Dugong Surveys of Manus and Bougainville Islands, Papua New Guinea

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Introduction

Dugong dugon are the last extant species in the Family Dugongidae and are listed as Vulnerable to extinction by the IUCN Red List. The dugong population is believed to be in decline globally. Throughout its range, relic populations remain and are separated by large areas where populations have disappeared (Marsh & Lefebvre 1994). The degree of the decline of numbers or fragmentation of its range is not known for any country. For many countries the only information available is from incidental sightings, drownings and anecdotal information.

The Pacific region supports the world's largest remaining population of dugongs (Marsh *et al*. 2002). Dugong occur in most of Melanesia, Papua New Guinea (PNG), the northeast and east coasts of Australia and as far east as Vanuatu.. The current status of dugongs is unknown throughout the region (Marsh *et al*. 2002) and information on dugong distribution and abundance is outdated or non-existent. It is likely that dugongs are widely distributed in small numbers in much of PNG, the Solomon Islands and Vanuatu and that larger numbers occur in the Papua New Guinea waters of Torres Strait. Marsh *et al*. (2002) states that their reliance on relatively shallow water seagrass beds for food, limits the ability of dugongs to travel between islands and continents that are separated by extensive areas of deep water. For this reason, many island populations become essentially isolated, making these populations especially vulnerable to extinction.

Current knowledge of dugong in Papua New Guinea

There have been several surveys for dugong conducted in Papua New Guinea. The most recent surveys were done in Samarai Islands in the Milne Bay Province as part of Conservation International's Milne Bay Marine Project (Yen 2006). The islands were selected following a recommendation from Hudson (1976) who listed Samarai Islands, of Milne Bay, Kairiru Island, of Wewak and Lou and St. Andrew Island group off Manus as the most important areas for dugong conservation in Papua New Guinea. Hudson (1976) conducted postal surveys in Papua New Guinea in 1973-74. Then, in 1977, Ligon and Hudson conducted shoreline aerial surveys of the Daru-Warrior Reef area, SE and NW coasts of PNG, Lae, and NW coast of West New Britain, where they found numbers to be lower than the postal survey done in 1974.

Project objectives

It is essential that dugong population status is determined and important areas are identified within the region, so that action may be taken to ensure the dugong's survival. The optimum conservation strategies for dugong recommended by UNEP in the Dugong Status Report and Action Plan (2002), is to:

- Identify areas that still support significant numbers of dugong; and
- Consider with extensive local involvement how impacts on dugongs can be minimised and the habitat protected in these key habitat areas. Surveys need to be conducted throughout the extent of the dugong's range in Melanesia to identify key areas for protection and to implement management actions to prevent the extinction of this unique species.

The Dugong Action Plan, 2008-20012 recognises the urgent need to address issues at a national and regional level in the Pacific. The Action Plan identifies the lack of information about dugong distribution, abundance and threats, and seagrass habitat. It emphasises the need for further research and monitoring, capacity building, management and awareness-

raising in the region. Theme 7 of the Plan aims to improve understanding of dugong population status through research and monitoring.

The objectives of this project were in line with the objectives of the Dugong Action Plan to establish population status and distribution of dugong in Melanesia and identify areas that still support significant numbers of dugong. This was to be achieved through the use of interview surveys, which also meet a second objective of raising awareness of the plight of dugong through the involvement of local communities. The project also aimed to foster the support and encouragement of regional, national and local networks to become involved in dugong conservation in the region.

The information obtained from these surveys will be used to identify important habitats and significant populations of dugong for site protection. Identifying sites for protection and suitable management actions through the involvement of the community is the next step in conservation planning for dugong in Melanesia.

Methods

Funding constraints limited the first year of this project to the provinces of Manus and North Solomons (Bougainville), in Papua New Guinea. To survey such a large region we relied on the assistance of our NGO partners (The Nature Conservancy, WWF International) who have staff based in these Provinces, to conduct the interviews. The project Coordinator established contact and conducted training with NGO staff in Madang, Manus, New Ireland and New Britain. To date, surveys results have only been returned from Manus. Since we had no NGO partners based in Bougainville, a local researcher was contracted to conduct the surveys along the NW and SE coasts of Bougainville.

A series of questions aimed at producing reliable information about dugong occurrence were devised (Appendix 1). Interviews were conducted with fishermen or key people in villages where dugong were known to frequent the adjacent coastal waters. Surveys were targeted in areas where there was previous evidence of dugong occurrence or where there was suitable habitat. Dugongs prefer shallow, sheltered coastal waters for feeding where extensive seagrass beds occur. Using seagrass habitat information and dugong occurrence data, suitable habitat for dugong was identified using the ESRI software, ArcGIS. The coordinator then approached NGO staff in these areas to ask for their assistance and guidance in conducting the surveys. Through mapping and gaining local advice the interviewers were able to design a survey plan to ensure the most likely dugong areas were visited.

Specific areas were targeted, based on previous survey data from 1976 (Hudson) and available seagrass habitat mapping. The areas targeted in 2007/2008 were Manus, New Britain, New Ireland and Bougainville. The Sepik region, considered by Hudson to support a high density of dugong in 1979 was not included at this time as we had no NGO partners based there to conduct the surveys. Surveys were conducted in Manus by staff from the WWF based in Manus. A local researcher was contracted to conduct the surveys along the coast of Bougainville as there are no NGO partners stationed there. Bougainville has not been surveyed previously for dugong.

Results

Surveys were completed on the islands of Manus and Bougainville. Meetings were held with NGO partners in Madang, New Ireland and West New Britain, however because the Coordinator left the employment of CI soon after these meetings, the surveys were not followed up. Results were received from Manus, and they show this Province to continue to support significant populations of dugong, although numbers are thought to be in decline. Data collected in Bougainville provide the first snapshot of dugong distribution from this island.

Results from both Provinces were encouraging in that dugong were reported from each location in significant numbers. People generally had respect for the dugong and mortality rates from hunting and strandings were relatively low. There was a general awareness of laws to protect the dugong and most people were supportive of further protection of the species.

MANUS

Distribution

Interviews were conducted in 13 locations around the island of Manus (Figure 1). In the first 3 months of 2008, 64 adult dugong and 18 calves were reported. A total of 187 adult and 48 calves was reported since 2005. Respondents estimated to have seen 952 dugong in the past 5 years.

Mortality

People surveyed reported a total of 34 dugong stranded since the 1980's. More than half of these were trapped in nets. Half the people interviewed said if the dugong flesh was in good condition they would take the stranded dugong home to eat. Only 2 people reported having released animals alive. Although 38% said they would release the dugong if it were alive.

Even though dugong are hunted for food in Manus, on average, people reported only 1-2 dugong caught in their village each year. Seventeen percent of people interviewed do not eat dugong because of religious beliefs or tabus. Thirty-five percent had eaten dugong in the last year, although 66% of those people reported that it was for a special occasion (funeral).

Education

Radio interviews were held in each of the Provinces visited by the Coordinator, prior to the surveys being conducted. The program was aimed at communicating key messages about the importance of dugong as a species and reasons for its conservation.

The Coordinator gave a presentation on the project and delivered training on giving interview surveys to NGO staff. This was held as part of the Locally Managed Marine Area Network meeting.

Conservation

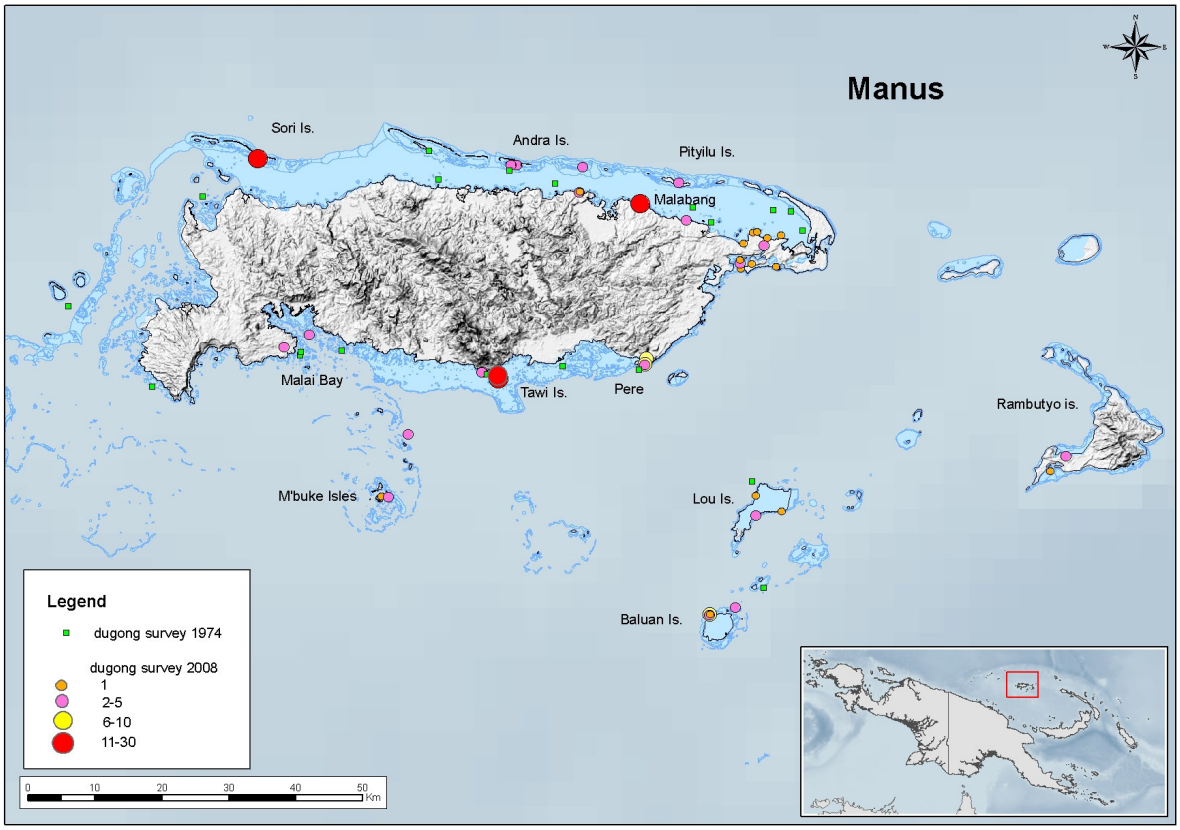
Legislation was introduced in Papua New Guinea in 1978 to protect the dugong, and it was declared the National Animal. The legislation allowed hunting only for village use, using traditional methods. Dugong surveys were conducted in Manus in 1979 and 1981 forming a baseline study for this legislation. The results of the recent survey show that Wildlife and

Fisheries Officers and the work of NGOs have continued to raise awareness of the legislation. Over 60% of people surveyed were aware of legislation protecting the dugong and all participants agreed that they would support protection of dugong in Manus. Sixty-seven percent of those, believed that the dugong feeding and or breeding grounds should be protected. Another 14% felt that there should be a total ban on hunting dugong.

Thirty eight percent of respondents thought dugong had decreased in numbers, 5% thought dugong populations have increased, and 41% believed that dugong numbers have stayed the same. A further 9% weren't sure. Most people believed decreasing numbers were due to over harvesting, and some blamed poaching from neighbouring villages. Others thought that boat traffic, sea temperature warming, habitat destruction and seasonal movement explained the decreases. Those that believed numbers had increased attributed it to a key hunter dying, and increased breeding of dugong.

The data compiled from this survey and that of previous surveys shows that whilst Manus is home to a significant population of dugong, there are some important areas that could be protected with the support of local people. These survey results are very positive in terms of showing the support of the community for conservation of this species. Since many people do not hunt dugong because of religious and or taboo beliefs, this makes Manus an important area to focus dugong conservation efforts on.

Figure 1. Map of Manus showing distribution and abundance of dugong recorded from surveys. Locations are approximations only.



BOUGAINVILLE

Distribution

Interviews were conducted in 25 locations in 5 survey areas in Bougainville from January-February 2008 (Figure 2). A total of 20 adults and 10 calves was reported during this period, with a total of 37 adults and 17 calves reported overall for 2007 and 2008.

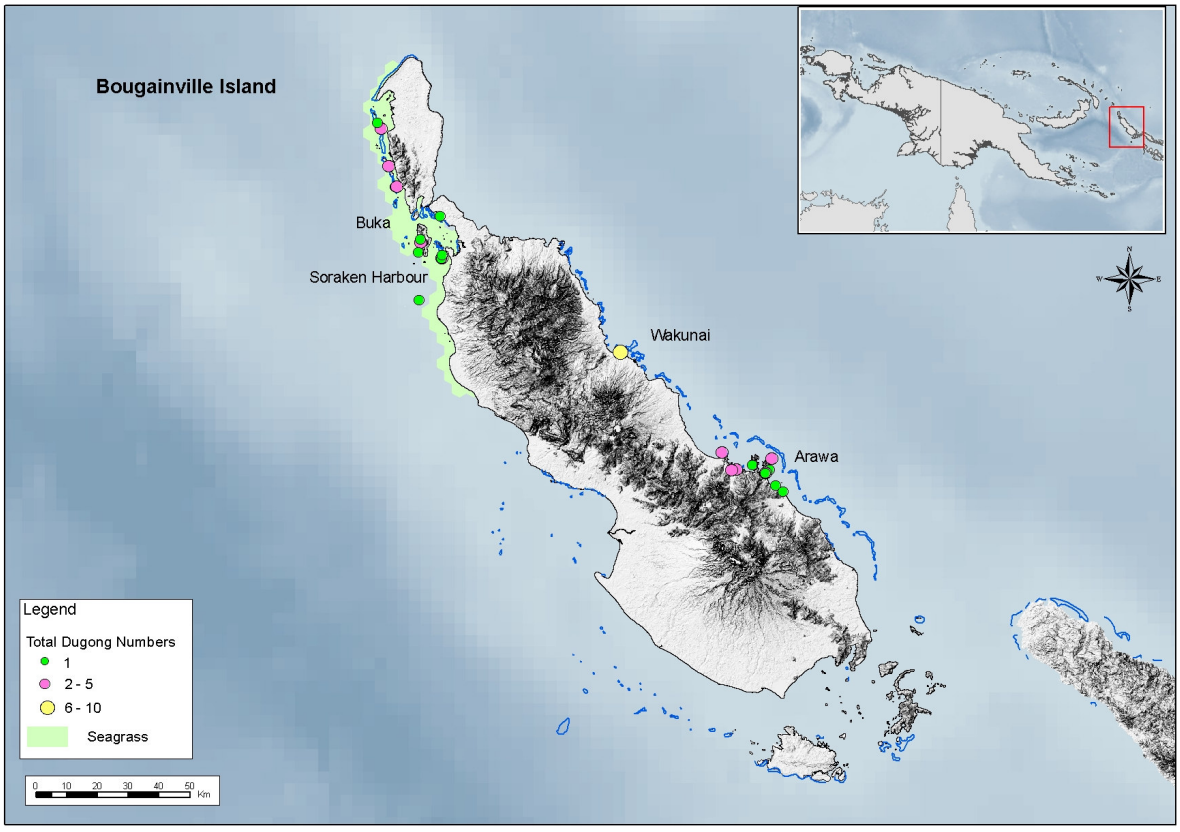
Mortality

There were 6 dugong strandings reported by informant groups, since 2003, and 3 of these were eaten. Fifty-two percent of respondents do not eat dugong. Dugong are not usually consumed although people will eat them when one is founded trapped in a net or in times of crisis when food is in short supply. People surveyed in these three areas of Bougainville do not hunt dugong anymore because it is clan totem for some people and generally taboo to hunt.

Education

A radio awareness program was broadcast prior to the surveys being done. Surveys were conducted in villages in a focus group setting where villagers gathered around to hear about the dugong. Questions were asked of individuals and a consensus was reached by the group. The Interviewer took this approach because he found it an effective way to reach all age groups of the community. Pamphlets about the dugong were distributed at these meetings. The interviewer also met with the Fisheries Advisor to talk about dugong conservation.

Figure 2. Map of Bougainville showing distribution and abundance of dugong recorded from surveys. Locations are approximations only.



Conservation
A total of 54% of respondent groups believed that dugong numbers had increased in recent years, 8% thought they had declined, and 29% believed they had remained the same. Reasons given in the north were due to the cessation of hunting; whilst respondents on the southeast coast thought it was due to the cessation of the mine and subsequently less waste being dumped offshore, less sedimentation and boat traffic.

It was evident from these surveys that dugong are not hunted in some areas because of religious beliefs or ancestral stories, so dugong are thought to be taboo to eat. This information is valuable for planning conservation strategies for dugong.

A high proportion of respondents (64%) had knowledge of laws pertaining to protection of dugongs. Overall, 96% thought that dugong did require protection and that they would support the establishment of protected areas to achieve this. The local communities have formed the Pirung Wildlife Management Area which is the only protected area in Bougainville and encompasses an area of 43,200 ha. It is the view of the interviewer that this area be extended and become a specific dugong protection area.

The presence of dugong in an established Wildlife Management Area, and the fact that local people are supportive of protection of the species, makes this an ideal area to make into a protected area for dugong.

It was a recommendation by the interviewer that the optimum management strategy for areas that consistently support large numbers of dugongs, is to set them aside as dugong sanctuaries in which dugong mortality is minimised and their seagrass habitats are protected. He was of the opinion that support should be given to the Pirung WMA to enable it to function adequately to become a dugong conservation area. He also recommended that the WMA boundary be extended to cover the Wakanai and Asatavi areas. To compliment this, the delivery of a large-scale education and awareness campaign to highlight the importance of dugongs (not only as a biodiversity 'flagship') but also their reproductive ecology and the interrelationship dugongs have with healthy seagrass eco-systems.

Recommendations

Collecting data on the distribution and mortality of dugong in PNG is only the first step in conservation of these species. The aim was to identify areas that consistently support large numbers of dugong. These areas should then be the focus for conservation action, for example, implement protected areas in which there are restrictions on hunting and netting, and protection of the seagrass habitat. In establishing dugong sanctuaries factors that should be considered include adequate size (to incorporate the home ranges of dugongs), quality of habitat, control of netting, local support and appropriate enforcement. Additionally, the long-distance movement of dugongs and the need to protect movement corridors should be taken into account (Preen 1998). For the protection of these areas to work, it would need support of the local people together with large scale education and awareness campaigns to highlight the importance of the species and their seagrass habitat. The campaign needs to be Country-wide so as to reach those neighbouring or visiting villagers outside the boundary of the protected area that may not respect the dugong sanctuary area.

Further collaboration with relevant partners and communities in areas where community support was shown is required to ensure the development of dugong conservation strategies. It will be important to involve all stakeholders, particularly in the communities that have developed 'Village Constitutions' to protect marine species. Management of natural resources, such as dugongs presents an opportunity for them to work with government, scientists and NGOs. A community based management approach for dugongs that give local coastal and island people authority and responsibility, and hence a sense of ownership, is more likely to result in greater commitment and compliance than management initiatives imposed by government agencies alone. As pointed out by the interviewer, given the difficulty of identifying stock boundaries and the capacity of dugongs to move across jurisdictional boundaries, it will also be important to co-ordinate management initiatives across jurisdictions.

The results from this survey are encouraging in that most people are aware of the need to protect dugong and are supportive of introducing dugong protected areas or enforcing hunting bans. It is recommended that these surveys be continued in other Provinces of PNG that are known to support populations of dugong, such as Sepik coast, Madang, Milne Bay and West New Britain, to determine what the dugong population status is nation-wide.

To follow on from this work, Government agencies and NGO's should progress conservation action by engaging communities in talks about the establishment of dugong protected areas in places with significant dugong populations. There is obviously a will from the community, as shown from these surveys, to establish protected areas. There is also a political incentive with PNG being a participating country in the SPREP Dugong Action Plan 2008-2012.

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Appendix 1: Dugong survey data sheet

Name of interviewee: …… Date: ……

Occupation: …… Reporter: ……

Age: <20; 20-35; 35-50; 50+ Location of interview:..……...

Gender: Male / Female Province:…..…….

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1. Have you seen dugong in this area? **Yes** **No**

   a) When did you see a dugong? (*time of year or date)*
   b) Where did you see it? (*location name, description or mark on map*)
   c) What was it doing? (*ie, feeding, swimming, mating*)
   d) Was it alone or in a group? How many in the group?
   e) Did you see calves?

(*record in table)*

Date/season	**Location**	**Number**	**Calves**	**Activity**

2. How many dugong have you seen in the past 5 years? ……

3. Have you seen these dolphins (show pictures of Irrawaddy)? **Yes** **No**
   a) How many and where?

4. Have you seen or heard of dugong being stranded? When, where, how many, was it dead or alive, and if dead, do you know what it died of? (*record in table)*

Date/season	**Location**	**Number**	**Cause of death? Or alive?**

4. What would you do/or did you do if you found a dugong stranded?

……

……

5. Where do dugong feed mainly? (*Location name or clear description of location and habitat type, distance off shore etc*)

……

……

……

6. How long have dugong lived here? ……..

7. Have people ever hunted dugongs in this area? **Yes No**

   a) If yes, do they still hunt them now? **Yes No**
   b) How many dugongs are caught here each year? ……..…

8. Do you eat dugong? **Yes No**
   a) If yes, how often do you eat dugong? ……

   b) When did you last eat dugong? ……..

   c) Was it for a special occasion? ……

9. Are there any tabus about eating dugong in this area?

……

……

10. Have you seen a change in dugong numbers over the years? Have numbers increased, decreased or stayed the same? When did you notice this change occur?

……

……

11. If numbers have increased/decreased, why have they changed?

……

……

……

12. Are you aware of any laws that protect dugong? **Yes No**

13. Do you think dugongs need to be protected? **Yes No**

14. Would you support protected areas for dugong where no hunting was allowed?

……

……