



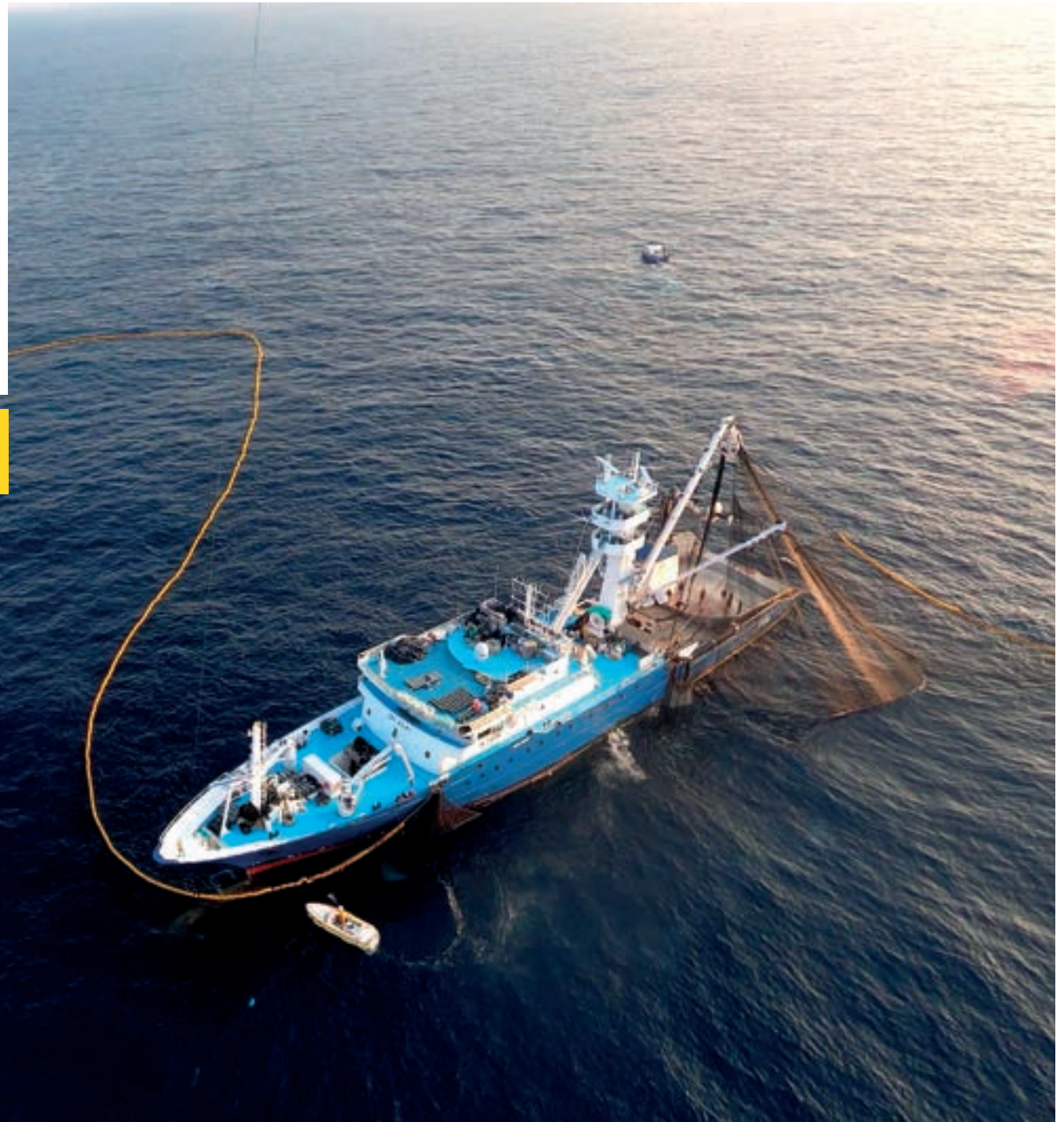
MEMBER OF
BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

www.azti.es

Best Practice Guidelines

for handling and release
of bycatch species in
tuna purse seiners.

Murua, J., Ferarios, J.M., Grande, M.,
Ruiz, J., Onandia, I., Zudaire, I., Krug, I.,
Salgado, A., Santiago, J.







Best Practice Guidelines

for handling and release of bycatch species in tuna purse seiners.

Murua, J., Ferarios, J.M., Grande, M., Ruiz, J., Onandia, I., Zudaire, I., Krug, I., Salgado, A., Santiago, J.

©AZTI

Index

Introduction	5
Sharks	6
Sea turtles	14
Mobulids and rays	18
Whale sharks and large cetaceans	22
General Notes	27
Acknowledgements	29



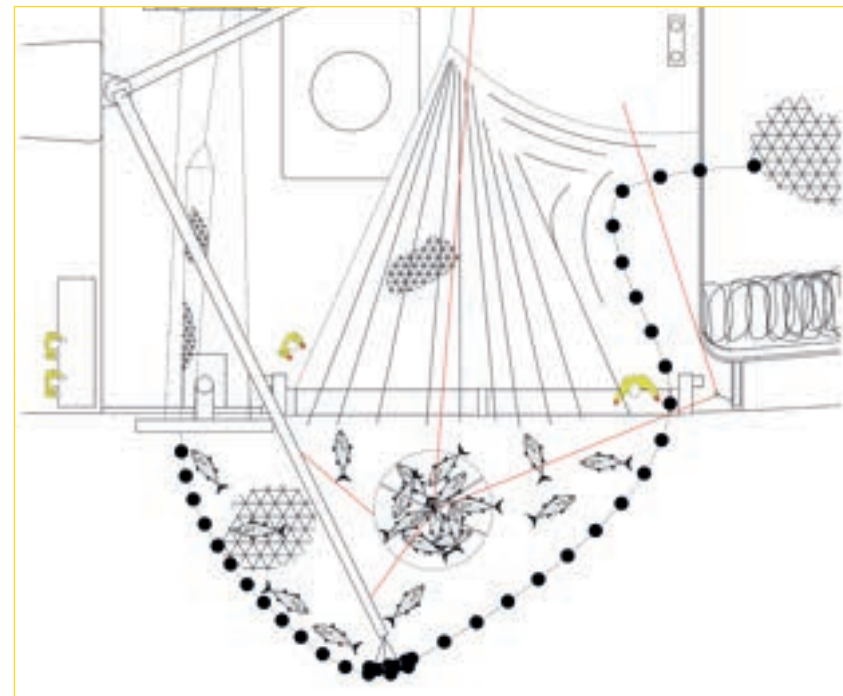
Introduction

All fisheries, even the most selective, generate some type of unwanted bycatch. The tropical tuna purse seine fishery, despite having a low percent of bycatch per ton of tuna (1-3%, ISSF, 2023), it has certain impact on megafauna species such as sharks and mobulids, both belonging to the elasmobranch family.

Elasmobranch populations are especially susceptible due to their biological characteristics such as late maturation and low rate of reproduction, which makes it difficult to recover from fishing impacts. Increasingly more shark and mobulid species are in a critical situation according to the Red List of the IUCN (International Union for Conservation of Nature), therefore it is important to make an effort to reverse this tendency.

This guide of best handling and release practices pretends to update the best options available at this time to maximize the survival of bycatch species accidentally captured, always having crew safety as the principal condition. Many of the new release devices shown are the result of collaborations between fishers and scientists.

The guidelines will be renewed in the future as new solu-



tions are developed to avoid the catch or facilitate a more efficient release of bycatch species.



SHARKS

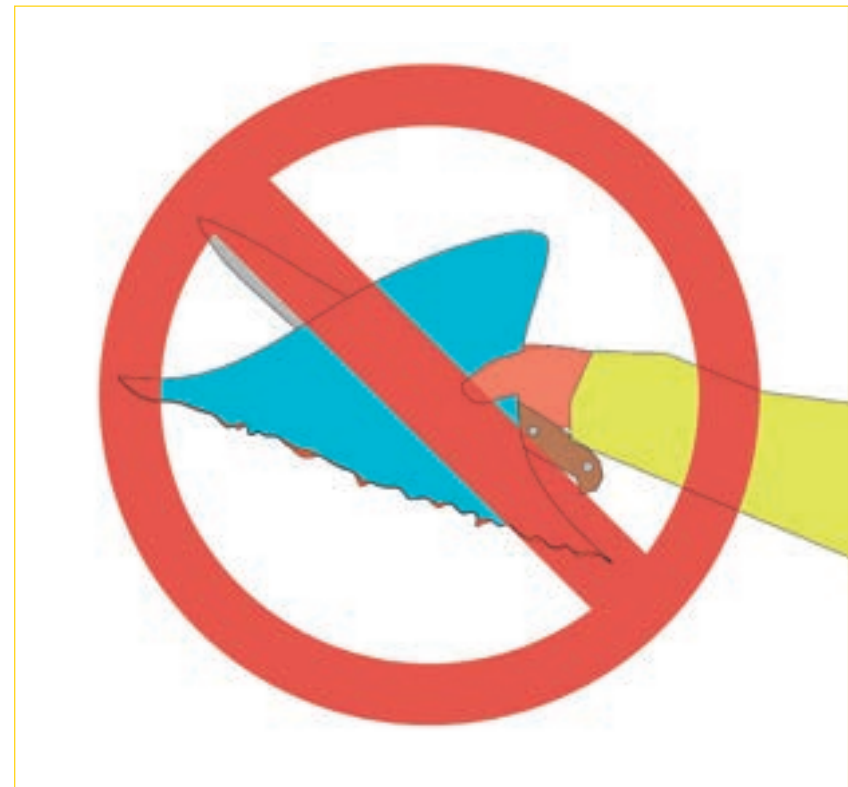


Sharks

While the number of sharks incidentally caught by purse seiners is not significant, when compared to the number of individuals caught by other gears, it can be reduced by applying suitable handling and release protocols.

The intentional retention of any shark is forbidden, being strict and inflexible regarding the practice of shark finning. All shark fins must be naturally attached to any unintentionally retained shark.

If any sharks are discovered when the catch is being hauled on board, and following RFMOs recommendations, they must be released from the deck or lower deck (provided that they can be handled with security), as quickly and carefully as possible, to avoid harming the animals. The necessary precautions must always be taken to maintain crew safety during the release process of dangerous animals.



Sharks

Particularly, holding sharks by the tail and one fin (pectoral or dorsal) is suggested (Fig.1) and avoid grabbing only from the tail, unless it is done with an adequate device such as a padded velcro (Fig.2), or by the gills, to avoid physical harm to the animal, as well as dangerous reactions towards the crew.

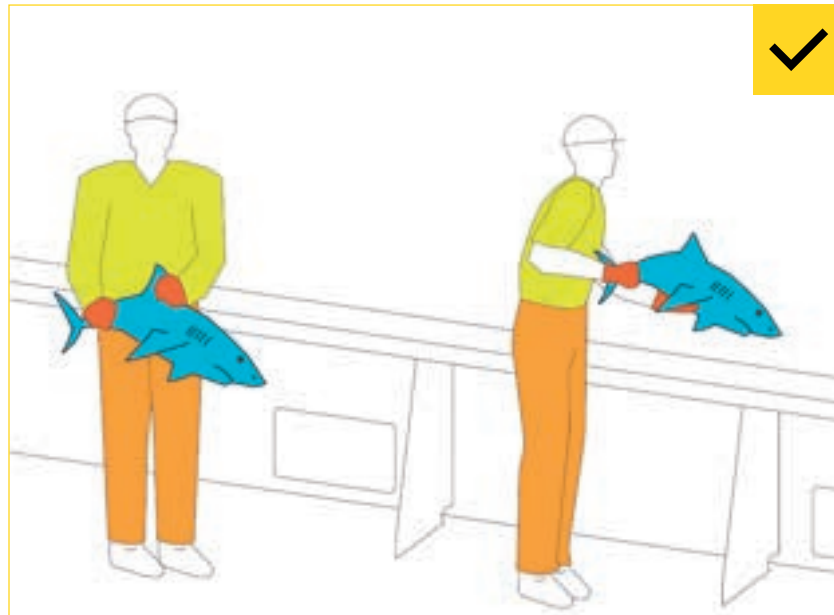


Figure 1. Small shark release holding by the fin and tail.

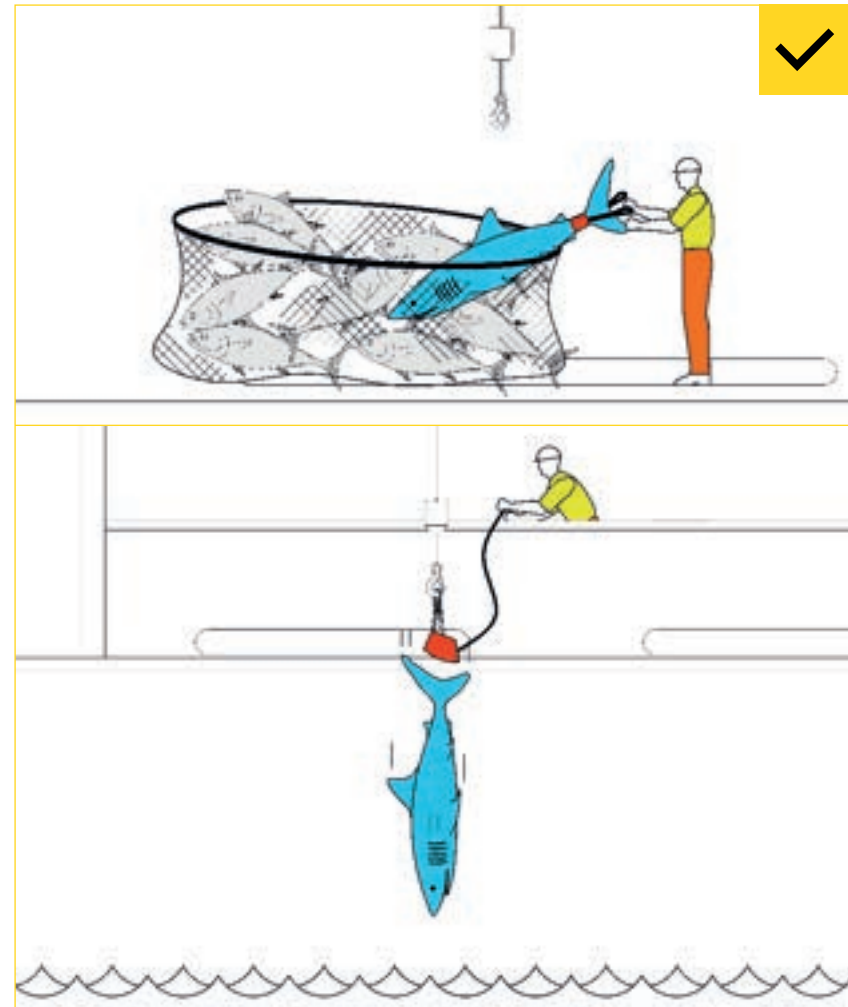


Figure 2. Release of shark with a padded velcro.

Sharks

Also, gaffs and nooses may not be employed (Fig. 3 and 4) to release sharks that appear on deck. If sharks are found inside the purse seine net, crew must attempt to get them out of the net using the brailer employed to bring the catch on board, even if a certain amount of target fish (2-3 tonnes) is lost.

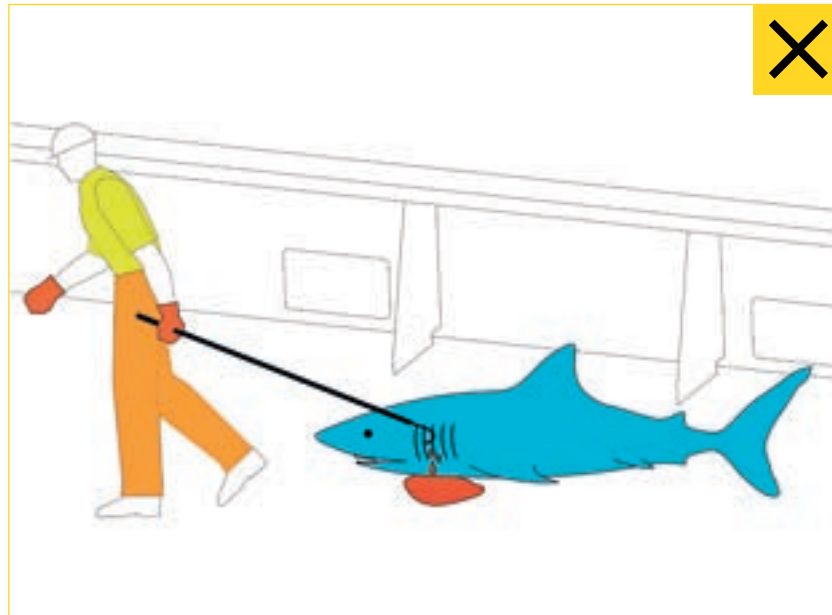


Figure 3. Bad practice using a gaff to move sharks.

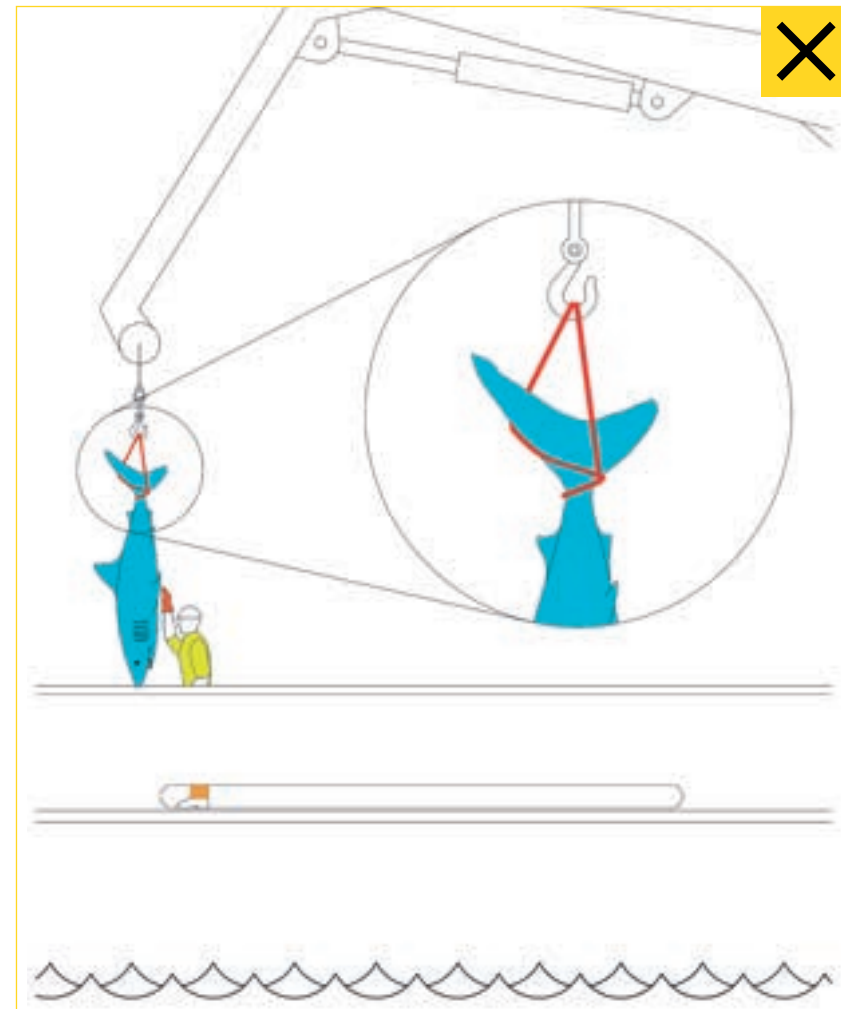


Figure 4. Bad practice using a rope with a noose to lift sharks.

Sharks

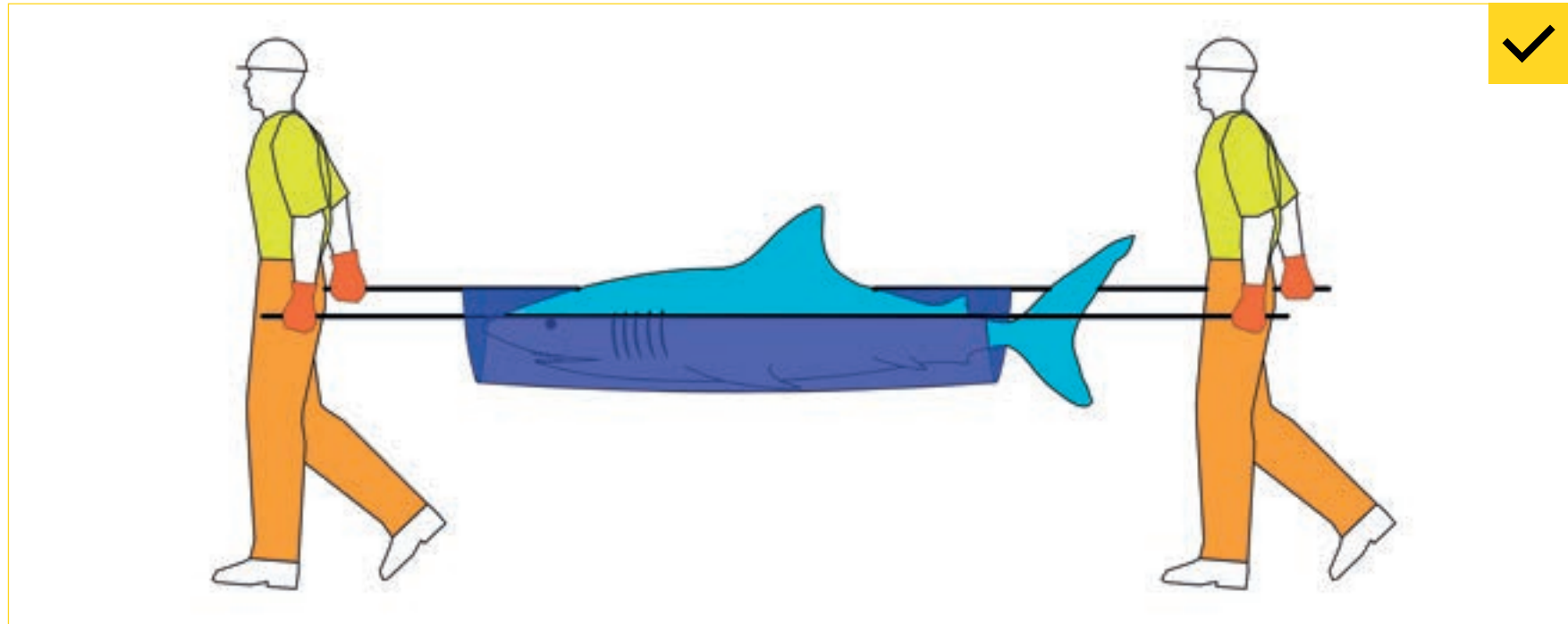


Figure 5. Release of shark with a stretcher bed.

Otherwise, use some cradle-like device, such as canvases or stretchers (Fig. 5) to avoid the possibility of injury. Likewise, if sharks cannot be released immediately from deck, it is recommended to keep the animals wet, in the shade and if possible, breathing freely, by introducing a water hose into the mouth for example. Vessels are obligated to have a

net carrier, a stretcher or a canvas on board and/or similar equipment alongside the brailer, so sharks found on deck can be handled more easily when detected on deck.

Sharks

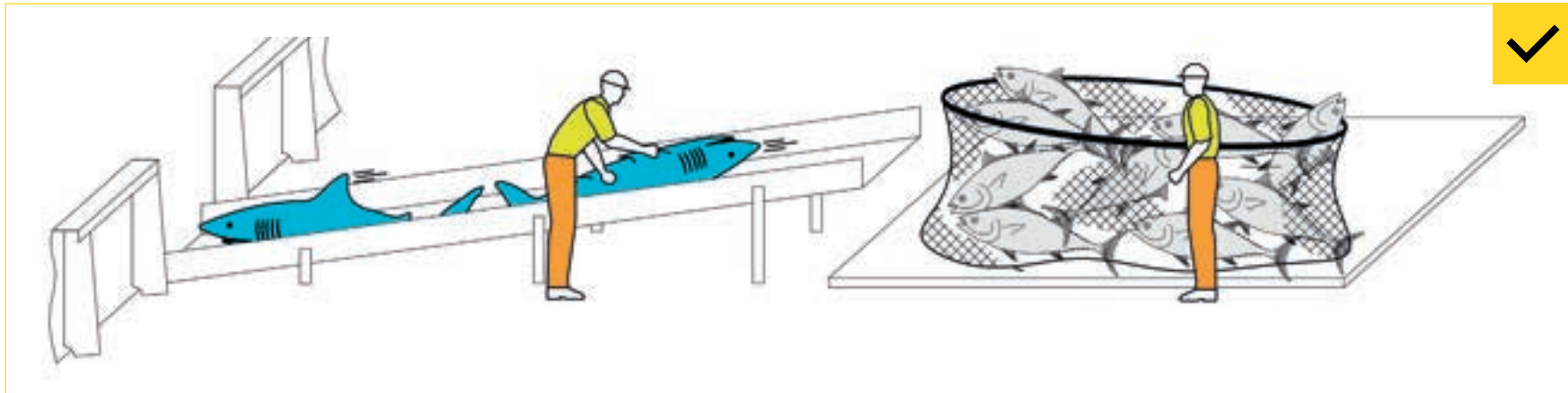


Figure 6. Ramp to release bycatch species.

The use of selective devices on deck that facilitate releases and reduce direct contact with the crew, such as release ramps for sharks, are recommended. (Fig. 6).

Sharks

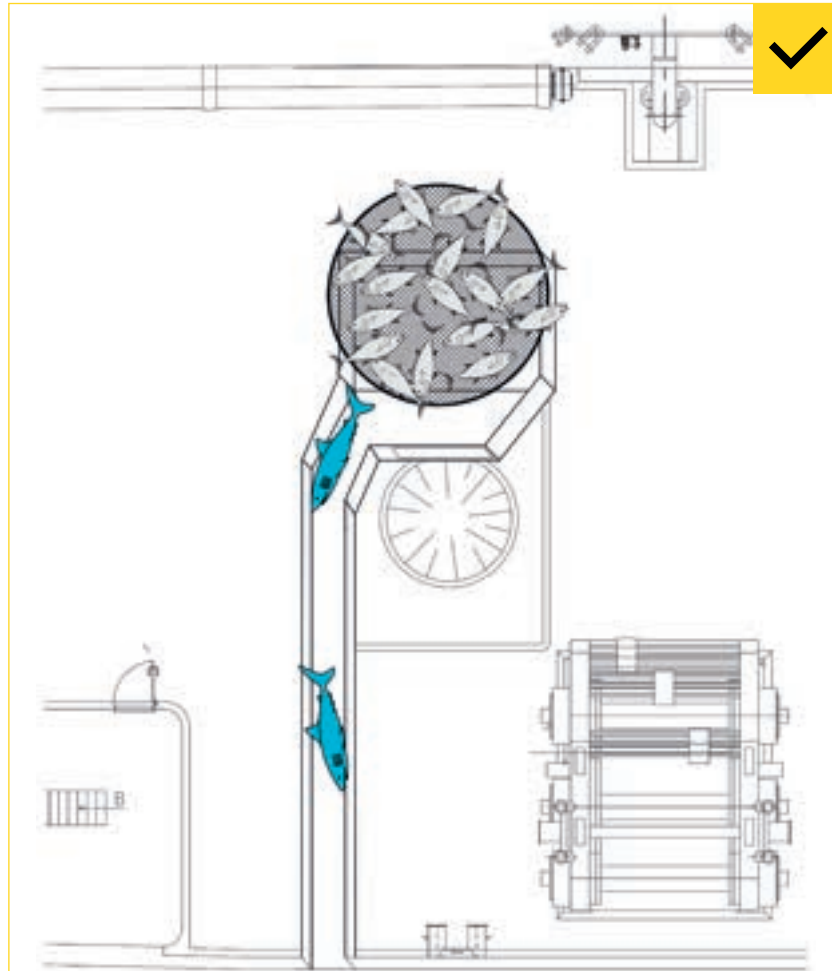


Figure 7a. Hopper with release ramp on the portside.

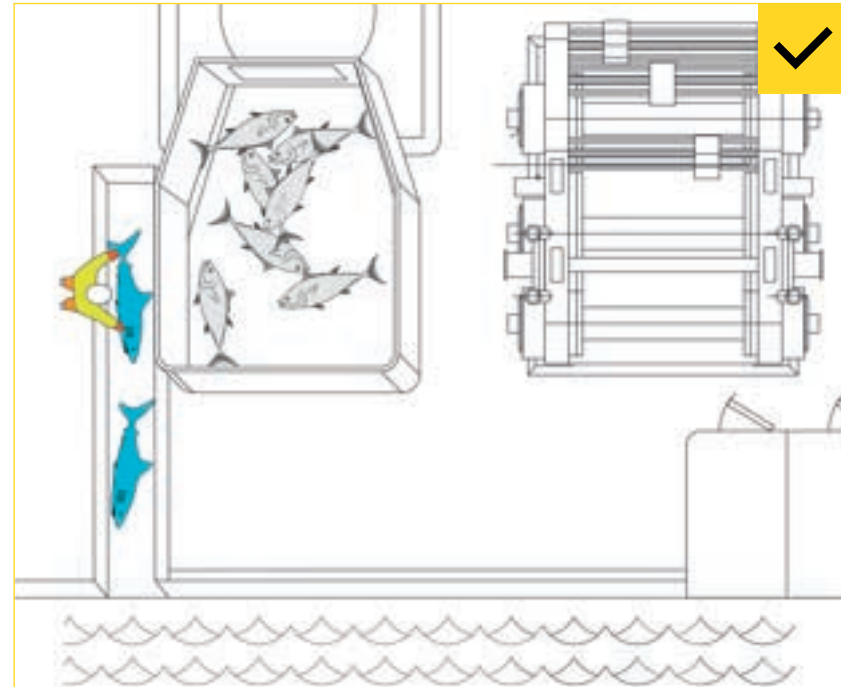


Figure 7b. Hopper with release ramp on the starboard.

Also, the installation of hoppers (integrated, on portside, on starboard) with ramps is recommended in vessels with sufficient space on deck, to maximize the fast and efficient release of sharks and other bycatch species from the upper deck, largely avoiding they end up in the lower deck (Fig. 7).

Sharks

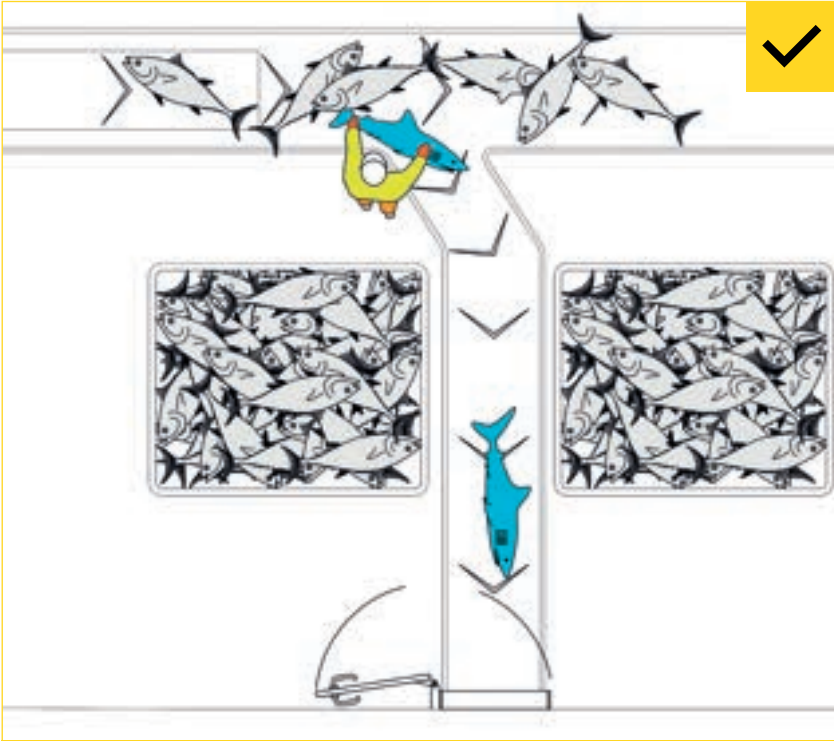


Figure 8. Sharks in the lower deck released with a waste chute.

Likewise, the installation of a waste chute in the lower deck is recommended (Fig. 8), to facilitate and expedite the best release of the animals that could not be released from the upper deck and accidentally fell into the lower deck (Fig. 9).

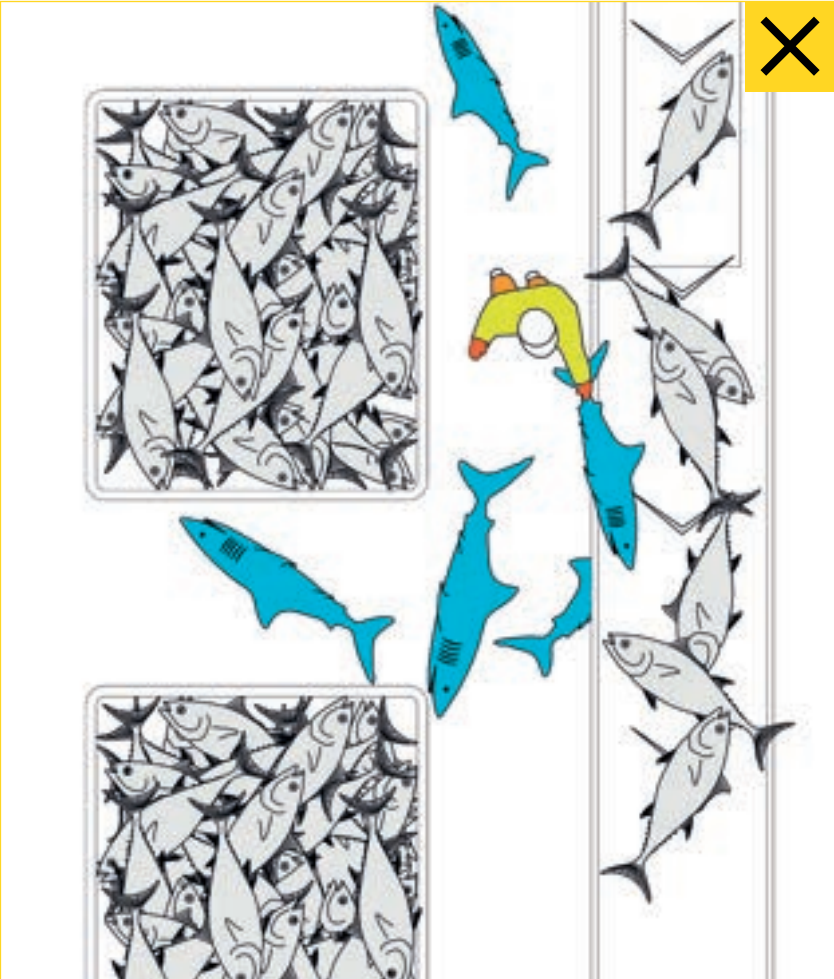


Figure 9. Bad practice of sharks being left on the floor of the lower deck.



**SEA
TURTLES**



Sea turtles

Following the recommendations of the 4 RFMOs on sea turtles, despite the fact that turtle entanglements is unusual, crew must attempt by all means to release every turtle entangled in FADs or in the purse seine net.

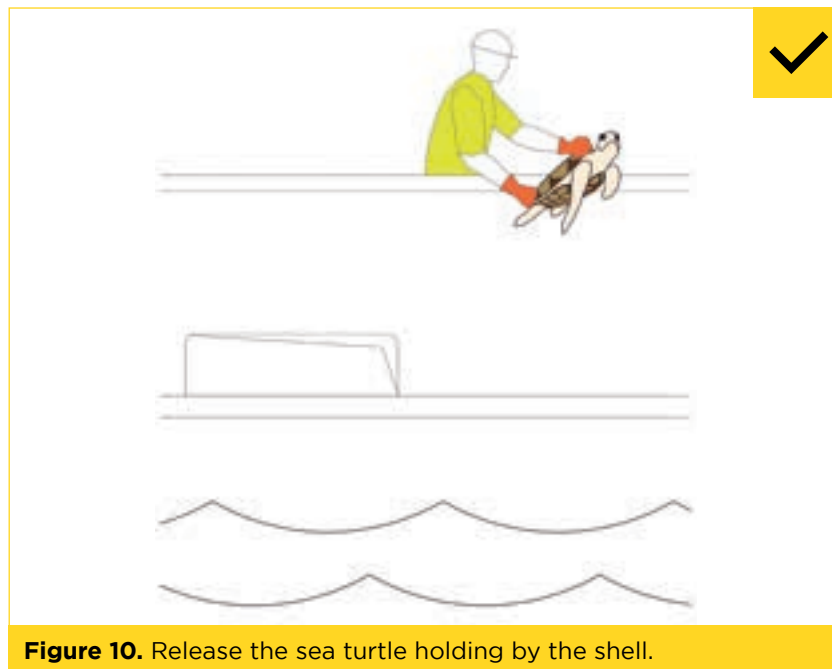


Figure 10. Release the sea turtle holding by the shell.

If an entangled turtle is found in the net, the net hauling operation must be stopped immediately so that the animal does not accidentally go through the power-block. As soon as possible, the crew must release all turtles they find inside the net, trying to prevent any injury. If an animal is accidentally injured in any way during the operation, it must be kept on board in a wet, cool place, and it must completely recover before it is released. If the turtle is carrying any plastic items or bits of net on it, or if it has any longline hooks embedded, the foreign items must be removed and/or disentangled, even if these materials do not originate from the vessel. Likewise, if crew find an entangled turtle when visiting a FAD, they must disentangle the turtle and release it using the same procedures. To handle a turtle, crew must hold the animal by the shell but avoiding just the head area, to protect from catching their hands if the turtle should retract its head in. (Fig. 10).

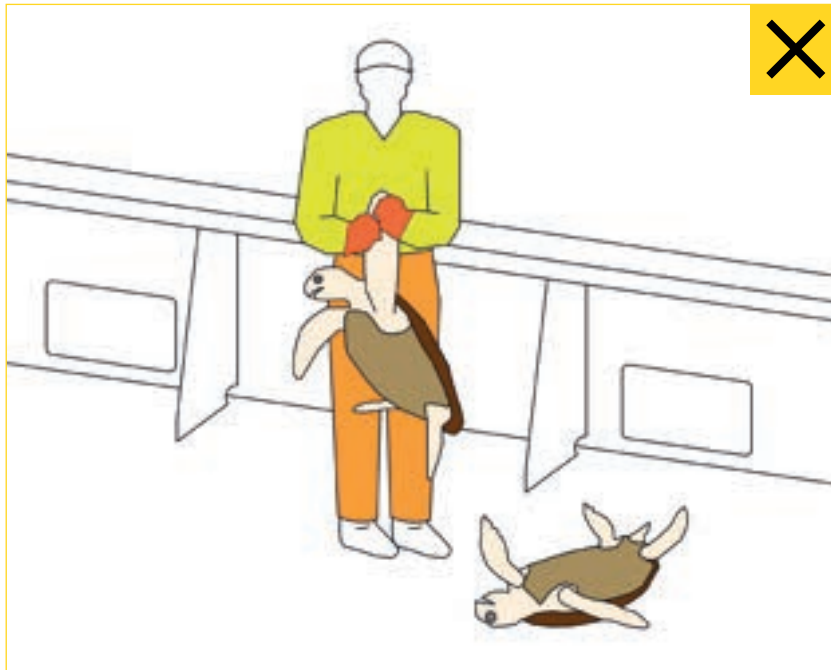
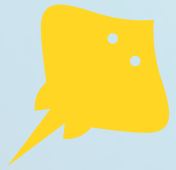


Figure 11. Bad practice lifting sea turtles by the flipper or resting them upside down.

It is important not to hold the animal by its flippers, because turtles' flippers are sensitive and could be dislocated (Fig. 11). If a sea turtle appears not to respond to stimuli or is inactive, it is recommended, if necessary, to place it in the resuscitation position to help it recover more easily. To place a turtle in the resuscitation position, crew must lift the

animal by its rear legs about 15 cm, with its head pointing downwards, and place something beneath it to maintain the sea turtle in this position (e.g., tyre, coiled rope). The crew must wet the sea turtle from time to time and keep it out of direct sunlight. With these practices the mortality of sea turtles in purse seine fisheries is practically null.





MOBULID RAYS



Mobulid rays

Although very few skates and rays are involved in purse seine sets, very simple and safe protocols are in place for their release, in line with RFMO recommendations. This procedure is based on trying to get the animal out of the purse seine either using the brailer employed to bring the catch on board, even if a certain amount of (2-3 tonnes) is lost or using some cradle-like device or specific equipment like canvases or sorting grids, to minimise any possible injury. If the animal is not detected or cannot be released before it is brought on board, it must be released from the deck. The use of gaffs, hooks, or ropes to lift the mobulid rays by the gills or wings is prohibited (Fig. 12).

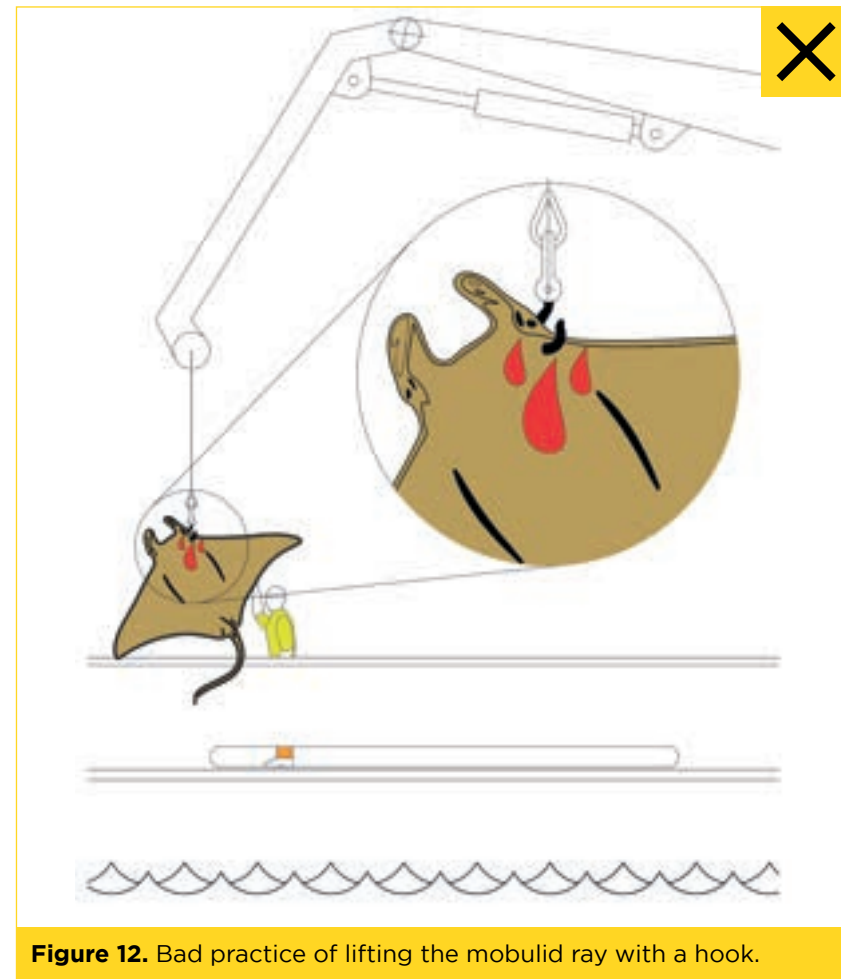


Figure 12. Bad practice of lifting the mobulid ray with a hook.

Mobulid rays



Figure 13. Mobulid ray lifted with a canvas for release.

It is recommended to have onboard nets, tarps and/or similar equipment alongside the brailer (Fig. 13), for handling large mobulid rays more easily when they are found on deck, and to release them with the aid of the crane.

Mobulid rays

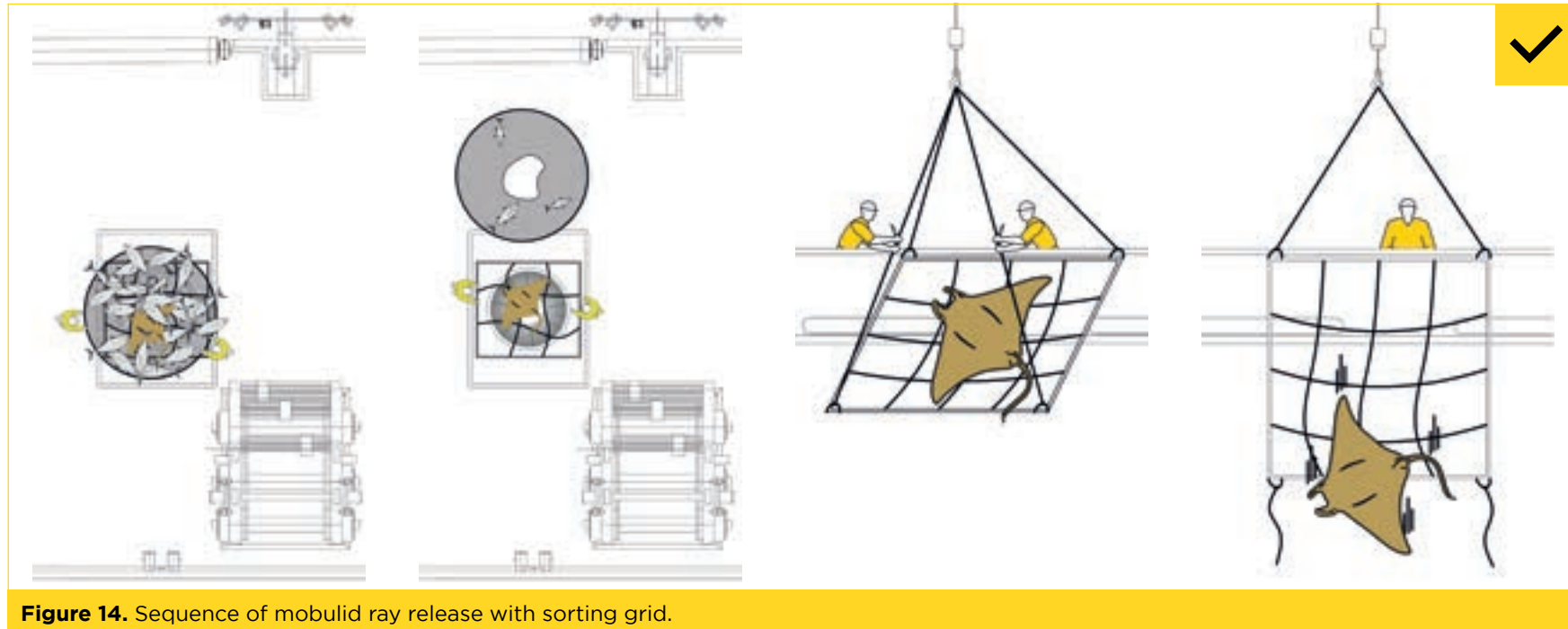


Figure 14. Sequence of mobulid ray release with sorting grid.

Also, new methods like sorting grids with wide spaces, which are placed over the unloading hatch or hopper and allow fish to be unloaded while the ray stays on top to be lifted for release with the crane, accelerating the process and preventing direct contact with fishers (Fig. 14). If on the other hand stakes or rays are released by hand, it is recommended that crew avoid handling the animal by its

tail, gills, or the cephalic lobes, to prevent injury and dangerous reactions. It is particularly recommended that crew avoid handling the rear part of stingrays, as many have a poisonous spike at the end of their tail. It is therefore preferable to handle these animals from the front, grabbing them from the pectoral fins.



**WHALE
SHARKS
AND LARGE
CETACEANS**



Whale sharks and large cetaceans

Most RFMOs (IOTC, IATTC, WCPFC) have implemented measures prohibiting fishing practices that intentionally target setting on whale sharks (*Rhincodon typus*). However, these animals may end up in the net unintentionally because they often swim well below the surface, making it difficult for fishers to detect them before setting the net. Although, the whale shark release manoeuvre is complex, crew must take all precautions to avoid injuring the animal. In the same way, cetacean bycatches are regulated by EU, some RFMOs and private agreements for intentional sets on these species' groups. The interaction with cetaceans, principally baleen whales, is rare and non-intentional. Mainly, these rare interactions occur with large cetaceans (e.g., humpback whale; *Megaptera novaeangliae*) which generally escape the net before its closure or by breaking the net.

Whale sharks and large cetaceans

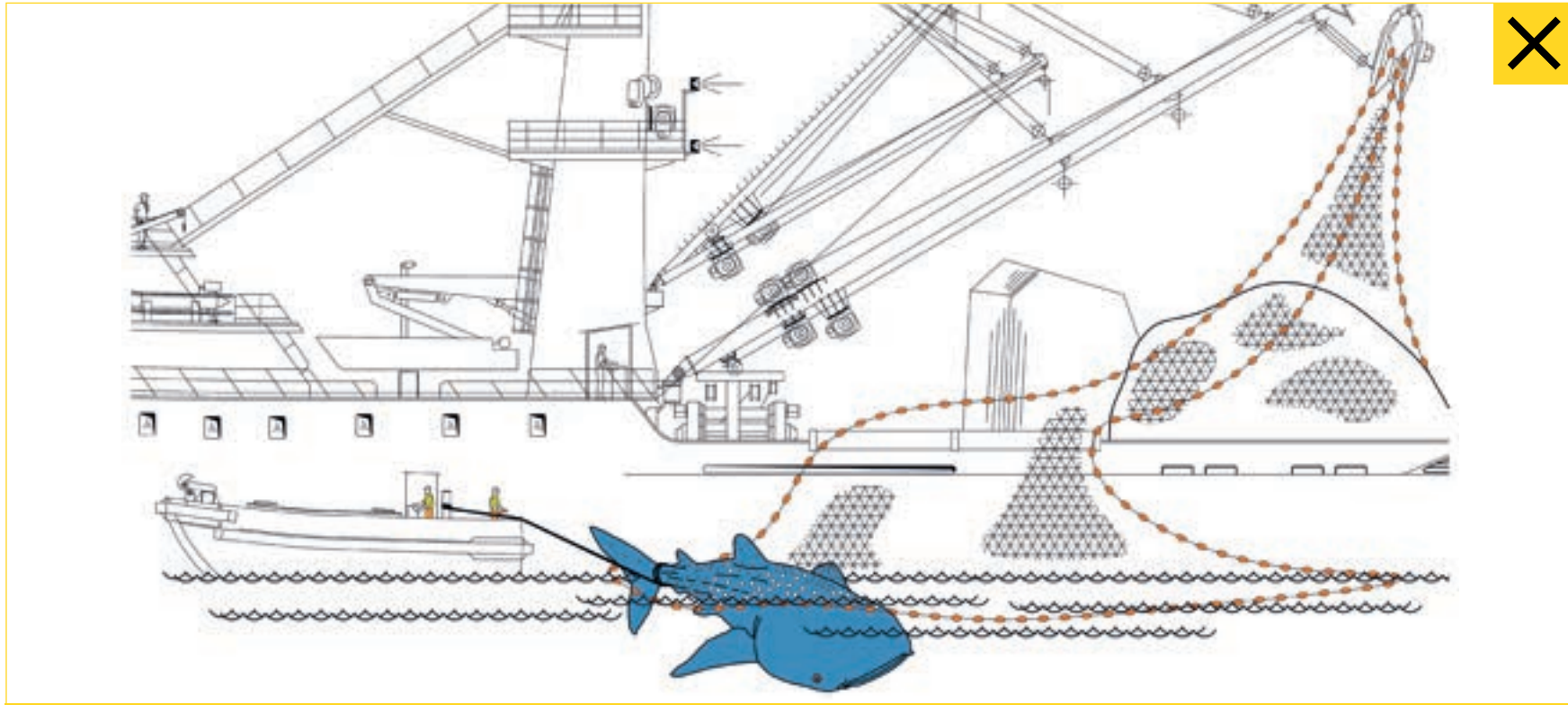


Figure 15. Bad practice of pulling whale shark by the tail.

Following recommendations established, with the objective of minimizing impacts on accidentally trapped individuals, and despite the inherent difficulty of the release manoeuvre, if a whale shark or a whale is found in the purse seine, the crew must take all actions to prevent damage

to the animal. The crew should haul the net carefully to isolate the animal in a small area of the bunt. The use of ropes to pull the animal by the tail to take move it out of the net is prohibited (Fig. 15).

Whale sharks and large cetaceans

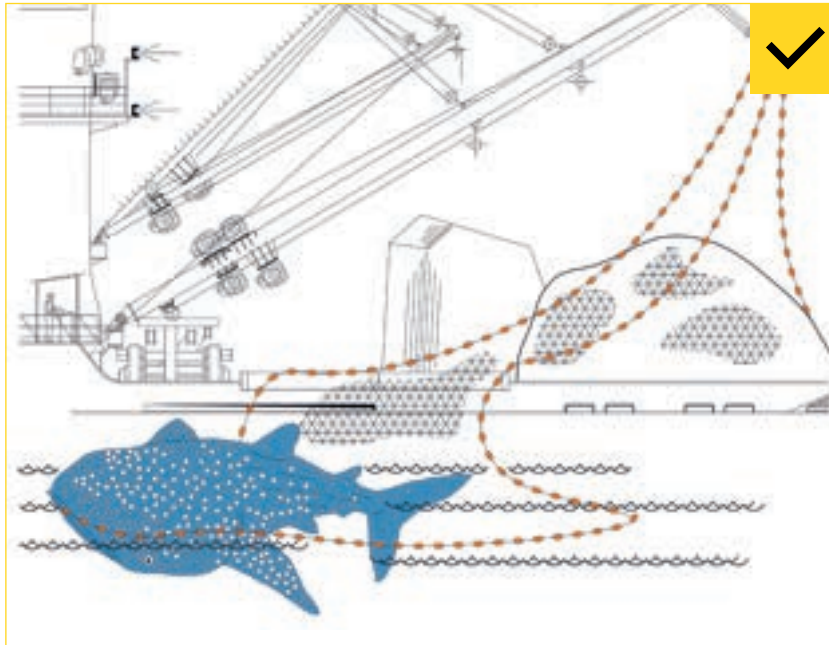


Figure 16. - Whale shark release lowering the purse seine corkline.

If a whale shark or a whale is found in the purse seine, the crew must take all actions to prevent damage to the animal. The crew should haul the net carefully to isolate the animal in a small area of the bunt. After this, crew may take the following measures, depending on the sea conditions and the animal's behaviour. At all times crew safety must be guaranteed.

When the animal is floating on the surface fishermen must gradually haul the net to bring the animal towards the closest cork line. The net must always be pulled in a direction from the animal's tail toward its head, along its belly, attempting to make the fish move towards the cork line. If the animal is small (2 metres long or less), it may be released carefully using the brailer. If the animal is bigger, release over the corkline to facilitate the escape, by partially sinking the cork line and wait for the animal to freely swim out of the net (**Fig. 16**). The catch may be brought on board only after the animal has been released from the net.



General notes

Regardless of the circumstances occurred and the measures adopted for the release of these animals, the crew will verify that their behaviour is normal and will record the operation in the logbook. In the event that strange behaviours are observed, it will also be recorded in the logbook.

It is recommended to collaborate in trials with new bycatch release devices designed to facilitate safer handling and increased vulnerable bycatch species survival, including tagging initiatives to assess survival after release.

The collaboration between fishermen and scientists to co-develop more efficient measures to limit the mortality of vulnerable species will result in better solutions that will be approved by the fleet. It is important to highlight that fishermen are the first ones interested in reducing interactions with species like sharks, sea turtles or mobulid rays. It is also critical that ship-owners invest resources into bycatch release devices to increase crew safety and survival of protected species in their purse seiners, to support sustainable fishing, which currently is in demand by consumers and markets.



Acknowledgements

This guide has been financed by the Recovery, Transformation and Resilience Plan through Next Generation of the European Union. Other organisms such as the Fishing Department of the Basque Country, the Spanish General Fishing Secretariat, and the International Seafood Sustainability Foundation (ISSF) have collaborated supporting the development of the bycatch release devices. Special thanks to the OPAGAC and ANABAC fleets for participating in experiments with release devices at sea.

Financed by:



Supported by:



Acknowledgements:



SUSTAINABLE DEVELOPMENT GOALS



Conserve and sustainably use the oceans, seas and marine resources is the responsibility of all of us.





