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Management Plan

Gales Point Wildlife Sanctuary

2008 – 2013

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PACT
Protected Areas Conservation Trust

Wildtracks, 2007

Executive Summary

The Gales Point Wildlife Sanctuary Management Plan, the first to be developed for this protected area, has been produced at the request of the Gales Point Community and Wildlife Trust to guide the community in their future development, and in the protection of the natural resources on which they depend.

The Management Plan provides the background information necessary for informed management decisions, and a structured framework of activities to assist the proposed co-management organization, the Gales Point Wildlife Sanctuary Community Management Committee, in working with the Forest Department to implement effective conservation management. It is designed to guide the management of the Wildlife Sanctuary through the next five years, providing a framework for both broad management activities as well as more specific research and monitoring activities. Detailed operational plans will be developed on an annual basis by Forest Department and the potential co-management agency, the Gales Point Wildlife Sanctuary Community Management Committee, based on the framework provided by this management plan.

In line with NPAPSP recommendations, this Management Plan has been prepared with the input of the key stakeholders, through community meetings, meetings with the Gales Point Wildlife Sanctuary Community Management Committee, and interviews with a wide variety of individuals, including fishermen, community members, tourism sector, and researchers, and seeks to protect the resources of the protected area while allowing economic benefit through sustainable tourism.

Section One: Introduction

The first section provides an introduction to the background context and scope of the Management Plan, and the framework it is required to fit within, developed under the National Protected Area Policy and System Plan (NPAPSP, 2006). It also discusses the other parameters that guide the development of the Plan - the categorization of the protected area as a Wildlife Sanctuary, designated under the National Park Systems Act for the protection of the Antillean Manatee, and the Vision and Goals of the NPAPSP to increase public participation in the planning and management process, and in economic benefits derived as a result of the effective management of the protected area.

Section Two: Current Status

The Current Status describes the management context as it exists at the moment – the regional and national biodiversity importance, the current legislative and socio-economic situation, and present use of the protected area.

Gales Point Wildlife Sanctuary, located in Belize District, is centered on one of two connected large lagoons on the central coastal plain, encompassing a complex matrix of brackish lagoons, creeks and mangrove mudflats, lying on a limestone bedrock. With rivers and creeks draining into the lagoon from the west, water then flows to the east, the lagoon being connected to the Caribbean Sea through Bar River, the Wildlife Sanctuary is defined by its Statutory Instrument as including a portion of Manatee River and Cornhouse Creek, and the 66' shoreline along all the lagoons and waterways within the protected area (with the exception of the Gales Point peninsula).

The Plan contributes to the National Protected Areas System, and to fulfilling Belize's commitments under a number of international treaties, including the Convention on Biological Diversity. The biodiversity assessment demonstrated the presence of twenty-six species of international concern (IUCN, 2007) within the Wildlife Sanctuary itself (including the 66' vegetation on the water frontage) - three of these are considered critically endangered, six are endangered, six are classed as vulnerable, and twelve are lower risk / near threatened (though three of these require further confirmation of their presences) Four further

species are considered at risk, but with insufficient information available to give an accurate idea of their population status. The Wildlife Sanctuary is considered of primary importance in the protection of the West Indian Manatee (*Trichechus manatus*), a species listed as 'vulnerable' (IUCN, 2006), which congregates within the lagoon system.

The three 'critically endangered' (IUCN, 2006) species that use the Wildlife Sanctuary include the goliath grouper (*Epinephelus itajara*), for which the lagoon system is an important recruitment area, and the regionally endemic Central American river turtle (*Dermatemys mawii*). The 'critically endangered' hawksbill turtle (*Eretmochelys imbricata*) is the other critical focal point of conservation interest. The sand bar that lies to the east, outside the Wildlife Sanctuary, has been identified as one of the most important nesting beaches within the Western Caribbean for the hawksbill, and other turtle species. The Smalltooth sawfish (*Pristis pectinata)* was once common within the lagoon system, but is now thought to be locally extinct *(*R.Graham, 2007)*.*

National species of concern identified under the National Protected Areas Policy and System Plan include waterbirds that both for nest and feed within the Wildlife Sanctuary – the great blue heron (*Ardea herodias*), roseate spoonbill (*Ajaia ajaja*), white ibis (*Eudocimus albus)*, reddish egret (*Egretta rufescens*) of the lagoons, and the more secretive agami heron (*Agamia agami*) and muscovy duck (*Cairina moschata*) of the rivers and creeks (Meerman, 2005).

The section also identifies the primary stakeholder community as Gales Point, and provides a socio-economic context, as well as documenting the current interests of stakeholders, including the local fishermen and the tourism industry, and provides information on the traditional fishing industry, on which the majority of the Gales Point community depends.

Section Three: Conservation Planning

The Conservation Planning section identifies sic Conservation Targets - species, species assemblages and ecosystems. These targets are chosen for their representativeness of the biodiversity of the area, with the understanding that strategies considered to maintain or increase viability of the targets, and reduce the pressures impacting them, will adequately address the needs of the system as a whole. The section analyzes the status and viability of the main biodiversity targets, and assesses direct and indirect threats, during stakeholder workshops and meetings, and through consultation with technical experts associated with the selected targets. Conservation strategies are developed within this section to address these threats, within the socio-economic context of the management area.

Priority	Conservation Target	Viability Rating	Primary Threat within GPWS
High Priority	*Goliath Grouper*	Poor	Unsustainable fishing
	Central American River Turtle	Fair	Unsustainable hunting
	Hawksbill Turtle	Fair	Low nest success
	Native Fish Species	Fair	Unsustainable fishing
Medium Priority	*West Indian Manatee*	Good	Potential boat impacts
	Aquatic, Riparian and Estuarine Ecosystems	Good	Land clearance
Low Priority	*Mangrove and Littoral Forest Ecosystems*	Very Good	Land clearance

Section Four: Management

The Management Planning section defines the management context and reviews past management effectiveness, as well as highlighting management problems, defining the goals and objectives of

management for the protected area, and outlining specific management programmes, including the zoning plan. It also sets in place the means for measuring reserve effectiveness.

Gales Point Wildlife Sanctuary has the goal of **"providing protection for the manatee population, whilst allowing the sustainable development of the Gales Point community,"** with a series of supporting objectives:

1. To protect and maintain the natural resources of the Gales Point Wildlife Sanctuary as an integral part of the National Protected Areas System

2. To protect and maintain West Indian Manatee and other globally threatened species present within the Gales Point Wildlife Sanctuary

3. To promote sustainable use of the Gales Point Wildlife Sanctuary for tourism and traditional fishing activities, for the benefit of the Gales Point community

4. To promote and facilitate active research and biodiversity monitoring activities towards provision of information for adaptive management

5. To provide recreational and educational opportunities for Belizean and international visitors in a manner that is compatible with the natural environment

6. To strengthen management capacity and community participation in management decisions, and develop mechanisms to ensure long term financial sustainability

Implementation of strategic actions is through a series of management programmes (Natural Resource Management, Research and Monitoring, Community Participation, Publix Use, Site and infrastructure Management and Administration.

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Acknowledgments

Many thanks go especially to Gales Point Wildlife Sanctuary Community Management Committee, Wildlife Trust (particularly Nicole Auil, Kevin Andrewin and Jamal Galvez) and Gales Point Village Council, as well as all the community members from Gales Point, for their participation in workshops and the planning process throughout the project, and for their logistical support during the biodiversity assessment.

Thanks also go to PACT for providing the funding for the Community Development Plan under the Protected Areas Conservation Trust Small Grant Programme.

Plan Facilitated By:

Zoe and Paul Walker, Wildtracks, Belize
December, 2007

1. Introduction

Background and Context

This Gales Point Wildlife Sanctuary Management Plan is one of two documents being produced at the request of the Gales Point Community and Wildlife Trust. The second is the Gales Point Community Development Plan. These two plans have been developed to guide the community in their future development, and in the protection of the natural resources on which they depend.

This Management Plan provides the background information for informed management decisions, and a structured framework of activities to assist the proposed co-management organization, the Gales Point Wildlife Sanctuary Community Management Committee, in working with the Forest Department to implement effective conservation management.

Annex 1, the Biodiversity Assessment of the Southern Lagoon Area (Wildtracks, 2006), provides more in-depth information on the biodiversity and biodiversity concerns of the Gales Point area.

Purpose and Scope of Plan

The management of Southern Lagoon is guided by its categorization as a Wildlife Sanctuary (the Gales Point (West Indian Manatee) Wildlife Sanctuary, designated under the National Park Systems Act of 1981, Chapter 215, Laws of Belize, Revised Edition 2000), being set aside:

> *"for the protection of nationally significant species, biotic communities or physical features.".*

This is the first draft management plan to be developed for the protected area, and has been prepared to fit within the framework required by the National Protected Area Policy and System Plan (NPAPSP, 2006). It includes general information on the physical and biological attributes of the Wildlife Sanctuary, documents the current uses and management problems, defines the goals and objectives of management for the protected area, summarises conservation planning, outlines specific management programmes, including the zoning plan, sets in place the means for measuring reserve effectiveness, and recommends an implementation schedule.

In line with NPAPSP recommendations, this Management Plan has been prepared with the input of the various stakeholders through community meetings, meetings with the Gales Point Wildlife Sanctuary Community Management Committee (who are currently seeking co-management), and interviews with a wide variety of individuals, including fishermen, tourism sector, and researchers, and seeks to protect the resources of the reserve while allowing economic benefit through sustainable tourism. The management programmes are based on the best available data and scientific knowledge, with the integration of conservation planning strategies, and fit within the scope of the current zoning scheme and regulations that govern the reserve.

The management plan, submitted to Forest Department, is designed to guide the management of the Wildlife Sanctuary through the next five years, providing a framework for both broad management activities as well as more specific research and monitoring activities. Detailed operational plans will be developed on an annual basis by Forest Department and the potential co-management agency, the Gales Point Wildlife Sanctuary Community Management Committee, based on the framework provided by this management plan. In addtion an annual review of implementation success will allow for adaptive management over the five year period.

2. Current Status

2.1 Location

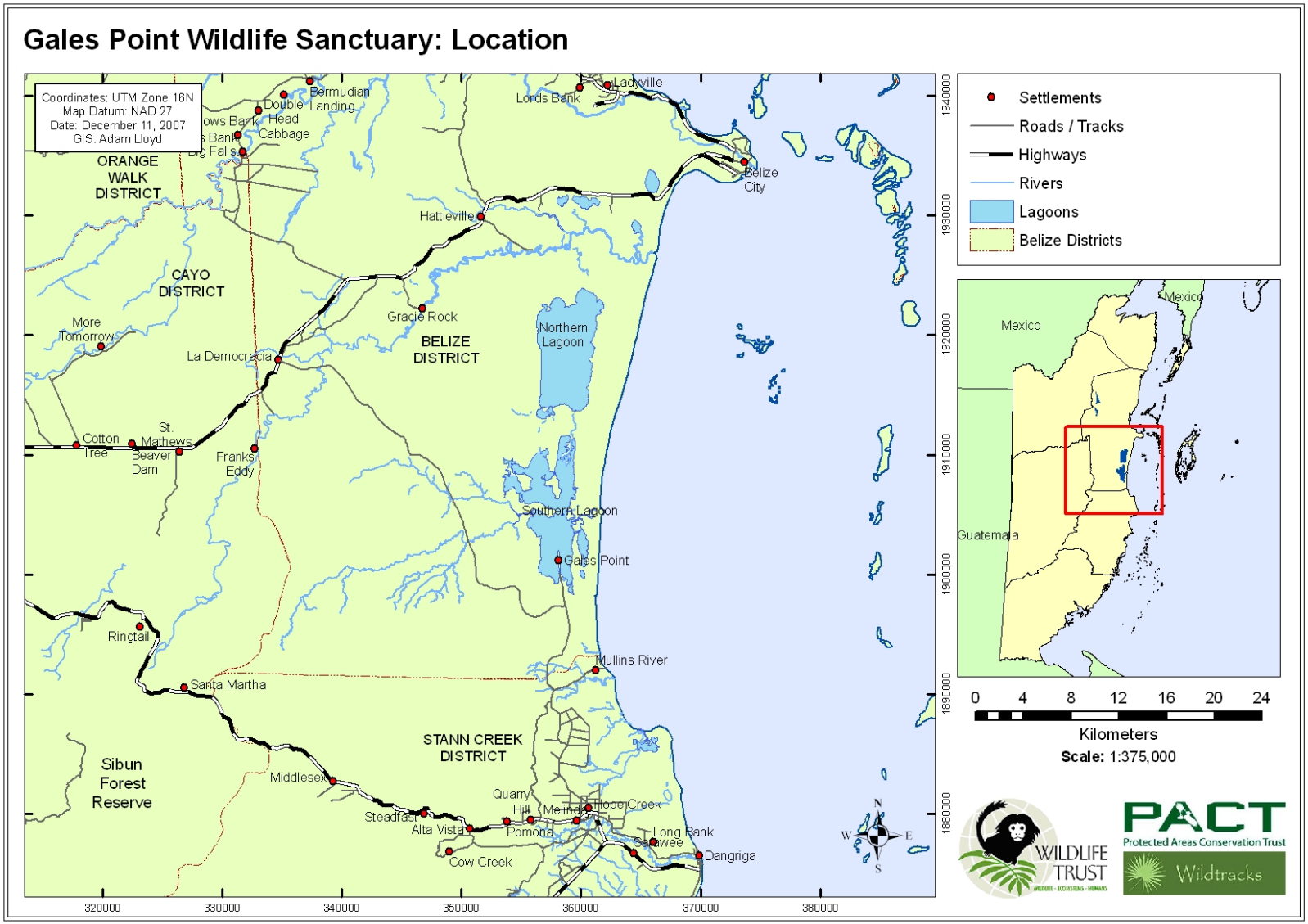
The Gales Point Wildlife Sanctuary includes Sapodilla Lagoon, Western Lagoon, Southern Lagoon, and the Quashie Trap Lagoon (including the Bar River and the Quashie Trap tributary). It also includes a portion of the Manatee River, from its estuary upriver for an approximate distance of 2,286 metres, and including 1,287m of Cornhouse Creek up river from its confluence with the Manatee River (SI 92 of 1998). Also included is the 66' shoreline along all the lagoons and waterways within the Wildlife Sanctuary, with the exception of the shoreline of the Gales Point peninsula.

The Wildlife Sanctuary is situated in the Belize District, the most developed of the six districts of Belize, approximately 30 km south-south west of Belize City (the largest population centre in Belize, with a population estimated at 59,400. (CSO, 2004)), and 34km north of Dangriga (the district capital of Stann Creek, with a population estimated at 10,400 (CSO, 2004)). Centered on one of two connected large lagoons on the central coastal plain, Gales Point Wildlife Sanctuary covers a complex matrix of brackish lagoons, creeks and mangrove mudflats. With rivers and creeks draining into the lagoon from the west, water then flows to the east, the lagoon being connected to the Caribbean Sea through Bar River, a channel that cuts through the coastal bar of the east coast of Belize (Map 1, Map 2). Private land lines the majority of the shorelines of the lagoons and coast, except in the north west, where the Manatee Forest Reserve abuts the Wildlife Sanctuary.

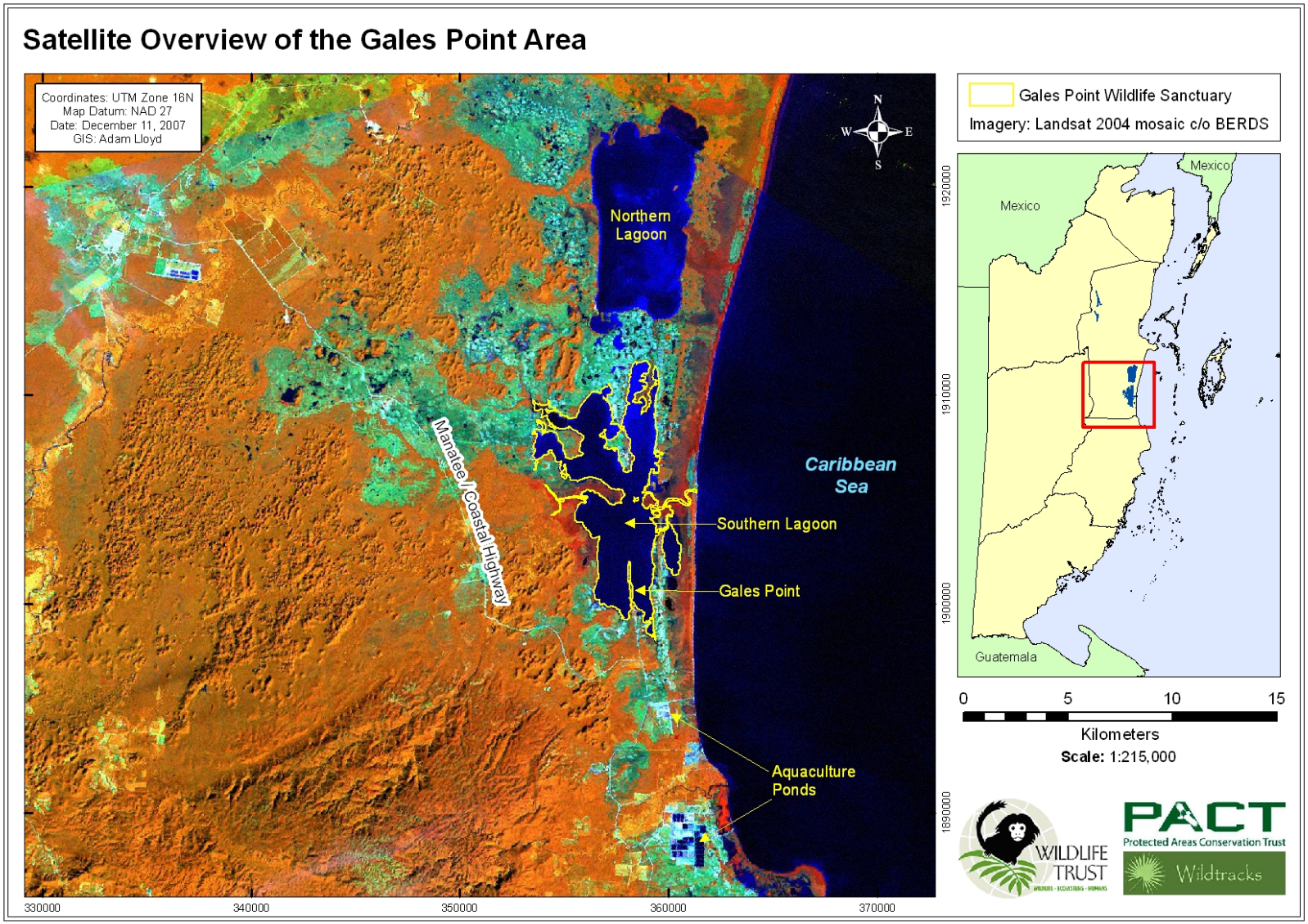
The primary stakeholder community is Gales Point, with a population estimated at approximately 250 (Wildtracks survey data, 2007), consisting of households lined along a narrow peninsular that juts northwards into the lagoon system. This very traditional community is heavily reliant on the natural resources of the Wildlife Sanctuary and adjacent areas. Other communities that also impact the area include Freetown Sibun, Belize City to the north, Dangriga, to the south – and even coastal communities of Honduras, primarily through fishing activities on the coastline by Bar Mouth.

The co-management body, the Gales Point Wildlife Sanctuary Commuinty Management Committee, is only in the provisional stages of taking on a co-management role, and therefore currently lacksinfrastructure associated with protected area management.

Access to the protected area is by road to the Gales Point peninsula - Gales Point is located on a side road leading from the Coastal Road, an unpaved short-cut between the Western Highway and Dangriga. Boat access is also possible through the Burdon Canal from Belize City, and from Dangriga, though no structured service exists.



Map 1: Location of Gales Point Wildlife Sanctuary



Map 2: Satellite Overview of the Gales Point area

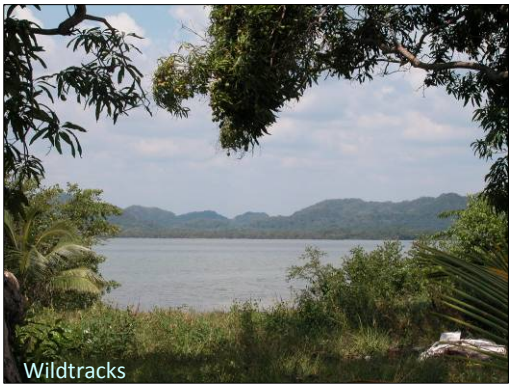
2.2 Regional Context

Gales Point Wildlife Sanctuary lies on the coastal plain of Belize, on the Atlantic coast of Mesoamerica. This region is highlighted as a world 'hotspot for species diversity' (Conservation International, 2003), and considered critical for the preservation of the biodiversity of the Western Hemisphere. Here, the Nearctic bioregions of North America converge with the Neotropical bioregions of South America, and, in Belize in particular, also with the Greater Antillean bioregion of the Caribbean. Each of these three bring a unique assemblage of plants and animals which has resulted in a particularly rich biodiversity, with components of all three regions being represented within the Central American land bridge – with 8% of the world's known plant species, and 10% of its vertebrates. The bridge has also enabled movement of species between the North and South American regions since the late Pliocene, and is still of vital importance today to migratory bird species, both as a corridor and as an over-wintering location.

Gales Point Wildlife Sanctuary, as part of the Central American 'hotspot', contributes towards the conservation of brackish lagoons and estuarine systems on the Atlantic coast of Mesoamerica, and is also a step towards fulfilling Belize's international commitments under the **Convention on Biological Diversity**, signed in 1992 (Table 1).

Table 1: International Conventions and Agreements of Relevance to Gales Point Wildlife Sanctuary

Convention on Biological Diversity (Rio de Janeiro, 1992) Ratified in 1993	To conserve biological diversity to promote the sustainable use of its components, and encourage equitable sharing of benefits arising from the utilization of natural resources. ***Gales Point Wildlife Sanctuary provides an important and integral part in the national protected areas system, protecting biodiversity and threatened species, as per Belize's commitment under the CBD.***
Alliance for the Sustainable Development of Central America (ALIDES) (1994)	Regional alliance supporting sustainable development initiatives. ***Wildlife Trust initiatives within Gales Point, the primary stakeholder community of the Wildlife Sanctuary are targeted for facilitation of sustainable economic and environmental development***
Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena de Indias, Colombia, 1983)	Regional convention with the objective of protecting the marine environment of the Wider Caribbean through promoting sustainable development and preventing pollution. ***Gales Point Wildlife Sanctuary provides an important and integral part in the national protected areas system, protecting brackish and marine biodiversity and threatened species, as per Belize's commitment under this Convention.***
International Convention for the Protection and Conservation of Sea Turtles for the Western Hemisphere (December 21st, 1997)	To protected and conserve sea turtle species of the Western Hemisphere. ***Whilst Gales Point Wildlife Sanctuary itself does not provide significant protection for sea turtles, the associated nesting beach is considered regionally and globally important for the conservation of hawksbill and is also used by both loggerhead and green turtles.***



Photograph 1: Southern Lagoon

Southern Lagoon (Photograph 1), with its associated coastal wetlands, lagoons, seagrass beds and mangroves, lies within the **Mesoamerican Caribbean Reef** ecoregion (WWF 200 Ecoregion #235, under the WWF 200 Ecoregion Programme). This ecoregion, stretching from the northern tip of the Yucatan Peninsula in Mexico to the Bay Islands in Honduras, provides critical habitat for many threatened species, including the Antillean manatee (*Trichechus manatus manatus*), and the critically endangered goliath grouper (*Epinephelus itajara*), Central American river turtle (*Dermatemys mawii*) and hawksbill turtle (*Eretmochelys imbricata*).

Whilst not within the footprint of the Wildlife Sanctuary, the Gales Point community is also contributing towards fulfillment of the **International Convention for the Protection and Conservation of Sea Turtles for the Western Hemisphere**, signed in 1997, through its actions to protect the Manatee turtle nesting beach, considered of regional importance for the viability of hawksbill turtle populations.

The major focus of the Gales Point Wildlife Sanctuary Community Management Committee is to ensure the environmental and economic sustainability of the primary stakeholder community, with respect to traditional use of the natural resources, contributing towards the fulfillment of a number of the goals of the regional alliance, ALIDES.

2.3 National Context

2.3.1 Legal and Policy Framework

The Southern Lagoon was designated in 1998 as the Gales Point (West Indian Manatee) Wildlife Sanctuary (SI 92 of 1998) under the National Parks System Act (1981) following recognition of its importance for the Antillean, or West Indian, manatee (*Trichechus manatus*) during planning for the Manatee Special Development Area..

The Wildlife Sanctuary is one of five distinct categories of protected areas under the National Parks System Act of 1981, each of which is protected by restrictions strictly defined by law. The Wildlife Sanctuary designation is for the protection of nationally significant species, biotic communities or physical features, and allows for research, tourism and education but no extractive activities.

The national objectives for conservation revolve around the protection, conservation and rational use of Belize's natural resources within the context of sustainable human development. These goals are supported by the **National Strategy on Biodiversity,** through the National Biodiversity Strategy and Action Plan (Jacobs and Castaneda, 1998), and mor recently, the **National Protected Areas Policy and System Plan** (NPAPSP, 2005), fulfilling two of Belize's commitments following the signing of the Convention on Biological Diversity in 1992 (later ratified by Belize in 1995). The overall goal of these two initiatives reflects the national objectives - ecological and economic sustainability over the long term, and recognizes the need to build both human and institutional capacity to effectively manage the biodiversity resources within Belize. There are also moves towards decentralization of the management of these resources, with a strong focus on co-management partnerships such as that being sought by the Gales Point Wildlife Sanctuary Community Management Committee, and on community-based participation

and equitable benefit from conservation efforts, a major objective of the community co-management partner.

Gales Point Wildlife Sanctuary falls under the Forest Department of the Ministry of Natural Resources and the Environment, and management is guided by the National Protected Areas Policy and System Plan (though limited resources currently prevent effective management).

National Legislation Protecting Fauna, Flora, and National Heritage

The Forest Act (1990)
Promotes the forestry industry, with the implementation of conservation techniques

The Wildlife Protection Act (1981)
"to provide for the conservation, restoration and development of wildlife, for the regulation of its use and for all other matters connected therewith"

Environmental Protection Act (1992)
"to promote the preservation and improvement of the environment, the rational use of natural resources, the control of pollution, and matters connected therein"

The National Parks Systems Act (1981)
Empowers government to create or maintain a "national system" of protected areas.

The Fisheries Act (1980)
Provides regulation of the fishing industry, and is directly concerned with maintaining sustainable fish stocks and protecting the marine and freshwater environments.

The Ancient Monuments and Antiquities Act (1971)
Enables the Minister responsible for Archaeology to designate land as an Archaeological Reserve to protect Ancient Monuments

National Lands Act (1992)
Provides legislation for protecting the 66' reserve along river edges, and allows GoB permission to access minerals etc.

Also contributing to the conservation framework of Belize is a number of laws designed to protect wildlife and national heritage within Belize. Administered under the Forest Department are the Forest Act (1990), Wildlife Protection Act (1981), and the National Parks System Act (1981). These three focus on the protection of the environment and natural resources.

The Environmental Protection Act (1992) was developed under the Department of the Environment, a department of the Ministry of Natural Resources and the Environment, with the aim of ensuring that development initiatives within Belize are planned for minimum environmental impact – in the context of Southern Lagoon, this is particularly important when ensuring that the impacts from development taking place on the shoreline and river banks are minimised.

Under the Ministry of Natural Resources, the Wildlife Protection Act provides protection for terrestrial wildlife and a number of marine species, including the West Indian Manatee, with the regulation of hunting and commercial extraction. The Protection of Mangroves regulations (1989) provides for the protection of mangroves, with restrictions on mangrove alteration and/or clearance without permission. This is an important legislative tool for the protection of this environmental resource, critical as juvenile fish habitat, and in its role in protecting against flooding and buffering against storm events.

The Fisheries Act of 1980, administered under the Fisheries Dept, is the principal governing legislation to regulate the fishing industry, and is directly concerned with maintaining sustainable fish stocks and protecting the marine, brackish and freshwater environments, an important resource for the traditional fishermen of the community. It also provides protection for nesting turtles and nest sites, including the Manatee Beach, which lies outside the protected area itself, but is considered an important annex, with protective management implemented by the Gales Point community, in collaboration with Fisheries Department. Marine turtles themselves have been given protection since the original Fisheries Ordinance in 1940.

Archaeological sites, including artifacts found within caves, are protected under the Ancient Monuments and Antiquities Act of 1971.

Whilst the above are the legislative Acts most relevant to the Gales Point Wildlife Sanctuary, there are others - such as the Mines and Minerals Act (1989) and the Petroleum Act (1991), which regulate the exploration and extraction of all non-renewable resources, governing natural resources other than wildlife. These Acts regulate activities including dredging and prospecting, which have been highlighted as potential threats to the Wildlife Sanctuary.

The Wildlife Sanctuary designation allows for education, tourism and research activities, though traditional fishing by the Gales Point community, whilst illegal under this designation, is continuing within the Southern Lagoon system. It is hoped that, with the development of a Sustainable Fisheries Plan, incorporating zoning, a sound baseline and rigorous monitoring in the future to inform management actions, that traditional fishing can continue within the Wildlife Sanctuary.

The Government has developed a funding mechanism to assist in management and development activities within protected areas – the Protected Areas Conservation Trust (PACT), through a 'conservation tax' of Bz$7.50 levied on non-residents as they leave the country. Protected Area managers can apply for funding from this trust, towards management of the protected areas.

2.3.2 Land and Sea Tenure

The Gales Point Wildlife Sanctuary is national land, designated as a protected area. Any mining, including beach sand mining or dredging activities, requires permission from the Forest Department and a license from the Geology & Petroleum Department, providing the Gales Point Wildlife Sanctuary Community Management Committee with forewarning of imminent impacts from such activities. Fishermen from Gales Point have fished the lagoon system for many years, and consider that they have informal, traditional rights to the fishing grounds in the area.

Land adjacent to the Wildlife Sanctuary is primarily in private ownership, though the legislated Statutary Instrument (SI 92 of 1998) does state that the protected area includes:

> *… a sixty-six (66) feet strip from the high water mark all along the shoreline of the aforementioned lagoons but excluding Gales Point Peninsula.*

2.3.3 Evaluation of Protected Area

Conservation Value

From a conservation standpoint, the Gale's Point Wildlife Sanctuary's primary importance within Belize's protected areas system lies in the protection of the West Indian Manatee (*Trichechus manatus*), a species listed as 'vulnerable' (IUCN, 2006), which congregates within the lagoon system. An ongoing long-term research project by Wildlife Trust is studying the West Indian Manatee population within this lagoon system, the prime objective being to determine the ranging patterns and conservation status of this species, and ways in which this knowledge can be utilized to enable the manatee to be used as an ecotourism resource by the Gales Point community whilst minimizing impact on their behaviour.

A second focal point of conservation interest lies to the east, outside the Wildlife Sanctuary, on the sand bar facing the Caribbean Sea. Originally identified as one of the most important nesting beaches within the Western Caribbean, the 'critically endangered' hawksbill turtles (*Eretmochelys imbricata*) return here each year to nest.Two other species of conservation importance have been recorded within the protected area. Both the goliath grouper (*Epinephelus itajara*), and the regionally endemic Central American river turtle (*Dermatemys mawii*) are considered 'critically endangered' (IUCN, 2006).

The biodiversity assessment of the Southern Lagoon area (Annex 1) confirmed a representative mammal and bird population, though depressed by heavy hunting pressure. Data collection during the assessment demonstrated the presence of twenty-six species of international concern (IUCN, 2007) within the Wildlife Sanctuary itself (including the 66' vegetation on the water frontage) - three of these are considered critically endangered, six are endangered, six are classed as vulnerable, and twelve are lower risk / near threatened (though three of these require further confirmation of their presences) Four further species are considered at risk, but with insufficient information available to give an accurate idea of their population status (Table 2). Also recorded within the area is the regionally vulnerable sub-species of the Central American spider monkey (*Ateles geoffroyi yucatanensis*). The Smalltooth sawfish (*Pristis pectinata)* was once common within the lagoon system, but is now thought to be locally extinct *(Graham, 2007).*

Implementation of management plan activities for the Gales Point Wildlife Sanctuary will provide direct protection for eleven of these internationally important species, once enforcement is in place (Table 3).

Sixteen species of concern, including the jaguar and a number of game species, are present within the terrestrial portion of the Southern Lagoon watershed, but with its limited terrestrial extent, the protected area itself is not considered to be critical for their continued viability. Increased conservation awareness in the Gales Point community, implementation of alternative livelihood options, and actions focused on maintaining broadleaf forest connectivity in the Gales Point / Manatee area should increase the viability of these species.

Local species of concern identified under the National Protected Areas Policy and System Plan include the waterbirds that frequent the Wildlife Sanctuary, both for nesting and for feeding – the great blue heron (*Ardea herodias*), roseate spoonbill (*Ajaia ajaja*), white ibis (*Eudocimus albus)*, reddish egret (*Egretta rufescens*) of the lagoons, and the more secretive agami heron (*Agamia agami*) and muscovy duck (*Cairina moschata*) of the rivers and creeks (Meerman, 2005).

Table 2: Distribution of degree of legal protection for Species of Concern within the Southern Lagoon Area		
Within the Gale's Point Wildlife Sanctuary	***Critically Endangered***	Hawksbill Turtle
		Goliath Grouper
		Central American River Turtle
	Vulnerable	West Indian Manatee
		American Crocodile
		Cubera Snapper
	Lower Risk / Near Threatened	Morelet's Crocodile
		Southern Stingray
		Cownosed Ray
		Lemon Shark *
	CITES Appendix I	Neotropical River Otter
Present in the riverine forest adjoining the Wildlife Sanctuary (but not directly protected unless within 66' of the water's edge)	***Endangered***	Yucatan Howler
		Baird's Tapir
	Lower Risk / Near Threatened	Water Opossum*
Present within the general Southern Lagoon area, but outside protected area	***Endangered***	Yellow-headed Parrot
		Yaxnik; Fiddlewood
	Vulnerable	Spanish Cedar
		Large-leaved Mahogany
	Lower Risk / Near Threatened	Jaguar
		Puma
		Great Curassow
		Mexican Giant Musk Turtle
		Common Slider
		Narrow-bridged Musk Turtle
		Tabasco Mud Turtle
		Cycad, Palmita
	CITES Appendix I	Jaguarundi
		Ocelot
		Margay
		Jabiru

Environmental Services of the Protected Areas

As well as the specific values of the protected area for protection of biodiversity, the riparian and estuarine ecosystems present in the Gales Point Wildlife Sanctuary also provide various ecosystem services (Table 3)

Table 3: Ecosystem Services of Gales Point Wildlife Sanctuary	
Regulation	Regulation of water flow and flooding , providing a sink area for floodwaters
	Mangroves lining Southern Lagoon play an important role in the reduction of beach erosion
	The coastal bar and shallow lagoon system provide protection against storm surges associated with hurricanes and tropical storms, ameliorating the strength of rising storm waters
	Mangrove inundation areas, seagrass beds and the shallow lagoon system provide filtration and settlement of sediment load from rivers and creeks, reducing sediment load of water reaching the coral reef
Recruitment	The mangrove roots of the Southern Lagoon system play an important role in protection of fish resources, especially as a nursery area for many commercial fish species
	Basin mangrove and mangrove cayes provide nesting habitat for several colony nesting bird species, the majority being identified as species of national concern
Cultural	The area is an important resource for tourism and recreation
	The pristine natural scenic values are important for aesthetic appreciation by the Gales Point community, Belizean visitors and intenational tourists
Support	The riparian and mangrove forests in the 66' adjacent to the lagoon system, and the seagrass of the lagoon itself play an important role in the cycling of nutrients
	The river and estuarine systems, and the riparian and mangrove forests within the Southern Lagoon area provide habitats necessary for different life stages of commercial and non-commercial species

Benefit to local communities

The Gales Point community has always been strongly tied to the natural resources, with a high dependency on fishing and hunting. The Gales Point Wildlife Sanctuary, whilst designated for its conservation value, has been an important natural resource for the community from the time they settled in the area. Quamina Creek, feeding into the lagoon system from the south, has traditionally been the freshwater source for Gales Point, and the fish stocks are considered one of the most important food resources.

A recent survey (Community Development Plan, Walker and Walker, 2007) assessed sources of income for the community, identifying fishing as the primary source for 21% of resident households, with 100% of households considering the ability to eat locally caught fish to be important to quality of life. However, survey results also showed that the general consensus among local fishermen of Gales Point is that the fish resources have declined significantly over the last five to ten years, reducing effective income from this resource.

More recently, there has been a shift towards the establishment of a tourism base, which relies heavily on the health of the natural resources, with the West Indian manatee as the prime focus. This has led to a wish to ensure the long-term protection of the Wildlife Sanctuary, putting in place the necessary infrastructure for sustainability, and developing and implementing conservation goals and actions that contribute to the long-term protection of the lagoon system.

Tourism potential for community development also relies on continued access to the many caves, broadleaf forests, and to the relatively undisturbed waters of the creeks and rivers that drain into the lagoon system, focusing attention on the need to also protect the adjacent watershed.

Mangrove and Riparian Buffer Vegetation

The Southern Lagoon system of Gales Point Wildlife Sanctuary lies in the Central Coastal Plain, draining from the karstic hills to the west, and flowing to the east into the Caribbean Sea. The mangroves of the shallow lagoon system and adjacent coastal mangrove savannas provide an important filtration mechanism for water draining from the mainland, allowing settling of sediment load before the water empties into the Caribbean Sea. This maintains the natural processes of sedimentation, allows agricultural chemicals to settle out, and minimizes the associated impacts of these on the reef. The red mangrove roots also provide shelter and protection for juvenile populations of a number of important commercial fish species, ensuring continued resources for both traditional fishing by the Gales Point community, and by communities further south along the coastline.

The Gales Point Wildlife Sanctuary includes not only Sapodilla, Western, Southern, and Quashie Trap Lagoons, but also includes a portion of both the Manatee River and Cornhouse Creek (SI 92 of 1998). The inclusion of the 66' shoreline within the Wildlife Sanctuary is of significant importance to the maintenance of water quality within the system – and should therefore be maintained in pristine condition, both on the lagoon shoreline and the banks of the rivers and creeks, though currently there is no enforcement to prevent land clearance.

Connectivity

In terms of connectivity in the maintenance of biodiversity, there are several considerations regarding the role of the Gales Point Wildlife Sanctuary and Manatee Forest Reserve area:

- The Gales Point Wildlife Sanctuary provides direct aquatic connectivity between the marine coastal environment and the brackish lagoon systems (via the Bar River), and from there to a number of freshwater drainages. This connectivity is critical not only to the resident manatee population, but also to the maintenance of viable populations of many of the brackish fish species – including several of great economic importance to the Gales Point Community.

- The 2005 dereservation of approximately 13,000 acres of the Manatee Forest Reserve has significantly reduced watershed integrity and biological connectivity between the Gales Point Wildlife Sanctuary and the broadleaf forest karst hills to the west.

- With this dereservation, protected riparian vegetation connectivity has been lost for the Central American River Turtle (critically endangered), the Yucatan Black Howler Monkey (endangered), the Central American Spider Monkey (vulnerable) and, to a lesser extent, the Baird's Tapir (endangered). Limited and tenuous terrestrial connectivity remains northwest of Western Lagoon, across the savannas north of the Ben Lomond area.

- Via this remaining narrow northern linkage of the Manatee Forest Reserve, limited biological connectivity remains between Gales Point Wildlife Sanctuary, the broadleaf forested karst hills to the west, and with the Peccary Hills National Park and the private Runaway Creek Nature Preserve to the northwest - and from there into the national biological corridor system.

- Terrestrial connectivity still remains along the riverbanks outside the protected area, within the 66 foot reserve. Community lobbying may be able to continue protection through developing collaborative agreements with landowners

2.3.4 Socio-Economic Context

National: Belize is a country of many ethnic cultures, with Mestizo, Creole, Maya and Garifuna being the major population groups (Figure 1). The original Maya occupants are subdivided into three ethnic groups – the Yucatec Maya of the north, the Mopan Maya of the west and south, and the Ketchi of the southern regions. Belize has a low population currently estimated at approximately 294,380, (CIA, 2007). Population densities are low, with 10 persons per sq. km., concentrated mostly within the coastal plain, Belize River Valley and Stann Creek Valley, with much of the remaining country being less suited to human habitation, with waterlogged soils in the coastal plains and steep terrain in the Maya Mountains.

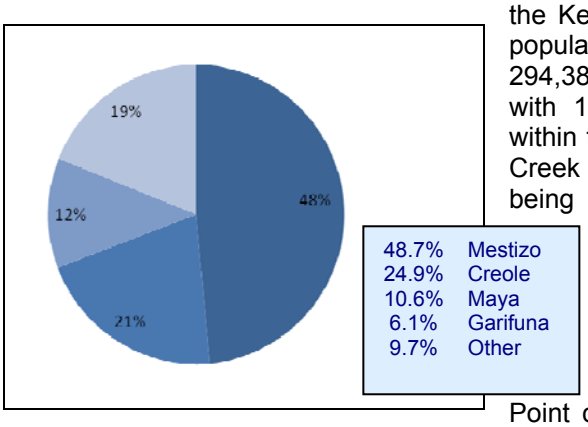


Figure 1: Ethnic Groups of Belize

There is an ongoing emigration of Belizeans to the United States – particularly from Gales Point community, where there is a strong family link with Belizean communities in the USA. There is also a significant influx of Central American refugees – primarily from Guatemala and Honduras - contributing approximately 13% towards the total population of Belize and resulting in the relatively high population growth rate of 2.3%. At the present rate of immigration, it has been calculated that the population of Belize will double in twenty-six years, with much of this immigrant sector tending to be rural-based with low levels of education, placing far greater stress on the natural resources than currently exists.

Belize's current primary export is crude petroleum, from the new oil reserves being tapped (Table 4). This new source of income now exceeds the traditional exports of Belize, which have been based largely on agriculture, - sugar, citrus and bananas. The economy of coastal communities in Belize has been closely linked with the coral reef, with lobster, conch, finfish and shrimp providing income generation. Whilst these four fisheries products contribute significantly to the

Major Exports		
	2006 Bz$ million	2007 Bz$ million
Marine Products	86.02	42.16
Sugar	100.07	88.14
Citrus Concentrate	108.99	117.44
Bananas	50.59	41.46
Garments	36.59	18.79
Papayas	31.01	26.07
Crude Petroleum	88.56	142.62
Other	34.58	31.20
Total	536.41	507.88
		CSO (2008)

Table 4: Major Exports of Belize

national economy, Gales Point, identified as the primary stakeholder of the Wildlife Sanctuary, has, maintained its traditional local fisheries connected to the Southern Lagoon system, and not diversified into the more lucrative reef-based fishing industry.

There is also an increasing national reliance on the developing tourism in dustry and associated services (Table 5), one of the fastest growing sectors in Belize, and rapidly becoming the major foreign exchange earner, with over 255,760 overnight visitors in 2007 (BTB, 2007). The majority of visitors to Gales Point are fly fishermen and student groups, staying in the community for a few days at a time. The current poor accessibility, with buses limited to twice a week, does not assist in attracting tourism to the community.

The Belize GDP and Labour Force		
	GDP Composition by Sector (%) (2007 est.)	Labour Force (Occupation) (%) (2005 est.)
Agriculture	21.3%	22.5%
Industry	13.7%	15.2%
Services	65%	62.3%
		CIA (2007)

Table 5: The Belize Economy and Labour Force

Gales Point has been highlighted as the primary stakeholder of the protected area in a basic stakeholder analysis identifies other stakeholder interests and impacts (Table 6). A socio-economic assessment of Gales Point was completed in 2007 (Walker and Walker, 2007) and included socio-economic indicators, and as aspects such as local value of natural resources.

Table 6: Stakeholder Communities of Gales Point Wildlife Sanctuary

Community	Location (UTM) Distance (km)	Population (approx.)	Population components	Comments
Gales Point	358 194 E 1 900 677 N (surrounded by GPWS)	Approx. 250*	Creole	Only community to lie adjacent to the protected area, and considered the primary stakeholder. Traditional fishing, tourism associated with the natural resources
Dangriga	369 992 E 1 876 288 N (approx 26km SSE)	8,814**	Garifuna	District centre, located on the coast. A small number of tour operators and fishermen use Southern Lagoon
Belize City	373 925 E 1 934 333 N (approx 27km NNE)	59,400**	Multi-cultural	Main port and population centre. A small number of tour operators and fishermen use Southern Lagoon

*** Walker and Walker, 2007; ** CSO Census data, 2000; *** CSO, 2004**

Table 7: Stakeholder Analysis for Gales Point Wildlife Sanctuary				
Stakeholder	**Influence or Impact of Gales Point Wildlife Sanctuary on Stakeholder**		**Influence or Impact of Stakeholder on Gales Point Wildlife Sanctuary**	
Gales Point Community	• Protection of fish, West Indian Manatee and other natural resources within the protected area, under the Gales Point Wildlife Sanctuary Community Management Committee • Increased tourism potential and marketing ability • Potential exclusion from traditional fishing areas	+ + -	• Community interest in co-management of the Gales Point Wildlife Sanctuary, thorugh the Community Management Committee • Low level of cooperation with Gales Point Wildlife Sanctuary Community Management Committee • Fishing impacts within protected areas (including gill nets) • Reduction of sport fish species through local fishing activities • Poor sewage disposal leading to poor water quality near the community	+ - - - -
Tour Guides	• Benefit from having Gales Point Wildlife Sanctuary as a venue for natural resource associated tourism • Benefit from the wildlife of the waters and riparian vegetation of Manatee River (eg. Yucatan howler monkeys, green iguanas, crocodiles) • Benefit from the cultural heritage and musical background of Gales Point • Benefit from sport fishing resources in the lagoon system • Income generation from using Gales Point and the Gales Point Wildlife Sanctuary for tourism	+ + + + +	• Support the conservation goals of the Gales Point Wildlife Sanctuary • Provide interpretation for visitors, facilitating overall visitor appreciation • If well trained, assist with visitor management within the protected area • If poorly trained, can result in poor visitor management and increased impact on wildlife – disturbance of manatee, bird nesting colonies etc. • Poorly trained sport fishing guides may not release catch, reducing viability of sport fish species	+ + + - -
Tourism Initiatives based in Gales Point	• Benefit from having Gales Point Wildlife Sanctuary as a venue for natural resource associated tourism • Benefit from the wildlife of the waters and riparian vegetation of Manatee River (eg. Yucatan howler monkeys, green iguanas, crocodiles) • Benefit from the cultural heritage and musical background of Gales Point • Benefit from sport fishing resources in the lagoon system • Income generation from using Gales Point and the Gales Point Wildlife Sanctuary for tourism	+ + + + +	• Support the conservation goals of the Gales Point Wildlife Sanctuary • Provide interpretation for visitors, facilitating overall visitor appreciation • If well trained, assist with visitor management within the pa • If poorly trained, can result in poor visitor management and increased impact on wildlife – disturbance of manatee, bird nesting colonies etc. • Poorly trained sport fishing guides may not release catch, reducing viability of sport fish species • Potenial impacts from pesticide / herbicide use lodges? • Potenial impacts from nutrient runoff lodges?	+ + + - - - -
Local / National Tour Operators	• Benefit from having Gales Point Wildlife Sanctuary as a venue for natural resource associated tourism • Income generation from using Gales Point and the Gales Point Wildlife Sanctuary for tourism	+ +	• Provide marketing at a national level, and send visitors to Gales Point, increasing sustainability • Support the conservation goals of Gales Point Wildlife Sanctuary • Increase the potential for exceeding the carrying capacity of the protected area	+ + -
International Tour Operators	• Benefit from having Gales Point Wildlife Sanctuary as a venue for natural resource associated tourism – particularly student groups and sport fishing	+ +	• Provide marketing at an international level, and send visitors to the protected areas, increasing sustainability • Support the conservation goals of Gales Point Wildlife Sanctuary • Increase the potential for exceeding the carrying capacity of the protected area	+ +

Table 7: Stakeholder Analysis for Gales Point Wildlife Sanctuary (cont.)				
Stakeholder	**Influence or Impact of Gales Point Wildlife Sanctuary on Stakeholder**		**Influence or Impact of Stakeholder on Gales Point Wildlife Sanctuary**	
BTIA (& BTB?)	• Benefits from having Gales Point and Gales Point Wildlife Sanctuary as a tourism venue, attracting visitors to the area	+	• Potential to provide national and international marketing of Gales Point and Gales Point Wildlife Sanctuary • Support the conservation goals of Gales Point Wildlife Sanctuary	+ +
General Belize Public	• Maintenance of fish stocks (particularly goliath grouper) • Environmental services • Cultural and aesthetic appreciation • Increased awareness through education	+ + + +	• Support of the general public will strengthen the position of protected area • Lack of support may increase risk of dereservation	+ -
Visitors: Tourists	• Enjoy Gales Point Wildlife Sanctuary as a tourism destination • Benefit from education and awareness opportunities	+ +	• Potential for entrance fee contributing towards the goal of pa management sustainability • Provide marketing nationally and internationally by word of mouth, if happy with level of product • Presence deters fishing (and other illegal activities) within protected area • May negatively impact the environment and wildlife	+ + + -
Visitors: Researchers	• Benefit from being linked to Gales Point Wildlife Sanctuary • Benefit from information on past research activities within the protected area, including past work by Wildlife Trust • Benefit from access to a virtually pristine estuarine environment	+ + +	• GPWS benefits from data gathered, greater knowledge of aquatic and terrestrial environments and species, for informing management • Benefit from increased activity within area, assisting against illegal fishing activities • Possible impact of research activities on terrestrial / aquatic environments	+ + -
Government of Belize	• Gales Point Wildlife Sanctuary is included within the National Protected Areas System Plan • Assists in demonstrating Belize Government's commitment to the conservation of natural resources, CCAD and CBD • Provides employment opportunities in stakeholder communities • Environmental services • Provides fisheries management	+ + + + +	• Political support (currently being strengthened through the NPAPSP) • Uncertainty of long term future commitment	+ -

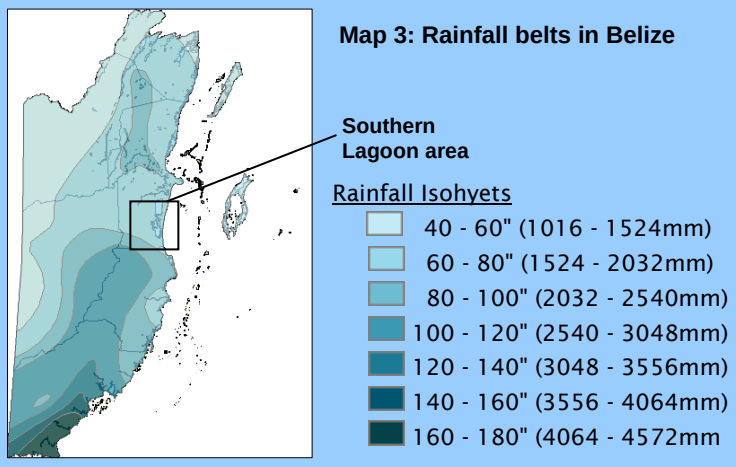
2.4 Physical Environment of Management Area

2.4.1 Climate

Belize lies within the outer tropical geographical belt – with the relatively high temperature and rainfall patterns associated with the tropics being one of the factors that promote and sustain the high levels of biodiversity within the region. Prevailing winds are easterly from the Caribbean.

Rainfall Patterns

The Gales point Wildlife Sanctuary is situated on the central coastal lowland, an area defined climatically as sub-tropical, with distinct wet and dry seasons. It lies within the second driest rainfall belt in Belize, with an average annual rainfall of 228cm per annum (National Meteorological Service, 2005; Map 3).



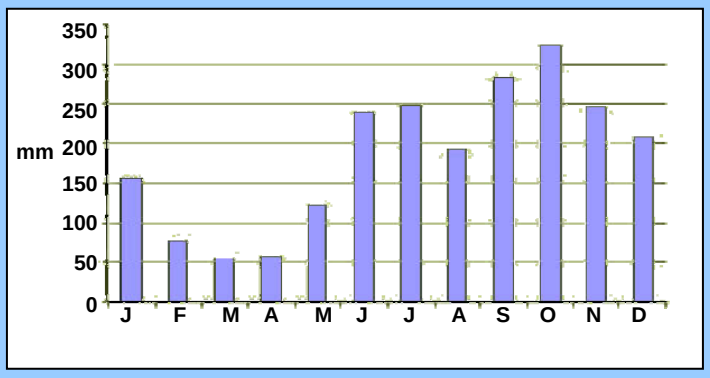


Figure 2: Rainfall (Dangriga)

Rainfall varies throughout the year, with the highest rainfall occurring between June and December, peaking in October, with an average of 323mm, during the tropical storm season. The dry season has minimum average rainfall levels of 55mm, recorded in March.

Data Sources: Map 3: BERDS
Graph 1: From King et. al., (1989). Based on National Meteorological data, Dangriga

There is a pronounced dry season stretching from February through to the end of May, with minimum monthly rainfall of as low as 55 mm in March, the driest month. The adjacent short grass savanna and associated pine stands of the watershed area become parched, and as a result are prone to extensive seasonal wildfires, started by hunters seeking to attract game to the ash and regenerating grass shoots.

The dry season is followed by a wetter season (June to December / January) with maximum monthly rainfalls in the region of 300mm, punctuated by a mini dry season in August. The majority of the rain falls within the hurricane season (June to November), associated with passing tropical storms (particularly between September and November), resulting in sheet flow on the pine savanna, draining into the lagoon and inundation of the low-lying coastal mangrove and pine savanna. The annual fluctuations in the salinity of the lagoon system are dependent on the interaction between the seasonality of the rainfall, and the daily tidal movements.

Temperature

Lying within the subtropics, annual temperatures in the coastal area of central Belize (including the Gales Point Wildlife Sanctuary) average approximately 26ºC, with fluctuations throughout the year. Minimum mean temperatures of 19.5ºC occur in January, during the cold fronts, whilst maximum mean temperatures of 31.8ºC are recorded in May (National Metereological Service, 2005) (Figure 3; Table 8).

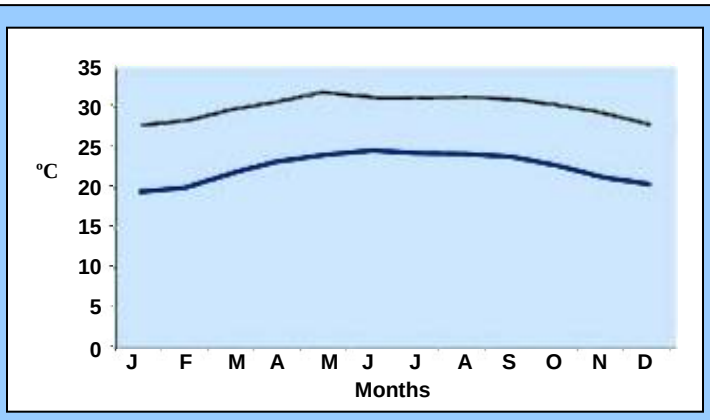


Figure 3; Table 8:

Temperature

Air temperature in the Southern Lagoon area fluctuates throughout the year, dependent on the prevailing winds.

Month	Mean Temperature °C		Mean Total Rainfall (mm)	Mean Number of Rain Days
	Daily Minimum	Daily Maximum		
Jan	19.5	27.6	137.9	11.8
Feb	20.1	28.3	72.6	7.4
Mar	21.8	29.5	59.2	4.9
Apr	23.1	30.7	51.7	3.9
May	24.2	31.8	104.6	6.1
Jun	24.7	31.3	257.6	14.1
Jul	24.3	31.1	243.5	16.3
Aug	24.2	31.3	186.9	15.9
Sep	23.9	31.0	286.5	15.9
Oct	22.7	30.2	254.6	15.4
Nov	21.3	29.1	182.8	12.6
Dec	20.4	28.0	175.6	11.9

Data Sources: Graph 2, Table 4: National Meteorological Service of Belize, 2005.

Weather Systems

Belize is affected by three very distinct seasonal weather systems - the Trade Winds (blowing from the east), tropical storms (occurring between June and November), and northers (occurring between October and April), all of which have an influence on the rainfall and temperature patterns.

Tropical Storms / Cyclones

Tropical storms form in the Atlantic Ocean over warm, tropical waters and are non-frontal, developing highly organized circulations. Ranging in scale from tropical depressions and storms (with sustained wind speeds of < 74 mph) to hurricanes (with sustained wind speed > 74 mph), these storms move westward towards the Caribbean, gathering strength until they hit land.

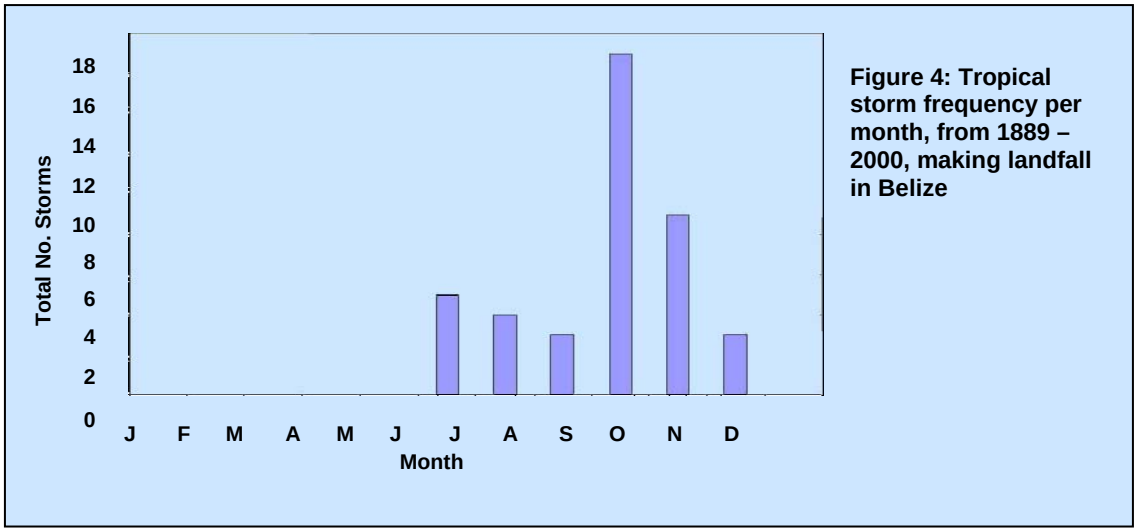


Figure 4: Tropical storm frequency per month, from 1889 – 2000, making landfall in Belize

Clearance of buffer vegetation from the creek and river margins for agriculture and tourism development removes the protective vegetation buffer, resulting in the heavy rainfalls associated with hurricanes, washing soil into the waterways - increasing sediment load in the creeks and rivers that flow into Southern Lagoon, whilst the strong storm waves during tropical storms alter the sediment distribution within the lagoon system.

The heavy rainfalls associated with these tropical storm events also cause increased river flow and a decrease of salinity within the lagoon system itself, resulting in changes in distribution of freshwater species such as the Central American river turtle (*Dermatemys mawii*), which is known to enter Western Lagoon at times of low salinity. Seagrass distribution has also been seen to vary with salinity, depletion of this resource during times of low salinity being thought to result in a lower manatee population within the lagoon system.

The Southern Lagoon area has been affected by a number of hurricanes in the recent past (Table 9) – with Hurricane Hattie in October 1961 being the most severe. This made landfall to the north east of the area, with hurricane force winds estimated at 150mph, and tides of 10 to 15 feet above normal, sweeping salt water many miles inland over the low coastal areas. Gales Point itself was protected from the worst of the storm surge by the coastal bar. Flooding only occurred in the lowest areas of the peninsula - though the strong winds caused the destruction of the majority of the houses.

Table 9: Hurricanes affecting the Southern Lagoon Area				
Year	**Hurricane**	**Speed at Landfall**	**Date of Landfall**	**Notes**
1961	**Hattie**	150mph	31/10/1961	Made landfall north east of the Gales Point area, with a tidal surge of between 10 and 15 ft on the coast, and inundation of the lower lying areas of the Gales Point peninsula.
1978	**Greta**	110mph	19/9/1978	Made landfall just north of Dangriga, approx. 20km south of the Southern Lagoon area, resulting in a tidal surge of between 4 and 10ft in coastal areas.
2000	**Keith**	69mph	03/10/2000	Made landfall far north of the Southern Lagoon area, but caused heavy rainfall resulting in substantial flooding of the coastal savanna
Data Source: National Hurricane Centre				

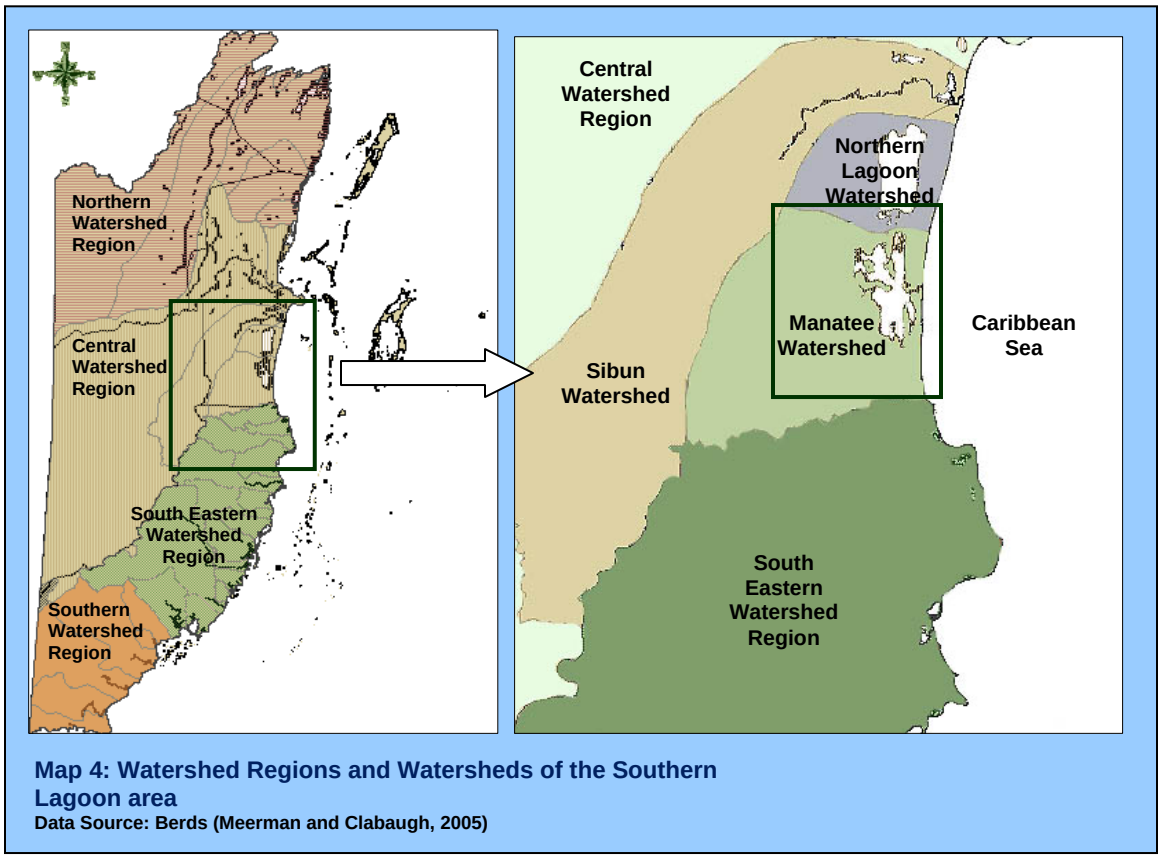
Hurricane Keith, in October 2000, also brought substantial flooding of the area as a result of the heavy rainfall associated with the storm.

Northers

Northers affect the country from October through to April (with the highest frequency in December, January and February). These cooler air masses move down from North America, bringing cooler temperatures and, on occasions, heavy rain and winds, drawing water out of the lagoon systems and dropping water level.

2.4.2 Hydrology

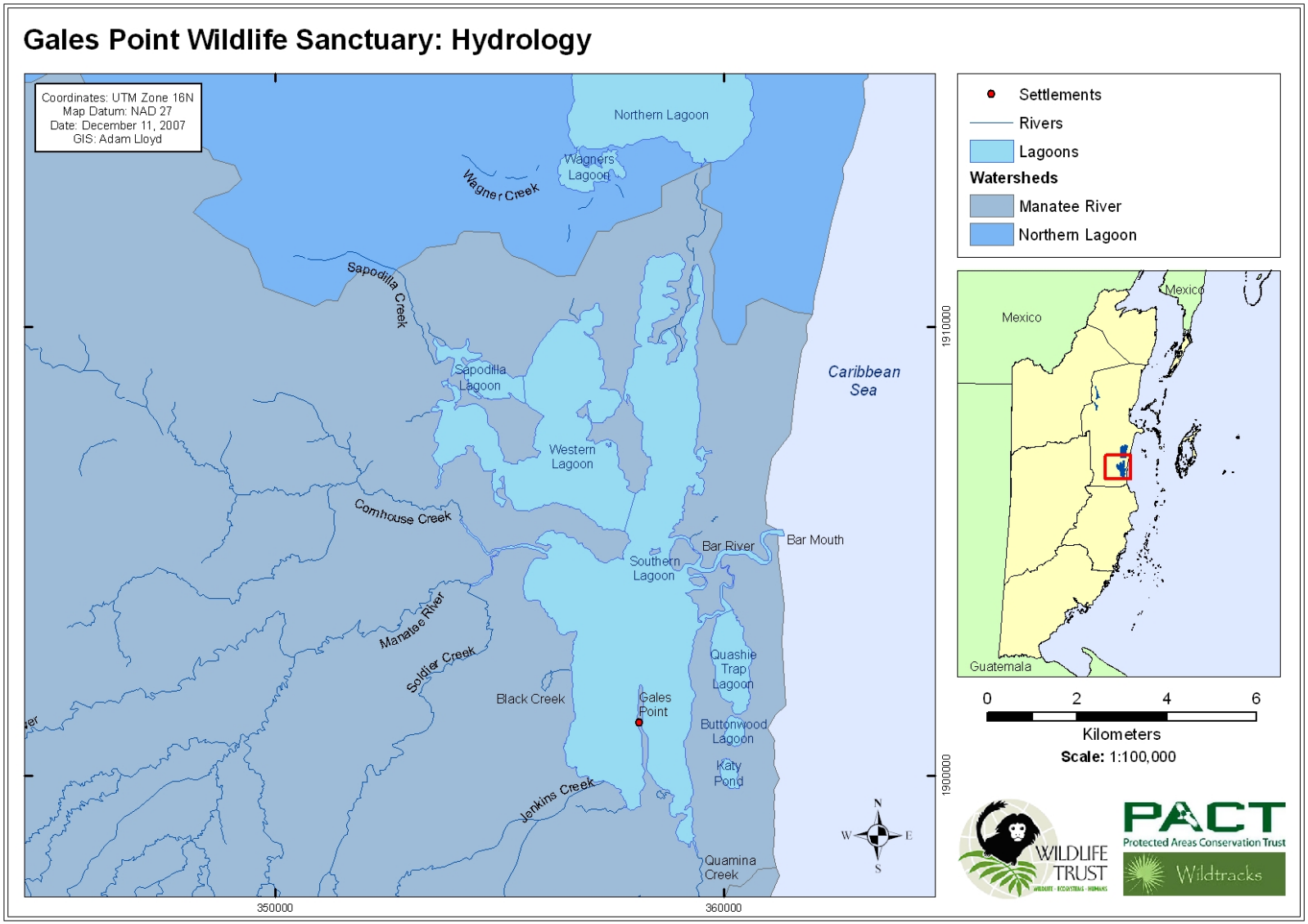
The Gales Point Wildlife Sanctuary is located within the Manatee Watershed, which lies in the Central Watershed Region, and covers approximately 125,400 acres, and (Map 4; BERDS, 2005). Water drains from the surrounding savannas and karst hill slopes into the rivers and creeks that feed into the system – Manatee River, Black, Cornhouse, Sapodilla, Soldier, Jenkins and Quamina Creeks (Map 5). Water then flows from the lagoon out to the Caribbean Sea through Bar River, and out to Northern Lagoon through Main Creek.



Map 4: Watershed Regions and Watersheds of the Southern Lagoon area
Data Source: Berds (Meerman and Clabaugh, 2005)

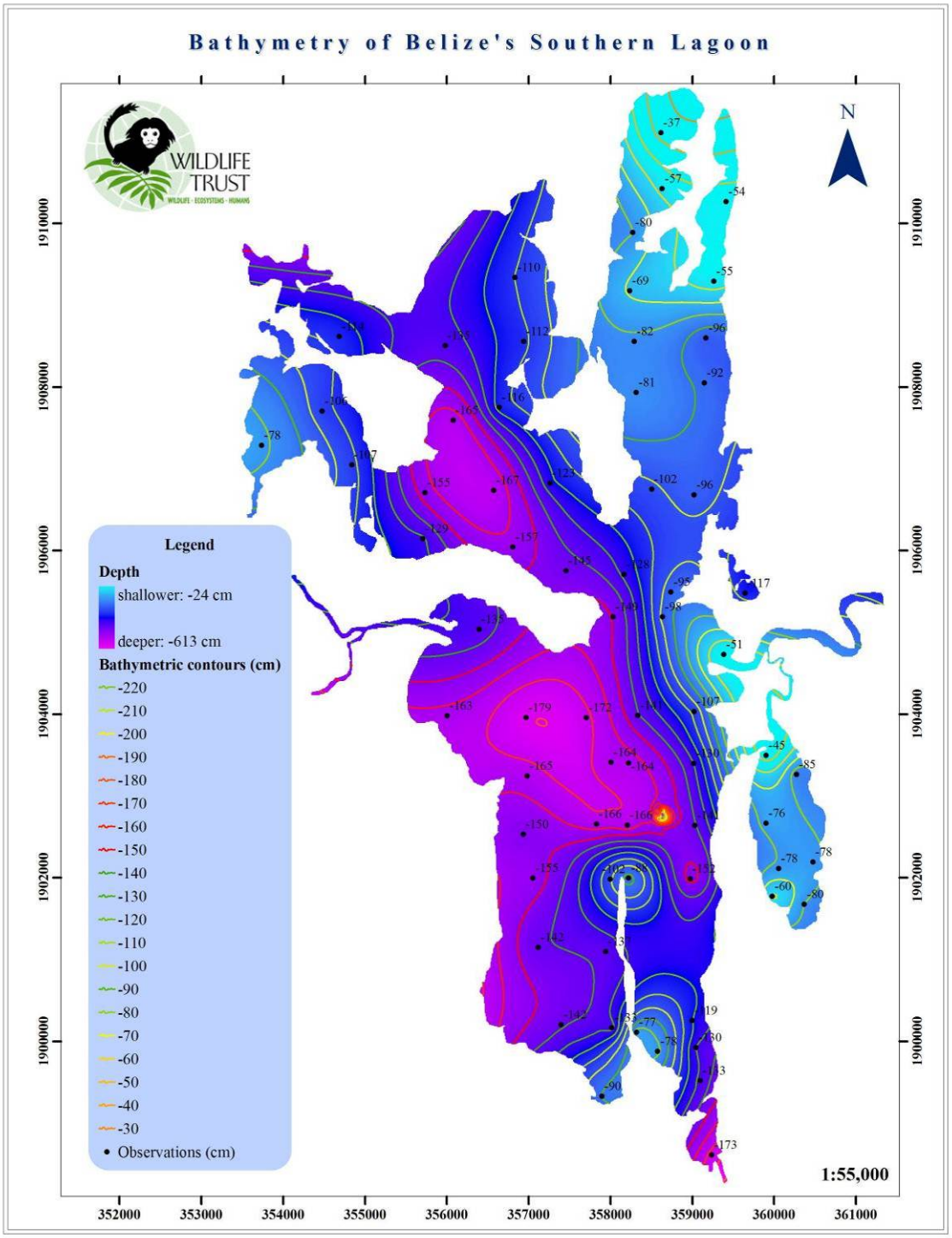
Direction of water flow through Main Creek and Bar River changes depending on the tides, whilst water level within the lagoon system, primarily influenced by tidal patterns (with a variation of between 6 and 10 inches), is also affected by changing wind directions. As with many of the coastal lagoons in Belize, the average water level drops with the strong north winds that blow from November to April, and increases later in the year with the strong easterly trade winds. Salinity within the lagoon system is moderated by the freshwater flowing into the system, and is highly variable throughout the system, being impacted by surface run off and the reversal of several of the creeks with the tides. It also varies seasonally as rainfall and temperature fluctuate throughout the year.

The convoluted nature of the shoreline of Southern Lagoon has led to the naming of bays and bights within the system – Western Lagoon, Sapodilla Lagoon, and Southern Lagoon all being within the main water body of Gales Point Wildlife Sanctuary, whilst Quashie Trap Lagoon, Buttonwood Lagoon and Katy Pond lie to the east, separated from the main lagoon by an old coastal bar, and from the sea by the most recent beach deposits. These three smaller lagoons are linked north to south to each other, and flow northwards out through Quashie Trap Lagoon and tributary into Bar River to the north and Southern Lagoon to the west (Map 7).



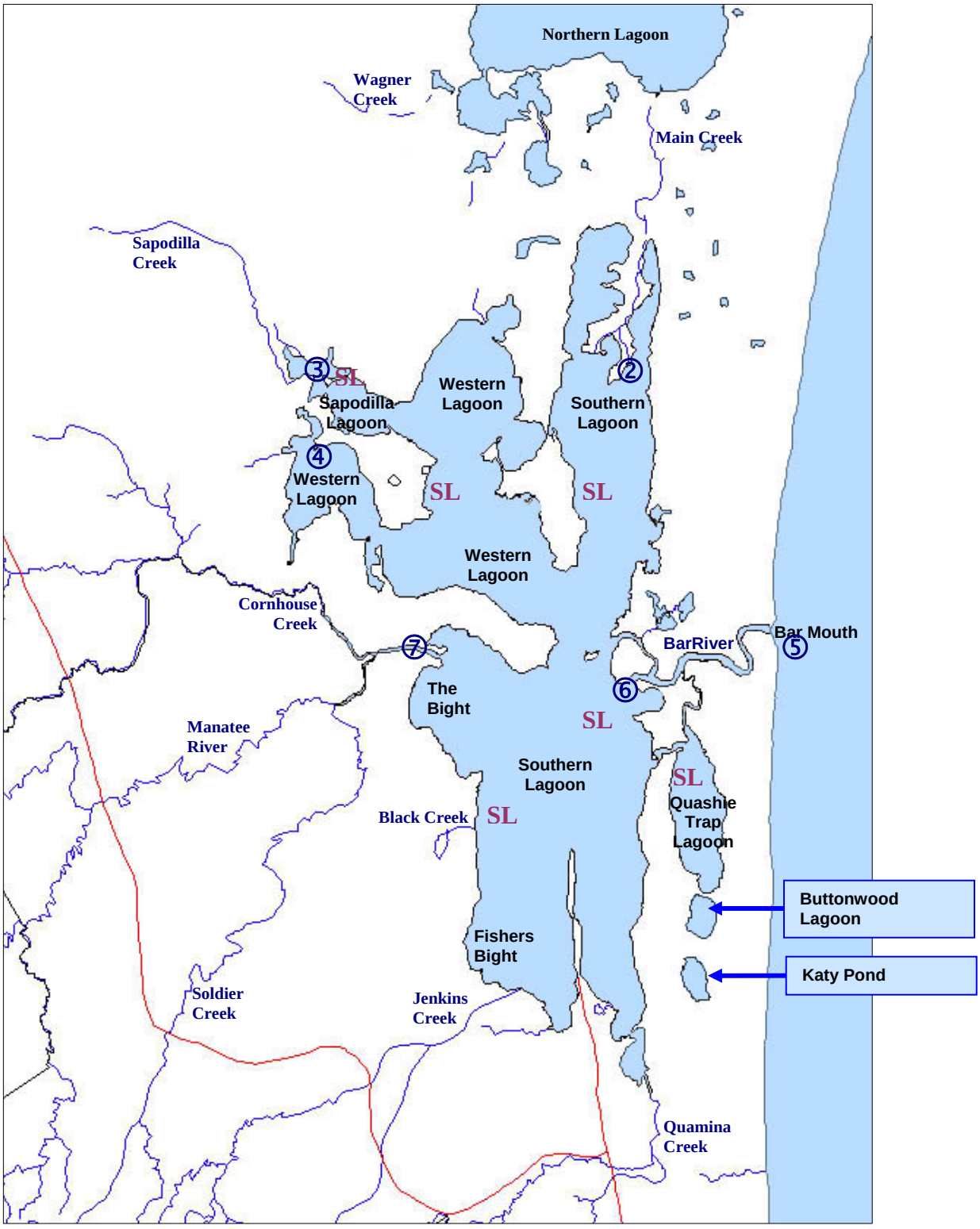
Map 5: Southern Lagoon: Hydrology

Mapping: A. Lloyd; Wildtracks



Map 6: Bathymetry of Southern Lagoon

Bathymetry of the system has been mapped under the Wildlife Trust project (Map 6), and clearly highlights the shallow nature of the enclosed lagoon system, with deeper water to the western portion of the system. A full description of all the waterbodies is given in Annex 1: the Biodiversity Assessment (Walker and Walker, 2007), as is a description of water quality.



Map 7: The Southern Lagoon System: Water Sample Points

① **Water sampling point for REA; SL1 Wildlife Trust vegetation sampling point**

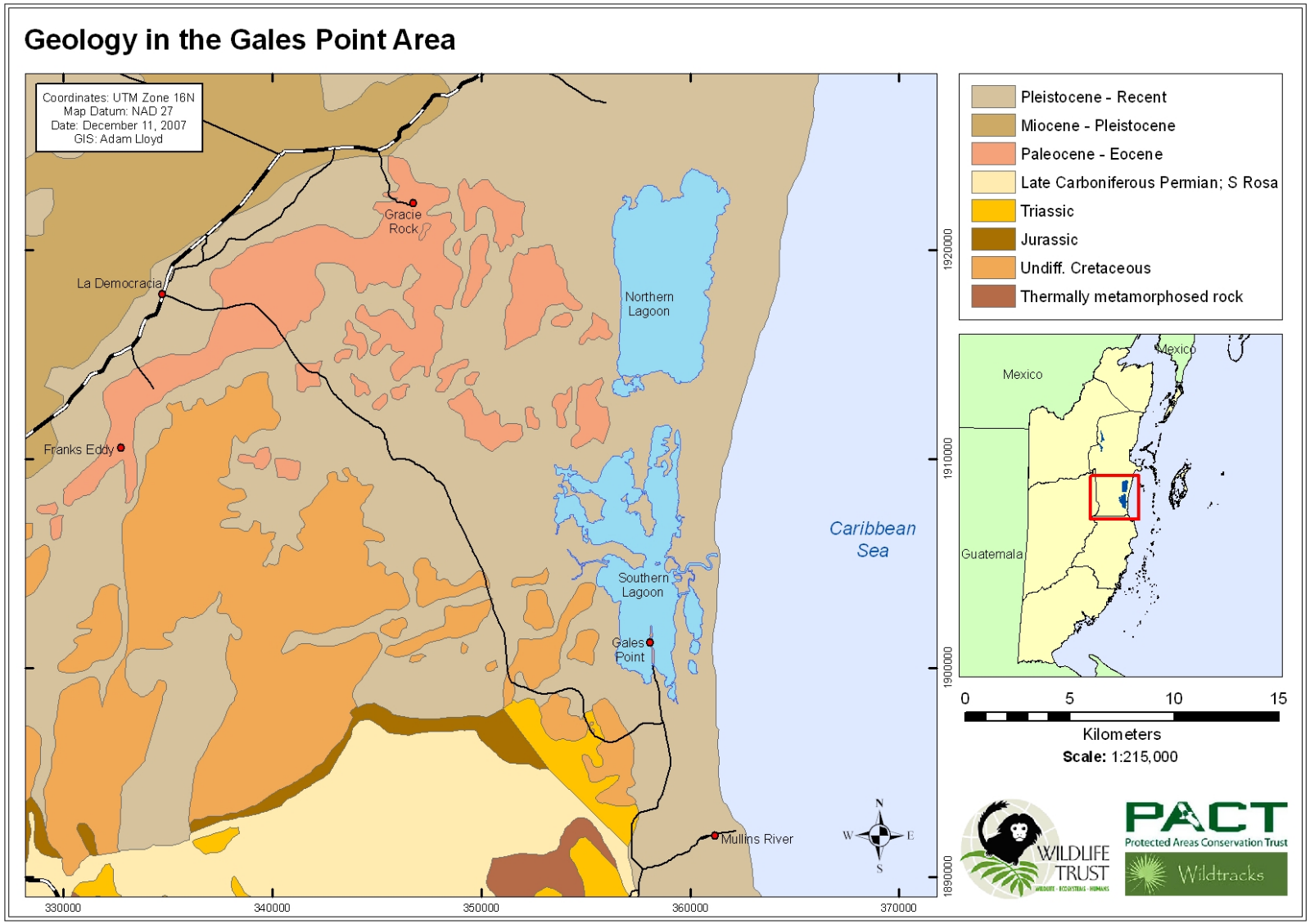
2.4.3 Geology

The Southern Lagoon area is characterized by two main geological features – the low to medium height karst hills of the watershed drainage area, formed from Cretaceous limestone rocks of the Campur formation (Miller, 1996), and the younger, low lying Pleistocene coastal plain, on which the Gales Point Wildlife Sanctuary is located (Maps 8 - 10).

The Pleistocene limestone, deposited by shallow seas between 1.6 million and 8,000 years ago, forms the bedrock for the Central Coastal Plain, and includes the majority of the land directly surrounding the Southern Lagoon system, stretching into the flood plains of the drainage systems that flow into it. Moving north east from the Maya Mountains, across the coastal plain, the underlying limestones get progressively younger, and the neutral to alkaline soils are often very shallow. The youngest soils are found on the coastal deposits, overlying recently exposed coral beds (King et. al., 1993), whilst fertile river alluviums follow the river courses. The Southern Lagoon itself lies on these young coastal deposit, and is separated from the sea by a coastal bar, whilst a second former coastal bar forms the peninsula on which Gales Point is located. These coastal soil support extensive areas of saline dwarf mangrove savanna.

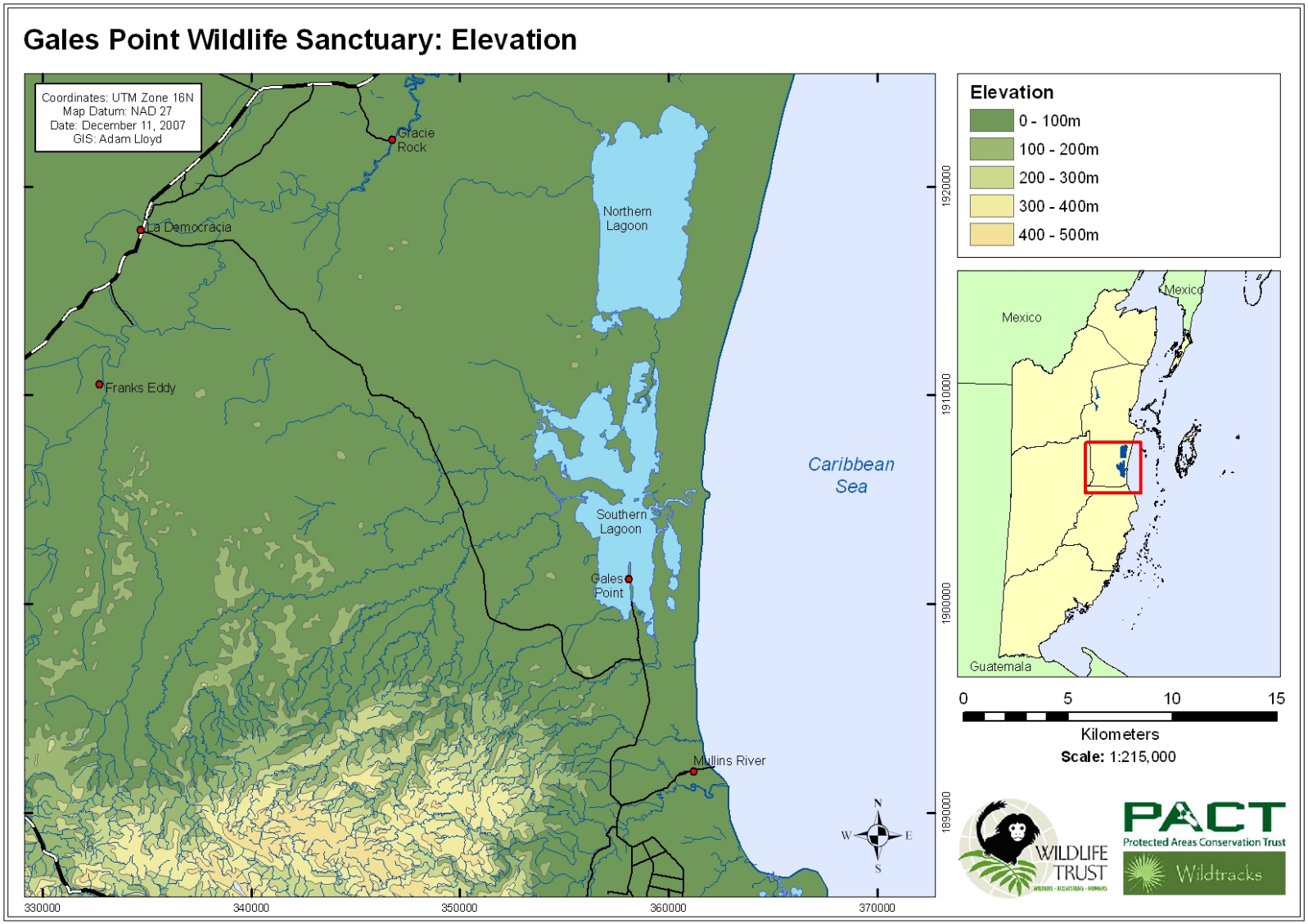
In many places, this bedrock underlies sand-based alluvium deposits derived from the Maya Mountains. The red soils cover the majority of the coastal plain, and are acidic, with a low nutrient content and extreme moisture regimes, being saturated in the wet season and droughty in the dry season. Soils are also affected by repeated burning, usually started by hunters during the dry season to attract deer to the ash and new growth. These soils support a gradient from short grass savanna to open pine forest surrounding the Northern and Southern lagoon systems.

A more in-depth discussion of the geology and soils of the area is given in Annex 1: the Biodiversity Assessment (Walker and Walker, 2007).



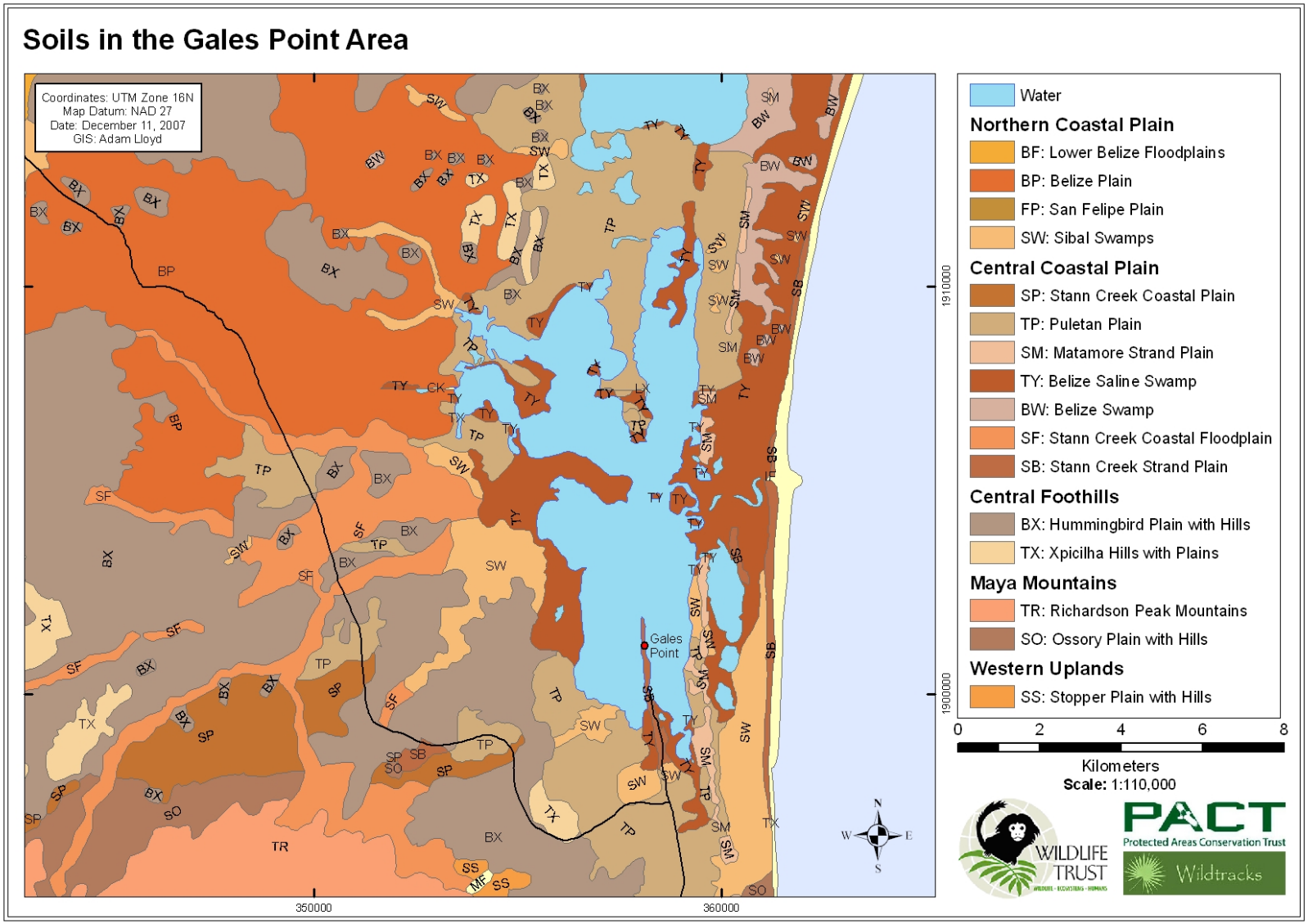
Map 8: Southern Lagoon: Geology (General)

Mapping: A. Lloyd; Wildtracks



Map 9: Southern Lagoon: Elevation

Mapping: A. Lloyd; Wildtracks



Map 10: Southern Lagoon: Soils and Land Systems

Mapping: A. Lloyd; Wildtracks

2.5. Biodiversity of Management Area

2.5.1 Ecosystems

Sixteen ecosystems have been identified in the Gales Point Wildlife Sanctuary under the UNESCO classification system, including two aquatic systems (and a third, seagrass beds, as a nested system) and the 66' edge vegetation (Maps 11 - 12; Table 10).

Table 10: Terrestrial Ecosystems of Gales Point Wildlife Sanctuary

Legend	UNESCO classification
28	Tropical evergreen seasonal broadleaf lowland forest over calcium-rich alluvium
29	Tropical evergreen seasonal broadleaf lowland forest over poor or sandy soils
42	Tropical evergreen seasonal broadleaf lowland swamp forest: high variant
43	Tropical evergreen seasonal broadleaf lowland swamp forest: low variant
47	Caribbean mangrove forest: Dwarf Mangrove Scrub
49	Caribbean mangrove forest: mixed mangrove scrub
51	Caribbean mangrove forest: riverine mangrove
52	Caribbean mangrove forest: basin mangrove
60	Deciduous lowland riparian shrubland of the plains
62	Short-grass savanna with scattered needle-leaved trees
63	Short-grass savanna with shrubs
66	Marine salt marsh rich in succulents
69	Tropical coastal vegetation on recent sediments
71	Tropical lowland tall herbaceous swamp
74	Rooted underwater communities of flowing water
761	Brackish / Saline Lagoon

A further six ecosystems are also found within the Gales Point area, outside the boundaries of the protected area (Table11)

Table 11: Ecosystems of the Southern Lagoon Area (outside GPWS)

Legend	UNESCO classification
19	Tropical evergreen seasonal broadleaf lowland forest over rolling calcareous hills
20	Tropical evergreen seasonal broadleaf lowland forest over steep calcareous hills
56	Evergreen broad-leaved lowland shrubland: Miconia variant
58	Deciduous broad-leaved lowland disturbed shrubland
60	Deciduous lowland riparian shrubland of the plains
65	Eleocharis marsh
	Urban

Aquatic Ecosystems

The principle aquatic ecosystem of the Gales Point Wildlife Sanctuary – the brackish coastal lagoon - provides food resources and shelter for many plant and animal species, supporting complex food webs. This ecosystem, along with the associated estuarine and wetland areas, also provides important ecosystem services, such as providing sediment filtration and flood and erosion control.

- **Brackish / saline lagoon (UNESCO code 761)**

  This ecosystem category encompasses Southern Lagoon and the associated water bodies in the area. In the estuarine system of Southern Lagoon, salinity varies daily and seasonally, with tidal and climatic influences – which impact flow rate and direction through the various creeks and channels, and the abundance of the seagrass and algae.

  Within the Southern Lagoon system, the predominant vegetation is *Halodule*, an aquatic flowering plant that provides shelter and food resources for a large number of commercial marine fin-fish species (in the Gulf of Mexico, it is estimated that between 70 and 90 percent of commercial fish species spend some part of their life in the seagrass habitat (FDEP, 2001)).

Terrestrial Ecosystems

The terrestrial ecosystems in that occupy the 66' buffer along the river, creek and lagoon margins are important in maintaining the water quality of the Souther Lagoon, as well as providing habitat for many species in the area.

The terminology of ecosystem classification used in the Belize Ecosystems Map has been applied in this assessment (Meerman & Sabido, 2001; Meerman, 2004), to facilitate future assessment of conservation importance of the various ecosystems in this location, within the national context, and to help in the prioritization of research and conservation actions.

Previous ecosystem mapping exercises covering this project area include those of Wright et. al. (1959), Lyon et. al. (1999), Meerman & Sabido (2001) and Meerman (2004). Of these, the work of Lyon et. al. is the most accurate – being based on more extensive groundwork. All are incorporated to a greater or lesser extent within this updated assessment, errors are corrected where possible, and further ground-truthing was conducted to verify validity of the ecosystem characterizations and mapping. As the UNESCO ecosystem categories are generally at a finer scale than those of Lyon et. al., there is often no direct 'translation' from one to the other – though in fact the rather broader system used by Lyon et. al. may be rather more meaningful on the ground.

- **Tropical evergreen seasonal broadleaf lowland forest over calcium-rich alluvium (UNESCO code 28)**

Photograph 2: Riparian forest - Broadleaf lowland forest over calcium rich alluvium, on the banks of the Manatee River

Located along the rivers, this ecosystem shows significant variation in stature and species composition, reflecting variation in hydrology and past land use. Undisturbed areas have a very high canopy, with emergents reaching 30m in height – some of the tallest forest in Belize. Species richness is high. Forest on this soil-type is alluvial and considered one of those most favoured for farming.

Regionally, this ecosystem has been greatly reduced from historical range – having greater agricultural potential than ecosystems occurring on many other soil types. In Belize, only 61% of the target of 33,670 acres is currently protected.

- **Tropical evergreen seasonal broad-leaf lowland forest on poor or sandy soils (UNESCO code 29)**

This ecosystem lies east of Southern Lagoon, but was not visited in the course of the current survey. Species likely to occur here include *Attalea cohune, Bactris mexicana, Bucida buceras, Calophyllum brasiliense, Coccoloba spp., Miconia spp., Simarouba glauca, Terminalia amazonia, Virola koschnyi, Vochysia hondurensis* and *Xylopia frutescens*. This is another ecosystem that is under-represented by 38% within the national protected areas system, with the target level of protection being approximately 33,000 acres.

- **Tropical evergreen seasonal broadleaf lowland swamp forest: high variant (UNESCO code 42)**

Photograph 3: Lowland swamp forest (high variant) lining Quamina Creek

The swamp forest in this locality grades from the low variant in a rather ill-defined ecocline. Predominant plant species include: *Bactris major, Bucida buceras, Calophyllum brasiliense, Coccoloba belizense, Cryosophila stauracantha, Desmoncus orthacanthos, Ficus sp., Metopium brownei, Pachira aquatica, Pterocarpus officinalis,* and *Swietenia macrophylla.* The ground is evidently flooded for several months of the year, with very extensive hog-wallow relief. Tracts of this forest type occur along the southern portions of Quamina Creek (Photograph 3).

- **Tropical evergreen seasonal broad-leaved lowland swamp forest: low variant (UNESCO code 43)**

Photograph 4: Lowland swamp forest (low variant) on Quamina Creek

Good examples of this ecosystem can be seen along and to the south of Manatee River and in the lower reaches of Soldier Creek. Species such as *Acoelorraphe wrightii, Bucida buceras, Cameraria latifolia, Chrysobalanus icaco* are common epiphytic *Aechmea sp*. and *Tillandsia spp*. bromeliads are locally common. *Pachira aquatica* is present in low densities, as is *Manilkara zapota. Coccoloba belizensis* and *Sabal mauritiformis* are present in the slightly less waterlogged areas. This ecosystem also occurs to the south of Southern Lagoon along portions of Quamina Creek, where it grades into tropical evergreen seasonal broadleaf lowland swamp forest: tall tree variant. Where these creeks and rivers meet the saline lagoon, a transition zone is indicated by the presence of red mangrove (Photograph 4).

- **Dwarf mangrove scrub (UNESCO code 47)**

Photograph 5: Dwarf Mangrove Scrub

Extensive tracts of this ecosystem occur within the Southern Lagoon area - this ecosystem was identified with marine salt marsh rich in succulent plants in the Belize Ecosystems Map (Meerman & Sabido, 2001; Meerman 2004), from which it differs largely in having a much lower species richness. It tends to have a low and relatively uniform canopy of 1 – 1.5m, and characteristically occurs on saline mudflats. With a minimal increase in elevation (generally no more than 5-10cm), this system becomes more species rich and grades into the marine salt marsh (Photograph 5). The dominant species is *Rhizophora mangle.*

- **Caribbean mangrove forest: mixed mangrove scrub (UNESCO code 49)**

Often bordering dwarf mangrove scrub mudflats or marine salt marshes, this ecosystem has a rather higher canopy (2-6m), and has a greater diversity of woody species – including the three mangroves (*Avicennia germinans, Laguncularia racemosa* and *Rhizophora mangle*) as well as *Conocarpus erecta* and *Myrica cerifera*, usually with a dense ground cover of sedges and grasses.

- **Caribbean mangrove forest: coastal fringe mangrove (UNESCO code 50)**

Occurring along sections of the river near Bar Mouth, and along portions of the beach, this ecosystem is dominated by *Rhizophora mangle*, with looping stilt roots stretching out into the water.

- **Caribbean mangrove forest: riverine mangrove (UNESCO code 51)**

  Occurring along lower portions of Manatee River, this ecosystem is dominated by *Rhizophora mangle*, with a canopy up to 15-18m, on permanently waterlogged soils. This ecosystem is severely under-represented within the protected areas of Belize, with only 16% of the 9,520 acres targeted for inclusion within the protected areas currently protected (Meerman, 2005).

Photograph 6: Riverine Mangrove lining Bar River

- **Caribbean mangrove forest: Basin mangrove (UNESCO code 52)**

  This ecosystem occurs in low-lying depressions in several areas – and can be seen on the bar northeast of the mouth of Manatee River, and at the entrance to Bar River. Most stands are tall, with a canopy height of at least 10-15m, and are primarily dominated by *Rhizophora mangle*, interspersed with specimens of *Avicennia germinans.* Species predominance appears to be dictated by the dynamics of seasonal flooding and by salinity. Structurally, this system differs little from riverine mangrove.

- **Deciduous lowland riparian shrubland of the plains (UNESCO code 60)**

  Small patches of this ecosystem occur along the banks of Manatee River and Soldier Creek, and include a mosaic of tall reeds, rushes, grasses and sedges interspersed with shrubs. These areas are ones that have been exposed to past disturbances, with the vegetation including a high proportion of early colonizing species. Whilst some of these disturbances may have been natural – from riparian erosion, the majority lie within the areas once farmed by the inhabitants of Gales Point and demonstrate the relatively slow regeneration from anthropogenic clearance and fires in such conditions. The patches were too small to be mapped within the resolution of the current survey.

- **Short-grass savanna with scattered needle-leaved trees (UNESCO code 62)**

  This open, grassland savanna is dominated by scattered, low-density *Pinus caribaea* and *Quercus oleoides.* The grasslands harbour quite a diverse assemblage of graminoids and herbaceous plants, with the terrestrial orchid *Bletia purpurea* and passionflower *Passiflora urbaniana* adding another highly visible component to the herbaceous ground-cover, along with the cycad *Zamia polymorpha.* Stands of *Acoelorraphe wrightii, Byrsonima crassifolia, Curatella americana* and *Gliricidia sepium* are interspersed amongst the pines and oaks.

Photograph 7: A stand of Caribbean pine within short grass savanna

  This ecosystem now covers an area that is evidently significantly reduced from historical coverage, frequent anthropogenic fires having eradicated pine from areas where they occurred as recently as 20

years previously, leaving a 'short-grass savanna with shrubs'. With the degradation of this ecosystem in relatively recent history, and without significant fire management, and habitat replenishment, it is unlikely that this ecosystem will continue to support breeding populations of key species such as the endangered yellow-headed parrot.

A little under half the area of this ecosystem targeted for conservation management is met by the current protected areas system of Belize (Meerman, 2005). Additionally, another significant conservation concern regarding this ecosystem is the steady, almost annual degradation that is taking place – frequent anthropogenic fires push the system towards that of short-grass savanna with shrubs, as the populations of pine trees are unable to withstand the frequent fires.

- **Short grass savanna with shrubs (UNESCO code 63)**

Actual coverage of this ecosystem is dynamic, and is increasing over its historical extent as a result of anthropogenic fire, with pines previously occurring over a larger portion of the savanna habitat than is currently the case. Short-grass savanna with shrubs is a complex mosaic of species assemblages, each reflecting micro-topography, soil hydrology, soil acidity & nutrient availability, fire regime and seed source (Photograph 8). In this locality, much of the short-grass savanna is open grassland. *Cameraria latifolia, Chrysobalanus icaco, Curatella americana, Gliricidia sepium* and *Quercus oleoides* occur at low density throughout much of the ecosystem, often as dwarfed specimens regenerating from past fires. Lower areas frequently support stands of *Acoelorraphe wrightii,* or *Eleocharis sp*.

Photograph 8: Short grass savanna with karst hills behind

- **Marine salt marsh rich in succulents (UNESCO code 66)**

This ecosystem occurs in some areas between the dwarf mangrove scrub and the vegetation on slightly drier ground. Around Southern Lagoon, it tends to be dominated by stunted *Rhizophora mangle*, but has a significant ground cover of grasses and sedges and a variety of low succulent plants. It is interspersed with rather stunted *Conocarpus erecta.* Extent is significantly less than previously mapped by Meerman (2004), as much of that area is in fact dwarf mangrove scrub.

- **Tropical coastal vegetation on recent sediments (UNESCO code 69)**

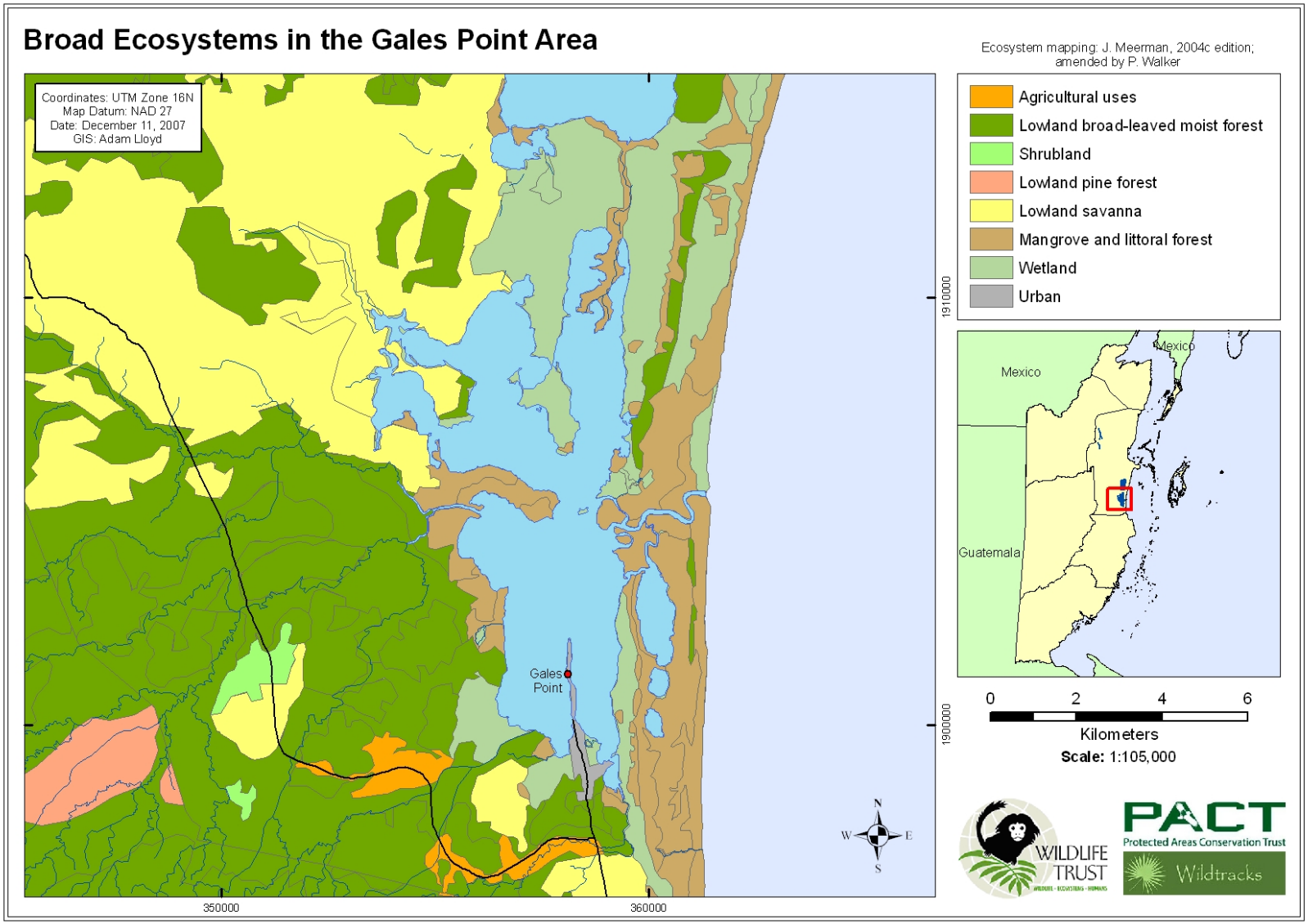
Photograph 9: Coastal Vegetation

This highly threatened ecosystem formerly occurred along several kilometers of coastal shoreline south of Bar Mouth, immediately behind the turtle-nesting beach (Photograph 9). Herbaceous beach vegetation is a highly threatened component of this ecosystem with less than 15% of the national target area for protection being met. It occurs on the seaward side of much of the coconut areas on Manatee Bar, this ecosystem is regenerating – but is negatively impacted by large amounts of sea-borne garbage. This habitat is essential for the continued nesting of the critically endangered hawksbill turtle. Whilst visited only briefly during the survey (being outside the Wildlife Sanctuary itself), it is clear that it has suffered extensive and significant anthropogenic impacts. Historically, much of this area had been converted to coconut plantation, albeit with some degree of regeneration of littoral forest species, and the clearance for the construction of permanent buildings further down the coast poses a significant threat to nesting success of marine turtles unless development, light-management and domesticated animal guidelines are put in place and strictly adhered to.

- **Tropical lowland tall herbaceous swamp (UNESCO code 71)**

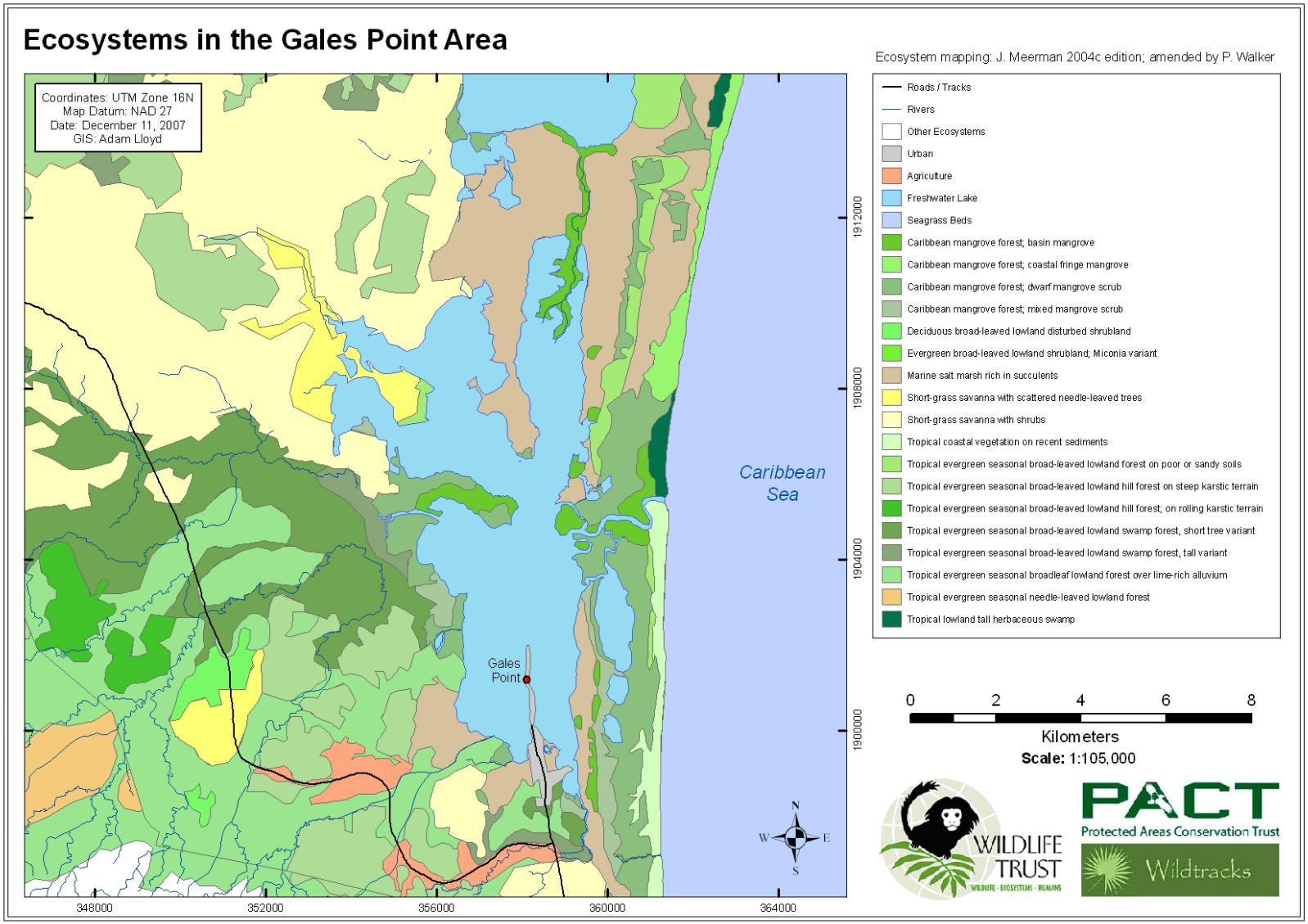
This ecosystem occurs in a narrow belt on the coast north of Bar Mouth. Course graminoids form a dense ground-cover to approx 0.7m in height, with a relatively dense shrub component dominated by *Acoelorraphe wrightii, Crescentia cujete* and *Concocarpus erectus*.

The other ecosystems that occur within the Gales Point area, but outside the protected area itself are covered in Annex 1: the Biodiversity



Map 11: Southern Lagoon: Ecosystems (after Meerman, 2005)

Mapping: A. Lloyd; Wildtracks



Map 12: Southern Lagoon: Ecosystems (after Meerman, 2005)

Mapping: A. Lloyd; Wildtracks

2.5.2 Flora

As the predominant ecosystem of the Gales Point Wildlife Sanctuary, this section covers the flora of the brackish lagoon system. Information on other species present within the Southern Lagoon area can be accessed from Annex 1: Biodiversity assessment of the Southern Lagoon Area.

The lagoon supports a large biomass of aquatic vegetation, including sizeable areas of the predominant vegetation - shoal grass (*Halodule wrightii*), considered to be the primary manatee food resource for these obligate grazers, the only herbivorous aquatic mammal within the lagoon. Shoal grass, a submerged flowering plant, is patchily distributed throughout the lagoon at all depths and is found in a range of salinities. It appears to be most abundant in the shallow waters of Quashie Trap Lagoon (Map 9; SL1), and almost absent from Sapodilla Lagoon. Grazing, boat propellers and other physical disturbance contribute to the patchiness of distribution – a typical feature of seagrass beds.

Photograph 10: Wigeon grass (*Ruppia maritima*)

A second seagrass species, Wigeon grass (*Ruppia maritima)*, first identified by Wildlife Trust in 2005 (Auil, pers. com.) is also found in the lagoon and has been highlighted in the United States for its importance for waterfowl (Photograph 10). It is similar in appearance to shoal grass but is less widespread in this ecosystem. Patches of this species, also thought to be an important food plant for manatees, have been found close to Tiger Point in Western Lagoon (Auil, 2005). Both the seagrass species that inhabit the lagoon are euryhaline and eurythermal - capable of growing in shallow lagoon waters that may vary dramatically in salinity and temperature.

A number of species of algae also occur in the lagoon, including a filamentous green alga (*Chaetomorpha* sp.?), present in Sapodilla Lagoon. This genus grows in mats, and is often found in high nutrient areas (such as around bird colony islands) – its presence in Sapodilla Lagoon, however, does not appear to be linked to such activity. *Chara* sp. (species unknown – likely more than one) is the second most common species, and is also abundant in Sapodilla lagoon, where seagrass is almost absent – this lagoon has a very low salinity which, though not beyond the tolerance threshold of the seagrass species, may give the algae a competitive advantage.

Green algae of the Dasycladaceae family are found in Western Lagoon, near Tiger Point, and are also abundant on mangrove roots in Main Creek. Species such as *Bataphora sp.* grow on hard substrates, and were recorded in most areas where exposed rocks were present in the lagoon. It is expected that further survey work in the area will show this species to be present wherever there is suitable substrate for its growth.

Southern Lagoon has more available food (in terms of types and biomass) for manatees than does the Northern Lagoon. As the water salinity decreases in the wet season, available vegetation decreases. With the excessive rainfall experienced in the latter part of 2006 and early 2007, seagrass was less abundant than expected from research in previous years, and the larger manatees are thought to have traveled outside of the lagoon system to forage on the *Thalassia*-rich seagrass beds located off-shore and south of the lagoon, near Mullin's River, an area where many manatees have been observed during aerial surveys.

2.5.3 Fauna

Mammals

A total of twenty-five confirmed mammal species were recorded within the Southern Lagoon area (Table 13), with a species composition representative of the tropical broadleaf forests, savanna and coastal lagoon ecosystems of Belize.

- Four of these species were observed directly during the survey (Antillean manatee, nine banded armadillo, northern raccoon and grey fox)
- Four species were recorded during the survey from their tracks or calls (Common/Virginia opossum, paca, Baird's tapir, Yucatan black howler)
- Seventeen species were confirmed as present from previous survey work (Greenlee, 1994; BERDS, 2006)

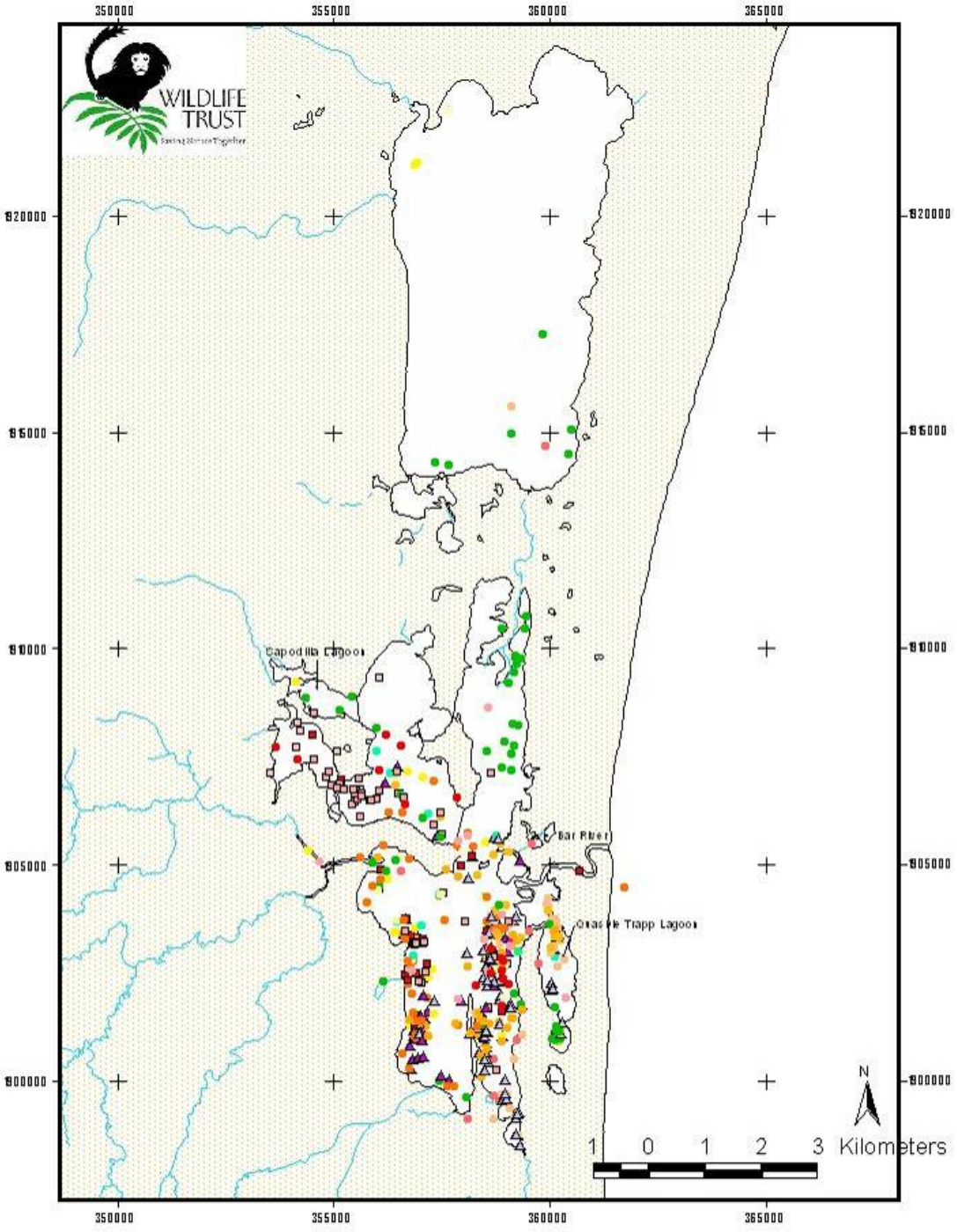
Of these, only the Antillean Manatee is linked specifically with the Gales Point Wildlife Sanctuary, though the Yucatan howler monkey, northern raccoon and Baird's Tapir are associated with the wetland ecosystems, and will be found within the 66' riparian vegetation. The Antillean manatee has been identified as a conservation target for Gales Point Wildlife Sanctuary.

Belize is particularly important for maintenance of viable populations of the Antillean manatee, having the largest population its range (Quintana-Rizzo and Reynolds, in review). The Antillean manatee is considered threatened throughout its range, and is listed as Vulnerable under the IUCN categories (IUCN 2006). Based on aerial survey counts and other surveys, Belize reportedly has the largest population of this subspecies within the Wider Caribbean (Auil 1998; Quintana-Rizzo & Reynolds in review), with an estimated population of about 1000 individuals (Auil, pers. com.). Within Belize, six sites have been identified as priorities for manatee conservation Belize, based on high probability of animal presence and favourable habitat. Southern Lagoon has been highlighted as one of six areas that has been found to be consistently important to manatees (Auil, 1998; O'Shea and Salisbury 1991), with the availability of freshwater, seagrass and sheltered areas, with a resident population estimated at approximately 150 individuals (Auil, pers. com.). Comprehensive long term monitoring of the manatee populations within the lagoon system is being conducted by Wildlife Trust (Map 22), with a long-term research project which began in 1996 (the longest standing Antillean manatee research site in the Western Caribbean.)

In order to be able to manage the Southern Lagoon as an effective conservation area for manatees, it is important to collect information on how manatees use the lagoon system. Wildlife Trust has been recording data on 23 manatees tagged and tracked within the Southern Lagoon area, from January 21, 2003 to May 3, 2007. This includes 11 mother-calf pairs: the location is considered to be preferred for calf rearing due to its availability of freshwater and vegetation, relatively low anthropogenic impacts (including pollution and boat traffic) and its protection from storms. Animals tracked show high site fidelity to Southern Lagoon and to a lesser extent, Northern Lagoon, although they are also known to travel up to 15km southward to Mullins River, probably to access the more abundant seagrass there.

The majority of sightings and tracking recordings within Southern Lagoon are made in the southeast portion, where the "Manatee Hole" is located. This depression in the lagoon floor is over 10m deep, with increasing salinity and temperature (to over 33^{o}C) with increasing depth. Up to 20 animals have been seen aggregating in this resource site at any one time, usually when the water temperature drops below 26^{o}C.

Tracking of mothers and calves has led to a better understanding of the behaviour of these mammals. The first mother / calf pair, F02 and calf F03 (triangles in Map 13), were captured and



Map 13: Distribution of tracked Antillean Manatees in Southern Lagoon, 2003 - 2007
Each color represents one animal. Triangular points represent dame F02 (dark purple) and its calf F03 (light purple); square points represent dame F29 (red) and its calves F28 and F57 (shades of pink).

tagged in 1997, and tracked until 2004. During that time, they were most frequently recorded in the southeast area of the lagoon system. The calf remained with her mother for two years, until becoming fully weaned and independent. Even following weaning, however, the calf demonstrated similar habitat use as the mother, and continued to utilize the southeast portion of the lagoon.

This is in contrast to the movements observed between the second reproductive female, F29 and her calves (F28 and F57). F29 has been recorded utilizing primarily the southern portion of the lagoon, particularly the southwest region. Whilst her first calf, F28, was recorded moving with her in this area during his first two years, following weaning he displayed very different site specific preference, becoming a resident of the northwestern part of the lagoon.

Long-distance travel has also been recorded, the first documentation of trans-boundary movement of a free-ranging Antillean manatee occurring in April 2006. Satellite data has indicated that four male manatees tagged in Mexico have traveled to Belize – two directly to the Southern Lagoon (~200km south from where they were tagged), one to Placencia, and one to the Belize City area. One of the largest males tagged in the Southern Lagoon has shown a similar pattern, traveling north of Belize City, then onward to Mexico, staying there for one month before returning to Belize waters. It is suspected that this may be a common occurrence as manatee populations respond to changes in habitats and react to influences due to anthropomorphic threats, and is presumed to play an important role in gene flow within the overall population.

The other mammals recorded during the survey will be found in the broadleaf forest areas that lie within the 66' riparian belt lining the rivers and creeks. Of the the twenty-five confirmed species of the Southern Lagoon area, five (20%) are considered to be species of international concern (Table 12), with two species, the Yucatan howler monkey and Baird's tapir, listed as Endangered (IUCN, 2006). One species is considered Vulnerable (the Antillean manatee), whilst one is classified as Near Threatened' (jaguar). One species, the Neotropical river otter, is listed as Data Deficient (IUCN, 2006) - potentially at risk, but for which there is insufficient data on abundance and/or distribution to allow an assessment of viability.

Three of the non-Red List species (jaguarundi, ocelot and margay) are listed in Appendix I of the Convention of International Trade in Endangered Species, with strict regulation of international trade, in recognition of their threatened populations. These three species are also highlighted in the provisional national list of critical species (Meerman, 2005).

There are three Yucatan endemics recorded within the area - the Yucatan and Deppe's squirrels, and the Yucatan black howler monkey, with ranges restricted to Mexico, Belize and Northern Guatemala. It is possible that further work on small mammals such as rodents and bats may show the presence of other regional endemics. The sub-species of Central American spider monkey (*Ateles geoffroyi yucatanensis*) is also restricted to this region, and is considered Vulnerable at sub-species level (IUCN, 2006).

A full report on mammals of the Southern Lagoon area is included in Annex 1: The Biodiversity Assessment of the Southern Lagoon Area.

Table 12: Mammal Species of National and International Concern of the Southern Lagoon area*			
Endangered	Yucatan Black Howler Monkey	*Alouatta pigra*	
	Baird's Tapir	*Tapirus bairdii*	
Vulnerable	Water Opossum	*Chironectes minimus*	
	Central American Wooly Opossum	*Caluromys derbianus*	
	Antillean Manatee	*Trichechus manatus manatus*	
Near Threatened	Jaguar	*Panthera onca*	
	Puma	*Puma concolor*	
Provisional Status in Belize (Meerman, 2005)			**Criteria**
Vulnerable	Central American Spider Monkey	*Ateles geoffroyi*	4
	Neotropical River Otter	*Lontra longicaudis*	5
	Ocelot	*Leopardus pardalis*	1,4,5
	Margay	*Leopardus weidii*	1,4,5
Least Concern	Jaguarundi	*Herpailurus yaguarondi*	5

IUCN Categories

EN Endangered
VU Vulnerable
NT Near Threatened
DD Data Deficient

* **Including Runaway Creek**

Criteria for inclusion in provisional national critical species listing (Meerman, 2005)

1 Hunted - Fished
2 Colony breeder or restricted number of nesting locations
3 Specialized ecological requirements
4 Charismatic species drawing national and international attention
5 Persecuted as a perceived pest
6 Requires a large range
7 Genetically different from South American counterpart

Birds

A total of 315 species of birds have been listed for the Southern Lagoon watershed and adjacent area, 73% of these (230 species) are considered permanent residents.

Birds were surveyed using both lagoon and terrestrial transects and point surveys (Map 14)., with recordings of opportunistic sightings by all members of the fieldwork team, and input from community consultations Data was also analyzed from adjacent areas – particularly from Runaway Creek Nature Preserve to the north, where Birds without Borders (a project of the Zoological Society of Milwaukee), has been conducting a long-term survey of resident and migratory bird species, between 1999 and 2002.

Table 13: Bird Species of National and International Concern of the Southern Lagoon area*			
Endangered	Yellow-headed Parrot	*Amazona oratrix*	
Vulnerable	Cerulean Warbler	*Dendroica cerulea*	
Near Threatened	Great Curassow	*Crux rubra*	
	Black Catbird	*Melanoptila glabrirostris*	
	Painted Bunting	*Passerina ciris*	
Provisional Status in Belize (Meerman, 2005)			**Criteria**
Vulnerable	Agami Heron	*Agamia agami*	2,3
	Yellow-lored Parrot	*Amazona xanthlora*	5
	Great Blue Heron	*Ardea herodias*	1,5
	Muscovy Duck	*Cairina moschata*	1
	Black-bellied Whistling-Duck	*Dendrocygna autumnalis*	1,5
	Snowy Egret	*Egretta thula*	2,5
	Tricolored Heron	*Egretta tricolor*	2,5
	White Ibis	*Eudocimus albus*	2
	Magnificent Frigatebird	*Fregata magnificens*	2
	Jabiru	*Jabiru mycteria*	1,4,5,6,7
	Wood Stork	*Mycteria Americana*	1,2,5
	Yellow-crowned Night-Heron	*Nyctanassa violacea*	2
	Black-crowned Night-Heron	*Nycticorax nycticorax*	2
	Brown Pelican	*Pelecanus occidentalis*	2,5
	Crested Guan	*Penelope purpurascens*	1
	Neotropic Cormorant	*Phalacrocorax brasilianus*	1,2,5
	King Vulture	*Sarcoramphus papa*	3,4,6

IUCN Categories

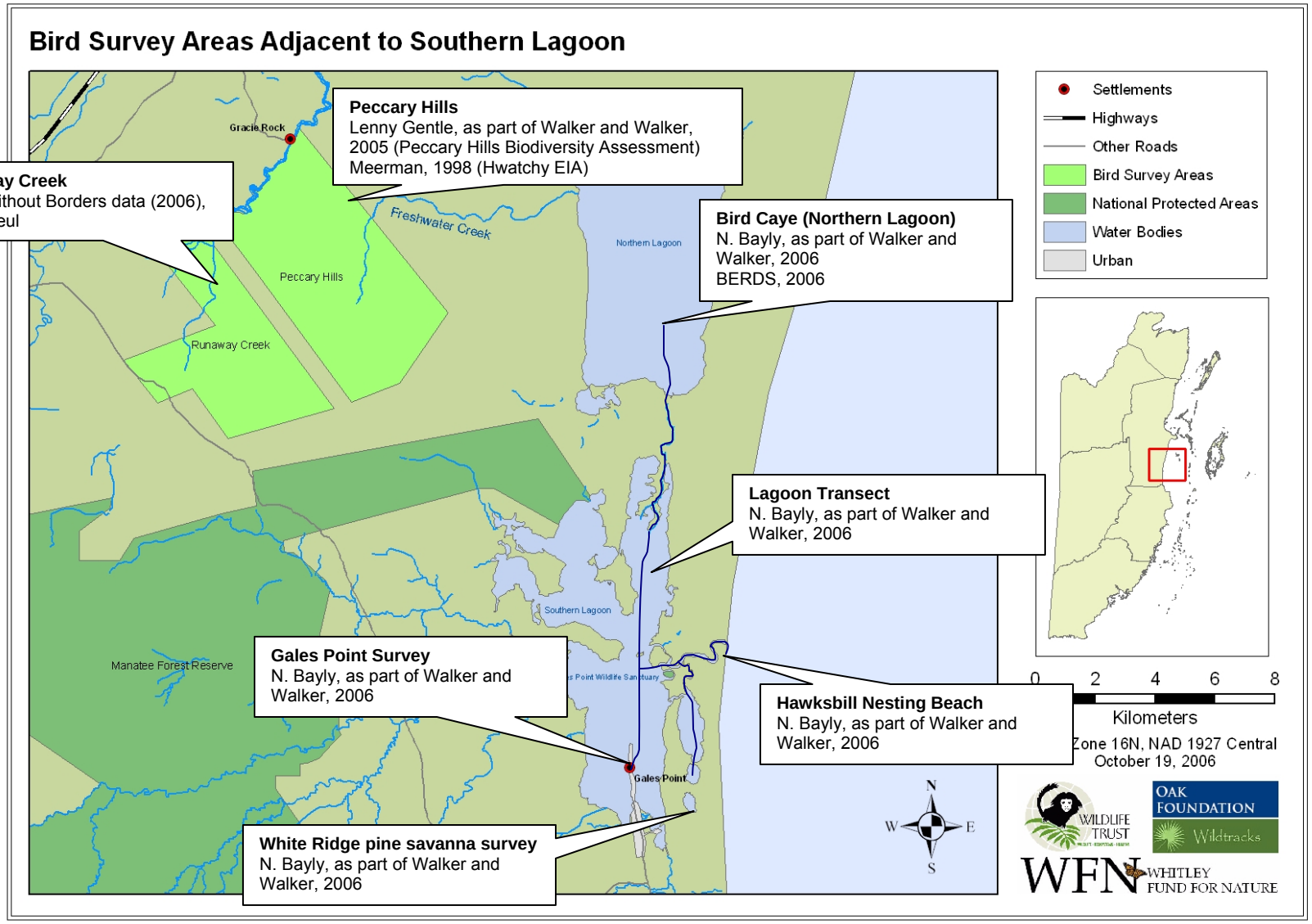
EN Endangered
VU Vulnerable
NT Near Threatened
DD Data Deficient

* **Including Runaway Creek**

Criteria for inclusion in provisional national critical species listing (Meerman, 2005)

1 Hunted - Fished
2 Colony breeder or restricted number of nesting locations
3 Specialized ecological requirements
4 Charismatic species drawing national and international attention
5 Persecuted as a perceived pest
6 Requires a large range
7 Genetically different from South American counterpart

Five bird species (the yellow-headed parrot (*Amazona oratrix*), cerulean warbler (*Dendroica cerulean*), great curassow (*Crax rubra*), black catbird (*Melanoptila glabirostris*) and painted bunting (*Passerina ciris*)) have been highlighted for their status as species of international concern (Table 13; IUCN, 2006). Of these, the Black Catbird has the strongest association with the ecosystems of the Gales Point Wildlife Sanctuary.



Map 14: Bird Survey Locations of the Southern Lagoon Area

Mapping: A. Lloyd; Wildtracks

The Southern Lagoon system, with its complex mosaic of creeks, lagoons and large expanses of red mangrove, provides a wilderness with a wide range of foraging habitats available to water birds (shallow water, shaded creeks, inundated mangrove flats and riverine edge) resulting in a rich and varied water bird population. The basin mangrove lining Bar River, and the isolated mangrove cayes, provide an excellent structure for nesting birds such as night herons and tiger herons, and refuge for kingfishers and green herons. On the national level, a provisional list of 46 critical bird species has been generated (Meerman, 2005), of which twenty three (50%) have been recorded within the Southern Lagoon area.

The black catbird (*Melanoptila gabrirostris*), listed as Near Threatened (IUCN, 2006), is a Yucatan endemic, restricted to the scrubby woodlands and mangrove of the Yucatan and north east Belize. Whilst the Southern Lagoon area is considered in the southern-most range of this species within Belize, this species has been recorded further south in Paynes Creek, Toledo, and both the numbers and the southward range are thought to be increasing (Jones, 2003), despite the rate of land use change for coastal development. This species, whilst not recorded during the survey, is considered likely to be present.

The focus on coastal development has also increased the risk to colony nesting birds, highlighted as national critical species. Many of these species use mangrove cayes for colonial nesting, concentrating populations within a small area during nesting season. Increased clearance, human presence, and disturbance from boat activity has the potential to have a negative impact on these species unless mitigation measures are put in place.

Photograph 11: Boat-billed heron (*Cochlearius cochlearius*)

The bird caye of Northern Lagoon (outside the Gales Point Wildlife Sanctuary) was one of five bird nesting cayes designated as crown reserves in 1977, under the Crown Lands Ordinance (1926), and has been included within the biodiversity assessment at the request of the Gales Point community and Wildlife Trust. Its inclusion as a Crown Reserve is a reflection of its value as a nesting colony site for magnificent frigatebirds (*Fregata magnificens*), great egrets (*Ardea alba*), boat billed herons (*Cochlearius cochlearius*) (Photograph 11), white ibis (*Eudocimus albus*), cattle egrets (*Bubulcus ibis*) and cormorants (*Phalacrocorax purpurascens*).

Whilst Southern Lagoon itself is important for many waterbirds, the surrounding savannas and broadleaf forests also provide a critical mosaic of habitat for other species.

A complete report of the bird fauna of the area can be found in Annex 1: Biodiversity Assessment of the Southern Lagoon Area.

Reptiles

Twenty-nine species of reptile and amphibian were recorded during the biodiversity assessment of the Southern Lagoon area – either as direct observations or as reliable local reports. A further 24 species not encountered in the survey have previously been collected within the survey area, and are known from museum records (Lee, 1996) – giving a known herpetofauna to date of 53 species. This is approximately half of the likely total that can reasonably be predicted to occur within the immediate environs of the Gales Point Wildlife Sanctuary and adjacent broadleaf-forests of the karst hills and coastal beaches, based on existing ground surveys and known species distributions and habitat requirements (Annex 1).

In the context of herpetofauna, it is necessary to examine the Gales Point Wildlife Sanctuary and adjacent area at three levels in terms of the herpetofaunal habitat potential:

- The brackish Southern Lagoon system, Bar River and associated tributaries, the approximately 3.6km of Manatee River and Cornhouse Creek within the Sanctuary boundaries, as well as the 66' terrestrial element of the Sanctuary surrounding the lagoons.
- Adjacent turtle nesting beaches south of the Bar River mouth – the protection of which is provided also by villagers from Gales Point with the support of the Wildlife Trust.
- Connectivity with the surrounding ecosystems, beyond the 66' terrestrial portion, including those within the Manatee Forest Reserve.

Approximately 10% of the likely overall herpetofauna of the Southern Lagoon area is considered threatened (IUCN, 2006). Of these 10 threatened species, 8 are turtles and 2 are crocodilians. Of these, two are Critically Endangered (hawksbill turtle (*Eretmochelys imbricate*) and Central American river turtle or 'hicatee' (*Dermatemys mawii*)) and two are Endangered (loggerhead turtle (*Caretta caretta*) and green turtle (*Chelonia mydas*)) (Table 14).

Table 14: Herptile Species of Concern for the Southern Lagoon Area

Critically Endangered	*Eretmochelys imbricata*	Hawksbill Turtle
	Dermatemys mawii	Central American River Turtle
Endangered	*Caretta caretta*	Loggerhead Turtle
	Chelonia mydas	Green Turtle
Vulnerable	*Crocodylus acutus*	American Crocodile
Lower Risk	*Claudius angustatus*	Narrowbridge Musk Turtle
	Staurotypus triporcatus	Mexican Giant Musk Turtle
	Kinosternon acutum	Tabasco Mud turtle
	Trachemys scripta	Slider
	Crocodylus moreletii	Morelet's Crocodile

Regarding overall herpetofaunal considerations, by far the most important national and regional function of the Gales Point Wildlife Sanctuary and its immediate environs is its role in assisting the regional conservation of two critically endangered turtles: the marine hawksbill turtle, and the freshwater Central American River Turtle – both of which have been identified as conservation targets in this management plan.

Manatee Bar, immediately south of the mouth of Bar River, has been identified as one of the six most important nesting beaches in the Caribbean for the hawksbill turtle (Smith, et *al*., 1992), with over 100 active nests having been recorded there in a single year. Recorded nests have however dropped by over 50% in the last ten years (Majil, 2005). With very high nesting beach

fidelity, and extremely limited migration between Caribbean populations, the population of hawksbills nesting on Manatee Bar appears to be in sharp decline and is clearly in immediate need of highly effective conservation measures to address and reverse the current trend if this regionally important population is not to be lost permanently within the next 10-20 years.

Photograph 12:
Hatchling hawksill turtle

Manatee Bar is also recognized as an important nesting site of loggerhead turtles (Majil, 2005), though numbers are far smaller. Green turtle nesting was also recorded as taking place here in 2007 (K. Andrewin/ Wildlife Trust, unpublished data).

Whilst the Manatee Bar turtle nesting beach has received significant conservation attention (initiated by Greg Smith, Kevin Andrewin and Lincoln McSweeney), and sporadic support from a number of national and international conservation agencies, nesting success remains low, with very low recruitment into the juvenile population. Nest predation by raccoons, skunks and possibly coatis, and periodic over-washing, resulting in chilled and/or drowned eggs, have been identified as the primary causes of low nesting success (K. Andrewin, pers. com.). Egg chilling / drowning, apparently caused by beach sinkage may be associated with previous removal of littoral forest and conversion to coconut plantation.

There is a need for conservation management planning and effective protection to highlight the urgency of re-inforcing the ongoing sea turtle work being undertaken by the Gales Point Community and its conservation partners, and a need to build the capacity, infrastructure and finance to be able to implement identified conservation actions, and determine if additional measures are needed. The Gales Point Wildlife Sanctuary Community Management Committee with the Wildlife Trust are taking a lead role in monitoring nest success and implementing conservation activities are very positive, but need to be reviewed in terms of setting and reaching goals for increased nesting success – to increase recruitment into the turtle population.

The 2006 beach surveys, conducted between June and October, resulted in the protection of 32 nests, with an additional 33 nests reported as being destroyed by predators (Figure 5). Species identification was not confirmed for all protected nests, but most nests were thought to be created by hawksbill turtles. With 65 total nests recorded, given a nest frequency of about 4 per season per species (hawksbill or loggerhead), the 6-mile beach likely supports less than 20 females. Of the 67 nests recorded in the 2007 season, 39 were of hawksbill, 17 were loggerhead, 7 were green, and 4 were not identifiable (Kevin Andrewin/ Wildlife Trust, unpublished data).

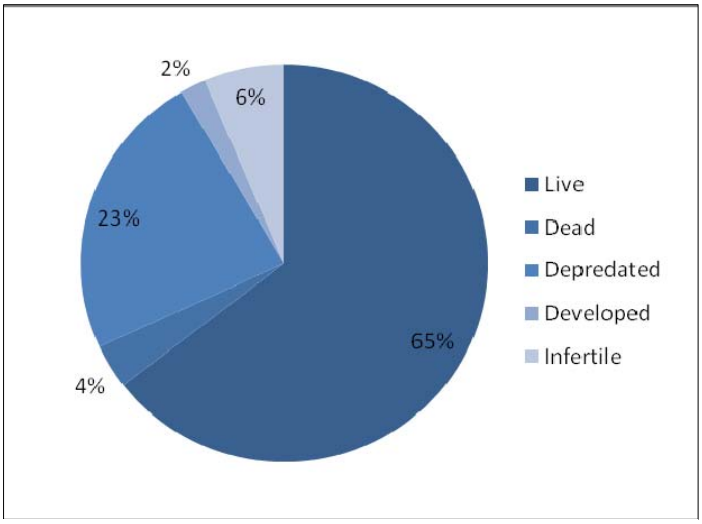


Figure 5: Hatchling success for 2006: 6 miles of beach south of Manatee Bar mouth.

The global conservation status of the Central American River Turtle has recently been upgraded from Endangered to Critically Endangered following a recent assessment of distribution and abundance (IUCN, 2006), in recognition of the plummeting populations, and broadscale local extinctions. Whilst isolated remnant populations have recently been discovered in the Peten, it is believed that few viable populations exist outside Belize. Within Belize however, the Central American River Turtle is also in sharp decline, with many areas having been effectively hunted out in recent years (Walker, P. pers. obs.). The remaining populations of this species within the Manatee River, Cornhouse Creek, Soldier Creek and the western drainage of Sapodilla Lagoon should figure prominently in national and regional initiatives to prevent the extinction of this species. Numbers within these creeks are reported by local hunters and fishermen to have declined significantly in recent years – but populations apparently remain viable to date.

The American Crocodile (IUCN: Vulnerable) is known to nest on the Manatee Bar north of the Bar River (Platt & Thorbjarnarson, 1997; K. Andrewin, pers. com.). This is one of the few nesting beaches known for this species on the Belize mainland, and will become increasingly important for this species nationally as preferred beaches on the offshore cayes are increasingly developed for tourism. Proposed tourism development does however already threaten the continued nesting of this species at this site as well. Morelet's Crocodile is also present within the less saline areas of the lagoon systems

A complete report of the herpetofauna of the area can be found in Annex 1: Biodiversity Assessment of the Southern Lagoon Area.

Fish of Southern Lagoon

A total of seventy two species of fish have been recorded both during the fieldwork and through analysis of previous reports (Table 19; Greenfield and Thomerson, 1997; BERDS, 2006; Walker and Walker, 2005). Of these, the goliath grouper (*Epinephelus itajara*) is 'Critically Endangered' and the cubera snapper (*Lutjanus cyanopterus*) is considered 'Vulnerable' (IUCN, 2007).

As fishing, and the fish of Southern Lagoon, are considered very important to the quality of life in Gales Point, this section has been reproduced in its entirety from the Biodiversity Assessment of the Southern Lagoon area (Walker and Walker,, 2006; Annex One), with additional inputs from more recent studies.

The Southern Lagoon area has a number of freshwater rivers and creeks that drain into the lagoon from the south, north and west. Salinity increases towards the east, where Bar River empties into the sea. The Bar River area includes a complex of mangrove-lined creeks that drain the saline mangrove savannas. The flooded coastal Eleocharis swamp areas to the south provide another freshwater ecosystem that supports freshwater fish.

Eight specific water bodies were identified for investigation (Map 9):

- Southern Lagoon
- Sapodilla / Western Lagoons
- Main Creek
- Bar River
- Manatee River
- Quamina Creek
- Soldier Creek
- Eleocharis swamp (White Ridge)

Local commercial fish catch was also investigated

Photograph 13: Commercial fish catch from Southern Lagoon

Southern Lagoon

The fish species assemblage in the lagoon itself is predominantly of euryhaline species, which are able to withstand the daily and seasonal shifts in salinity. A number of the more saline-tolerant freshwater species are present in areas of lower salinity where rivers and creeks enter the system.

The goliath grouper (*Epinephelus itajara*), found in saline and brackish areas of the Southern Lagoon system, is critically endangered on a global scale (IUCN, 2007), and has been identified as a conservation target for Gales Point Wildlife Sanctuary. This species has traditionally been fished in the lagoon system, with the result that both the individual size and the numbers of fish caught has decreased, indicating that the population is showing significant decline over the last decade, as gill net activity increased. Following intervention by Gales Point community and Fisheries Department, and the subsequent regulation of gill net types and use, numbers have started to increase again, as has the average size of the individuals caught, suggesting that the population may be starting to recover. This pattern has also been seen in many of the other commercial fish species – the snook and permit, for example.

A recent survey within the Wildlife Sanctuary was implemented to determined the relative abundance and distribution of goliath groupers within the lagoon system, and demonstrated that Southern Lagoon, whilst not supporting a high juvenile population, is critical 'growing-out' habitat for sub-adult /young adults that no longer need the protection of mangroves (Graham et. al. 2007). Catch rates in Southern Lagoon during the survey were considered comparable with results from souther Belize.

Fish Species of Southern Lagoon

Tarpon	*Megalops atlanticus*
Redfin needlefish	*Strongylura notata*
Ocellated killifish	*Floridicthys polyommus*
Yucatan mosquitofish	*Gambusia yucatana*
Common snook	*Centropomus undecimalis*
Goliath grouper	*Epinephelus itajara*
Striped Mullet	*Mugil cephalus*
Crevalle Jack	*Caranx hippos*
Grey snapper	*Lutjanus griseus*
Cubera snapper	*Lutjanus cyanopterus*
Lookdown	*Selene vomer*
Bonefish	*Albula vulpes*
Great barracuda	*Sphyraena barracuda*
Southern Sheepshead	*Archosargus probatocephalus*
Maya cichlid	*Cichlasoma uropthalmus*
Tilapia sp.	*Tilapia sp.*
Opossum pipefish	*Microphis brachyurus*
Southern stingray	*Dasyastis americana*
Longnose Ray	*Dasyastis guttata*
Green moray eel	*Gymnothorax funebris*
Chequered pufferfish	*Sphoeroides testudinum*

Preferential use of different areas of the lagoon based on bathymetry showed that groupers may aggregate in - 'holes' - areas of deeper water that are throught to provide shelter and protection. The Manatee Hole, in front of Gales Point, attracts a number of fish, including the cubera and tarpon (*Megalops atlanticus*) – the area once being known as Tarpon Hole. Whitefin sharksuckers (*Echeneis neucratoides*) can also be seen here, attached as commensals to Antillean manatee, which also congregate in the holes.

Local reports suggest that cow-nosed rays (*Rhinoptera bonasus*) form mating congregations seasonally in the shallow waters, between the months of February and April - this species still needs to be confirmed, but has been noted in Payne's Creek, and reports suggest that it may also utilize Northern Lagoon. It is thought that the presence of large tarpon within the lagoon may be indicative of the importance of Southern Lagoon as a spawning area, though this is still to be confirmed (Graham et. al., 2007)

Photograph 14: Smalltooth Sawfish blade – the last sawfish seen in Southern Lagoon was in the 1960's (D. Myers, pers. com.)

The smalltooth sawfish (*Pristis pectinata*), restricted to shallow coastal lagoons such as Southern Lagoon, was once present in large numbers, but was extensively fished to the point of becoming locally extinct in Southern Lagoon in the early 1960's (D. Myers, pers. com.). This species, which is considered 'endangered' (IUCN, 2006), has since disappeared from the majority of the shallow coastal lagoons in Belize, and there is a question as to whether it is still present in Belizean waters at all (Photograph 14; Z. Walker, per. obs.; R. Graham, pers. com.).

Recent studies suggest that whilst elasmobranchs may once have been common in the lagoon, only stingrays continue to be present. Community responses suggest that bonnethead (*Sphyrna tiburo)* bull shark (*Carcharinus leucas*) and nurse shark (*Ginglymostoma cirratum*), whilst once present, have not been caught within the lagoon within the last five years (Graham et. al. 2007), possibly as a result of the gillnet use.

Main Creek

Main Creek, linking Northern Lagoon with Southern Lagoon, is lined with red mangrove, the stilt roots extending into the water and providing a sheltered habitat for species such as the juvenile schoolmaster (*Lutjanus apodus*) and the Maya cichlid (*Cichlasoma uropthalmus*). Draining in from either side are shallow lagoons with dwarf mangrove, with ocellated killifish (*Floridichthys polyommus*) and chequered pufferfish (*Sphoeroides testudinum*).

Fish Species of Main Creek	
Tarpon	*Megalops atlanticus*
Central Tetra	*Astyanax aeneus*
Redfin Needlefish	*Strongylura notata*
Ocellated Killifish	*Floridicthys polyommus*
Mangrove Molly	*Poecilia orri*
Common Snook	*Centropomus undecimalis*
Crevalle Jack	*Caranx hippos*
Grey snapper	*Lutjanus griseus*
Schoolmaster	*Lutjanus apodus*
Great barracuda	*Sphyraena barracuda*
Striped mojarra	*Eugerres plumieri*
Brazilian mojarra	*Eugerres brasilianus*
Yellowfin mojarra	*Gerres cinereus*
Southern Sheepshead	*Archosargus probatocephalus*
Maya cichlid	*Cichlasoma uropthalmus*
Chequered pufferfish	*Sphoeroides testudinum*

Many of the sixteen species recorded were of the snapper (Lutjanidae) and mojarra (Gerridae) families, both of which are saline tolerant. However, the presence of *Astyanax aeneus* and *Cichlasoma synspilum* indicate that salinity is low (being recorded as 4ppt at the northern end of the creek, and 3 ppt at the point to entry to Southern Lagoon). Local reports suggest that the strong east trade winds in April and May increase water depth and salinity, resulting in a change in the species composition, with the appearance of large numbers (hundreds) of striped mojarra (*Eugerres plumieri*) (community consultations, 2006). This influx has traditionally been targeted by local fishermen, using cast nets. There is a valid concern among Gales Point fishermen that illegal gill net activity could rapidly deplete these seasonal congregations.

Quamina Creek

Quamina Creek enters Southern Lagoon from the south. At its mouth, the creek has a salinity of 2ppt. This gradually decreases to 0ppt with increasing distance from the lagoon, indicated by a significant change in creekside vegetation from mangrove-dominated forest to kaway swamp. Fish distribution and species composition is related to this salinity gradient, freshwater species such as the bay snook (*Petenia splendida*) and Central American tetra (*Astyanax aeneus*) only being observed in the more southerly, freshwater reaches of the creek, with a salinity of 0ppt. Towards the more saline creek mouth, species such as yellowfin mojarra (*Gerres cinereus*), grey snapper (*Lutjanus griseus*) and crevalle jack (*Caranax hippos*) occur.

Fish Species of Quamina Creek	
Tarpon	*Megalops atlanticus*
Central Tetra	*Astyanax aeneus*
Sleek Mosquitofish	*Gambusia luma*
Southern Yucatan mosquitofish	*Gambusia yucatana*
Common Snook	*Centropomus undecimalis*
Goliath grouper	*Epinephelus itajara*
Striped Mullet	*Mugil cephalus*
Crevalle Jack	*Caranx hippos*
Grey snapper	*Lutjanus griseus*
Yellowfin mojarra	*Gerres cinereus*
Southern Sheepshead	*Archosargus probatocephalus*
Firemouth Cichlid	*Cichlasoma meeki*
Musmus	*Cichlasoma friedrichsthali*
Redhead cichlid	*Cichlasoma synspilum*
Maya cichlid	*Cichlasoma uropthalmus*
Bay snook	*Petenia splendida*
Southern stingray	*Dasyatis americana*

Manatee River

Fish Species of Manatee River	
Central tetra	*Astyanax aeneus*
Grey snapper	*Lutjanus griseus*
Redhead cichlid	*Cichlasoma synspilum*
Opossum pipefish	*Microphis brachyurus*

Manatee River, the largest river flowing into the Southern Lagoon, provides a constant source of freshwater to the Southern Lagoon system. The Manatee River watershed drains an area estimated at 480km² (BERDS, 2005), consisting of very steep, fast moving tributaries over older granite rocks in the southern area of the watershed, that then slowly flows northwards then east across the flat coastal savanna. The freshwater conditions in the upper stretches, and brackish water in lower, provides a relatively healthy fish fauna representative of freshwater and brackish water conditions, across the salinity gradient (community consultations, Gales Point, 2005). The low number of fish species recorded is a reflection of the turbidity of the water at the time surveying took place.

Sapodilla and Western Lagoons

Sapodilla and Western lagoons lie in the north west of the Southern Lagoon system, and are fed primarily by Sapodilla Creek, and by sheet run off from the adjacent short grass savanna and low-lying dwarf mangroves. Western Lagoon in particular is favoured by local fishermen, who use hand lines, cast nets, and occasionally set-lines. Gill nets stretching from Tiger Point across the entrance to the lagoon are used by commercial fishermen. During the fieldwork, it was noted that this part of the lagoon had the greatest algal growth, with *Dasycladaceae* and other algae growing on the majority of the exposed stones, providing much greater cover and habitat complexity than other more open areas of the lagoon, with a corresponding apparent increase in fish diversity and abundance.

Fish Species of Sapodilla and Western Lagoons	
Tarpon	*Megalops atlanticus*
Redfin Needlefish	*Strongylura notata*
Yucatan Mosquitofish	*Gambusia yucatana*
Ocellated Killifish	*Floridicthys polyommus*
Crevalle Jack	*Caranx hippos*
Permit	*Trachinotus falcatus*
Grey snapper	*Lutjanus griseus*
Schoolmaster	*Lutjanus apodus*
Bonefish	*Albula vulpes*
Great barracuda	*Sphyraena barracuda*
Striped mojarra	*Eugerres plumieri*
Yellowfin mojarra	*Gerres cinereus*
Southern Sheepshead	*Archosargus probatocephalus*
Red-head cichlid	*Cichlasoma synspilum*
Southern stingray	*Dasyatis americana*

Permit are considered common in Western and Northern Lagoon, however community consultations suggest that the use of gill nets in the area is causing a population decline. The current observed decline in sport fish is a cause for concern, with the need for Gales Point to ensure the viability of its resources if the community wishes to focus on tourism and fly fishing as a means to elevate the standard of living within the community,.

Soldier Creek

Fish Species of Soldier Creek, January 2006	
Central tetra	*Astyanax aeneus*
Maya cichlid	*CIchlasoma uropthalmus*
Red head cichlid	*CIchlasoma synspilum*
Yellowbelly Cichlid	*Cichlasoma salvini*
Blue-eyed Cichlid	*Cichlasoma spilurum*

Diurnal and nocturnal sampling of the fish populations of Soldier Creek took place during the fieldwork, with results showing that species at both sample sites were typical of freshwater ecosystems of the coastal plain in Belize.

White Ridge Ponds

Sampling was also conducted in the Eleocharis swamp in the White Ridge property. The freshwater swamp and drainage ditches were reportedly the result of road construction on the property, and hold a diverse and seemingly abundant fish population.

Fish Species of White Ridge Eleocharis swamp	
Firemouth cichlid	*Cichlasoma meeki*
Maya cichlid	*CIchlasoma uropthalmus*
Bay Snook	*Petenia splendida*
Yucatan Mosquitofish	*Gambusia yucatana*
Mayan tetra	*Hyphessobrycon compressus*
Central tetra	*Astyanax aeneus*
Green swordtail	*Xiphophorus helleri*
Mangrove molly	*Poecilia orri*
Buttersea	*Rhamdia sp.*
Fat sleeper	*Dormitator maculatus*

Several species of cichlid were observed, including the predatory bay snook (*Petenis splendida*), as well as other typically freshwater species such as the Mayan tetra (*Hyphessobrycon compressus*) and the green swordtail (*Xiphophorus helleri*).

Condition of fishing resources

Fish stocks within the Gales Point Wildlife Sanctuary are considered to have fallen significantly since the arrival of gill nets between ten and fifteen years ago. Whilst there has been a recent recovery with the banning of gill nets from all but Western Lagoon, the general perception within the community is that stock are still down on previous levels. A socio-economic survey covering 96% of the occupied households of the community was conducted within Gales Point in October, 2007 to provide baseline data and input into this Management Plan and the Community Development Plan (Wildtracks, in prep.). This survey included responses on community perception of the state of the fishing stocks, with the following outputs:

- 79% of respondents believe the condition of fishing has decreased over the last 5 years
- 21% think it has stayed the same
- 0% believe it has improved

- When asked to rate the fisheries resource in 2002 and 2007, only 30% rated fisheries as 'Very Good', the majority rating it as 'Good' (Table 15).

Fisheries condition	2002	2007
Very good	30%	0%
Good	64%	15%
Not good	3%	42%
Bad	0%	24%
Very bad	3%	18%
	100%	100%

Table 15: Community perception of the condition of the Southern Lagoon fish stock over the last 5 years

- The majority of respondents believe that over-fishing, largely caused by gill nets is the main reason for the decline in fishing resources (Figure 6). Also cited was the detructive effect of shrimp trawlers on the sea grass beds contiguous to the coast, destroying benthic habitat and depleting juvenile fish stocks that would otherwise enter the lagoon

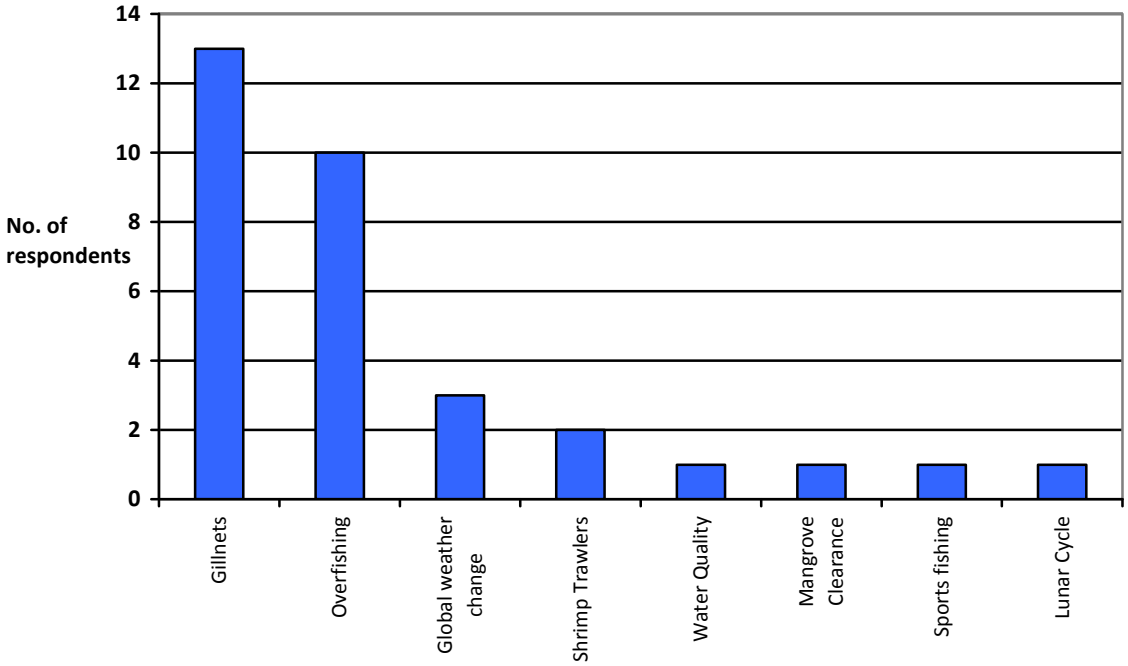


Figure 6: Reasons Cited for Decline in Fish Stocks

- In Buttonwood Lagoon, invasive tilapia is considered to have more or less replaced crana (*Cichlasoma uropthalmus*), stone bass and snapper
- Fish are considered 'not available' and 'too expensive' for locals to buy, especially elderly people on low incomes - fish are generally sold to wholesalers

When asked to provide possible solutions, respondents suggested the following:

- 33% suggested a ban on gill nets
- 12 % suggested placing limits on fishing times and number of fish caught
- 9% suggested increasing the enforcement of community fishing regulations in Southern Lagoon
- 9% suggested setting aside non-fishing zones
- 9% suggested provision of alternative livelihoods
- 9% suggested establishing a fishing moratorium

Management strategies and actions are focused on developing a Sustainable Fisheries Plan, with the phasing out of gillnets, to provide the Gales Point community with a mechanism to lobby with Forest Department to allow continued traditional use of the fish resources of the lagoons and creeks.

2.5.4 Past and Present Research

Southern Lagoon was first highlighted as of conservation interest for its high Antillean manatee population by first **Bengston and Magor (1979),** then later by **O'Shea and Salisbury (1991).** This and subsequent work was summarized in **Morales et. al. (2000).**

A series of baseline research activities for the Gales Point area took place in 1994, as part of the Gales Point Natural Resources Project, to provide background for the designation of the area as a Special Development Area:

- During the 1994 vegetation inventory of the Manatee Special Development Area **(Lyon, 1994)**, a series of 12 permanent vegetation plots were established throughout the Southern Lagoon area, with a summary report on the vegetation of the area. Unfortunately, these plots have not been maintained, and when revisted, the plot markers could not be located.

- **Augusta and Adrewin (1993)** conducted a preliminary survey of the primates of the area – the Central American spider monkey and Yucatan howler monkey, and **Augusta** then went on to provide an overview of the Antillean manatee population within Southern Lagoon, and developed a set of conservation recommendations.

- A brief survey by **Greenlee (1994)** established the initial mammal species list for the area, in collaboration with the hunters, concentrating on the terrestrial mammal species, and **Smith et *al.* (1995)** completed an overview of turtle nesting activity.

- A brief survey of the lagoon system was completed by **Platt and Thorbjarnason (1997)** as part of a country wide survey on the distribution of American Crocodiles in Belize.

- A biodiversity assessment of the Southern Lagoon area was conducted by **Walker and Walker (2007)** for Wildlife Trust and the Gales Point Wildlife Sanctuary Community Management Committee, to update biodiversity information available on the area for management planning

- A Rapid assessment of goliath grouper and elasmobranchs in Soutehrn Lagoon-Gales Point Manatee was conducted by **Graham and Polonio (2007),** to provide information on this critically endangered species, to integrate with national data.

Since 1996, **Wildlife Trust** has been engaged in the long-term conservation of the manatee (*Trichechus manatus manatus*) in Belize, through a combination of scientific research, professional training, and public education focusing on manatees that reside or use the Southern and Northern Lagoons.

2.6 Cultural and Socio-Economic Values of Management Area

2.6.1 Community and Stakeholder Use

Southern Lagoon is used by all households except one within the Gales Point community, - for fishing, swimming, transport, or as a tourism resource (Figure 7). The most common use of the lagoon is for fishing, with 81% of households engaged in this activity, either for household use, commercial or recreational purposes.

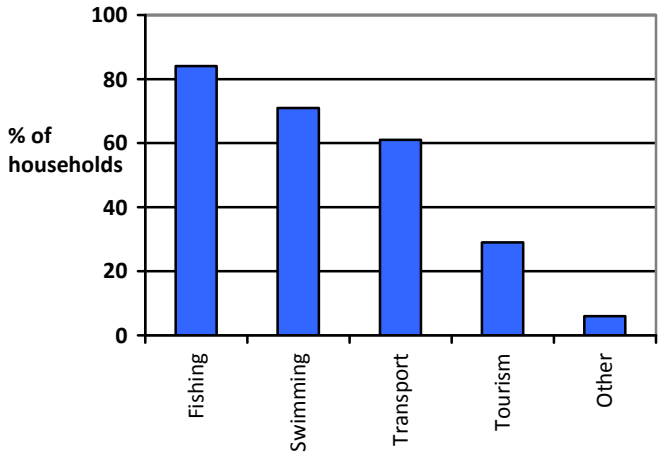
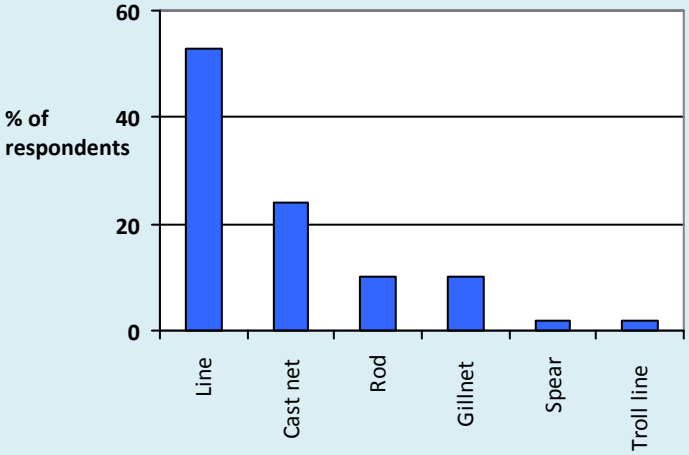


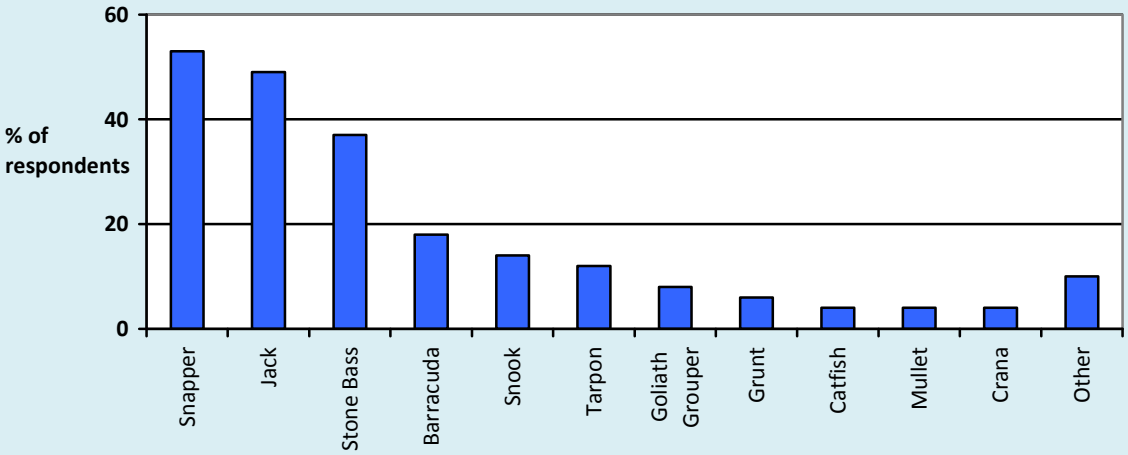
Figure 7: Use of Southern Lagoon by households within Gales Point

The community survey (October, 2007) provided extensive information on fishing activities within the Gales Point Wildlife Sanctuary (Figure 8) – fishing methods employed, the preffered fish species targeted, the number of years respondents have been using the Lagoon for fishing, what percentage of their total catch is from the Lagoon, and how regularly they fish - emphasizing how important this activity is for the majority of inhabitants. There is a concern that currently, use is unsustainable, with depleted fish stocks.

Whilst 71% of respondents noted that they used the lagoon for swimming, a number also commented that they had concerns about the water quality – from solid waste disposal in the waters on the west side of the peninsula, from poor sewage disposal, and agrochemical pollution.



Fishing Equipment Used in GPWS



Preferred Fish Targeted in GPWS

Number of years fishing in GPWS	
Years	***% of respondents***
<5 yrs	7%
5-10 yrs	10%
>10 yrs	83%
Total	**100%**

% of total catch from GPWS	
% of catch	***% of respondents***
0 – 25%	3%
25 – 50%	17%
50 – 75%	23%
75 – 100%	57%

Frequency of fishing	
Time Period	***% of respondents***
Every 1 – 5 days	43%
Every 1 – 2 weeks	30%
Once a month	10%
< Once a month	17%

Figure 8: Results from Socio Economic Survey on Use of Gales Point Wildlife Sanctuary as a Fisheries Resource

2.6.2 Archaeological Sites

Signs of Maya settlements can be found on the higher lands adjacent to Southern Lagoon, such as Tiger Point and Gales Point itself, as well as on the banks of the Manatee River. These communities appear to have been relatively small, and probably dependent on the river and lagoon resources. The Xibun Archaeological Research Project (XARP) completed an initial investigation of the ancient Maya settlements, cave systems and associated Maya pottery of the Sibun-Manatee karst area, concentrating on the Sibun river valley, a few kilometers to the north of the Southern Lagoon area, indicating a Maya presence during the Terminal Classic period, between AD700 and AD1000, over 1000 years ago (McAnany and Thomas, 2003). Ceramic shards within caves adjacent to Southern Lagoon suggest that the karst areas in the immediate proximity were used in a similar way, though looting has removed the majority of the vessels that once existed from this era.

Studies have shown that water level during the Classic Maya period was significantly lower than is is today, and other coastal lagoons (particularly Punta Ycacos) have been shown to have been important salt works during ancient Maya times. Whilst little work has been conducted within Southern Lagoon itself, it is possible that it, too, may have had a similar function before being inundated by rising sea levels. There is no continuity of settlement between the Maya settlements and the present Gales Point community.

The area returned to its natural state after the decline of the Maya, and was not resettled and cleared until colonial days, when large plantations were established along the Manatee River, Cornhouse Creek and Soldier (or Plantation) Creek.

These human influences have helped to shape the current forest structure throughout the watershed, and along the river banks, selecting for some semi-domesticated tree species (such as sapote), providing conditions suitable for the expansion of others such as cohune, and removing some tree species through over-harvesting.

2.6.3 Tourism and Recreation Use

In the last 10-15 years, Gales Point has built on its cultural traditions and natural resources to create a small scale tourism base, and recognizes the need for active management of the Wildlife Sanctuary and adjacent natural areas and wildlife if this industry is to expand in the future. Without further tourism, this small community and its rich culture will not be able to develop the economic base necessary for its survival.

Sport fishing has been lucrative in the past, with the establishment of the Manatee Lodge, and has potential to provide community members with economic opportunities, either as fly-fishing guides, boat captains, or in tourism-associated services. However there is currently a conflict with the level of commercial fishing within the lagoon, which is reducing the sport fish populations.

Development for tourism is addressed in more details as part of the Community Development Plan (Walker and Walker, in prep.).

Currently, a number of hotels / guest housess operate in the area - **The Gales Point Bed and Breakfast Association** established eight local Bed and Breakfast operations as a community project, with the capacity to lodge twenty guests. The Association established uniform prices for meals and lodging, and implemented strict guidelines for its members. Falling visitation, with the increasing problems of access, has unfortunately led to several of these rooms no longer being available. **Gentle's Cool Spot** is a well established, basic, family-run guesthouse with restaurant facilities whilst the **Manatee Lodge** is targeted at wealthier visitors. First established as a sport fishing hotel, the Manatee Lodge now caters more for tourists interested in the scenic values of the area, and student groups interested in the local culture and manatees, and provides some employment for tour guides from Gales Point.

Two camping grounds are also open - **Emmett's Camping Grounds and Metho's Coconut Camping**, for low-budget travellers interested in village culture and the traditional drumming schools.

Several larger developments have been prosposed in the general area - **White Ridge Eco-Tourism Resort Hotel Development** was proposed as an up-scale eco-tourism resort, catering for a maximum occupancy of 120 guests. This, however, has not been achieved. Also proposed is a coastal developement situated on north Manatee Bar, by **Belize R'Us Resorts & Tours Ltd,** with a maximum capacity of 150 guests. It is expected that as Belize becomes more popular as a tourism and retirement destination in the future, more of these projects will be proposed, and at least some will come to fruition.

2.6.4 Other Economic Use

No other economic uses have been listed for Gales point Wildlife Sanctuary within the GPWS boundaries.

2.6.5 Research and Education Use

Research activities have been ongoing under Wildlife Trust, in collaboration with the Gales Point Wildlife Sanctuary Community Management Committee, focused primarily on manatee populations and sea grass.

Telemetry tagging is being used to observe manatee movements both within the lagoon system and adjacent waters, and has highlighted several examples of long-distance movement, especially in males. Analysis of data will help determine which social class of manatees (e.g. males, females, juveniles, lactating females) are seasonally or permanently resident in Southern Lagoon, and how distribution within the lagoon system corresponds to available resources – seagrass, freshwater etc.

The objectives of this long-term project are:

- to determine the ranging patterns, threats, and health of manatees in the Southern Lagoon area (near Gales Point, Belize), to assess the conservation status of this manatee population;
- to provide information and advice to the Gales Point community and government bodies on how to best observe manatees with minimal impact;
- to provide ecological information to various organizations that can be used for the development of a conservation management plan for Belizean manatees.

The project also serves as a valuable training site for marine mammal conservation scientists from around the world; students from Cuba, Guatemala, Ivory Coast, and USA have completed internships at the site.

Integrated into the overall programme is assessment and monitoring of the seagrass within the lagoon system, in partnership with the Meso-American Barrier Reef System project, which has provided training, providing further information on the Southern Lagoon ecosystem. Future analysis will be conducted looking at correlations between the physical water parameters with vegetation availability and changes in established, long-term manatee distribution patterns (N. Auil, pers. com.).

More recently, there has also been increasing interest in research on goliath grouper within the lagoon system, both by Wildlife Trust and by Wildlife Conservation Society.

3. Conservation Planning

This conservation planning section looks at the species and ecosystems of concern, at the threats that impact them, and the strategies that can be used within the management of the area to abate these threats.

3.1 Conservation Targets

Conservation targets may be species, species assemblages or ecosystems that are selected as representing the biodiversity of a protected area – such that strategic actions, taken to ensure their continued viability and reduce the pressures impacting them, will adequately address the needs of the system as a whole.

3.1.1 Identification of Conservation Targets

As a first step in the conservation planning process, six conservation targets were chosen, at a coarse enough scale to encompass the diverse guilds and individual species of conservation concern. Two of these targets are broad ecosystem categories, one is a species assemblages, and three are individual species.

- Aquatic, Estuarine and Riparian Ecosystems
- Mangrove and Littoral Forest Ecosystems
- Native Fish Species
- West Indian Manatee
- Central American River Turtle
- Goliath Grouper

Also selected was a seventh target, outside of the scope of the Gales Point Wildlife Sanctuary:

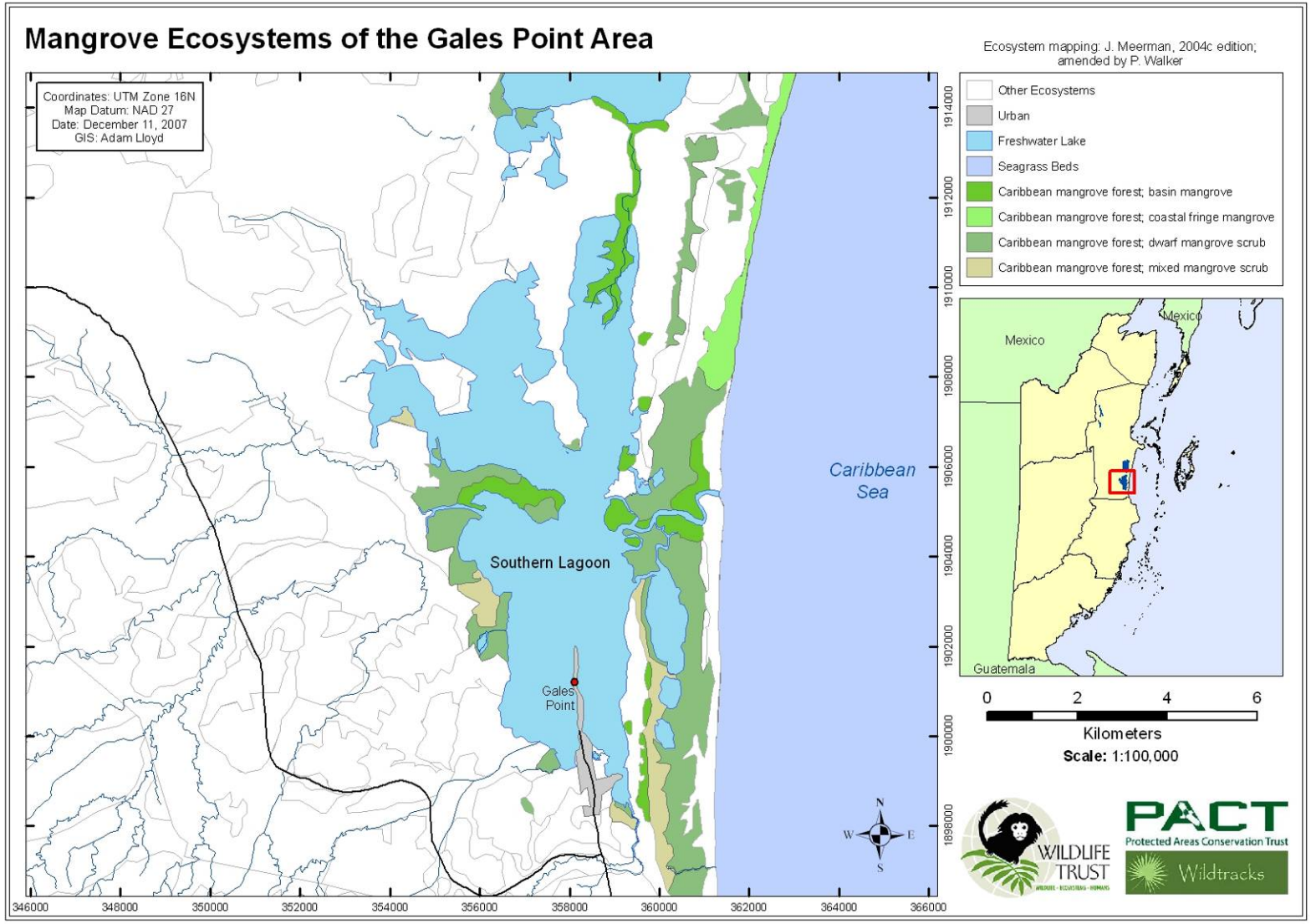
- Sea turtle nesting beach

…as this is considered not only a global priority, but also a community priority, and activities for management are already in progress.

Ecosystems, plants and animals of conservation concern were nested under the broader conservation elements listed above, on the understanding that strategies designed on the broader scale would be effective on those species nested within.

Conservation Targets of Gales Point Wildlife Sanctuary		
Conservation Target	**Justification for Target Selection**	**Species, Communities or Ecological Systems represented by Target**
Aquatic, Riparian and Estuarine Ecosystems	The freshwater systems of Manatee River and the creeks that drain the Manatee watershed and flow into Southern Lagoon are considered vital for maintaining flow through the lagoon system, and for controlling water salinity. The estuarine lagoon system is considered important as a fisheries resource for the traditional fishing carried out by the Gales Point community, as well as for sport fishing activities that draw visitors to the area. It also contributes significantly to the scenic values of the area.	These freshwater systems and the associated riparian vegetation are used by a number of species of concern such as muscovy duck and agami heron. It also provides habitat for the near threatened Morelet's crocodile (*Crocodylus moreletii*) and the slider (*Trachemys scripta*). It is considered to have a relatively healthy freshwater fish fauna, though somewhat reduced by local fishing activities, and by fishing from other communities. The critically endangered Central American river turtle (Dermatemys mawii) occurs in some areas of these habitats, and is included as a conservation target in its own right. It is expected that the Near Threatened Water Opossum (*Chironectes minimus*) and the Neotropical river otter (*Lontra longicaudis*) will also occur here. The estuarine lagoon system is considered important as a fisheries resource for the traditional fishing carried out by the Gales Point community, and has been highlighted as important for the maintenance of the critically endangered goliath grouper (*Epinephelus itajara*) and Antillean Manatee (*Trichechus* manatus), both included in conservation planning as targets in their own rights. The vulnerable mutton snapper (*Lutjanus analis*) has also been recorded here, along with several sport fishing species – permit, tarpon and jack among them.

Conservation Targets of Gales Point Wildlife Sanctuary		
Conservation Target	**Justification for Target Selection**	**Species, Communities or Ecological Systems represented by Target**
Mangrove and Littoral Forest Ecosystems	The lagoon system of the Gales Point Wildlife Sanctuary has been highlighted as important for the protection of the extensive estuarine mangrove areas found in the shallow waters and lining the brackish areas of rivers and creeks (Zisman, 1992). This Belizean Coastal Mangrove ecoregion extends along the coast of Belize as far south as the Bahia de Annatique in Guatemala, and is recognized for its importance in coastal protection filtration, and as a nursery for many fish species, including reef and estuarine species considered to be commercially important. It is considered 'vulnerable' (WWF Ecoregions Programme (WWF, 2001) with increasing threat of clearance for aquaculture and coastal development throughout its range. Whilst only a limited amount of littoral forest is present adjacent to the lagoons, this ecosystem is particularly vulnerable from human development as it occurs on the higher water-side areas targeted by developers. Map ..: Distribution of mangrove ecosystems within the Gales Point Wildlife Sanctuary	Mangroves are recognized for their importance in maintaining commercial fish populations (including the juvenile Goliath Grouper, included as a conservation target in its own right). The mangroves support a number of nesting and feeding waterbirds – white ibis (*Eudocimus albus*), boat-billed herons (*Cochlearius cochlearius*), bare-throated tiger-herons (*Tigrisoma mexicanum*) among them. The near threatened black catbird (*Melanoptila glabirostris*), a mangrove associate, has also been identified within the Gales Point area. Littoral forest is considered important for migratory warblers, as well as for its stabilizing influence on beach integrity. Its removal to make way for coconut plantations along the coastal bar adjacent to the Sanctuary is the most likely cause of beach subsidence that is impacting nesting success for the critically endangered hawksbill turtle.



Map 15: Mangrove Ecosystems of the Southern Lagoon Area

Mapping: A. Lloyd; Wildtracks

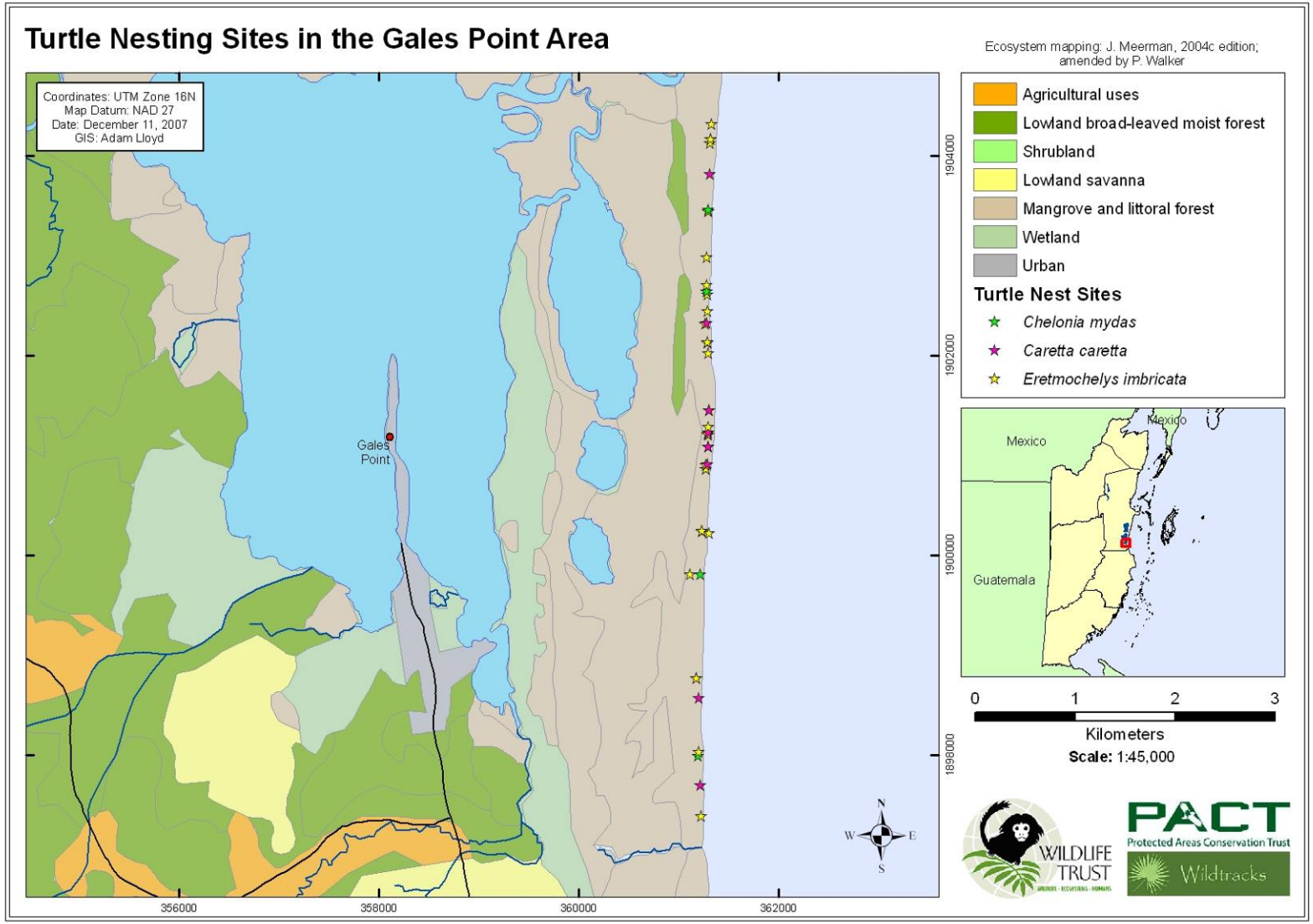
Conservation Targets of Gales Point Wildlife Sanctuary		
Conservation Target	**Justification for Target Selection**	**Species, Communities or Ecological Systems represented by Target**
Native Fish Populations 	Southern Lagoon has been traditionally important for its abundant fish stocks since before the establishment of Gales Point itself, and is still considered very important to the community. Increasing pressure on the fish stocks is thought to have started 10 to 15 years ago, with the use of the first gillnets within the lagoon system. This has caused a massive drop in population numbers generally over the last ten years, with the local extermination of the sawfish from the system, and alarming decreases in population numbers of the critically endangered Goliath Grouper (*Epinephelus itajara*) and cubera snapper (*Lutjanus cyanoptera*). It is also considered to be one of the reasons for the decline in shark presence within the lagoon system (Graham et. al, 2007). Some local reports also suggest that *Tilapia* are replacing some of the local species in Buttonwood Lagoon, with the potential to spread through the less saline areas of the lagoon system.	All commercial fish species of the Southern Lagoon system, including those important to the sport fishing industry. Of particular concern is the critically endangered Goliath Grouper (*Epinephalus itajara*) and cubera snapper (*Lutjanus cyanoptera*). Lower fish populations will also affect pescivores – the osprey, herons and egrets, Morelet's and the American crocodile, and the Neotropical river otter among them.

Conservation Targets of Gales Point Wildlife Sanctuary		
Conservation Target	**Justification for Target Selection**	**Species, Communities or Ecological Systems represented by Target**
Antillean (West Indian) Manatee 	The Antillean manatee, a flagship species of the Gales point area, has been chosen as a conservation target due to its cultural importance to the Gales Point community, and for the potential threats it may be facing with increased disturbance from tourism, increased risk of boat impacts, and the potential impacts on sea grass beds from lagoon-side developments and associated dredging activities. It is also an important tourism resource for the Gales Point community, being found throughout the lagoon systems. This species, considered threatened throughout its range, is listed as Vulnerable under the IUCN categories (IUCN 2006). Based on aerial survey counts and other surveys, Belize reportedly has the largest population of this subspecies within the Wider Caribbean (Auil 1998; Quintana-Rizzo & Reynolds, 2006 in review), with an estimated population of about 1000 individuals (Auil, pers. com.). Southern Lagoon has been highlighted as one of six areas in Belize that have been found to be consistently important to manatees (Auil, 1998; O'Shea and Salisbury 1991), with the availability of freshwater, seagrass and sheltered areas. There is estimated to be a resident population of approximately 150 individuals (Auil, pers. com.).	Whilst this conservation target has been chosen because of specific threats it faces, it is considered a good umbrella species for the health of seagrass ecosystems, and the health of the estuarine lagoon system generally, as well as being an early indicator of disturbance through land development and increased boat activities, being the first and most obvious species to stop utilizing the area.

Conservation Targets of Gales Point Wildlife Sanctuary		
Conservation Target	**Justification for Target Selection**	**Species, Communities or Ecological Systems represented by Target**
Central American River Turtle 	The critically endangered Central American River Turtle or 'Hicatee' (*Dermatemys mawii*) has been selected because of specific threats to the viability of not only the population at local level, within the project area, but also at national and regional level. Being erroneously classified as 'fish' by the Catholic Church, freshwater turtles are subject to very heavy hunting pressure during the period of Lent, when the consumption of red-meat is discouraged. Extirpated from much of its range in Mexico and Guatemala as a result of hunting pressure, this species is also in significant decline in Belize. Unless effective conservation strategic actions are implemented in the near future, it is likely that the remaining populations of this culturally important species will be lost throughout most of Belize. Manatee River, Cornhouse Creek and Soldier Creek, and seasonally, in wet season when the lagoon salinity decreases, the western drainage of Sapodilla Lagoon, are all known to provide habitat for the hicatee. Fishermen, hunters and members of the GPWSCMC report that the hicatee is still relatively easily found in some of the freshwater drainages, but that its numbers are significantly reduced, and that large specimens are now scarce. The Gales Point community is likely to be co-operative with conservation actions aimed towards securing the long-term presence of this species within the freshwater ecosystems of the protected area –particularly if there is strong community participation in the field work and development of conservation guidelines. A species recovery plan is urgently needed, which will need to address the critical conservation requirements of the species.	Whilst the hicatee (with its vegetarian diet and resulting distinctive taste) is a particularly popular food item in Belize during the time leading up to Easter, other species such as the slider (*Trachemys scripta*) and the Mexican giant musk turtle (*Staurotypus triporcatus*), which have some habitat overlap with the hicatee, have both suffered as well. Conservation actions to relieve pressures on the hicatee are likely to benefit these species and have broader implications regarding increased public awareness of the declining natural resources of the area.

Conservation Targets of Gales Point Wildlife Sanctuary		
Conservation Target	**Justification for Target Selection**	**Species, Communities or Ecological Systems represented by Target**
Goliath Grouper	Goliath grouper, large, conspicuous, solitary fish, are considered critically endangered on a global scale (IUCN, 2007). As a large, commercial species, it has been targeted heavily in Belize, and numbers have been decreasing rapidy. Goliath grouper are present in the Southern Lagoon system, which is considered important as a sub-adult / young adult 'growing-out' area (Graham et. al., 2007), and highlighted for further studies. Juveniles rely heavily on the protection of mangroves, such as those of of the Bar River area, though no studies have been conducted to show how important these mangroves are to grouper populations within the lagoon.	Many strategies to protect goliath grouper should provide protection for other commercial fish species.

Conservation Targets of Gales Point Wildlife Sanctuary		
Conservation Target	**Justification for Target Selection**	**Species, Communities or Ecological Systems represented by Target**
Sea Turtles 	Whilst not included within the conservation planning for the Gales Point Wildlife Sanctuary (because it nesting beaches occur outside the Sanctuary), the hawksbill turtle (*Eretmochelys imbricata*) is a focus of conservation activities within the area, and should therefore be included within the scope of the management plan. This species is recognized as Critically Endangered (IUCN, 2006), and is fully protected under Belize legislation Manatee Bar, immediately south of the mouth of Bar River, was until recently considered one of the six most important nesting beaches in the Caribbean for the hawksbill turtle (Smith, et *al*., 1992), with over 100 active nests having been recorded there in a single year. Recorded nests have however dropped by over 50% in the last ten years (Majil, 2005), and only 39 nests were recorded by late August in the 2007 season (K. Andrewin / Wildlife Trust, unpubl.). With very high nesting beach fidelity, and extremely limited migration between Caribbean populations, the population of hawksbills nesting on Manatee Bar appears to be in sharp decline and is clearly in immediate need of highly effective conservation measures to address and reverse the current trend if this regionally important population is not to be lost permanently within the next 10-20 years. An identified critical issue is beach sinkage (resulting in low hatch success), probably the result of past clearance of littoral forest for coconut plantations.	Green and loggerhead turtles also use the beach for nesting, and beaches such as this are considered important nesting habitats for American Crocodiles (*Crocodylus acutus*). Strategic actions to enhance nesting success of the hawksbill turtle will also benefit the other sea turtle species. Actions are also included to address the need for re-establishment of the remnants of littoral forest that help stabilize the nesting beaches.



Map 16: Sea Turtle nests on the Coast, Manatee Bar

Mapping: A. Lloyd; Wildtracks

3.1.2 Assessment of Conservation Target Viability

For each conservation target, the viability of each of the conservation targets (Table 1) is assessed to give a reflection of their abundance and condition. Each is rated as Very Good, Good, Fair, or Poor, based on site specific knowledge of the ecosystems and species chosen, local knowledge and social conditions, using the viability ratings developed by TNC.

Viability Ratings **(Adapted from TNC 5-S System)**

Very Good: Requires little or no human intervention to maintain conservation target at acceptable level (e.g. healthy, breeding populations, minimally impacted ecosystems)

Good: May require some human intervention to maintain conservation target at acceptable level (e.g. reducing / preventing hunting pressure)

Fair: Requires human intervention - if unchecked, the conservation target will be seriously degraded

Poor: If allowed to remain in the present status, restoration or preventing local extinction will be impossible

Justification is provided for the current viability rating, and a future viability goal is determined that is considered feasible within the 5-year term of the management plan, assuming the identified strategic actions are successfully implemented. Viability indicators are also listed, so that the GPWSCMC can monitor viability on an ongoing basis.

Conservation Targets – Current Viability Rating			
Conservation Target	**Current Rating**	**Goal**	**Justification for Rating, Goal and Indicator**
Aquatic, Riparian and Estuarine Ecosystems	**Good**	**Very Good**	***Justification:*** The condition of these ecosystems is critical to the viability of all species within the protected area. There is concern about chemical runoff from agricultural lands upstream, within the watershed, and increasing sedimentation load from gravel mining - increasing sedimentation load; question of poor sewage disposal and fecal contamination.
			Goal: Improve and then maintain water quality within Gales Point Wildlife Sanctuary
			Indicators: Land clearance in riparian belt; length of creeks and rivers adjacent to agricultural areas; gravel extraction ; faecal coliform counts in water adjacent to areas of development (including Gales Point)
Mangrove and Littoral Forest Ecosystems	**Very Good**	**Very Good**	***Justification:*** With the threat of increasing coastal and lagoon edge development, and high value of water front land, these ecosystems are particularly vulnerable, despite their importance in stabilizing shores, and, in the case of mangroves, their function as important nursery areas for commercial and non-commercial fish species. It must be noted that very little littoral forest vegetation occurs within the Sanctuary, and that the larger areas outside the Sanctuary have a very much lower viability. Identified as the highest priority is the littoral vegetation of the turtle nesting beach
			Goal: To maintain the integrity of water-side vegetation, both on the coast (where littoral forest restoration is needed for stabilizing the nesting beach) and within the protected area
			Indicators: Clearance of mangrove; clearance of littoral forest

Conservation Targets – Current Viability Rating			
Conservation Target	**Current Rating**	**Goal**	**Justification for Rating, Goal and Indicator**
Native Fish Populations	**Fair**	**Good**	***Justification:*** Reduced fish populations due to non-sustainable fishing practices. Competition from invasive species - *Tilapia* - within the system. Significant input from management required to improve status
			Goal: Improved fisheries resource within Gales Point Wildlife Sanctuary, with extraction, if permitted, being sustainable
			Indicators: Fish catch data; species abundance; size class distribution; ratio of native species to *Tilapia*
West Indian Manatee	**Good**	**Good**	***Justification:*** The population fluctuates with changes in sea grass availability, with individuals moving in and out of the system. There are no indications of anthropogenic mortality within the system, but there is an increasing risk both within and outside the protected area, with the increasing number of boats.
			Goal: Maintain current size and condition of manatee population in the Gales Point Wildlife Sanctuary
			Indicators: Numbers of manatee, condition of manatee, reproductive success, incidences of mortality
Central American River Turtle	**Fair**	**Good**	***Justification:*** Reduced population and recruitment caused by hunting pressure, due to high value as a traditional food source. Declining population in Belize, with global status of 'critically endangered'
			Goal: Improve viability of hicatee population within Gales Point Wildlife Sanctuary
			Indicators: Relative abundance (numbers) of hicatee, size class distribution of hicatee
Goliath Grouper	**Poor**	**Fair**	***Justification:*** Pressure on grouper is considered to be high, with significant management input required to assist population recovery.
			Goal: Continued increase in population numbers
			Indicators: Species abundance, size class distribution
Hawksbill Turtle	**Fair**	**Fair**	***Justification:*** Whilst the turtle populations are reproducing, they are doing so in low numbers with low recruitment and with continued pressure globally on the adult population. There is heavy predation on hatchlings and eggs, and problems with overwash, despite efforts to increase patrols on the turtle nesting beach.
			Goal: Continued increase in successful nesting
			Indicators: Number of nests, percentage of successful nests and hatching success

Summary of Conservation Target Viability – Prioritisation

Using the Viability Ratings, it is possible to prioritize the conservation importance of each of the Conservation Targets within the Gales Point Wildlife Sanctuary, to assist decision making in allocation of funding and future project targets.

Priority	Conservation Target	Viability Rating
High Priority	*Goliath Grouper*	Poor
	Central American River Turtle	Fair
	Hawksbill Turtle	Fair
	Native Fish Species	Fair
Medium Priority	*West Indian Manatee*	Good
	Aquatic, Riparian and Estuarine Ecosystems	Good
Low Priority	*Mangrove and Littoral Forest Ecosystems*	Very Good

3.2 Threats to Biodiversity

A fully participatory threat analysis was conducted in 2006 for the biodiversity assessment process, with input from a wide range of stakeholders – particularly community hunters and fishermen, and members of Wildlife Trust with technical knowledge of manatee and sea grass dynamics in the area.

3.2.1 Identifed Threats

Fishing

Fishing has been a traditional activity within the Southern Lagoon area, with both men and women being involved in providing fish and shrimp for the table since the establishment of the Gales Point settlement, and continues today. The general consensus expressed during community consultations (2006 / 2007) is that fish populations have declined significantly over recent years, with increasing gillnet activity both within the lagoon and across the creek entrances. Quamina Creek, in particular, was highlighted during community consultations as having much lower fish populations than in past years. Fishing within a wildlife sanctuary is not permitted without special consent, there has not yet been a specific agreement signed for GPWS. The use of gillnets within a wildlife sanctuary is illegal (Forest Dept. legislation) as is gillnet use within a lagoon or creek (Fisheries Dept. legislation), though these nests are used by a small number of community members from Gales Point.

Local fishing pressure is generally concentrated within Western Lagoon, though several community members also fish using handlines and cast nets at sea, beyond Bar Mouth. There is broad consensus that there has been an overall decline in the number and size of fish being caught - bonefish and barracuda in particular have been highlighted as having decreased in numbers over recent years. One species, the small tooth sawfish (*Pristis pectinata*) is now considered locally extinct, possibly throughout Belize, following extensive fishing. The sawfish used to be present in Southern Lagoon in shoals numbering a hundred or more. The last individual to be seen in the system was in the 1960's (E. Myers, pers. com.). Whilst the cause of the decline is almost certainly predominantly fishing, it is also suggested that Hurricane Hattie had a major adverse effect on the population.

Fishing is not only affecting the larger, traditionally harvested fish species within the lagoon systems, but also the smaller *Astyanax aeneus* in Manatee River, Quamina and Soldier Creeks, with reports that both Central American immigrants and Chinese living within the Dangriga area catch these fish in large numbers as a supplemental food source (community consultations).

Recently, more active enforcement and awareness activities by Fisheries Dept. has reduced the use of 3" gill nets, and the practice of using nets over the creek mouths, which has resulted in an increase in numbers and size of commercial species such as the Goliath Grouper, though populations are still far below their original levels (community consultations). There is concern, however, over the effect the shrimp boats that fish in the coastal waters may have on recruitment of fish stocks to the lagoon system, and on the possible effect agricultural pollutants may have in the future, with the increase in the agriculture areas along the Coastal Road.

Hunting

All communities of the Manatee Special Development Area – Gales Point, La Democracia, Gracie Rock and Freetown Sibun, have traditionally hunted in the coastal broadleaf forests and savannas, both for the table and for commerce (Gales Point, Gracie Rock, pers com.). This constant pressure on the game populations has led to the local extinction of the white-lipped

peccary, and to the current low population levels of the smaller collared peccary, paca, armadillo and great curassow.

Some species, such as Baird's tapir, were hunted in the past, but are now starting to recover, as increased awareness of the conservation status of this species, of the penalties should hunters be caught, and the decrease in the commercial market, have now afforded this species a measure of protection.

Hunting within the Gales Point Wildlife Sanctuary is limited primarily to the 66' buffer vegetation of the riparian belt, and focused on paca.

Fire

Frequent anthropogenic fires on the pine savannas undoubtedly cause significant species shift and loss, and have had short term impacts on water quality, especially where short grass savannas occur at the water's edge. Most short-grass savannas in Belize are exposed to anthropogenic fires on an annual basis, sometimes even more frequently. These fires, primarily started by hunters aiming to attract white-tailed deer to the new shoots, have a pronounced impact on the ecosystem, eradicating pine trees, and often the associated oaks and madre-de-cacao stands. Some fires on the savannas to the northwest of the Gales Point Wildlife Sanctuary are reported as being started by cattle farmers from Freetown Sibun, who allow their cattle to graze across these coastal savannas

Whilst not directly affecting the lagoon system, fires do encroach on the 66' buffer vegetation, and the frequent burning of the adjacent savannas during the dry season is thought to affect the water quality, as sheet water washes the ash into the lagoon from the flooded savannas during the wet season.

Water-side Development

Potential development within the area is an increasing cause for concern, with the recently completed Environmental Impact Assessment for BelizeRus Resorts and Tours, located on Manatee Bar, north of Bar River (Tunich-Nah Consultants and Engineering, 2005). Whilst ecotourism development is welcomed in Gales Point, with the benefits of increased employment, the prime location of potential developments is generally in sensitive areas such as the coastal beaches and lagoon and river-side banks, and often have plans that include clearance of mangroves and littoral forest, dredging activities, and potential to increase uncontrolled boat traffic. Developers generally, however, are open to recommendations on mitigation actions, I engaged early on in the process, and willing to work with the Management Committee.

3.2.2 Review of Current Situation – Areas of Concern

Several areas of concern have been identified for Gales Point Wildlife Sanctuary and adjoining lands, both in previous reports (FAO, 1978; Horwich; McGill, 1994; Manatee Advisory Team, 1992; Wilson, 1995; Zisman, 1996), and from community consultations. Recognition of the importance and fragility of the ecosystems resulted in the declaration of the area as the Manatee Special Development Area in 1992, and the Gales Point Wildlife Sanctuary in 1998.

Southern Lagoon complex

The extensive Southern Lagoon complex has been highlighted for its importance for the critically endangered West Indian manatee and goliath grouper, as well as for sport fish stocks and local commercial fish species. This system is shallow in depth, and therefore particularly sensitive to chemical runoff, siltation and changes in water quality. Water feeds into the lagoon

system from three primary sources, dependent on tidal flows – from the rivers and creeks of the Manatee watershed, from Northern Lagoon through Main Creek, and from the Caribbean Sea, through Bar River. Land use change in any of these areas may disrupt the seagrass and mangroves on which many of the lagoon species are reliant.

Concerns that have been highlighted within this area include:

- Mangrove clearance or filling for development, removing important juvenile fish habitat
- Development in 66' adjacent to Southern Lagoon
- Potential water contamination from septic tank waste, particularly during storm flood events or through poorly designed septic systems
- Potential water contamination from agricultural chemicals
- Dredging and canal digging activities within and adjacent to the lagoon area, potentially causing siltation of the seagrass beds
- Impacts of speeding boats on bank erosion, and increased potential for boat collisions

Rivers and Creeks

Southern Lagoon is fed by a number of rivers and creeks the majority of which start in the karst hills, then drain the pine savannas, before emptying into the lagoon system.

Concerns that have been highlighted within this area include:

- Clearance of 66' buffer riparian vegetation, with associated bank erosion and problems of increased sediment load
- Agricultural runoff from farmland, particularly in Quamina Creek (which has at times been used for drinking water collection)

Coastal Lands

Whilst only the lower reaches of Bar River and Bar Mouth are located within the Wildlife Sanctuary, approximately 21 miles of coast lie within the SDA, forming an important storm barrier, protecting the lagoon and Gales Point from the storm surges that have accompanied hurricanes in the past. This band of mangrove and swamp, stretching from one and a quarter to two and a half miles wide, also provides an important function in the filtration of sediment runoff before water from the Manatee Watershed reaches the sea and the reef.

Concerns that have been highlighted within this area include:

- Erosion rate of the beach was highlighted in consultations during the SDA development process
- The rate of sinking of the beach was highlighted during community consultations in 2006, resulting in overwash, causing mortality in the turtle eggs
- Potential and active development impacts in the coastal area, particularly in the Hawksbill nesting area, with associated mangrove and littoral forest clearance
- Predation of hawksbill turtle nests by both wild animals and dogs
- Artificial lights impacts on hatchling turtles
- Impact of shrimp boat activity offshore on the recruitment of fish to the lagoon system and the health of the turtle population
- Impact of potential dredging and shrimp boat activities on seagrass beds
- Impacts of boat traffic on manatee – especially in the Bar River area
- Fishing impacts by gill net fishermen both from Gales Point and outside the area (including Honduras)

Wildlife - Areas of Concern

Mammals

- Increasing clearance of vegetation along creeks and rivers, removing connectivity of forest corridor – of particular importance to spider monkeys and howler monkeys
- Continued high scope and severity of fires on the savanna, reducing savanna species diversity, and reducing forest connectivity between broadleaf forest and riparian areas, affecting many mammal species – especially Central American spider monkeys
- Increasing impact on water quality from agro-chemicals, potential oil spills, and increased sediment load affecting seagrass and reducing fish populations and impacting the Antillean manatee and Neotropical river otter
- High hunting pressure from both Gales Point and other communities, reducing viability of prey species
- Increased boat traffic in Southern Lagoon, Bar River and Main Creek - active manatee travel routes - and frequent congregation areas such as Manatee Hole and Quashie Trap increasing probability of manatee strikes
- Threat of manatee drowning in gill nets – especially those placed across creeks and rivers with active manatee travel
- Unregulated tourism disturbing wildlife – particularly the Antillean manatee

Birds

- Fragmentation of broadleaf forest areas through land clearance for agriculture and tourism development
- Increasing clearance of vegetation along creeks and rivers, removing connectivity of forest corridor – of particular importance to riparian specialists such as the shy agami heron (*Agami agami*) and muscovy duck (*Cairina moschata*)
- Continued high scope and severity of fires on the savanna, reducing nesting viability of savanna specialists – including the 'endangered' yellow-headed parrot (*Amazona oratrix*) and the jabiru (*Jabiru mycteria*)
- High hunting pressure from both Gales Point and other communities, reducing viability of prey species such as the 'near threatened' great curassow (*Crax rubra*), and the crested guan (*Penelope purpurascens*)
- Unregulated tourism disturbing wildlife – particularly of bird nesting colonies on the mangrove cayes, mainly by inexperienced tour guides and increased boat traffic

Reptiles and Amphibians

- Land-use change (and associated impacts) in areas adjacent to marine turtle and American crocodile nesting beach areas
- Current poor nesting success and population recruitment of marine turtles, especially the critically endangered hawksbill turtle
- High hunting pressure from both Gales Point and other communities, reducing viability of some species – including the critically endangered Central American river turtle, the lower risk Mexican giant musk turtle (also known as the freshwater loggerhead), the lower risk slider, as well as the green iguana
- Fragmentation of broadleaf forest areas through land clearance for agriculture and tourism development
- Increasing clearance of vegetation along creeks and rivers, removing connectivity of forest corridor
- Continued high scope and severity of fires on the savanna, affecting both savanna and broadleaf species – direct fatalities, and habitat degradation
- Increasing impact on water quality from agro-chemicals, potential oil spills
- Potential direct kills of amphibians from agro-chemical pollution, as well as potential feminizing of males by atrazine-based herbicides
- Threat of crocodile and turtle drowning in gill nets – especially those placed across creeks and rivers
- Unregulated tourism disturbing wildlife – particularly the Central American river turtle

Fish

- Gill net fishing within the lagoon system and over creek mouths, reducing the viability of fish populations
- Unregulated traditional fishing – limited knowledge of scale of impact
- Increasing impact on water quality from agro-chemicals, potential oil spills, and increased sediment load, affecting seagrass and reducing viability of fish populations
- Increasing and unregulated fly-fishing by people from outside of the community may have the potential to affect the value of Southern Lagoon area for fly-fishing as an alternative income

3.2.3 Identifying Critical Threats

The critical threats to the Gales Point Wildlife Sanctuary are identified as:

- Unsustainable Fishing
- Hunting of hicatee (Central American River Turtle)
- Hunting in the 66'
- Water contamination through pollution and sedimentation
- Land use change in riparian and littoral forests, and mangrove ecosystems
- Increased boat traffic
- Tourism impacts

Rating Critical Threats

The critical threats are assessed by Area, Severity and Urgency, using the following criteria:

☐ **Area:** The area of the threat (how much of the conservation target area it affects)

Proportion of Area Affected (adapted from WCS)		
Criteria	**Score**	
Area	**4**	Will affect throughout >50% of the area
	3	Widespread impact, affecting 26 – 50% of the area
	2	Localized impact, affecting 11 – 25% of the area
	1	Very localized impact, affecting 1 – 10% of the area

☐ **Severity:** The severity of the threat – how intense or great the impact is

Severity Ranking (adapted from WCS)		
Criteria	**Score**	
Severity	**3**	Local eradication of target possible
	2	Substantial effect but local eradication unlikely
	1	Measurable effect on density or distribution
	0	None or positive

☐ **Urgency:** The likelihood of the threat occurring over the next five years

Urgency Ranking (adapted from WCS)		
Criteria	**Score**	
Urgency	**3**	The threat is occurring now and requires action
	2	The threat could or will happen between 1 – 3 years
	1	The threat could happen between 3 – 10 years
	0	Won't happen in > 10 years

<table>
<tr><th colspan="2">Threats to biodiversity of the Gales Point Wildlife Sanctuary</th></tr>
<tr><td>Unsustainable fishing</td><td>
Status: Active

Target: Native Fish Populations

Threats (Direct):

Reduced viability of native fish populations
Traditional fishing with cast nets and line;
Fishing with gill nets in the lagoon system;
Fishing with gill nets across creek mouths
Fishing by non-traditional fishers from outside of the Gales Point area (including Honduras);
Poor sport fishing practices (not catch and release)
Potential for gill net by-catch (particularly manatee, crocodile, hicatee)

Source (Indirect Threat):

Low income,
Lack of economic opportunities in the Gales Point area,
Protein supplement for diet
Limited technical capacity and lack of interest in sustainability (fly-fishing guides)

<table>
<tr><td>Area</td><td>4</td><td>Fishing is happening throughout Gales Point Wildlife Sanctuary</td></tr>
<tr><td>Severity</td><td>2</td><td>There has been a substantial effect on fish populations, but local eradication is considered unlikely</td></tr>
<tr><td>Urgency</td><td>3</td><td>The threat is occurring now and requires action</td></tr>
</table>
Management Goal:

Increased fish populations capable of supporting a sustainable traditional fishery, with reduced impacts through zoning, a system of traditional fishing permits, phased removal of gill net fishing, monitoring and enforcement

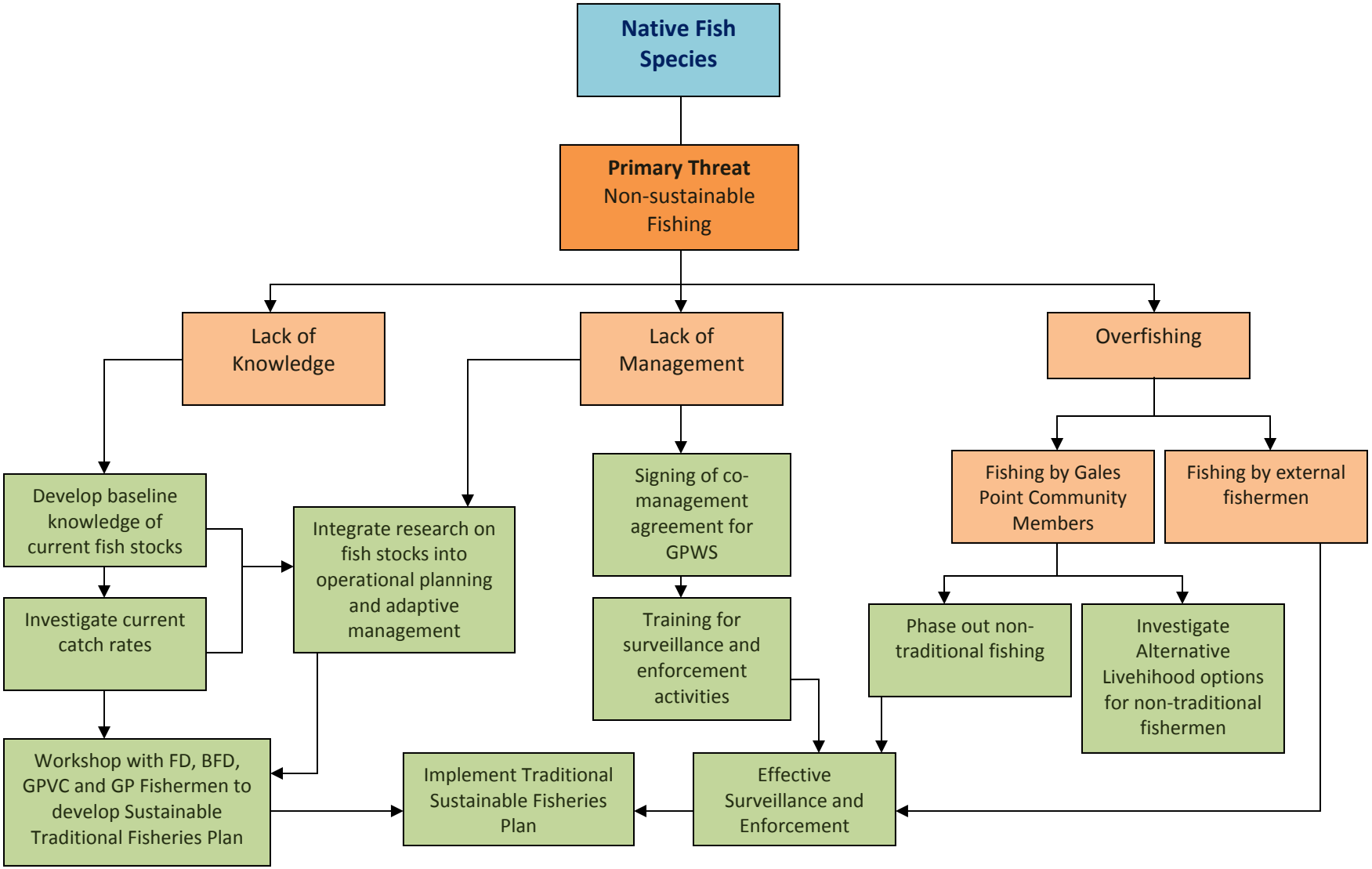
Management Strategies:

Strategy 1: Zonation of Southern Lagoon to allow fish stocks to recover in identified nursery areas

Strategy 2: Develop agreement between Gales Point Community, Gales Point Wildlife Sanctuary Community Management Committee, Forest Department and Belize Fisheries Department for development of sustainable traditional fisheries plan

Strategy 3: Phased removal of gill net fishing, with phased introduction of Alternative Livelihood projects for gill net fishermen

For Area, Severity and Urgency ratings, see page 79
</td></tr>
</table>


Native Fish Species
Primary Threat
Non-sustainable Fishing
Lack of Knowledge
Lack of Management
Overfishing
Develop baseline knowledge of current fish stocks
Investigate current catch rates
Integrate research on fish stocks into operational planning and adaptive management
Signing of co-management agreement for GPWS
Training for surveillance and enforcement activities
Fishing by Gales Point Community Members
Fishing by external fishermen
Phase out non-traditional fishing
Investigate Alternative Livehihood options for non-traditional fishermen
Workshop with FD, BFD, GPVC and GP Fishermen to develop Sustainable Traditional Fisheries Plan
Implement Traditional Sustainable Fisheries Plan
Effective Surveillance and Enforcement

<table>
<tr><th colspan="2">Threats to biodiversity of the Gales Point Wildlife Sanctuary</th></tr>
<tr><td>Hunting of hicatee</td><td>
Status: Active

Target: Hicatee (Central American River Turtle)

Threats (Direct):
▪ Reduced population viability of Central American River Turtle
▪ Opportunistic harvesting by hunters and fishermen;
▪ Gill net by-catch
▪ Targeted harvesting during religious festivals

Source (Indirect):
▪ Low income,
▪ Lack of economic opportunities in the Gales Point area,
▪ Protein supplement for diet
▪ Traditional demand for hicatee meat
▪ Traditional harvesting during religious festivals (especially Easter)

<table>
<tr><td>Area</td><td>4</td><td>Hicatee are hunted opportunistically wherever they are encountered</td></tr>
<tr><td>Severity</td><td>2</td><td>Hunting has had a substantial effect on hicatee populations, and whilst local eradication is considered unlikely, the hicatee is rapidly disappearing from other areas of its range in Central America</td></tr>
<tr><td>Urgency</td><td>3</td><td>The threat is occurring now and requires action</td></tr>
</table>
Management Goal: Hicatee population recovers to natural levels through effective implementation of a moratorium on hunting

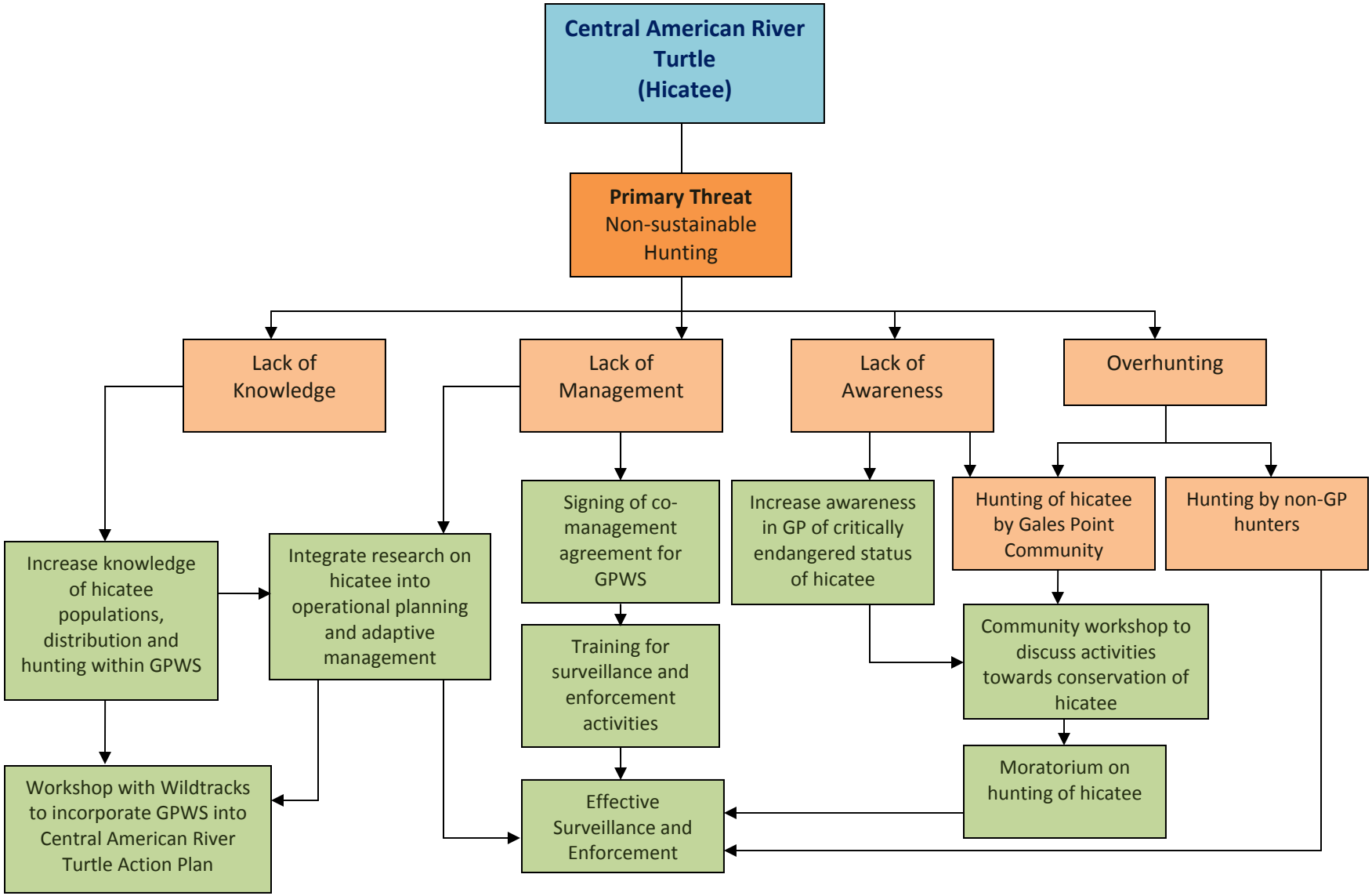
Management Strategies:

Strategy 1: Increase awareness of critically endangered status of hicatee and important role Gales Point plays in hicatee conservation

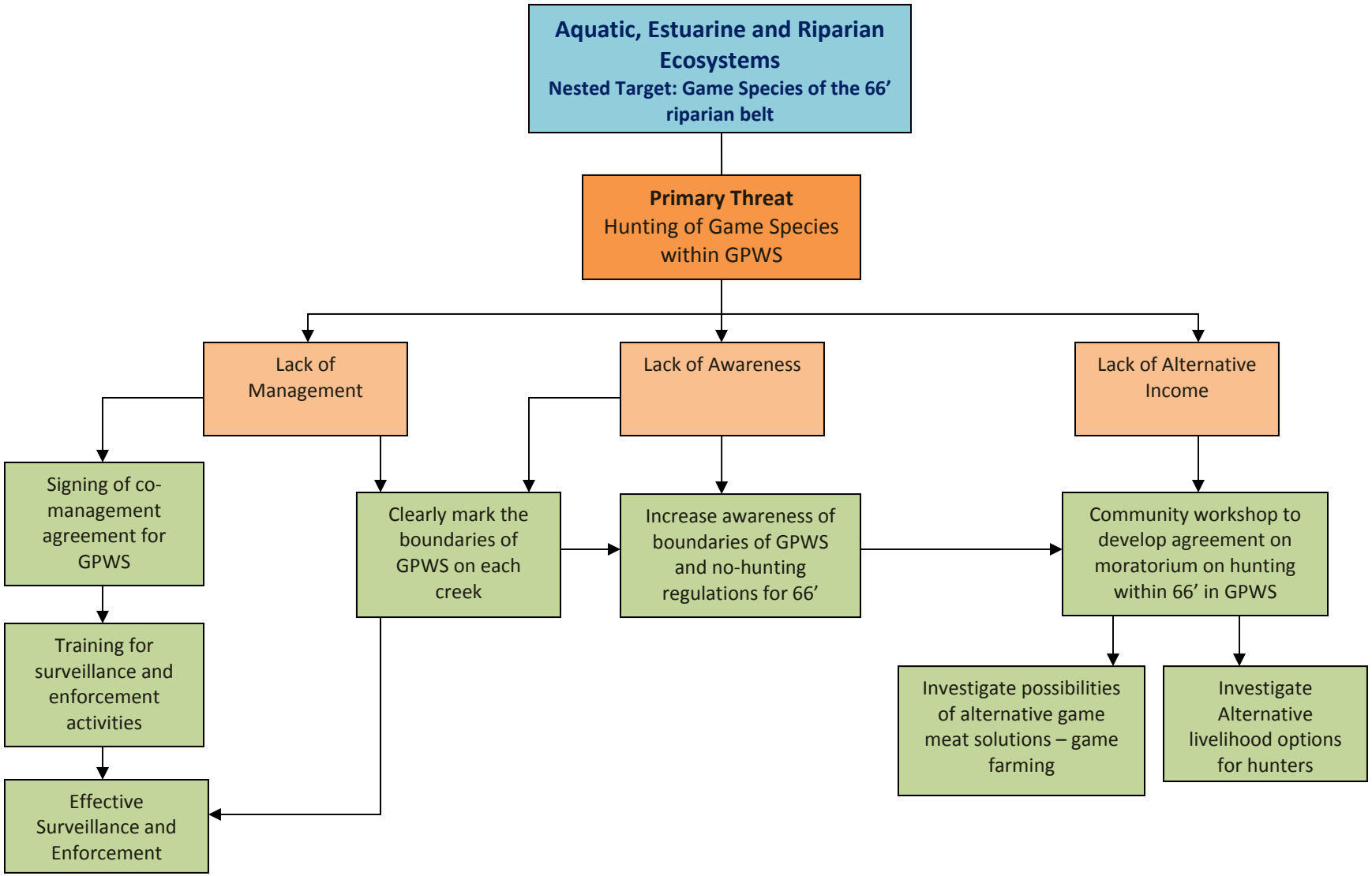
Strategy 2: Declare a moratorium on hunting of hicatee within Gales Point Wildlife Sanctuary

Strategy 3: Support other national and regional initiatives focused on conservation of the Central American River Turtle

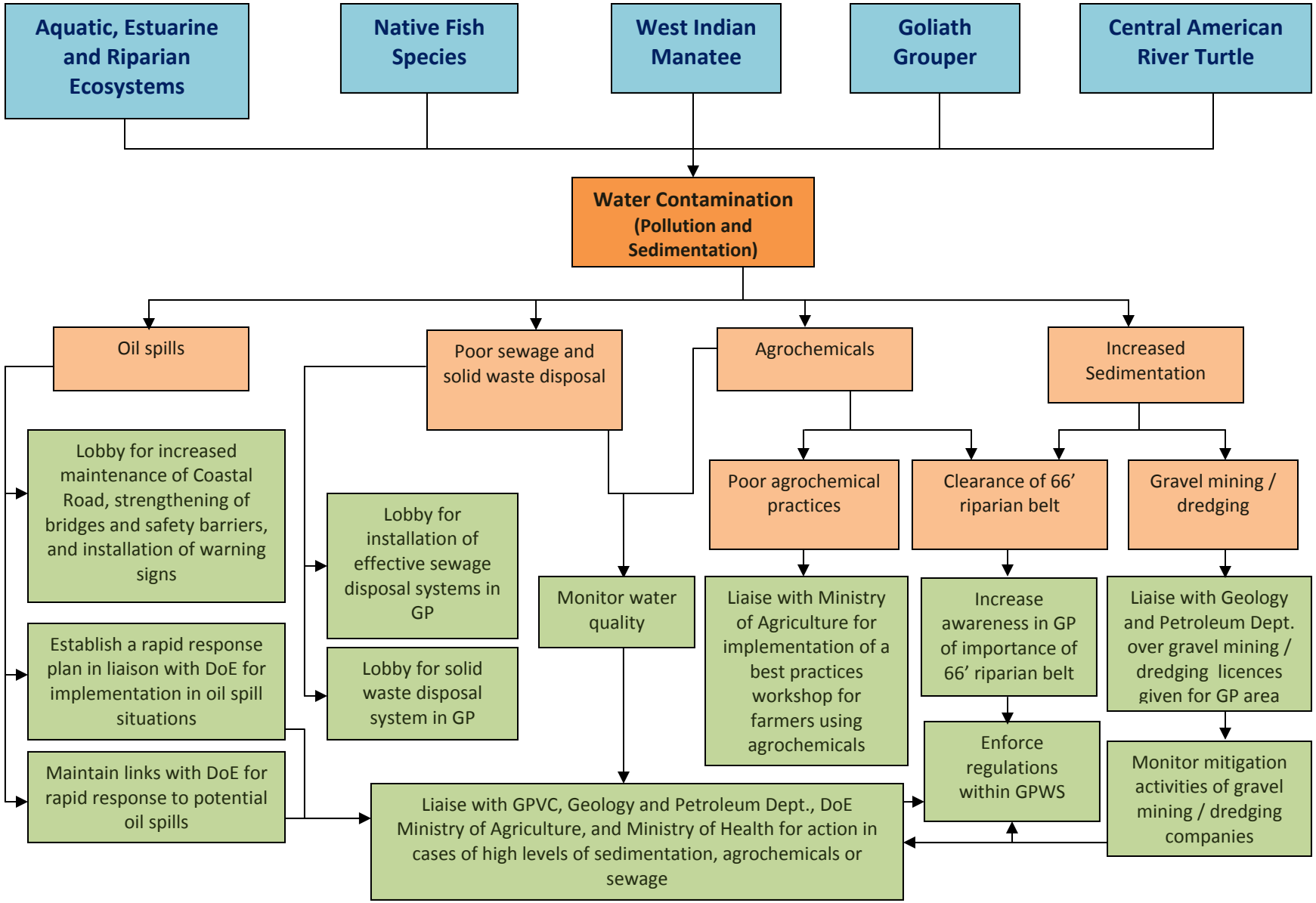
For Area, Severity and Urgency ratings, see page 79
</td></tr>
</table>


Central American River Turtle (Hicatee)
Primary Threat Non-sustainable Hunting
Lack of Knowledge
Lack of Management
Lack of Awareness
Overhunting
Increase knowledge of hicatee populations, distribution and hunting within GPWS
Integrate research on hicatee into operational planning and adaptive management
Signing of co-management agreement for GPWS
Increase awareness in GP of critically endangered status of hicatee
Hunting of hicatee by Gales Point Community
Hunting by non-GP hunters
Training for surveillance and enforcement activities
Community workshop to discuss activities towards conservation of hicatee
Workshop with Wildtracks to incorporate GPWS into Central American River Turtle Action Plan
Moratorium on hunting of hicatee
Effective Surveillance and Enforcement

Threats to biodiversity of the Gales Point Wildlife Sanctuary			
Hunting in the 66' water-edge riparian, littoral forest and mangrove ecosystems	***Status:*** Active		
	Target: Aquatic, Estuarine and Riparian Ecosystems (Nested target: Game species)		
	Threats (*Direct*)*:* ▪ ***Reduced viability of game species using the 66'*** ▪ Reduced tourism value as wildlife sightings decrease ▪ Reduced availability of game species for traditional hunting activities		
	Source (*Indirect*)*:* ▪ Low income, ▪ Lack of economic opportunities in the Gales Point area, ▪ Protein supplement for diet ▪ Traditional demand for game meat		
	Area	***4***	Game meat species (especially paca) are targeted wherever they are encountered in the riparian vegetation of the 66'
	Severity	***2***	Hunting has had a substantial effect on game species populations, though local eradication is considered unlikely, and game species are distributed throughout the terrestrial landscape
	Urgency	***3***	The threat is occurring now and requires action
	Management Goal: Game species viability is increased with the protection of the 66' as a no-hunting area, within the Gales Point Wildlife Sanctuary ***Management Strategies:*** **Strategy 1:** Collaborate with hunters for a no-hunting agreement in the 66' Queen's Chain within the Gales Point Wildlife Sanctuary **Strategy 2:** Ensure boundaries of Wildlife Sanctuary are well marked with signs on creeks and rivers ***For Area, Severity and Urgency ratings, see page 79***		


Aquatic, Estuarine and Riparian Ecosystems
Nested Target: Game Species of the 66' riparian belt
Primary Threat
Hunting of Game Species within GPWS
Lack of Management
Lack of Awareness
Lack of Alternative Income
Signing of co-management agreement for GPWS
Clearly mark the boundaries of GPWS on each creek
Increase awareness of boundaries of GPWS and no-hunting regulations for 66'
Community workshop to develop agreement on moratorium on hunting within 66' in GPWS
Training for surveillance and enforcement activities
Investigate possibilities of alternative game meat solutions – game farming
Investigate Alternative livelihood options for hunters
Effective Surveillance and Enforcement

Threats to biodiversity of the Gales Point Wildlife Sanctuary			
Water contamination through pollution and sedimentation	***Status:*** Active		
	Target: Aquatic, Estuarine and Riparian Ecosystems Native Fish Species West Indian Manatee Central American River Turtle Goliath Grouper		
	Threats (*Direct*)*:* ▪ Agrochemical runoff from farmland ▪ Washing of chemical spray tanks in creeks and rivers ▪ Washing of vehicles next to creeks or rivers ▪ Oil spills ▪ Increased sedimentation from gravel mining, land use change and dredging activities		
	Source (*Indirect*)*:* ▪ Poor agricultural practices ▪ Clearance of riparian buffer ▪ Poor gravel extraction methods with limited mitigation		
	Area	***3***	With connectivity between water systems, contamination will spread to much of the lagoon system
	Severity	***1***	Contamination at critical levels is generally confined to specific areas within creeks, rivers and the lagoon system, with dilution of pollutants with distance from source
	Urgency	***3***	The threat is occurring now and requires action
	Management Goal: Maintain the rivers, creeks and lagoon systems of Gales Point Wildlife Sanctuary free of contamination ***Management Strategies:*** **Strategy 1:** Raise public awareness of health risks (human and environmental) associated with agrochemical pollution **Strategy 2:** Increase awareness in water-edge land owners of the importance of maintaining the 66' water-edge riparian, littoral and mangrove ecosystems, and work towards maintenance through collaborative agreements **Strategy 3:** Work with relevant authorities to enforce regulations and policies relating to clearance of riparian buffer vegetation, clearance of any vegetation within the Sanctuary, safe use of agro-chemicals, and best practices **Strategy 4:** Work with Geology & Petroleum Dept. to ensure adherence to regulations policies relating to gravel and sand extraction ***For Area, Severity and Urgency ratings, see page 79***		


Aquatic, Estuarine and Riparian Ecosystems
Native Fish Species
West Indian Manatee
Goliath Grouper
Central American River Turtle
Water Contamination (Pollution and Sedimentation)
Oil spills
Poor sewage and solid waste disposal
Agrochemicals
Increased Sedimentation
Lobby for increased maintenance of Coastal Road, strengthening of bridges and safety barriers, and installation of warning signs
Establish a rapid response plan in liaison with DoE for implementation in oil spill situations
Maintain links with DoE for rapid response to potential oil spills
Lobby for installation of effective sewage disposal systems in GP
Lobby for solid waste disposal system in GP
Monitor water quality
Poor agrochemical practices
Clearance of 66' riparian belt
Gravel mining / dredging
Liaise with Ministry of Agriculture for implementation of a best practices workshop for farmers using agrochemicals
Increase awareness in GP of importance of 66' riparian belt
Liaise with Geology and Petroleum Dept. over gravel mining / dredging licences given for GP area
Enforce regulations within GPWS
Monitor mitigation activities of gravel mining / dredging companies
Liaise with GPVC, Geology and Petroleum Dept., DoE Ministry of Agriculture, and Ministry of Health for action in cases of high levels of sedimentation, agrochemicals or sewage

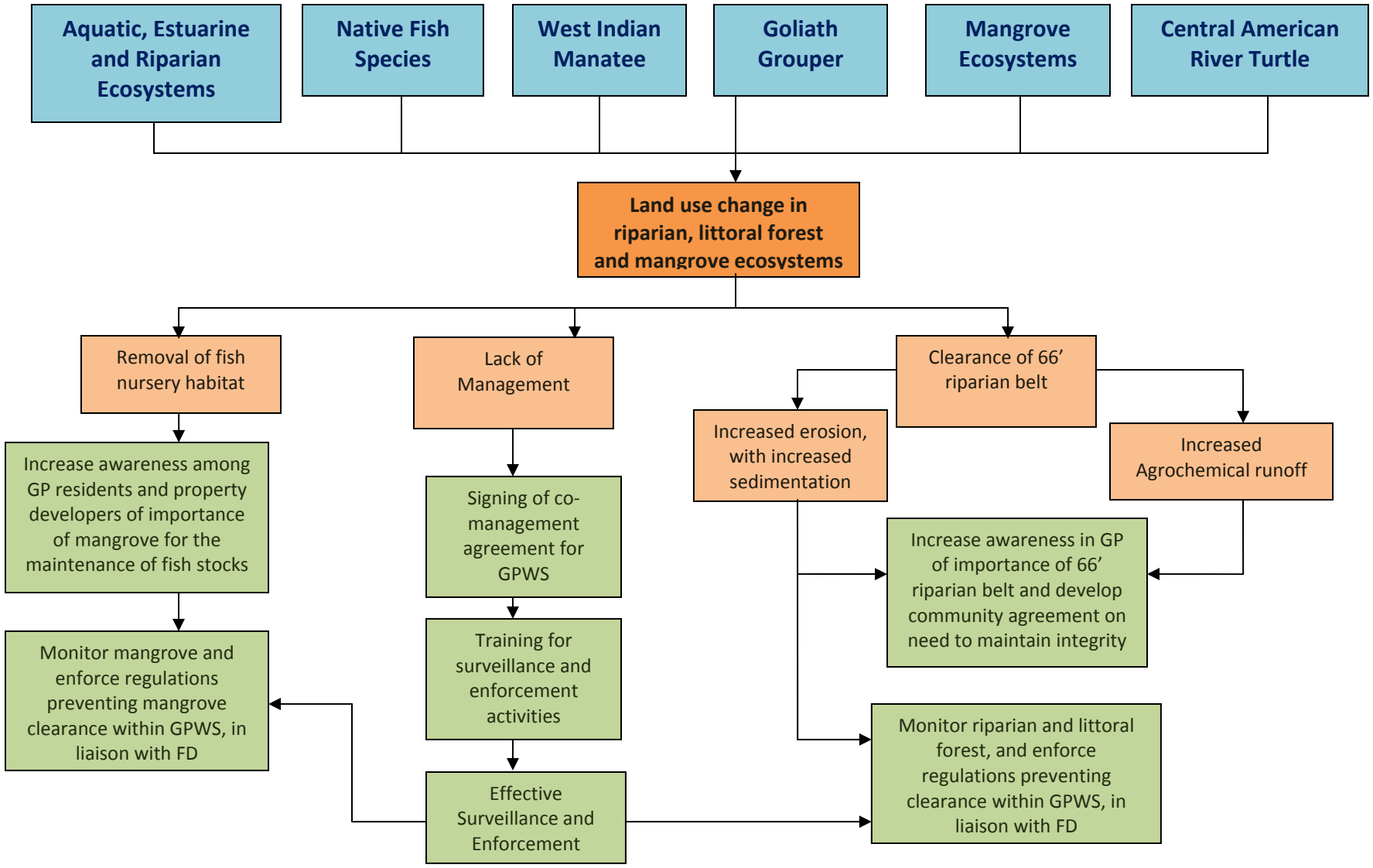
<table>
<tr><th colspan="2">Threats to biodiversity of the Gales Point Wildlife Sanctuary</th></tr>
<tr><td rowspan="5">Land use change in riparian, littoral forest and mangrove ecosystems</td><td>Status: Active, Potential</td></tr>
<tr><td>Target: Aquatic and Riparian Ecosystems
Mangrove Ecosystems</td></tr>
<tr><td>Threats (Direct):
Clearance of 66’ water-edge vegetation for agriculture or tourism development (riparian, littoral and mangrove ecosystems)
Reduction of connectivity in riparian vegetation
Reduction of beach vegetation necessary for turtle nesting (outside GPWS)
Increased sedimentation of water, with increased erosion of banks
Increased agricultural chemical runoff</td></tr>
<tr><td>Source (Indirect):
Demand for water-edge properties
Increasing retirement market in USA and Europe</td></tr>
<tr><td><table>
<tr><td>Area</td><td>1</td><td>Much of the riparian, littoral and mangrove ecosystems remains intact</td></tr>
<tr><td>Severity</td><td>3</td><td>Where clearing of vegetation occurs, clearance generally involves the complete removal of vegetation</td></tr>
<tr><td>Urgency</td><td>2</td><td>Whilst not an ongoing impact at the moment, it is anticipated that clearance of the riparian, littoral and mangrove ecosystems will be an increasing threat within the next three years</td></tr>
</table></td></tr>
<tr><td>Management Goal: The riparian, littoral and mangrove ecosystems of the 66’ water-edge vegetation remain intact

Management Strategies:

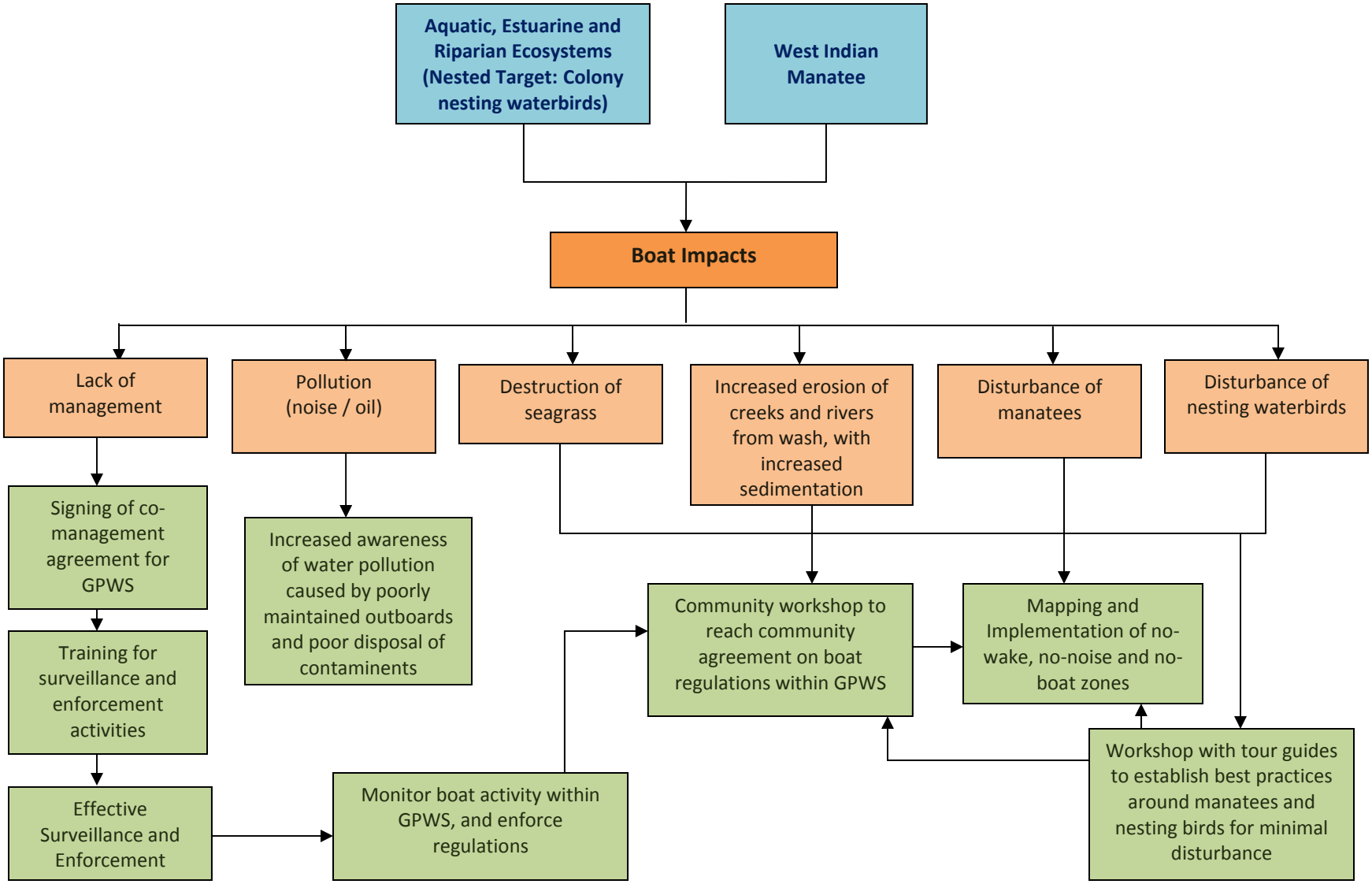
Strategy 1: Increase awareness among water-edge land owners of the importance of maintaining the 66’ water-edge riparian, littoral and mangrove ecosystems

Strategy 2: Maintain the 66’ water-edge riparian, littoral and mangrove ecosystems through collaborative agreements, increased awareness of proposed and active development activities, and enforcement of regulations

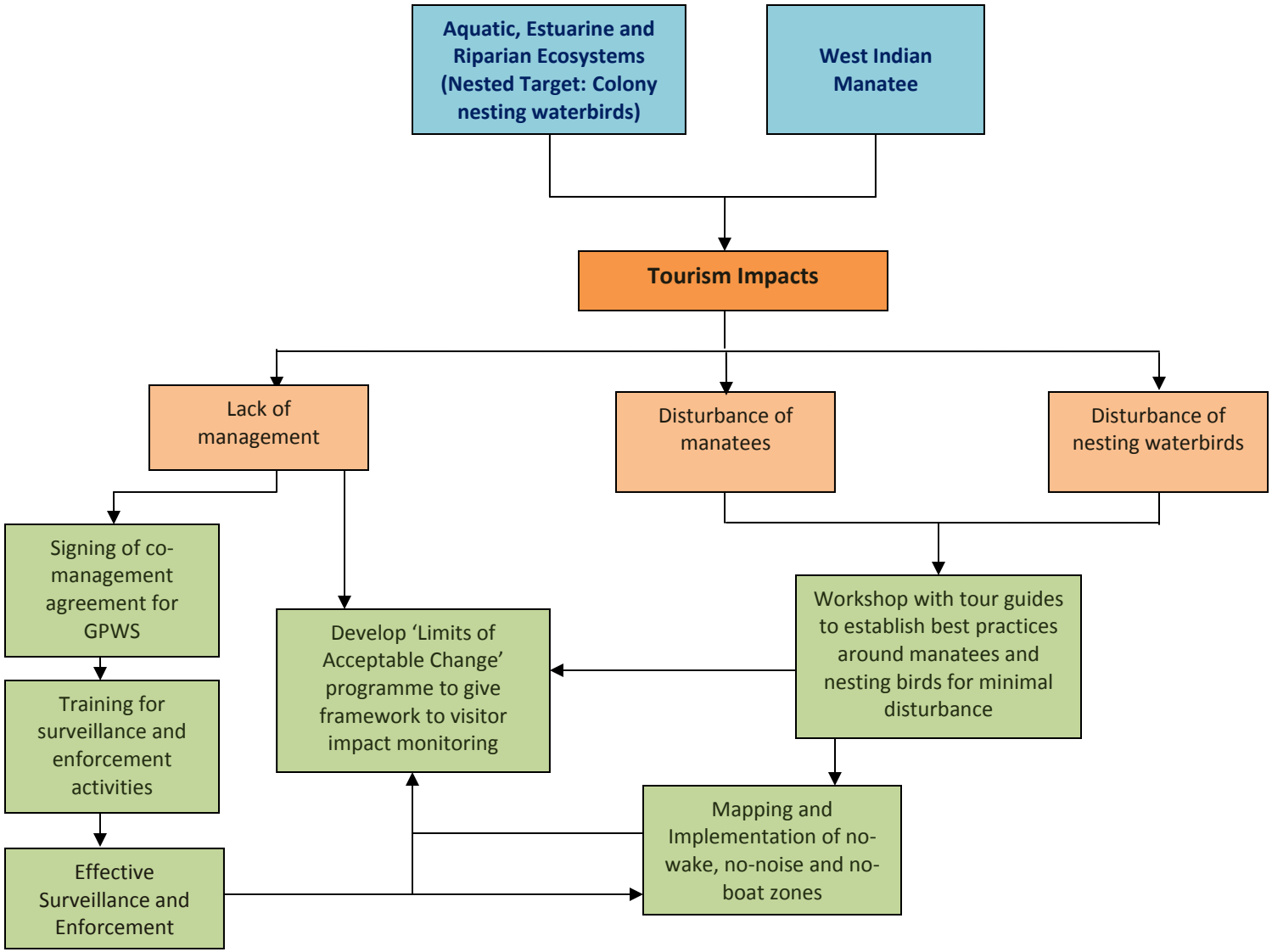
For Area, Severity and Urgency ratings, see page 79</td></tr>
</table>


Aquatic, Estuarine and Riparian Ecosystems
Native Fish Species
West Indian Manatee
Goliath Grouper
Mangrove Ecosystems
Central American River Turtle
Land use change in riparian, littoral forest and mangrove ecosystems
Removal of fish nursery habitat
Lack of Management
Clearance of 66' riparian belt
Increase awareness among GP residents and property developers of importance of mangrove for the maintenance of fish stocks
Signing of co-management agreement for GPWS
Increased erosion, with increased sedimentation
Increased Agrochemical runoff
Increase awareness in GP of importance of 66' riparian belt and develop community agreement on need to maintain integrity
Monitor mangrove and enforce regulations preventing mangrove clearance within GPWS, in liaison with FD
Training for surveillance and enforcement activities
Monitor riparian and littoral forest, and enforce regulations preventing clearance within GPWS, in liaison with FD
Effective Surveillance and Enforcement

Threats to biodiversity of the Gales Point Wildlife Sanctuary			
Increased boat traffic	***Status:*** Active, Potential		
	Target: Aquatic and Riparian Ecosystems West Indian Manatee Colony nesting waterbirds (nested target)		
	Threats (Direct): ▪ Disturbance of wildlife – noise impacts on feeding and nesting birds ▪ Physical injury of manatee and crocodiles from boat impacts ▪ Disturbance of scenic values – peace and tranquility ▪ Damage to sea grass beds ▪ Erosion of banks with increased wake and overwash ▪ Increased petrochemical pollution from engine oil and gasoline		
	Source (Indirect): ▪ Increased access for tourism		
	Area	***2***	Less than 25% of the Southern Lagoon is accessed by boats
	Severity	***1***	There are measurable disturbance effects on seagrass beds, on numbers and distribution of nesting and feeding birds, and disturbance of manatees
	Urgency	***3***	The threat is active and increasing
	Management Goal: Minimize boat impacts on wildlife, sea grass, water quality and scenic values ***Management Strategies:*** **Strategy 1:** Implementation of 'no-wake' zones and regulation of water traffic within the Gales Point Wildlife Sanctuary **Strategy 2:** Enforce regulations protecting wildlife from disturbance by visitors **Strategy 3:** Build capacity in best practices through provision of training in relevant fields ***For Area, Severity and Urgency ratings, see page 79***		


Aquatic, Estuarine and Riparian Ecosystems (Nested Target: Colony nesting waterbirds)
West Indian Manatee
Boat Impacts
Lack of management
Pollution (noise / oil)
Destruction of seagrass
Increased erosion of creeks and rivers from wash, with increased sedimentation
Disturbance of manatees
Disturbance of nesting waterbirds
Signing of co-management agreement for GPWS
Training for surveillance and enforcement activities
Effective Surveillance and Enforcement
Increased awareness of water pollution caused by poorly maintained outboards and poor disposal of contaminents
Monitor boat activity within GPWS, and enforce regulations
Community workshop to reach community agreement on boat regulations within GPWS
Mapping and Implementation of no-wake, no-noise and no-boat zones
Workshop with tour guides to establish best practices around manatees and nesting birds for minimal disturbance

Threats to biodiversity of the Gales Point Wildlife Sanctuary			
Tourism Impacts	***Status:*** *Active,* Potential		
	Target: Aquatic and Riparian Ecosystems West Indian Manatee Colony nesting waterbirds (nested target)		
	Threats (Direct): ▪ Potential increase in motorized watercraft, including jet skis ▪ Disturbance of wildlife – particularly manatees and nesting birds ▪ Poor sport fishing practices (not catch-and-release)		
	Source (Indirect): ▪ Increased tourism		
	Area	***2***	Less than 25% of the Southern Lagoon is accessed by tourists
	Severity	***1***	There is the potential for measurable disturbance effects on seagrass beds, on numbers and distribution of nesting and feeding birds, disturbance of manatees, and reduced sport fishing stocks
	Urgency	***3***	The threat is active and increasing
	Management Goal: Encourage low-impact, ecologically aware, environmentally-sustainable tourism ***Management Strategies:*** **Strategy 1:** Implement tourism-use regulations within the Gales Point Wildlife Sanctuary **Strategy 2:** Enforce regulations protecting wildlife from disturbance by visitors **Strategy 3:** Build capacity in best practices through provision of training in relevant fields ***For Area, Severity and Urgency ratings, see page 79***		


Aquatic, Estuarine and Riparian Ecosystems (Nested Target: Colony nesting waterbirds)
West Indian Manatee
Tourism Impacts
Lack of management
Disturbance of manatees
Disturbance of nesting waterbirds
Signing of co-management agreement for GPWS
Training for surveillance and enforcement activities
Effective Surveillance and Enforcement
Develop 'Limits of Acceptable Change' programme to give framework to visitor impact monitoring
Workshop with tour guides to establish best practices around manatees and nesting birds for minimal disturbance
Mapping and Implementation of no-wake, no-noise and no-boat zones

The scores developed during the threat assessment are summarized in the following table (Table 16), and a total ranking score worked out to provide a means of ranking the impacts, making it possible to prioritize conservation strategies and actions.

Total Rank = Area x Severity x Urgency

Threats	Criteria Rankings			Total Ranking
	Area	Severity	Urgency	
Unsustainable fishing	*4*	*2*	*3*	*24*
Hunting of hicatee	*4*	*2*	*3*	*24*
Hunting in the 66'	*4*	*2*	*3*	*24*
Water contamination through pollution and sedimentation	*3*	*1*	*3*	*9*
Land use change in riparian, littoral forest and mangrove ecosystems	*1*	*3*	*2*	*6*
Increased boat traffic	*2*	*1*	*3*	*6*
Tourism impacts	*2*	*1*	*3*	*6*

Table 16: Threat rankings for Gales Point Wildlife Sanctuary

3.3 Strategies to Reduce Threats

During the threat assessment process, the primary cross cutting strategies were identified for effective management of the Gales Point Wildlife Sanctuary (Table 17).

Primary Cross Cutting Strategies	Aquatic, Estuarine and Riparian Ecosystems	Mangrove Ecosystems	West Indian Manatee	Native Fish Species	Central American River turtle ('Hicatee')	Goliath Grouper	Sea Turtles
Strengthening of the Gales Point Wildlife Sanctuary Management Committee							
Signing of co-management agreement between GPWSCMC and Forest Department							
Increased management effectiveness through training and location of funding							
Increased surveillance and enforcement							
Increase and strengthen collaboration with Wildlife trust and other NGOs							
Increased awareness of importance of maintaining mangrove and riparian / littoral forest vegetation							
Enforcement of regulations re. clearance of riparian, littoral forest and mangrove ecosystems within the 66' by waters-edge							
Adequate marking of boundaries of Gales Point Wildlife Sanctuary – especially on creeks and rivers							
Monitor gravel mining and dredging activities and implement actions if necessary							
Monitor water quality							
Development and implementation of sustainable fisheries plan and zonation							
Establishment of best practices for tour guides and sport fishermen							
Investigate Alternative livelihood options	Game Species						
Community agreement on boat regulations							
Community agreement on moratorium on hunting within 66' riparian vegetation	Game species						
Signing of management agreement with Fisheries Department for turtle nesting beach							
Maintain patrolling of turtle nesting beach and protection of nests							

Table 17: Primary Cross Cutting Strategies

3.4 Measures of Success for Primary Cross Cutting Strategies

Measures of Success	Target	What to Monitor	How to Monitor	Indicator
Strengthening of the Gales Point Wildlife Sanctuary Management Committee	Gales Point Wildlife Sanctuary Management Committee is active and functioning	Election of new Board Number of meetings per month Presence of PA Manager	Discussion with GPWSCMC	Election of new Board Minutes of meetings Appointment of PA Manager
Signing of co-management agreement between GPWSCMC and Forest Department	GPWSCMC is the co-management organization for GPWS	Eixstence of signed co-management agreement	Discussion with GPWSCMC / FD	Signed agreement for co-management
Increased management effectiveness through employment of staff, capacity building and location of funding	GPWSCMC has increased management effectivnes, with sufficient, trained staff and funding for effective management	Management Effectiveness	Conduct annual management effectiveness assessment	Annual management effectiveness results
Increased surveillance and enforcement	Surveillance and enforcement activities are effective	Level of illegal activities within protected area Enforcement activities	Patrol reports (enforcement issues and activities)	Number of illegal activities within protected area per year Number of successful enforcement activities per year
Increase and strengthen collaboration with Wildlife trust and other NGOs	GPWSCMC strengthened by collaborations with Wildlife Trust and other NGOs	Level of support from Wildlife Trust and other NGOs	Discussion with GPWSCMC Discussion with Wildlife Trust Discussion with other NGOs	Level of support
Increased awareness of importance of maintaining mangrove and riparian / littoral forest vegetation	Landowners maintain mangrove and riparian / littoral forest vegetation within the PA and on turtle nesting beach	Clearance of mangrove and riparian / littoral forest vegetation within the PA and on turtle nesting beach	Patrol reports Aerial survey	% of mangrove and riparian / littoral forest vegetation that remains intact within the PA and on turtle nesting beach
Enforcement of regulations re. clearance of riparian, littoral forest and mangrove ecosystems within the 66' by waters-edge	No clearance of mangrove and riparian / littoral forest vegetation within the PA and on turtle nesting beach	Enforcement activities preventing land clearance within the PA and on turtle nesting beach	Patrol reports (enforcement issues re. clearance of 66')	% of mangrove and riparian / littoral forest vegetation that remains intact within the PA and on turtle nesting beach Number of successful enforcement activities
Adequate marking of boundaries of Gales Point Wildlife Sanctuary – especially on creeks and rivers	Boundaries of GPWS are adequately marked with signs	Presence of signs marking boundaries in key locations	Verify presence of signs	% of creeks and rivers with PA signs posted at boundary points

Measures of Success	Target	What to Monitor	How to Monitor	Indicator
Monitor gravel mining and dredging activities and implement actions if necessary	Prevention of excessive sedimentation in the rivers and creeks	Implementation of recommended mitigation measures by mining/dredging companies Turbidity	Develop baselines for each river /creek Monitor gravel mining and dredging activities for implementation of recommended mitigation measures Monitor level of turbidity downstream from gravel mining Monitor level of turbidity adjacent to dredging activities	Turbidity of water compared with normal levels % of mining / dredging operations that implement recommended mitigation measures
Monitor water quality	Maintenance of water quality	Temperature, Turbidity, Salinity, hardness, nitrates, phosphates, dissolved oxygen	Develop water quality monitoring programme in key locations	Monthly readings of Temperature, Turbidity, Salinity, hardness, nitrates, phosphates, dissolved oxygen
Development and implementation of sustainable fisheries plan and zonation	Sustainable traditional fishing in GPWS	Existence of Sustainable Fisheries Plan Monitor guidelines developed and integrated into Sustainable Fisheries Plan	Follow monitoring guidelines developed as part of Sustainable Fisheries Plan	Sustainable Fisheries Plan adopted by GPWSCMC, GPVC and traditional fishermen Indicators highlighted by Sustainable Fisheries Plan
Establishment of best practices for tour guides and sport fishermen,	Tour guides (including sport fishermen) follow best practices guidelines	Presence of best practices guidelines Implementation of Best Practices by tour guides	GPWS guidelines in place Patrol reports (enforcement issues re. tour guides) Reports from tour guides	Written guidelines for best practices Number of enforcement issues re. tour guides per year % of tour guides in signed agreement to follow guidelines
Investigate Alternative livelihood options	Fishermen and hunters have alternative livelihood options to replace income from fishing and hunting	Alternative livelihood projects and options available Number of fishermen and hunters involved in projects	GPWSCMC projects GPWS project reports Interviews with fishermen and hunters	Number of people targeted by alternative livelihood projects % of fishermen and hunters positively affected by alternative livelihood projects % reduction in hunting and fishing within GPWS

Measures of Success	Target	What to Monitor	How to Monitor	Indicator
Community agreement on boat regulations	Boat guidelines developed and implemented restricting speed and noise in key locations	Presence of written boat guidelines	Written guidelines for regulation of boat activity within GPWS Enforcement of guidelines	Written guidelines Number of enforcement issues per year
Community agreement on moratorium on hunting within 66' riparian vegetation	No hunting within 66' riparian vegetation	Level of community agreement, Level of hunting, number of hunting incidents	Signed community agreement Patrol reports (, enforcement issues, signs of hunting)	% hunters that sign agreement Number of enforcement issues re. hunting per year Number signs of hunting per year
Signing of management agreement with Fisheries Department for turtle nesting beach	GPWSCMC has ability to protect the turtle nests	Existance of management agreement between GPWSCMC and Belize Fisheries Department	Discussions with GPWSCMC and BFD Signed ocument	Management agreement
Maintain patrolling of turtle nesting beach and protection of nests	GPWSCMC increases nest success	Nest success Patrol activities	Patrol reports Nesting reports	Number of patrols per month during nesting season % nests successful %hatching success

Table 18: Monitoring Measures of Success for Primary Cross Cutting Strategies

4. Management Planning

4.1 Management and Organizational Background

The Gales Point Wildlife Sanctuary is currently under the mandate of the Forest Department, with no staff dedicated to management of the site. In Gales Point, the primary stakeholder community, the Gales Point Wildlife Sanctuary Community Management Committee exists - a community-based organisation that has been leading the interest in community management of Gales Point Wildlife Sanctuary since its establishment in 1996. Whilst not yet a full co-manager, GPWSCMC is recognized as a potential partner by the Forest Department, and has been active in lobbying for the protected area and its manatees, and also for the provision of benefits to the Gales Point community.

There is a collaborative agreement with the Belize Fisheries Department on the protection of the turtle nesting beach on Manatee Bar, though this lies outside the Gales Point Wildlife Sanctuary.

There is currently no day-to-day management structure for the Wildlife Sanctuary, and for effective management to be achieved, GPWSCMC needs to build its capacity, infrastructure and staffing structure. Identified as perhaps the most important requirements are the need for a **protected area manager** and **on-site park director,** both with a clear, unified vision of the long term goals of the Gales Point Willdlife Sanctuary, and who are able to share this vision with the community to build support and participation, and are dedicated to seeing the 5-year Management Plan succeed through the implementation of the six Management Programmes

Also considered important for successful co-management is an active and participatory **Local Advisory Committee,** which will provide input from the Gales Point community into management decisions.

4.2 Review of Previous Management Effectiveness

Whilst there has been no active management in place for the Wildlife Sanctuary, the Gales Point Wildlife Sanctuary Community Management Committee participated in a national review of management effectiveness in July, 2006, using the Management Effectiveness Tracking Tool developed under the NPAPSP.

The evaluation questionnaire for this assessment was completed by a member of the Gales Point Wildlife Sanctuary Community Management Committee, the prospective co-management organization for Gales Point Wildlife Sanctuary at a Management Effectiveness workshop.

Summary of the outputs from the 2006 NPAPSP assessment:

Individual Indicators*	
Indicator Category	**Average Score (out of a possible Score of 4)**
1. Resource Information	2.50
2. Resource Administration, Management and Protection	2.44
3. Participation, Education and Socio-Economic Benefit	2.64
4. Management Planning	1.60
5. Governance	1.33
6. Human Resources	2.29
7. Financial and Capital Management	1.25
Overall	**2.01**

***** Indicators and Indicator categories used are from Young et. al., 2005

Table 19: Indicator Categories for Assessment of Management Effectiveness

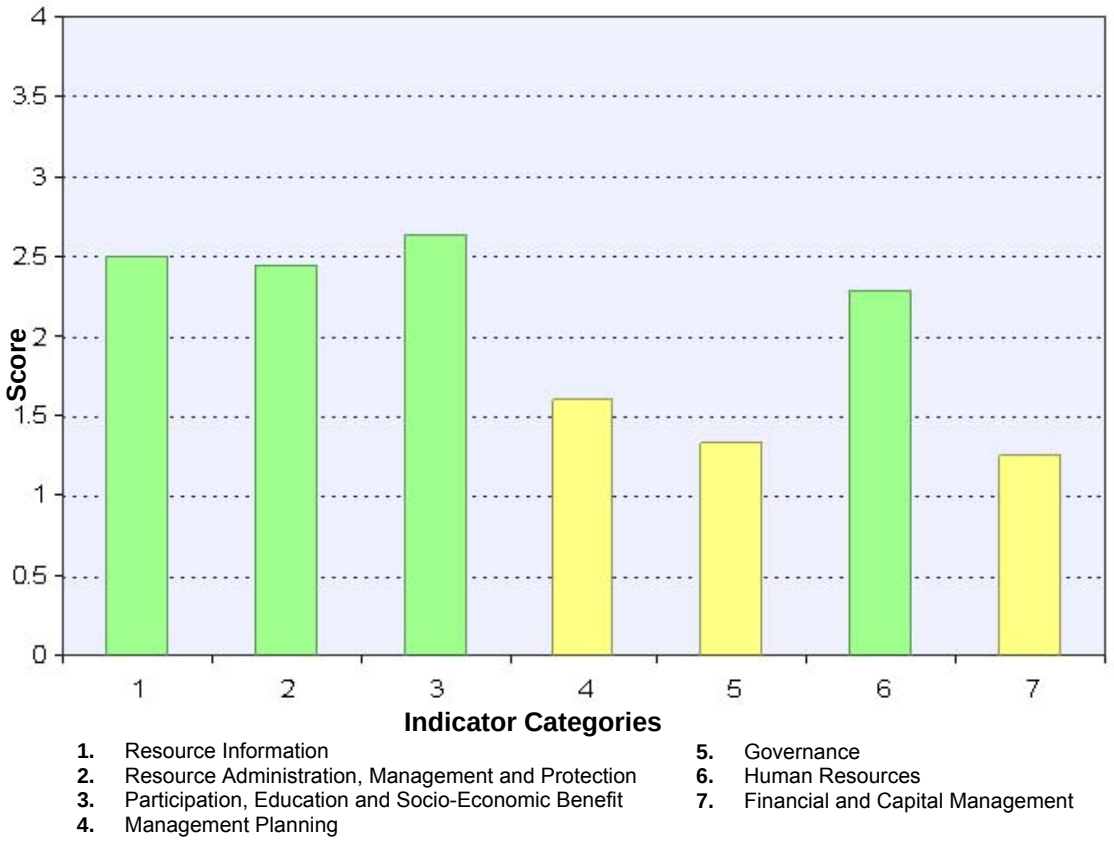
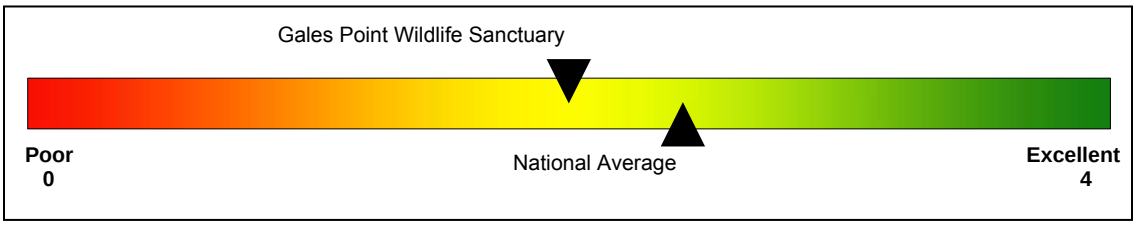


Figure 9: Average scores per Indicator Category for management effectiveness of Gales Point Wildlife Sanctuary

Whilst this assessment is not designed to give comparisons between protected areas, it is useful to compare the performance of Gales Point with the average for all protected areas assessed. Overall, the assessed protected areas score a total average of **2.51**. When averaged across the seven Indicator Categories, Gales Point Wildlife Sanctuary scores **2.01** – below the national average.



Conclusions and Recommendations

With an overall rating of **MODERATE,** Gales Point Wildlife Sanctuary cannot be considered to be managed as effectively as it could be. The potential management organization, a community-based organization with representation of community members, was assessed as having strengths in the area of **Participation, Education and Socio-Economic Benefits.** However, until **a comanagement agreement can be signed,** day to day management of the Wildlife Sanctuary itself falls under Forest Department, with no active surveillance or enforcement presence.

1. Resource Information

The management of Gales Point Wildlife Sanctuary is assessed as being moderately effective in resource information, reflecting past work, particularly by Wildlife Trust, and the recently completed rapid environmental assessment. It is weak in baseline data on cultural and archaeological resources, and on tenures and claims, and in not having undertaken conservation planning (with identification of conservation targets, viability assessment or threat analysis – though this is strengthened through this management plan), and in its limited environmental monitoring. The area of data management is in need of strengthening.

2. Resource Administration, Management and Protection

Despite having no dedicated protected area staff, the management of Gales Point Wildlife Sanctuary is assessed as being moderately effective in resource administration, management and protection, with community support of a number of enforcement issues (protection of the manatee, removal of gill nets from creeks, as examples). The legal status of the protected area is strong, and there is moderate effectiveness in surveillance and visitor management, but it is assessed as being weak and in need of strengthening in all other areas.

3. Participation, Education and Socio-Economic Benefit

Management of Gales Point Wildlife Sanctuary is assessed as being moderately effective in Participation, Education and Socio-Economic Benefit, being strong in local recognition of protected area benefits. It is considered moderately effective in communication between staff and stakeholders, in environmental education, in the volunteer programme, and in capacity building, but in need of strengthening in the dissemination of information, in the extent of stakeholder participation in management, and the extent of local economic benefits.

4. Management Planning

The management of Gales Point Wildlife Sanctuary is assessed as being in need of strengthening in all areas of management planning. This is being assisted through the preparation of this management plan, though strengthen of other steps within Management Planning section will figure heavily within the objectives and activities outlined in Section III – Management Programmes.

5. Governance

The management of Gales Point Wildlife Sanctuary is assessed as requiring strengthening in governance – reflecting the fact that a co-management agreement has not yet been approved and signed between the Gales point Wilidlife Sanctuary Community Management Committee and Forest Department. The proposed co-management organization has a Board of Directors and moderately effective collaboration with other protected area managers – but both need strengthening, with a recommendation that a new Board be elected to revitalize the organization. The protected area objectives are assessed as being in need of revision. The Board of Directors, comprising community members, currently performs the dual role as an advisory committee – this is being strengthened through the establishment of a Local Advisory Committee, to integrate community participation within the management decision making process.

6. Human Resources

The management of Gales Point Wildlife Sanctuary is assessed as being in need of moderate strengthening in human resources – largely reflecting its status as a volunteer organization. It is assessed as being strong only in the availability of operational, technical, scientific and professional staff within Forest Department. The qualifications and availability of the site manager and administrative staff are considered in need of strengthening, with a need for greater input in terms of capacity building activities.

7. Financial and Capital Management

The management of Gales Point Wildlife Sanctuary is assessed as in need of strengthening in most areas of financial and capital management.

The Management Effectiveness assessment highlights the areas requiring particular attention – those scoring only One or Two when being assessed. These are identified and specific activities recommended for improving effectiveness (Tables 20 - 21).

Table 20: Management Indicators Scoring One		
1. Resource Inventory		
1.3 Inventory of cultural and archaeological resources	**Activity:** Liaise with the Institute of Archaeology re. survey of shoreline archaeological sites within Gales Point Wildlife Sanctuary	
4. Management Planning		
4.2 Operational plan	**Activity:** Develop an Operational Plan at the start of each year to guide activities	
4.4 Identification of long term management needs	**Activity:** Develop a Strategic Plan to identify long term management requirements	
5. Governance		
5.1 Protected area objectives	**Activity:** Work with GP community and FD to finalize and strengthen objectives for GPWS	
5.2 Co-management agreement	**Activity:** Finalize and sign co-management agreement with FD	
5.3 Administrative autonomy	**Activity:** Finalize and sign co-management agreement with FD, and start implementation of management activities	
5.4 Advisory Committee	**Activity:** Establish a Gales Point Local Advisory Committee to provide GP with a mechanism to participate in management	
6. Human Resources		
6.6 Human resource assessment	**Activity:** Conduct a human resource assessment to identify human resource requirements	
6.7 Training and development activities	**Activity:** Conduct an assessment of training and development needs to identify capacity building requirements	
7. Finance and Capital Management		
7.1 Funding adequate for management	**Activity:** Develop an estimate of basic Operational Costs and additional project activity costs. Assess funding gap and address	
7.3 Financial management	**Activity:** Establish a financial management system for protected area management	
7.4 Infrastructure adequate for management	**Activity:** Assess current infrastructure, and future infrastructure requirements. Address identified gaps	
7.5 Equipment adequate for management	**Activity:** Assess current equipment, and future equipment requirements. Address identified gaps	
7.6 Area accessibility	**Activity:** Assess area accessibility and address mechanisms to improve accessibility issues	
7.7 Signage adequate for management	**Activity:** Assess signage requirements and address identified requirements	
7.8 Maintenance adequate for management	**Activity:** Assess maintenance activities and address identified requirements	

Table 21: Management Indicators Scoring Two		
1. Resource Inventory		
1.6 Inventory: Tenures and Claims	**Activity:** Establish a clear understanding of tenures and claims within the GPWS, particularly areas that overlap the 66' riparian and lagoon-side banks	
1.7 Conservation targets identified	**Conservation Targets have been identified within this Management Plan**	
1.8 Systematic threat assessment	**A systematic threat assessment has been conducted during the development of this Management Plan**	
1.11 Environmental monitoring activities	**Activity:** Increase capacity for environmental monitoring activities outlined in Managemnet Programme Two – Research and Monitoring Programme	
2. Resource Administration, Management and Protection		
2.2 Boundary survey and demarcation	**Activity:** Demarcate boundaries in key areas – particularly along rivers and creeks	
2.3 Legal registration, permit and approval process	**Activity:** Develop a permit system for traditional fishing	
2.4 Tenure claim conflict resolution activities	**Activity:** Ensure that any conflict involving tenure claim is resolved through dialogue	
2.5 Guidelines and best management practices exist	**Activity**: Develop guidelines and best management practices for traditional fishermen, tour guides, land owners and farmers	
2.7 Enforcement activities	**Activity:** Establish and implement an enforcement plan	
2.9 Visitor and tourism monitoring programme	**Activity:** Establish and implement a visitor and tourism monitoring programme, through setting 'limits of acceptable change'	
3. Participation, Education and Socio-Economic Benefit		
3.3 Dissemination of knowledge and information	**Activity:** Establish mechanisms for dissemination of knowledge and information – through LAC, workshops, and education and awareness programmes	
3.4 Level of stakeholder participation in management	**Activity:** Establish mechanisms for stakeholder participation in management decisions, through Local Advisory Committee and workshops	
3.9 Existence of socio-economic benefits strategy	**Activity:** Establish and implement a socio-economic benefits strategy	
3.10 Extent of local economic benefits	**Activity:** Establish a programme to monitor the extent of socio-economic benefits	
3.11 Local recognition of protected area benefits	**Activity:** Establish a programme to monitor the extent of local recognition of protected area benefits	
4. Management Planning		
4.1 Management plan	**The need for a Management Plan is currently being addressed**	
4.3 Regulation and implementation of management zones	**Activity:** Regulations and implementation of management zones need to be well founded through a series of community workshops if zoning is to succeed	
4.5 Programme monitoring and evaluation	**Activity:** Monitor and evaluate success and implementation of programme activities annually	
6. Human Resources		
6.1 Qualified site manager	**Activity:** Ensure funding is located to employ a qualified protected area manager	
6.2 Site manager availability (part time / full time)	**Activity:** Ensure funding is located to employ a qualified protected area manager	
6.3 Administrative staff	**Activity:** Ensure funding is located to employ essential administrative staff	

4.3 Management Goals

Under the National Protected Areas Policy and System Plan, there is a move to standardize protected area categories with those of the global conservation community, following the IUCN system. Under this, Gales Point Wildlife Sanctuary is designated as a Category II protected area, whilst Blue Hole Natural Monument is a Category III. This provides guidelines for activities that can take place within the protected areas, to be taken into account during the development of future goals and objectives.

Gales Point Wildlife Sanctuary	
CATEGORY IV	Wildlife Sanctuary: protected area managed for conservation through management intervention
Definition	An area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats, or to meet the requirements of specific species (in this case, the West Indian Manatee).
Objectives	1. To secure and maintain the habitat conditions necessary to protect significant species, groups of species, biotic communities or physical features of the environment where these require specific human manipulation for optimum management; 2. To facilitate scientific research and environmental monitoring as primary activities associated with sustainable resource management; 3. To develop limited areas for public education and appreciation of the characteristics of the habitats concerned and of the work of wildlife management; 4. To eliminate and thereafter prevent exploitation or occupation detrimental to the purposes of designation; and 5. To deliver such benefits to people living within the designated area as are consistent with the other objectives of management. **IUCN Protected Area definitions**

A series of management objectives have been developed to provide a framework for management for the next five-year period, to achieve the goal of:

> **"providing protection for the manatee population, whilst allowing the sustainable development of the Gales Point community."**

Management Goals

1. To protect and maintain the natural resources of the Gales Point Wildlife Sanctuary as an integral part of the National Protected Areas System
2. To protect and maintain West Indian Manatee and other globally threatened species present within the Gales Point Wildlife Sanctuary
3. To promote sustainable use of the Gales Point Wildlife Sanctuary for tourism and traditional fishing activities, for the benefit of the Gales Point community
4. To promote and facilitate active research and biodiversity monitoring activities towards provision of information for adaptive management
5. To provide recreational and educational opportunities for Belizean and international visitors in a manner that is compatible with the natural environment
6. To strengthen management capacity and community participation in management decisions, and develop mechanisms to ensure long term financial sustainability

These goals and their associated management programme objectives and activities cannot be taken as discrete units, as they exist as a part of an integrated overall management concept. To succeed, all parts of the whole have to be addressed and acted upon, as actions of each management programme support the others.

4.4 Management Strategies

With the relative inexperience of the potential co-management organization, a number of mechanisms are scheduled for development and implementation over the five year time-frame of this Management Plan, to provide a structured framework for the implementation of management activities. These areas include:

4.4.1 Management Zones

Two zoning requirements have been identified during the management planning process:

- **Zoning for Sustainable Traditional Fisheries** – zoning options for sustainable fisheries will be developed as an integrated part of the Sustainable Fisheries Plan, in collaboration with Belize Fisheries Department, Forest Department and the Gales Point Community fishermen
- **Zoning for boat activity** – No-wake zones have already been discussed and signs posted in high manatee activity areas. A series of guidelines for boat users within the protected area is to be produced as a Management Plan activity, to include zoning of recreational use, and and assessment of water sport activities to be forbidden or allowed (eg. jet skis). Low noise zones may also be considered appropriate in areas identified as important for nesting birds.

4.4.2 Limits of Acceptable Change

With increasing visitation comes the potential for increasing impacts to the environment, presenting the ever-present dilemma of how a protected area can develop a sustainable financial income from tourism without causing significant damage to the natural resources that attract the visitors. This poses the question that, given increasing recreational use and the inevitable impact this will have on the local environment, what are the biophysical and social conditions that should be considered as acceptable to both conservation planners and to visitors.

Planning for the mitigation of visitor impacts is based on the recognition of a number of specific values that are essential for both the conservation management of the area and for future appreciation by visitors.

- The quality of the environment, which forms the basis for all other human values and benefits associated with the protected area
- The dependence of recreational activities on the maintenance of near-pristine conditions
- The importance of economic and social benefits to both local stakeholders and to the Belize economy as a whole
- The value of the protected area as a recreational and educational resource

With the relative youth of the potential co-management organization, and the limited tourism currently being experienced in the Gales Point Wildlife Sanctuary, it is suggested that the development of a Limits of Acceptable Change programme should not be considered for at least the initial two years, to enable the Gales Point Wildlife Sanctuary Community Management Committee to focus on developing their management capacity and establishing a management presence.

4.4.3 Management Constraints and Limitations

This Management Plan has been developed with the assumption that the Gales Point Wildlife Community Management Committee can build its capacity to take on the co-management role. Whilst having several dedicated members, the Gales Point Wildlife Sanctuary Community Management Committee is currently in a state of near-dormancy, and needs to build an active Board again as a matter of urgency if it wants to move forward into a co-management position.

With the Management Plan to guide it, and with the support of organizations such as the Wildlife Trust, the GPWSCMC can use the momentum of recent community workshops to revitalize its position within the community, and with increased, active community support, take on the active role of co-management of the Wildlife Sanctuary.

Current constraints include the lack of a dedicated, paid staff member, and facilities and equipment. There is also a requirement to build capacity in locating funding, administration, surveillance and enforcement. Other management constraints have been also been identified under 4.2 (Review of Previous Management Effectiveness).

4.5 Management Programmes and Objectives

With the relative inexperience of the Gales Point Wildlife Sanctuary Community Management Committee in the management role, this first Five year Management Plan concentrates on ensuring that a solid foundation is established on which the GPWSCMC can develop to fulfill its role as co-manager.

This has to be in close collaboration with the Gales Point Village Council and community members, and several of the management activities are specifically focused on establishing mechanisms to facilitate community participation, whilst also ensuring that the conservation planning activities are implemented, and management planning supports and facilitates the parallel community development planning process.

It should be borne in mind that the Programmes of a Management Plan are interconnected over space and time, supporting each other and forming a whole that is greater than the single parts. As such, Management Programmes cannot be considered individually, but must be seen in terms of a bigger picture – the integrated management of Gales Point Wildlife Sanctuary towards the fulfillment of the Management Vision:

Gales Point Widlife Sanctuary

Overall Management Objectives:

1. To protect and maintain the natural resources of the Gales Point Wildlife Sanctuary as an integral part of the National Protected Areas System
2. To protect and maintain West Indian Manatee and other globally threatened species present within the Gales Point Wildlife Sanctuary
3. To promote sustainable use of the Gales Point Wildlife Sanctuary for tourism and traditional fishing activities, for the benefit of the Gales Point community
4. To promote and facilitate active research and biodiversity monitoring activities towards provision of information for adaptive management To provide recreational and educational opportunities for Belizean and international visitors in a manner that is compatible with the natural environment
5. To strengthen management capacity and community participation in management decisions, and develop mechanisms to ensure long term financial sustainability

Development of the management plan has taken into account recommendations for effective protected area management (Figure 10; Kelleher, 1999).

Checklist for Effective Protected Area Management

Be clear about objectives
Seek local support
Build partnerships
Plan for financial sustainability
Don't prohibit more than necessary
Build for the unforeseen
Put in place structures for conflict resolution
Establish self-enforcement as much as possible

Figure 10: Adapted from Kelleher, 1999

There are six programmes within the overall Management Strategy for Gales Point Wildlife Sanctuary:

A. Natural Resource Management Programme
B. Research and Monitoring Programme
C. Community Participation Programme
D. Public Use Programme
E. Site and Infrastructure Management Programme
F. Administration Programme

When prioritizing activities within these programmes, the results of the Conservation Planning prioritization should be taken into account:

Priority	Conservation Target	Viability Rating	Primary Threat within GPWS
High Priority	*Goliath Grouper*	Poor	Unsustainable fishing
	Central American River Turtle	Fair	Unsustainable hunting
	Hawksbill Turtle	Fair	Low nest success
	Native Fish Species	Fair	Unsustainable fishing
Medium Priority	*West Indian Manatee*	Good	Potential boat impacts
	Aquatic, Riparian and Estuarine Ecosystems	Good	Land clearance
Low Priority	*Mangrove and Littoral Forest Ecosystems*	Very Good	Land clearance

…as should the leverage value of cross cutting strategies:

Primary cross cutting strategies for Gales Point Wildlife Sanctuary	Aquatic , Estuarine and Riparian	Mangrove	West Indian Manatee	Native Fish Species	Central American River Turtle	Goliath Grouper	Sea Turtles	
Strengthening of the Gales Point Wildlife Sanctuary Management Committee								
Signing of co-management agreement between GPWSCMC and Forest Department								
Increased management effectiveness through training and location of funding								
Increased surveillance and enforcement								
Increase and strengthen collaboration with Wildlife trust and other NGOs								
Increased awareness of importance of maintaining mangrove and riparian / littoral forest vegetation								
Enforcement of regulations re. clearance of riparian, littoral forest and mangrove ecosystems within the 66' by waters-edge								
Adequate marking of boundaries of Gales Point Wildlife Sanctuary – especially on creeks and rivers								
Monitor gravel mining and dredging activities and implement actions if								
Monitor water quality								
Development and implementation of sustainable fisheries plan and zonation								
Establishment of best practices for tour guides and sport fishermen,								
Investigate Alternative livelihood options								
Community agreement on boat regulations								
Community agreement on moratorium on hunting within 66' riparian vegetation								
Signing of management agreement with Fisheries Department for turtle nesting beach								
Maintain patrolling of turtle nesting beach and protection of nests								

Wide ranging cross cutting issues (6-7 targets)	
Medium ranging cross cutting issues (4-5 targets)	
Narrow ranging cross cutting issues (1 to 3 targets)	

A. Natural Resource Management Programme

Vision

To ensure the continued maintenance of hydrological processes, healthy, functioning ecosystems and viable populations of all species maintain within the Gales Point Wildlife Sanctuary.

Objective	Activity Areas	Actions
To provide the framework for effective natural resource management	▪ Gales Point Wildlife Sanctuary Community Management Committee takes on co-management role ▪ Increase participation and collaboration with Gales Point community ▪ Increase communication and collaboration with other conservation organizations	A1, A2 A3 A4
To develop and implement measures for increasing general biodiversity viability within the Gales Point Wildlife Sanctuary	▪ Demarcate survey lines on boundaries of GPWS ▪ Ensure awareness of boundaries (including 66') of conservation area and regulations ▪ Develop Enforcement Plan ▪ Establish, train and equip surveillance and enforcement team ▪ Implement surveillance and enforcement activities ▪ Liaise with enforcement agencies to increase effectiveness	A5 A6 A7,A8 A9 – A12 A13 A14
Increase the viability of Conservation Targets of the Gales Point Wildlife Sanctuary	▪ Develop water quality monitoring programme and integrate results into management planning and management activities ▪ Maintain riparian, littoral forest and mangrove vegetation cover within GPWS ▪ Maintain West Indian manatee populations within GPWS ▪ Maintain sustainable traditional fisheries in the GPWS ▪ Develop and implement Hicatee Conservation Programme for the Gales Point area ▪ Develop and implement Goliath Grouper Conservation Programme for the Gales Point area	A15 A16 – A22 A23 – A26 A27 - A34 A35 – A39 A 40 – A42
Increase the viability of other biodiversity of the Gales Point Area	▪ Develop and implement Hawksbill Turtle Conservation Programme for the Gales Point area ▪ Reduction of hunting pressure within GPWS ▪ Develop fire management programme ▪ Mitigation of pollution issues ▪ Maintenance of Forest Connectivity	A43, A45 A46 - A48 A49 – A53 A54 – A57 A58 - A62
Provide policies for mitigation of future potential impacts	▪ Explore feasibility of developing a long term policy and plan in case a mining or oil exploration permit should be issued	A63

A. Natural Resource Management Programme						
GPWS: Gales Point Wildlife Sanctuary **GPVC: Gales Point Village Council** **GPWSCMC: Gales Point Wildlife Sanctuary Community Management Committee** **GPR: Gales Point Rangers** **LAC: Local Advisory Committee**						
To provide the framework for effective natural resource management for the Gales Point Wildlife Sanctuary						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
A1	Reconsolidate the Gales Point Wildlife Sanctuary Community Management Committee	GPWSCMC needs to reconsolidate and strengthen, and build capacity to engage in co-management of GPWS	Functional, active GPWSCMC with the capacity to take on co-management role for GPWS	1st	GPWSCMC GPVC	Hold re-elections for re-newel of Board, Greater community participation in planning, and capacity building for management
A2	Gales Point Wildlife Sanctuary Community Management Committee takes on role of co-management for GPWS	GPWSCMC has been recognized as a potential co-management partner for GPWS by the Forest Department	GPWSCMC has signed an agreement for co-management of GPWS	1st	GPWSCMC GPVC Forest Dept. Fisheries Dept.	Liaise with Forest and Fisheries Departments towards co-management agreement.. GPVC needs to be supportive
A3	Establish Local Advisory Committee within Gales Point	Community participation in management decisions is limited with no participation mechanism	Functional Local Advisory Committee is established to provide input into decision making, and ensure transparency	1st	GPWSCMC	Drawn from representatives of key sectors of the community (the Village Council, fishermen, tour guides, youth, women, etc.)
A4	Develop links with national and international organizations and Government agencies involved in protected areas management	Need for greater collaboration with other organizations and initiatives within the coastal plain area, and other national and international organizations and Government agencies involved in protected areas management	Strong links and collaboration developed with other organizations and initiatives within the coastal plain area, and other national and international organizations and Government agencies involved in protected areas management	1st – 5th	GPWSCMC	Forest Department, Belize Fisheries Department, Wildlife Trust, GRACE (Gracie Rock) Birds without Borders (Runaway Creek), Guardians of the Jewel Sibun Watershed Association, Monkey Bay, TIDE (Paynes Creek)
Develop and implement measures for increasing biodiversity protection within the Gales Point Wildlife Sanctuary						
A5	Demarcate boundaries of conservation area	Boundaries of area are not yet clear on rivers and creeks, either to the managers or to the local communities	Boundaries clearly demarcated on river and creek banks, and community aware of boundaries and 66' regulations	1st	GPWSCMC GPVC	Promoting community awareness of requirements for maintenance of 66' vegetation within the protected area, both along creek and river edges, and lagoon system

A. Natural Resource Management Programme						
Develop and implement measures for increasing biodiversity protection within the Gales Point Wildlife Sanctuary						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
A6	Increase general awareness of location of boundaries within the Gales Point community	Little awareness of location of boundaries and 66' regulations of GPWS in Gales Point community	General awareness of location of boundaries and 66' regulations within GP community	1st	GPWSCMC GPVC Forest Dept	
A7	Develop Enforcement Plan to guide surveillance and enforcement activities	No Enforcement Plan	Enforcement Plan developed and implemented	1st	GPWSCMC Forest Dept Fisheries Dept.	Participation should also be sought from Police Department and local fishermen & hunters
A8	Review Enforcement Plan at end of year, and modify where necessary	Preliminary Monitoring and Enforcement Plan developed for this Operational Plan - not yet implemented	Annual review of Monitoring and Enforcement Plan by management and staff, with modifications to increase effectiveness	1st – 5th	GPWSCMC Forest Dept Fisheries Dept.	Illegal fisheries pressures will vary with time, need for adaptive management - guided by outputs from monitoring and collaboration with recognized traditional fishermen & hunters
A9	Establish Gales Point Rangers Surveillance and Enforcement Unit	No surveillance or enforcement activities currently occurring within the GPWS	Enforcement team established, and regular, trained, coordinated and effective surveillance activities	1st	GPWSCMC Forest Dept Fisheries Dept.	Investigate liaison with GRACE for potential to collaborate surveillance and enforcement activities. Limited by finance
A10	Increase effectiveness of rangers through provision of adequate equipment	No surveillance or enforcement activities	Patrols are functional, and well equipped for task	1st	GPWSCMC	Dedicated patrol equipment, digital camera, GPS (and training in use), binoculars, maps, medical kit, radio communication throughout area, uniform, ID cards, boat
A11	Investigate possibility of rangers being trained as 'Forest Officers' 'Fisheries Officers' and Special Constables, with legal mandate to react to illegal occurrences within area	New GPR Surveillance and Enforcement Team will have no powers to enforce	Rangers have full powers of 'Forest Officers' 'Fisheries Officers' Special Constable, and are therefore able to enforce	1st	GPWSCMC Forest Dept Fisheries Dept.	FD Green Laws training, special constable training, fisheries officer training.
A12	Investigate feasibility of empowering fishermen as voluntary rangers for surveillance activities	No surveillance activities currently occurring within the GPWS	Surveillance on-going through voluntary rangers engaged from local fishermen	1st – 5th	GPWSCMC	Needs recognition by fishermen of the need (and advantages) for their involvement in protecting the fisheries resource and their livelihoods

A. Natural Resource Management Programme						
Develop and implement measures for increasing biodiversity protection within the Gales Point Wildlife Sanctuary						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
A13	Implement surveillance and enforcement activities under Enforcement Plan	No Enforcement Plan	Enforcement Plan developed and implemented	1st	GPWSCMC Forest Dept Fisheries Dept.	Participation should also be sought from Police Department and local fishermen & hunters
A14	Liaise with Forest Dept. and Belize Fisheries Dept.– freshwater compliance unit for enforcement	Limited liaison at present with Forest Department and Fisheries Department	GPWSCMC in constant liaison with Forest and Fisheries Departments	1st -5th	GPWSCMC	Support from the Forest & Fisheries Depts. will assist community acceptance and recognition of need for enforcement
Increase the viability of Conservation Targets of the Gales Point Wildlife Sanctuary						
Conservation Target: Aquatic and Estuarine Systems						
A15	Development of water quality monitoring within GPWS, and streams and creeks feeding into Southern Lagoon	No water quality monitoring within the Gales Point Wildlife Sanctuary system. Partial baseline developed during REA	Monitoring of water quality at specific target points within the Gales Point Wildlife Sanctuary system	1st – 5th	GPWSCMC	Include water monitoring of both ends of Main Creek
A16	Increase awareness of importance of maintaining 66' creek and river-side vegetation	Greater awareness needed within the Gales Point community of the important role played by 66' creek and river-side vegetation	Increased community awareness of community members of the important role played by 66' creek and river-side vegetation	1st-5th	GPWSCMC Forest Dept	A clear message about the health benefits resulting from the 66' buffer is needed
A17	Collaborate with landowners with creek and river-side properties to develop guidelines for maintaining 66' creek and river-side vegetation	Little knowledge and recognition of riparian areas within the Gales Point Wildlife Sanctuary, with no implementation of policy recommendations	Guidelines are agreed to on maintaining 66' creek and river-side vegetation	1st-5th	GPWSCMC Forest Dept GPVC	Legislation and policy recommendations – 66' and SDA
A18	Promote signing of a Memorandum of Agreement between land owners, the GPVC and GPWSCMC re. maintenance of 66' buffer	Little knowledge and recognition of riparian areas within the Gales Point Wildlife Sanctuary, with no implementation of policy recommendations	Land owners sign Memorandum of Agreement with Gales Point Village Council and Gales Point Wildlife Sanctuary Community Management Committee	2nd	GPWSCMC Forest Dept GPVC	Identify incentives, and use Bermudian Landing as a model Needs support of GPVC

A. Natural Resource Management Programme						
Increase the viability of Conservation Targets of the Gales Point Wildlife Sanctuary						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Conservation Target: Aquatic and Estuarine Systems (continued)						
A19	Monitor river and creek banks within the Gales Point Wildlife Sanctuary for clearance, and report any clearance to Village Council	Little knowledge and recognition of riparian areas within the Gales Point Wildlife Sanctuary	Monitoring and enforcement 66' for those creek and river banks within Gales Point Wildlife Sanctuary,	1st-5th	GPWSCMC	Needs to be part of ongoing surveillance and monitoring, needs a baseline map
Conservation Target: Mangrove Ecosystems						
A20	Map the mangrove vegetation of the Gales Point Wildlife Sanctuary and monitor for change	Mangrove mapped in ecosystem map, but specific mapping for monitoring, particularly within the 66', has not yet taken place	Mangrove mapping shows priority areas for monitoring to prevent mangrove clearance within the Gales Point Wildlife Sanctuary	1st-2nd	GPWSCMC	Needs fine resolution updating of current vegetation mapping
A21	Increase awareness of the value of mangrove ecosystem within the Gales Point Community	Many community members have some awareness of the importance of mangroves for the fish resources	All community members aware of the importance of mangrove vegetation, with the implementation of an awareness programme targeted at both adults and school children	1st-5th	GPWSCMC	Potential for conflict with developers and occupants of coastal properties – Should try to develop strategies to engage them. GPWSCMC will need to work closely with the GPVC and the Forest Dept.
A22	Enforce compliance of legislation preventing mangrove clearance within the Gales Point Wildlife Sanctuary	Co-management agreement not yet signed,	GPWSCMC active in enforcing protected area legislation preventing clearance of mangrove within the Gales Point Wildlife Sanctuary	1st-5th	GPWSCMC; FD DoE GPR	In liaison with FD
Conservation Target: West Indian Manatee						
A23	Ensure no-wake zones are enforced for protection of the West Indian Manatee	No wake signs are in place, but no enforcement	Enforcement of no wake zones, with penalties for	1st – 5th	GPWSCMC; FD GPR	Spearheaded by Wildlife Trust and GPWSCMC – needs continuity
A24	Develop and implement general regulations for boats and water sport vehicles (eg. jet skis) use within Gales Point Wildlife Sanctuary	No regulations guiding boat use within the Wildlife Sanctuary (except no wake zones)	General regulations developed and implemented for boat use within the Wildlife Sanctuary	1st -5th	GPWSCMC; FD GPR	Efforts will be greatly enhanced if given broad support by GPVC and the community

A. Natural Resource Management Programme						
Increase the viability of Conservation Targets of the Gales Point Wildlife Sanctuary						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Conservation Target: West Indian Manatee						
A25	Monitor and enforce regulations preventing tourism activities from disturbing manatees within the Wildlife Sanctuary	Co-management agreement not yet signed	GPWSCMC active in monitoring tourism activity, and ensuring manatees are not disturbed within the Gales Point Wildlife Sanctuary	1st-5th	GPWSCMC; FD GPR	Requires re-invigoration of GPWSCMC and existence of a co-management agreement with Forest Dept
A26	Maintain and strengthen collaboration with Wildlife Trust in areas of Manatee Conservation	GPWSCMC has a history of close collaboration with Wildlife Trust	Continue and strengthen links with Wildlife Trust	1st – 5th	GPWSCMC Wildlife Trust	
Conservation Target Native Fish Species						
A27	Demarcate zoning for traditional fishing activities	No zoning currently in place	Zoning of GPWS for traditional fishing activities	2nd	GPWSCMC GPVC Forest Dept. Fisheries Dept. Traditional fishermen	Greater collaboration needs to be fostered between GPWSCMC and traditional fishermen before this issue can be discussed
A28	Resolve traditional resource use issue	Local fishermen are extracting fish from Southern Lagoon, in contravention of the current FD legislation (and in the case of gill nets, in contravention of Fisheries legislation)	Recognition by FD and GoB of sustainable , non-commercial, traditional use for local community members, with training towards greater sustainable use	1st	GPWSCMC GPVC Forest Dept. Fisheries Dept.	Through discussion with Forest Department , and initiation of permitting process for identified traditional fishers
A29	Develop a baseline and guidelines for sustainable , non-commercial, traditional fishing within Gales Point Wildlife Sanctuary	No baseline or guidelines exist	Baseline and guidelines for sustainable fishing have been developed based on sound scientific research	1st-3rd	GPWSCMC GPVC Forest Dept. Fisheries Dept. Traditional fishermen Consultant	Requires assistance from Belize Fisheries Department and/or consultant to develop baseline , guidelines and monitoring programme

A. Natural Resource Management Programme						
Increase the viability of Conservation Targets of the Gales Point Wildlife Sanctuary						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Conservation Target Native Fish Species						
A30	Monitor fishing activity	At present no formalized monitoring of level of fishing activity	Guidelines in place for monitoring and reporting of fishing activity. A fishing impact monitoring programme with output of findings presented in annual report	1st – 5th	GPWSCMC	Establishment of protocol – will be needed for formal recognition of traditional fishing rights See Research and Mointoring Programme
A31	Develop and implement a Sustainable Fisheries plan	No Sustainable Fisheries or Sustainable Fisheries Plan	Sustainable Fisheries Plan developed and implemented with the input and participation of the traditional fishermen and Gales Point community	1st – 2nd	GPWSCMC GPVC Forest Dept. Fisheries Dept. Traditional fishermen Consultant	Requires assistance from Belize Fisheries Department and/or consultant to develop Plan, incorporating baseline, guidelines and monitoring programme
A32	Identify critical areas and times of peak fishing pressure to increase efficiency of patrol effort	No accurate mapping of fishing activity within Southern Lagoon, though knowledge is available. No surveillance or enforcement activities	Accurate mapping of fishing activity within Southern Lagoon, using community knowledge of the area Patrolling driven by knowledge of when and where patrolling needs to be carried out	1st	GPWSCMC GPVC	GIS mapping would facilitate development & implementation of sustainable fisheries plan – assistance from Wildlife Trust?Broad cooperation with identified local traditional fishermen will assist this process.
A33	Promote greater participation in surveillance and enforcement by traditional fishermen	Very few traditional fishermen are currently fully engaged in the protection of GPWS	Traditional fishermen actively protect their resources and assist GPWSCMC with surveillance activities	1st-5th	GPWSCMC GPVC Forest Dept. Fisheries Dept. Traditional fishermen	Traditional fishermen need to take ownership of their resources, and contribute towards management – through participatory focal workshops towards development of a Sustainable Fisheries plan
A34	Liaise with Forest Dept. and Belize Fisheries Dept.– freshwater compliance unit for assistance with enforcement activities	Limited liaison at present with Forest Department and Fisheries Department	GPWSCMC in constant liaison with Forest and Belize Fisheries Departments	1st -5th	GPWSCMC FD BFD	Support from the Forest & Belize Fisheries Depts. will assist community acceptance and recognition of need for enforcement

A. Natural Resource Management Programme						
Increase the viability of Conservation Targets of the Gales Point Wildlife Sanctuary						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Conservation Target: Central American River Turtle (Hicatee)						
A35	Develop Hicatee Conservation Programme, in liaison with Gracie Rock and Wildtracks	No programme currently in place.	Programme established by end of the first year with participation from LAC members and key community members	1st - 2nd	GPWSCMC Wildtracks	Review previous Freetown Sibun hicatee project - strengths and weaknesses. Integrate with National Hicatee Conservation Action Plan (Wildtracks), WildlifeTrust
A36	Identify funding support for Hicatee Conservation Programme	No Programme currently in place	Programme has funding by end of the 1st year	1st – 5th	GPWSCMC Wildtracks	Integrate with National Hicatee Conservation Action Plan (Wildtracks) Wildlife Trust
A37	Increase awareness in Gales Point of the conservation status of the Central American River Turtle (hicatee), and importance of GPWS for its continued survival	Little awareness in Gales Point of global significance of the hicatee population of GPWS	GPWSCMC and community members are fully aware of conservation status of hicatee, and global significance of the hicatee population of GPWS	1st - 5th	GPWSCMC Wildtracks	Declining, but still present in Manatee River, Cornhouse Creek, Soldier Creek and the western drainage of Sapodilla Lagoon Wildlife Trust
A38	Develop awareness and support for the Hicatee Conservation Programme in Gales Point	No Programme currently in place.	Programme is supported by Gales Point community by end of the 2nd year	1st – 5th	GPWSCMC Wildtracks	Wildlife Trust
A39	Increase awareness of national legislation protecting and regulating use of Hicatee	General awareness that there is legislation regulating hicatee use, but little awareness of specifics	Awareness (and compliance) in Gales Point of legislation regulating hicatee use	1st -5th	GPWSCMC BFD FD	In collaboration with Belize Fisheries and Forest Departments, Wildtracks and Wildlife Trust
Conservation Target: Goliath Grouper						
A40	Increase awareness in the Gales Point Community of the critically endangered status of the Goliath Grouper	There is a need for greater awareness of the critically endangered status of the Goliath Grouper in the Gales Point community	People in Gales Point are aware of the critically endangered status of the Goliath Grouper	1st-5th	GPWSCMC Wildlife Trust	In collaboration with Belize Fisheries Department WCS

A. Natural Resource Management Programme						
Increase the viability of Conservation Targets of the Gales Point Wildlife Sanctuary						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Conservation Target: Goliath Grouper						
A41	Discuss with the fishermen the feasibility of a moratorium on fishing of Goliath Grouper within the Gales Point Wildlife Sanctuary	No current specific regulations in place protecting the Goliath Grouper within the Gales Point Wildlife Sanctuary	Fishermen agree to the enforcement of a five year moratorium on the fishing of Goliath Grouper	2nd-5th	GPWSCMC GPVC	In collaboration with Belize Fisheries and Forest Department Wildlife Trust
A42	Enforce five year moratorium on fishing of Goliath Grouper within the Gales Point Wildlife Sanctuary	No current specific regulations in place protecting the Goliath Grouper within the Gales Point Wildlife Sanctuary	Enforcement of moratorium	2nd-5th	GPWSCMC GPR	In collaboration with Belize Fisheries and Forest Departments Wildlife Trust
Conservation Target: Sea Turtle nesting beach						
A43	Increase awareness among coastal landowners of the need to maintain coastal vegetation in key turtle nesting areas, and location of these areas	There is an awareness in Gales Point of the sea turtle nesting beach, but not of the importance of maintaining the coastal vegetation	Gales Point community is aware of the importance of maintaining the coastal vegetation on the nesting beach	1st-5th	GPWSCMC BFD	In collaboration with the Fisheries and Forest Dept, with support of Wildlife Trust
A44	Investigate potential for restoration of coastal vegetation on nesting beach	Other than predation, nest loss has been through overwash due to sinking beach	Studies provide guidelines on how to restore beach to reduce overwash	1st-5th	GPWSCMC Wildlife Trust	Wildlife Conservation Society
A45	Investigate feasibility og placing the turtle nesting beach under permanent protection	Turtle nesting beach gains protection from Fisheries regulations, preventing disturbance of the nests, but land behind could be developed	Addition of the turtle nesting beach to Gales Point Wildlife Sanctuary	1st-5th	GPWSCMC Wildlife Trust	Wildlife Conservation Society
Increase the viability of other biodiversity of the Gales Point Area						
Reduction of hunting pressure within GPWS						
A46	Develop agreement with hunters for no-hunting within the 66' riparian buffer within the Sanctuary	No enforcement presence within GPWS, hunters hunt across the area, wherever game is present; game species have no reproductive retreat	The 66' riparian buffer area fulfils its role within the Sanctuary, game species are secure from hunting in 66' and can replenish populations in adjacent areas	1st-2nd	GPWSCMC, Forest Department	Need for a strong GPWSCMC with support from Forest Department and good support from Gales Point Community

A. Natural Resource Management Programme						
Increase the viability of other biodiversity of the Gales Point Area						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Reduction of hunting pressure within GPWS						
A47	Work with the hunters to ensure hunting within the Gales Point area (outside of the GPWS) is sustainable	No management of GPWS, populations of many game species reported to be severely depleted as a result of over-hunting	No hunting within GPWS, hunting in surrounding areas should be sustainable.	1st-5th	GPWSCMC, GPVC Forest Department	Needs ongoing public awareness campaign re. the benefits of the Sanctuary to help foster cooperation with hunters
A48	Investigate mechanisms for decreasing pressure on game species – e.g. game farming, no-hunting areas	Depressed economy of Gales Point, lack of management of GPWS, limited employment opportunities and cultural traditions has placed severe pressure on game species	Unsustainable hunting pressure on game species alleviated by implementation of positive alternatives for hunters, and by reduction of need for wild-caught meat	1st-5th	GPWSCMC, Forest Department	Need for permission (from Forest Dept) if it is decided to establish game farming – peccaries, white-tailed deer, and possibly paca
Develop Fire Management Programme						
A49	Collaboration with FD, Runaway Creek and GRACE towards an integrated fire management programme for the savanna	Neighbouring conservation organizations are also developing integrated fire management programmes	GPWSCMC is collaborating with neighbouring conservation organizations in developing an integrated fire management programme for the central coastal plain area	1st-2nd	GPWSCMC FD	Liaise with Forest Dept, GRACE (Gracie Rock) and BWB (Runaway Creek)
A50	Training in fire management for the Gales Point Wildlife Sanctuary Community Management Committee	No trained or equipped staff for fire fighting	Trained staff ready and equipped to respond to fires within the Gales Point area	1st – 5th	GPWSCMC FD	Liaise with Forest Dept, GRACE (Gracie Rock) and BWB (Runaway Creek),
A51	Support and participate in any local and national fire awareness activities	Fire is presently an increasing impact on vegetation throughout coastal Belize, including the savannas of the Gales Point area	Greater awareness throughout Belize of the fire hazard during the dry season and the effect it has on natural resources of the country. Reduction of man-made fires.	1st – 5th	GPWSCMC; LAC FD	Requires increased liaison and collaboration with other NGOs and Forest Dept

A. Natural Resource Management Programme						
Increase the viability of other biodiversity of the Gales Point Area						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Develop Fire Management Programme						
A52	Increase awareness among hunters of the problems associated with the increasing frequency of fires, and seek support for a fire management programme	No awareness activities in stakeholder communities	Gales Point community aware of problems of increased fires, and cooperative in trying to prevent further fires	1st – 5th	GPWSCMC LAC	LAC – Local Advisory Committee
A53	Work with cattle-farmers from Freetown Sibun to deter deliberate setting of fires	Some fires are attributed to cattle farmers from Freetown Sibun	Increased communication with cattle farmers in the area identified as responsible for deliberate savanna fires to seek a compatible solution	1st-5th	GPWSCMC	In collaboration with Forest Dept
Mitigation of Pollution Issues						
A54	Development of water quality monitoring within streams and creeks feeding into Southern Lagoon	No water quality monitoring within the Gales Point Wildlife Sanctuary system	Monitoring of water quality at specific target points within the Gales Point Wildlife Sanctuary system	1st – 5th	GPWSCMC	Include water monitoring of both ends of Main Creek Wildlife Trust
A55	Raise awareness of farmers of the need to ensure that agrochemicals do not reach the water systems, either following application, or through washing of spray containers in water bodies	There is a need for greater local awareness of health risks (human and environmental) from chemical pollution	Community support and lobbying for maintenance of clean waters, free from chemical pollution	1st-5th	GPWSCMC GPVC	Needs to be part of an ongoing public awareness initiative re. maintenance of environmental services
A56	Work with Ministry of Works to ensure bridges have the capacity to withstand heavy vehicles, have signage re. weight limit, and have effective barrier rails	No signage re. weight limit on bridges – general uncertainty. No, or broken, barrier rails	Bridges in good repair and have signage re. weight limit, and effective barrier rails	2nd-3rd	GPWSCMC GPVC Ministry of Works	Needs finance and lobbying pressure

A. Natural Resource Management Programme						
Increase the viability of other biodiversity of the Gales Point Area						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Mitigation of Pollution Issues (continued)						
A57	Continue to ensure that the crude oil trucks are not permitted to use the Coastal Road	Crude oil trucks are not permitted to use the Coastal Road	Continuation of current status	1st-5th	GPWSCMC GPVC Ministry of Works	Possible increased pressure for such use of Coastal Road if oil found in coastal plain north of Gales Point
Forest Connectivity						
A58	Identify and map essential broadleaf forest corridor areas within national lands	Mapping of potential forest corridors is currently underway under the Maya Mountains Massif project, but needs to be finalized	GPWSCMC has identified forest corridors relevant to the Gales Point area	1st-2nd	GPWSCMC	In collaboration with GPVC, Forest Dept, Runaway Creek, GRACE (Gracie Rock) and the Lands Department and other national initiative, e.g. WCS
A59	Raise awareness in Gales Point of importance of maintaining forest corridors for wildlife, and benefits for tourism and hunting	There is a need for greater local awareness of national forest connectivity issues	Community support and lobbying for maintenance of forest structure connectivity as identified during biological corridor assessment	1st-5th	GPWSCMC	Would benefit from support of national initiatives
A60	Lobby with GoB and Village Council for regulation of activities within the highlighted corridor areas to ensure retention of forest structure	Forest connectivity currently exists within the Gales Point Manatee area	Forest connectivity continues to exist within the Gales Point Manatee area through regulation of activities within the highlighted corridor areas	1st-5th	GPWSCMC	Legislation and policies exist within SDA
A61	Monitor activities within identified broadleaf forest corridors, to ensure compliance with local regulations	Forest corridors are currently being identified and finalized under the Maya Mountains Massif project	Monitoring of activities within the identified biological corridors	1st-5th	GPWSCMC	Requires broad stakeholder cooperation
A62	Work with other local and national organizations towards maintaining connectivity between the Maya Mountains Massif and the Selva Maya forest block (Rio Bravo area)	No links exist between GPWSCMC and other conservation initiatives working towards forest connectivity	GPWSCMC liaising and collaborating closely with other organizations and initiatives working towards maintaining connectivity between the Maya Mountains Massif and the Selva Maya forest block (Rio Bravo)	1st-5th	GPWSCMC	Organizations: FD, FCD, GRACE, BWB, Initiatives: MMM, WCS (Jaguars)

A. Natural Resource Management Programme						
Increase the viability of other biodiversity of the Gales Point Area						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Contingency Planning for Mining / Oil Exploration						
A63	Explore feasibility of developing a long term policy and contingency plan in case a mining or oil exploration permit should be issued	No long term policy or plan exists at present to be enacted should a mining permit be issued	Advanced planning as to strategies to put into place should a permit be issued	1st	GPWSCMC	Ensure knowledge of legal aspects of situation, to allow proactive rather than reactive response

B. Research and Monitoring Programme

Vision

To facilitate applied conservation research towards increasing management effectiveness and biodiversity conservation, and ensure effective monitoring and evaluation

Objective	Activity Areas	
To provide the framework for effective research and monitoring	▪ Develop Research Programme for Gales Point Wildlife Sanctuary	B1 – B4
	▪ Develop a data management system to assist adaptive management	B5
	▪ Strengthen cross linkages with other research and conservation initiatives	B6
	▪ Identify and address research gaps	B7 – B10
	▪ Increase baseline data on biodiversity within the GPWS through encouragement of targeted research and assessment initiatives within the area	B11 – B19
	▪ Develop and implement monitoring programme	B20 – B31

B. Research and Monitoring Programme						
Provide the framework for effective research and monitoring						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
General Research and Monitoring						
B1	Provide a structured framework for research conducted within the GPWS	Some structure exists under Wildlife Trust, but does not yet integrate completely with the management of the Wildlife Sanctuary	Well structured research programme completely integrated with the management of the Wildlife Sanctuary	1st – 2nd	GPWSCMC Wildlife Trust BFD FD	Requires close liaison, collaboration and communication between GPWSCMC and Wildlife Trust
B2	Integrate research and monitoring into adaptive management planning	No integration of research and monitoring into adaptive management planning	Management planning is informed by research and monitoring outputs	1st – 5th	GPWSCMC Wildlife Trust	Will require assistance from Wildlife Trust, as the primary research partner
B3	Develop a priority research list for targeted research, to feed into adaptive management	No prioritization of research needs	Prioritisation of research needs, based on adaptive management requirements	1st – 2nd	GPWSCMC Wildlife Trust BFD FD	
B4	Identify biodiversity information gaps and collaborate with researchers to target these gaps	Not all future gaps can be identified in this management plan	Future biodiversity information gaps are identified and filled	1st – 5th	GPWSCMC Wildlife Trust BFD FD	
B5	Develop a system for storing research information	Papers and data are not easily accessible	List of research that has been conducted within the GPWS, with research information easily accessible	1st	GPWSCMC Wildlife Trust	Greater transfer of research information from Wildlife Trust to GPWSCMC
B6	Strengthen cross linkages with organizations involved in research and monitoring locally, nationally and regionally	Links exist with Belize Fisheries Department, Wildlife Trust, Wildtracks, Wildlife Conservation Society	Strong cross linkages with organizations involved in relevant research and monitoring	1st – 5th	GPWSCMC Wildlife Trust	
Research Gaps						
B7	Further studies on ecology, life history, habitat use, manatee hole use and relative abundance of Goliath Grouper within GPWS	Little is known of the ecology, life history, habitat use, manatee hole use and relative abundance of Goliath Grouper within GPWS	Greater knowledge of ecology, life history, habitat use, manatee hole use and relative abundance of Goliath Grouper within GPWS	1st – 5th	GPWSCMC Wildlife Trust WCS	Should feed into adaptive management planning

B. Research and Monitoring Programme						
Provide the framework for effective research and monitoring						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Research Gaps						
B8	Further studies on ecology, life history, habitat use, relative abundance and human use of elasmobranchs within GPWS	Little is known of the ecology, life history, habitat use, relative abundance and human use of of sharks and rays within GPWS	Greater knowledge of ecology, life history, habitat use, relative abundance and human use of sharks and rays within GPWS	1st – 5th	GPWSCMC Wildlife Trust WCS	Should feed into adaptive management planning
B9	Investigate ecology, life history, habitat use, size classes and relative abundance of cubera and tarpon within GPWS	Little is known of the ecology, life history, habitat use, size classes and relative abundance of cubera and tarpon within GPWS	Greater knowledge of ecology, life history, habitat use, size classes and relative abundance of cubera and tarpon within GPWS	1st – 5th	GPWSCMC Wildlife Trust WCS	Should feed into adaptive management planning
B10	Detailed study of 'manatee holes' within GPWS	Little is known of the conditions of the 'manatee holes' that result in manatee, tarpon and grouper congregations	Knowledge of the conditions of the 'manatee holes' that result in manatee, tarpon and grouper congregations	1st – 5th	GPWSCMC Wildlife Trust WCS	Suggested parameters: nutrients, temperature, salinity etc. (R. Graham) Should feed into adaptive management planning
Research for Baseline Information						
B11	Increase general baseline data of Gales Point Wildlife Sanctuary flora and fauna, with distributional data	Current knowledge of GPWS limited to rapid Biodiversity Assessment and previous SDA surveys – no detailed data collection	Better knowledge of flora and fauna presence and distribution within GPWS from ranger team (when established) and external researchers	1st – 5th	GPWSCMC Wildlife Trust	Attract researchers in specific fields – manatee, goliath grouper, sea grass, fish stocks, sea turtles,
B12	Develop baseline for commercial fish species	Community concern that fish stocks have declined significantly, but no scientific baseline information to measure success of strategies for recovery	Scientific baseline information to measure success of strategies for recovery	2nd – 4th	GPWSCMC Wildlife Trust BFD FD	Will require assistance from a research partner – Belize Fisheries Department / Wildlife Trust?
B13	Develop baseline for sport fish species	Community concern that sport fish stocks have declined significantly, but no scientific baseline information to measure success of strategies for recovery	Scientific baseline information to measure success of strategies for recovery	2nd – 4th	GPWSCMC Wildlife Trust	Will require assistance from a research partner – Belize Fisheries Department / Wildlife Trust?

B. Research and Monitoring Programme						
Provide the framework for effective research and monitoring						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Research for Baseline Information						
B14	Develop population size and distribution baseline for Central America River Turtle (hicatee) populations	Whilst it is known that the hicatee is present in the creeks and rivers that feed Southern Lagoon, and that the population has decreased, there is no data on current population size and distribution	Baseline for population size and distribution of Central American River Turtle	2nd	GPWSCMC	Will require assistance from a research partner – Wildtracks?
B15	Develop population size and distribution baseline for Goliath Grouper	Whilst it is known that the Goliath Grouper is present in GPWS, and that the population has decreased, there is no data on current population size and distribution	Baseline for population size and distribution of Goliath Grouper	2nd	GPWSCMC Wildlife Trust	Will require assistance from a research partner – Belize Fisheries Department / Wildlife Trust?
B16	Detailed mapping of the riparian vegetation within the GPWS	No detailed mapping of the riparian vegetation within the GPWS on which to base monitoring and surveillance activities	Detailed mapping of the riparian vegetation within the GPWS on which to base monitoring and surveillance activities	2nd – 3rd	GPWSCMC	Coarse scale mapping exists from Meerman (2004). Needs to be more detailed for monitoring and surveillance requirements
B17	Detailed mapping of the mangrove vegetation within the GPWS	No detailed mapping of the mangrove vegetation within the GPWS on which to base monitoring and surveillance activities	Detailed mapping of the mangrove vegetation within the GPWS on which to base monitoring and surveillance activities	2nd – 3rd	GPWSCMC	Coarse scale mapping exists from Meerman (2004). Needs to be more detailed for monitoring and surveillance requirements. MBRS support?
B18	Mapping of broadleaf forest connectivity, and identification of key connectivity areas for protection	No current mapping of broadleaf forest connectivity, and identification of key connectivity areas for protection	Mapping of broadleaf forest connectivity, and identification of key connectivity areas for protection	1st – 3rd	GPWSCMC FD WCS	Current initiatives within Belize are focused on identifying and protecting a forest corridor linkage from Maya Mountains Massif and Rio Bravo
B19	Develop baseline of tourism activity within the GPWS – numbers / activities	No baseline exists for tourism level and activity within the GPWS	Baseline for tourism level and activity within the GPWS	2nd – 5th	GPWSCMC GP Tour Guide Association	Should feed into the development of the 'Limits of Acceptable Change' programme. Assistance from BTIA / BTB

B. Research and Monitoring Programme						
Provide the framework for effective research and monitoring						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Monitoring						
B20	Develop Conservation Monitoring Programme	There is currently no programme to monitor Conservation Targets	A Monitoring Programme has been developed to monitor the success of conservation activities designed to protect conservation targets, and integrates community participation in monitoring activities	2nd – 5th	GPWSCMC Wildlife Trust	Should build on the baselines, and include monitoring of: ▪ Extent of riparian and mangrove ecosystems ▪ Extent of littoral forest ▪ Population size and distribution of hicatee, goliath grouper, ▪ Native Fish species …and threats ▪ Fish catch (species / size) ▪ Gill net use ▪ Hunting impacts ▪ Sport fish catch ▪ Boat activity ▪ Fire impacts within 66' buffer
B21	Establish a water quality monitoring programme for GPWS	There is currently no programme to monitor water quality	A water quality monitoring programme is established for GPWS	2nd – 5th	GPWSCMC Wildlife Trust	Linkages with Public Health / access to equipment resources to look at water parameters (e.g. contaminants, pathogens)
B22	Continue monitoring of manatee populations within GPWS	Monitoring is ongoing	Continued monitoring of manatee populations within GPWS	1st – 5th	GPWSCMC Wildlife Trust	Research opportunities for local and international graduate students
B23	Continue monitor nesting and hatching success of sea turtle nests	Monitoring is ongoing	Continued monitoring of nesting and hatching success of sea turtle nests	1st – 5th	GPWSCMC BFD	Needs greater finance, and assisted by current input from Wildlife Trust
B24	Monitor grouper populations within the Gales Point Wildlife Sanctuary	Monitoring is considered a potential activity under Wildlife Trust	Increased information on population numbers and distribution over time	1st – 5th	GPWSCMC Wildlife Trust	
B25	Continue monitoring of sea grass distribution and condition	Monitoring is ongoing	Continued monitoring of sea grass distribution and condition	1st – 5th	GPWSCMC Wildlife Trust	Seagreassnet / MBRS monitoring protocols

B. Research and Monitoring Programme						
Provide the framework for effective research and monitoring						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Monitoring						
B26	Monitor waterbirds/wading birds and colony nesting sites	No standardized monitoring	Standardised monitoring, with outputs feeding into adaptive management	1st – 5th	GPWSCMC Wildlife Trust	With community participation
B24	Monitor waterbirds/wading birds	No standardized monitoring	Standardised monitoring, with outputs feeding into adaptive management	1st – 5th	GPWSCMC Wildlife Trust	
B27	Monitor overlap between traditional fishing and sport fishing	No quantifiable knowledge of socio-economic value of sport fishing, impact of traditional fishing on this activity, and vice versa	Quantifiable knowledge of socio-economic value of sport fishing, impact of traditional fishing on this activity, and vice versa	1st – 5th	GPWSCMC Wildlife Trust	With input from BFD
B28	Monitor howler monkey populations within 66' riparian belt of GPWS	No baseline or knowledge of changes in populations of howler monkeys within GPWS	Baseline and knowledge of changes in populations of howler monkeys within GPWS	2nd – 5th	GPWSCMC	Important tourism resource
B29	Monitor American and Morelet's crocodile populations, and use of GPWS	No baseline or knowledge of American and Morelet's crocodile use of GPWS	Baseline and knowledge of changes in populations and distribution of crocodiles within GPWS	2nd – 5th	GPWSCMC	Important tourism resource Identify nesting sites
B30	Develop monitoring programme for environmental and socio-economic impacts of tourism	Baseline developed for socio-economic impacts in 2007, no monitoring programme in place for assessing environmental, economic and social impact of visitation to Gales Point	Monitoring programme in place and being implemented	1st – 5th	GPWSCMC Tour Guide Group	To be developed, then monitoring every two years. Integrated into Management Plan. 2007 survey can be used as baseline fo socio-economic indicators.
B31	Monitor tourism impact on natural resources though development of a structured monitoring programme based on 'Limits of Acceptable Change' programme	No 'Limits of Acceptable Change' programme	A 'Limits of Acceptable Change' programme is in place and implemented - output of findings presented in an annual report. Guidelines in place for monitoring and reporting of tourism impact.	1st – 5th	GPWSCMC Gales Point Tour Guide Assn.	Intern to assist with development of LOAC programme. Data collected through the monitoring programme needs to be analyzed, and report written on perceived impacts or lack of impacts. This then needs to be acted upon.

C. Community Participation Programme

Vision

Integrated community participation in the conservation management of the Peccary Hills area by key stakeholders

Objective	Activity Areas	
To provide the framework for integrated community participation in conservation management of the Gales Point Wildlife Sanctuary	▪ Strengthen Gales Point Wildlife Sanctuary Community Management Committee ▪ Community Participation in Resource Management ▪ Community Participation in Surveillance and Enforcement	C1 – C9 C10 – C15 C16 – C17
To provide socio-economic benefits fo Gales Point community	▪ Increase community Awareness and Benefit	C18 - 21

C. Community Participation						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Strengthen Gales Point Wildlife Sanctuary Community Management Committee						
C1	Clearly define the role of GPWSCMC and FD in context of Gales Point community / GPVC	Clear lines of responsibility need to be developed to avoid conflicts	Clear lines of have been developed to avoid conflicts	1st – 5th	GPWSCMC GPVC FD	
C2	Hold a community meeting to discuss co-management of Gales Point Wildlife Sanctuary, with re-elections for Management Committee Board	GPWSCMC needs to be revived, to become an active management force within the community	GPWSCMC is revived, and fulfills its role as an active management force within the community	1st	GPWSCMC	
C3	Gales Point Wildlife Sanctuary Community Management Committee to sign co-management agreement with Forest Department	No co-management agreement exists between FD and GPWSCMC	Co-management agreement exists between FD and GPWSCMC	1st	GPWSCMC	
C4	New Board to develop an Annual Operational Plan of activities based on the Actions within the Management Plan	No Operational Plan to guide GPWSCMC	Operational Plan developed to guide GPWSCMC through each year	1st	GPWSCMC	
C5	Establish Local Advisory Committee with representation from key sectors of Gales Point to advise on management issues	There is currently no mechanism for input into management decisions by Gales Point community	Local Advisory Committee established to provide a mechanism for input by Gales Point community	1st	GPWSCMC GPVC	Should meet quarterly with GPWSCMC to review progress and provide advice and input
C6	Develop structured role for LAC within Gales Point community	No LAC	LAC has a structured role – providing a two-way conduit between GPWSCMC and Gales Point community	1st – 5th	GPWSCMC LAC	Past experience shows that LACs need to have very specific TOR's, and scheduled meetings / activities to maintain motivation and commitment
C7	Develop capacity and knowledge of LAC members	No LAC	LAC members should have training in biodiversity, basic conservation issues, biodiversity legislation, conflict resolution	1st – 5th	GPWSCMC LAC	Through a series of training workshops run by invited speakers (Forest Dept, Fisheries Dept. researchers, Wildlife Trust, WCS etc.)

C. Community Participation						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Strengthen Gales Point Wildlife Sanctuary Community Management Committee (continued)						
C8	GPWSCMC to present quarterly activities to LAC for approval, and at annual community meeting, to inform, and for input and suggestions from the community	There is currently no mechanism for input into management decisions by Gales Point community	Local Advisory Committee established to provide a mechanism for input by Gales Point community	1st – 5th	GPWSCMC LAC	
C9	Present scheduled activities at annual community meetings, to inform, and for input and suggestions from the community	There is currently no mechanism for input into management decisions by Gales Point community	Local Advisory Committee established to provide a mechanism for input by Gales Point community	1st – 5th	GPWSCMC LAC	
Community Participation in Resource Management						
C10	Workshop for community participation in developing zoning and guidelines for traditional fishing activities within GPWS	No zoning or guidelines for traditional fishing activities within GPWS	Zoning and guidelines developed for traditional fishing activities within GPWS, with community participation	1st	GPWSCMC LAC Traditional Fishermen FD, BFD	
C11	Liaison with Forest and Fisheries Departments re. traditional fishing within the Wildlife Sanctuary	No current agreement for permission for traditional fishing	An agreement signed between GPWSCMC, FD, GPVC and Traditional Fishermen allowing sustainable fishing activities,		GPWSCMC Traditional Fishermen FD, BFD	Based on sound scientific baseline and information
C12	Continue community participation in patrolling of sea turtle nesting area	Ongoing surveillance activities	Community participation in surveillance activities	1st – 5th	GPWSCMC LAC	Potential to involve the youth group
C13	Increase mechanisms for community participation in research / monitoring activities	Some participation in research and monitoring activities	Greater community participation in research and monitoring activities	1st – 5th	GPWSCMC LAC	
C14	Investigate potential for Alternative Livelihoods for commercial fishermen	Commercial fishermen are using gill nets within the GPWS.	Commercial fishermen have alternatives to fishing when gill nets are phased out	1st – 3rd	GPWSCMC; LAC Commercial Fishermen	Needs to be based on interests and capacities of commercial fishermen
C15	Workshop to discuss alternatives to hunting in the 66' riparian belt	Hunting is active in the 66' riparian belt	Agreement is reached on a compromise, with a moratorium on hunting within the 66'	1st	GPWSCMC LAC Hunters	Possibilities of alternatives through ranching of game species

C. Community Participation						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Community Participation in Surveillance and Enforcement						
C16	Establish a community patrol group for surveillance activities, building awareness and ownership of natural resources	No surveillance activities	Community participation in surveillance activities	1st – 5th	GPWSCMC LAC	Incorporate fishermen, hunters and youth where possible
C17	Establish mechanism for community reporting of illegal activities threatening manatees – gill nets within lagoon system, speeding boats, tourists touching manatees, poor tour guide practices	No surveillance activities	Community participation in surveillance activities	1st – 5th	GPWSCMC LAC	
Increase community Awareness and Benefit						
C18	Develop community awareness programme	Whilst GPWSCMC members are aware to some extent of the biodiversity value of the protected area, this awareness may not extend far into the community	Increased community awareness of the biodiversity value of the protected area increases	1st – 5th	GPWSCMC LAC	Particularly of Southern Lagoon manatees, and sea turtles within Gales Point area
C19	Involve youth volunteer groups in protection of turtle nesting beach through structured volunteer programme	No structured volunteer programme	A structured volunteer programme taking both local, national and international volunteers	1st – 5th	GPWSCMC LAC GPVC	Youth Group, UB Needs discussion on length of time, daily/nightly schedule of activities
C20	Support implementation of the actions under the Community Development Programme	Community Development Plan provides a framework for community cooperation towards increasing socio-economic benefits for Gales Point	GPWSCMC support and promotes implementation of Community Development Plan	1st – 5th	GPWSCMC LAC GPVC	Community Development Plan requires active implementation. Includes tourism and alternative livelihoods actions
C21	Increase liaison with Government Agencies and NGOs that can assist implementation of the Gales Point Community Development Plan	Opportunities may exist to leverage assistance for community development from Government and NGOs	Opportunities are seized to leverage assistance for community development from Government and NGOs	1st – 5th	GPWSCMC GPVC	Public Health, Ministry of Education SIF, Wildlife Trust etc.

D. Public Use Programme

Vision

Providing opportunities for sustainable, traditional fishing and integrated tourism use of the Gales Point Wildlife Sanctuary, increasing awareness of the conservation value of the area, developing broad-scale public support, and providing economic sustainability

Objective	Activity Areas	
To provide the framework for sustainable, traditional fishing	▪ Provide scientific baseline and monitoriong guidelines for sustainable traditional fishing in a Sustainable Fisheries Plan	A27 – A34 B12, B13, B20, B24
	▪ Participatory workshop towards zoning and sustainable, traditional fishing, integrated into Sustainable Fisheries Plan	D1
To provide the framework for sustainable, eco-friendly tourism	▪ Develop user agreement between tour guides and GPWSCMC for tourism use within the GPWS	D2 – D4
	▪ Develop guidelines and regulations for sport fishing	D5
	▪ Develop 'Limits of Acceptable Change' and Best Practices programmes for regulation and monitoring of tourism impacts, and enforce regulations	C8 B27, B28
	▪ Establish system for data collection and monitoring of visitor and commuity use	D6, D7
To reduce illegal hunting within the GPWS	▪ Develop baseline and monitoring programme for illegal activities within the Gales Point Wildlife Sanctuary, feeding into adaptive management	D8
	▪ Investigate alternative sources of game meat	D9
To increase awareness of the conservation value of the area in Gales Point	▪ Upgrade and equip interpretive facilities	D10
	▪ Develop education field programme for primary level in Gales Point	D11

D. Public Use						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
D1	Work with GPVC and Gales point community to implement Community Development Plan	Community Development Plan is in preparation	GPVC and GPWSCMC work with Gales Point community to implement Development Plan	1st – 5th	GPSWCMC GPVC	Wildlife Trust
Provide the framework for sustainable, traditional fishing						
D2	Community workshop to discuss guidelines, permitting and zonation for tradition fishing activities	No permission, guidelines or regulations exist for traditional fishing within GPWS	Written permission, guidelines and regulations exist for sustainable, traditional fishing within GPWS	1st – 5th	GPWSCMC FD, BFD Traditional Fishermen	See also A27 – A34; B12, B13, B20, B24 Consultant
Provide the framework for sustainable, eco-friendly tourism						
D3	Work with tour guide group to ensure best practices within Gales Point Wildlife Sanctuary	No liaison between GPWSCMC and tour guides. No best practices guidelines in place	Tour guides work with GPWSCMC, and follow best practices guidelines within GPWS.	1st – 5th	GPWSCMC Tour Guide Group	See: Community Development Plan 2.2 Restablish tour guide association
D4	Develop users agreement between GPWSCMC and tour guides using GPWS	No contact between GPWSCMC and tour guides	Framework established fr tourism activities within GPWS, entrance fee payment, best practices and guidelines	1st – 5th	GPWSCMC Tour Guide Group	See: Community Development Plan
D5	Develop and enforce regulations regarding visitor and tour guide behavior (eg. noise pollution etc.)	No best practices guidelines developed for visitor and guide behaviour expectations	Written Best Practices guidelines provide clear guidelines on acceptable visitor and guide behaviour	1st – 5th	GPWSCMC Tour Guide Group	Clear guidelines will help reduce impact on biodiversity (eg. no disturbance of wildlife, no noise when watching howler monkeys.)
D6	Community workshop to discuss guidelines, permitting and zonation for sport fishing activities	No guidelines or regulations exist for sport fishing within GPWS	Written guidelines and regulations exist for sport fishing within GPWS	1st – 5th	GPWSCMC Sport fishing tour guides	
D7	Ensure that data on visitation and public use is available to assist in management decisions	No easily accessible figures or information for assessing visitor flow, activities and visitor satisfaction	Information gathered and made available in quarterly and annual report on visitor flow, activities and visitor satisfaction	1st – 5th	GPWSCMC Tour Guide Group	Need to develop a visitor satisfaction questionnaire – 'Visitor' also includes VIPs, researchers, students etc.
D8	Develop monitoring programme for environmental and socio-economic impacts of tourism	Baseline developed for socio-economic impacts in 2007, no monitoring programme in place for assessing environmental, economic and social impact of visitation to Gales Point	Monitoring programme in place and being implemented	1st – 5th	GPWSCMC Tour Guide Group	See B27

D. Public Use						
Management Actions		**Present Status**	**Desired Status**	**Year**	**Responsible Parties**	**Limitations/Requirements**
Other Community Use						
D8	Monitor illegal activities within Gales Point Wildlife Sanctuary to inform management	No formal monitoring programme in place and implemented for measuring illegal hunting, land clearance and fishing activities over time	Formal monitoring programme in place for measuring illegal hunting, land clearance and fishing activities over time	1st – 5th	GPWSCMC GPR	Patrol forms to collect the required information. Monthly report summarises patrol form information
D9	Investigate alternative sources of game meat for traditional hunters	Hunting is taking place within the Gales Point Wildlife Sanctuary	Hunters have access to alternative sources of game meat – game ranching initiative?	1st – 5th	GPWSCMC GPR	Needs close collaboration and liaison with traditional hunters
Provide interpretive facilities to increase visitor and community awareness						
D10	Upgrade Interpretive Centre, and develop interpretive exhibits	Facility for visitors and local community members to learn more about the biodiversity of the Gales Point area, and local culture	Interpretive Centre providing additional information for visitors	1st – 5th	GPWSCMC Tour Guide Group	See: Community Development Plan
D11	Develop education field programme for primary level in Gales Point	Increase structured educational field activities in Gales Point primary school	Structured educational field activities raising awareness of students and teachers of biodiversity and local conservation issues	1st – 5th	GPWSCMC	Tie into conservation targets Wildlife Trust See Community Participation

E. Infrastructure Programme

Vision

GPWSCMC, as the management body of Gales Point Wildlife Sanctuary, has adequate infrastructure for effective management of the natural resources of the protected area

Objective	Activity Areas	
To provide the infrastructural framework for the effective management of the Gales Point Wildlife Sanctuary	▪ Lobby for maintenance of access road (Coastal Road) ▪ Identify essential requirements for facilities and equipment for management of GPWS ▪ Solid Waste Disposal	E1 E2 – E6 E7 – E10

E. Infrastructure Programme						
Management Actions		**Present Status**	**Desired Status**	**Quarter**	**People**	**Limitations/Requirements**
E1	Lobby for better maintenance of coastal road	Poor access to the Wildlife Sanctuary from outside of Gales Point	Improved access to Gales Point and the Wildlife Sanctuary through better maintenance of the Coastal Road	1st – 5th	GPWSCMC GPVC	Access is seen as one of the primary barriers to development of the Gales Point community, and will affect financial sustainability of the protected area
E2	Identify essential facilities and equipment required for administration of the conservation area	No facilities or equipment currently exist for administration of GPWS	Essential facilities and equipment are identified and located for administration of GPWS	1st – 5th	GPWSCMC	Administrative HQ Equipment for Administration (computer, filing system, office equipment)
E3	Identify essential facilities and equipment required for surveillance and enforcement activities for the conservation area	No facilities or equipment currently exist for surveillance and enforcement activities for GPWS	Essential facilities and equipment are identified and located for surveillance and enforcement activities for GPWS	1st – 5th	GPWSCMC	Boat, engine, fuel Equipment for surveillance and enforcement (See A10)
E4	Identify essential facilities and equipment required for research and monitoring	No GPWSCMC facilities or equipment currently exist for research and monitoring	Essential facilities and equipment are identified and located for research and monitoring	1st – 5th	GPWSCMC	Boat, engine, fuel Equipment for research and monitoring
E5	Identify essential facilities and equipment required for education and awareness activities	No equipment currently exist for education and awareness activities	Equipment are identified and located for education and awareness activities	1st – 5th	GPWSCMC	Wildlife Trust manatee and turtle equipment
E6	Ensure all facilities and infrastructure are kept well maintained	No facilities and limited equipment	Facilities and equipment are well maintained	1st – 5th	GPWSCMC	Support from Wildlife Trust infrastructure, and through partnerships with other conservation organziations
Solid Waste Disposal						
E7	Post signs requesting tour guides and visitors to take their garbage with them	No signs request visitors to take garbage with them	Signs are posted to requesting tour guides and visitors to take their garbage with them	1st to 5th	GPWSCMC	
E8	Monthly beach cleanup during turtle nesting season	Beach cleanups not conducted regularly	Beach cleanups conducted on a monthly basis during turtle nesting season	1st to 5th	Park Director and staff	Annual beach clean up at start of nesting season as community activity

E. Infrastructure Programme						
Management Actions		**Present Status**	**Desired Status**	**Quarter**	**People**	**Limitations/Requirements**
Solid Waste Disposal						
E9	Ensure garbage collection is included in patrol activities	Garbage not collected	Garbage collected	1st to 5th	GPWSCMC	
E10	Ensure adequate planning for garbage collected from GPWS– both that left by visitors and fishermen, and beach debris	Garbage not collected	Garbage is taken to Dangriga dump for disposal	1st to 5th	GPWSCMC	If Gales Point develops its own solid waste dump, garbage can then be taken there

F. Administration Programme

Vision

GPWSCMC, as the co-management body for the Gales Point Wildlife Sanctuary, has the administrative structure and capacity to effectively manage the protected area.

Objective	Activity Areas	
To provide the administrative framework for the effective management of the Gales Point Wildlife Sanctuary	▪ Establish GPWSCMC as the formal co-management body ▪ Establish Local Advisory Committee	F1 – F8
To ensure human resources are in place for effective management	▪ Human resources for effective management ▪ Develop an employee handbook, ▪ Develop a Volunteer Policy ▪ Staff training to ensure effective general management	F9 - F12
To ensure effective financial; management and planning	▪ Develop Financial Plan ▪ Secure funding ▪ Establish administration structure for record keeping, accounting etc. for effective management of GPWS ▪	F13 - F17
Health and Safety Issues	▪ Ensure an effective Hurricane Plan is in place, and staff trained in implementation	F18
Monitoring and Evaluation	▪ Reporting procedures are in place ▪ Monitoring and Evaluation Procedures are in place	F19 – F25

F. Administrative Programme						
Management Actions		**Present Status**	**Desired Status**	**Quarter**	**People**	**Limitations/Requirements**
General Administration						
F1	Reconsolidate the Gales Point Wildlife Sanctuary Community Management Committee	GPWSCMC needs to reconsolidate and strengthen, and build capacity to engage in co-management of GPWS	Functional, active GPWSCMC with the capacity to take on co-management role for GPWS	1st	GPWSCMC GPVC	Hold re-elections for re-newel of Board, Greater community participation in planning, and capacity building for management
F2	Gales Point Wildlife Sanctuary Community Management Committee takes on role of co-management for GPWS	GPWSCMC has been recognized as a potential co-management partner for GPWS by the Forest Department	GPWSCMC has signed an agreement for co-management of GPWS	1st	GPWSCMC GPVC Forest Dept. Fisheries Dept.	Liaise with Forest and Fisheries Departments towards co-management agreement.. GPVC needs to be supportive
F3	Establish Local Advisory Committee within Gales Point	Community participation in management decisions is limited with no participation mechanism	Functional Local Advisory Committee is established to provide input into decision making, and ensure transparency	1st	GPWSCMC	Drawn from representatives of key sectors of the community (the Village Council, fishermen, tour guides, youth, women, etc.)
F4	Develop Operations Plan in November for forthcoming year	No Operational Planning	Operational Plan is prepared in November for forthcoming year	1st to 5th	GPWSCMC	
F5	Keep daily log of activities for GPWS, and prepare monthly report on enforcement activities, general situation report.	No activities ongoing	Daily log is completed, and summarized in monthly and annual reports of logged activities	1st to 5th	GPWSCMC	Enforcement activities, maintenance activities, number of visitors, entrance fees, and a general situation report.
F6	Conduct annual management effectiveness assessment and submit to FD	First Management Effectiveness assessment conducted in July 2006	Annual management effectiveness assessment and submitted to PA administration authority	1st to 5th	GPWSCMC	Should include input from Gales Point community and GPVC
F7	Establish administration structure for managing surveillance and monitoring data	No structure exists	A structure exists for storing surveillance and monitoring data, patrol reports etc. and producing quarterly and annual reports	1st – 5th	GPWSCMC	
F8	Prepare annual report	Reports prepared on an annual basis	Reports prepared on an annual basis and submitted to Forest Department	1st to 5th	GPWSCMC	Following Forest Department format

F. Administrative Programme						
Management Actions		**Present Status**	**Desired Status**	**Quarter**	**People**	**Limitations/Requirements**
Human Resources						
F9	Identify priority staffing requirements	No staff are currently employed	Priority staff employed for effective management	1st – 2nd	GPWSCMC	
F10	Develop an employee handbook covering topics such as job duties, employee policies, transport policy, and a staff appraisal process	No staff are currently employed	An employee handbook is developed covering topics such as job duties, employee policies, transport policy, and a staff appraisal process	1st to 5th	GPWSCMC	
F11	Develop a volunteer policy covering topics such as race and gender issues, expected behavior, health and safety	No volunteer policy in place	A volunteer policy is developed covering covering topics such as race and gender issues, expected behavior, health and safety	1st to 5th	GPWSCMC	
F12	Ensure accurate staff records of are maintained	Once staff are employed	Accurate staff records are maintained	1st to 5th	GPWSCMC	
Financial Administration						
F13	Develop financial plan for GPWS for next five years to set course for economic sustainability	No financial planning / business planning	Good financial plan developed and implemented to guide future financing and expenditure	3rd	GPWSCMC Consultant	
F14	Secure grant funding for the management of the GPWS	Currently, no funding	GPWSCMC has funding to implement management activities	1st – 5th	GPWSCMC	Grant funding secured; explore opportunities for grant funding via PACT, GEF SGP, and others, with support and assistance of Wildlife Trust
F15	Establish administration structure for record keeping, accounting etc. for management of the conservation area	No administrative structure currently in place for the conservation area for record keeping, reporting, accounting etc.	An administration structure in place for the conservation area for record keeping, accounting etc.	1st -2nd	GPWSCMC	

F. Administrative Programme						
Management Actions		**Present Status**	**Desired Status**	**Quarter**	**People**	**Limitations/Requirements**
Financial Resources						
F16	Prepare timely financial and management accounts and submit monthly	Currently no funding	Reports prepared on a monthly basis and forwarded for review by GPWSCMC and LAC	1st to 5th	GPWSCMC	
F17	Prepare financial reports as needed for funding agencies	Currently no funding	Financial reports prepared and submitted in time to funding agencies	1st to 5th	GPWSCMC	
Health and Safety						
F18	Ensure an effective Hurricane Plan is in place, and staff trained in implementation	No Hurricane Plan is in place	An effective Hurricane Plan is in place, and staff trained in implementation	1st to 5th	GPWSCMC	
Monitoring and Evaluation						
F19	Annual review of measures of success	No review system at present in place for success of management strategies	Annual review of measures of success of strategies and implementation prior to developing annual work plan	1st to 5th	GPWSCMC LAC	
F20	Annual evaluation of operational plan	No Operational Plan	Review operational plan in October and use successes/ failures to input into new Operational Plan	1s to 5th	GPWSCMC LAC	
F21	Annual evaluation of surveillance and enforcement activities	No surveillance and enforcement activities	Evaluation success / failures of surveillance and enforcement ectivities	1dt to 5th	GPWSCMC LAC	
F22	Annual review of education activities	Review of education activities over the past year before developing new operational plan	Develop new operational plan with input on successes/failures of education activities in old workplan	1st to 5th	GPWSCMC LAC	
F23	Annual review of community participation activities	Review of community participation activities over the past year before developing new operational plan	Develop new operational plan with input on successes/failures of community participation activities in old workplan	1st to 5th	GPWSCMC LAC	

F. Administrative Programme						
Management Actions		**Present Status**	**Desired Status**	**Quarter**	**People**	**Limitations/Requirements**
Monio]toring and Evaluation						
F23	Annual review of community participation activities	Review of community participation activities over the past year before developing new operational plan	Develop new operational plan with input on successes/failures of community participation activities in old workplan	1st to 5th	GPWSCMC LAC	
F24	Re-evaluate management plan after 2½ years	No previous management plan	Update and re-evaluate information in all sections of Management Plan - including Environmental Assessment	3rd year	GPWSCMC LAC	
F25	Re-evaluate management plan after 5 years	No standardised re-evaluation of management plan currently takes place	Update information in all sections of Management Plan - including Environmental Assessment	5th year	GPWSCMC LAC	

4.5.7 Management Policies

A number of policies need to be developed for effective management.

Enforcement Policy

Gales Point Wildlife Snactuary Community Management Committee should develop an Enforcement Policy, with input ffrom Forest and Fisheries departments, to guide protectected area staff through standardized procedures for approaching and apprehending people in contravention of the protected area regulations. Both Forest Department and Fisheries Department have strengthened their ability to assist co-management organizations with enforcement issues. Forest Department now offers Green Laws training in the legislative background when dealing with enforcement issues. Fisheries Department is currently developing an Enforcement Plan, as an offical Fisheries Department policy, following a review of current enforcement limitations (I. Majil, 2007).

Staff Policy

A Staff Policy should be developed with clear guidelines to address health, safety, race and gender issues, as well as behavior, arbitration and work output.

Volunteer Policy

A Volunteer Policy should be developed with clear guidelines to address health, safety, race and gender issues connected with local, national and international volunteers assisting the GPWS and sea turtle protection activities.

Hurricane Preparedness

A Hurricane Preparedness Plan should be in place to ensure protection of life and property during hurricane events, The main elements of the Plan should include the following:

- During the ***preliminary alert phase***, any GPWS buildings, equipment, boats and files should be secured as well as possible, with guidance in place as to where and how.
- Once facilities and equipment is secured, staff should be free to implement their personal hurricane plans, including evacuation if necessary

4.6 Monitoring and Review

Monitoring and evaluation are integral components of any management system and annual evaluations of reserve management are recommended. In the development of this management plan, the action areas are relatively specific, simplifying the process of monitoring success of implementation, and providing a mechanism for continual tracking of management activities, through annual review by GPWSCMC, the Forest Department, and the Local Advisory Committee.

Management evaluation is also achieved by an assessment of management effectiveness. An initial management effectiveness evaluation was conducted in 2006 (Walker and Walker, 2006), to provide a baseline for assessment. A summary of results are presented in 4.2.

It is suggested that a monitoring and evaluation tracking matrix be developed for the activities under the management programme, following the outline example (Table 22).

Tracking of Management Action Implementation								
Management Actions		Present Status	1st Year	2nd Year	3rd Year	4th Year	5th Year	Desired Status
A1	Reconsolidate the Gales Point Wildlife Sanctuary Community Management Committee	GPWSCMC needs to reconsolidate and strengthen, and build capacity to engage in co-management of GPWS						Functional, active GPWSCMC with the capacity to take on co-management role for GPWS
A2	Gales Point Wildlife Sanctuary Community Management Committee takes on role of co-management for GPWS	GPWSCMC has been recognized as a potential co-management partner for GPWS by the Forest Department						GPWSCMC has signed an agreement for co-management of GPWS
A3	Establish Local Advisory Committee within Gales Point	Community participation in management decisions is limited with no participation mechanism						Functional Local Advisory Committee is established to provide input into decision making, and ensure transparency
A4	Develop links with national and international organizations and Government agencies involved in protected areas management	Need for greater collaboration with other organizations and initiatives within the coastal plain area, and other national and international organizations and Government agencies involved in protected areas management						Strong links and collaboration developed with other organizations and initiatives within the coastal plain area, and other national and international organizations and Government agencies involved in protected areas management

Table 22: Management Tracking Matrix (Layout Example)

4.7 Timeline

A timeline should be developed for management activities by the new GPWSCMC Board, once established. However, a proposed timeline is included here for priority cross cutting strategies highlighted by Conservation Planning (Table 23).

Primary Cross Cutting Strategies	1st Year	2nd Year	3rd Year	4th year	5th Year
Strengthening of the Gales Point Wildlife Sanctuary Management Committee					
Signing of co-management agreement between GPWSCMC and Forest Department					
Increased management effectiveness through training and location of funding					
Increased surveillance and enforcement					
Increase and strengthen collaboration with Wildlife trust and other NGOs					
Increased awareness of importance of maintaining mangrove and riparian / littoral forest vegetation					
Enforcement of regulations re. clearance of riparian, littoral forest and mangrove ecosystems within the 66' by waters-edge					
Adequate marking of boundaries of Gales Point Wildlife Sanctuary – especially on creeks and rivers					
Monitor gravel mining and dredging activities and implement actions if necessary					
Monitor water quality					
Development and implementation of sustainable fisheries plan and zonation					
Establishment of best practices for tour guides and sport fishermen					
Investigate Alternative livelihood options					
Community agreement on boat regulations					
Community agreement on moratorium on hunting within 66' riparian vegetation					
Signing of management agreement with Fisheries Department for turtle nesting beach					
Maintain patrolling of turtle nesting beach and protection of nests					

Table 23: Timeline for Priority Cross Cutting Stratgies

4.8 Financing

Gales Point Wildlife Sanctuary Community Management Committee needs to focus on building its capacity for financial planning and financial management.

Entrance Fees

Under a co-management agreement, entrance fees can be charged by the Gales Point Wildlife Sanctuary Community Management Committee, with a percentage of these fees being retained by the GPWSCMC towards management costs. During the development of the co-management agreement, the GPWSCMC should also investigate the possibility of charging for permits for sport fishing activites, as levied by marine reserves, under the Fisheries Legislation. Also to be considered is the ability to levy on-the-spot fines as an enforcement tool.

Donor Contributions

A major source of past funding for Gales Point Wildlife Sanctuary has been from grants from both national and international agencies, sourced through the Wildlife Trust and PACT.

Accessing international donor funds is becoming more and more competitive and the GPWSCMC will need to demonstrate effective management to be able to successfully compete. Proposals can be submitted to both national and international donors (e.g. WWF, Summit Foundation, and Oak Foundation, NOAA, UNEP, US National Fisheries and Wildlife Foundation (NFWF), IUCN, GEF-SGP etc.), though it should be realized that many proposals will take time to be processed and approved.

Cost sharing mechanisms

In an effort to reduce costs and yet achieve good management, the GPWSCMC should explore possibilities of sharing certain management responsibilities with stakeholder groups such as Wildlife Trust, traditional fishermen and tour guides through special co-management agreements, involving them in enforcement, visitor monitoring (in the case of tour guides) and in catch data collection (in the case of fishermen). Cost-sharing mechanisms may also be in terms of fines for damages following bad practices. Collaboration with coastal propert owners in monitoring activities impacting the sea turtle nesting beach would also assist in sharing the financial burdon, as would the. This type of sharing of responsibility also fosters a greater sense of ownership by the users of the reserve.

Financial Sustainability Plan

GPWSCMC needs to develop a variety of funding sources in order to achieve sustainable financing to cover its expenses. In Belize, these sources have traditionally primarily been based on entrance fees and grants from national and international donors. However, in the future, other innovative sources and mechanisms for revenue generation will become essential to maintaining and increasing management effectiveness.

To provide justification for the financing of the Gales Point Wildlife Sanctuary, a Business Plan - an economic or cost/benefit analysis of the protected area - should be conducted once management is in place, to determine the direct and indirect values of the reserve and compare these to the costs of management, to identify funding gaps. Demonstrating that the value of

the reserve can be clearly shown to outweigh the management costs is a powerful argument to justify the expenditures made in protecting the reserve area, and also in providing benefits for local people who have had to modify use of the area to some extent through the establishment of the Wildlife Sanctuary.

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