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Aquatic mammals assessment in Indonesian waters

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ABSTRACT
The current paper presents brief information on aquatic mammal assessment in Indonesia, summarized from the existing literature. Results indicate that there are more than one third of all known Cetacean species worldwide and one species of Sirenian in Indonesian water. In terms of conservation, Indonesia has ratified CITES. Under the Government Decree No. 7/1999 internal trade cannot be allowed. While the exploitation of aquatic mammals is permitted to the traditional hunting and limited trade e.g. barter. Such activities only happened in the remote area e.g. Lamalera and Lamakera in Nusa Tenggara Timur, Eastern Indonesia. The target animal catch is sperm whale, and after a few years the catch number has decreased significantly. The cause of this happening is still unknown. This basic information would stimulate Indonesia to do research more intensively for better managing the aquatic mammals in Indonesian waters.

KEYWORDS: cetacean, conservation, utilization, management

INRODUCTION

Indonesian waters have exceptional aquatic mammal diversity including marine and freshwater mammals. There are more or less 30 species of Catacean (dolphins and whales) from a total of 86 species recorded in the world. For Sirenian group there is only one species found in Indonesian waters. These include some species with vulnerable and endangered classification. Beside that, eastern Indonesian waters are suspected to function as migration corridors for some sea animals including whale and dolphin, whereas every year they are traveling from Pacific Ocean to Indian Ocean, and vice versa (PHPA, 1984, Kahn 2001).

Aquatic mammals constitute important natural resources which are used for several needs such as foods, cosmetic, accessories, and eco-tourism. Therefore, these animals have been hunted since a longtime ago. The animal hunting may cause the decrease of their populations and for some cases the animals become endangered species which need the attention from the human being to save their present in the earth. By some regulations the world has conserved the animals and many countries have already followed the international actions by providing legal instruments in each country including Indonesia. However the utilization of aquatic animals, particularly as foods, is still happening in some areas in Indonesia. Even though, the people catch the animals by traditional ways.

In the way to better manage the aquatic mammals in Indonesian waters, Indonesian government through the Agency for Marine and Fisheries Research, Ministry of Marine Affairs and Fisheries, has determined a program on aquatic mammals assessment in objective to re-inventory the existing distribution, abundance, utilization and to management related measures affecting for aquatic mammals conservation.

RESEARCH ACTIVITIES

In the last few years aquatic mammal researches have been growing gradually in Indonesia. This may provide various data and information on species diversity, biology and ecology, which are useful for management and conservation making process. There some institutions which conducted marine mammal research in Indonesia, e.g.: LIPI (Indonesian Institute of Sciences), TNC (The Nature Conservation), APEX Environmental and RCCF (Research Centre for Capture Fisheries), Agency for Marine and Fisheries Research, Ministry of Marine Affairs and Fisheries, while some students conducted a research for their final assignment.

Research on Mahakam Irrawady Dolphin

This research activity was carried out by LIPI (Indonesian Institute of Sciences). The research was focused on the ecology and habitat of this specific animal in the freshwater of Kalimantan, especially in Mahakam river, Semayang lake, Melintang lake, and Loa Kang lake in East Kalimantan. The research was done mainly in fisheries protected area of Loa Kang Lake, because waters around Loa Kang Lake served as feeding ground from Mahakam dolphin (Hartoto *et al*.,

2003). This study seems to have not yet provided complete information in term of management purpose.

Visuak and acoustic Cetacean surveys in Solor-Alor

Since 1999, TNC collaborated with APEX Environmental and conducted marine mammal researches around Komodo National Park, Solor and Alor Sea as a swimming area for the marine cetaceans. By using alive-aboard vessel, visual and acoustic cetacean surveys were carried out cruising at 16-18 knots. The surveys were focused on coastal areas, bays, and inter-island passage of Komodo National Park. During the observation, photo identification was used to carry out the species identification. In this activity, a number of 20 cetaceans species were recorded around Komodo National Park waters, including numerous vulnerable and endangered species like Blue whale (*Balaenoptera. musculus*) and *Pygmy bride* whale (*Balaenoptera. edeni*) (Kahn,2003). It is also concluded that the Solor-Alor region is without reservation the marine conservation priority site in Indonesia for large marine life and also characterized by very intense local resource use of these large marine species. However, this study was not yet capable to estimate the density of marine cetaceans in these waters.

Inventory survey on aquatic mammals in Indonesian waters

This on going study lead by Research Centre for Capture fisheries has been started in 2004. The research activities were focused in Lamalera waters, Nusa Tenggara Timur for marine cetacean and East Kalimantan for Irrawady dolphin.

For marine cetacean survey in Lamalera waters, the survey method used line transects (zigzag) with double observer which was carried out from a 14 m Patrol boat 600 HP. In this survey three line transect sectors were determined (Fig. 1): sector A was located in west part of Lembata (Lamakera strait); sector B represented the whole southern Lembata waters until Tanjung Atadei; and sector C was located in the eastern part of Lembata (Alor strait) between Lembata and Rusa Island. The visual observation used 3 binoculars, and photo identification is taken by Cannon 300D 75-300mm. During survey of 2 days, total transects were 130.13 nautical mille with total cover areas of 241 km^2.

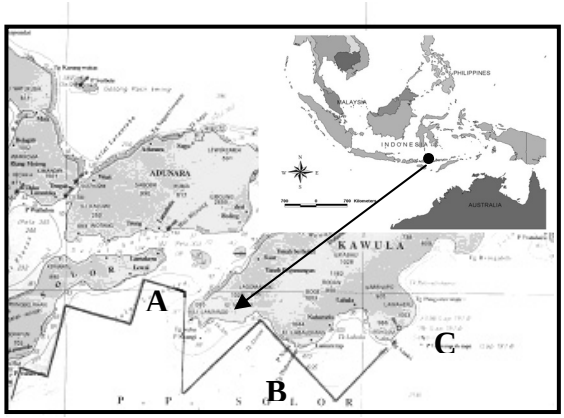

Fig. 1. Map showing the study area in Lamalera.

Survey was made on eleven sightings with two sighting of a non cetacean species, *Mola mola* (Sunfish). This brief observation just found one dolphin species, *Stenella longirostris* (spinner dolphin) (Fig. 2) without seeing any whales. This is due to the relatively bad sea condition and the boat was incapable to continue the research.

This survey pointed out that the dolphins of around Lamalera water are very sensitive and tend to avoid motor boats. This behavior change would be due to the use of motor boats to capture these animals.

Fig. 2 Dolphin sighting of spinner dolphin, Stenella longirostris in Lamalera

The survey on Mahakam Irrawady dolphin, succeeded to identify a group of dolphins consisting of about 8 -10 individuals, while their population ase estimated at about 34 individuals. This fact probably indicates the other individuals have left Mahakam River for the other habitats, such as: Semayang Lake and Melintang Lake (Fig. 3). Those lakes are naturally in conjunction with Mahakam River through Pela River. The animal are freely swimming and plying around the lakes and Mahakam River.

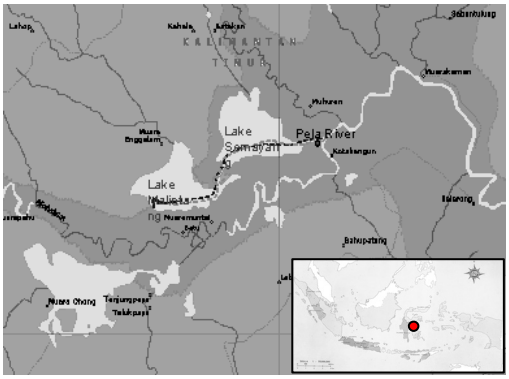

Fig. 3. The playing grounds of Mahakam Irrawady Dolphin in East Kalimantan.

The dolphin feed on fishes which are available in both lakes and rivers. The fish belong to a group of small fish called "white fish" (ikan putihan, Fig. 4), composing of: *Anabas tesdineus* (ikan pepuyu), *Thinnichthys vaillanti* (ikan kendia), *Puntius nini* (ikan pahat), *Osteochilus repang* (ikan repang) and others such as: *Barbicthys laeves* (ikan barukung) and *Trichogaster pectoralis* (ikan sepat Siam). It seems that the density of those fishes tends to decrese in the Mahakam River causing a part of Irrawady dolphin populations to go to other habitats. More seriously it is the degradaton of habitat that may affect the existence of Mahakam Irrawdy dolphin in Kalimantan.

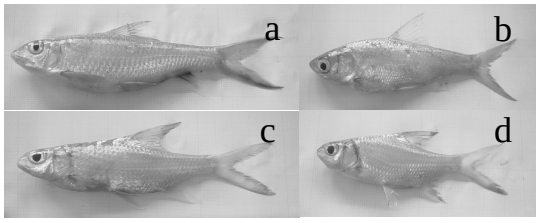

Fig. 4 The species fish serving as mainly foods for Irrawady dolphin: a- *Anabas tesdineus*; b- Thinnichthys vaillanti; c- *Puntius nini*; d- *Osteochilus repang*.

CURRENT CONDITION OF AQUATIC MAMMALS IN INDONESIA

Species Diversity

As summarized in some studies (Kahn, 2003; Rudolph et al, 1997), in Indonesia there are about thirty species of Cetacean that include five Families, i.e: (i) **Phocoenidae** with single species, *Neophocaena phocaenoides)*; (ii) **Delphinidae** includes about sixteen species as follows: *Steno bredanensis, Sousa Chinensis, Grampus griseus, Tursiop truncatus, Stenella attenuata, Stenella longirostris, Stenella coeruleoalba, Delphinus capensis, Delphinus delphis, Lagenodelphis hosei, Orcaella brevirostris, Peponocephala electra, Feresa attenuata, Pseudorca crassidens, Orcinus orca, Globicephala macrorhynchus*; (iii) **Ziphiidae** includes three species**:** *Mesoplodon* spp, *Ziphius cavirostris, Hyperoodon* sp; (iv) **Physeteridae** with one species: *Physeter macrocephalus;* (v) **Kogiidae** with two species: *Kogia breviceps, Kogia simus*; (vi) and **Balaenopteridae** includes seven species: *Balaenoptera acutorostrata, Balaenoptera borealis, Balaenoptera edeni, Balaenoptera brydei, Balaenoptera musculus, Balaenoptera physalus, Megaptera novaeangliae*). In Indonesian waters also found one species of Sirenian, *Dugong dugon*. Almost all of the species were recorded in the waters of Nusa Tenggara Timur, Eastern Indonesia (Fig. 5).

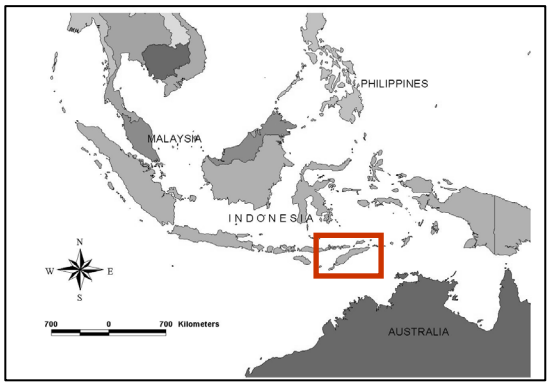

Fig. 5. The most records of marine cetacean are found in the waters of Nusa Tenggara Timur, Eastern Indonesia.

Conservation

Indonesia has implemented conservation efforts to promote wise and sustainable use of aquatic mammals, particularly marine cetacean. Several national legal instruments that have been provided by this country to conserve and protect these animals. The regulations are Act No. 9 of 1985/renewed Act No. 31 of 2004 regarding Fishery Management and Act No. 5 of 1990 regarding Conservation of Living Resources and their Ecosystem. The Government Regulation no. 7 of 1999 regarding Preservation of Plant and Wildlife states that all marine and freshwater mammals (Cetacean and Sirenian)are determined as protected species from internal trade, whereas Government Decree No.8 of 1999 about Wild animal and plant species exploitation that permits just for traditional hunting and limited trade, e.g. barter (Mustika, 2004)

Utilization

People of several places of Indonesia are carrying out activities in correlation directly or indirectly with marine mammals. This matter can threaten

the existence of marine mammal in some areas, if there is not any consideration for natural preservation and habitat of marine mammals.

A remote area off Lovina Beach, North Bali is suitable for some dolphins which come regularly for staying and playing. The people including local people and tourists use this moment for dolphin watching during certain time (Fig. 6), especially in the early morning.

Fig.6 Dolphin watching in Lovina water, Buleleng District, Northern Bali.

The people coming to this area usually rent a boat for going to the sea for dolphin watching when dolphins are looking for food. For a long time, dolphins have been the most attractive tourism objects that attract tourists to visit Lovina. The existence of dolphins directly affects revenue of the villagers which utilize the dolphins and realize to ensure the maintenance of the waters from destruction. Several things prevailed among the villagers, such as any fishing activities around the reefs are allowed and the interdiction of the bottom net operation. They are only able to use lines or surface nets for fishing activity. They also cannot capture fish in around fishponds. These things show that they have already become conscious on the existence of fish resources in their territorial water. In fact it seems the fish density in Lovina waters is in relation to the dolphins coming in the sea area. The decrease of the fish density may affect the number of dolphins, consequently the income of the villagers may be decreased (Purnomo, 2002).

The utilization of marine mammals that is known all over the world as a traditional whaling activity happens only in Lamalera, off Lembata and Lamakera, Solor Island, with capture zone areas described in Figure 7. The activities have been taking place for five hundred years ago. Traditional whaling is allowed by International Whaling Commission because including in Subsistent whaling, where would not cause the decreasing number of whale (Barnes, 1996; Mustika, 2004). The appliances used in traditional whaling are appliances to stab; string and boats without engines, but just only use oar and sail. The boat is called “paledang” (Fig. 8)

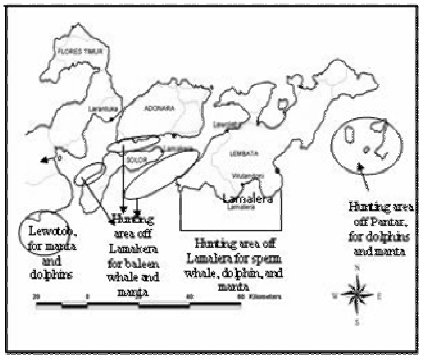

Fig. 7. Distribution area of cetacean hunting activity in Nusa Tenggara Timur.

Fig.8 Paledang boat used for whale hunting.

The main target for whaling off Lamalera is sperm whale (*Physeter macrocephalus*) and is called “Koteklema” by local people (Rudolph *et al.*,, 1997). After few years, the number of animals captured by the people of Lamalera recorded from 1959 to 2004 has been decreasing (Fig. 9). Nevertheless, people of Lamalera do not know exactly why this condition has happened (Barnes, 1996; Mustika, 2004). People of Lamakera are doing the same thing as people of Lamalera, but the people of Lamakera only catch baleen whale or Keraru instead of sperm whale in Lamalera. After several years, since 1980 Lamakera people changed the traditional instrument for whaling hunting by using a boat with an engine. Usually, whales and dolphins caught by the people of both villages, are used uniquely for foods or bartered for required other needs for their life. Since the local people capture whales with traditional ways (the catch is no more than 10 individuals per year), the whaling activity in this area would not affect the population of whales in the world (Barnes, 1996). To harmonize between conservation and traditional hunting, the control should be made to not allow the use of motorized boat or modern way of fishing gears in whale hunting.

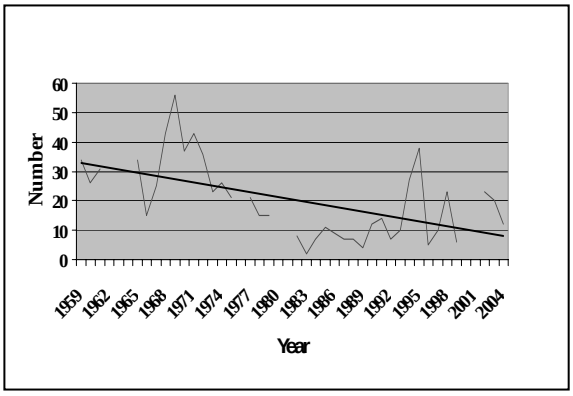

Fig. 9. The number of sperm whale catches from 1959 to 2004 in Lamalera.

FUTURE RESEARCH DIRECTION

To establish better management of aquatic mammals, Indonesia through The Agency for Marine and Fisheries Research, Ministry of Marine Affairs and Fisheries, formulates a program of aquatic mammals assessment. Based on the information available, some research activities should be improved by studying on: (i) migration pattern of whales; (ii) population density assessment; (iii) population status; (iv) and bio-ecology of aquatic mammals including whale, dolphin, and dugong. The role of local people should be as participant for monitoring and taking a note regulary of the whale catch. This data will be necessary to analyze the dynamic of population of the whales.

CONCLUSION

From the previous research activities, Indonesia waters are known as exceptional areas for aquatic mammal diversity which are identified as about 30 species of Cetacean and one species of Sirenian. They are all protected by Indonesian regulations. The utilization of aquatic mammals may happen just in remote area, uniquely for foods, with a traditional way for the capture that may or not affect the existence of the aquatic mammal populations crossing Indonesian waters. Some further research activities are required to complete the existing data in order to achieve the better management of aquatic mammals in Indonesia.

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