



## **National Environment and Planning Agency**

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

***Revised Management Plan for the Mason River Protected Area (2014 – 2019)***

**with Addendum - Revised Management Programmes (2017-2022)**

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*Management Plan for the Mason River Protected Area (2014 – 2019)*

**Management Plan for the Mason River Protected Area (2014 – 2019)**  
**(Final Version)**

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## LIST OF ACRONYMS

CBD	-	Convention on Biological Diversity
COP	-	Conference of the Parties
GEF	-	Global Environment Facility
GIS	-	Geographic Information System
GPS	-	Global Positioning System
HEART/NTA	-	Human Employment and Resources Training Trust/National Training Agency
IOJ	-	Institute of Jamaica
IUCN	-	International Union for the Conservation of Nature
JNHT	-	Jamaica National Heritage Trust
LFMC	-	Local Forest Management Committee
MRPA	-	Mason River Protected Area
NEPA	-	National Environment and Planning Agency
NHMJ	-	Natural History Museum of Jamaica
NLA	-	National Land Agency
NPAS	-	Strengthening the Operational and Financial Sustainability of the National Protected Area System
NRCA	-	Natural Resources Conservation Authority
NWC	-	National Water Commission
PoWPA	-	Programme of Work on Protected Areas
RIS	-	Ramsar Information Sheet
SIRI	-	Sugar Industry Research Institute
UNDP	-	United Nations Development Programme
UWI	-	University of the West Indies
WCPA	-	World Commission on Protected Areas

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## 1. Executive Summary

For the purposes of this Management Plan, the area under consideration and referred to as the **Mason River Protected Area** (Figure 1) includes the protected areas under the jurisdiction of both the National Environment and Planning Agency (through the Natural Resources Conservation Authority (NRCA) Act) and the Jamaica National Heritage Trust . The two protected areas have slightly different boundaries with a total area of 115 ha but they overlap at the centre, to protect the area's key biodiversity and ecological values. At the core of the Mason River Protected Area is Jamaica's only documented upland wetland of its type, comprising scrub savanna, marsh and a peat bog. The wetland at the core, referred to herein as the Reserve is about 47 ha and provides habitat for several endemic species of flora and fauna including the only known location of native, insectivorous plant species.



Figure 1: Map showing the boundary of the Mason River Protected Area (MRPA)

The Mason River Protected Area straddles the boundary of the parishes of Clarendon and St. Ann, and is located in between the communities of McNie and Mason River, Clarendon and Douglas Castle, St. Ann. The area is at an elevation of about 670 meters and the landscape is quite scenic consisting of mainly undulating hills and valleys as it is located at the edge of

cockpit karst formations. The total population of the districts immediately surrounding the Protected Area is 2,372. The nearest town is Kellits, Clarendon about 4km away. Although the wider area (Lluidas Vale) is known for sugar-cane, the local communities produce mainly yam and vegetables.

The Mason River Protected Area has two management zones (each with sub-zones):-

1. The Reserve - the core zone of 47 ha geared at preserving the unique, upland wetland ecosystem and plant communities at Mason River comprised of two sub-zones:-
  - Conservation Sub-Zone – to provide facilities and services for management of the site, researchers and visitors (comprising the Field Station and existing Trails)
  - Restricted Use Sub-Zone – to provide for the strict protection of the wetland ecosystems (comprising the remainder of the Reserve).
2. The Multiple Use Zone – a surrounding zone of 68 ha with the objective of involving the local community in supporting conservation in ways that benefit them but are not detrimental to management of the Reserve. This Zone comprises three sub-zones:-
  - Water Protection Sub-Zone
  - Community Centre Sub-Zone
  - Sustainable Use Sub-Zone

The Reserve, the Water Protection and Community Centre Sub-Zones and parts of the Sustainable Use Sub-Zones have been under the management of the Institute of Jamaica since 1963 and the site is managed to protect the wetland ecosystem and for research and education.

The key conservation targets (e.g. scrub savanna, marsh, peat bog, birds, water quality) and their threats are identified, with invasive species, fire, water pollution and cutting of trees being of particular concern. Climate change was also identified as a threat to the ecosystem which will require conservation action, monitoring and research.

The vision, mission, goals and objectives are laid out and the Programmes associated with each of the goals: - Zoning, Conservation, Research, Enforcement and Compliance, Education and Public Awareness, Sustainable Livelihoods. Administration is addressed including governance,

staffing, budget and sustainable financing. A Monitoring and Evaluation Programme is described and is aimed at assessing changes in status of the key conservation targets as well as other areas related to management effectiveness – visitation, finances and community involvement. The programmatic areas are based on international and national guidelines (International Union for the Conservation of Nature (IUCN), Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) and NRCA). The goals are long-term and the objectives are to be achieved within this five year plan (2014 – 2019). The strategies and activities aimed at achieving the objectives are described along with performance indicators, resources required and the timeframe and priority ranking. All maps are based on satellite imagery from Google Earth – 6 April, 2008. A Five Year Budget is detailed and the summary is provided in Table 1 below.

**Table 1: Summary Five Year Budget**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>5 Yr Total</b>
<b>RECURRENT EXPENDITURE</b>						
Field Staff (incl. PA Manager)	2,605,264	2,813,685	3,038,780	3,281,882	3,544,433	15,284,044
Time of Other IOJ Staff	4,360,000	3,844,800	3,499,200	3,779,136	4,081,466	19,564,603
Transportation & Subsistence	655,200	707,616	764,225	825,363	891,392	3,843,797
Operational Costs e.g. Workshops, Utilities, Fuel etc.	845,000	887,250	958,230	1,034,888	1,117,679	4,843,048
<b>TOTAL RECURRENT EXP.</b>	<b>8,465,464</b>	<b>8,253,351</b>	<b>8,260,435</b>	<b>8,921,269</b>	<b>9,634,970</b>	<b>43,535,489</b>
<b>CAPITAL EXPENDITURE</b>						
Vehicle, Equipment & Repairs	3,500,000	600,000	0	300,000	0	4,400,000
Zoning Programme	20,000	935,000	500,000	0	0	1,455,000
Conservation & Research	65,000	480,000	500,000	520,000	150,000	1,735,000
Enforcement & Compliance	350,000	350,000	600,000	600,000	0	1,900,000
Education and Public Awareness	810,000	2,100,000	2,500,000	950,000	250,000	6,610,000
Sustainable Livelihoods	50,000	750,000	250,000	250,000	250,000	1,550,000
<b>TOTAL CAPITAL EXP.</b>	<b>4,795,000</b>	<b>5,215,000</b>	<b>4,370,000</b>	<b>2,620,000</b>	<b>650,000</b>	<b>17,650,000</b>
<b>GRAND TOTAL</b>	<b>13,260,464</b>	<b>13,468,351</b>	<b>12,630,435</b>	<b>11,541,269</b>	<b>10,284,970</b>	<b>61,185,489</b>

## 2. Introduction

### 2.1 Protected Areas, Wetlands and Management Plans

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)

*“an area of land or water that is managed for the protection and maintenance of its ecological systems, biodiversity and/or specific natural, cultural or aesthetic resources”* (Government of Jamaica, 1997)

These definitions are accurate for the Mason River Protected Area (MRPA) which although only legally protected since 1998 as a Game Sanctuary, was purchased in 1963 to protect the unique biological diversity discovered there (Proctor, 1970). The MRPA is primarily for the protection of wetland biodiversity and ecosystem services. According to the Ramsar Convention, wetlands:

*“include a wide variety of habitats such as marshes, peatlands, floodplains, rivers and lakes, and coastal areas such as saltmarshes, mangroves, and seagrass beds, but also coral reefs and other marine areas no deeper than six metres at low tide, as well as human-made wetlands such as waste-water treatment ponds and reservoirs.”* (Ramsar, Iran, 1971)

A 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 MRPA (inclusive of all its legal designations) in order to sustain the protection of the species and ecosystems and habitats present and the ecosystem services the site provides.

## **2.2 National Protected Area 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.

As described in section 2.1, a management plan is a tool for increasing protected area management effectiveness, hence this plan will aid in the achievement of the national project's third outcome.

## **2.3 Mason River Protected Area (MRPA)**

The MRPA covers about 115 hectares of relatively flat land with several small depressions (see Figure 1), located at an elevation of about 670 m within the hilly countryside of upper Clarendon and lower St. Ann. The site is significant as it is the only documented upland wetland of its type in Jamaica and includes a peat bog as well as scrub savanna and marsh. There are over 400 plant species of which about 90% are indigenous and 11% endemic (Davis, 2003; NEPA.gov.jm and Ramsar.org). Of particular note amongst the flora are the insectivorous species of which there are six - three native and three introduced (Campbell, 2010). There are numerous animal species including bats, birds, lizards, butterflies and other insects. The site protects a small area of natural and semi-natural ecosystems within an agricultural landscape dominated by root crops, vegetables and sugar cane.

The MRPA has an interesting history having been discovered (in terms of its biodiversity values) by two botanists Ray Loveless and Anthony D. Skelding from the University of the West Indies (UWI) in 1956. The two botanists had identified the area as being of possible interest based on an aerial photograph which showed what appeared to be a “bog” (an area characterised by spongy peat deposits, acidic water and sphagnum moss). Bogs due to the acidity and associated low nutrient content are often the habitat for carnivorous (or more accurately, insectivorous) plants. These plants are adapted to consume insects to obtain nitrogen and other nutrients not available to them from the surrounding soil and water. The area in the Mason River district, which the two botanists explored, turned out to be a wetland comprising scrub savanna, marsh and indeed a peat bog. When they brought in samples of several plants including a native insectivorous plant – Sundew (*Drosera capillaris*) to Dr. G. Proctor at the Institute of Jamaica (IOJ), he was immediately intrigued (Proctor, 1970).

The on-going botanical studies in Mason River eventually led to the purchase of the property from Mr. Harry Atkinson by the then, Jamaica National Trust Commission in 1963. The Commission turned over custody and management of the 82 hectare property to the IOJ. The IOJ is a government agency established in 1879 for the encouragement of literature, science and art in Jamaica and the Jamaica National Trust Commission was at that time an organisation within the IOJ.

The section of the MRPA with the highest botanical and ecological value, “The Reserve” (dark green at centre of Figures 1 – 3) is about 47 hectares and became the focus of protection and study with the establishment of a 3-room field station for researchers and a 2- room warden’s house for the senior warden. Figure 42 is a diagram showing this section of the Reserve. The remaining lands in the property were allocated for community use (about 2 hectares to the east), agricultural use (about 19 hectares) to the north and east of the Reserve and about 14 hectares to the south, as a “control” to see what would happen to lands left unprotected (Proctor, 1970).

The focus of MRPA management has been on research, education and protection in the Reserve. Specific activities are:- employment of two wardens, fencing of the site, maintenance of the trails established to allow the exploration of the site, maintenance of firelines, monitoring of tour visits

and internal reporting by two wardens on birdshooting seasons. The two wardens currently employed, in addition to maintaining the trails, provide a level of protection in terms of warning persons encroaching or entering the property. The site has received increased assistance from the NEPA to protect its Game Sanctuary status during the Game Bird Hunting Season.

The Mason River Protected Area has multiple designations and requires a more integrated, collaborative and strategic approach. The preparation of this Management Plan will establish a clear vision, objectives and strategies for management, mutually agreed by the stakeholders.

## **2.4 Plans, Policy and Legislative Framework**

The protection of the biodiversity and ecosystem services of the MRPA is in keeping with both national and international plans, policies and legislation.

### **2.4.1 National Policy and Legislation**

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 Mason River Protected Area will contribute to attaining these outcomes and ultimately the nation's environmental and sustainable development goals.

### **Clarendon Parish Development Order**

The Town and Country Planning (Clarendon Parish) Provisional Development Order, 1978 was confirmed in 1982. It states that all development should provide for such amenities as the local planning authority deems necessary, with due regard for *inter alia*:-



- the reservation of land for game and bird sanctuaries;
- the preservation of listed historic sites or buildings of artistic, archaeological or ecological interest including the “Mason River Botanical Station”;
- the preservation and protection of forest, woods, trees, shrubs, plants and flowers and
- prohibiting, regulating and controlling the deposit or disposal of waste materials, and refuse, the disposal of sewerage and pollution of rivers, lakes, ponds, gullies and the seashore.

Further, the Development Order states that, “areas of outstanding landscape beauty, areas of outdoor recreational potential and areas of special scientific interest due to the presence of unique fauna and flora, areas with vulnerable watershed and areas of forestry will be conserved and developments within these areas will be severely restricted”.

### **St. Ann Parish Development Order**

Part of the MRPA is located in the parish of St. Ann. Section 14 of the Town and Country Planning (St. Ann Parish) Provisional Development Order, 1998 (confirmed in 2000) requires the local planning authority to consult with (amongst other agencies) the:-

- JNHT if land to be developed is within 91 metres of a protected national heritage and
- NRCA if land to be developed is in or adjacent to ecologically sensitive areas, conservation areas or near rivers, streams or other water bodies.

The Development Order provides four objectives to guide decision-making relating to Conservation of the natural and built environment. These include: taking steps to prevent the coalescence of existing settlements, ensuring provision of public recreational facilities, preservation of areas of significance identified by the JNHT and conservation of water resources.

### **Protected Area Policy and Plan**

Jamaica’s Policy for a System of Protected Areas (1997) mentions Mason River Scientific Reserve as an example of a Category 1 site. This management plan will aid in ensuring that the MRPA makes a contribution to the goals of this policy in particular, conservation, recreation and public education. The designation and management of the Mason River Protected Area is

important for the implementation of the island's National Strategy and Action Plan on Biological Diversity in Jamaica (2003) which noted the need to protect the site. Improved management (through development and implementation of this management plan) of the site will help Jamaica achieve the conservation and sustainable resource use goals of the Convention on Biological Diversity. The MRPA helps meet the wetlands target for Jamaica's National Ecosystem Gap Assessment Report (2009) and further is the island's only "palustrine" wetland, that is, one which is neither associated with marine, coastal, riverine or lake systems.

The preparation of this management plan and its implementation will contribute to the achievement of outcomes and goals listed in **Protected Areas System Master Plan: Jamaica 2013-2017**. In particular, Strategic Outcomes 1, 2 and 5 which address representativeness, integration into broader landscape management, strategies for addressing threats, community involvement and management effectiveness.

It must be noted that this Management Plan is for a protected area which is effectively, a conglomerate of:

1. the protected areas declared and designated under the Wild Life Protection and Natural Resources Conservation Acts respectively and
2. the Protected National Heritage declared and designated under the Jamaica National Heritage Trust Act.

Therefore, the descriptions below only refer (for example with respect to area) to the particular sections of the protected area to which the specific legislation speaks.

### **Game Sanctuary**

The first legal designation of the site was in 1998, as the Mason River Savanna, Clarendon Game Sanctuary under Section 3 of the Wild Life Protection Act (1945). In Game Sanctuaries or Game Reserves (declared under Section 5 usually on private lands) it is illegal to hunt any animal or bird or to take a bird's nest or egg(s). It is also an offence to take a dog or a shotgun, catapult or other weapon capable of being used to hunt animals or birds. Over the last few years, the assistance from NEPA in terms of the presence of Game Wardens during Bird Shooting Season

has increased significantly (pers comm. M. Bruce). Signs stating “No Shooting” have been placed around the site under the National Protected Area System (NPAS) Project.

### **Protected National Heritage**

In October, 2002, the JNHT designated the Mason River Field Station as a Protected National Heritage under Section 13 of the JNHT Act (1985). The designation notes that the property includes a reserve of 122 acres (49 hectares) which contains “several unique plant species of regenerating forest and 100 square yards of bog containing several species of the moss sphagnum”. 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. There are no area specific regulations for this site.

### **Protected Area**

The MRPA was designated in November, 2002 through the Natural Resources Conservation (Mason River Protected Area) Order under Section 5 (1) (b) of the Natural Resources Conservation Authority (NRCA) Act (1991). This section provides for the designation of 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 MRPA covers 82 hectares and has the same boundary as the earlier designated Game Sanctuary. No specific regulations guiding management or activities in the protected area have been prepared, although an early draft of recommendations for regulations exists (NEPA, 2007). The latter address the powers and duties of authorised officers, refusal to comply with orders and the requirement of research permits from NEPA, provided in consultation with the IOJ. The draft also identifies a number of proposed offences including collecting or selling of plants, introduction of invasive alien species, dumping or discharge of waste, and defacing of buildings or signs. MRPA signs stating “No Trespassing” and “No Shooting” have been placed around the Reserve, under the NPAS Project

### **Tourism**

The MRPA received about 200 visitors in 2013, to tour the Loop Trail within the Reserve. These are mainly students from primary through tertiary institutions. Whilst these groups visit mainly

for educational purposes, there is scope to increase the number of visitors for both educational and recreational purposes, particularly in partnership with the local farming communities. This protected area can therefore contribute to the provision of nature, heritage-based and community tourism products as highlighted in the Master Plan for Sustainable Tourism Development – Jamaica (Commonwealth Secretariat, 2002).

## 2.4.2 International Conventions

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

In 2011, the Mason River Protected Area was recognised as a Wetland of International Importance or a Ramsar Site, under the Ramsar Convention. This Convention was adopted in 1971 and came into force internationally in 1975 and Jamaica on 7<sup>th</sup> February, 1998 (when the State Party acceded to the Convention). It 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 2009 – 2015 Strategic Plan adopted by **tenth Conference of Parties (COP)** in 2008. Several of the strategies described in the Plan relate to management of Ramsar Sites and other wetlands:-

- Strategy 2.3 addresses the implementation of management planning processes;
- Strategy 2.4 is to “maintain the ecological character of all designated Ramsar Sites, through planning and management” inclusive zoning measures and collaborative management committees and activities and
- Strategy 2.5 deals with management effectiveness assessments (which will be an early action associated with this Management Plan).

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. These handbooks

range from general guidance on management e.g. #18 – Managing Wetlands to addressing more specific issues e.g. # Water Allocation and Management. Handbook #18 provided a useful guide for the management planning process for Mason River.

### **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.

The Convention requires Parties to prepare national biodiversity strategy and action plans to ensure that this strategy is mainstreamed into the planning and activities of all those sectors whose activities can have an impact (positive and negative) on biodiversity. “*In-situ*” conservation through the establishment and management of protected areas is seen as the “cornerstone of biodiversity conservation” ([CBD.int](http://CBD.int)) and the Parties to the CBD have committed to a Programme of Work on Protected Areas (PoWPA) The Introduction to the global PoWPA ([CBD.int](http://CBD.int)) clearly states the importance of protected areas:-

*Protected areas, together with conservation, sustainable use and restoration initiatives in the wider land-and seascape are essential components in national and global biodiversity conservation strategies. They provide a range of goods and ecological services while preserving natural and cultural heritage. They can contribute to poverty alleviation by providing employment opportunities and livelihoods to people living in and around them. In addition, they also provide opportunities for research including for adaptive measures to cope with climate change, environmental education, recreation and tourism.*

Programme Element 1 of the PoWPA guides direct actions for planning, selecting, establishing, strengthening and managing protected area systems and sites. Goal 1.4 is, “to substantially improve site-based protected area planning and management” through participatory processes, identification of appropriate, measurable conservation targets, integrating climate change issues

and ensuring well-trained, equipped and properly supported staff. Goal 1.5 is, “to prevent and mitigate the negative impacts of key threats to protected areas” through rehabilitation, restoration and implementation of strategies to prevent and mitigate threats including those from invasive species. Programme Element 2 addresses Governance, Participation, Equity and Benefit Sharing. Programme Element 3 speaks to Enabling Activities and Programme Element provides guidance on Standards, Assessment and Monitoring.

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.

Individual State Parties including Jamaica have prepared individual Programmes of Work for the 2012 – 2017 period. Priority actions listed for Jamaica include effective management at ten protected areas and other activities relevant to the MRPA including financial sustainability and community involvement.

The protection and management of the MRPA therefore will aid in accomplishing goals, objectives and specific strategies of international conventions and national policies, strategies and action plans.

## **2.5 Preparation of the Management Plan**

The management planning process was guided by several documents both local and international which are listed amongst the references. These included the NRCA (1998) Draft Guidelines, IUCN Guidelines for Management Planning of Protected Areas (Thomas and Middleton, 2003) and Ramsar Handbook #18 on Managing Wetlands (Ramsar Convention Secretariat, 2010). This Management Plan was prepared using a participatory process involving a wide range of stakeholders through formal and informal approaches. A “Zoning plan and zoning maps for the Mason River Protected Area, 2014 – 2019” and a “Final Report on the Consultancy” detailing all the meetings have also been prepared to support the Management Plan.

The following steps (from Thomas and Middleton, 2003) were followed (some occurring concurrently rather than consecutively):-

1. **Pre-planning – form planning team/preliminary planning** – with the managers of the site – particularly, NEPA and the Institute of Jamaica’s Natural History Museum staff forming the core of the team working with the Consultant.
2. **Data-gathering** – from documentation and maps from the IOJ, NEPA, JNHT, National Land Agency (NLA) 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 the managers 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 the managers and other stakeholders, based on the purpose of the protected area.
7. **Preparation of Draft Zoning Plan and Management Plan** – working with stakeholders particularly NEPA and IOJ. This component included digitising existing surveyor’s maps and using GPS units to gather additional coordinates for the preparation of maps using GIS. The latter work was conducted mainly by NEPA and the IOJ.
8. **Public Consultation** – public consultation was initiated early in the process with a community consultation in December, 2013 near the Mason River/McNie border and followed by other consultation meetings and methods of obtaining information and views from the local community. The final draft zoning and management plan was presented and discussed with 38 community members from Mason River, McNie and Douglas Castle in March, 2014. Consultation through meetings, workshops and interviews, also included a variety of stakeholders from government agencies and other organisations. A list of all stakeholders involved in consultations is included at Appendix 9.
9. Preparation of Final Management Plan based on feedback from consultation and document review.

### 3. Description of the area

#### 3.1 Location and Boundaries

The coordinates of the central point of the Mason River Protected Area are: - N 18° 11' 38" W 77° 15' 46". The site straddles the boundary of Clarendon and St. Ann and is located near the geographic centre of the island of Jamaica (Proctor, 1970). The MRPA is a 115 ha property located in the community of Mason River and McNie (the name Macknie on some maps is a property name not the name of the community) about 4 km north-west of the town of Kellits, Clarendon (Farr, 1989). Mason River and part of McNie lies within Clarendon and the community of Douglas Castle, St Ann lies to the north-north-west of the property (Figure 2).

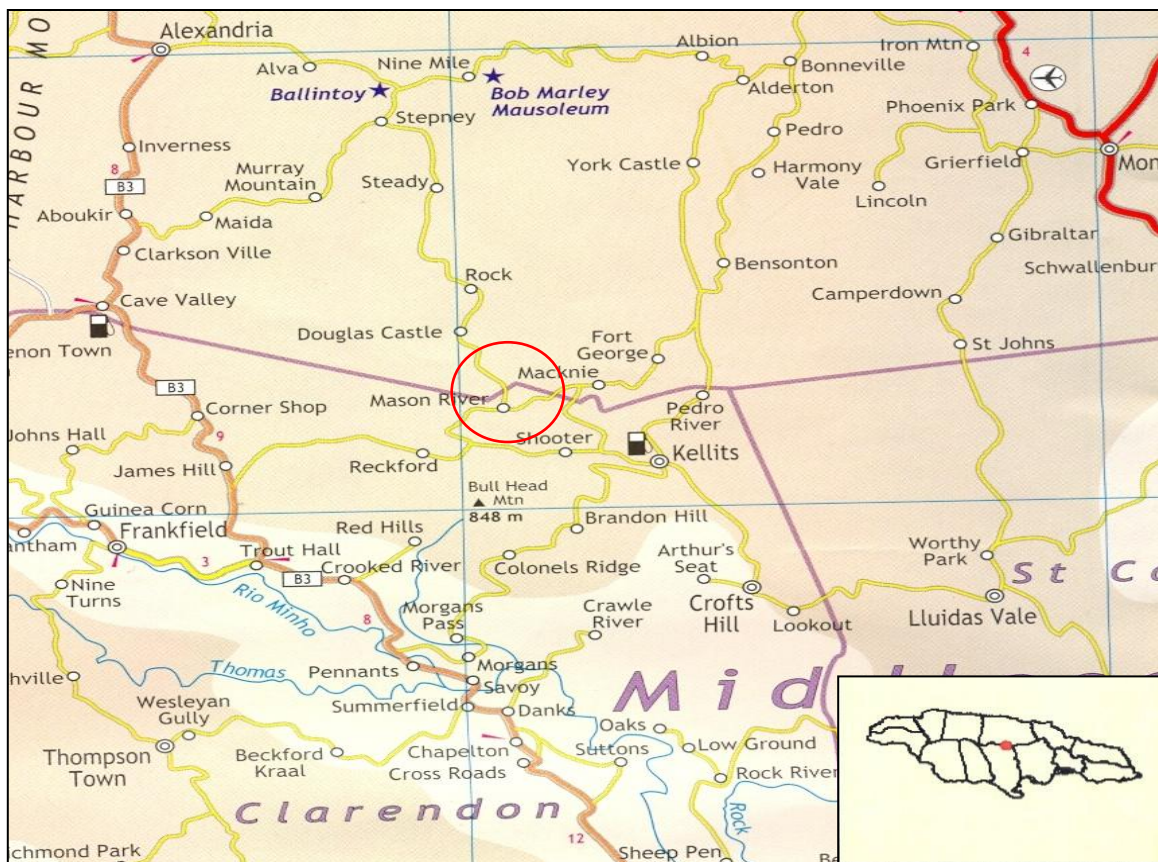


Figure 2: Map showing location of MRPA in Jamaica

#### Boundary

There are two over-lapping protected areas (Figure 3) with the shared area being the core, high biodiversity value section of the site, commonly referred to as, the Reserve:-



- (i) Mason River Protected Area: designated under the NRCA Act on boundary of the Mason River Savanna Game Sanctuary and the Mason River Bird Sanctuary and Ramsar Site.
- (ii) Mason River Protected National Heritage: designated under the JNHT Act on the boundary of the JNHT owned property purchased in 1963 to protect the Mason River wetlands.



Figure 3: Map showing two protected area designations

For the purpose of this Management Plan, the Mason River Protected Area (MRPA) is understood to include **all** the lands within **both** designations as shown in Figure 4 below.



Figure 4: Map showing boundary of the MRPA

### Neighbouring Protected Areas

The nearest protected areas are the Stephney John's Vale and Bull Head Forest Reserves designated under the Forest Act and managed by the Forestry Department. The Bull Head Forest Reserve is located about 4km south of Mason River in the Bull Head Mountains which are 840 metres at the peak. A Local Forest Management Plan was prepared in 2011 by Consultants working with the Forestry Department and the Northern Rio Minho Local Forest Management Committee (LFMC). In addition to conservation of existing forest and restoration of forest, this Plan addresses the use of the Forest Reserve by the LFMC for sustainable community tourism.

### 3.2 Socio-economic Setting

The central parishes of Jamaica are known for sugar cane plantations (Figure 5) with the Worthy Park Estate in Lluidas Vale, northern St. Catherine being one of the oldest and largest properties in the island. The Worthy Park Sugar Factory processes most of the sugar cane reaped from the communities around Kellits, Clarendon including McNie. The communities of Mason River and McNie, Clarendon and Douglas Castle, St. Ann (which are those closest to the Mason River Protected Area) are primarily agricultural based, producing yam and vegetables such as cabbage, pak choy, lettuce and peppers (Figure 6).



Figure 5: Sugarcane Field approaching Lluidas Vale (Photo courtesy: S. Otuokon)



Figure 6: Yam cultivation in McNie (Photo courtesy: S. Otuokon)

Much of the land in the area is family owned (pers comm. L. Notice) with a few large landowners including the JNHT and Shields Flower Farm. Other large land owners

immediately adjacent are Drummond and McTaggart with most of the rest of the land in the area divided into small parcels.

The town of Kellits, Clarendon is the nearest location of facilities such as the post office and clinic, remittance services, a variety of cooperative banks as well as several stores and business places. Kellits has a population of 2,105 (STATIN, 2013). McNie straddles Clarendon and St. Ann and this creates some challenges with services and projects. There is a Basic and an All Age School and students who continue their education further than Grade 9, travel to Kellits for school. There is a Human Employment and Resource Training Trust/National Training Agency (HEART Trust/NTA) Vocational Training Centre in Lluidas Vale about 8km from McNie, which offers skills training in a wide variety of areas under the commercial, construction and hospitality fields ([heart-nta.org](http://heart-nta.org) downloaded 5/1/14).

The communities immediately surrounding the Mason River Protected Area comprise five Enumeration Districts with a total population of 2,372 (STATIN, 2011) which is significantly less than the 2001 Census (Table 2 below) indicating a declining population (31% decline).

**Table 2: Population in and around the MRPA**

<b>Community</b>	<b>Enumeration District</b>	<b>2011 Population</b>	<b>2001 Population</b>
Mason River/Sandy River, Clarendon	N23	500	1,186
McNie, Clarendon	N25	295	329
McNie, Clarendon...	N27	449	822
McNie/Fort George, St. Ann	SE76	640	464
Douglas Castle, St. Ann	SW58	488	621
<b>Total Population</b>		<b>2,372</b>	<b>3,422</b>

According to the community members attending the Community Consultation 4th December, 2013, Douglas Castle is mainly residential (with fewer shops/businesses) and has a larger area with fewer people than McNie. The houses in Douglas Castle appeared to be generally newer construction suggesting that the area has been developing recently, but there is

significant new development in the Mason River and McNie areas also. Some of this development, according to community members, is being funded by family living abroad. Community members also indicated that there is a declining population because young people are leaving the area to find jobs and those that remain are having fewer children, however they felt that STATIN’s 2011 figures were very low.

According to community members, the majority of the population are farmers and there is high unemployment amongst the youth, many of whom are not interested in agriculture. There is a trend for youth to move away from the community in search of employment. Farmers apparently make a reasonable living selling their vegetables in Kellits, Lluidas Vale, Ocho Rios and Kingston (based on feedback at the 4<sup>th</sup> December, 2013 Community Consultation). Provision of taxi services and construction appeared to be thriving industries.

Electricity was introduced into McNie and Mason River in 1979 but piped water still does not exist. The community gets water from tankers, rainwater collection and the two springs within the MRPA. The roads are in poor condition although work has recently been done – grading and marling. It has been reported however, that the road will not be paved until pipes are run for water which should happen within 2014 -15. This is according to the Rural Water Supply Ltd., which has identified a source in the Bullhead Mountains and is awaiting directives from the government.

***Stakeholders***

The stakeholders or persons with interest in the MRPA are shown below in Table 3:-

**Table 3 – Stakeholder List and Analysis**

<b>Group/Organisation</b>	<b>Interest</b>
Jamaica National Heritage Trust (JNHT)	Own 82ha within the Protected Area including the wetland (Reserve). Designated it Protected National Heritage.
Institute of Jamaica (IOJ): Natural History Museum of Jamaica (NHMJ)	Convinced the then Jamaica National Trust Commission (forerunner of JNHT) to

<b>Group/Organisation</b>	<b>Interest</b>
	<p>purchase the land for conservation.</p> <p>Manage the Protected National Heritage for conservation, research and education even prior to protected area status.</p>
<p>Natural Resources Conservation Authority (NRCA) and its agent the National Environment and Planning Agency (NEPA)</p>	<p>Designated the area a Game Sanctuary and assists with enforcement during the annual Bird Shooting Season.</p> <p>Designated a Protected Area under NRCA Act and obtained assistance for management planning etc. through NPAS Project.</p> <p>Pursued (with IOJ) Ramsar Site status (international designation).</p> <p>NEPA willing to consider co-management of the site with IOJ &amp; JNHT.</p>
<p>Private landowners (to west of wetland, in the Protected Area)</p>	<p>Mainly use land for agriculture or horticulture.</p>
<p>Community members who own land around the boundary of the Protected Area</p>	<p>Their use of their land may impact the Protected Area e.g. agriculture, sewage, cattle.</p>
<p>Community farmers who lease land within the Protected Area</p>	<p>Their practices may impact the Protected Area.</p>
<p>Community students and teachers</p>	<p>Basic school is located within the JNHT property but these students do not visit the Reserve. Students from neighbouring schools visit the Reserve when invited by IOJ. The site could be used more often by community students and teachers.</p>
<p>Other/all community members</p>	<p>Would like to see some benefits to the community from the Protected Area, apart from low level of employment.</p>

### 3.3 Physical and Biological Features

#### 3.3.1 Physical Features

##### *Geology & Soils*

The MRPA is located within the Central and Eastern Limestone Region of the island which is typified by steep-sided humid tropical karst also known as cockpit karst. This type of karst is characterised by a series of cone-shaped hills separated from each other by multi-sided, closed depressions which together produce a “hummocky” landscape. This type of limestone is associated with intense weathering which often results in the formation of bauxite (Hennemann and Mantel, 1995). The Preservation Zone at the core of the MRPA is underlain by the Albert Town Member of the Yellow Limestone Group (White, 1991).

The soils in the area are deep, moderately well-drained, strongly acidic clays and clay loams (Hennemann and Mantel, 1995). The soils at the MRPA (specifically those within the core Preservation Zone) have been assessed (Evans, 2005) and identified as:-

- Deepdene Clay #98
- Boghole Clay #99
- Morass Peat #152
- Boghole Sandy Loam #199

They were found to be very acidic to extremely acidic with the waterlogged conditions contributing significantly to the low pH levels. This has resulted in several nutrients being deficient or unavailable to plants including nitrogen, phosphate, potash, calcium and magnesium and some elements e.g. iron actually exceeding the optimum range for most agricultural crops.

##### *Landscape*

The MRPA is located in the hilly region of upper Clarendon and south St. Ann at an elevation of about 670 metres. The landscape is undulating with numerous hills and valleys however the McNie and Mason River area are relatively flat (Figures 7, 8 and 9).





Figure 7: Looking NE from the MRPA Multiple Use Zone (Photo courtesy: S. Otuokon)



Figure 8: Looking NE from within the Reserve (Photo courtesy: S. Otuokon)



Figure 9: Map showing the MRPA on a topographic map

***Climate***

The Meteorological Office of Jamaica (MET Office) has maintained a station at Mason River since 1996, however the information has many gaps since data was collected manually. An

electronic system was installed in January, 2013 and so just one year's data is available from that source. Total rainfall for 2013 was 1,364 mm/yr with an average of 113mm/yr and highest rainfall in May – June and August – October as shown in Figure 10 below.

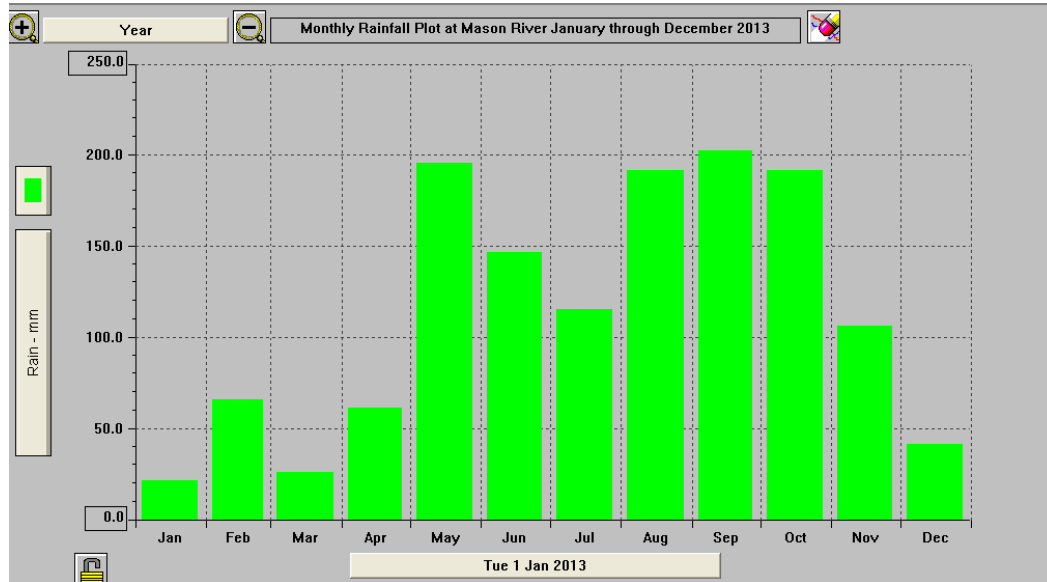


Figure 10: Rainfall for 2013 at Mason River Reserve

Mean maximum temperature is 28.2°C and mean minimum is 16.1°C as shown in Figure 11 below.

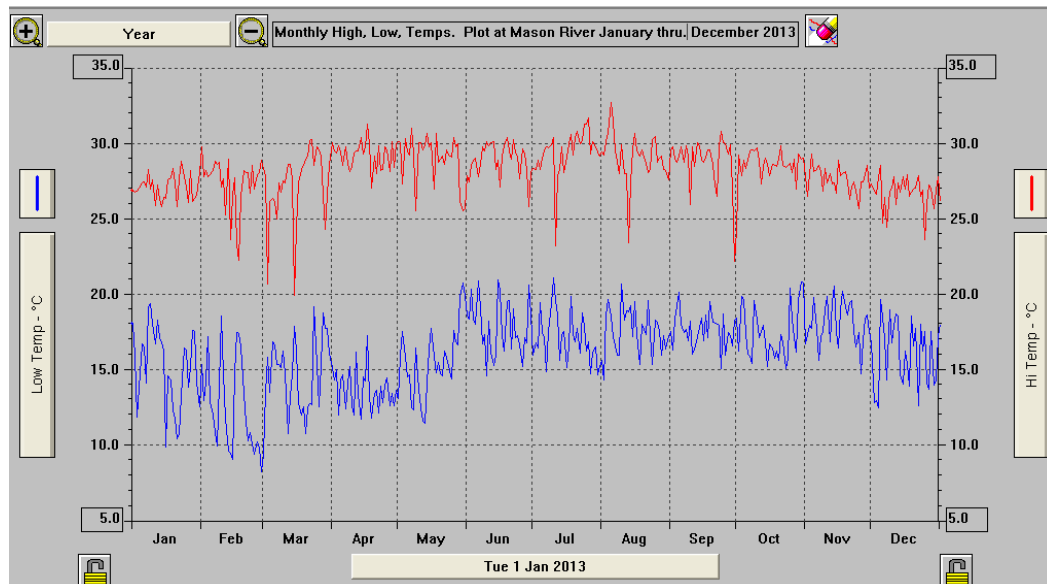


Figure 11: Monthly Maximum and Minimum Temperatures for 2013 at Mason River Reserve



The community members noted the cool climate as one of the positive features of their environment during a Community Consultation on 4<sup>th</sup> December, 2013.

### ***Hydrology***

According to White, 1991, the Mason River property straddles the surface water divide which separates the south flowing Rio Minho watershed from the north flowing Dry Harbour Mountains watershed. Surface run-off from the bog and lands south of the main McNie to Mason River Road (including the springs and underground streams located there) flow south into the Bull Head River/Pindars River tributary of the Rio Minho. Surface (and possibly underground) run-off flow north via the Blue River to Pear Tree Bottom River, Laughlands Great River and Roaring River in St. Ann. The latter information is supported by a report of an underground dye trace experiment (Smart and Smith, 1976). There is no run-off eastward to the Pedro River (Rio Cobre Basin).

The low permeability of the Yellow Limestone underlying the Reserve results in there being no significant groundwater storage in the Mason River property. The underground water exists mainly as underground streams and percolating water along joints and bedding planes (White, 1991). *Sphagnum* moss retains water and adds to the importance of the wetland ecosystem especially in the drier months (Commock et al., 2011).

There are several hydrological features comprising two main types (Figure 18):

- (i) surface water in ponds, streams and standing water (wetlands) and
- (ii) underground streams and springs.

#### (i) Surface Water

The marsh and peat bog are under water all year round and there are seasonal streams flowing in the rainy season and some time after. In addition during the rainy season, large portions of the scrub savanna are under water to varying levels (up to 15cm – pers. observation, 12/11/13). Whilst the quantity is not of great concern at the moment (although climate change is a threat and the neighbouring man-made ponds are of unknown impact) there is some concern regarding the quality of the water. Analysis (NEPA, 2012) of water samples from the stream and marsh showed high levels of faecal coliform (higher than the

standard for river quality). The bog had faecal coliform but somewhat lower than the standard. All three areas were above the standard for riverine Biological Oxygen Demand but this may be due to the high productivity of wetlands. All three water samples were lower than the standard for riverine water, being quite acidic – however this would be considered normal for peatlands and this is supported by the soil tests mentioned earlier.

There are several small isolated surface depressions within the property, in which rainwater collects and is stored for weeks and even months between rainfall events. The Peat Bog is developed in one such depression and perennially stores water inches below the peat surface. The Pond (Figure 12) on the Water Protection Sub-Zone, referred to by the IOJ as “Control Land” south of the Field Station (labelled Section 5 in Figure 9 above) is another such depression and elders in the community state that it has been full perennially since at least the time the Field Station was established. There are several seasonal ponds throughout the property which are floored not by clay but by thin soils over limestone. These ponds sustain the flow of the springs which issue south of the main road (White, 1991).



Figure 12: Pond within Protected Area south of Mason River road

Photo courtesy: S. Otuokon

#### (ii) Underground Streams and Springs

Three springs emerge on the Control Land, with the one closest to the main road being in perennial use by the community for drinking water (White, 1991). This spring (locally

known as Drip or “Jipp” has been entombed by the community and flows out of the ground through pipes as shown at Figures 13 and 14. The second spring is also in active use by the community and is referred to as “Bull”. It occurs within an area of limestone outcropping with tall trees and one can see the water flowing into the rocks and hear it flowing below the surface (Figures 15 and 16). The third spring mentioned in White, 1991 is not familiar to many community members, but it is said to be overgrown and not in use by the community (pers. comm. B. Wright, 29/1/14) - it was not visited during field trips.



Figure 13: “Jipp” Spring entombed by community  
Photo courtesy: S. Otuokon



Figure 14: Spring flows into a stream  
Photo courtesy: S. Otuokon

The brief report prepared by Michael White (White, 1991) did not provide estimates of yield but suggested that based on its perennial flow it could be assumed to have a low reliable yield of 0.25 imperial gallons per minute which would be more than adequate for a resident staff of 6 at the Reserve. There was no water quality data available at the time of White’s 1991 report and he suggested that it was likely potable bearing in mind its use by the community. However, he recommended care in the method and siting of sewage disposal to avoid faecal contamination of the spring. In August 1999 the National Water Commission (NWC) conducted tests on water samples taken from the “Jipp” Spring at Mason River and found Total Coliform of over 433 M.F. Count/100ml which is significantly over the drinking water standard of 1.1 MPN/100mL (NWC, 1999). The community collects and drinks the spring water and were told at the December, 2013 Community Consultation that there was contamination. Their response was that there have been no reports of illness, so it was safe to

drink. The IOJ had verbal reports from US Peace Corps Volunteers staying at the Reserve (years ago) of being ill after drinking the spring water (pers. comm. T. Commock 4/12/13).



Figure 15: Miss Bev collects water from “Bull” Spring (Photo courtesy: S. Otuokon)



Figure 16: Water flows south and disappears underground (Photo courtesy: S. Otuokon)

With regard to water quality and apparent faecal contamination of some water sources, it should be noted that the marsh and stream are to the north of the property and may be impacted by animals e.g. cattle. The land slopes from north to south where the springs are located and may be impacted by sewage from residences in the area. Drip or “Jipp” Spring has been entombed by community members (Figure 13) but water quality testing has not been conducted since 1999.

### *Caves*

Whilst there are no caves within the Mason River Protected Area there are at least two sinkholes, one of which is just visible from the Loop Trail in the Reserve (Figure 17). Jamaica Underground reports the “Blue River Sink” in Mason River, St. Ann as an “impenetrable sink” where a dye test gave positive results as highlighted earlier. There are however, several caves in the area including at least six (6) in the Douglas Castle area (Fincham, 1997).





Figure 17: Sinkhole - Loop Trail, Reserve (Photo courtesy: S. Otuokon)

### 3.3.2 Biological Features

The MRPA has been designated a Ramsar site because it meets criteria for containing representative, rare or unique wetland types and criteria based on species and ecological communities, specifically criteria 1 – 4 (Commock et al., 2011) as listed in Annex II of the MRPA Ramsar Information Sheet (RIS) found at Appendix 4.

The wetland is located at the centre of the MRPA, within the Reserve and is the location of numerous species of interest (Figure 18). Several endemic plant species found within the MRPA are listed on the IUCN Red List (2011); for example, *Myrcia skeldingii*, which was originally described from this locality. This species has subsequently been listed as extinct, since the plant has not been collected or seen in several decades. Other endemic plants including *Bactris jamaicana* (Prickly Pole), *Calyptanthes nodosa*, *Cordia troyana* and *Hyeronima jamaicensis* are listed as vulnerable species. While *Coccoloba plumieri*, *Gymnanthes integra*, *Phyllanthus cladanthus* and *Psychotria dolichanta* are listed as lower risk/near threatened species. *Ouratea jamaicensis* which is also endemic is listed as a species that is lower risk/near vulnerable (Commock et al., 2011).

The MRPA is an inland wetland with the following types (Commock et al, 2011) – listed in order of largest area occupied:-

- Non-forest Peatland – scrub or open bogs, swamps or fens;
- Seasonal/Intermittent/Irregular rivers/streams or creeks;
- Freshwater, tree-dominated wetlands: includes freshwater swamp forests, seasonally flooded forests, wooded swamps on inorganic soils;
- Permanent freshwater marshes/pools: ponds (below 8ha), marshes and swamps on inorganic soils, with emergent vegetation water-logged for at least most of the growing season;
- Forested peatlands – peat swamp forest;
- Seasonal/Intermittent Freshwater marshes/pools on inorganic soils, includes sloughs, potholes, seasonally flooded meadows, sedge marshes.

- Shrub dominated wetlands: shrub swamps, shrub-dominated freshwater marshes, shrub carr, alder thicket on inorganic soils;
- Karst and other subterranean hydrological systems, inland and
- Freshwater springs, oases

Weck (1970) described 13 different vegetative areas within the MRPA and a summary of these descriptions is included in the MRPA RIS (Commock et al., 2011). A simpler approach to describing the MRPA is as a wetland with three main habitats (Figure 18):-

- Scrub Savanna - which contains most of the 13 vegetative areas described by Weck and occupies the majority of the Reserve within the MRPA;
- Marsh – which occupies a small area to the north-west of the Reserve; and
- Peat Bog – which is located to the south-west of the Reserve.

The marsh and peat bog are perennially wet and the scrub savanna is seasonally wet.



Figure 18: Map of the MRPA Preservation Zone showing main features

### Scrub Savanna

A scrub savanna is an area with “stands of shrubs alternating in various patterns with grasslands in the tropics and subtropics” ([www.springerreference.com](http://www.springerreference.com) downloaded 4/1/14). In the case of the Mason River Scrub Savanna, it is seasonally wet with streams flowing through and there are numerous areas covered with sphagnum mosses, Sundew and other typical wetland species. There are 42 species of grasses (Graminae) recorded in IOJ’s Plant List for the Mason River Protected Area and Weck, 1970 describes most of this area as: “Melastome Scrub”. The IOJ Plant List catalogues 22 species of melastomes including the endemic *Blakea trinervia* commonly referred to as “Cup and Saucer” or “Jamaican Rose”. There are other shrubs or small trees including Coco Plum (*Chrysobalanus icaco*) - an important feeding tree for birds. Taller trees such as the Tarpot Tree (*Clusia rosea*) and several Palms e.g. Prickly Pole (*Bactris jamaicana*) are scattered throughout the savanna (Figures 19 and 20).

Weck (1970) describes the Mason River Scrub Savanna as a “disclimax” noting that the occurrence of stumps scattered around and the logs in the bog indicate pre-existing trees suggests that it may actually be remnants of “wet limestone forest disturbed by burning, clearing, cultivation and grazing over degraded poorly drained soils”. Proctor, 1970 and others concur with this observation. It is over thirty years since the last major fire and the area does not appear to be reverting to forest (pers. observation, Otuokon, 2013) however this succession is not being closely studied.



Figure 19: Community member photographs of the Prickly Pole during a tour

Figure 20: Tarpot Tree (*Clusia rosea*)  
(Photos courtesy: S. Otuokon)

The scrub savanna has been negatively impacted by two invasive species:-

- *Dicranopteris pectinata* – a native invasive species, locally referred to as “Vampire Fern” – it seems to have become invasive after the last fires (Figure 18)
- *Psidium cattleianum* – an alien invasive species, commonly called Strawberry Guava which was introduced, possibly for bird feeding.

### **Marsh**

A marsh is a type of wetland dominated by herbaceous rather than woody plant species (en.wikipedia.org downloaded 4/1/14). The marsh at Mason River is dominated by sedges of which 36 species have been recorded (Campbell, 2010). Sedge is the name given to members of the family Cyperaceae which are grass-like plants but with triangular rather than rounded or flattened stems. They are often found in wetlands and other locations with poor soils. The marsh is about 1 ha, located to the north-west of the Reserve (Figure 18) and dominated by sedges and grasses, in particular *Typha domingensis* sometimes called Bulrushes.

### **Peat Bog**

A peat bog is an area of “wet spongy ground of decomposing vegetation; has poorer drainage than a swamp; soil is unfit for cultivation but can be cut and dried and used for fuel”. ([www.freedictionary.com](http://www.freedictionary.com) downloaded 4/1/14). The peat bog at Mason River is about 83 square metres and located in the south of the MRPA Reserve (Figure 18). It is the only documented peat bog in Jamaica. It was the appearance of this bog on satellite imagery which caused botanists at the University of the West Indies to investigate the Mason River site. The peat bog is dominated by a fern (*Blechnum serrulatum*) and sphagnum mosses (Figure 21).





Figure 21: Peat Bog (Photo courtesy: S. Otuokon)

### ***Plants***

According to the plant list created by the IOJ Natural History Museum of Jamaica (Appendix 6.1) there are 420 plant species confirmed as at October, 2010 (Campbell, 2010). Other sources report 430 plant species of which 90% are indigenous and 11% endemic (Davis, 2003; [nepa.gov.jm](http://nepa.gov.jm) and [ramsar.org](http://ramsar.org)). It is likely that the confirmed numbers will reach those recorded earlier. The IOJ Plant List catalogues 10 species of bromeliads (Figure 27) and 21 species of orchids including *Habenaria purdiei* a rare endemic. The following groups are of particular interest:-

- **Insectivorous Plants**

Insectivorous Plants (sometimes called Carnivorous) are typical of the acidic, waterlogged conditions found at Mason River. These soils are usually low in nitrogen and other nutrients and further the nutrients are often in forms which make them unavailable to plants. Insectivory is an adaptation of plants to these conditions, whereby they catch insects to harvest the nitrogen and other nutrients from their tissues. These plants (Figures 22 – 24) are not known to occur naturally, anywhere else in Jamaica. There are three native species:-

- Sundew (*Drosera capillaris*) – which are bright red and from the same family as the Venus Flytrap
- Bladderworts (*Utricularia obtusa* and *U. pusilla*) – which are very small and inconspicuous, and three introduced species:-
- Venus Flytrap (*Dionaea muscipula*)

- Pitcher Plants (*Sarracenia minor* and *S. rubra*)



Figure 22: Venus Flytrap



Figure 23: Sundew



Figure 24: Pitcher Plant

(Photos courtesy: S. Otuokon)

- **Sphagnum Moss**

*Sphagnum* (Figure 25) is a genus of over one hundred (100) species of mosses which can store large quantities of water and are typical of peat bogs. However, because they can store water they can spread into drier conditions forming new peatlands as the younger plants grow on top of the older plants and dead moss, which decays very slowly and also holds water. At least six species of *Sphagnum* Moss have been recorded from the Mason River Protected Area (Campbell, 2010).

- **Ferns**

Over thirty (30) species of ferns have been recorded from the Mason River Protected Area including 2 species of Tree Ferns (*Cyathea* sp.), a rare endemic, *Lindsaea portoricensis* and the native invasive species *Dicranopteris pectinata* nicknamed “Vampire Fern” (Figure 26) which has invaded the Reserve including about 19% of the Loop Trail. It can be identified as the light green areas in satellite images (Figure 18).



Figure 25: Sphagnum Moss



Figure 26: Vampire Fern



Figure 27: Bromeliads in Prickly Pole Palm

(Photos courtesy: S. Otuokon)

## *Animals*

Several species of animals use the Mason River Protected Area as permanent habitat or for feeding and nesting.

### **Mammals**

Bats and specifically the Greater Antillean Long-tongued Bat (*Monophyllus redmani*) (Figure 28) are known to use the Mason River Protected Area for feeding on the nectar of flowers, fruits and insects. The Greater Antillean long-tongued Bat is regionally restricted and known to feed on the nectar of a flower locally known as Handsome Gal (*Passiflora penduliflora*) which has led to its role as an important pollinator of that plant (Kay, 2001). A colony of these bats (also known as Leach's Single leaf Bat) has begun roosting in Strawberry Guava trees on the site (pers. observation 12/11/13 and 29/1/14). These and other bats may also roost in nearby caves, as the book Jamaica Underground reports bat guano in some caves.

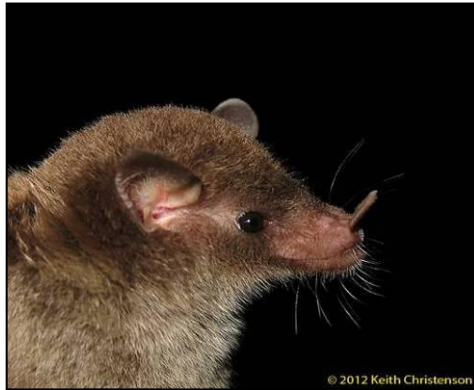


Figure 28: Greater Antillean Long-tongued Bat  
Photo courtesy: Keith Christenson

The Mongoose (*Herpestes javanicus*) is known to occur in the protected area and is considered a threat to the biodiversity of the site (IOJ, undated).

### **Birds**

A total of 55 species of birds were identified in the Mason River Protected Area during the 2000 – 2002 survey (Davis, 2003). This figure does not include “fly-over” species such as parrots, hawks, Black Swifts and Owls. Of these, 37 were found in the area known as the

Reserve whilst the others were found in the areas around. The Vervain Hummingbird (*Mellisuga minima*) - second smallest hummingbird in the world, found only in Jamaica and Hispaniola is relatively common in the Mason River Protected Area (Figure 29). The site provides important refuge (particularly during the bird shooting season) for doves such as the White Crowned Pigeon (*Patagioenas leucocephala*) commonly called, the Bald-pate (Figure 30). This Pigeon is listed as ‘Near Threatened’ (IUCN Red List of Threatened Species).



Figure 29: Vervain Hummingbird  
Photo courtesy: Miguel Landestoy



Figure 30: White-crowned Pigeon  
Photo courtesy: Georges Duriaux

There were 10 endemic species and 8 migratory species including the Connecticut Warbler (*Oporornis agilis*) of which this record is the first for Jamaica (Davis, 2001). The brochure “Fauna of Mason River” (IOJ, undated) reports slightly higher numbers: 59 species of birds, 10 of which are endemic. The complete list of species from Davis, 2003 can be found at Appendix 6.2 and the endemics are listed below in Table 4.

**Table 4 – List of Endemic Birds observed in the Mason River Protected Area**

Name	Scientific Name
Jamaican Tody	<i>Todus todus</i>
Orangequit	<i>Euneornis campestris</i>
Jamaican Euphonia	<i>Euphonia jamaica</i>
Yellow-shouldered Grassquit	<i>Loxipasser anosanthus</i>
Jamaican Elaenia	<i>Myiopagis cotta</i>



Sad Flycatcher	<i>Myiarchus barbirostris</i>
Jamaican Crow	<i>Corvus jamaicensis</i>
Red-billed Streamertail Hummingbird	<i>Trochilus polytmus</i>
Mango Hummingbird	<i>Anthracothorax mango</i>
Jamaican Stripe-headed Tanager	<i>Spindalis zena nigricephala</i>

### **Reptiles**

Three species of lizards have been recorded from Mason River:-

- Common Brown Lizard (*Anolis lineatopus*)
- Green Lizard (*Anolis grahami*)
- (*Anolis garmani*) locally referred to as the “Green Guana” as it is considered to be of iguana-like proportions (Figure 31).



Figure 31 (*Anolis garmani*)  
(Photo courtesy: S. Otuokon)

### **Amphibians**

Whilst frogs have been casually observed no studies on frogs and other amphibians have been conducted.

### **Invertebrates**

91 species of insects have been recorded at Mason River including numerous flies, wasps, grasshoppers, dragonflies and butterflies. There has been one sighting of a newly discovered (from the Cockpit Country) endemic grasshopper species (*Dellia karstica*) (Figure 32) and an endemic butterfly, the Jamaican Satyr (*Calisto zangis*) (Figure 33) is fairly common in the protected area. It should be noted that there has not been any night collecting of insects, which would likely increase the number of species recorded significantly. Since dragonflies are common and their larvae (and those of some other insects) are aquatic, it is likely the streams and waterways provide habitat for these species.



Figure 32: *Delliia karstica*  
(Photo courtesy: K. Campbell)



Figure 33: Jamaican Satyr  
(Photo courtesy: V. Turland)

### 3.4 Uses

Since 1963, the wetland ecosystem within the Mason River Protected Area has been used strictly for conservation, research and education, whilst the other areas surrounding it are either used for agriculture or were once used for agriculture and now abandoned. The wetland ecosystem at the centre of the Protected Area (the Reserve) has been studied by botanists since 1956 and reportedly some of it was in use for growing dasheen until the purchase of the property by the Jamaica National Trust Commission (now JNHT) in 1963. The elders of the Mason River/McNie community (from Community Consultation on 4<sup>th</sup> December, 2013 and other planning processes) remember that the area was in use for agriculture in their boyhood days but that the soil was not good for farming (having a marly clay soil) and most people abandoned attempts at farming on the property.

Like the rest of the McNie/Mason River/Douglas Castle area, agriculture within the Protected Area is mainly for yam and vegetables e.g tomatoes, peppers and cabbage. To the immediate west of the wetland ecosystem, along the Reserve fenceline, there are three main landowners within the Protected Area (pers. comm. L. Drummond 29/1/14):

1. Drummond with about 7 ha in parcels alternating with Shields Flower Farms in addition to other land to the west (the Drummond land was confirmed at NLA);
2. Shields Flower Farms which has about 4ha along the boundary with the central Reserve including a small parcel with irrigation ponds, about 12 ha further west used

for horticulture including greenhouses (pers comm. G. Shields 16/12/13 and L. Drummond 29/1/14). Checks with NLA showed a portion of this land as being owned by someone else but the information was dated 2002 and was not a title just a Property Description. Mr. Shields indicated that he had purchased his land from Mr. Drummond and the McConnells (the latter is not the name on the Property Description) more recently.

3. McTaggart owns the remaining lands immediately on the boundary with the Reserve to the north of the other landowners (pers. comm. L. Drummond 29/1/14). It should be noted that checks with NLA suggested that some of this land might be owned by others, however the information was dated 2002 and therefore may no longer be relevant.

Most of the land immediately west of the Reserve fence-line is covered with grass and a few trees (Figure 34) and used to be occupied by cattle, reduced due to praedial larceny. A kind of marl which used to be quarried from the wetland used to be used for wattle and daub houses which were given a thatch roof made from Foxtail grass (Figure 35) (pers. comm. L. Drummond, 29/1/14). Further west are vegetable farms (Figure 36) and Shield's Flower Farm. From north to south around these farms are residential sub-divisions within the Douglas Castle and Mason River communities. To the north-west of the Protected Area are a few limestone hills partially covered in forest, which are said to be privately owned (pers. comm. L. Drummond, 29/1/14).



Figure 34: Looking from west of Reserve near fence-line



Figure 35: Grasses including Foxtail once used as thatch  
(All photos courtesy: S. Otuokon)



Figure 36: Vegetable farming west of the Reserve

The JNHT owned lands outside of the Reserve consist of 18 hectares to the north and east of the Reserve, some of which are leased to local farmers for agricultural purposes and 15 hectares to

the south (Figures 37 – 39). Of this 15 ha, just under 1 hectare is used by the Sugar Industry Research Institute (SIRI) as a cane nursery from which sugar cane farmers can obtain sugar cane suckers for planting. This section of the Protected Area includes hydrological features including a pond and springs. The remaining lands are savanna – large areas of grass with scattered groups of trees.



Figure 37: Land east of Reserve



Figure 38: Land used by SIRI



Figure 39: Land south of the Reserve

(Photos courtesy: S. Otuokon)

### 3.5 Legal and management framework

Since the purchase of the 82 ha property in 1963 by the then, Jamaica National Trust Commission, this portion of the Mason River Protected Area has been managed by the IOJ, specifically, the Natural History Division, now, the NHMJ. In 1985, the JNHT Act resulted in the formation of the JNHT from the Jamaica National Trust Commission. All properties owned by the Jamaica National Trust Commission automatically transferred to the JNHT. The IOJ continued to manage the Mason River property and remains today, the manager of the site. In 2002, the JNHT designated the lands it owns at Mason River as Protected National Heritage. As indicated above, there are no regulations associated with the Act. The lease agreement between the JNHT and the IOJ is currently under discussion, but it is anticipated that the IOJ will continue to manage the site.



As described earlier, the Mason River Savanna Game Sanctuary was designated in 1998 under the Wild Life Protection Act, which is under the jurisdiction of the NEPA. Over the ensuing years, NEPA has increased its involvement with the Mason River site, designating the area within the Game Sanctuary boundary as a Protected Area in 2002 and later working with the relevant agencies to have this Protected Area awarded an international designation as a Ramsar Site for its wetland values. NEPA envisages a collaborative management agreement for the Mason River Protected Area and its contribution to the strengthening of Jamaica's System of Protected Areas through increased management effectiveness.

As manager of the site, the Institute is responsible for administration, maintenance and other aspects of protected area management. Currently, an Administrator within the NHMJ section of the Institute of Jamaica is responsible (along with other duties) for administration and oversight of maintenance of the area, which the Field Station staff implement. The NHMJ personnel implement conservation, research, education and other protected area management activities (in addition to duties at other locations). The Director of the NHMJ reports to the Executive Director and the Board of the Institute of Jamaica who provide over-arching guidance for the site's management.

#### **4. Identification & Analysis of Management Issues**

Based on the literature review and various consultative processes, the key conservation targets (biodiversity values) and threats to these have been identified.

##### **Key Conservation Targets**

1. Wetland Ecosystem:
  - 1a. Scrub Savanna
  - 1b. Marsh
  - 1c. Peat Bog
  
2. Species
  - 2a. Birds

- 2b. Native Insectivorous Plants
- 2c. Lower Plants e.g. Sphagnum
- 2d. Endemic Plants e.g. Orchids, Ferns

3. Water Quality of Springs and Streams

**Major Threats to Key Conservation Targets**

The main threats were identified as: invasive species, fire, cutting of trees, bird shooting, clearing trees/land and water pollution. In addition, climate change is a threat with the likely impact of drying out the wetland. Most of the other threats can be considered pressures as they are currently active. Table 5 below shows the threats, their sources and the cause or reason for the activity causing the threat.

**Table 5: Threats and their Sources**

<b>Threats</b>	<b>Source</b>	<b>Cause/Reason</b>
Invasive Species Particularly the fern <i>Dicranopteris pectinata</i> and Strawberry Guava <i>Psidium cattleianum</i> . These two species now cover a large (but not assessed) area of the Reserve	Uncertain – <i>Dicranopteris</i> sp. is native but became invasive after fire removed some vegetation. Strawberry Guava was introduced.	Strawberry Guava may have been introduced for bird-feeding (Commock et al., 2011)
Fire There have been at least 2 major fires in the last 60 years	Clearing of land for sugar-cane	Planting Crops Traditional Method used to clear land
Cutting of Trees for domestic use	Gathering materials for: Housing Furniture Fire Wood Yam Sticks Fencing	Easy Access Need for these items – economic reasons
Bird Shooting	Sport To be “marks men”	Recreation Livelihood Tradition amongst some groups/classes
Clearing of Trees for	Land space	Livelihoods (use of the land for

<b>Threats</b>	<b>Source</b>	<b>Cause/Reason</b>
Agriculture		agriculture) Easy Access to the land
Water Pollution Apparent faecal contamination found in “Jipp” spring, the marsh and seasonal streams in 1999 and 2012 tests	Lack of proper water supply Dumping of waste in water bodies From sewage, domestic animals	Convenience/Easy Access  Lack of Awareness Animals need water Lack of disposal options
Climate Change may lead to drying out of wetland	Global Anthropogenic	Jamaica not a main contributor

Other management issues that must be addressed include research, visitation, income generation and community benefits.

Tables 6 and 7 below provide analyses of the threats to the key values of the MRPA along with opportunities, threats, management constraints and strategies for management action. These analyses were developed in consultation with the stakeholders through the various consultations.

**Table 6: Analysis of Key Values, Opportunities, Threats and Possible Management Strategies**

Key Features/ Values	Significance	Status/Condition Current & Desired	Opportunities	Threats/ Pressures	Source of Threats/ Pressures	Constraints to Manage- ment	Possible Management Strategies	Information Needed for Action
<b>Sustainable Use Zone:- Community Centre, Sustainable Development &amp; Water Protection Sub-Zones</b>								
(i) Lands around Core “Reserve” (ii) Hydrological Features – springs/pond	Buffer for Core “Reserve” especially from water pollution  Benefits to, and involvement of Community  Aesthetic appeal – springs/pond	<b>Land:</b> Current: uses may not be polluting water and otherwise not environmentally sustainable Desired: agricultural & other uses are non-polluting and environmentally sustainable generally <b>Water:</b> Current: polluted Desired: clean and available for recreational and domestic use	Community uses & values water from spring and some community members think the Reserve helps protect/ maintain the water in the springs & pond	Water Pollution (sewage and oils)  Drying up of water	Housing Field Station & Community Centre Washing of vehicles  Possible Over-use Climate Change	Cost of studies & systems	1. Improve management of hydrological features/ systems 2. Improve sewage treatment – Field Station and Community Centre 3. Reduce water pollution by influencing community behaviour through: Demonstration Projects re: environmentally sustainable:- (i) agricultural practices particularly re: reducing water pollution (ii) sewage treatment (iii) car wash	1. Scope & costing of detailed hydrological study 2. Identification & costing of sewage treatment system 3. Status of piped water supply to community
<b>Reserve:- Restricted Use Sub-Zone and Conservation Zone</b>								
Only documented palustrine & upland wetland in Jamaica comprising:- Upland Scrub	Unique ecosystem	Current: Threatened by invasive species	Conservation Research Education Tourism The MRPA is a	1. Invasives	1. Native Fern: ( <i>Dicranopteris pectinata</i> ) and Alien Tree	Cost of management strategies  Limited	1. Invasives Control (based on K. Campbell’s MPhil research) etc.	Research: why <i>D pectinata</i> has become invasive (and not the other - <i>Dicranopteris</i> )

Key Features/ Values	Significance	Status/Condition Current & Desired	Opportunities	Threats/ Pressures	Source of Threats/ Pressures	Constraints to Manage- ment	Possible Management Strategies	Information Needed for Action
Savanna, Marsh & Peat Bog			small area – within about 2 – 3 hrs one can experience a wetland ecosystem and see a variety of different plant communities & species, some of which are endemic or unusual and be introduced to a variety of ecological concepts	2. Water Pollution  3. Cutting trees  4. Dry- ing out of the wetland ecosystem (potential threat)  5. Fire (potential threat) Major fires occurred 1960 & 1980	Strawberry Guava ( <i>Psidium cattleianum</i> ) 2. Sewage, agriculture – animals e.g. cattle & ferti- lisers, oils e.g. vehicles (car- washing) 3. For use as poles for domestic or other purpose or firewood 4. (i) Possible over-use of water for irrigation (ii) Climate Change  5. Clearing land adjacent for agriculture	knowledge of importance by the community	2. Improved sewage treatment, mgmt. of hydrological features & agricultural practices  3. Community tree planting on Water Protection Sub-Zone – for use for poles etc. 4. Hydrological Study & Monitoring  5. (i) Maintain fire-line (ii) Enforce no fire in Reserve	<i>flexuosa</i> ) – did the fire of 1980 cause an increase and why ?

Key Features/ Values	Significance	Status/Condition Current & Desired	Opportunities	Threats/ Pressures	Source of Threats/ Pressures	Constraints to Manage- ment	Possible Management Strategies	Information Needed for Action
				6. Agri- culture (potential) 7. Climate Change	6. Encroach- ment for agriculture 7. Global Warming	Limited information	6. Repair & Maintain fence & enforce no agriculture in Reserve 7. Monitoring	
Specific to Habitats within the Wetlands:-								
Upland Scrub Savanna – only documented in Jamaica	Unique community though Weck 1970 says it is a “dis- climax”  Provides feeding plants for birds, bats including Greater Antillean Long-tongued Bat ( <i>Monophyllus redmani</i> ) and other fauna including endemic butterflies e.g. Jamaican Satyr ( <i>Calisto zangis</i> ) & newly recognised endemic grass- hopper species ( <i>Dellia karstica</i> )	Threatened by Invasive Fern in places	Land is owned by JNHT & under active management by IOJ  Research Education Tourism	Invasives Fire Agriculture (as above)	Agriculture	Costs particularly: human resources, Transporta- tion	Address issue of possible re-growth of “forest” – needs monitoring & research	Research (IOJ): Complete mapping of Strawberry Guava as does not show up on satellite imagery Research: is it really a “disclimax” ? i.e. the climax comm- unity of wet lime- stone forest not arrived at because of burning, culti- vation and cutting of trees. May not be so, as fires occurred in 1960 & 1980 and trees have not signi- ficantly grown back over 30 yrs later. Also type of soils

Key Features/ Values	Significance	Status/Condition Current & Desired	Opportunities	Threats/ Pressures	Source of Threats/ Pressures	Constraints to Manage- ment	Possible Management Strategies	Information Needed for Action
								and peat.
Marsh	Only upland marsh documented in Jamaica	Current: Good	Research Education	Water pollution Possible impact of ponds on neighbouring land (drainage) Possible drying out due to Climate Change	Ponds on neighbouring lands to west may be increasing drainage of the marsh and grazing animals on these lands may be impacting water quality.	Limited resources	Hydrological Study and follow recommendations  Research on Marsh community and ecology	Scope and cost of Study
Peat Bog Sphagnum Moss species	Only upland Peat Bog in Jamaica	Current: Good	Research Education	Possible impact of visitors	Visitors	Limited resources	Monitor impact Research	
Sinkholes (and nearby Caves)			Research	Possible danger if deep	Garbage Visitors	Limited resources	Keep these areas out of bounds to visitors	
<b>Species – Individuals /Groups</b>								
<b>Birds</b> (i) Endemics (ii) Wetland species (iii) White Crowned Pigeon – nesting habitat (iv) Migratory species	<ul style="list-style-type: none"> <li>Ramsar Site</li> <li>Provides habitat – feeding &amp; nesting for birds</li> <li>Jamaica is a wintering or stopover site for many migratory</li> </ul>	Current status: Endemics: 10 species recorded Wetland sp.: under-studied White-crowned Pigeon: IUCN Red-listed as near	Bird Watching Research Education	Bird-shooting  Invasive fern – reduction of habitat (less birds in these areas)	Mainly “up town” & local assistance (likely would try to go in as being paid)	The IOJ does not have enough staff and financial resources to conduct regular bird surveys.	Monitoring of birds: bird banding over set period  Research  Need to develop partnerships with	Research: Bird population, distribution and ecology (bird-banding will assist)

Key Features/ Values	Significance	Status/Condition Current & Desired	Opportunities	Threats/ Pressures	Source of Threats/ Pressures	Constraints to Manage- ment	Possible Management Strategies	Information Needed for Action
	species whose well-being depends on maintenance of adequate habitats	threatened Migrants: 10 species recorded  Desired status: at least maintain adequate habitat which is a determining factor in species numbers & distribution		Maybe the Mongoose			relevant agencies/ resource persons	
<b>Bats – not of particular significance</b> (current research on Passiflora identified bats feeding on nectar are important for pollination)								
<b>Insects – not of particular significance</b>								
<b>Native Insectivorous Plants:</b> Sundew Bladderworts – soil is acidic and reduces availability of nitrates	Unique in Jamaica	Current status: found throughout Reserve	Nature Walks Research	Water pollution Oily residue in some of the pools	Possibly cattle or sewage Possibly car washing	Source not clear & cost to identify source	As per above	As per above
<b>Other plants:-</b> (i)Endemics e.g. Orchids, Melastomes, Bromeliads (ii)Lower (spore-bearing) Plants e.g. <i>Equisetum</i> , <i>Lycopodium</i> , <i>Sphagnum</i> )	Some are endemics Some of the lower plants are not common	Detailed status unknown	Research Horticulture	Drying out of wetland ecosystem	Possibly irrigation and also Climate Change	Limited resources	Conduct research	Research data



**Table 7: Analysis of Management Issues in terms of Possible Management Programmes**

Management Issues & Concerns	Conservation	Enforcement, Compliance & Legislation	Education	Sustainable Livelihoods
<p>Water Pollution of spring(s) and other water bodies from unknown source(s) possibly:-</p> <ul style="list-style-type: none"> <li>(i) Sewage from Field Station &amp; Community Centre &amp; nearby homes and/or</li> <li>(ii) cattle/animals drinking from streams and/or</li> <li>(iii) car washing</li> </ul> <p>The only testing done was of 2 samples from the “Jipp” Spring on 24/8/99 by NWC which was tested very high for Total Coliform and 1 sample each in 2012 from the Marsh, Bog and Seasonal Stream by NEPA which was above the Faecal Coliform standard for rivers</p>	<p>Conduct Study to :-</p> <ul style="list-style-type: none"> <li>(i) better understand hydrology of area inclusive issue of digging additional ponds outside the Reserve</li> <li>(ii) locate point and non-point sources of pollution and</li> <li>(iii) provide guidelines for management of hydrological features &amp; system</li> </ul> <p>Investigate &amp; install environmentally sustainable sewage treatment system within the protected area (Field Station &amp; Community Centre)</p>	<p>Enforce “No trespassing” on the protected area, particularly the Reserve &amp; Water Protection Sub-Zone (to avoid use of these sites as toilets)</p> <ul style="list-style-type: none"> <li>- Repair &amp; Maintain Fence</li> <li>- Additional Signage e.g. Zones &amp; Sub-Zones with information on objectives, rationale, use/non-use – the signage will also help to address the issue of trespassing</li> </ul>	<p>Raise awareness about the negative impacts of untreated and/or improperly treated human and animal waste on the water in the spring and raise knowledge &amp; skills re: appropriate treatment methods &amp; animal husbandry practices. Use the system installed for the protected area (Field Station &amp; Community Centre) as demonstration projects</p>	<p>Investigate ways to make the use of the pond for car washing environmentally sustainable (if possible) and seek to install system bearing in mind the need to maintain biodiversity &amp; aesthetic appeal of the site.</p> <p>Conduct Skills Training re: Animal Husbandry and Use of Fertilisers vis a vis water pollution</p>
<p>Fire (generally from nearby agricultural fields) Major fires: 1960 and 1980</p>	<p>Maintain fire-line (fire-break) around Reserve</p>	<p>No smoking in Reserve &amp; contained fires only in designated areas of Conservation Sub-Zone. No smoking and No fire signs to be placed</p>	<p>Raise awareness</p>	<p>Conduct Skills Training re: Emergency Response to Fire &amp; Environmentally Sustainable Agriculture Methods</p>
<p>Cutting of trees for use as poles/posts/firewood</p>	<p>No specific management activity identified in consultations</p>	<p>Enforce “No trespassing” on Reserve (see note re: signs above)</p>	<p>No specific management activity identified in consultations</p>	<p>Tree planting Programme on Community Centre and Water Protection Sub-Zones – for shade, beauty and use e.g.</p>

Management Issues & Concerns	Conservation	Enforcement, Compliance & Legislation	Education	Sustainable Livelihoods
				cutting of trees for posts etc. and fruit. Use endemics and natives e.g. <i>Cordia macrophylla</i> – white, fragrant flowers  Consider research regarding fuelwood to identify level of need and to recommend species based on factors including but not limited to growth rates.
Invasives	Use research data including pilot conducted by K. Campbell in his M.Phil thesis to implement an Invasives Control Programme starting with existing Wardens - Removal of <i>D. pectinata</i> (Vampire Fern) as per K. Campbell's thesis - Investigate uses of <i>P. cattleianum</i> (Strawberry Guava) which would remove it from the Reserve but be useful for MRPA & community members e.g. firewood & poles but a system would need to be in place for supervised collection.	No specific management activity identified in consultations	No specific management activity identified in consultations	Involve community members in removal and control of Vampire Fern and possible use of Strawberry Guava (e.g. as firewood until it is totally removed)
Issue of limited involvement of community members particularly from Douglas	No specific management activity identified in consultations	No specific management activity identified in consultations	Special outreach to Douglas Castle and Mason River – door to door with town crier	No specific management activity identified in consultations

<b>Management Issues &amp; Concerns</b>	<b>Conservation</b>	<b>Enforcement, Compliance &amp; Legislation</b>	<b>Education</b>	<b>Sustainable Livelihoods</b>
Castle community in meetings			Focus on agricultural practices and water protection	
Issue of limited awareness & interest/pride amongst community members vis a vis the site and fact that actually not ALL Mason River & McNie children have visited the Reserve	No specific management activity identified in consultations	No specific management activity identified in consultations	Increase and Deepen Environmental Education with McNie All Age and establish a programme for McNie Basic School. Aim to have every student at McNie All Age visit the Reserve at least once  Focus on water for the area and the significance of the site (local pride) particularly for adults.	Highlight jobs available in environmental sector, especially employment of 2 generations of MRPA Wardens from the local communities.
Concerns re: potential for over-dependence on tourism and other business for funds to protect the area, when mandate of IOJ is conservation, research & education Concerns re: need for funds for repairs to the property.	No specific management activity identified in consultations	No specific management activity identified in consultations	No specific management activity identified in consultations	Need for Business Planning  Identify ways to generate income from conservation, research and education etc.
Community Infrastructure and Socio-economic Concerns: Bad Road (although currently being repaired) No piped water (although supposedly going to be installed within the year) No jobs for young people No assistance for farmers No community group – though	No specific management activity identified in consultations	No specific management activity identified in consultations	No specific management activity identified in consultations	Follow up with authorities re: plans for road and water.  Include education and projects on water conservation  Focus of youth re: potential jobs/self-employment e.g. linked to tourism – domestic, education/research and

<b>Management Issues &amp; Concerns</b>	<b>Conservation</b>	<b>Enforcement, Compliance &amp; Legislation</b>	<b>Education</b>	<b>Sustainable Livelihoods</b>
have tried to establish in the past				foreigners Facilitate assistance for farmers through relevant agencies  Encourage and facilitate assistance for community members to establish a community organisation
IOJ should focus on conducting and facilitating research as well as protecting the site for this purpose and with a link to education at the tertiary (and other levels) to disseminate the knowledge from the research	Conduct a field assessment to identify the most vulnerable habitats to threats that should be prioritized for protection and research.	No specific management activity identified in consultations	(i)Tertiary – involve the various universities – local and foreign – field trips, research projects at all levels to Ph.D. – research prospectus, continue with Teacher Training institutions. (ii)Secondary level (CSEC & CAPE subjects) field trips (iii)Primary level – field trips	Find and facilitate ways to benefit community e.g. places for researchers to stay, lunch etc. for visitors and therefore involve community in caring for the site
Collaborative Management – (i) how can NEPA etc. be involved apart from assistance during Bird Shooting Season & through Projects e.g. NPAS (ii)how can JNHT be more involved e.g. financing, community outreach, enforcement etc (iii)involvement of other stakeholders	Agreements with NEPA and JNHT  Agreements with and between other stakeholders	Agreements with NEPA and JNHT  Agreements with and between other stakeholders	Agreements with NEPA and JNHT  Agreements with and between other stakeholders	Agreements with and between other stakeholders

## **5. Vision, Mission, Goals and Objectives**

### **5.1 Vision**

**A well managed Protected Area with: healthy ecosystem and habitats with high biodiversity maintained and threats minimised; improved infrastructure including high quality research and visitor interpretive facilities; knowledgeable local community members implementing sustainable livelihoods and with values which support conservation of the Mason River Protected Area.**

### **5.2 Mission**

To manage the Mason River Protected Area so that it contributes a locally rare ecosystem to the National Protected Area System, with management that ensures habitats are restored, threats are minimised, monitoring and enforcement are improved, awareness and understanding of the Protected Areas values are promoted, the site is used for research, education and awareness raising and these and other activities help support site management.

### **5.3 IUCN Management Category**

IUCN Protected Area categories are defined by their management objectives (Dudley, 2008). The decision regarding the most appropriate category for the Mason River Protected Areas was based on careful reading of the IUCN Guidelines for Applying Protected Area Management Categories (Dudley, 2008), deliberation at the Conservation Planning workshop and application of the Ramsar definition of a wetland as comprising several habitats.

The Mason River Protected Area is a Category IV Protected Area whose primary objective is, “to maintain, conserve and restore species and habitats”. Other objectives are, “to protect fragments of habitats as components of landscape” and “to develop public education and appreciation of the species and/or habitats concerned”.

As no category will fit exactly it should be noted that there were some aspects of Category III Protected Areas which were considered very relevant. Category III Protected Areas are, “to protect specific outstanding natural features and their associated biodiversity and habitats” but the focus was more on protection of the features – often geological than on the biodiversity.

Whilst some documents have suggested that the Mason River Reserve could be categorised as a Category 1 protected area, this designation is usually given to those sites which have been almost free from human intervention. The primary objective of a Category 1a protected area is,

“to conserve regionally, nationally or globally outstanding ecosystems, species (occurrences or aggregations) and/or geodiversity features: these attributes will have been formed mostly or entirely by non-human forces and will be degraded or destroyed when subjected to all but very light human impact” (Dudley, 2008).

The primary objective of a Category 1b protected area (Wilderness Reserve) is,

“to protect the long-term ecological integrity of natural areas that are undisturbed by significant human activity, free of modern infrastructure and where natural forces and processes predominate, so that current and future generations have the opportunity to experience such areas” (Dudley, 2008).

The Mason River Protected Area, including the core Reserve has been significantly altered by human use and impact prior to its protection in 1963. The wetland protected within the core Preservation Zone of the Protected Area is a fragment of an ecosystem and literally an island in a sea of agricultural lands. Category IV is therefore the best designation for this protected area.

## 5.4 Goals and Objectives

The goals are five-years in time-frame and are derived from the Vision and Mission and link with the management Programmes. The over-arching goal of the MRPA is,

“To protect the wetland ecosystem and biodiversity within the Reserve.”

Each management Programme has a goal and objectives geared towards achieving this over-arching goal and hence the mission and vision of the MRPA.

### 1. Zoning Programme

**Goal:** To use zoning to aid in the protection of the wetland ecosystem and biodiversity of the Protected Area.

**Objectives:**

- 1.1 To conduct further investigation towards the rationalisation of the boundaries (including changes) if deemed necessary, within the next 3 years.
- 1.2 To conduct a study to assess carrying capacity and establish Limits of Acceptable Change for the Reserve within the next 5 years.
- 1.3 To conduct hydrological studies to provide recommendations to guide management of the Water Protection Sub-Zone and the Reserve within the next 5 years.
- 1.4 To demarcate the boundaries of the key Zones and Sub-Zones to aid in their management.

### 2. Conservation Programme

**Goal:** To maintain and restore biodiversity (using Weck, 1970 as a baseline) within the Reserve.

**Objectives:**

- 2.1 To reduce cover of Vampire Fern (*Dicranopteris pectinata*) by 60% in 5 years.
- 2.2 To reduce cover of Strawberry Guava (*Psidium cattleianum*) by 60% in 5 years.
- 2.3 To restore vegetation within trail illegally cut to the east of the Reserve, in 4 years.
- 2.4 To plant trees on the Water Protection Sub-Zone for use by community to discourage cutting of trees from the Reserve.
- 2.5 To propagate and grow plant seedlings for use in restoration and enhancement of the MRPA (in a way that may help generate sustainable financing).

### **3. Research**

**Goal:** To implement and facilitate research which contributes to better understanding the special ecosystem and habitats and Mason River and to its effective management.

**Objectives:**

3.1 Conduct research fitting the mission of the IOJ and to meet the needs of the Mason River Protected Area

3.2 Promote and facilitate research (including biodiversity surveys) by IOJ staff and other institutions, through research partnerships

### **4. Enforcement & Compliance**

**Goal:** To use enforcement measures and promote compliance in order to minimise threats.

**Objectives:**

4.1 To conduct regular patrols circling the Reserve at least eight times per week (twice per day on three days of the week and once per day on the other two) stopping to check on all the Buffer

4.2 To secure the Reserve by repairing/replacing existing fencing and adding signage along fencing

4.3 To protect the Reserve from the threat of fire

4.4 To protect birds within the Game Sanctuary from bird-shooting

4.5 To encourage compliance with, and enforce relevant legislation to reduce threats to the Reserve

4.6 To prepare and gazette regulations that aid in effective management of the protected area by Year 5

### **5. Education and Public Awareness Programme**

**Goal:** To raise awareness and knowledge of visitors and the local community about the Mason River Protected Area and the Reserve in particular

**Objectives:**

5.1 To provide interpretation for visitors, that promotes support for the Protected Area



- 5.2 To raise awareness, knowledge and positive attitudes towards the Protected Area amongst local community members (targeting the 3 closest communities: McNie, Mason River and Douglas Castle)
- 5.3 To conduct targeted public education activities to address specific threats to the Protected Area
- 5.4 To implement a targeted school-based Programme to ensure all young people leaving school are aware, knowledgeable and supportive of the Protected Area (targeting the 3 closest communities: McNie, Mason River and Douglas Castle)

## **6. Sustainable Livelihoods Programme**

**Goal:** To promote and facilitate sustainable livelihoods in terms of use of lands within the Protected Area Multiple Use Zone and further afield.

**Objectives:**

- 6.1 To ensure sustainability of activities at the Protected Area and the Reserve in particular
- 6.2 To establish and operate a sustainable visitation Programme to the Protected Area (linked to the sustainable financing and marketing activities)
- 6.3 To promote and facilitate sustainable livelihoods and development within the local communities, that is environmentally sustainable and benefits the protection of the Reserve or is not detrimental to this.

The implementation of these Programmes will be supported by appropriate Governance and Administration as described in Chapter 8. The identification of deliverables or outputs for each management Programme will allow for the assessment of management inputs. Monitoring and evaluation of outcomes is described in Chapter 9.

## 6. Zoning Plan and Maps

The details of this Zoning Plan are found in the Mason River Protected Area Zoning Plan 2014 – 2019 (Otuokon, 2014) which was prepared in conjunction with this Management Plan. The purpose of a Zoning Plan is to guide effective management by identifying different geographical areas with different purposes based on their features and providing details as to how each should be managed (Thomas and Middleton, 2003). The Plan was guided *inter alia* by literature review, stakeholder consultation, current uses and values of the different geographical areas within the Protected Area. Satellite imagery for all maps is from Google – April 6, 2008.

The Ramsar Handbook #18 on Wetlands Management recommends zoning particularly when the site comprises not only the wetland but substantial areas of surrounding non-wetland habitats, often with multiple uses. Further, in a similar manner to the IUCN, Ramsar recommends establishment of a buffer zone around the core wetland area. This Multiple Use Zone area would include lands where activities may impact the ecological character of the wetland and therefore land use within the Multiple Use Zone should be sustainable and consistent with the maintenance of the wetland. Handbook #18 recommends complementary and mutually supportive objectives within the various zones and establishment of zoning for particular uses e.g. ecotourism.

### 6.1 Boundary description for each zone

The MRPA has two zones (Figure 40) :-

- (i) **The Preservation Zone** (henceforth referred to as the Reserve) – the core zone of 47 ha geared at preserving the unique, upland wetland ecosystem and plant communities at Mason River
- (ii) **The Multiple Use Zone** – a surrounding zone of 68 ha with the objective of involving the local community in supporting conservation in ways that benefit them but are not detrimental to management of the Reserve.

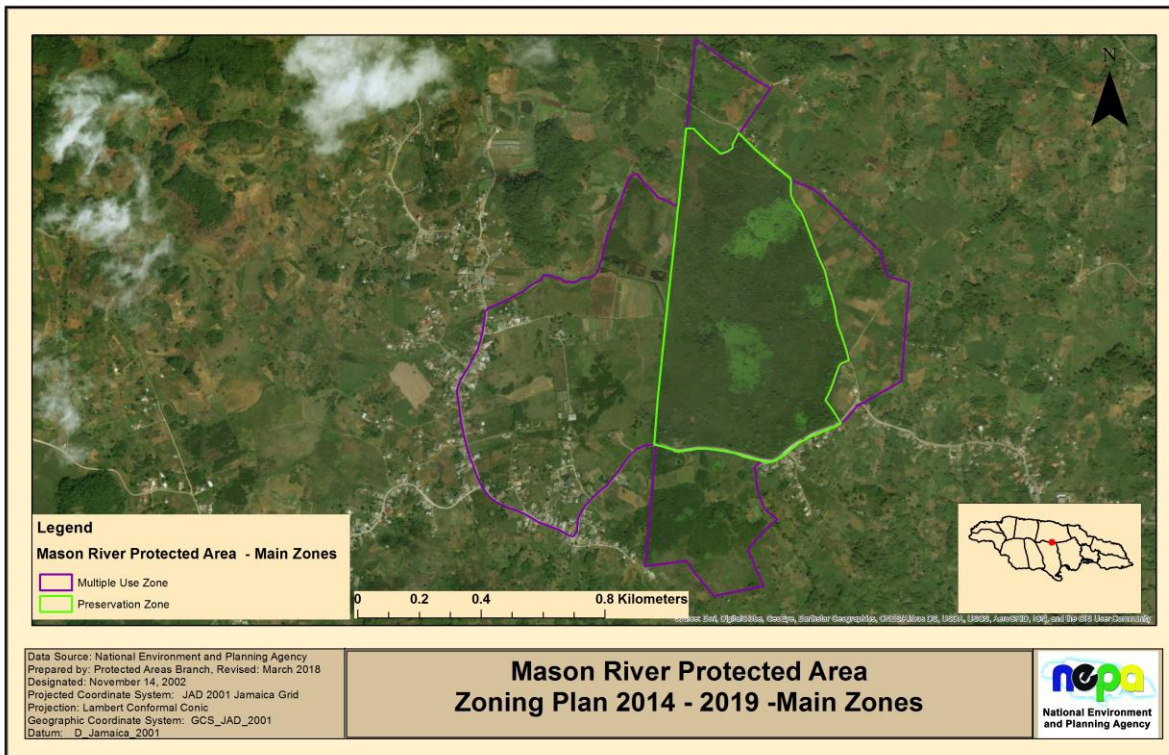


Figure 40: Map showing the Two Zones in the MRPA

Each of the two zones has sub-zones (Figure 41):-

1. **The Preservation Zone** has two sub-zones:-

- **Conservation Sub-Zone** – to conserve natural and cultural characteristics of the landscape and provide for modest levels of recreational use including facilities and services for management of the site, researchers and visitors (comprising the Field Station and existing Trails)
- **Restricted Use Sub-Zone** – to provide for the strict protection of the wetland ecosystems (comprising the remainder of the Reserve).

2. **The Multiple Use Zone** – a surrounding zone of 68 ha with the objective of involving the local community in supporting conservation in ways that result in sustainable livelihoods and development, but are not detrimental to management of the Reserve.

This Zone comprises three sub-zones:-

- **Water Protection Sub-Zone** - to protect hydrological features (springs and pond)
- **Community Centre Sub-Zone** – for community use and benefit

- **Sustainable Use Sub-Zone** – to help protect the special ecosystem and habitats within the Reserve by promoting sustainable use of these lands.

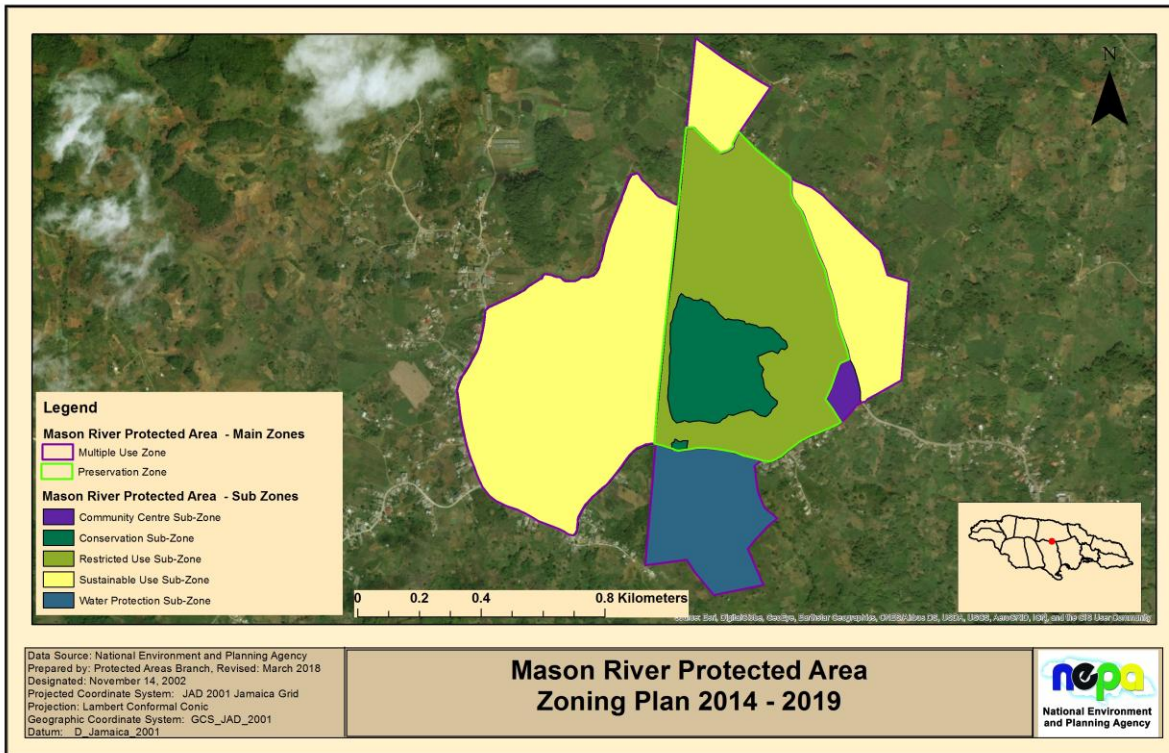


Figure 41: Map showing Sub-Zones of the MRPA

The detailed boundary descriptions with coordinates are provided in the MRPA Zoning Plan and Maps.



## 6.2 Objectives and rationale for each zone

### 6.2.1 Reserve

The Reserve is 47 hectares (Figure 42). It is defined by the extent of the wetland and is located at the centre of the MRPA.

**Primary Objective:** To protect the wetland ecosystem, communities and species in addition to the ecosystem services provided.

**Secondary Objectives:**

- To conduct and promote research and monitoring to help better understand and protect the ecosystems and species therein.
- To ensure the sustainability of management and protection of the ecosystems and associated species and services by providing support for these activities including income generation through visitation and other activities which would benefit but not be detrimental to the site.

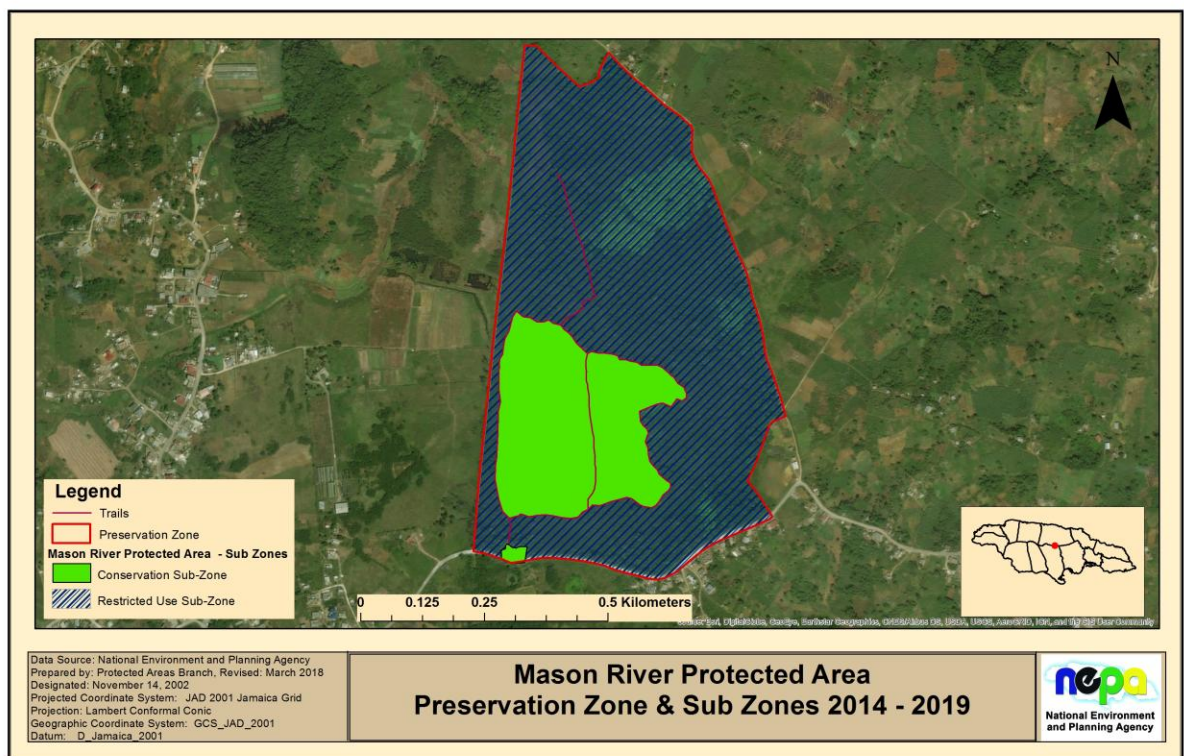


Figure 42: Satellite Image showing boundary of the MRPA Reserve and Sub-Zones

## **Rationale/Justification**

This zone will simply be referred to as the “Reserve” providing continuity as this is the name the IOJ has been calling the central wetland ecosystem within the Protected National Heritage they manage. This is the area where the wetland ecosystems, communities and species are located. All the other lands within the property have been totally converted to agriculture and rinate prior to the acquisition of the lands in the 1960s. The Reserve therefore protects the values for which the area has been designated both nationally and internationally. These values include the ecosystem services (referred to in the Primary Objective) and are *inter alia* water supply and climate change adaptation.

## **Uses**

The types of uses allowed within the Reserve depend on the Sub-Zone – whether Conservation or Restricted Use. The uses approved or prohibited are based on the objectives of the Reserve and the specific sub-zone hence activities which threaten ecosystem health, water levels and quality should be prohibited from the Reserve. Within the Conservation Sub-Zone, there may be some such activities but not if they do not contribute to visitor safety and conservation work. The two Sub-Zones are described in Table 8 below.

**Table 8: Description of Reserve Sub-Zones**

	<b>ConservationSub-Zone</b>	<b>Restricted Use Sub-Zone</b>
<b>Description</b>	The ConservationSub-Zone is about 10 hectares and is located in the south-western section of the Reserve. It has 2 sections joined by a trail - the area at the entrance along the Mason River road including the Field Station and Warden’s House and inside and 3 metres around the Loop Trail (Figure 42 and 43).	The Restricted Use Sub-Zone is about 37 hectares and comprises the majority of the Reserve excluding the Visitor Use Sub-Zone which is bounded by trails as shown in Figure 42.
<b>Objective</b>	To provide facilities and services for management of the site, researchers and visitors, in a way that generates income to help support management of the site but in ways that are not detrimental.	To provide for the strict protection of the wetland ecosystems and research only.
<b>Rationale/ Justification</b>	The section of the ConservationSub-Zone to the south and immediately adjacent to the road has formed the entry and main service area for the Reserve since its purchase. The Loop Trail was more recently developed and is used by the management of the site for research and visitation. These areas have already been partially developed for use by the managers, visitors and researchers. A protected area must have facilities which are best concentrated in the least ecologically valuable part of the site - this is the case.	To protect, preserve and conserve the wetland ecosystem for its biodiversity and ecosystem services, it is best to restrict use, particularly as the area is so small and the Reserve contains the only remaining fragment. Therefore, whilst a small section will be used for visitors, researchers, education and other protected area management activities, the majority of the Reserve will be restricted for use only by researchers with permits.
<b>Approved Uses /Activities</b>	<p>a. Conservation and other Protected Area Management activities;</p> <p>b. Research and Monitoring – Site manager and others (with permits inclusive site manager permission) including the Metereological Service of Jamaica (MET Office) personnel since the MET Office has a station at this location. Educational and Ecotourism Tours – school groups (primary through tertiary), youth groups, interest groups e.g. horticulture, bird-watching.</p> <p style="text-align: center;"><b>ConservationUse Sub-Zone</b></p>	<p>a. Research and Monitoring – Site Managers and others (with special permits inclusive site management permission) including the Metereological Office personnel as needed (since the MET Office has a station at this location).</p> <p>b. Conservation activities e.g. control of alien invasive species e.g. Vampire Fern (<i>Dicranopteris</i> sp.) and Strawberry Guava (<i>Psidium cattleianum</i>); fire control zone; habitat restoration with appropriate native species.</p> <p style="text-align: center;"><b>Restricted Use Sub-Zone</b></p>

<p><b>Approved Uses /Activities</b></p>	<ul style="list-style-type: none"> <li>c. Recreation – domestic tourists (residents) and foreign (non-residents) e.g. nature tours, bird-watching, photography, painting.</li> <li>d. Residential – for the purpose of site management and to facilitate research (numbers to be based on carrying capacity and special care to be taken vis a vis sewage disposal to avoid contamination of the ground water and solid waste management): <ul style="list-style-type: none"> <li>1. for Senior Warden (permanent) at the Warden’s House</li> <li>2. for Researchers (IOJ and others on short term basis) at the Field Station</li> <li>3. Camping (by researchers and other groups)</li> </ul> </li> </ul>	
<p><b>Prohibited Uses /Activities</b></p>	<ul style="list-style-type: none"> <li>a. Major Construction – any structure larger than those existing, although repairs, extension and re-building (if deemed necessary) of more durable structures on the footprints of existing buildings (with possible addition of a total of up to 50 m<sup>2</sup> for use by staff and researchers – primarily office/lab space). The decision to construct should also be based on the ecological footprint of the new construction. Consideration to be given for one building to have an upstairs section for use in viewing the Reserve from a height e.g. to look-out for fires and trespassers. Approval from requisite agencies as necessary for construction.</li> <li>b. Cutting or removing of plants except for invasive species being controlled or where necessary for research and monitoring or where essential for construction/repairs.</li> <li>c. Hunting or harming of animals (including eggs, their habitats and/or nests).</li> </ul> <p style="text-align: center;"><b>ConservationSub-Zone</b></p>	<ul style="list-style-type: none"> <li>a. Construction of any permanent buildings or structures.</li> <li>b. Residential.</li> <li>c. Educational Tours (Research use may include taking a group of tertiary level students for some type of research activity e.g. sampling plots but general education tours should not be allowed as there is adequate provision in other areas of the Reserve).</li> <li>d. Recreation.</li> <li>e. Cutting or removing of plants except for invasive species being controlled or if necessary for research or monitoring.</li> <li>f. Hunting or harming of animals (including eggs, their habitats and/or nests).</li> <li>g. Fires.</li> </ul>



	<p>d. Fires – outside designated areas.  e. Littering/Dumping of garbage/solid waste on the property (receptacles to be used).</p>	
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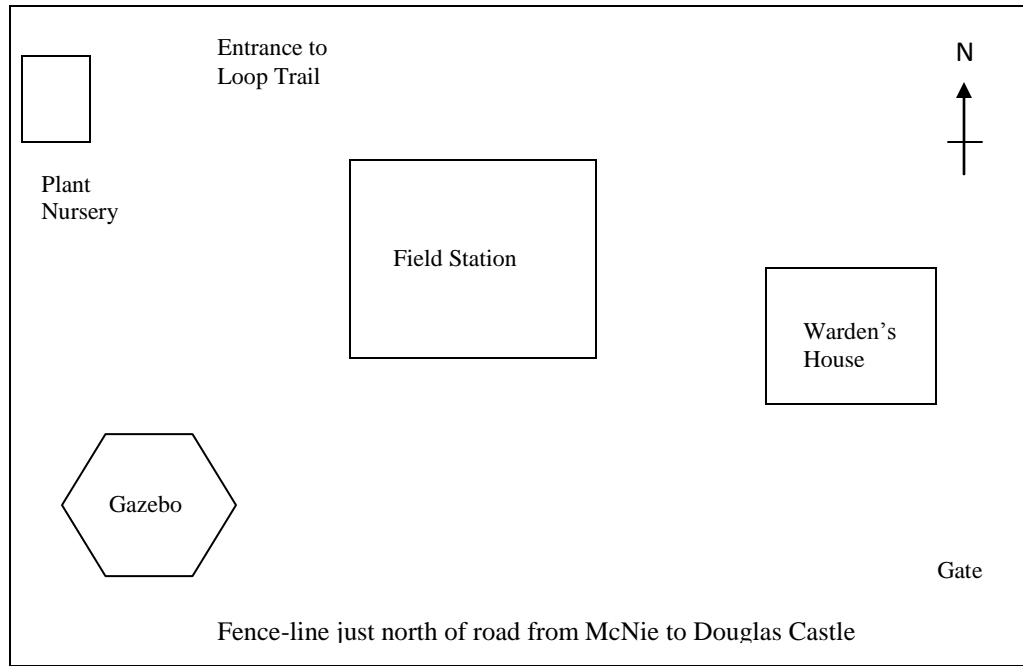


Figure 43: Diagram showing structures to south of the Conservation Sub-Zone (not to scale)

## 6.2.2 Multiple Use Zone

The Multiple Use Zone is about 68 hectares and is located around the Reserve, in five sections (Figure 44). Three form the Sustainable Use Sub-Zone and the other two are the Community Centre Sub-Zone and the Water Protection Sub-Zone.

**Primary Objective:** To help ensure the sustainability of management of the protected area by garnering community support through the facilitation of community development that is environmentally sustainable and benefits the protection of the Reserve or is not detrimental to this.

**Secondary Objectives:** To provide some level of buffering for the Reserve by promoting environmentally sustainable practices.

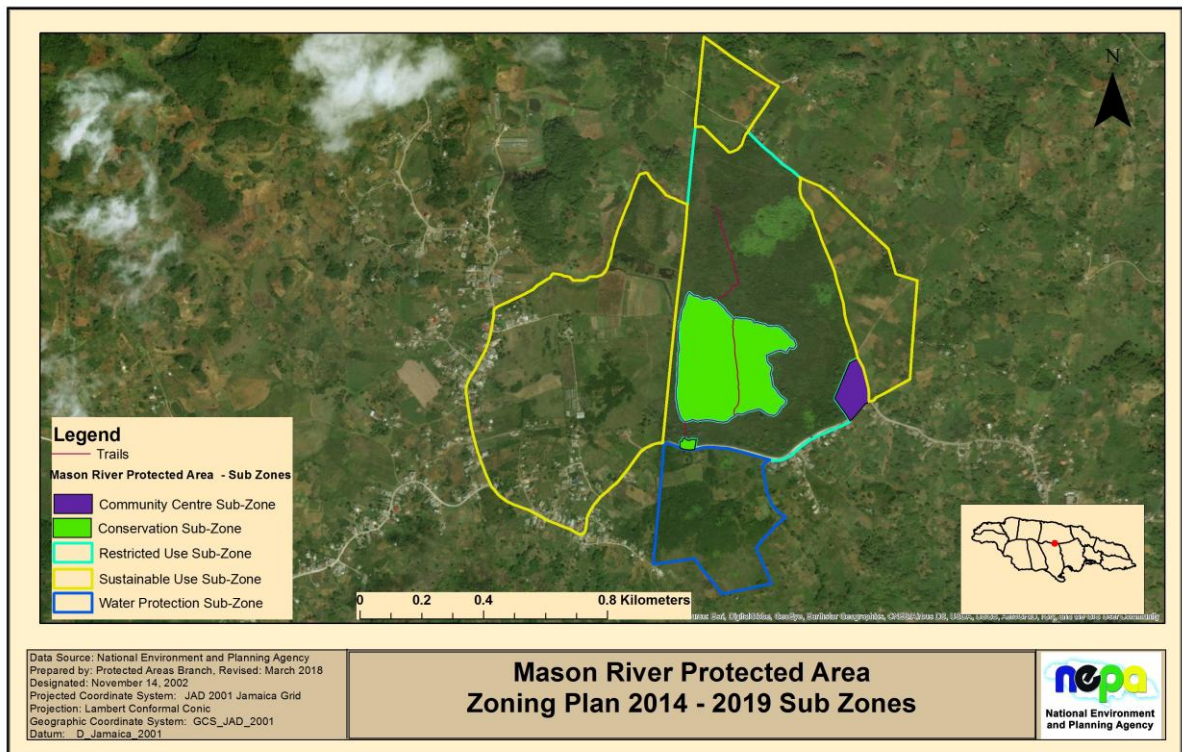


Figure 44: Satellite Image showing MRPA Zones and Sub-Zones

## Rationale

The lands referred to here are either privately owned or within the JNHT property but all had been totally converted to agriculture or left in ruinate prior to the 1960s. The land in the Sustainable Community Use Zone does not have any strict conservation values. Further, this area has been left out of the Reserve fence and given over to use by the community. It would be prudent therefore, to use these lands to more effectively garner community support for the protected area by facilitating (more purposefully) benefits through sustainable community use inclusive recreation and tourism, education and training opportunities.

## Uses

The types of uses allowed within the Multiple Use Zone depends on which of the three Sub-Zones is specified as each has different objectives.

### (i) Sustainable Use Sub-Zone

The Sustainable Use Sub-Zone is about 51 hectares and has three sections:-

A: located west of the Reserve on land owned by several private individuals (Figure 45)

B: located north of the Reserve on JNHT owned land (Figure 46) and

C: located east of the Reserve on JNHT owned land (Figure 47).

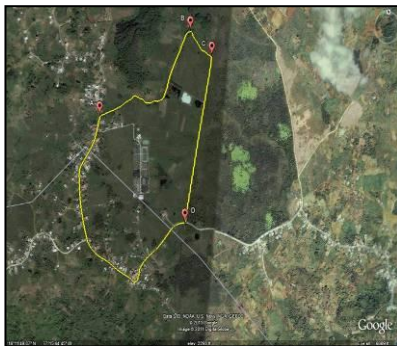


Figure 45: Sub-Zone A



Figure 46: Sub-Zone B



Figure 47: Sub-Zone C

**Objective:** To provide for and facilitate sustainable development, primarily agriculture implemented by private landowners or Protected Area management in conjunction with the community.

### **Rationale/Justification**

The lands within the Sustainable Use Sub- Zone (whether A, B or C) are all in use for agriculture and have been so prior to the 1960s. In Sub-Zone A which is privately owned there is also horticultural and residential use. Sub-Zones B and C were set aside in the 1960s by IOJ for use for agriculture by the local communities, to aid in engendering support for conservation of the Reserve. This purpose is to be maintained with a focus on improving the environmental sustainability of the agricultural, horticultural and domestic practices.

### **Approved and Prohibited Activities**

#### **Approved Activities:**

- Agriculture and Horticulture (with increasing levels of environmentally sustainable approaches);
- Residential (development that addresses environmental concerns and will not have a negative impact on the Reserve e.g. through water pollution) and
- Other sustainable development activities to be determined

#### **Prohibited Activities:**

Activities which threaten ecosystem health, water levels and quality should be prohibited e.g. major industrial i.e. no large-scale factories; environmentally unsustainable agricultural practices.

## (ii) Water Protection Sub-Zone

The Water Protection Sub-Zone is about 15 hectares and is located south of the Reserve across the Mason River Road.

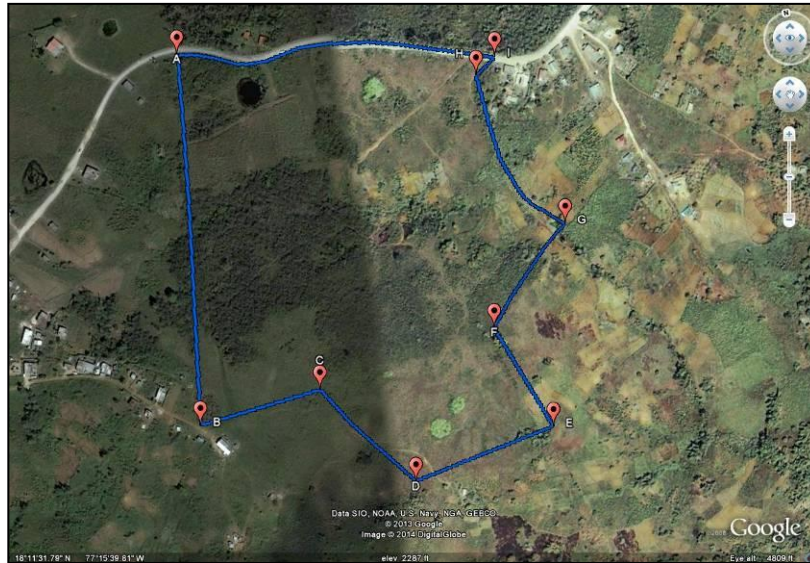


Figure 48: Satellite Image showing Water Protection Sub-Zone

**Objective:** To provide for protection of the hydrological features – springs and pond, particularly in terms of water quality.

### Rationale

This sub-zone has several hydrological surface features – a pond and three springs, two of which are used by the local community. There are likely underground aquifers linking these features and also those in the wetland. Whilst this area is the original “Control” Area according to Proctor, 1970, and apart from formal use by SIRI, it is recommended that the area should be more carefully managed, particularly for water protection.

### Approved and Prohibited Activities

#### Approved Activities:

- Protection of springs as deemed necessary by the studies conducted;
- Collection of water for domestic purposes;



- Light recreation e.g. picnicking, nature walks (limited construction);
- Small scale agriculture and agro-forestry (with restricted application of any fertilisers or other chemicals). This includes the continued use (under lease) by SIRI of under 1 ha as a sugar-cane nursery (inclusive harvesting if the cane is not used as nursery material but rather allowed to grow to maturity);
- Trees planted for sustainable harvesting of wood for fencing, firewood etc. and
- Sustainable Development Demonstration Projects as appropriate.

**Prohibited Activities:**

Activities which threaten water levels and quality should be prohibited e.g.:

- Removal of vegetation (except as applies to the sugar-cane nursery) without permission from management e.g. for fence posts and firewood if done according to approved methodology e.g. coppicing and re-planting, and
- Large-scale agriculture or major development e.g. involving the movement of soil/land using heavy equipment.

These are to be further determined by the hydrological studies to be implemented.

**(iii) Community Centre Sub-Zone**

The Community Centre Sub-Zone is about 2 hectares and located at the south-eastern edge of the Reserve adjacent to the intersection of McNie Road, Mason River to Douglas Castle Road and the “motorable track” which runs north between the Reserve and Sustainable Use Sub-Zone C.

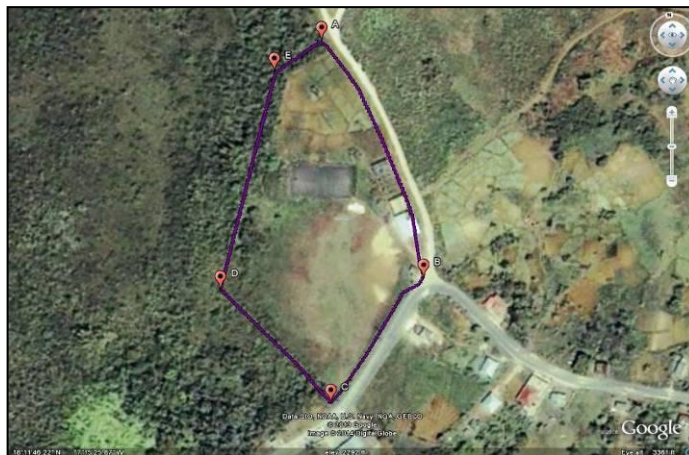


Figure 49: Satellite Image showing the Community Centre Sub-Zone

**Objective:** To provide for and facilitate sustainable development of the local community.

### **Rationale/Justification**

These lands have been in use by the local community since the 1970s and are the location of the Community Centre which houses the local basic school. The playing fields are used by the community, mainly for football and events e.g. treat for children at Christmas. Currently, the Community Centre is in disrepair due to hurricane damage however, if it had a roof and electricity it could be put to better use by the community for activities e.g. recreation/tourism linked to the MRPA amongst other things.

### **Approved and Prohibited Activities**

#### **Approved Activities:**

- Recreation and Sports (Playing Fields and Games/Courts);
- Tourism (fairs/hosting of visitors for food, refreshment etc);
- Education (location of existing basic school) and Educational Activities;
- Training/meetings/community development (community centre) and
- Limited environmentally sustainable development and construction including repairs and expansion of Community Centre for improvements to the existing basic school and to provide other facilities e.g. for training centre, improvement/additions to playing fields, construction of gazebos/stalls and bathroom facilities. All construction, maintenance and operations must address environmental concerns such as sewage, water use, solid waste, energy efficiency;
- Planting of native and non-invasive introduced species e.g. fruit trees.

#### **Prohibited Activities:**

Development, construction or use that is not deemed appropriate and environmentally sustainable by management, should be prohibited e.g.:

- No use of fire near Reserve boundary and
- No dumping of solid or other waste.

## 7. Management Programmes

The following management Programmes are based on international and national guidelines for protected area management e.g. IUCN, Ramsar, NRCA. The goals for each Programme are meant to be long-term and will likely extend beyond the time-frame of this management plan (2014 – 2019). The objectives are medium term and should be achieved within the five year time-frame of this plan. This however, will be dependent mainly on funding to access the necessary resources and options have been provided to reduce the funding required. The deliverables are the useful outputs from each of the activity sets and their delivery will indicate successful implementation of the relevant strategy. Prioritisation was based on a score of (1) – (3) with one indicating highest priority and this was based on how critical the activity is to effective management and the dependence of one activity on another.

### 7.1 Zoning Programme

**Goal:** To use zoning to aid in the protection of the wetland ecosystem and biodiversity of the Protected Area.

**Objective 1:** To conduct further investigation towards the rationalisation of the boundaries (including changes) if deemed necessary, within the next 3 years.

**Table 9.1: Description of Implementation of Zoning Programme Objective 1**

Strategies/Activities	Deliverables	Resources	Timeframe & (Priority)
Within the first two years, address the disparity in the boundaries of the protected areas (those under NEPA’s jurisdiction with those under JNHT designation) and the issue of private land inclusion by conducting field studies and stakeholder consultations.			
1. Conduct desk and field studies to (i) Identify land owners (will require NLA search and interviews within community – this could be done in conjunction with the Survey at Strategy 2) (ii) Assess the privately owned land (which is	Land ownership and Conservation Value Report (with recommendations regarding the boundary)	Consultant (\$200,000) or Intern Fees to NLA: @ \$500/search – estimate \$10,000	Timeframe: 4 months in Year 1  Priority: (1)



Strategies/Activities	Deliverables	Resources	Timeframe & (Priority)
<p>within the protected area designated under NEPA’s jurisdiction but outside the Preservation Zone) for their conservation value, and</p> <p>(iii) assess other nearby areas outside both protected area boundaries, which may be of conservation value e.g. land to the north-west which appears to be forested on hills of about 720m and nearby caves.</p> <p>(iv) Collate and analyse information to provide a report on Land ownership and conservation value and provide recommendations regarding the existing boundary.</p>		<p>Plus other: \$25,000 Not included in budget – it has been subsumed in Strategy 2.</p> <p>IOJ staff could conduct biological assessments following field visits – would need about \$20,000</p>	
<p>2. Conduct a Community Survey (in conjunction Public Education Programme activities) and stakeholder consultations to assess the willingness of landowners to implement conservation practices and design Programmes to facilitate this.</p> <p>The Community Survey should be door to door within all 3 communities and should include:-</p> <ul style="list-style-type: none"> <li>• Demographic information – age, sex, education level, occupation/income</li> <li>• Land ownership</li> <li>• 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</li> <li>• Knowledge, attitudes and practices</li> </ul>	<p>Survey and Consultation Report</p> <p>Sustainable Use Education &amp; Community Outreach Plan</p>	<p>Consultant inclusive personnel for survey – could be local community members (after training)(\$400,000 – includes Strategy 1/Activity 2 at significantly decreased cost)</p> <p>Assistance can be sought from SDC as they implement such surveys but likely do not have the funding.</p>	<p>Timeframe: 6 months in Year 1 Priority: (1)</p>

Strategies/Activities	Deliverables	Resources	Timeframe & (Priority)
regarding the MRPA, the Reserve in particular and environmental issues more generally			
3. Make changes to boundary and legislation as necessary	Boundary Legislation	Agency Staff Time (NEPA)	Timeframe: By Year 3 Priority (2)

**Objective 2:** To conduct a study to assess carrying capacity and establish Limits of Acceptable Change for the Preservation Zone

**Table 9.2: Description of Implementation of Zoning Programme Objective 2**

Strategies/Activities	Monitoring Indicators	Resources	Timeframe & (Priority)
Within the first two years, identify funds and resources to conduct the study and prepare a Plan.			
Work with the Consultant to conduct necessary desk and field studies and to prepare a Report assessing carrying capacity and determining the Limits of Acceptable Change and a Plan for maintaining change within those limits. This should be with particular respect to visitors but also researchers staying at the Reserve	Limits of Acceptable Change Report and Plan	Consultant (could be UWI M.Sc. student project working with IOJ staff (\$200,000))	Timeframe: 9 months in Year 2 or 3 Priority: (2)
Use the Study Report and Plan to guide management and use of the Reserve and in particular, the Visitor Use Sub-Zone.	Reporting as required by the Plan	Staff	Ongoing from Year 3

**Objective 3:** To conduct hydrological studies to provide recommendations to guide management of the Water Protection Sub-Zone (in conjunction with other studies related to the hydrology of the Protected Area)

**Table 9.3: Description of Implementation of Zoning Programme Objective 3**

Strategies/Activities	Monitoring Indicators	Resources	Timeframe & (Priority)
Within the first three years, identify funds and resources and conduct the study and prepare a Plan.			
Prepare Terms of Reference and seek funding	TOR, Proposal Funds	Time of Existing Management level	Timeframe: Year 1 Priority: (1)

Strategies/Activities	Monitoring Indicators	Resources	Timeframe & (Priority)
		Staff	
Work with the Consultant to conduct necessary desk and field studies and to prepare a report and Plan for managing the water resources and hydrological features of the Protected Area, particularly in the Water Protection Sub-Zone (but also water levels and quality in the Protected Area generally).	Report	Consultant \$1 million) or could possibly be a Ph.D. student (\$500,000) including water testing	Timeframe: 2 years by Year 3 Priority: (2)
Use the Study Report and Plan to guide management and use of the Reserve and in particular, the Visitor Use Sub-Zone.	Reporting as required by the Plan	Staff	Ongoing from Year 3

**Objective 4:** To demarcate the boundaries of the key Zones and Sub-Zones to aid in their management.

**Table 9.4: Description of Implementation of Zoning Programme Objective 4**

Strategies/Activities	Monitoring Indicators	Resources	Timeframe & (Priority)
Within the first three years, identify funds and resources to fence and sign the Reserve and the Water Protection Sub-Zones .			
Seek funding	TOR, Proposal Funds	Time of Existing Management level Staff	Timeframe: Year 1 Priority: (1)
Fence the Reserve	Fence in place (photos and approval for payment by relevant officers)	Funds for materials and contractor	Timeframe: Year 1 - 2 Priority: (1)
Place markers e.g. metal posts with signs at strategic locations e.g. coordinate points around the Water Protection Zone to clearly define the zone and state permitted uses	Markers and signs in place (photos and approval for payment by relevant officers)	Funds for materials and contractor	Timeframe: Year 2 Priority: (2)
Within five years, identify funds and resources to erect signs marking and explaining all Zones and Sub-Zones.			
Design, produce and erect signs for each Zone and Sub-Zone indicating Protected Area status and the purpose, uses and prohibited activities.	Signs in place	Funds	Timeframe: Year 4 Priority: (3)

## 7.2 Conservation Programme

**Goal:** To maintain and restore biodiversity (using Weck, 1970 as a baseline) within the Preservation Zone.

**Objective 1:** To reduce cover of Vampire Fern (*Dicranopteris pectinata*) by 60% in 5 years.

**Table 10.1: Description of Implementation of Conservation Programme Objective 1**

Strategies/Activities	Deliverables	Resources	Timeframe & (Priority)
Use methodology tested by K Campbell (M.Sc. thesis) to control <i>D. pectinata</i> ensuring documentation			
1.Pilot Project: (a) Identify (measure and mark) a small pilot plot and clear the ferns (including roots). (b)Use the wardens (and possibly a small team of community volunteers) to assess the work needed (# days work/unit area) and hence the unit cost. (c)Calculate funds needed based on assessment of coverage of the Reserve by these ferns	Plots cleared (suggest minimum total 0.05ha) evidenced by documentation (reports & photos)	Existing NHMJ staff - Botanists, Wardens  Volunteers  \$20,000 – meals, stipends, travel etc.	Timeframe: 2 weeks in Year 1 Priority: (1)
2.Monitor plots (starting with pilot) and (a)remove fern seedlings before they spore (b)use any indigenous species (which sprout seedlings where ferns are removed) for restoration of illegal trail (see Objective 3) – growing them up first in the nursery.	Records	Existing  Funds for potting materials	Timeframe: Year 1 – 2 (pilot) Priority (1)
2.Seek funds to expand pilot project – expansion of plant nursery as needed	Proposals	Existing personnel	Year 1 Priority (1)
3.Expand pilot project	Reports	Funds -  Estimate: 1million	Year 2 Priority (1)
4.Research & monitoring  Consider UWI graduate student	Reports	Existing	On-going

**Objective 2:** To reduce cover of Strawberry Guava (*Psidium cattleianum*) by 60% in 5 years.

**Table 10.2: Description of Implementation of Conservation Programme Objective 2**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
1a. Complete satellite imagery analysis to identify the location and coverage of <i>P. cattleianum</i> 1b. Conduct research into the control of <i>P. cattleianum</i>	Report & Plan	Existing staff: Botanist	Timeframe: Current Priority: (1)
2. Seek funds and implement a pilot project for the control of <i>P. cattleianum</i> This will likely require both chemical and physical treatments. Consider the possibility of sale of the wood (for firewood/charcoal) to raise funds to assist with removal. Discuss with JCDT, chemical methods used for controlling Wild Coffee – <i>Pittosporum undulatum</i> in the Blue and John Crow Mountains National Park). Explore combinations of methods for most effective and inexpensive approach e.g. limb tree and sell wood and then inject chemical to kill remaining tree.	Records & Report	Existing if the pilot is small	Timeframe: Year 1 - 2 Priority: (1)
3. Seek funds and implement expansion of pilot	Proposal & Reports		Timeframe Yr 2 - 4

**Objective 3:** To restore vegetation within trail illegally cut to the east of the Reserve, in 4 years.

**Table 10.3: Description of Implementation of Conservation Programme Objective 3**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
1. Assess trail (length and existing use if any, types of trees in area) and discuss with local	Report with recommendations for	Existing Staff	Timeframe: Year 1

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
community, possible reasons the trail may have been cut, in order to develop a plan for mitigating against encroachment (see Education and Community Outreach Programme)	Community Outreach		
2.Use seedlings which sprout where invasives are removed to restore this trail. This will require waiting until the end of the year when there are enough large seedlings	Report: Number of seedlings planted & growing Photos: Trail no longer visible	Existing Staff	Timeframe: 4 weeks in Year 2 Priority: (1)
3.Maintain seedlings and monitor growth	Records	Existing Staff	

**Objective 4:** To plant trees on the Water Protection Sub-Zone for use by community to discourage cutting of trees from the Reserve.

**Table 10.4: Description of Implementation of Conservation Programme Objective 4**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
1.Conduct research to identify suitable trees for different purposes (e.g. firewood, charcoal, posts) as identified by the community	Report	Existing Forestry Dept. & RADA	Timeframe Year 1 – 2 Priority: (1)
2.Identify suitable locations within the Sub-Zone	Plan	Existing	Year 1
3.Organise Tree planting and maintenance with communities e.g. on National Tree planting Day (using plant seedlings from the nursery (Objective 5) and other sources)	Report	Funds for workday meal Funds for maintenance	Year 1
4.Facilitate training of community members to coppice the trees for harvesting of wood for fire, charcoal, posts etc. rather than cutting down the tree, in order to encourage re-growth and maintenance of tree cover.	Training Report Patrol Reports (observations)	Funds for training day Resource personnel e.g. RADA	Year 2

**Objective 5:** To propagate and grow plant seedlings for use in restoration and enhancement of the MRPA (in a way that may help generate sustainable financing).

**Table 10.5: Description of Implementation of Conservation Programme Objective 5**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
1. Remove seedlings which sprout where invasives are removed to the existing plant nursery to grow up for planting (restoration within Reserve e.g. illegal trail – Objective 3, enhancement of Water Protection Sub-Zone and other Multiple Use Zone areas, particularly immediately adjacent to the Reserve)	Report: Number of seedlings planted & growing Photos: Trail no longer visible	Existing Potting material (bags and use mix of soil from area)	Timeframe: 4 weeks in Year 2 Priority: (1)
2. Maintain seedlings and Monitor growth	Records	Existing	
3. Initiate and follow up discussions with Shields Flower Farm re: propagation and growing of plants of interest including for sale with a percentage commission for the MRPA Reserve conservation.	Site Visit Report Propagation Testing Report Agreement for propagation and plant sale commission	Existing: Senior Botanist and wardens  IOJ Administration/ Management	Start in Year 1 with aim for Agreement by Year 2

### 7.3 Research

**Goal:** To implement and facilitate research which contributes to better understanding of the special ecosystem and habitats and Mason River and to its effective management.

**Objective 1:** To conduct research fitting the mission of the IOJ and addressing the needs of the Mason River Protected Area

**Table 11.1: Description of Implementation of Research Programme Objective 1**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
Strategy 1: Clarify & Rationalise research to be conducted at Mason River by IOJ			
Develop a Research Prospectus and determine which components will be conducted by IOJ and which will be promoted to other researchers. Staff can submit proposals/ideas for research and a meeting can be held to compile, refine and add research concepts in order to develop the prospectus. The meeting can also address who should conduct the research (IOJ, Other or combination) and other issues e.g. research priorities.	Research Prospectus	Existing Staff	Timeframe: Year 1 Priority: (1)
Strategy 2: IOJ staff implement research			
IOJ staff conduct research	Reports and Publications	Existing Some research will require resources Vehicle & Accommodation	Timeframe: Year 2 Priority: (1)
IOJ staff analyse and use monitoring data to help guide management	Reports	Existing	Ongoing
Seek funds and implement repairs to the existing accommodation to allow staff to overnight. Convert smaller room to a Research Lab (desk, shelf and filing space) and use the	Proposal Project funding Project reports (photos	Existing staff to prepare proposal  Funds for	Timeframe: Year 2



<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
larger room for accommodation.	and invoices)	repairs/renovation	
Seek funds and acquire a 4WD vehicle for NHMJ	Vehicle	Funds	Timeframe: Year 2

**Objective 2:** Promote and facilitate research (including biodiversity surveys) by IOJ staff and other institutions, through research partnerships

**Table 11.2: Description of Implementation of Research Programme Objective 2**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Strategy 1: Promote collaborative and other research by student groups and individual researchers from local, regional and international institutions			
Promote Research Prospectus	Prospectus on website	Existing Staff	Timeframe: Year 2
Invite academic institutions to conduct research in the MRPA (outlining facilities and including the Research Prospectus as a guide for possible research ideas)	Letters to institutions  Increased Research (as per Research Log)		Priority: (1)
Strategy 2: Organise accommodation for researchers/research groups within the local community			
1. Identify appropriate accommodation within the community, working with TPDCo. Bed & Breakfast Programme for standards	Contact List of Community Members with appropriate accommodation	Project Manager with hospitality experience	Timeframe: Yr 1 – 3 Priority: (1)
2. Make arrangements for use of accommodation			
3. Monitor accommodation facilities based on system Project Manager prepares	Agreements with the above-mentioned Community Members Records	Existing Administrative	Year 3 onward

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
Strategy 3: Otherwise facilitate researchers			
1.Allow use of Research Lab and other facilities and/or services as possible including time of existing staff as possible	Research (as above)	Existing	Timeframe: Year 2
2.Establish group of community members who can assist researchers	Corps of community volunteers	PA Manager	Timeframe: Year 2

## 7.4 Enforcement & Compliance

### Description and Analysis of Current Programme

There are two wardens employed: Senior Forest Warden and Assistant Field Warden. These titles are not particularly appropriate but are those given by IOJ although the current job descriptions are thorough and generally adequate. Section 8.3 on Staffing provides different titles and updated job descriptions. This number of enforcement officers is more than adequate according to the Sustainable Financing Plan for the National System of Protected Areas. The wardens are required to patrol the Reserve twice a day and each patrol takes 1½ to 2 hours depending on the number of stops. These patrols are done on foot as although bicycle would be faster, there are some areas that can only be traversed on foot. This number of patrols is not considered necessary based on the amount of work otherwise required of the wardens and is unlikely to deter illegal activity since the patrols are likely at set times daily.

**Goal:** To use enforcement measures and promote compliance in order to minimise threats.

**Objective 1:** To conduct regular patrols circling the Reserve at least eight times per week (twice per day on three days of the week and once per day on the other two) stopping to check on all the Multiple Use Zone’s Sub-Zones on at least four occasions per week and visiting the western Sustainable Use Sub-Zone at least twice per month.

**Table 12.1: Description of Implementation of Enforcement & Compliance Programme Objective 1**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
1a. Adjust and Improve existing patrolling schedule so that it reflects Objective 1 1b. Plan monthly schedules	Patrolling schedule  Reports	Time of PA Manager  Existing Wardens and Administrator	Ongoing (1)  Immediate implementation
2. Improve the reporting systems and implement it – this should include regular reporting and emergency reports	Reporting System implemented	Time of MRPA Manager Existing Personnel	Ongoing (1) Immediate implementation

**Objective 2:** To secure the Reserve by repairing/replacing existing fencing and adding signage along fencing

**Table 12.2: Description of Implementation of Enforcement & Compliance Programme Objective 2**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
This objective links with Objective 4 of the Zoning Programme to demarcate boundary and zones with fencing and appropriate signage.			
1. Repair and replace fencing around Reserve in strategic locations with signage & community outreach.  Cost estimates for a combination of chain link and barbed wire fencing to replace broken areas have been obtained and are prohibitive (\$4 million). Barbed wire on wooden fence posts can be considered for the whole length but the possibility exists that the fence posts may be stolen. At least in the interim barbed wire on “quick stick” trees should be used. The trees will have to be planted first to grow enough to accommodate the barbed wire. Therefore focus on Interpretive Enforcement.	Perimeter fence repaired and/or replaced as evidenced by Reports and Receipts.	Cost of Fencing & Initial Repairs: Front: \$500,000 Openings: \$500,000	Timeframe: Year 2 Priority (2)  Immediate implementation
2. Use Interpretive Enforcement to discourage			Timeframe: Year 1 - 2

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
encroachment:- (a)Liaise with community members at meetings (b)Design, produce and install interpretive and enforcement signs targeting local community members – not just “No Trespassing” but for example “Mason River Preservation Zone – a unique wetland ecosystem – managed to maintain local water supply and protect special plants and animals – Help keep Mason River special” with photographs of flora and fauna.	Report meetings attended  Signage Plan, Report and Invoices	Existing Staff  Existing Staff to prepare Signage Plan Cost of Signage: \$350,000 (10 3x2 ft)	Priority: (1)

**Objective 3:** To protect the Reserve from the threat of fire

**Table 12.3: Description of Implementation of Enforcement & Compliance Programme Objective 3**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Maintain the fire line twice per year  Check with Forestry Dept. that fire line is wide enough and if it is not, consider widening	Reports  Invoices  Outcome: No fire in the Reserve	Cost of Fire Line Maintenance: \$90,000	Ongoing  Priority: (1)  Currently is only once per year
Institute the guideline (and eventually regulation) of no fires within the Reserve, except in designated area where there is a fire control measure in place	Guidelines instituted	Fire extinguishers  Additional Signage  Existing	Timeframe: Year 1  Priority: (2)
Establish a Fire Extinguishing Programme with Community Volunteers	Fire Extinguishing Programme established	Time of Staff	Timeframe: Year 2  Priority: (1)

**Objective 4:** To protect birds within the Game Sanctuary from bird-shooting

**Table 12.4: Description of Implementation of Enforcement & Compliance Programme Objective 4**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Collaborate with NEPA			
Liaise with NEPA for assistance during and outside of bird-shooting season	Reports Correspondence	Existing  Accommodation  Volunteer Game Wardens	Ongoing  Priority: (1)
Consider and address as possible with community Game Wardens through Honorary Game Warden Programme. This will likely be useful in addressing breaches of environmental legislation more broadly.	Additional Honorary Game Wardens	Training (NEPA & IOJ)	Timeframe: Year 2 Priority: (2)
Liaise with NEPA to address loophole in legislation re: people shooting from outside into the Reserve	Correspondence Identify and begin to implement legal solution	Existing	Timeframe: Year 1 Priority: (2)

**Objective 5:** To encourage compliance with, and enforce relevant legislation to reduce threats to the Reserve

**Table 12.5: Description of Implementation of Enforcement & Compliance Programme Objective 5**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Wardens use Interpretive Enforcement: that is, when they are on patrol they should speak to community members about the MRPA and its importance (particularly the Reserve), encourage community members to assist in the conservation of the MRPA and explain why certain practices are harmful to the MRPA and the community's environs	Reports	Existing  Training	Timeframe: Ongoing Priority: (1)

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Place information on the fines for offences on the various signs as relevant		Signage Plan	
Wardens report offences for enforcement action by NEPA	Correspondence	Existing	Timeframe: Year 1 Priority: (2)
IOJ liaises with NEPA (and JNHT as appropriate) for enforcement action	Correspondence and Reports	Existing PA Manager	On-going

**Objective 6:** To prepare and gazette regulations that aid in effective management of the protected area by Year 5

**Table 12.6: Description of Implementation of Enforcement & Compliance Programme Objective 6**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Collaborate with NEPA and JNHT			
NEPA to draft regulations based on other protected areas and IOJ and JNHT to review and make recommendations for editing	Reports	Existing Possibly some from the NPAS Project	Timeframe: Start in Year 1 Priority: (1)
NEPA to submit final draft for the process	Correspondence	Existing	Timeframe: Year 2 Priority: (2)

## 7.5 Education and Public Awareness Programme

**Goal:** To raise awareness and knowledge of visitors and the local community about the Mason River Protected Area and the Reserve in particular.

**Objective 1:** To provide interpretation for visitors, that promotes support for the Protected Area

**Table 13.1: Description of Implementation of Education & Public Awareness Programme Objective 1**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
1.Review and improve existing Programme (inclusive signage, exhibits/displays and materials) particularly with respect to age-group relevant activities at the Field Station (Reserve) (a) All-weather posters/signs to hang from existing gazebo when groups are expected (b)Small Exhibit for Verandah and Front Room (use of Walls) (c) Establish aVisitors Centre (10 x 8 feet) in container along with Research Lab	Report/Plan	Existing	Timeframe: Year 1 Priority: (1)  Timeframe: Year 3 Priority: (2)
2.Train all relevant staff as Interpreters	Report	Funds	Timeframe: Year 1 Priority: (1)
3.Add signage and exhibits/displays at the Community Centre (a) Signage initially re: about the Reserve (b) Visitors Centre when the Community Centre is renovated and expanded	Report/Invoices	Existing staff Funds	Timeframe:Year 2 Priority: (1)
4. Explore possibility of a viewing tower (could also be use as a look-out for fires – possibly adjacent to warden’s house)	Information, Design Feasibility/Cost	Existing	Timeframe: Year 2 Priority: (3) Likely expensive to build and maintain

**Objective 2:** To raise awareness, knowledge and positive attitudes towards the Protected Area amongst local community members (targeting the 3 closest communities: McNie, Mason River and Douglas Castle)

**Table 13.2: Description of Implementation of Enforcement & Compliance Programme Objective 2**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
1. Conduct Knowledge, Attitudes & Practices Survey  Ideally this should be implemented with the Survey to be conducted under the Zoning Programme.	Report	Consultant – consider working with UWI – CARIMAC to reduce costs and use local community members. May still need: \$400,000	Timeframe: Year 1 Priority: (1)
2. Design appropriate Public Awareness Campaign including activities and materials.	Campaign Plan	Consultant/UWI	
3. Implement Public Awareness/MRPA Pride Campaign - this campaign could use the Rare Conservation Pride Campaign methodology (see <a href="http://www.rare.org">www.rare.org</a> ) Rare offers training for these campaigns. It should address directional & informational signage in all 3 communities and for all the objectives. Ideally, it should be implemented by a Project Manager – this person could eventually become the PA Manager.	Campaign implemented	Project Manager & Materials etc (\$2.5million)	Timeframe: One year, Year 2 or 3 Priority: (1)
4. Conduct post-Campaign KAP Survey and disseminate findings	Report	Consultant/UWI (\$200,000)	Timeframe: Year 3 or 4 Priority: (1)

**Objective 3:** To conduct targeted public education activities to address specific threats to the Protected Area

**Table 13.3: Description of Implementation of Enforcement & Compliance Programme Objective 3**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
<b>Strategy 1:</b> Address issue of Fires			
1. Conduct educational workshops for farmers re: safe use/non-use of fire for clearing land vis a	Workshop Plan	Existing Staff	Timeframe: Year 2



<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
vis nutrient content of soil and establish an alerting system to let wardens know when fires are going to be used near the Reserve		Resource Personnel e.g. Fire Brigade	Priority (2)
<b>Strategy 2: Address issue of Bird Shooting</b>			
1. Obtain educational materials from NEPA and ensure posted in community 2. Speak to young men in community just prior to Bird Shooting Season to discourage bad practices amongst “bird boys” 3. Address issue in school Programme	Materials disseminated and activities implemented	Existing Staff NEPA materials	Timeframe: Year 1 Priority: (1)
<b>Strategy 3: Address Other Issues e.g. Water Pollution including use of Chemicals e.g. Pesticides/Herbicides, Cutting Trees</b>			
Through school Programme and posters	Programme Report and Posters posted widely.	Existing Staff	On-going

**Objective 4:** To implement a targeted school-based Programme to ensure all young people leaving school are aware, knowledgeable and supportive of the Protected Area (targeting the 3 closest communities: McNie, Mason River and Douglas Castle)

**Table 13.4: Description of Implementation of Education & Public Awareness Programme Objective 4**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
1. Review existing approach to school interaction and revise to target the nearest schools and McNie All Age in particular with visits at least once a month to McNie All Age 2. Teacher Training activities and materials (relating Mason River to school curricula) 3. Environmental Club activities/materials 4. Competitions in the school 5. Every child in Grade 6 should visit the Protected Area – have a one day event and conduct several tours and activities through the	Implementation Plan  Plan and Report on Annual Activities Club activities and competition implemented Plan and Report for annual Grade 6 activities/event (at least 4	Existing	Timeframe: Year 1 Priority: (1)

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
day	schools per annum)		
Seek assistance from NEPA to continue to address schools in other neighbouring communities where work had been conducted previously e.g. Kellits High	Agreement regarding assistance from NEPA	Personnel	Timeframe: Year 2 Priority: (1)

## 7.6 Sustainable Livelihoods Programme

**Goal:** To promote and facilitate sustainable livelihoods in terms of use of lands within the Protected Area Multiple Use Zone and further afield.

**Objective 1:** To ensure sustainability of activities at the Protected Area and the Reserve in particular

**Table 14.1: Description of Implementation of Sustainable Livelihoods Programme Objective 1**

<b>Strategies/Activities</b>	<b>Monitoring Indicators</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Conduct an audit of all activities and resource use, in particular – water, waste disposal (sewage & garbage), utilities to assess environmental sustainability and obtain recommendations to improve sustainability	Audit Report	Consultant  (could be done internally)	Timeframe: Year 1  Priority: (2)
Implement the Audit recommendations in phases – in-expensive first and more costly as funds are sourced	Reports	Existing Funds for equipment/ materials etc., possibly training	Timeframe: Year 3

**Objective 2:** To establish and operate a sustainable visitation Programme to the Protected Area (linked to the sustainable financing and marketing activities

**Table 14.2: Description of Implementation of Sustainable Livelihoods Programme Objective 2**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Prepare a Business and Marketing Plan to guide the business aspect of visitation by the different target groups	Plan	Consultant and/or Existing Business Development Officer	Timeframe: Year 2 Priority: (2)
Implement the Plans	Reports	Protected Area Manager with assistance from Business Development Officer	Some aspects can begin immediately
Make improvements to the Facilities :- Purchase a 20 feet shipping container and convert to Research Lab and Visitors' Centre	Research Lab and Visitors' Centre established	Funding	Timeframe: Year 3 Priority: (1)

**Objective 3:** To promote and facilitate sustainable livelihoods and development within the local communities, that is environmentally sustainable and benefits the protection of the Reserve or is not detrimental to this.

**Table 14.3: Description of Implementation of Sustainable Livelihoods Programme Objective 3**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Strategy 1: Promote and facilitate sustainable agricultural practices including organic farming			
1. Encourage and facilitate the strengthening of local farmers' organisation with assistance from the Social Development Commission and others	Meeting Attendance Report	Protected Area Manager	Timeframe: Year 2 Priority: (2)
2. Encourage and facilitate e.g. through introduction of resource persons and facilitation of training (including through Rural Agricultural Development Agency and Jamaica Organic Growers Association), the	Training Activities Report	Funds for travelling, training workshops  Project funding for demonstration projects	

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
<p>development of relevant skills</p> <p>3. Target Douglas Castle farmers on Protected Area land and establish demonstration projects</p> <p>4. Encourage and facilitate e.g. through agreements, the local CBO(s) to provide goods and services for sale</p>	<p>Reports</p> <p>MOU with CBO(s) and individuals for provision of goods &amp; services</p>		
<p><b>Strategy 2:</b> Promote and facilitate sustainable tourism practices including sale of goods e.g. agricultural produce and services e.g. meals, accommodation, by community groups to Protected Area visitors</p>			
<p>1. Encourage and facilitate the formation and strengthening of local community organisation with assistance from the Social Development Commission and Society of Cooperatives</p> <p>2. Encourage the local CBO(s) by facilitating projects e.g. sourcing trees and helping with beautification of community centre grounds and helping with their proposal writing</p> <p>3. Encourage and facilitate e.g. through introduction of resource persons and facilitation of training (including at nearby HEART Trust/NTA facility), the development of relevant skills</p> <p>4. Encourage and facilitate the growth and strengthening of the local CBO(s) by attending meetings and providing technical and other assistance</p> <p>5. Encourage and facilitate e.g. through agreements with the local CBO(s) to provide goods and services for sale e.g. agricultural produce at Farmers</p>	<p>Meeting Attendance Report</p> <p>Training Activities Report</p> <p>MOU with CBO(s) and individuals for provision of goods &amp; services</p>	<p>Protected Area Manager</p> <p>Funds for travelling, training workshops</p>	<p>Timeframe: Year 2</p> <p>Priority: (2)</p> <p>Some of the provision of goods &amp; services could begin immediately e.g. sweets, roast corn for students, produce &amp; meals for adult groups</p>

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
Markets and food/refreshment at the Community Centre associated with monthly tours of Mason River, accommodation for researchers			

## **8. Administration**

### **8.1 Governance**

A major portion of the Mason River Protected Area is owned by the JNHT including the wetland ecosystem in the core Reserve. This is useful to help ensure the protection of this special area. The site is managed by the IOJ-NHMJ, in terms of day to day activities including conservation, education and research. The NEPA has an interest as the site is a Game Sanctuary and carries out activities in the area particularly during the bird shooting season. The site is also designated a Protected Area under the NRCA Act and a Protected National Heritage under the JNHT Act. The IOJ – NHMJ will need particular assistance with enforcement, which should be provided by both JNHT and NEPA through the legislation under their respective Acts. The section of the Multiple Use Zone (Sustainable Use Sub-Zone A – Figure 45) to the west of the Preservation Zone, which is all under private ownership but designated as part of the Protected Area under the NRCA Act, will require significant assistance from NEPA and other agencies. The IOJ – NHMJ, as the agency with a base and permanent staff in the area, will need to play a coordinating role and alert the relevant agencies to any need for their intervention.

IOJ-NHMJ management personnel reports to the NHMJ Board which reports to IOJ Council. There is a Field Station Sub-Committee on the NHMJ Board. The Mason River Protected Area has been managed through this Sub-Committee to date and therefore this governance system can be maintained for internal management by the IOJ.

However, as there are other organisations with responsibilities and interests, there should be a Management Committee established involving NEPA, JNHT and IOJ-NHMJ meeting at least three times per year. This will aid in collaboration and coordination which will improve management effectiveness. The IOJ as on-site manager should coordinate these meetings.

At least annually, a meeting involving other relevant government and other agencies e.g. universities, should be held to allow for information sharing and collaboration.

A Local Advisory Committee should be established with community representatives from each of the three main neighbouring communities and other stakeholders. This should be one of the products of the Public Awareness/Protected Area Pride Campaign. This Committee should meet at least three times a year and should focus on the protection of the site by local community members including sustainable livelihoods and how IOJ and other agencies can facilitate this.

## **8.2 Staffing**

There are two categories of staff – those based at the Institute’s headquarters in Kingston and those at the Field Station at Mason River. Only the latter are accounted for on the current “Mason River” budget.

There is a need for a full-time Mason River Protected Area Manager. This staff member would have multiple responsibilities ranging from fundraising through project management and coordination. This position would have over-arching responsibility for the Protected Area reporting to the Director of the NHMJ or as determined by NEPA and/or JNHT. Job Descriptions are provided at Appendix 7.

Bearing in mind that funds are limited and that at least initially, project funding is a more likely source of funding than regular recurrent budget funding, the following approach to addressing the management needs of the site in the interim is recommended. In year 1, seek funds and assistance from Rare ([www.rare.org](http://www.rare.org)) and other donors to fund the following activities along with a Project Manager:-

- Knowledge, Attitudes and Practices Survey along with a Community Survey (which aims to survey every household within the 3 communities) – pre- and post campaign
- Public Awareness/Conservation Pride Campaign

This major project would allow for the training and practical experience of the Project Manager who would then be very capable of taking on the Protected Area Manager role. This staff member would not need to have strong biodiversity conservation educational background as the IOJ-NHMJ has several staff with that knowledge and skill set. This individual would need to be out-going and eager to learn with excellent communications skills. They should have tertiary level education but this could be in business and/or hospitality or community development.

### 8.3 Financing

The majority of the management activities at the Mason River Protected Area is currently funded by recurrent budget of about JA\$2 million from the Institute of Jamaica through the Natural History Museum (Table 9 shows the 2013 – 2014 budget received from the NHMJ).

**Table 15: Current Annual Budget for the Mason River Reserve (and other JNHT property)**

DESCRIPTION	AMOUNT	TOTAL (\$)
<b><u>Staff Salaries</u></b>		
Forest Warden (1)	427,284.00	
Assistant. Field Warden (1)	405,080.00	
Part-Time Cleaner (1)	172,900.00	
Pension (1)	162,435.00	1,167,699.00
<b><u>Utilities</u></b>		
Jamaica Public Service	24,000.00	24,000.00
<b><u>Toiletries</u></b>		
Cleaning Supplies and Toiletries	27,000.00	27,000.00
<b><u>Travelling and Subsistence</u></b>		
Bus Fare for Mason River Staff to Travel to Head Office	29,925.00	
Travel - Administrator	45,482.00	
Mileage for other travel Officers (estimate 2 trips/mth (\$35/km for 237.7 km) for two officers)	399,360.00	474,767.00
<b><u>Subsistence</u></b>		
Administrator	40,000.00	40,000.00
Filling of Water Tank	11,000.00	
Cutting of Fire Lines	45,000.00	
Raincoats	6,400.00	
Waterboots	11,200.00	
Maintenance of Property (e.g. bushing trails, cutting lawns, basic repairs)	250,000.00	323,600.00
<b>TOTAL COSTS</b>		<b>2,057,066.00</b>

The budget above does not account for the significant percentage of time contributed by staff of the Institute – Natural History Museum:-

- Director
- Botanist and Assistant Botanist (research and guided tours)



- Education Outreach and Assistant Education Officer – school visits, annual World Wetland Fairs,
- Senior Research Officer (Clearing House Mechanism) – bird ecology and GIS
- Senior Research Officer (Entomology)
- Administrator – visits site monthly to check on work/condition of property and supervises Field Station staff

Other management activities are funded by NEPA:-

- Bird shooting season patrols
- Project funding e.g. management plan, signage

Income is derived from the following sources, but currently there is significant leakage:-

- Agricultural lands – leases not regularly collected and some lessees are giving up land (about \$50,000/year)
- Sugar-cane Nursery – leased to SIRI but funds not regularly collected (\$11,000/year)
- Fees for Educational tours – likely just covers costs (though not time nor transportation of staff who conduct tours – Botanist/Assistant Botanist). Need to train Assistant Education Officer and Assistant Warden to conduct the tours, especially for student groups)

There are no funds available for capital expenditure e.g. major repairs to the buildings and fence.

There is a need to increase the levels of income and diversify the income sources and where possible, to increase the efficiency of current expenditure. Two main approaches to increasing income are recommended and both are slanted towards increasing visitation to the Reserve (hence the importance of the zonation) and the ConservationSub-Zone specifically:-

1. Visitors

Increasing the number of tours, particularly targeting middle class, professional, Jamaicans with an interest in nature, plants, outdoor activities, healthy living

2. Researchers

Increasing the number of researchers and research groups conducting research and studies within and around the Mason River Protected Area

## 8.4 Budget

**Table 16: Management Plan Budget**

LINE ITEMS	2014 - 2015	2015 - 2016	2016 - 2017	2017 - 2018	2018 - 2019	5 Year Total
<b>RECURRENT EXPENDITURE</b>						
<b>Human Resources</b>						
MRPA Manager	1,600,000	1,728,000	1,866,240	2,015,539	2,176,782	9,386,562
Senior. Forest Warden	427,284	461,467	498,384	538,255	581,315	2,506,705
Assistant Field Warden	405,080	437,486	472,485	510,284	551,107	2,376,443
Part-time Cleaner	172,900	186,732	201,671	217,804	235,229	1,014,335
<b>Sub-total Field Staff</b>	<b>2,605,264</b>	<b>2,813,685</b>	<b>3,038,780</b>	<b>3,281,882</b>	<b>3,544,433</b>	<b>15,284,044</b>
Conservation/Research/Monitoring Officer (time of IOJ NHMJ personnel)	1,800,000	1,944,000	2,099,520	2,267,482	2,448,880	10,559,882
Education & Community Outreach Officer (time of IOJ NHMJ personnel)	1,600,000	864,000	279,936	302,331	326,517	3,372,784
Administrative Assistant (time of IOJ NHMJ personnel)	420,000	453,600	489,888	529,079	571,405	2,463,972
Technical Support (tourism marketing & financial management) - time of IOJ personnel	540,000	583,200	629,856	680,244	734,664	3,167,965
Transportation/Milage (7200km/year @ \$35/km)	252,000	272,160	293,933	317,447	342,843	1,478,383
Subsistence (84hr/mth for 1 person @ \$400)	403,200	435,456	470,292	507,916	548,549	2,365,414
<b>TOTAL</b>	<b>7,620,464</b>	<b>7,366,101</b>	<b>7,302,205</b>	<b>7,886,382</b>	<b>8,517,292</b>	<b>38,692,444</b>
<b>Operational Costs</b>						-

<b>LINE ITEMS</b>	<b>2014 - 2015</b>	<b>2015 - 2016</b>	<b>2016 - 2017</b>	<b>2017 - 2018</b>	<b>2018 - 2019</b>	<b>5 Year Total</b>
Workshops (1) & Meetings (4)	30,000	31,500	34,020	36,742	39,681	171,943
Utilities (electricity, telephone)	30,000	31,500	34,020	36,742	39,681	171,943
Supplies & Stationery (incl. Toiletries)	40,000	42,000	45,360	48,989	52,908	229,257
Fuel/Diesel (vehicle & cooking) @ \$10,000/month)	120,000	126,000	136,080	146,966	158,724	687,770
Operations & Maintenance (fireline, fence, property, equipment, water)	400,000	420,000	453,600	489,888	529,079	2,292,567
Uniforms	25,000	26,250	28,350	30,618	33,067	143,285
Insurance	200,000	210,000	226,800	244,944	264,540	1,146,284
<b>TOTAL</b>	<b>845,000</b>	<b>887,250</b>	<b>958,230</b>	<b>1,034,888</b>	<b>1,117,679</b>	<b>4,843,048</b>
<b>TOTAL RECURRENT EXPENDITURE</b>	<b>8,465,464</b>	<b>8,253,351</b>	<b>8,260,435</b>	<b>8,921,269</b>	<b>9,634,970</b>	<b>43,535,489</b>
<b>CAPITAL EXPENDITURE</b>						-
<b>Vehicle (IOJ-NHMJ)</b>	<b>3,000,000</b>					<b>3,000,000</b>
<b>Equipment</b> (including bush whacker)	<b>500,000</b>			<b>300,000</b>		<b>800,000</b>
<b>Field Station &amp; Warden's House Repairs</b>		<b>600,000</b>				<b>600,000</b>
<b>Projects (from Management Plan):-</b>						-
<b>Zoning Programme:-</b>						-
- Multiple Use Zone Rationalisation	20,000	235,000				255,000

<b>LINE ITEMS</b>	<b>2014 - 2015</b>	<b>2015 - 2016</b>	<b>2016 - 2017</b>	<b>2017 - 2018</b>	<b>2018 - 2019</b>	<b>5 Year Total</b>
- Carrying Capacity/Limits of Acceptable Change		200,000				200,000
- Hydrology & Water Pollution		500,000	500,000			1,000,000
<b>Sub-total Zoning Programme:-</b>	<b>20,000</b>	<b>935,000</b>	<b>500,000</b>	-	-	<b>1,455,000</b>
<b>Conservation Programme:-</b>						-
- Vampire Fern Control	20,000	330,000	330,000	330,000		1,010,000
- Strawberry Guava Control	10,000	50,000	150,000	150,000	150,000	510,000
- Restore Illegal Trail	25,000	40,000	40,000	40,000		145,000
- Reforest Water Protection Sub-Zone	5,000	60,000				65,000
- Plant Propagation	5,000					5,000
<b>Sub-total Conservation Programme:-</b>	<b>65,000</b>	<b>480,000</b>	<b>520,000</b>	<b>520,000</b>	<b>150,000</b>	<b>1,735,000</b>
<b>Research Programme</b> (see Field Station Repairs)						-
<b>Enforcement &amp; Compliance Programme:-</b>						-
- fencing/signage (and see Warden's House Repairs)	<b>350,000</b>	<b>350,000</b>	<b>600,000</b>	<b>600,000</b>		<b>1,900,000</b>
<b>Education and Public Awareness Programme:-</b>						-
- Interpretive signs/exhibits	50,000	500,000				550,000
- Visitor Centre (10 x 8 ft in Container)			1,000,000			1,000,000

<b>LINE ITEMS</b>	<b>2014 - 2015</b>	<b>2015 - 2016</b>	<b>2016 - 2017</b>	<b>2017 - 2018</b>	<b>2018 - 2019</b>	<b>5 Year Total</b>
- Interpretation at Community Centre	250,000			500,000		750,000
- Knowledge Attitudes and Practices/Community Survey (pre- & post- campaign)	400,000			200,000		600,000
- Public Awareness/Pride Campaign		1,250,000	1,250,000			2,500,000
- Public Education (fire, birds, other issues)	50,000	250,000	150,000	150,000	150,000	750,000
- Schools Programme	60,000	100,000	100,000	100,000	100,000	460,000
<b>Sub-total Education/Community Outreach Programme:-</b>	<b>810,000</b>	<b>2,100,000</b>	<b>2,500,000</b>	<b>950,000</b>	<b>250,000</b>	<b>6,610,000</b>
<b>Sustainable Livelihoods Programme:-</b>						-
- MRPA Audit and Environmental Sustainability Plan		200,000				200,000
- Business & Marketing Plans & Implementation		400,000	100,000	100,000	100,000	700,000
- Promote & Facilitate Sustainable Agriculture	25,000	50,000	50,000	50,000	50,000	225,000
- Promote & Facilitate Sustainable Tourism	25,000	100,000	100,000	100,000	100,000	425,000
<b>Sub-total Sustainable Livelihoods Programme</b>	<b>50,000</b>	<b>750,000</b>	<b>250,000</b>	<b>250,000</b>	<b>250,000</b>	<b>1,550,000</b>
<b>TOTAL CAPITAL EXPENDITURE</b>	<b>4,795,000</b>	<b>5,215,000</b>	<b>4,370,000</b>	<b>2,620,000</b>	<b>650,000</b>	<b>17,650,000</b>
						-
<b>TOTAL BUDGET (Recurrent &amp; Capital)</b>	<b>13,260,464</b>	<b>13,468,351</b>	<b>12,630,435</b>	<b>11,541,269</b>	<b>10,284,970</b>	<b>61,185,489</b>

## 8.5 Business and Marketing Plans

A Business Plan should be prepared along with a Marketing Plan, to guide the business operations which will help to fund the management of the protected area. There are two main sources of income and a third potential one:-

### 1. Visitation from Research/Academic Institutions:-

- Primary level school groups
- Secondary level school groups
- Teacher Training Institutions
- Tertiary environmental sciences Institutions:-
  - Field Trips (if regular, can implement annual monitoring)
  - Study Tours (involves more interaction with local community)
  - M.Sc. Projects (more applied)
  - M.Phil and Ph.D. research
  - Post-doctoral research

### 2. Visitation from Interest Groups and other Jamaican tourists:-

- Nature/Horticulture
- Youth Groups e.g. Girl Guides, Scouts, Churches
- Persons looking for week-end family oriented activities

### 3. Horticulture venture with Shields Flower Farm

- Sphagnum and other plants e.g. orchids

This will require research to see what will grow on the Flower Farm so that Shields can grow out plants propagated or from cuttings from the Reserve with a percentage (royalties) accruing to the IOJ for management of the Protected Area and with associated branding.

## 8.6 Marketing and Sales

There is a need to market the Mason River Protected Area to researchers and academic institutions, interest groups and others. A Marketing Plan needs to be developed and implemented and sales of tours and other services increased. In addition to existing IOJ

marketing/business development personnel, this could be one role of a Protected Area Manager, guided by the Plan and marketing personnel.

## 9. Monitoring & Evaluation

The goal of monitoring and evaluation is to aid in assessing management effectiveness. This will be done by implementing ongoing monitoring Programmes to provide the data to evaluate the status of key conservation targets. The monitoring described in this section addresses the outcome level whilst monitoring identified within each Programme is at the output level.

The scientists at the IOJ – NHMJ will be responsible for finalising the details for methodology and implementation of the Monitoring Programme described in Table 11 below. The PA Manager and wardens can be responsible for some of the regular measurements e.g. water levels.

Five indicators were identified which would aid in the assessment of the health of the Reserve and for each of these, their desired status was noted. Achieving the desired status will indicate that the Protected Area is being effectively managed. Approaches to measurement of the indicators were also identified.

**Table 17: MRPA Monitoring Programme**

Indicators	Baseline	Desired Status	Measurement
Invasive species	Existing Satellite Imagery indicates locations and area covered (exact area needs to be calculated)	Decreased	Satellite Imagery Analysis (for both <i>Dicranopteris</i> and <i>P. cattleianum</i> ) – at least every two years)
Plant Diversity	Weck’s 1970 results	Species richness & composition maintained or increased	Conduct sampling using quadrats (at Weck’s and additional sites) and compare with Weck’s results and over time
Water Quality	Over 200 MPN/mL in both Stream & Marsh (2012) and “Jipp” Spring (1999)	Within NEPA River Standards (100 MPN/mL) particularly for Faecal Coliform	Samples to be taken regularly and sent to NEPA Pollution Monitoring and

<b>Indicators</b>	<b>Baseline</b>	<b>Desired Status</b>	<b>Measurement</b>
		Close to drinking water standards for Springs (< 1.1 MPN/100mL)	Assessment Branch for Analysis
Water level in the Bog, Marsh and Seasonal Streams consistent	Unknown Install measuring sticks at key locations in Marsh, Peat Bog and Seasonal Stream  Use soil moisture sensors at set sample points in different habitats	No Drying out of the Wetland	Establish baseline in Year 1 and conduct water-level measurements 8 times/year at start and finish of wet and dry seasons.  Consider developing Sphagnum Moss Colour Monitoring
Terrestrial Birds – local and migrant	2000/1 bird survey and vegetation assessment data	Habitats used by birds maintained or increased	Species diversity for birds and plants and habitat assessment monitored at least every 5 years.

The MET Service should be able to provide guidance with regard to the soil moisture sensors.

It was noted that Sphagnum moss (changes in colour) could be used to help assess water level and hydration and that dragonflies could be used to help assess water quality but that these would need to be researched and a Programme developed.



## **List of Appendices**

Appendix 1 - Gazette for the Mason River Savanna, Clarendon Game Sanctuary

Appendix 2 - JNHT National Protected Heritage Designation

Appendix 3 – Gazette for the Mason River Protected Area

Appendix 4 – Ramsar Information Sheet – MRPA - 2011)

Appendix 5 – Map sent with Ramsar Information Sheet 2011

Appendix 6 – Lists of Species

Appendix 6.1 – List of Plants (from IOJ)

Appendix 6.2 – List of observed Bird Species (from Davis, 2003)

Appendix 7 - Preliminary Draft Research Prospectus

Appendix 8 – Job Descriptions

Appendix 9 – List of Stakeholders Participating in the Management Planning

# Appendix 1 – Gazette for the Mason River Savanna, Clarendon Game Sanctuary

(b) in Part II—

- (i) by deleting from the description of the Boundary of the Lower Morass, Black River, St. Elizabeth, Game Sanctuary the words "Black River" where they appear a sixth time and a seventh time and substituting therefor in each case the words "Broad River";
- (ii) by deleting the heading "Boundary of West Harbour, Clarendon, Game Sanctuary" and the description thereof;
- (iii) by inserting next after the description of the "Boundary of the Amity Hall, St. Catherine, Game Sanctuary" the following descriptions—

" BOUNDARY OF WEST HARBOUR—PEAKE BAY, CLARENDON GAME SANCTUARY

Starting at the jetty with geographical coordinates 17° 45' 025"N 77° 08' 459 "W where the mangrove meets the sea at Barnswell Beach in Mahoe Garden seaward, then in a generally north-western direction on the outer periphery of the mangrove passing Dolphin Island with geographical coordinates of 17° 47' 516'N 77° 09' 640"W to the channel at Bogue Creek with geographical coordinates of 17° 48' 110"N 77° 10' 456"W near Peake Bay; then in a generally south-western direction, along the southern mangrove edge of Bogue Creek to Bogue Pond; then in a generally south-eastern direction to West Harbour; then in a generally south-western direction along the periphery of West Harbour mangrove passing Deep Creek to Bar Mouth Creek; then along this Creek in a generally south-western direction to the docking bay at the fishing beach at Portland Cottage; then in an easterly direction along the periphery of the mangrove to the starting point.

BOUNDARY OF CABARITA POINT, ST. CATHERINE GAME SANCTUARY

Starting at the tip of Cabarita Point with geographical coordinates 17° 50' 450"N 77° 02' 346"W; then going in a northerly direction following the periphery of the mangrove, passing Great Goat Island to a point with geographical coordinates 17° 53' 370'N 77° 03' 500'W; then continuing along the periphery of the mangrove in a general south-easterly then northern direction to geographical coordinates 17° 53' 37'N 77° 03' 49.5'W; then in a straight line with bearing 259° for 2.3 km to Riddleys Bay at geographical coordinates 17° 50' 45'N 77° 02' 34'W; then from Riddleys Bay along the periphery of the mangrove in a south-western direction to the starting point.

BOUNDARY OF MASON RIVER SAVANNA, CLARENDON GAME SANCTUARY

Starting at the bridge which crosses the Blue River on the Mason River to Douglas Castle main road (point (1) ); then going in a north-easterly direction along the river which also coincides with

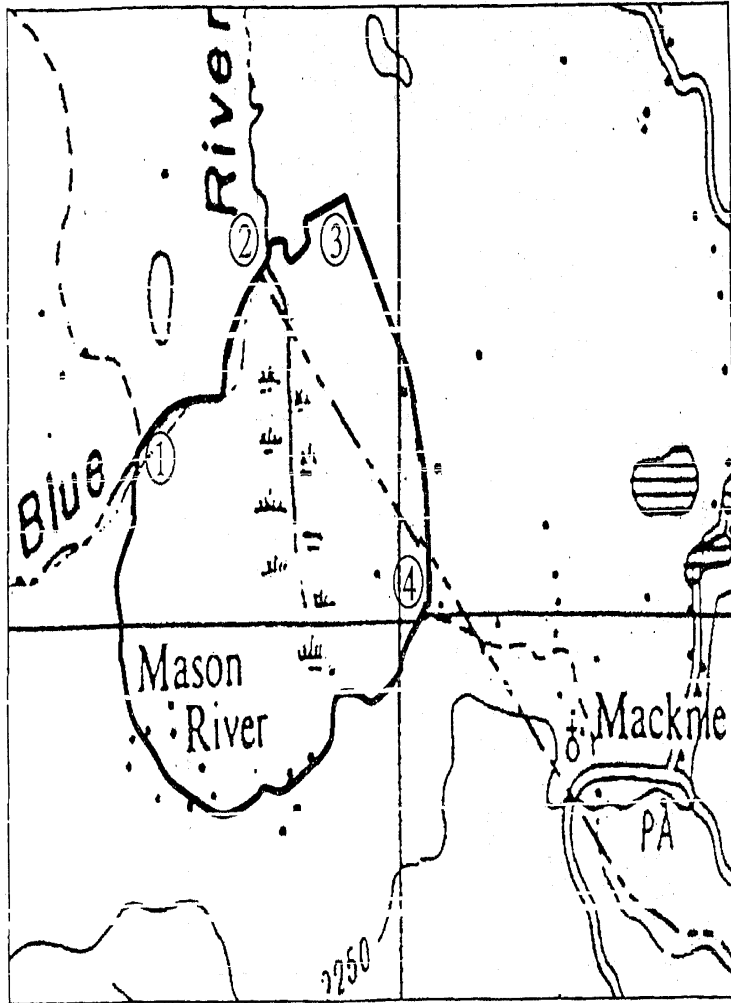
the Parish Boundary of St. Ann and Clarendon, to the point where a tributary meets with it (point (2) ); then in an easterly direction along the tributary to where the motorable track crosses it (point (3) ); then in a southerly direction crossing the Parish Boundary of St. Ann and Clarendon into the parish of Clarendon to the junction of the motorable track and the Mason River to McNie main road (point (4) ); then in a westerly direction along the centre line of the Mason River to McNie main road to the starting point.

BOUNDARY OF THE LONG ISLAND CLARENDON GAME  
SANCTUARY

Starting at the centre point of Salt Island with geographical coordinates  $17^{\circ} 48' 803'' N 77^{\circ} 08' 603'' W$ ; then in a straight line with bearing  $003^{\circ}$  to the mouth of Bowers River; then along the river for 400 metres to the point where the tributary enters Bowers River; then along this tributary in a westerly direction to the point where it meet the Freetown to Salt River main road in Cockpit; then along the Freetown to Salt River main road in a south-westerly direction, passing Bratts Hill and Tarentum to the bridge at Salt River; then along the Salt River in a south-easterly direction to the jetty at Salt River Bay; then in a straight line with bearing  $101^{\circ}$  to the starting point."

- (c) in Part III—
- (i) by deleting from the heading the word "*Delegating*" and substituting therefor the word "*Delineating*";
  - (ii) by deleting the map headed "West Harbour";
  - (iii) by inserting next after the map headed "Amity Hall—St. Catherine" the following maps—

Mason River Savanna Game Sanctuary, Clarendon



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PROCLAMATIONS, RULES AND REGULATIONS

[Aug. 21, 1998

## Appendix 2 – Gazette for the Mason River Protected National Heritage

Nov. 28, 2002]

THE JAMAICA GAZETTE

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- (c) A capital allowance under the Income Tax Act, where he incurs capital expenditure in developing the National Monument.
- (2) The owner, or where appropriate, the person in possession of the National Monument will be prohibited from carrying out any demolition, removal, or alteration thereon without the prior approval of the Trust.
- (3) The Trust may, in its own discretion, maintain or assist in the maintenance of the National Monument so as to prevent its falling into a state of disrepair.
- (4) Authorized persons may enter any land or building which is or contains the National Monument for the purpose of investigation, inspection, or maintenance.
- (5) Where the Declaration affects registered land, the fact of the Declaration will be communicated by the Trust to the Registrar of Titles who is required to note the Declaration on the registered title.
- Where the land does not have a registered title, the fact of the Declaration will be communicated to the Deputy Keeper of the Records for recording.
- (6) Criminal procedures may be instituted in respect of the doing of any prohibited act pertaining to the National Monument.

#### SCHEDULE

All that parcel of land, in particular a two storey 18th century Georgian structure with thick walls, a peaked portico and an elaborate arrangement of stone steps known as Halse Hall Great House in the parish of Clarendon and registered at Volume 1146 Folio 131 in the Register Book of Titles.

Dated the 31st day of October, 2002.

DEVON DICK,  
Chairman.

SUSANNE LYON,  
Executive Director. (22)

#### DESIGNATION

##### JAMAICA NATIONAL HERITAGE TRUST ACT

##### *Designation of a Protected National Heritage—MASON RIVER FIELD STATION*

WHEREAS section 13 (1) of the Jamaica National Heritage Trust Act confers on the Jamaica National Heritage Trust (hereinafter referred to as "the Trust"), the power to designate any place a Protected National Heritage:

NOW THEREFORE, the Trust, in exercise of the power conferred as aforesaid hereby designates, Mason River Field Station, more particularly described in the Schedule hereto, to be a Protected National Heritage.

##### *Effects of Designation*

In accordance with the Act, the designation will have the following effects:—

- (1) Any owner of land, buildings or property within the protected national heritage will be entitled to:
- (a) appropriate compensation for any financial loss resulting from the designation;

- (b) have treated as a deductible expense for income tax purposes, any amount spent by him on work certified by the Trust as being necessary for the preservation of such land, buildings, or property within the protected national heritage.
- (2) The owner, or where appropriate, the person in possession of land, buildings, or other property within the protected national heritage will be prohibited from carrying out any demolition, removal or alteration thereon without the prior approval of the Trust.
- (3) The Trust may, in its own discretion, maintain or assist in the maintenance of land, buildings, or other property within the protected national heritage so as to prevent their falling into a state of disrepair.
- (4) Authorized persons may enter any land or building within the protected national heritage for the purpose of investigation, inspection or maintenance.
- (5) Criminal procedures may be instituted in respect of the doing of any prohibited act pertaining to the protected national heritage.

#### SCHEDULE

All that parcel of land known as the Mason River Field Station in the parish of Clarendon and registered at Volume 1021 Folio 96 in the Register Book of Titles, in particular the reserve of 122 acres of land containing several unique plant species of regenerating forest and 100 square yards of bog containing several species of the moss sphagnum.

Dated the 31st day of October, 2002.

DEVON DICK,  
Chairman.

SUSANNE LYON,  
Executive Director. (23)

#### DESIGNATION

##### JAMAICA NATIONAL HERITAGE TRUST ACT

##### *Designation of a Protected National Heritage—BLACK RIVER SPA*

WHEREAS section 13 (1) of the Jamaica National Heritage Trust Act confers on the Jamaica National Heritage Trust (hereinafter referred to as "the Trust"), the power to designate any place a Protected National Heritage:

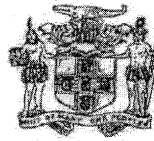
NOW THEREFORE, the Trust, in exercise of the power conferred as aforesaid hereby designates, Black River Spa, more particularly described in the Schedule hereto, to be a Protected National Heritage.

##### *Effects of Designation*

In accordance with the Act, the designation will have the following effects:—

- (1) Any owner of land, buildings or property within the protected national heritage will be entitled to:
- (a) appropriate compensation for any financial loss resulting from the designation;
- (b) have treated as a deductible expense for income tax purposes, any amount spent by him on work certified by the Trust as

Appendix 3 – Gazette for the Mason River Protected Area



THE  
**JAMAICA GAZETTE**  
SUPPLEMENT

PROCLAMATIONS, RULES AND REGULATIONS

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Vol. CXXV

THURSDAY, NOVEMBER 14, 2002

No. 77

No. 129

**THE NATURAL RESOURCES CONSERVATION AUTHORITY ACT**

**THE NATURAL RESOURCES CONSERVATION (MASON RIVER PROTECTED AREA) ORDER, 2002**

In exercise of the power conferred upon the Minister by section 5 (1) (b) of the Natural Resources Conservation Authority Act, and of every other power hereunto enabling, the following Order is hereby made, on the recommendation of the Natural Resources Conservation Authority after consultation with the Jamaica National Heritage Trust:—

1. This Order may be cited as the Natural Resources Conservation (Mason River Protected Area) Order, 2002.

2. The area specified in Part I of the schedule, which is delineated on the map set out in Part II thereof, is hereby designated as a protected area and shall be known as the Mason River Protected Area.



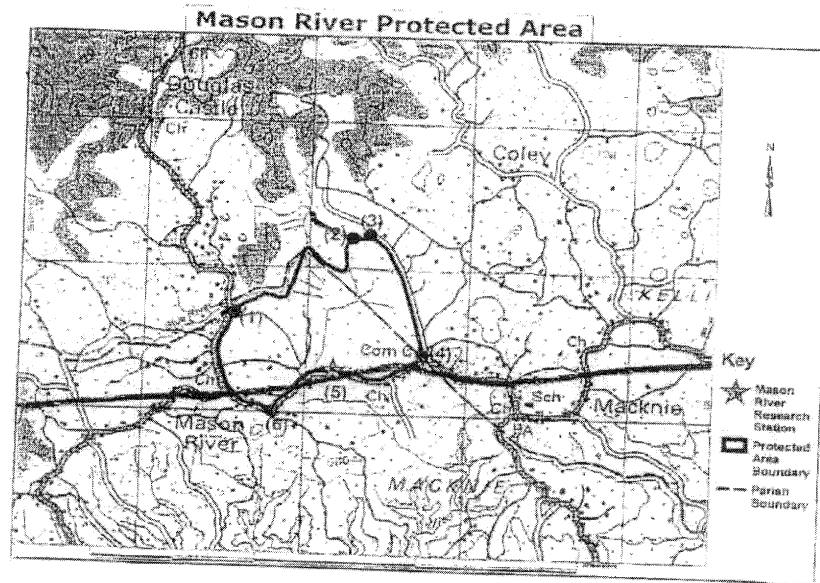
## SCHEDULE

*Part 1—Mason River Protected Area*

Starting at the bridge where the Mason River—Douglas Castle Main Road crosses the Blue River (point 1); then going in a north-easterly direction along the Blue River, which also coincides with St. Ana-Clarendon parish boundary, to the point where a tributary meets with it (point 2); then in an easterly direction along this tributary to where the motorable track crosses it (point 3); then in a south-easterly direction along this motorable track to the junction with the Mason River—Macknie Main Road (point 4), then in a westerly direction along the center line of the Mason River Main Road to the entrance to the Mason River Research Station (point 5); then south-westerly along the said main road for 1km to a point where it is intersected by a motorable track (point 6); then in a northerly direction to the starting point.

SCHEDULE, contd.

Part II—Map of the Mason River Protected Area



Dated this 11th day of October, 2002

HORACE DALLEY,  
Minister of Land and Environment.

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## Appendix 4 – Information Sheet on Ramsar Wetlands (RIS) – 2009-2012

Available for download from [http://www.ramsar.org/ris/key\\_ris\\_index.htm](http://www.ramsar.org/ris/key_ris_index.htm).

### 1. Name and address of the compiler of this form:

Tracy Commock, Director - Natural History Museum of Jamaica, 10-16 East Street, Kingston  
Keron Campbell, Botanist – Natural History Museum of Jamaica, 10-16 East Street, Kingston  
Ainsley Henry – Director, Applications Management Division  
Monique Curtis - Environmental Officer, Ecosystems Management Branch  
Shakira Azan - Environmental Officer, Ecosystems Management Branch  
National Environment & Planning Agency, 10 Caledonia Avenue, Kingston 5  
Jerome Smith – Director, Environmental Management Division, Ministry of Water, Land,  
Environment and Climate Change, Half Way Tree Road, Kingston 5

### 2. Date this sheet was completed/updated:

August 4, 2011

### 3. Country:

Jamaica

### 4. Name of the Ramsar site:

The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

Mason River Protected Area, Bird Sanctuary and Ramsar Site

### 5. Designation of new Ramsar site or update of existing site:

**This RIS is for** (tick one box only):

a) Designation of a new Ramsar site ; or

b) Updated information on an existing Ramsar site

### 6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area

The Ramsar site boundary and site area are unchanged:

or

**If the site boundary has changed:**

i) the boundary has been delineated more accurately ; or

ii) the boundary has been extended ; or

iii) the boundary has been restricted\*\*

and/or

**If the site area has changed:**

i) the area has been measured more accurately ; or

ii) the area has been extended ; or

iii) the area has been reduced\*\*

\*\* **Important note:** If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

**b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:**

**7. Map of site:** Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

Please send the official map of the site.

**a) A map of the site, with clearly delineated boundaries, is included as:**

i) **a hard copy** (required for inclusion of site in the Ramsar List): ;

ii) **an electronic format** (e.g. a JPEG or ArcView image) ;

iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** .

**b) Describe briefly the type of boundary delineation applied:**

e.g. the boundary is the same as an existing protected area (nature reserve, national park, etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc. The boundary is the same as an existing protected area and Game Sanctuary. The delineation used follows geopolitical boundaries (Parish boundaries), roadways and rivers. Starting at the bridge which crosses the Blue River on the Mason River - Douglas Castle main road; then going in a north-easterly direction along the Blue River which also coincides with the St. Ann - Clarendon Parish Boundary, to the point where a tributary meets with it; then in an easterly direction along the tributary to where the motorable track crosses it; then in a south- easterly direction along this motorable track to the junction with Mason River - McNie Main Road; then in a westerly direction along the centre line of the Mason River to McNie main road to the entrance to the Mason River Research Station; then south-westerly along the said main road for 1km to a point where it is intersected by a motorable track; then in a northerly direction to the starting point.

**8. Geographical coordinates** (latitude/longitude, in degrees and minutes):

Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

N 180 11' 38"

W 770 15' 46"

**9. General location:**

Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.

The Mason River Protected Area and Bird Sanctuary (MRPA) is located in the central section of the island of Jamaica on the parish boundary between Clarendon and St. Ann. It is 4km away from the Town of Kellits, Clarendon which has a population of 2,423 (STATIN, 2001).

**10. Elevation:** (in metres: average and/or maximum & minimum)

Mean altitude of 670 metres

**11. Area:** (in hectares)

Inland Wetland – 82 hectares

**12. General overview of the site:**

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

In the hilly countryside of central Jamaica, is a flattish area with several surface depressions, ponds, and sinkholes that seasonally store surface water. The MRPA is found in this area at a mean altitude of 670m and is the highest wetland area in Jamaica. The original vegetation surrounding the MRPA was cleared decades ago for expanding agriculture, making the 'protected area' an ecological island of upland scrub

savanna amidst a sea of cultivation surrounded in the distance by dry limestone hillsides. It has a peat bog, which perennially stores water below the surface. The site also has a network of trails roughly estimated to have a total length of 2.25km.

### **13. Ramsar Criteria:**

Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1  2  3  4  5  6  7  8  9

### **14. Justification for the application of each Criterion listed in 13 above:**

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

#### **JUSTIFICATION FOR RAMSAR CRITERION #1**

Mason River is a representative and rare example of an inland wetland and contains an upland peat bog and scrub-savanna. The bog is unique to the area and rare in Jamaica. The bog is mainly a result of terrestrialization where *Sphagnum* moss spreads across the area that originally may have been a pond. The bog is accompanied by several other wetland types such as small ponds, marsh and a small stream. Some of these wetlands are seasonal and may be dry at the surface. The ponds form settlement areas as a result of the topography, which has numerous depressions. Small streams are all that remain of what was formerly referred to as the Blue River.

#### **JUSTIFICATION FOR RAMSAR CRITERION #2**

Several endemic plant species found within the MRPA are listed on the IUCN Red List (2011); for example, *Myrcia skeldingii*, which was originally described from this locality. This species has subsequently been listed as extinct, since the plant has not been collected or seen in several decades. Other endemic plants including *Bactris jamaicana* (Prickly Pole), *Calyptanthes nodosa*, *Cordia troyana* and *Hyeronima jamaicensis* are listed as vulnerable species. While *Coccoloba plumieri*, *Gymnanthes integra*, *Phyllanthus cladanthus* and *Psychotria dolichanta* are listed as lower risk/near threatened species. *Ouratea jamaicensis* which is also endemic is listed as a species that is lower risk/near vulnerable.

#### **JUSTIFICATION FOR RAMSAR CRITERION #3**

There are approximately 430 plant species found in the MRPA with 90% being indigenous and about 11% being endemic. Twenty-nine of the 93 genera found in the MRPA are represented by at least one endemic species. Endemic palms such as *Calyptronoma occidentalis* and *Roystonea altissima* are all found in the MRPA. The endemic orchid, *Habenaria purdiei*, which has not been seen for decades, is thought to have been discovered in the MRPA. The MRPA also contains more than 30 species of ferns, two of which are *Cyathea* species (commonly known as “Tree Ferns”), *Equisetum giganteum* (commonly known as “Giant Horsetail”) and *Psilotum nudum* (commonly known as “Skeleton Fork Fern”) which are all primitive plants. Several bromeliads are also present, some of which hosts faunal species within the pools of water accumulated in the bases of their leaves. These bromeliads not only supply water but act as discrete ecosystems where some faunal species spend their entire life cycle.

#### **JUSTIFICATION FOR RAMSAR CRITERION #4**

Mason River Protected has several species of the moss *Sphagnum* that are essential for the existence of the bog. Likewise is an important site for the endemic *Mellisuga minima* (Vervain Hummingbird), the migratory species *Oporomis agilis* (Connecticut Warbler) which prefers moist vegetated or wetland habitats (Davis, 2001) and three types of carnivorous plants as the native *Drosera capillaries* (Sundew), *Urticularia* spp. (Bladderworts), and the *Dionaea muscipula* (Venus Flytrap). Jamaica has a managed shooting season for several species of birds. To facilitate the sustainability of this activity, the mechanisms for protection/conservation employed include the designation of sanctuaries. The MRPA is one such declared Game Sanctuary and is an important site for the *Columba leucocephala* (White-Crowned Pigeon), as it serves as a refuge from bird shooters.

**15. Biogeography** (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

**a) biogeographic region:**

Jamaica falls in the Neotropical Biogeographical Region  
Terrestrial Ecoregion – World Wildlife Fund  
Tropical and subtropical Moist Broadleaf Forests  
Neotropical Greater Antillean Moist Forests

**b) biogeographic regionalisation scheme** (include reference citation):

[http://wwf.panda.org/about\\_our\\_earth/ecoregions/greaterantillean\\_moist\\_forests.cfm](http://wwf.panda.org/about_our_earth/ecoregions/greaterantillean_moist_forests.cfm)

**16. Physical features of the site:**

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc. Please complete the information regarding the physical features of the site, including hydrology, soil type, water quality, etc.

The topography of the site has been described as having a flattish, undulating surface with several peat filled depressions in which water collects and is stored (Proctor, 1970; White, 1991). The site, like the rest of Jamaica is subject to two rainy and two dry seasons. The depressions are therefore inundated seasonally along with other sections of the MRPA. There are also limestone features within the boundaries of the MRPA in the form of sinkholes. Water quality monitoring within the area yielded the following results: Biological Oxygen Demand (BOD) 8.1-31, Total Suspended Solids (TSS) 4-222, Total Dissolved Solids (TDS) 94-100, Faecal Coliform (FC) 79-1600, Nitrates (NO<sub>3</sub>) 0.01-0.3, Phosphates (PO<sub>4</sub>) 0.06-0.2 and pH 4.2-6.4. The BOD and FC exceeded the national standards and may be explained by anthropogenic influences in the area. The pH value also exceeded the national standard but this is expected, since the chemistry of inland bogs tends to be acidic.

**17. Physical features of the catchment area:**

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type). Please complete the information regarding the physical features of the catchment area.

The soil types found at the MRPA are Deepdene Clay #98 (*Aquic Tropudults*), Boghole Clay #99 (*Umbric Palequults*), Morass Peat #152 (*Typic Tropohemists*) and Boghole Sandy Loam #199 (*Umbric palequults*) (Evans, 2005). These soils are fine and heavy except for those bordering the limestone sinkholes which are well drained. In general, the soils are acidic in nature. The

catchment area, which refers to the majority of the MRPA, is undulating with depressions and gentle slopes throughout. The two rainy seasons with peak rainfall in May and September (Davis, 2003)

### **18. Hydrological values:**

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

The MRPA is located on the main ESE-WNW watershed in central Jamaica, which gives rise to north and south flowing rivers (White, 1991). To the north, the MRPA feeds into the Roaring River, Laughlands River and Rio Bueno along the north coast in St. Ann. All the wetland types present play an important ecological function in preventing downstream flooding by absorbing precipitation. There is little groundwater storage except for intermittent underground streams and ponds. The lack of groundwater results from a basement aquiclude underlying the MRPA. This aquiclude is a saturated geological unit that cannot transmit significant quantities of water under normal circumstances (Underground Water Authority, 1990 as reported by Davis, 2003). The *Sphagnum* moss also retains water and this adds to the importance of the ecosystem especially during the drier months.

### **19. Wetland Types**

#### **a) presence:**

Circle or underline the applicable codes for the wetland types of the Ramsar “Classification System for Wetland Type” present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

**Marine/coastal:** A • B • C • D • E • F • G • H • I • J • K • Zk(a)

**Inland:** L • M • N • O • P • Q • R • Sp • Ss • Tp • Ts • U • Va •

Vt • W • Xf • Xp • Y • Zg • Zk(b)

**Human-made:** 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

#### **b) dominance:**

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

U – N – Xf – Tp – Xp – Ts – W – Zk(b) – Y

### **20. General ecological features:**

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them. Generally, the MRPA has been described as an induced upland scrub-savanna by Weck in 1970. The savanna was further differentiated into thirteen vegetative areas and is presented below:

- **Southwestern Melastome Scrub**

Average height of the dominant vegetation (melastomes) is about 18m (5ft). The predominant scrub is

*Miconia albicans* with liberal amounts of *Clidemia strigillosa*, *Miconia laevigata*, and *Miconia attenuata* spaced about 0.3m (1ft) apart. Except for a few *Myrsine coriacea*, *Clethra occidentalis* and *Buchenavia capitata*, which are 2.4-3m (8-10ft) high, there are no forest trees and shading is moderate. *Andropogon bicornis*, *Lantana camara*, and *Pteridium aquilinum* comprise the 0.9m (3ft) layer of the scrub vegetation. The 0.3-0.9m (1-3ft) layer includes many melastome seedlings, grasses and sedges. Partly because the area is so small, the tree types are quite similar and the area stands alone as both a topographic, soil, and vegetation unit. The soil is dry with no

humus and about 5cm litter. Surface soil consists of a brown, friable clay-loam grading into orange clay at about 25cm depth. The presence of ackee and guava trees indicates previous human habitation.

- **Southwestern Hill Vegetation**

Melastomes such as *Miconia albicans*, *Miconia attenuata*, *Miconia laevigata*, and *Clidemia strigillosa* are dominant as in the Southwestern Melastome Scrub, but are more widely spread at about 0.6-0.9m (2-3ft) from stem to stem. The hill has quite a number of forest trees: *Coccoloba swartzii*, *Eugenia axillaris*, *Eugenia wilsonella*, *Clethra occidentalis*, *Clusia rosea*, *Cyrilla racemiflora*, and *Lisianthus exertus*. The melastomaceous vegetation reaches a high of about 1.2m (4ft), while the scattered forest trees grow either as seedling, in clumps of 0.9-1.2m (3-4ft) high or singly to about 2.4m (8ft).

Although grasses, sedges, melastome seedlings and ferns are common, no one species stands out as being dominant in the 0.3-0.4m (1-1.5ft) layer. *Pteridium aquilinum* appears physiognomically dominant because it is widespread and 0.3-0.6m (1-2ft) higher than the other low vegetation. The steep topographic gradient on the hill may account for the very dry, grainy nature of the topsoil which is a brown clay-loam as in the Southwestern Melastome Scrub. Again, humus is lacking and litter is slight. Reddish clay is encountered at a depth of about 23cm (9in.). The hill is a fairly well-defined unit due to its topographic and floristic composition.

- **Pteridium Bog**

The bog is the most visible and defined region. The bog is basically 0.9-1.08m (3-6ft) with *Blechnum serrulatum* ferns growing in hummocks, which stand out of 0.3-1.2m (1-4ft) deep water. Scattered within the bog are a few 4.5m (15ft) tall *Clusia rosea* and *Henriettia ramiflora* trees with stilt roots. Towards the edges of the bog, drier species like *Miconia attenuata*, *Myrsine coriacea*, *Miconia dodecandra*, *Miconia laevigata* are common. Aside from some scattered *Lindseae portoricensis* ferns, no other herbs are present in the main part of the bog.

Soil within the water of the bog is soft, dark, red-brown organic mud. The hummocks are composed entirely of *Blechnum serrulatum* roots and dead organic matter, no mineral soil and are surprisingly dry. Soil near the edges of the bog is gray-brown, clay-loam underlain by gray marly clay at 10cm (4in.) and red clay at 0.3m (10in.). Although the bog is higher than any other area of the station, it forms a sink from the surrounding higher topography, perhaps partly accounting for its high water table.

- **Limestone Sinkholes**

The sinkholes are scattered throughout the south-eastern region of the station, each with different flora. The floras are similar, however, in that they are plants that flourish in well-drained rather than waterlogged sites. The sinkholes vary in depth from about 1.5-3.6m (5-12ft) and are located over porous limestone rock. There seems to be one or more water outlets at the bottoms of these holes, where water draining from nearby disappears underground into cavernous areas.

Three of the sinkholes on the site supported several medium large trees or shrubs, a small grass or herb layer, and very few of the small shrubs. Two of the holes are considerably shaded; one hole has several clumps of *Bambusa vulgaris*, *Miconia prasina*, and *Cyathea parvula*. The other hole is dominated by several *Psidium guajava* (Guava), indicating previous habitation, with some small shrubs of *Clidemia hirta* and *Lantana camara* accompanied by *Impomoea tiliacea* and *Mikania micranatha* vines. At 9m (30ft) the third hole is too large to be shaded by the *Eugenia axillaris* trees surrounding it. This results in a greater number of grasses and shrubs such as *Clidemia strigillosa* and *Miconia attenuata* growing in the hole. Soil on the sinkhole slopes is

a dark, granular clay lam grading into plastic, yellow-brown clay with a small amount of litter and up to 1cm of humus. Near the drain holes, litter accumulation is 8-12cm (3-5m).

- **Small Southeastern Swamp**

This predominant vegetation of the swamp is sedge, growing hummocks which occupy a low but not very distinct area of the MRPA. The swamp is 100m long and 25m wide and generally contains standing water. *Rhychospora marisculus*, *Rhynchospora fascicularis*, and *Rhynchospora cyperoides* are common sedges growing about 0.5m (1.5ft) from water level. Common plant species 0.3m (1ft) and lower, included *Lycopodium cernuum*, *Gerardia albida*, *Centella asiatica*, *Nepsera aquatica*, and *Acisanthera quadrata*. The swamp is surrounded to the northwest by forest trees and large melastomes, some of which intrude into the edges of the swamp, whose boundaries are indefinite and vary with rainfall. East of the swamp, the land rises abruptly and gives way to a different vegetation type.

Hummocks and hollows understandably differ with respect to soil character. The hummocks contain soft, fine clay, which has been deposited between the roots and stems of the grasses and sedges. Hollows, on the other hand, contain a grayish clay loam, which grades into gray clay marl at about 10cm (4in.) and at 1.5-3.0dm (6-12in.) into orange-gray clay. The 5cm litter is composed of grass and sedges leaves and roots with some fermentation into humus taking place.

- **Low Melastome Scrub on Western Boundary**

Outside of the Pteridium Bog and the Small Southeastern Swamp, this is the wettest area on the station. The Low Melastome Scrub encompasses most of the topographically lowest part of the MRPA, extending to the pond and tributaries of the Mason River at the northwestern corner. The most common shrubs are the melastomes, *Miconia attenuata* and *Clidemia strigillosa*, both of which attain heights of approximately 0.9m (3ft). The common herbs are *Blechnum serrulatum*, *Centella asiatica* and *Lycopodium cernuum*. Scattered within the low limestone matrix is a higher melastome and shrub vegetation composed of *Miconia dodecandra*, *Vernonia acuminata*, *Eugenia axillaris* and *Miconia prasina*. These 1.8-3.0m (6-10ft) species range about 10-30m from stem to stem. Towards the north of the site, forest trees become more common. Trees and shrubs common in the transition region are *Cyrilla racemiflora*, *Coccoloba plumieri*, *Clethra occidentalis*, and *Myrsine coriacea*, which attain heights of 3.6-4.2m (12-14ft). The soils are generally dark clay loam grading into white clay at 15cm (6in.). Litter of about 2.5cm (1in.) is present but this is accompanied by very little humus.

- **South-central Thick Hill Melastome Scrub**

This area is adjoining the Low Melastome Scrub on the western boundary in the southern half of the MRPA. A thick melastome scrub grows along a rising topography to the low hills, which form a spine or ridge to the southern half of the site. The shrub density is attested by the highest stem count per unit area on the site. This vegetation gives way to a glade type as the lands drops on the eastern side of the site.

Again, as in the Low Melastome Scrub on the western boundary, *Miconia attenuata* and *Clidemia strigillosa* predominate, but are taller than their counterparts in the Low Melastome Scrub on the western boundary. As the topography rises, so does the frequency of *Miconia dodecandra* and *Miconia prasina*. The height of these latter melastomes is from 1.5-1.6m (5-12ft), averaging about 1.4m (7ft). At the highest elevation of this area, forest trees such as *Coccoloba swartzii*, *Myrsine coriacea*, and *Eugenia wilsonella* are common, but mostly as seedlings and small plants. Common herbs are the 1m *Pteridium aquilinum* (often dead), a 3-

6dm (1-2ft) layer of *Panicum glutinosum* and a grand layer of *Coccocypelum herbaceum*. The presence of jackfruit, ginger, potato and pineapple indicates previous agricultural use of this area. Soils are brown, sandy clay loams overlying sand, grayish clay and marl. The water table is at 0.3m (13in.) at discrete points within the site. Litter is up to 7.6cm (3in.) deep, with a slight fermentation layer underneath.

- **Eastern Glades**

This area, pock-marked with sinkholes, is generally dry, but has regions of standing water. It is quite open and sunny and favors many grasses and sedges which attain heights of 1.5m (5ft) such as *Scleria melaleuca*, *Panicum glutinosum*, *Scleria secans*, *Arundinella confinis* and *Andropogon bicornis*. Common herbs include *Blechnum serrulatum*, *Lycopodium cernuum* at 0.6m (2ft) and mats of *Centella asiatica*. Shrubs and trees such as *Miconia dodecandra*, *Clethra occidentalis*, *Clusia rosea*, *Coccoloba swartzii*, *Clidemia strigillosa* and *Miconia prasina* are scattered several meters apart from each other or grow in clumps. *Psidium guajava* is present in abundance in this area as well as in the sinkholes. In areas of standing water, the palm *Bactris jamaicana* and the tree fern *Cyathea parvula* are common. The palms are some of the highest trees on the site at approximately 10.5m (35ft). The other shrubs and trees vary from 1.5-4.5m (5-15ft). Loamy tan clay covers tough orange clay, which starts at about 0.2-0.3m (9in.) deep. Gray sand can also form the topsoil. The water table is usually 15-20cm (6-8in.) down. About 2.5cm (1in.) litter was found at the soil surface.

- **Groves**

Similar to the sinkholes in the south, the groves are discontinuous and scattered throughout the northern portions of the site. Unlike the sinkholes, however, the groves do not occupy a given topographic level on the site, ranging from the lowest to medium low regions. The groves vary in size from about 600m square to 3000m square, but are not in themselves discrete units, being a mosaic of groups of forest trees and more open scrub and grassy areas. Common upper species averaging about 4.5m (15ft) are *Bactris jamaicana*, *Eugenia axillaris*, *Eugenia wilsonella*, *Coccoloba swartzii*, *Coccoloba plumieri*, *Guettarda argentea*, varieties of *Randia aculeata*, *Myrsine coriacea*, *Clethra occidentalis*, *Hedysomum nutans*, *Cyathea parvula*, and *Cyrilla racemifolora*.

The common herb underneath the forest canopy was *Blechnum serrulatum* and *Thelypteris kunthii* ferns with mats of *Centella asiatica*. In the shadiest groves herbs as well as shrubs are scarce. Around the clumps of taller trees are 1.2-1.8m (4-6ft) shrubs of *Miconia dodecandra*, *Miconia albicans*, *Miconia laevigata*, and *Cordia brownie*. Many seedlings of the above melastomes occur in the herb layer in open areas around the groves along with myrtaceous seedlings of 0.3-0.6m (1-2ft) high. Other herbs include grasses such as *Panicum pilosum*, *Panicum glutinosum*, and *Andropogon bicornis*.

Despite the low topography, surface soil is dry. This may be due to the numerous, probably man-made drainage ditches running throughout the groves. Water table is fairly close to surface, about 15cm (6in.) below the drier surface soil. A dark clay loam overlies a white to orange clay. Litter varies from 1.5-2.5cm or more around tree stems. No humus was found.



- **Large Central Swamp**

This area is quite distinguishable since it was cultivated at the time as a dasheen field, which was not abandoned until 1962. The area is in a pocket of low topography between ridges to the south and north. The dominant vegetation is tall sedge and grass, primarily hummocks. Other common vegetation includes 1.8m (6ft) *Typha domingensis* plants, a 0.3-0.6m (1-2ft) layer of *Scleria melaleuca*, *Phaius tancarvilleae*, *Arundinella confinis*, and *Blechnum serrulatum* with mats of *Centella asiatica*. Small, trailing woody plants such as *Arthrostemma fragile*, *Nepsera aquatica*, and *Desmodium canum*, growing 0.6-0.9m (2-3ft) long are scattered throughout the swamp as are 0.9-1.2m (3-6ft) shrubs of *Clidemia strigillosa*, *Cordia brownei*, and *Vernonia acuminata*. The shrubs average about 9m (30ft) from stem to stem *Myrsine coreacea* and *Chrysobalanus icaco*, the few forest trees of about 2.4m (8ft) in height, are even less common.

Standing water is usually found in the swamp but may dry up after a week of no precipitation. The soil remains moist, however, consisting of a gray clay loam over tough orange clay which starts 0.2-0.3m (6-12 in.) down. In one section of the site, marly clay was encountered below 10cm (4in.) of orange clay. Litter accumulation is 2.5-10cm (1-4in.) and some fermentation also occurs, perhaps due to the slow drainage from this area.

- **Northcentral Glades**

Between the pond on the west and the thicker vegetation on the hill to the east, lies a gently sloping area of mixed characteristics. It forms a matrix to the groves scattered within and its borders are, as a result, ill-defined. In the wet and low region to the west, sedges such as *Rhynchospora cyperoides* and tall grasses such as *Andropogon bicornis* and *Arundinella confinis* predominate. *Blechnum serrulatum*, *Lycopodium cernuum*, and *Centella asiatica* fill out the 0-0.3m (0-1ft) layer while *Clidemia strigillosa* and *Miconia attenuata* shrubs of 0.6- 1.2m (2-4ft) are scattered irregularly at 2-10m from stem to stem. *Coccoloba swartzii* is the only forest tree in the glades and is rather rare. A gray-brown clay loam of 15-23cm (6-9in.) overlies tough gray or orange clay. Litter varies from 2.5-5cm (1-2in.) and is composed mostly of grass and sedge leaves from the hummocks. Some fermentation occurs in the hollows, but otherwise there is little humus.

- **Thick Melastomes of Northeastern Hill**

Occupying the highest hill of the site, this area exhibits a large number of woody stemmed melastomaceous shrubs, primary of which are *Miconia albicans*, *Miconia attenuata*, *Clidemia strigillosa*, *Miconia prasina*, and some *Miconia dodecandra*. All the shrubs are about 1.5m (5ft) high and very dense at 0.2-0.3m (0.5-1.0ft). Common plants of the 0.1-0.6m (1-2ft) layer are *Nephrolepis exaltata*, *Panicum pilosum* and *Lycopodium cernuum*. *Coccocypselum herbaceum* and *Centella asiatica* comprise the ground layer with a few ginger and cassava plants as reminders of previous cultivation. Aside from a few *Myrsine coriacea* individuals, there is no forest. Despite the high topography, the water table was reached at 23cm (10in.) and has granular, loose, brown clay loam that grades into tough orange clay at 20cm (8in.). Litter is slight at 2.5cm (1in.) humus lacking.

- ***Dicranopteris* Fern Brake**

The areas covered by *Dicranopteris* sp. are like the groves, scattered throughout the site but are more defined. The fern seems almost of be superimposed over a previous thick melastome scrub. While the fern is decidedly the dominant plant, other vegetation was observed creeping over the closed canopy that extended from 0.3-2.4m (1-8ft) high. The fern appears to grow over existing vegetation, eventually killing it through shading. Among the dying and enduring vegetation are

*Miconia dodecandra*, *Miconia attenuata*, *Coccoloba plumieri*, *Clidemia strigillosa*, *Miconia prasina*, and *Clethra occidentalis*. A ground layer is understandably lacking due to excess shading. The dead fern leaves create a springy litter layer of about 0.3-0.5m (1-1.5ft) deep. Humus is again absent. Beneath the litter, a tan clay-loam grades into a tough orange clay at about 18cm (7 in.).

### **21. Noteworthy flora:**

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

The MRPA has several species of the moss *Sphagnum* that are essential for the existence of the bog and several species of plants and animals. The MRPA is also known for its flora which range from common to rare. Within this range, there are plants that are exotic, indigenous, endemic and even endangered. The MRPA is the only locality in Jamaica where four different types of carnivorous plants can be found in the same habitat. These plants include the native *Drosera capillaries* (Sundew), *Urticularia* spp. (Bladderworts), the introduced *Sarracenia* spp. (Pitcher Plants) and the *Dionaea muscipula* (Venus Flytrap).

Also of note is *Psidium cattleianum* (Strawberry Guava), which was introduced to the site presumably to encourage birds but has now become quite aggressive, forming small stands through out the site. The efficacy of maintaining this species is to be evaluated as a part of the overall management plan when completed.

### **22. Noteworthy fauna:**

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

The MRPA has a range of faunal species such as mammals, birds, insects, crustaceans, amphibians and reptiles. The endemic *Mellisuga minima* (Vervain Hummingbird) is of special note because it is the second smallest bird in the world with a maximum size of 5cm (2in.) as well as the migratory Connecticut Warbler (investigations into the importance of the site as a critical habitat for this species needs to be undertaken). The regionally restricted *Monophyllus redmani* (Greater Antillean Long-tongued Bat) is also found at the MRPA where it is a pollinator of *Passiflora penduliflora* (Kay, 2001). *Herpestes javanicus* (Small Indian Mongoose), which was introduced is a major threat to birds, snakes, lizards and other fauna. A mechanism to control this species is to be included in the management plan to be developed.

### **23. Social and cultural values:**

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values: The Jamaica National Heritage Trust (JNHT) in 2002 declared the MRPA a Protected National Heritage Site under the JNHT Act of 1985 ([http://www.jnht.com/download/declared\\_sites.pdf](http://www.jnht.com/download/declared_sites.pdf)). The site currently acts as a resource for education for students within the area and throughout the island of Jamaica. Several scientific studies have also been carried out in the area which indicates its importance as

an area of scientific interest. The site also acts as a catchment area from which water moves to the north and south which is used on occasion by the community as a source of water.

**b)** Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

If Yes, tick the box  and describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

**24. Land tenure/ownership:**

a) within the Ramsar site: Government of Jamaica – Jamaica National Heritage Trust

b) in the surrounding area: Privately owned

**25. Current land (including water) use:**

a) within the Ramsar site: Scientific Research Station

b) in the surroundings/catchment: Agriculture such as sugarcane, yam, cabbage, pineapple, and other small cash crops.

**26. Factors (past, present or potential) adversely affecting the site’s ecological character, including changes in land (including water) use and development projects:**

a) within the Ramsar site: Invasive species, illegal bird shooting, fires caused from ambers crossing the fire lane from neighbouring sugarcane farms, illegal removal of trees and encroachment.

b) in the surrounding area: Farming and deforestation

**27. Conservation measures taken:**

**a)** List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

The MRPA is entirely fenced and in 1998 was declared a Game Sanctuary under the Wild Life Protection Act of 1945, a Protected Area in 2002 under the Natural Resources Conservation Authority (NRCA) Act of 1991, and also a Protected National Heritage site in 2002 under the JNHT Act of 1985. The MRPA has since been managed as such and signage has been installed to enhance awareness.

**b)** If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box

or boxes as appropriate):

Ia X; Ib ; II ; III ; IV X; V ; VI

The MRPA is not reported as a protected area on the website [www.protectedplanet.net](http://www.protectedplanet.net).

However, based on the description of the IUCN (1994) protected area categories, the MRPA can be described as a “Strict Nature Reserve (Ia)” and “Habitat/Species Management Area (IV)”.

c) Does an officially approved management plan exist; and is it being implemented?

Currently, an officially approved management plan does not exist; however, steps have been undertaken to prepare the plan.

d) Describe any other current management practices:

Over the past 40 years the Natural History Museum of Jamaica (formerly Natural History Division) has been actively addressing the practice of the removal of wooden fence posts and small trees for firewood, periodic fires, wandering livestock and illegal trespassing within the fully fenced MRPA (on which the museum's field station is also located). The inadequacy of funds has resulted in the repairs to the fence being occasional and not as thorough as is required. Regular patrols by the resident Forest Warden and Assistant are also conducted to identify and remedy issues surrounding trespassers, wandering livestock and fires. Additionally, fire lanes are also cut to enhance fire control and the trails are also maintained for accessibility throughout the site and to facilitate the tours.

**28. Conservation measures proposed but not yet implemented:**

e.g. management plan in preparation; official proposal as a legally protected area, etc.

Invasive species removal and habitat restoration work is currently being planned for implementation at the site. Specific species that have already been identified for removal or intensive management are *Psidium cattleianum* and *Dicranopteris pectinata*. There is also a proposal for the expansion of the existing green house to facilitate the propagation of a range of species for reintroduction in some of the areas from which invasive species have been removed.

**29. Current scientific research and facilities:**

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

There exists a field research station with three associated posts: a Forest Warden, an Assistant Forest Warden and an Auxiliary Worker. Presently, there is one main project to develop a field guide with descriptions, images and general information about the species found at the MRPA.

**30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:**

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Presently the MRPA is one of the sites at which World Wetlands Day celebrations are held annually. Schools and community members are invited to the MRPA and tours, presentations, exhibits, games and other activities which help them to have a greater appreciation and understanding of the importance of the MRPA and the Ramsar Convention are conducted. Additionally, schools visit the MRPA throughout the year for tours and field assessments as part of their curriculum. The activities and Programmes carried out at the MRPA are highlighted through the National Ramsar Committee (NRC) and are also included in the National Reporting mechanism to the Ramsar Convention.

**31. Current recreation and tourism:**

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity. The site is open for local and overseas visitors for tours and research but currently, the majority of visitors are school children from schools in and around the community.

**32. Jurisdiction:**

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc. Clarendon Parish Council is the local authority with jurisdiction. There is, however, some jurisdiction

shared by the Ministry of Water, Land, Environment, and Climate Change and the Ministry of Youth and Culture.

**33. Management authority:**

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Institute of Jamaica  
8-16 East Street  
Kingston, Jamaica  
Mrs. Tracy Commock  
Director, Natural History Museum of Jamaica  
[tcommock@nhmj-ioj.org.jm](mailto:tcommock@nhmj-ioj.org.jm)  
922-0621-6  
Jamaica National Heritage Trust  
79 Duke Street  
Kingston, Jamaica

Mrs. Laleta Davis-Mattis  
Executive Director  
[executive@jnht.com](mailto:executive@jnht.com)  
922-1287-8  
967-0960

National Environment and Planning Agency  
10 Caledonia Avenue  
Kingston 5, Jamaica  
Mr. Peter Knight  
Chief Executive Officer  
[Peter.Knight@nepa.gov.jm](mailto:Peter.Knight@nepa.gov.jm)  
754-7540

The area is currently the primary responsibility of the Institute of Jamaica. It should however be noted that in 2005, a draft co-management agreement has been prepared. The agencies (NEPA, JNHT and IOJ) have not yet formally implemented the agreement but it is still under consideration for eventual implementation.

**34. Bibliographical references:**

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

Davis, S. (2001). A survey and inventory of the avifauna of the Mason River Game Sanctuary, Clarendon, Jamaica. *El Pittre* 14(1): 34.

Davis, S. (2003). *A survey and inventory of the avifauna of the Mason River Game Sanctuary, Clarendon, Jamaica*. Technical Report to the Environmental Foundation of Jamaica.

Evans, B. B. (2005). *An investigation into some of the chemical properties of the soil at the Mason River Field Station, Clarendon*.

IUCN (2011). *2011 IUCN Red List of Threatened Species*. Retrieved from <http://www.iucnredlist.org>.



Kay, E. (2001). Observations on the pollination of *Passiflora penduliflora*. *Biotropica* 33(4): 709-713.

Protor, G. (1970). Mason River Field Station. *Jamaica Journal* 4(2): 29-33

STATIN. (2001). *Population census 2001: Parish of Clarendon*. Government of Jamaica.

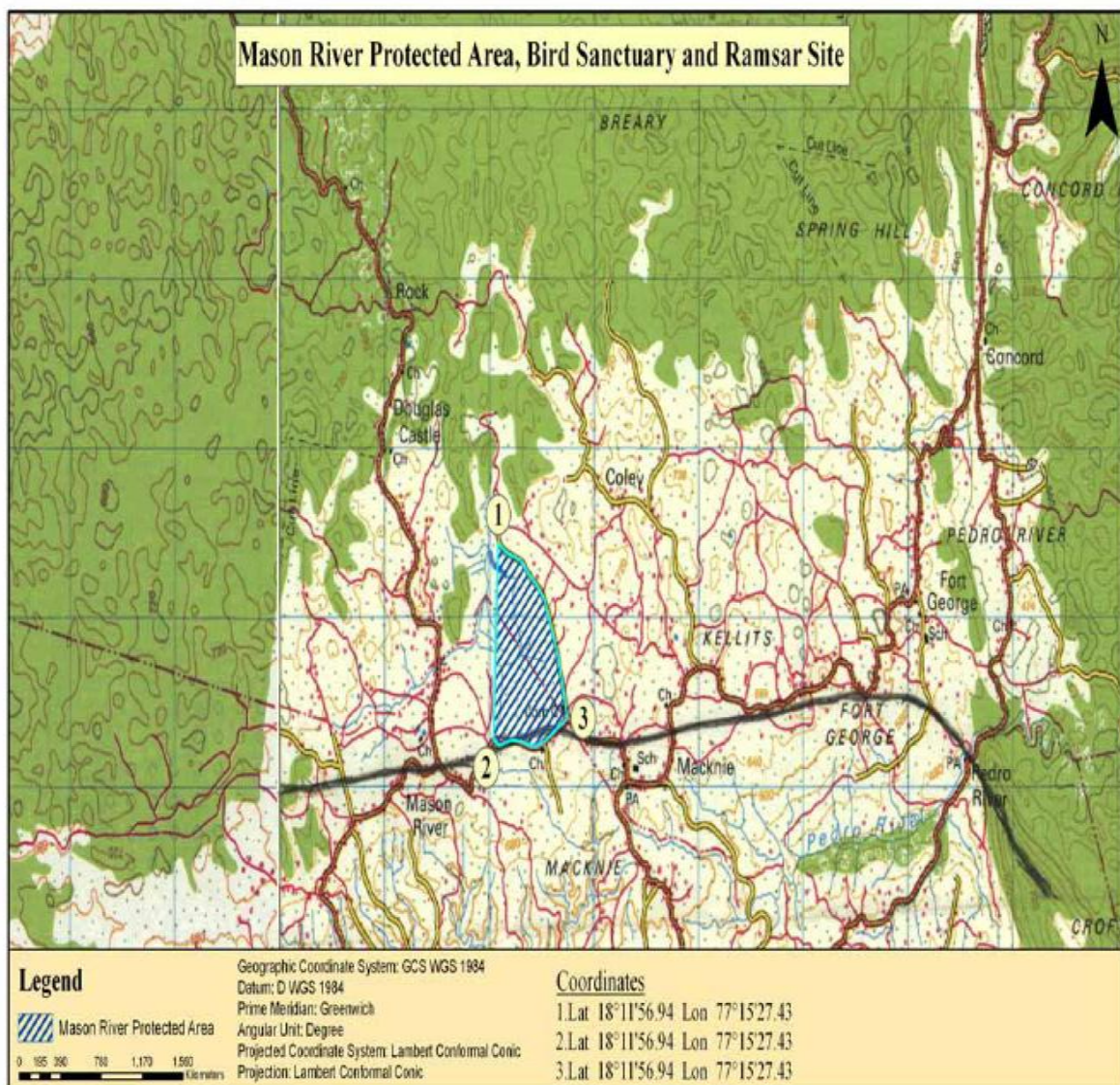
Weck, S. G. (1970). *The vegetation of Mason River Field Site—An induced, upland scrub savanna*. Masters of Arts Thesis. Department of Botany, Duke University, North Carolina, USA.

White, M. N. (1991). *Reconnaissance survey of the hydrology of the Mason River Field Station*. Hydrology Consultants Limited.

Please return to: **Ramsar Convention Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**

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### Appendix 5 – Map sent with Ramsar Information Sheet, 2011)



## Appendix 6 – Lists of Species

### Appendix 6.1 – List of Plants (from IOJ)

#### PLANTS OF MASON RIVER PROTECTED AREA

##### Dates of Collection Numbers

15794-15826.....	Nov.22,1956	27692.....	Nov.18,1956
15886-15970,15998.	Dec.21-23,1956	27729.....	Dec.2,1966
16125-16136.....	Jan.18,1957	27772.....	Jan.20,1967
16219-16247.....	Mar.3,1957	27777.....	Jan.28,1967
16475-16495.....	July.9,1957	27809.....	Feb.18,1967
16708-16767.....	Oct.13,1957	27810.....	Mar.2,1967
18382-18411.....	Nov.20,1958	28534.....	Feb.16,1968
19650-19661.....	Apr.16,1959	28610.....	Apr.12,1968
19708-19719.....	June.11,1959	28625.....	Apr.19,1968
19788-19792.....	Oct.2,1959	29280-29288.....	Oct.28,1968
22511-22514.....	July.16,1962	29974.....	Feb.14,1969
23363-23368.....	Mar.22-23,1963	30371-30372.....	May.23,1969
23552-23556.....	May.20,1963	31054.....	Sept.19,1969
24209.....	Nov.16,1963	31121-31123.....	Dec.11,1969
24280-24282.....	Dec.8,1963	31188.....	Jan.10,1970
24629.....	Feb.14,1964	31221.....	Feb.6,1970
24684.....	Mar.6,1964	31223.....	Feb.13,1970
24809-24810.....	Apr.17,1964	31266-31267.....	Mar.11,1970
24895-24897.....	June.5,1964	31317-31321.....	June.12,1970
26295-26317.....	Mar.28,1965	31787.....	Apr.18,1971
26336-26341.....	Apr.5,1965	32687.....	Oct.16,1971
26355.....	Apr.13,1965	32745.....	Nov.26,1971
26356.....	Apr.18,1965	32915.....	Sept.17,1972
26382-26391.....	Apr.24,1965	33772.....	Apr.21,1974
26399.....	May.7,1965	34128.....	Aug.4,1974
26403-26404.....	May.18,1965	34731-34736.....	Feb.4,1975
26425-26431.....	May.23,1965	34972-34982.....	Apr.19,1975
26432.....	May.26,1965	35331.....	Oct.4,1975
26442.....	June.11,1965	36282.....	June.11,1976
26459-26469.....	June.22,1965	36301-36302.....	June.19,1976
26497-26520.....	July.4,1965	37223.....	Sept.9,1977
26544.....	July.15,1965	37242.....	Sept.16,1977
26563-26568.....	July.20,1965	37321-37323.....	Oct.8,1977
26660-26661.....	Aug.24,1965	37550.....	Jan.7,1978
26697-26698.....	Nov.23,1965	37639-37641.....	Feb.9,1978
26715.....	Dec.10,1965	37852-37854.....	June.18,1978
26805-26817.....	Jan.22,1966	37970.....	Jan.21,1979
26860.....	Feb.16,1966	38102-38106.....	Mar.29,1979

26881-26884.....	June.2,1966	38129.....	Apr.6,1979
27620.....	Set.9,1966	38143-38148.....	May.2,1979
27637.....	Sept.19,1966	38153-38155.....	May.5,1979
27641-27644.....	Sept.23,1966		

The above numbers represent collections made by George R. Proctor.

MC = Maarten Y.M. Christenhusz coll. 13 Feb.2004 dupl. TUR, IJ NRS.3379-3394

Miss Susan G. Weck, a graduate student of Duke University, made collections in connection with ecological studies between June and September, 1969.

Non-vascular plants are omitted from the present list, as the material of fungi, algae, lichens and bryophytes have not yet been adequately studied. Some of the specimens of these groups are represented among the numbers cited above.

Explanation of Symbols:

B...Bog

Ls...Limestone sinkholes

T...Thickets along stream

Tt ...Tall thickets away from streams

M...Shrub thickets, chiefly Melastomes (Other habitats as indicated)

S... Savanna-like (moist type)...New record for Jamaica

Sd...Savanna-like (dry type)... Not indigenous to Jamaica

#### VASCULAR CRYPTOGRAMS

##### **Psilotaceae**

1. *Psilotum nudum* (L.) Beauv. (18391) Sd, terrestrial MC 3392 (on a termite heap)

##### **Lycopodiaceae**

2. *Lycopodium cernum* L. (16133) S, etc. (common)
3. *Lycopodium carolinianum* L. var. *meridionale* (L.M. Underw. & Lloyd) Nessel & Hoehne (15893, 26431) S

##### **Equisetaceae**

4. *Equisetum giganteum* L. (15821, 29288) S. etc. MC 3388

##### **Ophioglossaceae**

5. *Ophioglossum reticulatum* L. (26881) M

##### **Osmundaceae**

6. *Osmunda cinnamomea* L. (15890) B MC 3380

##### **Schizaeaceae**

7. *Lygodium volubile* Sw. (15911) T, Tt



8. *Schizaea popeppigiana* Sturm (16477, 18390) Sd, B MC 3385

### **Gleicheniaceae**

- 9. *Dicranopteris flexuosa* (Schrad.) L.M. Underw. (15953, 26313) M, T
- 10. *Dicranopteris pectinata* (Willd.) L.M. Underw. (26299) M, T
- 11. *Gleichenia bifida* (Willd.) Spreng. (16743) T, rare

### **Hymenophyllaceae**

- 12. *Trichomanes crispum* L. (16220) Tt

### **Cyatheaceae**

- 13. *Cyathea arborea* (L.) J.E. Sm. (sight) Ls
- 14. *Cyathea parvula* (Jenman) Domin (15898) T, Tt

### **Polypodiaceae, sens. Lat.**

- 15. *Adiantum macrophyllum* Sw. (26311) Ls
- 16. *Adiantum pulverulentum* L. (26336) Ls
- 17. *Adiantum pyramidale* (L.) Willd. (*A. cristatum* of authors) (15910) T, Ls
- 18. *Adiantum tenerum* Sw. (26339) Ls
- 19. *Blechnum occidentale* L. (sight) Ls, Tt
- 20. *Blechnum serrulatum* L.C. Rich. (15970) B, S, M, T (common) MC 3381
- 21. *Elaphoglossum maxonii* L.M. Underw. ex Morton (16219, 16476) Tt
- 22. *Lastreopsis effusa* (Sw.) Tindale (26303) Ls
- 23. *Lindsaea portoricensis* Desv. (15823, 37641) B, S, T MC 3384
- 24. *Maxonia apiifolia* (Sw.) C. Chr. (16742, 19713) T, Tt MC 3390
- 25. *Nephrolepis multiflora* (Roxb.) Jarrett ex Morton (formerly identified as *N. exaltata*) (15901) T \**Nephrolepis exaltata* (MC3379)
- 26. *Odontosoria jenmanii* Maxon (16223) Tt
- 27. *Polypodium aureum* L. (sight) on tree.
- 28. *Polypodium dissimile* L. (*P. chnoodes* of most modern authors) (16222) Tt
- 29. *Polypodium lycopodioides* L. (sight) on trees.
- 30. *Polypodium phyllitidis* L. (16730) Tt
- 31. *Polypodium polypodioides* (L.) Watt (16723) Tt
- 32. *Polystichum echinatum* (Gmel.) C.Chr. (15918) T
- 33. *Pteridium arachnoideum* (Kaulf.) Maxon (31266) Sd, M, MC 3398
- 34. *Pteridium caudatum* (L.) Maxon (31267) Sd, M  
(Note: the above two taxa are often considered varieties of *Pteridium aquilinum* (L.) (Kuhn.)
- 35. *Tectaria heracleifolia* (Willd.) L.M. Underw. (26309) Ls
- 36. *Thelypteris balbisii* (Spreng.) Ching (26338) Ls
- 37. *Thelypteris deltoidea* (Sw.) Proctor (16221) T
- 38. *Thelypteris dentata* (Forsk.) E. St. J. (26340) Ls
- 39. *Thelypteris kunthii* (Desv.) Morton (*T. normalis* of many authors) (16715) T, also near cultivations and along roadsides.
- 40. *Thelypteris oblitterata* (Sw.) Proctor (15912) T
- 41. *Thelypteris opulenta* (Kaulf.) Fosberg (38144) Ls

42. *Thelypteris patens* (Sw.) Small (26314) T.  
Polypodiaceae, sens. Lat. (Con't)
43. *Thelypteris poiteana* (Bory) Proctor (26310) Ls
44. *Thelypteris reticulata* (L.) Proctor (16744) T
45. *Thelypteris sancta* (L.) Ching (26300) Ls
46. *Thelypteris tetragona* (Sw.) Small (Weck, s.n.)

## PHANEROGAMS

### Monocotyledonae

#### **Typhaceae**

47. *Typha domingensis* (Pers.) Kunth (26385, 28610) B, T; also in pond

#### **Gramineae**

48. *Andropogon bicornis* L. (15967) M, Sd, S
49. *Andropogon brevifolius* Sw. (15956) Sd
50. *Andropogon glomeratus* (Walt.) B.S.P. (Weck 10624-4)
51. *Andropogon gracilis* Spreng. (19719) Sd
52. *Andropogon leucostachyus* Kunth (26355) S
53. *Andropogon virginicus* L. (Weck 141-201; 221-203)
54. *Arundinella confinis* (Schult.) Hitchc. & Chase (15899) Sd
55. *Axonopus compressus* (Sw.) Beauv. (37323; Skelding s.n.) Dooryard weed
56. + *Bambusa vulgaris* Schrad. (sight) Relic of cultivation!
57. *Digitaria ciliaris* (Retz.) Koeler (16760) S
58. + *Digitaria decumbens* Stent. (26468) Escape from cultivation. "Pangola"
59. + *Eleusine indica* (L.) Gaertn. (26463) Dooryard weed
60. *Ichnanthus pallens* (Sw.) Munro (16226) T, Tt
61. *Imperata brasiliensis* Trin. (26302) S
62. *Lasiacis divaricata* (L.) Hitchc. (16228) T, Tt
63. *Panicum aciculare* Desv. (15812, 26565, 26860) S
64. *Panicum acuminatum* Sw. (24209, 26566) S
65. *Panicum chrysopsidifolium* Nash (15966) S
66. *Panicum glutinosum* Sw. (16227) Tt
67. *Panicum laxum* Sw. (16757) S
68. + *Panicum maximum* Jacq. (Weck 42-205)
69. *Panicum parvifolium* Lam. (15813, 15924) B
70. *Panicum pilosum* Sw. (Weck, s.n.)
71. *Panicum polycaulon* Nash (15892) S.
72. *Panicum roanokense* Ashe (Weck 644-204; 732-2)
73. *Panicum rudgei* R. & S. (15958, 26309) M, Tt, MC 3394
74. *Panicum stenodes* Griseb. (15957, 26568) S
75. *Panicum strigosum* Muhl. (26567) S
76. *Panicum zizanioides* Kunth (16758) B
77. *Paspalum densum* Poir. (15947, 29283) S, M
78. *Paspalum distortum* Chase (Weck 243-18)
79. *Paspalum fimbriatum* Kunth (26464) Dooryard weed.
80. *Paspalum lindenianum* A. Rich. (26466) Sd

81. *Paspalum notatum* Flugge (26467) Dooryard weed.
82. *Paspalum paniculatum* L. (16756) S
83. *Paspalum plicatum* Michx. Michx. (15948) S
84. *Paspalum virgatum* L. (Weck 1259-4)
85. *Sacciolepis gilzenei* Proctor, ined. (37853, type) S
86. *Setaria scandens* Schrad. (16759) S
87. *Setaria geniculata* (Lam.) Beauv. (Weck 532-15)
88. *Sporobolus jacquemontii* Kunth (Weck 13249-1)
89. *Sporobolus poiretii* (R. & S.) Hitchc. (26465) Dooryard weed.
90. *Sporobolus tenuissimus* (Schränk) Ktze. (Pruski 1474.)

### **Cyperaceae**

91. *Bulbostylis junciformis* (Kunth) Lindm. (16138) S
92. *Cyperus flavus* (Vahl) Nees (15952) S
93. *Cyperus humilis* Kunth (16136) Sd
94. *Cyperus sphacelatus* Rottb. (16129) S, Sd
95. *Cyperus tenuifolius* (Steud.) Dandy (15951, 16753) S
96. *Diplacrum longifolium* (Griseb.) C.B. Clarke var. *angustifolium* Kuk (Skelding, area 15; Weck 591-7) S
97. *Eleocharis elegans* (Kunth) R. & S. (16127) B
98. *Eleocharis flavescens* (Poir.) Urb. (16132) S
99. *Eleocharis interstineta* (Vahl) R. & S. (Weck 1192-207)
100. *Eleocharis mutata* (L.) R. & S. (16131) B
101. *Eleocharis nodulosa* (Roth) Schult. (18411; Skelding s.n.) S
102. *Eleocharis rotroflexa* (Poir.) Urb. (15796) S
103. *Fimbristylis complanta* (Retz.) Link (16754, 18410) S
104. *Fimbristylis dichotoma* (L.) Vahl (15946) S
105. *Fuirena umbellata* Retz. (16128) S; also in wet ditches.
106. *Rhynchospora comata* Schult. In R. & S. (16230, 23365, 24895; Weck) Tt
107. *Rhynchospora corymbosa* (L.) Britton (16130, 16481) S
108. *Rhynchospora cyperoides* (Sw.) Mart. (15804) S
109. *Rhynchospora fascicularis* (Michx.) Vahl (15950; Skelding area 15) S
110. *Rhynchospora globularis* (Chapm.) Small var. *recognita* Gale (Weck 243-200)
111. *Rhynchospora intermixta* C. Wright (15923) S
112. *Rhynchospora marisculus* Lindl. & Nees (Weck 523-7; 591-18)
113. *Rhynchospora microcephala* Britton ex Small (15805, 31123, 33772) S
114. *Rhynchospora miliacea* (Lam.) A. Gray (16483) T
115. *Rhynchospora nervosa* (Vahl) Boeck. (*Dichromena ciliata* of many authors) (16752) S, Sd
116. *Rhynchospora oligantha* A. Gray var. *brevisetata* Gale (16126) S, Sd
117. *Rhynchospora polyphylla* Vahl (16247; Fosberg 42769) S, Sd

### **Cyperaceae (Con't)**

118. *Rhynchospora rariflora* (Michx.) Ell. (Fosberg 42738; T.L. Lewis & M. duquesnay 1514) S
119. *Rhynchospora robusta* (Kunth) Boeck. (Barkley & Proctor 35164) S

- 120. *Rhynchospora rugosa* (Vahl) Gale
- 121. *Rhynchospora setacea* (Berg.) Boeck. (15803) S
- 122. *Scleria ciliata* Michx. (18409, 27644; Weck 6436-6; 6644-6) Sd, S
- 123. *Scleria cubensis* Boeck. (Weck)
- 124. *Scleria georgiana* Core (18406, 19718) Sd
- 125. *Scleria hirtella* Sw. (15802) S
- 126. *Scleria melalcauca* Schlecht. & Cham. (15945) S, Sd
- 127. *Scleria secans* (L.) Urb. (16482) Tt

**Araceae**

- 128. + *Colocasia esculenta* (L.) Schott (31321) Cult. “Dasheen”
- 129. *Philodendron lacerum* (Jacq.) Schott (26425) Tt
- 130. *Syngonium auritum* (L.) Schott (16718, 26306) Tt, Ls
- 131. + *Xanthosoma sagittifolium* (L.) Schott (sight record, sterile) Cult. “Coco”

**Palmae**

- 132. *Bactris jamaicana* Bailey (31320) T, Tt, M
- 133. *Calyptronoma occidentalis* (Sw.) H.E. Moore (38102) T, Tt
- 134. *Roystonea altissima* (Mill) H.E. Moore (37970) S, T

**Mayacaceae**

- 135. *Mayaca fluviatilis* Aubl. (15889) B

**Xyridaceae**

- 136. *Xyris carolinensis* Walt. (15817, 16484) S, B

**Bromeliaceae**

- 137. *Guzmania monostachia* (L.) Rusby ex Mez (sight record) Tt
- 138. *Hobenbergia polycephala* (Baker) Mez (16727) T, Tt
- 139. *Tillandsia compressa* Bert. (38103) Tt
- 140. *Tillandsia polystachya* L. (sight record) Tt
- 141. *Tillandsia pruinosa* Sw. (26564) Tt
- 142. *Tillandsia setacca* Sw. (38129) Tt
- 143. *Tillandsia utriculata* L. (sight record) Tt
- 144. *Vriesea capituligera* (Griseb.) L. B. Sm. & Pitt. (16489) Tt
- 145. *Vriesea platynema* Gaud. (16729) Tt
- 146. *Vriesea ringens* (Griseb.) Harms (16728) Tt

**Commelinaceae**

- 147. *Commelina diffusa* Burm.f. (Weck)
- 148. *Commelina longicaulis* Jacq. (15806) S

**Smilacaceae**

- 149. *Smilax domingensis* Willd. (16708, 27641, 35331) Tt, MC 3393

### **Dioscoreaceae**

150. + *Dioscorea bartlettii* Norton (37321) Introduced from Belize ; Tt

### **Amaryllidaceae-Hypoxidaceae** : Adauns

151. *Hypoxis decumbens* L. (16750, 26304) Sd, S

152. *Hypoxis wrightii* (Baker) Brackets (26303) S

### **Iridaceae**

153. *Trimeza martinicensis* (Jacq.) Herb. (15902, 18382) M ; along paths

### **Heliconiaceae**

154. + *Heliconia spissa* Griggs (38148) Introduced from Belize ; cult.

### **Burmanniaceae**

155. *Apteria aphylla* (Nutt.) Barn. var. *hymenantha* (Miq.) Jonk (15887, 26807)  
B, MC 3382 (unilate TUR)

156. *Burmannia capitata* (J.F. Gmel.) Mart. (Adams 13266, UWI)

### **Orchidaceae**

157. *Bletia purpurea* (Lam.) DC. (15894) S, Sd, M

158. *Campylocentrum fasciola* (Lindl.) Cogn. (Skelding, s.n.) B

159. *Campylocentrum micranthum* (Lindl.) Roth (Weck T-37)

160. *Dendrophylax barrettiae* F. & R. (sight) Tt

161. *Epidendrum nocturnum* Jacq. (16720, 23366) Tt

162. *Eulophia alta* (L.) F. & R. (16486, 37854) S, Tt

163. *Habenaria alta* Hook. (15814, 29284) S

164. *Habenaria monorrhiza* (Sw.) Reichb.f. (15816) S

165. *Habenaria purdiei* F. & R. (15815) S (Probable type locality; endemic)

166. *Ionopsis utricularioides* (Sw.) Lindl. (26544) M

167. *Jacquinella globosa* (Jacq.) Schltr. (16722) Tt

168. *Lepanthopsis microlepanthes* (Griseb.) Ames (16721) Tt

169. *Liparis elata* Lindl. (Skelding, s.n.; Weck t-59 ; 7397-2)

170. *Liparis vexillifera* (Llave & Lex.) Cogn. (27692) Tt

171. *Oncidium pulchellum* Hook. (sight) Tt

172. + *Phaius tancarvilleae* (Banks ex L'Her.) Blume (16125) S

173. *Polstachya cerea* Lindl. (18297) T

174. *Spiranthes lanceolata* (Aubl.) Leon (16240) S

175. *Spiranthes tortilis* (Sw.) L. C. Rich. (16248, 19658, 28625) S, M

176. *Triphora surinamensis* (Lindl.) Britton (26660) M

177. *Vanilla wrightii* Reichb.f. (16495) Tt

### Dicotyledonae

### **Piperaceae**

178. *Peperomia amplexicaulis* (Sw.) A. Dietr. (26337) Ls

179. *Piper aduncum* L. (26296) Ls

180. *Piper auritum* Kunth (23556, 26563) Roadside thickets

181. *Piper hispidum* Sw. (23554, 26297) Tt, Ls  
182. *Pothomorphe umbellata* (L.) Miq. (26298) T

### **Chloranthaceae**

183. *Hedyosmum nutans* Sw. (16485) T

### **Lacistemaceae**

184. *Lacistema aggregatum* (Berg.) Busby (16224, 19652) Tt, T

### **Myricaceae**

185. *Myrica microstachya* Krug & Urb. (15895) M, T

### **Moraceae**

186. + *Artocarpus heterophyllus* Lam. (24283) relic of cultivation. 'Jakfruit'  
187. *Ficus maxima* Mill. (31317) Ls

### **Cannabinaceae**

188. + *Cannabis indica* Lam. (29286) formerly cultivated. 'Ganja'

### **Polygonaceae**

189. *Coccoloba longifolia* Fisch. (31318) Ls.  
190. *Coccoloba plumieri* Griseb. (15916) T, Tt  
191. *Coccoloba swartaii* Meisn. (15915) T, Tt

### **Phytolaccaceae**

192. *Phytolacca rivinoides* Kunth & Bouche (16733) Tt, in clearing.

### **Nymphacaeae**

193. *Brasenia schreberi* Gmel. (26317) In pond.  
194. *Nymphaea ampla* DC. (29287) In pond.

### **Lauraceae**

195. *Ocotea leucoxyton* Mez (16488) Tt  
196. *Persea americana* L. (sight) Cultivated.

### **Droseraceae**

197. + *Dionaea muscipula* Ellis (36282) S (Introduction on Nov. 1969 from North Carolina) 'Venus flytrap'  
198. *Drosera capillaris* Poir. (15797, 29974) S 'Sundew' MC 3383

### **Sarraceniaceae** 'Pitcher plants'

199. + *Sarracenia minor* Walt. (36301, 37223) S (Introduced in July 1975 from Florida)  
200. + *Sarracenia rubra* Walt. (36302) S (Introduced in Nov. 1969 from North Carolina)

### **Chrysobalanaceae**

- 201. *Chrysobalanus icaco* L. (15903) S, Tt ‘Coco plum’
- 202. *Hirtella jamaicensis* Urb. (19791, 23363) T

### **Rosaceae**

- 203. *Rubus jamaicensis* L. (sight record) Ls ‘Jamaican blackberry’

### **Leguminosae** (including Mimosoideae & Caesalpinoideae)

- 204. *Aeshynomene villosa* Poir. (31122) S
- 205. *Cassia patellaria* DC. ex Collad. (15936, 16487) Sd
- 206. *Cassia viminea* L. (15811) T
- 207. *Centrosoma virginianum* (L.) Benth. (18383) Sd
- 208. *Clitoria rubiginosa* A. Juss. (32687) M
- 209. *Crotalaria sagittalis* L. (15937, 18387) Sd
- 210. + *Crotalaria zanzibarica* Benth. (24684) In formerly cultivated area.
- 211. *Desmodium adscendens* (Sw.) DC. (15940, 16761) Sd
- 212. *Desmodium barbatum* (L.) Benth. (18392, 24896) Sd
- 213. *Erythrina corallodendrum* L. (38143) Planted as living fence-posts, persisting.
- 214. + *Mimosa bimucronata* (DC.) Ktze. (26661) In overgrown pasture area.
- 215. *Mimosa pudica* L. (16762) Sd, also near cultivations. ‘Shame-lady’
- 216. + *Moghania strobilifera* (L.) J. St. Hil. (38106) Tt
- 217. *Phaseolus lathyroides* L. (19660) S
- 218. *Zornia diphylla* (L.) Pers. (18393) Sd

### **Linaceae**

- 219. *Linum jamaicense* (Small) Fawc. & Rendle (*L. floridanum* var. *Jamaicense* of some authors) (15935, 26520) S, Sd

### **Rutaceae**

- 220. *Fagara martinicensis* Lam. (31319) Ls

### **Malpighiaceae**

- 221. *Byrsonima coriacea* (Sw.) DC. (15896, 26428) M, Tt

### **Polygalaceae**

- 222. *Polygala paniculata* L. (16751) S, and along paths.
- 223. *Securidaca brownei* Griseb. (16731, 26429, 27642) Tt

### **Euphorbiaceae**

- 224. *Alchornea latifolia* Sw. (sight record) Tt, Ls
- 225. *Ateramnus integer* (F. & R.) Rothm. (16738) T
- 226. *Chaetocarpus globosus* (Sw.) F. & R. (16732) Tt
- 227. *Croton nitens* Sw. (15917, 18398) T
- 228. *Hieronyma jamaicensis* Griseb. (18396, 19651) T
- 229. + *Manihot esculenta* Crantz (31121) Relic of cultivation. ‘Cassava’
- 230. + *Manihot glaziovii* Muell. Arg. (Weck 12225-206) Relic of cultivation.

231. *Phyllanthus cladanthus* Muell. Arg. (19712) T  
232. *Phyllanthus stipulatus* (Raf.) Webster (15891) B  
233. +*Phyllanthus tenellus* Roxb. (30371) Dooryard weed.  
234. +*Phyllanthus urinaria* L. (Weck)

### **Buxaceae**

235. *Buxus purdieana* Baill. (*B. laevigata* of modern authors) (15906, 22514) T

### **Anacardiaceae**

236. + *Mangifera indica* L. (sight record) Tt, adventive. 'Mango'

### **Cyrillaceae**

237. *Cyrilla racemiflora* L. (15922) Sd, M, T, Tt

### **Aquifoliaceae**

238. *Ilex occidentalis* Macf. (16726) Tt

### **Sapindaceae**

239. + *Blighia sapida* Koenig (sight record) Relic of cultivation.  
240. *Matayba apetala* (Macf.) Radlk. (16709, 19717) Tt, T  
241. *Paullinia jamaicensis* Macf. (27777) Tt

### **Tiliaceae**

242. *Triumfetta lappula* L. (Weck)  
243. *Triumfetta semitriloba* Jacq. (Weck 49-7 ; 49-10)

### **Elaeocarpaceae**

244. *Sloanea jamaicensis* Hook. (26388) Tt

### **Malvaceae**

245. + *Hibiscus eetveldeanus* Willd. & T. Dur. (15968, 24280) S, escape from cultivation  
246. *Malvastrum coromandelianum* (L.) Gareke (26460) Dooryard weed.  
247. *Pavonia rosea* Schlecht. (26307) Ls  
248. *Sida rhombifolia* L. (26461) Dooryard weed.  
249. *Sida urens* L. (26697) Dooryard weed.  
250. *Urena lobata* L. (16765) Sd, esp. near cultivation

### **Ochnaceae**

251. *Ouratea jamaicensis* Urb. (sight record) Tt has been collected on nearby limestone hills.  
252. *Sauvagesia brownei* Planch (15820) S, M

### **Marcgraviaceae**

253. *Marcgravia branchysepala* Urb. (16725) Tt

### **Theaceae**

254. *Cleyera theaeoides* (Sw.) Choisy (26399) Sd



255. Laplacea (probably sp. nov.) (28611) T

### **Guttiferae**

256. Calophyllum calaba L. (16225, 18395) T, Tt

257. Clusia rosea Jacq. (sight record) T, Tt

### **Flacourtiaceae (Salicaceae)**

258. Casearia arborea (L. C. Rich.) Urb. (15939) Sd

259. Casearia sylvestris Sw. (19653) T

260. Samyda glabrata sw. (19790) T

### **Turneraceae**

261. Piriqueta cistoides (L.) Griseb. (15931, 18388)

### **Passifloraceae**

262. Passiflora edulis Sims (26341) M

263. Passiflora foetida L. (34128) M

264. Passiflora penduliflora Bert. ex DC. (26430, 27643) Tt

265. + Passiflora seemanii Griseb. (38145) Cultivation & escaping.

266. Passiflora sexflora Juss. (15908) T

267. Passiflora suberosa L. (31223) Sd

### **Cactaceae**

268. Selenicereus (probably sp. nov.) (24809) T

### **Thymelaeaceae**

269. Daphnopsis americana (Mill.) Johnson (Webster, Ellis & Miller 8134) Tt

270. Daphnopsis occidentalis (Sw.) Krug & Urb. (16745) T

### **Lythraceae**

271. Cuphea decandra Ait.f. (Sight record) Cultivated; introduced from a nearby river valley.

272. Cuphea parsonia (L.) R. Br. (Weck)

### **Rhizophoraceae**

273. Cassipourea elliptica (Sw.) Poir. (16747, 23368) T

### **Combretaceae**

274. Buchenavia capitata (Vahl) Eichl. (15914) T, Tt, M

275. Terminalia latifolia Sw. (sight record) Planted in M; natural in T, Tt

### **Myrtaceae**

276. Calyptanthus chytraculia (L.) Sw. (16480, 19710) T

277. Calyptanthus nodosa Urb. (16735, 18394, 19654, 19708) T

278. Calyptanthus zuzygium (L.) Sw. (16736, 26427) T, Tt

279. + Eucalyptus sp. indet. (3215) Planted in 1969.

280. Eugenia axillaries (Sw.) Willd. (15921) T, M

281. Eugenia confusa DC. (16737, 26390) Tt

282. *Eugenia glabrata* (Sw.) DC. (28534) T  
 283. *Eugenia monticola* (Sw.) DC. (26386)  
 284. *Eugenia wilsonella* F. & R. (15969, 16479, 19659, 19709, 22512, 26382) M,  
 Sd Locally common  
 285. *Myrcia skeldingii* Proctor (16478, 16734; also 26511 from nearby) T  
 286. + *Psidium cattleianum* Sabine (24281, 26442) M, etc.; also planted.  
 287. *Psidium dimetorum* Proctor (15920, 18402, 19650) T  
 288. + *Psidium guajava* L. (19714) T, M, etc.  
 289. + *Syzygium jambos* (L.) Alston (26882) Tt, naturalized.  
 290. + *Syzygium malaccense* (L.) Merr. & Perry (38147) Planted near house.

### **Melastomataceae**

291. *Acisanthera quadrata* Juss. ex Poir. (15809) S  
 292. *Arthrostemma fragile* Lindl. (15807) S  
 293. *Blakea trinervia* L. (16238, 16490) Tt  
 294. *Clidemia erythropogon* DC. (16719) Tt  
 295. *Clidemia hirta* (L.) D. Don (16237) T  
 296. *Clidemia strigillosa* (Sw.) DC. (15810) M, S; common.  
 297. *Clidemia swartzii* Griseb. (16235) Tt  
 298. *Henriettea remiflora* (Sw.) DC. (15930, 23364, 23552, 26432) M, T, Tt  
 299. + *Heterocentron subtriplinervium* (Link & Otto) A. Br. ex Bouche (26698)  
 M, presumably an escape from cultivation.  
 300. *Heterotrichum umbellatum* (Mill.) Urb. (15929) M  
 301. *Mecranium virgatum* (Sw.) Triana (16234) Tt  
 302. *Miconia albicans* (Sw.) Triana (15799) M, common  
 303. *Miconia ampla* Triana (16492) Tt  
 304. *Miconia attenuata* DC. (15801, 23553, 26404) M, common  
 305. *Miconia ciliata* (L. C. Rich.) DC. (15798) M  
 306. *Miconia dodecandra* (Desr.) Cogn. (15825) T, Tt  
 307. *Miconia laevigata* (L.) DC. (15932) M, T  
 308. *Miconia multispicata* Naud. (16239) T  
 309. *Miconia prasina* (Sw.) DC. (15800, 26403) M, T  
 310. *Miconia tetrandra* (Sw.) Naud. (16236) T  
 311. *Nepsera aquatica* (Aubl.) Naud. (15808) S  
 312. *Miconia mirabilis* MC 3387

### **Onagraceae**

313. *Ludwigia erecta* (L.) Hara (15964) S  
 314. *Ludwigia octovalvis* (Jacq.) Raven (16244) S  
 315. *Ludwigia peruviana* (L.) Hara (16134) B

### **Araliaceae**

316. *Oreopanax capitatum* (Jacq.) Decne. & Pl. (26356) B, Tt  
 317. *Schefflera sciadophyllum* (Sw.) Harms (16232) Tt

**Umbelliferae**

318. *Centella erecta* (L.f.) Fernald (15933) S, Sd, etc.; common.  
319. *Eryngium footidium* L. (37550) Dooryard weed.

**Clethraceae**

320. *Clethra occidentalis* (L.) Steud. (15927, 16475, 22511, 37242) M, S, T, Tt

**Myrsinaceae**

321. *Myrsine coriacea* (Sw.) R. Br. (15905, 37639, 37640) T, Tt  
322. *Wallenia venosa* Griseb. (18400, 26817, 27637) T

**Sapotaceae**

323. *Bumelia nigra* Sw. (18403) T

**Oleaceae**

324. *Chionanthus domingensis* Lam. (19656) T

**Gentianaceae**

325. *Leiphaimos aphylla* (Jacq.) Gilg (15888, 26806) B= *Voyria aphylla*  
326. *Lisianthus exsertus* Griseb. (15826) M, Tt, MC 3386

**Apocynaceae**

327. + *Allamanda cathartica* L. (15897) M, escape & naturalized.  
328. *Angadenia lindeniana* (Muell. Arg.) Miers (26383) M  
329. *Urechites lutea* (L.) Britton (Weck)

**Asclepiadaceae**

330. *Asclepias curassavica* L. (sight record) Pasture area.  
331. *Asclepias nivea* L. (19661) S  
332. *Cynanchum priorii* (Rendle) Stearn (23367, 32745) T, M

**Umbelliferae**

333. *Apium leptophyllum* (Pers.) Muell ex Benth. MC 3391 (unicate TUR)

**Convolvulaceae**

334. + *Ipomoea batatas* (L.) Lam. (sight record) cultivated and escaping.  
335. *Ipomoea rubella* House (16746, 18386) T  
336. *Ipomoea tiliacea* (Willd.) Choisy (26295) M

**Boraginaceae**

337. *Cordia brownie* (Frieson) I. M. Johnston (Weck)  
338. *Cordia jamaicensis* I. M. Johnston (16713) T, Tt  
339. *Cordia linnaei* Stearn (16714) Tt  
340. *Cordia macrophylla* L. (23555, 31221) Tt, Ls  
341. *Cordia troyana* Urb. (16233, 26389) Tt  
342. *Tournefortia maculata* Jacq. (19716) T

343. *Tournefortia hirsutissima* L. (22513) M

#### **Verbenaceae**

344. *Citharexylum caudatum* L. (16717) Tt

345. *Lantana camara* L. (15959) S, near cultivations.

346. *Petitia domingensis* Jacq. (sight record) Tt, planted.

347. *Stachytarpheta jamaicensis* (L.) Vahl (31188; Weck) Dooryard weed

#### **Labiatae**

348. *Hyptis capitata* Jacq. (15961) S, near cultivations.

349. *Hyptis pectinata* (L.) Poit (15960) S, near cultivations.

350. *Hyptis spicigera* Lam. (15900, 16135) S, near cultivations.

351. *Hyptis suaveolens* (L.) Poit (Weck)

#### **Solanaceae**

352. *Solanum americana* Mill. (*S. nodiflorum* of some authors) (26316) near cultivations, in disturbed ground.

353. *Solanum jamaicense* Mill. (16245) S

354. *Solanum torvum* Sw. (sight record) Ls

355. *Solanum umbellatum* Mill. (19711) T

#### **Scrophulariaceae**

356. *Agalinis albida* Britton & Pennell (15822, 31787) S

357. *Buchnera longifolia* Kunth (16767, 19657) M, S, Sd

358. *Lindernia diffusa* (L.) Wettst. (30372) in path.

#### **Lentibulariaceae**

359. *Utricularia obtusa* Sw. (15886) B, also in pond.

360. *Utricularia pusilla* Vahl (15794, 18385) S

#### **Gesneriaceae**

361. *Alloplectus grisebachianum* Urb. (16724, juvenile, sterile) Tt

362. *Columnnea rutilans* Sw. (26883) Tt

363. *Rytidophyllum grande* (Sw.) Mart. (26387) Tt

#### **Acanthaceae**

364. *Teliostachya alopecuroidea* (Vahl) Nees (15909) S, T

365. + *Thunbergia alata* Bojer (31054) Roadside thickets, etc.

366. + *Thunbergia erecta* T. Anders. (26715) relic of cultivation.

#### **Rubiaceae**

367. *Antirhea coriacea* (Vahl) Urb. (18401) T

368. *Chiococca parvifolia* Wullschl. (16741) T

369. *Coccocypselum guianense* (Abul.) K. Schum. (15819) S

370. *Coccocypselum guianense* var. *glabratum* Proctor, var. nov. ined. (15818, 26426) S

371. *Faramea occidentalis* (Jacq.) A. Rich. (16231) Tt

372. *Gonzalagunia brachyantha* (A. Rich.) Urb. (16739, 18404) T  
 373. *Guettarda argentea* Lam. var. *glabrata* Urb. (16712) M, T, Tt  
 374. *Hemidiodia ocimifolia* (Willd.) K. Schum. (16241) S  
 375. *Lasianthus lanceolatus* (Griseb.) G. Maza (16491) M, Tt  
 376. *Psychotria amplifolia* Ra usch. (16493, 16711, 26884) Tt  
 377. *Psychotria brachiata* Sw. (26497) Tt  
 378. *Psychotria dolichantha* Urb. (16710) Tt  
 379. *Psychotria glabrata* Sw. (16740) T  
 380. *Psychotria manna* Urb. (16229, 16494) Tt  
 381. *Psychotria nervosa* Sw. (26391) Tt  
 382. *Randia aculeata* L. (3 varieties are alleged to occur) (15965, 19655) T, M  
 383. *Spermacoce assurgens* Ruiz & Pavon (*Borreria laevis* of Adams and most modern authors, not *Semacoce laevis* Lam.) (15926) Sd  
 384. *Spermacoce confusa* Rendle ex Gillis (15913) T

### **Caprifoliaceae**

385. *Viburnum alpinum* Macf. (19715) T

### **Cucurbitaceae**

386. *Cayaponia racemosa* (Mill.) Cogn. (16716) Tt

### **Compositae**

387. *Ageratum conyzoides* L. (15962, 16763) S  
 388. *Aster exilis* Ell. (29285) Roadside.  
 389. *Baccharis scoparia* (L.) Sw. (27729) M  
 390. *Bidens pilosa* L. (16764, 26315) S, near cultivations.  
 391. *Calea jamaicensis* L. (15928, 18384) M  
 392. *Chaptalia dentata* (L.) Cass. (18389) Sd  
 393. *Chaptalia nutans* (L.) Polak. (26384) Sd  
 394. *Clibadium terebinthaceum* (Sw.) DC. (15925) S  
 395. *Conyza bonariensis* (L.) Cronquist (26462) Dooryard weed.  
 396. *Elephantopus angustifolius* Sw. (Adams 5938, UWI) Sd  
 397. *Elephantopus mollis* Kunth (15963) Sd  
 398. *Emilia fosbergii* Nicolson (E. *Javanica* of some recent authors) (15934) Sd, etc., also along paths  
 399. *Erigeron cuncifolius* DC. (15938) Sd  
 400. *Eupatorium odoratum* L. (15955) Sd, S  
 401. *Eupatorium riparium* Regel (38105) S  
 402. *Eupatorium triste* DC. (15954) Sd  
 403. *Eupatorium villosum* Sw. (18399) T  
 404. *Mikania micrantha* Kunth (18405) M  
 405. *Neurolaena lobata* (L.) R. & Br. (16242) S, Tt  
 406. *Pluchea symphytifolia* (Mill.) Gillis (*P. carolinensis* of recent authors) (16243) S  
 407. *Porophyllum ruderale* (Jacq.) Cass. (15942) Sd  
 408. *Pterocaulon alopecuroideum* (Lam.) DC. (15998) S  
 409. *Salmea scandens* (L.) DC. (15919) T

410. *Verbesina pinnatifida* Sw. (15904) Sd, T  
 411. *Vernonia acuminata* Loss. (15907) T, M  
 412. *Vernonia divaricata* Sw. (15943) Sd, T  
 413. *Wedelia gracilis* Pers. (16749) S

### Mosses

414. *Sphagnum cuspidatum*  
 415. *Sphagnum cuspidatum* var. *serrulatum*  
 416. *Sphagnum erythrocalysc*  
 417. *Sphagnum magellanium* was a new record for W.I of J.A  
 418. *Sphagnum palustre* Not reported for J.A. only 1 specimen in collection  
 419. *Sphagnum perichaetiale*

### Appendix 6.2 – List of observed Birds Species (from Davis, 2003)

White-crowned Pigeon	Jamaican Tody*
Ruddy-Quail Dove	Orangequit*
Common Ground Dove	Bananaquit
White-winged Dove	Jamaican Euphonia*
Zenaida Dove	Black-faced Grassquit
Common Moorhen	Yellow-face Grassquit
American Coot	Yellow-shouldered Grassquit*
Cattle Egret	Black and White Warbler
Great Egret	Northern Parula
Little Blue Heron	Northern Waterthrush
Killdeer	Black-throated Blue Warbler
Spotted Sandpiper	American Redstart
Smooth-billed Ani	Cape May Warbler
Rufous-throated Solitaire	Common Yellowthroat Warbler
Greater Antillean Elaenia	Praire Warbler
Jamaican Elaenia*	Connecticut Warbler
Sad Flycatcher*	Palm Warbler
Gray Kingbird	Ovenbird
Loggerhead Kingbird	Worm-eating Warbler
Northern Mockingbird	Black-whiskered Vireo
Barn Swallow	Greater Antillean Grackle
Cave Swallow	Jamaican Oriole
Antillean Palm Swift	Red-billed Streamertail Hummingbird*
Jamaican Stripe-headed Tanager*	Vervain Hummingbird
Jamaican Crow*	Mango Hummingbird*
Olive-throated Parakeet	European Starling
American Kestrel	
Turkey Vulture	

Key: \* = Endemic Species

## Appendix 7 – Preliminary Draft Research Prospectus

This Preliminary Draft Research Prospectus is simply a compilation of issues requiring research, which arose out of the management planning process. The IOJ staff will need to develop a complete Research Prospectus. This should provide more detail with respect to the research needed i.e. more of a research outline. Further, the complete Prospectus (to be disseminated) should have background information on the MRPA and the research facilities and services available through the IOJ.

Topic	Research Questions/Objectives
Scrub Savanna	Is this community stable or is it becoming forest ? This type of long term research may best be led by IOJ but could be enhanced by regular sampling conducted by students over the years at the same locations.
Marsh	To study the composition of the MRPA marsh community and its ecology and make recommendations for its conservation  Amphibian Survey (also in/around Bog)
Birds	Assess populations of key species, in particular the White-crowned Pigeon which is currently listed by IUCN as ‘Near Threatened’.  Use of site for migratory species and study of ecology of Connecticut Warbler
Freshwater Ecology	Study the ecology of the surface water in the Protected Area  Study the dragonfly and other insect larva of the surface water toward s the design of a Programme to use the monitoring of these species to assess water quality.
Sphagnum Moss	Study the change in colour of the different species of sphagnum moss to establish a system for monitoring and assessing water levels and hydration of the wetland ecosystem.
Tank Bromeliads	Study the species composition and population of tank bromeliads from different parts of the Reserve
Recreation, Tourism and Protected Areas	Conduct a study to assess carrying capacity and establish Limits of Acceptable Change for the Reserve within the next 5 years.
Hydrology	Conduct hydrological studies to provide recommendations to guide management of the Water Protection Sub-Zone (in conjunction with other studies related to the hydrology of the Protected Area) within the next 5 years.

## Appendix 8 – Job Descriptions

### Appendix 8.1 Job Description – Mason River Protected Area Manager

(N.B.: This may initially be a project position as described earlier)

**Qualifications and Experience:** At least a first degree or equivalent certification, preferably in hospitality and business management and/or community development with at least two years work experience and ideally some supervisory experience. This post would be at the Mason River Protected Area.

**Reports to:** IOJ NHMJ Director

**Supervises:** All Field Staff (Forest Warden, Assistant Field Warden, Cleaner)

**Job Purpose:** Management of the MRPA, in particular, property owned by the JNHT and managed by IOJ in a manner which promotes sustainable conservation of the Reserve.

#### Technical/Professional Responsibilities

1. Property management, supervision and oversight
2. Guide field staff and assist with implementation of management of the MRPA
3. Work to ensure local compliance with PA legislation and liaise with relevant agencies for enforcement.
4. Support conservation and research activities of IOJ and other authorised personnel at the MRPA and the Reserve facilities in particular.
5. Outreach, liaison and communication with local community members, groups and schools inclusive assisting with environmental education for sustainable development and other technical assistance.
6. Hospitality and visitor management at the Reserve and liaison with local community members and groups inclusive provision of technical assistance to support local community tourism efforts.

#### Other Responsibilities

Performs any other duties that are assigned from time to time

### Appendix 8.2 Job Description - Forest Warden

The following is an excerpt from the Job Description provided by the IOJ NHMJ:-

**Job Purpose:** The Forest Warden is responsible for maintaining the facilities of the Mason River Field Station and common areas surrounding the Reserve.

#### Technical/Professional Responsibilities

1. Repairs fences
2. Maintains supervision of the Mason River property and vegetation
3. Prepares incident reports and takes precautionary measures against fire and other damage by others.
4. Ensures Warden's house is properly bushed and cleaned



5. Ensures visitors log book is signed by visitors
6. Ensures minor structural repairs are carried out
7. Prepares a critical incident report for defective plumbing and electrical equipment to relevant authority
8. Alerts supervisor of visitors to the reserve
9. Assists with the promotion and preparation of functions such as World Wetlands Day
10. Maintains record of materials and equipment assigned to Mason River
11. Ensures that Reserve is accessible
12. Prepares time of attendance register for all staff members at the Mason River Field Station

#### Other Responsibilities

Performs any other duties that are assigned from time to time

### **Appendix 8.3 Job Description – Assistant Field Warden**

The following is an excerpt from the Job Description provided by the IOJ NHMJ:-

#### Job Purpose

The Assistant Field Warden is responsible for assisting in maintaining the facilities of the Mason River Field Station and common areas surrounding the reserve.

#### Technical/Professional Responsibilities

1. Patrols property to monitor damages or trespassers
2. Assists in the maintenance and repair of fences
3. Assists in the maintenance of the trails and fire lines
4. Reports incidents and takes precautionary measures against fire and reports any damage by others.
5. Ensures area around the visitor's house is properly bushed and cleaned
6. Assists with the promotion and preparation of functions such as World Wetlands Day

#### Other Responsibilities

Performs other duties that are assigned from time to time

### **Appendix 8.4 Job Description – Part-time Cleaner**

The following is an excerpt from the Job Description provided by the IOJ NHMJ but has been slightly edited to remove reference to "peace corps section" of the property:-

Job Purpose: The Part-time Cleaner is responsible for maintaining and cleaning the interior of the buildings of the Mason River Reserve and common areas within the outstation.

#### Technical/Professional Responsibilities

1. Sweeps and mops floors
2. Dusts books, furniture, fixtures and windows
3. Empties bins

4. Cobwebs the corners of all walls and dusts all surface areas
5. Washes all the used utensils and cutlery
6. Assists with the promotion and preparations for functions such as Wetlands Day
7. Assists with hosting visitors to the Reserve and serves refreshment.

Other Responsibilities

1. Performs any other duties that are assigned from time to time

## Appendix 9 – List of Stakeholders participating in the Management Planning

	<b>Name</b>	<b>Community/Organisation</b>
1	Jodian Jackson	McNie
2	Thelma Douglas Gray	McNie
3	Kimmarie Forrest	McNie
4	Annette Ormsby	McNie
5	Zapordo Whitter	McNie
6	George Staple	McNie
7	Ricardo Peters	McNie
8	Carlton Daley	McNie
9	Lloyd Andrews	McNie
10	Eron Brown	McNie
11	Nathalie Bygrave	McNie
12	Virol Bruce	McNie
13	Grinville Bruce	McNie
14	Sheril Alexander	McNie
15	Sophia Bruce	McNie
16	Kemar Daley	McNie
17	Dehelina Bruce	McNie
18	Louise Staple	McNie
19	Javian Daley	McNie
20	Walton Daley	McNie
21	L. Pinnock-Douglas	Teacher – McNie All Age
22	Hyacinth Powell	Teacher – McNie All Age
23	Andre Ludford	Teacher – McNie All Age
24	Nicholet Smith	Student, McNie All Age School
25	Tejay Patterson	Student, McNie All Age School
26	Shamoy Barnes	Student, McNie All Age School
27	Anthony Nesbeth	Student, McNie All Age School
28	D-Aundre Taylor	Student, McNie All Age School
29	Ravalle Gazader	Student, McNie All Age School
30	Stephen Patterson	Student, McNie All Age School
31	Antomly Royes	Mason River
32	Melody Dawkins	Mason River
33	Ricardo Patterson	McNie
34	Uroy Gentles	McNie
35	Faithlyn Cummings	McNie
36	Derrick Douglas	McNie
37	Jock Letts	Mason River
38	Shaldo Daley	McNie
39	Lincoln Drummond	Mason River
40	Aaron Swaby	Mason River
41	Vivia Whitter	Mason River
42	Kevin Riley	RADA

	<b>Name</b>	<b>Community/Organisation</b>
43	Robert Cummings	McNie
44	Bernice Lopez	McNie
45	Desmond Hudson	Mason River
46	Judan Letts	Mason River
47	Audrey Brown	Tate District
48	Robert Wallen	Rowe Town
49	Herbert Letts	Mason River
50	Louise Harriott	McNie
51	Wessel Walker	Douglas Castle
52	Herbert Letts	Mason River
53	Albert Letts	Mason River
54	Wray Letts	Mason River
55	Kenneth	Douglas Castle
56	Rupert Smith	McNie
57	Lloyd Andrews	McNie
58	Samuel Pinnock	McNie
59	Edrick Prince	McNie
60	Trudyann Swaby	Mason River
61	Winston Haynes	Mason River
62	Ann-Marie Bonner	Institute of Jamaica
63	Ronald Young	Institute of Jamaica (NHMJ Board)
64	Arthur Geddes	Institute of Jamaica (NHMJ Board)
65	Tracy Commock	IOJ - NHMJ
66	Dionne Newell	IOJ - NHMJ
67	Patricia Parchment	IOJ - NHMJ
68	Marcia Forrester	IOJ - NHMJ
69	Suzanne Davis	IOJ - NHMJ
70	Keron Campbell	IOJ - NHMJ
71	Judeen Meikle	IOJ - NHMJ
72	Elizabeth Morrison	IOJ - NHMJ
73	Dorsia Brooks	IOJ - NHMJ
74	Krystina Jones	IOJ - NHMJ
75	Marcel Bruce	McNie – IOJ- NHMJ
76	Christopher Daley	Mason River – IOJ-NHMJ
77	Bevonie Wright	McNie – IOJ-NHMJ
78	Leando Notice	Mason River (retired IOJ-NHMJ)
79	Lesa Smith- Morris	Social Development Commission, Clarendon Office
80	O'Neil B. Thomas	Tourism & Training Resource Person, AIDE
81	Jerome Smith	Ministry of Water, Land, Environment and Climate Change
82	Yvette Strong	NEPA
83	Carla Gordon	NEPA

	<b>Name</b>	<b>Community/Organisation</b>
84	Bernard Blue	NEPA
85	Christine Sutherland	NEPA
86	Jason Gooden	NEPA
87	Maureen Milbourn	NEPA
88	Ngozi Christian	NEPA (NPAS Project Manager)
89	Derek Little	Sugar Industry Research Institute
90	Errol Henry	Sugar Industry Research Institute
91	Delroy Tomlinson	Metereological Services
92	Donald Chin	Metereological Services
93	Lisa Grant	JNHT
94	Jane Cohen	UWI – Botany Dept.
95	Geoffrey Shields	Flower Farm

## **Glossary**

### **Marsh**

According to Wikipedia, a marsh is “a type of wetland dominated by herbaceous rather than woody plant species” ([www.wikipedia.org](http://www.wikipedia.org) downloaded 4/1/14).

### **Scrub Savanna**

According to SpringerReference, a scrub savanna is an area with “stands of shrubs alternating in various patterns with grasslands in the tropics and subtropics” ([www.springerreference.com](http://www.springerreference.com) downloaded 4/1/14)

### **Peat Bog**

According to the Free Online Dictionary, a peat bog is a “wet spongy ground of decomposing vegetation; has poorer drainage than a swamp; soil is unfit for cultivation but can be cut and dried and used for fuel” ([www.freedictionary.com](http://www.freedictionary.com) downloaded 4/1/14).

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## ADDENDUM

### Management Plan for the Mason River Protected Area Chapter 7 Year 1 (2017/2018) – Year 5 (2021/2022)

#### 7. Management Programmes

The following management programmes are based on international and national guidelines for protected area management e.g. International Union for Conservation of Nature (IUCN), Ramsar Convention and the Natural Resources Conservation Authority (NRCA). The goals for each programme are meant to be long-term. The objectives are medium term and should be achieved within a five year time-frame. This however, will be dependent mainly on funding to access the necessary resources and options have been provided to reduce the funding required. The deliverables are the useful outputs from each of the activity sets and their delivery will indicate successful implementation of the relevant strategy. Prioritisation was based on a score of (1) – (3) with one indicating highest priority and this was based on how critical the activity is to effective management and the dependence of one activity on another.

##### 7.1 Zoning Programme

**Goal:** To use zoning to aid in the protection of the wetland ecosystem and biodiversity of the protected area.

**Objective 1:** To conduct further investigation towards the rationalisation of the boundaries (including changes) if deemed necessary, within the next four years.

**Table 9.1: Description of Implementation of Zoning Programme Objective 1**

Strategies/Activities	Deliverables	Resources	Timeframe & (Priority)
Within the first two years, address the disparity in the boundaries of the protected areas (those under National Environment and Planning Agency's (NEPA's) jurisdiction with those under Jamaica National Heritage Trust's (JNHT) jurisdiction) and the issue of private land inclusion by conducting field studies and stakeholder consultations.			
4. Conduct desk and field studies to: (v) Identify land owners (will require National	Land Ownership and Conservation Value	Consultant (\$200,000) or	Timeframe: 4 months in Year 2

Strategies/Activities	Deliverables	Resources	Timeframe & (Priority)
<p>Land Agency (NLA) search and interviews within the community – this could be done in conjunction with the survey at Strategy 2)</p> <p>(vi) Assess the privately owned land (which is within the protected area designated under NEPA’s jurisdiction but outside the Preservation Zone) for their conservation value</p> <p>(vii) Assess other nearby areas outside both protected area boundaries, which may be of conservation value e.g. land to the north-west which appears to be forested on hills of about 720m and nearby caves.</p> <p>(viii) Collate and analyse information to provide a report on land ownership and conservation value and provide recommendations regarding the existing boundary.</p>	<p>Report (with recommendations regarding the boundary)</p>	<p>Intern Fees to NLA: @ \$500/search – estimate \$10,000 Plus other: \$25,000 Not included in budget – it has been subsumed in Strategy 2.</p> <p>Institute of Jamaica (IOJ) staff could conduct biological assessments following field visits – would need about \$20,000.</p>	<p>Priority: (1)</p>
<p>5. Conduct a Community Survey (in conjunction with Public Education Programme activities) and stakeholder consultations to assess the willingness of landowners to implement conservation practices and design programmes to facilitate this.</p> <p>The Community Survey should be door to door within all 3 communities and should include:-</p> <ul style="list-style-type: none"> <li>• Demographic information – age, sex, education level, occupation/income</li> <li>• Land ownership</li> </ul>	<p>Survey and Consultation Report</p> <p>Sustainable Use Education &amp; Community Outreach Plan</p>	<p>Consultant inclusive of personnel for survey – could be local community members (after training) (\$400,000 – includes Strategy 1/Activity 2 at significantly decreased cost)</p> <p>Assistance can be</p>	<p>Timeframe: 6 months in Year 2 Priority: (1)</p>

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; (Priority)</b>
<ul style="list-style-type: none"> <li>• 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</li> <li>• Knowledge, attitudes and practices regarding the Mason River Protected Area (MRPA), the Reserve in particular and environmental issues more generally.</li> </ul>		sought from Social Development Commission (SDC) as they implement such surveys but likely do not have the funding.	
6. Make recommendations for changes to boundary and legislation as necessary.	Boundary Legislation	Agency Staff Time (NEPA)	Timeframe: By Year 4 Priority (2)

**Objective 2:** To conduct a study to assess carrying capacity and establish Limits of Acceptable Change for the Preservation Zone

**Table 9.2: Description of Implementation of Zoning Programme Objective 2**

<b>Strategies/Activities</b>	<b>Monitoring Indicators</b>	<b>Resources</b>	<b>Timeframe &amp; (Priority)</b>
Within the first three years, identify funds and resources to conduct the study and prepare a plan.			
1. Work with the Consultant to conduct necessary desk and field studies and to prepare a report assessing carrying capacity and/or determining the Limits of Acceptable Change and a plan for maintaining change within those limits. This should be with particular respect to visitors and also researchers staying at the Reserve.	Limits of Acceptable Change/Carrying Capacity Report and Plan	Consultant (could be University of the West Indies (UWI) M.Sc. student project working with IOJ staff (\$200,000)	Timeframe: 9 months in Year 2 or 3 Priority: (2)
2. Use the study report and plan to guide management and use of the Reserve and in particular, the Visitor Use Sub-Zone.	Reporting as required by the Plan	Staff	Ongoing from Year 3

**Objective 3:** To conduct hydrological studies to provide recommendations to guide management of the Water Protection Sub-Zone (in conjunction with other studies related to the hydrology of the protected area)

**Table 9.3: Description of Implementation of Zoning Programme Objective 3**

Strategies/Activities	Monitoring Indicators	Resources	Timeframe & (Priority)
1. Within the first four years, identify funds and resources and conduct the study and prepare a plan.			
2. Prepare Terms of Reference (TOR) and seek funding.	TOR, Proposal Funds	Time of Existing Management level Staff	Timeframe: Year 2 Priority: (1)
3. Work with the Consultant to conduct necessary desk and field studies and to prepare a report and plan for managing the water resources and hydrological features of the protected area, particularly in the Water Protection Sub-Zone (but also water levels and quality in the protected area generally).	Report	Consultant (\$1 million) or could possibly be a Ph.D. student (\$500,000) including water testing	Timeframe: 2 years by Year 4 Priority: (2)
4. Use the study report and plan to guide management and use of the Reserve and in particular, the Visitor Use Sub-Zone.	Reporting as required by the plan	Staff	Ongoing from Year 4

**Objective 4:** To demarcate the boundaries of the key Zones and Sub-Zones to aid in their management.

**Table 9.4: Description of Implementation of Zoning Programme Objective 4**

Strategies/Activities	Monitoring Indicators	Resources	Timeframe & (Priority)
Within the first three years, identify funds and resources to fence and sign the Reserve and the Water Protection Sub-Zones.			
1. Seek funding	TOR, Proposal Funds	Time of existing Management level staff	Timeframe: Year 2 or 3 Priority: (1)
2. Explore options for boundary demarcation for the Reserve (including identification of threatened areas and best locations for installation).	Fence in place (photos and approval for payment by relevant officers)	Funds for materials and contractor	Timeframe: Years 2-3 Priority: (2)
3. Place markers e.g. posts with signs at strategic	Markers and signs in	Funds for materials	Timeframe: Ongoing

Strategies/Activities	Monitoring Indicators	Resources	Timeframe & (Priority)
locations e.g. coordinate points around the Water Protection Zone to clearly define the zone and state permitted uses	place (photos and approval for payment by relevant officers)	and contractor	Priority: (2)
Within five years, identify funds and resources to erect signs marking and explaining all Zones and Sub-Zones.			
1. Design, produce and erect signs for each Zone and Sub-Zone indicating protected area status and the purpose, uses and prohibited activities.	Signs in place	Funds	Timeframe: Year 4 Priority: (3)

## 7.2 Conservation Programme

**Goal:** To maintain and restore biodiversity (using Weck, 1970 as a baseline) within the Preservation Zone.

**Objective 1:** To reduce cover of Vampire Fern (*Dicranopteris pectinata*) by 60% in five years.

**Table 10.1: Description of Implementation of Conservation Programme Objective 1**

Strategies/Activities	Deliverables	Resources	Timeframe & (Priority)
Use methodology tested by K. Campbell (M.Sc. thesis) to control <i>D. pectinata</i> ensuring documentation			
1. Pilot Project: a. Identify (measure and mark) a small pilot plot and clear the ferns (including roots). b. Use the wardens (and possibly a small team of community volunteers) to assess the work needed (# days work/unit area) and hence the unit cost. c. Calculate funds needed based on assessment of coverage of the Reserve by these ferns.	Plots cleared (suggest minimum total 0.05 ha) evidenced by documentation (reports and photos)	Existing Natural History Museum of Jamaica (NHMJ) staff - Botanists, Wardens  Volunteers \$20,000 – e.g. meals, stipends, travel	Timeframe: 6 months-1 year in Year 1 Priority: (1)
2. Monitor plots (starting with pilot) and a. Remove fern seedlings before they spore b. Use any indigenous species (which sprout seedlings where ferns are removed) for restoration of illegal trail (see Objective 3)	Records	Existing funds for potting materials	Timeframe: Years 2 – 3 (pilot) Priority: (1)

– growing them up first in the nursery.			
3. Seek funds to expand pilot project – expansion of plant nursery as needed.	Proposals	Existing personnel	Year 2 Priority: (1)
4. Expand pilot project.	Reports	Funds - Estimate: \$1million	Year 3 Priority: (1)
5. Research and monitoring.	Reports	Existing Consider UWI graduate student	On-going

**Objective 2:** To reduce cover of Strawberry Guava (*Psidium cattleianum*) by 60% in five years.

**Table 10.2: Description of Implementation of Conservation Programme Objective 2**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
1a. Complete satellite imagery analysis to identify the location and coverage of <i>P. cattleianum</i> 1b. Conduct research into the control of <i>P. cattleianum</i>	Report & Plan	Consultant/Student	Timeframe: Year 3 Priority: (1)
6. Seek funds and implement a pilot project for the control of <i>P. cattleianum</i> . This will likely require both chemical and physical treatments. Consider the possibility of sale of the wood (for firewood/charcoal) to raise funds to assist with removal. Discuss with Jamaica Conservation and Development Trust (JCDDT), chemical methods used for controlling Wild Coffee – <i>Pittosporum undulatum</i> in the Blue and John Crow Mountains National Park). Explore combinations of methods for most effective and inexpensive approach e.g. limb trees and sell wood and then inject chemical to kill remaining tree.	Records & Report	Existing if the pilot is small	Timeframe: Years 3 - 4 Priority: (1)

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
7. Seek funds and implement expansion of pilot	Proposal and Reports		Timeframe: Years 4 – 5 Priority: (1)

**Objective 3:** To restore vegetation within trail illegally cut to the east of the Reserve, in four years.

**Table 10.3: Description of Implementation of Conservation Programme Objective 3**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
1. Assess trail (length and existing use if any, types of trees in area) and discuss with local community, possible reasons the trail may have been cut, in order to develop a plan for mitigating against encroachment (see Education and Community Outreach Programme).	Report with recommendations for Community Outreach	Existing Staff	Timeframe: Year 3 Priority: (1)
2. Use seedlings which sprout where invasives are removed to restore this trail. This will require waiting until the end of the year when there are enough large seedlings.	Report: Number of seedlings planted & growing Photos: Trail no longer visible	Existing Staff	Timeframe: 4 weeks in Year 3 Priority: (1)
3. Maintain seedlings and monitor growth.	Records	Existing Staff	Timeframe: 4 weeks in Year 4 Priority: (1)

**Objective 4:** To plant trees on the Water Protection Sub-Zone for use by community to discourage cutting of trees from the Reserve.



**Table 10.4: Description of Implementation of Conservation Programme Objective 4**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
1. Conduct research to identify suitable trees for different purposes (e.g. firewood, charcoal, posts) as identified by the community.	Report	Existing Forestry Dept. & Rural Agricultural Development Authority (RADA)	Timeframe: Year 2 Priority: (1)
2. Identify suitable locations within the Sub-Zone.	Plan	Existing	Timeframe: Ongoing commencing Year 3
3. Organise tree planting and maintenance with communities e.g. on National Tree Planting Day (using plant seedlings from the nursery (Objective 5) and other sources).	Report	Funds for workday meal Funds for maintenance	Timeframe: Year 3
4. Facilitate training of community members to coppice the trees for harvesting of wood for fire, charcoal, posts etc. rather than cutting down the tree, in order to encourage re-growth and maintenance of tree cover.	Training Report Patrol Reports (observations)	Funds for training day Resource personnel e.g. RADA	Timeframe: Year 4

**Objective 5:** To propagate and grow plant seedlings for use in restoration and enhancement of the MRPA (in a way that may help generate sustainable financing).

**Table 10.5: Description of Implementation of Conservation Programme Objective 5**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
1. Remove seedlings which sprout where invasives are removed to the existing plant nursery to grow up for planting (restoration within Reserve e.g. illegal trail – Objective 3, enhancement of Water Protection Sub-Zone and other Multiple Use Zone areas, particularly immediately adjacent to the Reserve).	Report: Number of seedlings planted & growing Photos: Trail no longer visible	Existing Potting material (bags and use mix of soil from area)	Timeframe: Ongoing commence in Year 2 Priority: (1)

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
2.Maintain seedlings and monitor growth.	Records	Existing	
3.Initiate and follow up discussions with Shields Flower Farm re: propagation and growing of plants of interest including for sale with a percentage commission for the MRPA Reserve conservation.	Site Visit Report Propagation Testing Report  Agreement for propagation and plant sale commission	Existing: Senior Botanist and wardens  IOJ Administration/ Management	Start in Year 3 Priority: (3)

### 7.3 Research

**Goal:** To implement and facilitate research which contributes to better understanding of the special ecosystem and habitats and Mason River and to its effective management.

**Objective 1:** To conduct research fitting the mission of the IOJ and addressing the needs of the MRPA

**Table 11.1: Description of Implementation of Research Programme Objective 1**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Strategy 1: Clarify & Rationalise research to be conducted at Mason River by IOJ			
Develop a Research Prospectus and determine which components will be conducted by IOJ and which will be promoted to other researchers. Staff can submit proposals/ideas for research and a meeting can be held to compile, refine and add research concepts in order to develop the prospectus. The meeting can also address who should conduct the research (IOJ, Other or combination) and other issues e.g. research priorities.	Research Prospectus	Existing Staff IOJ NEPA UWI JNHT	Timeframe:Year 2 Priority: (1)

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Strategy 2: IOJ staff implement research			
IOJ staff conduct research	Reports and Publications	Existing Some research will require resources Vehicle & Accommodation	Timeframe: Year 2 Priority: (1)
IOJ staff analyse and use monitoring data to help guide management.	Reports	Existing	Ongoing
Seek funds and implement repairs to the existing accommodation to allow staff to overnight. Convert smaller room to a Research Lab (desk, shelf and filing space) and use the larger room for accommodation.	Proposal Project funding Project reports (photos and invoices)	Existing staff to prepare proposal  Funds for repairs/renovation	Timeframe: Year 3

**Objective 2:** Promote and facilitate research (including biodiversity surveys) by IOJ staff and other institutions, through research partnerships

**Table 11.2: Description of Implementation of Research Programme Objective 2**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Strategy 1: Promote collaborative and other research by student groups and individual researchers from local, regional and international institutions			
Promote Research Prospectus  Invite academic institutions to conduct research in the MRPA (outlining facilities and including the Research Prospectus as a guide for possible research ideas)	Prospectus on website Letters to institutions  Increased Research (as per Research Log)	Existing Staff	Timeframe: Commence Years 2- 3 Priority: (1)
Strategy 2: Organise accommodation for researchers/research groups within the local community			

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
5. Identify appropriate accommodation within the community, working with Tourism Product Development Company (TPDCo.) Bed & Breakfast Programme for standards.	Contact List of Community Members with appropriate accommodation	Project Manager with hospitality experience	Timeframe: Years 3-5 Priority: (1)
6. Make arrangements for use of accommodation.	Agreements with the above-mentioned Community Members Records	Existing Administrative	Timeframe: Year 3 onward
7. Monitor accommodation facilities based on system Project Manager prepares.			
8. Provide accommodation for visitors.			
<b>Strategy 3: Otherwise facilitate researchers</b>			
1. Allow use of Research Lab and other facilities and/or services as possible including time of existing staff as possible.	Research (as above)	Existing	Timeframe: Year 4
2. Establish a group of community members who can assist researchers.	Corps of community volunteers	Protected Area Manager	Timeframe: Year 4

## **7.4 Enforcement and Compliance**

### **Description and Analysis of Current Programme**

There are two wardens employed: Senior Forest Warden and Assistant Field Warden. These titles are not particularly appropriate but are those given by IOJ although the current job descriptions are thorough and generally adequate. Section 8.3 on Staffing provides different titles and updated job descriptions. This number of enforcement officers is more than adequate according to the Sustainable Financing Plan for the National System of Protected Areas. The wardens are required to patrol the Reserve twice a day and each patrol takes 1½ to 2 hours depending on the number of stops. These patrols are done on foot although bicycle would be faster, there are some

areas that can only be traversed on foot. This number of patrols is not considered necessary based on the amount of work otherwise required of the wardens and is unlikely to deter illegal activity since the patrols are likely at set times daily.

**Goal:** To use enforcement measures and promote compliance in order to minimise threats.

**Objective 1:** To conduct regular patrols circling the Reserve at least eight times per week (twice per day on three days of the week and once per day on the other two) stopping to check on all the Multiple Use Zone’s Sub-Zones on at least four occasions per week and visiting the western Sustainable Use Sub-Zone at least twice per month.

**Table 12.1: Description of Implementation of Enforcement & Compliance Programme Objective 1**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
1. a. Adjust and improve existing patrolling schedule so that it reflects Objective 1. 1. b. Plan monthly schedules.	Patrolling schedule Reports	Time of Protected Area Manager  Existing Wardens and Administrator	Timeframe: Ongoing (1) Priority: (1)  Immediate implementation
2. Improve the reporting systems and implement it – this should include regular reporting and emergency reports.	Reporting System implemented	Time of MRPA Manager Existing Personnel	Timeframe: Ongoing Priority: (1) Immediate implementation

**Objective 2:** To secure the Reserve by repairing/replacing existing fencing and adding signage along fencing

**Table 12.2: Description of Implementation of Enforcement & Compliance Programme Objective 2**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
This objective links with Objective 4 of the Zoning Programme to demarcate boundary and zones with fencing and appropriate signage.			
1. Repair and replace fencing around Reserve in strategic locations with signage and community outreach.	Perimeter fence repaired and/or replaced as evidenced by reports and	Cost of Fencing & Initial Repairs: Front: \$500,000	Timeframe: Year 3 Priority: (2)

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Cost estimates for a combination of chain link and barbed wire fencing to replace broken areas have been obtained and are prohibitive (\$4 million). Barbed wire on wooden fence posts can be considered for the whole length but the possibility exists that the fence posts may be stolen. At least in the interim barbed wire on “quick stick” trees should be used. The trees will have to be planted first to grow enough to accommodate the barbed wire. Therefore focus on Interpretive Enforcement.	receipts.	Openings: \$500,000	Immediate implementation
2. Use Interpretive Enforcement to discourage encroachment:- a. Liaise with community members at meetings. b. Design, produce and install interpretive and enforcement signs targeting local community members – not just “No Trespassing” but for example “Mason River Preservation Zone – a unique wetland ecosystem – managed to maintain local water supply and protect special plants and animals – Help keep Mason River special” with photographs of flora and fauna.	Report meetings attended  Signage Plan, Report and Invoices	Existing staff  Existing staff to prepare Signage Plan Cost of Signage: \$350,000 (10 3x2 ft)	Timeframe: Year 2 - 3 Priority: (1)

**Objective 3:** To protect the Reserve from the threat of fire

**Table 12.3: Description of Implementation of Enforcement & Compliance Programme Objective 3**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
1. Maintain the fire line once per year	Reports Invoices	Cost of Fire Line Maintenance:	Ongoing Priority: (1)

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
2. Check with Forestry Dept. that fire line is wide enough and if it is not, consider widening	Outcome: No fire in the Reserve	\$90,000	Currently this is once per year
3. Institute the guideline (and eventually regulation) of no fires within the Reserve, except in designated area where there is a fire control measure in place.	Guidelines instituted	Fire extinguishers Additional Signage Existing	Timeframe: Ongoing Priority: (1)
4. Establish a Fire Extinguishing Programme with Community Volunteers	Fire Extinguishing Programme established	Time of Staff	Timeframe: Year 3 Priority: (1)

**Objective 4:** To protect birds within the Game Sanctuary from bird-shooting

**Table 12.4: Description of Implementation of Enforcement and Compliance Programme Objective 4**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
Collaborate with NEPA			
1. Liaise with NEPA for assistance during and outside of bird-shooting season.	Reports Correspondence	Existing  Accommodation  Volunteer Game Wardens	Timeframe: Ongoing Priority: (1)
2. Consider and address with community Game Wardens through Honorary Game Warden Programme. This will likely be useful in addressing breaches of environmental legislation more broadly.	Additional Honorary Game Wardens	Training (NEPA & IOJ)	Timeframe: Year 3 Priority: (2)
3. Liaise with NEPA to address loophole in legislation re: people shooting from outside into the Reserve.	Correspondence Identify and begin to implement legal solution	Existing	Timeframe: Year 3 Priority: (2)

**Objective 5:** To encourage compliance with, and enforce relevant legislation to reduce threats to the Reserve

**Table 12.5: Description of Implementation of Enforcement & Compliance Programme Objective 5**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
1. Wardens use Interpretive Enforcement: that is, when they are on patrol they should speak to community members about the MRPA and its importance (particularly the Reserve), encourage community members to assist in the conserv-ation of the MRPA and explain why certain practices are harmful to the MRPA and the community’s environs.	Reports	Existing  Training	Timeframe: Ongoing Priority: (1)
2. Place information on the fines for offences on the various signs as relevant.		Signage Plan	
3. Wardens report offences for enforcement action by NEPA	Correspondence	Existing	Timeframe: Ongoing Priority: (2)
4. IOJ liaises with NEPA (and JNHT as appropriate) for enforcement action	Correspondence and Reports	Existing staff	On-going

**Objective 6:** To prepare and gazette regulations that aid in effective management of the protected area by Year 5

**Table 12.6: Description of Implementation of Enforcement & Compliance Programme Objective 6**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
1. Collaborate with NEPA and JNHT			
2. Draft regulations based on other protected areas and IOJ and JNHT to review and make recommendations for editing.	Reports	Existing	Timeframe: Start in Years 1 and 2 Priority: (1)
3. NEPA to submit final draft for the process.	Correspondence	Existing	Timeframe: Year 2 Priority: (2)



## 7.4 Education and Public Awareness Programme

**Goal:** To raise awareness and knowledge of visitors and the local community about the MRPA and the Reserve in particular.

**Objective 1:** To provide interpretation for visitors, that promotes support for the protected area

**Table 13.1: Description of Implementation of Education and Public Awareness Programme Objective 1**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
1. Review and improve existing programme (inclusive of signage, exhibits/displays and materials) particularly with respect to age-group relevant activities at the Field Station (Reserve) <ul style="list-style-type: none"> <li>a. All-weather posters/signs to hang from existing gazebo when groups are expected</li> <li>b. Small Exhibit for Verandah and Front Room (use of Walls)</li> <li>c. Establish a Visitors Centre (10 x 8 feet) in container along with Research Lab</li> </ul>	Report/Plan	Existing	Timeframe: Year 2 Priority: (1)  Timeframe: Year 4 Priority: (2)
2. Train all relevant staff as Interpreters (guides)	Report	Funds	Timeframe: Year 2 Priority: (1)
3. Add signage and exhibits/displays at the Community Centre <ul style="list-style-type: none"> <li>a. Signage initially about the Reserve.</li> <li>b. Visitors Centre when the Community Centre is renovated and expanded.</li> </ul>	Report/Invoices	Existing staff Funds	Timeframe: Year 4 Priority: (1)
4. Explore possibility of a viewing tower (could also be used as a look-out for fires – possibly adjacent to warden’s house).	Information, Design Feasibility/Cost	Existing	Timeframe: Year 4 Priority: (3) Likely expensive to build and maintain

**Objective 2:** To raise awareness, knowledge and positive attitudes towards the protected area amongst local community members (targeting the 3 closest communities: McNie, Mason River and Douglas Castle)

**Table 13.2: Description of Implementation of Enforcement and Compliance Programme Objective 2**

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
<p>1. Conduct Knowledge, Attitudes and Practices (KAP) Survey.</p> <p>Ideally this should be implemented with the Survey to be conducted under the Zoning Programme.</p>	Report	Consultant – consider working with UWI – Caribbean Institute of Media and Communication (CARIMAC) to reduce costs and use local community members. May still need: \$400,000	Timeframe: Year 3 Priority: (1)
2. Design appropriate Public Awareness Campaign including activities and materials.	Campaign Plan	Consultant/UWI	After Year 3
3. Implement Public Awareness/MRPA Campaign - this campaign could use the Rare Conservation Pride Campaign methodology. Rare offers training for these campaigns. It should address directional and informational signage in all 3 communities and for all the objectives. Ideally, it should be implemented by a Project Manager – this person could eventually become the Protected Area Manager.	Campaign implemented	Project Manager and Materials etc. (\$2.5million)	Timeframe: One year, Year 4 Priority: (1)
4. Conduct post-Campaign KAP Survey and disseminate findings	Report	Consultant/UWI (\$200,000)	Timeframe: Year 4 or 5 Priority: (1)

**Objective 3:** To conduct targeted public education activities to address specific threats to the protected area

**Table 13.3: Description of Implementation of Enforcement and Compliance Programme Objective 3**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
<b>Strategy 1: Address issue of Fires</b>			
1. Conduct educational workshops for farmers re: safe use/non-use of fire for clearing land vis a vis nutrient content of soil and establish an alerting system to let wardens know when fires are going to be used near the Reserve	Workshop Plan	Existing Staff Resource Personnel e.g. Fire Brigade	Timeframe: Year 3 Priority: (2)
<b>Strategy 2: Address issue of Bird Shooting</b>			
1. Obtain educational materials from NEPA and ensure posted in community. 2. Speak to young men in community just prior to Bird Shooting Season to discourage bad practices amongst “bird boys”.	Materials disseminated and activities implemented	Existing staff NEPA materials	Timeframe: Ongoing Priority: (1)
3. Address issue in school programme			Year 3
<b>Strategy 3: Address Other Issues e.g. Water Pollution including use of Chemicals e.g. Pesticides/Herbicides, Cutting Trees</b>			
1. Through school programme and posters.	Programme Report and Posters posted widely.	Existing Staff	On-going

**Objective 4:** To implement a targeted school-based programme to ensure all young people leaving school are aware, knowledgeable and supportive of the protected area (targeting the 3 closest communities: McNie, Mason River and Douglas Castle)

**Table 13.4: Description of Implementation of Education & Public Awareness Programme Objective 4**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
1. Review existing approach to school interaction and revise to target the nearest schools and McNie All Age in particular with visits at least once a month to McNie All Age. 2. Teacher Training activities and materials (relating Mason River to school curricula).	Implementation Plan  Plan and Report on Annual Activities Club activities and competition implemented	Existing	Timeframe: Year 3 Priority: (1)

<b>Strategies/Activities</b>	<b>Deliverables</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
3.Environmental Club activities/materials. 4. Competitions in the school. 5. Every child in Grade 6 should visit the protected area – have a one day event and conduct several tours and activities through the day.	Plan and Report for annual Grade 6 activities/event (at least 4 schools per annum)		
6. Seek assistance from NEPA to continue to address schools in other neighbouring communities where work had been conducted previously e.g. Kellits High.	Agreement regarding assistance from NEPA	Personnel	Timeframe: Year 3 Priority: (1)

## 7.6 Sustainable Livelihoods Programme

**Goal:** To promote and facilitate sustainable livelihoods in terms of use of lands within the protected area Multiple Use Zone and further afield.

**Objective 1:** To ensure sustainability of activities at the protected area and the Reserve in particular

**Table 14.1: Description of Implementation of Sustainable Livelihoods Programme Objective 1**

<b>Strategies/Activities</b>	<b>Monitoring Indicators</b>	<b>Resources</b>	<b>Timeframe &amp; Priority</b>
1. Conduct an audit of all activities and resource use, in particular – water, waste disposal (sewage and garbage), utilities to assess environmental sustainability and obtain recommendations to improve sustainability.	Audit Report	Consultant (could be done internally)	Timeframe: Year 2 Priority: (2)
2. Implement the audit recommendations in phases – in-expensive first and more costly as funds are sourced	Reports	Existing funds for equipment/ materials etc., possibly training	Timeframe: Years 3 and 4

**Objective 2:** To establish and operate a sustainable visitation programme to the protected area (linked to the sustainable financing and marketing activities).

**Table 14.2: Description of Implementation of Sustainable Livelihoods Programme Objective 2**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
1. Prepare a Business and Marketing Plan to guide the business aspect of visitation by the different target groups	Plan	Consultant and/or Existing Business Development Officer	Timeframe: Year 3 Priority: (2)
2. Implement the plans	Reports	Protected Area Manager with assistance from Business Development Officer	Timeframe: To commence in Year 4
3. Make improvements to the Facilities :- Purchase a 20 feet shipping container and convert to Research Lab and Visitors' Centre	Research Lab and Visitors' Centre established	Funding	Timeframe: Years 4 and 5 Priority: (1)

**Objective 3:** To promote and facilitate sustainable livelihoods and development within the local communities, that are environmentally sustainable and benefits the protection of the Reserve or is not detrimental to this.

**Table 14.3: Description of Implementation of Sustainable Livelihoods Programme Objective 3**

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
Strategy 1: Promote and facilitate sustainable agricultural practices including organic farming			
5. Encourage and facilitate the strengthening of local farmers' organisation with assistance from the SDC and others.	Meeting Attendance Report	Protected Area Manager	Timeframe: Year 3 Priority: (2)
6. Encourage and facilitate e.g. through introduction of resource persons and facilitation of training (including through RADA and Jamaica Organic Growers Association), the development of relevant skills.	Training Activities Report  Reports	Funds for travelling, training workshops  Project funding for demonstration projects	

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
<p>7. Target Douglas Castle farmers on protected area land and establish demonstration projects.</p> <p>8. Encourage and facilitate e.g. through agreements, the local Community Based Organizations (CBOs) to provide goods and services for sale.</p>	<p>Memorandum/Memoranda of Understanding (MOU) with CBOs and individuals for provision of goods and services</p>		
<p><b>Strategy 2:</b> Promote and facilitate sustainable tourism practices including sale of goods e.g. agricultural produce and services e.g. meals, accommodation, by community groups to protected area visitors</p>			
<p>6. Encourage and facilitate the formation and strengthening of local community organisation with assistance from the SDC and Society of Cooperatives.</p> <p>7. Encourage the local CBO(s) by facilitating projects e.g. sourcing trees and helping with beautification of community centre grounds and helping with their proposal writing.</p> <p>8. Encourage and facilitate e.g. through introduction of resource persons and facilitation of training (including at nearby HEART Trust/NTA facility), the development of relevant skills.</p> <p>9. Encourage and facilitate the growth and strengthening of the local CBO(s) by attending meetings and providing technical and other assistance.</p> <p>10. Encourage and facilitate e.g. through agreements with the local CBO(s) to provide goods and services for sale e.g. agricultural produce at Farmers Markets and</p>	<p>Meeting Attendance Report</p> <p>Training Activities Report</p> <p>MOU with CBO(s) and individuals for provision of goods &amp; services</p>	<p>Protected Area Manager</p> <p>Funds for travelling, training workshops</p>	<p>Timeframe: Year 3</p> <p>Some of the provision of goods and services could begin immediately e.g. sweets, roast corn for students, produce and meals for adult groups</p>

Strategies/Activities	Deliverables	Resources	Timeframe & Priority
food/refreshment at the Community Centre associated with monthly tours of Mason River, accommodation for researchers.			