

**Socio-Economic Baseline Survey of the Portland Bight Protected Area  
(PBPA): Report Part 2 – The Portland Ridge Dry Forest**

Prepared by  
Climate Studies Group, Mona (Jamaica)  
University of the West Indies  
Department of Physics

For:

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## **About this document**

This report will form the last of five deliverables of a consultancy awarded by the Caribbean Coastal Area Management Foundation (C-CAMF) to the Climate Studies Group, Mona (CSGM).

The purpose of the socio-economic survey is to:

1. Gather information on the socio-economic dynamics of forest users.
2. Collect primary data on the practices of individuals who use the forests so as to develop practical measures to reduce their impacts on conservation targets.
3. Estimate the number of individuals who directly and indirectly benefit from the use of the Hellshire Hills and Portland Ridge forests and their resources.
4. Assess variations in income sources and skill sets for different categories of forest users.

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Alethea Medley  
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Karlene Vassiana  
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## 1. INTRODUCTION

The Portland Bight Protected Area (PBPA) is Jamaica's largest protected area at 1,876 km<sup>2</sup> (724 mi<sup>2</sup>). Its 520 km<sup>2</sup> (200 mi<sup>2</sup>) terrestrial area represents 5% of Jamaica's land mass, and its 1356 km<sup>2</sup> (524 mi<sup>2</sup>) of marine space is 48% of the island's shelf (UNEP, 2009). The PBPA is a habitat for birds, iguanas, crocodiles, manatees, marine turtles, fish and approximately 50,000 human beings. It contains two ports, a part of three sugar estates, several fish farms, a bauxite-alumina plant, a feed mill, two power plants and other industrial and commercial entities (C-CAMF, 2012; UNEP, 2009).

The PBPA contains 211 km<sup>2</sup> (81.5 mi<sup>2</sup>) of dry limestone forest of which the Hellshire Hills and Portland Ridge forest reserves accounts for 114 km<sup>2</sup> and 42 km<sup>2</sup> respectively of it. The Portland Ridge is situated on the south coast of Jamaica (see Figure 1). Portland Ridge is an area of relatively intact dry limestone forest on a peninsula that projects into the Caribbean Sea and protects the waters of Portland Bight. Portland Bight is a shallow marine and wetland area with well-developed mangrove woodlands, salt flats, sandy beaches and offshore cays (Levy & Koenig, 2008).

**Figure 1: The Portland Bight Protected Area**



Source: Hunt (2005).

Within the PBPA, Portland Ridge is an important habitat for birds and endemic reptiles. Its natural resources also support the livelihoods of many individuals in the area and provide several ecological services, including protection from natural disasters, to which the area is especially prone (C-CAMF, 2012). Understanding the nature and magnitude of human threats to Portland Ridges' habitats is a crucial first step in ensuring conservation of the area and the local ecosystems that it facilitates.

This study provides a quantitative assessment of the scale and extent of human pressures on the PBPA. The report is based on the results of fieldwork carried out in the Portland Ridge forest and its environs from November 9<sup>th</sup> to 16<sup>th</sup> 2012. The field visits consisted of a focus group session, surveys, interviews and field observations. The study aims to analyse forest use in Portland Ridge in order to support the development of practical measures to conserve the approximately 724 square miles of the PBPA.

The terms of reference for the consultancy under which this study was undertaken were:

- To work with the University of the West Indies, C-CAMF, Forestry Department, Urban Development Corporation (UDC), Jackson's Bay and PWD Gun Clubs to prepare a literature review and summary of what is already known about the activities of forest users in Portland Ridge and collect the information needed to develop and implement strategies to reduce the impacts of forest use.
- To derive an estimate of the number persons who are involved (directly and indirectly), in the use of the Portland Ridge forest.
- To find out what they are doing, where they operate, where they come from and why they operate in the areas.
- To find out what other sources of income they have access to, other skills they have, and whether or not they would be interested in training or other sources of income.
- To interview enforcement officers and land managers to assess the difficulties they face in controlling illegal access to the forests.

A similar socio-economic survey was carried out for the Hellshire Hills. Both studies will be used to inform policy makers in preparation of a final comprehensive management plan for the PBPA and sub-area management plans for Hellshire and Portland Ridge. It is to be noted that the National Environment and Protection Agency (NEPA) signed a delegation instrument with C-CAMF in 2003 for

management of the PBPA. Though the delegation agreement expired in 2008, efforts are currently being made by NEPA to establish new arrangements in the form of a multi-agency Memorandum of Understanding for the PBPA (C-CAMF, 2012). It is also noted that Portland Ridge is forested Crown Land and as such the Forest Department, (National Forestry Agency) has management responsibility for it. The lands have however been leased to the PWD Hunting and Sporting Club and the Jackson's Bay Gun Club, who jointly manage the lands of Portland Ridge.

The report is divided into five sections. Section two provides a review of the literature relating to activities which generally take place in the PBPA and section three gives a brief overview of the survey methodology. Section four presents the main findings from the socio-economic survey and section five provides some conclusions and discusses the implications of the survey results.



## 2. LITERATURE REVIEW

The PBPA represents one of the most important remaining natural areas in Jamaica, in part because of the extensive areas of Jamaican dry forests found in the PBPA. Dry forests within the PBPA cover an area of approximately 210 km<sup>2</sup> and include the Hellshire Hills (114 km<sup>2</sup>), Portland Ridge (42 km<sup>2</sup>) and the Brazilletto Mountains (30 km<sup>2</sup>). The dry forests are so named because of the little rainfall they receive. They are comprised mainly of rugged limestone hills that arise from the karst topography which makes up most of Jamaica.

The dry forests of the PBPA provide a habitat for a number of endemic species. Wilson and Vogel (2000) find that numerous bird, invertebrate and plant species endemic to Jamaica are found in the Hellshire Hills, and that the area supports the last remaining population of the Jamaican iguana *Cyclura colei*. The Jamaican iguana was thought to be extinct by the mid 1900's but was rediscovered in 1970 and again in 1990 (UNEP, 2009). It was listed among the world's 100 most critically endangered species in 2012 (Wilson, 2013). By far, more is known about the biodiversity of the Hellshire Hills due to ongoing research programs undertaken by the University of the West Indies in that region. However, C-CAMF (2013) notes that *the Hellshire and Portland Ridge (and the more disturbed Brazilletto Mountains which lie between them) share many ecological characteristics and most species of concern in the PBPA occur in most or all of the aforementioned regions.*

At least 20 globally threatened species are to be found in the PBPA (CEPF 2010, cited by C-CAMF, 2012). Plant and animal species of concern, particularly for the Portland Ridge dry forest, include the Portland Ridge Land frog *Eleutherodactylus cavernicola*, Blue-tailed Gallywasp *Celestus duquesneyi*, Parker's Banded Sphaero *Spherodactylus parkeri*, Jamaican Skink *Spondylurus fulgidus*, Yellow Boa *Epicrates subflavus* Portland Ridge Trope *Trophidophis stullae* Plain Pigeon *Patagioenas inornata* and others, as well as the possibly extinct Jamaican Least Paruaque *Siphonorhis americana* and the Jackson's Bay blind cave fish (undescribed species) (C-CAM 2013). The Portland Ridge Land frog *Eleutherodactylus cavernicola* is entirely restricted to caves within the Portland Ridge.

Dalling *et al.* (1998) suggest that *tropical dry forests are the most endangered and least understood major tropical ecosystem* and the recommendation of the Forestry Department (2001) is that all of Jamaica's remaining dry forests should be set aside for uses compatible with conservation and forest restoration. Apart from climate hazards, the threat to Jamaica's forests is primarily due to human

activities. Within the PBPA principal forms of human-induced habitat destruction include illegal forest fuelling, hunting, housing developments and limestone mining (see, *inter alia*, Berke & Beatley, 1995; Folks, 2010; Levy & Koenig, n.d.; Tole 2002; and Wilson & Vogel, 2000).

Peterson (1998) finds that the productive potential of forests in Jamaica is being continuously undermined with the rapid removal of trees from many forest ecosystems. According to Peterson (1998), charcoal burning is a significant contributing factor to the removal of forest cover as it involves the total removal of 50 square kilometres of native deciduous and evergreen trees annually without any guarantee of full regeneration. The activity, he contends, is not distributed evenly amongst the island's forest but tends to be concentrated in more accessible forests. Wilson (2013) highlights charcoal burning as a serious threat to the dry forests of the Hellshire Hills and Portland Ridge. Peterson (1998) further suggests that present and anticipated future demand for fuel wood would likely result in Jamaica's forests losing their potential to continue providing multiple economic and ecological benefits for the island.

Folks' (2010) assessment of commercial charcoal and firewood use in Jamaica concurs with Peterson (1998). Folks (2010) suggests that charcoal production is concentrated in accessible areas where the resource base is available and where other opportunities for work are limited. Folks' study presents evidence that food courts along the Hellshire beach generally consume between 5 and 7 pieces of firewood per day (about the size of a bar stool leg) originating from the nearby Hellshire Hills. The quantity of firewood consumed varied in accordance with the number of orders received by the vendor throughout the day. Folks (2010) indicates that among the main types of wood gathered and utilized were 'mangroves, logwood, black jacket and acacia'.

Not many studies have been done with respect to charcoal production in Clarendon. Folks (2010) did some assessment of charcoal production and use in the Rozelle Landsettlement and the Raymonds community. The results show that the nearby Braziletto Mountains created a source of seemingly abundant resources and provided the basis for the continued production by members of the two communities (See Appendix D). At least two burners interviewed had operated in charcoal production for over 25 years, two others for over 12 years and one for over 3 years. The quantity of charcoal produced in these communities was dependent on the number of kilns built for the year and the size of these kilns. The weight of a bag of charcoal was dependent on the type of wood that was used which mainly included Cashaw and Logwood, among other types. UNDP (1988) suggests that the amount of

money earned by the charcoal burners depends on the number of bags that can be produced in a given time period. This is also dependent on the amount of time spent cutting and gathering wood, with most producers aiming to produce 30 bags of charcoal each cycle. Though some burners in the present study indicated no changes in the demand for charcoal over time, at least one indicated increased demand due to the upsurge of food festivals. He notes that one Boston jerk chicken seller may order approximately 70-80 bags of charcoal. Passen and Hesse (1986) show that households, hotels, guest houses and supermarkets were among the primary consumers of charcoal in Jamaica.

Tole's (2002) empirical analysis of habitat loss and anthropogenic disturbance in the Hellshire Hills shows that fuelwood use, population density and household dependency had a consistently strong and positive relationship to forest loss throughout Jamaica. Households situated in constituencies with a higher number of non-working age dependents and population densities and relying primarily on fuelwood/charcoal for their household cooking needs in both 1992 and 1982 had higher rates of deforestation, *ceteris paribus*, than did those with lower values for these variables. The study's other socio-economic variables also indicate a strong contributory role for poverty and population in deforestation on the island. Tole's findings essentially suggest that deprivation, arising from a lack of alternative opportunities for non-forest destructive livelihoods and inadequate incomes, is a significant contributor to deforestation on the island. PIOJ and STATIN (2007) note that, given the environmental implications of charcoal and firewood use, alternative livelihoods should be explored for those directly dependent on the production and sale of charcoal for a living. Furthermore, the organizations postulate that policies should create the supporting environment for the improvement of incomes of regular users to enable the transition to more sustainable alternatives to fuel.

In spite of the PBPA's importance to Jamaica's natural environment, human activities are impacting the forest cover of the area. This study concentrates on the activities of forest users in Portland Ridge and collects information needed to develop and implement strategies to reduce their impacts. The study complements a similar study done for the Hellshire Hills. Both plants and animals alike are at risk due to the human activities. Yet, many of the forest users depend directly or indirectly on the natural resources that the PBPA provides as a source of livelihood. There therefore exists a problem as it relates to preserving the forest without significantly disrupting the life of people that depend on it. *"Striking a balance between the need for people to earn a living and preserving the*

*ecosystem is a most pressing need in the area which is under serious threat from development” (Serju, 2012).*

### 3. METHODOLOGY

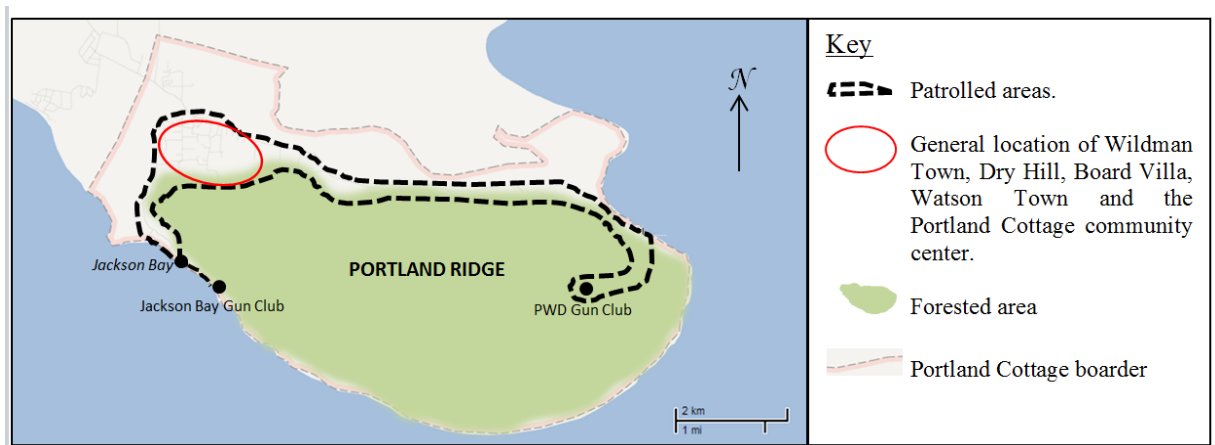
#### 3.1 Sampling Design

For the purpose of this study, a “forest user” is taken to be any individual (or entity) that accesses the Portland Ridge forest and/or utilizes its resources for leisure and/or for economic gains. Though desirable, a sampling frame for such individuals could not be obtained for this study, therefore, a non-probability sampling design, namely snowball sampling, was used. Despite not being probability sampling, snowball sampling was particularly useful in this study as the social group being interviewed included members who were more inclined to hide their identity for legal reasons (see Corbetta, 2003).

The survey design, in part, involved identifying subjects for inclusion in the sample by referrals from other subjects. The process began with a small number of persons who were themselves users of the Portland Ridge forest (the desired requisite). These key individuals were then asked to identify and introduce to the survey team other persons who they knew were also using the area. As the process continued, the number of subjects increased significantly.

In support of the snowballing methodology, the survey team conducted a focus group session with both forest users and community members at the Portland Cottage community centre. The survey team also patrolled along the main roads leading to both the Jackson Bay and PWD gun clubs and interviewed the users seen using the forest between these two points. The Portland Ridges’ northern, eastern and western margins were also monitored and surveyed in order to intercept and interview other forest users along these paths (see Figure 2).

**Figure 2: Sampling Locations**



The participants of the focus group were also interviewed on the first day of the field visits so as to pre-test the questionnaire utilized in the study. The majority of the data was collected on the second field visit when all the known forest users were re-invited to the community centre (or visited at home) to participate in the study (see Table 1).

<b>Table 1: Sampling dates by sampling locations</b>							
<b>Sampling dates</b>	<b>Sampling locations</b>						<b>Total</b>
	<b>Portland Cottage (community centre)</b>	<b>Wildman Town</b>	<b>Dry Hill</b>	<b>Jackson Bay</b>	<b>Board Villa</b>	<b>Watson Town</b>	
<b>November 9, 2012</b>	Pre-test	-	-	-	-	-	-
<b>November 13, 2012</b>	18 (36%)	-	-	-	-	-	<b>18 (36%)</b>
<b>November 16, 2012</b>	1 (2%)	15 (30%)	8 (16%)	4 (8%)	3 (6%)	1 (2%)	<b>32 (64%)</b>
<b>Total</b>	<b>19 (38%)</b>	<b>15 (30%)</b>	<b>8 (16%)</b>	<b>4 (8%)</b>	<b>3 (6%)</b>	<b>1 (2%)</b>	<b>50</b>

### 3.2 Survey Instrument

The socio-economic study of those individuals who use the Portland Ridge forest involved the following:

- a) A mapping exercise using basic mapping techniques.
- b) Discussions with the key forest users which primarily focused on finding out information on the extent of timber related activities and hunting in the forest by different persons.
- c) A socio-economic questionnaire which was designed to obtain information specifically relating to the Terms of reference (see Table 2). Details of the socioeconomic survey instrument, the discussion with the focus group and the interview with a PWD gun club caretaker, Mr Miller, are presented in the Appendices.

### 3.3 Limitations

Ideally, it would have been better if this survey had covered 100% of all persons who use the Portland Ridge forest. Unfortunately, the fieldwork was constrained by limited time and the limited number of enumerators that could be employed. Also, it was felt that despite reassurances that the data collected would be treated confidentially, some individuals were hesitant in divulging information for

fear that the data would be used to identify them. Consequently, information on tree harvesting, charcoal burning and hunting are likely to be under-reported.

In some instances, individuals who were heard using the forest could not be interviewed because the thickness of the forest prevented the team from reaching them. For that reason, though the survey team could hear trees being cut, the persons doing the cutting could not be accessed to be interviewed.

The design adopted for this study has the disadvantage of selecting individuals who are socially most active and most visible. This means that the survey may have underestimated those less active individuals who utilize the area seasonally and/or it may have overlooked those who are more discrete with their practices. Furthermore, there is a risk that the chain of selection may have been channelled along pathways that were too specific. So, if for instance the initial sets of interviewees were charcoal burners, they likely referred only other charcoal burners. In order to avoid these risks, it is generally necessary to impose constraints based on what is already known of the phenomenon being studied (see Corbetta, 2003 for details).

Finally, respondents were asked to recall the amount of individuals that they observed using the forest during the last 12 months. Some inaccuracies are likely to have occurred when questioning elderly individuals about details from activities that happened months ago.

**Table 2: Research questions and methodologies used to address the questions**

<b>Research Question</b>	<b>Research method used to address question</b>
How many people are involved (directly and indirectly) in the use of the Portland Ridge?	<input type="checkbox"/> Questionnaire items 6, 8 and 13. <input type="checkbox"/> Interviews: focus group and PWD gun club.
What activities take place in the Portland Ridge and/or surrounding areas?	<input type="checkbox"/> Questionnaire items 7, 9, 10 and 13. <input type="checkbox"/> Interviews: focus group and PWD gun club. <input type="checkbox"/> Field observations.
Where do individuals operate in the Portland Ridge?	<input type="checkbox"/> Questionnaire item 3. <input type="checkbox"/> Field observations. <input type="checkbox"/> Interviews: focus group and PWD gun club.
Regarding those individuals who use the Portland Ridge, where do they come from and why do they operate in this area?	<input type="checkbox"/> Questionnaire items 4, 5, 7, 8, 11, 12 and 14. <input type="checkbox"/> Interviews: focus group and PWD gun club.
Regarding those individuals who use Portland Ridges' resources for economic gains, what other sources of income do they have?	<input type="checkbox"/> Questionnaire item 15.
For those persons who use the forest, what formal skills/qualifications do they have?	<input type="checkbox"/> Questionnaire item 16.
Would forest users be interested in being re-trained or in other sources of income?	<input type="checkbox"/> Questionnaire item 17.
What are some of the difficulties faced in controlling illegal access to the forests?	<input type="checkbox"/> Field observations.



## 4. SURVEY RESULTS: USERS OF THE PORTLAND RIDGE FOREST

### 4.1 Introduction

A total of 50 users were interviewed for the socio-economic survey of the Portland Ridge dry forest. Each interview lasted about 10 – 15 minutes. The results of the survey are presented as follows:

### 4.2 SOCIO-ECONOMIC SURVEY: An Overview

A significant portion (38%) of the 50 questionnaires completed were administered to forest users while they were gathered at a community center meeting in Portland Cottage to participate in a focus group session on forest use. Of the remaining 31 questionnaires, 15 were completed in the vicinity of Wildman Town and 8 along Dry Hill Road. Only 1 questionnaire was completed in Watson Town (see Table 3 for additional information). Tables 4 to 6 provide some basic features of the individuals surveyed.

Table 3: Locations where interviews were conducted		
Location	Number of Respondents	Proportion of Sample
Portland Cottage (community center)	19	38%
Wildman Town	15	30%
Dry Hill Road	8	16%
Jackson Bay	4	8%
Board Villa	3	6%
Watson Town	1	2%
<b>Total</b>	<b>50</b>	<b>100%</b>

*Source: Fieldwork (2012)*

#### 4.2.1 Age-Sex Distribution

Males accounted for 80% of the 50 respondents (Table 4). Table 4 also shows that the modal age group for both male and female users was 45 to 54 years old; just over a third all individuals surveyed fell in this category. The age distribution of the sample is characteristic of an aging population of forest users. Sixty four percent (64%) of the total sample (32 persons) were older than 45 while only 6% (3 persons) were below the age of 25 years old. If the sample is representative, then the data pattern implies that not many young persons are being recruited to work in the Portland Ridge forest.

<b>Table 4: Age-sex distribution of sample</b>			
<b>Age Group (Years)</b>	<b>Sex</b>		<b>Total</b>
	<b>Male</b>	<b>Female</b>	
<b>18-24</b>	2 (4%)	1 (2%)	3 (6%)
<b>25-34</b>	5 (10%)	1 (2%)	6 (12%)
<b>35-44</b>	8 (16%)	1 (2%)	9 (18%)
<b>45-54</b>	13 (26%)	4 (8%)	17 (34%)
<b>55-64</b>	8 (16%)	2 (4%)	10 (20%)
<b>65 and over</b>	4 (8%)	1 (2%)	5 (10%)
<b>Total</b>	<b>40 (80%)</b>	<b>10 (20%)</b>	<b>50</b>

*Notes: Percentages are based on the total number of completed questionnaires. Source: Fieldwork (2012)*

Table 5 shows that 30 (or 60%) of the 50 respondents reported using the Portland Ridge forest for 10 years or more. Of the 30, 21 are individuals 45 years old or older. Only 6% of the respondents (3 individuals) indicated that they have been using the area for under a year. These relatively new users were mature individuals between the ages of 35 and 64 years old.

<b>Table 5: Length of use of Portland Ridge by age group</b>							
<b>Length of use</b>	<b>Age group</b>						<b>Total</b>
	<b>18-24</b>	<b>25-34</b>	<b>35-44</b>	<b>45-54</b>	<b>55-64</b>	<b>65 and over</b>	
<b>Less than 1 year</b>	-	-	1 (2%)	1 (2%)	1 (2%)	-	3 (6%)
<b>1-3 years</b>	-	2 (4%)	1 (2%)	2 (4%)	1 (2%)	-	6 (12%)
<b>4-6 years</b>	1 (2%)	1 (2%)	-	2 (4%)	-	1 (2%)	5 (10%)
<b>7-10 years</b>	-	1 (2%)	2 (4%)	2 (4%)	1 (2%)	-	6 (12%)
<b>More than 10 years</b>	2 (4%)	2 (4%)	5 (10%)	10 (20%)	7 (14%)	4 (8%)	30 (60%)
<b>Total</b>	<b>3 (6%)</b>	<b>6 (12%)</b>	<b>9 (18%)</b>	<b>17 (34%)</b>	<b>10 (20.0%)</b>	<b>5 (10%)</b>	<b>50</b>

*Notes: Percentages are based on the total number of completed questionnaires. Source: Fieldwork (2012).*

Overall, the survey results imply that the majority of persons who use the Portland Ridge are middle aged males. This inference is consistent with information obtained from the focus group session. The users and residents who were interviewed in the session claimed that the majority of persons who use the Portland Ridge forest are middle age individuals between the ages of 45 and 55 years old. The findings also suggest a declining trend with respect to the number of new persons who have moved into

forest use between 2002 and 2012. This is perhaps a consequence of low demand for forest related products, such as charcoal, over that period (see Folks, 2010).

#### 4.2.2 Skills, education and formal training

The majority of the persons interviewed (54%) indicated that they did not have any sort of skill, training or formal qualification (see Table 6). Only 12% of the users sampled received vocational training and about 4% had been educated up to the secondary level. On the other hand, as much as 30% (15) cited some sort of informal training/experience as their only form of qualification. Consequently, about 84% (42) of the sample had no certified qualification. It is noted that the majority of the persons interviewed are older than 44 years old (born about the time of Jamaica's independence) and so the results may be reflecting the well-known absence of secondary education in the colonial era.

<b>Table 6: Level of skill/training/qualification by age group</b>							
<b>Level of Qualification</b>	<b>Age Group</b>						<b>Total</b>
	<b>18-24</b>	<b>25-34</b>	<b>35-44</b>	<b>45-54</b>	<b>55-64</b>	<b>65 and over</b>	
<b>None</b>	1 (2%)	1 (2%)	4 (8%)	10 (20%)	6 (12%)	5 (10%)	<b>27 (54%)</b>
<b>Informal training</b> (experience, apprenticeship, etc.)	-	3 (6%)	3 (6%)	5 (10%)	4 (8%)	-	<b>15 (30%)</b>
<b>Secondary/High school</b>	1 (2%)	-	-	1 (2%)	-	-	<b>2 (4%)</b>
<b>Vocational training</b>	1 (2%)	2 (4%)	2 (4%)	1 (2%)	-	-	<b>6 (12%)</b>
<b>Total</b>	<b>3 (6.0%)</b>	<b>6 (12.0%)</b>	<b>9 (18%)</b>	<b>17 (34%)</b>	<b>10 (20%)</b>	<b>5 (12%)</b>	<b>50</b>

*Notes: Percentages are based on the total number of completed questionnaires. Source: Fieldwork (2012)*

#### 4.2.3 Physical Health

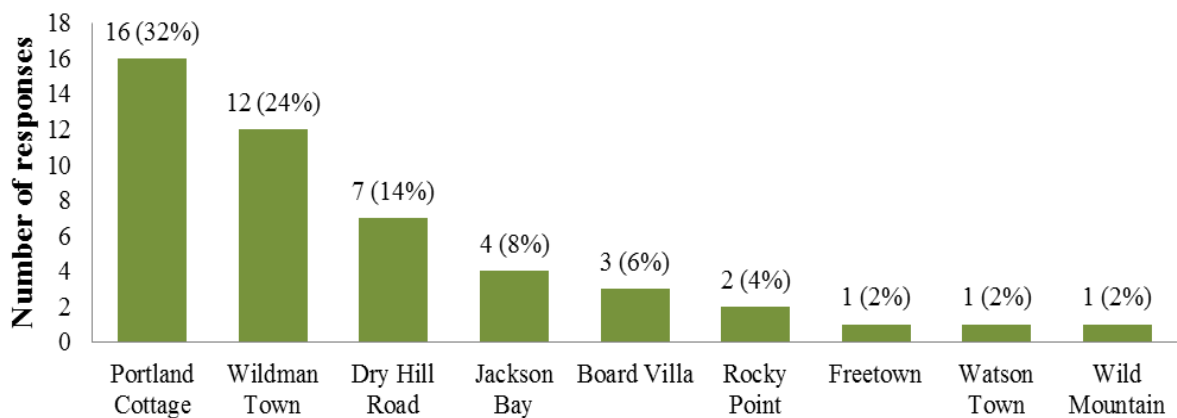
Only 1 individual (a female) indicated that she had some sort of physical challenge. She did not, however, identify the specific type of disability. She was between 45 and 54 years old. The majority of persons who use the Portland Ridge forest therefore appear to be physically healthy individuals.

#### 4.2.4 Users' Origin

Most of the users captured by this survey live in Clarendon, the parish in which the Portland Ridge forest is situated. Figure 3 shows that a large portion of respondents (43%) were from communities bordering the forest i.e. Portland Cottage, Jackson Bay and Rocky Point (16, 4 and 2

persons, respectively). A representative sample would infer that those individuals who use Portland Ridge are mostly from Clarendon, and more specifically are from communities adjoining the forest.

**Figure 3: Origin of Respondents**

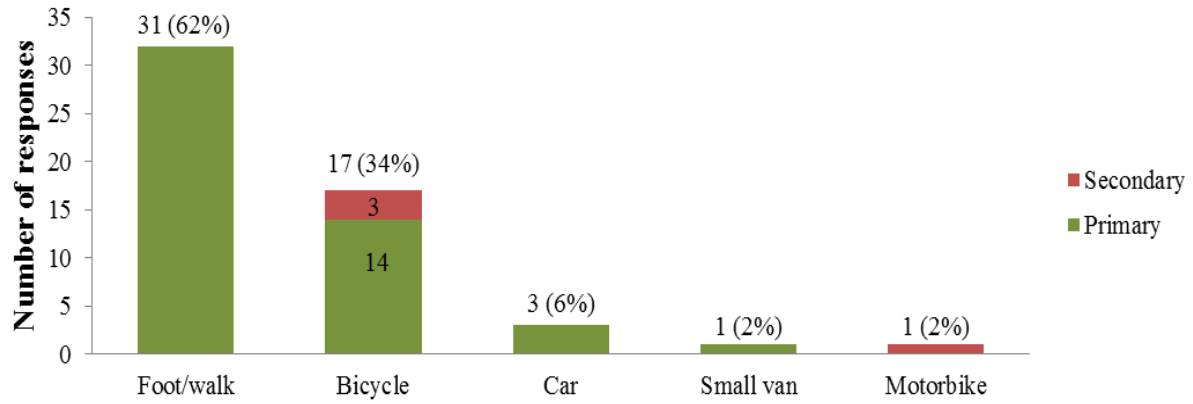


*Notes: Percentages are based on the total number of valid responses, 47. Three (3) persons did not disclose where they came from. Source: Fieldwork (2012).*

Miller (2012), the interviewed caretaker of the PWD Hunting and Sporting Club, notes that most of the persons seen harvesting trees to burn charcoal are from the surrounding communities bordering the Portland Ridge. However, Miller (2012) also notes that the thatch harvesters he observed do not live in the community but come from as far as May Pen in some instances. The participants of the focus group session concur that the majority of individuals who use the forest to harvest thatch are not from the Portland Cottage community.

Regarding modes of transportation used to access the forest, almost all of the respondents (or 96%) indicate that they access Portland Ridge from home by either foot (31 persons) or a bicycle (17 persons). This supports the idea that the majority of respondents lived in close proximity to the forest as discussed above. Only 3 persons saw the need to utilize motor cars to travel to the area and only 1 used a small van (see Figure 4). Of the 4 respondents who used multiple modes of transportation, the primary mode selected by all was foot but the secondary modes varied – 3 used bicycles and one a motorbike

**Figure 4: Modes of transportation used to access the Portland Ridge forest**



*Note: This question allowed for multiple responses and so the total number of responses (53) will differ from the total number of respondents (50). Percentages are based on the total number of respondents, 50.*

### 4.3 SOCIO-ECONOMIC SURVEY: Use and extent of use of the Portland Ridge forest

The results presented in this section focus on the socio-economic benefits of the activities carried out in the Portland Ridge forest and/or along its periphery. Figures 5 to 7 and Tables 7 to 20 provide summaries of use and extent of use of the Portland Ridge forest by the individuals surveyed.

#### 4.3.1 Charcoal burning

When both primary and secondary activities are taken into account, the most common activity which takes place in the Portland Ridge forest and/or along its periphery is charcoal burning. As illustrated in Table 7, charcoal burning accounts for about 25% of all the activities which take place in Portland Ridge (i.e. 22 of the 88 responses). The activity is also practiced by about 44% (22) of the 50 users interviewed. Charcoal burning is listed by 17 respondents as the main reason for accessing the forest, while another 5 persons list it as a secondary activity done occasionally. Both Miller (2012) and the focus group concur that charcoal burning is the most common purpose for accessing the Portland Ridge forest.

**Table 7: Activities taking place in the Portland Ridge forest by priority of use**

Activity	Priority of use					Total
	Primary	Secondary 1	Secondary 2	Secondary 3	Secondary 4	
<b>Burn charcoal</b>	17 (34%)	3 (6%)	1 (2%)	1 (2%)	-	<b>22 (44%)</b>
<b>Farming (crops)</b>	13 (26%)	6 (12%)	1 (2%)	1 (2%)	-	<b>21 (42%)</b>
<b>Graze animals</b>	9 (18%)	3 (6%)	-	-	-	<b>12 (24%)</b>
<b>Fishing</b>	4 (8%)	1 (2%)	2 (4%)	1 (2%)	-	<b>8 (16%)</b>
<b>Harvest thatch</b>	-	5 (10%)	1 (2%)	1 (2%)	-	<b>7 (14%)</b>
<b>Hunt wild pigs</b>	3 (6%)	-	2 (4%)	-	-	<b>5 (10%)</b>
<b>Harvest fence posts</b>	2 (4%)	1 (2%)	1 (2%)	-	-	<b>4 (8%)</b>
<b>Collect firewood</b>	-	4 (8%)	-	-	-	<b>4 (8%)</b>
<b>Harvest lumber</b>	2 (4%)	-	1 (2%)	-	-	<b>3 (6%)</b>
<b>Bird shooting</b>	-	1 (2%)	-	-	-	<b>1 (2%)</b>
<b>Harvest pot sticks</b>	-	-	-	-	1 (2%)	<b>1 (2%)</b>
<b>Total</b>	<b>50 (100%)</b>	<b>24 (48%)</b>	<b>9 (18%)</b>	<b>4 (8%)</b>	<b>1 (2%)</b>	<b>88</b>

*Notes: The question related to the data presented in this table allowed for multiple responses. Hence, the total number of responses (88) will differ from the total number of respondents (50). Percentages are based on the total number of respondents (50). Source: Field work (2012).*

A number of those who indicated charcoal burning as the primary activity undertaken in the forest also indicated that they participated in other activities in the general Portland Ridge area. The most popular supplementary activity carried out by charcoal burners in the forest is farming— this was reported by 4 (or 10.5%) of the principal charcoal burners (Table 8). Harvesting thatch, gathering

firewood and fishing are the other activities commonly reported as secondary activities by the charcoal burners (Table 8). These activities all had 3 responses each.

<b>Table 8: Primary use of Portland Ridge by secondary use</b>						
<b>Secondary use of Portland Ridge</b>	<b>Primary use of Portland Ridge</b>					<b>Total</b>
	<b>Burn charcoal</b>	<b>Farming (crops)</b>	<b>Graze animals</b>	<b>Fishing</b>	<b>Hunt wild pigs</b>	
<b>Burn charcoal</b>	-	3 (7.9%)	2 (5.3%)	-	-	<b>5 (13.2%)</b>
<b>Farming (crops)</b>	4 (10.5%)	-	2 (5.3%)	1 (2.6%)	1 (2.6%)	<b>8 (21.1%)</b>
<b>Graze animals</b>	-	-	-	2 (5.3%)	1 (2.6%)	<b>3 (7.9%)</b>
<b>Fishing</b>	3 (7.9%)	-	1 (2.6%)	-	-	<b>4 (10.5%)</b>
<b>Hunt wild pigs</b>	1 (2.6%)	-	1 (2.6%)	-	-	<b>2 (5.3%)</b>
<b>Harvest thatch</b>	3 (7.9%)	3 (7.9%)	1 (2.6%)	-	-	<b>7 (18.4%)</b>
<b>Collect firewood</b>	3 (7.9%)	1 (2.6%)	-	-	-	<b>4 (10.5%)</b>
<b>Harvest fence posts</b>	1 (2.6%)	1 (2.6%)	-	-	-	<b>2 (5.3%)</b>
<b>Bird shooting</b>	1 (2.6%)	-	-	-	-	<b>1 (2.6%)</b>
<b>Harvest lumber</b>	-	-	-	-	-	<b>1 (2.6%)</b>
<b>Harvest pot sticks</b>	-	1 (2.6%)	1 (2.6%)	-	-	<b>1 (2.6%)</b>
<b>Total</b>	<b>16 (42.1%)</b>	<b>9 (24%)</b>	<b>8 (21.1%)</b>	<b>3 (7.9%)</b>	<b>2 (5.3%)</b>	<b>38</b>

*Notes: Percentages are based on the total number of persons who indicated that they conducted at least two activities in the Portland Ridge forest, 38. Source: Fieldwork (2012).*

The popularity of charcoal burning as the primary activity for forest resources is likely a consequence of the demand for charcoal by commercial and domestic users who are from Clarendon and neighbouring parishes. According to the focus group, food prepared using charcoal “tastes better” and so there is a local demand for the product. One resident claimed that heavily loaded trucks, vans and cars are often seen collecting bags of charcoal and/or thatch which are purchased directly from community members and/or from outsiders who source these products from the Portland Ridge area and sell them. Field observations also supported this claim. While conducting the survey a few individuals and cars were seen transporting forest related products (charcoal, thatch and yam sticks) from the general Portland Ridge area. One individual who was stopped and questioned confirmed that the charcoal that he was seen transporting on his bicycle was purchased in Portland Cottage, a community bordering the Portland Ridge.

#### **4.3.2 Crop Farming**

The survey revealed that crop farming is the most common secondary activity which is carried out in Portland Ridge by the group of forest users interviewed and second most commonly practiced overall. Crop farming accounts for nearly 24% (21 out of 88 responses) of all activities taking place in

the forest by the persons interviewed (Table 7). This finding is supported by both Miller (2012) and the participants of the focus group sessions who assert that the Portland Ridge forest is used by many for agricultural purposes. Among the more popular crops grown are: Cassava, Yam, Potato, Tomato, Pumpkin, Gungo peas, Sorrel and Corn. The participants of the focus group session further revealed that both residents and persons from outside of the communities surrounding the forest cultivate marijuana in some parts of the Portland Ridge. Jointly, farming and charcoal burning constitute nearly half (or 48%; 43 of 88 responses) of all the activities which take place in Portland Ridge by the group of forest users surveyed. Table 8 shows that the most prevalent secondary activity that is carried out in the forest by the respondents who primarily farm is either charcoal burning or thatch harvesting (these options received 3 responses each).

#### **4.3.3 Thatch harvesting**

Thatch harvesting is another commonly practiced activity which is taking place in Portland Ridge forest. Despite only appearing as a secondary activity in Table 8, and accounting for merely 8% (7 of 88 responses) of the all activities overall (see Table 7), harvesting thatch is the second most commonly practiced secondary activity which takes place in the forest according. Harvesting thatch is mostly done by primary charcoal burners or primary farmers in the area (Table 8). Miller (2012) concurs that apart from farming and charcoal burning, harvesting thatch is among the most popular activities that he observes being conducted in Portland Ridge. He explains that this activity is done from early in the mornings to just about midday. Harvesting thatch is also done mostly by individuals outside of the communities according to both Miller and the participants of the focus group session. Thatch is primarily done to make broom house brooms according to their claims.

In terms of the techniques used to gather thatch, the majority (4) of the 7 persons who harvested thatch indicated that they only cut the leaves of the thatch plant when doing so. This, they said, was done in order to allow the plant to recover and reproduce more thatch in the future. Despite the obvious benefits of this approach, 3 users report that they cut the entire plant when harvesting thatch.

#### **4.3.4 Animal grazing and fishing**

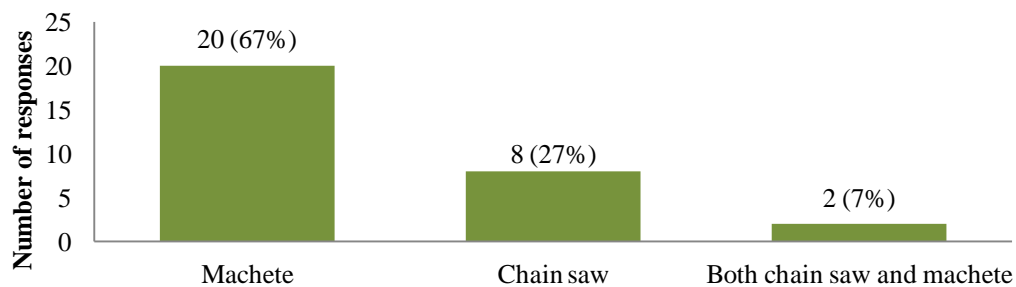
When counted together, animal grazing (done by 12 respondents) and fishing (done by 8) also account for a noteworthy portion (23%) of the activities which take place in Portland Ridge. Fishing activities primarily take place in Jackson Bay however animals (mostly goats and cows) are grazed in the general Portland Ridge area.



#### 4.3.4 Equipment used to cut trees

As depicted in Figure 5, trees in Portland Ridge are generally harvested using machetes; about 20 respondents identified this tool as the main type of equipment used to cut plants in the Portland Ridge forest. Just about 8 respondents indicated that they used chain saws to cut trees while 2 indicated that they used both chain saws and machetes.

**Figure 5: Equipment used to harvest trees in the Portland Ridge forest**



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*Note: Only the 30 respondents who reported that they harvested trees answered this question. Source: Field work (2012).*

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#### 4.3.5 Intensity of Use

The majority of the Portland Ridge is leased to the PWD Hunting and Sporting Club and Jackson's Bay Gun Clubs. Field observations revealed that these clubs have been quite successful in conserving and protecting the inner parts of the forest from indiscriminate use. The PWD gun club has erected a gate about three miles in on the north north-eastern side of to the forest. This gate, along with other measures<sup>1</sup>, seems to be beneficial in reducing unauthorized use and access of the area. Figure 6 below depicts the conditions of the forest along a road which leads from Portland Cottage to the club's headquarters. The distribution and density of the forest's vegetation improves as the club's monitored area is approached. The club has restricted access to charcoal burners and wood harvesters, and ensures that hunters follow laws, and replant trees.

The survey findings revealed that the majority of the forest users interviewed accessed the Portland Ridge forest quite frequently. Seventy six percent (38 persons) of the respondents visited

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<sup>1</sup> PWD gun club also has on-going conservation programmes where they work to protect and restore the forest and manage bird shooting for game (C-CAM, 2012).

Portland Ridge and/or its periphery at least once per week to conduct various activities (see Table 9). Of these 38 “frequent users”, more than half (60%) have been using the area for more than 10 years.

**Figure 6: Vegetation density of an area of the Portland Ridge which is accessible to local residents**

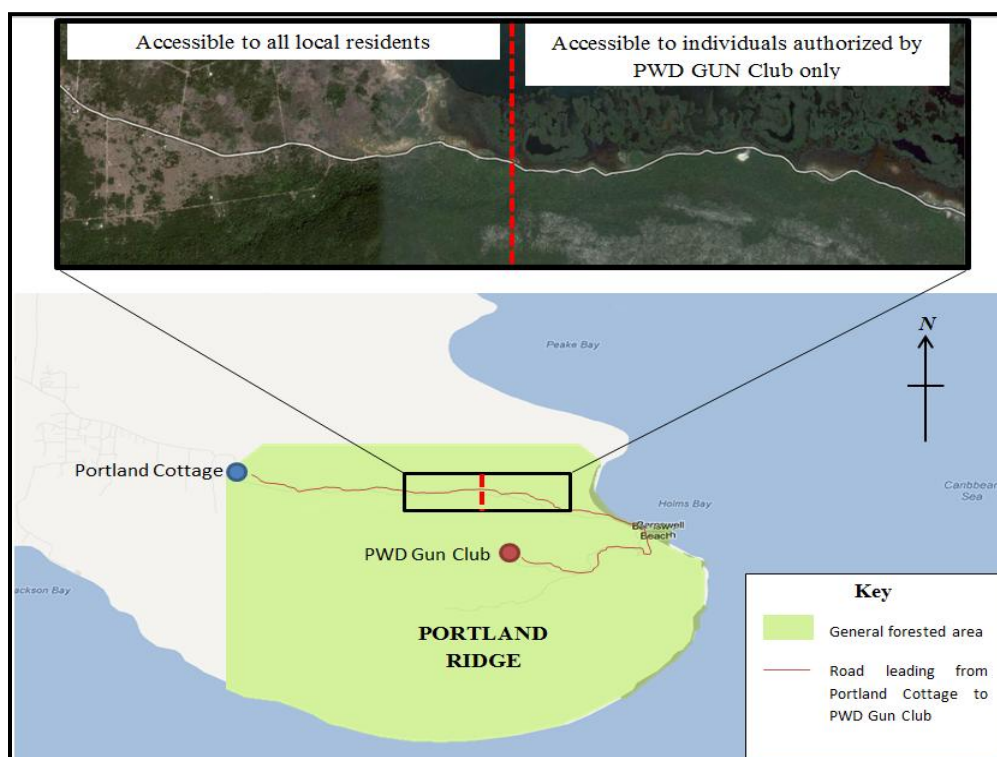


Table 9: Length of use by frequency of use					
Length of use	Frequency of use				Total
	Once per week or more	Once per month or more	Once or twice every 2-3 months	Once every year	
Less than 1 year	1 (2%)	1 (2%)	1 (2%)	-	3 (6%)
1-3 years	3 (6%)	3 (6%)	-	-	6 (12%)
4-6 years	3 (6%)	2 (4%)	-	-	5 (10%)
7-10 years	6 (12%)	-	-	-	6 (12%)
More than 10 years	25 (50%)	3 (6%)	-	2 (4%)	30 (60%)
Total	38 (76%)	9 (18%)	1 (2%)	2 (4%)	50

*Notes: Percentages are based on the number of completed questionnaires. Source: Field work (2012).*

Equally interesting is the distribution of users in regards to depth of penetration. The data presented in Table 10 demonstrate that most of the more frequent users of the Portland Ridge forest avoid operating close to the core of the forest. 22 of the 37 respondents who access the forest once or more per week report that they do not go beyond a mile into the forest – 8 operate close to but not inside the forest while 14 travel as far as 1 mile in. Only 9 (18%) respondents said that they penetrated the forest by more than 3 miles.

<b>Table 10: Depth of penetration by frequency of use</b>					
<b>Depth of penetration</b>	<b>Frequency of use</b>				<b>Total</b>
	<b>Once per week or more</b>	<b>Once per month or more</b>	<b>Once or twice every 2-3 months</b>	<b>Once every year</b>	
<b>Close to but not inside</b>	8 (16.3%)	1 (2.0%)	-	-	<b>9 (18.4%)</b>
<b>Less than 1 mile</b>	14 (28.6%)	4 (8.2%)	-	-	<b>18 (36.7%)</b>
<b>Between 1 and 3 miles</b>	8 (16.3%)	4 (8.2%)	-	1 (2.0%)	<b>13 (26.5%)</b>
<b>More than 3 miles</b>	7 (14.3%)	-	1 (2.0%)	1 (2.0%)	<b>9 (18.4%)</b>
<b>Total</b>	<b>37 (75.5%)</b>	<b>9 (18.4%)</b>	<b>1 (2.0%)</b>	<b>2 (4.1%)</b>	<b>49</b>

*Notes: Percentages are based on the total number of valid responses, 49. Source: Fieldwork (2012).*

The results presented in Table 10 support the information obtained from both the focus group session and Miller (2012). Discussions with the focus group revealed that those forest users who originate from outside of the Portland Cottage community operate on the forest's edge. On the other hand, the group maintained that the more knowledgeable charcoal burners who reside in Portland Cottage harvest wood for charcoal close to but not inside the forest i.e. they operate in nearby communities where the acacia plant is found in abundance. Miller (2012) likewise asserts that most individuals who use Portland Ridge usually operate closer to the edge the forest.

#### **4.3.6 Estimating the number of persons involved**

In deriving an estimate of how many other individuals are involved in the use of the forest (directly or indirectly), each respondent was asked to reveal the number of persons that usually accompany them on their visits to the forest. Of the 50 respondents, 22 (44%) said that they are usually accompanied by other persons on their visits to the area. The number of accompanying individuals ranged from 1 additional person to 12. However, the majority (73%) of these 22 respondents said that they usually go to Portland Ridge with no more than 3 persons on each visit (see Table 11). Table 11 shows that persons who use the forest to burn charcoal or to farm are more likely to do so with

companions compared to those who use the area for other activities. The 22 respondents revealed that there may be as many as 64 accompanying individuals. Mathematically, this equates to about 114 users of Portland Ridge (28 who travel alone, 22 who travel with company, and 64 accompanying those who travel with company).<sup>2</sup>

<b>Table 11: Primary use of forest by number of Accompanying individuals</b>								
Primary use of forest	Number of accompanying individuals							Total
	One	Two	Three	Four	Five	Six	Twelve	
<b>Burn charcoal</b>	4	2	1	1	-	-	1	<b>9</b>
<b>Graze animals</b>	1	-	-	-	-	-	-	<b>1</b>
<b>Farming (crops)</b>	2	1	1	-	-	1	-	<b>5</b>
<b>Hunt wild pigs</b>	1	-	1	1	-	-	-	<b>3</b>
<b>Harvest fence posts</b>	-	1	1	-	-	-	-	<b>2</b>
<b>Fishing</b>	-	-	-	-	2	-	-	<b>2</b>
<b>Total</b>	<b>8</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>22</b>

*Source: Field work (2012).*

In support of the approximations above, crude estimates of the number of forest users were also ascertained from observations provided by each respondent. As illustrated in Table 12, the total number of individuals observed in the forest over the last 12 months, as recalled by the respondents themselves, range from a minimum of 11 persons (4 burning charcoal, 1 hunting, 2 harvesting lumber and 4 doing other activities) to a maximum of 432 (300 burning charcoal, 60 hunting, 30 harvesting lumber and 42 doing other activities). When the estimates were weighted by the number of individuals observed by the number of respondents who reported those specific estimates, and then averaged, the following statistics were derived: on average, about 39 other users were seen burning charcoal over the last 12 months in Portland Ridge while 9 others on average were seen hunting and 14 harvesting lumber (last row of Table 12). A similar weighted average of the totals column in Table 12 works out to be approximately 23 other individuals seen in Portland Ridge overall during the last 12 months.

Considering these estimates, the results imply that as many as 61 persons might be burning charcoal in Portland Ridge (22 respondents and 39 observed). Additionally, it implies that roughly 14 may be using the area for hunting wild pigs (5 respondents and 9 observed) and 17 for harvesting lumber

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<sup>2</sup> One must be cautious when quoting this estimate because i) no sampling frame was available so the degree of statistical error contained in the estimate is unknown, and ii) it is possible that some individuals may be counted more than once.

(3 respondents and 14 observed).<sup>3</sup> Just about 14 other individuals were seen doing other activities (minimum 4 persons, maximum 42) in Portland Ridge. Among the other activities observed are farming, fishing, goat rearing and recreational activities.

**Table 12: Number of other individuals observed by activities observed in Portland Ridge during the last 12 months**

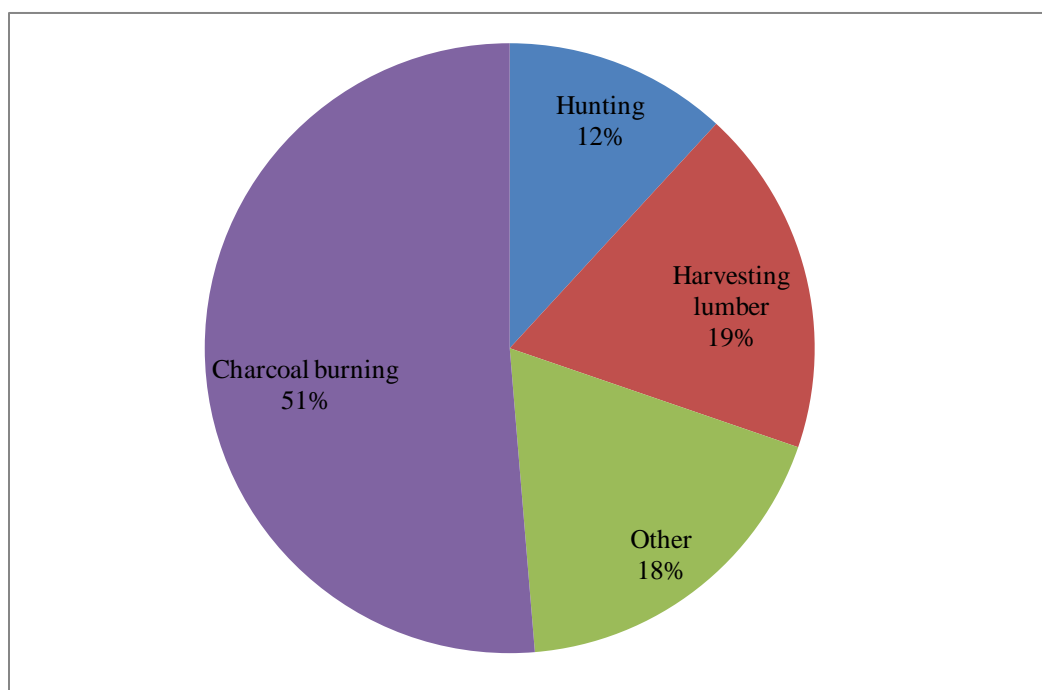
Number of other individuals observed	Activities observed in Portland Ridge during the last 12 months				Total
	Charcoal burning	Hunting	Harvesting Lumber	Other	
1	-	1	-	-	1
2	-	3	1	-	4
3	-	5	-	-	5
4	2	5	3	2	12
5	1	1	-	-	2
6	2	3	-	-	5
7	1	1	-	-	2
8	-	1	-	-	1
10	6	-	2	2	10
12	3	-	-	-	3
14	-	1	-	-	1
15	-	1	-	-	1
16	-	1	-	-	1
20	3	2	2	-	7
23	1	-	-	-	1
24	1	-	1	-	2
25	-	1	1	-	2
30	3	-	1	-	4
42	-	-	-	1	1
50	1	-	-	-	1
52	1	-	-	-	1
60	-	1	-	-	1
100	3	-	-	-	3
150	1	-	-	-	1
300	1	-	-	-	1
<b>Number of respondents</b>	<b>30</b>	<b>27</b>	<b>11</b>	<b>5</b>	<b>73</b>
<b>Average observation</b>	<b>39</b>	<b>9</b>	<b>14</b>	<b>14</b>	<b>23**</b>

*Notes: Cell “ij” represents the number of respondents who observed “i” number of other individuals doing activity “j”. Only appropriate responses that could be analyzed were included in the construction of this table. This question allowed for multiple responses so the number of responses (73) will not necessarily reflect the number of respondents (50). \*\*This figure represents a weighted average of column 1 by column 6.*

<sup>3</sup> “Respondents” refer to the persons who actually participated in the survey while “observed” refers to the average number of persons seen in the area by the respondents as depicted in Table 12.

Relative to all other activities observed, again charcoal burning accounted for the majority of these actions in the Portland Ridge during the last 12 months according to the group of respondents interviewed; as much as 51% of all activities observed in the forest by the respondents related to charcoal burning (see Figure 7). The least popular of the 3 activities presented in Figure 6 was hunting wild pigs.

**Figure 7: Activities taking place in the Portland Ridge forest as observed by the respondents over the past 12 months; Total (average observation) = 76**



*Source: Field work (2012).*

#### **4.3.7 Motives for operating in the Portland Ridge forest**

##### ***Income***

The survey finds that the forest plays a significant role in sustaining the livelihoods of most of the individuals who use it. Forest-related activities (including activities related to fuel, logging, hunting and farming) provide income for approximately 86% of the individuals surveyed. Forest-related activities are also considered to be the primary sources of livelihoods for over half of the interviewees

(see Table 13). The study further reveals that as much as 14% of the 50 respondents use the forest's resources for personal consumption; these individuals do not earn any direct income from the activity itself which is carried out in the forest. A further 32% of the sample (or 16 respondents) generate income from forest related activities to supplement primary livelihoods.

The activities which are carried out in the forest among these individuals are collecting firewood, harvesting thatch and harvesting pot sticks, among other things. From this it may be implied that the resources which are collected from the Portland Ridge are used to support the fishing related activities from which these men earn their primary income.

<b>Table 13: Forest activities constitute main livelihood by forest provide income</b>			
<b>Earnings from forest activities constitute main livelihood</b>	<b>Forest activities provide income</b>		<b>Total</b>
	<b>No</b>	<b>Yes</b>	
<b>Yes</b>	-	27 (54%)	27 (54%)
<b>No</b>	7 (14%)	16 (32%)	23 (46%)
<b>Total</b>	<b>7 (14%)</b>	<b>43 (86%)</b>	<b>50</b>

*Note: Percentages are based on the total number of persons interviewed. Source: Fieldwork (2012).*

<b>Table 14: Activity carried out in the Portland Ridge by socio-economic benefit derived</b>								
<b>Activity</b>	<b>Socio-Economic Benefits</b>							<b>Total</b>
	<b>Sold directly to households</b>	<b>Sold to both households and merchants</b>	<b>Sold some to households and consumes the rest</b>	<b>Sold to merchants only</b>	<b>Sold some to merchants and consumes the rest</b>	<b>For personal use only</b>	<b>Collected for someone</b>	
<b>Charcoal burning</b>	14 (12.2%)	2 (2.4%)	-	2 (9.8%)	1	3	-	22 (26.8%)
<b>Collection of firewood</b>	3 (4.9%)	-	-	-	-	1	-	4 (14.6%)
<b>Farming (crops)</b>	8	-	5 (2.4%)	-	-	5	-	18 (2.4%)
<b>Fishing</b>	4	-	1 (2.4%)	-	-	2	-	7 (2.4%)
<b>Animal grazing</b>	8	-	2 (7.3%)	1 (9.8%)	-	-	1	12 (17.1%)
<b>Fence post harvesting</b>	-	-	-	-	-	4	-	4 (4.9%)
<b>Lumber harvesting</b>	1 (2.4%)	-	-	-	-	2	-	3 (9.8%)
<b>Pot stick harvesting</b>	1 (2.4%)	-	-	-	-	-	-	1 (4.9%)
<b>Thatch harvesting</b>	4 (7.3%)	-	-	-	-	3	-	7 (12.2%)
<b>Bird shooting</b>	-	-	-	-	-	1	-	1 (4.9%)
<b>Boar Hunting</b>	4	-	-	-	-	1	-	5
<b>Total</b>	<b>47 (34.1%)</b>	<b>2 (4.9%)</b>	<b>8 (22.0%)</b>	<b>3</b>	<b>1</b>	<b>22</b>	<b>1 (39.0%)</b>	<b>84</b>

*Notes: This question allowed for multiple answers, hence the total number of responses (84) differs from the total number of respondents (50). Source: Field work (2012).*

The information presented in Table 14 suggests that the majority of resources gathered from the Portland Ridge are either sold directly to households or utilized for personal consumption.

The popularity of charcoal burning as a primary activity is seemingly linked to a vibrant domestic market for the product. Of the 22 respondents who burn charcoal in Portland Ridge, 14 sell the finished product directly to households once it is acquired from the forest (Table 14). A further 4% of the respondents report that the charcoal that they make is sold to merchants who then resell it elsewhere. Only 3 respondents said that they consume all the charcoal that is gathered from the forest.

Table 15 presents information about the main livelihoods of 15 of the 16 respondents who classified income from forest-related activities as supplemental. Generally speaking, the occupations of these respondents are low income and/or labour intensive. In fact, as much as 7 (47%) of the 15 respondents indicated that they would rather be doing something else than continuing in their current occupations or continuing to use the forest.

<b>Table 15: Main livelihoods by preferred livelihood: Supplemental income earners</b>							
<b>Main livelihoods</b>	<b>Preferred livelihood</b>						<b>Total</b>
	<b>None</b>	<b>Construction</b>	<b>Electrician</b>	<b>Farming</b>	<b>Taxi operator</b>	<b>Teaching</b>	
<b>Cane cutter</b>	-	1 (7%)	1 (17%)	1 (7%)	-	-	<b>3 (20%)</b>
<b>Clothes vendor</b>	1 (7%)	-	-	-	-	-	<b>1 (7%)</b>
<b>Construction</b>	3 (20%)	1 (7%)	-	-	-	-	<b>4 (27%)</b>
<b>Fishing</b>	3 (20%)	-	-	1 (7%)	-	-	<b>4 (27%)</b>
<b>Gardener</b>	-	-	-	-	1 (7%)	-	<b>1 (7%)</b>
<b>Shop owner/operator</b>	1 (7%)	-	-	-	-	1 (7%)	<b>2 (13%)</b>
<b>Total</b>	<b>8 (53%)</b>	<b>2 (13%)</b>	<b>1 (7%)</b>	<b>2 (13%)</b>	<b>1 (7%)</b>	<b>1 (7%)</b>	<b>15</b>

*Note:* This table represents those individuals who earn income from forest activities but do not consider these activities to be main livelihoods. Percentages are based on total number of valid responses, 15. One response was omitted because it could not be analysed. Source: Fieldwork (2012).

Table 16 below implies that the preferred livelihood for charcoal burners might actually be construction; of the 17 respondents who access the forest primarily for charcoal, 5 of them would like to work in the construction industry. The majority of the other primary users have no preferred livelihood.



Of the 27 individuals who consider their earnings from forest related activities to be their main sources of their livelihood, as much as 63% (17 individuals) had no alternate source of income; 8 of the 17 also had no preferred livelihood apart from what they were doing in the forest. About 10 of these respondents supplemented the income earned from their forest related activities with earnings from other work such as fishing, cane cutting at the nearby money musk sugar factory, and subsistence occupations (see Table 17).

<b>Table 16: Preferred livelihood by primary use of forest of Portland Ridge</b>								
<b>Preferred livelihood</b>	<b>Primary use of forest</b>							<b>Total</b>
	<b>Burn charcoal</b>	<b>Graze animals</b>	<b>Farming (crops)</b>	<b>Hunt wild pigs</b>	<b>Harvest fence posts</b>	<b>Harvest lumber</b>	<b>Fishing</b>	
<b>None</b>	4 (8%)	6 (12%)	7 (14%)	-	1 (2%)	2 (4%)	3 (6%)	<b>23 (46%)</b>
<b>Any job</b>	-	-	2 (4%)	-	-	-	-	<b>2 (4%)</b>
<b>Construction</b>	5 (10%)	-	3 (6%)	-	-	-	-	<b>8 (16%)</b>
<b>Electrical work</b>	1 (2%)	-	-	1 (2%)	-	-	-	<b>2 (4%)</b>
<b>Entrepreneur</b>	-	-	-	-	-	-	1 (2%)	<b>1 (2%)</b>
<b>Farming</b>	3 (6%)	-	-	2 (4%)	1 (2%)	-	-	<b>6 (12%)</b>
<b>Fishing</b>	-	1 (2%)	-	-	-	-	-	<b>1 (2%)</b>
<b>Cane cutter</b>	-	-	1 (2%)	-	-	-	-	<b>1 (2%)</b>
<b>Hairdressing</b>	-	1 (2%)	-	-	-	-	-	<b>1 (2%)</b>
<b>Taxi operator</b>	1 (2%)	-	-	-	-	-	-	<b>1 (2%)</b>
<b>Handy man (Painting/tiling)</b>	2 (4%)	-	-	-	-	-	-	<b>2 (4%)</b>
<b>Teaching</b>	1 (2%)	-	-	-	-	-	-	<b>1 (2%)</b>
<b>Retail</b>	-	1 (2%)	-	-	-	-	-	<b>1 (2%)</b>
<b>Total</b>	<b>17 (34%)</b>	<b>9 (18%)</b>	<b>13 (26%)</b>	<b>3 (6%)</b>	<b>2 (4%)</b>	<b>2 (4%)</b>	<b>4 (8%)</b>	<b>50</b>

*Source: Fieldwork (2012).*

<b>Table 17: Other livelihoods by preferred livelihood: Primary income earners</b>										
<b>Other livelihoods</b>	<b>Preferred livelihood</b>									<b>Total</b>
	<b>None</b>	<b>Any job</b>	<b>Construction</b>	<b>Electrical work</b>	<b>Entrepreneur</b>	<b>Farming</b>	<b>Fishing</b>	<b>Handy man</b>	<b>Retail</b>	
<b>None</b>	8 (30%)	1 (4%)	2 (7%)	-	1 (4%)	2 (7%)	1 (4%)	2 (7%)	-	<b>17 (63%)</b>
<b>Fishing</b>	1 (4%)	-	1 (4%)	-	-	-	-	-	-	<b>2 (7%)</b>
<b>Fishing/Farming</b>	-	-	-	1 (4%)	-	-	-	-	-	<b>1 (4%)</b>
<b>Landscaping</b>	-	-	2 (7%)	-	-	-	-	-	-	<b>2 (7%)</b>
<b>Cane cutter</b>	1 (4%)	-	-	-	-	1 (4%)	-	-	-	<b>2 (7%)</b>
<b>Domestic helper</b>	-	-	-	-	-	-	-	-	1 (4%)	<b>1 (4%)</b>
<b>Sells detergent)</b>	-	-	-	-	-	1 (4%)	-	-	-	<b>1 (4%)</b>
<b>Sewing</b>	1 (4%)	-	-	-	-	-	-	-	-	<b>1 (4%)</b>
<b>Total</b>	<b>11 (41%)</b>	<b>1 (4%)</b>	<b>5 (19%)</b>	<b>1 (4%)</b>	<b>1 (4%)</b>	<b>4 (15%)</b>	<b>1 (4%)</b>	<b>2 (7%)</b>	<b>1 (4%)</b>	<b>27</b>

*Note: This table represents those individuals who earn income from forest activities and consider these activities to be main livelihoods. Percentages are based on the 27 full time forest workers interviewed. Source: Fieldwork (2012).*

### ***Other Reasons for using the Portland Ridge Forest***

Apart from income, there were several other reasons for using the Portland Ridge forest as highlighted by the respondents. Chief reasons highlighted were proximity to and accessibility of the Portland Ridge (see Table 18).

- a) *Proximity of domicile*: Over 64% of the respondents reported that they lived on the periphery of the forest. There are several economic benefits that could be derived from living close to a forest reserve which has no clear borders or fences. Two of these benefits include: 1) the short distance provides users with the opportunity to access a seemingly free and abundant source of forest related products without detection and as frequently as they like, and 2) it significantly reduces or eliminates production cost for those persons who transport bags of charcoal (or other products) for consumption or sale to close by communities.
- b) *Accessibility*: As much as 34% of the respondents indicated that they use the Portland Ridge because it is accessible: No physical barriers coupled with isolation means that the area is easy to access and hard to monitor.

<b>Table 18: Reasons for using the Portland Ridge as opposed to other areas</b>		
<b>Reason</b>	<b>Responses</b>	<b>Proportion</b>
Near to where I live	32	64%
Ease of access	17	34%
Quality of trees (size)	2	4%
Family tradition	2	4%
Isolation (privacy)	2	4%
Don't know anywhere else to go	2	4%
Quality of trees (species)	2	4%
Other	2	4%
<b>Total</b>	<b>62</b>	

*Note: Percentages are based on the total number of persons interviewed, 50. Source: Fieldwork (2012).*

Among the reasons listed as “Other” was the quality and quantity of trees/wood that are available in the general Portland Cottage area and along the forest’s periphery. More specifically, the Acacia tree, according to the respondents, is not only of the ideal quality for making charcoal, but it is also fast growing and widely available in the general area.

### 4.3.8 Operational hotspots in the Portland Ridge

The majority of charcoal burners who were surveyed said that they only operate on the fringes of the forest where the Acacia tree is relatively abundant; about 13 (or 59%) of the 22 charcoal burners indicated that they conducted their activities no further than a mile inside of the forest (see Table 19). The focus group along with Miller (2012) confirm that the majority of charcoal burners only operate on the fringes of the Portland Ridge.

**Table 19: Depth penetrated to conduct forest activities**

Activity	Depth of penetration				Total
	Close to but not inside	Less than 1 miles	Between 1 and 3 miles	More than 3 miles	
Burn charcoal	2 (4%)	11 (22%)	8 (16%)	1 (2%)	22 (44%)
Collect firewood	-	3 (6%)	1 (2%)	-	4 (8%)
Graze animals	1 (2%)	5 (10%)	3 (6%)	3 (6%)	12 (24%)
Farm crops	7 (%)	7 (14%)	2 (4%)	5 (10%)	21 (42%)
Hunt wild pigs	-	3 (6%)	1 (2%)	1 (2%)	5 (10%)
Harvest fence posts	-	1 (2%)	2 (4%)	1 (2%)	4 (8%)
Harvest lumber	-	-	3 (6%)	-	3 (6%)
Harvest thatch	-	3 (6%)	4 (8%)	-	7 (14%)
Harvest pot sticks	-	-	1 (2%)	-	1 (2%)
Shoot birds	-	1 (2%)	-	-	1 (2%)
<b>Total</b>	<b>10 (20%)</b>	<b>34 (68%)</b>	<b>25 (50%)</b>	<b>11 (22%)</b>	<b>80</b>

*Notes: This question allows for multiple answers, hence the total number of responses (80) differs from the total number of respondents (50). Fishing is omitted from this table. Percentages are based on the sample size, 50. Source: Field work (2012).*

It is also apparent from Table 19 that farming plots are distributed right across the Portland Ridge. Overall, the study suggests that the majority of the activities which take place in the Portland Ridge by the respondents are concentrated along the forests periphery and up to one mile into the forest.

### 4.3.9 Supervision of the Portland Ridge forest

Only 6 of the 50 respondents indicated that they have been confronted or challenged by any government or administrative personnel for using the forest (see Table 20). The authorities who have contacted these respondents are the forestry department and the police.

The focus group revealed that they are not aware of the area being a protected area. They further added that there are no forest rangers protecting Portland Ridge currently. If the sample is representative, then these results imply that only a handful of the users of the Portland Ridge forest may actually know that the area is protected.

<b>Table 20: Confronted by authorities</b>		
<b>Confronted by authorities</b>	<b>Number of responses</b>	<b>Proportion</b>
Yes	6	12%
No	44	88%
<b>Total</b>	<b>50</b>	<b>100%</b>

*Source: Fieldwork (2012).*

## 5 CONCLUSIONS AND SOME IMPLICATIONS

The purpose of this study is to provide a quantitative assessment of how the Portland Ridge forest is utilized. This analysis is a necessary step in the development of practical measures to reduce human impacts on the conservation targets for the Portland Bight Protected Area. The survey reveals critical features of the typical user of the Portland Ridge and the activities they carry out in the area.

The results of this study reveal that the users of the Portland Ridge forest are mainly males, most of who are in their late 40s or older. The majority of users are also largely uneducated, uncertified and unskilled. As such, if economic alternatives are to be proposed as a strategy to curtail environmentally destructive practices in this area, they must be tailored to fit the needs and capabilities of low-skilled elderly individuals.

The analysis reveals that most of the users of Portland Ridge originate from Clarendon, the parish in which the forest is located. Most of the more frequent users come from communities bordering the Portland Ridge forest including Portland Cottage, Wildman Town and Dry Hill. This has implications for where and to whom enforcement and education initiatives should be targeted.

As many as 114 (possibly up to 126) persons may have been benefiting from the wealth of the Portland Ridge forest over the last 12 months. The study estimates that at least 38 persons still access the forest at least once per week to work. About 43 individuals obtain all or part of their income from using the forest to burn charcoal, farm or graze animals and/or gather resources to make fence posts and thatch brooms, among other things. Of these 43 individuals, 17 rely entirely on the income generated from forest related activities to meet their daily needs. Notwithstanding the seemingly small numbers, if forest use is not managed so that it is done in a sustainable manner, such a reliance on the forest will impact the availability and species composition of the plants and animals, leading to inevitable deterioration over time. In proposing management options, it should be borne in mind that tightening forest regulations will also likely impact the economically vulnerable individuals (especially the elderly and the unemployed) who the survey show to be dependent on the area.

Wilson (2013) suggests in a recent article in the Gleaner that tree farming may be a good idea to preserve the forest. Respondents reacted positively to the idea of land being leased through C-CAMF for a plantation.<sup>4</sup> This would be used to sustainably manage and reduce pressure on forest use. It is to be

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<sup>4</sup> A plantation is a place where trees are planted for a specific purpose such as broom and coal production

noted, however, that a previous attempt by C-CAMF to establish a fuelwood plantation failed, allegedly because of sabotage by cattle grazers who perceived it as a threat (Brandon Hay, pers. comm. 2013). Other problems that will have to be overcome are (i) that persons currently have free access to resources in the forest reserve but would have to pay to access wood from a managed plantation (ii) growing trees takes time; and the better (harder) the wood, the slower the growth rate. Wilson (2013) does concede that tree farms, albeit an attractive solution, may not represent a remedy to the immediate crisis at hand. Fortunately several of the species used for charcoal burning grow quickly and coppice easily. Further investigations of the feasibility of sustainable harvest of these species in selected areas are needed.

Community based tourism, is a venture that could be established in the community. Respondents highlighted areas that could be exploited like the caves and forested areas for bird or nature watching e.g. for spotting bats, owls, swallowtail butterflies. The residents expressed interest in being used as tour guides. Another suggestion was that a factory for broom production could be built in the community, which would provide gainful employment for many people from the community.

An economic valuation<sup>5</sup> of the Portland Ridge area is needed so that its exploitation can be guided by sound economic and environmental principles (Wilson, 2013). Two economic valuations have been carried out for PBPA as a whole. An economic valuation should be supported by a mapping of the region's biodiversity. The literature review to support this study did not reveal evidence of any comprehensive survey of flora or fauna for Portland Ridge. This will be necessary information in the preparation of any kind of zoning plan aimed at protecting threatened species and protecting remaining forests.

Finally, the importance of effective monitoring and enforcement cannot be emphasized enough for the Portland Ridge dry forest. While environmental laws (the Forest Act and the Wild Life Protection Act) have long been in place to protect the area from trespassers, it seems that monitoring and enforcement is weak and inadequate. The availability of resources to employ, train and equip rangers may be a constraint, as was identified in the accompanying study of the Hellshire Hills. Partnerships could be formed with the communities surrounding the forest as well as with the Gun Clubs who currently lease the land and who (as suggested by this study) are somewhat effective in policing some sections of the forest. The community residents indicated an interest in being forest rangers and helping to protect and sustainably manage forest use. Studies have shown that there is considerable merit in

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<sup>5</sup> Monetary value of ecosystem services including water and carbon storage, among other things.

engaging the resource user in monitoring and enforcement (see for example Berke and Beatley (1995) or Osborn (1990)).

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## APPENDIX A: Socio-economic and Climate Change Survey Questionnaire

This survey is being conducted by the **Climate Studies Group** of the **University of the West Indies Mona** on the behalf of the **Caribbean Coastal Area Management Foundation (C-CAM)**. We seek to understand how Jamaicans benefit from the use of the Hellshire Hills and/or the Portland Ridge forests and how this use can be made more sustainable. **Your name is not required**. The survey is **voluntary** and all responses are **confidential**. The survey should take approximately **15 minutes** to be completed.

### SECTION I: FOREST USE

1. How long have you been using the *Hellshire Hills or Portland Ridge* area?

1. Less than 1 year ☐  
2. 1-3 years ☐  
3. 4-6 years ☐

4. 7-10 years ☐  
5. More than 10 years ☐  
6. Other (*Specify*) \_\_\_\_\_

2. How often do you visit the area (i.e. *Hellshire Hills/Portland Ridge*)?

1. Once per week or more ☐  
2. Once per month or more ☐  
3. Once or twice every 2-3 months ☐

4. Once every six months ☐  
5. Once every year ☐  
6. Other (*Specify*) \_\_\_\_\_

3. How far into the forest do you usually go?

1. Less than 1 mile into the forest ☐  
2. Between 1 and 3 miles into the forest ☐  
4. Other (*Specify*) \_\_\_\_\_

3. More than 3 miles into the forest ☐  
4. Close to but not inside of the forest ☐

4. From how far do you usually travel to access this forest?

1. Parish: \_\_\_\_\_ 2. Community/district: \_\_\_\_\_ 3. Distance: \_\_\_\_\_

5. How do you usually get to the *Hellshire Hills or Portland Ridge* from your home?

1. On foot/walking ☐  
2. Bicycle ☐  
3. Motorbike ☐

4. Car ☐  
5. Boat ☐  
6. Other (*Specify*) \_\_\_\_\_

7. Truck ☐  
8. Small van ☐

6. Do you usually travel alone on your trips to the forest?

1. Yes ☐ 2. No ☐

a. If no, how many persons usually travel to the forest with you? \_\_\_\_\_

7. What do you mainly do in the forest? (*Identify main use with 'P' and other uses with 'S'*)

1. Collect firewood ☐  
2. Burn charcoal ☐  
3. Graze animals ☐  
4. Bee farming ☐

6. Hunt birds ☐  
7. Hunt ducks ☐  
8. Hunt pigs ☐  
9. Harvest fence post ☐  
15. Gather craft material ☐

10. Harvest lumber ☐  
11. Harvest thatch ☐  
12. Harvest plants: medicinal/orchids? ☐  
13. Harvest pot sticks ☐  
14. Other (*Specify*) \_\_\_\_\_

5. Farming (what type of crops?) \_\_\_\_\_

8. How do you usually benefit from what you do in the forest? (*For ALL options that apply, indicate 1, 2, 3 and/or 4 on the lines provided – see key below for the meaning of these numbers*)

1. Firewood \_\_\_\_\_  
2. Charcoal \_\_\_\_\_  
3. Grazed animals \_\_\_\_\_  
4. Honey \_\_\_\_\_  
5. Crops reaped \_\_\_\_\_

6. Birds \_\_\_\_\_  
7. Ducks \_\_\_\_\_  
8. Pigs \_\_\_\_\_  
9. Fence posts \_\_\_\_\_  
10. Craft materials \_\_\_\_\_

11. Lumber \_\_\_\_\_  
12. Thatch \_\_\_\_\_  
13. Plants: medicinal/orchids \_\_\_\_\_  
14. Pot sticks \_\_\_\_\_  
15. Other (*Specify*) \_\_\_\_\_

[**Key:** 1 = sell to individual    2 = sell to company    3 = collect for someone    4 = use for own purposes]

9. When cutting trees in the forest, do you use a 1. Chain saw ☐ or 2. Machete ☐ 3. Other \_\_\_\_\_

10. When harvesting thatch in the forest, do you cut 1. Only leaves ☐ 2. Whole plants ☐

11. Why do you come to this forest and not go elsewhere?

- |  |  |  |
|--|--|--|
| 1. Easy access <input type="checkbox"/>                      | 4. Near to where you live <input type="checkbox"/> | 7. Isolation ( <i>privacy</i> ) <input type="checkbox"/> |
| 2. Quality of trees: size/species? <input type="checkbox"/>  | 5. Family tradition <input type="checkbox"/>       | 8. Don't know of anywhere else <input type="checkbox"/>  |
| 3. Nobody stops you from getting in <input type="checkbox"/> | 6. Other ( <i>Specify</i> ) _____                  |  |

12. Apart from *Hellshire Hills/Portland Ridge*, do you go to any other area to \_\_\_\_\_ (*activity said in Q7*)? 1. Yes ☐ 2. No ☐

a. If yes, where? \_\_\_\_\_

13. To the best of your knowledge, approximately how many individuals do you see using the *Hellshire Hills/Portland Ridge* forest to do the following activities? (*Within the last 12 months*)

- |                                   |  |
|-----------------------------------|--|
| 1. Cut trees: <i>amount</i> _____ | 3. Burn charcoal: <i>amount</i> _____                            |
| 2. Hunt: <i>amount</i> _____      | 4. Other activities ( <i>Specify</i> ) _____ <i>amount</i> _____ |

## SECTION II: LIVELIHOOD AND TRAINING

14. Is this your main livelihood (*activity highlighted in Q7*)? 1. Yes ☐ 2. No ☐

15. What other livelihoods do you have? \_\_\_\_\_

16. Do you have any formal skill, training or qualification? 1. Yes ☐ 2. No ☐

- a. If yes, in what area(s) \_\_\_\_\_
- b. Level of qualification(s) \_\_\_\_\_

17. Is there any other livelihood/activity that you would rather be doing (*compared to your main livelihood highlighted in either Q14 or Q15*)? 1. Yes ☐ 2. No ☐

a. If yes, what? \_\_\_\_\_

18. On any of your visits to this forest, have you ever been confronted or challenged by any government official (*Forestry Department, Forest Ranger, Police, etc*)? 1. Yes ☐ 2. No ☐

- a. If yes, by whom? \_\_\_\_\_
- b. How do you feel about it? \_\_\_\_\_

## SECTION III: CLIMATE CHANGE

19. Are you aware of the term "Climate Change"? 1. Yes ☐ from where? \_\_\_\_\_ 2. No ☐

- a. If yes, please explain your understanding of the term \_\_\_\_\_
- \_\_\_\_\_

20. In your opinion has Climate Change had any impact on the forest? 1. Yes ☐ 2. No ☐

- a. If yes, how? \_\_\_\_\_
- \_\_\_\_\_

21. For the *Hellshire Hills/Portland Ridge*, have you noticed a change in any of the following:

	Increased	Decreased	No change	Comments
1. Number of large trees				
2. Type of trees available				
3. Closed forest canopy (shaded areas)				
4. New plants in the area				
5. Number of wild pigs				
6. Number of birds				
7. Daytime temperatures				
8. Night-time temperatures				
9. Amount of rainfall				
10. Availability of roots, flowers & craft materials				
11. Other ( <i>Specify</i> )				

22. Is your “effort” in the forest getting harder in any way because of the change(s) you have noticed?

1. Yes ☐ 2. No ☐ 3. Not sure ☐

a. If yes, what do you think is the cause of this? \_\_\_\_\_

23. Do you think you will continue using the forest for the next five years?

1. Yes ☐ 2. No ☐

a. State why \_\_\_\_\_

#### SECTION IV: DEMOGRAPHY

24. To which age group do you belong?

1. Under 18 ☐ 3. 25 – 34 ☐ 5. 45 – 54 ☐ 5. 65 and over ☐  
2. 18-24 ☐ 4. 35 – 44 ☐ 6. 55 – 64 ☐

25. Sex? (*observe and record*) 1. Male ☐ 2. Female ☐

26. Do you have any disabilities? 1. Yes ☐ 2. No ☐ If yes, please list \_\_\_\_\_



**End of interview. Thank you for your time!**



## **APPENDIX B: Summary of the Interview with Mr. Miller, Caretaker of the PWD Hunting and Sporting Club**

### **1. What are the general activities that you observe in the Portland Ridge forest and by whom?**

- People use the 3 mile boundary outside of the club forest for farming (outside the gate) and for harvesting thatch.
- People from the community mostly harvest trees to burn charcoal and they operate on private land. This activity happens beyond the gate. There is no coal burning inside the forest per say.
- As for thatch, about 8 or 9 men and women come every day in a little pickup to harvest the thatch for broomsticks. They come early morning and leave by midday. The people who cut the thatch use the whole leaves and the branches of tree, by cutting them with chain saws and machetes. They don't live in the community, they come from as far as May Pen
- Pigs are hunted beyond the gate.
- Fishermen use the beaches in the district; [Jackson bay and Rocky Point].

### **2. Do you notice any changes in the number of large trees?**

There are more large trees. It is a heavily shaded area because of tropical storm Sandy and also people who use the club plant a lot of trees.

### **3. What do you understand from the term climate change?** Rain only fall when depression build up. The residents of the community used to be able to predict the seasons. Days gone by people used to use fireside and have to pack up when May is coming. When rain fell, it used to fall for 13 days. There are warmer days and nights than years gone by.

## **APPENDIX C: Summary of Interview conducted with Focus Group in Portland Cottage on Friday November 9, 2012**

The following summary is a collection of responses gathered by the Climate Studies Group in a focus group session with eleven (11) residents from the Portland Cottage community on forest use and the socioeconomic activity of the area.

### **1. How is the forest used by the Portland Cottage community?**

- The forest is used mainly for agricultural purposes; harvesting of trees for coal and broom production. Both residents and outside persons cultivate Gungo peas, tomato; cassava, pumpkin and marijuana in the forest.<sup>6</sup>
- Acacia is the plant used for coal production by knowledgeable coal burners. It is a fast growing plant species, taking two years to fully mature for harvesting. It grows wildlly in the district of Portland Cottage. Coal production is a process that takes 4 days.
- Wild boars are hunted for consumption. They have a taste similar to pork and are perceived by the respondents to be of higher nutritional value, due to their diet of berries.
- One respondent noted that near to Christmas time, more trees are logged in the area for coal production by the young people from Portland Cottage because they want “money to spend for the upcoming Christmas season”. Therefore in a very direct way, employment would reduce pressure on forest use.

### **2. How far do they go into the forest?** Forest users (from outside of the community) who harvest the trees for broom and coal production, operate at the lower areas of the forest. The more knowledgeable coal burners from within the community harvest wood for coal from anywhere in the community, where the kasha plant can be found. The respondents felt that the demand for coal is due to not only obvious reasons but because food prepared on a coal stove is better tasting.

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<sup>6</sup> The term forest is defined by residents to not only include traditional definitions but also extends to areas of abandoned lands where vegetation grows wildlly.

**3. How old are the forest users and how often do they visit the forest?**

They are middle aged (45-55 years) and visit the forest between 4 and 5a.m. in the morning. They don't come at any particular day of the work week. [The respondents noted that thatch harvesters from outside the community use the forest much more frequently than those living inside the community].

**4. Who oversees use of the forest?** Currently there are no forest rangers protecting the area from human disturbance.

**5. Why do people use the forest?** A lack of livelihood options coupled with a robust market for coal and broom products are the key socioeconomic conditions driving internal and external indiscriminate logging of wood. [The respondents claimed that they have witnessed an increase in forest use – logging for coal and broom production – since the year 2000 due to massive unemployment.]

**6. What are the main sources of income for residents of the Portland Cottage community?**

Fishing, charcoal burning and agriculture are the main sources of income in the community. Some persons work at the Monymusk sugar cane factory.

**7. What could be done to address the high unemployment rate, especially among the youth in the community?**

- The youth of the community are generally unwilling to “get their hands dirty” in agriculture and are more “quick profit seeking”. Therefore, HEART training programmes could enlist about 50 young people from the community per year in programmes like welding, building construction, electrician and plumbing work to address unemployment. This would provide them with certification which could secure opportunities for a steady income, reduce their forest use and reduce petty theft within the community.



**8. How do you propose organizations such as C-CAM improve the lives of people within the community?**

- Community based tourism, is a venture that could be established in the community. Areas that could be exploited include the caves and forested areas for watching the birds, owls and swallowtail butterflies.
- A factory for broom production could be built in the community, which would provide gainful employment for many people from the community.
- [The residents expressed a strong interest in being recruited as tour guides for any such venture. Community residents also indicated interest in being forest rangers to protect and sustainably manage forest use. The respondents reacted positively to the idea of land that C-CAM could lease for a plantation.<sup>7</sup> This could be used to also sustainably manage and reduce pressure on forest use].

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<sup>7</sup> A plantation is a place where trees are planted for a specific purpose i.e. broom and coal production.

**APPENDIX D: Summary of burners of Rozelle Landsettlement and Raymonds community and their production of charcoal. Source: Folks (2010).**

**Table 21: Summary of burners of Rozelle Landsettlement and their production of charcoal**

	Number of years burning charcoal	Number of kiln for the year	Average number of bags of charcoal per kiln	Main consumers	Current P/price
Burner 1	6yrs – Part-time	4	15-25	Community Retailers	400/R 350/W
Burner 2	3yrs - Part-time	4	30-40	Wholesalers Traders and Truckmen	400
Burner 3	25 yrs - Part-time	2	34	Wholesalers Traders and Truckmen	400/R 300/W
Burner 4	15yrs - Part-time	3	34	Wholesalers Traders and Truckmen	550/R 400/W
Burner 5	30 yrs – Full-time	10	100-120	Community Retailers	500/R 400/W
Burner 6	12 yrs - Part-time	4-5	70-80	Market vendors and Households	400/R 350/W
<i>Notes:</i> W- whole price and R – retail price, source: Folks (2010)					

**Table 22: Summary of burners of Raymonds community and their production of charcoal**

	Number of years burning charcoal	Number of kiln for the year	Average number of bags of charcoal per kiln	Main consumers	Current Price (\$)
Burner 1	24 yrs –Full-time	8	15-35	Hotels	400/R 350/W
Burner 2	5 yrs - Part-time	3	15-20	Wholesaler and Truckmen	500/R 400/W
Burner 3	10 yrs – Full time	8	30-40	n/a	400/R 350/W
Burner 4	4 yrs – Part-time	4	20-40	Community Retailers	400/R
<i>Notes:</i> W- whole price and R – retail price, source: Folks (2010)					