CHAPTER 4: CODE 1 INCIDENT:
Response Procedures for Live Shark and Ray Reports

STEP-BY-STEP RESPONSE

This chapter provides guidelines to follow when responding to a live stranding of sharks and rays. Sharks and rays are very delicate animals and could easily perish if care is not given when handling them. Time is of the essence especially if the animal is out of the water as its condition will quickly deteriorate. Some sharks are more vulnerable to stress than others and are even susceptible to capture stress causing mortalities.

When dealing with live sharks and rays, the following risks should be considered when an animal is immobilized, hyperactive, and stressed (Marshall, 2004):

- Injury from pressure on the internal organs when out of the water
- Injury to the delicate skin
- Stimulation of sensitive sensory organs
- Increased energy expenditure from hyperactivity
- Impaired respiration and compromised systemic oxygenation
- Build-up of metabolites and blood acids

For a Code 1 response, the immediate release of the animal should be the priority. This will address the problems associated with the risks mentioned above as the animal's condition worsens as the release gets delayed. Data collection and documentation, if time permits, should be carried out swiftly.

A shark and ray should be immediately placed in the water to allow respiration to take place. It should be facing the open sea. The risks mentioned should be reduced mainly by minimizing hyperactivity through proper restraint and handling.

STEP 1. ASSESS THE ANIMAL AND ENVIRONMENT

Observe the animal in its condition which could be motionless on the beach, thrashing in the shallows, or entangled in fishing gear. Note the condition of the environment such as the tide and waves, weather, and the characteristics of the shoreline (rocky, sandy, seagrass, or coral reef). These factors might be important in the cause of stranding or capture and will be important in planning the release of the animal or its retrieval. Note the fishing gear that is implicated in the capture.

Based on field experiences, the following scenarios are often encountered:

1. An animal is beached on shore or stranded in shallow waters
2. An animal is trapped in a fish corral or other fixed structures
3. An animal is entangled in a fishing net
4. An animal is caught or found with a hook and line

For scenarios involving fishing gear, it is best to contact the owners of the gears prior to executing the response which may result to the gear being damaged. The crowd controller is assigned to do this task.

STEP 2. CHECK VITAL SIGNS

Check the wellness of the animal quickly using the following parameters.

Respiration

Observe and count the opening and closing of the shark's gill slits which actively pumps water through the gills if submerged (50-60 breaths per minute could be a basis for the rate). Increased respiration is a sign of lack of oxygen (Stoskopf, 1993). This will be difficult to determine if the animal is above water. If the gills are not moving in the water, the animal could be weak or dead.

Movement

Caudal fins moving from side to side can be a gauge of alertness. Muscle contractions are often observed in response to stimuli. Signs of distress include sustained erratic and jerky body movements whilst swimming. The animal may also thrash around in panic.

Non-movement, even with stimulation, may indicate that the animal is weak or dead.

Body color and condition

Uniform color (particularly in non-patterned species) across the body, erect fins, and full-bodied appearance around abdomen are normal fitness indicators. Discoloration, patchiness in color, lesions, drooping/damaged fins, thinning around abdomen is an indication that something is wrong. Hypo-oxygenation could cause sharks to turn blotchy (Stoskopf, 1993). Reddening of the skin on the ventral side and body rigidity is a sign of toxic metabolites building-up.

Injuries

Cuts, abrasions, lesions on the body and fins should be noted. Some of these scratches may have been inflicted during stranding in the shallows.

Classification of Live Animals

The shark condition classification scheme is based on the conditions upon release of fished sharks and rays in the Atlantic Canada waters (Corke, 2012).

ALIVE - NOT INJURED

All of the following characteristics should apply:

- Quick movements and/or response to being handled.
- Frequent gill movement.
- Fish is not bleeding or is bleeding slowly and not from the gills. Blood may be seen around mouth and/or jaw.
- Hook is visible (e.g., mouth hooked) and has not been swallowed or hooked in from the gills.
- Jaw is intact and appears functional. Injury is limited to hook puncture and/or small extraction wound, with some bleeding possible from the wound.
- If gear is wrapped around the fish, it is not inhibiting or it is removed with minimal damage; appendages remain functional after removal of gear.

ALIVE - INJURED

At least one of the following characteristics applies:

- Fish is moving and/or reacts to being handled.
- Movement.
- Fish is hooked by the gills or hook is not visible and has obviously been swallowed by the fish.
- Blood is flowing freely and continuously from any wound on the fish and shows no sign of slowing down or stopping.
- Jaw is damaged, but still useable.
- Injuries are present, but not immediately life-threatening, e.g., fins may be frayed, damaged or torn, but are still useable.
- If wounds are present on the body - though muscle may be visible - they are not deep enough to expose internal organs.

ALIVE - WEAK

Fish is alive, but not moving with weak gill movement. It is presumed to have at least one of the following lethal injuries:

- Bleeding from a torn or severed gill arch. Fish are unlikely to survive if gills are bleeding, even though it may look alive at the moment of release.
- Multiple fins missing.
- Serious damage to eyes or head.
- Jaw broken, unuseable or missing to the point where the fish will be unable to swim, hunt or feed.
- Deep wounds with internal organs visible.
- Amount of bleeding may be used to qualify whether a fish is moribund.

Decisions on What to Do

Based on the vital signs assessment, the following decision on what to do with the animal is indicated:

- If the animal is ALIVE-NOT INJURED and ALIVE-INJURED, the only option is to release it.
- If the animal is assessed ALIVE- WEAK, there is no other option but to leave it until it dies. No euthanasia protocols are required nor recommended.
- If the animal is dead (in rigor or is lifeless), the carcass needs to be retrieved for data and specimen collection (Codes 2-6) and disposal.
- If the animal is alive for release, the succeeding steps needs to be taken.

STEP 3. RESTRAIN THE ANIMAL

Retraint is the act of limiting the movement of a live animal to prevent further injury. This is especially important if the stranding occurred in a shallow area. Under restraint, collection of data from the animal becomes more manageable. The following procedures on proper handling should serve as a guide to ensure a safe environment and manageable restraint on the animal, given different stranding scenarios. Restraint is necessary to be able to move the animal, acclimatize it, and prepare it for release. This process should be done as quickly and calmly as possible.

On the beach or in shallow water

Figure 14 If small enough, a stretcher is the best way to move the animal. This should not be attempted for large animals.

- Limit the number of handlers to only what is necessary. In single stranding, one person may do. Too many people handling one animal can add to the stress
- It is important to bring the animal back to normal buoyancy to stimulate swimming behavior.
- Use a stretcher to lift the animal to the water if it is small enough. For the stretcher, use a wooden pole and vinyl sheets (tarpaulin material). It is possible to use old streamers, blankets, or other soft materials you can find that is strong enough to hold the weight of the animal. Make sure the animal is in a horizontal position (Fig 14). For rays, use a rigid round-shaped stretcher built like a trampoline to move the animal.
- If animal is too large and cannot be lifted, use a net made of soft knot-less nylon to prevent abrasions (Smith et al., 2004).
- Approach the animal from the side with care.
- Avoid loud noises and abrupt movement.
- For whale sharks, always be careful of the caudal part of its body (remember the tail moves sideways).
- For rays, always be mindful of the whip-like tail.

Never tie the animal with a rope by the tail or any other part of the animal. To drag a large animal using this method will cause it further injury which will worsen its condition.

In deep water

Working at a depth can be difficult without proper swimming skill, swimming gear, and water vessel. Therefore, safety of the responders should not be underestimated.

- Approach the animal with a non-motorized vessel. Should it be unavoidable, the engine must be turned off at least 10 meters away from the animal or the enclosure.
- Use of SCUBA or snorkeling gear is recommended. As an added precaution, buddy system should be strictly followed.
- Limit the number of handlers in the water. Other members should be on the lookout for their safety in case the situation becomes dangerous.
- In the event of rough sea condition, tow the animal to calmer waters to facilitate ease of handling.

It is possible to induce a trance-like state to the shark called tonic immobility by holding the animal upside down for a few minutes (Smith et al., 2004). This is only possible if the animal is small enough but should be used with caution because the process may cause osmotic imbalance, and consequently affect its ability to maintain buoyancy and other metabolic processes.

STEP 4. ACCLIMATIZE THE ANIMAL

Acclimatization is the process wherein the animal is stabilized in the water in preparation for release. The animal needs to be acclimatized to make the situation less stressful to the animal and to make it more manageable for the team. Data collection should be conducted during this step. Form EB01, Shark and Ray Stranding Data Sheet should be used for documentation (Annex 1).

During this step, it is important to monitor the respiration rate, animal movement, and body coloration, and swimming behavior. The risks should be reduced by:

- Using a stretcher to support the animal's body weight when lifting to move it from the beach to shallow waters (at least waist-deep)
- Floating the animal in the water (may necessitate waiting for the high tide) which facilitates respiration
- Massaging the musculature by flexing the caudal peduncle and stroking the dorsal part of the animal. This will reduce metabolic build-up and stimulate better circulation
- Avoiding use of metallic objects and equipment with electric currents as these are easily picked up by the animal's sensors
- Preventing injury to the skin by clearing area of sharp rocks
- Using gloves during the handling as not to give the animal any infection especially if the mucous layer is damaged

FIRST AID TIPS

- Do not transport the animal to another location.
- If a large animal is on the beach due to low tide, it is best to wait for the tide to come in before moving the animal.
- If there is a delay moving to the water, make sure that the animal is shaded and wet all the time.
- No treatment of the animal is necessary which includes the use of medications, vitamins, or antibiotics.
- Whale sharks, manta rays, and other sharks and rays have no known communicable diseases to humans.

STEP 5. RELEASE THE ANIMAL

The only option for any live shark and ray is to release it (ALIVE-INJURED and ALIVE-NOT INJURED). In no instance shall rehabilitation or euthanasia be allowed. There are no benefits from any type of treatment to the animal, such as wound treatment or providing vitamins and antibiotics, and better if avoided. For ALIVE-WEAK condition, the animal is left to die without assistance.

After a short acclimatization process and data collection, release the animal without delay. The following are the procedures recommended for the release. Note that the situation varies greatly and it will be up to the response team to decide on the best method for release given the unique situation they are in. When dealing with fishing gear, it is best to inform the owner of the gear first

and allow him/her to participate in the process, especially if the gear needs to be cut. As rescues are emergencies and if the owner of the gear can not be found, proceed with the rescue but make sure that the whole process is documented and the gear returned to the owner.

In shallow water

- The animal should have been moved to the water if found beached.
- Move the animal facing the open sea.
- If the water is high enough, release the animal from the stretcher to facilitate the release. The objective is to let the animal swim on its own in deep enough water.

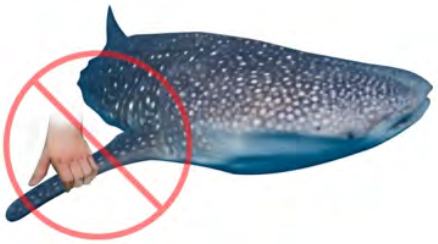


Figure 15 Keep the pectoral fins free during the release.

- It is possible to guide the animal to swim towards deeper water. For whale sharks, avoid touching the pectoral fins as this tends to stress the animal (Fig. 15).
- If the animal is not able to swim on its own, assist the animal in swimming towards open sea by carefully pushing it forward.
- When guiding the animal, never swim above it as this will cause the animal to dive and hit the bottom.
- Stay clear of the caudal part and the pectoral fins to limit injuries to the responders and to ensure that the animal's mobility is not impeded.

Trapped in fish corral

Due to the confined space of enclosed fixed gears such as a fish corral, the number of rescuers approaching the animal should be limited to a maximum of four. The rest of the rescuers and extended team can be instructed to remove obstructions along the animal's path and/or to widen the way to the designated exit point.

- To release the animal, have at least two responders approach the animal carefully without the use of SCUBA gear (Fig. 16).
- For whale sharks, the responders can position themselves on both sides of the animal's head region but avoiding its pectoral fins.

Figure 16 Approach the animal without SCUBA gear.

- Slowly and gently hold the animal by its lower jaw and guide it out of the enclosure (Fig. 17).
- For manta rays, the responders should try to herd the animal without touching it by stretching pieces of cloth to delineate the way out of the enclosure. However, if this proves unsuccessful after repeated attempts, responders may guide the animal by gently grabbing its mouth. This option should be a last resort because the mouth area is most sensitive and fragile and extra care should be taken, when doing so.

Figure 17 Guide the whale shark out of the enclosure with gloves on.

•SCUBA gears may only be used after three failed attempts. By this time, responders may be exhausted and the animal stressed out. This option is considered only so that efforts to release the animal may be continued while avoiding added stress and ensuring the safety of the responders. Give the animal time to rest before repeating the steps in using SCUBA gear.

• Sharks and manta rays at times, mistake bubbles from SCUBA gears for shoals of food and thus, may be coaxed into following it out of the enclosure. However, in some cases, bubbles have been observed to stress the animal even more so the responders have to decide for themselves whether SCUBA gears will be useful for their particular situation or not.

Entangled in fishing net

- If the distance of the animal is too far from shallow water, the net can be cut to facilitate the release.
- If close enough to land, the animal may be brought closer to the shore so that its release will not endanger the lives of the responders.
- The animal should be brought close to the shore head first to ensure proper breathing. Do not tow the animal to shore backwards or tail first.
- Try to preserve the net as best as you can to lessen the damage to the fisherman's livelihood. However, if this is not possible, cut the net off of the animal.

Caught or found with a hook and line

Due to the perilous nature inherent to removing a hook that is often stuck in or around the mouth of a shark, taking accurate measurements and collecting tissue samples may be bypassed. The procedures below must be followed:

- Carefully try to remove the hook by cutting off the barb/hook
- If shallowly embedded, pull the hook free.
- Should the removal of the hook be too complicated, such as deeply embedded or too close to sensitive part of the body or the safety of the responders is threatened, choose to leave the hook and cut the line as close to the hook as possible.

STEP 6. MONITORING AFTER RELEASE

Stay at the release site at least an hour after release just in case a re-stranding occurs. The help of local residents at the site and in adjacent barangays may be enjoined in the monitoring of the animal after the animal's release. They must also be warned of the possibility of a re-stranding event so that they can report the incident immediately to the response team or to the local authorities.

If a re-stranding occurs within hours of the release, assist the animal to maintain its natural position. However, give the animal a rest period before attempting a second release.

If a re-stranding occurs days after the release, consider it as a separate or new stranding and respond accordingly. Confirm whether it is the same individual by comparing measurements and photographs from the earlier strandings.

If the animal dies in the course of the stranding response, procedures on carcass disposal should be followed. Additional tissue samples may also be collected and a necropsy undertaken by DA personnel and DA-certified persons only.

STEP 7. PREPARE A STRANDING REPORT

Standard forms need to be filled up completely after each stranding response. Instructions on how to fill out the data sheets can be seen in the chapter on data collection and reporting. Forms EB01 and EB02 are found in Annexes 2-3.

PUBLIC EDUCATION AND AWARENESS RAISING

Throughout the response operations, make it a point to educate the community on the work that is being done, the importance of the rescue of the animal, and the conservation issues relevant to the locality and the species involved. Having a captive audience is the best opportunity to raise awareness on sharks and rays. Debrief and acknowledge the assistance provided by those who were present in the area and helped in the response activity. Share as much information on the stranding response with the people who helped and the rest of the community. Doing so will help establish vigilance and active support from the members of community in case another incident happens.

Disclaimer

Some parts of the succeeding chapters of this manual are highly technical and specialized. Necropsy, internal examination, and tissue/specimen collection require the supervision of a DA-BFAR-NFRDI certified responder knowledgeable in sharks and rays biology. If none are available, it is strongly recommended that the abovementioned offices be informed to provide the appropriate action.

CHAPTER 5: CODES 2-6 INCIDENTS:
Response Procedures for Dead Shark and Ray Reports

This chapter discusses the procedures on dealing with dead sharks and rays. The animal may be already dead when reported and must be categorized from Codes 2-6. The animal could have died during the rescue or rehabilitation operation. It is necessary to examine the animal closely before declaring the animal dead. All the vital signs should be absent. The animal is in rigor and lifeless and shows absolutely no response to handling.

Compared to the quick data collection from Code 1 where release is prioritized, the time with a dead animal is unlimited. Therefore, it is important to get as much information and samples under such conditions.

The main purpose of a necropsy is to determine the cause/s of death through the examination of the body and internal organs as well as through tissue analysis. It also provides an opportunity to collect samples for other research useful to determine the animal's life history and help document possible human-related causes of death. Necropsy needs to be done by a trained individual. Interpretation of the gross and laboratory findings should only be done by qualified professionals such as a wildlife veterinarian or a fish pathologist.

In some cases, the species may only be confirmed through DNA analysis extracted from tissue samples collected. The complete skull including teeth could also confirm the species. It is best not to damage the skeleton, particularly the skull and jaws, when doing the necropsy as these are fragile in sharks and rays as they are made of cartilage instead of bone.

In handling animals classified under Codes 2-4, discretion is left to the response team whether a necropsy can be done or not. It is easier to do on fresh specimens (Code 2) than decaying ones (Code 3 and 4). For obvious reasons, necropsy cannot be conducted on Code 5 or 6 cases, but whatever data is available must be collected.

The necropsy will most likely be done under field conditions, especially if there is no access to a laboratory. Whenever possible, transport the carcass to a facility where the external and internal examinations can be performed more thoroughly.

The equipment and materials needed are listed on the next page. Remember to always use gloves or even full protective clothing throughout the entire procedure.

TRANSPORT MATERIALS
- Ice coolers or ice chest
- Leak-proof, break-proof containers
- Absorptive packing materials
- Sealing tape

SPECIMEN CONTAINERS AND SAMPLING EQUIPMENT
- Rigid plastic containers with tight fitting lids (approximately 1 liter)
- Small vials, tissue cassettes, or tags to identify specific samples
- Plastic bags with closure tops (Zip-Lock)
- Parafilm or sealing tape
- Aluminum foil
- Sterile syringes and needles
- Labeling tape or tags, water proof labeling pens, and pencil

NECROPSY EQUIPMENT
- Sharp knife (including sharpening stone or steel)
- Scissors (small and large)
- Forceps
- String
- Hack saw or bone saw
- Scalpels and razor blades
- Plastic ruler or measuring tape

EXTERNAL EXAMINATION

Before dissecting the animal, make sure to observe its external appearance. Markings on the body can give the examiner a clue on the probable cause of mortality. Make sure that enough photographs are taken and included in the report. Some pointers to keep in mind are:

- Describe the appearance of the carcass. Is it bloated? Does it show signs of fishing gear marks? Is the flesh still intact, damaged, or in advanced decomposition?
- Take note of the presence of lesions on the body (e.g., location, shape and texture, severity, color, and odor if any) or any parasite attached. Collect the parasites (if any) as needed.
- Measure the different parts and sections of the carcass. Refer to Annex 1 for a complete guide.
- Distinguish between marks and wounds acquired by the carcass before and after death.
- Record information on Form EB01 found in Annex 2.

INTERNAL EXAMINATION

Incisions have to be made to see the internal organs of the animal. Use protective clothing both on hand and body for safety. Sufficient working space should be secured especially when dealing with large stranded animals. Describe, measure, and record all findings on the necropsy form, EB03 on Annex 4.

1. Collect skin and muscle tissue samples at the base of the first dorsal fin. Preserve in 95% Ethanol. If unavailable, 70% Ethanol will do for a short period of time. This is easily found at a local drugstore (e.g., Casino brand alcohol).

Store at -5 to -20°C until analysis. Complete drying under the sun or using a fruit dehydrator is another option. Label all samples taken correctly.

Figure 18 A stranded whale shark on ventral position ready for necropsy. Photo credit: M Santos

2. Turn the animal on ventral side up (Fig. 18). Observe the area between the pelvic fins, describing any lesions and collect parasites, if present.

3. In males, observe, describe, and measure the claspers - two finger-like structures located medial to the pelvic fins. Claspers of mature males appear large and are covered by cauliflower-like formation on its skin (Fig. 19). Manipulate the claspers to assess the degree of calcification has occurred, the presence of which is an indication of sexual maturity.

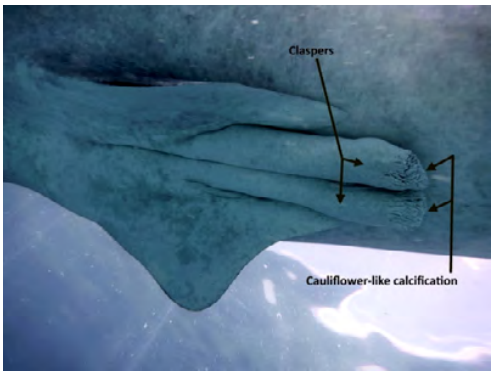


Figure 19 Claspers of a mature male whale shark. Photo credit: Physalus-LAMAVE

4. Make an incision through the skin and connective tissue along the midline following the longitudinal axis of the animal. Start below the lower jaws, continuing between the pectoral fins and ending caudally just before the pelvic fins.

5. Make two more incisions perpendicular to the longitudinal body axis, the first one below the lower jaw and the second one just before the pelvic fin.

6. Fold the skin and tissue sideways to expose the internal muscle layers and observe any lesions, unusual formations, and parasites. If present, describe, measure, collect, and preserve samples.

7. Make another incision, this time through the muscle layer along the midline of the body and fold (similar to the procedure used on the skin) to expose the internal organs. Observe and describe the organs in the abdominal cavity.

8. Move the liver (large light brown organ which occupies most of the cavity) aside to access the stomach (J-shaped organ). Make an incision on the side of the stomach wall and carefully collect its contents. Strain into a container (Fig. 20). Preserve and store these stomach content samples in 95% Ethanol. If unavailable, 70% Ethanol, which is easy to find at local drugstores, will do for a short period then store at -5 to -20°C until analysis.

9. The urogenital system is located below the stomach and the rest of the digestive system. Remove or move the organs to the side to expose the dorsal wall of the abdominal cavity. The kidneys look like ribbons attached to the back wall of the cavity along its midline. Collect samples as needed.

Figure 20 Collecting stomach contents using a fine-mesh strainer. Photo credit: M Santos

10. Locate and describe the ovary and testis found in the cranial portion of the cavity along the midline. Both organs are very small and undeveloped in immature animals. The uterus appears distended and thickened in gravid females.

After all measurements and specimens have been collected and recorded, proceed to carcass disposal.

CARCASS DISPOSAL

The carcass of the animal may be disposed in two ways: (a) burying and (b) disposal at sea. In both instances, the responding team should work with the LGU officials/staff in identifying an appropriate burial site for the animal. There are some burial facilities for large marine vertebrates located in Dagupan, Pangasinan; Sta. Lucia, Puerto Princesa, Palawan; Southeast Asian Fisheries Development Center (SEAFDEC) office, Iloilo; and the BFAR office in Bicol. The Team Leader should incorporate a summary of the disposal procedure into the brief but complete stranding report. Details on report-writing and data collection are found in the next chapter.

ON LAND

When burying the carcass, the site should be unreachable by the highest high tide mark and preferably far from residential areas to avoid scavenging by domestic animals. Depending on the size, availability of the equipment, and other circumstances, the carcass can be buried whole or cut into pieces for ease of disposal. Ideally, the grave should be at least three meters deep.

AT SEA

For disposal at sea, the site should be away from reef areas and water use zones. Wrap the carcass with a net to make towing the animal offshore manageable. Weigh it down with rocks secured by using hemp (abaca) before throwing overboard or towing to keep it sunk. Make sure that the wrapping material is made of biodegradable material. Tow and dispose the animal offshore at about a 100m depth or more.

IMPORTANT
To date, only one gravid female whale shark specimen has been documented in the world and none for the megamouth shark. If one encounters a stranding case with gravid females, it will be an important find. Immediately coordinate with DA-BFAR-NFRDI for proper documentation. Necropsy may be continued by opening the uterus to expose the pups and the egg cases. Describe and measure each pup and associated egg case. Pups may be kept as voucher specimens but should be fixed in 10% formalin for 2-3 days before final preservation in ethanol. To facilitate fixing in formalin, cut one or two slits along the pup's midline.

WHAT NOT TO DO WHEN DISPOSING OF SHARKS AND RAYS

Burning is not an eco-friendly method because it requires fuel such as gasoline. Furthermore, in most cases, it does not dispose of the carcass completely, especially when dealing with large specimens.

Slaughtering for food consumption. Stranded animals are usually sick, infected with bacteria, virus, parasites, and laden with heavy metals. Therefore, it is not advisable to eat them. It is also illegal under Philippine laws if it is a protected species.

Using explosives. The use of explosives for large animals can be detrimental in so many ways, including damage to property and risks to human safety. Thus, it should be avoided at all costs.

CHAPTER 6: DATA COLLECTION AND REPORTING

Data collection is an important part in any stranding response. This is especially true in the Philippines where not all species of sharks and rays have been verified. It is also very useful in assessing environmental and socio-economic parameters (e.g., aquatic pollution, fisheries, and non-compliance to guidelines by tourism sector) that could be threats to threatened shark and ray populations in the Philippines, especially if there is a trend. Documentation also helps. The basic data form for a response (EB01) can be found in Annex 2.

GENERAL INFORMATION

Interview the person who reported the incident and/or the person who initially saw the animal, in case they are different individuals. Record the name, address and contact information, time of stranding or capture, exact location (gear location, beach, sitio, barangay, municipality, etc.), sea condition when the animal was first seen (especially if the condition is often different from the time the response team arrives on site), condition of the animal when first seen, and the number of animals found. Fill up the Environmental Condition box, Stranding Code box, and Animal Information box found in the stranding form EB01. Use the species identification sheet in Annex 1 and Figure 4 to determine the species of the animal.

External examination ideally requires two data collectors and one documenter. Photo-documentation, morphometrics or body measurements, tissue sampling, and tagging (if available) should be taken. All numerical data should be accompanied with appropriate unit of measure.

PHOTO-DOCUMENTATION

Proper photo-documentation is essential for species identification. Body form, special markings, colorations, and body features are important to note especially if the species cannot be identified while doing the response. The best way is to position the camera perpendicular to the part or whole body of the animal being photographed, be it the ventral, lateral, or dorsal sides (Form EB01, Annex 2), to avoid distortion of image perspective that might lead to misidentification of the individual. Photograph the claspers or its absence to document the animal's sex.

IDENTIFYING INDIVIDUALS THROUGH PHOTOGRAPHS

Individual whale sharks can be identified through their unique spot and line patterns using photo-identification technique. This technique is one of the most effective and popular method of recording natural markings on an animal that will identify it as a unique individual. Whale sharks are born with unique body patterns that are retained throughout their lives and are used to distinguish individuals. Similarly, spot patterns on their ventral side are also used to identify individual manta rays. The method allows gathering of photos to be used in a library for cross-matching matrices, allowing the study of movement patterns, site fidelity, annual aggregation size, and other parameters (Meekan et. al., 2008). This method should be done for both live and dead animals.

Record the white lines and spots along the flanks of the animal using either still or video cameras. Photographs are taken perpendicular to the spot pattern area which is just above the pectoral fin and immediately behind the gills (Fig. 21). Photograph this area on the left side of the whale shark making sure that multiple shots are taken.

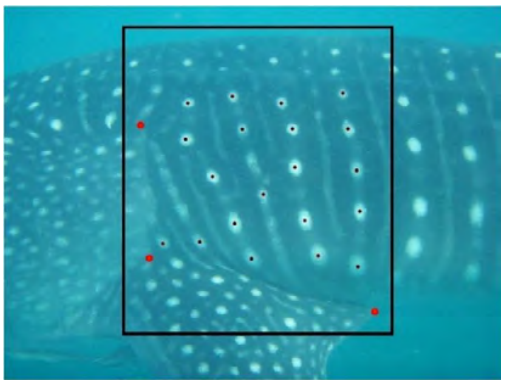


Figure 21 Photo-ID of the left side of a whale shark taken perpendicular to the spot pattern area just above the pectoral fin and immediately behind the gills. Photo credit: E Aca

Photo-identification of beached animals is nearly impossible even if the skin is still intact due to the body distortion or uneven contour of the body because the body collapses on land. Nevertheless, photographs should still be taken for possible identification by comparing it with other photos in a database.

For manta rays, each individual has a unique spot pattern on their ventral surface that can be used to permanently identify individuals. Once an individual is identified, its movements can be tracked down through sighting reports. The area of interest for photo identification is located on the ventral side of the animal (Fig. 22). Photograph perpendicularly the entire underside in one frame. This can be done by SCUBA diving or snorkeling underneath the animal or if the animal is dead, by laying the animal on its dorsal side.

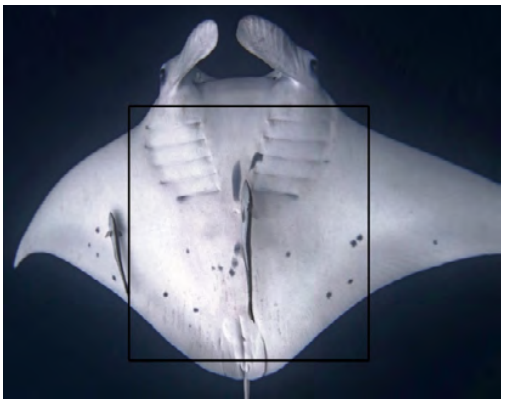


Figure 22 Ventral area for photo-identification of rays. Photo credit: Physalus-LAMAVE.

Scars, especially propeller marks or fin nicks, should also be documented as these at times are enough to identify certain individuals.

Photographs may be submitted to online global databases created and managed by ECOCEAN (www.whaleshark.org) and MantaMatcher (www.mantamatcher.org). Response groups through their team leader may submit photos directly to these

databases. Reports could also be made to the listed local agencies involved but copies of the submitted photos should also be attached to the Stranding Response Report (Form EB02) which will be sent to the DA-BFAR-NFRDI for data-banking. Use a field photo ID card with every photograph taken. This practice is to ensure that you do not mix up photographs from one response to another given that you have accumulated several documentations. A sample is provided below.

FIELD PHOTO-ID CARD

Field No._____

Species_____

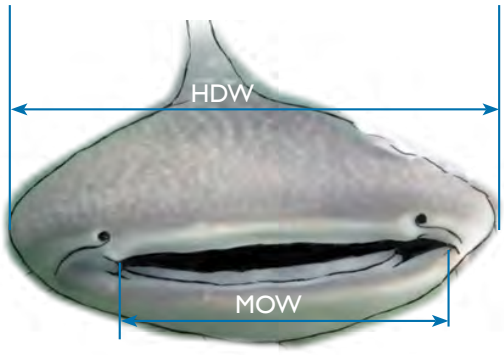
Date (Stranding and Necropsy, if different) _____

Location of Stranding _____

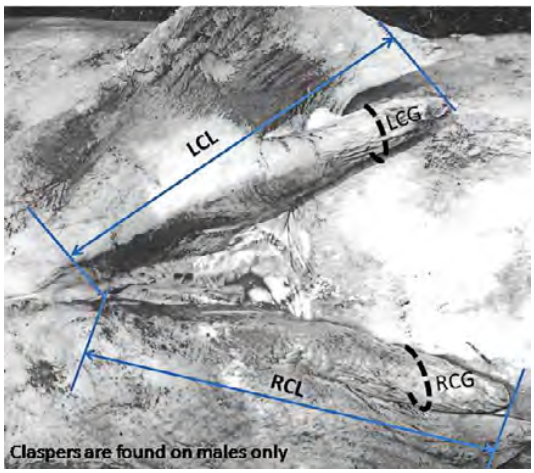
BODY MEASUREMENTS

Figure 23 illustrates body features to be measured for sharks while Table 2 provides descriptions of each part to be measured. Features in bold letters (Table 2) are ideal measurements taken for live stranding or Code 1. If this is not possible, doing so causes more stress to the animal, the most important ones would be the total length and dorsal fin measurements. Similarly, Figure 24 defines the features of rays or skates for measurement and Table 3 identifies these features. The most important information to measure for rays or skates is disc length, disc width, and cranial width. For dead animals, that is, under Codes 2-6, collect all the measurements indicated in the form.

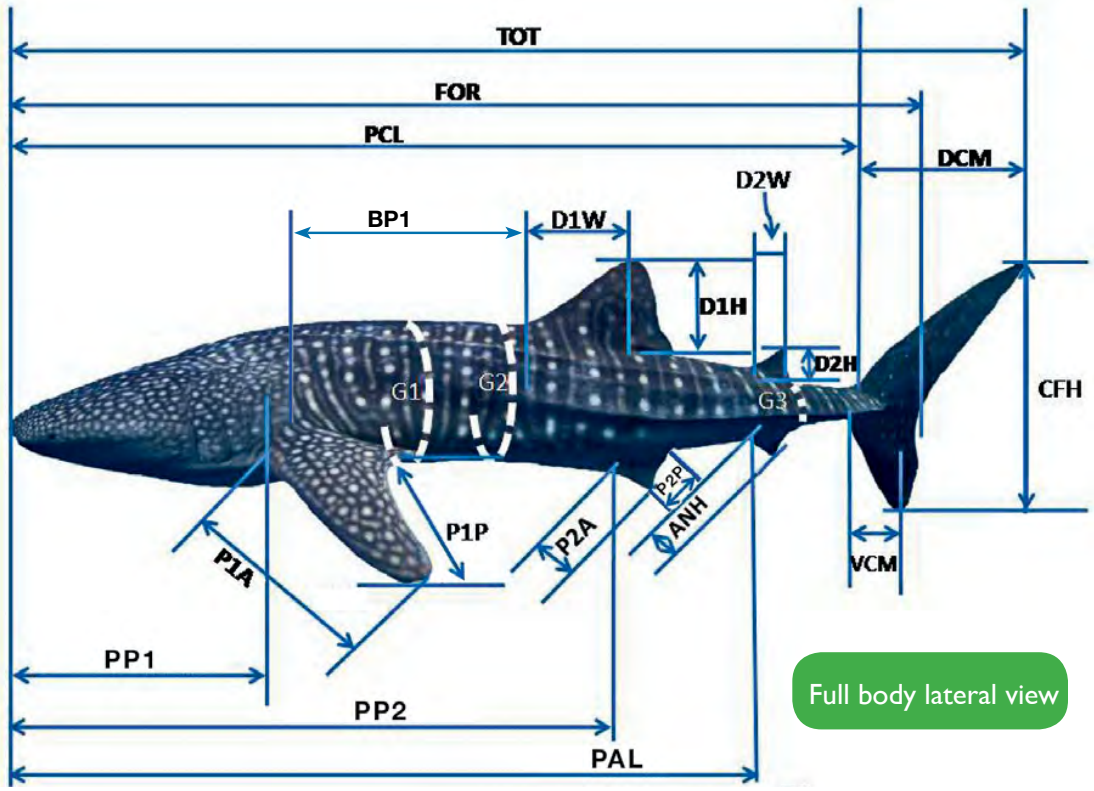
All measurements are taken in a straight line parallel to the body axis and measure to the center of apertures. In the event that a pregnant animal strands, fill out separate form for each pup collected.



Head front view

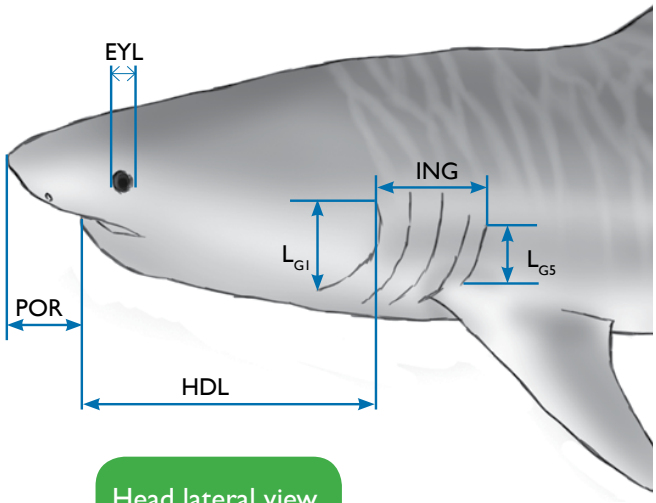


Pelvic fins with claspers in males



Full body lateral view

Figure 23 Body measurements for sharks. Refer to Table 2 on the next page for the description.



Head lateral view

Table 2. Important body measurements for sharks. SL = straight line. Features in bold font are essential measurements to be taken.

Body feature	Description
TOT = Total body length	From the center of the upper jaw to the tip of the upper caudal fin lobe (SL)
FOR = Fork length	From the center of the upper jaw to center of the tail or fork
PCL = Pre-caudal fin length	From the center of the upper jaw to pre-caudal fin notch (SL)
BP1 = 5th gill to start of 1st dorsal fin distance	From the top corner of the 5th gill to be cranial margin of the 1st dorsal fin (SL)
D1H = 1st dorsal fin height	From the base to the highest point of the first dorsal fin perpendicular to the body axis (SL)
L_{G1} = 1st gill length (left)	From the ventral corner to the dorsal corner of the 1st gill (SL)
L_{G5} = 5th gill length (left)	From the ventral corner to the dorsal corner of the 5st gill (SL)
G1 = Girth at axilla	Circumference of the shark body just behind the pectoral fins
G2 = Girth maximum	Circumference of the shark body at its maximum width
G3 = Girth at anus	Circumference of the shark body just behind the anal fin
HDL = Head length	From the center of the upper jaw to the dorsal margin of the 5th gill (SL)
ING = Inter-gill length	Distance between the dorsal margin of the 1st gill and the 5th gill (SL)
HDW = Head width	Distance between the eye (SL, above the head)
EYL = Eye length	Horizontal diameter of the eye
MOW = Mouth width	Distance between the corners of the mouth (SL)
P1A = Pectoral fin anterior margin	From the cranial insertion of the pectoral fin to the tip of the pectoral fin (SL)
P1P = Pectoral fin posterior margin length	From the caudal medial margin of the pectoral fin to the tip of the pectoral fin (SL)
P2A = Pelvic fin anterior margin	From the cranial insertion of the pelvic fin to the tip of the fin (SL)
P2P = Pelvic fin posterior margin length	From the caudal medial insertion of the pelvic fin to the most caudal (SL)
D1W = First dorsal fin base width	From the cranial to the caudal margin of the dorsal fin at its maximum width (SL)
D2H = Second dorsal fin height	From the base to the highest point of the second dorsal fin perpendicular to the body axis (SL)
D2W = Second dorsal fin base width	From the cranial to the caudal margin of the second dorsal fin at its maximum width (SL)
ANH = Anal fin height	From the cranial insertion of the anal fin to the tip of the fin (SL)
DCM = Dorsal caudal fin margin length	Pre-caudal fin notch (dorsal side) to the tip of the upper caudal fin lobe (SL)
VCM = Ventral caudal fin margin length	Pre-caudal fin notch (ventral side) to the tip of the lower caudal fin lobe (SL)
CFH = Caudal fin height	Distance between the tip of the upper and lower lobes of the caudal fin (SL)
LCL = Left clasper length	Length of the medial margin of the left clasper from the cloaca to the posterior tip (SL)
LCG = Left clasper girth	Maximum circumference of the left clasper
RCL = Right clasper length	Length of the medial margin of the right clasper from the cloaca to the posterior tip (SL)
RCG = Right clasper girth	Maximum circumference of the right clasper
POR = Pre-oral length	From tip of snout to upper mouth line
PP1 = Pre-pectoral length	From tip of snout to cranial insertion of pectoral fin (SL)
PP2 = Pre-pelvic length	From tip of snout to cranial insertion of pelvic fin (SL)
PAL = Pre-anal length	From tip of snout to cranial insertion of anal fin (SL)