



National Environment and Planning Agency

Strengthening the operational and financial sustainability of the National Protected Area System (NPAS) Project

Draft Black River Protected Landscape Management Plan 2017 - 2022

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Draft Black River Protected Landscape Management Plan 2017 - 2022

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For

The National Environment and Planning Agency

Government of Jamaica

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List of Acronyms

BRLM	Black River Lower Morass
BRUM	Black River Upper Morass
BRPL	Black River Protected Landscape
CBD	Convention on Biological Diversity
GEF	Global Environment Facility
IUCN	International Union for the Conservation of Nature
JNHT	Jamaica National Heritage Trust
KAP	Knowledge, Attitudes and Practices
NEPA	National Environment and Planning Agency
NLA	National Land Agency
NRCA	Natural Resources Conservation Authority
NCU	Northern Caribbean University
NPAS	National Protected Areas System
PA	Protected Area
PAC	Protected Areas Committee
PoWPA	Programme of Work on Protected Areas
TCPA	Town and Country Planning Act
SFCA	Special Fishery Conservation Area
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UTECH	University of Technology
UWI	University of the West Indies
WCPA	World Commission on Protected Areas

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Executive Summary

The purpose of this Management Plan is to guide the management of the proposed Black River Protected Landscape (BRPL) which is located in the coastal southwestern parish of St. Elizabeth, Jamaica between the two major towns of Black River and Santa Cruz (Figure 1).

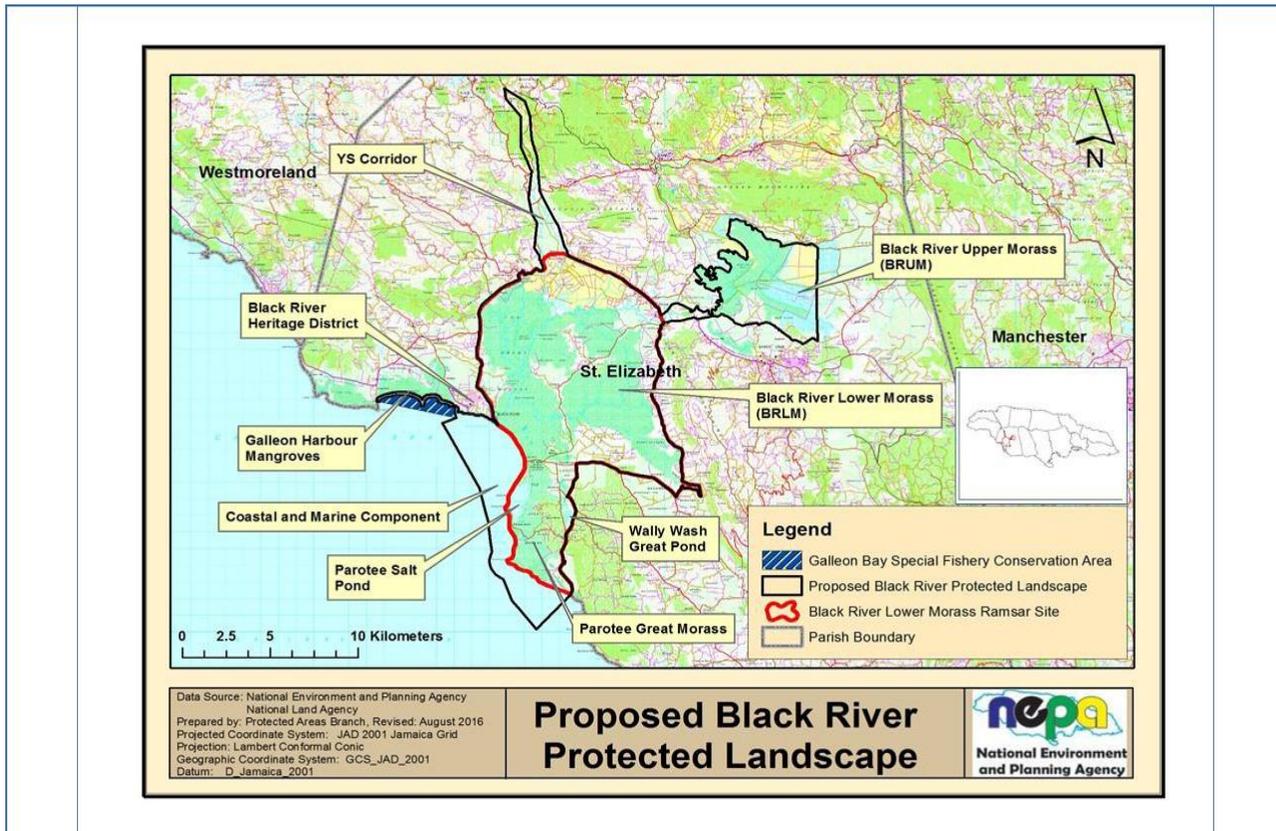


Figure 1. Proposed Black River Protected Landscape

There are 6 components within the BRPL:-

- YS Corridor
- Black River Upper Morass (BRUM) – a Game Reserve
- Black River Lower Morass (BRLM) – a Game Reserve
- Parrottee Great Morass – a Game Reserve
- Galleon Bay Mangroves (adjacent to Galleon Bay Special Fishery Conservation Area)
- Coastal and Marine Component

The area includes public and private lands and several small communities within the terrestrial components.

The BRLM along with the Parrottee Great Morass were listed as the Black River Lower Morass Ramsar Site in 1997 in recognition of the international significance of the area for wetlands and wetland birds in particular. The BRPL does not overlap with either the Black River Heritage District (designated by the Jamaica National Heritage Trust (JNHT) nor the Galleon Special Fishery Conservation Area (SFCA) designated by the Fisheries Division, but could contribute to the improved protection of all the properties, through collaboration amongst the relevant agencies inclusive the exploration of joint sustainable tourism opportunities.

A Protected Landscape (and/or Seascape) is a type of protected area which aims to conserve not only biological diversity and ecosystem services but also traditional uses of natural areas and developed areas which are dependent on the health of ecosystems for their survival. The purpose of the protected area status is to sustain the protection of the species, ecosystems and cultural heritage present, ecosystem services the site provides and to facilitate sustainable development for local communities.

This Plan was prepared using the best scientific information available, particularly from reports and studies commissioned from the University of the West Indies. A participatory process was used to involve as many stakeholders from the various communities within the proposed boundary as possible, in addition to the government agencies and private sector entities. Due to the extent of the area and the issues relating to private lands as well as the illegal occupation and use of government lands within the Morass, the implementation of this Plan will require an initial extensive and intensive outreach to local community members and land-owners and a phased approach. This is described in Chapter 6 and detailed in Section 6.3.6.

The first two chapters set the national and international context in terms of the significance of the site and the relevant national legislation and international conventions supporting the management of the protected area. Chapters 3, 4 and 5 describe the physical, biological and cultural features of the BRPL. All three of these chapters note the impacts of human uses and

threats from these and other sources. Chapter 6 describes the vision, goals, objectives and management programmes and strategies with work plans for each of these as well as a budget.

A proposed zoning plan has been recommended for the BRPL which aims to establish areas geared towards the protection of the rich biodiversity of the wetlands and which help to ensure the traditional shrimping and fishing activities which Black River is famous for. Other areas are zoned for multiple use and sustainable development and detailed guidelines are to be prepared for these areas in addition to the provision of training for community members and land owners. The concept is to guide and control the development of the privately owned lands adjacent to the wetlands and to ensure that development is compatible aesthetically and environmentally with the biodiversity and ecological systems. This will contribute to the socio-economic development of the area for eco- and heritage tourism and will benefit the local communities and economy.

The BRPL is to be designated under the Natural Resources Conservation Authority (NRCA) Act and will therefore be the responsibility of the National Environment and Planning Agency (NEPA). It is anticipated that NEPA will work very closely with government agencies in particular the St. Elizabeth Parish Council and Social Development Commission and with civil society such as the St. Elizabeth Chamber of Commerce and the Community Development Committees. The first year start-up budget is about JA\$25 million and the average annual budget is about JA\$45 million plus an additional \$15 million for river cleaning. The management programmes and strategies address: Biodiversity Conservation, Cultural Heritage Preservation, Enforcement and Compliance, Recreation and Tourism, Governance and Administration, Monitoring and Evaluation and Public Education and Outreach. The latter has a strong emphasis on the facilitation of job creation and sustainable livelihoods and development. Together these strategies seek to ensure the long term protection of the natural and cultural heritage of the BRPL for the benefit of its residents and neighbours.

1.0 Introduction

1.1 Background and Context of the Management Plan

The rich natural and cultural heritage of the parish of St Elizabeth in general and the Black River Lower Morass in particular, is recognised by numerous development and conservation plans including the National Ecological Gap Assessment Report, the St. Elizabeth Local Sustainable Development Plan, the Greater Treasure Beach Sustainable Development Plan and the St. Elizabeth Provisional Development Order Draft of 2014. These and many other documents highlight the significance of the area for biodiversity particularly wetland birds and ecosystem services e.g. flood and coastal protection.

All the reports and plans including older ones make recommendations for the protection and conservation of these resources including legal protection, possibly under the NRCA Act. This has never happened to date, even though the Upper and Lower Morass areas were protected from bird shooting under the Wild Life Protection Act and the Lower Morass and immediately surrounding area was awarded international recognition as a Ramsar Site.

National Protected Areas System Project

The Government of Jamaica has received support through the Global Environment Facility (GEF) for implementing a 6 year project, the United Nations Development Programme (UNDP/GEF) Strengthening the Operational and Financial Sustainability of the National Protected Area System – the NPAS Project. The project is being implemented by the National Environment and Planning Agency (NEPA) in collaboration with the Forestry Department, Jamaica National Heritage Trust (JNHT) and the Fisheries Division. Its goal is to safeguard Jamaica's globally significant biodiversity. The project objective of consolidating the operational and financial sustainability of the system of protected areas is to be met through three distinct outcomes:-

- (i) Strengthening financial planning and revenue generation;
- (ii) Rationalising and integrating the national protected areas system; and
- (iii) Increasing the effectiveness of protected area management.

Recognising the significance of the area and the active threats to the site, the Black River Morass and associated ecosystems were amongst those identified for protection with support from the NPAS Project through the preparation of a management plan amongst other activities.

1.2 Purpose and Scope of Management Plan

According to international and national definitions, a protected area is,

“a clearly defined geographical space recognized, dedicated and managed, through legal and other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values” (Dudley, 2008)

“A protected area is a clearly defined geographical area of land and or water that is dedicated to and managed for the long term conservation and sustainable use of its ecological systems, biodiversity and/or specific natural, cultural or aesthetic resources” (Protected Area Committee, 2015).

The Black River Protected Landscape (BRPL) is to be designated under the NRCA Act primarily for the protection of wetland biodiversity and ecosystem services. IUCN Category V has been selected by the various stakeholders as the most appropriate type of protected area bearing in mind the traditional uses of the area and the existence of several communities within and immediately around the Morass. Fishing particularly for shrimp has likely been an activity since the original inhabitants of the area – the Taino and the associated tangible and intangible cultural heritage still exists. The Morass, particularly the Upper Morass but also the northern sections of the Lower Morass, has been used for farming since the 1940s and this has resulted in significant changes to the vegetation and hydrology. In addition, local communities have been established in and around the Morass with a dependence on its resources even more acute with the high levels of unemployment. These reasons make the Category V approach a suitable one for protecting and conserving the biodiversity, ecosystem services and cultural heritage of the area.

According to the International Union for the Conservation of Nature (IUCN) a Protected Landscape (Category V) is:

"An area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity" (Dudley, 2008).

Further, Dudley, 2008 states, "Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area."

The management plan for a protected area is a tool for the manager and other stakeholders to guide them as to how the site should be managed to achieve long term goals. It establishes a results-oriented system based on "management by objectives" which allows for a scientific approach to management involving monitoring and evaluation and adaptation through corrective measures as necessary (Thomas and Middleton, 2003). Essentially, management plans, if implemented should assist in improving management effectiveness.

The purpose of this management plan is to guide the management of the BRPL to sustain the protection of the species, ecosystems and cultural heritage present, ecosystem services the site provides and to facilitate sustainable development for local communities.

1.3 The Planning Process Used in the Preparation of the Plan

The management planning process was guided by several documents both local and international which are listed amongst the references. These included the Protected Area Management Guidelines prepared under the NPAS Project (Henwood and Otuokon, 2015), IUCN Guidelines for Management Planning of Protected Areas (Thomas and Middleton, 2003) and Ramsar Handbook #18 on Managing Wetlands (Ramsar Convention Secretariat, 2010). Information from the University of the West Indies (UWI) from the Biodiversity Conservation Specialist consultancy for the NPAS Project was an important source. In addition, the Provisional Development Order for St. Elizabeth and other regional plans and studies were considered.

This Management Plan was prepared using a participatory process involving a wide range of stakeholders through formal and informal approaches including 5 community workshops, 2 stakeholder agency workshops in Kingston and a presentation of the draft plan in Black River. A report detailing all the meetings has been prepared to support the Management Plan. The following steps were followed (some occurring concurrently rather than consecutively):-

1. **Pre-planning – form planning team/preliminary planning** – discussions with the proposed managers of the site – NEPA, the UWI and the Protected Area Committee (PAC).
2. **Data-gathering** – from documentation and maps from NEPA, UWI, National Land Agency (NLA), Forestry Department and the St. Elizabeth Parish Council amongst other agencies and from the local community and other stakeholders.
3. **Analysis and evaluation of data** – using a variety of tables and participatory tools.
4. **Identification of constraints, opportunities & threats** – from the literature review, managers and community.
5. **Development of management vision and objectives** – working with NEPA and other stakeholders, based on the purpose of the protected area.
6. **Development of a variety of strategies for achieving the vision and objectives; selection and refining of the most appropriate strategies** - working with NEPA and other stakeholders, based on the purpose of the protected area.
7. **Preparation of the Management Plan** – write the document comprising the information and analysis obtained in the other steps.
8. **Public Consultation** – public consultation took place throughout the process and included consultation meetings and workshops between December, 2015 and April, 2016. A list of all stakeholders involved in consultations is included at Appendix 1.

2.0 Management Context

2.1 Location and Boundary

The proposed Black River Protected Landscape (BRPL) is located in the coastal southwestern parish of St. Elizabeth, Jamaica between the two major towns of Black River and Santa Cruz (Figure 2).

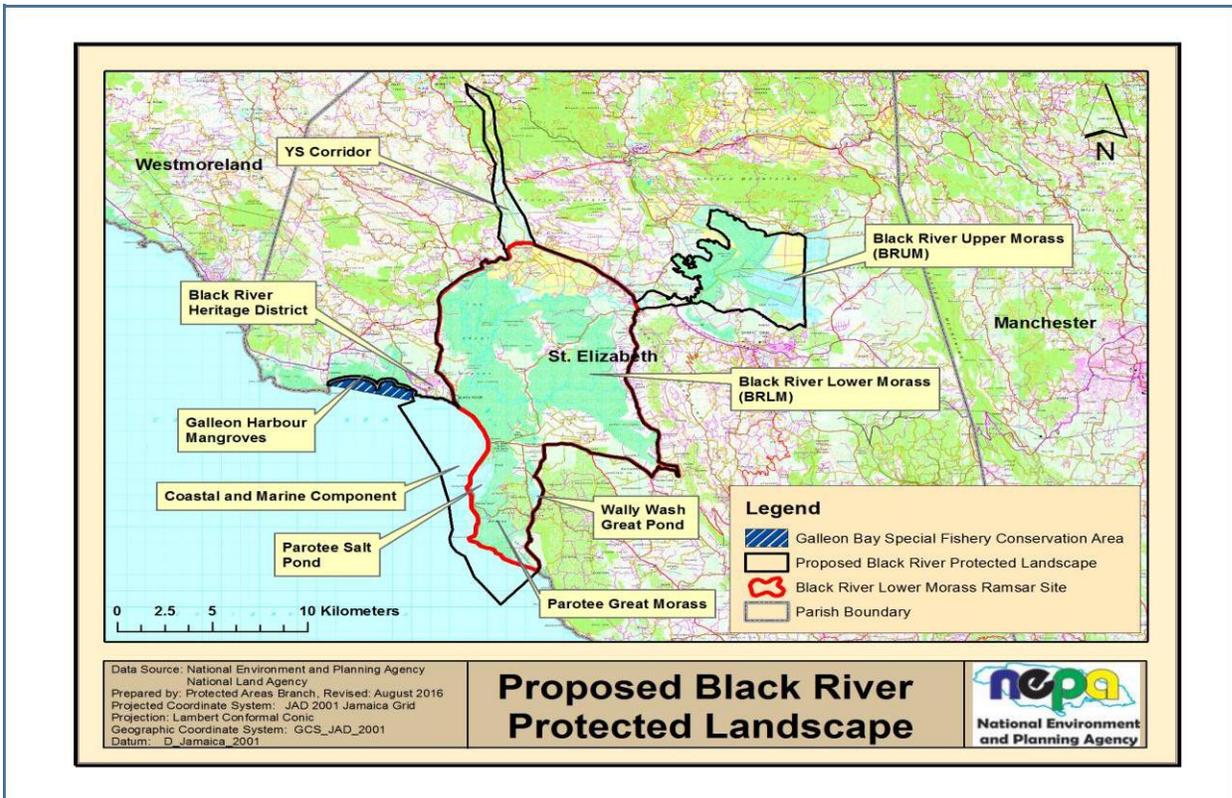


Figure 2. Location and Boundary of the Proposed Black River Protected Landscape

It has central coordinates of 18 degrees 4 minutes north, 77 degrees 48 minutes west (Jamaica metric grid 10/162/153 to nearest 100 metres) and covers an area of 207.7 square kilometres (20,767 ha). The core area for conservation focus is within the Black River Ramsar Site which is 137 square kilometres (13,749 ha) and comprises most of the southern section of the BRPL currently protected as Game Sanctuaries – Black River Lower Morass and Parottee Great Morass. Within the Ramsar Site an estimated 43 square kilometres (4,300 ha) is actual Morass (Björk and Digerfeldt, 1991) compared to limestone outcrops and communities.

The boundary shown in Figure 2 and described in detail in Appendix 2 seeks to protect the areas of critical biodiversity and ecosystem health:-

- YS River to the north, which supplies highest quality water to the Lower Morass;
- Black River Lower Morass (BRLM) Ramsar Site and adjacent coastal and marine ecosystems,
- Malcolm's Bay mangroves to the west (which are adjacent to the Galleon Special Fishery Conservation Area (SFCA))
- Black River Upper Morass (BRUM) - through which the Black River flows and which is a main factor in the health of the Lower Morass

2.2 National, Regional and International Context

National and Regional Context

The Black River Morass is the largest freshwater wetland ecosystem in Jamaica and one of the largest in the insular Caribbean (NRCA, 1997; Massa and Sutton 1998). In addition, the largest freshwater lake (Wallywash) in Jamaica is located between the communities of Pongside and Hilltop within the Lower Morass (Massa and Sutton 1998). Both the Upper and Lower Black River Morass areas and the Parrottee Great Morass were designated as Game Sanctuaries in 1997 under the Wild Life Protection Act (1945).

The proposed Black River Protected Landscape (BRPL) is immediately adjacent to the town of Black River, the capital of the parish of St. Elizabeth. Within the town, a Black River Historic District (Appendix 3) was designated Protected National Heritage in 1999 under the Jamaica National Heritage Trust (JNHT) Act (1985). The town of Black River is one of Jamaica's earliest and was very wealthy in the eighteenth and nineteenth centuries (due in particular to the export of logwood for dye) as exhibited by its being the first town with electricity, in 1893. Several buildings e.g. the Anglican Parish Church in the town of Black River are protected as national monuments under the JNHT Act and the Black River Spa was designated Protected National Heritage in 2002 (www.jnht.com downloaded 20/3/16).

The Black River area and Middle Quarters in particular is known for “pepper shrimps”. The tradition of catching and preparing the native shrimp from the Morass is probably as old as the Taino in terms of the use of dug-out canoes and certainly at least 300 years old linked to the bringing of the African shrimp basket making tradition from the Niger Delta.

International Context

The BRLM (including the Parrottee Great Morass) was designated a wetland of International Importance especially as Waterfowl Habitat under the Ramsar Convention in 1997. The area is therefore of significance for biodiversity and the Convention on Biological Diversity (CBD), to which Jamaica is also a signatory, requires States Parties to establish protected areas for the conservation of biodiversity. Both the CBD and the Ramsar Convention address the preparation and implementation of management plans.

2.3 Values and Importance of the Protected Area and its Role in the National Protected Area System

The Black River Protected Landscape protects critical wetland, riverine, estuarine, coastal and marine ecosystems of significance for both biodiversity and sustainable development. The only other freshwater ecosystems in Jamaica’s current PA System are the Mason River Reserve and Protected Area and within the Negril Environmental Protection Area however the combined areas of the wetlands within these two areas is much smaller than even the Lower Morass alone.

Jamaica’s National Ecological Gap Assessment Report (NEGAR) indicates that the protection of the Black River Complex (Figure 3 below) would result in achievement of 65% of the conservation goal for wetlands, 234% for freshwater wetlands, 98.6% for lakes and ponds, 15% for mangroves, 29.7% for coastal mangroves and 23.5% for the West Indian Whistling Duck. The area is important for endemic fish, migratory and other shorebirds, rocky and sandy shores amongst others (McLaren, 2016, NEGAR, 2009). For practical reasons the area proposed as the BRPL is a bit smaller than the area proposed for protection in the NEGAR.

The Black River Morass and associated rivers play a critical role in the hydrology of the parish of St. Elizabeth – recharging and discharging groundwater systems and controlling the amount of nutrients, sediments and toxins which are released to the freshwater and marine ecosystems. Further, the mangroves associated with the wider Black River Complex and the proposed Black River Protected Landscape protect the coast and river shorelines from erosion, storm surges and hurricane impacts.

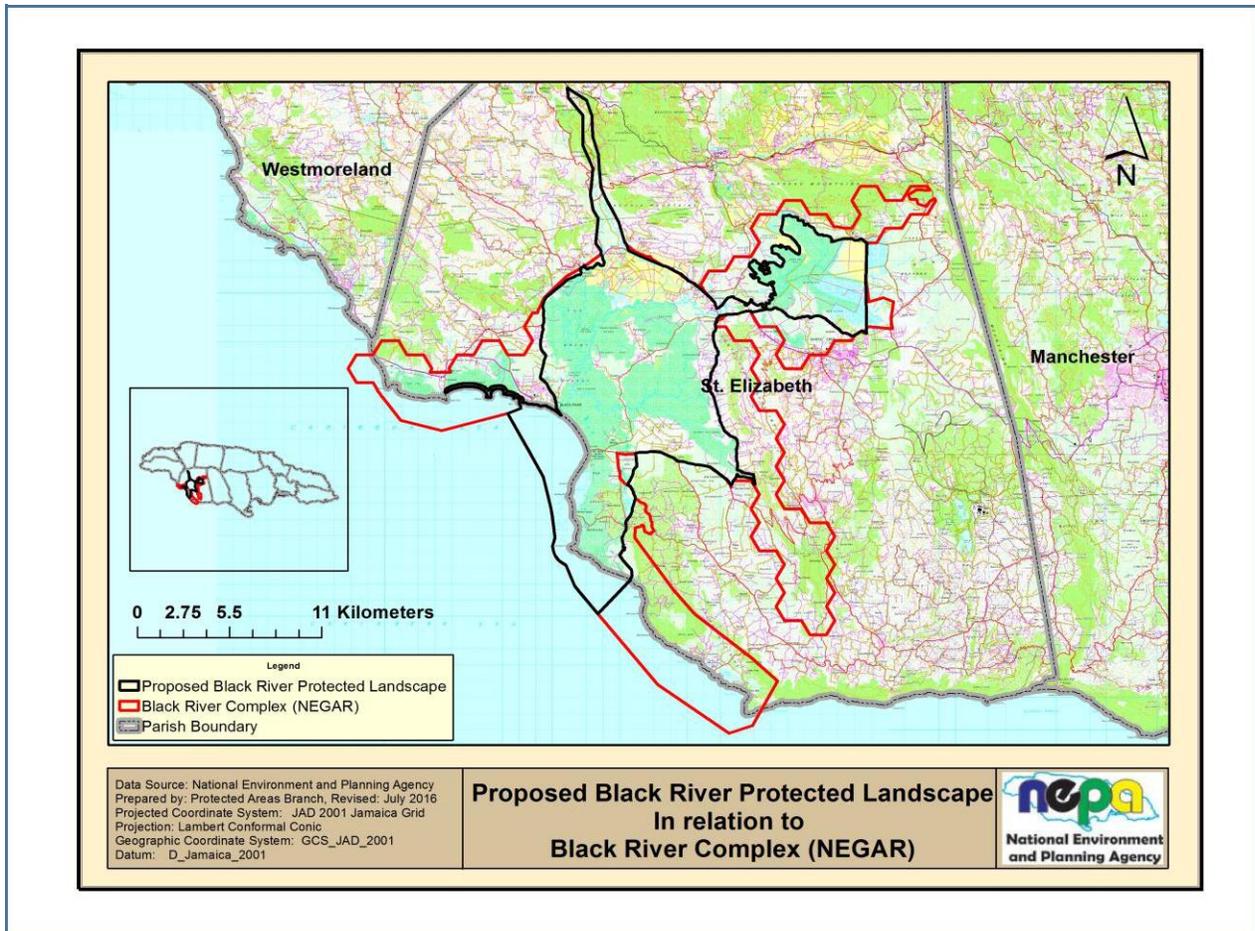


Figure 3. Black River Complex – National Ecological Gap Assessment Report

2.4 Management and Planning History

The Black River Morass was listed as a proposed protected area in the Country Environmental Profile – Jamaica (GOJ et al., 1987). Efforts were to have been made to establish protected area status under the Protected Areas Resource Conservation Project

Phase II in about 1995 however this did not come to fruition due to project challenges and changes (Otuokon, 2009). The year 1997 saw protection under national legislation through the gazetting of Game Reserves and international recognition as a Ramsar site.

Monitoring of the area to prevent shooting of birds during the hunting season (usually between August and September) has been implemented by the National Environment and Planning Agency since 1997. In addition there have been a few environmental projects focused on the Black River area, notably the Mitigating the Threat of Invasive Alien Species (IAS) in the Insular Caribbean Project implemented by NEPA and funded by the Global Environment Facility between 2009 and 2014. Project components implemented in Black River included pilot projects for the control of Wild Ginger (*Alpinia allughas*) and Paper Bark Tree (*Melaleuca quinquenervia*) and public education including the establishment of an exhibit on the wetlands and IAS mounted temporarily at the Black River Safari.

Jamaica's Ecological Gap Assessment Report recommended as a priority, the protection of an area referred to as the Black River Complex (Figure 3 above) to improve the protection provided under the Game Reserve regulations and to capture terrestrial, freshwater and marine ecosystems critical to the overall health and functionality of the river as well as its riparian and estuarine areas. Under the NPAS Project, protection under the NRCA Act and preparation of a management plan to guide protection are being implemented.

2.5 Management Authority

The Natural Resources Conservation Authority (NRCA) will be the relevant management authority for the Black River Protected Landscape with the designation of the area under the NRCA Act. As the agent of the NRCA, the NEPA is ultimately responsible for management.

2.5.1 National Policy and Legal Framework

National Policy

The fourth goal of Jamaica's National Development Plan – Vision 2030 (Planning Institute of Jamaica (PIOJ), 2009) is, “Jamaica has a healthy natural environment” and

this goal is to be achieved in tandem with three other goals which address empowerment of our people, economic prosperity and a safe, just and cohesive society. The three outcomes linked to the national environmental goal are:-

- Sustainable Management and Use of Environmental and Natural Resources;
- Hazard Risk Reduction and Adaptation to Climate Change and
- Sustainable Urban and Rural Development.

If well managed, the BRPL will contribute to attaining these outcomes and ultimately the nation's environmental and sustainable development goals.

National PA Policy and Plans

Jamaica's National Protected Area Policy (GOJ, 1997) lists the Black River Morass, Holland Swamp Forest and Parrottee Pond and Beach as PA candidates. The Protected Areas System Master Plan: 2013 – 2017 lists protection of new areas beginning with Black River as a target under Goal 5: to address under-representation of marine, inland water and terrestrial ecosystems and heritage sites in the national PA System.

Regional and Local Plans

The St. Elizabeth Local Sustainable Development Plan: 2030 and Beyond prepared by the St. Elizabeth Parish Council and Parish Development Committee in 2015 includes the Natural Environment as Goal 1, specifically to “ensure growth and development do not conflict or compromise the state of the natural environment. Objectives under this goal include:-

- protection and management of species and ecosystems,
- monitoring and restoration of degraded natural resources and
- improving the management and quality of water resources.

Strategic directions and actions listed include:-

- stricter enforcement of policies and regulations,
- raising public awareness and promotion of environmentally sustainable practices,

All the goals and objectives from this Plan are relevant to this management plan, in particular:-

- Goal 2: Disaster Mitigation and Management
 - Solutions to flooding and bush fires
 - No build zones in flood prone or hazard vulnerable areas
 - Reducing the impact of disasters on communities
- Goal 3: Social Environment and Facilities
 - Improved sanitation and garbage collection
 - Improved skills training facilities and effective training programmes
- Goal 4: Built Environment
 - Introduction of composting and/or dry toilets
 - Improved waste disposal and introduction of recycling
- Goal 5: Economic Environment
 - Improvement in farming techniques
 - Development of community and small-scale ecotourism

The Greater Treasure Beach Local Sustainable Development Plan: 2030 and Beyond was prepared by the St. Elizabeth Parish Development Committee in association with the Parish Council. The Greater Treasure Beach Area is defined to include the area stretching from Pedro Bluff through Treasure Beach, Parrottee and Black River along the coast and inland to communities including Flagaman, Newell, Pondsides, Vineyard, Cataboo and Sandy Ground.

The Greater Treasure Beach Area does not stretch as far inland as the BRPL but the Sustainable Development Plan makes recommendations for addressing several issues within key communities of the BRPL. Specifically the Greater Treasure Beach Area Plan identifies priorities to be addressed for the sustainable development of the area and those of particular relevance to this management plan are:-

- Coastal Hazards
 - Implement and enforce policies to avoid building in high flood risk areas and ensure climate proof development occurs along the coast,

- Replant 60% of the deforested mangroves along the Parrottee coastline and develop pilot project for artificial reefs.
- Economic Diversity
- The Plan notes that agriculture, fishing and tourism are the economic drivers and makes recommendations to grow and sustain these industries including:-
- Boardwalks through wetlands including to access the coast,
 - Catch limits for fish and additional Special Fishery Conservation Areas,
 - Improving agricultural practices for environmental sustainability and climate change readiness,
 - Diversification of the tourism industry e.g. hiking, biking in addition to river-based tours; suggestion of horse-racing in Fullerswood noting that horse-racing was introduced to Jamaica first in Black River.
- Wetlands Conservation
- Establish the Lower Morass as a National Park and establish a local authority for its management,
 - Create a natural buffer around the Salt Pond,
 - Establish and enforce capacity thresholds for different types of tourism activities in the Morass and rivers,
 - Monitor select indicators and set targets for achievement.
- Community Involvement – increasing community involvement and public awareness by strengthening community-based organisations for planning and economic development.
 - Heritage Conservation – explore ways to manage, monitor and capitalise on the tangible and intangible forms of heritage.

National Legislation

Legislation relevant to the protection and management of natural and cultural heritage are the purview of the National Environment and Planning Agency (NEPA) through the Wild Life Protection Act, the NRCA Act, Town and Country Planning Authority (TCPA) Act

(working with the Parish Council). The Jamaica National Heritage Trust (JNHT) is responsible for enforcing the JNHT Act.

Wild Life Protection Act

Game Sanctuaries are specified under Section 3 of the Wild Life Protection Act (1945) as being those areas listed in the First Schedule of the Act to which the Minister may add from time to time. The Upper and Lower Morass Game Sanctuaries were gazetted in 1997. Section 4 of the Act makes it an offence to hunt any animal or bird or to take a bird's nest or eggs or even to take a dog or weapon capable of being used for hunting, within these Game Sanctuaries. Section 6 of this Act protects certain animals (listed in the Third Schedule) no matter where they may be found and this includes crocodiles, manatees and various species of sea turtles and their eggs. Section 7 provides for a shooting season during which specified days and times, game birds listed in the Second Schedule may be hunted within certain limits.

Section 9 makes it an offence to capture immature fish and Section 10 makes it an offence to use any traps for fishing except those defined in the Wild Life Protection Regulations (1945) which are hook and line and shrimp pots. Section 13 allows for the appointment of Game Wardens to enforce the Act and its regulations and Section 19 makes it an offence to assault, obstruct or hinder the Game Warden and other designated officers. Section 20 states that every person guilty of an offence under the Act and its Regulations to be liable to a fine not exceeding one hundred thousand dollars or to imprisonment for a term not exceeding twelve months, upon summary conviction before a Resident Magistrate

NRCA Act – Protected Areas

Under Section 5 (1) (b) of the NRCA Act (1991) the NRCA may designate areas of land or water as a protected area for the preservation of any object (whether animate or inanimate) or unusual combination of elements of the natural environment that is of aesthetic, educational, historical or scientific interest. The BRPL is expected to be designated under this section of the NRCA Act and Protected Landscape regulations are

being prepared under the NPAS Project to be passed under the NRCA Act. These regulations will provide for a broader and deeper level of protection of the wetland, coastal and marine ecosystems within the Protected Landscape. The focus will be on protecting, maintaining and restoring the biodiversity and ecosystems particularly within the context of their traditional use for artisanal shrimping and fishing.

NRCA Act – Permits and Licences Regulations

The NRC (Permits and Licences) Regulations of 1996 was passed pursuant to Section 9 of the NRCA Act and requires certain types of development to obtain an environmental permit and certain levels of effluent to require an environmental licence. Applications are made through the NEPA and the decision to approve the permits or licences and require any caveats is made by the NRCA. Permits are required for example by ecotourism developments and construction of housing developments over certain sizes. Licences are required for example by manufacturing industries.

TCPA Act

Under the TCPA Act of 1957, Development Orders may be prepared to guide development of specific geographic areas and these Orders are usually enforced by the Parish Council in association with the TCPA through NEPA. The TCPA Act requires all applications to the relevant Parish Council and the TCPA as necessary to be determined in accordance with the provisions of the Order unless material considerations indicate otherwise. An applicant who proposes a development that does not accord therewith, except those falling within the categories outlined in the Second and Third Schedules will need to demonstrate compelling reasons why it should be allowed.

The existing Development Order for the parish of St. Elizabeth is from 1976 however a new or provisional Development Order has been prepared which should be gazetted in 2016. This provisional Order states that its purpose is to make provision for the orderly and progressive development of the parish of Saint Elizabeth, encouraging activities the planning authorities have identified as beneficial to the parish generally and to the Local Planning Areas specifically, and preventing those land uses that could harm the

environment or amenity of the residents. The main aim is to provide the basis for sound decisions on planning applications in accordance with the Vision, Strategies, Objectives, Policies and Proposals outlined in the document. Objectives of particular relevance to the BRPL include the following:-

Rural Economy (RE) Objectives include:-

Obj.RE2 To protect types of developments consistent with maintaining its rural and cultural landscape.

Tourism (TO) Objectives:-

Obj. TO1 To assist in promoting the cultural and historical aspects of the tourism product and support new opportunities for the future development of the sector.

Obj. TO2 To strengthen the quality and attractiveness of the tourism product.

Obj. TO3 To make provisions for the incorporation of small and large scale support services through development of non-traditional tourism products, thereby creating a broader economic base.

Obj. TO4 To facilitate the development of a diverse tourist industry while protecting the environment by fostering a desirable ecological balance in all areas.

Natural Environment/Conservation (C) Objectives:-

Obj. C1 To establish green belts in strategic locations which will protect the country-side and prevent the coalescence of existing towns and settlements.

Obj. C2 To preserve and enhance conservation areas, areas with views and other valued landscape features for the enjoyment of the population.

Obj. C3 To conserve, protect and enhance wetlands and watershed areas and the species therein because of their intrinsic environmental value and the importance of maintaining a viable hydraulic regime.

Obj. C4 To identify areas of ecological importance for further protection.

Obj. C5 To ensure that land uses are allocated in a manner which:

- (a) does not compromise the quality and quantity of usable water
- (b) will protect aquifers, wells, watersheds and other sources of water

Obj. C6 To restrict incompatible land uses within significant and sensitive environmental area.

Obj. C7 To prevent any increased marine and coastal contamination and degradation which would adversely affect the tourism and fishing industries.

Obj. C8 To control coastal development and limit new residential and commercial development along the coast.

Obj. C9 To maximize appropriate public accessibility to coastal areas

JNHT Act

The JNHT Act (1985) provides for the designation of buildings or sites (whether of cultural or natural heritage significance) as Protected National Heritage or National Monuments. The JNHT Act provides for income tax breaks related to repairs and for criminal procedures to be instituted in the event of any prohibited acts.

The main emphasis of the JNHT is to ensure that development of the listed buildings and sites and the area within the Heritage District is in keeping with the original appearance e.g. materials, colours and style. Therefore when alerted by the Parish Council or others of changes being made to listed heritage, the JNHT will take action. The JNHT does not currently manage any of the Black River sites but they do encourage the involvement of civil society and the private sector and there has in the past been a local Heritage Foundation.

2.5.2 Land Status and Tenure

Much of the land within the BRPL and particularly the Lower Morass (Figure 4) is Crown Land owned by the Commissioner of Lands whose agent is the National Lands Agency (NLA). Therefore if any private individual wishes to use any of these lands, they must apply to the NLA for a lease. Unfortunately there appears to be very little monitoring of lands within the Lower Morass and so there has been significant encroachment particularly for farming. There are also significant private lands within the BRPL mainly associated with agriculture and communities. The Upper Morass, the YS Corridor, Malcolm's Bay and much of Parrottee are all under private tenure.

As at the time of the final draft, some information regarding land tenure was still not yet available e.g. areas identified as Unclassified and shown in red in Figure 4.

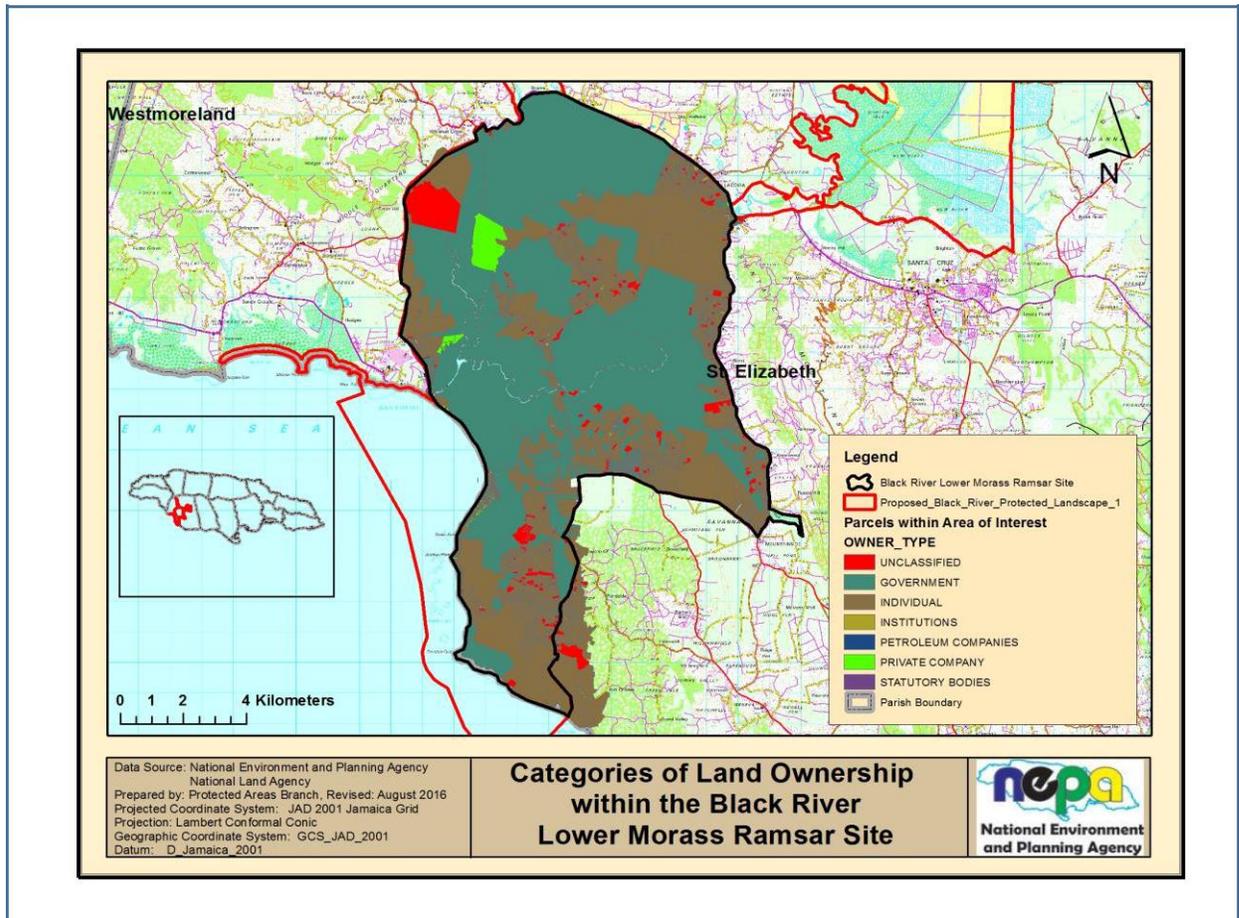


Figure 4. Land Ownership within the Black River Lower Morass Ramsar Site

2.5.3 Delegation Authority and Collaborative Management Agreements

The BRPL will be designated under the NRCA Act and therefore its management will be the direct responsibility of the NEPA which has responsibility also for Game Sanctuaries and Ramsar Sites.

Under Section 6 of the NRCA Act, the Authority may delegate any of its functions apart from that of making regulations to an agent of its choice. The NRCA has delegated a number of protected areas to other organisations - both government agencies and non-government organisations. Under these delegation agreements, the NRCA usually provides a management fee to help support management activities and requires the

preparation of management plans, annual operations plans and reports on the status of management activities. The other organisation is able to leverage the remaining funds required for management of the site from grants, donations, sponsorship and income generation.

This is therefore a possibility for the BRPL, however there do not appear to be any organisations with the necessary capacity at this time although there may be some organisations with interest. The NEPA will therefore need to work closely with the St. Elizabeth Parish Council, the Social Development Commission and others to initiate the implementation of this management plan whilst local capacity is strengthened. What will be critical are some key personnel stationed in the area. Recommendations for an approach are described under the Governance and Administration Programme.

2.6 Compliance with International Agreements and Obligations

There are two main international conventions of relevance to the BRPL and these are described below.

The Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)

The BRLM (including the Parrottee Great Morass) was designated a wetland of International Importance especially as Waterfowl Habitat under the Ramsar Convention in 1997. The Ramsar Convention requires State Parties to commit *inter alia* to:

- (i) wise use of all wetlands;
- (ii) designation of suitable wetlands for the List of Wetlands of International Importance (“Ramsar List”) and ensure their effective management; and
- (iii) cooperating internationally concerning shared wetlands and species.

The latest strategic direction from the Ramsar Convention is provided by the 4th Ramsar Strategic Plan 2016 – 2024 and this document will be useful as a guide for managing the proposed BRPL. In addition, the Ramsar Convention Secretariat has produced several

Handbooks or technical guides (which are updated after each COP to ensure that they meet the various resolutions) which should also be used by the PA management. These handbooks range from general guidance on management e.g. #18 – Managing Wetlands to addressing more specific issues e.g. # Water Allocation and Management.

The Convention on Biological Diversity

Jamaica is also a Party to the Convention on Biological Diversity (CBD) which has three main objectives:-

- (i) the conservation of biological diversity;
- (ii) the sustainable use of the components of biological diversity and
- (iii) the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

“*In-situ*” conservation through the establishment and management of protected areas is seen as the “cornerstone of biodiversity conservation” (CBD.int) and the Parties to the CBD have committed to a Programme of Work on Protected Areas (PoWPA). The World Commission on Protected Areas (WCPA) of the International Union for the Conservation of Nature (IUCN) is a major partner of the CBD and many of the WCPA/IUCN guidelines e.g. with respect to protected area management and management categories are accepted usage by the CBD.

The protection and management of the BRPL will assist Jamaica in accomplishing goals, objectives and specific strategies of international conventions.

3.0 Physical Environment and Features of the Protected Area

Details can be found in UWI, 2015, 2016a and 2016b and other documents in the References.

This chapter seeks to highlight key features of management significance.

3.1 Climate, Weather Systems and Trends

Temperatures in the Black River area range between 24 – 33°C and annual rainfall is approximately 1,391 mm (Prospere et al., pending publication). Whilst the parish of St. Elizabeth falls within the annual rainfall average of 180 – 200 mm/month, the Black River Morass receives a bit more rain than the rest of the parish (UWI Climate Studies Unit, undated in ESL, 2016). The morass is flooded during wet season (June to November), and even during the dry season (December to May) the water table remains high, consequently the peat is constantly waterlogged (Prospere et al. publication pending).

The ecosystems of the BRPL are climate sensitive with temperature and rainfall being of particular significance with respect to the health of the wetlands. For example, native shrimp are less common in the dry season (Prospere et al. publication pending). Recent droughts had a very negative impact on ecosystems particularly Parrottee Pond and Great Morass. The main issue of concern however would be the likely impact of sea-level rise which would include saline intrusion of the freshwater wetlands and inundation of coastal areas and the Lower Morass (ESL, 2016). These areas are therefore high risk areas for human habitation.

3.2 Geology and Geomorphology

The BRPL lies on the coastal flood plain and is situated around the lower and upper reaches of the Black River and associated tributaries and up-wellings. It consists of low marshland with limestone islands, which support human habitation, grazing of livestock and cultivation (NRCA, 1997).

3.3 Soils

The soils of the Black River Morass are predominantly peat of which there are several types depending on the salinity of the water where it was laid down and hence the type of vegetation. In the Upper Morass, the peat is not usually more than 2 meters thick and is underlain by clay or by the limestone bedrock (Digerfeldt and Ennell, 1983). These soils are waterlogged and high in nitrogen and phosphorus, with the mean water content of the peat

averaging 88.1% Fresh Weight and the mean content of nitrogen and phosphorous ranging from 11 – 15 milligrams per gram (mg/g) Dry Matter (DM) and 0.20 – 0.24 mg/g DM (Digerfeldt and Enell 1983).

Batjes, 1986 classifies the Black River Morass (upper and lower) as Class VI – land with little or no productive use for agriculture. Because of its swampy nature with regular flooding and in some areas high salinity (Salt Pond), the land would require major drainage to be suitable for agriculture. Much of the land around the Morass is classified as Class III with productive use limited by climatic and drainage issues.

3.4 Hydrology

The wetland is traversed by the Black River, the island's largest river system that originates in the Cockpit Country, north of the wetland and has a total length of 70km (Massa and Sutton, 1998). It has an important influence not only of aspects of the area's hydrology and ecology, but also on its social and economic systems.

The Lower Morass (Figure 10) is fed by three rivers, the YS, Middle Quarters/Gayle and Broad/Salt Spring Rivers. The first two are exogenous, also originating outside of the morass, flooding large areas with freshwater before emptying into the sea. The YS, like the Black River rises at the edge of the Cockpit Country while the Middle Quarter or Gayle River rises at the north-western edge of the Lower Morass (Bjork, 1983). The Broad or Salt Spring River is the largest endogenous river, arising within the morass by artesian upwellings in the limestone bedrock and it has intrusions of salt water which extend as far as 10 km, depending on rainfall and tides (Bjork, 1983). Other streams arising within the morass are the Styx River, Frenchmans River and Cashew Spring.

The Lower Morass (Figure 5) is fed by three rivers, the YS, Middle Quarters/Gayle and Broad/Salt Spring Rivers. The first two are exogenous, also originating outside of the morass, flooding large areas with freshwater before emptying into the sea. The YS, like the Black River rises at the edge of the Cockpit Country while the Middle Quarter or Gayle River rises

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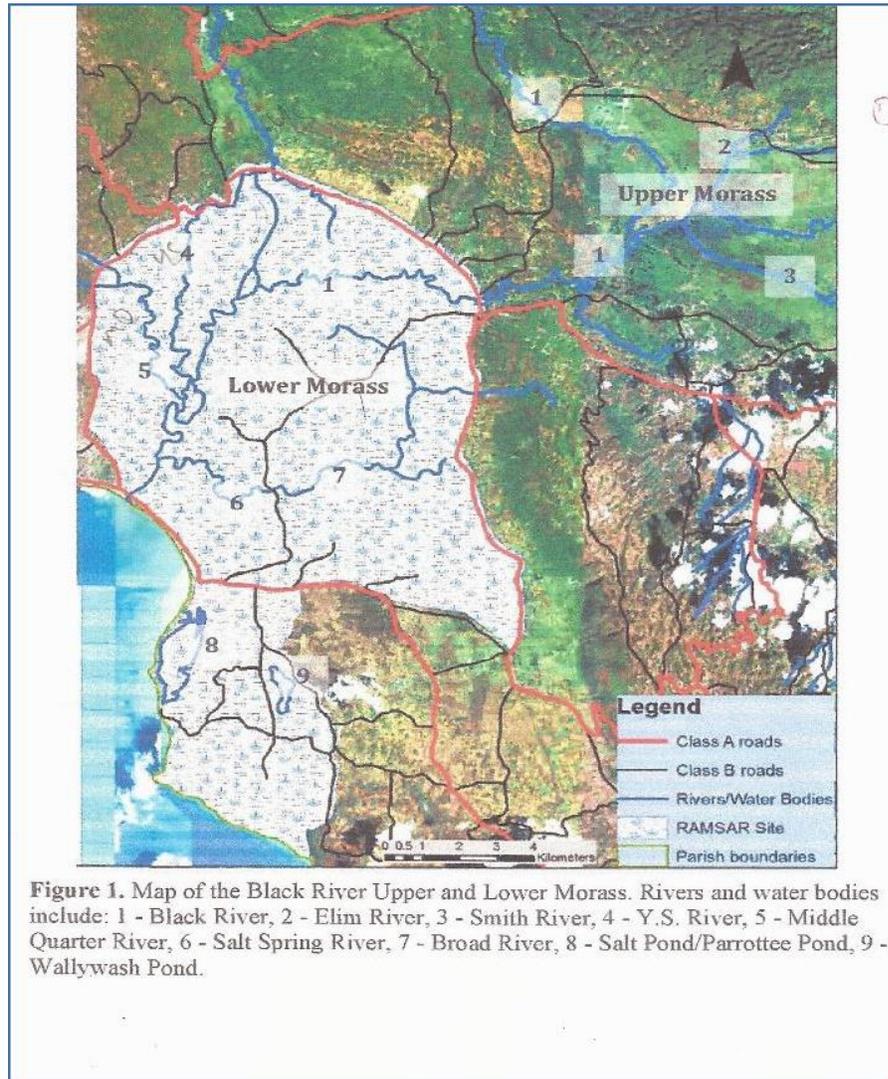


Figure 5. Map of the BRUM and BRLM showing water-ways and bodies – from UWI, 2015

The detailed studies conducted by the University of the West Indies include bathymetry and benthic substrate typology and the results are described in UWI, 2016. The three rivers studied (Black, Middle Quarters and Salt Spring) all had blue holes or sinkholes but these

were predominant in the Salt Spring River which also had the only occurrence of shells in its sediment (presumably from the bivalves present on the Red Mangroves).

3.5 Natural Hazards

Jamaica is in the Hurricane Belt and has experienced numerous hurricanes over the last ten years, most of which impacted the Black River area. During the hurricane season (June 1 – November 30) tropical waves, depressions, storms and hurricanes are relatively frequent. In addition to heavy rainfall, hazards associated with these weather systems include lightning strikes, heavy winds and flooding. The Morass reduces the flooding of communities as it holds the overflow from the rivers during heavy rainfall and associated increased flows. However with increasing encroachment of communities into the Morass flooding is experienced in some areas such as Slipe, Cataboo, Frenchman and Fullerswood and along the Salt Pond. Black River particularly in the areas created by “dumping up” in the 1970s e.g. Fire Station, Market and Attractions is also impacted (ESL, 2016).

Whilst there are no known records of any major earthquake damage in the Black River area, it is seismically active and situated on unconsolidated alluvial deposits. The latter is known to amplify seismic ground motions. Further there are a number of faults in the Black River drainage basin (ESL, 2016).

4.0 Biodiversity of the Protected Area

The Black River Lower Morass is one of Jamaica’s Key Biodiversity Areas (Birdlife International, 2010) This area forms the core of the Black River Protected Landscape (BRPL) which also includes small sections of the Cockpit Country Key Biodiversity Area – within the Upper Morass section.

4.1 Description of Terrestrial and Aquatic Ecosystems

The BRPL is a complex mix of wetland, coastal and marine ecosystems, where terrestrial and aquatic systems are closely intertwined. The majority of the terrestrial area includes the

Black River Lower Morass characterised by a dense network of waterways through marshlands, mangrove forests and swamp forests. The coastal areas are predominantly mangroves and beaches (Galleon Harbour, Parottee Beach and Fort Charles) whilst the marine areas are mainly soft-bottomed sandy communities with seagrass beds and several small coral reef patches. Figure 6 from UWI depicts the vegetation of the core area of biodiversity significance in the Lower Morass (excluding marijuana cultivation).

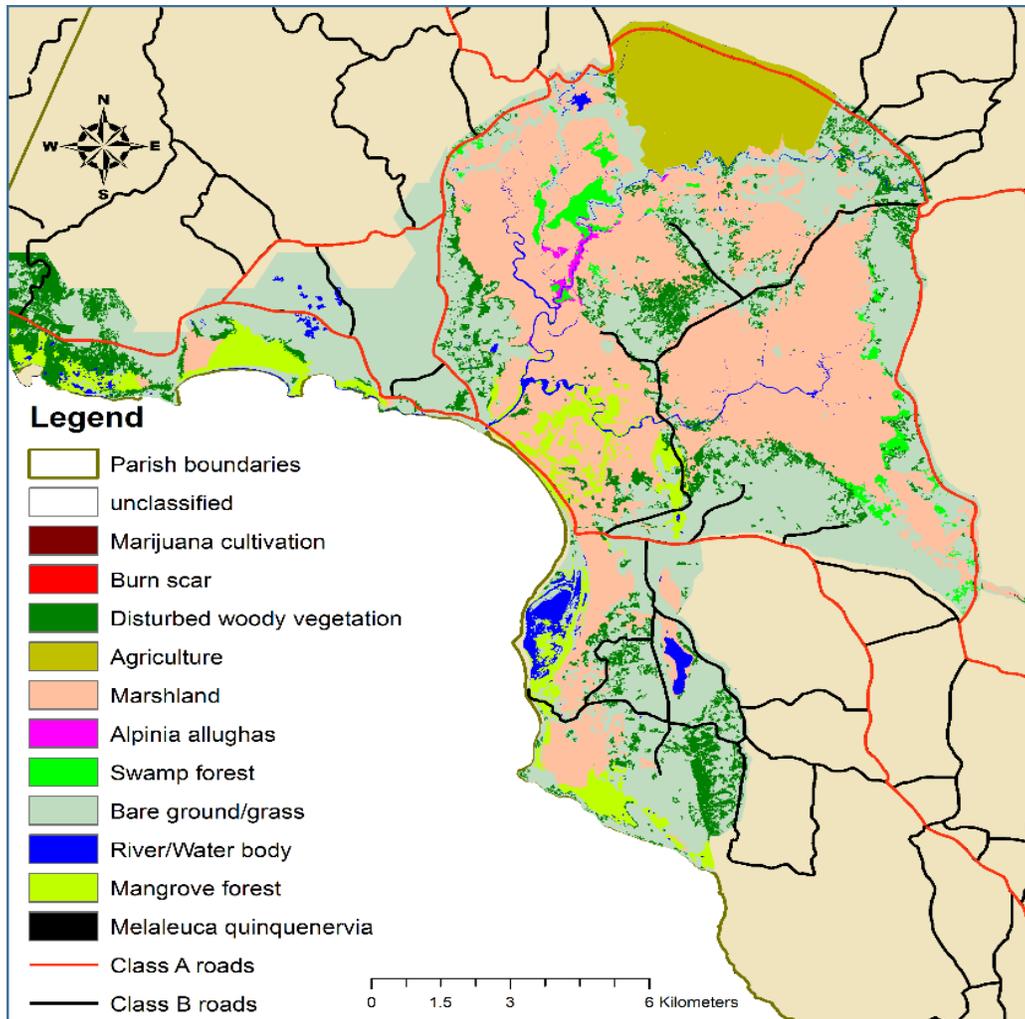


Figure 6. Vegetation of the main components of the BRPL (from UWI, 2016)

The BRPL does not include the Galleon SFCA which extends only as far as the high water mark but serves to ensure the proper functioning of the fish sanctuary by protecting the adjacent mangroves from destruction. The BRPL extends out to sea where the Galleon SFCA eastern boundary ends at the edge of Dead Man’s Hole Bay. Hence, the coastal and marine

component includes the Black River Spa beach, Black River Harbour, Crane and Parrottee Beaches and Thatchfield. The marine areas are mostly soft-bottom communities with sea-grass beds of both Manatee (*Halodule wrightii*) and Turtle (*Thalassia testudinum*) Grasses as well as patches of coral reef (Figure 7). The latter are in better condition to the east of the BRPL where there is less influence from the Black River in terms of sedimentation. The critical areas for conservation areas between the town and Galleon Fish Sanctuary and the area adjacent to the Salt Pond and south to the boundary of the BRPL at Thatchfield.

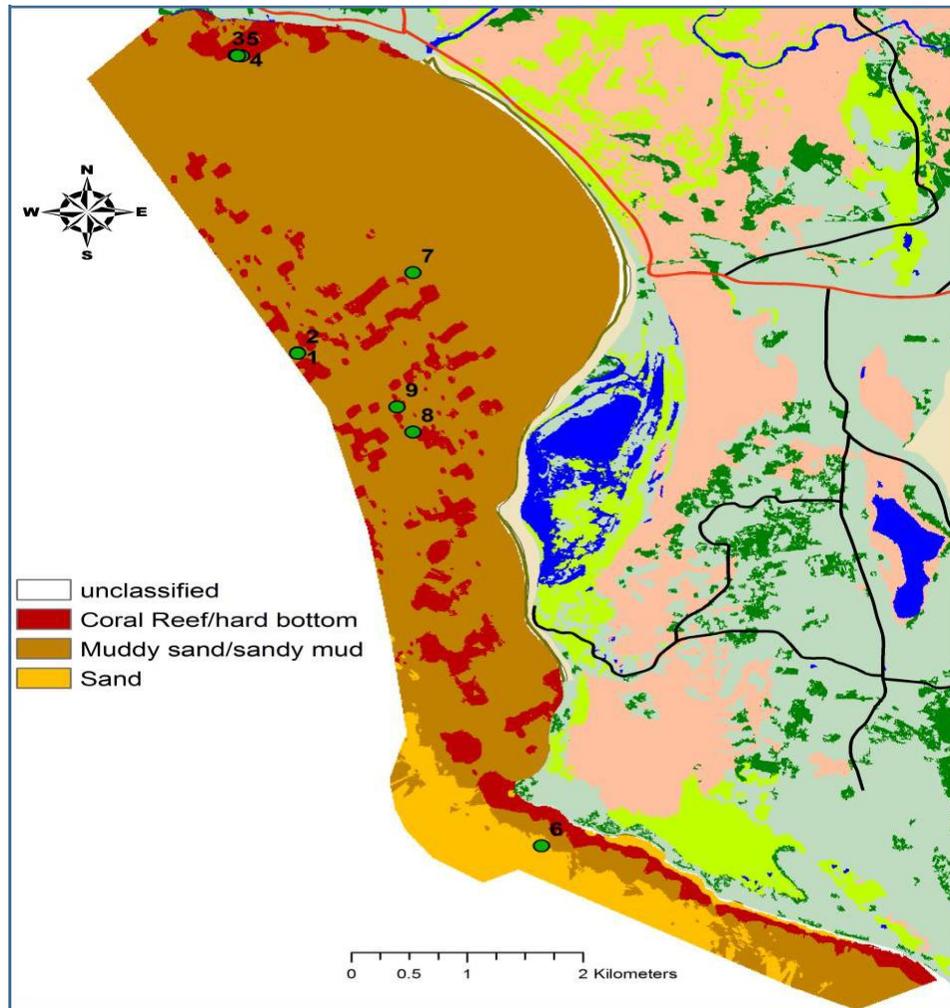


Figure 12. Coastal and Marine Communities of the BRPL (from UWI, 2016)

4.2 Flora

As described in the Ramsar Information Sheet (NRCA, 1997), the BRLM consists of the following habitats:-

- (i) Sedge Marsh dominated by *Cladium jamaicensis* (sawgrass);
- (ii) Riparian Swale dominated by *Typha domingensis* (cat tail or bulrush);
- (iii) Mangrove Forest consisting of *Rhizophora mangle* (Red Mangrove), *Avicennia germinans* (Black Mangrove) and *Laguncularia racemosa* (White Mangrove);
- (iv) Swamp Forest dominated by *Grias cauliflora* (Anchovy Pear) *Roystonea princeps* (Endemic Swamp Cabbage or Royal Palm);
- (v) Woodlands on limestone islands dominated by *Sabal jamaicensis* (Bull Thatch).



Figure 13. Cat Tail and Water Hyacinth



Figure 14. Sawgrass and Swamp Forest



Figure 15. Red Mangrove along Black River



Figure 16. Swamp Forest and Wild Ginger

Mangroves are also found along much of the coast with the best examples in Malcolm's Bay and the bays adjacent to the Galleon Special Fishery Conservation Area (SFCA) and in the Thatchfield area below Parrottee Point. Much of the mangrove forest along Parrottee Beach and the Salt Pond have been removed for residential and tourism development. A study of the mangroves at Malcolm's Bay (Rankine, 2014) indicated a healthy mangrove forest dominated by Red Mangroves indicating a strong marine influence. The mangroves are

separated from the sea by a barrier beach which has very soft sand and is quite wide in some areas. This barrier beach is seasonal and often broken by channels during heavy rain at which time the water in the mangrove forest is released leading to a red colouring of the sea, from the bark of the trees. This process is critical for the release of nutrients to the marine area which promotes the growth of plant and animal life supporting the fish population.

The mangroves extended inland as far as 460 meters closest to the Galleon Fishing Beach and there was a small lagoon associated with this area. In the middle of Malcolm's Bay the depth of the mangrove forest was 530 meters. As shown in Figure 12 there is a cleared area where there is less mangrove forest with a depth of about 350 meters and at the point before Hodges Bay, there is a thick mangrove forest extending inland about 600 meters. Hodges Bay has been cleared of mangroves for the industrial activities at that location but the mangroves occupy the coast again to the edge of the SFCA. Beyond this point to the Black River Hospital and the Black River Harbour the coastal vegetation includes Red Mangroves.

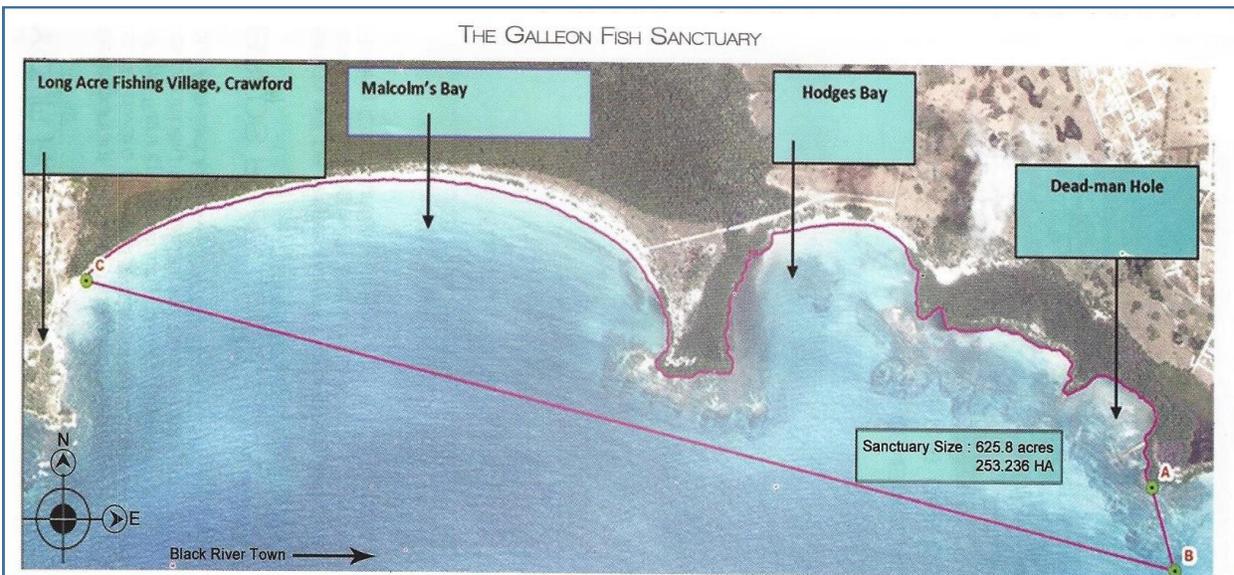


Figure 12. Galleon SFCA boundary



Figure 13. Malcolm's Bay



Figure 14. Red Mangroves - Malcolm's Bay

The swamp forest is considered to be a particularly unusual habitat for the Caribbean, usually referred to as “Amazonian type” (Prosperre et al., pending publication). It was once more extensive and, however it is now very restricted and seriously threatened (NRCA, 1997; Prosperre et al., pending publication). The woodland areas have been modified and are now dominated by *Haemotoxylum campechianum* (Logwood) and tree crops such as ackee, coconut, mango and cashew (Prosperre et al., pending publication).

Botanical surveys of the BRLM conducted between the 1960s and 2000s were found to have widely varying numbers of species but the UWI Literature Review (UWI, 2015) suggests that the list of 202 from Massa and Sutton, 1999 may be the most reliable. However the RIS reports 92 flowering plants of which 25% are considered rare and 8% endemic to Jamaica. .

4.3 Fauna

The Black River Protected Landscape provides habitat for a large number of vertebrates and invertebrates. The only mammals listed in the literature are the West Indian Manatee (*Trichechus manatus*), introduced pests such as the Mongoose (*Herpestes griseus*) and rats (*Rattus rattus*) and domesticated animals: dogs, cats, pigs and cattle. There are likely to be bats but no mention was found of them.

The main group of vertebrates are the birds and both the Lower and Upper Morass are important for aquatic and migratory species and the Upper Morass in particular is used for

bird-watching tours for serious bird-watchers. Reportedly 111 of the 149 aquatic species and 41 species of migratory birds occur in the Morass (NRCA, 1997). A list of birds recorded from the area can be found in UWI, 2015.



Figure 15. Great Egret and Crocodile



Figure 16. Great Blue Heron on *G. caulerpa*

There are at least eight species of reptiles, mainly anoles, found throughout the BRPL but the American Crocodile (*Crocodylus acutus*) is found only in the Lower Morass and is promoted as a part of the Safari Tour attractions. Sea-turtles, primarily the Green (*Chelonia mydas*) and Hawksbill (*Eretmochelys imbricata*) are found in the marine and coastal waters and nest in the area. Freshwater turtles - the endemic *Pseudemys terrapen* and the introduced edible freshwater turtle (*Chrusemys terrapen*) are found in the Lower Morass. Amphibians include several of the endemic *Eleutherodactylus* species and the introduced *Bufo marinus* and *Rana catesbiana* are found throughout the area. Appendix 3 lists animals other than birds.

Several species of fish inhabit the rivers and streams of the Morass including the endemic Ticki Ticki (*Gambusia melapleura*) and fish of commercial value such as the Tarpon (*Megalops atlantica*), Snook (*Centropomus undecimalis*), Jack (*Caranx latus*), and Snapper (*Lutjanus apodus*). Marine fish extend into the Black River and into the Salt Spring River because of the influence of the sea. These fish also use the mangroves along the river banks as nurseries.

The best known invertebrates of the Black River Morass are the native shrimps of which there are seven (7) species primarily *Macrobrachium acanthurus* and *M. faustinum* (Pienkowski et al., 2015). Other invertebrates include butterflies and other insects.

4.4 Rare and Endangered Species

The two species of sea-turtles in the area are listed by the IUCN's Red List as endangered – the Green Turtle and critically endangered – the Hawksbill Turtle. Despite their protected status there is still poaching for the meat and the eggs which are considered both as an aphrodisiac and for male stamina. Increasing coastal development is likely to have a negative impact on nesting sites along Parottee Bay and the bays adjacent to the Galleon SFCA. The American Crocodile is listed by IUCN as vulnerable and is protected in Jamaica and considered part of the Black River Safari attraction. Despite this, it is being poached for its meat and the eggs which are believed to aid male stamina.

The West Indian Manatee is known from the area particularly at sea but is likely to enter the Black and Salt Spring Rivers as it can tolerate brackish waters. Although endangered and protected, it is known to be poached for its meat which is considered a delicacy. In addition, it is often injured and killed by boat propellers as it cannot manoeuvre away quickly enough.

Of note amongst the birds is the West Indian Whistling Duck (*Dendrocygna arborea*) a rare, wetlands bird that is considered by the IUCN to be vulnerable, but is resident in the BRLM.



Figure 17. West Indian Manatee
(Courtesy: life-sea.blogspot.com)



Figure 18. West Indian Whistling Ducks
(Courtesy: Wikimedia commons)

4.5 Invasive Alien Species

The Mitigating the Threat of Invasive Alien Species in the Insular Caribbean (MTIASIC) Project was recently completed and the Black River Lower Morass was one of its targeted sites. This project and the studies conducted to guide McLaren, 2016 note the following invasive alien species of particular concern:-

- Water Hyacinth (*Eichornia crassipes*) – floats on the water and has been present for many years;
- Wild Ginger (*Alpinia allughas*) – spreading along river banks and appears to be a recent invader;
- Paperbark Tree (*Melaleuca quinquenervia*) – spreading throughout the Morass and is a recent invader;
- Australian Red-claw Crayfish (*Cherax quadricarinatus*) – in the lower Morass and considered a threat to the pepper shrimp industry;
- Suckermouth Catfish or Pond Cleaner (*Pterygoplichthys pardalis*) – in the lower Morass and is a threat because it is generally not considered edible;
- Armour-plated Catfish (*Hoplosternum littorale*) – in the lower Morass and is a threat because it is generally not considered edible;
- Perch (*Oreochromis mossambicus*) – has been in the Morass since at least the 1980s;
- Carp (*Cyprinus carpio*) – appears to be a newly introduced species.



Figure 19. Red-claw Crayfish



Figure 20. Suckermouth Catfish

There are other potentially invasive species present e.g. African oil-palm (*Elais guiriensis*) but they do not appear to be having a negative impact on the ecological and socio-economic values of the BRPL.

4.6 Impacts of Human Use within and adjacent to the Protected Area

The flora and fauna of the BRPL have definitely been negatively impacted by human activity. The Upper Morass is basically completely converted to agriculture with patches of wetland vegetation. The expansion of settlements has resulted in encroachment into the Lower Morass. The expansion of farming, in particular marijuana is rapidly changing the vegetation of the Morass through (i) conversion of biodiverse natural marshlands to mono-culture plantations of Marijuana (*Cannabis sativa*) (ii) removal of marsh and wood-land vegetation (especially by fires but also for making sheds) and concomitant factors e.g. invasive species (Figure 21).

4.7 Conservation Status and Research

Significant research has been conducted in the Black River Morass, particularly the Lower Morass, particularly for the investigations into the feasibility of peat mining in the 1980s. This however was mainly descriptive research and did not delve much into the ecology of the flora or fauna. Since the 2000s increasing research is occurring within the Lower Morass and other parts of the Protected Landscape, mainly through the University of the West Indies.

The Carrying Capacity study conducted by the Environmental Solutions Ltd (ESL, 2016) found relatively stable number of species but apparent decreases in populations e.g. crocodiles. Prospere et al., pending publication indicated a major concern for the swamp forests which are under significant threat and Pieskowski et al., 2015 indicated the possibility of declining shrimp populations.

The Black River Upper Morass is already converted to agriculture but the variation in vegetative cover provided by crops alongside wetland vegetation along with the food

opportunities provided by crops, results in a high diversity of bird life. This, along with relative ease of vehicular access, has led to growth in the bird-watching industry in the area.

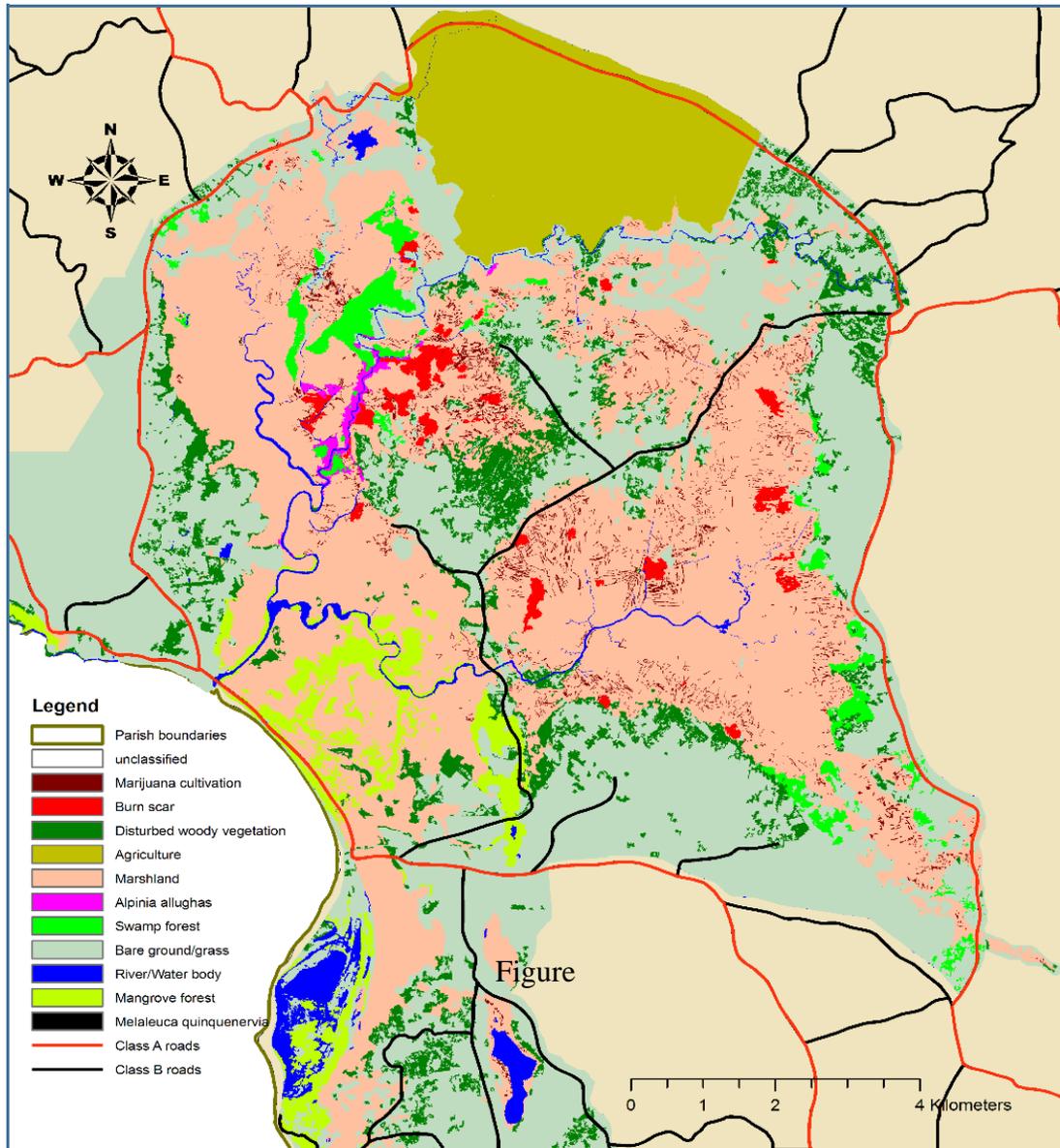


Figure 21. Map showing the land cover in the Lower Morass in 2001 (UWI, 2016)

The Lower Morass is dominated by freshwater herbaceous wetlands – marsh with pockets of swamp forest, however the wetlands are degraded and the area under natural vegetation has declined in particular the swamp forest. Much of the marsh, particularly the eastern side, has

been converted to agriculture for short-term “cash” crops in particular, the cultivation of the very lucrative marijuana plant (Figure 26). The latter has taken advantage of the limited access to the Morass and hence the ability to grow this illegal crop without being easily detected. Further much of the lands are government owned and it is often the case that such lands are not well protected from encroachment in comparison to privately owned lands.

5 Cultural and Socio-economic Values of the Protected Area

This section focuses on the wetlands and associated areas within the BRPL and not on the Black River Protected National Heritage/Heritage District.

5.1 Cultural History and Archaeological sites

The parish of St. Elizabeth is known to be an area where the Taino settled and hence there are numerous archaeological sites associated with the Taino, primarily along the southern beaches and highlands to the north. Most of these occur do not occur within the BRPL however (Figure 27) but only limited archaeological research has been conducted within the Lower Morass. The Taino likely used dug-out canoes made from large trees e.g. cotton trees, in a similar manner to their production today for shrimp fishing. The shrimp pots used however are known to have had their origin in West Africa and the knowledge of their construction was brought to the area by enslaved Africans. The latter would likely also have been familiar with the construction of dug-out canoes as many of them would have been from delta regions of West Africa.

Much of the cultural history close to the BRPL is associated with the Historic District of Black River – one of Jamaica’s first towns established at least since 1685. There are numerous houses and other buildings e.g. Invercauld, Waterloo Guest House and the Parish Church, dating back to the 1700s.



Figure 22. Heritage Sites within the Black River Complex (courtesy JNHT)

5.2 Contemporary Community and Stakeholder Use

The population of the Black River Protected Landscape is about 13,616 with 12,000 of those people living within the Lower Morass including the Crawford area (coast adjacent immediately west of the town of Black River), 1,027 in the Upper Morass and 566 in the YS Corridor (STATIN, 2013). These figures have been estimated based on overlap between Enumeration Districts (ED) and the proposed boundary of the BRPL (Figure 25). The number of people living immediately around the BRPL is about 7,538 with 13,154 in the Lower Morass area of which 5,352 live within the Black River Local Planning Area and 4,380 living in communities closer to the Upper Morass. The total population which should be considered as the stakeholders for the BRPL is 31,154 which is about 21% of the population of the parish of St. Elizabeth.

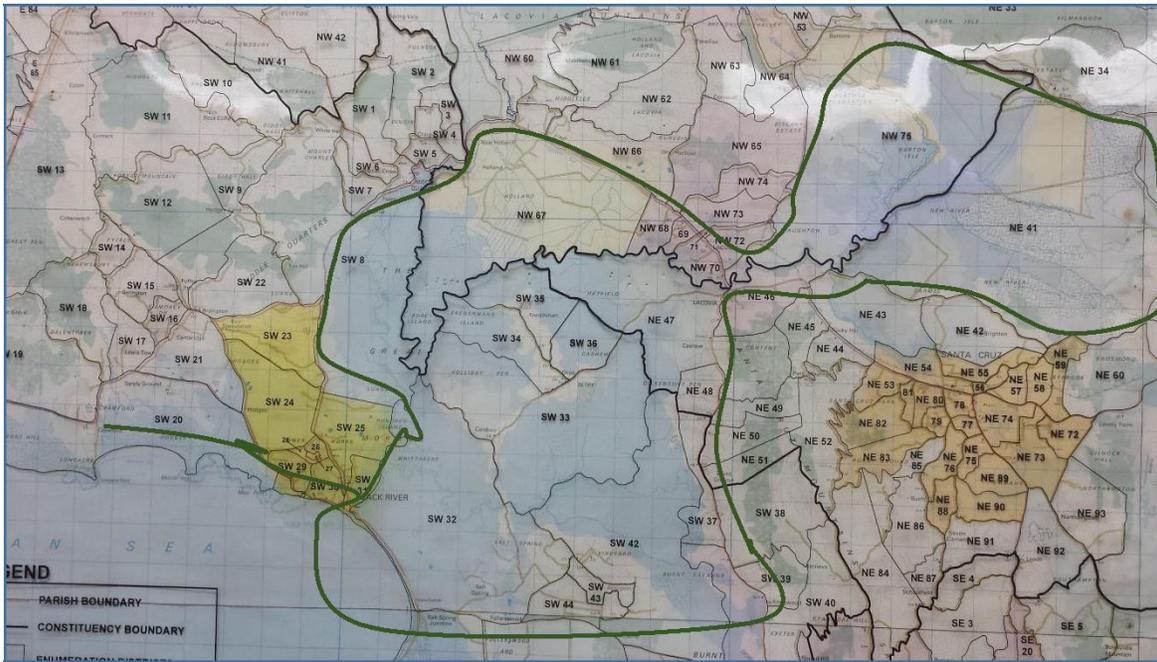


Figure 23. Map showing Enumeration Districts in and around the BRPL

In 2011, the Social Development Commission (SDC) conducted a detailed Knowledge, Attitudes and Practices Survey on behalf of NEPA, with a focus on many of the same communities within and around the BRPL, in addition to a few other communities within the Black River watershed. 72.5% of the dwellings visited for the survey were made of concrete and blocks (the national average for 2007 was 66.6%) and 10.4% were made of board (wood). 36% of the dwellings were considered to be in fair condition, 31% in good condition and 17% in very good condition whilst 14% were considered to be in poor condition and 2% in very poor condition (SDC, 2011). This information suggests that communities within the BRPL and surrounding areas are above the poverty line, however the data for employment indicates that whilst the communities are not destitute, they are not doing well financially especially the youth.

Approximately 87.8% of respondents were of working age (15- 64 years old) and the majority of this labour force (33.2%) were between 15 – 29 years old. However only 40% of the respondents were employed. Unemployment was higher for females than males but females held more professional and elementary (e.g. vendors, domestic workers) level jobs

whereas the males were mainly skilled agriculture and fishery workers (48.5%). The majority of employed persons were self-employed (67.7%) and the others worked either for public (13.5%) or private sector (18.8%) (SDC, 2011). 9.4% of the respondents were enrolled in an educational institution with 57.4% of those enrolled at the secondary level. 51.8% of respondents stated that their highest level of educational attainment was secondary level education (SDC, 2011).

With 60% unemployment in the BR region, one might expect the communities to look more destitute however there is evidence of new construction of houses made of concrete and blocks throughout the area. This suggests that many of the unemployed persons are active in a lucrative, illegal business. Evidence from researchers in the field, local community members and satellite imagery (Google Maps) and maps from satellite imagery analysis indicate that much of the Lower Morass has been converted to marijuana plantations. The plantations are illegal not only because of the crop is still illegal (can only be grown under special licenses since 2015) but primarily because the farmers are occupying Crown Lands in the Morass without permission from the National Land Agency.

5.3 Non-recreational Social and Economic Activity

As indicated above, for males the majority of those employed are self-employed as farmers and/or fishers. The latter either go to sea (particularly those closer to the coast e.g. Parrottee) whilst others fish in the Morass using pots, nets and lines to catch Jamaican mudfish, Tilapia, Mullet and Perch (ESL, 2016). Shrimp fishing is conducted throughout the Black River Morass in almost all the rivers and even in Wallywash Pond but the community of Middle Quarters is the best known retail sales outlet.

The farmers use the traditional method of creating banks from the peat soil - like the walls of a moat – and plant on top of these banks (Figure 24). Land use in the Upper Morass comprises sugar-cane (large scale farmers) and vegetable or “cash-crop” farming in addition to some fish farms. The small-scale farmers grow crops such as callaloo, peanuts, pumpkin, yam, coco, plantain and bananas on farms about 0.4 – 0.6ha (1 – 1.5 acres); they are unable

to expand as they are dependent on rain-water and cannot afford irrigation (ESL, 2016). Many of the farms in the Upper Morass are in areas that have been drained and so they do not have access to the water in the Morass for farming on banks. Some farmers also raise livestock – cows, goats and chickens mainly.



Figure 24. Farming vegetables in the Morass

In the Lower Morass, the northern section between Lacovia and Middle Quarters are mainly under sugar-cane on the Wray and Nephew Ltd. lands and a variety of short-term vegetable crops on lands in this area leased from Wray and Nephew Ltd. These farmers grow sweet pepper, peas, tomatoes and other vegetables. In addition, cattle are reared in this area and throughout the region.

5.4 Recreational and Tourism Activities and Visitation Trends

Black River and in particular the Broad River have been used for boating tours since at least the 1990s. These tours generally take visitors up the Black River through the Salt Spring into the Broad River and are often referred to as “Safari Boat Tours”. They were initially conducted only in large, motorised canoes but in recent years, the size and comfort level of the boats have been increased by the tour operators to motorised pontoons capable of holding between 10 – 40 passengers depending on the size of the vessel. Most of these tours are between an hour to an hour and a half and do not go as far as the Salt Spring Bridge or further up-river to “Cheese Rock” (ESL, 2016). Recreational and tourism activities have been increasing as indicated by the recent introduction of a fourth tour operator on the Black and

Broad Rivers – BREDS from Treasure Beach, which use canoes with outboard engines and take visitors from Treasure Beach along the coast to Black River and then upriver. Currently, the tour operators registered with the River Rafting Authority are (ESL, 2016):-

- BR/South Coast Safari – Mr. Charles Swaby (4 vessels)
- Jacana Aqua Tours (Irie Safari) – Mr. Lloyd Linton (3 vessels)
- St. Elizabeth Safari – Dr. Donovan Bennett (5 vessels)
- BREDS Treasure Beach – (7 canoes; motorized and non-motorized)

The Environmental Solutions Ltd. (ESL) Carrying Capacity Study indicated that the Safari Tours see most of their visitors during week days particularly between October and March. Based on the 29 visitors interviewed by ESL, 95% of the visitors are foreign and only 5% are Jamaicans. The respondents were generally happy with their experience although 21% who considered themselves “naturists” pointed out the need for water and garbage bins on their boats and wanted the opportunity to explore within the Morass itself (ESL, 2016).

There are also several un-licenced operators using smaller, motorised canoes and these operators usually speed although sometimes the licenced boats do as well, particularly the canoes. River rafting has been reported on the Middle Quarters River (ESL, 2016). These smaller unlicensed vessels and the licensed ones from Treasure Beach tend to go further up river to Salt Spring or “Cheese Rock” although for some reason the latter is more popular. This situation has left residents of Salt Spring unhappy particularly as the larger boats which used to stop there don’t anymore due to the short one hour time-frame many package tour operators require (ESL, 2016).

In addition to the river tours, there are a number of other attractions, namely: Apple Valley Farm in Maggotty, Bubbling Spring in Middle Quarters, Y.S Falls and Cashew Park.

There are a few small hotels and guesthouses in the town of Black River e.g. Waterloo Guest House and Invercauld Hotel. The majority of the hotels in the area are located along the Crane Road and Parrottee Beach. Along the Parrottee Beach across from the Salt Pond there are a large number of half built and derelict buildings and some of these are up for sale.

Discussions with community members indicates that there was a surge in development around the 1980s but there were problems with storm surge, flooding and rust caused by the hyper-saline Salt Pond as well as the sea-side location. Further, there is a high cost to develop these lots in the traditional manner (dumping of marl) as large quantities of materials are required.



Figure 25 Unfinished House, Parrottee



Figure 26 Waterloo Guesthouse

There is increased interest in tourism on the South Coast with a particular thrust in the Treasure Beach area to the south-east of the BRPL. The St. Elizabeth Parish Development Committee prepared a Greater Treasure Beach Development Plan which outlines a focus on tourism from Treasure Beach to the Black River Morass (St. Elizabeth Parish Development Committee, 2015).

5.5 Social and Economic Values

Whilst community members recognise the environmental value of the Morass and Mangrove ecosystems for water supply and wildlife conservation, the main perceived values are economic. These are mainly through the shrimp, tourism and farming industries. The two former rely on the health of the ecosystems whilst the latter has a negative impact but is an important socio-economic activity for many residents. Other activities include harvesting and sale of thatch but there is no information on this industry.

Shrimp Industry

Shrimp vendors are primarily located in Middle Quarters and purchase shrimp from as far afield as Slipe, Cataboo and even the parish of Clarendon. If necessary, they purchase imported shrimp from Rainforest to sell. In the community of Middle Quarters, the Tourism Product Development Company has supported the design and erection of signs and branded carts. The Social Development Commission and Parish Council are assisting the Middle Quarters Community Development Committee to source funding for a project to establish a well-organised rest stop with booths selling shrimp and related products.

Webber et al., 2010 estimated that on average a shrimp fisher earned between JA\$24,960 and \$624,000 per annum and vendors make up to JA\$2,340,000 per annum. Pienkowski et al., 2015 estimated 95 shrimp fishers from two communities and on average US\$7,077 per shrimp fisher per annum. Further, Pienkowski detailed a value of US\$22.81 from an average day's haul with US\$3.53 of that coming from the invasive crayfish but these values are based on catch and sale value was not provided. Further catch is apparently declining (Prospere et al., pending publication). Wade, 1985 is reported in ESL, 2016 as estimating the industry as valuing JA\$3million per annum but it is not clear if this is per shrimp fisher or vendor. He estimated 200 shrimp fishers and an equal number of people in associated businesses e.g. vending, basket and boat making. Assuming there are at least 25 vendors in the Middle Quarters area making a conservative JA\$1.5 million per annum, then the industry as a whole is generating at least JA\$37.5 million per annum. The value of fish has not been estimated but is far less lucrative than shrimp and is mostly for consumption at home or within the local community.

Tourism Industry

Figures are not available for the Black River area as the visitor statistics collected by the Jamaica Tourist Board are for "Mandeville/South Coast" and do not disaggregate the areas within that resort area which would include Treasure Beach, Bluefields and Whitehouse. For the last three years visitors indicating intent to visit this resort area has remained at about 5.8% of total visitors to the island and was 122,588 in 2014 (JTB, 2015). However, many of the visitors to the region's attractions are from further afield – namely Montego Bay.



Figure 27. Shrimp Country sign in Middle Quarters

Based on the estimate of 1,445 visitors on boat tours (canoes and pontoons) over a three day period (ESL, 2016) and a cost of US\$19/tour (Black River Safari Tours) for foreign visitor and JA\$2,300 for residents, the average weekly income across the industry is US\$27,455. This amounts to a gross income of US\$1,317,840 (JA\$159 million) per annum for the industry.

Farming

No information was found on the average income of a small farmer (1 – 2 acres) in St. Elizabeth either by ESL or this Consultant. Marijuana farming however is of particular concern for management of the BRPL. UWI, 2016 estimates 177 ha in the Lower Morass under marijuana cultivation in 2001 based on satellite imagery analysis and ground-truthing (Figure 23 above). This figure is known to have increased significantly in 2009 however the information is not available due to copyright issues. An estimate for 2013 is to be calculated if data becomes available. Marijuana cultivation is occurring in the Lower Morass primarily because it is illegal and therefore farmers are “hiding” their activities in the Lower Morass which is relatively difficult to access. It is said that enforcement agency personnel know about the cultivation and in fact benefit from it, in return for not alerting the authorities or destroying it.

There is little in the literature available about outdoors, commercial marijuana production in terms of yields however a search of the internet provided a number of estimates which have been used to estimate the value of marijuana cultivation in the Lower Morass. Cost of marijuana per pound has been estimated by asking a number of people what they had heard. Assuming that the area cultivated has increased by at least 25% in 15 years to 221 ha the estimates below indicate a value of at least JA\$99 million/annum for the existing industry.

Estimates	Pounds/Hectare	Cost (JA\$)/Pound	Value (JA\$)/Hectare
Low	1,500 lbs/ha (The Weed Business.com, 2016)	300	450,000
Medium	6,250 lbs/ha comprising:- 5,000 lbs leaves 1,250 lbs buds (Caulkins, J., 2010)	300 1,000	1,500,000 <u>1,250,000</u> 2,750,000
High	1,500 lbs/ha	2,500	3,750,000
Very High	2,200 lbs/ha (liq.wa.gov, 2016 and oilseedcrops.org, 2016)	2,000	4,400,000

Table 1. Estimates of Value of Marijuana Production

5.6 Impact of Human Uses on Protected Area Values

In addition to the negative physical, chemical and biological impacts of human use on the biodiversity and integrity of the natural systems within the proposed BRPL, there are negative socio-economic impacts as well. Several of these are already being felt by the communities as described in the Report on community meetings and further described in the literature. These include apparently declining native shrimp and fish populations which are negatively impacting the earnings of both fishers and vendors.

The findings of the Biodiversity Conservation Consultancy (McLaren, 2016) which guide this Management Plan indicate that the herbaceous wetland within government-owned lands has been over-run by farming – in particular, marijuana plantations. This is not apparent from the Land Use Maps prepared by the Forestry Department - likely due to the difficulty in distinguishing the plantations from surrounding vegetation without specific analyses. This is

because the marijuana plants are herbaceous and growing in wetland conditions as the farmers use the traditional method of planting on banks of peat soil around which the water runs.

The several impacts of human use which are threatening the natural and cultural heritage values of the proposed BRPL are depicted in the Problem Tree (Figure 35) along with the causes of these impacts or threats and their causes. These threats are further analysed in chapter 6, section 6.3.1.1 with particular reference to the conservation targets which are essentially the key values for protection.

6.0 Key Strategies and Management Priorities

Based on the vision and goals described below and the stresses which are an immediate threat to the status and existence of the natural and cultural heritage values as shown in the Problem Tree (Appendix 4), Public Education and Outreach will be the most critical Programme to initiate management of the Black River Protected Landscape. It will not be possible to implement the necessary management programmes (particularly Enforcement and Compliance) without first implementing a successful Public Education and Outreach Programme.

6.1 Vision and Goals

VISION

The natural and cultural heritage of the Black River Protected Landscape is preserved with healthy morass, swamp forest, mangroves, beaches, sea grass beds and coral reefs providing habitat for wildlife populations that are thriving. The protection of these values is supported through the facilitation of sustainable livelihoods particularly the wild, native shrimp, thatch and tourism industries in close association with conservation. The communities of the Black River Protected Landscape are knowledgeable about the natural and cultural heritage of the area and live in harmony with their natural environment as they make a good living from the resources and enjoy access to nature, which they share with visitors.

GOALS

1. **Ecosystem Conservation:** To maintain existing and expand areas in natural and healthy condition by stopping further encroachment, regaining control of key areas, restoring and rehabilitating natural ecosystems and reducing use of agricultural chemicals.
2. **Wildlife Conservation:** To protect wildlife in the Morass, coastal and marine areas.
3. **Cultural Heritage Preservation:** To preserve the cultural heritage related to the wild, native shrimp and thatch industry and related activities.
4. **Sustainable Development:** To facilitate sustainable livelihood opportunities associated with conserving the distinct character of the Black River community and its natural and cultural values.

6.2 Zoning

Zoning is a management tool – it identifies zones (smaller areas) within a protected area where there are particular objectives and/or opportunities. Whilst different zones may have different objectives, they must work together to aid the achievement of the protected area’s primary objective or goal.

6.2.1 Description of the Zone Types and Applicable Policies

Three zones have been identified for the BRPL: Sustainable Use, Multiple Use and Conservation as briefly described in Table 2 and depicted in Figure 28.

Table 2. Description of the Three BRPL Zones

Zone	Purpose	Applicable Policies and Legislation
Sustainable Use (on private lands, in and around communities – YS Corridor, Upper Morass, Lower Morass, Slipe and its districts, Pondside, Parottee and Fullerswood)	To ensure environmentally sustainable development and use of privately owned lands for the conservation of local biodiversity and ecosystems. Support primarily for Goal 4.	St. Elizabeth Development Order NRCA Permits and Licences Act Wild Life Protection Act (Game Reserve)
Multiple Use (Black River Harbour	To allow for a variety of environmentally sustainable use	NRCA Permits and Licences Act

Zone	Purpose	Applicable Policies and Legislation
and areas immediately adjacent; Main Rivers: Broad, Middle Quarters, Salt Spring and Black; areas immediately adjacent Lower Morass along road which forms BRPL boundary)	in government owned lands and waters. Support primarily for Goals 3 and 4.	
Conservation Wallywash and Parottee Salt Pond, Thatchfield, Galleon Harbour Mangroves, Lower Morass – west and south-east)	To protect and restore biodiversity and ecosystems. Support primarily for Goals 1 and 2.	General Protected Landscape regulations and specific BRPL regulations (being prepared)

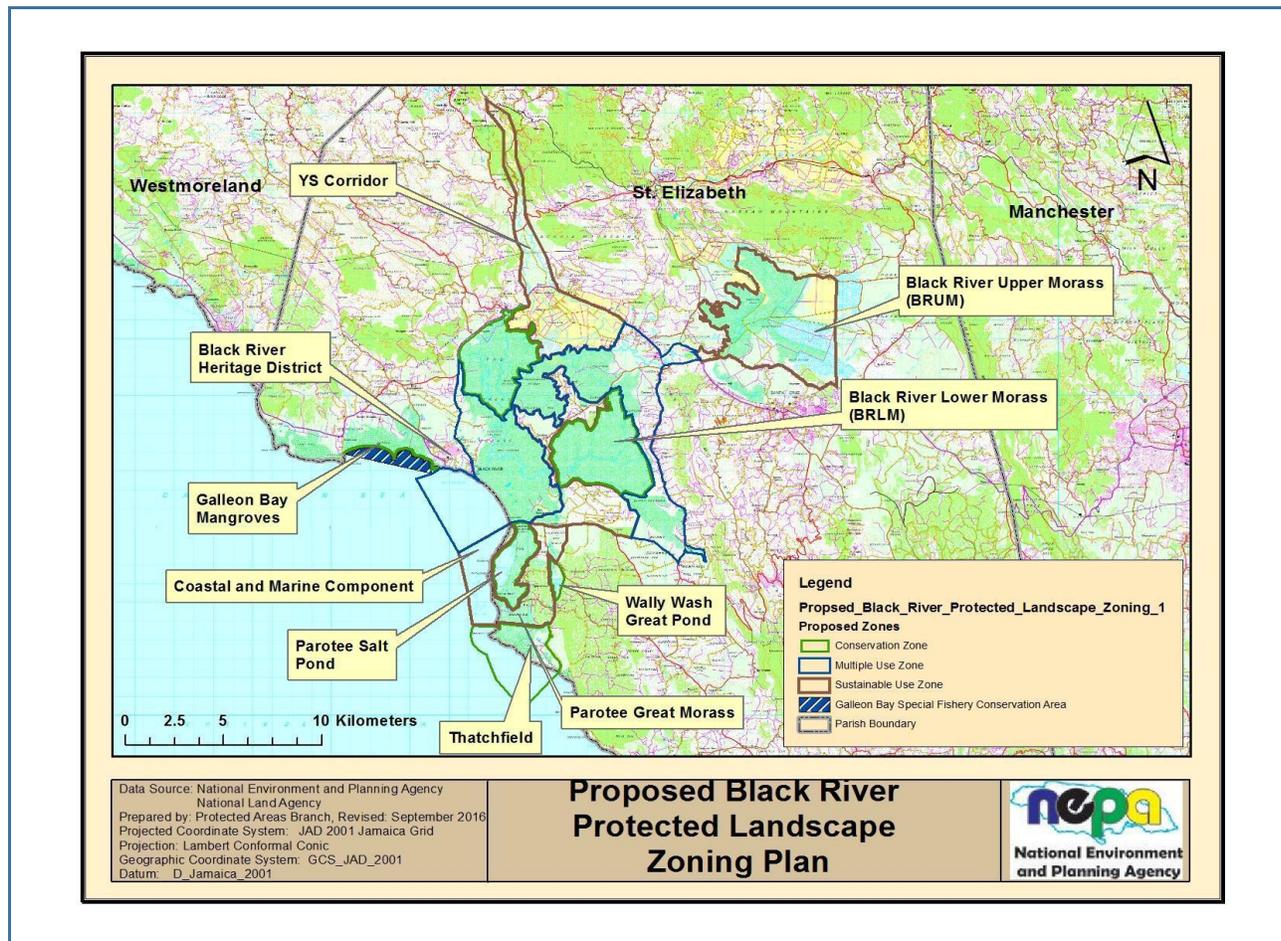


Figure 28. Zoning of the BRPL

The Sustainable Use Zone covers mainly private lands in the YS Corridor, Upper Morass and in the Lower Morass in and around communities e.g. Slipe and Pondside where the management priority is for the PA manager to promote environmentally sustainable practices. Depending on the geographic location of this Zone and therefore the ecosystems present, the particular focus will vary:-

- Within the Upper Morass, the focus will be on reducing siltation of the rivers and streams and reducing the amount of agricultural chemicals (fertilisers, pesticides and herbicides) used. This will be implemented through activities under the Public Education and Outreach, Conservation and Monitoring and Evaluation Programmes.
- Along the YS River Corridor, the focus will be on maintaining the pristine water conditions limiting development to strictly controlled ecotourism and ecologically sound housing development – no large schemes. There should be no intensive agriculture nor use of fertilisers and chemical pesticides and herbicides. There should be no motorised use of the river.
- Within the Parrottee Beach area, the focus will be on the promotion of development which is both environmentally sustainable and aesthetically in keeping with the environment and a Protected Landscape. This will be implemented through activities under the Conservation, Recreation and Tourism and Public Education and Outreach Programmes.

The Lower Morass is primarily comprised of government-owned lands – this area is zoned as Multiple Use and Conservation except for the existing communities within the Morass and along the coast (Slipe and its districts, Pondside, Parrottee and Fullerswood) and private lands which are zoned as part of the Sustainable Use Zone.

Six Conservation Zones have been identified but further field work will be needed to accurately map them in detail, they are described below. The recommendation for the five year timeline of this Management Plan is to work with the local communities to establish the definitive boundaries of these areas starting with public education and outreach and using detailed cadastral surveys, research (particularly for the ponds) and enforcement for the

herbaceous wetlands (Lower Morass). With respect to the latter, the critical activity is to secure any remaining areas that are in natural condition and obtain compliance with respect to stopping any further encroachment and thus securing these zones for restoration and protection.

6.2.2 Spatial Description of the Location of the Zones

Figure 28 above, shows the location of the zones and the spatial descriptions are provided below and detailed at Appendix 2.

Sustainable Use Zone:-

- Black River Upper Morass – the boundary of this component of the Sustainable Use Zone is the same as that for the Black River Upper Morass Game Sanctuary.
- YS Corridor – this corridor is 12.5 km meters running north from the entry of the YS River into the Lower Morass at the main road and width is 30.5 meters on either side of the river bank in low water (non-spate) condition.
- Crane and Parrottee Beaches including the community of Parottee (including Spice Grove) – the boundary of this part of the zone is along the Salt Pond and out to sea 3 km.
- The communities of Slipe (including districts of Frenchman, Cataboo and Cashew) to the north-east of the Lower Morass and the communities of Pondsides (including Hilltop) and Fullerswood.

Conservation Zone

The Conservation Zones are located mainly in the Ramsar Site and much of this land (except around communities) is owned by the Government of Jamaica.

1. Wallywash Pond
2. Parrottee Salt Pond
3. Thatchfield (between Parrottee Point through Starve Gut Bay to Fort Charles) – a mangrove forest, coastal and marine ecosystems (2.86km out to sea to enclose reefs).
4. Galleon Harbour Mangroves (up to 300 meters inland from high tide mark) - at least 75% of the mangroves should be untouched except for boardwalks through or

buildings on stilts. There are numerous resorts around the world which have been built using this concept e.g. the Ranweli - Eco-Resort on Mangrove Forest by the Beach, Sri Lanka - <http://www.ranweli.com/index.php>

5. Two core areas of government-owned lands occupied by herbaceous wetlands and swamp forest (within the Ramsar Site):-
 - 4a. Western Lower Morass – an area incorporating the Middle Quarters, YS and upper Black River to the north and Black River to the south;
 - 4b. South-eastern Lower Morass – an area in and around the upper Broad River.



Figure 29 Wallywash Pond



Figure 30 Parrottee Pond (dry season)

Multiple Use Zone

All remaining parts of the BRPL which comprise of the Lower Morass wetlands, coastal and marine areas where fishing, boating and tourism activities will be allowed but with the appropriate permits and/or licences. This Zone is primarily riverine and the relevant fishing regulations under the Wild Life Protection Act must be enforced whilst the regulations for the PA are being prepared. Seine fishing is to be banned from all marine areas.

6.2.3 Implementation of the Zoning Plan

As noted above and described in detail in Section 6.3 the focus for the period of this Management Plan will be on introducing the Black River communities to the concept of and reason for the Protected Landscape, particularly in terms of sustainable practices and conservation activities.

For the Sustainable Use and Multiple Use Zones – two documents should be researched and prepared using participatory processes as well as best practices gleaned from international, regional and national cases and bearing in mind the local environment:-

- (i) Under the Conservation Programme, “Guidelines for Environmentally Sustainable Agricultural Practices for the Black River Protected Landscape”
- (ii) Under the Recreation and Tourism Programme, “A Plan for the Sustainable and Aesthetically Appropriate Development of the Parrottee Beach, Black River Protected Landscape”.

These will both be promoted through the Public Education and Outreach Programme, including the organisation of training workshops and distribution of copies to community members, landowners and other stakeholders within the Protected Landscape.

For all the Zones, there will need to be cadastral surveys conducted of the communities and private lands and clear identification of the government owned lands in order to reduce encroachment. This will be conducted under the Enforcement and Compliance Programme. There is an urgent need for this to be done for the western Lower Morass Conservation Zone as this area may be the only remaining area not yet affected by marijuana cultivation.

For the Conservation Zone generally, the focus will be on activities under the:-

- (i) Enforcement and Compliance Programme – marking the boundaries and securing especially government lands in the Morass and where they occur along Parrottee Beach and Thatchfield.
- (ii) Research, Monitoring and Evaluation Programme - using participatory approaches – to involve the local communities in understanding the ecology and hydrology of the systems as well as the wildlife populations and their distributions. Conducting research will be particularly challenging within the two Lower Morass areas where marijuana farming is occurring, as the farmers are known to be very suspicious of researchers and can be intimidating and even threatening. This is true even for local community members and so care will have to be taken in working with the farmers to devise appropriate approaches. Despite the challenges, efforts must be made to work

with the farmers to convince them of the need to save a section of the Lower Morass from farming of any kind and then to identify, map and mark this area.

- (iii) Conservation Programme using participatory approaches to develop detailed conservation plans for specific areas, based on the research conducted.

6.3 Identification of Key Strategies and Management Priorities

The key strategy for implementation during the period for this Management Plan is to obtain the “buy-in” of local stakeholders, particularly to the issue of encroachment into the Morass and use of agricultural chemicals. Therefore the Management Priority will be on the implementation of the Public Education and Outreach Programme under which the key strategy to be used will be the building of local capacity for environmental management and sustainable livelihoods. The next two management priorities will be the Recreation and Tourism and the Conservation Programmes. Under the latter the focus will be on the implementation of River Cleaning and Swamp Forest Restoration although the latter will have to wait for the identification of a safe restoration plot. This approach will address the urgent needs the local community has expressed for youth training, employment and income-generating opportunities, and river cleaning. Targetted communities are: Black River (including Crawford), Middle Quarters, Slipe (including Cataboo, Frenchmans and Punches), Pondside, Parrottee and Fullerswood.

Table 3. Summary of Goals, Programmes and Strategies

GOALS	PROGRAMMES	STRATEGIES
1. Ecosystem Conservation	Public Education and Outreach	<ul style="list-style-type: none"> • Youth Corps • Public Education e.g. website, brochures, school programmes • Facilitation of Sustainable Livelihoods
	Recreation & Tourism	Develop and disseminate detailed guidelines for recreation and tourism development in key areas
	Cultural Heritage	<ul style="list-style-type: none"> • Promote “shrimp friendly” livelihoods to reduce pollution • Facilitation of Sustainable Livelihoods
	Enforcement & Compliance	<ul style="list-style-type: none"> • Clearly identify and mark the boundaries of government lands – Stop

GOALS	PROGRAMMES	STRATEGIES
		encroachment
	Conservation	<ul style="list-style-type: none"> • Restoration (including control of invasives):- <ul style="list-style-type: none"> ○ Swamp Forests ○ Herbaceous Wetlands • Cleaning Rivers & Streams • Reduce use of Agricultural Chemicals
	Research, Monitoring & Evaluation	<ul style="list-style-type: none"> • Promote and facilitate the conduct of research to better understand ecosystems for conservation • Monitor ecosystems
2. Wildlife Conservation	Public Education and Outreach	<ul style="list-style-type: none"> • Youth Corps • Public Education about wildlife
	Enforcement & Compliance	Enforce species protection laws
	Conservation	<ul style="list-style-type: none"> • Restoration of habitat • Develop & Implement Conservation Plans
	Research, Monitoring & Evaluation	Promote and facilitate the conduct of research to better understand ecosystems and habitats
3. Cultural Heritage Preservation	Public Education and Outreach	Facilitate sustainable livelihoods based on cultural heritage
	Recreation and Tourism	Support cultural heritage tourism
	Cultural Heritage	Promote and support cultural heritage and related sustainable income generation
4. Sustainable Development	Public Education and Outreach	Facilitation of Sustainable Livelihoods through Training, Business Incubator, Festivals & Youth Corps and other Programmes Raising awareness, understanding and knowledge of local community members
	Conservation	Manage fisheries sustainably
	Recreation & Tourism	Facilitation of new and improved recreation and tourism offerings
	Cultural Heritage	Facilitation of cultural heritage business ventures

Each of the following sections describes one of the management programmes. A brief analysis of the constraints and opportunities affecting the area and a statement of the principal threats to its conservation, management and maintenance, are provided. This

analysis guides the management strategies and actions described as an action plan in table format for each management programme. For each strategy, the responsible agencies and/or organisations are provided but it is acknowledged that the NEPA has ultimate responsibility as the agency through which the protected area will be designated. It may be that NEPA may delegate components of this responsibility to other agents however NEPA will be responsible for supervision of the delegated agent.

The action plans include the priority levels (1 – 3) with 1 indicating the highest priority and a timeframe indicating the years within which the activities should be implemented. Key resources required for implementing the action plan are listed in order to guide the budget, but this does not include basic resources e.g. stationery. Monitoring of the management programmes is described in terms of the outputs that should be delivered.

6.3.1 Biodiversity Conservation

The biodiversity of the Black River Protected Landscape is under immediate threat from conversion to agriculture and the negative impacts from environmentally unsustainable agricultural practices. The Upper Morass and YS Corridor components have long been converted to agriculture but are included in the PA because of the important hydrological connections between these areas and the Lower Morass. In addition, despite the decrease in native plant diversity in the Upper Morass there are still large numbers of a variety of animal species. The Conservation Programme aims to address and reduce the threats in order meet the conservation goals for each identified conservation target for the Protected Landscape.

6.3.1.1. Identification/Analysis of Conservation Targets and Threats

The Conservation Targets selected for the Black River Protected Landscape (BRPL) are based on those presented as national conservation targets in the National Ecological Gap Assessment Report (Ecological Working Group, 2009). A Black River Management Planning workshop held with academics and technical experts in December, 2015 examined these and identified those of particular relevance to the proposed Black River Protected Landscape. Further, the Carrying Capacity Report for the Black River and its Tributaries

(ESL, 2016) provided significant information and suggestions for monitoring that are relevant not only as it relates to use of the rivers for boating but more generally to the conservation status of the area.

Table 4 initiates the identification and analysis of threats by presenting the selected Conservation Targets along with a brief description of their conservation significance, the goals and threats impacting them. The Conservation Targets were selected during a planning workshop involving technical experts from the NEPA, UWI and Institute of Jamaica/Natural History Museum of Jamaica and were based on those identified in the NEGAR.

The BRPL (Morass and associated coastal and marine areas) have been degraded through alterations to the Upper Morass in 1960s (UWI, 2015) and increasing levels of farming in the Lower Morass.

The main threats and/or stresses (active threats) to the BRPL and the various conservation targets identified within it have been identified and are listed and then described in detail below:-

- blockage of rivers and streams
 - farming and associated impacts:-
 - clearing of swamp forest
 - conversion of herbaceous wetlands to agricultural crops including marijuana
 - overuse of agricultural chemicals – fertilisers, herbicides, pesticides
- fires (mostly for farming but also fishing)
- declining populations of native shrimp and fish
- invasive species
- garbage
- sewage pollution
- cleaning agents used on boats in the harbour
- clearing and potential clearing of mangroves
- wildlife harvesting e.g. crocodiles and turtles
- uncontrolled boating on the rivers
- climate change.

Table 4. Conservation Targets, their Status and Threats

Conservation Targets	Description	Conservation Significance & Status	Threats with their Sources & Causes
Freshwater (FW) herbaceous wetlands - located mainly within the Conservation and Multiple use Zones	Dominate the Lower Morass and pockets remain in the Upper Morass. It is dominated by sedges and grasses.	Largest FW wetland in Jamaica and island's first Ramsar Site. Peat with greatest thickness has highest diversity e.g. around Frenchmans. Areas have been and continue to be converted to agriculture	Conversion to agriculture including use of fire for clearing, particularly for illegal and lucrative marijuana cultivation
Rivers, Streams and Estuary - mainly in Multiple Use Zones	Black River and tributaries and estuary, Broad, Salt Spring Rivers and tributaries YS River Corridor	Black River is the largest river in Jamaica and one of longest. The waterways are critical to the ecology of the Morass.	Blockage of waterways by alien invasive plant species which are overgrowing due to high nutrient loads from agriculture.
Ponds (freshwater and saline) - located in Conservation Zones	Wallywash Pond (between the communities of Ponside and Hilltop). Salt Pond, Parrottee is close to the coast and hyper-saline – its size changes with rainfall. There are several other ponds throughout the area.	Wallywash Pond is the largest FW body in Jamaica It appears to be in good condition. Salt Pond appears to be drying up likely due to climate change induced droughts in recent years. A number of local ponds have dried up.	Drying up of Ponds – the blockage of rivers and streams higher up in the Morass is reducing the amount of water reaching the springs that feed the Ponds. Reduction of fish in the Salt Pond maybe due to drought.
Mangroves - located mainly in the Conservation and Multiple Use Zones	Mangroves dominate the estuary of the Black River and are dotted throughout sections of the Morass particularly the Parrottee area. There is a large stretch of mangrove forest (600 meters) adjacent to the Galleon Fish Sanctuary	Mangrove forests are particularly important along coasts and rivers to protect the land behind from storm surges and flooding. They are also critical wildlife habitats especially for fish. Mangroves are currently stable in condition.	Some cutting of mangroves for a variety of uses. The potential clearing of mangrove forest adjacent to the Fish Sanctuary particularly in Malcolms' Bay is a major concern.
Swamp Forest - located in Conservation and Multiple	Lower Morass	Last remaining Amazonian type peat swamp forests possibly in the Caribbean are in	Burning and Cutting of trees to clear land for agriculture and cutting for wood and other

Conservation Targets	Description	Conservation Significance & Status	Threats with their Sources & Causes
Use Zones		the Lower Morass but the area has been significantly reduced and the forest occurs now only in small pockets	reasons. Overgrowth of invasive alien plant species.
Beaches including Sea Turtles and Shore-birds	The beaches along Parrottee Bay from the Black River Bridge east to Parrottee Point and the beaches adjacent to the Galleon Fish Sanctuary particularly Malcolm's Bay.	Beaches are a dynamic natural feature providing habitat for many species including over-wintering shore-birds and nesting sea-turtles.	Threat of inappropriate and over-development of beaches and areas adjacent e.g. landscaping and raking of beaches, large concrete areas close to high water mark. Sea turtles are threatened by killing for the exotic meat trade and their eggs.
Crocodiles	Crocodiles are found in the Lower Morass particularly in the Black River estuary and the Parrottee area as well as the Wallywash Pond.	Crocodiles are listed as Vulnerable by the IUCN Red List. They play an important role in the wetland ecosystem as predators.	Killing for exotic meat trade and out of fear – as human settlements encroach further into the Morass.
Native Shrimp and Fish	Native shrimp of several species are found throughout the Upper and Lower Morass	These shrimp are typical of the area and have become an important cultural phenomenon and are integral to the cultural heritage of the area.	Blockage of rivers and streams is reducing flow and along with pollution these are impacting populations. The invasive crayfish is increasingly common. Possible over-fishing of native shrimp and fish.
Wetland Birds including the West Indian Whistling Duck (WIWD)	Large numbers of native and migratory species are found throughout the Morass and the coastline.	The Lower Morass is a wetland of international importance especially for birds (a Ramsar Site). Migratory shore-birds spend their winter on the coast and the Salt Pond is significant for them. The WIWD is a resident of the Morass.	Habitat destruction and degradation through agriculture including fires. Inappropriate boating activities which can scare the birds and damage the river banks where many nest.
West Indian	This endangered	The Manatee can be	Poaching

Conservation Targets	Description	Conservation Significance & Status	Threats with their Sources & Causes
Manatee	mammal is found in the shallow coastal marine areas and in the brackish rivers (Black and Salt Spring)	considered a sign of healthy waters. Its status is unknown but believed to be on the decline.	Accidental injury from boat propellers
Marine Areas - there are sections in all three zones	Seagrass beds and coral reefs in Parrottee	The health of these habitats is critical for biodiversity, the beaches and fishing industry	Nutrient overload from agriculture which is threatened with loss of the Morass and the mangroves in particular. Potential for nutrient overload from sewage if Parrottee tourism development expands without careful control. Use of seine nets is destroying benthic habitat and fish population.

Blockage of Rivers and Streams

The blockage of waterways (making the smaller tributaries impassable even for shrimp fishers in dug-out canoes) with plants, particularly invasive species such as Water Hyacinth (locally known as “lilies”), silt and garbage have been identified as a current stress having a negative impact on both people and wildlife. Impacts include:-

- flooding of human settlements and farms,
- drying out of the Morass and some springs running dry,
- stagnation of water which results in mosquito infestations (which are of particular concern with the increasing prevalence of serious diseases spread by mosquitoes),
- preventing shrimp fishers from accessing streams and
- possible negative impact on native shrimp populations.

The sources of this stress were identified as follows:-

1. Eutrophication - from over-use of fertilisers and possibly sewage, laundry and fish farm pollution, which is resulting in the overgrowth of plants especially invasive species which

block the rivers especially the smaller tributaries shrimp-fishers use (McLaren, 2015). Dunder was identified by many people as a source of eutrophication however Wray and Nephew Ltd. noted that since 2015, dunder has been transported to Caymanas because of this concern and updates to the NRCA Permits and Licences Regulations. Farms in the Upper and Lower Morass use fertilisers which easily leach into the ecosystem. According to ESL, 2016, 60% of farmers interviewed said that they use fertilisers regularly and 40% as necessary (as it is expensive and leaches into the Morass during heavy rainfall). The reality is that due to the peat composition, Morass soils are highly permeable and therefore leaching is constant particularly in the Lower Morass. Further, the invasive plants e.g. water hyacinth and wild ginger are out-competing the native plants e.g. water lilies (locally known as “pancakes”) and water thyme which are believed by local fishers to be favoured by the native shrimps.

2. Siltation from the Upper Morass due to the flood control infrastructure which prevents the river from flowing through the Upper Morass and depositing silt there, deforestation throughout the area and inadequate soil conservation measures (UWI, 2015). Silt has also had a negative impact on the beach at Black River – the sediment is no longer sandy but silty and mushy underfoot which is not appealing to swimmers (pers. comm. L.Linton, 2016);
3. Garbage from the communities throughout the area – due to inadequate collection (inadequate number of working garbage trucks for the parish to allow for regular collection within the area; inadequate skips and other strategically placed containers in communities) and inappropriate disposal of waste especially plastics;
4. Severely Limited Cleaning of the Rivers and Streams by the National Irrigation Commission (NIC) – this used to be done as often as twice a year for all waterways in the Upper and Lower Morass. Over the last ten or more years however, the number of waterways cleaned by the NIC has dramatically decreased with some tributaries not cleaned in as many years. This is due to the high cost of river cleaning (estimated JA\$44 million/annum, NIC undated) and the lack of budgetary provision to the NIC for this purpose. River cleaning is paid for from a drainage fee of \$47/acre/year to be paid by agricultural users within the Morass however many small farmers do not pay and in any event the rate is too low to even make a significant contribution to the costs. In addition

there are other non-agricultural users who are beneficiaries of the cleaning of the river but who are not required to pay (NIC, undated). Due to the nature of the complex web of waterways in the Upper and Lower Morass and made worse by the eutrophication of the water, cleaning of the rivers in the Morass is essential for biodiversity and ecosystem conservation.

5. Stagnation of water in tributaries of the river (from the over-growth of plants due to eutrophication, siltation from deforestation and inadequate soil conservation measures). In addition, logs are sometimes used by shrimp-fishers to prevent larger boats from accessing tributaries or trees may have fallen due to logging or fires (Prospere et al., 2016 pending). Native shrimp are sensitive to oxygen and nutrient levels in the water and are likely to be killed from both stagnation and eutrophication which would negatively impact water quality. On the other hand, the invasive crayfish is not as sensitive to low water quality and can travel short distances over land to find larger bodies of water.

Farming

Farming in the Black River Morass is not only practiced in the drier areas but particularly in the wet areas, where irrigation (requiring tools and significant investment) is not required. With the increasing number of farmers (particularly of marijuana in the Morass since the 1990s) the leaching of the chemicals used is significant, particularly in periods of drought and lower flow. Herbicides are used to clear the land of the original vegetation (as the traditional method of cutting with machetes is considered too labour intensive and slow). A variety of pesticides to control insects and even rats as well as fungicides are used on the crops in addition to fertilisers (ESL, 2016 and Community Meeting Reports. As the water table is very high and the peat soil very porous, it is almost impossible for chemicals not leach into the water.

Farmers cut down trees including in the swamp forest to clear land to increase their acreage and increasingly use fires to clear the land (Prospere et al., pending publication). Trees are cut for wood and construction, making charcoal and mangroves are cut for making fish pots. The cutting down of trees and cutting of mangroves together was the most commonly listed

poor environmental practice stated by community respondents in the KAP Survey (SDC, 2011).

Livestock farmers often allow their animals to roam free much to the vexation of vegetable farmers whose crops the livestock damage by trampling and/or eating. Further, the hooves of the animals particularly the heavier ones like cows, compact soil causing it to become easily waterlogged and also increasing soil erosion particularly on river banks.

Currently there are large numbers of farmers, particularly marijuana farmers within the Lower Morass where they can hide their illegal activity. Farming and otherwise using the majority of the lands within the Morass is in itself illegal whether the crop is illegal or not, as the land is owned by the Commissioner of Lands and the farmers do not have leases for the lands they are occupying. It will not be easy to remove these farmers whilst the status of marijuana is illegal and it may even be dangerous to enter some of the farmed areas. Further, the illegal plant is lucrative and even when prices are low (reportedly JA\$200 - \$300/pound) farmers persist with the crop as fluctuations in price are expected and it is allowing many people who have not been able to find a job, to make a living and send their children to school. It may be possible to better manage the lands, if these farmers organise themselves to obtain licences for growing medicinal marijuana. On the other hand, this may simply result in an increase the number of persons farming in the Morass.

It is critical, particularly for the remaining swamp forest to identify a reasonably large area for a Conservation Zone – where no farming at all is conducted. The enforcement of this will only be possible with the involvement of the stakeholders in this decision.

Fires

Fires are not believed to start on their own but the peat, especially when relatively dry due to climate change induced drought and the degradation of the Morass, causes fire to catch and spread easily and rapidly. Fires are started mainly to clear vegetation especially swamp forest and invasive paperbark trees to plant crops (McLaren et al., 2016). According to community members at a Management Planning meeting in Black River, fires are used to a lesser extent

to chase or “herd” fish into an area of the Morass where they are more easily caught. Setting of fires in the Morass was raised as a concern by the Safari Boat Tour operators (ESL, 2016) and setting of fires in forested areas was stated as a concern by community members in the KAP Survey (SDC, 2011) and fires generally, during Management Planning community meetings. In addition to destroying the Morass vegetation by burning, it also results in erosion of the river banks as the dead roots can no longer hold the soil and so pieces break off and float out to sea. In addition the fires are a hazard to wildlife habitat and health especially birds as well as to human habitation and public health.

Declining populations of native freshwater shrimp and fish

During Management Planning community meetings, community members spoke with great concern of declining catch of native shrimp and fish. They believe that this is due to pollution in the water from agricultural chemicals – fertilisers, herbicides and pesticides including rodenticides as well as the blockage of the waterways and the increasing number of invasive species particularly the Australian redclaw crayfish and the Pond cleaning Fish. Another reason suggested for the decline in shrimp and fish was over-fishing including the harvesting of berried shrimp (shrimp with eggs). One shrimp vendor suggested that a more recent cause could be the hydro-electric plant at Maggotty which she thought might reduce the water flow into the Lower Morass (ESL, 2016) however technically, this should not be the case. Studies (Prospere et al., pending publication, Pieskowski et al., 2015) suggest that the native shrimp populations are on the decline although Prospere et al. notes that the maximum sustainable yield (for either the native shrimps or the invasive crayfish) has not been exceeded. Both studies indicate that there is also a seasonal decline in native shrimp particularly during the droughts experienced over the past few years as well as concerns regarding pollution from agricultural chemicals and a need for increased management of the resources. Droughts makes the conditions unsuitable for the native shrimp whereas the invasive crayfish is adapted to low oxygen and drought conditions.

Invasive Alien Species

Several invasive alien species have been introduced into the Black River Morass and are having a negative impact on biodiversity and livelihoods.

Plants

Water Hyacinth and Wild Ginger are the two main plants blocking the waterways and increasing siltation. The Wild Ginger is considered worse as it is turning the waterways to dry land, whereas the Water Hyacinth just floats on top of the water. Further, Prospere et al., pending publication note that Wild Ginger is spreading rapidly and having a negative impact on the swamp forest ecosystems. The Paperbark Tree is spreading rapidly even more so as farmers try to clear it by burning it which causes it to produce more seeds (McLaren et al., 2016 pending). There are other invasive plants present but these are the ones of greatest concern.

Animals

There have been relatively new introductions of fish and shellfish species which are particularly invasive and resulting in great concern locally. The Australian Redclaw Crayfish (Crayfish) found throughout much of the Lower Morass and believed by community members to be contributing to the decline of the native shrimp, possibly by eating the smaller crustaceans. Further, the crayfish are better able to survive poor water quality and drought in comparison to the native shrimp. The Pond Cleaning Fish is said to be increasing in numbers and because of its appearance and leathery like skin is not appealing for consumption. It can survive poor water quality and drought in comparison to native fish. Therefore, even if the invasive animals are not predated on the native shrimp and fish, they are able to outcompete them and if no action is taken may eventually dominate and hence completely change the Black River Morass forever.

Garbage

Garbage disposal in waterways was listed second most often as cutting trees and mangroves, by community members identifying poor environmental practices in the area (SDC, 2011). This problem was also raised at Management Planning community meetings and during informal interviews with community members. It was noted during one community meeting that there had been times when there were less than four garbage trucks working in the parish of St. Elizabeth. It was felt by community members that the problem was both one of

inadequate collection and poor behaviour on the part of citizens. They were concerned not only because the presence of garbage was aesthetically displeasing but also because it encouraged stagnation of water creating a haven for disease-spreading mosquitoes. Garbage and particularly fish waste at the Fish Market in Black River was also raised a serious public health concern.

Sewage pollution

High faecal coliform was found (ESL, 2016) in the rivers near Lacovia and a few other areas associated with larger human populations. The NEPA Draft Black River Watershed Water Quality Status Report for 2015 (NEPA, 2016) notes that faecal coliform levels displayed a general tendency to be above the recreational guideline of 100 MPN/100 ml. However, these occurrences were only around 45% of the samples taken whereas a sample point is deemed unsafe when 70% of the samples collected from that area exceed the recreational guideline.

Other pollution

Chemicals used to clean boats in the Black River Harbour were mentioned as a concern by some community members in Black River however they indicated that there had been some attempt by the authorities to stop the practice.

Clearing and potential clearing of mangroves along the coast

Mangroves are being cleared along the coast primarily for development e.g. along Parrottee Beach and Salt Pond. The mangroves along the coast adjacent to the Galleon Special Fishery Conservation Area (Malcolm's Bay, Dead Man's Hole and Hodges Bay) are currently in excellent condition (Rankine, 2014). They are mainly located behind a barrier beach which is similar to that which had occurred along Parrottee Beach. This type of beach system can become inundated during storm events and varies in width according to the season. Along Parrottee, associated with the removal of the mangroves, coastal erosion has increased leading to the damage and destruction of many beach properties (ESL, 2016). There are several beaches and coastlines around the world which have been lost due to the removal of coastal mangroves e.g. La Fe, Belize.

The Malcolm's Bay beach is at risk from a potential major resort development. The common practice in Jamaica is to remove the mangroves and build as close to the beach as possible. The new Development Order states 30.5 meters from high-water mark as the set-back along gently sloping coastlines however the mangroves adjacent to the Galleon SFCA range in width up to 350 - 600 meters from high-water mark (Rankine, 2014). It would be ideal to retain 100% of the mangroves along Malcolm's and the other Galleon Harbour bays and critical to maintain at least 75% of the mangroves to ensure the survival of the beach and the functioning of the fish sanctuary. This development prospect is also a threat to the coastal mangroves from Parrottee Point to Fort Charles however this threat is not as imminent.

Wildlife harvesting

Community members reported the capture and killing of crocodiles and sea-turtles as well as their eggs as a threat to these animals. Manatees were also reportedly caught. The capture of these animals for their meat and harvesting of the eggs was because of the purported positive effects on male sexual prowess.

Uncontrolled boating on the rivers

Whilst use of the rivers for commercial boating – tourism is regulated in terms of numbers, safety etc. there are still problems associated with both licensed and unlicensed tour operators, namely speeding. This activity occurs particularly on the return leg of the tour because the operators are trying to catch up on time as the package tour operators e.g. Black River Safari/YS Falls are requesting that boat tours should be no longer than one hour (L. Linton, pers. comm.). Further, some operators are hurrying in order to make another tour for the day. Speeding in addition to being unsafe creates a huge wake which scours the vegetation and peat from the river banks negatively impacting nesting birds and causing erosion.

Climate change

Prosperre et al., pending publication indicate that native shrimp biomass is impacted by La Niña, specifically changes in water level which would be affected both by the amount of rainfall and temperature. Climate change with its impact on weather conditions is very likely

to affect the BRPL in terms of storm surges, flooding in times of tropical depressions and drying out of the Morass during droughts.

6.3.1.2. Managing for Ecological Integrity

Managing for ecological integrity will require addressing the hydrological and chemical imbalances in the Morass, as well as the physical changes. The Black River Morass is a complex maze of waterways many of which are very small but which need to be kept clear of silt and plants to allow the flow of the water through the Morass. Without this steady flow, the chemicals build up and sections of the Morass dry out - both having a negative impact. Further if flow through the Morass declines further it will also have a negative impact on groundwater throughout the parish.

In order to conserve (protect and restore) the wildlife and ecosystems in the BRPL and in particular the Lower Morass, the issue of encroachment in the Morass will have to be addressed as this is changing the very nature of the Morass – physically, hydrologically, biologically and chemically.

6.3.1.3. Strategies to Reduce Threats

Table 5 identifies strategies to reduce the threats to the PA values by addressing the root causes of the threats as well as restoration as needed.

Table 5: Strategies to Address Threats to the BRPL Natural Values

Conservation Targets & Goals	Strategies to Reduce Threats
<p>Freshwater (FW) herbaceous wetlands</p> <p>1. Maintain existing areas of native vegetation 2. Stop expansion of agriculture in government owned areas</p>	<ul style="list-style-type: none"> ● Enforcement & Compliance Programme: <ul style="list-style-type: none"> ○ Secure any remaining areas without agricultural activity (UWI satellite imagery analysis) - Conservation Zone ○ Work with farmers to reduce the amount of farming and burning in the Morass ● Conservation Programme: <ul style="list-style-type: none"> ○ Restoration of wetlands
<p>Rivers, Streams and Estuary</p> <p>1. Maintain connections and flow</p>	<ul style="list-style-type: none"> ● Conservation Programme: <ul style="list-style-type: none"> ○ River Cleaning Programme – removal of alien invasive plant species overgrowing waterways

Conservation Targets & Goals	Strategies to Reduce Threats
<p>throughout the Morass</p> <p>2. Reduce pollution especially nitrates and phosphates</p>	<ul style="list-style-type: none"> ● Public Education & Outreach Programme <ul style="list-style-type: none"> ○ Sustainable Agriculture Public Education & Training
<p>Ponds (freshwater and saline)</p> <p>Maintain size and ecological health (including water quality) in Wallywash Pond, Salt Pond and ponds throughout the BRPL</p>	<ul style="list-style-type: none"> ● Conservation Programme: <ul style="list-style-type: none"> ○ River Cleaning Programme – removal of alien invasive plant species overgrowing waterways ● Research, Monitoring & Evaluation Programme: <ul style="list-style-type: none"> ○ Research, studies and monitoring on the Wallywash, Salt and other ponds in the BRPL
<p>Mangroves</p> <p>Maintain all mangrove forests especially those along the Black River, adjacent to the Galleon Fish Sanctuary and Thatchfield</p>	<ul style="list-style-type: none"> ● Enforcement & Compliance Programme: <ul style="list-style-type: none"> ● Secure Conservation Zone for Mangroves ● Recreation & Tourism Programme: <ul style="list-style-type: none"> ○ Work with landowners to integrate mangroves into development
<p>Swamp Forest</p> <p>Maintain and restore existing swamp forests</p>	<ul style="list-style-type: none"> ● Enforcement & Compliance Programme: <ul style="list-style-type: none"> ● Enforce no cutting of trees within the Morass in particular Swamp Forest ● Secure areas with no farms for Morass Conservation Zone <ul style="list-style-type: none"> ○ Work with farmers to reduce the amount of farming in the Morass ● Public Education and Outreach Programme: <ul style="list-style-type: none"> ○ Raise awareness about the unique nature of the swamp forests
<p>Beaches including Sea Turtles and Shore-birds</p> <p>1. Maintain wide beaches</p> <p>2. Maintain turtle & shorebird populations</p>	<ul style="list-style-type: none"> ● Enforcement & Compliance Programme: <ul style="list-style-type: none"> ○ Enforce species protection legislation ● Public Education & Outreach Programme: <ul style="list-style-type: none"> ○ Raise public awareness and knowledge ● Recreation & Tourism Programme: <ul style="list-style-type: none"> ○ Work with landowners to manage beaches to promote sea-turtle nesting and reduce beach erosion
<p>Crocodiles</p> <p>Maintain populations</p>	<ul style="list-style-type: none"> ● Enforcement & Compliance Programme: <ul style="list-style-type: none"> ○ Enforce species protection legislation ○ Enforce no further expansion of communities within the Morass
<p>Native Shrimp and Fish</p> <p>Maintain and if possible increase populations</p>	<ul style="list-style-type: none"> ● Conservation Programme: <ul style="list-style-type: none"> ○ River Cleaning Programme – removal of alien invasive plant species overgrowing waterways ○ Shrimp Conservation Plan ● Public Education & Outreach Programme <ul style="list-style-type: none"> ○ Sustainable Agriculture Public Education & Training

Conservation Targets & Goals	Strategies to Reduce Threats
<p>Wetland Birds including the West Indian Whistling Duck (WIWD)</p> <p>Maintain bird populations with a focus on shorebirds and the WIWD</p>	<ul style="list-style-type: none"> • Cultural Heritage Programme • Enforcement & Compliance Programme: <ul style="list-style-type: none"> ○ Secure any remaining areas without agricultural activity (UWI satellite imagery analysis) - Conservation Zone ○ Work with farmers to reduce the amount of farming in the Morass ○ Control speed of boating along the rivers • Public Education & Outreach Programme: <ul style="list-style-type: none"> ○ Raise public awareness and knowledge
<p>Manatees</p> <p>Maintain and if possible increase populations</p>	<ul style="list-style-type: none"> • Enforcement & Compliance Programme: <ul style="list-style-type: none"> ○ Enforce species protection legislation • Public Education & Outreach Programme: <ul style="list-style-type: none"> ○ Raise public awareness and knowledge
<p>Marine Areas</p> <p>Maintain existing habitats in healthy condition</p>	<ul style="list-style-type: none"> • Conservation Programme <ul style="list-style-type: none"> ○ Work to develop and establish conservation plans, zoning and ban of seine fishing • Public Education & Outreach Programme <ul style="list-style-type: none"> ○ Sustainable Agriculture Public Education & Training • Recreation & Tourism Programme: <ul style="list-style-type: none"> ○ Work with landowners and marine interests for environmentally sustainable use of marine areas

6.3.1.4. Management Actions

The management actions for the proposed strategies listed above are detailed in Table 6.

Table 6. Management Actions for Conservation Programme Strategies

Actions	Responsibility/ Collaborators Priority/Timeframe	Resources	Monitoring
Strategy 1: Restore Swamp Forests Objective: To establish a successful nursery and pilot plots including documentation of protocols for swamp forest restoration within 4 years.			Outcome: Satellite imagery analysis shows increased swamp forest
Work with the Botany Dept. of the UWI to plan and implement a pilot project. Seek funds and implement over a 3 year period and then review and expand on implementation based on lessons learned. Seek assistance from the Forestry Dept.	NEPA UWI Priority 1: Start by Year 2	Funds for Pilot Research Project (post-doctoral researcher, local labour, transportation etc.) JAS\$5,500,000/yr Nursery: JA\$1,000,000 Nursery worker: JAS\$600,000/yr	Outputs: Liaise with UWI to monitor swamp forest area and pilot restoration plots – successful growth of seedlings and trees
Strategy 2: Restore herbaceous wetland vegetation along river banks to provide buffers from agriculture Objective: To restore native herbaceous vegetation along river banks in targeted areas within 3 years			
Work with the Botany Dept. of the UWI to plan and implement a pilot project. Seek funds and implement over a 3 year period and then review and expand on implementation based on lessons learned. Liaise with local farmers, RADA and NIC. Include the control of wild ginger.	NEPA UWI RADA, NIC Priority 2: Start by Year 3	Funds for Pilot Research Project (post-graduate student etc.) - use same researcher, nursery and nursery worker as for Swamp Forest	Outputs: Liaise with UWI to monitor buffer herbaceous vegetation and pilot restoration plots: successful growth of seedlings and plants
Sub-Total Cost (Strategies 1 and 2): Personnel: Conservation Officer and Youth Corps (see detailed budgets); Project Costs: \$6,100,000/year; Capital: \$1,000,000			

Actions	Responsibility/ Collaborators Priority/Timeframe	Resources	Monitoring
Strategy 3: Restore rivers and streams Objective 1: To conduct cleaning of priority rivers and streams and develop plan to support ongoing cleaning of rivers and streams including use of the plant material for bio-gas or other product to help sustain the programme			Outcome: River and tributary connectivity restored as shown by physical checks
Work with the NIC to clean rivers and streams:- (a) ID priority rivers and streams (for shrimp fishers & allowing water to ponds (Wallywash) and customers - See Public Education & Outreach Programme (b) Implement a combination of relatively low cost priority water channels and test the use of the vegetable material e.g. biogas and organic fertiliser to help generate income to increase financial sustainability of river cleaning and reduce return of invasive species to river that occurs when they are left on the river banks. (c) Re-establish regular, river cleaning of the Lower and Upper Morass water channels – working with NIC and/or other partnership approaches.	NEPA & NIC Priority 1: Start by Year 1 Priority 1: Start by Year 1 Priority 2: Start by Year 2	Funds (- See Public Education & Outreach Programme Funds - \$5M Funds: \$20M/year	Outputs:- Reports & Plans Report on Cleaned Rivers and Employment Plan and Reports
Sub-Total Cost (Strategy 3): \$25million/year			
Objective 2: To reduce the level of nutrients particularly nitrates and phosphates in the Black River and tributaries through Public Education and Outreach Programme – Sustainable Agriculture Awareness-raising and Training			
Strategy 4: Work with Fishers to prepare a Conservation Plan for Native Shrimp and Fish Objective: To prepare a Conservation Plan for Native Shrimp and Fish			Outcome: Shrimp population maintained or improved (counts)
a) Work with fishers to agree on detailed plans for managing the native shrimp and fish resources e.g. limiting fishers, not taking berried	NEPA Fisheries Division Conservation Officer	Time of personnel	Output: Plan and Reports

Actions	Responsibility/ Collaborators Priority/Timeframe	Resources	Monitoring
(gravid) shrimp, catch monitoring, closed season (b) Work with vendors and others through the Cultural Heritage Programme to develop the market for the invasive crayfish so that fishers can include these more profitably	Priority 1: Start by Year 2		
Strategy 5: Protect and maintain existing Crocodile, Manatee and wetland birds populations Objective: To develop and implement Conservation Plan for these animals in the BRPL inclusive monitoring			Outcome: Stable populations as reported from monitoring.
Work with NEPA to develop and implement a Conservation Plan and investigate issues of crocodile farming and hunting of manatees and wetland birds	NEPA Conservation Officer Priority 1: Improve existing programmes	Time of personnel	Output: Plan and Reports
Strategy 6: Protect and maintain the coastal and marine ecosystems and associated species Objective: To develop and implement a Conservation Plan for key areas in the BRPL (Malcolm's Bay and Thatchfield)			
Work with NEPA to develop and implement a Conservation Plan and institute regular monitoring visits. Consider establishing a Special Fishery Conservation Area working with the Fisheries Division.	NEPA Conservation Officer Priority 2: By Year 3	Time of personnel	Output: Plan and Reports
Strategy 7: Protect Sea-turtles by establishing a Turtle Watch Programme on the beaches Objective: To develop and implement a Conservation Plan for Sea-turtles			
(a) Work with NEPA and use examples from other countries to establish a community-based Turtle Watch Programme on Parrottee and other beaches to record and monitor sea-turtles. (b) Use this information for a Conservation Programme inclusive tourism opportunities	NEPA Conservation Officer Youth Corps Priority 1: Improve existing programme	Time of personnel	Output: Plans and Reports
TOTAL: Personnel: Conservation Officer and Youth Corps (see detailed budget below); Programme Costs: \$31,100,000; Capital Costs: \$1,000,000.			

6.3.2 Cultural Heritage Preservation

The focus for this Management Plan is on the Protected Landscape which does not include the Black River Heritage District but goes around it. However the preservation of the built cultural heritage in Black River and its potential for tourism and therefore employment addresses one of the root causes of the stresses and threats on the natural heritage of the area. With this in mind, whilst the strategies and management actions will not focus directly on the built heritage of the town of Black River opportunities for collaboration on recreation and tourism ventures should be seized.

As described earlier, Black River and Middle Quarters in particular are known for pepper shrimps and the shrimp fishers in their dug-out canoes with special shrimp baskets. Roof thatching, basket weaving and the making of mats and other items from plant materials found in the morass are also typical of the area. Therefore, the emphasis for the preservation of cultural heritage will be on the BRPL “Shrimp Country” heritage. Bearing in mind the link between Taino and West African heritage and current practices, efforts should be made to support the conduct of archaeological work and research to better understand and promote the heritage.

6.3.2.1 Identification/Analysis of Conservation Targets and Threats

Native freshwater shrimp are one of the BRPL conservation targets and dovetail with the cultural component. The main threat to the Black River Protected Landscape losing its “Shrimp Country” status is the decline of the native shrimp industry due to the possible decline in the population and catch of native shrimp which may be caused by the factors listed in section 6.3.1.

Shrimp fishers say they cannot access the channels where they normally catch native shrimp and that they believe the invasive crayfish is eating the native shrimp and further that over-use of agricultural chemicals is poisoning the shrimp. Vendors say they sometimes have to buy shrimp from the supermarket (usually imported) in order to ensure that they have supplies of pepper shrimps to sell, however this is expensive and reduces their profits. The vendors also say that the invasive crayfish does not taste good – certainly its hard shell and large size make it inappropriate for the traditional pepper shrimps dish. Despite this, the

vendors sell especially the smaller sized crayfish but this may have a negative impact on sales as buyers may feel cheated. If the native shrimp population declines significantly then so will the associated cultural heritage of making dug-out canoes and shrimp baskets. Community members said that these are still being made and that both old and young people are involved.

Locally made baskets mats and brooms are not seen for sale as much as in earlier days because of the higher price in comparison to imported items from synthetic materials. Further, styles have changed and some of the designs of baskets and even bags may no longer be considered fashionable. There is a danger therefore that these traditional skills may be lost however community members indicated that several people of different ages can and still do basket weaving and the production of other items on an as needed basis.

Thatch, in particular Long Thatch is harvested for sale as roofing material and although community members say that this (and other Palms) are not on the decline, the literature indicates otherwise. Community members say cutting the leaves makes them spring more leaves faster, however it is important for cultural heritage preservation not to lose these trees.

The conservation targets of the BRPL Cultural Heritage and associated threats are:-

- Native Shrimp (and fish) - decline of the population and catch,
- Morass (herbaceous wetlands and swamp forest) - decline of vegetation used for thatching and craft and
- loss of associated skills.

6.3.2.2 Strategies to Reduce Threats

Strategies to reduce the threats to the BRPL “Shrimp Country” heritage will be implemented under the following programmes:-

Table 7: Strategies to Address Threats to the BRPL Cultural Values

Conservation Targets & Goals	Strategies to Reduce Threats
Native Shrimp (and Fish)	Conservation Programme Enforcement & Compliance Programme Public Education and Outreach Recreation and Tourism Cultural Heritage Preservation

Conservation Targets & Goals	Strategies to Reduce Threats
Morass (Herbaceous Wetlands and Swamp Forest)	As above
Skills/Livelihoods (e.g. shrimping, boating, thatching, basket/mat-making)	Public Education and Outreach Recreation and Tourism Cultural Heritage Preservation

Only those strategies related directly to the Cultural Heritage Preservation Programme are described below.

6.3.2.3 Management Actions - Cultural Heritage Preservation

Table 8. Management Actions for Cultural Heritage Preservation Programme Strategies

Actions	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
Strategy 1: Use an annual festival and associated competitions to promote and support “BRPL Shrimp Country” heritage Objective: To organise and host an annual festival to promote retention of traditions			Outcome: Increased products for sale/being sold
1. Culinary Competition:- (i) Best Pepper Shrimps (ii) Best new Shrimp Dish (iii) Best Crayfish Dish (iv) Best Fish Dish (with incentive prize for use of the pond cleaner fish) 2. Craft making Competition:- (i) Fastest Shrimp Basket maker (ii) Best Basket (iii) Best Mat (iv) Most stylish woven product (v) Most innovative basket or woven product 3. Dug-out Canoe carving demonstration – and use of the canoes in different ways e.g. benches. 4. Other competitions and activities for different age groups as suggested by community members and Committees. 5. BRPL & Other Exhibits	Public Education & Outreach Officer SDC, RADA, TPDCo Priority 1: From Year 2 on	Time of PEO Programme Officer and Youth Corps Main and community events – stage, sound system, tents, prizes etc.: \$3M	Output: Event held Festival Report – narrative and financial

Actions	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
Strategy 2: Offer lessons in basket weaving and mat making as an activity for visitors Objective: To facilitate the offering of craft lessons as a recreational activity – part of a tour.			Outcome: new products for sale
Make this a project for the Youth Corps to help skilled community members to develop – identify a small item e.g. mini-basket and coasters for visitors to learn to make, test the process by teaching someone and timing and costing it. Then design the product and promote it e.g. at Middle Quarters and other locations. Pilot the programme at the first festival. Each community should have its own distinctive craft item to be made by a visitor.	Public Education & Outreach Officer JBDC Priority 1: Year 2	Youth Corps Skilled artisans Technical assistance e.g. from JBDC to cost and package the plan	Output: Report
Strategy 3: Support Festival competition winners to bring their products to the market Objective: To facilitate the development of business ventures and new products based on the competition winners			Outcome: New products for sale
Seek assistance from JBDC and other appropriate entities to help competition winners to take their products to the next level – whether training others to make it or to establish their own businesses.	Public Education & Outreach Officer JBDC Priority 2: Year 3	Public Education & Outreach Officer	Report
Strategy 4: Support archaeological and historical studies on Taino and West African heritage Objective: To facilitate increased knowledge about the Taino and West African heritage related to the shrimp industry			Outcome: More knowledge on this heritage in BRPL
Seek assistance from the JNHT and the UWI History and Heritage Studies Department to conduct archaeological research, historical and heritage studies and raise public awareness through meetings, brochures and exhibits e.g. at the Cultural Festival	Public Education & Outreach JNHT, UWI Priority 2: Year 4	Public Education & Outreach Officer Youth Corps	Report
TOTAL COSTS: Personnel: Public Education & Outreach Officer and Youth Corps; Programme Costs: \$3,000,000.			

6.3.3. Recreation and Tourism

Currently the main recreation and tourism activity is boating however there are many opportunities that can be taken advantage of, to the benefit of local communities. In addition there are several accommodations but many are in poor condition and their design and operations are not environmentally sustainable. There is the potential for further inappropriate tourism development – particularly accommodations but also attractions, which are likely to destroy existing ecosystems and the PA values and threaten wildlife.

Another threat posed by unplanned and inappropriate recreation and tourism and also housing development particularly on beaches, is the reduction of unrestricted views of the sea and restriction of public access to beaches. This is not in keeping with the current situation nor the vision for the BRPL. Unrestricted views of the sea enhance the aesthetic appeal of a coastal and marine area and help enhance the connectivity. Further, when local community access to beaches is restricted it results in conflicts and increases the potential for visitor harassment.

The River Boating Carrying Capacity Report (ESL, 2016) indicated that the carrying capacity for boating did not seem to be surpassed based on ecological, hydrological or socio-economic assessments. However it was noted that there was a need for improved management of both the boating activities and the ecosystems including river cleaning, ecosystem restoration, increased water quality monitoring and zoning. In terms of boating controls the report recommended training to improve the technical skills of the policing officers and increasing the number of patrols and enforcement action. The main concerns regarding boating are:-

- Speeding on the rivers – the wake erodes the river banks and disturbs nesting birds
- Pollution (hydrocarbons, litter etc.) from the boats and visitors
- Possible increase in the number of boaters and the expansion of the activity (especially motorised boating) into additional rivers and tributaries

There are now four formal “safari tour” operators on the Black/Broad Rivers, however, there are a large though unknown number of informal/unlicensed operators. Whilst the carrying capacity may not have been surpassed as yet care must be taken to avoid such a situation (ESL, 2016).

6.3.3.1. Identification of Recreation and Tourism Targets

- Boating Guidelines and Legislation including Carrying Capacity on rivers
- Registration and Licencing of all Operators and limiting of the number of Operators
- Development and Dissemination of Accommodation Development and Operations Guidelines
- Plan for Recreation and Tourism Development for each of the 6 targetted communities
- Plan for Public Access to Beaches

6.3.3.2. Visitor Management Strategies

- Detailed Recreation and Tourism Development Plans to guide infrastructural and other development
- Establish agreed guidelines for boating – operators and visitors
- Establish legislation for boating – operators and visitors.

6.3.3.3. Management Action

Table 9. Management Actions for Recreation & Tourism Programme Strategies

Actions	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
<p>Strategy 1: Facilitate appropriate development of recreation and tourism for the area through detailed planning for the area and specific sites and community sensitisation (Objectives 1, 2 and 3 should be implemented simultaneously) Objective 1: To prepare a cohesive and detailed Sustainable Tourism Development Plan ensuring that each community has a different focus.</p>			<p>Outcome: Increased number of sustainable recreation & tourism ventures</p>
<p>1. Develop a Terms of Reference and seek funding for a Consultancy to prepare the Plan using international best practice guidelines and a participatory approach within the communities and area. The Plan should include an over-arching approach to the sustainable development of Recreation and Tourism in the BRPL and should include a chapter on each of the 6 communities within the Black River DAC. The Plan should provide a theme and related activities for each community so that each one has a distinctive brand and activities within the context of the wider BRPL.</p> <p>2. Prepare and Disseminate the Plan to stakeholders – for Parrottee the over-arching Plan will include a summary referencing the detailed Plan for Parrottee.</p>	<p>NEPA BRPL R&T Prog. Officer Key roles: Parish Council, Ministry of Tourism and its agencies, JHTA Chamber of Commerce Stakeholders: Businesses Land owners Priority 1: Start by Year 1</p> <p>Priority 1: By end of Year 2</p>	<p>Time of BRPL Manager (could possibly be done by the NEPA PA Branch Officer with responsibility for the area)</p> <p>Programme Officer: Consultancy: \$2.6M</p> <p>Dissemination: \$100,000 (not including Parrottee)</p>	<p>Outputs:</p> <p>Terms of Reference by Quarter 2, Year 1</p> <p>Project Proposal by Quarter 3, Year 1</p> <p>Funding by Quarter 1 Year 2</p> <p>Plan by end Year 2</p>
<p>Objective 2: To prepare a detailed plan for Sustainable Recreation and Tourism in Parrottee Beach & Salt Pond area inclusive architectural concepts for cohesive design, environmentally appropriate engineering to address flooding and protect all ecosystems</p>			<p>Outcome: Reduced threat to Parrottee ecosystems</p>
<p>1. Develop a Terms of Reference and seek</p>	<p>NEPA – BRPL</p>	<p>Time of BRPL Manager</p>	<p>Outputs:</p>

Actions	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
<p>funding for a Consultancy to prepare the Plan using international best practice guidelines and a participatory approach within the communities and area. The Plan should include architectural concepts and engineering designs – drawings and descriptions that provide examples of aesthetically and environmentally appropriate buildings for the area – bearing in mind flooding and the need to maintain hydrological connections between the Morass, Salt Pond, Mangroves, Beach and other coastal and marine ecosystems. It should include sustainable beach management.</p> <p>2. Prepare and Disseminate the Plan to stakeholders</p>	<p>Manager Key roles: Parish Council, Ministry of Tourism and its agencies, JHTA Chamber of Commerce Stakeholders: Businesses Land owners Priority 1: Year 1 Priority 1: By end of Year 2</p>	<p>(could possibly be done by the NEPA PA Branch Officer with responsibility for the area)</p> <p>Consultancy: \$2.2M Dissemination: \$100,000</p>	<p>Terms of Reference by Quarter 2, Year 1 Project Proposal by Quarter 3, Year 1 Funding by Quarter 1 Year 2 Plan by end of Year 2</p>
<p>Objective 3: To sensitise local community to sustainable tourism concepts and practices through involvement in planning and dissemination of the Final Plan(s)</p>			
<p>1. Involve the local communities in the planning e.g. showing consultant(s) around the communities and participating in meetings 2. Conduct a series of workshops for the dissemination of the Final Plan(s).</p>	<p>NEPA BRPL PEO Officer</p>	<p>The costs are included under Objectives 1 and 2</p>	<p>Outputs: Report</p>
<p>Sub-Total (Strategy 1): Personnel: Public Education Officer; Project Costs: \$5 million</p>			
<p>Strategy 2: Establish a comprehensive plan for the control of boating on the rivers using the ESL Carrying Capacity study and existing legislation as the basis Objective: To prepare and implement a Plan for Control of Boating in the BRPL</p>			<p>Outcome: Functional boat control system</p>
<p>1. Fine-tune the Carrying Capacity recommendations – pull the guidelines for dissemination and enforcement and use to develop new regulations as needed.</p>	<p>NEPA RRA, TPDCo Marine Police Priority 1: Start Year</p>	<p>Marine Police – Boat, fuel and officers</p>	<p>Outputs: Regulations Guidelines Training Reports</p>

Actions	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
2. Conduct sensitisation of boat tour operators including individuals re: regulations, guidelines and the requirements of licencing 3. Facilitate the licencing of persons through training and assistance through the Business Incubator but ensure no additional beyond existing unlicensed.	1		Business Incubator Assistance Reports
Strategy: Preserve public views to the sea, public access to the beach and retain some coastal areas in natural condition, along Parrottee Beach, adjacent Galleon SFCA and in Thatchfield Objective: To retain natural ecosystems in these areas and public access to view and the beach			Outcome: Public access to the beach at other key areas.
1. Assist the Parrottee Citizens Association with their plans for Parish Council owned beach park on Parrottee Beach 2. Identify government owned lands along Parrottee Beach and through to Thatchfield and maintain for public access at Parrottee and conservation and protection in the Thatchfield area 3. Assist the owners of lands along Parrottee Beach and adjacent to the Galleon SFCA to protect the Salt Pond, mangroves and nature generally	BRPL Manager NLA and Parish Council Priority 1: Start in Year 1 to help Parrottee Citizens Association	Time of Manager	Outputs: Reports Lands, access paths retained
Strategy: Establish a BRPL Recreation and Tourism Public Education Programme to sensitise local community members and facilitate business development in an organised manner – see above and Public Education and Outreach Programme (Community workshops and Business Incubator)			
Strategy: Work through Cultural Heritage Preservation Programme to facilitate Sustainable Recreation and Tourism and related activities e.g. Festival			
TOTAL COSTS: Personnel: Public Education & Outreach Officer and Youth Corps; Projects: \$5 million			

6.3.4 Infrastructure Management

6.3.4.1 . Identification/Analysis of Infrastructure Issues

Currently there is no infrastructure to be managed by the manager of the BRPL. The BRPL management will require venues for meetings and training and eventually space for the Office and Business Incubator and a boat but these can be rented during the initial period of this Plan. No other infrastructure is required for implementation of this Management Plan.

There is privately owned infrastructure including buildings such as hotels, houses and sheds, some of which have been illegally constructed on government lands. There is significant privately owned infrastructure on private lands within the BRPL and some of it is in need of attention to increase the environmental sustainability, protected landscape aesthetics and climate change resilience. This is dealt with under the Public Education and Outreach and the Recreation and Tourism Programmes.

Most of the Morass is Crown Land vested in the Commissioner of Lands through the National Lands Agency. Unfortunately there is almost no land management and squatting has occurred along with conversion of the natural, highly diverse vegetation to plantations of low diversity or mono-crop cultures. In order for this Management Plan to be successful in protecting remaining natural wetlands and restoring degraded areas, addressing the issue of illegal occupation of Crown Lands must be carefully managed. This matter is described in the Enforcement and Compliance Programme.

In addition, NEPA and the Parish Council should work together to identify any additional Crown Lands within the BRPL (outside of the Morass) and secure these for protection and conservation as well as public beach access e.g. in the Parrottee to Thatchfield area.

6.3.4.2 Strategies to Address the Issues

Infrastructure for BRPL Management

Initially the BRPL can be operated managed virtually and physically from any location within or nearby the BRPL. There must be a physical presence from early on – in the person of the PEO Programme Officer and the BRPL Youth Corps but an office is not required although at least a small space would be ideal. Initially space can be rented (preferably at discount e.g. through sponsorship) for the training activities for the Youth Corps. A space will very quickly be required for the Business Incubator and to provide a central location for the Youth Corps to report to and be mobilised from. This will require at least 40 square meters (about 400 square feet) and if a training and meeting space is included, about 60 square meters (600 square feet) is required.

This space could be rented but the site must be relatively easily accessed from all 6 targetted communities: Black River (including Crawford), Middle Quarters, Slipe (including Cashew, Cataboo, Frenchmans and Punches), Fullerswood, Pondside and Parrottee (including Hilltop). Parrottee or Black River would be ideal for ease of access for all persons. Arrangements should also be made e.g. with local schools or other institutions for space or points of assembly for each community, Youth Corps and other meetings and training activities. The BRPL can offer in-kind assistance in return for the space e.g. fundraising and beautification.

Boat docking space will likely be needed, but arrangements for rental as needed can be used until the latter years of this Management Plan.

No management actions will be required, the PEO Programme Officer and within a year, the BRPL Manager, should make arrangements as necessary. This will include the signing of rental and other agreements (e.g. Memoranda of Understanding) as well as an office manual with respect to defining policy regarding use of the BRPL management's office and equipment. The latter should be prepared within six months of taking possession of office

space and existing templates and examples from other organisations may be used for guidance.

Privately owned Infrastructure

The Recreation and Tourism Programme will address the issue of privately owned infrastructure to be used for recreation and tourism through the preparation of detailed guidelines for design, construction and operations, in keeping with the aesthetic of the protected landscape, environmental sustainability and climate change resilience.

Privately owned Infrastructure on illegally occupied Lands

One of the first activities requiring action once the 2013 satellite imagery is analysed to better define the Black River Lower Morass Conservation Zones, is to secure those lands and stop any further encroachment. This will be addressed under the Enforcement and Compliance Programme.

6.3.5 Enforcement and Compliance

In an ideal world, the public – both local community members and visitors – will comply with the legislation in place to protect the biodiversity and cultural values within a protected area. Unfortunately, the reality is that there will always be law-breakers and this will be compounded by socio-economic challenges particularly unemployment. Compliance with legislation requires knowledge not only of the laws but also knowledge of the alternatives and availability of solutions. For example, solid waste pollution will continue to be a problem if there is an inadequate collection and disposal system. Littering however e.g. discarding of food containers on the streets can be easily avoided and the Litter Act should be strictly enforced.

6.3.5.1. Identification/Analysis of Enforcement and Compliance Issues

Most of the degradation of the biodiversity and cultural values of the BRPL has resulted from the lack of enforcement of existing legislation, primarily, the illegal occupation and conversion of the Morass to agriculture or housing. If a land owner (government in this case)

does not show interest or concern in the fact that his land is being occupied by someone else without permission, then the squatter is going to continue his occupation. Further, since much of the illegal occupation is income generating, it will be difficult to remove the illegal occupant in the absence of a strong local economy and other economic opportunities. In addition, the crop that is being grown in much of the Morass is lucrative and worth defending by the occupant. Apparently much of the enforcement activity has been targeted at the removal and destruction of the illegal plant and has not addressed the illegal occupation of government lands. This means that it will be particularly difficult to restore lands already converted to marijuana cultivation. However, there is an urgent need to secure any remaining areas of natural Morass vegetation and prevent their occupation and conversion to any other vegetation.

Illegal occupation of the Morass also occurs for housing – the wetlands are simply dumped with marl over time and the “dry-land” built on. Within the BRPL, the Local Development Areas identified under the Draft St. Elizabeth Development Order, 2014 are Lacovia, Middle Quarters and Black River however it is clear from observation that the communities in Slipe (including Cataboo, Frenchmans and Punches) Parrottee, Fullerswood and Pondsides are growing in terms of infrastructural development. Further because of the poor condition of the roads and inadequate government vehicles within the Parish Council, the level of monitoring and enforcement is very limited.

The other major threat to the Morass – use of agricultural chemicals, whilst related to farming in the Morass is not illegal now and will be difficult to control. If over time increasing acreage of the Lower Morass can be restored, that will reduce the level of nitrates and phosphates and reduce the over-growth of invasive weeds such as Water Hyacinth. However, virtually all of the Upper Morass has been converted to farmland and there are areas of the Lower Morass particularly to the north which are legally occupied by farmers on lands owned by Wray and Nephew Ltd.

Threats to wildlife may be addressed under existing legislation – the Wild Life Protection Act of 1945. Crocodiles and Sea-turtles are hunted and their eggs are still being harvested,

mainly because of the continuing belief that the meat and eggs ensure sexual prowess particularly in men.

6.3.5.2. Strategies to Address the Issues

A multi-pronged approach must be taken through several management programmes and not only through Enforcement and Compliance:-

- (i) Public Education and Outreach
- (ii) Recreation and Tourism
- (iii) Cultural Heritage Preservation
- (iv) Zoning

The activities under these programmes will help increase local public support for enforcement of legislation, in particular the occupation of the Morass, by increasing the level of understanding about the harm the activities are causing and by increasing socio-economic opportunities. The local consultations found that community members were well aware of the occupation of the Morass and also that it was illegal whether for housing or farming, regardless the crop. They were also very aware of the pollution from agricultural chemicals and the harm this was doing to the native shrimp and fish populations.

The Enforcement and Compliance Programme must implement strategies to:-

- first, secure any areas of Morass found to be unoccupied and later secure areas (working with the National Land Agency) identified for restoration;
- support the Parish Council in enforcing the Development Order for the Parish within the BRPL including halting the expansion of the community of Slipe and its districts and instead promoting development in Lacovia (with appropriate infrastructure and facilities) and movement of the population to Lacovia;
- protect wildlife;
- control boat use in the Morass.

6.3.5.3. Management Actions

Table 10. Management Actions for Enforcement and Compliance Strategies

Actions	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
<p>Strategy: Secure government lands within the Lower Morass – starting with those found to be in natural state Objective: To secure areas within the Lower Morass that are not converted and later areas identified for restoration and prevent occupation and conversion</p>			<p>Outcome: Protection of the herbaceous wetlands & swamp forest</p>
<p>1. Secure areas of unconverted, natural Morass including swamp forest:- (i) Survey, Map and Mark (ii) Patrol (iii) Enforce land ownership</p> <p>2. Secure areas identified through the Zoning and Conservation Programmes for restoration including the outer boundaries of the Sustainable Use Zones i.e. community boundaries. (i) Survey, Map & Mark (ii) Patrol (iii) Enforce land ownership through collaboration with the NLA</p>	<p>NEPA National Land Agency (NLA) Priority 1: From Year 1</p>	<p>Enforcement Personnel (may need to involve personnel from outside the area)</p>	<p>Satellite imagery and aerial photography (consider use of a drone)</p>
<p>Strategy: Support Parish Council in enforcement of St. Elizabeth Development Order Objective: To provide monitoring and enforcement support to the Parish Council</p>			<p>Outcome: Greater compliance</p>
<p>1. Liaise with the Parish Council to determine approach and prepare an appropriate work-plan 2. Advise local community members regarding their development activities to help them maintain compliance; the</p>	<p>NEPA Parish Council Youth Corps Priority 1: From Year 1</p>	<p>NEPA Enforcement Officers Youth Corps (promotion of compliance)</p>	<p>Work-plan Data-base of community members assisted and whether or</p>

Actions	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
<p>Youth Corps should have a clear understanding of what is and what is not allowed and therefore be able to provide basic advice to local community members as they move through the communities.</p> <p>3. Report inappropriate and illegal development action to the Parish Council</p>			not their development is in compliance
<p>Strategy: Promote compliance with the Wild Life Protection Act Objective: To reduce infractions of the Wild Life Protection Act</p>			<p>Outcome: Wildlife increasing</p>
<p>1. Record all infractions of the Wild Life Protection Act and submit to NEPA – this will provide a baseline for the activity</p> <p>2. Provide guidance to community members with respect to any interaction with wildlife</p>	<p>Youth Corps NEPA Priority 2: From 2018</p>	<p>Youth Corps</p>	<p>Records</p>
<p>Strategy: Promote compliance with Boating Regulations and regulations related to recreation and tourism Objective: To facilitate the conservation of Morass and River ecosystems</p>			
<p>Work with Tourism agencies and Marine Police to enforce relevant regulations</p>	<p>NEPA Priority 1: From Year 1</p>	<p>Enforcement Personnel</p>	<p>Records</p>

6.3.6 Public Education and Outreach

The Public Education and Outreach Programme cross-cuts all the other programme areas and is critical for the successful management of the natural and cultural heritage of the Black River Protected Landscape. This programme will underpin the other programmes and its implementation must be initiated first.

6.3.6.1. Identification/Analysis of Education and Outreach Issues

The Knowledge Attitudes and Practices Survey for the Black River Watershed (SDC, 2011) indicated a need for much more environmental education and practical environmental activities. There was a basic level of knowledge e.g. 60% said they could define “environment” but only 42% gave the correct response however only 31% could define “watershed”, 13.4% “invasive alien species” and 8% “biodiversity”. It was noted that although citizens felt the environment was important (97.5%), 73.8% had not participated in environmental activities but 80.9% said they were willing to participate.

The two most dominant concerns regarding the environment were the condition of the drains and flooding, which accounted for 51.3% and 50.1% respectively and which are related to each other. This was confirmed as being still the most important, during the community consultations held in 2016. Other important concerns reported in the KAP Survey were: solid waste collection and disposal (30.4%), river pollution (29.5%) and poor farming practices (15.4%). Other issues were of less concern for residents: fishing beach (7.9%), other beach condition (7.5%) river poisoning (7.2%) and state of the mangroves (4.7%) (SDC, 2011).

The KAP Survey reported the top five poor environmental practices in the Black River Watershed according to the respondents as: garbage disposal in rivers and other waterways; cutting down of trees; poor farming practices; catching of small fishes and washing vehicles in rivers. Approximately 73% of the respondents indicated that they thought community members have a choice in avoiding/preventing the poor environmental practices outlined above. The main recommendations made for improving environmental practices in the Black River Watershed were that community members should unite and have community meetings

(17.6%), public education (15%), proper disposal of garbage (14.3%) and regular cleaning of drains (6.1%). Other suggestions of note, though provided by fewer persons, were that residents must practice good farming/fishing activities (3.9%), government agencies must visit the community and have community meetings (2.6%) and that laws and penalties must be enforced for poor environmental practices (1.9%). The latter points were also raised in the community consultations for this Management Plan.

6.3.6.2. Strategies to Address the Issues

As highlighted earlier, this programme is the most critical of all the management programmes and must be initiated as early as possible and before the other programmes start. It will require a Public Education and Outreach Programme Manager (Job Description at Appendix 8) who will be responsible for all the strategies and actions under the programme, collaborating with persons from other agencies, organisations and communities. This person will need access to a suitable vehicle (bearing in mind the bad road conditions of some areas – a Suzuki Jimny will be the best value for money and reliable) and mileage as well as communications support (at least phone credit and a lap-top computer). These resources are therefore not listed in the action plans for each strategy.

Key strategies described below are:-

- Establishment of a Youth Corps to address unemployment and assist with implementation of the management plan;
- Community Studies/Surveys to better understand the local communities;
- Public Education e.g. Facebook Page, Exhibitions
- Community Schools outreach
- Sustainable Livelihoods Facilitation e.g. Business Incubator, Training

6.3.6.3. Management Actions for Public Education and Outreach

Table 11. Management Actions for Public Education and Outreach

Action	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
<p>Strategy 1: Establish a Black River “Shrimp Country” Youth Corps Objective: Within the first year, to establish an on-going training and involvement programme that will provide a corps of youth who will be engaged in environmental management, sustainable tourism and social entrepreneurship.</p>			
<p>1. Design the programme and source the funding for it (possible sources include Digicel and other corporate foundations/sponsors). The training programme should target youth 17 – 24 years old and include: personal development, environmental management, organisational, business and project management skills. It should include motivational talks, team building and practical activities.</p> <p>2. Select 40 youth & implement the training component Advertise in communities for interested youth and hold test & interview activities to select 40 youth (at least 6 from each of the 6 key areas). At least 12 weeks initially inclusive periods of internship & group project work. Seek complimentary trainers, venues, sponsored lunch & refreshment and other activities.</p> <p>3. Operate the programme Following training, a minimum of 18 should be selected and retained for regular</p>	<p>NEPA Programme Officer SDC National Youth Service (NYS)</p> <p>Consider approaching: Northern Caribbean University for assistance</p> <p>Priority 1: Establish by Year 1 Implementation: on-going</p>	<p>Public Education & Outreach Programme Officer – designs programme, prepares, submits & follows-up proposals; organises & implements programme, including some training.</p> <p>Stipends for Trainees: 40 @ \$4,500/wk: \$2.16M Venues (partner schools & churches): \$120,000 Training (travelling & honoraria for trainers & for certificate courses: \$1M; Lunch:\$240,000; Materials: \$180,000 Graduation Event: \$300,000 TOTAL YR1: \$4M</p>	<p>Outcome: 40 youth capable of implementation of field & other aspects of BRPL management: Certificates Youth Corps Members Personal Reports</p> <p>Outputs: Proposal Funding (cash and in-kind)</p> <p>Training Reports Final Report on all Activities</p> <p>Activity Reports</p>

Action	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
<p>activities involvement in the BRPL management e.g. conducting surveys, monitoring, environmental education. The others would be recommended to other agencies &/or companies for placement and/or called in as required for additional assistance in BRPL. In addition, monthly meetings with a training component should be scheduled so as to maintain the Corps. Consider training a group every three years</p>		<p>Youth Corps: 16 @ \$8,000/wk for 12 mths: \$6.14M</p> <p>Monthly meetings (12) @ \$10,000/meeting: \$120,000 RECURRENT: \$6.26M</p>	
<p>Sub-Total Strategy 1: Project: \$4 million; Programme: \$6.26 million</p>			
<p>Strategy 2: Conduct studies and surveys to better understand the local communities Objective: Within three (3) years produce reports that provide information on land tenure, use and community contacts, knowledge, attitudes and practices in order to increase willingness to participate in conservation and guide the other management programmes.</p>			
<p>1. Community Sensitisation (a) Design & produce a sensitisation flier (1,500) featuring a map identifying key areas, their values, threats & solutions (b) Conduct Community Sensitisation re: the BRPL – Distribution of fliers during community “walk & talk” activities. Conduct community meetings. Use this activity to alert community re: KAP Surveys, other information gathering & new signage re: not defacing.</p> <p>2. Conduct a Community KAP Survey - to help assess in particular, willingness of landowners and land users to implement conservation practices inclusive contributing</p>	<p>NEPA – PA Branch Officer responsible for area</p> <p>PEO Prog Officer</p> <p>Priority 1: Year 2</p> <p>SDC NIC</p> <p>Priority 1: Year 1</p>	<p>Design & Printing: YR1: \$150,000</p> <p>12 communities @ \$15,000: \$180,000</p> <p>Consultant (\$2M) - could be SDC &/or University working with Youth Corps</p>	<p>Outcome: Raised knowledge: new KAP survey Willingness to participate: ease of conducting KAP</p> <p>Outputs: BRPL Flier Community Meeting Reports & Sign-in Sheets</p> <p>KAP Survey and related Reports</p>

Action	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
<p>to the River Cleaning Programme. The KAP Survey should be door to door within the targeted communities and should include:-</p> <ul style="list-style-type: none"> • Demographic information – age, sex, education level, occupation/income • Land tenure (inclusive a map with contact information) • Land use and practices whether domestic e.g. type of sewage system, water supply; agricultural e.g. crops grown, chemicals used and how they are used or other land use • Knowledge, attitudes and practices regarding the BRPL, in particular and environmental issues more generally • Information needed by NIC re: River Cleaning <p>3. Conduct desk and field studies to help identify River Cleaning and BRPL customer base and obtain contact information for land owners & residents to improve communications and management.</p> <p>4. Collate and analyse information from all the surveys, studies and consultations and prepare a report on Land tenure and use and a report to guide the detailed development of the Conservation e.g. River Cleaning, Conservation Zone and</p>	<p>NIC, NEPA, NLA RADA, SDC Priority 1: Year 2 (6 mths with Survey)</p> <p>NEPA BRPL Manager Programme Officer NIC Priority 1: Year 1</p>	<p>Support to NIC: \$500K Personnel within relevant agencies</p>	<p>Report with information</p> <p>Report with recommendations regarding the conservation zone and detailing plans for feasible and effective Conservation and Enforcement & Compliance</p>

Action	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
Enforcement & Compliance strategies.			Programmes
Sub-Total Strategy 2: Project: \$2.83 million			
Strategy 3: Public Education			
Objective: Within the first year, to establish a public education programme inclusive website and social media to raise knowledge and increase levels of positive attitudes and practices towards the BRPL			
<p>1. Branding of the BRPL – develop a logo (involve the Youth Corps and communities in its design)</p> <p>2. Website Design, establish and maintain Black River Protected Landscape Website</p> <p>3. Facebook Page A Blog and Twitter can be added if the time and resources of the Programme Officer’s time allows</p> <p>4. Brochures & Posters Design & produce BRPL brochures (10,000) and posters (1,000)</p> <p>5. Signage – Design, produce and install BRPL signs (18) with map and “You are Here” highlighting natural & cultural heritage values in each of the targeted communities and districts.</p> <p>6. Exhibition Materials – a set of 4 pull-up Banners, Header Banner and Feather</p>	<p>NEPA Programme Officer & Youth Corps Priority 1: Year 1</p>	<p>Time of Programme Officer & Youth Corps \$100,000 for design & registering name/logo</p> <p>YR1:\$100,000 RECURRENT:\$20,000 /yr</p> <p>Time of Programme Officer & Youth Corps</p> <p>Design & Production: \$300,000</p> <p>18 42” x 42” laminated metal signs @ \$50,000 inclusive design, production & installation: \$900,000 (seek sponsorship)</p> <p>\$350,000</p>	<p>Outcome: Raised knowledge: new KAP survey Willingness to participate: ease of conducting KAP Feedback on Social Media</p> <p>Outputs: Website - monitor hits Facebook – monitor likes & shares Brochures & Posters: in schools, shops, households Signage in place - photographs</p> <p>Exhibition Materials produced and being</p>

Action	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
<p>Banner</p> <p>7. Organise and Implement an Annual Festival with activities in each community culminating in a major event in one community. The latter should include a culinary & craft competitions including Best Crayfish Dish and Best Pepper Shrimps, Best Baskets etc.</p> <p>8. Conduct public education campaigns on an annual basis on key issues of concern for the area – one issue/theme per year e.g. fire, garbage, farming practices. These campaigns should include:-</p> <ul style="list-style-type: none"> • Design & Production of Thematic brochure & poster • School Presentations • Community Meetings (12) • Local radio/cable <p>9. Quarterly Newsletters</p>	<p>SDC, TPDCo., RADA, other agencies & groups Priority 1: From Year 2 on-going</p> <p>Priority 2: From Year 3 on-going</p> <p>Priority 3: From Year 4 on-going</p>	<p>See Cultural Heritage Preservation Programme</p> <p>Brochures & Posters: \$300,000/yr Workshops: 6 @ \$15,000 2/year: \$180,000 Time of Programme Officer and Youth Corps</p> <p>Time of Programme Officer and Youth Corps</p>	<p>used – annual report</p> <p>Annual Festival held – Report</p> <p>Activities implemented – Report</p> <p>File with copies of Newsletters</p>
<p>Sub-total Strategy 3: Projects: \$1,650,000; Programmes/Recurrent: \$500,000/year</p>			
<p>Strategy 4: Community Schools Programme Objective: By the second year (third quarter), to establish a community schools programme with regular, on-going activities in each school within the targeted communities</p>			

Action	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
<p>1. Liaise with local school teachers and Youth Corps to design and implement a programme linked to the public education programme and wider Public Education & Outreach Programme involving at least:-</p> <ul style="list-style-type: none"> • Establishment of regular BRPL Environmental Programme in each school • Monthly school visits by Youth Corps to implement activities with students to include field visits to nearest part of the Morass, to the local BRPL sign etc. and further afield at least once a quarter • Annual competitions and prizes associated with the Annual Festival 	<p>NEPA Programme Officer Schools & Ministry of Education</p> <p>Use existing material from NEPA, Jamaica Environment Trust (JET) and others Priority 1: From Year 2</p>	<p>Teachers' Workshop: \$100,000/yr (materials, honorarium for facilitator, venue, meal, travel stipend for teachers & Youth Corps who are not employed)</p> <p>Time of Programme Officer and Youth Corps</p> <p>Field Trips (to be part-sponsored/part paid by students): \$300,000/yr</p> <p>Competition: Promotion & Materials: \$100,000/yr Prizes: \$200,000/yr</p>	<p>Outcome: Raised knowledge and willingness to participate: KAP Survey # teachers & students involved in each activity increasing</p> <p>Outputs: Teachers' Workshop Report</p> <p>Plan for Community Schools' Programme</p> <p>Reports from Programme implementation</p>
<p>Sub-total Strategy 4: Programme/Recurrent: \$700,000/year</p>			
<p>Strategy 5: Facilitate Sustainable Livelihoods</p>			
<p>Objective: To facilitate sustainable livelihoods starting by the beginning of the first year through facilitation of training, employment and business planning, development and operations services</p>			
<p>1. Youth Corps Programme:-</p> <p>(a) train and employ youth as indicated above within BRPL management programmes</p> <p>(b) facilitate establishment of new income-generating opportunities by providing ongoing motivational</p>	<p>NEPA PEO Pro-gramme Officer SDC, JBDC TPDCo. Priority 1: From Year 1</p>	<p>Time of Programme Officer</p> <p>Support from NEPA, SDC, JBDC, TPDCo., NYS and other agencies and institutions</p>	<p>Outcome: Increase in employment & income generation: KAP Survey</p> <p>Outputs: BRPL management</p>

Action	Responsibility/ Collaborators Priority/ Timeframe	Resources	Monitoring
<p>support and training</p> <p>2. Provide Business Incubator and Virtual Business Services e.g. advice, networking, computer access, telephone answering, meeting space</p> <p>3. Community Sustainable Livelihoods Training Workshops – 2dy training sessions in each of 6 targeted communities</p> <p>4. Annual Festival – Cultural Heritage Programme</p> <p>5. Support BRPL Recreation & Tourism Programme</p>	<p>BRPL Manager & Programme Officer JBDC & others Programme Officer Priority 1: From Year 2</p>	<p>Office space & equipment \$1M (seek sponsorship)</p> <p>1 set of 6/year @ \$360,000</p> <p>As below</p> <p>As below</p>	<p>pro-programmes being implemented by Youth Corps</p> <p>New businesses established Training conducted</p> <p>Reports indicate support to other programmes</p>
Sub-Total Strategy 5: Programme/Recurrent: \$1,360,000/year			
TOTAL COSTS: Personnel: Public Education & Community Outreach Officer (see below) and Youth Corps (\$6,140,000/year); Programme/Recurrent: \$2,680,000/year; Project: \$8,480,000			

6.3.7 Governance and Administration

6.3.7.1. Protected Area Management and Administration

As the Black River Protected Landscape is to be designated under the NRCA Act it will be the responsibility of the NEPA. Currently, there does not appear to be any one organisation that the NRCA could delegate all management responsibilities to and therefore, NEPA must play the lead role particularly in the initial organisation and implementation of the Management Plan. NEPA may therefore identify an individual from its Protected Area Branch with direct responsibility for management of the BRPL. This person will be responsible for liaison, collaboration (particularly with the Parish Council and the Social Development Commission – Santa Cruz Office, which will have significant roles to play) including the servicing of the relevant committees (organising meetings) and supervising and facilitating the implementation of management activities whether by other staff contracted or seconded.

Further, NEPA directly or through a delegated organisation should contract the relevant staff described below to implement the Management Plan, in particular the Public Education and Outreach (PEO) Programme Officer. The NRCA through NEPA should therefore delegate some specific responsibilities e.g. the implementation of this Programme to an appropriate agency or organisation.

Co-management Committee

NEPA must establish a Co-management Committee involving the agencies with specific management roles to play, in particular the Parish Council, the Social Development Commission and the National Irrigation Commission. This will require the development and signing of agreements with the relevant agencies, using existing templates and examples but meeting with the agencies to detail and negotiate the specifics as it relates to the implementation of this Management Plan.

The Co-management Committee with NEPA's PA Branch as its Secretariat will be responsible for guiding operational management as each agency involved may be responsible

for implementation of some aspects of management. The Committee should prepare an annual work-plan which should dove-tail with their own agency work-plans. The Committee should initially meet monthly and after the first two years at least every other month this can move to meetings every other month. Once the BRPL Manager is in place, the responsibility for coordinating Co-management Committee meetings and activities can be shifted from the NEPA PA Branch staff member to this person.

Advisory Committee

NEPA should also establish an Advisory Committee meeting quarterly to address broader issues such as public health, solid waste management and sustainable tourism. Members of this Committee may be involved on a more regular basis with the implementation of specific activities e.g. public education campaigns and the proposed annual festival. The Advisory Committee should include the members of the Co-management Committee in addition to representatives from each of the 5 Black River Community Development Committees (CDCs and the Black River Development Area Committee (DAC) in addition to representatives from the CDCs of the 3 other key communities: Lacovia, Holland and Burnt Savanna.

Local Advisory Committees

The CDCs for each of the 6 key, targeted communities should take on the function of local advisory committees for the BRPL. That is, matters relevant to the management of the BRPL (and the specific community) should be discussed. The PEO Programme Officer will maintain a relationship with the CDCs and the SDC Officers and organise special meetings twice a year to address community specific issues. The CDCs along with individuals and groups from each community will be responsible for implementation of sustainable livelihood ventures. The facilitation of sustainable livelihoods through the BRPL Management Plan will take place in collaboration with the CDCs.

Operational Management

Day to day operations should be guided by an annual work-plan as per the NEPA template. The work-plan should be drawn from this Management Plan and aim to guide the organisation and its personnel towards achievement of the Management Plan goals and

objectives. Monthly, quarterly and annual reports providing the status of work-plan implementation should be prepared by the senior officer with responsibility for the BRPL (initially this will likely be the PEO Programme Officer). For the first year, the focus of the BRPL operations will be on the implementation of the Public Education and Outreach Programme in particular, the Youth Corps along with key studies and the securing of the Morass Conservation Zone.

An Operational Manual should be prepared by the BRPL Manager as soon as possible after taking office. This should be modelled on the manuals of similar organisations and should not take long to prepare. The Operational Manual should provide policies and guidance regarding human resources management, office procedures, vehicle and property management.

6.3.7.2. Human Resources Management

As soon as possible NEPA directly or through the NRCA delegated entity, should seek to fill the position of Public Education and Outreach (PEO) Programme Officer. This is critical since the PEO Programme has been identified as the priority programme to initiate and underpin management of the BRPL. This person could be seconded from within NEPA or from another agency but must live in the BRPL or at least in one of the towns immediately adjacent and no further than Santa Cruz.

A BRPL Manager is not essential until 2018/2019. It is recommended that at the end of the first year of successful implementation of the PEO Programme, the PEO Programme Officer should be promoted to the position of BRPL Manager. Therefore the PEO Programme Officer should be someone with the necessary background, education and leadership skills to manage the BRPL (with training as needed). It is recommended that one of the members of the Youth Corps should be identified early on to be groomed to take over the position of the PEO Programme Officer, supervised by the BRPL Manager (former PEO Programme Officer). The BRPL Manager can then begin to strengthen focus on the Recreation and Tourism and Cultural Heritage Programmes as well as to bring in university students for the

study of the various aspects of the BRPL which require more detailed conservation planning. Eventually perhaps one of these students will take on the role of Conservation Officer.

Enforcement should be dealt with at least initially by a team from Kingston staying in the area as necessary, and working with the Marine Police and other enforcement officers in the area as needs be.

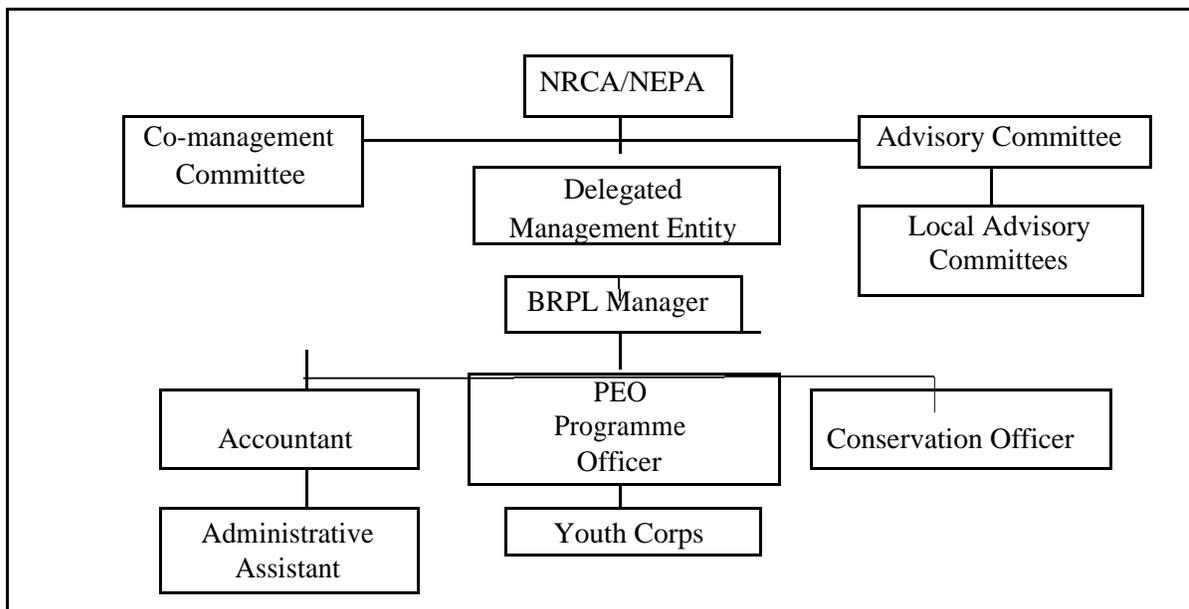


Figure 31. BRPL Management Structure

6.3.7.3. Budget and Financing

The average annual basic (core costs) budget for the management of the BRPL has been estimated at JA\$45,000,000 (excluding \$15 million of River Cleaning costs) with a start-up budget of JA\$25 million in Year 1 which ideally should begin at the start of the 2017/18 Financial Year. Table 5 below shows the Five Year Summary Budget and the workplans above and budgets at Appendix 6 provide details on the costs for each Programme. Financing of the annual budget is expected from the following sources:-

- Government of Jamaica: NRCA/NEPA – annual management fee, technical support from NEPA personnel
- National Funds/Foundations e.g. Environmental Foundation of Jamaica, National Conservation Trust Fund of Jamaica, Tourism Enhancement Fund

- Corporate Foundations e.g. Digicel, Jamaica National for projects.
- Private Sector Sponsorship e.g. local businesses in cash or kind.
- International Donors and Projects e.g. GEF Small Grants Programme.
- Income generating and Fundraising activities e.g. souvenirs and craft.

In addition, technical and advisory support from the staff of other agencies e.g. SDC, RADA and the Parish Council as appropriate.

The BRPL Manager with assistance from the Administrative Officer will be responsible for preparing budgets and financial reports and statements. The BRPL Manager with the assistance of the Management Entity Board and the various Committees will be responsible for fundraising in particular, proposal writing.

Table 12. Summary Budget – BRPL Five Years

	YEAR 1 2017/18	YEAR 2 2018/19	YEAR 3 2019/20	YEAR 4 2020/21	YEAR 5 2021/22
PERSONNEL	6,242,000	13,250,000	17,214,000	18,415,000	19,632,000
SUPPLIES & SERVICES	570,000	1,240,000	1,432,000	1,306,000	1,430,000
PROGRAMMES:					
Conservation		8,257,000	8,309,000	8,363,000	3,320,000
River Cleaning	5,000,000	20,000,000	20,000,000	20,000,000	18,000,000
Research, Monitoring & Evaluation	90,000	3,017,000	1,587,000	1,689,000	3,759,000
Enforcement & Compliance		3,157,000	3,209,000	1,263,000	1,320,000
Public Education & Outreach	8,990,000	1,240,000	1,240,000	5,948,000	2,340,000
Cultural Heritage Preservation	100,000	3,000,000	3,060,000	3,123,000	3,374,000
Recreation & Tourism		5,000,000	500,000	500,000	500,000
TOTAL PROGRAMMES	14,180,000	43,671,000	37,905,000	40,886,000	32,613,000
TOTAL RECURRENT COSTS	20,992,000	58,161,000	56,551,000	60,607,000	53,675,000
CAPITAL (Vehicle Purchase)	4,500,000		4,500,000		
TOTAL BRPL MGMT COSTS	25,492,000	58,161,000	61,051,000	60,607,000	53,675,000

7.0 Research, Monitoring and Evaluation

Several areas of research would have been useful in guiding the preparation of this management plan and the Literature Review conducted by the University of the West Indies

(UWI, 2015) identified several of these. The Memoranda of Understanding between the University of the West Indies and the Natural Resources Conservation Authority should be used to promote and implement the conduct of some of this research. In addition, the research needs should be promoted e.g. on the BRPL website to encourage researchers from other institutions to liaise with management to conduct research which will be useful in guiding conservation of the PA values.

Not all the information required will necessitate in-depth academic research but a number of studies are required to gather information that will help guide management. Studies and in-depth research will be important in establishing baselines for long term monitoring activities. Participatory approaches to research must be encouraged to help ensure that local community members increase their knowledge and understanding of the issues, the importance of the wetlands and how to protect the area. The Youth Corps to be established will be an important group to involve in conducting research and in mobilising support for research.

The following are areas requiring studies and in-depth academic research:-

Studies/Research related to the Biodiversity Conservation Programme

1. Habitat Descriptions and Population Studies for the Morass in general but the proposed Conservation Zones in particular i.e. Wallywash and Salt Ponds, Thatchfield, Western and Eastern Lower Morass:
 - The size and configuration of various habitats found in the morass, the rate of habitat loss and degradation, and the effects of deforestation and habitat fragmentation on native species;
 - Up-to-date status of floral and faunal populations within defined habitats and information on the present status and diversity of the different habitats;
 - Species distribution maps with priority given to red-listed species;
2. Information on the structural and functional loss/degradation of the Black River Morass, particularly the Upper Morass;
3. River Ecology
 - The effects of river quality (physicochemical composition) on the presence/ absence, abundance and distribution of aquatic flora and fauna;
 - Biological/ecological indicators of river health.

4. The effects of habitat degradation, habitat loss, burning and other anthropogenic activities (e.g. pollution, cultivation of marijuana, etc.) on the various habitats and the species they house;
5. The frequency and extent of fires and its impact on the spatial configuration, extent and distribution of various habitats and biota;
6. Sustainability of fish/shrimp harvesting;
7. Invasive Species and their Control
 - The impact of non-native/invasive alien flora and fauna on native species and habitats;
 - The distribution and rate of spread of non-native/invasive flora and fauna, and site of future invasions.
 - Methods of controlling non-native species;
11. Long term monitoring program to assess long-term changes in species populations and habitats;
12. The long-term dynamics of each habitat type, particularly, the remnant swamp forest fragments;
13. Biology, ecology and dynamics of native fauna and flora;
14. Predicted effects of climate change, particularly sea level rise on fauna and flora.

Studies/Research related to Other Programmes

15. Archaeological studies of the identified historical sites within the BRPL.
16. The proximate causes (agriculture, residential development etc.), underlying driving forces (socio-political, economic and cultural forces that explain motivations of agents of land use change) and spatial pattern drivers (biophysical landscape features and climate) on land use change/deforestation and forest fragmentation/habitat loss;
17. Socio-economic studies of the communities and their livelihoods and views.

7.1 Monitoring and Evaluation of Success of Management Strategies

Each Management Programme has monitoring associated with the implementation of specific strategies and objectives. This monitoring must be included as a component of annual work-plan preparation and monthly and quarterly reporting, so that the success of management strategies can be tracked. This will provide information mainly on the achievement of outputs or deliverables.

Achievement of conservation goals or outcomes will be assessed and evaluated through the monitoring of conservation targets. A long-term monitoring programme including use of drones for landscape level data collection for mapping should be seriously considered.

Table 13: Monitoring of Conservation Targets

Conservation Targets & Goals	Monitoring of Conservation Targets & Goals
Freshwater (FW) herbaceous wetlands 1. Maintain existing areas 2. Reduce expansion of agriculture	Detailed satellite imagery analysis annually using free Landsat imagery to monitor for: maintenance of existing farm-free areas, reduction in farmed areas and no further expansion of housing development in the Morass Conservation Zones and Multiple Use Zones
Rivers, Streams and Estuary 1. Maintain connections and flow throughout the Morass 2. Reduce pollution especially nitrates and phosphates	Water Quality Monitoring Programme This Programme will expand on and intensify the existing work of NEPA through the involvement of the Youth Corps to collect monthly water samples and send to NEPA for analysis, especially nitrates and phosphates. Also:- <ul style="list-style-type: none"> • liaison with the WRA to obtain additional data • consider macro-invertebrate monitoring or at least include photographs of vegetation • checks along all waterways re: river cleaning
Ponds (freshwater and saline) Maintain size and ecological health (including water quality) in Wallywash Pond, Salt Pond and ponds throughout the BRPL	Water Quality Monitoring Programme As above
Mangroves Maintain all mangrove forests especially those along the Black River, adjacent to the Galleon Fish Sanctuary and Thatchfield	<ul style="list-style-type: none"> • Monthly checks at each of the Conservation Zones by Youth Corps • Annual transects at each of the Conservation Zones – establish baseline in 2018 (refer to Rankine, 2014). • Detailed satellite imagery (2018 and 2022) to monitor for changes in the size of mangrove areas and the health of the mangroves.
Swamp Forest Maintain and restore existing swamp forests	<ul style="list-style-type: none"> • Swamp Forest Restoration Project Monitoring • Detailed satellite imagery annually using free Landsat imagery to monitor for changes in size of the swamp forest area.
Beaches including Sea Turtles and Shore-birds 1. Maintain existing wide beaches	<ul style="list-style-type: none"> • Beach monitoring – winter and summer (inclusive simple bird identification and counts on beaches) • Sea-turtle monitoring in nesting season - expand

Conservation Targets & Goals	Monitoring of Conservation Targets & Goals
2. Maintain turtle & shorebird populations	and intensify existing NEPA Programme through involvement of Youth Corps and local community members
Crocodiles Maintain populations	Basic monitoring for crocodiles when on the river for water quality or other monitoring activities – maintain log at office for number, estimated size, location and reports of sightings and incidents
Manatees Maintain populations	Basic monitoring for manatees when on the river or at sea for water quality or other monitoring activities – maintain log at office for number, estimated size, location and reports of sightings and incidents
Native Shrimp and Fish Maintain and if possible increase populations	Institute monitoring by 2019 working with the Fisheries Division and local shrimp fishers and possibly through additional research.
Wetland Birds including the West Indian Whistling Duck (WIWD) Maintain bird populations with a focus on shorebirds and the WIWD	Basic monitoring for wetland birds when on the river for water quality or other monitoring activities – maintain log at office for number, estimated size, location etc.
Marine Areas Maintain existing habitats in healthy condition	Detailed high resolution satellite imagery (2018 and 2022) to monitor for changes in the size of the coral reef and sea-grass areas and the health of the ecosystems.

7.2 Review of Management Plan/Programmes

Since the annual work-plans will be based on the management plan, there will be regular monitoring and assessment of work towards achieving management goals and the programmatic objectives, as monthly, quarterly and annual reports are prepared. More formal review of the management plan and achievement of goals and objectives should be conducted by NEPA with co-management entities during 2019/20 and again at the end of the five years, in 2022. The satellite imagery analysis and conservation target monitoring records will be important in evaluating the success of the management plan and its programmes. Of course, the management plan will only be as successful in so far as it is being implemented and this will most likely be dependent on the ability of NEPA and co-management organisations to raise the necessary funding.

Review of this Management Plan at the end of the 2021/22 period will provide guidance in the revision and updating of the Plan for the next period of five years or more.

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Appendices

Appendix 1 List of Stakeholders participating in the Management Plan consultations

A list of all the people (names and organisations or communities) who participated in the consultations (whether attending the meetings or interviewed).

NAME	ORGANISATION OR COMMUNITY	NAME	ORGANISATION OR COMMUNITY
Keron Campbell	Institute of Jamaica (IOJ) – Natural History Museum of Jamaica (NHMJ)	Oswald Chinkoo	NEPA
Kurt McLaren	University of the West Indies (UWI)	Vivian Blake	NEPA
Christine Sutherland	National Environment and Planning Agency (NEPA)	Jasinth Simpson	Jamaica National Heritage Trust (JNHT)
Mona Webber	UWI	Ann-Marie Howard Brown	JNHT
Alison Foster	NEPA	Ranya Reid Edwards	NEPA
Sheries Simpson	NEPA	Nalini Jagnarine	Environmental Solutions Ltd. (ESL)
Danielle Andrade	Consultant	Wayne Barrett	National Irrigation Commission (NIC)
Jason Gooden	NEPA	Kwesi Falconer	J. Wray & Nephew Ltd. (Appleton Estate)
Carla Gordon	NEPA	Selena Osbourne**	J. Wray & Nephew Ltd. (Appleton Estate)
Ricardo Miller	NEPA	Michael Samuels	Water Resources Authority (WRA)
Natalie Remikie**	Social Development Commission (SDC)	Anika Sutherland	WRA
Michael Ebanks**	SDC	Adrian Thomas	Forestry Department
Alric Miller*	SDC	Damion Gayle**	NIC
Trevor Smith	Pondside	Kirk Freckleton	NIC
V Grindley Miller	Pondside	Robert Miller	NIC
Pauline Hutchinson	Pondside	Everett Legore	NIC
Joan Lewis	Pondside	Brahim Diop	Forestry Department

NAME	ORGANISATION OR COMMUNITY	NAME	ORGANISATION OR COMMUNITY
Verna James	Pondside	Maureen Milbourn**	NEPA
Melva Satchwell	Pondside	Ngozi Christian*	NEPA (NPAS Project Manager)
Annagay Foster	Pondside	Danail Parlachie	Parrottee
Oral Rattigan	Pondside	Willbert Brooks	Parrottee
Domaine Baker	Pondside	Vannie Braham	Parrottee
Inez Wright	Pondside	Damon Stewart	Parrottee
Pauline McCalla Belle	Pondside	Teron Beckford	Parrottee
Alexis Foster	Pondside	Joyce Brown**	Parrottee
Gwendolyn Smith	Pondside	Josephine Wright	Parrottee
Nelsie Wright	Pondside	Selena Wright	Parrottee
Jacie-Ann Foster	Pondside	Latoya Blackwood	Parrottee
Kemane Channer**	Pondside	Hannah Wright**	Parrottee
Christopher Thompson	Pondside	Shavice Wright**	Parrottee
Dwayne Rattigan	Pondside	Gwendolyn McRae	Parrottee
Vivian Harriott	Pondside	Denshen Mulling	Parrottee
Gartlett Miller	Slip	Ranique Bennett	Parrottee
Hyacinth Campbell	Slip	Troy Bennett**	Parrottee
Nesbert Messam	Slip	Eric Samuels	Parrottee
Lambert Campbell	Slip	Wesley Beckford**	Parrottee
Junior Roye	Slip	Helena Blake	Parrottee
Dannovan Campbell	Slip	Joan Pinnock	Black River
Junior Foster	Slip	Victoria Simms	Black River
Jody-Ann Pennicook	Slip	Leisha Simms	Black River

NAME	ORGANISATION OR COMMUNITY	NAME	ORGANISATION OR COMMUNITY
Pauline Williams	Slipe	Juliet Johnson**	Black River
Wellington Green	Slipe	Michael McLean	Black River/St. Elizabeth Parish Council
Robert Campbell	Slipe	David Morris**	Black River/ Black River Chamber of Commerce
Jonathan Wilson	Slipe	Andrew Parker**	Black River/ Black River Chamber of Commerce
Donna Dunkley	Slipe	Constance Wright	Black River
Hortense Forrester	Slipe	Patrick Stuart	Black River
Nicklas Myers	Slipe	Leslie Edwards	Black River
Cheryl Roye	Slipe	Admino Hendricks	Black River
Garvin Glencor	Middle Quarters	Kevin Vassell	Middle Quarters
Christal Cohen	Middle Quarters	Calvin Blackwood	Middle Quarters
Rodeen Cohen	Middle Quarters	Nordion Williams	Middle Quarters
Jayson Scott	Middle Quarters	Hilary Blake	Middle Quarters
Wayne Bauld	Middle Quarters	David Gillespie	Middle Quarters
Carlous Robinson	Middle Quarters	Len Malcom	Middle Quarters
Andrea Tyrell	Middle Quarters	Levi Panton	Middle Quarters
Staubian Blake	Middle Quarters	Hollis Sanderson	Middle Quarters
Caswel Stephens	Middle Quarters	Ann-Marie Stevens	Middle Quarters
Sharon Ball	Middle Quarters	D Lewis	Middle Quarters
W.Cambell	Middle Quarters	Donieve Cohen	Middle Quarters
Tetana Campbell	Middle Quarters	Diana Anderson	Middle Quarters
Wenisha Bauld	Middle Quarters	Wayne Blake	Middle Quarters
Trysion Walters*	Crawford/Galleon Fish Sanctuary	Richard McBean	Middle Quarters
Douglas Henry*	Crawford/Galleon Fish Sanctuary	Shane Taylor*	St. Elizabeth Parish Council

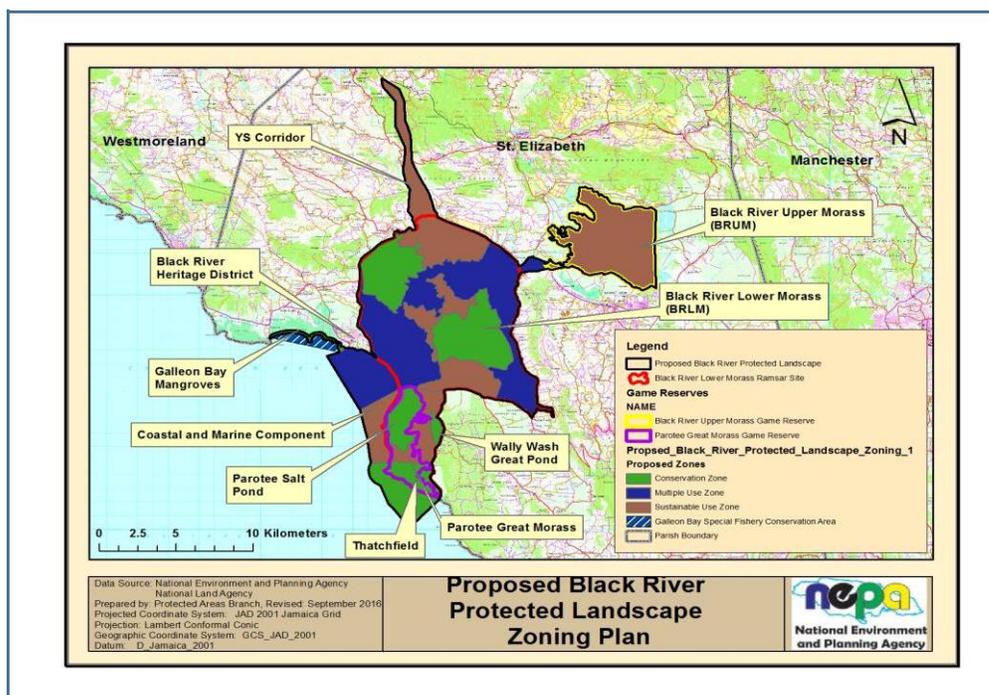
NAME	ORGANISATION OR COMMUNITY	NAME	ORGANISATION OR COMMUNITY
E. Renullon*	Black River	Christina Francis Lowe*	St. Elizabeth Parish Council
Kenloy Smith*	Black River	Hon. Minister Floyd Green, M.P.*	MP, South West St. Elizabeth
W/Constable S. Miller*	JCF – Marine Police	Constable C. Passmore*	JCF – Marine Police
Simon Browne	YS Falls	Lloyd Linton	Black River (Irie Safari)
Jason Henzell	St. Elizabeth Parish Development Committee/BREDS	Luke Ben Brown	Galleon Fish Sanctuary (Special Fishery Conservation Area)

*People who attended the Draft Management Plan Consultation in Black River

**People who attended both the Draft Management Plan Consultation and another meeting

Total Number of People consulted: 136 (in addition to several others spoken to in the field but whose names were not recorded)

Appendix 2 Black River Protected Landscape Boundary Description



The Black River Protected Landscape Boundary is contiguous with three existing legal boundaries (Game Sanctuaries) and hence those descriptions will be used below to detail those components. There are 6 components:-

- YS River Corridor

- Black River Upper Morass
- Black River Lower Morass
- Parrottee Great Morass
- Malcolm's Bay Mangroves
- Coastal and Marine Component

YS River Corridor

The boundary starts at the bridge where the YS River enters the Lower Morass and runs north 10 km along the YS River, 30.5 meters from the western river bank (low water) and then south 10 km, 30.5 meters from the eastern river bank (low water) back to the YS River bridge at the Lower Morass where it meets the Lower Morass Game Sanctuary boundary..

Galleon Harbour/Malcolm's Bay Mangroves

The boundary starts at the edge of Dead Man's Hole Bay (using the same Point A marking the eastern, land boundary of the Galleon Special Fishery Conservation Area (SFCA) and running inland 500 meters behind the high water mark along the bays which form the landward boundary of the Galleon SFCA to end at the edge of Malcolm's Bay using the same Point C marking the western, land boundary of the Galleon SFCA.

Coastal and Marine Component

The boundary starts at the eastern, land boundary of the Galleon SFCA (Point A) and heads in a southerly direction to sea for 3 km at which point it turns south-east and runs in that direction past Black River Harbour, Parrottee Bay to a point 3 km south-west from Starve Gut Bay where it turns north-east and runs 3km in to meet the Great Morass Parrottee Game Sanctuary boundary.

Parrottee Great Morass

Starting at a high water mark at Parottee Point going generally north to where it meets the Parottee main road at Parottee Bay; then generally north along the Parottee main road to the bridge at Brodse Point; then generally north-east along the edge of the wetlands to where it meets the main road at Salt Spring Junction; then east along Fullerswood main road for one kilometre

to where it is intersected by a motorable track opposite the Slipe to Fullerswood intersection; then going generally south along the edge of the wetlands passing Spice Grove, Parottee and Thatchfield to the high water mark at Starve Gut Bay; then following the high water mark going in a southwesterly direction back to the starting point.

Black River Lower Morass

Starting at the bridge which crosses the Black River along the Slipe to Lacovia main road, going generally west along the Black River where it intersects with the Holland Sugar Estate Road on the southwestern end of the Estate, then in a straight line due north-west to the intersection of Whitehall Cross main road and the Middle Quarters to Black River main road at Point; then generally south along the Black River main road to where the wetlands meet this main road one kilometre north of the Brampton main road intersection at Luana; then following the edge of the wetlands going generally south to the bridge which crosses the Black River at Crane Road; then going southeast along Crane Road to where it intersects with the Parottee main road at Salt Spring Junction; then going east along the Fullerswood main road for five hundred metres to the point where the wetlands meet this said main road; then following the edge of the wetlands in a north-easterly direction to where the Slipe main road crosses the Broad River; then going six hundred metres east along the Broad River to the point where it meets the motorable track; then south-easterly along this motorable track to the edge of the wetlands; then going northeast along the edge of the wetlands to where it meets the Mountainside to Lacovia main road at Develders Pass at Exeter; then generally north along the Lacovia to Mountainside main road to where it is intersected by a slip road at the Police Station in Lacovia; then north-west along the slip road to where it meets with the Slipe to Lacovia main road at Lacovia; then north along the Slipe to Lacovia main road back to the starting point.

The Lower and Upper Morass components join along the Black River as it flows from the Upper into the Lower Morass, 30.5 km on either side of its banks (from low water).

Black River Upper Morass

Starting at the point where the power transmission line crosses the Black River at Haughton, going generally east along the Black River to the point where Island River joins it; then going

due north along the edge of the wetlands to the point where it meets the motorable track at Barton Isle; then going generally north-west along the motorable track to the fish ponds: then north along the motorable track to the fish plant at Bartons; then going generally east along the edge of the wetlands to where it meets with the motorable track by the fish ponds at Elim; then generally east along this motorable track to where it intersects the Elim to Braes River main road at Elim; then generally east along Elim to Braes River main road for three hundred metres to where it is intersected by a motorable track; then south along the motorable track until intersects with the Grosmond to Carmel Road; then going south-west to where the Bybrook Road intersects with the Grosmond to Carmel Road; then north-west passing Brighton; then generally west passing Carmel to the point where it intersects with the Santa Cruz to Lacovia main road; then to the point where the power transmission line crosses the main road; then back to the starting point.

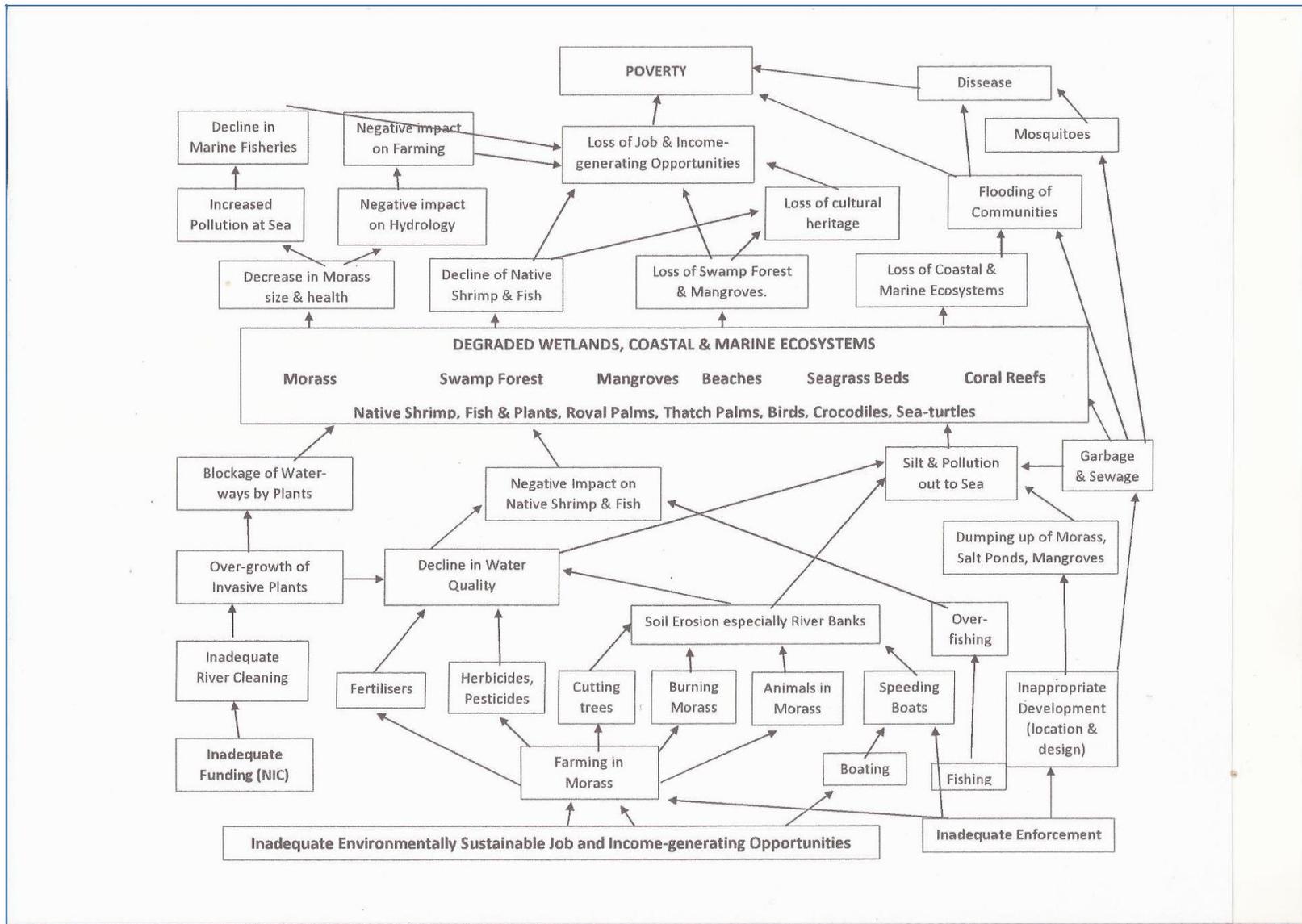
Appendix 3 - List of Other Animals

Scientific Name	Common Name	Status
<i>Trichechus manatus</i>	West Indian Manatee	Native
<i>Crocodylus acutus</i>	American Crocodile	Native
<i>Aristelliger praesignis</i>	Croaking Lizard	Native
<i>Anolis</i> sp.		5 species listed
<i>Pseudemys terrapen</i>	Freshwater Turtle	Endemic
<i>Chrusemyss terrapen</i>	Edible Freshwater Turtle	Introduced
<i>Eleutherodactylus luteolus</i>		Endemic
<i>Eleutherodactylus gossei</i>		Endemic
<i>Eleutherodactylus johstonei</i>		Endemic
<i>Bufo marinus</i>	Cane Toad	Introduced (also <i>Rhinella marina</i>)
<i>Rana catesbiana</i>	American Bullfrog	Introduced
(from Ramsar Information Sheet and McLaren, 2016)		
<i>Pterygoplichthys pardalis</i>	Suckermouth catfish	Introduced
<i>Diapterus auratus</i>	Chad**	Native
<i>Centropomus undecimalis</i>	Snook*	Native
<i>Oreochromis mossambicus</i>	Perch*	Introduced
<i>Caranx hippos</i>	Jack*	Native
<i>Mugil curema</i>	Mullet*	Native
<i>Elops saurus</i>	Lady fish*	Native
<i>Megalops atlanticus</i>	Tarpon*	Native
<i>Gerres cinereus</i>	Yellow fin morjarra*	Native
<i>Ctenograullis edulens</i>	Sprat*	Native
<i>Hoplosternum littorale</i>	Amour-plated catfish	Introduced
<i>Syacium micrurum</i>	Flounder	Native
<i>Bairdella rhonchus</i>	Grunt**	Native

<i>Lutjanus campechanus</i>	Snapper**	Native
<i>Gobiomorous dormitor</i>	Mud fish*	Native
<i>Platybelone argalus argulus</i>	Gar fish*	Native
<i>Anguilla rostrata</i>	Eel*	Native
<i>Cyprinus carpio</i>	Carp	Introduced
<i>Gambusia melapleura</i>	Ticki Ticki	Endemic
<i>Callinectes sapidus</i>	Blue crab*	Native
<i>Macrobrachium acanthurus</i>	Shrimp	Native
<i>Macrobrachium carcinus</i>	Shrimp	Native
<i>Macrobrachium faustinum</i>	Shrimp	Native
<i>Xiphocaris elongata</i>	Shrimp	Native
<i>Atyidae</i> sp	Shrimp	Native

McLaren, 2016 and Ramsar Information Sheet) Table modified from Prospere (2016). * = Species previously recorded in the Black River Lower Morass; ** = Species from this genus have been previously recorded in the Black River Lower Morass.

Appendix 4 - Problem Tree Depicting Threats to the Protected Area Values and their Causes



Appendix 5 - Job Descriptions

Job Description – BRPL Manager

Qualifications and Experience: At least a first degree or equivalent certification, preferably in business, environmental management and/or community development with at least five years work experience including supervisory experience. Excellent communications and leadership skills. Demonstrated project management and proposal writing abilities. Familiarity with environmental management. A drivers' licence and experience would be an advantage.

Location: Within the Black River Protected Landscape and the Manager will be expected to live within or near to the PA – no further than Santa Cruz.

Reports to: BRPL Management Entity Chair

Liaises with: NEPA especially the PA Branch

Parish Council, SDC, Parish Development Committee, Black River Development Area Committee, Community Development Committees

NIC, RADA, Solid Waste Management Authority, Public Health Dept. amongst others

Supervises: Programme Officers

Job Purpose: Management of the BRPL in a manner which will achieve the goals and objectives of the protected area.

Technical/Professional Responsibilities

1. Over-arching PA management – strategic planning and management to ensure that the work-plan is being implemented in a manner which will achieve the goals and objectives of the PA as per the Management Plan.
2. Liaison and collaboration with all relevant agencies and organisations inclusive coordination and support of the meeting of the various BRPL Committees.
3. Hire, supervise, evaluate and (if necessary) terminate other staff.
4. Ensure the BRPL management meets all legal and financial requirements e.g. reporting to donors.
5. Guide and support all Programmes of the Management Plan inclusive responsibility for implementation as possible in the absence of Programme Officers and in particular, the supervision of consultants, interns, volunteers and others who might be involved in the implementation of components of the BRPL Programmes.
6. Fundraising – preparation of proposals to NRCA, Foundations, Private Sector and others to raise funds for management of the BRPL.

Other Responsibilities

Performs any other duties that support BRPL management and that may be assigned from time to time.

Job Description – Public Education and Outreach Officer

Qualifications: At least a first degree or equivalent certification, preferably in sociology and/or community development with at least four years' work experience and ideally some supervisory experience. Training in public education, social marketing and/or facilitation would be an advantage. This person should be: out-going and friendly with excellent verbal and written communication skills; comfortable in all types of settings whether a local community or a corporate meeting; able to motivate and mentor youth and have the ability to organise and conduct training activities. A driver's licence and experience would be an advantage.

Location: Within the Black River Protected Landscape and the Manager will be expected to live within or near to the PA – no further than Santa Cruz.

Reports to: BRPL Manager (or Chair of BRPL Management Entity in absence of a Manager)

Supervises: Youth Corps

Job Purpose: Management of the Public Education and Outreach Programme as described in the Management Plan and in a manner which will achieve the goals and objectives of the protected area.

Technical/Professional Responsibilities

1. Youth Corps (Year 1 and 4) – plan, organise and implement the Programme with the assistance of all relevant government agencies, corporate sponsorship and others as possible
2. Youth Corps Supervision – ensure Youth Corps members are rostered so as to implement the BRPL management programmes and that they prepare and submit all relevant reports; organise monthly Youth Corps meetings along with associated training and motivational activities to maintain the wider group.
3. Public Education – implement all public education programme activities with the help of the Youth Corps and technical assistance from NEPA.
4. Public Outreach – implement outreach programme activities particularly the conduct of surveys and facilitation of sustainable livelihoods through training, business incubator.
5. Implementation of activities under other Programmes where they involve community outreach e.g. annual Cultural Festival
6. Mobilise community participation in all BRPL activities, working through Youth Corps.

Other Responsibilities

Performs any other duties that are assigned from time to time

Job Description – Conservation Officer

Qualifications: At least a second degree or part-way through programme in environmental sciences with at least two years' work experience. Training in research techniques and reporting would be an advantage. This person should have excellent verbal and written communication skills; comfortable in all types of settings whether a local community or a corporate meeting; able to liaise with and help guide the work of researchers at different levels to ensure the benefit of BRPL management. A driver's licence and experience would be an advantage.

Location: Within the Black River Protected Landscape and the Manager will be expected to live within or near to the PA – no further than Santa Cruz.

Reports to: BRPL Manager (or Chair of BRPL Management Entity in absence of a Manager)

Job Purpose: Management of the Conservation, Research, Monitoring and Evaluation Programmes and liaison with relevant agencies and enforcement officers to ensure implementation of the Enforcement & Compliance Programme in particular the cadastral surveys and marking of the boundaries of the various zones, as described in the Management Plan and in a manner which will achieve the goals and objectives of the protected area.

Technical/Professional Responsibilities

1. Implementation of at least one of Conservation Programme Strategies and lead role in implementation of Research, Monitoring and Evaluation Programme.
2. Supervision of researchers, Youth Corps and others responsible for implementation of activities under the Conservation and Research, Monitoring and Evaluation Programmes.
3. Analysis of data and preparation of reports including Conservation Plans and Monitoring.

Other Responsibilities

Performs any other duties that are assigned from time to time

Job Description – BRPL Youth Corps Members

Qualifications: At least five CSEC subjects or equivalent including Maths and English. The following would be an advantage: subjects such as environmental science, information technology and/or tourism; work experience and interest in natural and cultural heritage. BRPL Youth Corps Members should be friendly, courteous, eager to learn, team players and should show initiative. Youth Corps Members will be trained and must successfully complete the 12 week training programme.

Location: Within the Black River Protected Landscape – BRPL Members will be selected for representation of equal numbers from each key, targeted community and its districts.

Reports to: PEO Programme Officer

Job Purpose: BRPL Youth Corps Members are responsible for assisting with the implementation of the Programmes of the BRPL by carrying out Programme activities as directed by the PEO Programme Officer.

Technical/Professional Responsibilities – to carry out assigned duties.

Duties

1. Implement community sensitisation and conduct community surveys.
2. Conduct community meetings and presentations
3. Conduct school presentations and activities with students.
4. Public education activities e.g. social media, newsletter preparation, manning exhibits
5. Assist in the Business Incubator e.g. assist clients in finding information and completing forms.
6. Assist with the organisation of events e.g. workshops, festivals
7. Assist with conservation activities e.g. wildlife monitoring, tree planting

Other Responsibilities

Performs any other duties that are assigned from time to time by the PEO Programme Officer

Appendix 6 – Detailed Budget

Governance & Administration Programme	Q1 2017/18	Q2 2017/18	Q3 2017/18	Q4 2017/18	TOTAL YR1 2017/18	YEAR 2 2018/19	YEAR 3 2019/20	YEAR 4 2020/21	YEAR 5 2021/22
RECURRENT EXPENSES									
PERSONNEL									
BRPL Manager						2,600,000	2,730,000	2,784,600	2,840,292
PEO Programme Officer	600,000	600,000	600,000	600,000	2,400,000	1,200,000	1,260,000	1,323,000	1,389,150
Conservation Officer						500,000	2,000,000	2,100,000	2,205,000
Accountant/Accounting Services					500,000	1,000,000	2,000,000	2,100,000	2,205,000
Administrative Assistant						800,000	816,000	832,320	848,966
Youth Corps (18)			1,728,000	1,536,000	3,264,000	6,960,000	8,208,000	9,072,000	9,936,000
Sub-Total	600,000	600,000	2,328,000	2,136,000	6,164,000	13,060,000	17,014,000	18,211,920	19,424,408
Uniform (polo shirts, water boots)	8,000				8,000	40,000	42,000	42,840	43,697
Training	50,000				50,000	100,000	105,000	107,100	109,242
Other	5,000	5,000	5,000	5,000	20,000	50,000	52,500	53,550	54,621
Sub-Total	63,000	5,000	5,000	5,000	78,000	190,000	199,500	203,490	207,560
Total PERSONNEL	663,000	605,000	2,333,000	2,141,000	6,242,000	13,250,000	17,213,500	18,415,410	19,631,968
SUPPLIES & SERVICES									
Office Rent & Utilities					-		630,000		

Governance & Administration Programme	Q1 2017/18	Q2 2017/18	Q3 2017/18	Q4 2017/18	TOTAL YR1 2017/18	YEAR 2 2018/19	YEAR 3 2019/20	YEAR 4 2020/21	YEAR 5 2021/22
						600,000		642,600	655,452
Office Equipment & Supplies	500,000				500,000	400,000	250,000	100,000	200,000
Stationery	15,000	15,000	15,000	15,000	60,000	120,000	126,000	128,520	131,090
Bank Charges, Audit etc.				10000	10,000	120,000	426,000	434,520	443,210
Total SUPPLIES & SERVICES	515,000	15,000	15,000	25,000	570,000	1,240,000	1,432,000	1,305,640	1,429,753
TOTAL RECURRENT EXPENSES	1,178,000	620,000	2,348,000	2,166,000	6,812,000	14,490,000	18,645,500	19,721,050	21,061,721
CAPITAL EXPENSES									
Vehicles		4,500,000			4,500,000		4,500,000		

Conservation, Monitoring & Evaluation and Enforcement & Compliance Programmes	Q1 2017/18	Q2 2017/18	Q3 2017/18	Q4 2017/18	TOTAL YR1 2017/18	YEAR 2 2018/19	YEAR 3 2019/2020	YEAR 4 2020/21	YEAR 5 2021/22
RECURRENT EXPENSES									
PERSONNEL									
Conservation Officer						500,000	2,000,000	2,040,000	2,080,800
PROGRAMME STRATEGIES									
Restore Swamp Forest and Restore Herbaceous Wetlands						7,100,000	6,100,000	6,100,000	6,100,000
Clean Rivers & Streams				5,000,000	5,000,000	20,000,000	20,000,000	20,000,000	18,000,000

Conservation, Monitoring & Evaluation and Enforcement & Compliance Programmes	Q1 2017/18	Q2 2017/18	Q3 2017/18	Q4 2017/18	TOTAL YR1 2017/18	YEAR 2 2018/19	YEAR 3 2019/2020	YEAR 4 2020/21	YEAR 5 2021/22
Wildlife Conservation						120,000	120,000	120,000	120,000
Subsistence @ \$400/dy						345,600	362,880	381,024	400,075
Transportation @ \$800/dy						691,200	725,760	762,048	800,150
TOTAL Conservation				5,000,000	5,000,000	28,756,800	27,808,640	29,403,072	27,500,225
Research, Monitoring & Evaluation Prog									
Satellite Imagery Analysis						1,500,000			2,000,000
Water Quality Monitoring				90,000	90,000	360,000	378,000	417,690	438,575
Other Research & Monitoring Costs						120,000	120,000	120,000	120,000
Subsistence @ \$400/dy						345,600	362,880	381,024	400,075
Transportation @ \$800/dy						691,200	725,760	762,048	800,150
TOTAL Monitoring & Evaluation	-	-	-	90,000	90,000	3,016,800	1,586,640	1,680,762	3,758,800
Enforcement & Compliance Prog									
Cadastral Surveys						2,000,000	2,000,000		
Miscellaneous Costs						120,000	120,000	120,000	120,000
Subsistence @ \$400/dy						345,600	362,880	381,024	400,075
Transportation @ \$800/dy						691,200	725,760	762,048	

Conservation, Monitoring & Evaluation and Enforcement & Compliance Programmes	Q1 2017/18	Q2 2017/18	Q3 2017/18	Q4 2017/18	TOTAL YR1 2017/18	YEAR 2 2018/19	YEAR 3 2019/2020	YEAR 4 2020/21	YEAR 5 2021/22
									800,150
TOTAL Enforcement & Compliance						3,156,800	3,208,640	1,263,072	1,320,226

Public Education & Outreach Programme	Q1 2017/18	Q2 2017/18	Q3 2017/18	Q4 2017/18	TOTAL YR1 2017/18	YEAR 2 2018/19	YEAR 3 2019/20	YEAR 4 2020/21	YEAR 5 2021/22
RECURRENT EXPENSES									
PERSONNEL									
BRPL Manager						2,600,000	2,730,000	2,784,600	2,840,292
PEO Programme Officer	600,000	600,000	600,000	600,000	2,400,000	1,200,000	1,224,000	1,248,480	1,273,450
Youth Corps (18)			1,728,000	1,536,000	3,264,000	6,960,000	8,208,000	9,072,000	9,936,000
Sub-Total	600,000	600,000	2,328,000	2,136,000	5,664,000	10,760,000	12,162,000	13,105,080	14,049,742
STAFF WELFARE									
Uniform (polo shirts, water boots)									
Training									
Sub-Total	-	-	-	-	-	-	-	-	-
SUPPLIES & SERVICES									
Office Rent & Utilities									
Office Equipment & Supplies									
Stationery									

Public Education & Outreach Programme	Q1 2017/18	Q2 2017/18	Q3 2017/18	Q4 2017/18	TOTAL YR1 2017/18	YEAR 2 2018/19	YEAR 3 2019/20	YEAR 4 2020/21	YEAR 5 2021/22
Sub-Total	-	-	-	-	-	-	-	-	-
PROGRAMME STRATEGIES									
Youth Corps									
Stipends (40 @ \$4,500 for 12wks)		2,160,000			2,160,000			2,376,000	
Venue Contribution		120,000			120,000			132,000	
Lunch/Refreshment		240,000			240,000			264,000	
Training & Meetings		1,000,000	30,000	30,000	1,060,000			1,166,000	
Materials & Gear including Tshirts		400,000			400,000			440,000	
Graduation		300,000			300,000			330,000	
Sub-Total	-	4,220,000	30,000	30,000	4,280,000	-	-	4,708,000	-
Community Studies & Surveys									
Community Sensitisation	330000								
KAP			1,000,000		1,000,000				1,100,000
Land Tenure and Others			750,000		750,000				
Sub-Total	330,000	-	1,750,000	-	1,750,000	-	-	-	1,100,000
Public Education									
Logo				100,000	100,000				
Website									

Public Education & Outreach Programme	Q1 2017/18	Q2 2017/18	Q3 2017/18	Q4 2017/18	TOTAL YR1 2017/18	YEAR 2 2018/19	YEAR 3 2019/20	YEAR 4 2020/21	YEAR 5 2021/22
				100,000	100,000	20,000	20,000	20,000	20,000
Brochures & Posters				300,000	300,000	300,000	300,000	300,000	300,000
Signage				900,000	900,000				
Set of Pull-up & Other Banners				350,000	350,000				
Newsletters (quarterly)		10,000	10,000	10,000	30,000	40,000	40,000	40,000	40,000
Community Meetings		90,000		90,000	180,000	180,000	180,000	180,000	180,000
Sub-Total	-	100,000	10,000	1,850,000	1,960,000	540,000	540,000	540,000	540,000
Community Schools									
Teacher Training Workshops					-	100,000	100,000	100,000	100,000
Competition					-	300,000	300,000	300,000	300,000
Field Trips					-	300,000	300,000	300,000	300,000
Sub-Total	-	-	-	-	-	700,000	700,000	700,000	700,000
Facilitating Sustainable Livelihoods									
Community Training Workshops					-	360,000	360,000	360,000	360,000
Business Incubator Services				1,000,000	1,000,000				
Sub-Total	-	-	-	1,000,000	1,000,000				
TOTAL PEO Programme									

Public Education & Outreach Programme	Q1 2017/18	Q2 2017/18	Q3 2017/18	Q4 2017/18	TOTAL YR1 2017/18	YEAR 2 2018/19	YEAR 3 2019/20	YEAR 4 2020/21	YEAR 5 2021/22
	330,000	4,320,000	1,790,000	2,880,000	8,990,000	1,240,000	1,240,000	5,948,000	2,340,000

Cultural Heritage Preservation and Recreation & Tourism Programmes	Q1 2017/18	Q2 2017/18	Q3 2017/18	Q4 2017/18	TOTAL YR1 2017/18	YEAR 2 2018/19	YEAR 3 2019/20	YEAR 4 2020/21	YEAR 5 2021/22
RECURRENT EXPENSES									
PROGRAMME STRATEGIES									
Annual Festival						3,000,000	3,060,000	3,213,000	3,373,650
Other Costs				100,000	100,000				
TOTAL Cultural Heritage Programme				100,000	100,000	3,000,000	3,060,000	3,213,000	3,373,650
Community Tourism Plans (6)						1,700,000			
Parrottee Development Plan						1,200,000			
Other Costs							500000	500000	500000
TOTAL Recreation & Tourism Programme						2,900,000	500,000	500,000	500,000

