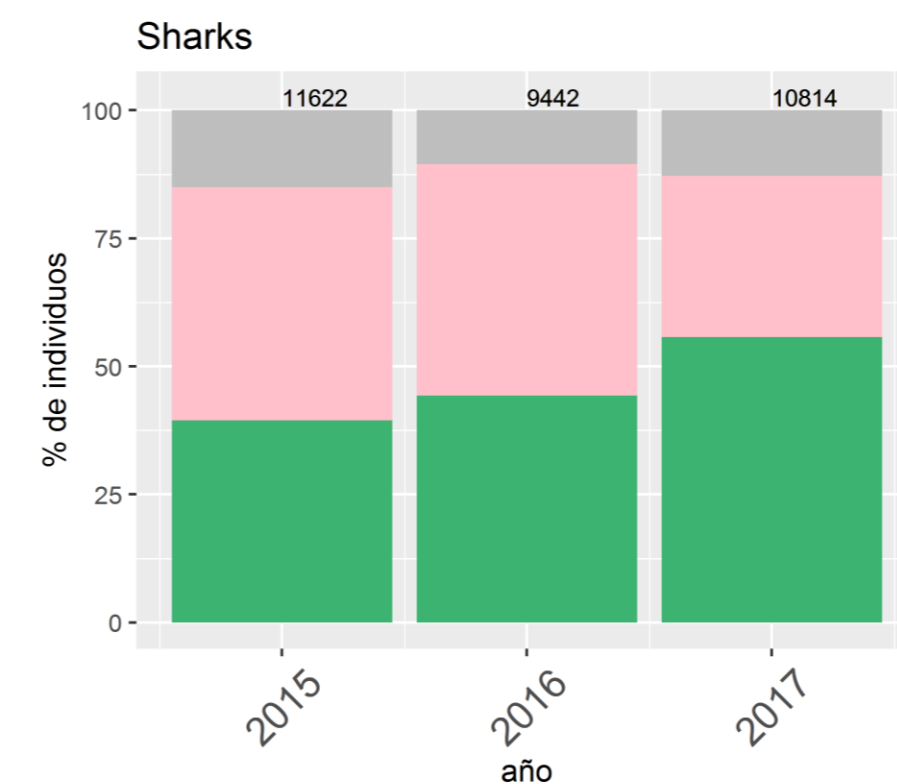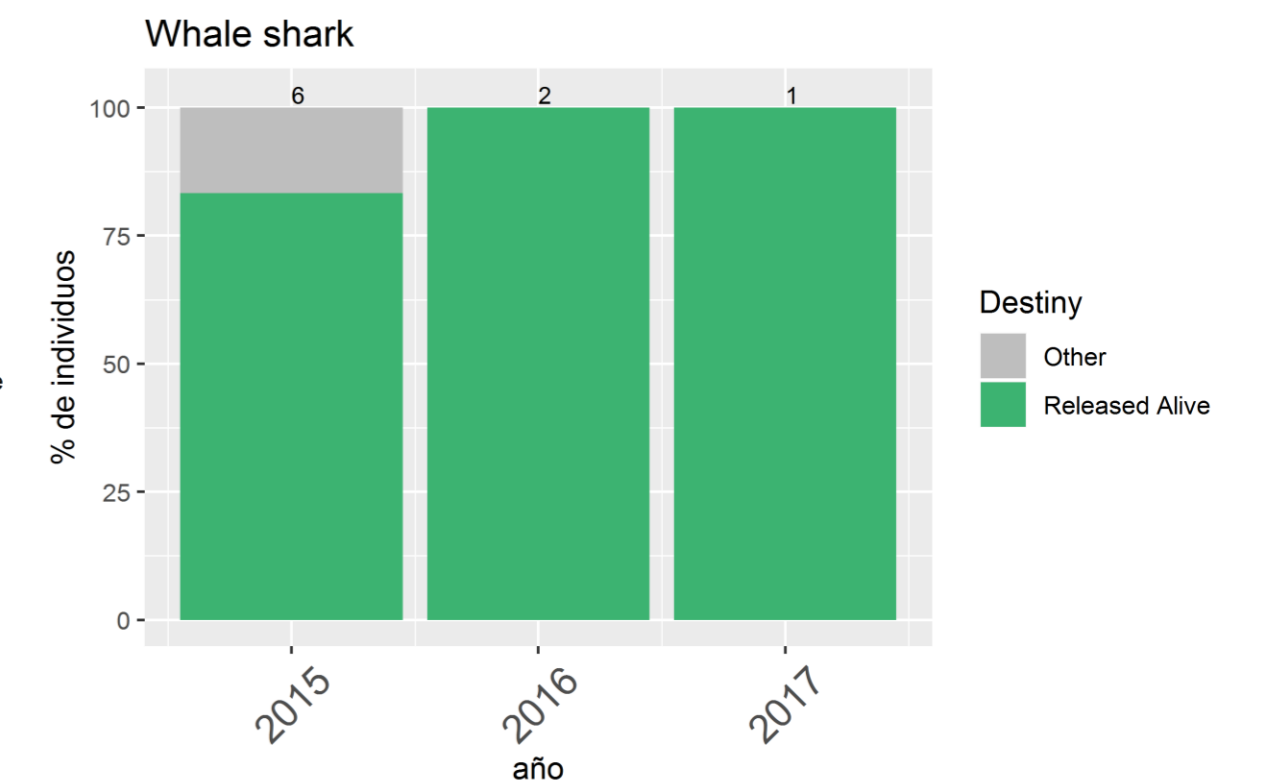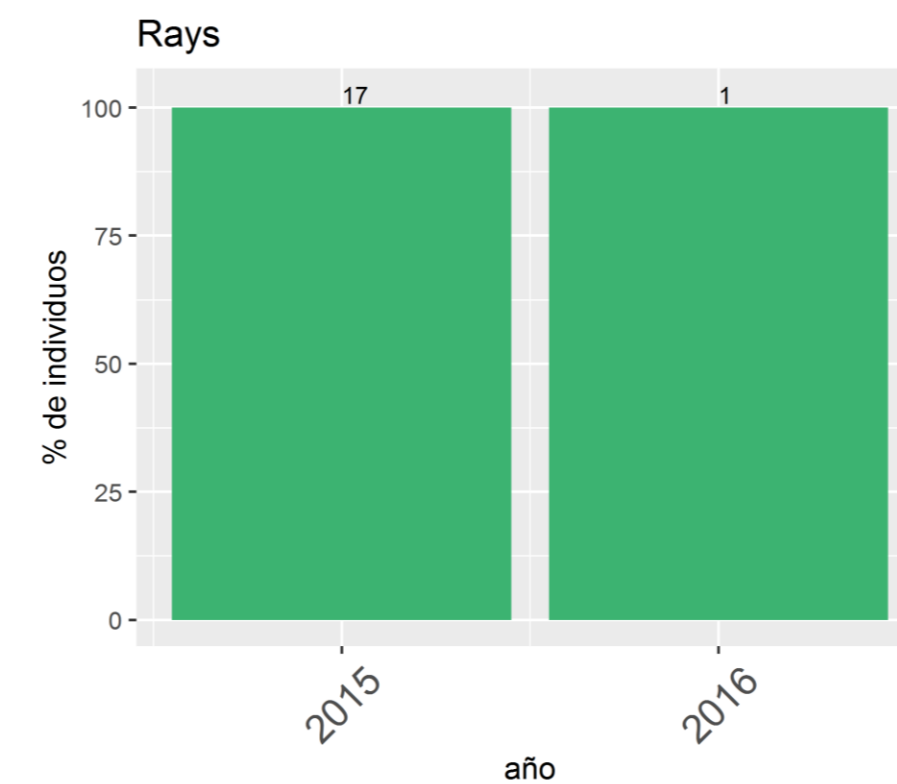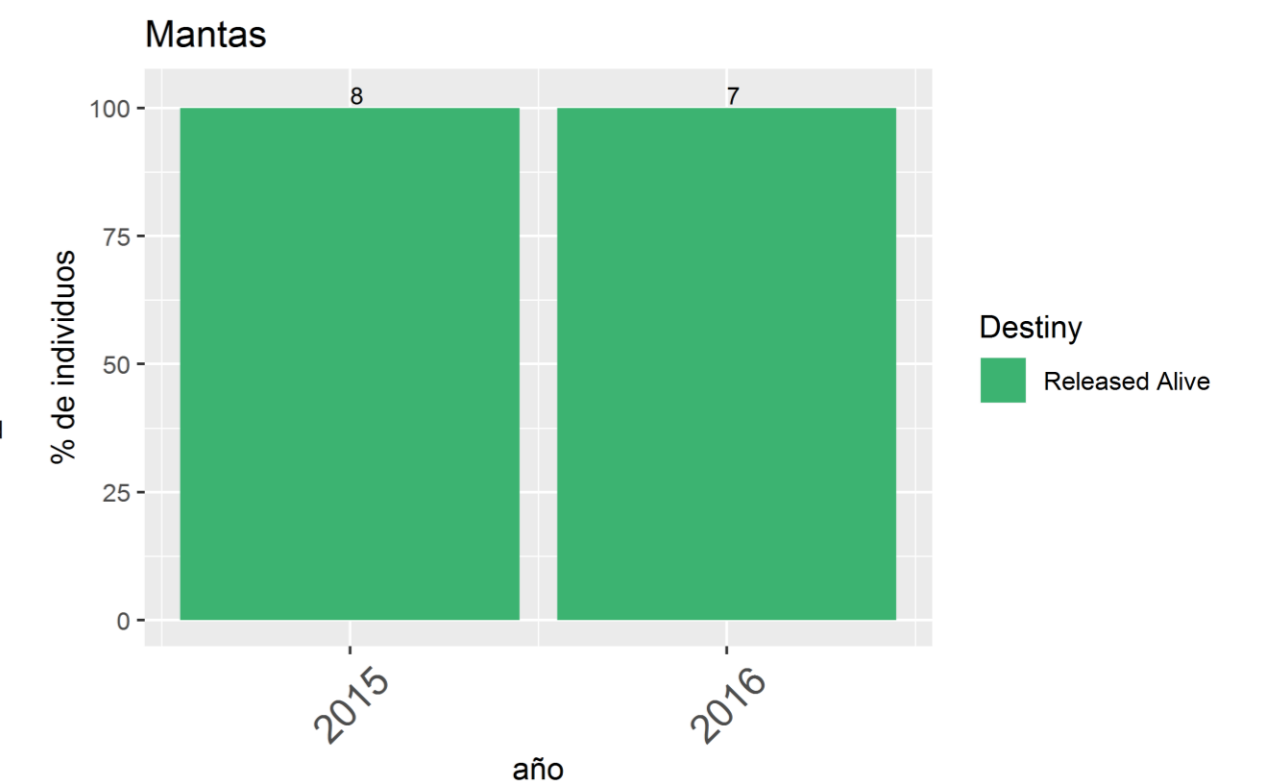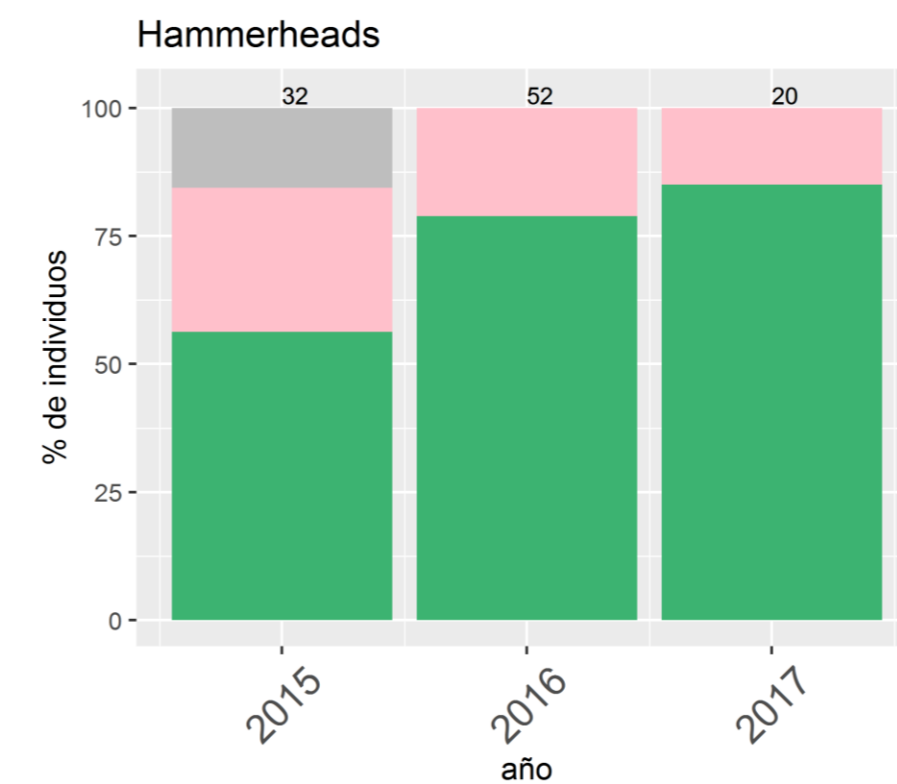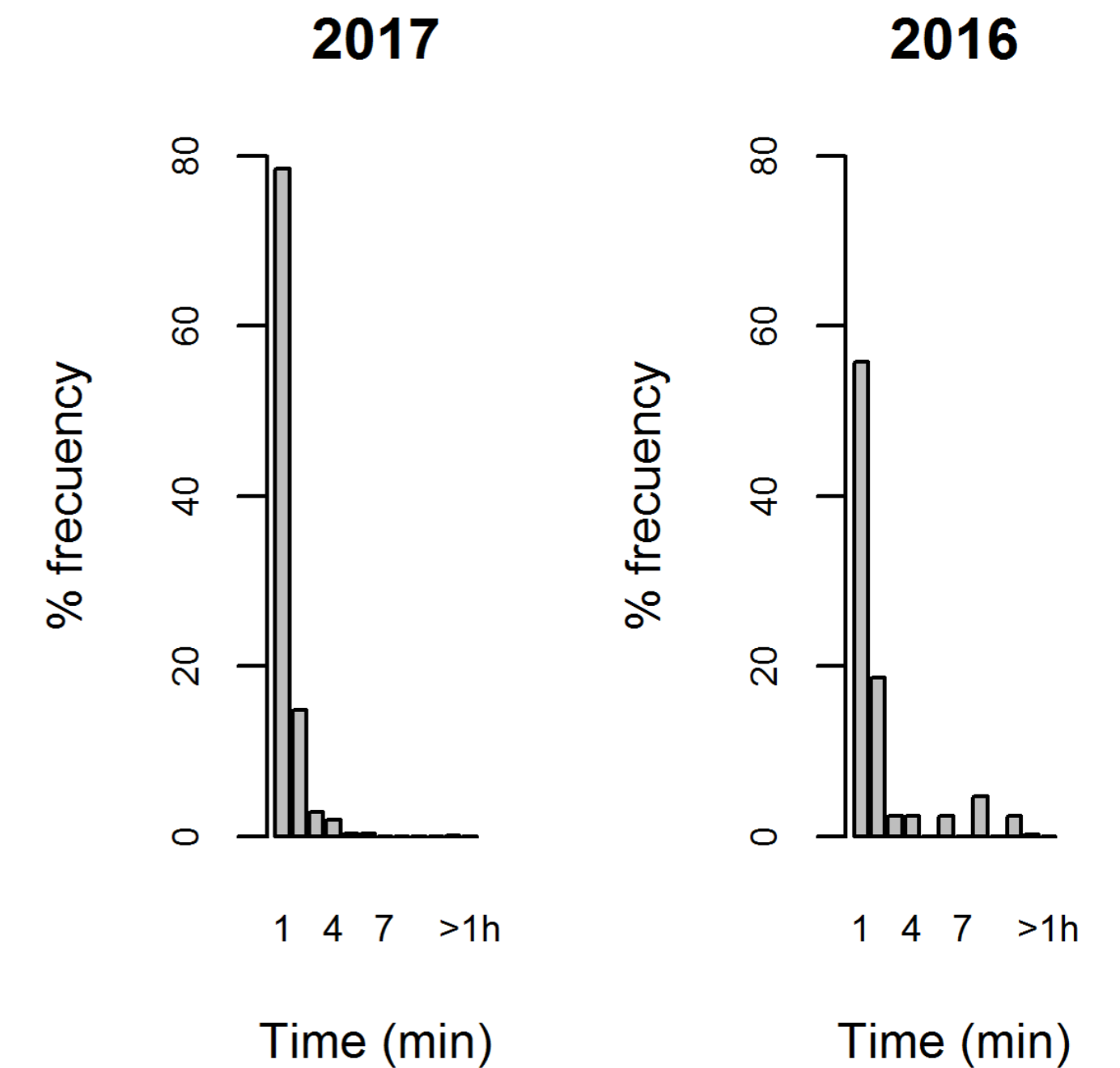
Results on Good Practices: Fauna release

Releasing mode

Sharks

Releasing time

- Sharks generally manipulated by hand, which can suppose a risk for the crew
- The release time has been reduced in this group, which could positively affect post-release survival rates

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# Results on Good Practices: Fauna release

- Potential contribution of good practices based on post-release survival experiments:

Group	Post-release survival rates
Sharks from the deck	≈5-20%
Sharks from the net	≈100%
mantas	≈40%
Turtles*	≈90%
whale shark	≈100%

Overall mortality rate on turtles is estimated from observers records and not from tagging studies
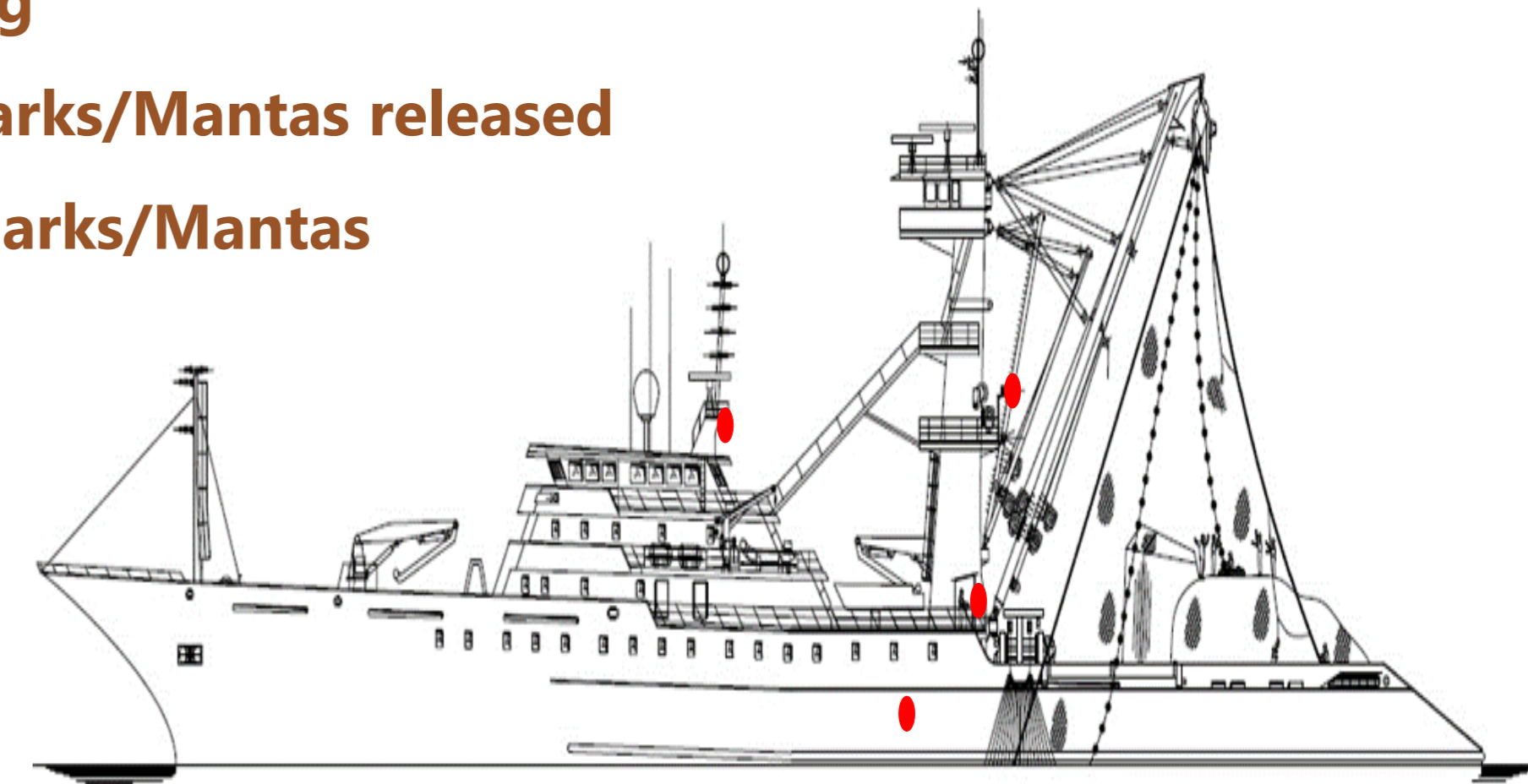
Fauna releasing Tools
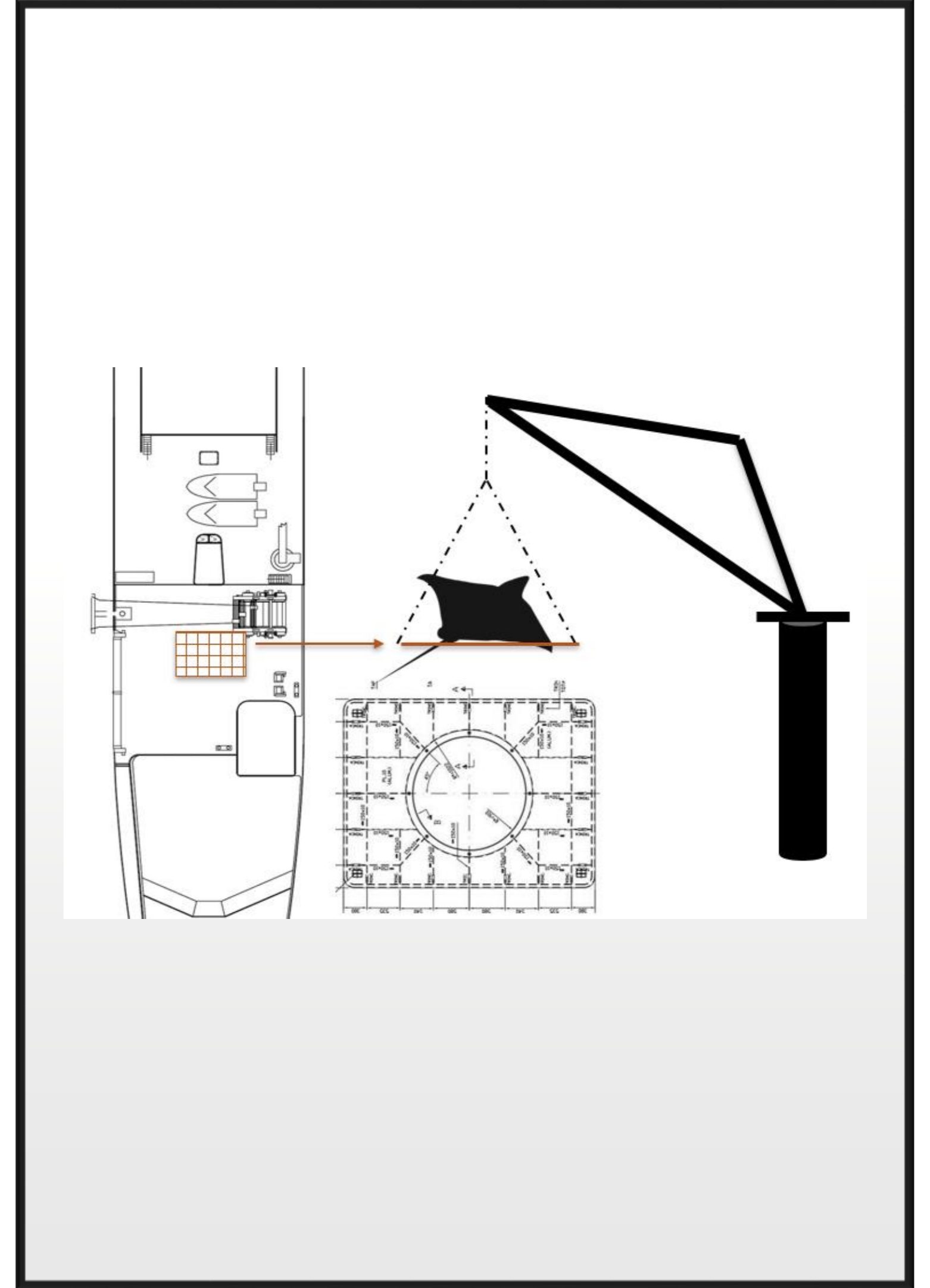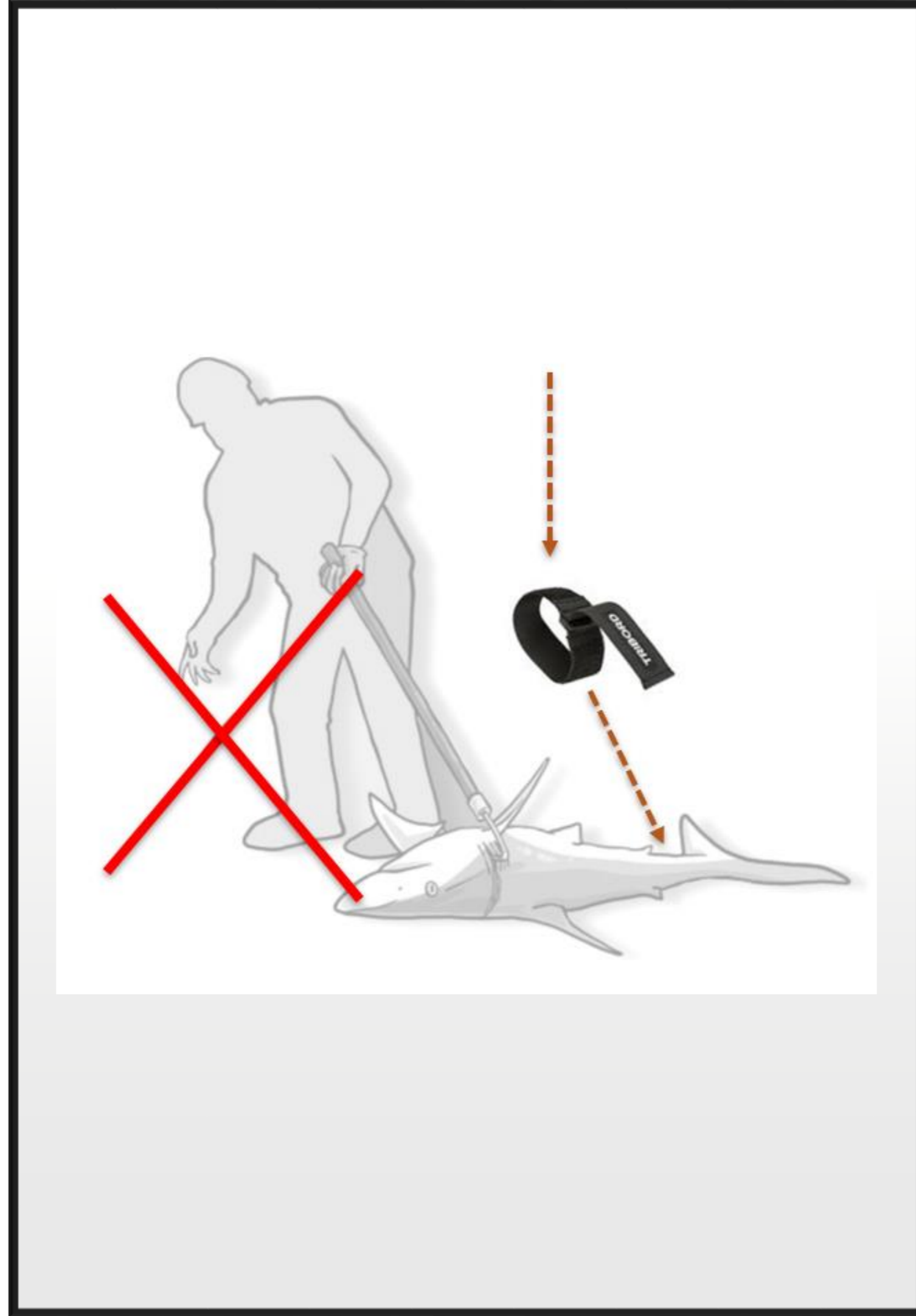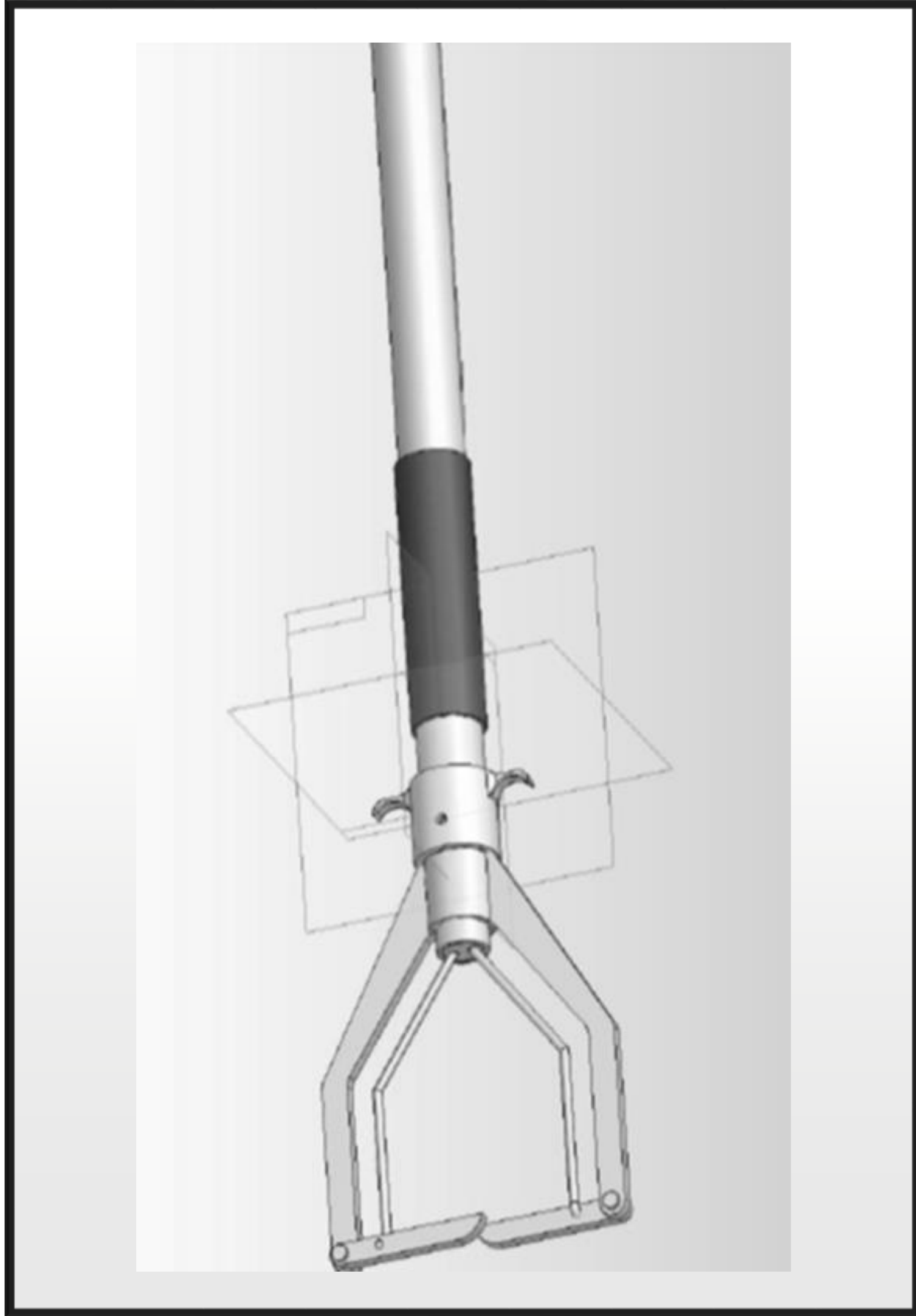
Fauna releasing Tools: The hopper

- 100 sets with and without Hopper on Garavilla vessels Will be analyzed
- Electronic Monitoring System will be used for the evalution (DOS)

- **Tons by set**
- **Number of brailers**
- **Time of brailing**
- **Time of loading**
- **Number of Sharks/Mantas released**
- **State of the Sharks/Mantas**
- **.....**

Conclusions and recommendations

- **Follow with the construction and deployment of non-entangling FADs**, avoiding the use of entangling nets (open netting with mesh size >7cm) on the raft and submerged structure, and through **replacement of traditional FADs for non-entangling FADs when encountered at sea.**

- In a short/medium term, **move to non-entangling FADs constructed entirely without any net and with biodegradable material** which will help to eliminate the potential entangling risk and other associated habitat impacts.

- In order to increase the survival of vulnerable species (mainly of sharks), **new mitigation approaches should be explored**, e.g. promoting release from the net and avoidance of hot spots.

- In sets where high incidence of sharks is observed, **avoid loading them onboard by brailing them directly to the sea.**

- **Improve handling methods while ensuring the safety of the crew,** through the use of suitable tools for release including canvas or carriage nets, or through the development of new tools and gear to assist in release operations. These should be gradually implemented in all vessels.

- **Strengthen training of the crew involved in the handling** of sensitive species both in the upper and lower decks.

- Further **experiments on fauna survival rates** should be conducted in order to test the effectiveness of different mitigation measures.