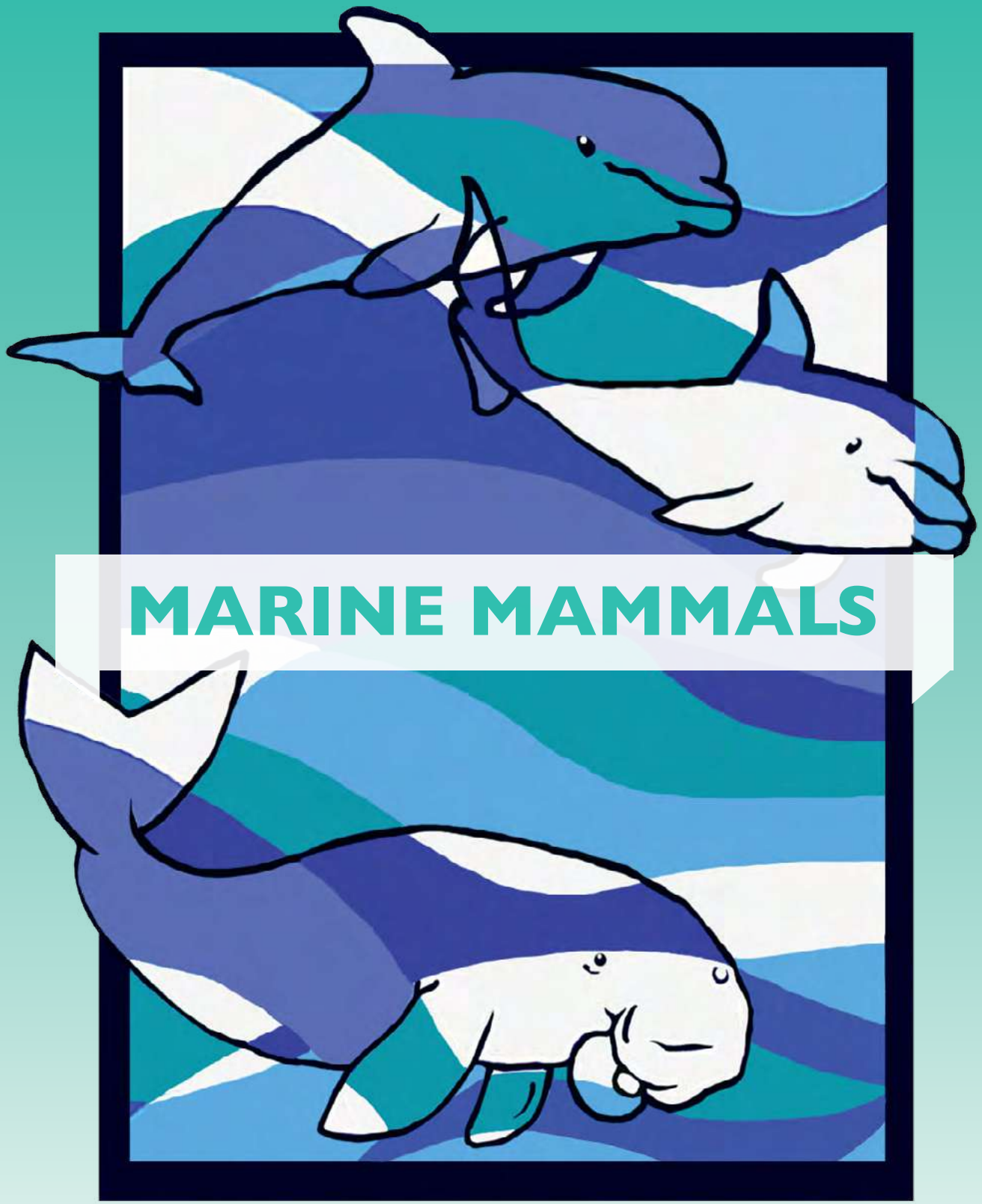
PHILIPPINE AQUATIC WILDLIFE RESCUE AND RESPONSE MANUAL SERIES



MARINE MAMMALS

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On behalf of Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety of the Federal Republic of Germany

ACCCoast Adaptation to Climate Change in Coastal Areas

Marine Wildlife Watch of the Philippines

Published by:
Marine Wild Fauna Watch of the Philippines, Inc.
G/F, Spanish Bay Tower, Bonifacio Ridge, 1st Ave.
Bonifacio Global City, Taguig City
1634, Philippines
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ISBN 978-61-95068-2-3

Recommended Entry:
Marine Wildlife Watch of the Philippines. 2014. Philippine Aquatic Wildlife Rescue and Response Manual Series: Marine Mammals. Marine Wild Fauna Watch of the Philippines, Inc. 86 pages.

Use of this manual:
The publishers are not liable for any accidents that may happen as a result of the use of this manual. While the procedures outlined in the manual are based on numerous field experiences of practitioners from across the country, stranding incidents may still vary from one another and users of this manual may have to adapt suitably to each specific situation.

Suggestions and comments are encouraged from users of this manual for the continued improvement of stranding response protocols for cetacean and dugong species. Suggestions and comments may be sent to Marine Wildlife Watch of the Philippines (MWWP) at info@mwwphilippines.org.

Philippine Aquatic Wildlife Rescue and Response Manual Series:

Marine Mammals

A collaboration of the
Department of Agriculture-Bureau of Fisheries and Aquatic Resources (DA-BFAR)
National Fisheries Research and Development Institute (NFRDI)
Department of Environment and Natural Resources-
Biodiversity Management Bureau (DENR-BMB)
Marine Wildlife Watch of the Philippines (MWWP)
and the
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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Preface

Marine life is very diverse in the Philippine archipelago. Over 7,000 islands provide a variety of habitats, including a lengthy coastline, deep inner seas and trenches, off-shore waters, shallow coasts with reefs, seagrass beds, and mangrove forests. The Philippines lies within the Coral Triangle, the most biodiverse marine environment in the world. With this richness comes the responsibility to manage human activities around these resources to preserve ecological processes and maintain a healthy environment to sustain millions of Filipinos.

There are potentially more than 30 marine mammal species (cetaceans and dugong) in the country occupying a variety of habitats. Marine mammals are some of the most widespread species in Philippine waters. However, human-caused problems in the marine environment have resulted to the decline of marine mammal populations, many of which have become threatened. Marine mammals have become victims of harvesting, poaching, by-catch, pollution, habitat degradation, disturbance, prey depletion, and even climate change.

Over the years, incidents of marine mammal stranding and bycatch have been reported to coastal resource managers, national government offices (such as the Department of Environment and Natural Resources and Department of Agriculture), and local governments by coastal communities. It seems that a lot of these incidents are human-induced. The usual scenario is that the agencies or individuals who receive reports are unable to conduct rescue, release, documentation, or salvage operations due to the lack of technical skills and know-how. Training, usually time consuming and expensive, is required to be able to respond accordingly. To be able to provide the different agencies, offices, and communities with the knowledge, there is a need to produce a response manual that is understandable and easily available to the potential users. The manual can be used in coastal resource management programs, marine protected area (MPA), and MPA networks. This manual is best used in a program that will be integrated in biodiversity research and monitoring activities.

This manual in part supports the conservation aim to improve the status of threatened marine species in the country and in the regional context, specifically goal number 5 of the Coral Triangle Initiative - National Plan of Action (CTI-NPOA). It also contributes to the development of standard research and monitoring protocols for threatened populations and habitats.

The manual also responds to the Comprehensive Action Plan for Threatened, Charismatic, and Migratory Species of the Sulu-Sulawesi Marine Ecoregion (SSME), which has been identified as the first priority seascape of CTI. The Tri-National Committee of the SSME developed the Comprehensive Action Plans (CAP) that identified four Key Result Areas (KRAs) to improve the status of marine mammals in the SSME, as follows: (a) Minimize threats on marine mammal populations and their habitats; (b) Promote initiatives on the protection and management of marine mammal habitats and migratory routes; (c) Facilitate reduction of incidental capture and mortality of marine mammals in fisheries; and (d) Provide recommendations on marine mammal stranding responses to minimize mortality in stranding events and maximize data collection.

This manual is an important step to address gaps and issues on threatened marine wildlife in the Philippines to better protect and conserve marine biodiversity in the Coral Triangle.

Acknowledgment

The making of this manual proved to be tedious but has been made feasible through collaborative efforts. The help of countless people from reporting a stranding to responding and extending their generosity to the stranding team is greatly appreciated: the local chief executives from the stranding networks, who have been supportive of this endeavour, Bantay Dagat members from the province of Negros Oriental, Silliman University for the curation of specimen, Mr. Federico Infante, Mr. Alfredo de la Paz, Mrs. Carolina de la Paz, and Mr. Ed Montelibano of Oriental Cold Storage Inc., from Bacolod City, the University of St. La Salle for allowing us to use their facilities during necropsy and providing manpower through their faculty and students. Thank you to those who contributed their photographs: C. Alvior, M.E. Arbiol, A.L. Barcelona, L. Callanta, M.E. de la Paz, J. Delos Reyes, C.L. Emata, T. Jequinto, Y. Lee, and A.J. Tiongson. This manual would not have been finished if not for the help of the following: Beterinaryo sa Fort Animal Clinic and Kirschner Travel Manila office for providing us a free venue; Molly Manalansan for the support; Macky Lovina for the valuable comments; Karen Yaptinchay-Gella, Fara Policarpio, Cris Villarey, and Ms. Anna Oposa for editing; Jenica Dizon, for the layout, book design, and graphic work; Mike Yap for some of the artwork, and Emelinda Ramoso for the cover.

The publication of this book is made possible through the collaboration of the Department of Agriculture- Bureau of Fisheries and Aquatic Resources (DA-BFAR) National Fisheries Research and Development Institute (NFRDI), Department of Environment and Natural Resources-Biodiversity Management Bureau (DENR-BMB), Marine Wildlife Watch of the Philippines (MWWP), and the Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) through its Adaptation to Climate Change in Coastal Areas Project (ACCCoast). This project is part of the Internationale Klimaschutziniative (IKI). The German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) supports this initiative on the basis of a decision adopted by the German Bundestag (http://www.international-climate-initiative.com).

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List of Abbreviations

BFAR	Bureau of Fisheries and Aquatic Resources
BMB	Biodiversity Management Bureau
CAP	Comprehensive Action Plan
CI-Phils	Conservation International-Philippines
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CTI	Coral Triangle Initiative
CTI-CRFF	CTI-Coral Reefs, Fisheries, and Food Security
CTI-NPOA	Coral Triangle Initiative - National Plan of Action
CWR	Certificate of Wildlife Registration
DA	Department of Agriculture
DAO	DENR Administrative Order
DENR	Department of Environment and Natural Resources
DNA	deoxyribonucleic acid
EO	Executive Order
FAO	Fisheries Administrative Order
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GPS	Global Positioning System
ICC	Indigenous Cultural Community
ICRMP	Integrated Coastal Resource Management Program
IP	Indigenous People
IPRA	Indigenous Peoples Rights Act
IUCN	International Union for the Conservation of Nature
IUCN-SSC	IUCN Species Survival Commission
kg	kilogram
KRAs	Key Result Areas
mg	milligram
mL	milliliter
MM	Marine Mammal Form
MoA	Memorandum of Agreement
MoU	Memorandum of Understanding
MPA	Marine Protected Area
MWWP	Marine Wildlife Watch of the Philippines
NFRDI	National Fisheries Research and Development Institute
NIPAS	National Integrated Protected Areas System
PAP	Philippine Action Plan
PASu	Protected Area Superintendent
PCSD	Palawan Council for Sustainable Development
PENRO	Provincial Environment and Natural Resources Office
PPM	parts per million
PPT	parts per thousand
RPOA	Regional Plan of Action
SEAMMAM	Southeast Asia Marine Mammal Symposium
SEAFDEC	Southeast Asian Fisheries Development Center
SEP	Strategic Environmental Plan for Palawan
SSME	Sulu-Sulawesi Marine Ecoregion
SU-IEMS	Silliman University Institute of Environmental and Marine Sciences
TIHPA	Turtle Islands Heritage Protected Area
TIWS	Philippine Turtle Islands Wildlife Sanctuary
TRICOM	Tri-National Committee
TRNP	Tubbataha Reefs Natural Park
WBC	white blood cell
WRC	Wildlife Rescue Center
WWF-Phils	World Wide Fund for Nature-Philippines

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Definition of Terms

Acoustic - relating to sound or the sense of hearing
Anterior - front part of the animal
Blowhole - similar to the nostril; Single for toothed whales and one pair for baleen whales
Buoyancy - the ability or tendency to float in water
Bycatch - all non-target fish/organism whether retained and sold or discarded in fisheries
Cephalopods - any mollusk of the class Cephalopoda, having tentacles attached to the head, including the cuttlefish, squid, and octopus
Cervical – referring to the area in the neck area
Constrict – to contract or shrink
Crustacean - any chiefly aquatic arthropod of the class Crustacea, typically having the body covered with a hard shell or crust, including lobsters, shrimps, crabs, barnacles, and wood lice
Dilate - to become wider or larger
Dorsal - top of the animal
Dorsal fin - single fin on the back of whales absent in dugong and some cetaceans
Dystocia – difficulty in giving birth
Elasmobranch - subclass Elasmobranchi (sharks, skates and rays) under the class Chondrichthyes (cartilaginous fishes) belong to an ancient group of fishes that evolved for over 400 million years
Emphysematous – disease of the lungs characterized by abnormal enlargement of air spaces in the lungs accompanied by destruction of the tissue lining the walls of the air spaces
Epipelagic – oceanic zone from surface to 200 m, the maximum depth of light penetration
Falcate – curved
Flukes - refers to the tail of the marine mammal
Friable - easily crumbled
Herbivorous – plant-eating animal, usually exclusively
Hypothermia - condition that occurs when your body loses heat faster than it can produce heat, causing a dangerously low body temperature
In situ – being in the original position, on-site
Intertidal zone - also known as the littoral zone, in marine aquatic environments is the area of the foreshore and seabed that is exposed to the air at low tide and submerged at high tide
Krill - Euphausiidae family of shrimp-like crustaceans that swarm in dense shoals, particularly in Antarctic waters
Lateral - side of the animal
Latitude - a geographic coordinate that specifies the north-south position of a point on the Earth's surface
Lob tailing - when a whale lifts its flukes out of the water and brings it down forcefully to slap
Mesopelagic – Oceanic zone between 200 and 1000 m, no light
Neonate – new born
Neritic - shallow water above the continental shelf
Pectoral fin - flipper closest to the head of the animal
Pelagic – anything not referring to the bottom in the sea, but the water column
Posterior - rear or end part of the animal
Prognosis - forecast of the likely course of a disease or ailment
Pupil - the black opening in the center of the eye
Release – action when a marine mammal is brought back to its natural habitat
Rescue - to free or deliver from confinement or danger
Response - to act on a report of a marine wildlife incident
Rostrum - beak, mouth or snout in front of the animal
Salinity - measure of the concentration of dissolved salts in water
Serrated - resembles a saw-edge, jagged or uneven
Ventral - underside of the animal
Yaw - a twisting or oscillation of a moving object around its vertical axis
Zoonotic - a disease that normally exists in animals but can be transmitted to humans

Overview of the Manual

Rationale

The exact status of marine mammal populations in the Philippines is largely unknown, but the trend shows a decline. The lack in information has been addressed since the 1990s when focus on increasing the knowledge on these animals through surveys and assessments were conducted by the Department of Agriculture-Bureau of Fisheries and Aquatic Resources (DA-BFAR), Department of Environment and Natural Resources-Biodiversity Management Bureau (DENR-BMB), Department of Tourism (DOT), Silliman University – Institute of Environmental and Marine Sciences (SU-IEMS), University of the Philippines-Marine Science Institute (UP-MSI), World Wide Fund for Nature (WWF)-Philippines, and Bookmark Inc.

In 2004, Palawan became the first province to take on trainings for proper rescue of marine mammals. In line with conservation efforts, rescue teams were created in the Province and started to respond to marine mammal incedent reports with much success.

Training manuals were then provided, with different standards, procedures, and rehabilitation methods. To date, several manuals exist for the Philippine setting, e.g., Field Manual for the Rescue or Salvage of Stranded and Captured Marine Mammals (Pawikan Conservation Project, 1993); Discovering Marine Mammals (WWF Philippines, 2001); Marine Mammal Stranding Response Manual (Aragones and Laule, 2008); and the Field Guide to Marine Mammals and Sea Turtles in Palawan, Philippines (Aquino, 2009). All of which follow different protocols. Given this variation, there is a need to come up with standardized procedures from the national government in a manual that will include easy, step-by-step procedures for first responders, as well as a more in-depth guide for processing stranded animals for the purpose of necropsy and further studies. This is important as it will enhance knowledge on the life history of Philippine marine mammals for the purposes of effective conservation and management.

Although the protection of marine mammal species is covered to some extent in existing national laws such as the Philippine Fisheries Code of 1998 (R.A. No. 8550) and the Philippine Wildlife Act of 2001 (R.A. No. 9147), enforcement of these laws and policies has been challenging. In most response cases, there is a need to capacitate government personnel and various stakeholders engaged in marine mammal conservation. This publication serves to supplement and aid current efforts.

Purpose

The purpose of this manual is to provide understandable, step-by-step instructions to marine mammal stranding responders in the country. It will serve as the official manual in support of capacity-building programs of the DA and DENR. Considering the species covered by this manual are threatened and protected in the country and globally, this publication will strengthen the implementation of relevant local and national policies and support international commitments such as the Convention on International Trade in Endangered Species of Fauna and Flora (CITES), Convention on Migratory Species (CMS),

and Convention on Biological Diversity (CBD). Furthermore, this serves as a tool to add to the scientific knowledge on marine mammals in the Philippines.

Scope

This manual begins with an overview of marine mammals and shares a brief history of marine mammal stranding networks in the Philippines. It discusses the animals' current conservation status, issues and threats, and provides standardized handling protocols to respond to stranding incidences. Illustrations are not drawn to scale except those indicated.

The content is a step-by-step, illustrated, and easy to follow guide that can be used by immediate responders on site.

The last two chapters deal with rehabilitation, euthanasia, and necropsy procedures. It is strongly advised that the users implementing that portion of the manual have a background on marine mammal anatomy and physiology.

Inset boxes are color-coded to signify policy in blue, procedural emphasis in red and biological explanations in yellow.

policy | procedural emphasis | biological explanations

Other concerns such as data management, tissue bank, sample repository, skeleton display, training program (rescue team, design, and program), response team accreditation, and stranding network organization are not addressed in this manual.

Finally, this rescue and response manual does not cover enforcement procedures and other legal protocols. It is best to contact law enforcers if needed.

Target Users

This manual is intended for the use of individuals trained and certified by the DA-BFAR and/or the DENR. Non-government groups and non-government-partners who encounter marine mammals in need of a response should immediately contact the local DA-BFAR and/or DENR-BMB to seek assistance in handling the situation.

CHAPTER 1: INTRODUCTION TO MARINE MAMMALS

TAXONOMY

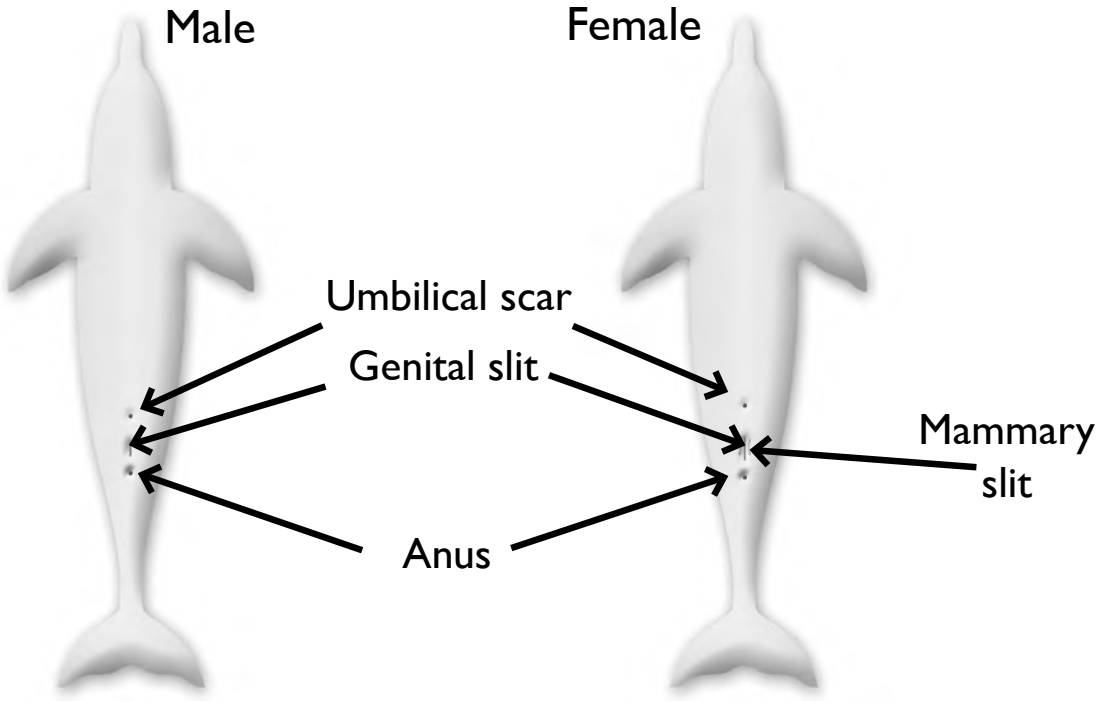
The collective term "marine mammal" refers to a group of animals that spends most or all of its life in the marine habitat. They belong to the kingdom Animalia, phylum Chordata, and class Mammalia. They are represented by three taxonomical orders: (1) Carnivora, (2) Cetacea, and (3) Sirenia. Only the latter two are known to occur in the Philippines. Cetaceans include whales, dolphins, and porpoises. It is further classified into mysticetes, those with baleen plates instead of teeth, and odontocetes for those with teeth. The only sirenian (sea cow) species in the Philippines is the dugong.

BIOLOGY

Marine mammals are not fish, so they do not have gills and gill slits. Figure 2 illustrates the difference between fish and marine mammals. Marine mammals breathe air and have lungs. Cetaceans have blowhole/s on the top of their heads, while the dugong have nostrils on the tip of its snout. The dorsal location of the blowhole means that the animal does not need to lift its head fully out of the water, allowing for easier breathing (Jefferson, 2007). Cetaceans are adapted to live in marine habitats, with forelimbs evolved into pectoral fins and a single dorsal fin that acts as a yaw for stability. Dugongs lack dorsal fins (Fig. 1). Both cetaceans and dugong swim by vertical movement of their tail or flukes, which propels them forward. Marine mammal skin is smooth and has a rubbery feel, in contrast to fish, which is rough in texture due to the presence of scales. Hair can be seen sparsely distributed in the body of a dugong and can only be seen in cetacean newborns. Pigmentation of the skin is prominent in marine mammals, often used to differentiate species or a regional population.

Marine mammal lungs also function in buoyancy maintenance and are more elastic than that of their terrestrial counterparts for quicker recovery from compression after a long dive. The depth reached and period of time a marine mammal can remain underwater varies across species, but generally, larger animals can dive deeper and longer (Perrin et al., 2002). Smaller animals can last some minutes underwater while bigger whales can stay for hours. The presence of blubber, a thick layer of dense fat under the skin of a cetacean, affects buoyancy and regulation of temperature. According to Berta et al. (2006), superficial blubber layer has significant functions in hydrodynamics (e.g., distribution pattern varies which helps to streamline the body), insulation, and protection. This dense layer of fat stores energy in the form of lipids, which plays an important role during pregnancy or lactation (Iverson, 1993).

Of the three groups that make up marine mammals, the cetaceans and sirenians are the groups that carry out all reproductive activities (from mating to live birth) completely in the water (Jefferson, 2007). They are considered as k-selected species, characterized by low reproduction rate but long life span (Berta et al., 2006). As mammals, they give birth to live young. Usually, and under normal circumstances,



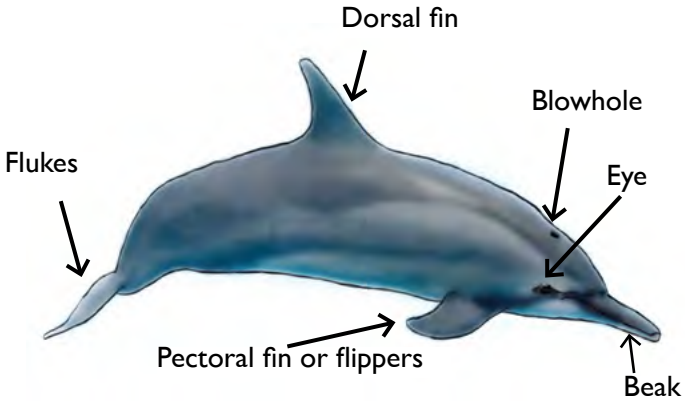
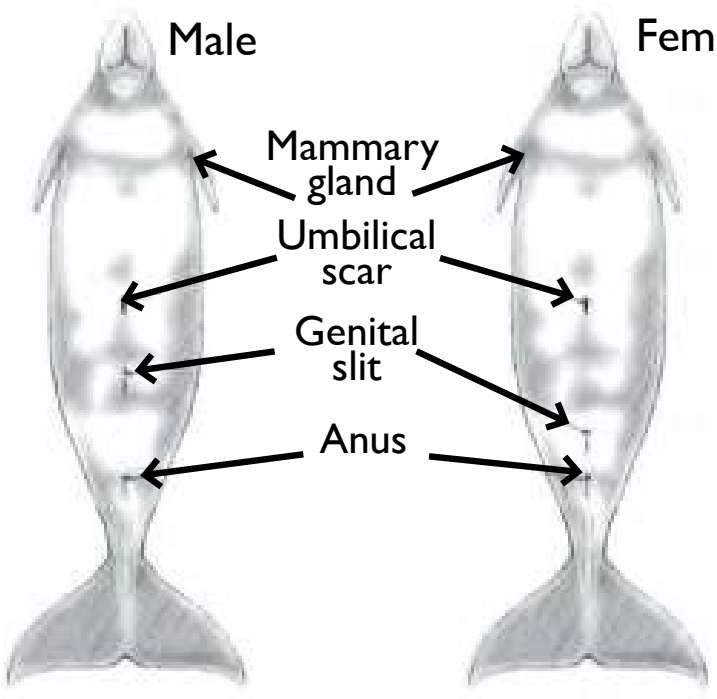
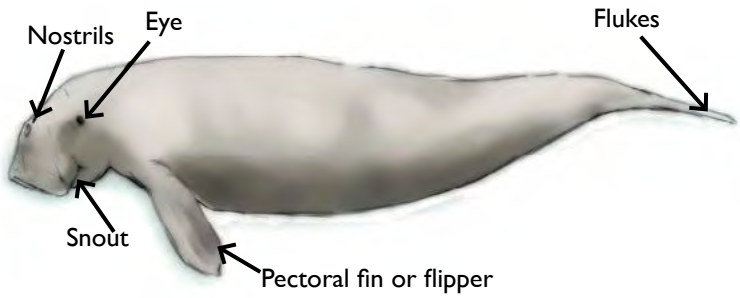


Figure 1 Basic external anatomy of a cetacean (top) and a dugong (bottom). Ventral aspect included to differentiate sexual characteristics of the animals.





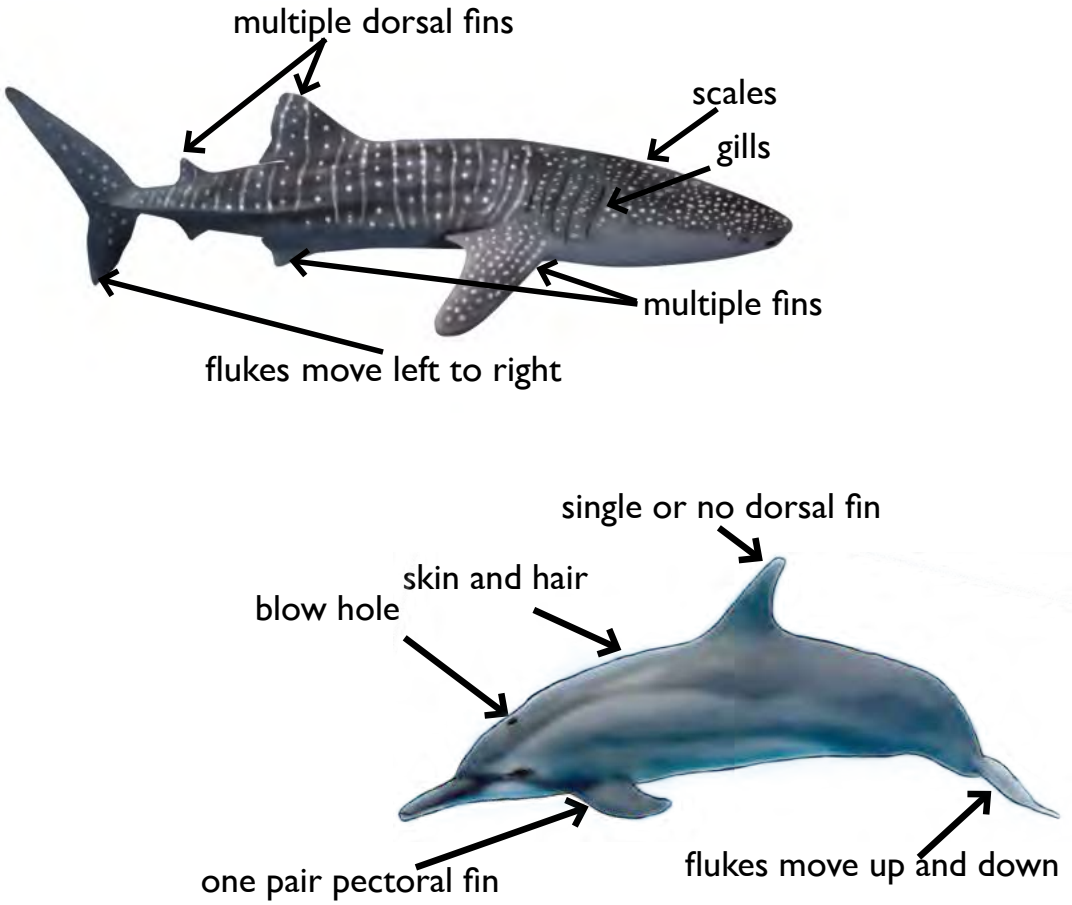


Figure 2 Basic anatomical differences between a fish (left) and a marine mammal (right).

the female gives birth to only one calf. In tropical regions such as in the Philippines, breeding and calving seasons last longer compared to non-tropical regions. Gestation period in most species lasts around one year.

Cetaceans and dugongs use acoustic and visual senses for communication. Clicks, whistles, and even "songs" are some of the sounds produced, which are amplitude and frequency-specific to behavior. This means that the sounds they produce change according to activity. Vision may be limiting in most cases because of the type of habitat they occupy. However, it has been suggested that sense of touch supplements poor visibility. Tactile display such as rubbing, lob tailing, spins, and leaps are often observed these marine animals. Many cetaceans utilize echolocation for navigation and hunting for food.

The feeding ecology of marine mammals is varied across species. Sirenians are herbivorous with dugongs feeding mostly on seagrass. Toothed dolphins generally feed on fish and squid while larger cetaceans such as baleen whales feed on plankton, small fish, and invertebrates. Marine mammals hardly drink sea water and take all their body requirement of fresh water from the food that they eat. Therefore, an animal that has not eaten is also very dehydrated. The table below shows predominant diet of selected marine mammal species found in the country.

Table 1 Food Preferences of Some Marine Mammals
(Arnold, 2002; Dolar et al., 2003; Perrin et al., 1999; Perrin et al., 2002; Koen Alonso and Pedraza, 1999; Robertson and Chivers, 1997; Jefferson and Barros, 1997).

Species	Food Preference
Dugong	Seagrass
Irrawaddy dolphin	Wide variety of fish, squid, and shrimp
Spinner dolphin	Mesopelagic fishes, squid, and shrimp
Pantropical spotted dolphin	Small epipelagic fishes, squids, and crustaceans
Bottlenose dolphin	Consumes a variety of fish and squid
Fraser's dolphin	Mesopelagic fish, squid, and crustaceans
Risso's dolphin	Neritic and oceanic squid species
Rough-toothed dolphin	Different types of fish and squid
Striped dolphin pelagic	Fish and squid
Melon-headed whale	Pelagic fishes and squid and occasionally crustaceans.
Short-finned pilot whale	Squid
Killer whale	Diverse prey species from fish, squid, seabirds, elasmobranch species, including other marine mammal species
False filler whale	Variety of squid and fish, including yellow fin tuna, salmon, and mahi-mahi
Sperm whale	Giant squid
Dwarf sperm whale	Cephalopod species and occasionally on shrimp and crabs.
Pygmy sperm whale	Cephalopods and occasionally on shrimp and crabs
Blainville's beaked whale	Mostly squid
Cuvier's beaked whale	Cephalopods, crustaceans, and fish
Longman's beaked whale	Cephalopods
Humpback whale (does not feed in the Philippines)	Krill and small schooling fish
Bryde's whale	Small schooling fish, and small shrimps locally known as *alamang*
Omura's Whale	Small shrimps locally known as *alamang*

SPECIES IDENTIFICATION AND DISTRIBUTION

As of 2013, there are 27 cetacean species including a subspecies and one sirenian reported and confirmed in the Philippines. Annex I shows the global and Philippine conservation status of marine mammal species listed in the Red List Status Marine Mammals in the Philippines (Alava et al., 2012) with additional species documented since then such as *Mesoplodon hotaula* (Lacsamana et al., 2013) and other potential species which could be present in the country. Other species may possibly occur based on species distributional range, but they remain unverified. There are only reported sightings and unresolved taxonomy for some species. Cetacean distribution is widespread across the archipelago but abundance varies among sites where research efforts are present. Dugong on the other hand has fragmented occurrence with higher concentration in Palawan. The Red List Status Marine Mammals in the Philippines provides comprehensive information on distribution and status of each species under consideration in this manual.

THREATS

Threats to marine mammals are varied and widespread across the archipelagic Philippines. These include hunting, bycatch in nets, pollution (solid waste, chemical, noise), habitat destruction and degradation, use of illegal and destructive fishing methods, disturbance and displacement from habitats, death and injury from boat strikes, irresponsible tourism interactions in the wild, and captive animals used for entertainment taken from unsustainable sources. There is also the impact of overfishing which has caused the depletion of prey for cetaceans. Very few studies have been done to quantify impact of these threats on cetacean and dugong populations in the Philippines.

As an effect of global climate change, physico-chemical parameters of the ocean such as temperature and salinity are expected to intensify and change. Since these parameters are not constant, effects on migratory species like marine mammals vary across geographical ranges because of latitudinal gradient (MacLeod, 2009) but do not eliminate the vulnerability of the species or population. Climate-induced habitat shift can be observed in the restriction or expansion in habitat range. Selection of indicators of the impact of climate change has been attempted by Newson et al. (2009), and for marine mammals, reduced foraging opportunities is seen to be one of them. In terms of resilience to impacts of climate change, much has been put forward, yet remains speculative (Moore and Huntington, 2008). Habitat range use and survivability may be of particular interest to baleen whales during migration wherein they feed in colder waters but are known to visit warm waters. In the Philippines, humpback whales that utilize the waters of the Babuyan Islands for the purpose of reproduction and calving, and other coastal species (Irrawaddy dolphin and dugong) may be affected (Santos and Aquino, 2012).

LEGAL FRAMEWORK FOR CONSERVATION

Cetaceans and dugong in the Philippines have been afforded protection by several legislations. It is best to mention that cetaceans fall under the jurisdiction of the Department of Agriculture, while the dugong is under the Department of Environment and Natural Resources.

The dugong was the first marine mammal to be protected through DENR Administrative Order (DAO) 55 in 1991. The dugong was declared as Critically Endangered under DAO 15 of 2004. Dugong protection is currently governed by the Philippine Wildlife Act of 2001 (RA Number 9147). Illegal under the Philippine Wildlife Act are:

> "Killing and destroying wildlife species; inflicting injury which cripples and/or impairs the reproductive system; effecting destructive acts in critical habitats; introduction, reintroduction, or restocking of wildlife resources; trading of wildlife; collecting, hunting or possessing wildlife, their by-products and derivatives; maltreating and/or inflicting injuries; and transporting of wildlife."

In 1992, Fisheries Administrative Order (FAO) 185 protected cetacean species under the family Delphinidae. This was amended in 1997 through FAO 185-1 which added other cetaceans such as whales and porpoises. The Fisheries Code of 1998 (RA Number 8550) accorded the DA-BFAR the mandate to manage and conserve cetaceans while FAO 208 of 1998 explicitly defined the mandate to conserve cetaceans, listing the 20 species of cetaceans (known at the time of the issuance of this legislation) as endangered (Perrin et al., 2005). Although not in the list for protection in FAO 208, the Irrawaddy dolphin population of Malampaya Sound, Palawan was declared Critically Endangered by IUCN (Smith and Beasley, 2004), is protected under FAO 185-1 and by other legislations protecting the Malampaya Sound such as the Philippine Wildlife Act and Presidential Proclamation 342 which declared Malampaya Sound as a Protected Landscape and Seascape. It is stated under the FAOs that it shall be:

> "unlawful to take or catch dolphins, whales and porpoises in Philippine waters or to sell, purchase, possess, transport or export the same whether dead or alive, in any state or form whether raw or processed."
>
> "unlawful to wound or kill dolphins, whales and porpoises in the course of fishing. Dolphins, whales, and porpoises, which are accidentally included in the catch by any gear or washed ashore alive, shall be immediately released unharmed into the sea; otherwise the liability shall be deemed to still exist. Dead whales, dolphins or porpoises that are washed ashore shall be reported and/or surrendered to the nearest Department of Agriculture (DA) office for proper disposition and documentation."

Cetaceans and dugong are also covered under the Philippine Animal Welfare Act of 1998 as amended in 2012. This is of particular importance for marine mammals undergoing rehabilitation which states:

> "It is the purpose of this Act to protect and promote the welfare of all terrestrial, aquatic, and marine animals in the Philippines by supervising and regulating the establishment and operations of all facilities utilized for breeding, maintaining, keeping, treating or training of all animals."

Cetacean stranding is a concern included in a Joint Administrative Order No. 1 series of 2004 of the DA and the Department of Tourism, entitled "Guidelines to Govern the Conduct of People Interaction with Cetaceans." Although the Order covers tourism interactions in detail, a section of it deals with cetacean stranding with details on rescue and salvage procedures.

Under the section on conduct around cetacean, procedures on how to respond to strandings include the following highlights:

"Check if animal is alive or dead; If the animal is alive, expert help shall be summoned at once; While waiting for help to arrive, keep onlookers at a distance and make as little noise as possible. Do not stand close to the tail or head of the cetacean and refrain from pushing or pulling any parts of its body; If the cetacean is dead, information about the stranding could still be useful to marine mammal researchers; Obtaining photographs of the stranding. No part of cetacean should be taken as souvenir. Philippine laws expressly forbid this. Once enough information has been collected, local authorities should be contacted and informed of the stranding to facilitate the disposal of the cetacean's remains."

Despite these numerous laws, there is a need to introduce new legislation and improve existing ones. There is also a need to establish critical areas and marine protected areas for marine mammals.

Internationally, the Philippines is a signatory to agreements such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Migratory Species (CMS), Convention on Biological Diversity (CBD), and the Convention on Wetlands. Programs such as the Coral Triangle Initiative (CTI) and the Sulu-Sulawesi Marine Ecoregion (SSME) allow the Philippines to set targets that also meet the region's conservation goals.

CHAPTER 2: MARINE MAMMAL RESEARCH AND STRANDING NETWORKS IN THE PHILIPPINES

THE HISTORY OF PHILIPPINE MARINE MAMMAL RESEARCH

The first formal documentation of marine mammal presence in the Philippines was made by Townsend (1935) when he plotted the location of sperm whale kills in 1821 to 1899. Then Slijper et al. (1964) plotted the location of rorquals he saw in southwestern Palawan on board the Dutch ship. Hammond and Leatherwood (1984) reported the presence and collection of dolphins near Cebu by people from Ocean Park in 1974.

The first formal study of marine mammal was made by Dr. Angel Alcala in the mid-1980s when he documented the presence and utilization of dugongs in Palawan. Dr. Louella Dolar from Silliman University started marine mammal research in 1989 around Negros and northern Mindanao after she went back to the Philippines from marine mammal training at the Smithsonian. During this time, she documented the whale fishery in Pamilacan Island, Bohol, and investigated the direct and incidental catches of dolphins in gillnet fisheries in Negros and Pamilacan Island.

The results of the preliminary investigation were presented in the Gillnet Workshop in La Jolla, California that Dr. Bill Perrin organized in 1990. The Gillnet Workshop also sparked the interest of people from Earth Island Institute (EII) particularly in the directed fishery and incidental catches of cetaceans in the Philippines. EII contacted BFAR about the lack of protection for cetaceans. The pressure resulted in BFAR drafting the administrative order protecting delphinids in 1992. That same year, EII asked Dr. Dolar to do the tuna monitoring for dolphin safe tunas in Philippine canneries.

The surveys and published papers on directed and incidental fishery enabled the marine mammal studies as we know it now. With a seed grant from WWF and Earth Trust in 1991, Dr. Dolar was able to do proper surveys and monitoring of directed and incidental catches.

The marine laboratory in Silliman University started doing dolphin-watching trips for the local students and residents in Bais City, Negros Oriental. Around this time, the Mayor of Bais became very interested in dolphins and would sometimes join the surveys. The following year, the Foundation for the Philippine Environment (FPE) gave a grant to study the dolphins in Tañon Strait further. The interest snowballed when Jose Ma. Lorenzo Tan of Bookmark publishing started writing a book on marine mammals and with further studies in the Sulu Sea and Tañon Strait conducted by Dr. Dolar and a marine mammal project at WWF. By 1996, the Philippines hosted the Southeast Asia Marine Mammal Symposium sponsored mainly by the Convention on Migratory Species (CMS) and held at Silliman University. This resulted into more research and collaborations among Silliman, WWF, and Malaysian government and academic institutions.

Milestones in marine mammal conservation have improved knowledge on occurrence, distribution, and population size estimates. In effect, awareness and protection of the Philippine population was amplified. Furthermore, there was an increase in responses to strandings, reduced incidence of by-catch in some areas like the Malampaya Sound, Palawan (Matillano, 2007), and curtailed slaughtering of marine mammals in most parts of the country especially after their protection.

Marine mammal conservation has gone a long way since then. There are several projects around the Philippines focused on research and conservation management of wild populations including dugong surveys in several sites, Irrawaddy dolphin conservation and research in Palawan and the Guimaras Strait, cetacean surveys in Mindanao, Palawan, Mindoro, Batangas, Bohol, Davao Gulf among others, and humpback whale studies and conservation in the Babuyan Islands. The projects and programs are implemented by a number of academic institutions, government offices, and non-government organizations, all of which were involved and consulted in the making of this manual.

MARINE MAMMAL STRANDING NETWORKS IN THE PHILIPPINES

In December 1993, the Inter-Agency Task Force for Marine Mammal Conservation (IATFMMC) was created upon the issuance of Special Order No. 1636 by the DENR. It was placed under the leadership of the DENR-BMB for the purpose of conducting a survey and assessment of marine mammal resources in the country. Member agencies included the BFAR, DOT, SU-IEMS, UP-MSI, WWF-Philippines, and Bookmark Inc.

As part of its mandate, the IATFMMC formulated a national marine mammal conservation plan in 1994 during the first Symposium Workshop on Marine Mammals in the Philippines. The conservation plan had four major components: 1) Survey and Research, 2) Habitat and Resource Management, 3) Policy, and 4) Public Information, Education and Capacity Building. Consequently, the task force identified the need to develop local capacity to respond to marine mammal strandings in the Philippines.

As a result, the Philippine National Marine Mammal Stranding Response Network (PNMMSRN) was formed with the following goals:

- Provide for the welfare of live animals;
- Minimize risk to public health and safety;
- Support scientific investigation; and
- Advance public education.

PNMMSRN, based in Manila and composed only of a few technical people, faced difficulties in responding to stranding incidents because the incidents often occurred in remote coastal areas in the Philippines.

In 1996, the Crocodile Farming Institute (CFI), a special project of DENR and the official rescue center for Palawan, was handling stranding responses in the province. With the increasing number of incidents being reported, the rescue center was short-handed in responding to these. Conservation partners helped out and the concerted efforts resulted in successful releases. Taking lessons into serious consideration, CFI invited interested conservation partners (e.g., government and non-government agencies, military, private businesses) to come together and formalize a partnership specifically aimed to stranding responses. The invitation was met enthusiastically, and the first marine mammal rescue network, the Palawan Marine Mammal Rescue Society (PMMRS), was formed. Because of its highly active and visible members, a higher awareness among communities resulted in more strandings being reported and responded to.

With the growing number of people directly getting involved in rescue operations, PMMRS realized a need to conduct a formal training in rescue response. CFI came up with the training design and, together with partner NGOs Saguda-Palawan and WWF-Philippines, conducted the first marine mammal rescue response training workshop in 1998. WWF-Philippines showed interest on the training design and adapted it into their program after refinements were made. Taking lessons learned from the Palawan experience, WWF-Philippines replicated the network setup in Bohol, Batangas, and the rest of the country.

In the first six years of existence of the PMMRS in Palawan, the network received and responded to 127 stranding reports, with 45 cases of successful release, 48 cases of mortalities and disposed carcasses, and 34 cases lacking information regarding the fate of the animal. Marine mammal rescue training was given upon the request of interested parties. Commonly through the facilitation of WWF-Philippines, members of the IATFMMC were called on to train an average of 30 participants per training. In support of the Local Government Code of 1991 and the Philippine Wildlife Act, representatives of local government units and concerned government agencies with the inclusion of at least one veterinarian, were the individuals targeted for training. The interested party covered half to majority of the funding for the activity, while the rest of the expenses, such as airfare and educational materials, were covered by the training team. The training involved a three-part process that included lectures, a practicum, and a workshop to develop an action plan for the newly-formed team. Lectures covered basic marine mammal information such as their biology, identification, role in ecology, conservation importance, and an analysis of their conservation status, both on a national and local scale. National policies on marine mammals were emphasized.

Over the years, instructional materials were modified to suit the needs of the trainees. Topics were expanded to cover cetacean by-catch, dugong and marine turtle biology, and related legislation. All these efforts led to WWF-Philippines' development of a manual on marine mammal stranding response entitled "Discovering Marine Mammals" in 2001. Copies were distributed to active members of response teams in each region.

Teams with coordinating centers, such as WWF-Philippines and the SU-IEMS, focused on the research and conservation of marine mammals. These centers have shown to yield a higher number of stranding reports and information post-stranding response. The SU-IEMS museum holds the largest collection of marine mammal bones in the country and several marine mammal references.

As of 2013, the network has 18 rescue teams representing the provinces of Cagayan, Batangas, Palawan, Negros Occidental, Negros Oriental, Bohol, and Misamis Oriental. Monitoring a total of 59 known cetacean sites throughout the Philippine archipelago, the network consists of 296 individuals trained to provide the proper response for stranded marine mammals, and disseminate information regarding the importance and conservation of these animals.

Ocean Adventure located in Subic Bay, Olongapo, a captive dolphin entertainment facility, created its Stranding Response Team and has been involved in 47 whale and dolphin and three dugong strandings since 2002. This was later formalized as a Philippine Marine Mammal Stranding Network together with the BFAR. The network is involved in training, information dissemination as well as organizing symposiums (Aragones et al., 2013).

Although some of the stranding response teams are no longer active, trained individuals, researchers, and active member agencies continue to respond to stranding events in their own capacities, bearing in mind the goals of the stranding network. Outside of government, the most active organizations involved in marine mammal response include: SU-IEMS, WWF-Philippines, Marine Wildlife Watch of the Philippines (MWWP), Balyena.org, and Large Marine Vertebrate Research Institute among others.

CHAPTER 3: STRANDING THEORIES, PATTERNS, AND RESPONSE BASICS

This chapter provides important information that the user needs to know to be able to respond to a stranding call. It explains what a marine mammal stranding is, reasons why the animal strands, stranding patterns, stranding codes, composition and functions of the response team, and things to keep in mind before going to the stranding site.

MARINE MAMMAL STRANDINGS

A stranding is the occurrence of a marine mammal on the beach, in shallow water, or accidentally trapped or entangled, outside of its normal habitat and is unable to return to their natural habitat without assistance. The animal could be dead or alive. It is also called beaching.

Usually an animal is too weak to swim or dead and is washed ashore by currents; or weak animals consciously swim to the shallows, an adaptive behavior that will ensure that their blowhole is above water all the time. If the animal seems healthy, it is possible that they might have stranded intentionally (accompanying sick members of a pod to the shallows) or accidentally (while pursuing prey).

CAUSES OF MARINE MAMMAL STRANDINGS

Natural causes

Animals die of old age, during and upon birth (e.g., dystocia and still birth), predation, and starvation. Starvation may be caused by calf abandonment, disease, injury, or a weak animal consciously swims to the shallows. Death and stranding of starved dugongs have occurred where seagrass beds have been devastated by cyclones in Australia. Stroud (1979) has identified the primary or contributory cause in the stranding of pinnipeds and cetaceans as shark predation; difficult birth, typically caused by a large or awkwardly positioned fetus (dystocia); the presence or formation of new, abnormal growth of tissue (neoplasia); and starvation due to neonatal abandonment.

Disease

Serious health hazards emerge from infectious diseases caused by parasites, viruses, and at times, bacteria. Parasitism in marine mammals has been rampant mostly by trematodes (flatworms) and nematodes (roundworms) often called whaleworms (Parsons and Jefferson, 2000). Infection from cetacean morbilivirus has been reported on fin whales, long-finned pilot whales, striped dolphins, and juvenile bottlenose dolphins (Mazzariol et al., 2012; Fernandez et al., 2008; Raga et al., 2008; Stone et al., 2011). In such cases, the infection was pinpointed as the primary cause of mortality. Toxoplasmosis is more widespread in odontocetes, with cases of aborted fetus in bottlenose and Risso's dolphins (Resendes et al., 2002). Another kind of disease detected among cetaceans is brucellosis, caused by a bacteria called *Brucella sp*.

One of the causes of disorientation in marine mammals is impaired hearing caused by a parasite infection that affects the ear. This was confirmed to be the cause

of mass strandings of melon-headed whales, pilot whales, and false killer whales (Morimitsu et al., 1987).

In the Philippines, parasitic infection has only been documented among cetaceans. Presence of two Anasakis species (worm-type parasites) was identified from a stranded dwarf sperm whale (Quiazon et al., 2013).

Marine debris ingestion or entanglement

Marine debris is seen floating in the world's oceans. Given the varied prey marine mammals consume, they mistakenly ingest debris that resembles some of their prey, e.g., plastic bags that the mammals mistake as squids (Mereilles and Barros, 2007). Walker and Coe (1990) suggested that it is more probable that different debris is accidentally ingested while these animals are pursuing their prey. The common types of debris involved in strandings caused by ingestion or entanglement are plastics, ropes, nets, bait hook, line, or lost traps (Laist, 1997; Raum-Suryan et al., 2009).

In the Philippines, strandings caused by marine debris ingestion have been reported. In 2011, a four-meter female Blainville's beaked whale that beached alive in Davao Gulf died after an hour from stranding. Upon examining its body after it died, it was found to have 0.25 kilos of plastic garbage in its stomach consisting of marker caps, sachet wrappers, hair clips, nylon strings, plastic balls, and a plastic cable. The plastic ball was blocking the intestine while the plastic cable was lodged in the throat (pers. com. Darrell Blatchley).

Stranded animals due to entanglement were also observed in the province of Palawan. Individuals of spinner and spotted dolphins were found dead and entangled in hook and line in the 1990s and in 2003 (pers. com. Teri Aquino).

Boat strikes

Another reported cause of strandings is boat strikes. This is evident in areas that are busy shipping channels overlapping with the migratory route, coastal habitats, or even feeding areas of marine mammals. Reports from Hong Kong waters showed scars caused by propellers that eventually led to mortality (Parsons and Jefferson, 2000).

This has been reported in Calatagan, West Philippine Sea. One mother and calf of Risso's dolphins appeared to be dragged by a cargo ship in 2006. The remains of these animals were found floating dead two days after the incident (pers. com. Jessie Delos Reyes).

Another case was observed in Panglao, Bohol, where a spinner dolphin was struck by a boat that was trying to get as near to the dolphin as possible to please the tourists on-board (Sorongon, 2010).

Noise pollution

Echolocation is used by cetacean for navigating, hunting, and communicating. If unable to function properly, it is one of the main causes of stranding. Marine mammals,

cetaceans in particular, rely on their hearing and are very sensitive to sound. Loud noises underwater affect marine mammal populations as the stress it gives marine mammals is known to cause shifts in respiration, foraging behavior, and may even bring about hearing damage (Wright et al., 2007). This is usually observed in areas where naval maneuvers or any underwater activities using sonar frequencies are conducted (Fernandez et al., 2005; Hildebrand, 2005). Other acoustical gears such as seismic air guns used in oil and gas explorations have been observed to alter behavioral responses on marine mammals. Gordon et al. (2003) indicated avoidance reactions (e.g., deviation from migration routes, interruptions in feeding and social interactions), and changes in vocalization patterns in response to sound as examples of behavioral responses.

Toxic poisoning

Pollution in the ocean is not in the form of solid or chemical waste from humans alone, but also generated by toxin-producing marine species such as algae. These toxins have poisoned stranded animals and caused adverse health effects that manifest as lesions (Fire et al., 2009). This has been observed in Pacific States (Takahashi et al., 2008) and Southeast US waters (Fire et al., 2009).

Large numbers of marine animals contain high levels of persistent organic pollutants (POPs), such as dioxins, furans, polychlorinated biphenyls, and some heavy metals, which have been documented to show adverse effects in reproductive, cognitive, and neurological functions in humans. Although supporting studies are lacking, this may likely affect marine mammals as well, many of which are highly dependent on well-developed cognitive abilities (Jenssen, 2003). Additionally, Jenssen (2003) cites that the occurrence of POPs in blubber products of marine mammals and the effects of consumption by indigenous people have been studied by Dewailly et al. (1999) including mercury toxicity.

Extreme weather conditions

Typhoons that bring in big waves and strong current may affect the movement of marine mammals and bring them to shore. Typhoons are also known to wipe out coral reefs and seagrass beds which may affect the food source of the dugong leading to starvation. Extreme tides have caused stranding of marine mammals when they accidentally find themselves in the shallows.

Other causes

It is possible that marine mammals strand due to navigational factors, such as failure of the animal to detect the earth's magnetic field; a disease that affects the navigational sense; a complex underwater topography (e.g., narrowing or convoluted); or the introduction of new physical structures (man-made or natural) in traditional migration routes. Marine mammals also have predators that could chase them to shallow waters causing them to strand. Reversely, it is possible for marine mammals to strand if in pursuit of a prey in very shallow waters.

Cetaceans are very social animals forming strong bonds with each other. This is evident in mother and calf pairs and various social groupings of dolphins (e.g., bachelor pod or family pod). Due to these bonds, healthy individuals might strand in unity with the weak or dead group member.

TYPES OF STRANDINGS

Single Stranding
A single animal or a mother and calf pair strand.

Mass stranding
Two or more animals of the same species strand simultaneously in close proximity to each other.

STRANDING CODES

In the Philippines, there are six stranding codes created which were modified from the internationally recognized five stranding codes (Geraci and Lounsbury, 2005) to suit local conditions. Code 6 was added to include a common situation where the animal has been tampered with (e.g., burned or slaughtered) and only certain body parts remain. The description and characteristics of each stranding can be seen in Table 2.

RESPONDING TO MARINE MAMMAL REPORTS

When a report is received about marine mammals, it is usually an emergency case, be it dead or alive. It is best to be prepared and organized to carry out a response operation. This manual will help you through the procedures with the following objectives:

1. To provide rapid and effective action that will best serve the well-being of the marine mammal;
2. To gain maximum scientific information from the incident;
3. To prevent the public from harming the marine mammal;
4. To help protect the public from injury, contamination, or communicable disease; and
5. To use the incident for education and raise awareness on marine mammal conservation.

It is very important to coordinate the response with the local authorities particularly the barangay officials, the municipal government, and the nearest DA-BFAR and DENR offices.

RESPONSE TEAM COMPOSITION AND FUNCTIONS

The response team must have a minimum of four members, ideally 5 or more, performing different functions. Each member will have assignments prior to arrival at the stranding/rescue site for coordinated action. Each person assumes the responsibility of the different members of the team, such as the team leader, crowd controller, data collector, and documenter. Additional manpower may be sourced from the local community or crowd as needed with guidance from the team leader.

Table 2 Stranding Codes and Animal Conditions

Stranding Code	Status of Animal	Condition of Animal
1	ALIVE	Vital signs present such as movement, breathing and pupillary reflex
2	DEAD Carcass in good Condition (fresh)	- Freshly dead with organs and body parts intact - Normal appearance, usually with little scavenger damage - Fresh odor - Minimal drying and wrinkling of skin, eyes or mucous membrane - Eyes clear - Carcass not bloated - Tongue and penis not protruded - Blubber firm, white and semi-translucent - Muscles firm, dark red, well-defined - Surface features distinct.
3	DEAD Carcass decomposed, but organs basically intact or in fair condition	- Carcass intact - Bloating evident - Tongue and penis protruded - Skin cracked and sloughing - Possible scavenger damage - Characteristic mild odor - Mucous membranes dry - Eyes sunken or missing
4	DEAD Carcass in advanced decomposition; organs not intact or in poor condition	- Carcass may be intact, but collapsed - Skin sloughing or may be entirely missing - Often severely scavenged - Strong odor - Blubber soft, often with pockets of gas and pooled oil - Muscles nearly liquefied and easily torn, falling easily off bones - Blood thin and black oozing out of the body and pooled where the animal is - Internal organs often identifiable but friable, easily torn and difficult to dissect.
5	DEAD Skeletal remains with dried tissues	- Skin maybe draped over skeletal remains - Any remaining tissues are desiccated.
6	DEAD Destroyed	- Disarticulated skeleton with or without soft tissue due to human or scavenger (including domestic animals) disturbance - Carcass may be dismembered, butchered, cooked, or burned and parts may be distributed widely in the community - It might be difficult to determine the cause of mortality whether stranding, hunted, by-catch, etc.

Photographic Example

The roles of the responding team members are as follows:

1. Team Leader. The team leader acts as the overall coordinator of the team. S/he decides on actions to be taken depending on the need of the situation. S/he shall coordinate with local officials or community leaders, government authorities, and experts for technical or logistical requirements. S/he is responsible for introducing the team members. It is proper to show identification cards for each of the member. S/he is also responsible for thanking everybody who helped and participated in the stranding response/rescue, and acts as the information officer attending to the media if needed. The team leader will write the report.

2. Crowd Controller. The crowd controller is in charge in cordoning the periphery of the area, isolating the animal from the crowd to provide working space for the response team, thereby minimizing stress to the animal if alive. However, the crowd controller must not alienate the crowd, as they can be utilized as additional manpower if needed. S/he is also in charge of giving information to the crowd on the species, conservation status, and the team's response action. Policies related to the protection of the animal and the operations also need to be clarified.

3. Data Collector/s. It is best to have two people handling the animal. The data collector/s is/are involved in handling the animal, checking the vital signs, measuring body parts, and taking other relevant data.

4. Documenter. The documenter is responsible for recording data obtained by the data collector, and for taking photos and videos. S/he must ensure that all data sheets are filled out completely. The use of a waterproof digital camera is recommended. It is important to maintain communication at all times using a mobile phone. Extra batteries and credits in the mobile phone (also referred to as "load") are a must.

Optional team members

Security, veterinarian, local officials, relevant government agency representatives may accompany the team and should be assigned specific tasks by the team leader.

GENERAL EQUIPMENT AND SUPPLIES

There should be a response kit ready and accessible to the response team. The minimum items to be taken are provided below. Other materials not taken by the team would have to be sourced on site. Each team member should also bring their own personal needs. Figure 4 shows the basic items/materials recommended for the kit:

1. **Flashlight.** Used as a source of artificial light that is most useful at night, and as a tool to check eye reflex. A waterproof flashlight with extra batteries is recommended.
2. **Cordon/Rope.** Used to cordon-off the crowd, allowing the rescue team to perform its task without interference from onlookers.
3. **Stretcher.** Made up of a tarpaulin, canvas, or any soft, smooth but sturdy material strong enough to carry the weight of the animal during transport. Must be built with a handle.

4. **Umbrella/Canvas/Tarpaulin/Tent.** Any material that can provide shade to minimize stress to the animal and protect the rescue team from the sun's heat or rain.
5. **Bucket, and water dipper (tabo).** To hold water.
6. **Sponge and large towels.** To keep the animal wet and protected from the sun.
7. **Gloves**. To protect the responders when handling the animal, especially if necropsy is to be done.
8. **First Aid Kit.** For use of the team members.
9. **Communication equipment.** To facilitate coordination and exchange of information. A mobile phone is most convenient for this.

Figure 3 Recommended material to bring in every stranding response.

Team Member Personal Kit

- Drinking water	- Pair of slippers	- Change of clothes	- Identification card
- Food	- Hat	- Towel	
- Extra cash	- Sunscreen	- Toiletries	

10. **Data / Information Gathering Materials**
    a. Tape measure or transect line
    b. Pencil and sharpener, pens
    c. Notebook and waterproof slate
    d. Camera with extra batteries and memory
    e. Watch preferably with a timer
    f. Permanent markers
    g. Marine Mammal Response Manual
    h. Stranding, report, and necropsy forms. A set of pre-printed forms to record stranding information.
    i. Sticker labels or strong tape
    j. Sample collection kit with preservatives and vials (Fig. 4).
    k. Necropsy kit
11. **Other Items**
    a. Snorkeling gear
    b. Wetsuit
    c. Life Jacket

Figure 4 Sample collection kit.

Keep all materials in a water-resistant pouch and keep them as dry as possible during and after the operations.

Tips on How to Clean Up
The odor of a marine mammal carcass is very pungent due to the high lipid or fat content in the blubber. The smell stays for a long period of time.
A strong powder, detergent, bleach, calamansi or tomato juice/ sauce will come in handy to remove odor of the dead animal from your skin and clothes. Use biodegradable detergents when possible.

PRE-RESPONSE PROCEDURE

Every response begins with a report that a marine mammal has been sighted. The first step will be to verify this report and to get more information from the informant. Information including the type of animal, its status, exact location, how to get to the site, presence of local officials or agencies, and the informant's name, and contact details shall be determined. For further insights on the report, approach local reliable partners or officials close to the site. When confirmed, the next step is to organize the team and plan the appropriate response operation.

It is possible that the response operations could be as short as a few hours or last for a few days up to a week. It is best to be prepared for the different scenarios.

1. Inquire about accessibility of the site, vehicle access requirement, and local weather condition. If not accessible, do not proceed to the site and abort team response. It may be possible to continue coordination over the phone with the site point person and conduct the response remotely.
2. Immediately notify the DA and/or the DENR.
3. If accessible, organize the stranding response team and agree on a common pickup location. The stranding response kit and team members' personal kits should be ready. Time is of the essence, especially for Code 1 cases.
4. The team leader assigns roles based on the identified functions.
5. Proceed to the site and coordinate, or inform local officials of your presence and do a situation briefing regarding your purpose,
6. Proceed with response operations depending on stranding code.

Upon arrival, the crowd controller will cordon off the animal, the work area of the responders. The crowd should be moved away from the animal, providing enough space for the response team to do their tasks. There should be an open access to the sea without anyone blocking the way. The crowd should be prevented from making loud noises and crowding that could restrict members of the response team from implementing their operation; touching or riding the animal, taking pictures within the cordoned off area, or getting parts of the animal for mementos and even for food. The crowd controller needs to explain to the community what is going on.

The succeeding chapters present steps on dealing with the different coding incidents.

CHAPTER 4: CODE 1 STRANDING INCIDENT:
Response Procedures for Live Marine Mammal Reports

STEP-BY-STEP RESPONSE

The procedure to follow when responding to a live marine mammal report is outlined in this chapter.

STEP 1: ASSESS THE ANIMAL AND ENVIRONMENT

- Observe the animal and prepare a plan before approaching.
- Approach the animal slowly, calmly, and with caution. Avoid loud or startling sounds, abrupt movements, or bright lights.
- Keep clear of the tail (flukes) and mouth.
- Minimize potential sources of disturbance such as noise and sudden movements.
- There should be no handling of the animal at this point.
- Check the location and position of the animal relative to the water edge, houses and infrastructure both in water and on land, and presence of the reef/ mangrove/intertidal flats.
- Check the sea condition such as waves and tide.

STEP 2: CHECK VITAL SIGNS

At this point the animal can be handled. The following vital signs need to be checked to assess the wellness of the animal. Mother and calf pairs need to be assessed individually, as one may be in better condition than the other, requiring different procedures.

Breathing. If the animal is alive, it will exhale through the blowhole/s or nostril forcefully with a strong sound. If the breathing is weak and non-continuous, it is an indication that there is something wrong with the animal. Increased breathing rate is an indicator that the animal is stressed.

The following are normal breathing rates for various marine mammals:

- Small-sized cetaceans: at least 2 to 5 breaths every minute
- Medium-sized cetaceans: at least 1 breath every minute
- Large-sized cetaceans: at least 1 breath every 20 minutes
- Dugong: at least 1 breath every 3 to 5 minutes

Heart rate. The heart rate may also be checked by placing your palm over the side of the animal just behind the base of the left pectoral fin. Normal pulse rate for small cetaceans or dugong is around 60 beats per minute.

Blinking reflex of the eyes. Put light pressure near or around the eye (on the skin and never on the eye itself). This will make the animal blink. This will also give you an idea of how reactive the animal is to stimuli.

Pupillary reflex. Use a flashlight on the eye to check if the pupils constrict when exposed to direct light. It should dilate when the light source is removed.

Muscle movement. Muscle reflexes to look out for include movements in the jaw, flipper, flukes, and muscle contractions in the body.

If any of these reflexes are present, the animal is alive. If they are not present, the animal is dead. For live animals it is necessary to assess the severity of its condition which can be graded as alert, weakly responsive, or non-responsive:

- **ALERT** means the animal is aware, easily responds to stimuli
- **WEAKLY RESPONSIVE** means the animal only responds weakly and only with multiple and stronger stimulations
- **NON-RESPONSIVE** means the animal does not respond to noise or touch, yet animal is breathing

DECIDING THE NEXT STEPS

- "Alert" animals need to be released immediately after taking the minimum amount of information required.
- "Weakly responsive" animals should be considered for rehabilitation.
- "Non-responsive" animals may be considered for rehabilitation or euthanasia.

Other considerations

Check the body condition

Body condition is one of the immediately recognizable indicators of health of the animal. The muscle mass on the dorsal length of the animal (in cetaceans just below the dorsal fin) should be inspected (Fig. 5). A more rounded form indicates that the animal is in 'Good Condition.' A depression or sunken form indicates that an animal has not been getting enough food and could be an indication of malnutrition and disease. Depressions in the neck area showing bony protrusions is seen in very thin animals.

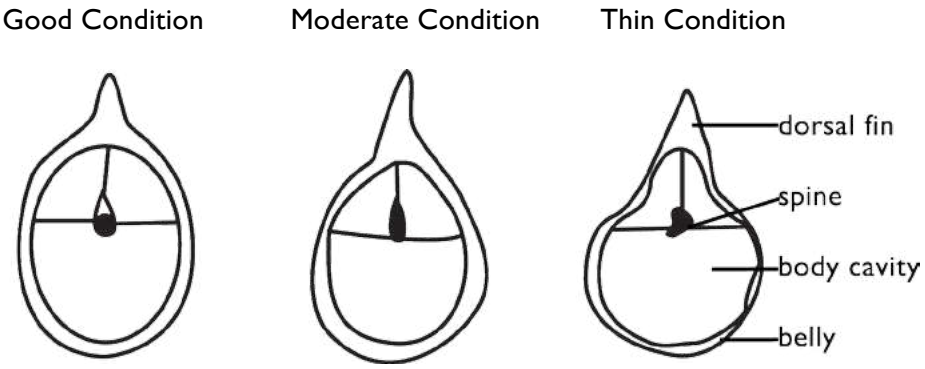


Figure 5 Body conditions of marine mammals. Mid body, cross section.

Check for wounds

Skin abrasions like scratches, shallow fresh wounds or scars are not lethal and sometimes even normal to the animal and should not require any form of treatment. Some of these scratches may have been inflicted during stranding in the shallows or normally occurring to the animal due to social interaction among their group, e.g., scratches on the body of Risso's dolphins and parallel scars on the dugong from infighting. Deeper wounds that penetrate deep into the muscle or expose bones would require special care and may be untreatable.

Commonly found on the skin of marine mammals are round-shaped wounds and scars caused by the bite of a cookie-cutter shark. The average size of the scar is

5cm in width and can be as deep as 7cm cutting through the skin, blubber, and flesh. The marine mammal would usually have several bites in varying degrees of healing. These are non-lethal and would require no treatment if the animal is a candidate for immediate release. These marks are usually mistaken as spear or gunshot wounds.

Bleeding from body orifices such as the blowhole, mouth, and anus is not a good sign with very poor outcome.

IMPORTANT REMINDER

A live animal is not used to any form of handling and would be under a lot of stress. The condition of the animal will also deteriorate with time. It is important to make decisions quickly to be able to release the animal immediately if such is the case after assessment.

STEP 3: RESTRAIN THE ANIMAL

Restraint 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. Restraint is necessary if there is an urgent need to move the animal.

Several stranding situations may be encountered and should be addressed accordingly.

On the beach

It is easier to restrain the animal on dry land, but it will be more prone to stress and injury. Ensure a safe environment by following the proper handling procedures below

- Limit the number of handlers to only what is necessary. In single strandings, one person may do. Too many people handling one animal can add to the stress. In mass stranding, one person per animal is best. Observing this rule maximizes manpower and hastens response.
- Be aware of your hand placement. Always hold the animal on its side and avoid the mouth (Fig. 9).
- Dig a shallow hole in the sand to allow the flippers and flukes to lie in a natural position on the side of the animal without restricting movement.
- Protect blowhole from sand and water. Protect the eye from sand.
- Drape moist towels over exposed surfaces, except the blowhole, fins, and fluke. Ensure that majority of the skin is kept wet. The skin deteriorates when out of the water and can result in more fluid loss and infection.
- Leave the blowhole uncovered as well as the fins and the flukes to allow for better body heat regulation (Fig. 6).
- A tarpaulin or umbrella can be used to provide shade to the animal from the sun.
- When the condition of the animal becomes more stable on land (e.g., breathing becomes more regular), bring it to the water to complete the acclimatization process.

In the water

- Select a proper site in the shallow waters that is free of rocks and other sharp objects and the surf is not so rough.
- It may not always be possible to bring the animal to shallow water immediately, e.g., the seabed in the shallow water is rocky, or sea conditions are too rough. You may have to wait for the tide to get higher to do this.
- When moving the animal, it is best to use a stretcher described in Figure 8. Never roll or drag the animal. Never tie a rope to the tail, or any body part.
- The animal should be held in waist-deep water until it is able to lift its blowhole on its own when breathing. This step can be short or could last for several hours.
- Make sure that the animal faces the open sea when placed on the beach or shallows.
- Mother and calf should be acclimatized together.
- If the animal cannot stay upright and breathe properly on its own, reassess condition and consider rehabilitation.
- Collect the required data using the stranding forms and make sure that enough pictures are taken.
- Release the animal when ready.

Figure 6 Acclimatization of marine mammals on the beach.

DNA tissue collection from a live animal

If possible, collect a very small 2cm section of tissue from a fluke for DNA analysis (Fig.7). Use a sharp, clean pair of scissors. If done correctly, the animal will hardly react to the procedure. The tissue needs to be preserved in Ethanol solution discussed in Table 3.

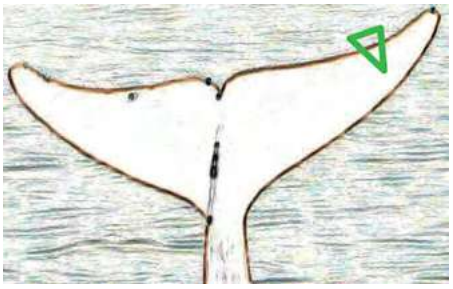


Figure 7 Clipping of the fluke for tissue collection. Drawn to scale.

Marine mammals are quite heavy. Consider the size and weight of the animal before moving them. A spinner dolphin may weigh 30-80 kg, a bottlenose dolphin 150- 500 kg, dugong at 400kg, pilot whales come at 1,000 to 3,000 kg, while a humpback whale can weigh as much as 45 tons.

Use of a stretcher is only effective when lifting or moving small to medium-sized animals.

Never use rope that has not been padded to lift or tie the animal as this will cause abrasion and possibly injury. Use cotton or cloth to wrap around the animal when needed.

1. Fold the stretcher without poles lengthwise with one side extending beyond the folds. Place the folded stretcher beside the animal, following its orientation.

2. Facing the same direction as the animal, kneel on the unfolded part of the stretcher with the knee touching the animal's side. Another person should do the same on the other side without the stretcher. Make sure that the pectoral fins are comfortably positioned between the animal and your knee.

3. The person with the stretcher then gently tilts the animal by leaning towards its side. When enough space has been created under the animal, gently push the stretcher, unfolding it as far underneath as possible. Release the pressure and allow the other person to repeat the tilting process. This time, pull the stretcher out from underneath the animal. Attach the poles as soon as both sides of the stretcher have been pulled away from the animal.

4. Pull the poles together and lift. Touch only the poles but make sure that the neck and head of the animal are adequately supported and the edge of the stretcher is not choking the animal.

Ensure that the stretcher is long enough to fit the body of the animal. The head and the flukes should extend beyond the edge of the stretcher. Holes for the flippers should be provided.

Figure 8 Moving small to medium-sized marine mammals.

Do not pull the animal by the tail or flippers. This could result in more trauma. These body parts are vital to their movement in the sea. Dragging is an acceptable option only when lifting is impossible, like for large whales. In such cases, make sure there is appropriate cushion.

STEP 4: ACCLIMATIZE THE ANIMAL

To make the situation less stressful to the animal and make it more manageable to handle, the animal needs to be acclimatized. Acclimatization is the process wherein the animal is stabilized on the beach and in shallow water in preparation for release.

ACCLIMATIZATION
- Calms the animal down
- Re-adjusts its body temperature
- Restores circulation in the muscle
- Restores equilibrium
- Allows the lung to re-distend and animal to breathe properly
- Is completed when animal surfaces on its own to breathe and supports itself

In shallow water

For animals that are stranded in the shallows, use the following procedures to acclimatize the animal.

- Check the buoyancy of the animal. If it consistently tilts to the side, it has a buoyancy problem. In such cases, buoys or flotation devices may be attached to the poles of the stretcher. This will keep the animal upright in the waters. Provide temporary shade or maneuver the animal to a shaded area.
- Keep the back of the animal that is exposed to the sun constantly wet by using a water-soaked blanket and by constantly pouring sea water on it using a bucket. Make sure that the blowhole area or nostrils areas are avoided when pouring water over the animal.
- Position the animal perpendicular to water's edge. If the waters are calm, let the animal face the open sea for it to orient itself. If there are strong waves, let the animal face land. This position offers least resistance to surf and makes it easier for the animal to raise its blowhole above the water surface.
- When weather or tide conditions are unsuitable, the animal may be kept on the beach and brought back when circumstances improve.
- For the safety of the animal and the rescuer, carry out the response in at least waist deep water (applicable to small and medium-sized animals). Larger animals, however, need to be kept in waters deep enough for them to float and not have their bellies press on the seabed. In this case, waiting for the tide to rise is necessary.
- Allow the animal to stabilize before release.
- If the animal cannot stay upright and breathe properly on its own, reassess condition and consider rehabilitation.
- Collect the required data using the stranding forms and make sure that enough pictures are taken.
- Release the animal when ready.

Figure 9 Proper orientation of the responder relative to the animal.

In deep water

The animal may be weak, wounded, or entangled in fishing gear away from the coast. This response will be executed on a boat and it may be necessary for the team to get in the water. An entangled animal will be in panic, approaching it in the water might be dangerous. On the other hand, animals that have been entangled for some time are tired and weak and might not move. It is best to assess the way the animal was entangled first before approaching the animal in the water. Make sure that life jackets are worn in the water and all safety precautions are carried out.

- If entangled in a net or rope, guide the animal to the surface and cut off the net/rope to set it free. Make sure that the cutting instrument used is sharp enough and avoid inflicting injury to the animal.
  If the entanglement is by the tail, exercise precaution when cutting the gear as the tail might slap during the process or when relieved.
- If entrapped in an unnatural barrier such as permanent fishing gears, it may be as easy as opening the gear and allowing the animal to swim out. It may be necessary to force the animal out of a net or fishing structure if it refuses to pass through the opening.
  If the exit point is not wide enough, it may be necessary to take down part of the structure so that the animal may be induced to swim out.
- In more complicated situations, lift the animal onto a stretcher and take it out of confinement. This option is possible on animals of manageable size and weight.
  If the incident occurred in an enclosed bay, it may be necessary to bring the animal out to the open sea.
- Observe if the animal is stable and fit for release.
- If the animal is weak and a candidate for rehabilitation, it will be necessary to tow the animal or transport on a boat to the shallows for further treatment.
- Acclimatization is not necessary in deep water cases.
- Data collection may be difficult at sea but do your best to get as much information as possible.

Coordinate with the owner of the fishing gear involved as cutting the gear will entail costs to the owner. Reduce stress to the animal by working fast and thoroughly.

STEP 5: TRANSPORT

PREVENT FURTHER INJURY AND KEEP THE ANIMAL COMFORTABLE.

Transport the animal only if necessary. Release the animal in a safer location when doing it in the stranding area is not feasible (e.g., wide intertidal area, plenty of fishing gear). This should be conducted with trained personnel present who can continue to monitor the vital signs of the animal. Depending on the chosen route, transport may be done by boat or by a land vehicle. Make sure that the transport time does not exceed two hours so that the animal is not severely stressed, uncomfortable, or agitated. This may be appropriate only for small to medium sized animals.

Transport by boat

Transport by boat is usually done if the stranding occurred in enclosed bays or bodies of water with narrow openings and the animal has to be brought out to open sea to avoid re-stranding. Place the animal on a stretcher which will be tied to the side of the boat.

- Tie one pole of the stretcher to the side of the body of boat and stabilize with a double square knot (Fig. 10) that is fixed. Then secure both ends of the two poles to the side of the boat and lock using a slip knot (Fig. 10). This will facilitate quick release of the animal when it is time to do so because only one side of the stretcher will loosen when the slip knot is unknotted.
- This method will effectively enwrap the animal in the stretcher and secure it to the side of the boat. The animal in the stretcher should always be facing the direction the boat is taking. Its head and blowhole should always be above water.
- Observe proper speed so that the bow waves do not drown the animal. Remember that the animal is restrained and cannot correct its position while in transport.
- Release when the appropriate site is reached.

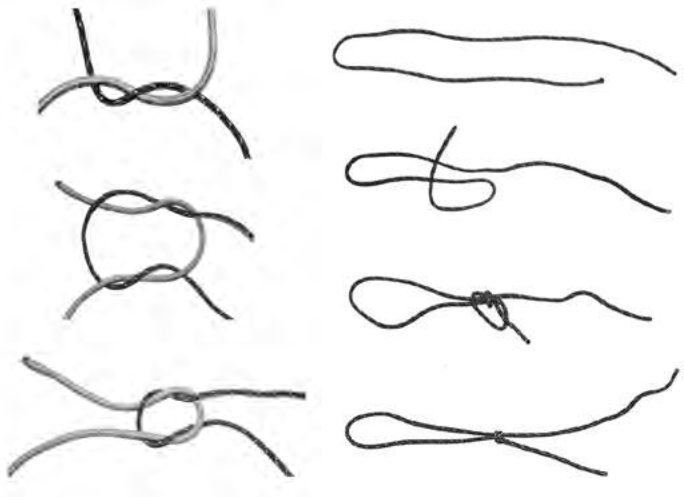


Figure 10
How to make a square knot (left) and a slip knot (right).

Transport by land vehicle

- Use a tank big enough to fit the animal and line the tank with thick cushion. Fill the tank with sea water but not to fully submerge the animal.
- For short distances (less than 30 min), a cushion lining and regular wetting of the animal may suffice without a tank. Make sure you bring enough seawater to wet the animal throughout the trip.
- Make sure that a stretcher is used when moving the animal to and from the vehicle.
- Release the animal when the appropriate site is reached.

STEP 6: RELEASE THE ANIMAL

After the animal has acclimatized and if the assessments indicate that the animal is well, then it is fit for release. Alert animals will need little assistance and would swim away quickly, probably with slight disorientation. Recovered weakly responsive animals may be more disoriented and would require more care for release. Release efforts should not only consider the welfare of the animal but also the safety and

capability of the responders. Ensure that personnel and equipment are adequate for operating in the surf zones and deeper water. Personnel should wear life jackets at all times.

Release the animal in its natural habitat. It will be pointless to release coastal species (e.g., dugongs or Irrawaddy dolphins) too far away from shore. It is a good idea to check if there have been other sightings of cetaceans and dugong in the area where the animal can join back to, although this should not delay or deter release. With dolphins and whales, re-stranding may occur if the animal is unable to find its proper orientation, depth, or access to open sea.

Choose a release route free of obstacles and fishing gears. Coordinate with locals who are familiar with the topography of the site for the release site. It may be necessary to lift the animal up on to a stretcher and attach it to the side of the boat to take it out to the open sea as described earlier. Herding or directing the animals to the mouth of the cove should be done when the tide is high.

If you are dealing with a mother and calf pair, keep them together during release. If the mother dies, release the calf. If the calf dies, release the dead calf with the mother. The mother will not leave a dead calf due to the strong mother and calf bond.

When the animal appears to be able to support itself and is making an effort to swim, it should be moved periodically into deeper water to see if it can swim unaided. Animals that are strong enough will gladly swim away towards the open sea when released in deep enough waters.

If the animal cannot stay upright, swim properly, and breathe normally, reassess condition and consider rehabilitation.

There is no need to treat wounds, especially shallow ones. According to Geraci and Lounsbury (2005), there is no proven benefit to medicating an animal that has just stranded and is about to be released.

There are cases when the animal restrands at it will be necessary to repeat the response procedures.

Prioritize release over data collection or documentation. The health and survival of the animal should be the foremost concern. Its release should not be delayed unnecessarily.

STEP 7: MONITORING AFTER RELEASE

The success of a release can only be measured by knowing exactly what happened to the animal. In most cases, this will be difficult to achieve. Nevertheless, an attempt to monitor should be made.

- After release, maintain visual contact for as long as possible. The responders need to keep watch on site for at least two hours. It cannot be assumed that a whale has survived simply because it has not re-stranded.
- Coordinate with the coastal communities while on site. They can keep watch for sightings of the released animal or any other restrandings in their area in the following days.

Restranding sometimes happens. When this happens, establish that the animal is the same individual previously released. Data collected will be useful here especially if unique identifying marks are present. If the same animal/s restrands, treat it as another stranding incidence and follow the stranding response procedure in Chapter 5. It will be good at this point to also review the release procedure done as the restranding might be due to poor site selection or a mistake in the procedure.

If it restrands for a second time, consider rehabilitation. If rehabilitation is not possible or unsuccessful, it is best for the animal to be euthanized, or just leave the animal where it is or bring out to open sea to let it die naturally.

STEP 8: 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 Chapter 6. Forms are found in the Annex.

MASS STRANDINGS

Mass strandings may occur when a whole group of animal find themselves on the beach or in the shallows due to an epidemic, unusual environmental condition, or perhaps due to strong social bonds wherein healthy animals follow a weak member of the group. Since there are a lot of animals involved and probably not enough manpower to do a thorough response, it is best to prioritize animals with the following considerations:

- For mass strandings the population needs to be assessed as a whole and determine the individuals that are weaker than others. Do a selection of release candidates by checking the presence and strength of vital signs to identify animals that are alert and those that are not.
- Divide by marking the animals into the different categories of alert, weakly responsive, non-responsive, and dead.
- First priority is the release of healthy individuals, most of which will still be in the water because they have the best chances of surviving. Alert animals for release need not be acclimatized and should be released immediately. Delay of release will cause their condition to deteriorate. Release in small groups instead of individually.
- Second priority is the acclimatization of the weak stranded animals, some of which may require rehabilitation. This will take more time to do with lower chances of survival. Weak ones that need to be acclimatized or rehabilitated. Release if the condition improves.
- Third priority is the collection of data from dying and dead animals.

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 marine mammals. 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.

PRECAUTION ON ZOONOTIC DISEASES

Dolphins can transmit infections and diseases to other species including humans. There are no recorded zoonotic disease cases in the Philippines so far. This can be caused by virus, bacteria, fungi, etc. However, for public and rescue team safety, it is best to be aware of zoonotic parasites like *Anasakis* species, a type of worm, which are present in marine mammals.

Disclaimer

Some parts of the succeeding chapters of this manual are highly technical and specialized. Rehabilitation, euthanasia, internal examination, necropsy, and tissue/specimen collection require the supervision of a DA-BFAR and DENR certified responders and a licensed veterinarian knowledgeable in marine mammal biology. If none is available, it is strongly recommended that the abovementioned offices be informed to provide the appropriate action.

CHAPTER 5: PROCEDURES FOR REHABILITATION AND EUTHANASIA

This chapter focuses on the considerations for rehabilitation of cetaceans and dugong, including euthanasia. When immediate release of the animal is not feasible as assessed, rehabilitation is indicated. Rehabilitation should always be done in the water. Rehabilitating an animal should only be considered in dire situations and only for a fixed duration.

Rehabilitation is an intervention whereby health-compromised marine mammals are diagnosed, treated, and cared for under controlled conditions until the individual is capable of functioning in the wild. The goal is to release the animal back to its natural habitat, allowing it to be a productive member of the wild population.

The main considerations for rehabilitation includes the presence of a nearby rehabilitation facility with holding tanks, equipment, and full-time staff; availability of funds for long-term rehabilitation, and a reintroduction program with protocols to facilitate the release. Unfortunately, this ideal set-up for rehabilitation does not exist in the Philippines. It will be difficult to do the rehabilitation if the systems and facilities are not in place. This manual offers the options available to us in the field.

CONSIDERATIONS ON REHABILITATION OF CETACEANS

Consider rehabilitation of cetaceans only if after acclimatization, the following are still observed:

1. Vital signs are weak or not stable. Initial assessment indicates that the animal is either 'weakly responsive' or 'non-responsive.'
   - Blinking reflex is weak or absent. Breathing is erratic, weak, and shallow. Stranded animals often have accelerated breathing rates.
   - No response to external stimuli. Unresponsive to sight, sound, and touch stimuli.
2. Difficulty in floating and swimming.
3. The animal floats on its side constantly with difficulty in keeping upright. This should be differentiated from instances when the animal intentionally turns on its side as an evasive reaction.
4. The animal restrands for the second time.

The above reasons are the only conditions for going into rehabilitation. Keeping an animal because you want to treat its wounds will only add to its stress and reduce its chances of recovery. Release is still a priority even for borderline cases.

Moving the animal to a facility not dedicated to marine mammal rehabilitation is discouraged. Thus, it is important to weigh and analyze the situation first before deciding to rehabilitate. If need be, in situ (on-site) rehabilitation is the most beneficial and most practical option for the animal. Ideally, the site is in a calm bay with mostly sandy bottom and waist-deep water. It would help if there is a fish corral or fish farm facility in the area that can be used as a temporary holding pen during the rehabilitation process. The area needs to be quiet away from noisy boat

traffic and community activities.

- In a situation where on-site rehabilitation will be done, the target of the response team is to improve the condition of the animal within seven days. Given a few days to a week to rehabilitate will allow you to explore the possibility, however slim, that the animal might qualify for release by providing help in recovering from its weakened state and not overly tax the logistics of the response team indefinitely by making it time-bound.

It should always be remembered that the underlying purpose of any rehabilitation effort is to release the animal back to the sea.

IN SITU REHABILITATION OF CETACEANS

The animal should be kept in water by the shore using a modified stretcher with floaters. If the animal can float on its own, the responders should keep the animal secure from the sides. It will be necessary to do this in shifts as being in the water for too long leads to hypothermia of the responders. Protection from the sun is necessary. Revisit the acclimatization procedures.

During rehabilitation, the team should:

1. Monitor respiratory rates every hour.
2. Monitor floatation of the animal. Gently rock the animal from side-to-side to help restore its equilibrium.
3. Check for abnormal behavior such as uncoordinated movement, flexion, body distortions, and signs of disorientation.
4. When the animal has stranded for more than three hours prioritize hydration through feeding as described below.
5. Feeding of the animal (consider species food preference in Table 2) at 6-hour intervals is advised.
   - Compute 10% of the body weight of the animal and provide this amount of food daily. You may have to give less at the beginning and slowly increase the amount if animal shows a positive response.
   - Initially, try coaxing the animal with whole fish, squid, or shrimp. If this does not work, place the fish inside the mouth of the animal (towards the back of the throat), close the mouth, and massage the throat to stimulate swallowing. If the animal does not accept food this way, try the next method.
   - Dolphin meal should be prepared and provided to the animal. Finely chop the fish, squid, or shrimp and liquefy the preparation by adding 5% dextrose or 0.9% saline solution for easier administration. The meal should be able to flow through the feeding tube easily. Administer the mixture orally using a plastic syringe or aspirator, applying the tip of the syringe or aspirator to the corner of the mouth while massaging the throat to stimulate the swallowing reflex. Avoid trauma that may be caused by forcing the syringe into its mouth. Using a stomach tube will require more specialized training and understanding of the animal's anatomy and should be implemented by a professional.
   - Try giving the animal solid food several times a day to check if the animal will

accept it. When the animal starts to eat this, consider releasing the animal.

6. Check on the improvement on the condition of the animal every three hours. The animal has shown signs of progress if it has moved from a 'weakly responsive state' to an 'alert state'
7. If the animal is not showing any improvement after seven days and assessed unreleasable, the team has to stop all interventions. Euthanasia is then indicated.

CONSIDERATIONS ON REHABILITATION OF DUGONGS

Most reported cases with dugong involve fishing gear and therefore the animal is usually healthy if uninjured. Only stranded/orphaned unweaned dugong neonates (e.g., no seagrass stains on the snout or flippers) are candidates for rehabilitation. Adults and calves without any question should be returned back to the sea in all possible stranding scenarios. Caring for dugong neonates is a long-term engagement which requires rearing the animal until it is able to feed on seagrass that may take up to 12 months. Reintroduction to the wild is also difficult with very limited success. There is neither an appropriate nor recommended facility in the Philippines for dugong rehabilitation. The survival rate of neonates in captivity is very low. Globally, less than a handful has survived and only in places with modern aquarium facilities. Due to these reasons, neonates should also be released with the hope that it will survive on its own or rejoin its mother.

EUTHANASIA

Euthanasia is the act of killing a cetacean or dugong for its welfare in the most humane way possible. According to the Philippine laws, it is unlawful to kill marine mammals as they are all protected in the Philippines. However, Chapter 4 t 27 of the Philippine Wildlife Act and the Animal Welfare Act stipulate that killing and destroying wildlife species is allowed in some instances, provided that the act is done in a humane manner using scientific procedures or methods available and approved by the committee on animal welfare. Any euthanasia procedure should be carried out in full coordination with DA-BFAR and DENR.

Several methods have been described in various literatures (Barnett et al., 1999; Daoust and Ortenburger, 2001; AVMA, 2007; Moore, 2010). However, most of these accepted procedures may not be feasible in the Philippine setting. Administering chemical substances intravenously into the animal requires skill and restraint of the animals. These chemicals are also not readily available in the Philippines and are very expensive. Special consideration on the disposal should be undertaken as these substances are toxic and persist in the carcass and the environment. Using of firearms and knives are not recommended because the act will most likely be misinterpreted by the community.

It seems that the best option in the Philippines is to just let the animal die a natural death on the beach or at sea.

CHAPTER 6: CODES 2-6 STRANDING INCIDENTS:
Response Procedures for Dead Marine Mammals

This chapter deals with the procedures on dealing with dead marine mammals. 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.

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

Necropsy is the examination of a dead animal's body. 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 tissue analysis. It also provides an opportunity to collect samples for research and 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 veterinary pathologist.

In some cases, confirmation of the identity of 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.

In handling strandings classified under Codes 2-4, discretion is left to the response team whether a necropsy can be done or not. It is easier done 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 data collection is a must.

The necropsy will most likely be done under field conditions without access to a laboratory. Whenever possible, transport the carcass in a facility where the external and internal examinations could be performed more thoroughly.

IMPORTANT NOTE
Dead marine mammals have a tendency to bloat when decomposing because of the accumulation of gas in the gastro-intestinal tract that cannot escape. The gas causes distension and increased pressure in the abdomen may result in an explosion if released suddenly. This explosion can be prevented by making several small but deep puncture holes around the animal's body that will penetrate the stomach and allow the gas to be released slowly. The animal is ready to be cut up when the abdomen is no longer distended.

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

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

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
- Sterile vials or blood tubes
- 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

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

EXTERNAL EXAMINATION

- Describe the appearance of the carcass using the body condition index.
- 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.
- Measure the different parts and sections of the carcass.
- Note any indication that a fishing gear was involved such as depressed line or net marks on the skin.
- Distinguish between marks and wounds acquired by the carcass before or after death.
- Record information on Form MM01 found in the Annex.

Make sure that enough photographs are taken and included in the report.

Figure 11 Making a ventral incision on a dolphin.

INTERNAL EXAMINATION

Necropsy technique on cetaceans is illustrated in Figures 11 to 14 while that on the dugong in Figures 15 and 16.

1. Place the carcass on the examination table. Position it on its back with the ventral side or belly facing you.

2. Using a sharp knife cut into the skin by carefully making a ventral incision from the top of the neck through the midline down to the genital slit (Fig. 11). Cut into the skin with blubber, and superficial muscles. Measure the thickness of the blubber at different locations of the body (ventral, dorsal, lateral, and cervical) as seen in Figure 12.

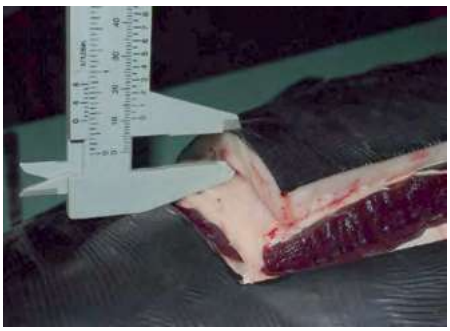


Figure 12 Measuring the blubber.

3. For dugongs, make a second incision (perpendicular to the first) from one pectoral fin to the other. Follow this with a third incision parallel to the second just before the genital slit (Fig. 15).
4. Reflect the skin or pull the skin outward to reveal the ribs. Observe for lesions underneath the skin.
5. Cut away the ribs and the abdominal muscles to expose the underlying organs (Fig. 13). To cut through the thoracic cavity, incision may be done at the attachment of the rib to the spine (costochondrial junction) or if bone cutters are available, at the dorsal level of the ribs. Ensure that the exposed area of the chest will be big enough to work with. Take a photograph of the underlying organs as they are found. Describe the organs in general and note lesions.
6. Expose the lungs with the trachea and the heart. Separate from the esophagus and other organs. Note down descriptions and take a photograph of the thoracic organs, as is. Note the presence of fluids in the thoracic cavity if any. Take special note of the lung tissue especially if emphysematous. Remove and examine the lungs and heart separately. Describe and note for lesions. Collect tissue samples from organs with lesions, taking care to include normal tissue with that of the diseased part, and submit for histopathology.

Figure 13 Opening the body cavity of the carcass.

7. Examine, describe, measure, and weigh the stomach. When separating the stomach from the rest of the gastro-intestinal tract, make sure to secure all its contents by tying a string around the openings before cutting it out. The contents of the stomachs will be examined separately. Examine other internal organs including the intestines, liver, kidney, uterus, and ovary/testis separately (Figs. 14 and 16). Take note of the lymph nodes and the adrenals as well, note for any abnormalities. Note the presence of fluids, if any, in the abdominal cavity.

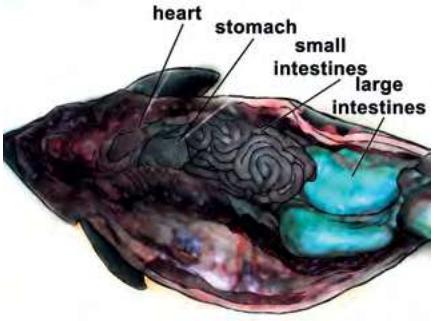


Figure 14 Examine the internal organs for lesions.

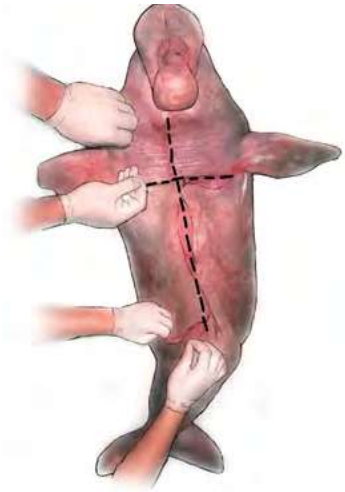


Figure 16 Abdominal organs of a dugong.

Figure 15 Ventral incision on a dugong.

For larger animals, it may be difficult to lay it on its back. An option is to position the animal on its belly. Figure 17 shows a side incision on a dolphin. Make a side incision (A). Using a sharp knife, cut laterally into the skin to expose the blubber, muscle, and internal organs (B and C) and proceed with Steps 4 and 5. Separate the ribs at the costal cartilage to open the rib cage and provide access to other organs for examination, measurement, and documentation (D).

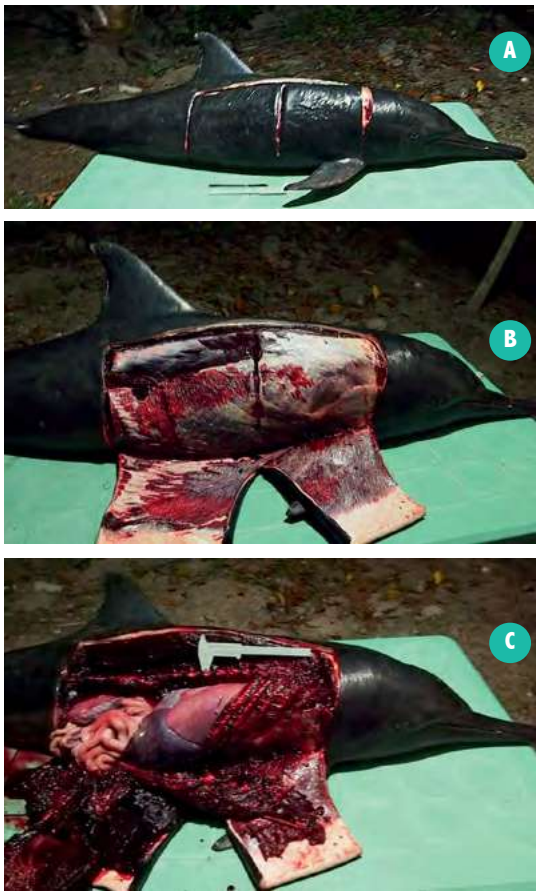
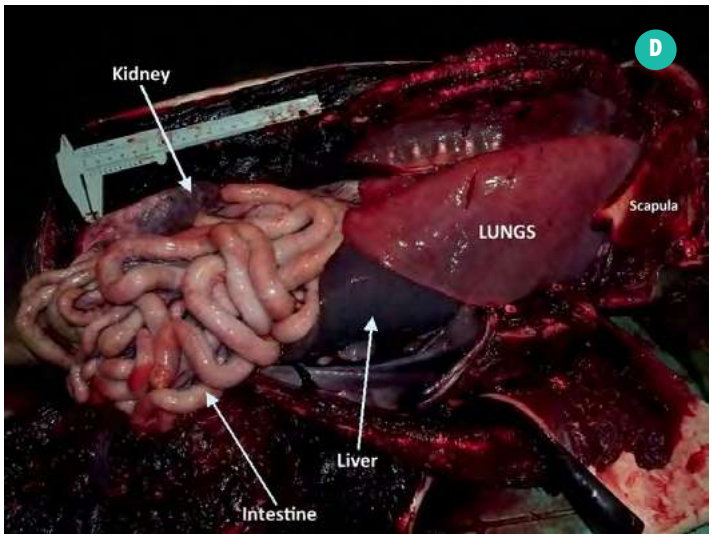


Figure 17 Side incision techniques for cetaceans.



NOTE
Trash such as plastic bags, rope, bottle caps, pieces of fishing gear are normally found in the gut of cetaceans which be a possible cause of the stranding. Do note the presence of these when dissecting the gastro-intestinal tract.

8. Record all findings and observations on a necropsy form. Make sure that the tissue samples collected for histopathology are also recorded. Include clear photographs.

   Collection of specimens and proper preservation will be discussed in the next chapters.

CARCASS DISPOSAL

After all the information, measurements, and samples have been collected, the carcass needs to be disposed of properly. Removal all the internal organs and meat from the bones is advised. The whole skeleton is recommended for retrieval which will be useful for further studies.

The site for disposal is of primary concern because it should not be in an area where it could be a hazard to communities, including scavenging wildlife and domestic animals. The considerations for disposing of marine mammal carcasses include the following:

- Location
  - o Is there a community living nearby?
  - o Are you close to a water source?
  - o Is the area prone to soil erosion?
  - o Are there wild and domestic scavengers present?
  - o Would the community attempt to utilize the carcass for food?

  Dead animals are best disposed of in isolated areas away from communities, wildlife and domestic animals, without risk of it contaminating groundwater.

- Rarity of species
  - o Has the animal been recorded in the Philippines before?
  - o Have you confirmed the species through external examination?

  Whole animal specimens are valuable for scientific purposes especially if recorded for the first time or the species has not yet been confirmed. If the whole animal cannot be collected, the whole skeleton should be collected.

- Size
  - o Can the animal be moved easily?
  - o Do you have the equipment to move large animals?

  The bigger the animal, the more challenging the disposal is. It may require the use of mechanical equipment like backhoe, truck, and other heavy machineries to lift or move the animal.

- Interested accredited parties
  - o Is there an institution, agency, or individual doing research on this animal who may be interested in the specimen?
  - o Do they have the proper permits to receive samples and specimens?

  The institution should have the proper permits from DENR and DA.

- Retrieval of the skeleton
  - o Would there be any use of articulating the skeleton, perhaps for scientific or educational purposes?

  There is always value in collecting the skull and skeleton for future studies or educational purposes. If this is the intent, retrieval of the bones should be considered.

- Documentation of the site. This is important if retrieval of the skeleton is an option.

METHODS OF DISPOSAL

Burial

When burying the carcass it is best to think that the skeletal remains will be retrieved when all the tissues have decomposed completely. This will take two years for small animals and longer for larger animals. Larger animals may have to be cut up before disposal. 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.

If the intent is to retrieve the bones at a later date, wrap the carcass securely with a net of the smallest mesh size available (Fig.18). Choose a dry area and dig a two-meter deep hole big enough for the carcass to fit. Make sure you mark the site for retrieval after the tissues have decomposed which at a minimum will take two years.

Figure 18 Carcass wrapped in a net prior to burial.

A better method is to remove all the meat from the bones before burial. The skeleton will have to be disarticulated so knowledge on the animal's anatomy is required. The head should be severed from the body and the brain removed from inside the skull. Extra care is needed to avoid damage especially to smaller bone parts (e.g., bones on the flipper, head, and spine). The bones should then be placed in a sack or a net with the smallest or finest mesh size available. Bury the bones

two meters below the surface. Choose a dry sandy area to bury the bones in. Mark the site for later retrieval. . The meat and internal organs should be disposed of separately. Document the date of burial to monitor burial time and retrieve the 'cleaned' skeleton around a year from burial date.

To hasten the decomposition of the tissues on the bones, another method is recommended. Prepare the skeleton as above and wrap in a net of the smallest mesh size. It should then be anchored, not buried, in a secured mangrove or reef area (with sandy/muddy bottom). Choose an area that will not dry out during low tide. Worms and amphipods will consume all the tissue on the bone and it will be cleaned out in less than a month.

When conditions are not suitable in the stranding site, the carcass needs to be moved in whole or in parts (especially for large animals) to a more appropriate site. When moving sites, the authorities in the new location need to be informed and permission from them secured.

Disposal at sea

Another option is to tow the carcass out to sea. This should be done far enough from the coast to prevent the carcass from being washed ashore again. It is best to check the depths of the area where the animal will be left and should be the deepest part of the sea in at least 100m depth. Never dispose of the animal in a reef area.

If the animal is big and would need to be towed on the side of the boat, make sure that it is tied with the head towards the back of the boat. It might be best to weigh down the animal (with biodegradable materials) to make it sink and perforate the body cavities and the gastro-intestinal tract to prevent bloating. This will take more effort and expenses especially for boat fuel compared to other methods. There is also no chance to recover the bones. The carcass should be monitored after disposal in case it moves shoreward.

The skeleton could be retrieved after the predicated time of complete tissue decomposition. When it is time, dig up the site and haul out the skeleton. If necessary remove the remaining dried tissues still attached to the bone. Make sure that smaller bones are secured and accounted for. Cetacean bones are brittle and very oily while dugong bones are very dense.

Sort the bones then articulate or put together, if possible. Good quality bones are needed in the articulation hence, extra care should be taken to avoid losing or crushing the bone parts. Bones may be kept and catalogued in a museum specifically for research purposes.

Bones can be retrieved for display under the authorization of the national government through the DA and DENR, where the Philippine government retains ownership of the remains.

Leaving the animal where it is
This option should not be considered if the carcass is found near a settlement in consideration of the communities there. Nevertheless, it is an option if the animal is too large to move. It is ideal to leave the carcass or move it to a remote area with no issue of disturbing humans.






WHAT NOT TO DO WHEN DISPOSING OF MARINE MAMMALS

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

Slaughtering for eating. Stranded animals are usually sick, infected with bacteria, virus, parasites, and laden with heavy metals. It is also illegal under Philippine laws.

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

CHAPTER 7: DATA COLLECTION AND REPORTING

Response to any stranding is often tedious and exhausting, but there is a need to collect as much information as possible from the incident. These data are needed for studies that will help better address issues that affect our threatened marine mammal populations in the country.

DATA COLLECTION

When strandings fall under Code 1, the survivability of the animal is the primary goal and therefore the release or treatment are prioritized over data collection. For conditions Codes 2-6, data collection becomes the priority. Marine mammal forms MM01 and MM02 (as Annexed) are the main data sheets to be filled out for each and every response conducted. The forms can be copied for use in the field. All forms must be completed with accuracy and reliability. Proper ways to collect the information are discussed in detail in this section. The documenter is in charge of collecting the information for the forms with help of the data collectors.

GENERAL INFORMATION

Interview the person who reported the incident to you and/or the person who initially saw the stranded animal, in case they are different. Record the name, address and contact information, time of stranding, exact location (particular beach, sitio, barangay, municipality, etc.), sea condition when the animal was first seen especially when the condition is often different from the time the response team arrives on site, and condition of the animal when first seen and the number of animals found stranded. Ask if other marine mammals were observed near the stranding site. Fill up the Environmental Condition box, Stranding Code box, and Animal Information box found in the stranding form MM01. Use the species identification sheet in the Annex to determine the Genus and species of the animal.

CODE 1 data. For live strandings, minimal data will be collected to lessen the stress to the animal. The most important one would be the total length over maximum girth, flukes, and dorsal fin measurements.

CODE 2-6 data. For dead animals, collect all the measurements indicated in the form.

External examination ideally requires two data collectors and one documenter. Body condition, sex, and measurements are taken. All numerical data should be accompanied with appropriate unit of measure.

BODY CONDITION

Rate the body condition as Good, Moderate, or Thin based on the assessment procedures.

Any bleeding, wounds, or other skin condition like cookie-cutter shark marks, scratches, and bruises should be noted and documented on form MM01 under external physical description of the animal. Any signs of gear entanglement should be noted on the form.

SEX

It is easiest to check the genital slits on the ventral part of the animal when the animal is on its side. It might be difficult to look at if the animal is on the beach. If the animal is floating in the water, you can snorkel to check the animal's underside or if not safe, take a picture using an underwater camera. To identify the male and female for cetaceans and dugong, see Figure 1.

BODY MEASUREMENTS

Take all the measurements asked in the form as shown in Figure 19.

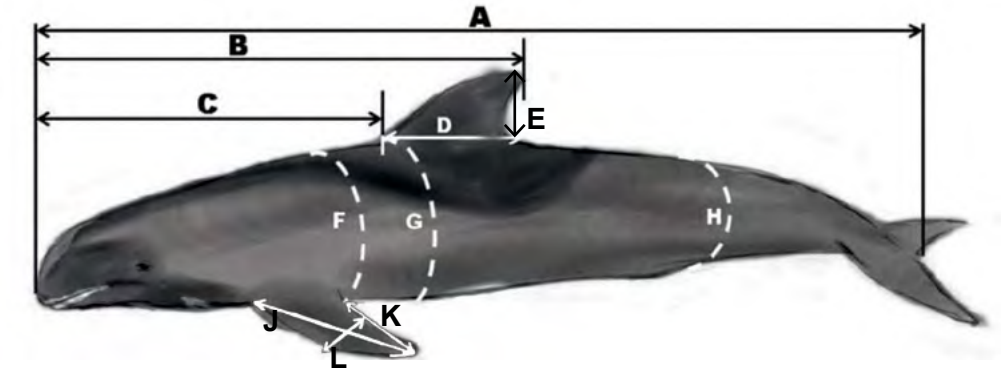


Figure 19 How to measure body lengths and widths.

A. Total length – straight line distance from the tip of the snout to the notch of the flukes.
B. Snout to dorsal fin tip – straight line distance from the tip of the snout to the tip of the dorsal fin.
C. Snout to anterior dorsal fin – straight line distance from the tip of the snout to the anterior base of the dorsal fin.
D. Dorsal fin base length – the length of the anterior base of the dorsal fin to the posterior base.
E. Dorsal fin height – straight line perpendicular to the body from the base to the tip of the dorsal fin.
F. Girth axilla – the measurement around the body just behind flipper.
G. Girth maximum – the measurement around the body just before the dorsal fin.
H. Girth anus – the measurement around the body at the level of anus.
I. Flukes width – the measurement from tip to tip of flattened tail (Fig. 20).
J. Flipper length, anterior – the measurement where the pectoral fin or flipper joins the body to tip at the front portion of the fin.
K. Flipper length, posterior – the measurement where the pectoral fin or flipper joins the body to tip at the back portion of the fin.
L. Flipper width – the measurement of the widest part of the flipper.

Figure 20 Measurement of the flukes width.

DO NOT FORGET THE SCALE!
Use the metric system: meter (m); centimeter (cm); millimeter (mm)

If possible, weigh the animal using the stretcher and a hanging weighing scale. If not available estimate the weight of the animal. Do this only when feeding the animal is indicated to be able to estimate the amount of food per day.

Figure 21 shows a spinner dolphin neonate. Newly born animals have visible hairs, natal folds, and slightly folded dorsal fins. Age is difficult to determine just by physical appearance, but there are scientific procedures that determine age using teeth or ear bones.

Figure 21 Newly born dolphin or neonate.

PHOTOGRAPHIC DOCUMENTATION

Take images that are clear, crisp, well-lit, and free from unnecessary background and shadows that may compromise the details needed from the animal. Photographer should capture the whole image of the animal or its features perpendicularly. It is best to shoot at the level of the animal or the body part so it might be necessary to squat or lie on the ground. The body colour patterns and markings are best captured if the exposure setting of the camera is right.

Images serve as visual tools of the written report and will provide additional information which might be needed long after the response operations. At a minimum, the following parts need to be photographed. The complete part needs to be captured in the frame of the picture:

- Flukes - dorsal and ventral view
- Head - dorsal and lateral view
- Body - dorsal and lateral view
- Dorsal fin - lateral view
- Beak or snout – lateral, dorsal, and front view showing most if not all teeth

FIELD PHOTO-ID CARD

Field No. _____

Species _____

Date (Stranding and Necropsy, if different) _____

Location of Stranding _____

Use a field photo ID card with every photograph taken. A sample is provided above. This will ensure that each photograph is labeled correctly.

Disposal site must be marked with GPS coordinates or other reliable landmarks if there is a plan to retrieve the bones. The final disposition is noted for both live and dead animal.

SPECIMEN COLLECTION AND PRESERVATION

This section deals with the collection of samples from a dead animal. Further tests, analyses, studies, and interpretation will be carried out by the appropriate research institution accredited by the DENR and DA.

Analysis of samples taken from a stranding incident is important in providing more information about the individual animal as well as insights on the status of their population and habitat. Various tissue and specimens are taken from the animal for specific research. This is usually determined by the institution or organization involved in the research.

At a minimum, a skin sample, usually from a fluke (Fig. 7) needs to be taken from both live and dead animals for DNA analysis. For dead animals, the skeletal remains must be collected particularly the skull and teeth. This is important especially if the species has not yet been confirmed. The whole stomach with the contents intact needs to be collected and examined.

Tissue samples taken from different organs, including bones and teeth, must follow a protocol on collection and preservation in order to carry out intended diagnostic tests. Correct samples but wrong preservation will give wrong result interpretation despite the correct diagnostic test used. A list of samples to be collected with corresponding priority status and preservation method should be part of any necropsy kit. Sample replicates should be practiced to allow duplication of tests in case prior test was doubtful. Hence, storage is critical.

Table 3 outlines various types of specimen, optimal sample size, storage, sample analysis, and applicable carcass condition. Notes on specimen preparation according to type are listed below. These are based on existing research studies conducted in the Philippines. However, more samples may be collected if needed or requested depending on which institution requires what. Limitation on the collection is driven by lack of capability to properly store, catalogue, and maintain them.

The procedures in collecting the samples are listed below:

- Skin and blubber – Slice with clean scalpel or knife. Wash with water prior to preservation. Get samples from the ventral and dorsal part of the body. Indicate location where samples are collected or better yet take photos of the procedure. Take more than one sample.

- Kidneys – Representative parts of the left and right kidney that shows healthy and diseased tissues.

- Muscle - Slice with clean scalpel or knife. Wash with water prior to preservation. Get samples from the ventral and dorsal part of the body. Indicate location where samples are collected or better yet take photos of the procedure.

- Blood – Collected only from freshly dead animal. Extract blood samples from the base of the tail or fluke or from the heart or internal blood vessels in the thoracic cavity during necropsy.

- Stomach – Cut the whole stomach starting from the fore-stomach (or esophageal) up to the pyloric ends (intestinal side). Tie each end to prevent contents from spilling. Weigh the entire stomach. During analysis, decant content into a glass container. Stomach walls must be scraped and washed.

- Parasites – Loose parasites may be collected directly. Wash with salty or saline water to clean before preservation. If the parasite is embedded in an organ, cut off the piece of the organ with the parasite including parts of the healthy tissue for preservation. Take photos of the parasites in situ.

- Ovaries and testis – Left and right ovaries must be weighed and properly labeled to avoid mix up.

- Liver – Cut the required piece from the liver in a cube with a sharp knife. Collect several samples from the different lobes.

- Thyroid gland - Carefully dissect away from the trachea and weigh.

- Teeth and skeleton – Skeleton and skull is prepared for collection as described earlier. Teeth are included in this preparation although could be extracted and collected immediately during necropsy.

The whole intact animal can also be collected and frozen for future studies and dissection. The appropriate research facility with a large enough freezer, preferably a walk-in one, needs to be identified.

IMPORTANT
Always label your specimens on the picture with a field photo ID card. The sample bottles should be labeled directly on the bottle or with a water resistant sticker which will include the field number, date of death, date of collection, species, organ/tissue, preservative used.

The manual covers only the collection of the samples and tissues in the field, including how to preserve them. Further analysis will be done by a partner organization. For recommended institutions involved in marine mammal research, contact the DA and DENR offices.

WRITE AND SUBMIT A REPORT

The forms should be attached to a narrative stranding incident report using Form MM02, making sure all other relevant information not covered by Form MM01 are included. Include the photographs taken as well. Submit the completed forms to the agencies and offices listed below. The report can be submitted in hard copy or electronically, making sure that you secure a copy for your own records. The recommended offices to which the reports shall be submitted are listed below. A list of the National Office addresses is annexed.

- DA-BFAR-NFRDI National Office
- DENR-BMB National Office
- Regional offices of the DENR and DA
- PCSD (for Palawan)
- Mayor's Office
- Barangay Captain

Online reporting may be done to NGOs and academe such as the:

- Marine Wildlife Watch of the Philippines Facebook site (https://www.facebook.com/marinewildlifewatchofthephilippines) or E-mail to info@mwwphilippines.org
- SU-IEMS webpage (http://su.edu.ph/iems/projects/cetacean/stranding.shtml) or E-mail to iems.su@gmail.com
- Balyena.org webpage (www.balyena.org) or E-mail to info@balyena.org
- Large Marine Vertebrate Research Institute Philippines webpage (http://www.lamave.org) or E-mail to lamave.project@gmail.com

The information will be useful in collating stranding information in the Philippines through a database that is yet to be established by the DA and DENR with the help of relevant NGOs and academic institutions.

Table 3 Sample Collection and Preservation from Dead Marine Mammals

*Methods based on literatures by: Pugliares et al., 2007, Geraci et al., 2005, Clarke 1986;

Analysis Specimen Type	Histopathology	Parasitology	Toxicology - POPs	Toxicology – Heavy Metals	Reproduction	Genetics	Aging	Feeding Ecology	Sample dimension/ remarks
Stranding Code	Code 2	Code 2	Code 2	Code 2	Code 2	Code 2-6	Code 2-6	Code 2	
Skin				X		X			5 x 5 cm with blubber.
Blubber		X	X					X	More than one sampling required. Code 1 skin sampling possible.
Kidneys	X	X		X					5 x 5 cm each from left and right kidneys
Liver	X	X		X					5 x 5 cm
Muscle	X	X		X	X	X			5 x 5 cm
Bones						X			Collect the complete skeletal remains
Teeth							X		Collect all
Blood	X	X			X				Use 3 vacuum tubes, 10 mL each
Stomach		X			X			X	Collect whole stomach
Testis	X	X							
Ovaries and Uterus	X	X							Collect whole thing
Thyroid gland	X	X							Collect whole thing
Parasite (Internal and external)		X							Collect whole thing Note location or organ. Collect five or more specimen each kind.
Preservation*	Samples in 10:1 ratio of 10% neutrally buffered Formaldehyde stored in plastic leak-proof container; Keep blood samples in room temperature to clot, then separate the serum and freeze at -5°C.	Samples in Absolute or 95% Ethanol stored at room temperature	Freeze samples at -20°C stored in clean polyethylene bags.	Freeze samples at -20°C stored in clean polyethylene bags.	Samples fix in 10 % buffered solution of Formaldehyde.	Samples in Absolute or 95% Ethanol in clean, leak-proof, polyethylene containers. Keep blood samples in room temperature to clot then separate the serum and freeze at -5°C.	Collect 4–7 teeth from the mid-lower, left mandible of the toothed animal, tusks from dugong. Preserve in 70% Ethanol then frozen at -5°C. Teeth can be dried	Samples frozen at -20°C. Preserved in 70% Ethanol then kept cold.	

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ANNEXES

1. Marine Mammal Species Identification Guide
2. Form MM01 – Marine Mammal Stranding Data Sheet
3. Form MM02 – Marine Mammal Stranding Report Form
4. Form MM03 – Marine Mammal Necropsy Form
5. Government Offices Contact Information
6. Decision Flow Chart for a Marine Mammal Stranding Response

Marine Mammal Species Identification Guide

Abbreviated status based on 2001 IUCN Red List Category version 3.1.

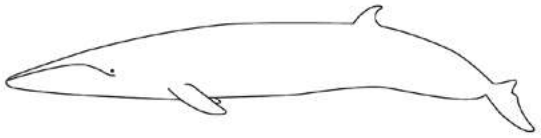
EN = Endangered VU = Vulnerable CR = Critically Endangered
NT = Near Threatened DD = Data Deficient LC = Least Concern
NA = Not Assessed

Global Status: Based on IUCN Red List of Threatened Species. PH Status: Based on Alava et al., 2012.
Description: Based on Jefferson et al., 2007

Order Cetartiodactyla (Whales, Dolphins, and Porpoises)

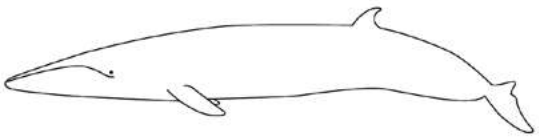
Sub Order MYSTICETI Baleen Whales
Family Balaenopteridae

1. *Balaenoptera edeni*, Bryde's whale



Global Status DD; PH Status DD
- 11.5-14.5 m
- Three prominent rostral ridges
- Shape of the head is pointed when viewed from the top
- Dorsal fin is tall and falcate

2. *Balaenoptera omurai*, Omura's whale

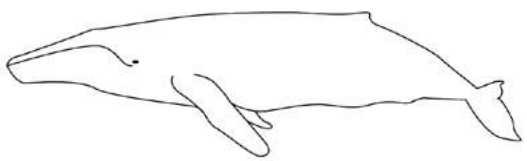


Global Status DD; PH Status DD
- 11.5 m
- Single prominent ridge on the rostrum
- Asymmetrical coloration of the lower jaw. Left side is black, right side is white
- Dorsal fin is suspected to be tall and falcate
- May be confused with Bryde's whale

3. *Balaenoptera musculus*, blue whale

Global Status EN; PH Status EN
- 33 m
- Single prominent ridge on the rostrum
- Head resembles a U-shape
- Dorsal fin is small located 3/4 of the body length
- Pectoral fins are long and pointed

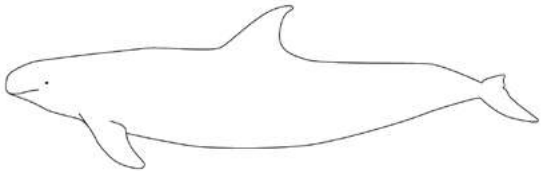
4. *Megaptera novaeangliae*, humpback whale



Global Status LC; PH Status VU
- 11.5 – 15 m
- Head is broad and has a single median ridge lined with tubercles
- Flippers are very long, about 1/3 of the body length, and white on the underside
- Fluke is serrated on the trailing edge. Ventral color varies from all white to black and a combination of both

Sub Order ODONTOCETI Toothed Whales
Family Delphinidae

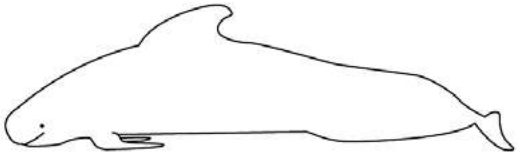
5. *Feresa attenuata*, pygmy killer whale



Global Status DD; PH Status DD

- 2.1-2.6 m
- Head is rounded without beak
- Body is dark gray to black
- Dorsal fin is tall and slightly falcate
- Extensive white snout tips and lips
- Pectoral fins have rounded tips

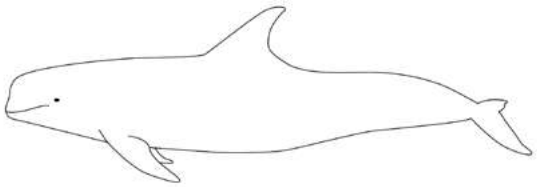
6. *Globicephala macrorhynchus*, short-finned pilot whale



Global Status DD; PH Status DD

- 3.6 – 6.5 m
- Large animal with bulbous, blunt, square-like head
- Dorsal fin is very falcate or hooked with broad base

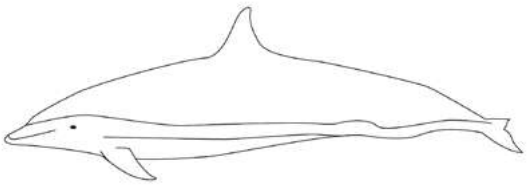
7. *Grampus griseus,* Risso's dolphin



Global Status LC; PH Status DD

- 2.6 – 3.8 m
- Front of the head has a V-shaped crease and blunt in shape
- Dorsal fin tall, pointed and slightly falcate.
- Body is often scarred or white in color as it ages.
- Flippers are long and pointed

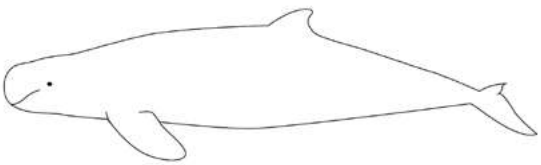
8. *Lagenodelphis hosei*, Fraser's dolphin



Global Status LC; PH Status VU

- 2 – 2.6 m
- Stocky body with well-defined beak
- Short pectoral fins and triangular dorsal fin
- Dark band or color pattern from the face to the anus

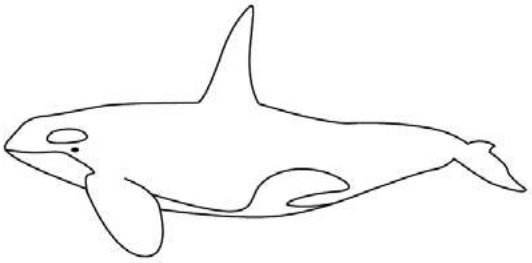
9. *Orcaella brevirostris*, Irrawaddy dolphin



Global Status VU; PH Status CR, EN

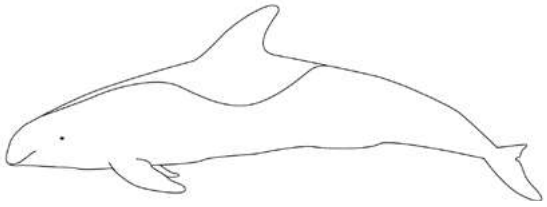
- 2.1 – 2.6 m
- Robust body with round head without beak
- Dorsal fin is rounded and small
- Flippers are wide with rounded tips
- Inhabits the coastal, estuarine, and freshwater habitats
- Neck is flexible because of unfused cervical vertebrae

10. *Orcinus orca*, killer whale
Global Status DD; PH Status DD



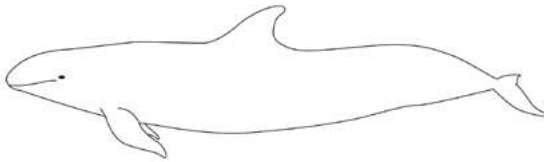
- 5.5 – 9.8 m
- Black and white coloration is distinct.
- Saddle and eye patch are whitish in color
- Dorsal fin is erect and pointed. Males have tall and triangular dorsal fin while immature and females are slightly rounded at the tip

11. *Peponocephala electra*, melon-headed whale
Global Status LC; PH Status DD



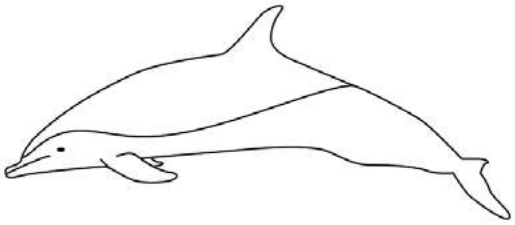
- 2.1 – 2.7 m
- Head is triangular in shape when seen from top and without beak
- Lips are white in color but not as extensive as the pygmy killer whale
- Dorsal fin is tall and slightly falcate
- Grayish to black in body color with anchor-shaped white patch on the throat area
- Pectoral fins have pointed tips

12. *Pseudorca crassidens*, false killer whale
Global Status DD; PH Status DD



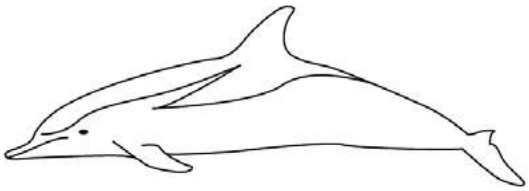
- 4.3 – 6 m
- All black in color with conical or tapering body shape
- Pectoral fins are S-shaped with rounded tips
- Dorsal fin is slender and falcate

13. *Stenella attenuata*, pantropical spotted dolphin
Global Status LC; PH Status DD



- 1.7 – 2.4 m
- Body is streamlined with white dorsal spots
- Beak is long and slender often white on the tip
- Dorsal fin is falcate and pointed
- Young individuals are unspotted

14. *Stenella coeruleoalba*, striped dolphin
Global Status LC; PH Status DD

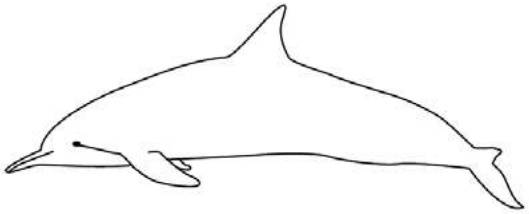


- 1.8 – 2.5 m
- Body is stockier than the pantropical spotted dolphin
- Dorsal fin is tall and falcate
- Distinct dark stripes from the eye to the anus and from the eye to the flippers
- Very rarely seen in the Philippines

15. *Stenella longirostris longirostris*, Gray's spinner dolphin

Global Status DD; PH Status VU

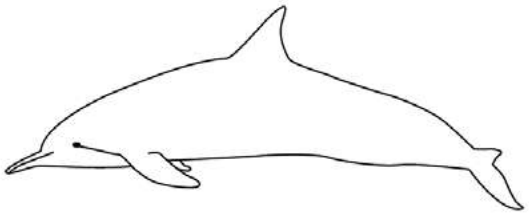
- 1.3 – 2.1 m
- Most encountered species in the Philippines
- Slender body with long thin beak that is black at the tip
- Small triangular dorsal fin
- Very active and acrobatic



16. *Stenella longirostris roseiventris,* dwarf spinner dolphin

Global Status DD; PH Status DD

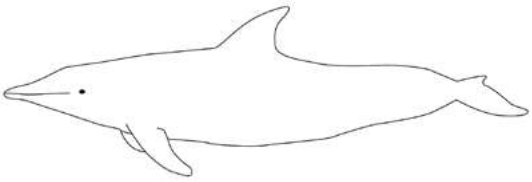
- 1.3 – 1.6m
- This is a subspecies or dwarf form of the spinner dolphin
- Smaller in length but with large appendages (e.g., dorsal and pectoral fins)
- Dorsal fin is falcate



17. *Steno bredanensis,* rough-toothed dolphin

Global Status LC; PH Status DD

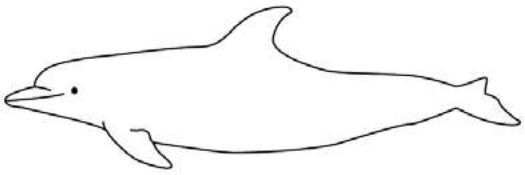
- 2.1 – 2.6 m
- Relatively robust body with conical head
- Beak is long with smooth slope from the melon
- Dorsal fin is slightly falcate
- White colorations are visible on the lips, lower jaw, and the belly



18. *Tursiops aduncus*, Indo-Pacific bottlenose dolphin

Global Status DD; PH Status DD

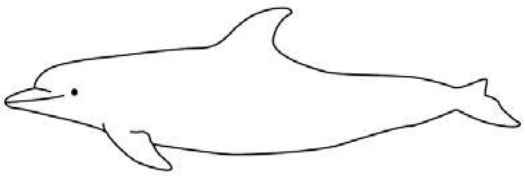
- 2.7m
- Size is similar to the common bottlenose dolphin
- Beak is slender and longer
- Beak crease is less prominent compared to the common bottlenose dolphin
- Dorsal fin is tall and slightly falcate
- Gray to black spots are visible on the belly of adult animals



19. *Tursiops truncatus*, common bottlenose dolphin

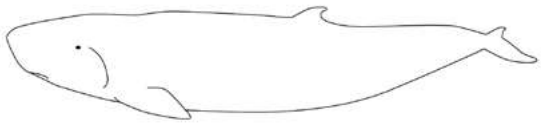
Global Status DD; PH Status DD

- 1.9 – 3.8m
- Large and relatively robust body
- Beak is stocky with distinct slope from the melon
- Dorsal fin is tall and falcate



Family Kogiidae

20. *Kogia breviceps*, pygmy sperm whale



Global Status DD; PH Status DD

- 2.3 – 3.4 m
- Head is square-like in shape with a narrow shorter lower jaw
- Small dorsal fin located further posterior, very falcate, and rounded tip
- "False gill" is light in color and located between the eye and the pectoral fin
- Difficult to detect at sea because of its stealth or sluggish behavior

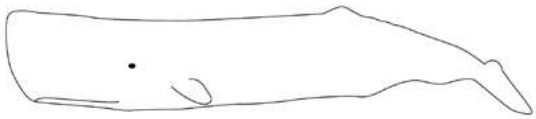
21. *Kogia sima,* dwarf sperm whale

Global Status DD; PH Status DD

- 2.1 – 2.7m
- Has similar characteristics with the pygmy sperm whale
- Dorsal fin is larger than *K.breviceps* and slightly pointed

Family Physeteridae

22. *Physeter macrocephalus,* sperm whale

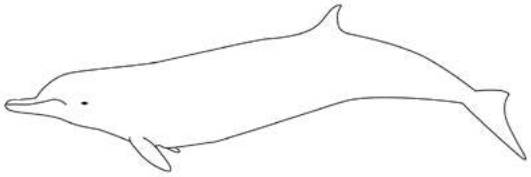


Global Status VU; PH Status VU

- 11 – 18 m
- Large blunt and squarish head
- Blowhole located to the left and oriented forward of the head
- Short, wide, and paddle-shaped pectoral fins
- Dorsal fin is small almost like a hump
- Fluke is triangular in shape and broad with deep fluke notch
- Lower jaw is very narrow and shorter or underslung
- Teeth are found only on the lower jaw
- Wrinkling of the skin is prominent

Family Ziphiidae - Beaked Whales

23. *Indopacetus pacificus,* Longman's beaked whale

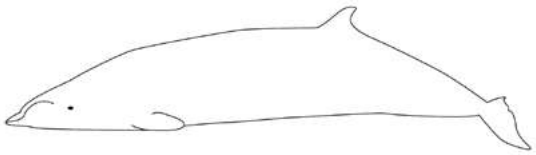


Global Status DD; PH Status DD

- 4 – 9 m
- Beak is tube-like, long and distinct with bulging forehead
- Dorsal fin is falcate and located further midway to the back
- A pair of V-shaped grooves is seen on the throat
- Brownish to bluish gray in color

24. *Mesoplodon densirostris*, Blainville's beaked whale

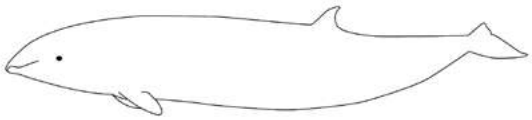
Global Status DD; PH Status DD



- 4.5 – 6m
- Body is brownish to blue gray in color with small head
- Dorsal fin is small and located to the back
- Pectoral fins are narrow and small
- The posterior half of the lower jaw is very arched with erupted tusk on the top

25. *Ziphius cavirostris*, Cuvier's beaked whale

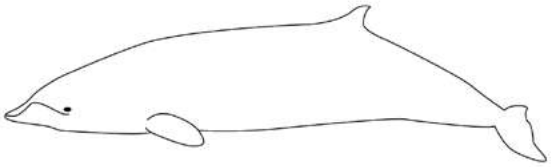
Global Status LC; PH Status DD



- 5.5 – 7m
- Dorsal fin small and falcate located 3/4 to the back
- No distinct beak but stubby in appearance and forehead slopes gently
- Body is dark gray to light brown and relatively robust
- Flippers have rounded tip

26. *Mesoplodon ginkgodens*, ginkgo-toothed beaked whale

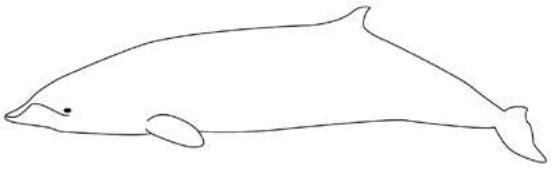
Global Status DD; PH Status NA



- 5.3 m
- Spindle shaped body, small head
- Small dorsal fin 2/3 back of body length

27. *Mesoplodon hotaula*, Deraniyagala's beaked whale

Global Status DD; PH Status NA



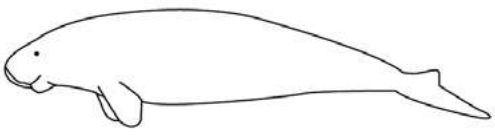
- Similar to *M. ginkgodens*

Order Sirenia (Manatees and Dugongs)

Family Dugongidae

28. *Dugong dugon,* dugong

Global Status VU; PH Status CR

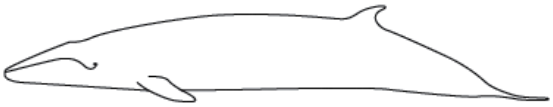


- 2.4 – 2.7m
- No dorsal fin
- Body is brownish to grayish in color, roundly-shaped and less streamlined than cetaceans
- Mammary glands are located in the armpits
- Nostrils are slightly above the snout

Other yet unconfirmed species:

1. *Balaenoptera physalus*, fin whale
   Global Status EN; PH Status NA
   - 27 m
   - V-shaped head dorsally
   - Single median ridge on the head
   - Body is black or dark brownish-gray
   - Left jaw is dark, right is white

2. *Balaenoptera acutorostrata*, common minke whale
   Global Status LC; PH Status NA
   - 6.5 – 8.8 m
   - Head sharply pointed
   - Prominent median head ridge
   - Dorsal fin tall and falcate, located 2/3 back of the body

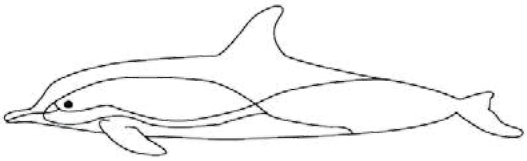


3. *Neophocaena phocaenoides*, finless porpoise
   Global Status VU; PH Status NA
   - 2.27 m
   - No dorsal fin
   - Flexible neck

4. *Sousa chinensis,* Indo-Pacific humpback dolphin
   Global Status NT; PH Status NA
   - 2.6 – 2.8 m
   - Rounded melon with beak, no deep crease
   - Dorsal fin sits on a hump
   - Dark grey calves which becomes lighter (pink) as adults

5. *Balaenoptera borealis*, sei whale
   Global Status EN; PH Status NA
   - 12-17 m
   - Rostrum pointed
   - Single prominent ridge on head
   - Dorsal fin rises at a steep angle

6. *Delphinus capensis*, long-beaked common dolphin
   Global Status DD; PH Status NA
   - 2.6 m
   - Beak narrow and long
   - Tall falcate dorsal fin
   - Crease present between melon and beak
   - Hourglass pattern on the side



MM01 MARINE MAMMAL STRANDING DATA SHEET

DATE OF STRANDING OR CAPTURE _____ **TIME OF STRANDING OR CAPTURE**_____

DATE OF EXAMINATION _____ **TIME OF EXAMINATION**_____

DATA COLLECTOR _____

DATA COLLECTOR'S TELEPHONE NUMBER _____ **ADDRESS** _____

_____

SOURCE OF REPORT _____ **CONTACT DETAILS**_____

STRANDING LOCATION (*Sitio, Barangay, Island, Municipality, Province*) _____

_____

OTHER INFORMATION _____

_____

_____

ENVIRONMENTAL CONDITION *(check appropriate box)*									
Topography		**Weather condition**				**Sea state**		**Tides**	
Sandy beach		Sunny		Rainy		Calm		High tide	
Rocky beach		Overcast		Heavy rain		Rough		Low tide	

GPS Coordinates

Latitude_____

Longitude _____

STRANDING CODE *(check appropriate box)*		
Alive	CODE 1	
Freshly dead	CODE 2	
Decomposed, but organs are intact	CODE 3	
Advance decomposition	CODE 4	
Skeletal remains	CODE 5	
Destroyed (burned or slaughtered)	CODE 6	

ANIMAL INFORMATION *(check appropriate box)*	
Single animal	
Mother and calf	
Multiple stranding	
Multiple species stranding	
GENUS	
SPECIES	

Sex: Male _____ **Female** _____ **Not Determined** _____

All measurements should be done in a straight line, except for the girth.

FOR LIVE STRANDING CODE 1:

Total Length _____ **Maximum girth** _____ **Flukes width** _____

Dorsal fin base width _____ **Dorsal fin height**_____

VITAL SIGNS: Alert _____ **Weakly-responsive** _____ **Non-responsive** _____

BODY CONDITION: Good _____ **Moderate** _____ **Thin** _____

DNA tissue collection and preservative used: _____

Physical Examination of the animal: _____

_____

Draw marks and lesions:

FOR CARCASS EXAMINATION CODES 2, 3, and 4:

MORPHOMETRICS *(include unit of measurement)*			
Total length		Girth axilla	
Snout to dorsal fin tip length		Girth maximum	
Snout to anterior dorsal fin length		Girth anus	
Dorsal fin height		Flipper length anterior	
Dorsal fin base length		Flipper length posterior	
Flukes width		Flipper width	

PHOTO DOCUMENTATION *(check if images were taken)*			
Body - Lateral view whole		Head - Lateral view	
Body - Dorsal view whole		Head - Dorsal view	
Body - Ventral view whole		Head - Beak or Snout	
Fluke - Dorsal view whole		Fluke - Ventral view whole	
Dorsal fin - Lateral view whole			

FOR TISSUE SAMPLING CODES 2 and 3:

TISSUE AND PARTS COLLECTED *(to be done with necropsy form)*					
Skin with blubber		Stomach with content		Uterus and Ovaries	
Muscle		Bones		Testis	
Kidney		Teeth		Thyroid gland	
Liver		Blood sample (optional)		Parasite	

Institute for sample analysis: _____

ANIMAL DISPOSITION *(check or underline appropriate box)*

RELEASED	FOR REHABILITATION	LEFT AT SITE	TOWED OUT TO SEA	BURIED	STORED IN FREEZER

Disposal Site: _____

Notes:

Photographs (attach):

MM02 MARINE MAMMAL STRANDING REPORT FORM

DATE OF STRANDING OR CAPTURE _____ TIME OF STRANDING OR CAPTURE_____

DATE OF EXAMINATION _____ TIME OF EXAMINATION_____

STRANDING LOCATION (Sitio, Barangay, Island, Municipality, Province) _____

_____

Brief and concise summary of the stranding (use additional sheet if needed)

First Responder/s (locals)	Response Team

Submitted to: _____

_____

Prepared by: _____

Date Prepared: _____

Address and contact details: _____

_____

Photographs taken (attach):

MM01/MM03 (attached):

MM03 MARINE MAMMAL NECROPSY FORM

Date of Death ☐ Location of death ☐

Date of Necropsy ☐ Time of Necropsy ☐

Specimen Number ☐
(should refer to a stranding form)

Note findings on the following, check if photographs and samples were taken

	Sample taken	Picture taken
EXTERNAL CONDITION	☐	☐
BLUBBER (Measure blubber thickness at different points: ventral, dorsal, lateral, and cervical)	☐	☐
THORACIC CAVITY		
Trachea	☐	☐
Thyroid gland	☐	☐
Lungs	☐	☐
Heart	☐	☐
ABDOMINAL CAVITY		
Esophagus	☐	☐
Stomach	☐	☐
Small Intestines	☐	☐
Large intestines	☐	☐
Liver	☐	☐

REPRODUCTIVE AND URINARY TRACT		
Testis	☐	☐
Ovaries	☐	☐
Uterus	☐	☐
Kidneys	☐	☐
Urinary tract and bladder	☐	☐
HEAD AND NECK REGION	☐	☐
MUSCLES	☐	☐
SKELETON	☐	☐

DIAGNOSIS

CAUSE OF DEATH

Examined by _____

Contact details _____

Government Offices Contact Details

Cetaceans

OFFICE OF THE DIRECTOR
Bureau of Fisheries and Aquatic Resources
Department of Agriculture
3rd Floor, Philippine Coconut Authority (PCA) Building
Elliptical Road, Diliman
Quezon City, Metro Manila
Telephone Number: (02)9299597; (02)9298074
Website: www.bfar.da.gov.ph
E-mail: info@bfar.da.gov.ph

OFFICE OF THE INTERIM DEPUTY DIRECTOR
National Fisheries Research and Development Institute
Bureau of Fisheries and Aquatic Resources
Department of Agriculture
Corporate 101 Bldg.
Mother Ignacia Ave.
Brgy. South Triangle
Quezon City, Metro Manila
Telephone Number: (02)3523596
Website: www.nfrdi.da.gov.ph
E-mail: its@nfrdi.da.gov.ph and nfrdi.misu@gmail.com

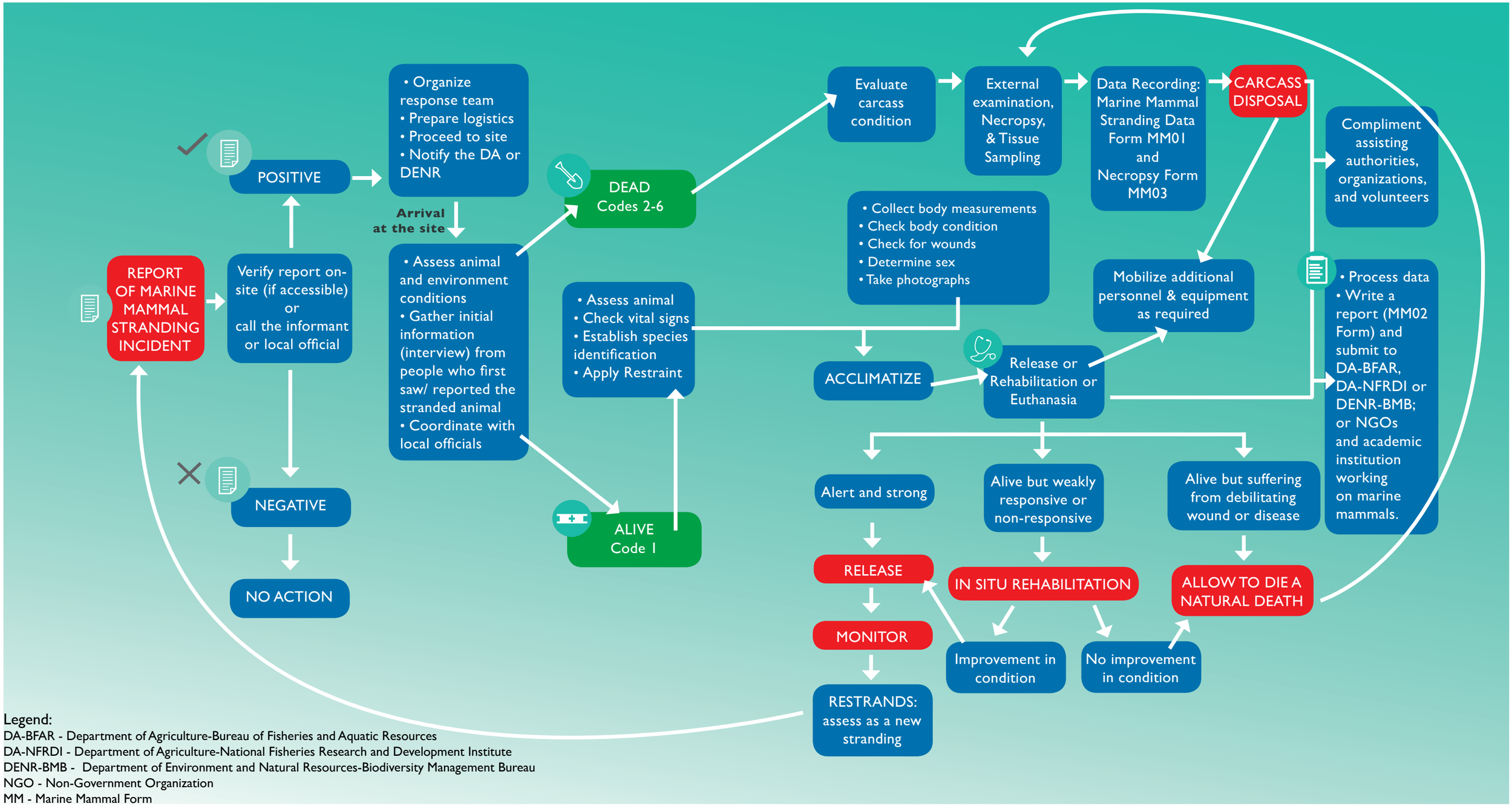
Dugong

OFFICE OF THE DIRECTOR
Biodiversity Management Bureau
Department of Environment and Natural Resources
Ninoy Aquino Parks and Wildlife Center
North Avenue, Diliman
Quezon City, Metro Manila
Telephone Number: (02)9246031-35
Website: www.bmb.gov.ph
E-mail: bmb@bmb.gov.ph

In Palawan

OFFICE OF THE EXECUTIVE DIRECTOR
Palawan Council for Sustainable Developement
PCSD Building, Sports Complex Road
Sta. Monica Height, Puerto Princesa
Palawan
Telephone Number: (048) 4344234, 4344235
Website: www.pcsd.ph
E-mail: oed@pcsd.ph

DECISION FLOWCHART FOR A MARINE MAMMAL STRANDING RESPONSE



Legend:
DA-BFAR - Department of Agriculture-Bureau of Fisheries and Aquatic Resources
DA-NFRDI - Department of Agriculture-National Fisheries Research and Development Institute
DENR-BMB - Department of Environment and Natural Resources-Biodiversity Management Bureau
NGO - Non-Government Organization
MM - Marine Mammal Form