

# Survival Blueprint

**Antillean Manatee**  
*Trichechus manatus manatus*  
**Belize**



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## 1. STATUS REVIEW

### 1.1 Taxonomy:

The West Indian manatee (*Trichechus manatus*), is from the order of the sirenian of the Trichechidae family and is divided into two subspecies: the Florida manatee *T. m. latirostris*; and the Antillean manatee *T. m. manatus* (Hatt, 1934).

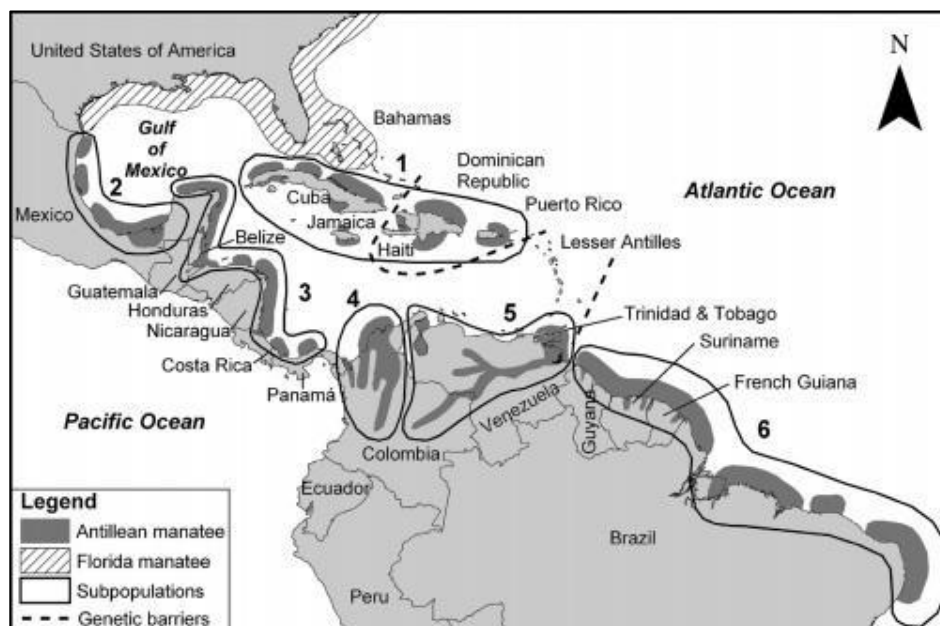
#### Antillean Manatee

Kingdom: Animalia  
 Order: Sirenia  
 Phylum: Chordata  
 Family: Trichechidae  
 Class: Mammalia  
 Genus: *Trichechus*  
 Species: *Trichechus manatus manatus*

#### Florida Manatee

Kingdom: Animalia  
 Order: Sirenia  
 Phylum: Chordata  
 Family: Trichechidae  
 Class: Mammalia  
 Genus: *Trichechus*  
 Species: *Trichechus manatus ssp. latirostris*

### 1.2 Distribution and population status:



**Figure 1.** Map of Antillean and Florida manatee distribution. Dark grey area shows the distribution of Antillean manatee *Trichechus manatus manatus*. The distribution of the Florida manatee is displayed in diagonal lines, and the known subpopulations of Antillean manatee with the species genetic barriers is demarcated with dotted lines, according to Vianna et al., 2006. Map used from Castelblanco-Martínez et al 2012.



The Antillean Manatee has a fragmented distribution that ranges from the southeast of Texas to as far as the northeast of Brazil, including the Greater Antilles (Lefebvre et al., 2001; Reynolds and Powell, 2002). This species can be found in coastal marine, brackish and freshwater systems, and is capable to alternate between these three environments (Lefebvre, 2001). According to the International Union for Conservation of Nature (IUCN) the Antillean manatee is classified as “Endangered” due to the estimated population reduction as well as the degradation of their habitat throughout their range (Self-Sullivan, C. & Mignucci-Giannoni, 2008). The status for most of the current populations is unknown or declining throughout its distribution (Castelblanco-Martínez et al., 2012), however research in 2012 estimated the global population at approximately 6,700 individuals throughout its range (Castelblanco-Martínez et al., 2012). Belize is considered a population hotspot for the Antillean manatee (*Trichechus manatus manatus*), a subspecies of the West Indian manatee, due to the richness of suitable habitats for the species. Thus, it is believed that Belize has the largest population of the Antillean manatees throughout the wider Caribbean, with a population of approximately 1000 individuals (Quintana-Rizzo & Reynolds III, 2010).

**1.2.1 Global distribution:** (Castelblanco-Martínez, Nourisson, Quintana-Rizzo, Padilla-Saldivar, & Schmitter-Soto, 2012)

Region	Population estimate (plus references)	Distribution	Population trend (plus references)
<b>Greater Antilles</b>	450 J. Collazos (pers. comm.)	Puerto Rico	Stable
	50 Quintana-Rizzo & Reynolds (2010)	Jamaica	Unknown
	200 H. Domínguez (pers. comm.)	Dominican Republic	Declining
	100 Quintana-Rizzo & Reynolds (2010)	Haiti	Unknown
	500 Alemán (pers. comm.)	Cuba	Unknown but suspected to be declining
<b>Gulf of Mexico</b>	1250 Quintana-Rizzo & Reynolds (2010)	Gulf of Mexico	Unknown
<b>Mesoamerica</b>	250 Quintana-Rizzo & Reynolds (2010)	Caribbean Mexico	Unknown
	1000 N. Auil (pers. comm.)	Belize	Unknown but suspected to be declining
	150 E. Quintana-Rizzo (pers. obs.)	Guatemala	Unknown



	100 Quintana-Rizzo & Reynolds (2010)	Honduras	Stable
	500 Quintana-Rizzo & Reynolds (2010)	Nicaragua	Declining
	200 C. Espinoza-Marín (pers. comm.)	Costa Rica	Declining
	150 K. Ruiz (pers. comm.)	Panama	Unknown
<b>Colombia</b>	400 Quintana-Rizzo & Reynolds (2010)	Colombia (Pacific & Caribbean region)	Unknown but suspected to be declining
	100 D. N. Castelblanco-Martínez (pers. obs.)	Colombia (Orinoco Region)	Declining
<b>Trinidad &amp; Tobago</b>	100 Quintana-Rizzo & Reynolds (2010)	Trinidad & Tobago	Declining
<b>Venezuela</b>	200 A. Manzanilla (pers. comm.)	Caribbean & Orinoco region	Declining
<b>French Guiana</b>	100 Quintana-Rizzo & Reynolds (2010)	NA	Stable
<b>Guyana</b>	100 Quintana-Rizzo & Reynolds (2010)	NA	Declining
<b>Suriname</b>	100 Quintana-Rizzo & Reynolds (2010)	NA	Declining
<b>Brazil</b>	700 J. Borges (pers. comm.)	Brazil	Unknown but suspected to be declining

## 1.2.2 Local distribution in Belize:

The current manatee population in Belize rates as 'Fair', with an estimate between 700 and 1,000 individuals, based on a maximum population count of 507 in 2012 (Auil, unpublished data). The desired, long term management goal would be to increase the population to over 1,000 individuals, raising the rating threshold to Good.

**Table 1.** Assessment of Belize manatee population thresholds for recovery management (Auil, 1998).

Manatee population	Manatee population thresholds			
Minimal population size	Poor (500 - 699)	Fair (700-1000)	Good (1001-1500)	Very Good (> 1500)



**Table 2.** Belize manatee aerial survey population estimate by district 1998

District	Site	Level of Protection	Total # of Animals	Reference(s)
Corozal	Corozal Bay	Wildlife Sanctuary	72	(Auil, 1998)
Belize City	Belize City Cayes & Rivers	Wildlife Sanctuary	436	
	Southern Lagoon	Wildlife Sanctuary	120	
Stann-Creek	Placencia Lagoon	Proposed Wildlife Sanctuary (pending)	179	
Toledo	Indian Hill Lagoon	None	51	
	Port Honduras	Marine Reserve	31	

### 1.3 Protection status:

Manatees are protected by the Marine Mammal Protection Act of 1972, the Endangered Species Act of 1973 (Comission, n.d.) in the United States of America. This species is also protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendix 1 (1973). In Belize, manatees are protected under section 88 of the Fisheries Resources Act 2020. It is illegal to feed, harass, harm, pursue, hunt, shoot, wound, kill, annoy, or molest manatees (Belize Fisheries Resources Bill, 2020). Despite the protection afforded to the species including the implementation of protected areas where the species occurs, it is not sufficient as many of the protection area lacks effective enforcement.

### 1.4 Ecology, behaviour, and habitat requirements:

Antillean manatees are known to frequent shallow coastal waters throughout the Caribbean and Gulf of Mexico. One of their most important habitats is found along the coast of Belize in rivers, lakes, lagoons, and coastal marine environments, including seagrass, mangrove, and coral reef ecosystems (Lefebvre, 2001). Antillean manatees are fully aquatic mammals, feeding on seagrasses, mangroves, algae, and other primary producers, and are obligated to consume freshwater periodically (Bacchus, Dunbar, & Self-sullivan, 2009). When found in marine or coastal environments, they tend to be located nearby access to freshwater (Powell et al., 1981; Powell & Rathbun, 1984; Rathbun et al., 1990; Olivera-Gomez & Mellink, 2005). Access to sheltered and quiet protected areas is essential for resting and for females with young calves; safe travel corridors and resting areas are also very important (Sullivan, 2008).

Manatees are gentle and slow-moving mammals that spend most of their time feeding, resting, and traveling. Generally, manatees have a long life span, with the reported age of a manatee in Florida over 66 years of age (Reep & Bonde, 2006). Manatee reaches sexual maturity as early as two to five years of age and has a long gestation time of about 12-14 months. Mothers bare one single offspring, and twins are very rare. (Reep & Bonde, 2006). The calves have a 1.5 to 2.5 years



dependency period and mothers have a 2.5 to 3 year calving intervals (Reep & Bonde, 2006). Manatees can feed on a large variety of submerged, emergent, and floating vegetation and are said to consume approximately 5-10% of their body weight in vegetation daily and feeds for about four to eight hours daily (Reep & Bonde, 2006). Adults tend to average 400-550 kg and 2.7 – 3 m in length. These large mammals may rest submerged at the bottom or just below the surface of the water, but must come to the surface for air. Though slow-moving these mammals can move as fast as 25 km/h and have ten minutes breathing intervals (Reep & Bonde, 2006). However, the longest submerged record lasted 24 minutes (Reynolds 1981).

The Antillean manatees reside in habitat in water temperatures ranging from 20 -23 °C, at shallow water depths of 1 – 4 m. They also need to have easy access to sufficient aquatic plants for food, and nearby freshwater access (Reep & Bonde, 2006).

### 1.5 Threat analysis:

Threat	Description of how this threat impacts the species	Intensity of threat (low, medium, high, critical or unknown)
Boat traffic-related incidents	Manatees are hit by speed boats causing injuries or even death. With increasing tourism in Belize thousands of tourists flock to the country, many of whom engaging in marine tours and adventures. This causes an increase in boating activities particularly by tour boats within known manatee habitats and has resulted in an increasing trend of manatee boat collisions. Since 1995 there were a total of 133 verified manatee stranding incidents. Manatees at all life stages were captured in Belize from 1997-2019 (n=180) during health assessments, and twenty-seven percent of the assessed individuals had at least one watercraft-related scar.	Low in Corozal Bay High in Belize City Cayes & Rivers Low in Southern Lagoon Medium in Placencia Lagoon Low in Indian Hill Lagoon Low in Port Honduras
Sewage and other effluents	Improper sewage disposal can cause pollution of water bodies and feeding resources which can impact manatee's health. This is a great long-term concern align with population rises ( population grew approximately 10% between the years 2015 – 2020 (Belize Population - LIVE)) and the impact of increased improper sewage disposal within the environment and its detrimental impact on not only the environment and wildlife, but also human health as well.	Low in Corozal Bay Low in Belize City Cayes & Rivers Low in Southern Lagoon High in Placencia Lagoon Low in Indian Hill Lagoon Unknown in Port Honduras
Alteration and destruction of habitat (coastal land reclamation/development)	Loss of critical habitat due to new infrastructure and unsustainable development of coastal areas, such as mangrove habitat. The majority of this development is a result of the growing tourism industry and the demand for more accommodation and tourism-related	Medium in Corozal Bay High in Belize City Cayes & Rivers Low in Southern Lagoon Low in Indian Hill Lagoon High in Placencia Lagoon



	experiences. As tourism numbers continue to grow the ability of environmental agencies to monitor and enforce development regulations are limited.	Low in Indian Hill Lagoon Low in Port Honduras
Pollution by agriculture/aquaculture practices	Pollution of water bodies and feeding resources caused by agricultural and aquaculture runoff can impact manatee habitat and health. As Belize's population increases and the demand for food increases, as well and results in increased agricultural production and an increase in the environmental impact caused by agricultural runoff and waste-water released into the environment from the aquaculture industries.	Low in Corozal Bay Low in Belize City Cayes & Rivers Low in Southern Lagoon Medium in Placencia Lagoon Low in Indian Hill Lagoon High in Port Honduras
Entanglement in fishing gears/Incidental catch through fishing practices	Manatees being entangled in nets and improperly discarded lines that may cause them to lose limbs and even cause drowning. Though there is currently the passage of Fisheries Resources Act No. 7 Section 88 of 2020 to phase out the use of the destructive fishing gear, the capacity to enforce that bill is minimum as many of these nets are unlicensed and are used in very remote areas and at night to evade authorities.	Low in Corozal Bay Low in Belize City Cayes & Rivers Low in Southern Lagoon Medium in Placencia Lagoon Medium in Indian Hill Lagoon Low in Port Honduras
Illegal hunting/poaching	Manatees are being hunted for food or for other reasons, which can seriously impact an already endangered population. Historical overhunting of this species has led to manatees becoming endangered. Though there are not many reports of hunting, these activities continue to be of concern as it is difficult to monitor or measure its exact impact on the species today.	Low in Corozal Bay Low in Belize City Cayes & Rivers Low in Southern Lagoon Medium in Placencia Lagoon Low in Indian Hill Lagoon Low in Port Honduras
Plastic pollution	Manatees generally feed on submerged and emergent vegetation. Often plastic is broken down into small particles that become sediment at the bottom of the seafloor, and thus can be ingested by manatees when feeding on seagrass. Plastic is being banned in Belize and its impact on the environment and wildlife is expected to be lowered significantly considering the environmental agency's ability to monitor and enforce the ban.	Low in Corozal Bay Medium in Belize City Cayes & Rivers Low in Southern Lagoon Low in Placencia Lagoon Low in Indian Hill Lagoon Medium in Port Honduras
Natural disasters	Natural disasters, such as hurricanes can displace manatees through flooding, heavy wind and strong ocean waves. As the world continues to be impacted by climate change, natural disasters are not only expected to increase but to be significantly stronger, drastically damaging both the environment and wildlife.	Medium in Corozal Bay Medium in Belize City Cayes & Rivers Low in Southern Lagoon Low in Placencia Lagoon Low in Indian Hill Lagoon Low in Port Honduras



## 1.6 Stakeholder analysis:

Stakeholder	Stakeholder's interest in the species' conservation	Current activities	Impact (positive, negative or both)	Intensity of impact (low, medium, high or critical)
Belize Port Authority	Maritime Enforcement	As a part of their mandate, the Belize Port Authority manages and oversees the maritime activities including the enforcement of the laws and regulations. With that mandate the Port Authority can be of critical assistance to the project considering the main threat to manatees in Belize is boats. They can assist in designating slow speed areas and other regulations that can ameliorate some of the boating-related threats.	Positive/Negative. The impact of the Port Authority can be both positive and negative considering their commitment to assist in conservation projects. With their commitment and support it can address some of the unchecked boating activities that impact manatees. If they do not participate or support conservation activities it will negatively impact conservation efforts to lower the number of manatees impacted by maritime activities.	High
Belize Tourism Board	Government body with responsibility for tourism activities	The Belize Tourism Board operates under the Ministry of Tourism & Civil Aviation with the mandate that includes sustainable tourism. The Tourism Board has been implementing strategies and regulations to promote more eco-friendly tourism activities in Belize. Under the sustainable tourism sector, the tourism impact on manatees can be addressed and the importance of safeguarding the species promoted.	Positive/Negative. The Belize Tourism Board can impact manatee conservation projects positively or negatively. This also is dependent on their commitment to the project. Their commitment can promote a change for more sustainable manatee tourism activities. Should they not participate it will be more difficult to address the unsustainable tourism activities that may impact manatees.	High
Fisheries Department	Government body with responsibility for Wildlife	The Fisheries Department is a government agency with the mandate that covers marine mammals including manatees. Through their mandate, they can provide support	Positive/Negative. The Fisheries Department can provide a positive impact on manatee conservation projects as the department can provide the regulations	High





		through regional treaties/agreements and partnerships promoting manatee conservation as well as passing and implementing laws and regulations that safeguard manatees and their habitats.	needed to protect the species as well as support for enforcing those regulations. Without their participation, it can provide a negative impact as it would be difficult to protect the species without the necessary regulations and laws and their enforcement.	
Boaters & Tour companies	Boaters and tour companies use manatees for their livelihoods in the form of tourism to generate income.	Boat collisions are the leading cause of manatee deaths in Belize. Boaters and tour companies use the waterways weekly for tourism activities and their livelihoods. By attending meetings, manatee tour-guide and boater training, may improve adherence to boating manatee regulations which can be critical in safeguarding the species.	Positive/Negative. They can provide a positive impact on manatee conservation projects with their support and participation. Should they participate in meetings and training, they would be more aware of the risk of boat collisions to manatees, and more likely to change behaviors that may negatively impact manatees. Should they not participate and are not informed they can harm the species through reckless boating and environmentally negative behavior.	High
Local Communities	The communities benefit economically from tourism activities as tourists visiting these communities to see manatees purchase food, souvenirs, etc. from the local communities. Also, with manatee presence potentially associated with tourism interest, the	Communities participate in trainings within the area, attend meetings, and provide insight on issues and threats to the species within their communities.	Positive/Negative. These communities can have a positive and a negative impact, as their support for eco-friendly and environmentally sustainable practices will also support the conservation of the species. It can negatively impact the species as poorly managed tourism can lead to unsustainable numbers of people in manatee habitat can increase the aforementioned threats to the species.	High



	government is compelled to secure these areas for manatee survival.			
Fishers	Fishers using unsustainable fishing gears, such as gill-nets can result in manatee bycatch, or fishers in some cases intentionally hunt the species.	Awareness in fishing communities to highlight the negative impact of their gear on the environment. There is also a proposed phase-out and ban of destructive fishing gears.	Positive/Negative. Gill-nets have been a gear used for many generations and its ban will impact gill-net users as they will be forced to switch to more sustainable gear, or alternative livelihoods. There is currently a phase-out of the gear which can smooth the transition until the eventual ban. The long-term use of unsustainable fishing gears has diminished fishing stocks and generated a high percentage of bycatch including protected species such as manatees, turtles whales etc. The ban will have a positive impact on the environment, wildlife and human livelihoods. The promotion of fishers transitioning to the use of more sustainable fishing techniques will support increased fish stocks through the reduction in juvenile fish often caught in fishing gears such as gill nets. This will enable juvenile fish to have the opportunity to grow and reproduce. This will also have a positive yield to the sports fishing industry which contributes significantly to the Belize economy as it will contribute to ensuring long-term sustainable fish stocks for sport fishing.	High



**1.7 Context and background information that will affect the success of any conservation action for this species:**

Country: Belize	Description	Barriers to conservation	Opportunities for conservation
Socio-cultural effects and cultural attitudes	Historically manatees have been hunted for food within different ethnic groups and communities. Though poaching pressures have lessened there are still occasional incidents.	Today reports of poaching have significantly decreased to about 1-3 reports of poaching a year. If these practices are not halted they can contribute to the decrease in the population size placing the species at even greater risk.	Forming partnerships with local communities can bring conservation awareness in areas where poaching occurs and can facilitate opportunities to learn from poachers and use this information to put measures in place to address poaching pressures.
Economic implications	Tourism is the number one driver of Belize's economy and employs many Belizean. Manatees provide a tourism opportunity in the form of manatee tours that generate income for many households. Conservation of the manatees ensures longevity for the tourism industry.	Increased tourism means increased revenue as well as boats and boating activities. With the revenues that tourism brings, it may also result in difficulties to pass boating laws as well as its enforcement.	Increased tourism revenues may provide financial support to the conservation of the species as well as avenues to promote the protection and conservation of the species.
Existing conservation measures	The Clearwater Marine Aquarium Research Institute, formally the Sea to Shore Alliance, Belize Marine Mammal Stranding Network, Belize Fisheries Department are working to put conservation actions in place to safeguard manatees in Belize since 1996.	These entities all play a crucial role in the effective management of the manatee. This collaboration is crucial to the success of manatee conservation efforts and can present barriers to success without a coordinated effort.	Should all these organizations be able to work closely together, these efforts can result in improved laws and penalties to protect manatees, enforcement, better-managed manatee protected areas, and proposals for additional priority protected areas.
Administrative/political set-up	The government of Belize is the ultimate entity responsible for	Without government will power it can impede efforts to implement the	Having strong government support and engagement for manatee conservation presents a



	<p>manatees in Belize. Human livelihoods is a government priority, while environment and wildlife protection are secondary and may not get the necessary government attention.</p>	<p>required regulations, which can affect conservation actions that seek to protect the species. For instance, the approval and enforcement of manatee no-wake zones are crucial for the protection of the species and cannot be carried out effectively (or at all) without government support, which can lead to a detrimental impact on the population.</p>	<p>huge opportunity to implement the necessary regulation and enforcement, and better environmental management of manatees.</p>
Local expertise and interest	<p>Belize has considerable local and knowledgeable individuals in the field of manatee conservation. These individuals are capable of leading and carrying out conservation actions to safeguard the species.</p>	<p>Though there is good local expertise, if there is no commitment to support and promote the participation of this local expertise in manatee conservation actions it may result in a lack of local support. With the local experts discouraged this knowledge may not be shared with the next generation or translate into successful conservation efforts into the future.</p>	<p>Having established capacity in this area the pooling of local expertise can reduce training costs, and support more effective species management, recovery and future efforts.</p>
Resources	<p>Expertise, fieldwork equipment (i.e. research &amp; rescue boats, trucks, rescue equipment, office equipment), and other vital resources (additional rehab facilities, office etc.) are necessary to successfully implement the conservation strategy to safeguard the endangered manatees.</p>	<p>Without the critical resources needed to implement the conservation strategy, it will likely impact the ability of the conservation strategy to be successful.</p>	<p>Manatee conservation in Belize has established resource structures in place, however, the lack of funds to support and maintain the program activities can limit the effectiveness of its implementation. Having the necessary support and resources can ensure positive results to conservation actions to safeguard the species and its environment.</p>



## 2. ACTION PROGRAMME

<b>Vision (30-50 years)</b>	
Thriving population of Antillean Manatees in Belize	
<b>Goal(s) (5-10 years)</b>	
Belize manatee population recovering and estimated at greater than 1,000 individuals	
<b>Objectives</b>	<b>Prioritization</b> <i>(low, medium, high or critical)</i>
Strengthen the National Manatee Working Group (NMWG)	Low
Design and implement a coordinated public awareness and outreach campaign	High
Continued monitoring of manatee population health, movement, behaviour, habitat usage and threats	High
Increase manatee protected area management in Belize	Critical
Increase law enforcement in manatee high impact areas to reduce manatee stranding incidents	Medium



Activities	Country / region	Priority (low, medium, high or critical)	Associated costs (currency)	Time scale	Responsible stakeholders	Indicators	Risks	Activity type
<b>Objective 1: Strengthening the National Manatee Working Group (NMWG)</b>								
1.1 Continue strengthening the National Manatee Working Group with increased training, team building and frequent meetings under the coordination of the Belize Fisheries Department	Belize	High	500 USD/year	10 Years	CZMAI and Fisheries Department	<ul style="list-style-type: none"> <li>Annual list of NMWG capacity building meetings (including target of meeting, minutes)</li> <li>Capacity building mechanisms implemented for NMWG per year</li> </ul>	Lack of members participating in or attending meetings	Management
1.2 Implement the planned fundraising strategy for NMWG	Belize	Critical	1,000 USD/year	8 Years	NMWG (Financial sub-committee)	<ul style="list-style-type: none"> <li>NMWG Fundraising Strategy (FS)</li> <li>Monitoring and evaluation reports on the implementation of NMWG FS – 3<sup>rd</sup>, 6<sup>th</sup>, 9<sup>th</sup> year</li> <li>Total funds raised per year</li> </ul>	Proposed strategy not as successful as expected	Management
1.3 Support NWMG engagement with coastal enforcement and management authorities	Belize	Critical	3,000 USD/year	10 Years	NMWG	<ul style="list-style-type: none"> <li>Trends in participation of coastal enforcement and management authorities at NMWG meetings (per year)</li> </ul>	Management authorities lacking the resource or will to enforce regulations and laws	Management/Education/Awareness
1.4 Support NWMG engagement with the private sector in manatee conservation	Belize	Medium	500 USD/year	10 Years	NMWG	<ul style="list-style-type: none"> <li>Trends in private sector participation at NMWG meetings (per year)</li> </ul>	The lack of interest or recourse from the private sector	Awareness/Education



						<ul style="list-style-type: none"> <li>▪ Trends in financial support from the private sector in Belize (per year)</li> </ul>		
1.5 Promote cooperation and exchange of information on manatee conservation at national and regional levels	Belize	High	500 USD/year	10 Years	NMWG (through SACD TCP and TIDE TRIGOH; N. Auil)	<ul style="list-style-type: none"> <li>▪ Trends in Belize participation in regional meetings re. manatee research and conservation (per year)</li> <li>▪ Number of transboundary meetings between Belize organizations and Mexican / Guatemalan / Honduran organizations (per year)</li> <li>▪ Number of NMWG meetings with participation from Mexico</li> </ul>	Not having participation by all countries within the region	Partnership
1.6 Support of organizations involved in manatee rescue, rehabilitation and release activities proposed on the NMWG	Belize	High	5,000 USD/year	10 Years	NMWG BMMSN	<ul style="list-style-type: none"> <li>▪ Number of NMWG activities/decisions that support rescues (per year)</li> <li>▪ Number of activities/decisions by NMWG that support rehabilitation and release (per year)</li> <li>▪ % of decisions by NMWG identified in the above indicators that are implemented within one year</li> </ul>	<p>The lack of funding to support all the organizations involved</p> <p>Organizations are not interested in supporting the NMWG anymore</p>	Management



1.7 Implement training, following guidelines from The Belize Marine Mammal stranding network, for local response to strandings, collecting data, necropsies, and manatee monitoring data	Belize	High	2,000 USD/year	10 Years	BMMSN	<ul style="list-style-type: none"> <li>Number of BMMSN training courses (per 5 years)</li> </ul>	<p>Lack of access to funding to support these activities</p> <p>Local people/organizations are not interested in the training</p>	Management/Education
1.8 Support regional treaties/agreements and partnerships promoting manatee conservation	Belize	High	1000 USD/year	10 Years	Fisheries Departments	<ul style="list-style-type: none"> <li>Number of relevant regional treaties/agreements Belize has signed (updated per 5 years)</li> <li>% of relevant treaties/agreements Belize provides reporting to (updated per 5 years)</li> </ul>	Lack of government will by countries involved	Partnerships
<b>Objective 2: Design and implement a coordinated public awareness and outreach campaign</b>								
2.1 Define the coordination of national manatee awareness raising activities through collaboration with the National Manatee Working Group and key stakeholders	Belize	High	5,000 USD/year	10 Years	National Manatee Working Group, Clearwater Marine Aquarium Research Institute (CMARI) and other partners	<ul style="list-style-type: none"> <li>Minimum number of 2-3 national manatee awareness activities per year</li> <li>Number of people reached per sector per year</li> </ul>	Lack of participation on a national level	Awareness/Education
2.2 With the support of a communication consultant empower the NMWG to	Belize	High	3,000 USD	2 Years	NMWG Communication Sub-	<ul style="list-style-type: none"> <li>NMWG-Approved Communication and</li> </ul>	Lack of participation from all partners and	Awareness/Education





implement a Manatee Communication and Awareness Strategy targeting key stakeholders such as the tourism industry, fishers, boaters and coastal communities					Committee PA Managers	Awareness Strategy by 2021 with budget <ul style="list-style-type: none"> <li>▪ Biennial monitoring and evaluation of Communication and Awareness Strategy</li> </ul>		
<b>Objective 3: Continued monitoring of manatee population health, movement, behaviour, habitat usage and threats</b>								
3.1 Assess national manatee population status, trends, and distribution at least once every 5 years	Belize	High	17,000 USD/ year	10 Years	Clearwater Marine Aquarium Research Institute	<ul style="list-style-type: none"> <li>▪ National manatee population count</li> <li>▪ Robust population estimates for manatees</li> <li>▪ Shapefile of national survey data</li> <li>▪ Report on manatee status, trend and distribution data</li> </ul>	Availability of survey experts. National or global pandemic, unpleasant weathers and natural disasters	Research/Management
3.2 Develop and implement standardized protocols for monitoring manatees in key manatee areas	Belize	Critical	1,500 USD	2 Years	NMWG Technical sub-committee PA managers	<ul style="list-style-type: none"> <li>▪ Protocols for site-specific monitoring of manatees</li> <li>▪ Defined key manatee areas (shapefiles, SMA SI)</li> <li>▪ % of key manatee areas monitored</li> </ul>	Lack of support by implementing agencies	Research/Management
3.3 Develop and implement standardized protocols habitat assessments in key manatee areas	Belize	Critical	1,500 USD	2 Years	NMWG Technical sub-committee PA managers	<ul style="list-style-type: none"> <li>▪ Protocols for site-specific monitoring of manatee habitats for key manatee areas</li> <li>▪ % of key manatee areas monitored</li> </ul>	Lack of support by implementing agencies	Research/Management



3.4 Collect and evaluate data on manatee mortality and causes	Belize	High	3,000 USD	10 Years	BMMSN (National Coordinator)	<ul style="list-style-type: none"> <li>Annual report on manatee mortality and causes</li> <li>5 year summary of manatee mortality and causes</li> </ul>	Lack of support by all network members to properly collect the data	Research/Management
3.5 Implement a database to support effective stranding data management, analysis, reporting and dissemination	Belize	High	2,000 USD	10 Years	NMWG (through ERI)	<ul style="list-style-type: none"> <li>Consolidated database managed under ERI</li> <li>Annual automated reports from stranding data</li> </ul>	Data not properly collected or reported	Management
3.6 Coordinate monitoring of seagrass water quality and threats in key manatee areas	Belize	High	3,000 USD/year	10 Years	NMWG (through PA members)	<ul style="list-style-type: none"> <li>Protocol</li> <li>Baseline status report</li> <li>Annual update reports</li> </ul>	National or global pandemic, unpleasant weathers and natural disasters	Research
3.7 Socio-economic assessment of the value of manatees in the Belize multi-sector context	Belize	Medium	3,500 USD	2 Years	NMWG (through ERI)	<ul style="list-style-type: none"> <li>Socio-economic assessment report on value of manatees to Belize and Belizeans</li> </ul>	Lack of community participation	Research/Management

**Objective 4: Increase manatee protected area management in Belize**

4.1 Develop and strengthen area-specific management plans for key manatee areas	Belize	Critical	3,000 USD/year	10 Years	NMWG Co-management agencies Potential co-management partners Regulatory Authorities	<ul style="list-style-type: none"> <li>% of key manatee areas with current management plans integrating strategies for manatee conservation</li> <li>% of key manatee area management plans reviewed by NMWG (per year)</li> <li>% recommendations provided by NMWG that</li> </ul>	No enforcement or compliance	Management
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						have been incorporated into management plans		
4.2 Support protected area managers in strengthened management of manatees	Belize	Critical	5,000 USD/year	10 Years	NMWG	<ul style="list-style-type: none"> <li>Number of NMWG activities/decisions that support protected area managers (per year)</li> <li>% of decisions by NMWG identified in the above indicators that are implemented (per year)</li> </ul>	Lack of interest and will by the protected area managers or overburden with current management issues	Management/Education
4.3 Lobby for protection of identified key manatee areas	Belize	Critical	1,500 USD/year	10 Years	NMWG	<ul style="list-style-type: none"> <li>List of key manatee areas (protected and unprotected) (per 5 years)</li> <li>% of non-protected key manatee areas that gain protection (per 5 years)</li> </ul>	Lack of government interest	Management
<b>Objective 5: Increase law enforcement in manatee high impact areas to reduce manatee stranding incidents</b>								
5.1 Provide input to reflect conservation and research data into the development of regulatory guidelines and certification for the tourism sector relevant to manatees	Belize	High	4,000 USD	4 Years	BTB (with NMWG, FD and BPA)	<ul style="list-style-type: none"> <li>Regulatory guidelines for improved management of manatee tours approved by relevant regulatory Department</li> <li>Training course and certification system for manatee tour guides</li> <li>Number of guides certified for manatee tours</li> </ul>	Lack of support from tourism agencies and refusal to accept recommendations, including lack of compliance or enforcement of potential guidelines	Management/Education
5.2 Provide input to reflect conservation action and research data into national land-use planning initiatives	Belize	Medium	2,500 USD/year	10 Years	NMWG	<ul style="list-style-type: none"> <li>Recommendations in minutes re. relevant national planning</li> </ul>	Input not taken into consideration or implemented	Management/Education/Awareness



relevant to the coastal zone and key manatee use areas						<ul style="list-style-type: none"> <li>▪ Recommendations submitted to relevant agencies</li> <li>▪ Recommendations integrated into key planning initiatives</li> </ul>		
5.3 Review relevant Environmental Impact Assessments and provide feedback and recommendations to the Forest and Fisheries Departments for input into the National Environmental Appraisal Committee evaluation	Belize	High	2,000 USD/year	10 Years	NMWG	<ul style="list-style-type: none"> <li>▪ Recommendations in minutes re. EIAs</li> <li>▪ Recommendations submitted to relevant agencies</li> <li>▪ Recommendations integrated into EIAs / ECPs</li> </ul>	The recommendations not taken or implemented	Management/Education
5.4 Collaborate with the Belize Port Authority (BPA) to provide relevant data and technical support for the establishment of no-wake zones in key manatee areas	Belize	Critical	1,500 USD/year	10 Years	NMWG, BPA (with relevant co-managers)	<ul style="list-style-type: none"> <li>▪ Number of identified key areas for no-wake zones</li> <li>▪ % of identified key no-wake areas formally established by BPA</li> <li>▪ % of established key no-wake zones with adequate signage</li> <li>▪ % of established key no-wake zones with adequate enforcement</li> </ul>	No compliance by boaters and no enforcement from government	
5.5 Support enforcement agencies involved in manatee protection by providing technical expertise, as well as	Belize	Critical	5,000 USD/year	10 Years	NMWG Co-management partners	<ul style="list-style-type: none"> <li>▪ Minutes of relevant meetings with surveillance and enforcement agencies active in key manatee</li> </ul>	Lack of will and support by agencies	Management/Education



support enforcement expenses						<p>areas for strengthening of / supporting enforcement</p> <ul style="list-style-type: none"> <li>List of concrete strategies for support of enforcement agencies</li> <li>% of support strategies successfully implemented</li> </ul>		
5.6 Formalize and implement protocols and guidelines to be approved by the National Manatee Working Group sub-committee along with the Belize Fisheries Department for the rescue, rehabilitation and release of manatees	Belize	High	3,000 USD	2 Years	NMWG (Technical sub-committee) BMMSN Wildtracks	<ul style="list-style-type: none"> <li>Manatee rescue protocols approved by the relevant authority</li> <li>Manatee rehabilitation protocols approved by the relevant authority</li> <li>Manatee release protocols approved by the relevant authority</li> </ul>	Protocols not strictly abided to	Management/Education



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