

The role of the coastal communities as first responders of stranded marine mammals in East Java

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Abstract. Marine mammals in Indonesia mainly consisting of whales and dolphins belonging to the *Cetacean* and *duyung* or dugong of the order *Sirenia*. These rare animals are protected by law. However, the frequency of marine mammal occurrences stranded in Indonesia is now getting higher, as in East Java. Based on data from whale stranding of Indonesia, at least 12 marine mammal stranded incident occurred only in East Java in 2003-2017. Some events are also reported by BKSDA East Java and BPSPL Denpasar. Knowledge and readiness of coastal communities is needed in the handling of fast and precise in accordance with the guidelines handling. Fast and proper handling of alive stranded animals can reduce the risk of death so that the animals' hope for life and can be restored to their habitats is higher. Whereas in dead stranded animals, rapid and good handling can reduce the risk of disease from stranded animal carcasses.

Keywords: stranded marine mammals; coastal community; first responder

1. Introduction

Indonesian oceans are an important habitat as well as migratory pathways of various marine mammals. In Indonesia, at least 36 species of Cetacean including whales, dolphins and porpoises as reported by Rudolph *et al.* (1997) and Kreb *et al.* (2013) in Mustika *et al.* 2015 [1], which Blue Whales, Finned Whales and Humpback whales are protected animals that usually found, these are by law No. 7 of 1999, while in the IUCN red list, the three species are endangered, meaning they have a extinction high risk in the wild.

Stranded whales and dolphins that are commonly found in Indonesian waters is an alarming phenomenon, but cannot be determined the precise causes. The incidence of marine mammal stranding is caused by many factors; natural factors, physical condition of animals and due to human activities or anthropogenic factors. In some mass stranded is caused by only a factor or a combination of several causal factors [2–5]. Natural factors that caused the stranded included oceanographic and weather conditions [3, 6], the effects of lunar cycles [7] and habitat destruction as accumulated effects of climate change [8], [9]; For example sea grass beds damage as habitat and food for dugong. Sea grass beds are a highly effective carbon sink in the sea. Sea grasses can absorb 40 times more carbon than terrestrial forests. The natural factors of the animals themselves, for example by hunger or disease [3] as well as anthropogenic factors or related to human activities. Human activities that cause the depletion of marine mammals include military activity on the seas [10-

11]; disruption of navigational systems due to ship sonar exposure [12], marine mammals as bycatch of fishing activities [13], [14][15], hunting or whaling [16] and marine debris effect especially plastics and fishing equipment [17].

First responder has a very important role in the handling of stranded marine mammals. First responders who are proficient and have good competence in handling of alive stranded marine mammals can increase their chances of survival by taking the required action in quick time or immediately reporting the authority [18]. Coastal communities are the closest community to be expected to be the first responder when marine mammals are stranded. Therefore, the knowledge of the handling of stranded marine mammals is needed to be improved to increase the chances of rescuing alive stranded animals and handling dead animals. Fast and precise handling have a major contribution to the safety and probability of stranded marine mammals to be able to restore to the sea [19]. The carcass of dead stranded marine mammal contains many viruses and bacteria that can harm human health [20], [21]. Increasing public knowledge, especially in coastal areas in handling of stranded marine mammals, is needed to provide greater opportunities for alive stranded marine mammals to return to the ocean and to maintain the sustainability of the biota. In addition, good knowledge related to handling of dead stranded animals can reduce the risk of zoonotic disease from the carcass of a stranded animal. The aims of this research is to determine the role of coastal community in handling stranded marine mammals in East Java.

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2. Materials and Methods

The stranding marine mammal information is taken from three regencies in East Java, Tuban, Probolinggo and Situbondo. All this regencies is located in northern Java Sea. Stranded mammals in this study is the alive, injured, dead that beached or washed ashore or carcasses that floated at sea [22]. The information of stranded animals were collected from published literature, local coastal administration, local fisheries department, fishermen organization or media news that provided detail information and documentation and were confirmed by cetacean expert. The data include species, estimated body measurement, body conditions (alive, injured or dead), number of individuals, date, stranding location, beside, it also covers the community activities including the first founder and the rescue or responds action. The data will be presented descriptively and the respond action and role of coastal community of all regencies will be also compared.

3. Result and discussion

3.1 Probolinggo

On June 15th, 2016, 32 Short-finned Pilot whales (*Globicephala macrorhynchus*) in various size, age and sex were stranded in Probolinggo waters. A total of 17 whales were rescued and returned to the seas, while 15 whales died. Communities around the coast who found it immediately reported to the agency that rescue teams from various agencies such as Management of Coastal and Marine Resources Centre in Denpasar (BPSPL Denpasar), Ministry of Marine Affairs and Fisheries (KKP), Fisheries and Maritime Department of Probolinggo, Indonesian Institutes of Sciences and several non-government environmental organizations were formed. The community participated in the animal search process. The waters of the stranded whales were intertidal waters with the mangrove forests surrounding the waters. In addition, the community along with the rescue team participated in the evacuation process of alive whales to be returned to the seas. On the dead whales, the people participated in the burial. Based on the report of M. Yunus *et al.* (2017) [23] the main cause the mass stranded Short-finned Pilot Whale in Probolinggo was suspected as weather factor and oceanographic conditions in the Java Sea.

3.2 Situbondo

A whale rescue in Situbondo waters was one of the most successful rescue efforts. Friday, in a midnight of February 2nd 2018 a Sperm whale (*Physeter macrocephalus*) swam toward a shallow water about 200 m from the shore of Jangkar beach, Situbondo. The whale's condition was still alive and no injuries were found on its body. The first fisherman that saw the whale immediately reported the incident to Water Police in that area. In the morning, many locals came to watch and wanted to see and even touch the whale. Some youths were seen climbing a whale still held in shallow water. Water polices worked together with fishermen safeguarded animals from locals. The whale's body was covered with a wet carpet to keep the whale's body moist, as recommended procedures in handling protocols. The process of whale would evacuated to the sea at the highest tide. At 7 pm, fishermen with rescue team from Fisheries and Maritime Department of Situbondo, East Java National Recourses Conservation Center, Banyuwangi Supervision of Marine and Fishery Resources, Indonesian Navy and Jangkar Police District with coordination led by Management of Coastal and Marine Resources Center in Denpasar began to conduct evacuation process. The evacuation process has done by using 3 fishing boats and 3 jets sky. The whale was pulled into the middle of the sea using nets and ropes. At 00.30 on Saturday February 3rd 2018, the whale has reached 3 miles from the shoreline and the evacuation was accomplished.

3.2 Tuban

On February 5th 2018, in Tambakboyo sub-district, Tuban, found an unidentified species marine mammal swam to the shore. The fishermen that watched it had tried to drive the marine mammal to back to the sea but it failed. The dying marine mammal swam towards the beach. At once it reached the shore, the marine mammals was found dead. By the time the animal were stranded on the shore, several people were found documented the incident (taking pictures the dead animal). The fishermen who found immediately brought back the carcass into the sea and drowned. Fishermen did not make any report to any authorized agencies.



Figure 1. (A) An unidentified marine mammals stranded in Tuban waters (C, B) The stranded animal was unsafeguarded so it was possible for local people to direct access to the dead animal

Table 1. Stranded cetaceans information and handling actions in Probolinggo, Situbondo and Tuban

	Location		
	Probolinggo	Situbondo	Tuban
Species	Short-finned Pilot Whale (<i>Globicephala macrorhynchus</i>)	Sperm Whale (<i>Physeter macrocephalus</i>)	Unidentified
Numbers of individual Stranded condition	32 17 alive and 15 dead	1 Alive	1 Dead
Estimated body measurement	Various measurement	±20 m	±1 m
Handling actions	Alive: refloatation Dead: land-burial	Refloatation	Sea-burial
Appropriate to the handlings guidelines	√	√	√
Safeguarded animals from direct contact with the locals	√	√	-
Documentations	√	√	√
Reported to the authorized agency	√	√	-
<i>Coastal communities roles</i>			
Became part of the rescue team of stranded animals	√	√	-
Facilities providing (boats, nets, rope) in the handling process	√	√	√

In general, the coastal community in all regencies have high participation in responding and handling stranded marine mammals. Community independence is also worth to be appreciated. However, in some cases, procedures of handling is not much appropriate to the protocols, such as direct contact with dead stranded animals without adequate equipment as in Tuban. As well known, the body of marine mammals contains bacteria, viruses, pathogens, parasites and other zoonotic organisms that are harmful to humans when directly touched [18–20, 24, 25]. Another thing is the absence of public reports to the competent authorities, so the coordination and guidance on appropriate procedures cannot be provided. Community action in self-help without reporting does not violate any regulations, but the absence of agencies eliminates the opportunity in data collection and information from the incident of stranded marine mammals. Data and information from marine mammals stranded provide very valuable to consider the population, the type and distribution of marine mammals in Indonesian waters and also the cause of stranded [26–29].

The fishermen's decision to self and fast handling to stranded mammals were because the animal's body size was relatively small, not more than a meter body length, so the handling process became easy and did not need to involve many people. The condition of the animal that has just died without any wound found on its body also ease the rescuer in the disposal. Whereas small cetacean, such as dolphin can easily handle and transport where as large animal such as sperm or baleen whales are requiring much effort to deal with. The decision of the fisherman to do the disposal with sea burial is very appropriate and in accordance with the guidelines state that the best disposal is sea burial [18]. Unlike the stranded mammals in Tuban that are small and freshly dead, the mass-stranded marine

mammals in Probolinggo and also a giant alive stranded sperm whale in Situbondo definitely need the support from authorized agencies. Local people had no sufficient ability and competency to handle all the stranded animals, this should be done under supervision of professionals. Otherwise, official and authorized agencies not only need volunteers from locals but also availability equipment such as vehicles, excavators, boats, etc.

The Indonesian government still had no regulations to stranded marine mammals and its handling. A high level of participation should be balanced with the community's ability to well handle marine mammals as well. The community needs to be given socialization and training on handling in accordance with the guidelines. In addition, the community also needs to be about the urgencies to report and inform the incident to government agencies so that documentation can be done to identify and as data of the marine mammals species and its distribution in Indonesia, as well as to know the cause of stranded animals with necropsy test which can only be done by experts.

Another medium that has developed in many countries around the world in stranded marine mammal discussion is through networking. Several countries in the European Union have established inter-state stranding marine mammals networks in the European Union to share and review all information about stranded marine mammals. The same network has been initiated in Indonesia, but less effective because not all stockholders are involved in the network. Through the network, it is expected to maintain a trained and well informed and organized local community networks; to ease network members to share data in order to better inform the rescue and response processes; standardize data collection across the region for the whole rescue and response process; set up a

working group to establish standard protocols for data collection [25].

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