



**Forest Management Plan  
Cockpit Country Forest Reserve and Surrounding Forest Estates  
Jamaica**

**November 2012**

*Adapted from Draft Forest Management Plan for  
Cockpit Country/Martha Brae Watershed Jamaica  
(September 2007, Windsor Research Centre)*

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## List of Acronyms

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CAP	Conservation Action Planning
CBO	Community Based Organisation
CEP	Critical Emphasis (Area)
CO <sub>2</sub>	Carbon Dioxide
EC	Existing Condition
DC	Desired Condition
FD	Forestry Department
FTBG	Fairchild Tropical Botanical Garden
IOJ	Institute of Jamaica
ISCF	Island Special Constabulary Force
JNHT	Jamaica National Heritage Trust
LFMC	Local Forest Management Committee
FMP	Forest Management Plan
NGO	Non-governmental Organization
NEPA	National Environment and Planning Agency
PSP	Permanent Sample Plot
RADA	Rural Agricultural Development Authority
SIA	Special Interest Area
STEA	South Trelawny Environmental Association
SRC	Scientific Research Council
SDC	Social Development Commission
TNC	The Nature Conservancy
TPDCo	Tourism Product Development Company
TSP	Temporary Sample Plot
UWI	University of the West Indies
WMU	Watershed Management Unit

## Executive Summary

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The Forest Act 1996 (8) requires the Forestry Department to prepare “a forest management plan for each forest reserve and each forest management area.” The development of this Forest Management Plan (FMP) is based upon the mission of the Forestry Department, priorities established by law and policy, values of the Jamaican people, legal framework, and the National Forest Management and Conservation Plan. This FMP is consistent with, adheres to, and incorporates by reference the Plans, laws, regulations and policies of the Jamaican government. Over the life of this FMP, additional laws, etc. may be enacted; where applicable, these future plans, policies, etc. may result in changes to the Plan and/or Plan implementation. Additionally, budget constraints and shifting priorities may impact the Forestry Department’s (hereinafter referred to as the Agency) ability to achieve and/or move towards desired conditions.

This Forest Management Plan (hereinafter, referred to as the Plan) is designed for the Cockpit Country Forest Reserve with the surrounding forest estates being grouped with the Cockpit Country Reserve for convenience of management (Figure 1). The Plan was established to guide the sustainable management of the Forest Ecosystem, based on values attendant to the conservation of the forest with its intrinsic biodiversity and water resources, its aesthetic value and potential for carbon storage, recreation, tourism, community interaction, and the delivery of timber and non-timber forest products.

The following categories and special interests define the primary uses of the area covered by the Plan: Forest Cover, Watershed, Forest Products, Forest Research, Caves, Wildlife Habitat, Mineral Development, Community Relations, Enforcement, Public Education, Recreation and Eco-Tourism.

Threats to continuing the above uses in the Plan Area include: Agricultural Squatting; Amateur/Scientific Collection; Forest Conversion; Inappropriate Waste Disposal; Invasive Alien Species; Mining/Quarrying; Natural Disasters; and Poaching.

The existing condition for the uses/resources/special interest area is described in alphabetical order and not by order of importance in the body of this Plan. Some of these conditions include fragmented areas within the closed broadleaf forest reserve, availability of forest products, scientific monitoring, presence of caves and habitats for endemic flora and fauna as well as eco and heritage tours occurring within the Plan Area.

The desired conditions are aligned with the categories identified for the existing conditions and are described in the body of the Plan. This includes restored forest cover, sustainable harvesting of forest products, maintenance of habitats for wildlife, sustainable ecotourism and heritage tourism projects.

Strategic actions to maintain or move toward the desired conditions over the life of the plan are included as part of the Plan. These actions show what should happen in the Plan Area over the life of the Plan. Strategic action items are addressed under the following headings:

- Management & Conservation
- Recreation & Eco-Tourism
- Governance & Administration
- Public Education & Awareness
- Compliance & Enforcement
- Monitoring & Evaluation

## 1.0 Introduction

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The development of this Forest Management Plan (FMP) (hereinafter referred to as the Plan) is based upon the mission of the Forestry Department (hereinafter referred to as the Agency), priorities established by law and policy, values of the Jamaican people, legal framework, and the National Forest Management and Conservation Plan (2001). The plan will be valid over a period of five years and becomes effective on the date on which it has been approved/ signed by the Minister.

One of the important characteristics of the Cockpit Country forest is that it highlights Jamaica's spectacular floral and faunal endemism. *The Nature Conservancy, Parks in Peril Project* revealed that the forests are estimated to contain 1500 vascular plant species, of which 400 are endemic, with many individual hilltops displaying local/niche endemism. Most of Jamaica's 550 native fern species are found in Cockpit Country and relative to its area, more species of ferns are found here than in any other tropical forest in the world.

The diverse vegetation and topography create ideal habitats for all 28 of Jamaica's endemic land birds. The region also has the highest local diversity of amphibians and reptiles on the island, with four new endemic species discovered in 2004. Thirteen of Jamaica's 21 bat species are obligate cave dwellers, including three of the four endemics. Their colonies occupy fewer than 17% of caves documented island-wide and nearly one third of these bat caves are recorded in the environs of Cockpit Country forests, with some sheltering over 50,000 individuals (*Windsor Research Centre 2007*).

This Plan is therefore primarily established to guide the management of the rich biodiversity and the sustainability of the ecology of the Plan Area.

### 1.1 Values

The following list of values is based on discussions with Local Forest Management Committees (LFMCs), other agencies, and interested individuals and groups. It also includes values that were identified in the *Socio-economic Study of the Cockpit Country* (Wright, 2006). These values reflect the Agency's desire to have a plan that results in the sustainable protection of biodiversity in the Plan Area:

- Protect, restore and conserve forest and water resources;
- Manage forest lands for Carbon Dioxide (CO<sub>2</sub>) sequestration and aesthetics;
- Manage selected areas for biodiversity to maintain high levels of endemism;
- Manage selected areas for recreation, tourism and agro-forestry;
- Identify new products and markets for forest resources;
- Produce products such as timber, fuel wood (charcoal), etc. in a sustainable manner;
- Protect Limestone/karst ecosystem;
- Promote sustainable community opportunities.

## *1.2 Location and Map Boundaries*

This Plan covers an area in the northwest portion of Jamaica. The Forest Act of 1996 requires the Department to prepare “a forest management plan for each forest reserve and each forest management area”. For this Plan, surrounding forest estates are grouped with the Cockpit Country Reserve for convenience of management and will be referred to hereafter as the “Plan Area” (Figure 1).

The Plan Area spans six (6) parishes, and four (4) Watershed Management Units (WMU) namely, Martha Brae, Black River, Montego River and Rio Bueno.

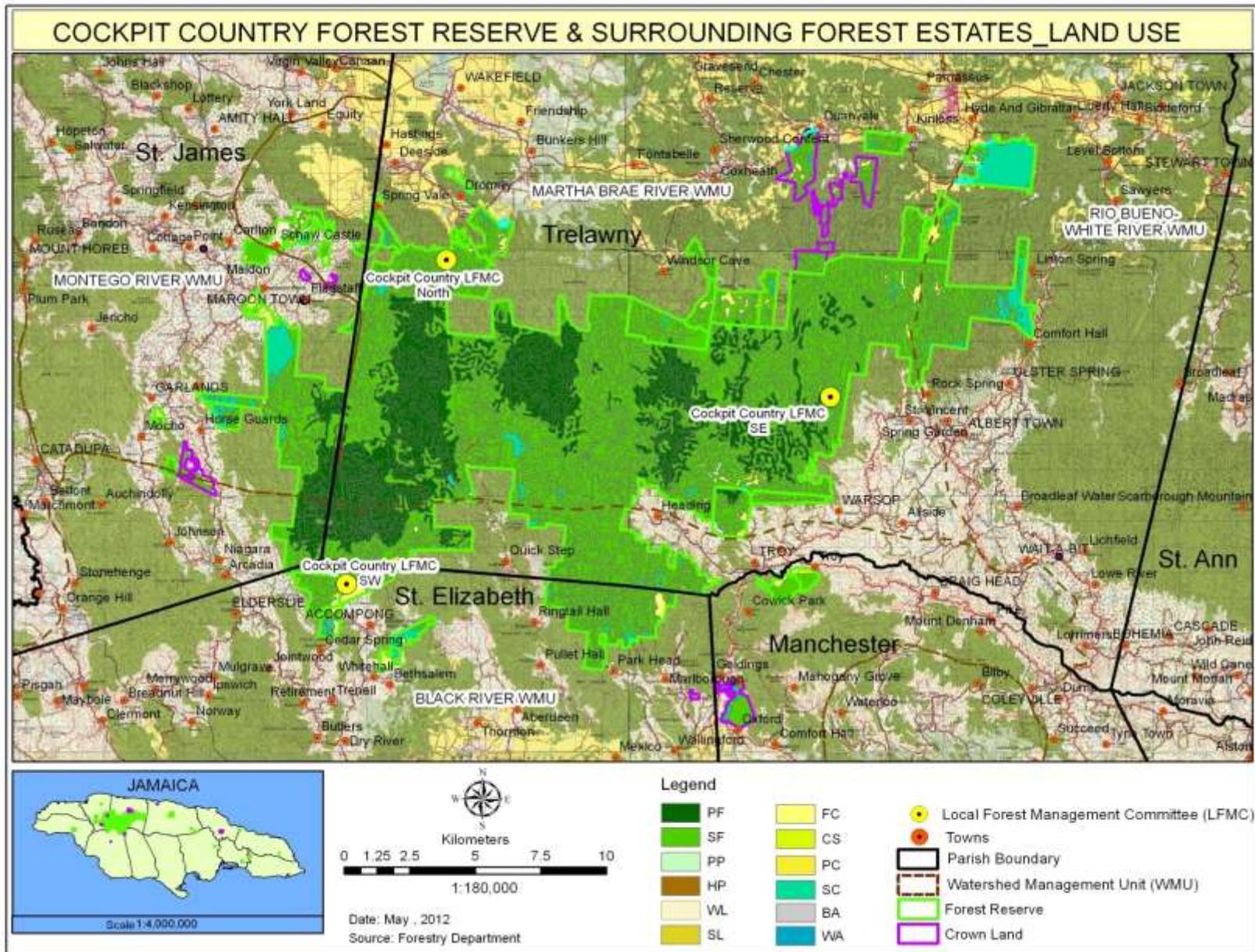


Figure 1: Map of Cockpit Country Forest Reserve and Surrounding Forest Estates

### *1.3 Land Use History*

The Cockpit Country is an important centre of Jamaica's natural and cultural heritage. This area is known globally for its cockpit karst limestone which has given it the appearance of an over-turned egg tray which mostly occupies the parish of Trelawny but also extending into St. James, St. Elizabeth, and Manchester.

Taino Indians were the original inhabitants of the Plan Area. In 1655 when the British fleet arrived in Kingston and defeated the Spaniards, Spanish slaves known as maroons sought protection in the Cockpit Country and settled in Maroon Town and Accompong. They were able to use the caves and rugged terrain for security as they fought the British. The cultural heritage of the Maroons is still present in these communities.

The "heyday" of the sugar plantations was during the last half of the eighteenth century. It was during this period that most of the Great Houses in Trelawny were built. High tariff barriers in Britain lasted for a hundred years and protected Jamaica from competition. The mid nineteenth century saw the demise of the sugar plantations as emancipation took place in 1838, followed by a loss of tariff protection. At this time, many estates were abandoned.

The government of Jamaica had sought to protect forest areas across the island for conservation and ecological purposes, as such several areas were declared as forest reserves. The Cockpit Country was declared as a forest reserve in December 1950.

Much of the vegetation around the perimeter of the area has been cleared in recent years. Valley bottoms are cultivated by subsistence farmers with the primary crop being yams. There has been an increase in encroachment within the forest reserve for charcoal production, goat grazing, marijuana growing, collection of fruits, leaves, and roots for the production of root drinks, and perhaps the largest impact is the cutting of yam sticks. There is also a potential threat regarding development of a bauxite mine in the area.

In recent years, eco and heritage tours have been established in Albert Town, Windsor, Flagstaff and Accompong to allow visitors the opportunity to take day hikes into the area, explore caves, and learn more about the maroon heritage. A socioeconomic assessment of the main uses and users of forest land and forest products conducted in 2006 revealed that for the lands surrounding the cockpit country forest reserve, the land tenure arrangements show predominantly private ownership, family land, occupied rent-free and a small number of rented properties. The predominant activity in the areas surrounding the Cockpit Country Forest Reserve is farming, where yam is the most widely produced crop.

The current land cover within the Plan area is shown in Table 1.

**Table 1: Area of land cover types within the boundaries of the Plan Area**

2001 LAND COVER/USE TYPE			
FOREST		AREA (HA)	%
Closed broadleaf (PF)	Mesic Limestone Forest	6 219.52	22.73%
Disturbed broadleaf (SF)	Modified Mesic Limestone Forest	18 866.04	68.94%
Tall open dry (WL)	Modified Dry Limestone Forest	112.94	0.41%
Carib Pine Plantation (PP)	Caribbean pine - Forest Plantation	21.40	0.08%
Other Species Plantation (HP)	Hardwood Forest Plantations	6.06	0.02%
Short open dry (SL)	Dry Limestone Forest	1.64	0.01%
<b>SUB-TOTAL</b>		<b>25 227.60</b>	<b>92.18 %</b>
MIXED FOREST			
Disturbed Broadleaf Forest & Mixed land Use (SC)	Modified Mesic Limestone Forest & Other Crops	1 348.51	4.93%
Mixed land Use & Disturbed Broadleaf Forest (CS)	Fields & Disturbed Broadleaf forest	101.59	0.37%
<b>SUB-TOTAL</b>		<b>1 450.10</b>	<b>5.30%</b>
NON-FOREST			
Plantations (PC)	Tree crops, and other crops like sugar cane, bananas, citrus and coconuts	11.36	0.04%
Fields (FC)	Herbaceous crops, fallow, cultivated grass/legumes	676.37	2.47%
Water Bodies (WA)	Ponds, Lakes, rivers	1.66	0.01%
Buildings and Other Infrastructure (BA)	Buildings and other constructed features such as airstrips, quarries, etc.	0.29	0.00%
<b>SUB-TOTAL</b>		<b>689.68</b>	<b>2.52%</b>
<b>GRAND TOTAL</b>		<b>26 367.40</b>	<b>100%</b>

Source: Forestry Department 1998

## **2.0 Existing Conditions, Desired Conditions and Threats**

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The Cockpit Country Forest Management Plan has been developed as a guide for the management of the Cockpit Country and for implementation by The Agency in partnership with the Local Forest Management Committees in the Plan Area. Successful implementation of this Plan is based on partnerships with local stakeholders, international partners, government agencies, private sector, as well as civil society groups and donors.

The core of the Plan Area is the Cockpit Country Forest Reserve. It is one of Jamaica's most rugged areas. The Plan Area features eroded limestone, hummocks divided by precipitous ravines, and from the air; resembles an inverted bright green egg carton. Fully covered with natural vegetation, most of the core protected area remains to be explored and is uninhabited. No paved roads penetrate the area (although a rough dirt road cuts across the eastern edge between Clark's Town and Albert Town).

The Plan Area contains the largest and most intact example of moist to wet limestone forest in Jamaica with a high concentration of diversity and endemism. It has been recognized as one of the most globally important sites for plant diversity. The area is known to contain approximately 1,500 vascular plant species, 400 of which are Jamaican endemics. 106 species are found only in the Cockpit Country, including 100 species of flowering plants and fern species. These Cockpit Country endemics include shrubs, trees, vines, herbs, orchids, bromeliads, and species of wild yam. In addition, the Plan Area is the stronghold for many endemic species of fauna and new species continue to be discovered, particularly among invertebrates (e.g. Schurbart et al. 1997, Perez-Gelabert 2001, Rosenberg and Muratov 2005).

The main threats to species' persistence are bauxite mining and limestone quarrying, habitat loss and fragmentation associated with deforestation. These threats remove forest cover that may result in a decrease in native forest biodiversity, and an increase in fragmentation. They may also result in expansion of non-native vegetative species.

Management of the Plan Area will result in reducing or eliminating identified threats and risks, and achieving desired conditions. The existing conditions, desired conditions and threats were identified for the Plan Areas and are listed under these 11 categorical headings:

- Forest Cover
- Watershed
- Forest Products
- Forest Research
- Caves
- Wildlife & Invertebrates
- Mineral Development
- Community Relations
- Public Education
- Recreation and Ecotourism
- Enforcement

A summary of the *Existing Conditions, Desired Conditions and Threats* by these Categories is provided in Table 2

**Table 2: Existing Conditions, Desired Conditions and Threats by Categories**

CATEGORIES	EXISTING CONDITIONS	DESIRED CONDITIONS	THREATS
<b>Forest Cover</b>	<p>Closed Broadleaf (Mesic limestone forest) which:</p> <ul style="list-style-type: none"> <li>• Contains a high level of endemic plants and animals;</li> <li>• Contains the largest intact (unfragmented) block of mesic limestone forest in Jamaica;</li> <li>• It contains pockets of disturbed forest areas</li> <li>• Functions as a reserve for biodiversity;</li> <li>• Results in economic benefits derived from forest products and ecotourism.</li> </ul>	<ul style="list-style-type: none"> <li>• Closed Broadleaf (Mesic limestone) forest which: <ul style="list-style-type: none"> <li>• Maintains forest cover for biodiversity, aesthetics, wildlife, and soil/water conservation.</li> <li>• Has Restored forest cover in fragmented areas through enrichment planting</li> </ul> </li> <li>• Updated forest resource inventory</li> <li>• Reduction in invasive species</li> </ul>	<ul style="list-style-type: none"> <li>• Mining and quarrying;</li> <li>• Forest conversion to agriculture, etc.;</li> <li>• Invasion/spread of non-native species;</li> <li>• Incompatible agricultural practices;</li> <li>• Illegal timber extraction;</li> <li>• Illegal yam stick extraction;</li> <li>• Construction of roads and trails.</li> <li>• Natural hazards</li> <li>• Poor forest health</li> <li>• Climate Change</li> </ul>
<b>Watershed</b>	<p>The Cockpit Country is represented by a Karstic Freshwater Ecosystem. It is:</p> <ul style="list-style-type: none"> <li>• A major(40%) freshwater recharge area for western Jamaica;</li> <li>• One of the few remaining areas with intake karstic watersheds;</li> <li>• Highly specialized ecosystem with endemic freshwater species.</li> <li>• An area which possesses four watershed management units</li> </ul>	<ul style="list-style-type: none"> <li>• Improved forest cover</li> <li>• Improved water quality within the four Watershed Management Units</li> </ul>	<ul style="list-style-type: none"> <li>• Forest cover removal</li> <li>• Bauxite Mining;</li> <li>• Quarrying;</li> <li>• Incompatible agriculture practices;</li> <li>• Inappropriate septic systems;</li> <li>• Uncontrolled harvesting in riparian areas;</li> <li>• Farming;</li> <li>• Housing development;</li> <li>• Agro-chemical runoff and accelerated erosion</li> <li>• Improper waste management.</li> </ul>
<b>Forest Products</b>	<p>Forest products from Cockpit Country vary within the three following Geographical Areas. The following list is not exhaustive but represents the primary products utilized from or within these areas.</p> <p>Southeast Cockpit (Albert Town)</p> <ul style="list-style-type: none"> <li>• Sticks used for yam planting (Yam sticks)</li> <li>• Trees for posts or poles;</li> <li>• Trees for charcoal production which is produced within the forest;</li> <li>• Roots and leaves collected for medicinal purposes, personal use, and sale.</li> </ul>	<ul style="list-style-type: none"> <li>• A protocol for the sustainable harvesting of forest products</li> <li>• A market for existing and alternative agro-forestry products</li> </ul>	<ul style="list-style-type: none"> <li>• Unsustainable harvesting of forest products</li> </ul>

CATEGORIES	EXISTING CONDITIONS	DESIRED CONDITIONS	THREATS
	<p>North Cockpit (Clarks Town)</p> <ul style="list-style-type: none"> <li>• Sticks used for yam planting (yam sticks);</li> <li>• Fruits such as oranges, mangoes, raspberries, breadfruit, and banana, and yams are taken from the forest;</li> <li>• Herbs, roots, bark, and leaves are collected for medicinal, personal use, and sale;</li> <li>• Trees cut for carvings e.g. Cedar;</li> <li>• Wicker collected for crafts and furniture;</li> <li>• Rocks removed for carvings;</li> <li>• plants collected for personal use and sale e.g. Orchids</li> </ul> <p>South West Cockpit (Accompong)</p> <ul style="list-style-type: none"> <li>• Trees are cut for lumber for sale, personal use, fencing, and furniture;</li> <li>• Materials removed for wicker;</li> <li>• Land clearing for farming.</li> </ul>		
<b>Forest Research</b>	<p>Research in the Plan Area have been conducted in the following areas:</p> <ul style="list-style-type: none"> <li>• Scientific Monitoring of floristic and volumetric changes in forest structure using Permanent Sample Plots (PSP) – established by the Department and Department of Life Sciences, UWI;</li> <li>• Native conifer <i>Podocarpus purdieanus</i> propagation (St. Ann yacca);</li> <li>• Medicinal plant propagation;</li> <li>• Developing natural resource valuation methodologies to strengthen community-based conservation of Jamaica's Cockpit Country – Windsor Research Centre</li> <li>• Anthropological and sociological studies regarding forest use and impacts</li> <li>• Botanical expeditions to ferret out/ rediscover native species of flora- FTBG/ The Agency/ IOJ/UWI/ NP</li> </ul>	<ul style="list-style-type: none"> <li>• Management recommendations and decisions are informed by the scientific data derived from research</li> <li>• Increased collaboration with Universities, NGOs and other Agencies in the development of research</li> <li>• A coordinating committee to streamline research efforts</li> </ul>	<ul style="list-style-type: none"> <li>• Illegal Harvesting</li> <li>• Climate Change</li> </ul>
<b>Caves</b>	<p>Caves represent a Special Interest Area (SIA) in the Plan Area, they are a very specialized habitat for fauna and many endemic species of cave dwelling bats, guano-dependent invertebrates, and</p>	<ul style="list-style-type: none"> <li>• Classification and management of caves in accordance with established guidelines</li> </ul>	<ul style="list-style-type: none"> <li>• Amateur/scientific collecting and hunting;</li> <li>• Recreation/Tourism;</li> <li>• Guano extraction;</li> <li>• Changes to cave micro-climate, and loss of bat</li> </ul>

CATEGORIES	EXISTING CONDITIONS	DESIRED CONDITIONS	THREATS
	amphibians; <ul style="list-style-type: none"> <li>Over 200 caves have been documented. 30 are known to be occupied by bats.</li> <li>one third of bat caves in Jamaica are located in Cockpit Country .</li> </ul>		food sources <ul style="list-style-type: none"> <li>Climate change</li> </ul>
<b>Wildlife &amp; Invertebrates</b>	<ul style="list-style-type: none"> <li>14 of 21 endemic amphibians and 1 new species are found in the Plan Area.</li> <li>Two Bird species of special interest are found in Plan Area: the Black and the Yellow billed parrots.               <ul style="list-style-type: none"> <li>The black-billed parrots (90 - 95% of the entire population is in Cockpit Country)</li> <li>yellow billed parrots live in highly specialized ecosystems with trees of large diameter and large horizontal branches</li> </ul> </li> <li>Over 250 of the 1800 known invertebrates are associated with caves. An endangered species protected under the Wildlife Protection Act (1945) is found in the Plan Area; Giant Swallowtail Butterfly.</li> <li>Mammals such as bats may be found in the Plan Area</li> <li>Reptiles in the Plan Area include 15 species of lizards; 6 native, endemic snakes are found in the Cockpit Country including the Jamaican Boa (Yellow Boa).</li> </ul>	<ul style="list-style-type: none"> <li>Sufficient suitable habitat is present to maintain self-sustaining populations of all desirable wildlife and invertebrate species.</li> <li>Forest cover restored, maintained and managed for the provision of suitable habitats for amphibians, birds, invertebrates, mammals and reptiles.</li> </ul>	<ul style="list-style-type: none"> <li>Forest cover removal;</li> <li>Removal of species through hunting, poaching, scientific collection;</li> <li>Recreation/Tourism;</li> <li>Invasive alien species such as Mongoose.</li> <li>Mining and quarrying</li> <li>Guano extraction</li> <li>Domestic animals turned feral (e.g. goats, pigs, cats)</li> <li>Climate Change</li> </ul>
<b>Mineral Development</b>	<ul style="list-style-type: none"> <li>Active quarrying occurs;</li> <li>Past quarrying is evident;</li> <li>A proposal exists for bauxite mining.</li> <li>Active exploration licences exist.</li> </ul>	<ul style="list-style-type: none"> <li>No bauxite mining and/or quarrying occur in the Plan Area especially the Cockpit Country Forest Reserve;</li> </ul>	<ul style="list-style-type: none"> <li>Mining and quarrying in Plan area</li> </ul>
<b>Community Relations</b>	<ul style="list-style-type: none"> <li>Local Forest Management Committee (LFMC) has been established in three groups (North,</li> </ul>	<ul style="list-style-type: none"> <li>Established sustainable groups working in partnerships.</li> </ul>	<ul style="list-style-type: none"> <li>Conflict of interests</li> </ul>

CATEGORIES	EXISTING CONDITIONS	DESIRED CONDITIONS	THREATS
	<p>Southeast and Southwest).</p> <ul style="list-style-type: none"> <li>Several existing NGOs and CBOs</li> </ul>	<ul style="list-style-type: none"> <li>Joint coordinating committee</li> </ul>	
<b>Public Education</b>	<ul style="list-style-type: none"> <li>Community awareness programmes</li> <li>In-school programmes are established;</li> <li>Brochures and posters developed and distributed in the communities.</li> <li>Discovery/ information centre</li> <li>Training activities</li> </ul>	<ul style="list-style-type: none"> <li>A comprehensive education and awareness programme is developed, implemented and maintained.</li> </ul>	<ul style="list-style-type: none"> <li>Inadequate funding</li> <li>Low levels of Literacy</li> <li>Lack of coordination</li> </ul>
<b>Recreation and Eco-tourism</b>	<ul style="list-style-type: none"> <li>Eco and Heritage tours carried out</li> <li>Guided hikes and cave tours are primary attractions;</li> <li>Cabin rentals</li> </ul>	<p>Maintenance of the existing condition with the following additions:</p> <ul style="list-style-type: none"> <li>Products and opportunities that cater to various niches (e.g. cruise ship passengers, backpackers);</li> <li>Expanded cultural heritage opportunities</li> <li>Eco- and Heritage tours carried out in accordance with the GOJ Community tourism policy</li> <li>Carrying capacity established and adhered to</li> </ul>	<ul style="list-style-type: none"> <li>Removal of forest cover</li> <li>Footprints in excess of carrying capacity</li> </ul>
<b>Enforcement</b>	<ul style="list-style-type: none"> <li>The Forest Rangers monitor activities in the Plan Area, in some instances with the assistance of the ISCF, JCF, NEPA, NLA, and RADA.</li> </ul>	<p>Maintenance of the existing condition with the following addition:-</p> <ul style="list-style-type: none"> <li>Increased number of enforcement personnel, capacity and equipment to Plan Area.</li> <li>Increased public knowledge of offences under relevant legislation</li> <li>Readily identifiable (measured, marked and monitored) boundaries of the Plan Area</li> </ul>	<ul style="list-style-type: none"> <li>Difficulty in identifying the forest reserve boundaries readily on the ground.</li> <li>Lack of monitoring equipment</li> </ul>

## 3.0 Management Strategies

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Strategic actions have been identified as courses that will lead toward the desired outcome for the plan area. The actions are classified in accordance to the categories identified in the previous chapter. Details on the actions, timelines and responsibilities are provided in Appendix I however this chapter will provide a summary of the actions to be undertaken.

### 3.1 Strategic Actions & Plans

#### 3.1.1 Forest Cover:

Action areas include but may not be limited to:

- Restore 50 hectares of degraded forest in critical areas within the Plan Area on an annual basis;
- Over the life of the Plan, identify *two* incentive programmes to reduce the degradation of the Cockpit Country biodiversity;
- Collaborate with private landowners to restore 50 hectares of forest cover, on lands adjacent to this Forest Reserve, over the life of the Plan.
- Over the life of the plan, treat (seek to eradicate) 100 hectares of invasive species and reforest with native species within the Plan Area, of which 10 hectares will be within riparian corridors

*Strategic Action #1.1 – 1.2 in the Appendix*

#### 3.1.2 Forest Products:

Action areas include but may not be limited to:

- Encourage Local Groups (i.e. Local Forest Management Committees and schools) to utilize and have access to non timber forest products.
- The Agency will develop a logging plan for mature plantation stands;
- The Agency will develop a plan for the sustainable harvesting and marketing of non-forest product.

*Strategic Action #1.4 in the Appendix*

#### 3.1.3 Forest Research:

Action areas include but may not be limited to:

- Development of alternative sources for yam sticks.
- The Agency will strive to collaborate with Universities, NGOs and other Agencies in the development of research for:
  - Identification and propagation of selected native tree species seedlings;
  - Production of species suitable for yam sticks;
  - Determine growth rate of tree species within Permanent Sample Plots (PSPs);
  - Expand research of the propagation and establishment of native species;

- Determine Wildlife habitat relationships (purpose is to first research to identify what critical wildlife habitat is necessary for a species and thus what needs to be restored);
- Anthropological study of some communities

*Strategic Action #1.3 in the Appendix*

### **3.1.4 Watershed:**

Action areas include but may not be limited to:

- Reforest open and degraded areas that are currently brush fields that need replanting;
- Encourage communities to develop techniques to restore forest cover in critical areas such as abandoned agricultural lands, river banks, and cave entrances within the watershed.
- Select, promote, and disseminate information on appropriate waste management practices in at least one Cockpit Country community;

*Strategic Action #1 and 4 in the Appendix.*

### **3.1.5 Caves:**

Action areas include but may not be limited to:

- Conduct species inventories in at least three caves in the Limestone Forest within the Plan Area, over the life of the Plan.

*Strategic Action #1.3 in the Appendix*

### **3.1.6 Wildlife/Invertebrates:**

Action areas include but may not be limited to:

- Maintaining existing and increase in suitable habitat hectares through reforestation;
- Minimize poaching through enforcement efforts.

*Strategic Action #1.1 – 1.3 in the Appendix*

### **3.1.7 Mineral Development:**

Action areas include but may not be limited to:

- Continue to educate the public about the threats
- Continue to recommend that no bauxite mining and quarrying occur in the Plan Area.

*Strategic Action #4 supports the move toward this desired condition*

### **3.1.8 Community Relations:**

Action areas include but may not be limited to:

- Establish self-sustaining Local Forest Management Committees (LFMCs) and include Partnerships and Community Involvement.

*Strategic Action #3 in the Appendix*

### **3.1.9 Public Education:**

- Continue developing and implementing a public awareness campaign that may include displays at public events, brochures, school programmes, community meetings, and newspaper articles.

*Strategic Action #4 in the Appendix*

### **3.1.10 Recreation and Eco-tourism:**

Develop a recreation plan for the Plan Area, in collaboration with Ministry of Tourism –TPDCO.

*Strategic Action #2 in the Appendix.*

### **3.1.11 Enforcement:**

Action areas include but may not be limited to:

- Within 1 year, identify 3 critical emphasis areas (hot spots) for enforcement of forest legislation;
- Work to enforce forest laws in Cockpit Country.

*Strategic Action #5 in the Appendix*

## 4.0 Laws, Policy, and Administration

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The following laws, policies and plans are hereby incorporated by reference and available at the Agency's Head Office:

1. Forest Act (1996)
2. Forest Regulations (2001)
3. Forest Policy (2001)
4. National Forest Management and Conservation Plan (2001)
5. Strategic Forest Management Plan (2010-2014)
6. The Mining Act (1947)
7. The Mining Regulations (1947)
8. Draft National Minerals Policy 2010-2030 (2011)
9. The Natural Resources Conservation Authority Act (1991)
10. The Natural Resources (Prescribed Areas, Prohibition of Categories of Enterprise, Construction and Development) Order (1996)
11. The Natural Resources Conservation (Permits and Licensing)(Amendment) Regulations (2004)
12. Wildlife Protection Act (1945)
13. Watershed Protection Act (1963)
14. Draft Watersheds Policy (2012)
15. Draft Protected Areas System Master Plan (2012)

### 4.1 Governance and Administration

The Plan will be guided by an annually reviewed co-management agreement between the LFMC and the Agency. The LFMC and the Agency will seek funding in order to conduct activities on the Plan Area in order to govern and administer the plan. Planning, programme and project management, supervision and communication are critical management functions that ensure timely and effective implementation of activities. Administrative functions include procurement, accounting, financial management and reporting, filing and correspondence. Marketing and public relations activities are also essential.

The management of the Cockpit Country Forest Reserve has to be approached through partnerships between government, civil society and the private sector. Key partners include the:-

- ✓ Social Development Commission
- ✓ Tourism Product Development Company
- ✓ Trelawny Parish Development Committee
- ✓ Rural Agricultural Development Agency
- ✓ Jamaica Agricultural Society
- ✓ National Environment and Planning Agency.
- ✓ Private land owners and businesses.

Other partnerships and alliances will be developed with donors and international organizations. *Strategic Action #3 in the Appendix* provides details on the development and strengthening of governance and administrative structures for management of the Reserve.

Over the life of this Plan, additional laws, etc. may be enacted; where applicable, these future Plans, policies, etc. may result in changes to the Plan and/or Plan implementation. Additionally, budget constraints and shifting priorities may impact the Agency's ability to achieve and/or move towards desired conditions.

## 5.0 Monitoring and Evaluation

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The monitoring programme is considered an important element of adaptive management planning. It incorporates the principles of TNC's Conservation Action Planning and the framework identified in the National Forest Management and Conservation Plan (2001). Adaptive management includes: analyzing action and data; learning and changing from results, sharing findings, defining measurable objectives, recognizing uncertainties with outcomes of achieving the objectives, and the need for input from stakeholders.

Monitoring is a major key to discovering what Plan changes (e.g. desired condition, or standards) may be needed in the future. Changes to the monitoring strategy are expected on an annual basis primarily due to fluctuating budgets and unexpected events. Various levels of monitoring (see Strategic Action #6) will be applied and conducted. Monitoring will assess the status of the forest, forest biodiversity; forest management activities and their social and environmental impacts.

The results of monitoring shall be incorporated into the revisions of the management plan. While not publicly divulging all data and information, the LFMCs and The Agency will make summaries of changes through monitoring available to the public as part of the awareness initiatives.

### 5.1 Standards

Standards are technical specifications/instructions that may not be found in law, and/or policy. Standards can be more specific than what is in a law, etc. but cannot be less restrictive. For example, the following standards do not repeat prohibitions from the National Plan or in the Forest Act (1996). They are fixed procedures and must be adhered to. Standards are organized by category (see Existing Conditions and Desired Conditions categories).

#### 5.1.1 Forest Cover Standards

- Retain forested areas where significant heritage/cultural features identified and certified by the JNHT exist.
- Closed Broadleaf Forests designated as protected

#### 5.1.2 Mineral Development Standards

- Roads to access mine sites are constructed to minimize forest disturbance and sedimentation of water.
- Public access on mine roads is prohibited.
- Mine sites are designed to mimic natural gaps in the forest landscape.

#### 5.1.3 Recreation and Ecotourism Standards

- Tour guide size is limited to 8 people (including the tour guide) – This will be implemented in collaboration with TPDCO.

#### **5.1.4 Watershed Standards**

- Retain forested areas where slope gradient is 30 degrees or more and the effective soil depth is below 50 centimeters.
- Retain a 20 metre forested strips along both sides of streams or channels greater than 5 metres wide.
- Retain forested strips on both sides of established roadways - 5 metres forested strips adjacent to rural roads and a 25 metre forested strips adjacent to major roads.

#### **5.1.5 Wildlife Standards**

- Final Standards will be developed and distributed as separate document at a later date. (To be developed in collaboration with NEPA)

#### **5.1.6 Cave Standards**

- Final Standards will be developed and distributed as separate document at a later date.

#### **5.1.7 Forest Product Standards**

- Final Standards will be developed and distributed as separate document at a later date.

## Glossary

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**Desired Condition (DC):** Descriptions of the ecological, economic, and social attributes that characterize or exemplify the desired outcome of land management. Desired conditions can be the maintenance of existing conditions or specific descriptions of the condition of the landscape in the future over the life of the Plan.

**Existing Condition (EC):** A description of what currently prevails/exists. Existing conditions include the current ecological, economic, and social attributes of the Plan Area.

**Hummock:** A hillock or knoll which is described as a piece of forested ground rising above a marsh

**Monitoring and Evaluation:** The monitoring programme is considered an important element of planning. It includes analyzing action and data; learning and changing from results, and sharing findings.

**Plan Area:** The predetermined (mapped) lands covered by the Plan.

**Special Interest Areas (SIAs):** These are special areas across the forest that have unique, unusual, or important flora, fauna, geological, historical, scenic, or recreational attributes. These areas are managed to protect and enhance the values for which they were identified. SIA types include: botanical, caves, ecological, aquatic, zoological, geological traditional cultural, recreational, cultural, and scenic area.

**Standards:** Standards are technical specifications/instructions that may not be found in law, regulation and/or policy. Standards can be more specific than what is in a law, etc. but can NOT be less restrictive.

**Threats:** Threats are human or natural activities that affect the environment in a manner that is undesirable. Human threats can be activities like bauxite mining, invasive species, bird hunting, animals, agriculture practices/activities, squatting, fish poisoning, illegal harvest of forest products, etc.). Natural threats can be natural events on the environment such as hurricanes, animals, etc.

**Values:** Positive attributes/means of assessing resource worth/ perceived benefit defined by a group of persons and are specific to a resource and Plan Area.

## References

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John, Kimberly and Newman, Minke. 2006. Cockpit Country Conservation Action Plan (A Summary)

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Windsor Research Center. 2007. "Draft Forest Management Plan Cockpit Country/Martha Brae Watershed Jamaica". The Nature Conservancy and USAID.

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*Strategic Action Plan for Cockpit Country FMP*

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### Strategic Action #1: Management and Conservation

STRATEGY: To Prevent forest conversion and restore degraded forest in critical areas						
OBJECTIVES:	ACTIONS:	Primary Responsibility	Supporting Responsibility	Resource requirements	Duration	Performance Indicator/s
1.1 Restore forest cover	Restore 50 hectares of degraded forest in critical areas within the Plan Area on an annual basis, based on approved silvicultural plans	THE AGENCY	LFMC	Technical information, Labour	3 Years	Tree replanting plan developed based on the Agency silviculture plans
	Identify two incentive programmes to reduce the degradation of biodiversity;	LFMC/ THE AGENCY	Surrounding Communities	Funding	3 Years	2 incentive programmes developed
	Develop techniques to restore forest in critical areas such as abandoned agricultural lands, river banks, and cave entrances.	THE AGENCY	LFMC Surrounding Communities	Funding	5 Years	Tree planting plan developed and implemented for critical areas
	Collaborate with private landowners to restore 50 hectares of forest cover, on lands adjacent to this Forest Reserve, over the life of the Plan	LFMC/ THE AGENCY	Surrounding Communities	Funding	3 Years	50 hectares replanted under the Private Planting/ Forestry Programme (PPP)
1.2 Mitigate the threat of invasive species	Seek to eradicate 100 hectares of invasive species and reforest with native species,	THE AGENCY	Invasive Species Working Group LFMC NGOs	Funding, Meeting space	5 Years	3 Training sessions held in first year. removal of 60% target area invasive species Ongoing monitoring of the management of invasive species
1.3 Conduct forest research and resource assessments	Gather and analyse biophysical inventory data from TSPs	THE AGENCY	LFMC	Funding, Equipment	5 Years	Updated Biophysical Report and other research findings published
	Expand research on propagation of native species	THE AGENCY	LFMC	Funding, Equipment	5 Years	Updated Biophysical Report and other research findings published
	Re-measure existing PSPs	THE AGENCY	LFMC	Funding, Equipment	5 Years	Updated Biophysical Report and other research findings published
	Conduct species inventories in at least 3 caves per plan period in the Limestone Forest within the Plan Area. Inventory information will be used to identify the cave as needing protection or to be	THE AGENCY	LFMC Jamaican Caves Organization	Funding, technical expertise	5 Years	Inventory record created for 3 caves within plan area

	used as an education or eco-tourism opportunity.					
1.4 Sustainable Management of Forest Products	Encourage Local Groups (i.e. Local Forest Management Committees and schools) access to assess and utilize non timber forest products.	LFMC/ THE AGENCY	Surrounding Communities	Technical information, Funding	2 Years	Sustainable management of agro forestry products being implemented
	Develop a logging plan for mature plantation stands.	THE AGENCY	LFMC	Technical information	3 Years	Logging plan completed and being implemented
	Develop a plan for the sustainable harvesting and marketing of non-timber product	THE AGENCY	LFMC	Technical information	3 Years	Harvesting and marketing plan completed and being implemented
	Social Research: Conduct socio economic research knowledge attitude & practice surveys	THE AGENCY/ SDC	LFMC	Current Information, funding	5 years	One study per plan period.

**Strategic Action #2: Recreation and Eco-tourism**

<b>STRATEGY : Tourism and recreation promoted as an economic opportunity</b>						
<b>OBJECTIVES:</b>	<b>ACTIONS</b>	<b>Primary Responsibility</b>	<b>Supporting Responsibility</b>	<b>Resource requirements</b>	<b>Duration</b>	<b>Performance Indicator/s</b>
2.1 Develop and implement a recreation plan for the Plan Area	Retain consultant for development of the plan and the mobilization of stakeholders	Consultants	LFMC/THE AGENCY	Funds to hire consultants	4 months	Visits are eventful Plan drafted
	Retain consultant to conduct feasibility study on the pursuit of agricultural hiking tours within the Plan Area	Consultants	LFMC/THE AGENCY	Funds to hire consultants	4 months	Paper on study drafted
	Encourage agricultural hiking tour of sites including dasheen, sugar cane, and tree planting research	LFMC/ THE AGENCY	Consultant/ TPDCo.	Funds to hire specialist	To be determined after Feasibility Study	Two tourism project proposals developed and submitted in Year 1
2.2 Create an awareness of the natural, historical and cultural features and develop the capacity of local residents to participate in tourism activities	Create awareness of the resources in the Plan Area Promote the plan area as a forest reserve and the importance of its resources	THE AGENCY/ LFMC	Graphic artist/writer	Funds to contract graphic artist and writer	12 months and ongoing	Signage and other educational tools on site at strategic points

**Strategic Action #3: Governance and Administration**

<b>STRATEGY : Effective governance and administration structures developed and implemented</b>						
<b>OBJECTIVES:</b>	<b>ACTIONS:</b>	<b>Primary Responsibility</b>	<b>Supporting Responsibility</b>	<b>Resource requirements</b>	<b>Duration</b>	<b>Performance Indicator/s</b>
3.1 Develop appropriate management structures and reporting mechanisms for the implementation of the Cockpit Country Management Plan	Develop MOUs	THE AGENCY	LFMC	Ongoing consultation	3months	Signed MOU agreements
	Establish self sustaining Local Forest Management Committees.	THE AGENCY	LFMC	Ongoing consultation	Ongoing	Committees established
	Include Partnerships and Community Involvement.	THE AGENCY	LFMC	Ongoing consultation	Ongoing	Reporting schedule developed
3.2 Assess and strengthen the capacity of the LFMC to effectively participate in the implementation of the Cockpit Country Management Plan	Conduct an institutional self-assessment of the Cockpit Country LFMC	LFMC Consultant	The Agency	14 days consulting	one month	Self-assessment completed, with key capacity needs identified and recommendations made
	Develop plan to improve capacity for Cockpit Country LFMC	LFMC/ Consultant	The Agency	6 days consulting	one month	Plan for capacity development defined and funding being sought
	Implement plan to improve capacity	THE AGENCY/ LFMC	Partners	To be determined	Ongoing	Capacity plan implemented
	Assess capacity built through implementation of capacity plan	LFMC	The Agency		Annual	Capacity strengthened and new needs identified annually
3.3 Monitor and evaluate implementation of the Cockpit Country Management Plan	Monitor and evaluate implementation of Local plan and work plan	THE AGENCY/ LFMC	THE AGENCY/ Evaluator	Ongoing	Annually	Annual evaluation completed and recommendations incorporated into subsequent plans

**Strategic Action # 4: Public Education and Awareness**

<b>Strategy: Increasing and promoting awareness, appreciation, knowledge and skills</b>						
<b>OBJECTIVE:</b>	<b>ACTION</b>	<b>Primary Responsibility</b>	<b>Supporting responsibility</b>	<b>Resource Requirements</b>	<b>Duration</b>	<b>Performance Indicator/s</b>
4.1 Empower the public to adopt a culture of forest resource protection and preservation of the environment for future generations	Collect baseline information regarding the level of knowledge and status of culture/actions	LFMC Consultant	The Agency, Cluster sub-committees		1 Year	
	Identify all target groups	THE AGENCY	LFMC Consultant		1 Year	Target groups identified
	Develop and implement a public education programme	THE AGENCY	LFMC	Funding	1 Year	Public education programme developed and being implemented
	Use popular culture and personalities to deliver message	LFMC	Media Houses/CBOs	Public Relations Department The Agency	5 Years	Advertisements utilized to deliver messages to various target audiences
	Project message linking protection of forest resources on the Reserve to quality of life and economy in the buffer communities	Marketing and public awareness consultant	LFMC/THE AGENCY	Funding	2 Years	Messages developed and activities commenced
	Have annual exchanges with other LFMCs	LFMC	THE AGENCY		Annual	Exchanges held
	Arrange field days with schools and farmer groups	LFMC	THE AGENCY/SDC	Request from groups	Annual	Two field days held per year as per request
	Continue to educate the public about the threats to the Plan Area	THE AGENCY	LFMC NGOs	Funding	Ongoing	At least three Public Consultations over the Plan period.
	Select, promote, and disseminate information on appropriate waste management practices in at least one Cockpit Country community;	LFMC	SRC/NEPA	Funding	2 years	Waste Management programme initiated within one Cockpit country community as determined

**Strategic Action #5: Compliance and Enforcement**

<b>STRATEGY : Compliance with the laws, regulations and policies is promoted and law enforcement capacity strengthened</b>						
<b>OBJECTIVES:</b>	<b>ACTIONS</b>	<b>Primary Responsibility</b>	<b>Supporting Responsibility</b>	<b>Resource requirements</b>	<b>Duration</b>	<b>Performance Indicator/s</b>
5.1 Work to enforce existing laws in Cockpit Country	Identify 3 hot spot (CEP) areas for enforcement of forest legislations	THE AGENCY	NEPA LFMC Law enforcement personnel	THE AGENCY Legal & Enforcement	1 Year	Reduction in the number of enforcement actions undertaken
5.2 Produce a patrolling plan for Plan Area	Develop and implement patrolling plan	THE AGENCY	LFMC	Funding for communication and transportation	1 Year	Patrol plan developed and being implemented by The Agency and the LFMC

**Strategic Action #6: Monitoring and Evaluation**

<b>STRATEGY : Monitoring plan developed and changes in conditions</b>			
<b>Conditions</b>	<b>Indicators</b>	<b>Primary Responsibility</b>	<b>Monitoring Frequency</b>
Forest Cover	<ul style="list-style-type: none"> <li>Total area of gaps as a % of total forest area.</li> <li>Change in diameter at breast height (DBH) size class distribution in permanent sample plots.</li> </ul>	THE AGENCY	Every 5 to 10 years
Watershed	<ul style="list-style-type: none"> <li>Status of vegetation in 20 metre buffer around sampling sites (stream, spring, or sinkhole).</li> <li>Species diversity (TSPs to be set up to monitor diversity)</li> <li>Concentration of nitrates, phosphates in rivers (results from other agencies)</li> </ul>	THE AGENCY	Twice per year- once in wet season once in dry season.
Forest products	<ul style="list-style-type: none"> <li>Hectares/Volume of timber sold</li> <li>Hectares/ Volume of non timber products sold</li> </ul>	THE AGENCY	Annually
Cave Communities	<ul style="list-style-type: none"> <li>Change in relative abundance of characteristic invertebrate and bat species at cave monitoring sites.</li> <li>Abundance of food trees.</li> </ul>	THE AGENCY	Annually
Wildlife and Invertebrates	<p>Giant Swallowtail Butterfly</p> <ul style="list-style-type: none"> <li>Change in relative number of individuals per unit area.</li> </ul> <p>Black-billed and Yellow-billed Parrots</p> <ul style="list-style-type: none"> <li>Change in DBH size class distribution in permanent sample plots.</li> <li>Average block size measured from satellite image or aerial photography.</li> </ul> <p>Jamaican (Yellow) Boa</p> <ul style="list-style-type: none"> <li>Average habitat block size measured from satellite image or aerial photography and number of blocks.</li> </ul>	THE AGENCY (forest biologist/ NEPA)	Annually  Every 5 to 10 years  Every 5 to 10 years
Heritage/Cultural	<ul style="list-style-type: none"> <li>Change in number of heritage/cultural sites inventoried, restored, or developed. (e.g additional maroon sites).</li> </ul>	JNHT/ LFMC	Every 5 years
Mining	<ul style="list-style-type: none"> <li>Change in hectares of mining activity (via the number of licences issued for mining &amp; quarrying &amp; prospecting; patrolling)</li> </ul>	THE AGENCY	Annually
Recreation/Tourism	<ul style="list-style-type: none"> <li>Change in number of recreation/tourism opportunities (via patrolling; licensing systems )</li> </ul>	LFMC/THE AGENCY	Every 5 years
Public Awareness	<ul style="list-style-type: none"> <li>Monitor the awareness levels of the importance of the cockpit country forest reserve and surrounding forests (via use of surveys)</li> </ul>	THE AGENCY	Every 2 years