

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

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Código de Buenas Prácticas
Code of Good Practices
Code de Bonnes Pratiques

Riesgos
Risks
Risques

Requisitos Requisites Requisites

Material liberación
Release tools
Libération outill

No aleteo
No finning
Pas d'aillonnage

No enmallante
Non-entangling
Non maillants

100% Observadores
100% Observers
100% Observateurs

Si Yes Oui

No Non

Tiburón
Shark
Requin

Mantarraya
Manta ray
Raie manta

Tortuga
Turtle
Tortue

Tiburón ballena
Whale shark
Requin baleine

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



1

2

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

4

3

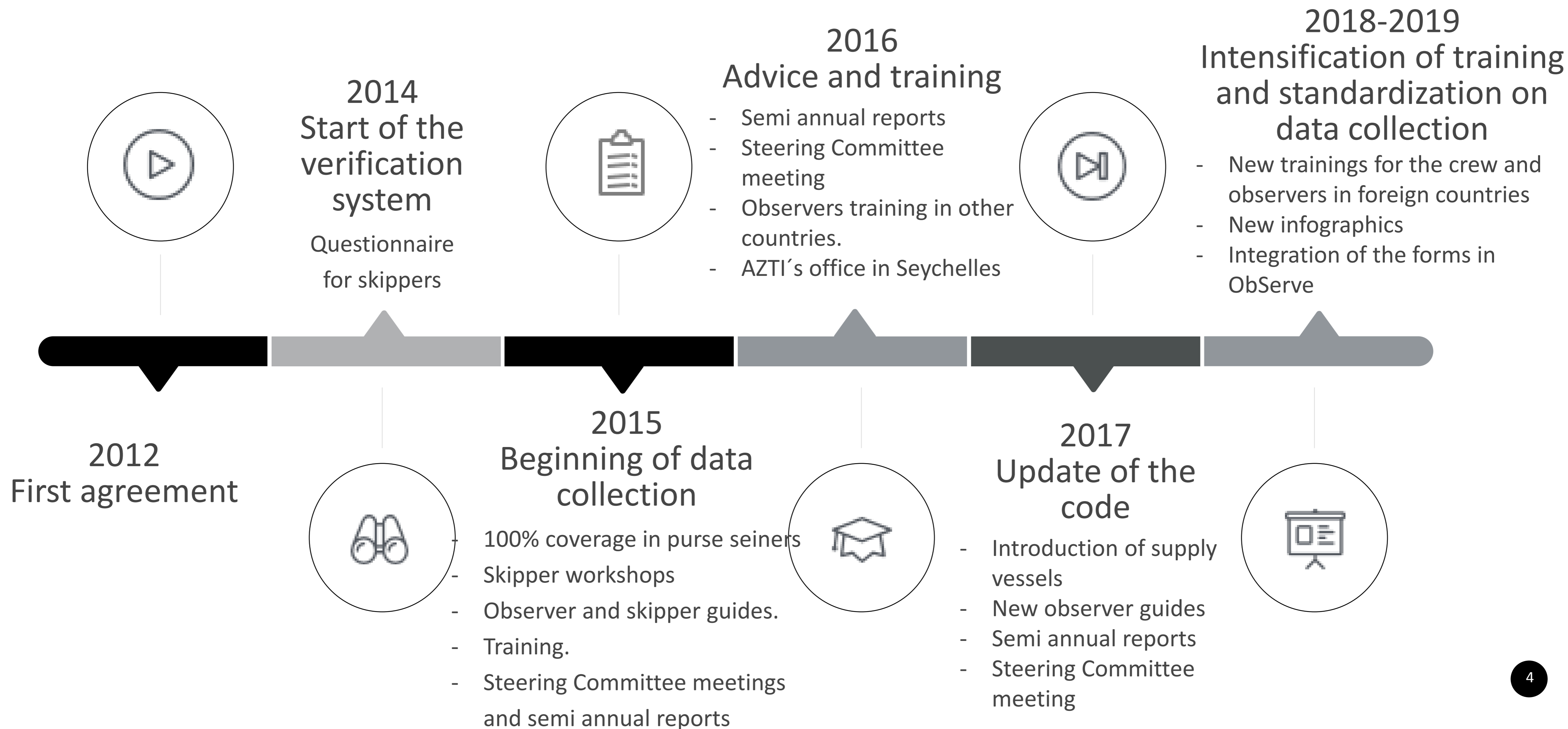
Advice

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



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 liberation form n°:										purse shaping start time														
										h	h	m	m											
Released fauna - sharks (1 line by individual, see example)																								
individual			release mode						time		(4) state of the animal													
(1) species	(2) size	(3) sex	using brailer	by stretcher,	fabric, sarria,	cargo net	with specific	equipment	manual from	deck	after	disentangling	non conform	reason of non	conformity (6)	animal	detected	animal	released	Excellent	Good	Fair	Poor	Unacceptable

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

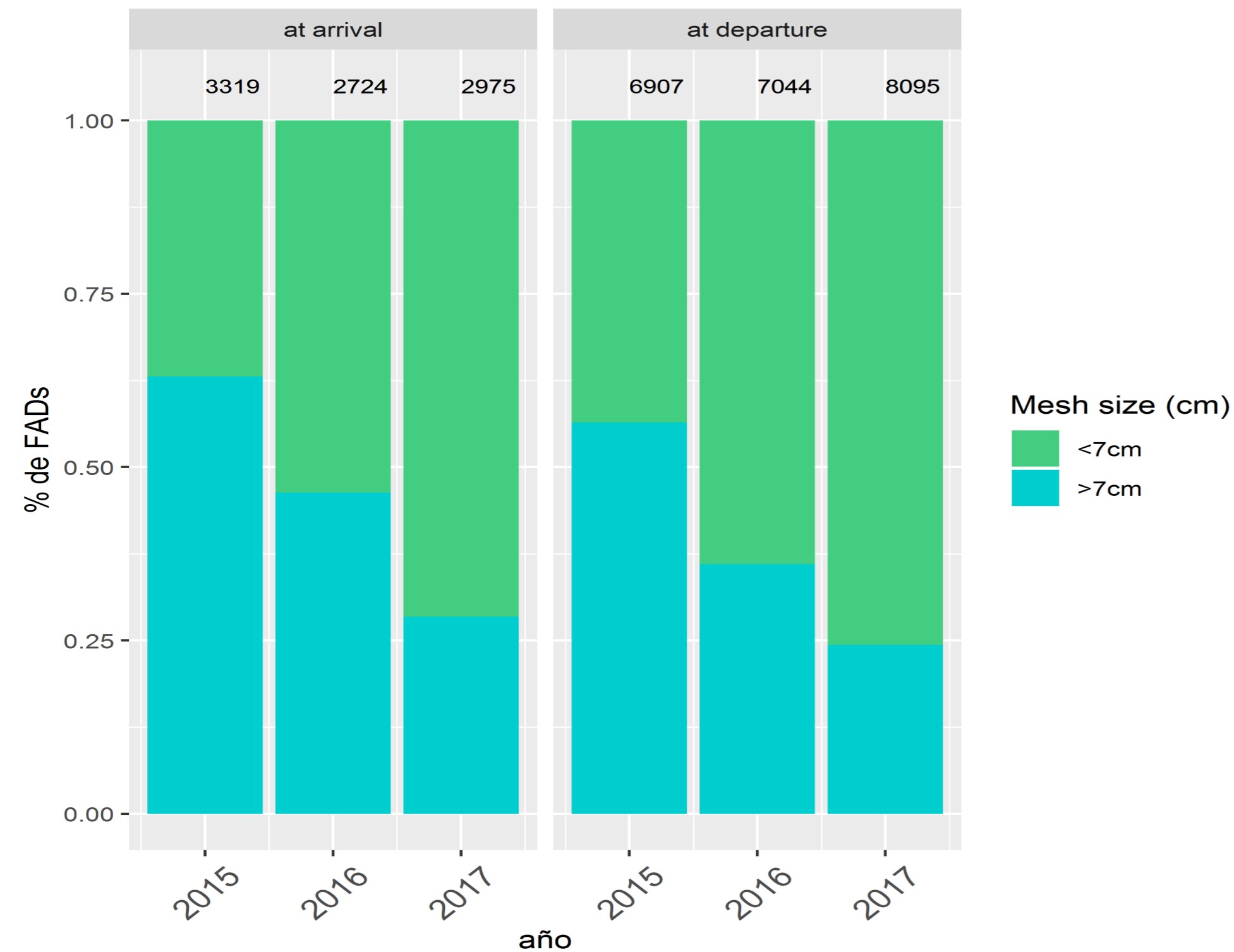
RAYS and MANTA RAYS: Use code table 10									
Code	Est. by number of individuals			Total	Destiny				
	Small < 90 cm	Medium 90 - 150 cm	Large > 150 cm		S	M	L	T	

OTHER BIG and MEDIUM FISH: Use code table 10									
Code	Est. by number of individuals			Total	Destiny				
	Small < 30 cm	Medium 30 - 60 cm	Large > 60 cm		S	M	L	T	

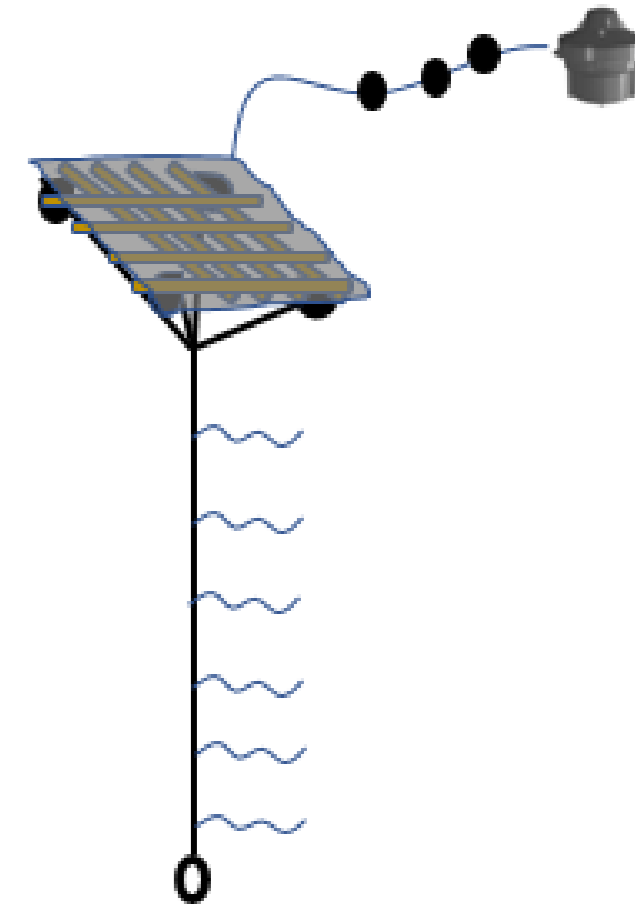
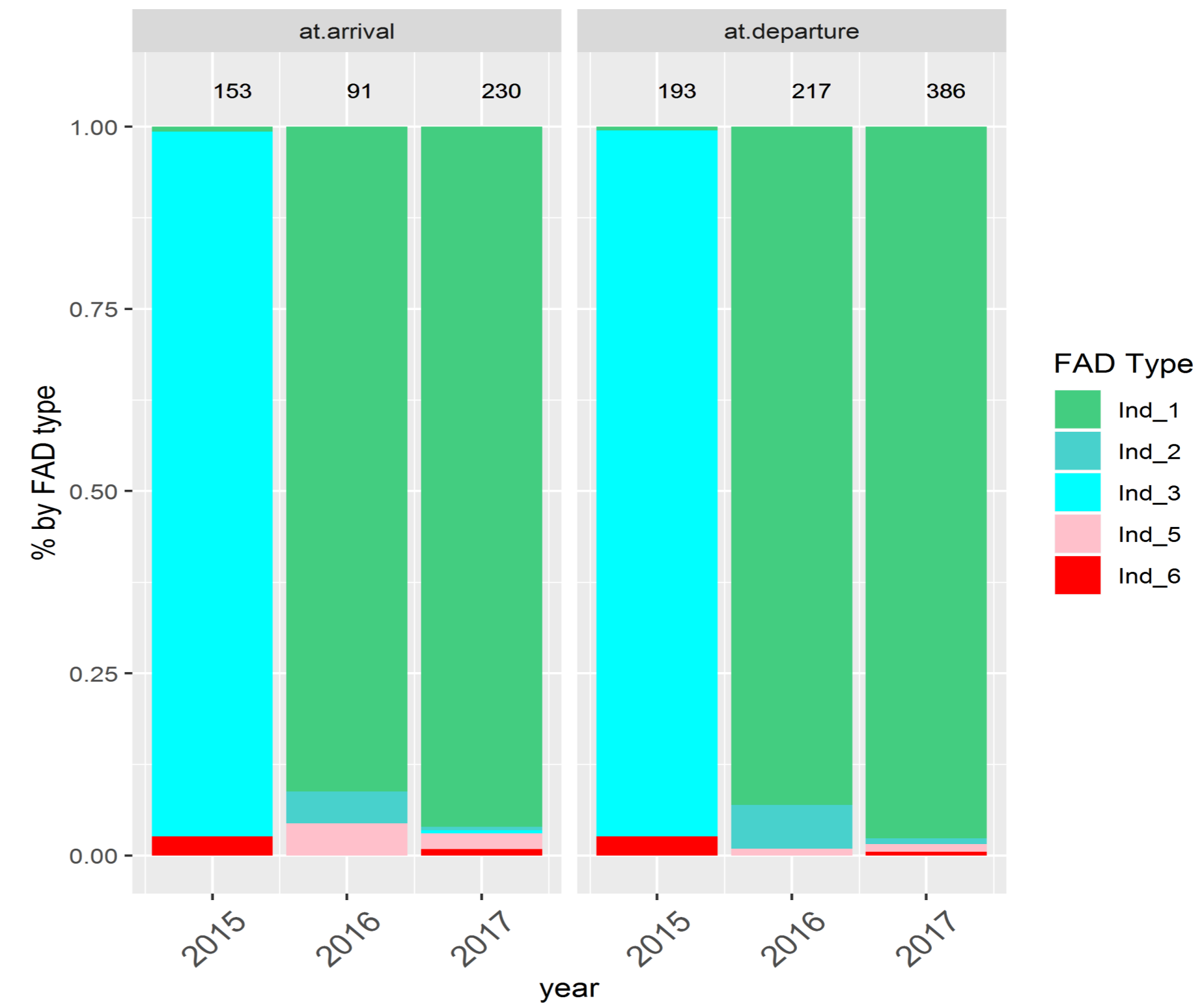
Inter-American Tropical Tuna Commission SEA TURTLE RECORD														
Cruise Number	Record Number	Set Numbr	YY	DATE MM	DD	TIME	LATITUDE	N/S	LONGITUDE	W				
SPECIES:			ACTIVITY:			OTHER DATA:								
Olive Ridley	[] 1	Alive & immobile	[] 1	Number of turtles										
Green	[] 2	Swimming	[] 2	If there is more than one turtle answer:										
Leatherback	[] 3	Copulating	[] 3	- Various individual sightings [] 1										
Hawksbill	[] 4	Feeding	[] 4	- One group with multiple turtles [] 2 Yes										
Loggerhead	[] 5	Dead	[] 5	¿Found trapped/entangled in a floating object? []										
Unidentified	[] 6	Other / Unknown	[] 6	¿Passed alive through the power block? []										
CONDICION UPON LEAVING THE TURTLE						ASSOCIATION:								
Entangled alive in a FOB	[] 0	Mark only one			With marine mammals [] 1 No. MMSSR: _____									
Already dead	[] 1				With tuna (BREEZER) [] 2									
Released unharmed	[] 2				Unassociated [] 3									
Released with light injury	[] 3				With other (not turtles) [] 4 Other: _____									
Released with grave injury	[] 4				With floating object [] 5 No. FIR: _____									
Accidentally killed	[] 5				Distance of the association: _____ m									
Escaped/evaded the net	[] 6													
Treated as catch (consumed)	[] 7													
Not involved in fishing operation	[] 8													
Other / Unknown	[] 9													
Comments on the condition:														

Results on Good Practices: Evaluation on FADs

IATTC Observer Program

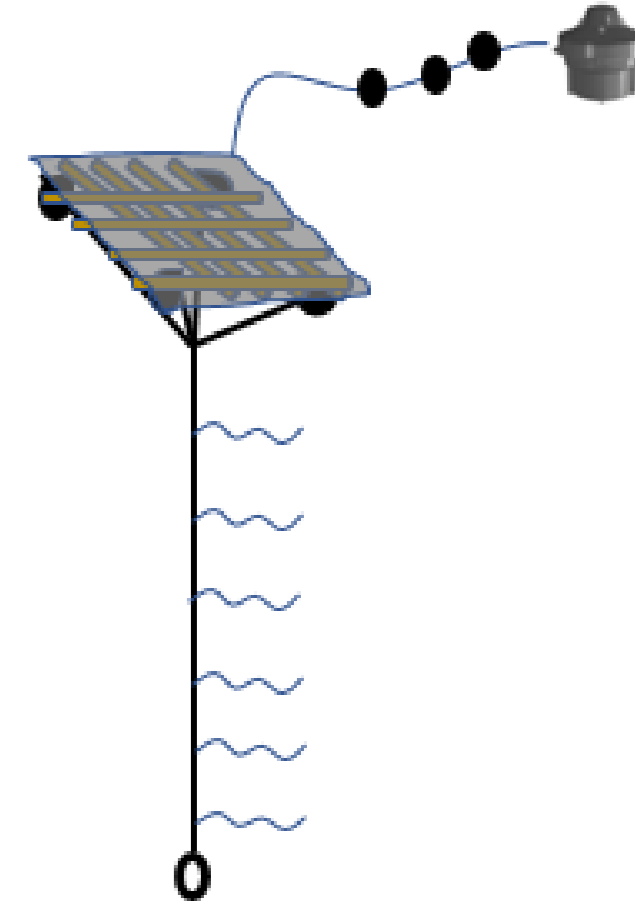
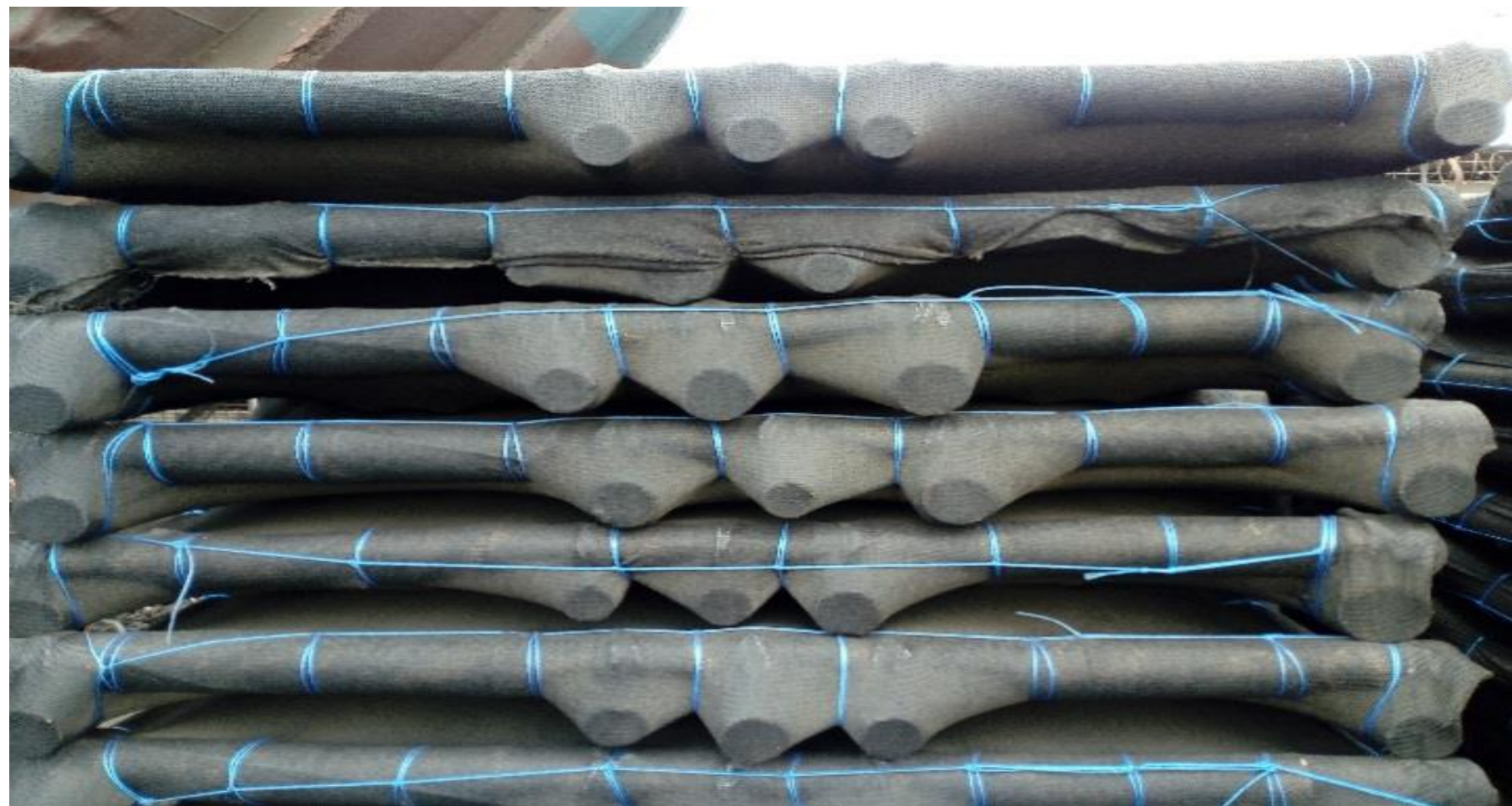


Code of Good Practices (Opportunistic data collection)



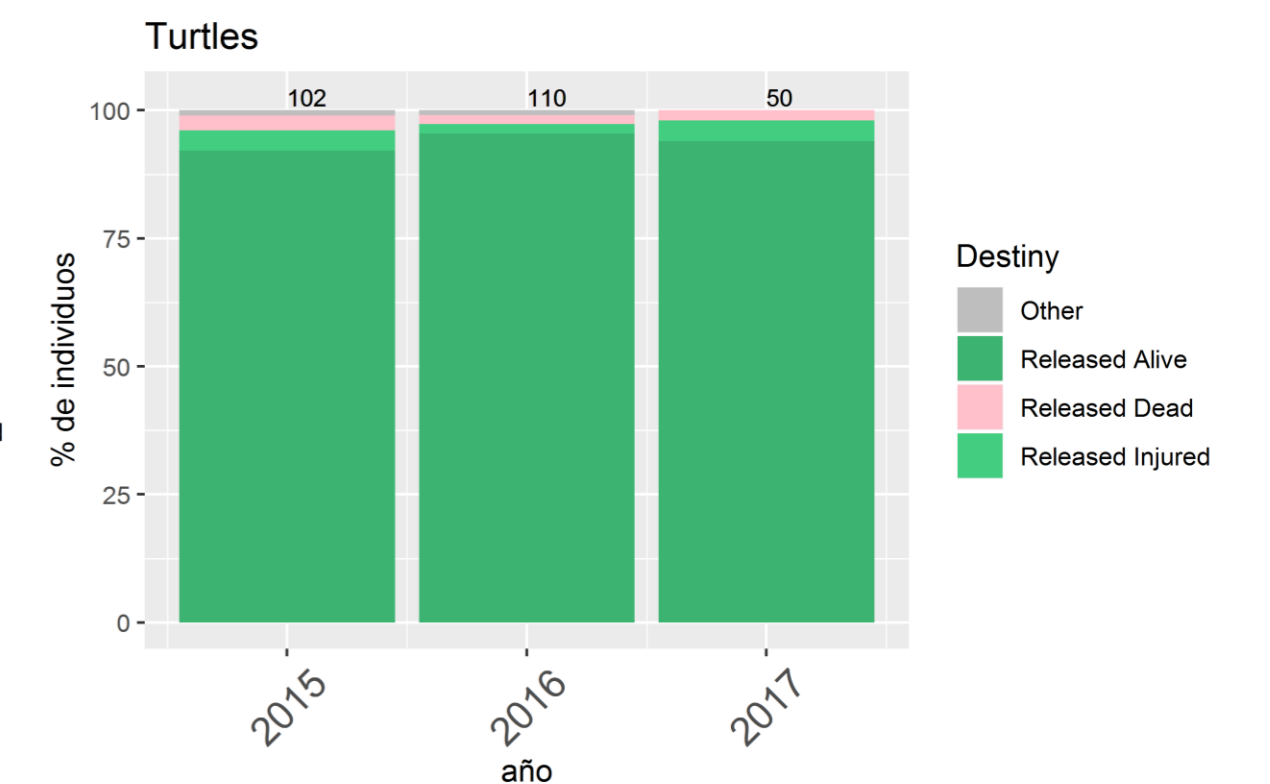
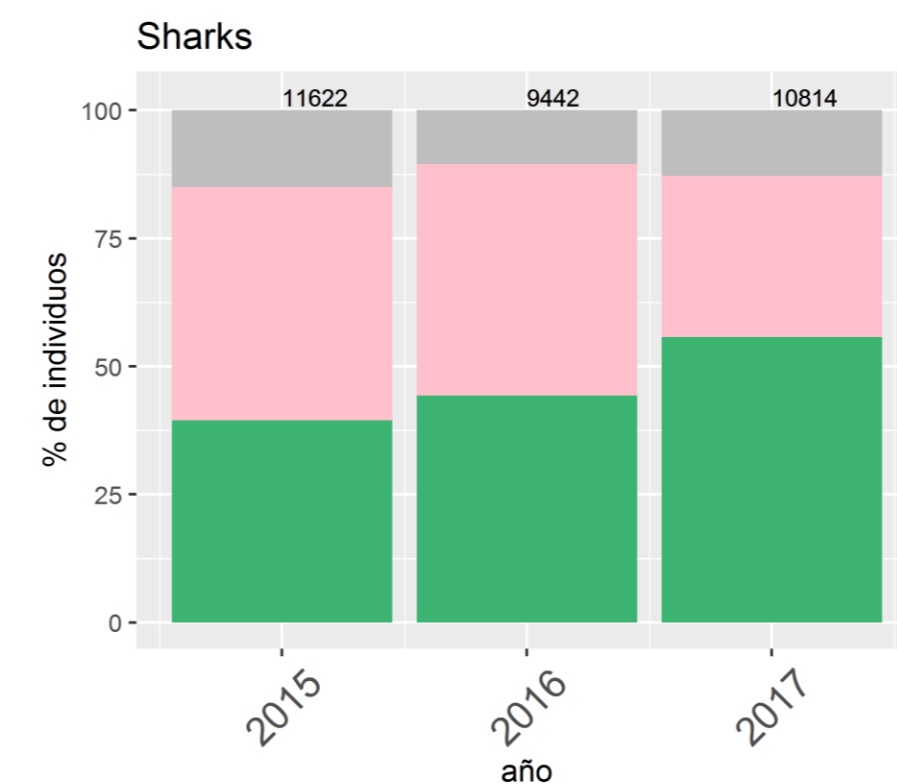
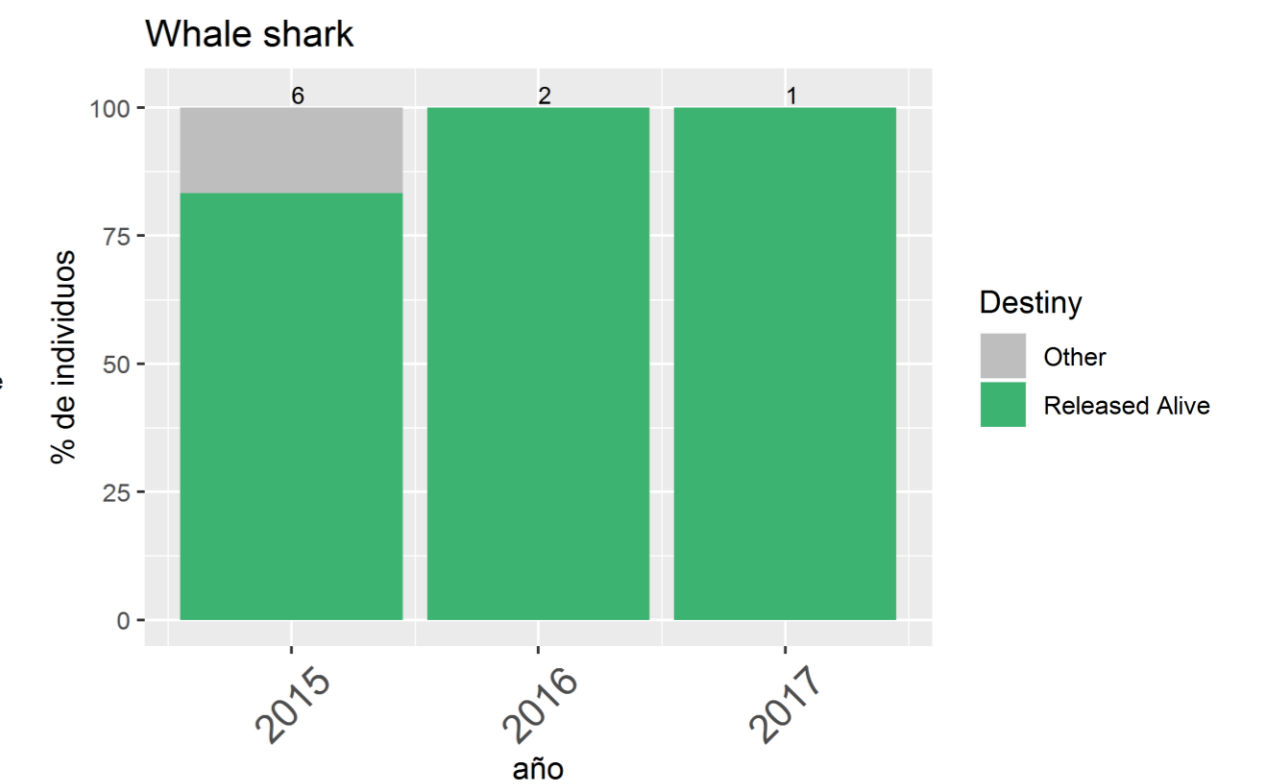
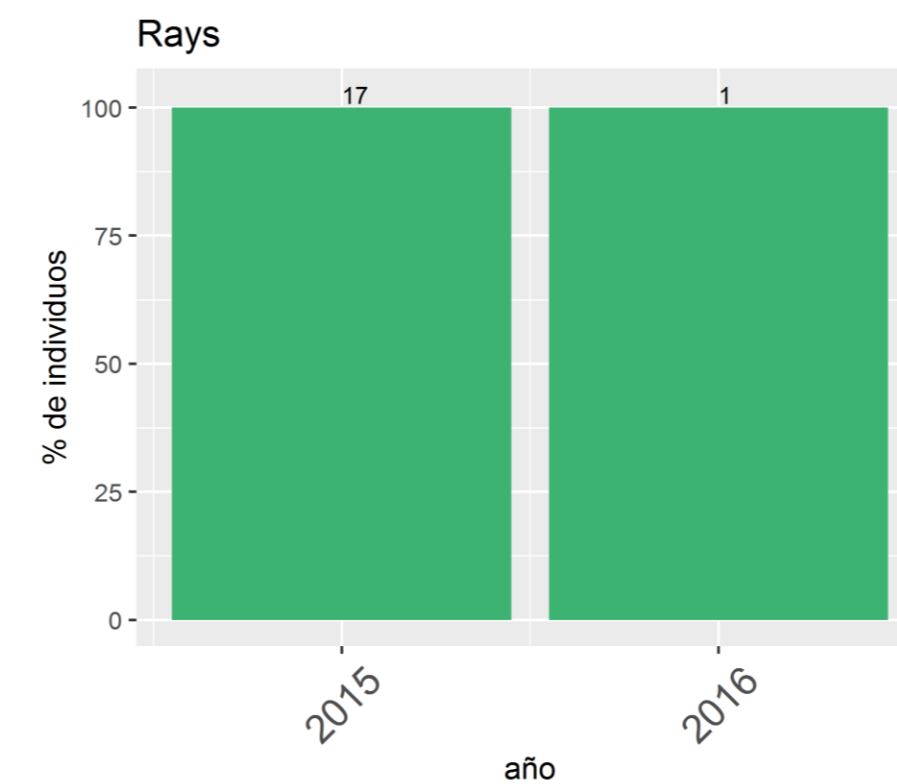
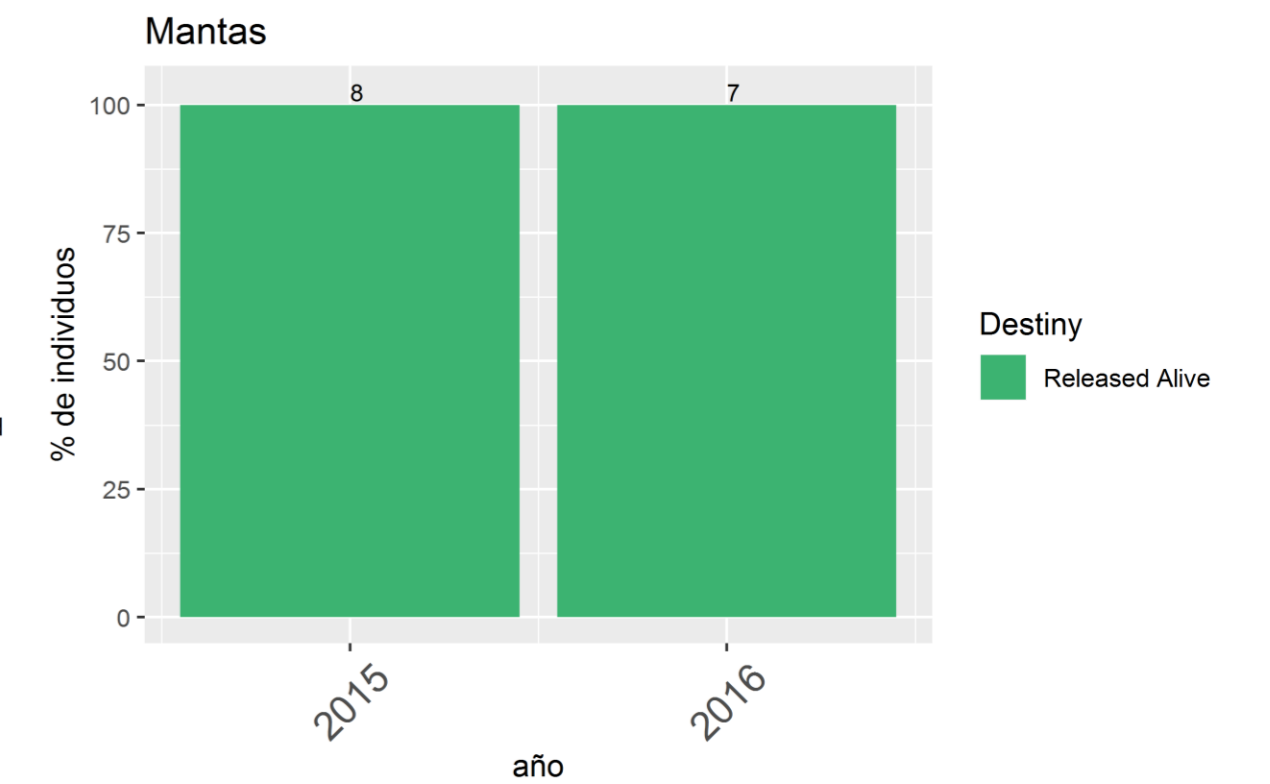
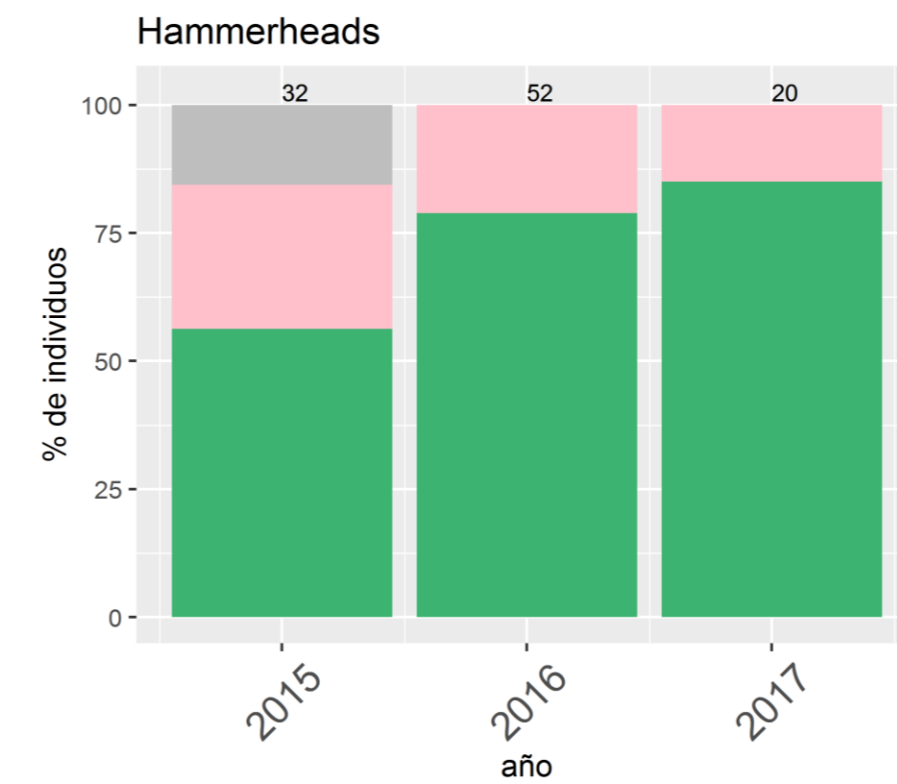
- Ind 1 - totally non-entangling;
- Ind 2 - net of >7 cm in the bottom part of the raft;
- Ind 3- net of >7cm in the upper part of the raft;
- Ind 4: pieces of net >7cm in the underwater part;
- Ind 5: underwater part with open net >7cm;
- Ind 6: raft and underwater part with net >7cm.

Results on Good Practices: Evaluation on FADs



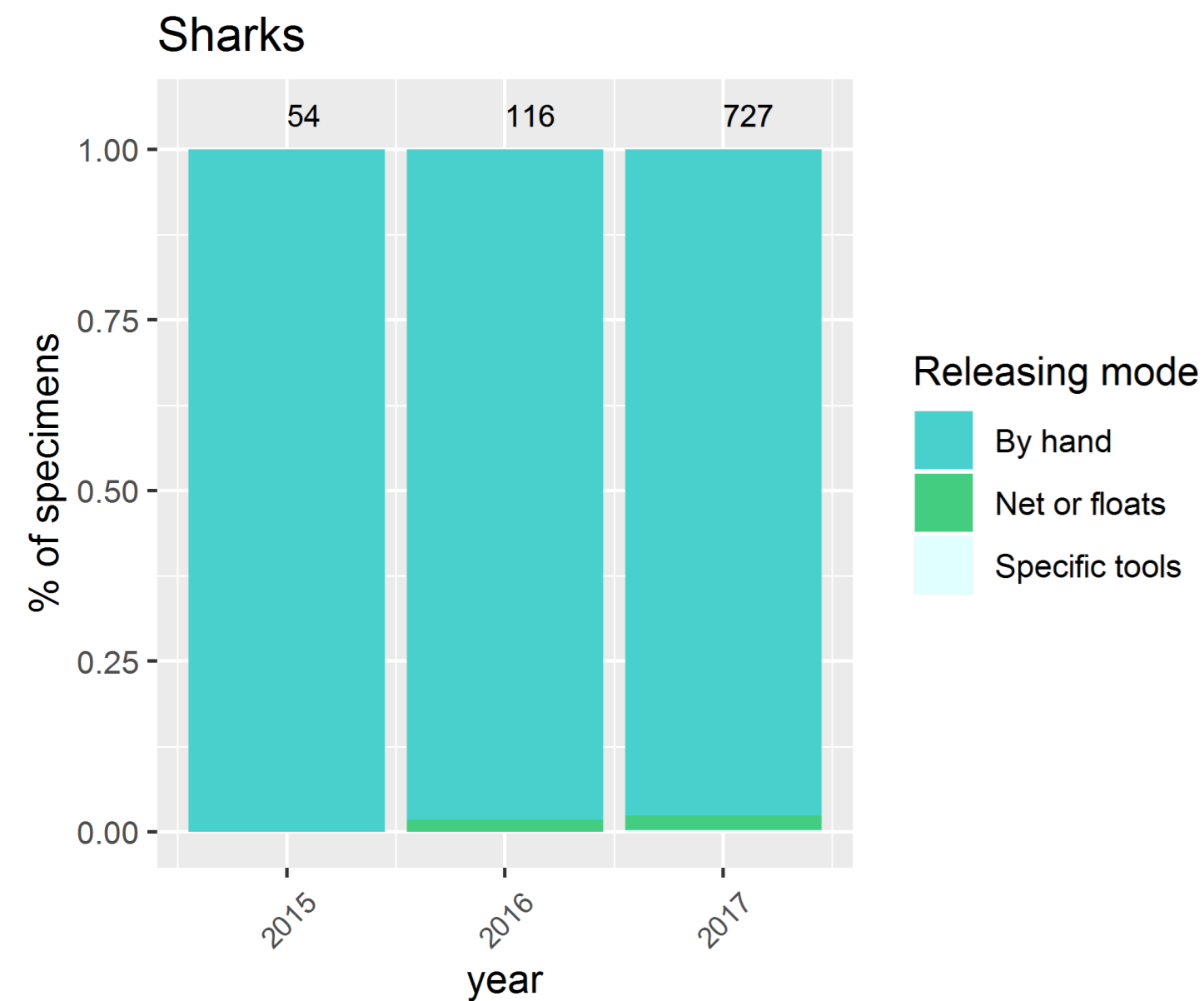
Results on Good Practices: Fauna release

- 98% of interactions correspond to sharks
- The % of fauna released alive has increased or has maintained high during the study period

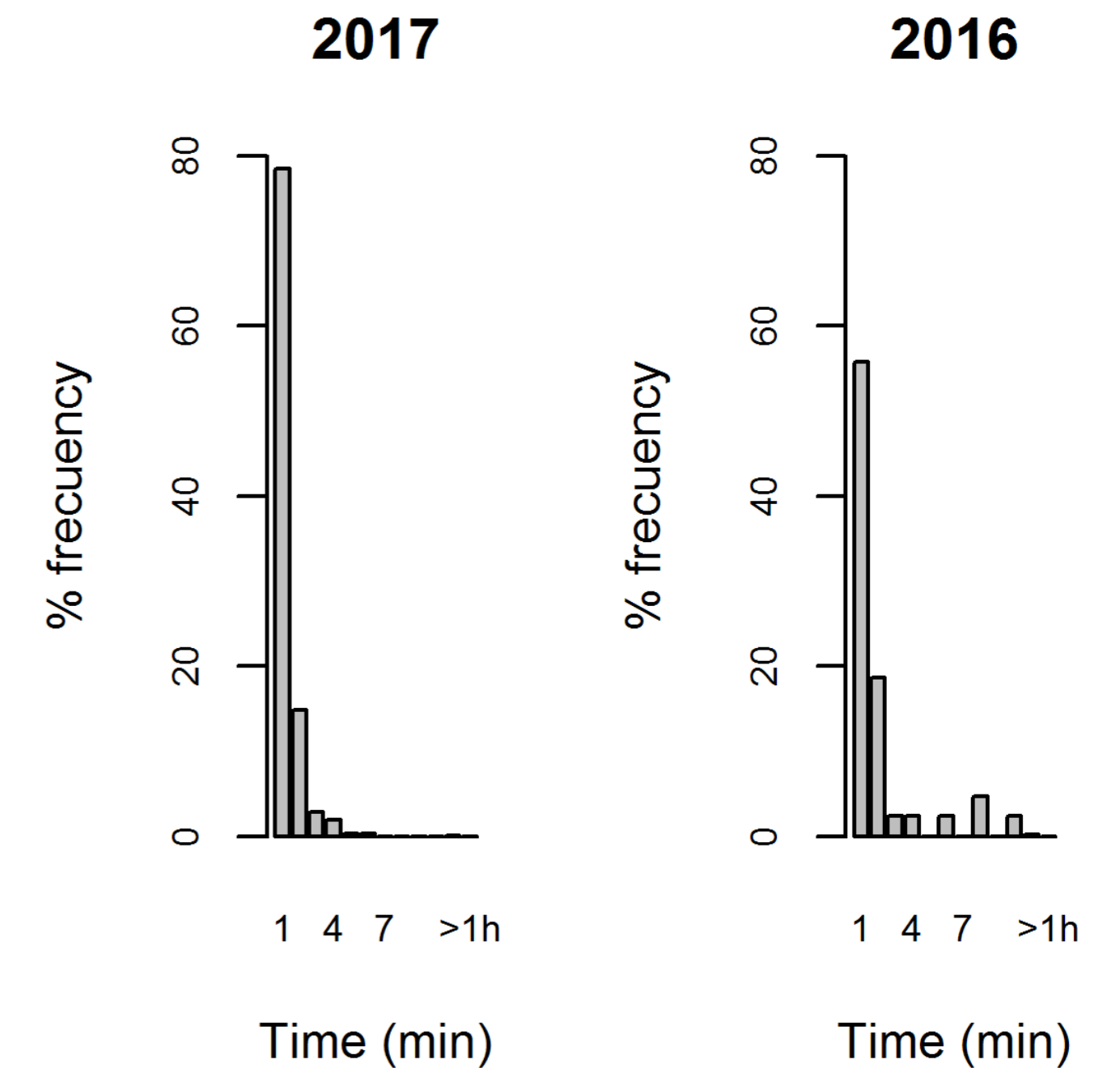


Results on Good Practices: Fauna release

Releasing mode



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

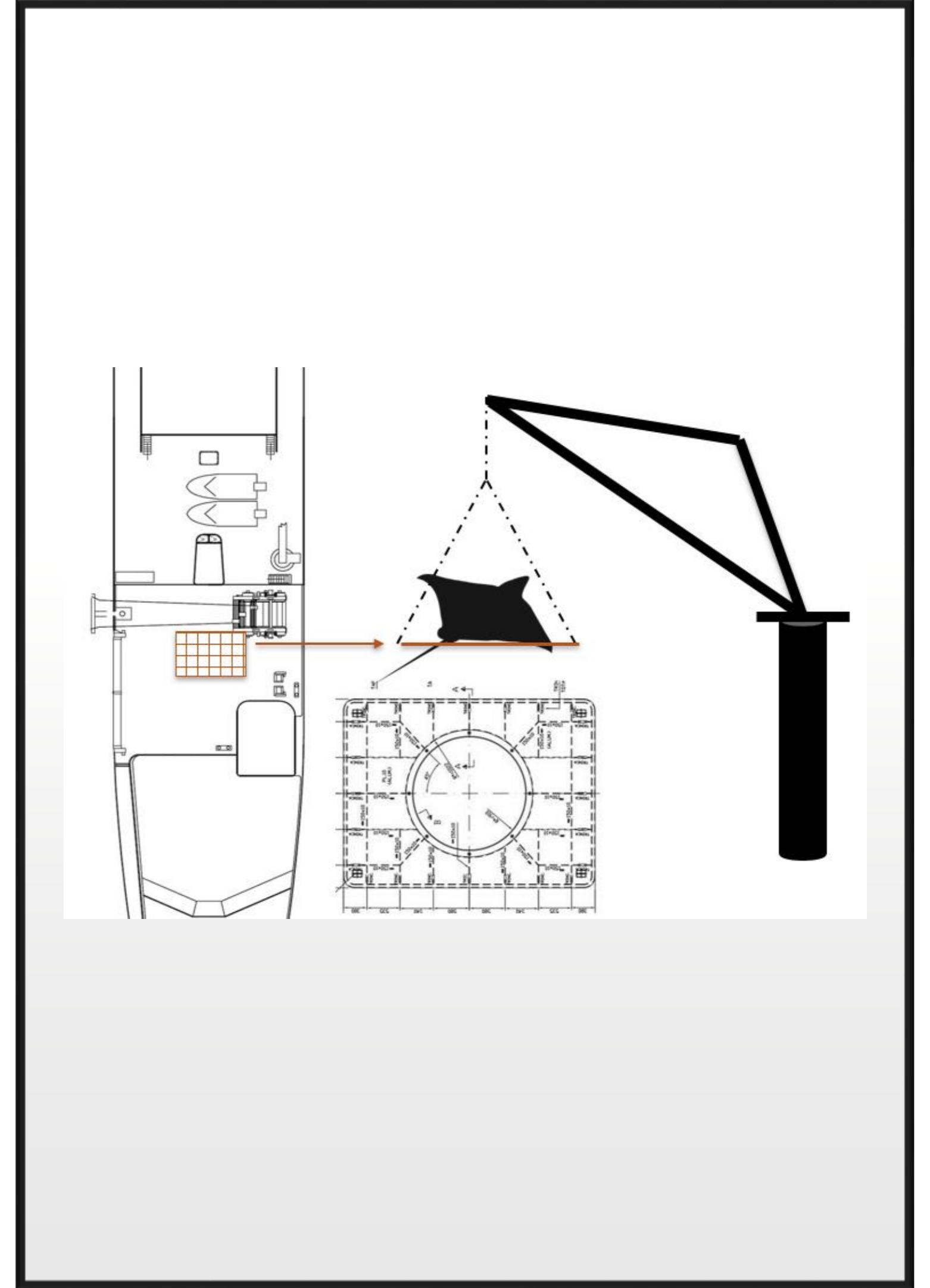
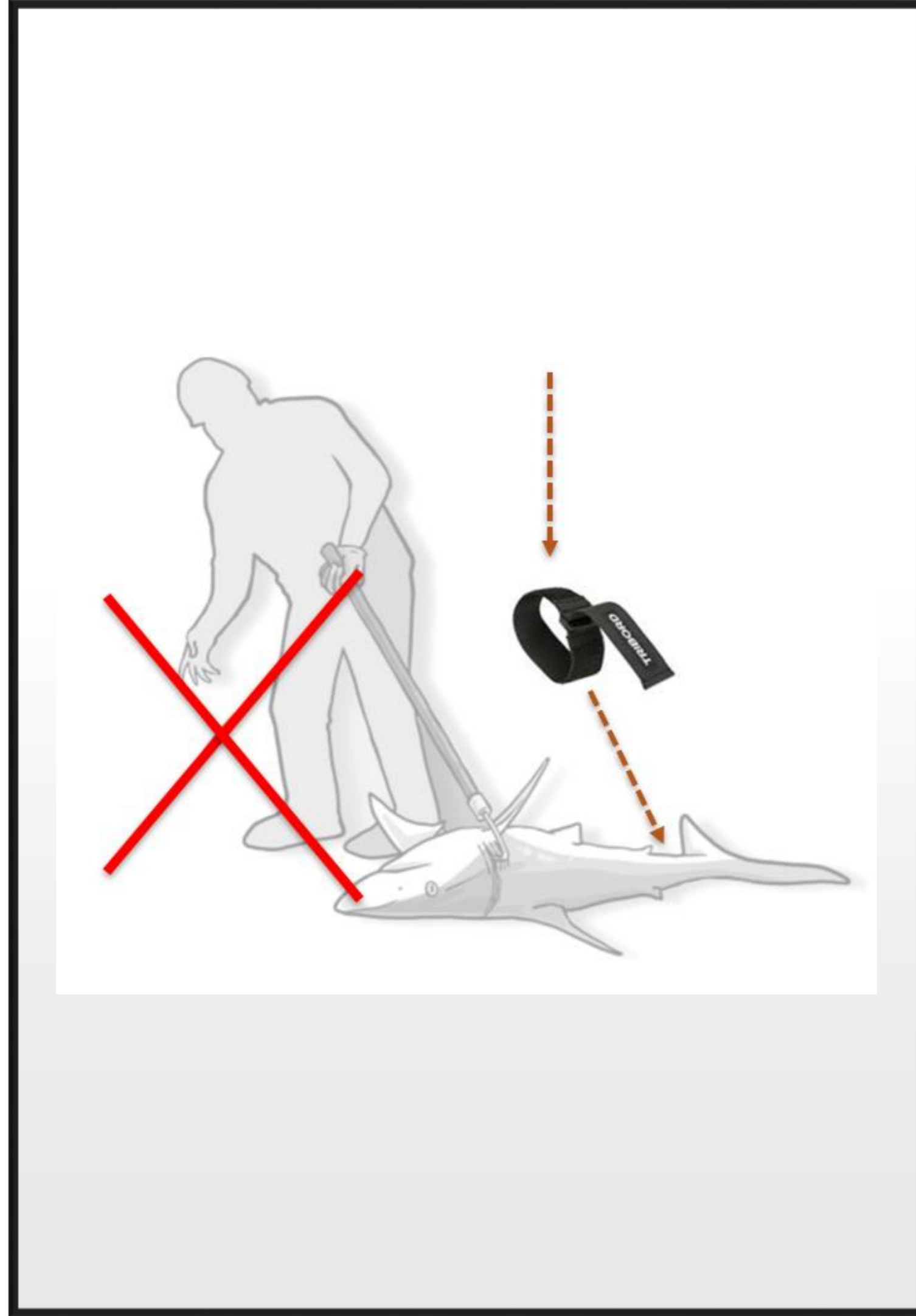
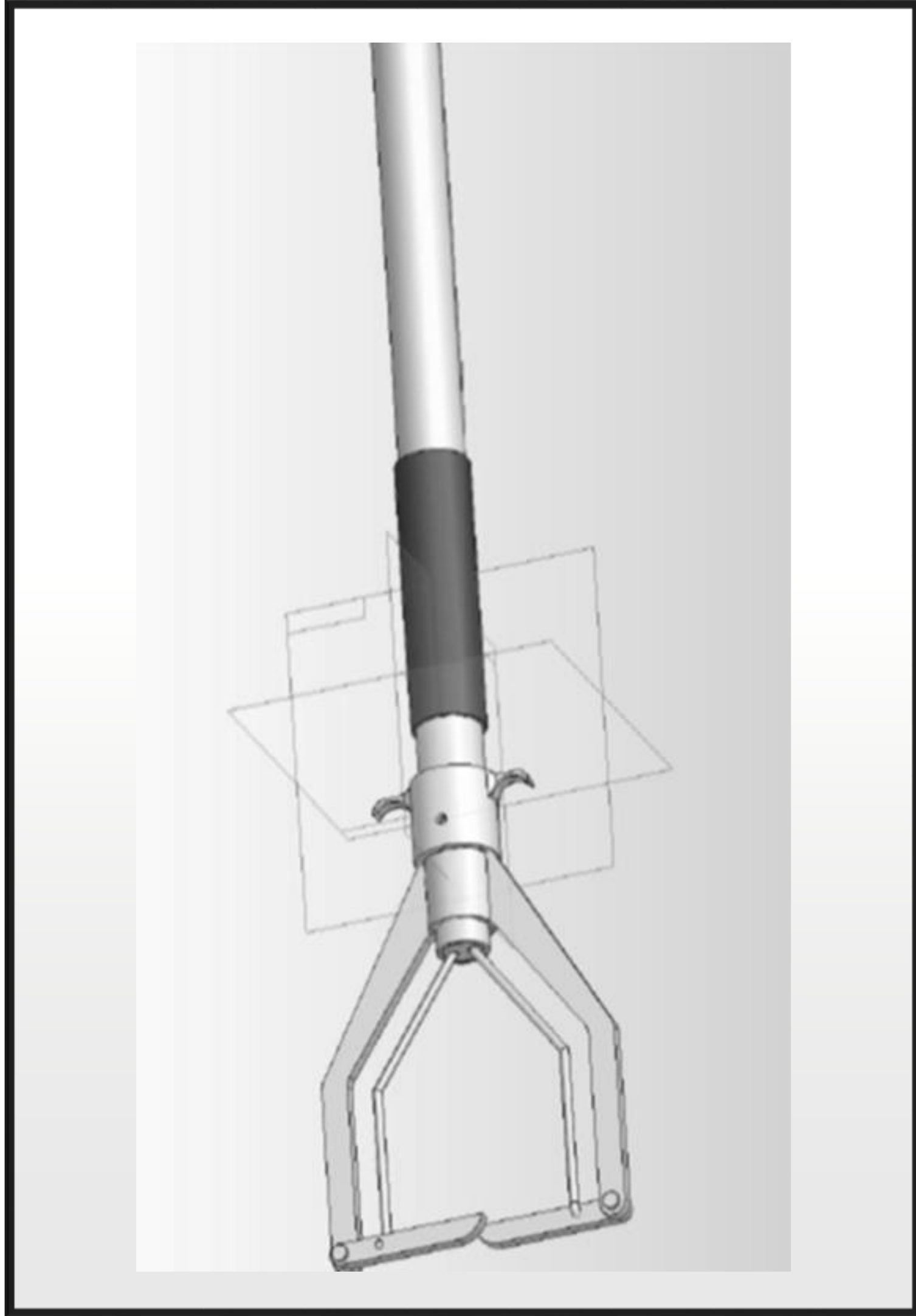
Results on Good Practices: Fauna release

- 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

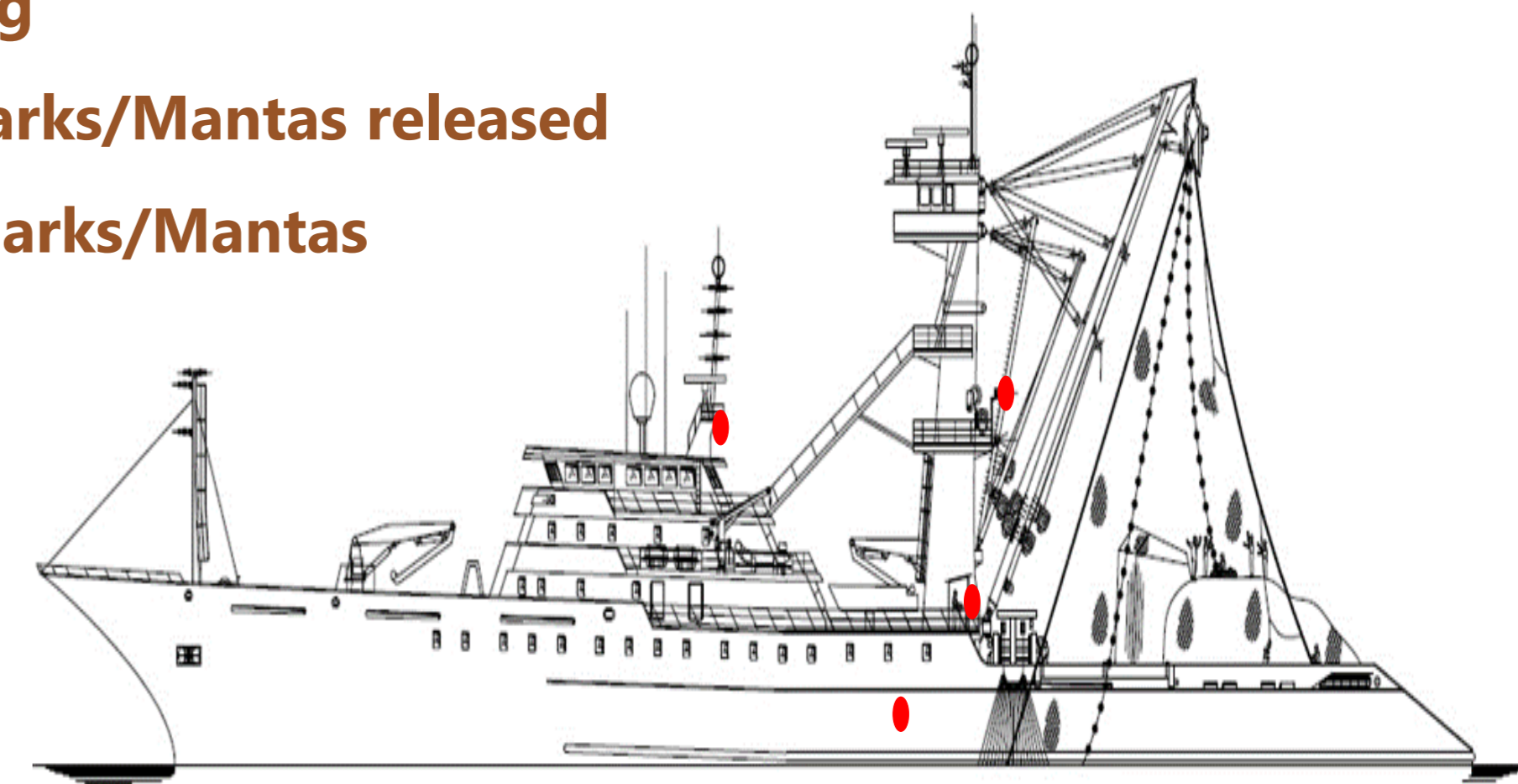


Fauna releasing Tools: The hopper

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