A PRELIMINARY SURVEY:

Distribution and habitat suitability of Dugong (*Dugong dugon*) in Peninsular Malaysia (project.No. 622149)

Prepared By:

Mr. Mohamed Hifni Mohd. Baharuddin

Project Members : Prof. Mashhor Mansor
Prof. Ahyauddin Ali
Mr. Mohamed Hifni Mohd. Baharuddin
Dr. Shahrul Anuar Mohd. Sah
Dr. Ahmad Sofiman Othman

Introduction

The dugong (*Dugong dugon*) is the only herbivorous mammal that is strictly marine and is the only extant species in Family Dugongidae. A characteristic dugong weighs about 400 kilograms and can grow up to three meters long (Stonehouse, 1992). It is easily distinguished from others in order Sirenia by its triangular whale-like tail. The manatee, the other member of order Sirenia, has a distinct paddle-shaped tail and spends its life in rivers and estuaries. Like the manatee, dugongs have a thick layer of blubber giving them a distinctly rotund posture, have small paddle-like flippers positioned far forward on the body, and a broad, flattened tail. The ochre brown skin of a dugong appears smooth, but a close view reveals a rough surface covered in pits with short, thick hairs. Dugongs have two nostrils near the top of their heads on a "fleshy lip", which can curl up to make breathing easier on the surface (Reynolds *et al.* 1991).

The name "sea cow" refers to the fact that dugongs graze on seagrasses that form meadows in coastal waters. As dugongs feed, whole plants are uprooted and a telltale feeding trail is left behind. These feeding 'scars' in the seagrass can be easily seen by people walking over the seagrass areas at low tide (Great Barrier Reef Marine Park Authority [GBRMPA]). The dugong feeds almost exclusively on a number of genera of seagrasses, especially the marine vascular grasses *Halodule* and *Halophilia*. These grasses are low in fiber, high in available nitrogen (*Halodule*) and very digestible (*Halophilia*) in order to maximize the intake of nutrients rather than bulk (Aragones, 1996). Dugong intestines are extremely long and there is a large mid-gut cecum between the large and small intestine. These adaptations allow the dugong to digest a large volume (8-15% of body weight by volume daily) of low quality plant material (Reynolds *et al.* 1991).

Current theories suggest that the ancient dugong (Protosiren) was related to the ungulates (ancient hoofed mammals) and an ancestor of the elephants that fed on shallow sea grass meadows of the Caribbean during the warm Eocene period (54-38 MYA). The manatees appeared during the Miocene (26-7 MYA), when climate favored growth of

also seems to be regular daily movements between feeding areas and deeper waters (Husar, 1978).

Figure 1. The dugong distribution.

Ecological population status of dugong in Malaysia

There is a lack of information on the historical population status of dugong, except for observational sighting reports. A past account of dugong population size in Australia as quoted by Bertram and Bertram (1973) states that "In July 1883, a herd in Moreton Bay was reported as extending over a length of about three miles with a width of 300 yards." However, there is no certainty whether dugong populations are substantially reduced from pre-European times, or whether they have reached critical limits for continuity (Chase, 1981).

past research on seagrass distribution combined with the 2 aerial surveys conducted by the Department of Fisheries Malaysia on the 25th of March 1999 and again with the assistance of Professor Helene Marsh on the 11th of May 1999 identified several seagrass beds in the area, some with feeding trails in *Halophila ovalis*, which is a species preferred by dugongs. Based on the hypothesis of a resident dugong population, long-term research studies have been launched. An integrated study of endangered marine species in the Exclusive Economic Zone waters of Malaysia, with special emphasis on the dugong and its habitat, has been recently proposed by the Department of Fisheries, Malaysia, and the Singapore Wild Marine Mammal Survey project (SWiMMS) also includes dugong distribution and abundance assessments among its main goals.

At least three live dugongs have been seen off Tan Jung Pongee during dedicated aerial surveys, and authorities are talking of gaze ting a marine park to provide protection. Meanwhile, fishermen have been asked to demolish disused kelong and to monitor active kelongs regularly.

Sabah, Malaysia. - The dugong population has not been formally censused in the Sabah area. Dugongs are still sighted by fishermen, who believe them to be decreasing in abundance. Although dugongs are totally protected by law, sometimes they are accidentally captured in fishing nets or killed by illegal fishing using explosives. Meat is illegally sold in the market.

Methods of population survey

Since dugong distribution is huge and scattered, population census is difficult and costly. Aerial survey is the best method of assessing the population, but it is highly dependent on the weather conditions and the clarity of water (Marsh and Rathbun, 1990).

The survey was carried for two years (from May 2001 until May 2003), encompassed the coastal water of Peninsula Malaysia, with the emphasis on the Mersing area in Johor (Figure 2). Dugongs present were surveyed according to the report from the

Results

From the survey, there was no report on the present of dugong on both east and west coast, except at the southeastern tip of the state of Johor, as reported by fisherman and local people. The absence of dugong along the west coast was probably due to the unsuitability of habitat for dugong. The Straits of Malacca is the one of the busiest strait in the world and fully utilized for shipping and transportation. Over fishing activities by fisherman from both countries Malaysia and Indonesia along the straits worsen the situation, thus contributing to the further deterioration of dugong habitat. The use of various sophisticated and uncontrolled fishing gear threatened the existence of dugong. In addition, the rapid development along the west coast of Peninsula Malaysia especially along the coastal areas deepen the situation and deteriorate the quality of habitat for dugong.

The same situation exists on the east coast, but only at a lower magnitude. Their occurring in the coastal water of Johor state was probably due to the presence of favorable and encouraging habitat, with the existence of natural seagrass beds.

During the course of survey, we received two separate calls regarding the present of carcasses washed ashore on Langkawi beach. Unfortunately, after further investigation, the carcasses were found to be that of dolphin. The presence of dugong in an area was highly related to the food and habitat requirement as indicated the absence of dugong on the west and east coast Peninsula Malaysia. Summaries of the survey results are as follows:

Discussion

From the survey, the dugong can be found and sited only in the state of Johor (Pasir Gudang, Mersing and Tanjung Sedeli coastal area). Their presence in these areas probably associated with the existence of seagrass bed scattered along the east coast of Johor. The individual sited is belief to come from a larger group probably from Australian water, strayed and wandering to venture into new area seeking for new environment, food and shelter. Even though a small group of resident dugong exist in Thailand especially in Trang coastal area, but the sighting of individual dugong in Johor water was believed to comes from Australian water. Movement of individual from Thailand coastal water along the west coast of Peninsular Malaysia probably very limited due to various reasons mentioned earlier regarding the condition of the deteriorating habitat of the west coast of Peninsular Malaysia. However, further investigation regarding movement of dugong need to be carried out and verified. Another reason is the abundant seasonal changes associated with the monsoons, which may trigger movements in response to rough weather and availability of food (Marsh, 1989).

Dugong population in the Malaysia region was belief to be dwindling due to economic factor. Dugong hunting, incidental catch from fishing activities, habitat loss including loss from land reclamation, and pollution from palm oil plantations and sedimentation, are the main threats to dugong populations in this region.

Kushairi (1992) conducted a SCUBA survey of seagrasses throughout the coastal waters of Peninsular Malaysia between mid 1986 and mid 1991 at the following locations: west coast north to south – Tanjong Rhu, Telok Ewa, Seberang Perai, Teluk Nipah, Telok Kemang; east coast north to south – Setiu, Pulau Tengah, Pulau Besar, Pulau Tinggi, Pulau Sibu Hujong. A total of eight seagrass species *(Halophila ovalis, H. minor, H. spinulosa, Halodule uninervis, H pinifolia, Cymodocea serrulata, Syringodium isoetifolium* and *Enhalus acoroides*) were recorded at the ten locations.

Suggested conservation initiatives

Research

• The Malaysian Cabinet has directed the Secretary General of the Ministry of Science, Technology and the Environment to ensure that research is undertaken on dugongs. We recommend that the highest priority should be given to surveys to determine the distribution and relative abundance of dugongs and their habitats throughout the waters of Peninsular Malaysia and Singapore and East Malaysia (especially Sabah). Priority areas should be selected with input from relevant stakeholders using criteria such as:

1. Biodiversity importance, especially areas of known dugong and seagrass abundance (such as the east coast of Johor and the coast of Sabah)

2. Other relevant ecological data

3. The degree of local commitment

4. The probability of success in sustainable management of seagrasses in the context of the critical social and environmental factors affecting the proposed priority areas.

•We also suggest that surveys should be conducted simultaneously to assess the knowledge of the local people and the fishing communities with regard to dugong protection, their biology, seagrass distribution and fisheries. The magnitude of directed and incidental takes of dugongs for local consumption should be investigated as part of the interview surveys. The impacts of dugong by-catch in fishing gear (especially gill nets and traps) need to be investigated and documented. Emphasis should be on the priority areas identified as suggested above.

• Survey data can be useful to provide decision makers and local communities with data essential for coastal zone management in general and dugong and seagrass conservation in particular.

References

1. Aragones, L. 1996. Dugongs and green turtles: grazers in the tropical seagrass ecosystem. PhD thesis. James Cook University of North Queensland, Townsville, Australia.
2. Bertram, C. and K. Bertram. 1973. The modern Sirenia: their distribution and status. *Journal of the Linnaean Society of London* 5:297-338.
3. Chase, A.K. 1981. Dugongs and Australian Indigenous cultural systems; some introductory remarks. In: Marsh, H. (ed). *The dugong: Proceedings of a seminar/workshop held at James Cook University May 1979.* 2nd Ed. Department of Zoology, James Cook University of North Queensland, Townsville, Australia. Pp. 112-122.
4. Dietz, Tim. 1992. *The Call of the Siren: Manatees and Dugongs.* Golden Colorado, Fulcrum Publishing.
5. Heinsohn, G.E. 1972. A study of dugongs. (*Dugong dugon)* in Northern Queensland, Australia. *Biological Conservation* 4(3): 205-213.
6. Husar, S. L. 1978. Dugong dugon. Mammalian Species Account. No. 88. *American Society of Mammalogists, 7 pp.*
7. Jaaman, S.A. 2000. Malaysia's endangered marine species (Marine Mammals and Whale Shark). *Maritime Awareness Programme Forum Series 2000,8 April 2000.* Maritime Institute of Malaysia, Kuala Lumpur.
8. Kushari, M.M.R. 1992. The areas and species distribution of seagrass in Peninsula Malaysia. *Paper presented at First National Symposium on Natural Resources 23-26 July 1992.* FSSA, UKM. Kota Kinabalu, Sabah.
9. Marsh, H. and W.K. Saalfeld. 1989. The Distribution and abundance of dugongs in the northern Great Barrier Reef Marine Park. *Australian Wildlife Research* 16. 429-440.