



October 2016

Funded by the U.S. Marine Mammal Commission

Number 66

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SIRENIAN BIBLIOGRAPHY AVAILABILITY

Regular users of the on-line *Bibliography of the Sirenia and Desmostylia* will have noticed that for many months it has been difficult or impossible to use because queries would repeatedly time-out. This has apparently been due to server problems at Host My Site, the organization that for years has been generously hosting the database at no charge through an arrangement with Caryn Self-Sullivan's organization Sirenian International. Moreover, Caryn recently discovered that Sirenian International's domain name [sirenian.org](http://www.sirenian.org) had expired and had been purchased by someone else, so consequently the bibliography's original Web address www.sirenian.org/biblio/ has no longer been working.

Fear not, however; the website and bibliography still exist. While our website is undergoing renovation, at least for the time being the bibliography can be accessed at <http://67.59.1130.204/biblio/>. Meanwhile, Helene Marsh and the IT people at James Cook University in Australia are trying to arrange for JCU to host our site in the future, so we hope that will provide a permanent solution to the recent technical glitches and a secure home for the database from here on out. Stay tuned for further updates!

-Daryl Domning (ddomning@howard.edu)

UNION INTERNATIONALE POUR LA CONSERVATION DE LA NATURE ET DE SES RESSOURCES
INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES
Commission de la sauvegarde des espèces - Species Survival Commission

Sirenews (ISSN 1017-3439) is published in April and October and is edited by
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Sirenews is available online at <http://sea2shore.org/publications/sirenews/> and www.sirenian.org/sirenews.html

ANNOUNCEMENT: DUGONG WEBSITE LAUNCH

The Global Environment Facility (GEF) Dugong and Seagrass Conservation Project unveiled its new, interactive and informative website that includes information about the project, resources for dugong and seagrass conservation, as well as information for project partners. The website was launched at an event hosted by Zayed University in Abu Dhabi, where the Mohamed bin Zayed Species Conservation Fund (the MBZ Fund) publicly announced the GEF grant for the project.

The goal of the Dugong and Seagrass Conservation Project is to improve the conservation status of dugongs and their seagrass habitats across the Indian and Pacific Ocean basins. The project represents the first coordinated approach across a wide range of countries toward the conservation of dugongs and their seagrass habitats, covering 38 national projects in Indonesia, Madagascar, Malaysia, Mozambique, Solomon Islands, Sri Lanka, Timor-Leste and Vanuatu, managed by 26 local partners.

The CMS Dugong MOU Secretariat developed the project between 2011 and 2014, putting together documents for submission to UNEP and the GEF, and working with project partners to secure funding for the identified projects. The four-year Dugong and Seagrass Conservation Project commenced in January 2015, at which time the Dugong MOU Secretariat handed the coordination responsibility over to the MBZ Fund, who act as the executing agency of the project. The CMS Dugong MOU Secretariat remains a partner in the project, providing technical support to the MBZ Fund as necessary, through its technical advisors. UNEP is the implementing agency of the project. For more information please visit the project website: <http://www.dugongconservation.org/> .

-Donna Kwan (Donna.Kwan@cms.int)

UPCOMING: THIRD MEETING OF SIGNATORIES TO THE CMS DUGONG MOU

On the 13th and 14th of March 2017, the Secretariat of the Convention on Migratory Species (CMS) Memorandum of Understanding on the Conservation and Management of Dugongs and their Habitats throughout their Range (Dugong MOU) will be holding the Third Meeting of Signatories (MOS3) in Abu Dhabi, United Arab Emirates (UAE). The Secretariat is co-hosting the meeting with the Environment Agency - Abu Dhabi and the Ministry of Climate Change and Environment of the UAE.

Participants are expected from the 26 Signatory States of the Dugong MOU as well as other dugong range states, project partner organizations and private sector. The meeting will present updates on ongoing operations and will act as a platform for collaboration and for reviewing dugong and seagrass conservation efforts that the Dugong MOU and partners have invested in. It will also provide the Signatories an opportunity to discuss the future direction of the Dugong MOU. An associated Dugong & Seagrass Technical Workshop is planned to be held back-to-back, on the 15th and 16th of March 2017, at the same venue.

Meeting documents and further information will be posted to the MOS3 webpage (<http://www.cms.int/dugong/en/meeting/third-meeting-signatories-dugong-mou>) in due course. Signatories and invited range states of the Dugong MOU are advised to pre-register by 31 December

2016 by using the online form available on the MOS3 webpage. International agencies or NGOs qualified in protection, conservation and management of dugongs and their seagrass habitats who are interested to attend MOS3 may also wish to pre-register – however the Secretariat advises that financial support for attendance is not available.

For additional news on activities of the Dugong MOU Secretariat, follow our news at <http://www.cms.int/dugong/news>.

LOCAL NEWS

BRAZIL

Marajó Island, Brazil, has nutrients for manatees. The east coast of Marajó Island, located in the state of Pará, Brazil, is home to two species of manatees and is likely considered a sympatric zone (Luna 2013). The beaches at the Soure and Salvaterra municipalities, alongside the eastern side of Marajó, have large vegetation banks adequate for the foraging activities of both species. Lins *et al.* (2014) identified 18 species of aquatic plants in this area, and suggested that they are all part of manatee diet.

Reports involving aquatic plants consumed by manatees, especially in Florida (USA), have evaluated the level and variability of plant nutrients based on species, collection site, location within the community, total volume of the plant and time of year (Dawes & Lawrence 1979, Durako & Moffler 1985, Etheridge *et al.* 1985, Dawes 1986, Dawes *et al.* 1987, Worthy & Worthy 2014). However, in Brazil, scarce information involving the nutritional composition of plants ingested by manatees is available. Thus, the purpose of this work is to shed light on the essential information of manatee feeding habitats in estuarine waters of Pará, Brazil.

The investigation presented herein began in December 2013, by the Amazon Aquatic Mammals Studies Group (Grupo de Estudos de Mamíferos Aquáticos da Amazônia), GEMAM, who is currently characterizing and assessing the nutrient content of some plant species presumably consumed by manatees. Some of these plants have been given regularly to Omar, a captive manatee calf rescued in July 2013, in Salvaterra (see Sirenews 60). Plant species *Blutaparon portulacoides*, *Crenea maritima*, *Eleocharis geniculata*, *Fimbristylis* sp. and *Spartina alterniflora* were chosen for this purpose, since they are the most abundant small macrophytes at the beaches of the study areas and, according to Lins *et al.* (2014), serve as potential food for manatees in the region.

The plant species collected in the dry and rainy seasons at the beaches of the study region underwent bromatological analyses at the Food Analysis Laboratory (Laboratório de Análise de Alimentos) of the Federal Rural University of the Amazon (Universidade Federal Rural da Amazônia, UFRA, Campus Parauapebas), in which Dry Matter (DM), Mineral Matter or Ash (MM), Crude Protein (CP), Ether Extract (EE), Neutral-Detergent Fiber corrected for Ash and Protein (NDFap) and Acid-Detergent Fiber (ADF) content were evaluated in accordance to the methodologies proposed by Detmann *et al.* (2012a). From the characterization of these nutrients, the values for Total Carbohydrates (TC), Nonfiber Carbohydrates (NFC) and Gross Energy (GE) of the foodstuff were obtained (Detmann *et al.* 2012b), displayed in Table 1.

Table 1. Mean values of the nutritional composition of the evaluated macrophytes that potentially belong to the diet of free-living manatees in Marajó Bay, expressed in grams per kilogram of NM** (g Kg⁻¹) and average values of energy content expressed in kilocalories per kilogram of NM** (kcal Kg⁻¹).

Species	DM*	MM*	CP*	EE*	NFC*	NDFap*	ADF*	GE*
<i>Blutaparon portulacoides</i>	182.28	26.99	11.51	1.00	94.10	48.67	43.46	3609.46
<i>Crenea maritima</i>	222.82	27.21	15.99	5.30	84.10	90.22	78.77	3937.68
<i>Eleocharis geniculata</i>	244.39	34.85	21.11	6.41	61.20	120.81	89.25	3838.66
<i>Fimbristylis</i> sp.	210.67	27.34	15.02	4.34	49.60	114.37	70.15	3799.01
<i>Spartina alterniflora</i>	256.69	19.55	20.08	6.33	46.19	164.54	98.56	4088.64

*dry matter (DM), mineral matter or ash (MM), crude protein (CP), ether extract (EE), nonfiber carbohydrates (NFC), neutral-detergent fiber corrected for ash and protein (NDFap), acid-detergent fiber (ADF), gross energy (GE).

** Natural Matter (NM), the form found in nature, as supplied to the animal.

The data passed the normality and homoscedasticity tests and were then analyzed using the ANOVA test to determine differences in nutrient and energy values between the species of aquatic macrophytes. When significant differences were observed, Fisher's exact test (LSD test) was applied. All statistical tests were performed using the Statistica ® software package.

In the current study, *Eleocharis geniculata* and *Spartina alterniflora* presented the highest CP and EE values. *Blutaparon portulacoides* and *Crenea maritima* rendered the highest NFC values, perhaps indicating rapidly digested sources of carbohydrates. NDFap is a limiting factor regarding consumption, since the higher the NDFap content, the less the animal voluntarily consumes the foodstuff, while ADF shows an association to food digestibility (Van Soest 1994). *Spartina alterniflora* showed the highest NDFap and ADF content. However, although rich in CP and EE and presenting the highest GE value, this species shows lesser digestibility compared to the other evaluated macrophytes.

The east coast of Marajó Island has extensive vegetated areas and its beaches form vegetation banks in intertidal zones (Figures 1 and 2), which favor the occurrence of manatees in the area. The study of the nutritional composition and energy of aquatic macrophytes that manatees feed on will, in future studies, include the calculation of a balanced diet for animals in rehabilitation, showing high significance for calves in the growth phase. -**Nilson Felipe B. Rodrigues**^{1,2}; **Janaina B. Luz**³; **Renata Emin-Lima**¹, **Salvatore Siciliano**⁴ (¹ Museu Paraense Emílio Goeldi, Coordenação de Zoologia, Setor de Mastozoologia, Grupo de Estudos de Mamíferos Aquáticos da Amazônia (GEMAM), Belém, Pará, Brazil; ² PPG em Ecologia Aquática e Pesca, Universidade Federal do Pará (UFPA), Instituto de Ciências Biológicas, Cidade Universitária José da Silveira Netto, Belém, Pará, Brazil; ³ PPG em Saúde e

Produção Animal na Amazônia, Universidade Federal Rural da Amazônia (UFRA), Belém, Pará, Brazil;
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Figure 1. Extensive macrophytes banks along the east side of Marajó Island, locality of Garrote, Soure. Sightings of manatees have been regularly reported at this locality in recent years. Photo by S. Siciliano.



Figure 2. Another view of extensive macrophytes banks during low tide at the locality of Garrote, Soure, Marajó Island. Photo by N.F.B. Rodrigues.

Rescuing an injured Amazonian manatee calf in Caxiuanã, Pará, Brazil. An Amazonian manatee calf (*Trichechus inunguis*) was found on 9 September 2016 in River Anapú, near Floresta Nacional de Caxiuanã, southwestern Marajó Island, state of Pará (PA), Brazil (Figure 1). Citizens of Brabo Village, in the Community of Santo Antônio, communicated the finding to the staff of Estação Científica Ferreira Penna (ECFPn), an extension of Museu Paraense Emílio Goeldi (MPEG) in Caxiuanã. The Aquatic Mammals Group – GEMAM/MPEG was warned and immediately joined efforts with ICMBio and IBAMA/SUPES Pará officers to rescue the manatee calf.

A team composed of a biologist and a veterinarian travelled immediately to Breves on 13 September in order to provide the required veterinary care to the calf. As the locality where the animal was rescued is difficult to reach, the rescue team arrived in the Brabo Village on 15 September. There they found Kaluanã, as locals named the calf, which means “*great warrior*”. Kaluanã was kept for seven days in an excavated hole on the bank of the Anapú River specially dug to lodge the animal until the arrival of the research team. According to locals, Kaluanã ate aquatic plant leaves. The calf was transported to the ECFPn headquarters to start treatment for the coming journey. There, Kaluanã was placed in a 5,500 liter swimming pool and given a specially prepared soy milk supplemented with canola oil. A general clinical examination was carried out, and standard measures for sirenids were taken. Kaluanã is a 90 cm, 13.5 kg female manatee (Figures 2-4). The animal exhibited six round wounds on the head, and has intestinal problems. The wounds were cleansed using antiseptic and treated with antibiotic cream. In addition, the treatment included antibiotic injections to treat the head wounds, dimeticone, *Saccharomyces boulardii* to replenish the intestinal microbiota, and a phytotherapeutic formulation prepared with four medicinal plants with laxative properties.

Kaluanã will be taken to the municipality of Breves, where she will be met by a UNAMA – Santarém veterinary doctor, who will then transport the animal to ZooFIT, a rehabilitation center for Amazonian manatee calves. Kaluanã will remain under the care of veterinary doctors, biologists, and staff until full recovery, when she will be returned to the natural environment of Floresta Nacional de Caxiuanã. The Amazonian manatee is one of the aquatic mammal species most seriously threatened with extinction in Brazil. The species was almost decimated by poachers in that region. For this reason, any specimen of manatee deserves special attention in the effort to preserve native populations and improve ecosystem balance. Hence this massive effort to rescue this little *great warrior* of the Amazon! - **Renata Emin-Lima** (Grupo de Estudos de Mamíferos Aquáticos da Amazônia/Museu Paraense Emílio Goeldi (GEMAM/MPEG), Belém, Pará, Brazil), **Doracele A. Tuma (Biologia e Conservação de Mamíferos Aquáticos da Amazônia** (BioMA), Instituto de Ciências Biológicas, Universidade Federal do Pará, Belém, Pará, Brazil), and **Salvatore Siciliano**, Instituto Oswaldo Cruz/Fiocruz, Rio de Janeiro, Brazil and GEMAM/MPEG.

Acknowledgements

We would like to thank Socorro Andrade, Chief, Serviço de Campo da Estação Científica Ferreira Penna, MPEG. Carlos Alberto Braga, Chief, Floresta Nacional de Caxiuanã, ICMBio; Christina Whiteman, Environmental Analyst, IBAMA-PA. Coworkers at ECFPn/MPEG. Professors and students

of the Environmental Impact Studies course, Biological Sciences College, UFPA, 2016. Davi C. Tavares kindly prepared the map.



● The injured Amazonian manatee

Figure 1. Location of the site where Kaluanã was found on 9 September, 2016 in River Anapú, nearby Floresta Nacional de Caxiuanã, southwestern Marajó Island, state of Pará (PA), Brazil.



Figure 2. Kaluanã, where she was kept under the care of the Family of Mr. Brabo, until 16 September 2016, community of Santo Antônio, Floresta Nacional de Caxiuanã, PA.



Figure 3. Wounds on the head of an Amazonian manatee calf (*Trichechus inunguis*).



Figure 4. Amazonian manatee calf being fed a soy milk vitamin supplementation formulation.



Figure 5. Measurement of physical parameters of an Amazonian manatee calf rescued in Floresta Nacional de Caxiuanã, PA, Brazil.



Figure 6. Treatment of wounds on Kaluanã, Amazonian manatee calf (*Trichechus inunguis*) rescued in Nacional de Caxiuanã, PA, Brazil.

Local ecological knowledge and feeding vestiges as subsidy to assess the occurrence and feeding ecology of manatees *Trichechus* sp. in the Amazon Estuary. Since 2012, the research group Biology and Conservation of Amazon Aquatic Mammals – BioMA has carried out studies on the feeding ecology of manatees (*Trichechus* sp.) in the surroundings of the city of Belém (S 01° 17' 38.2" W 048° 29' 19.7") and Capim Island (Abaetetuba City) (S 01° 34' 11.2" W 048° 52' 50.1"), Pará State, Brazil, in the Amazon Estuary (Figure 1). We were unable to identify the manatees to the species level because the distribution of both Amazonian (*T. inunguis*) and West Indian (*T. manatus*) manatees overlap in the studied area, although based on morphological descriptions from locals, the Amazonian manatee is the most likely species to inhabit the area. Because manatees are quite inconspicuous and hard to track through surveys, feeding vestiges on plants are an efficient proxy for the occurrence of the animal in the area and in showing how it uses the habitat. In order to obtain information on the feeding ecology of manatees we conducted semi-structured interviews within local communities. Among the vestiges collected, and based on reports from local people, the feeding on “aninga” (*Montrichardia linifera* (Arruda) Schott) by manatees was a peculiar finding. Among 31 interviewees 26 reported the following description for the use of aninga: first the animals remove the bark to eat the insides of the aninga stem, preferentially when the plant is a sprout (Figure 2), as the plant tissues are softer and it is easy to remove leaves. Also according to interviewees, after the manatees eat the sprout the remainder of the plants resemble a “peeled banana” (Figure 3). We found 11 vestiges of feeding in the places indicated by the locals as possible manatee feeding grounds, including areas where orphan calves were rescued, possibly

entangled in fishing nets or whose mothers were hunted. Local community reports allowed us to map sites of manatee occurrence, describe those habitats, and gather information on feeding behavior and other ecological aspects of the species. In addition, by the identification of vestiges we may infer which species is or are using the area based on the analysis of the diet, and how those feeding areas overlap with human activities. In short, this study will provide an updated overview of manatee distribution in the Amazonian estuary, contributing to mitigation of human impact on manatee populations in the Amazon. In addition, it is necessary to carry out more field studies of manatee populations in that area because oil spills, waste water, and hunting are common occurrence that may threaten the species and the local biodiversity.

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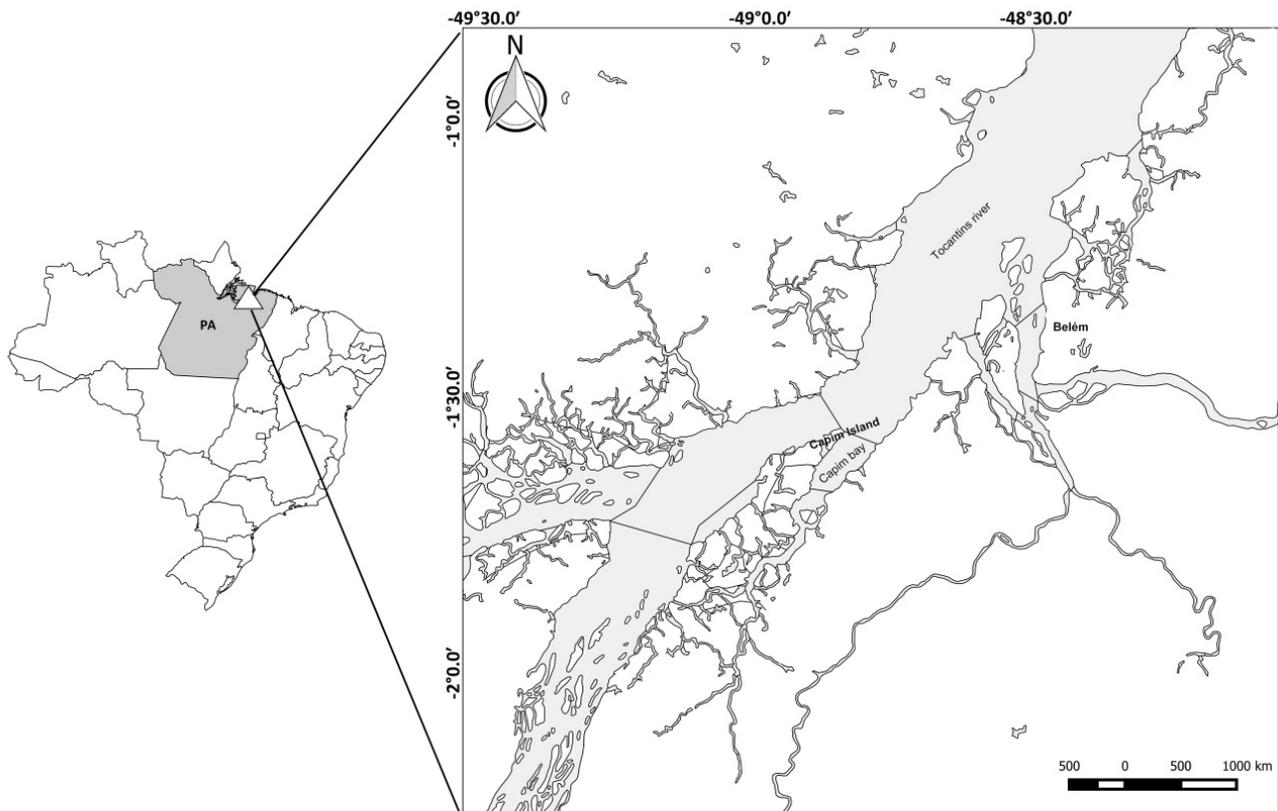


Figure 1. Section of the State of Pará, Brazil, showing the location of the city of Belém and the Capim Island.



Figure 2. (A) Aninga *Montrichardia linifera* in adult phase; (B) Aninga sprout, reported as manatees preferred phase for feeding. Photo: BioMA



Figure 3. Feeding vestiges of manatees on the aquatic macrophyte aninga, Capim Island, Abaetetuba, Pará State, Brazil. Photo: BioMA

GABON

Trade in African Manatee Penises Discovered in Gabon. During recent interviews with local fishers and hunters in the Ogooué River and the lake region of central Gabon, researcher Cyrille Mvele was informed that they have begun a trade in manatee penises to Malaysian, Chinese, as well as Gabonese customers. The hunters reported that Malaysian workers in Gabon requested the penises, which are believed to enhance virility. Because it is impossible to determine the sex of a manatee from the surface of the tannic and muddy water in this region, hunters kill any manatee they see, and the meat is eaten or sold on the black market. One of the dried penises was shown to Cyrille (Figure 1) and he was told that it could be sold for \$300 USD and above, equivalent to one or two months of typical income in Gabon.

We are greatly concerned about this trade, which could quickly decimate manatee populations, and we have reported it to TRAFFIC and CITES. If others have heard of trade in manatee penises in other African countries or other parts of the world, please contact us, we would like to hear from you. - **Cyrille Mvele** (cyrillemvele@yahoo.fr), **Lucy Keith Diagne** (lkd@africanaquaticconservation.org), and **Heather Arrowood** (harrowood@yahoo.fr)



Figure 1. Dried manatee penis observed in Gabon.

VENEZUELA

Captive reproduction of an Antillean manatee (Trichechus manatus manatus) in Bararida Zoo, Barquisimeto, Venezuela. *Trichechus manatus* is a species distributed in Venezuela in Maracaibo Lake, Gulf of Paria and the Orinoco River Basin. It is protected by Venezuelan law and classified as Vulnerable in the IUCN Red List and as critically endangered at the national level due to habitat loss and degradation, entanglement in fishing nets, pollution and indiscriminate hunting.

In order to contribute to the conservation of wildlife, on 19 January 1994 the captive manatee breeding program began at the Barquisimeto Zoo. On that date a 3.5 year old female from the Apure state was brought to the facility, where she was housed with a male already in captivity. The male came to the Zoo in September 1992 from Maracaibo Lake, with an estimated age of two months. They were housed in a tank 20 m long, 12 m wide and 0.6 m deep with water replacement every 48 hours. Every

day they are fed lettuce (*Lactuca sativa*), spinach (*Spinacia oleracea*), chards (*Beta vulgaris*), bananas (*Musa paradisiaca*) and carrots (*Daucus carota*).

Several copulating events have been observed since reaching sexual maturity in 1997. After 13 years in captivity together, and ten years after reaching sexual maturity, the birth of the first captive manatee in Venezuela occurred on 2 September 2007. The calf was a male weighing 22.7 kg and measuring 1.12 m in length. Four years later, a female was born on 13 October 2011, with a weight of 27 kg and a length of 1.22 m. Two years later, a male was born on 4 December 2013 weighing 27.6 kg and measuring 1.23 m in length, and finally on 8 September 2016 another male was born weighing 27.7 kg and measuring 1.27 m in length. During the final pregnancy the female remained with the male without any problems; however, during the first three births, the male was separated in an adjacent tank to avoid any accidents. Based on the data from these births it was determined that the breeding season of these manatees in captivity occurs from September to December. Between the first observation of intercourse and the birth, there were 383 days for the first birth and 387 days for the second. The average weight and length at birth were 26.2 kg and 1.21 m.

Currently data collection continues and we will continue to generate information that will strengthen the local breeding program and serve as a reference for other national and international centers that decide to manage and reproduce this species.

The calves are separated from their parents to avoid inbreeding. These calves and those that could be born later may be transferred to other *ex situ* centers of conservation at the national level, to form new pairs with non-related individuals. They could also be reintroduced to natural habitats as appropriate, under proper management and following local and international guidelines, contributing to the conservation of this endangered species. -Carlos Silva and Leonel Ovalle-Moleiro (Parque Zoológico y Botánico Bararida, cjsvet@gmail.com)

ABSTRACTS

An evaluation of the status, distribution, threats and management of dugongs in the marine waters of Kenya.

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This study proposes to investigate environmental management practices at the coast of Kenya through the case study of a rare marine mammal, the dugong (*Dugong dugon*). The dugong is an herbivorous marine mammal found in the coastal waters of the tropical and subtropical Indo-West Pacific and Indian Ocean. Dugongs are among the most endangered large mammals in the African oceans with a growing concern of imminent extinction unless immediate conservation measures are instituted. The objectives of this study are to: assess the historical and current status of dugongs across their range in Kenyan coastal waters; evaluate the links between social, cultural and economic paradigms on conservation and management of dugongs; identify threats to dugongs along the Kenyan coast and evaluate management and conservation strategies implemented in Kenya and other parts of the world on dugongs and their habitats since the 1960's. Previous studies have shown that dugong populations may be affected by anthropogenic factors such as marine resource exploitation practices, indigenous and cultural off-takes, rapid coastal development and biophysical factors such as habitat loss, pressure on sea grasses and climate change.

The study will follow an exploratory cross sectional approach. Current anecdotal information on availability of dugongs and their habitats will be collected from fishing villages; and scientific information on availability of dugongs in specific locations will be compiled. The primary data will be collected through systematic beach surveys, aerial census, acoustic data loggers, questionnaire surveys and focus group discussions. Secondary data will be collected through reviews of existing literature. Analytical questions will be asked, and patterns, categories, and linkages identified and recorded throughout the data collection process.

Quantitative data such as data on seagrass species from beach cast surveys and data on dugong aerial counts will be entered and analyzed on Microsoft excel and SPSS and modeled to ascertain useful information. The study will show the current dugong range in Kenya and recommend management measures that can be taken to facilitate recovery of the dugong population in Kenya.

Assessment of distribution, status and threats to Mozambique dugongs (*dugong dugon*) to inform their conservation and management.

Alima Ismael Gomes de Oliveira Taju

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The dugong (*Dugong dugon*) has been listed as vulnerable by the IUCN Red List of Threatened Species. However, the populations in East Africa are likely to be already endangered. In the Western Indian Ocean (WIO) region, dugongs are believed to still occur in Somalia, Kenya, Tanzania, Mozambique and further east off the islands of the Comoros, Seychelles and Madagascar (WWF-EAME 2004; Cockcroft et al. 2008; Findlay et al. 2011). Although the distribution of dugongs in the WIO is highly fragmented and appears to be declining, Bazaruto Archipelago in Mozambique harbors a population of about 250 dugongs. This population is believed to be the most and possibly the only viable population of dugongs in the WIO region (Findlay et al. 2011).

Due the importance of Bazaruto dugongs for the WIO region, this study will assess how stable this population is and factors influencing its long-term viability. Thus, the objectives of this study are (1) to assess whether the estimates of population size and distribution of dugongs in Bazaruto Archipelago have changed significantly in relation to estimates from 2007; (2) to investigate dugongs' home range in Bazaruto Archipelago using joint visual-acoustic surveys; (3) to investigate whether dugong habitat use in Bazaruto Archipelago has been influenced by the availability and quality of seagrasses, protection from natural predators, boat traffic and fishing activity; (4) to examine the genetic population structure within Bazaruto Archipelago; (5) to assess the potential effects of current management interventions on future population stability using a population and habitat viability analysis (PHVA). The ultimate aim of this study is to provide a template for evaluating the current strategies for the protection of dugongs in Mozambique.

Keywords: aerial survey, Bazaruto archipelago, dugong, passive acoustic monitoring, population and habitat viability analysis, seagrasses, small population

RECENT LITERATURE

Adimey, N.M., M. Ross, M. Hall, J.P. Reid, M.E. Barlas, L.W. Keith Diagne and R.K. Bonde. 2016. Twenty-six years of post-release monitoring of Florida manatees (*Trichechus manatus latirostris*):

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