


COMMERCIAL FISHERIES
SHARK, RAY AND SKATE HANDLING GUIDELINES

Sharks, skates and rays belong to a group of animals called elasmobranchs. Elasmobranchs are a unique class of fish with a skeleton made of cartilage, 5-7 gill slits and scales which are pointed backwards with a projection made of enamel, called dermal denticles. Sharks, skates and rays are often caught as bycatch, sometimes retained and sometimes discarded, dependant on species, permit conditions and value to the fishery.

Contrary to popular belief, sharks, skates, and rays are actually a sensitive group of animals because they are adapted to life in water. They are particularly susceptible to stress, especially when caught and handled by fishermen. This is because they have skeletons made of cartilage and when removed from the water, are no longer supported which places pressure onto their internal organs. Unlike land animals, sharks, skates, and rays have organs that are not supported by internal structures but effectively float around in a single soft cavity. This increases the risk of damage to the internal organs when they are removed from the water, dragged over hard surfaces, or left for extended periods of time.

Proper handling techniques ensure that the risk of damaging these animals is kept to a minimum, thus giving them the best possible chance of survival upon release. This guide serves to allow South African fisheries and vessels to achieve a minimal impact on these animals by using the proper techniques to safely release sharks, skates and rays.

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WHY LOOK AFTER SHARKS, RAYS AND SKATES WHEN FISHING?

Sharks play a significant role in maintaining the delicate balance of marine ecosystems and the ocean. They are predators in the ecosystem, serving to balance and maintain healthy populations by targeting weaker, slower and sick prey. Sharks are also tourist attractions in many countries and bring in large amounts of revenue. Some of the important tourism species in South African waters are tiger sharks, white sharks, bronze whalers, blue sharks and blacktips.

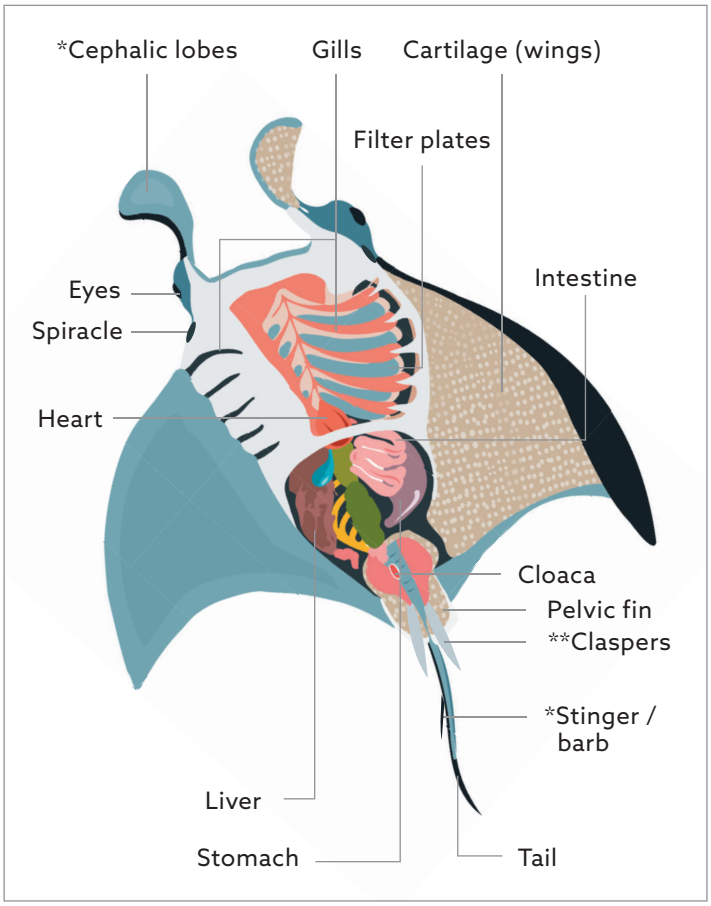
Rays and skates also have an important role because they feed on the seabed and leave indentations in the substrate. This forms collection sites for organic nutrients and leads to an increase in food availability for other species. Some sharks and rays, such as manta rays, whale sharks and basking sharks, are filter-feeders aiding the nutrient cycle and the improvement of water quality. Some common rays found in South African waters are the blue stingray, shorthorn devil ray, spotted eagle ray, diamond ray and the honeycomb stingray.

Many commercial fisheries are keen to minimise their impact on the marine environment. To do this, the correct handling of sharks, rays and skates should be undertaken in a way to ensure the best chance of survival. To reduce the amount of stress, injury and suffering by these animals, fishermen can rapidly learn and apply the correct handling techniques.

VULNERABILITY OF SHARKS, RAYS AND SKATES

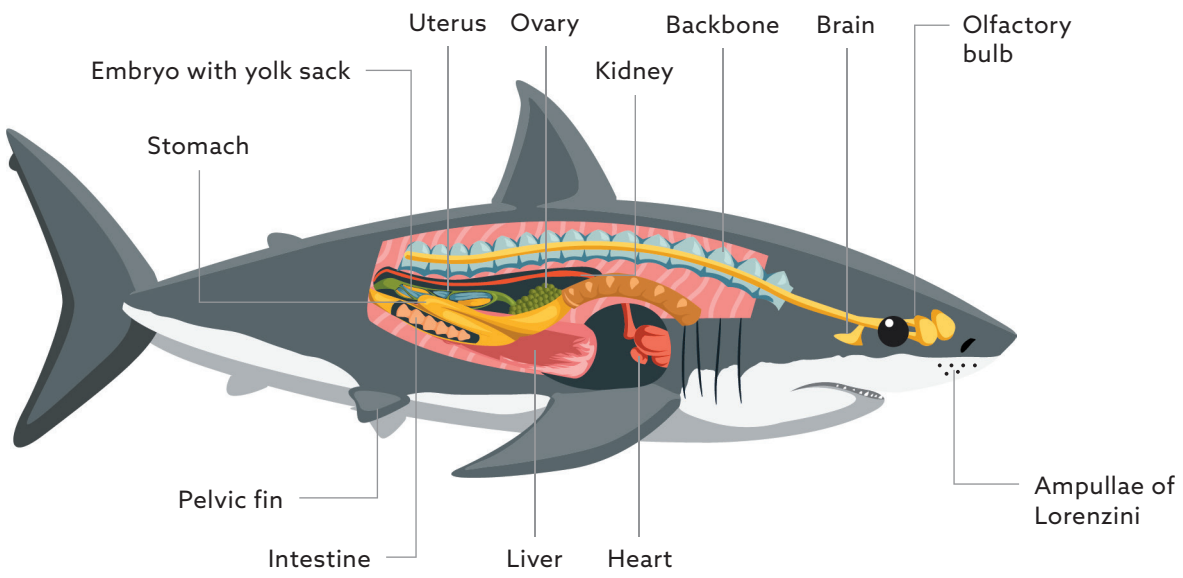
Apart from the internal organs of sharks and rays not being held in place like in terrestrial species, they have other characteristics and morphologies which make them particularly vulnerable. The weaknesses of sharks, skates and rays include:

1. Many of the shark and ray species are slow to mature and have low fecundity, meaning they only produce a few offspring at a time. This extends the time of recovery of populations if their numbers are depleted.
2. A large number of sensory organs called Ampullae of Lorenzini are situated in the snout, making the head and mouth area extremely sensitive. Damage to this area could lead to the loss of the animal's ability to locate and eat its prey.



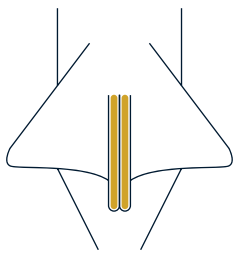
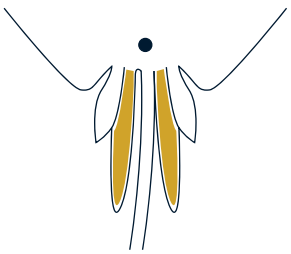
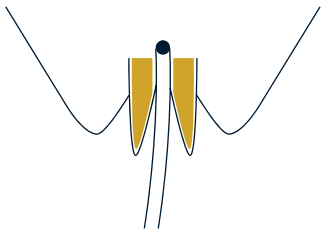
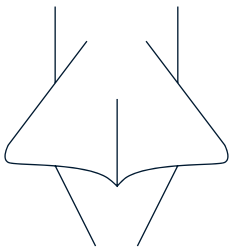
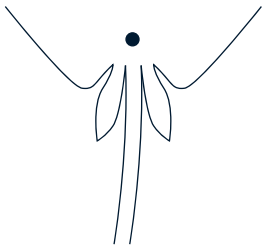
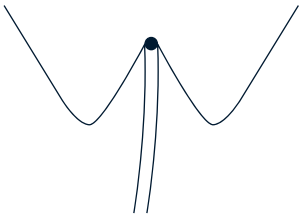
**Not present in all ray species*
***Only present in males*

3. Since the skeleton of sharks and rays are made of cartilage, holding them by their tails will damage their spinal cords and the vertebrae of their backbone. This could lead to irreversible damage and scoliosis of the spine.
4. While in water, the blood circulation of sharks and rays depend heavily on their movement. If they are restrained, preventing water movement over the gills, the animal could suffocate. In addition, the gills are also fragile and being out of the water can cause permanent damage and could lead to death long after its release.



DETERMINING THE SEX OF A SHARK, RAY OR SKATE

Distinguishing the sex of these animals is simple. Male sharks, skates and rays have claspers on the posterior side of the pelvic fin. This organ is not present in females. Below is an illustration of such claspers:

	SHARK	SKATE	RAY
MALE			
FEMALE			

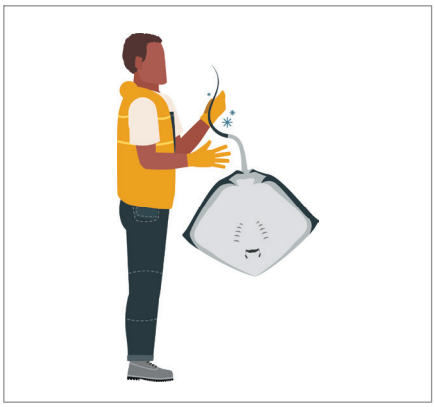
INCREASING THE CHANCES OF SURVIVAL OF A RELEASED SHARK, SKATE OR RAY

All sharks, rays and skates captured should be treated humanely and with care to ensure a successful release. Various practices such as incorrect hook removal, damage to gills, bruising, abrasions and wounds, can lead to a fatal injury of an animal during capturing, landing and release. There are other stressors such as lack of oxygen, that are less obvious but also have an effect on the biological functioning of the animal. These practices cause stress to the animal:

1. **Lactic acid build-up:** When an animal fights for extended periods of time, lactic acid accumulates in its muscles, which leads to acidosis. This leads to an extended recovery time for the animal and thus increases the probability of mortality (if released). The quality of the flesh of these animals also decreases.
2. **Exposure to air:** When sharks, rays and skates are removed from the water for extended periods of time, they suffer from hypoxia (oxygen deprivation). This significantly reduces the survival rate of these animals.
3. **Injuries during landing and handling:** A layer of slime protecting the skin of the animal is removed if the animal is not handled correctly. This slime layer protects the animal from bacterial and fungal infections and damaging this could leave the animal susceptible to infections. Care must be taken not to cause any damage to sensitive organs such as the eyes, gills and spiracles. In addition, bumping and dropping animals will cause injury. As far as possible, an animal destined for release should not leave the water.

RISKS TO THE CREW

Apart from the safety of the sharks, skates and rays, the safety of the crew handling these animals is also at stake if the animals are mishandled. Crew members should exercise caution when handling any shark, skate or ray (irrespective if the animal is thought to be alive or dead).



The crew should try to:

1. Always remain cautious when handling sharks, skates or rays. The most common risk is a crewman being knocked off his/her feet by the tail of large and medium sized sharks and rays.
2. Avoid the jaws of sharks to reduce the chances of being bitten. Sharks of all sizes have been known to bite crew. Do not assume a shark is dead if it's not moving.
3. Avoid the tail end of rays and do not use the tail to pick them up. Rays have barbs on their tail which they use for defence. If proper caution is not given, the crew run the risk of being stung. If stung, seek medical attention, some spine poisons can cause necrosis of the tissue. Generally, the risk is increased when working with smaller rays.

SAFELY REMOVING HOOKS

1. Removing a barbed hook from an animal, without causing too much harm, includes pushing the point of the hook through the tissue of the animal and flattening the barb when it protrudes. The hook can then be removed without snagging and causing damage to tissue.
2. If an animal is hooked in an area which is sensitive (like the gills, throat, eye or if the hook has been swallowed), cut the line as close to the hook as possible and release the animal with the hook left in place (the hook will eventually rust out or if barbless, will be spat out or safely passed through the digestive system).
3. Dehooking devices should be used and are encouraged.
4. Never swing and/or smack rays against the side of the vessel to separate hook from jaws. The jaws of the rays will be ripped out. This method to release stingrays is dangerous for crew whilst swinging through the air and the animal will die.

RELEASING SMALL SHARKS (1 PERSON)

1. Ensure that all hooks, line or rope are removed (if not possible, then ensure that the trace is cut as short as possible).
2. Use two hands to support the animal when releasing it, one hand should be used to support the body and the other should be used to hold the pectoral / dorsal fin as shown to the right. If possible support the shark under its pectoral fins (pectoral girdle).
3. When releasing the shark, take care to ensure that the shark enters the water with its head first.
4. Where handling is not feasible, small animals can be released via stern ramps, offal conveyors or bycatch chutes.

RELEASING SMALL RAYS AND SKATES (1 PERSON)

1. Ensure that all hooks, line or rope are removed (if not possible, then ensure that the trace is cut as short as possible).
2. Use two hands, with one hand in or under the mouth and the other hand supporting the remainder of the body with the tail away from you to avoid coming into contact with the barbs at the base or on the tail.
3. If possible, place ray on a movable flat surface to avoid contact with the ray / skate.
4. Place gloved hand directly over barb, holding it against the tail.
5. NEVER break off the tail or barb.
6. NEVER insert fingers into spiracles or gills.
7. NEVER pierce holes in the wings so it is easier to grasp the animal.
8. When releasing the ray, try to ensure that the ray enters the water right side up and with its head at a slight downward angle.
9. Minimise touching the animal or dragging it across deck. The mucous serves an important function for the ray / skate.
10. Never swing and bash a ray on the side of a vessel to dislodge a hook from an animal.
11. Where handling is not feasible, animals can be released via stern ramps, offal conveyors or bycatch chutes.

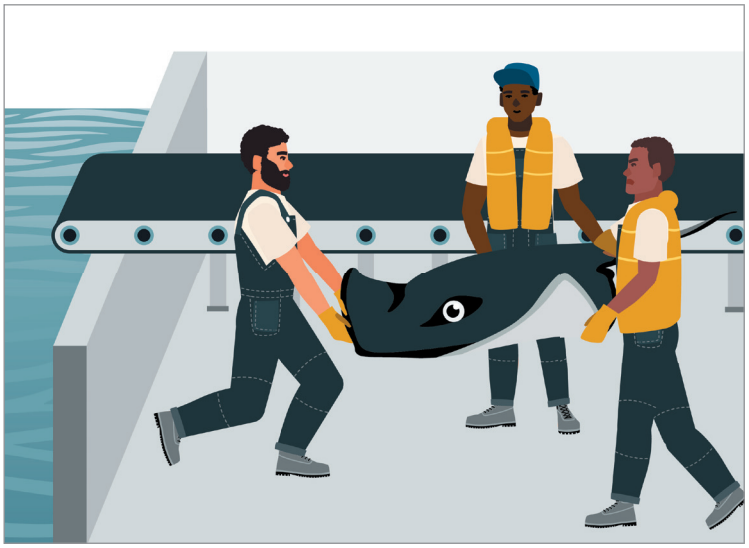
RELEASING MEDIUM AND LARGE SHARKS (2+ PEOPLE)

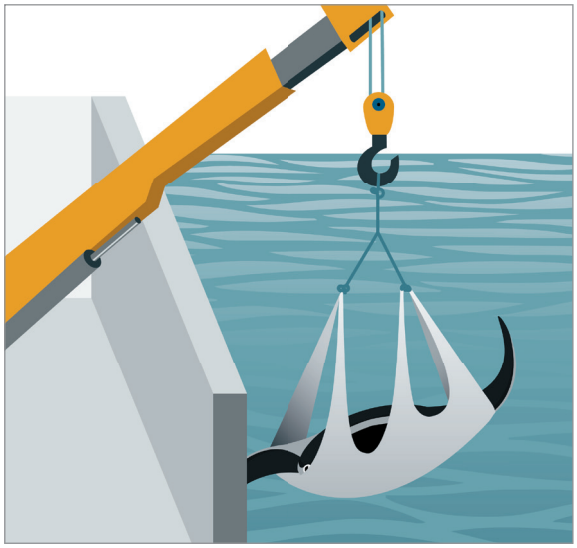
1. Ensure that all hooks, line or rope are removed (if not possible, then ensure that the trace is cut as short as possible).
2. A wet, dark cloth may be used to cover the eyes of an energetic shark (ensure not to put pressure on the eyes and nose of the shark when doing so). This calms the shark down.
3. A hose pumping seawater into the shark's mouth may also calm the shark down and increase its chances of survival if its release is not imminent. A stick or medium sized fish could be placed into the mouth of the shark to prevent it from biting the crew.
4. When releasing, use one person to hold the tail (with both hands) while another person holds the pectoral / dorsal fins as shown below while monitoring the head (in case of sudden movement).

5. Care must be taken to drop the shark into the water, head first, and not thrown it forcefully overboard.
6. If the shark is too large to carry by hand, a brailer, net or a piece of canvas can be used to return the animal to the water with the aid of a crane.
7. Where handling is not feasible, animals can be released via stern ramps, offal conveyors or bycatch chutes.
8. Avoid lifting a shark (regardless of size) by its tail. This practice can break the spinal column. If possible a second strop / rope should be placed near the pectoral (front) fins (without damaging gills) to support the sharks weight.

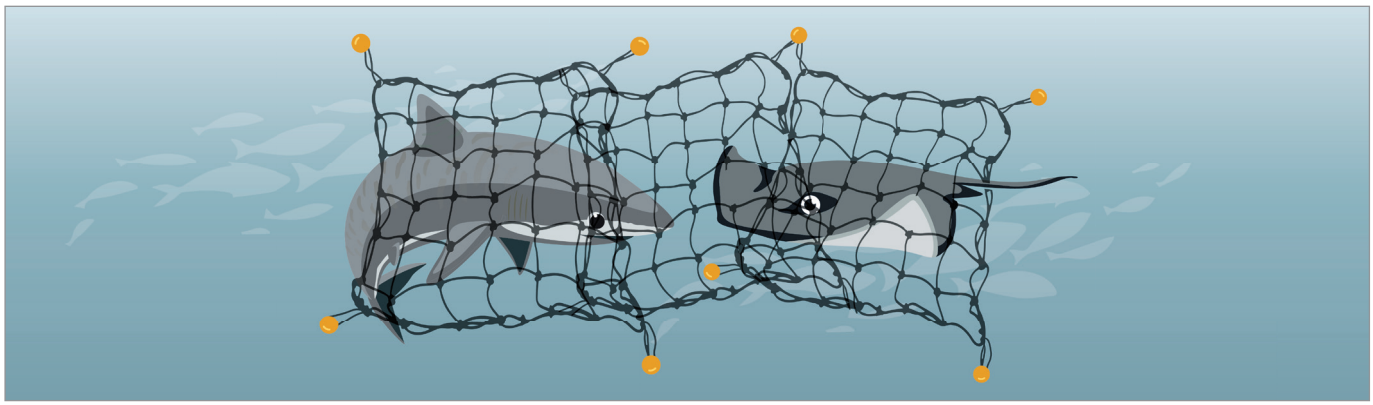
RELEASING MEDIUM AND LARGE RAYS AND SKATES (2+ PEOPLE)

1. Ensure that all hooks, line or rope are removed (if not possible, then ensure that the trace is cut as short as possible).
2. When releasing, one person may support the head of the ray using both hands underneath where the mouth is. A second and/or third person may support the ray under the wings, while holding the tail. Some rays have barbs on or at the base of their tails which could inflict damage.
3. Holding directly over the barb on the tail with a gloved hand will prevent injuries.
4. Care must be taken that the ray is dropped into the water and not thrown forcefully overboard.
5. If the ray is too large to carry by hand, a brailer, net or a piece of plastic canvas can be used to return the animal to the water with the aid of a crane.
6. NEVER insert fingers into spiracles or gills.
7. NEVER pierce holes in the wings so it is easier to grasp the animal.
8. Where handling is not feasible, animals can be released via stern ramps, offal conveyors or bycatch chutes.





RELEASING SHARKS, RAYS OR SKATES ENTANGLED IN NETS

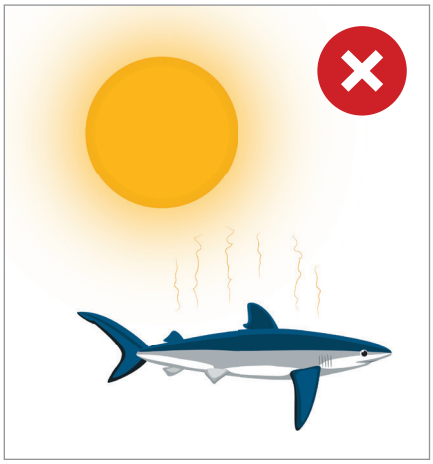
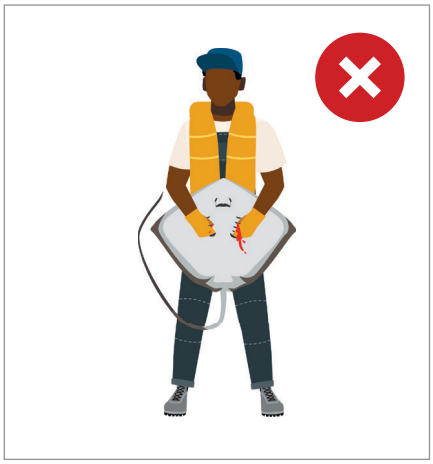
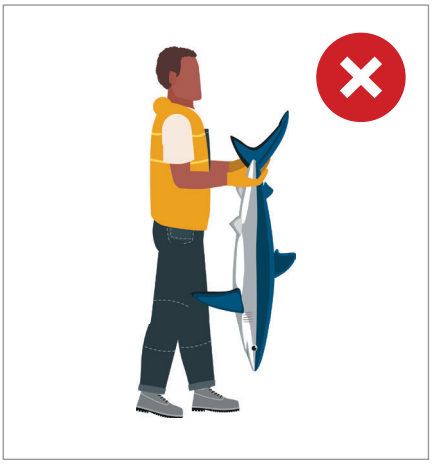
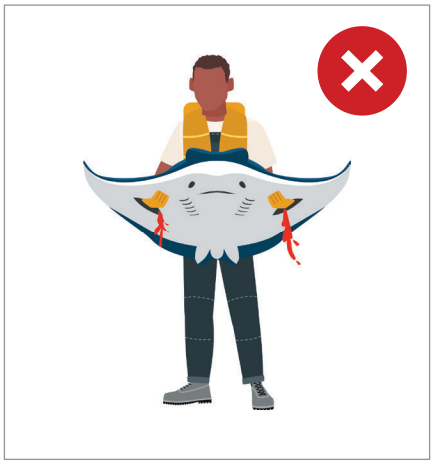


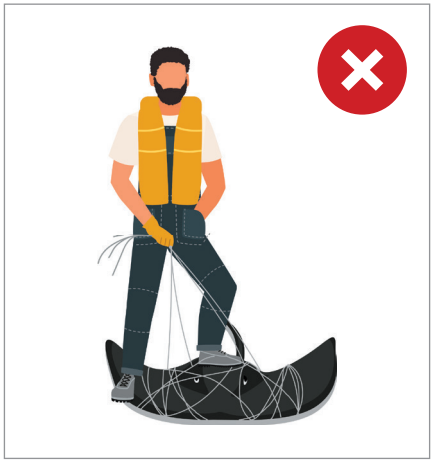
1. Reduce the speed of the net reel / drum. This will provide a little bit of slack in the net.
2. Carefully aid the animal in untangling itself from the net. Use clippers (if necessary) to slightly cut the net to allow for the animal to be freed.
3. As far as possible avoid tugging and yanking of the net when trying to free the animal. It is a good idea to keep an eye out on the net so that entangled animals can be spotted before the net is onboard, and necessary plans can be made to free the animal.

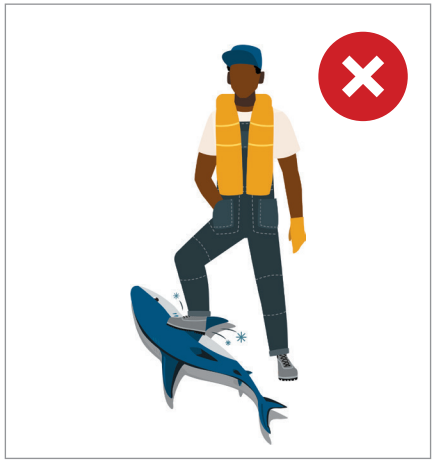
BAD PRACTICES OF SHARK, RAY AND SKATE HANDLING

It is important to NEVER:

- Hold, lift or drag them by the tail without supporting another portion of the body, i.e. around pectoral (front) fins.
- Hold or place fingers into the gills or spiracles.
- Push, kick, stand or drop them.
- Use a gaff or other sharp object to manoeuvre them.
- Leave them in direct sunlight.
- Hit, throw or allow the animal to batter itself on the deck.
- Use bind wire around any part of their body to tow or lift them.
- Make holes in wings or fins for easy lifting.
- Break off barbs or tails.
- Cut out flesh/jaws or eyes to remove hooks.



CONCLUSION

If this simple guide is followed, the fishery and crew can be confident that the released sharks, rays and skates have the highest chance to recover and survive after being caught. By following safe handling procedures, the crew can reduce their chances of being injured by sharks, skates and rays. In addition, their impact of fishing on the marine environment can be greatly reduced which supports fishery managers and industry to comply with ecosystem-based fishery management principles.

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