Report on fauna release operations in the frame of the Code of Good Practices (2015-2017)

A report prepared by AZTI[1], December 2018.

The increasing use of FADs in the past decades [i.e., about 100,000 FADs are estimated to be deployed annually worldwide (Scott and Lopez 2014)], and their impact on the marine ecosystem, have recently received much attention (Dagorn et al. 2012). The main concerns over FAD fishing are common for all tuna regional fisheries management organizations (RFMOs, International Commission for the Conservation of Atlantic Tuna, ICCAT, in the Atlantic Ocean, Indian Ocean Tuna Commission, IOTC, in the Indian Ocean, Inter American Tropical Tuna Commission, IATTC, in the Eastern Pacific Ocean, and the Western Central Pacific Fishery Commission, WCPFC, in the Western Pacific Ocean): (1) reduction in yield per recruit of some target species (i.e. yellowfin and bigeye tuna); (2) increased by-catch and perturbation of pelagic ecosystem balance, including ghost fishing of sensitive species (e.g. sharks, turtles); (3) generation of marine debris and impacts on coastal habitats as a result of beaching events; and (4) alteration of the behavior of the species associated with FADs (Bromhead et al. 2003; Hallier and Gaertner, 2008; Dagorn et al. 2012; Filmalter et al., 2013).

In this context, mortality reduction and conservation of by-catch species has become a priority for RFMOs and for the fishing industry that are working for sustainability standards (e.g. Marine Stewardship Council). Considering all these potential impacts, since 2013 most RFMOs have gradually adopted the use of non-entangling FADs as bycatch mitigation measures and, have promoted the use of biodegradable materials to reduce the incidence of entanglement of non-target species and pollution impacts on marine and coastal ecosystem. In addition, measures to safely release the sensitive fauna as turtles, sharks, whale sharks, and mantas are included, and the obligation of recording all the interactions with these species' groups to fill the data gaps and improve the managements of bycatch. These binding conservation measures are coming in force gradually in all RFMOs. In this line, The Spanish tuna purse seiner associations ANABAC[2] and OPAGAC[3], pioneered in 2012 a voluntary agreement for the application of a code of good practices for responsible tuna fishing activities. Some of the mitigation measure were adopted voluntarily before the tuna RFMOs did. The code of good practices (CGP) was developed with the aim of reducing bycatch mortality and potential environmental impacts of FADs. The program is subjected to continuous revisions and adjustments, to respond to newly identified needs. The aim of this document is to present a review of the fauna release operation adopted by the fleet in the frame of the GPC in the period 2015-2017 by the OPAGAC fleet.

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1.1 Safe fauna release operations

To reduce as much as possible the mortality associated to handling and release operations, the CGP develops and promotes appropriate species-specific handling procedures. The code always preserves crew's safety while discouraging non-sustainable practices. These releasing procedures are based in the outputs of the EU project MADE (Poisson et al., 2012; 2014), which have been used as standard best practice for safe release operations by most RFMOs.

1.1.1 Elasmobranch

1.1.1.1 Sharks

Sharks can appear at different stages of the fishing operation, such as entangled in the net when hauling, when brailing the catch in the upper deck or unloading into the lower deck. When sharks are detected they must be released from the vessel as quickly as possible following the best handling practices and security measures to prevent harm to the animal while ensuring crew safety. Most times, specific crew members are designated for this activity. If sharks are small, one person can manually release them by holding (not pulling) with two hands from two points, one hand holding the pectoral or dorsal fin and the other holding the tail (Fig. 1). Medium-sized sharks shall be handled by two crew members if it is safe to do so: one person holding the tail while the other holds the dorsal and pectoral fins. For medium and larger sharks, the crew can also use equipment, such as stretchers, loading nets, cargo nets or tarpaulins to help with releases. Other larger and structurally complex equipment may also be used, such as a hoppers or trays with a ramp or deck hatches (Poisson et al., 2012, 2014). The handling equipment should be available on board to handle sharks. Sharks must not be handled exclusively by their tails, or gills to prevent physical damage to the animal and dangerous reactions compromising crew safety. Likewise, the use of lassoes, gaffs or poles to release sharks is strictly forbidden (Fig. 1). If sharks are found while preparing the bunt, release using the brailer or dip net is encouraged, even if a certain amount of target fish is lost (2-3 tonnes), preventing hauling them on-board. When sharks cannot be immediately released, they should be kept cool, wet and out of the sun and be released as soon as possible. Once the animal has been released, the crew should check that its behavior is normal (i.e. swims away normally) and record the operation in the fishing logbook. Note that finning is strictly forbidden under all circumstances, even if the shark arrives dead on deck.

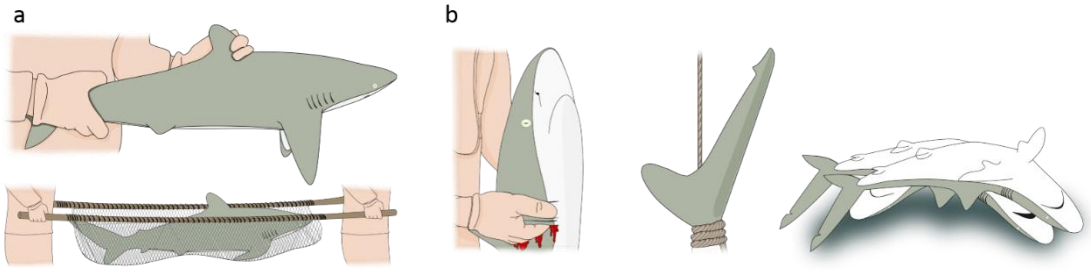

Figure 1. Best handling practices for shark release (a); and practices that should be avoid (b)

1.1.1.2 Skates and manta rays

Presence of mantas are usually detected when brailing, rather than during earlier stages of the set. When detected at sea surface, fishing crew should try to remove them from the net using the brailer or dip net, even if a certain amount of fish is lost (2-3 tonnes), or otherwise with another type of cradle device to prevent injury. For small specimens detected at deck level during brailing, they can be manually released

by crew by holding carefully their wings (Fig. 2) When handling manually rays must not be handled by the tail, gills or cephalic lobes to prevent damage to the animal and minimize crew risks. Similarly, while holding keep away and hold from the front (e.g. pectoral fins) to avoid the poisonous sting that many of these animals have. If the animal cannot be released manually other equipment can be used, such as a tarpaulin, canvas, stretchers and cargo nets (Fig. 2). This specific release equipment should be available on deck to handle especially large manta rays, which can be lifted more easily with the aid of a crane. Use of gaffs, hooks or rings to lift rays with the crane are totally prohibited. Once the animal has been released, fishers must check its behavior and record whether it is normal or not in the fishing log.

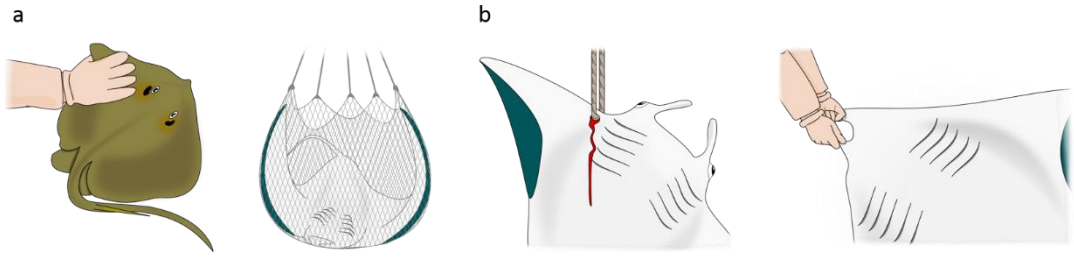

Figure 2. Best handling practices for mantas and skates release (a); and practices that should be avoid (b)

1.1.1.3 Whale sharks

If a whale shark is found in the net, the net must be hauled in carefully to isolate the animal in a small area of the bunt. Once at that position, these steps can be followed, depending on the condition of the sea and position of the animal (Fig. 3):

(i) When the animal is floating on the surface:
- the crew must haul in the net to bring the animal to the nearest line of floats. The net must always be retrieved in the direction of the animal's head to its tail and by the ventral part so that the fish slides towards the line of floats.
- If the animal is small (less than 2 m length), it must be released using the brail or dip net.
- If the animal is larger than 2 m then cut the float line to facilitate the exit over the net.
- Wait until the animal swims out of the net by itself.
- The catch must be hauled in only when the animal has been released from the net.

(ii) When the animal does not appear on the surface: the catch can be hauled in until the whale shark appears on the surface, at which point stop hauling in the net and proceed as in point (i).

(iii) When the animal pushes the net with its head before lowering the floats: the line of floats should be submerged using long poles or weights to allow the animal to swim over the floats.

(iv) When the animal is trapped in the bunt with its head facing the back of the net: the most effective way is to locate the joint nearest to the animal's head and cut a pair of net panels to form a window through which the whale shark can exit.

In any case, a whale shark should never be pulled or lifted by its tail (Fig. 3). Regardless of the circumstances and the means used, once the animal has been released, the crew must check that its behavior is normal and must record the operation in the fishing log. If unusual behavior is seen, this must also be recorded in the fishing logbook.

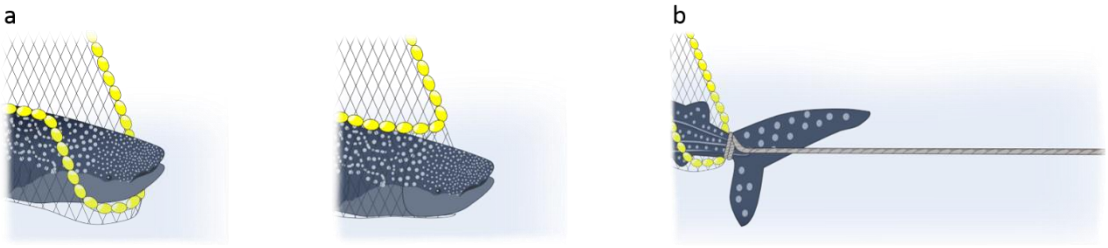

Figure 3. Best handling practices for whale shark release (a); and practices that should be avoid (b)

1.1.2 Marine turtles

Following recommendations in the four RFMOs regarding this group of marine animals, crew members must try to release all turtles entangled in FADs or in the purse seiner's net as soon as possible. If turtle is found trapped in the net, hauling must be stopped immediately to prevent it passing through the capstan. If a turtle is harmed during the fishing operation, it must be kept on board in cool and wet conditions and regularly checked to ensure it has properly recovered before release. If the animal has plastics or netting wrapped around, it must be removed even if these materials do not come from the vessel's activity. If a turtle is observed entangled in a FAD, it must always be released, even if the vessel does not plan to stop to fish on it. Handling turtles from the flippers is not permitted, as this can dislocate the limb (Fig. 4). Turtles should be handled by the shell by one or two crew members depending on its size (Fig. 4). Fishers should avoid holding the shell right behind the head, to keep their hands safe if the animal retracts its head.

If a turtle seems to be non-responsive or sluggish, it must be placed in the resuscitation position to allow it to recover. This position consists on inclining the back part of the animal about 15 cm, so that it can easily breathe in case it presents signs of drowning. Resting turtles upside down should be avoided as they could suffocate (Fig. 4). Once the animal has been released,-the crew must check that its swimming behavior is normal and must record the operation in the fishing logbook. If unusual behaviors are observed, they should also be recorded in the fishing logbook.

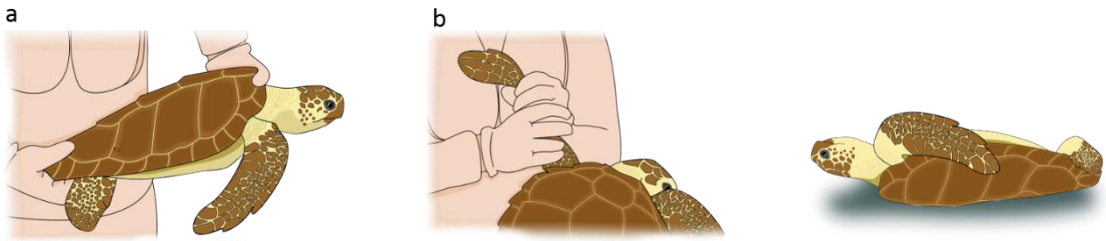

Figure 4. Best handling practices for sea turtle release (a); and practices that should be avoid (b).

1.2 Data collection and evaluation criteria

The CGP contemplated a progressive increase on the observer coverage during the first years, until reaching 100% monitoring coverage for PS from 2015 and for supply vessels from 2017 onwards. This monitoring could be either done by human observers or by EM (electronic monitoring) systems. If this last case is chosen by a vessel, EM system should follow minimum standards described by Ruiz Gondra et al. (2017). This monitoring program, which aims to evaluate the CGP, is mostly managed by private contracts between industry and human observer or EM service providers.

Specific forms are in English, French and Spanish to collect detailed information on bycatch release operations through scientific observers (Annex 1). The level of conformity (i.e. conform or non-conform)

and, since 2016, the bycatch release non-conformity reason (i.e. residual mortality; non-conform due to lack of specific material for the manipulation; non-conform due to the application of incorrect practices), as well as the time used to release animals are register for each species and specie group (i.e. sharks other than hammerheads sharks and whale sharks, hammerheads sharks, whale sharks, mantas, rays and turtles). In the evaluation, the whale sharks and hammerheads sharks are classified in an independent group apart from sharks due to their size, morphology and sensibility. Information on biological parameters such as the size and sex of the specimens is also recorded when possible. For the estimation of the bycatch rates, a mean weight by species and ocean is applied in this work.

The resulting percentage of level of conformity is the sum of release cases classified as conform and those classified as inevitable residual mortality relative to total records by species or species group. Those cases classified as inevitable residual mortality correspond to situations in which the specimens arrive already dead to deck or could not be handled without compromising the safety of the crew and are later reclassified as conform in the Best Practices compliance assessment.

In the case of the Pacific Ocean, IATTC and WCPFC are running their observer program with 100 % coverage in the purse seiners with their specific data forms on sensitive species releasing state and faith details. As such, the specific forms developed in the frame of the good practices program are not implemented in the Pacific Ocean. Thanks to the collaboration with both organizations, access to their observer program data has been obtained which enables a partial assessment of the best practices on board. In this case, details on number and fate of species can be accounted but the assessment on the application of best handling methods described in the CBP cannot be verified.

1.3 Fauna releasing operations in the Atlantic and Indian Ocean

A total of 27,493 and 39,767 vulnerable specimens' bycatches were registered during the study period (2015-2017) in the Atlantic and Indian Ocean, respectively (Table 1). In the Atlantic Ocean sharks (other than hammerhead shark and whale shark) were the dominant group with 20,218 records (73.5%). followed by hammerheads sharks (n=4,010, 14.6%), turtles (n=1,969, 7.2%), mantas (n=1,016, 3.7%), rays (n=199; 0.7%) and whale sharks (n=81, 0.3%) (Table 1). In the Indian Ocean dominance of sharks (other than hammerhead shark and whale shark) is also observed (n=39,067, 98.2%) and the interaction with other species type is rare (hammerheads: n=357 and 0.9%; mantas: n=172 and 0.4%; turtles: n=121 and 0.3%; rays: n=41 and 0.1%; whale sharks: n=9 and 0.02%). Details by species are included in the Table 1

Table 1. Number of individuals released (n) and % of conform cases (Conf) by species in the Atlantic (Atl) and Indian Ocean (Ind).

Group	Scientific_name	FAO code	Atlantic		Ind	
			n	Conf	n	Conf
Mantas	Mobulidae	MAN	5	60	3	66.7
	Manta spp	MNT	10	60	1	0
	Manta alfredi	RMA	1	100	0	0
	Manta birostris	RMB	206	52.4	62	72.6
	Mobula japanica	RMJ	369	68.8	35	48.6
	Mobula mobular	RMM	129	79.1	13	84.6
	Mobula thurstoni	RMO	20	60	0	0
	Mobula tarapacana	RMT	145	84.8	5	100
	Mobula spp	RMV	131	64.1	53	67.9
Rays	Myliobatis aquila	MYL	3	100	0	0
	Dasyatis violacea	PLS	186	88.7	33	66.7
	Rhina ancylostoma	RRY	0	0	2	50
	Rajiformes	SRX	4	75	1	100
	Dasyatidae	STT	6	100	5	100
Hammerheads	Sphyrna mokarran	SPK	287	74.2	0	0
	Sphyrna lewini	SPL	2,230	67.1	250	84
	Sphyrnidae	SPY	611	53.5	107	91.6
	Sphyrna zygaena	SPZ	882	67.5	0	0
Sharks	Alopias superciliosus	BTH	47	66	2	50
	Alopias spp	THR	14	100	0	0
	Carcharhinidae	RSK	4,312	84.2	8,154	91.8
	Carcharhinus altimus	CCA	7	57.1	4	25
	Carcharhinus brachyurus	BRO	0	0	8	100
	Carcharhinus falciformis	FAL	14,820	88.3	30,065	90.5
	Carcharhinus leucas	CCE	0	0	153	100
	Carcharhinus limbatus	CCL	15	86.7	0	0
	Carcharhinus longimanus	OCS	60	81.7	507	62.9
	Carcharhinus obscurus	DUS	67	91	16	87.5
	Galeocerdo cuvier	TIG	1	100	0	0
	Isurus oxyrinchus	SMA	258	70.5	3	100
	Isurus paucus	LMA	2	100	0	0
	Isurus spp	MAK	10	70	3	100
	Lamna nasus	POR	4	100	0	0
	Lamnidae	MSK	10	60	0	0
	Prionace glauca	BSH	522	75.7	4	100

	Selachimorpha(Pleurotremata)	SKH	69	92.8	148	83.8
Whale Shark	Rhincodon typus	RHN	81	91.4	9	66.7
turtles	Dermochelys coriacea	DKK	64	76.6	0	0
	Lepidochelys olivacea	LKV	806	96.3	17	100
	Lepidochelys kempii	LKY	8	100	0	0
	Eretmochelys imbricata	TTH	17	100	7	100
	Caretta caretta	TTL	612	95.6	3	100
	Testudinata	TTX	359	84.1	86	83.7
	Chelonia mydas	TUG	103	97.1	8	100

1.4 Fauna releasing operations in the Pacific Ocean

A total of 32,850 vulnerable specimens' bycatches were registered during the study period (2015-2017) in the Pacific Ocean, respectively (Table 2). Sharks (other than hammerhead shark and whale shark) were the dominant group with 32,431 records (98.7%). followed by hammerheads sharks (n=107, 0.3%), turtles (n=268, 0.8%), mantas (n=17, 0.05%), rays (n=18; 0.05%) and whale sharks (n=9, 0.02%) (Table 2).

Table 2. Number of individuals (total n) and % by specific fate in the Pacific Ocean

Group	Scientific Name	FAO code	total n	% retained	% released	% released alive	% released No damaged	% released Major injuries	% released Minor injuries	% unknown	% Other	% not involved in the set	% dead
Mantas	Mobula japanica	RMJ	2	0	100	0	0	0	0	0	0	0	0
	Mobula spp.	RMV	5	0	100	0	0	0	0	0	0	0	0
	Mobula tarapacana	RMT	2	0	100	0	0	0	0	0	0	0	0
	Mobula thurstoni	RMO	6	0	100	0	0	0	0	0	0	0	0
	Mobulidae, Dasyatidae	RANI	2	0	100	0	0	0	0	0	0	0	0
Rays	Pteroplatytrygon violacea	PLS	18	0	100	0	0	0	0	0	0	0	0
Hammerheads	Sphyrna lewini	SPL	47	0	15	85	0	0	0	0	0	0	0
	Sphyrna mokarran	SPK	2	0	100	0	0	0	0	0	0	0	0
	Sphyrna spp.	SPN	15	0	20	73	0	0	0	7	0	0	0
	Sphyrna zygaena	SPZ	43	9	26	65	0	0	0	0	0	0	0
Shark	Isurus oxyrinchus	SMA	9	11	33	56	0	0	0	0	0	0	0
	Isurus spp.	MAK	1	0	100	0	0	0	0	0	0	0	0
	Alopias pelagicus	PTH	2	50	0	50	0	0	0	0	0	0	0
	Alopias spp.	THR	3	33	33	33	0	0	0	0	0	0	0
	Carcharhinidae	RSK	1,627	24	21	54	0	0	0	0	1	0	0
	Carcharhinus falciformis	FAL	30,037	11	42	46	0	0	0	0	2	0	0
	Carcharhinus limbatus	CCL	4	0	100	0	0	0	0	0	0	0	0
	Carcharhinus longimanus	OCS	135	1	24	75	0	0	0	0	1	0	0
	Euselachii		603	29	47	22	0	0	0	1	0	0	0
	Prionace glauca	BSH	10	20	10	60	0	0	0	0	10	0	0
Whale shark	Rhincodon typus	RHN	9	11	0	89	0	0	0	0	0	0	0
Turtles	Caretta caretta	TTL	9	0	0	0	89	0	0	0	0	11	0
	Chelonia mydas	VDPT	20	0	0	0	90	0	0	0	0	5	5
	Testudinata	TONI	157	0	0	0	30	1	2	0	1	65	1
	Dermochelys coriacea	DKK	3	0	0	0	33	0	0	0	0	33	33
	Eretmochelys imbricata	TTH	11	0	0	0	9	0	0	0	0	91	0
	Lepidochelys olivacea	LKV	68	0	0	0	87	3	3	0	0	4	3

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