Manatee (*Trichechus manatus manatus*) Use of Turneffe Atoll in Belize, Central America

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Although West Indian manatees (Antillean subspecies, *Trichechus manatus manatus*) have been documented throughout the Caribbean, manatee use of Caribbean atolls has only been reported at one, Turneffe Atoll in Belize, Central America (Morales-Vela et al. 2000). The authors have found no other accounts of manatees using atolls in other locations worldwide. However, there was a report of a dugong traveling thousands of kilometers from shallow water habitat to the Cocos (Keeling) Islands, an isolated set of atolls in the Indian Ocean (1000 km from Indonesia and 2000 km from mainland Australia; Croll, 2002).

The four best developed atolls of the greater Caribbean are all located off southern Mexico and Belize. This region is believed to support one of the largest populations of endangered (Appendix I of CITIES 2003) Antillean manatees in the Caribbean (Morales-Vela *et al*. 2000, O'Shea and Salisbry 1991). Although the status of the manatee population is mostly unknown, the estimated number of manatees inhabiting Belizean waters ranges from about 300 to 900 individuals.[1]

Turneffe Atoll, located approximately 50 km off the coast of Belize (Fig.1), is the largest of three Belizean atolls. Turneffe, comprised of approximately 200 sand or mangrove covered oceanic cayes, extends 48.2 km in length and 16.1 km in width, and covers an overall area of 525 km^2 (Gischler and Hudson 1998). The atoll is encircled by fringing and patch reefs; twenty-two percent of it is covered by land that surrounds three central lagoons (<8m in depth; (Spalding *et al*. 2001) (Fig. 1). Water of low salinity has been documented in various locations around the atoll, and it is likely that fresh water seeps may be present. This is important since fresh water is a resource needed by manatees (Ortiz *et al*. 1998). The shallow protected waters of the lagoons provide a very suitable location for sea grasses, such as manatee grass

[1] Belize Coastal Zone Management Authority and Institute. 2003. Manatee Research Program. Available online (http://www.coastalzonebelize.org/)

(*Syringodium filiforme*), shoal grass (*Halodule wrightii*), and turtle grass (*Thalassis testudinnum*). Several other endangered or threatened species also inhabit Turneffe including the American crocodile (*Crocodylus acutus*), hawksbill turtles (*Eretmochelys imbricate*), roseate tern (*sterna dougallii*), Nassau grouper (*Epinephelus striatus*) and others. In addition, the atoll provides year round habitat to a small population of coastal bottlenose dolphins (*Tursiops truncatus*) (Dick and Hines 2011, Campbell 2002, and Grigg and Markowitz 1997).

The first aerial survey of Belizean manatees was conducted in 1977 (Bengstson and Magor 1979). During five surveys, 101 manatees were sighted. Other surveys of the Belizean mainland were conducted by O'Shea and Salisbury in 1991, and by Auil in 1997 and 1999-2002, but these surveys did not include Turneffe Atoll. Aerial surveys of Turneffe were first conducted by Morales-Vela *et al*. (2000) in January and May of 1994, and January of 1995. Eleven manatees were sighted on those surveys. In 2002, the Oceanic Society began opportunistically monitoring manatees on Turneffe by both boat and aircraft to document numbers, distribution, and seasonality of use of the atoll. Since 2002, 38 manatees have been recorded at Turneffe including cow/calf pairs (Fig. 1). These surveys are the only assessments of manatee use of the atoll that have been conducted on a regular basis, and provide the only data currently available to resource managers to inform conservation actions concerning manatees on Turneffe. The distribution of manatees sighted during these surveys indicates that the passes along the western side, particularly near Douglas lagoon, are used by manatees to access the atoll, and the creeks and shoreline areas in Central Lagoon and Long Bogue appear to be important manatee habitat (Fig. 1). However, more information about Turneffe manatees including robust statistical estimates of abundance and fine-scale habitat use and distribution are needed to assist future conservation planning efforts.

Belizean manatees, including those that use Turneffe, have been shown to be impacted by human activities including habitat degradation, entanglement in fishing nets, poaching, and watercraft (Auil 1998). According to the Belize Coastal Zone Management Authority and Institute, the atoll itself faces several threats to its diversity and productivity including: 1.) unsustainable fishing; 2.) mangrove clearing; 3.) overdevelopment; and 4.) dredging. Currently, Turneffe has no national or international legal foundation for sustainable management and only a few regulations protecting manatees exist. Only two small seasonal marine reserves have been established to protect fish spawning aggregations. However, the recent Belize National Protected Areas Policy and System Plan, commissioned by a Task Force, acknowledged the unique ecological and socio-economic value of Turneffe and listed it as a priority area for conservation.

Data from surveys demonstrate that Turneffe is an important and consistently used habitat for endangered Antillean manatees in Belize and manatee use of the atoll should be considered in all future conservation planning efforts. In 2004, a radio tracked manatee crossed the barrier reef from the mainland and traveled to Turneffe, illustrating the exchange of manatees from other habitats in other parts of Belize[2]. To adequately protect and preserve this atoll and the variety of species it supports, including manatees, appropriately zoned ecosystem-wide sustainable management areas should be established to limit habitat degradation. In addition, effective management strategies should be considered and adopted as appropriate, including those that establish regulations for boat use and speeds (and signage in high use areas), marking boating corridors, implementing fishing regulations to limit the use of entangling equipment, and establishing special use areas or no entry sanctuaries and protection zones for critical habitat.

[2] Personal communication from James Powell 4411 Bee Ridge Road #490, Sarasota, FL 34233

These management actions have been implemented in the State of Florida (USA) for many years, and have assisted in the recovery of the Florida manatee (*Trichechus manatus latirostris*), another sub-species of the West Indian manatee (Calleson and Frohlich 2007, USFWS 2001). Tourism currently accounts for about 20% of Belize's Gross Domestic Product and much of Belize's tourism is geared towards coastal activities including diving, snorkeling, fishing and boating. As Belize's dependence on tourism grows and its use of coastal regions increases, balancing economic growth and the sustainability of tourism and other related activities should be a priority for managers and environmental groups working to protect Belize's natural resources including those of Turneffe Atoll.

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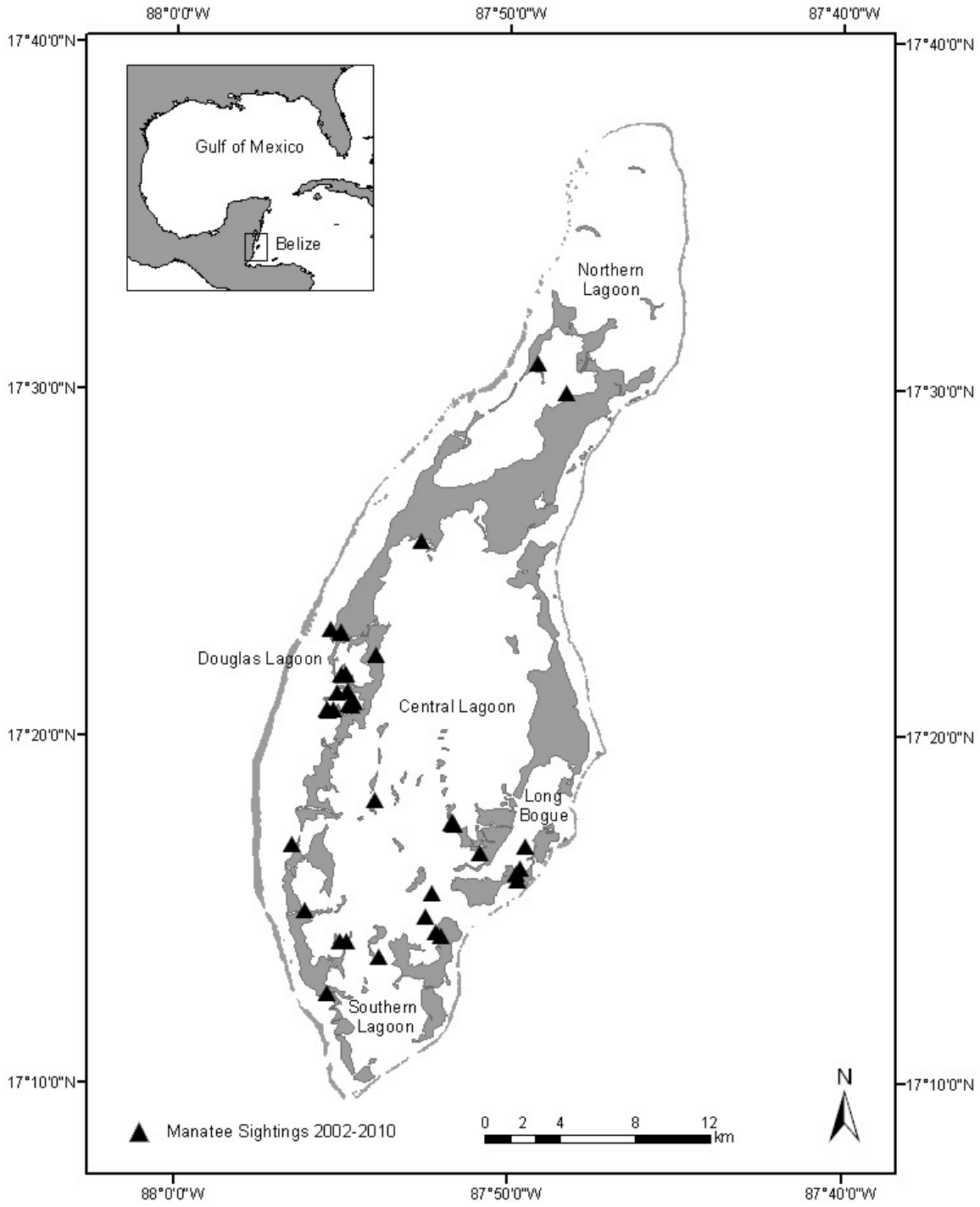

158

159 Figure 1. Locations of manatee sightings on Turneffe Atoll, Belize from 2002 to 2010.