

Enhancing the capacity for management of dry forests in the Portland Bight Protected Area, Jamaica funded by the European Union – 2021 to 2024

Project Description

Pre-project situation in the Portland Bight Protected Area

Tropical and subtropical dry forests are among the most threatened ecosystems in the world (e.g. Miles *et al.* 2006). Forestry Department (2001) has recommended that all remaining dry forests island wide should be set aside for uses compatible with conservation and forest restoration. Similar recommendations have been included in many other national planning documents (e.g. NEPA 2016).

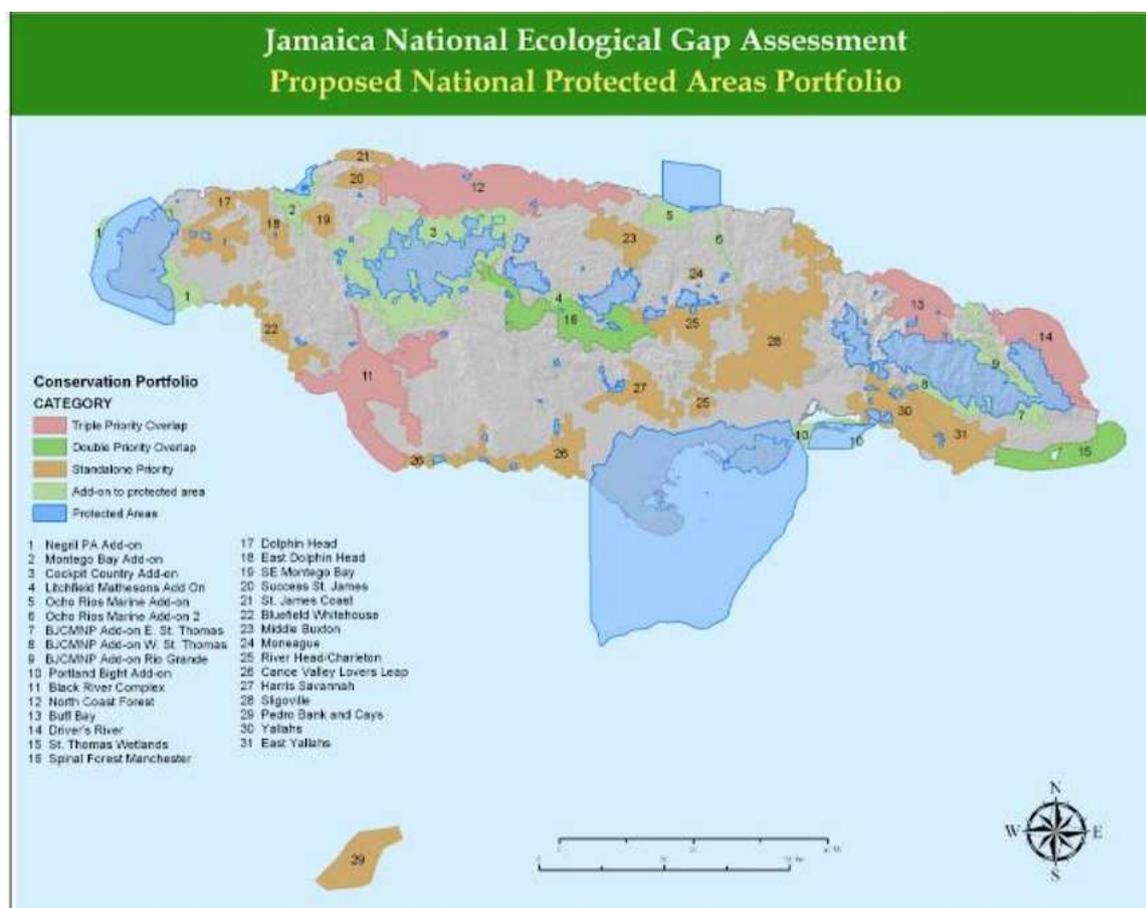


Figure 1: Map of the protected areas of Jamaica

The Portland Bight Protected Area is the largest protected area in Jamaica (Figure 1). It was established in 1999. It includes 210 km² of Jamaican dry forests (also classified as subtropical dry forests), in several areas – Hellshire Hills, Goat Islands, Portland Ridge, Braziletto Mountains (and the adjacent Harris Savannah), Kemps Hill and the Portland Bight Cays (Figure 2). It is managed on behalf of the National Environment and Planning Agency by Caribbean Coastal Area Management Foundation, in partnership with the Urban Development Corporation, Forestry Department and the National Fisheries Authority. It includes two Forest Reserves (Hellshire Hills and Peake Bay).

Each of the dry forest areas supports a slightly different flora, probably because of differences in rainfall and topography (Loveless and Asprey 1957). They provide habitat for several species that are critically endangered according to the World Conservation Union (IUCN) including the last remaining populations of the Jamaican Iguana *Cyclura collei*, the Portland Ridge Land Frog *Eleutherodactylus cavernicola* and Jamaican Skink *Spondylurus fulgidus*, and an important population of Jamaican Hutia *Geocapromys browni*. New species of amphibians are still being discovered in Hellshire (B. Wilson, pers. comm.).

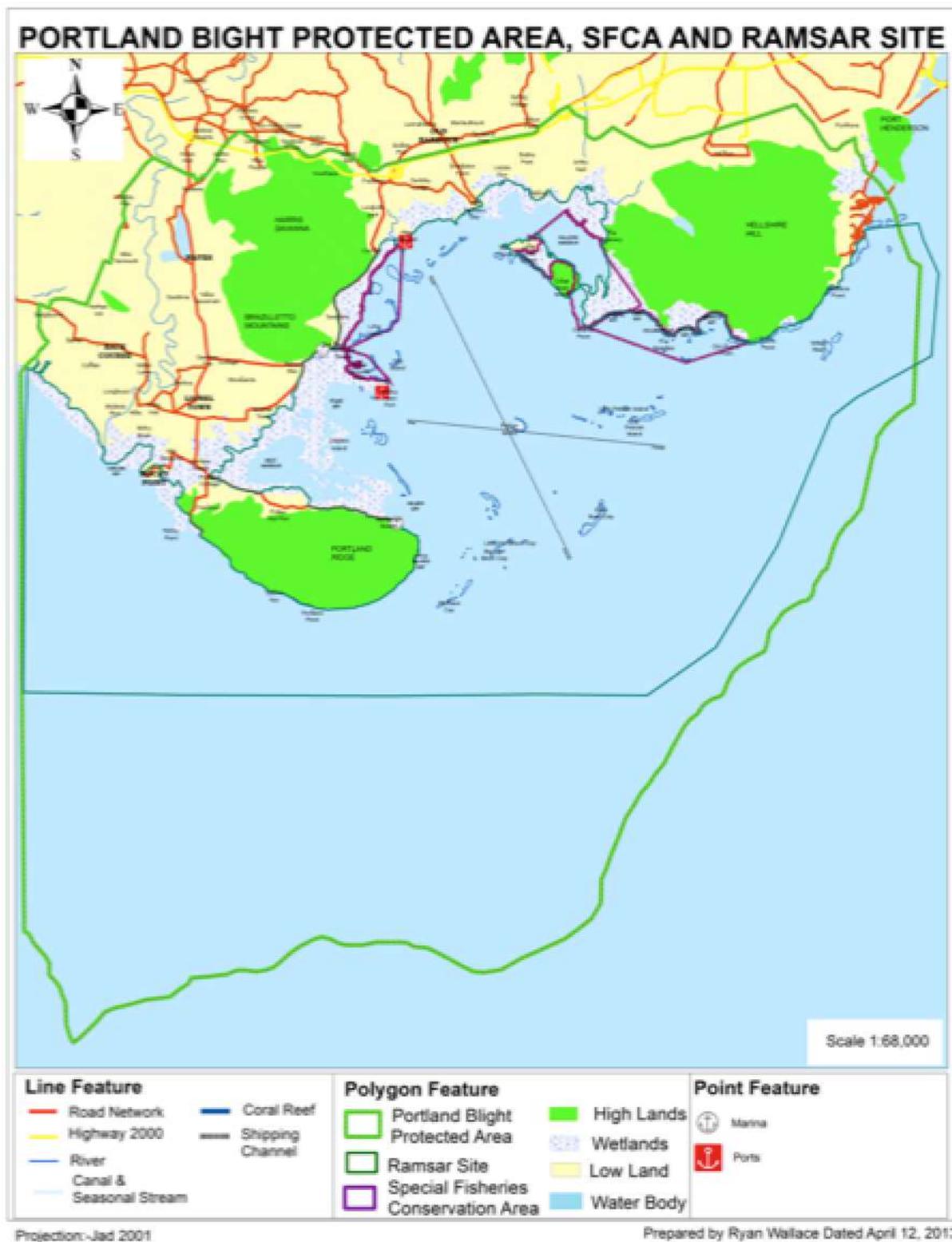


Figure 2: Map of the Portland Bight Protected Area

Problems to be addressed by the action

Figure 3 shows a conceptual model for the action, including the conservation target, the issues to be addressed and the proposed activities.

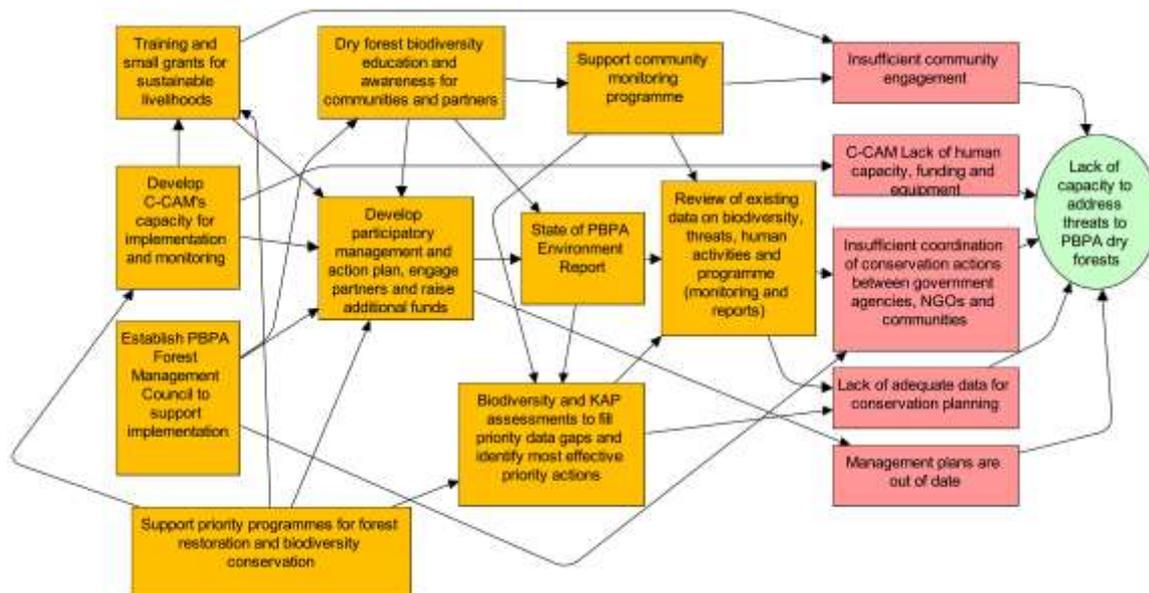


Figure 3: Conceptual model for the action, showing the conservation target (green), problems to be addressed (pink) and proposed activities (orange)

The most recent Management Effectiveness Tracking Tool (METT) assessment (C-CAM 2018) identified the need to increase management effectiveness of the dry forests of the PBPA. This project will address the most important problems that were identified in the METT.

Lack of capacity

C-CAM lacks the capacity and resources to effectively implement its forest conservation and monitoring responsibilities as manager of the PBPA and to carry out its mission to engage communities in conservation across the PBPA. This has been exacerbated by major budget cuts following COVID19.

Lack of adequate data to support conservation planning and implementation

Data on the dry forests are either non-existent or scattered across the various management agencies. A botanical inventory of the Hellshire Hills and Goat Islands was carried out in 2012 (Caribbean Wildlife Alliance 2012). A botanical assessment of parts of Portland Ridge was also implemented in 2012 (Oberli 2012). Herpetological and socio-economic assessments of Portland Ridge were also completed in 2012 (Climate Studies Group 2012a,b). The last study of the Braziletto Mountains was in 1987 (Dalling *et al.* 1987). Data on the status of dry forests and biodiversity (including IUCN red list species, apart from the Jamaican Iguana *Cyclura collei*) are insufficient. Conservation action plans have only been developed for the Jamaican Iguana (Iguana Specialist Group 2008) and Jamaican Hutia *Geocapromys brownei* (NEPA 2010). Hellshire Hills are one of the most important refuges for the hutia, but no surveys have ever been done there and the status of the species in the other forests of the PBPA is unknown. The Kite Swallowtail butterfly *Protographium marcellinus* is one of the most threatened butterflies in Jamaica. Its actual and possible breeding sites urgently need reassessment (Turner and Turland 2017, 2021). Several studies have assessed the avifauna (e.g. Haynes-Sutton and Hay, 2018). A critically endangered Portland Bight endemic species whose current status is unknown is the Portland Ridge Land Frog *Eleutherodactylus cavernicola*.

Management plans are out of date

The most recent participatory management plan for the PBPA was developed in 2013 (C-CAM 2013). Biodiversity action plans and sub-area management plans for Hellshire Hills and Goat Islands and for Portland Ridge were also developed in 2013 (Haynes-Sutton 2013a,b,c,d) but are now out of date. A management plan for Great Goat Island is currently in preparation (UDC 2020)

Lack of coordination, insufficient community engagement and lack of awareness of the importance of forests

Management responsibility for forest resources in the PBPA is carried out by several agencies whose

activities could be better coordinated. Many studies around the world and in have shown the importance of community participation in the management of forest resources but there is currently no mechanism for engaging Portland Bight communities, or empowering them in activities related to sustainable forest management. The socio-economic assessments showed that there are major gaps in awareness of forests at all levels (Climate Studies Group 2013; Campbell 2015). The forest exhibition at the PBDC was designed to address this issue but due to COVID it has not been opened to the public.

Objectives of the action:

The overall objective of the project is that by 2023 C-CAM and its community partners will have enhanced their capacity to manage, protect and monitor the dry forests of the Portland Bight Protected Area (PBPA).

Specific objectives include:

1. By 2022, **C-CAM's capacity** to manage, protect and monitor the dry forests of the PBPA will have been enhanced by provision of at least 2 additional staff, vehicle and essential equipment.
2. By 2022, **adequate data on the status of dry forests and their biodiversity** will be available to support management planning and the expansion and development of specific conservation programmes, through the completion of at least 3 assessments.
3. By 2023, **a management plan for the dry forests** of the PBPA will be in place and will be guiding the activities of government, NGO, private sector and community partners, as measured by a 25% increase in dry forest activities in the 2023 operations plan.
4. By 2023, **community engagement in dry forest conservation** will be enhanced in at least 3 communities.
5. By 2023, **coordination of conservation actions** to conserve dry forests will be enhanced through the establishment of the PBPA Forest Conservation Council.

Relevance of the action to the broader planning context - relevant national, regional and/or local plans

This project addresses priorities identified in national planning documents including Vision 2030 (whose goals include creating prosperity through sustainable use and management of natural resources) (Planning Institute of Jamaica 2010). It also meets similar requirements articulated in the National Forest Management Plan (Forestry Department 2017), contributes to meeting Jamaica's obligations under the Convention on Biodiversity (National Biodiversity Strategy and Action Plan NEPA 2016), fills gaps in biodiversity information identified in the National Ecological Gap Assessment (National Ecological Working Group 2009), support sustainable development initiatives identified in the Clarendon and Portmore Local Sustainable Development Plans (Clarendon Municipal Council 2016; Portmore Municipal Council 2018), contribute towards integrated watershed management for the Rio Minho (Birthwright 2016) and support climate change adaptation in the PBPA (e.g. Climate Studies Group 2015).

This project is part of C-CAM's overall management of the PBPA, and the Urban Development Corporation's management of the dry forests Hellshire Hills and Goat Islands. It complements activities that Forestry Department has been implementing in other parts of Jamaica as part of its European Union's Budget Support Programme for the Forest Sector, which includes an alternative livelihood project component, as well as agro-forestry, training in craft production and carbon stock monitoring. Forestry Department is committed to work in close cooperation with C-CAM to build on their experiences and the capacity they have developed, including providing training in best practices for nursery management and tree planting. C-CAM has several on-going and planned projects, the most important of which is funded by BIOPAMA. The latter project will support an adapted management review of management of the PBPA since its declaration in 1999, based on a review of management plans and monitoring data, as well as an updated Management Effectiveness Tracking Tool (METT) scorecard for the entire PBPA. The findings of this project will directly contribute to the EU project.

Relevance of the action to the management of the PBPA: This project will build the capacity of the Caribbean Coastal Area Management Foundation in partnership with civil society and government to maintain and improve the protective functions of the forests of the Portland Bight Protected Area. It will enable a diverse group of stakeholders to increase their roles in defending forests from degradation,

disturbance and loss from natural and man-made adversity.

Relevance of the action to the call for proposals: This project directly contributes to the sustainable participatory management of forests in the Portland Bight Protected area, through assessing progress that has been made for this sector in the protected area since its creation in 1999, identifying gaps and developing the civil society capacity to address them.

This project will address the expected results referred to in Lot 1 (Forestry) section 2 “**maintain and improve the protected function of forests and defend them from natural and man-made adversity.**”

Through a process of preparation of a State of the Portland Bight Forests report, participatory planning, partnership development, strategic actions, small grants and enhancement of on-going programmes (including the participatory management of natural resources, conservation nursery, community monitoring, ecotourism and environmental awareness) the project will:

- a. Review the strategic role of the forests of the PBPA in relation to their functions, for example **hydrogeological security, disaster prevention, and mitigation of extreme climatic events**, determine the extent to which existing programmes are addressing problems, implementing plans (e.g. Climate Studies Group 2018) and recommend future actions. This is important because the PBPA is the most vulnerable part of Jamaica to natural disasters, including hurricanes, storms, drought and flooding.
- b. **Enhance the protection of biodiversity in the PBPA through improved management.** This will be achieved through:
 - i. Assessing the extent to which the existing management programmes are providing adequate protection to the forests through METT scorecards, workshops and desk studies),
 - ii. Recommending ways to enhance management and build capacity to implement necessary measures. This will include:
 - updating the dry forest management plan,
 - developing business and development plan for the conservation nursery (including the Conservation Garden programme),
 - experimental replanting of selected species
 - enhancing partnerships for sustainable management of forests, including the formation of the PBPA Forest Management Council.
- c. **Promote and implement strategic initiatives to conserve forest biodiversity *in situ* and *ex situ***
Socioeconomic importance and awareness
 - i. Knowledge Attitudes and Practices assessments for the biodiversity of two dry forest areas - Braziletto Mountains and Kemps Hill.

Biodiversity assessments and planning
 - ii. Assessments of the status and habitat use of the Kite Swallowtail butterfly on Portland Ridge, the Portland Ridge Land Frog and Jamaican Hutia in Hellshire Hills, Braziletto Mountains and Portland Ridge will be undertaken.
 - iii. The results of these surveys will be used to develop participatory species conservation plans for these forest species in the PBPA, which will lead to further conservation actions and development of monitoring programmes.

Monitoring

- iv. Existing monitoring programmes (including permanent plots in forests) will be continued. They will be enhanced utilizing the latest technology, including drones, passive acoustic monitoring and camera traps. Community monitors will be trained to carry out basic monitoring and reporting
- v. Conservation nursery

The conservation nursery programme at the Portland Bight Discovery Centre (PBDC) was started in 2013. Its purpose is to develop the technology for growing native species that can be used for forest restoration (e.g. Maclaren 2020) and in the conservation garden programme. It is currently being partly upgraded with funding from the US Forest Service. Cultivation and out-planting of native trees has proved more difficult than expected and more funding and technical support are needed to allow it to reach its full potential. The Forestry Department has undertaken to work closely with C-CAM on this aspect of the project.

Conservation Gardens

The conservation garden programme is an innovative approach to engaging communities in growing, producing and ultimately selling native plants, to support forest conservation and livelihoods. The project will review the programme, develop a business plan and set the stage for the full implementation of this programme.

d. **Promote gender equality and youth involvement and assist in the reduction of poverty while supporting disadvantaged people, including sustainable use of native and endemic species.**

We plan to support community engagement in forest conservation through involving community members in wildlife surveys, promoting our community monitoring scheme, offering a small grants programme for sustainable livelihood projects that support conservation, and an education and awareness programme to make people aware of the importance of forest biodiversity and what they can do to protect it. These programmes will also engage gender equality, involve youth, reduce poverty and support disadvantaged people.

ii. **Target groups**

The target groups include youth, women, men and vulnerable persons who live within the PBPA particularly those who are near the dry forests such as the Braziletto Mountains and Harris Savanna and who rely on the forest for their livelihoods. This includes woodcutters, wood gatherers, gardeners, small farmers.

Many of these persons within the PBPA live on or below the poverty line and while the target groups and final beneficiaries rely on the forest for their livelihoods their knowledge regarding conservation and sustainable use is limited or non-existent. This means they can be involved in overexploitation of resources (including use of fire) and introduction of invasive into the forest, which can have a negative effect. The proposal seeks to engage these persons in data collection, conservation, education and livelihood enhancement activities which will provide the tools for better actions by forests users which will hopefully enhance their lives and livelihoods and engender sustainable forest use. This will also build the partnerships needed to make this possible.

C-CAM's approach to management has always involved stakeholder participation from planning through to implementation. The participatory management planning process, working with stakeholders to develop criteria for grant beneficiaries, establishment of Forest Council are some of the ways that will be used to ensure participation of target groups and final beneficiaries.

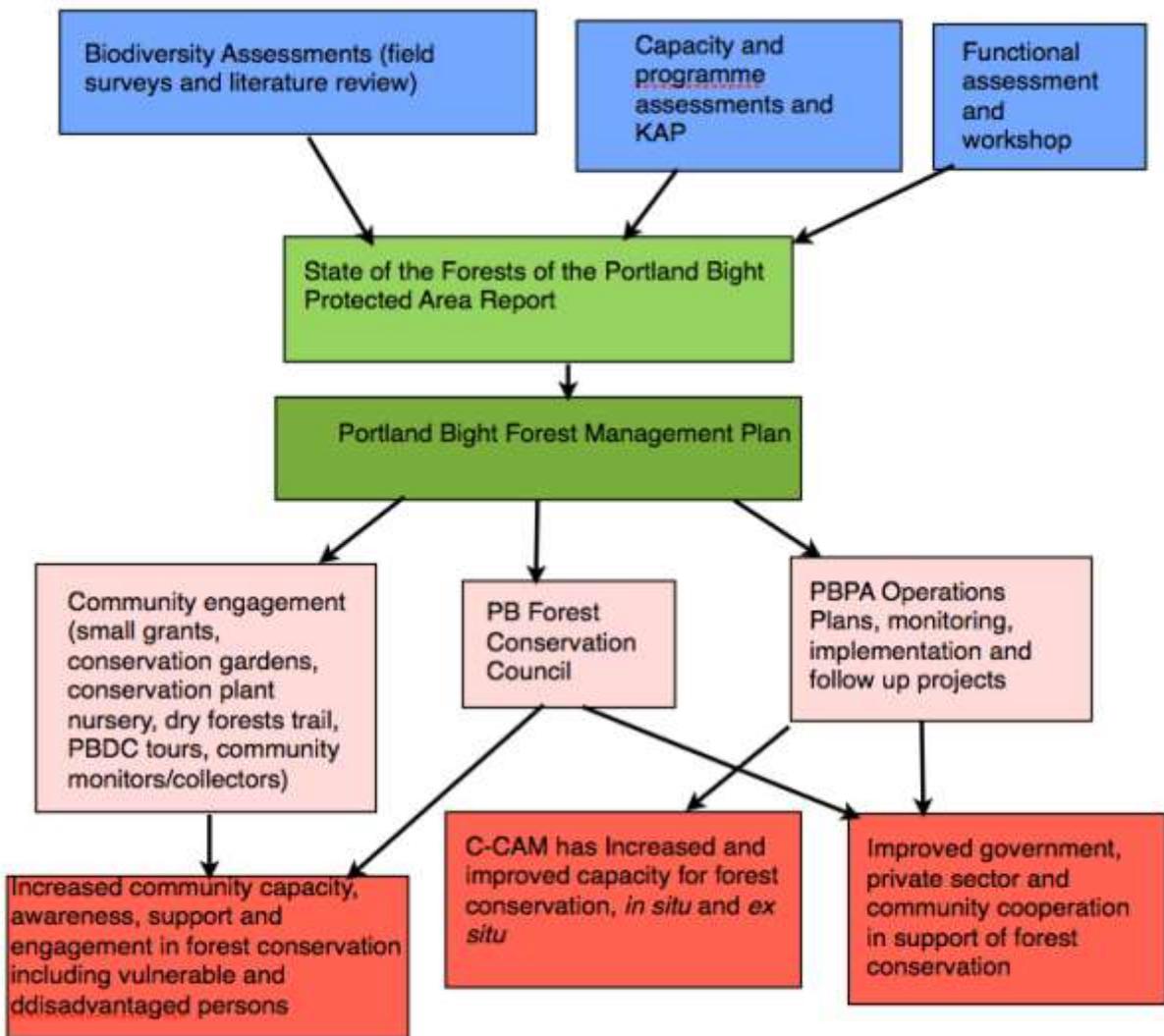


Figure 4: Intervention logic

- A management plan is essential to ensure the most effective use of limited resources but the PBPA Management Plan 2013-2018 is out of date.
- C-CAM’s capacity to manage, protect and monitor the dry forests of the PBPA is limited by lack of staff, vehicles and the most up to date equipment (e.g. drones, drone software, trail cameras and passive acoustic monitoring units) that can make our activities more effective.
- Currently data on the status of dry forests and their biodiversity are insufficient to support management planning and the expansion and development of specific conservation programmes. Completion of at least 3 assessments including a comprehensive assessment of the Braziletto Mountains, Jamaican Hutia and Portland Ridge Land Frog will provide essential information for conservation planning and action.
- Community engagement is essential for effective dry forest conservation. This can be enhanced through public education, outreach, and training and small grants for sustainable livelihoods. Activities will include sponsored visits to the Portland Bight Discovery Centre dry forest exhibition, and the development of a dry forest trail and engagement of community members in dry forest surveys and monitoring.
- Coordination of conservation actions across the multiple stakeholders of the PBPA forests is essential but there are no current mechanisms to do this. The issue will be addressed through the establishment of a PBPA Dry Forest Council.
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Table 1: Outputs, outcomes, impacts and risks

Outputs	Outcomes	Impact	Risks
1. State of Dry Forests Report	Data available for planning and education Data storage systems established	Improve plans Increased awareness Funding	Agencies do not cooperate or share data
2. Dry Forest Management and action plan 2022-2027	Conservation actions identified and prioritized. Agencies commit to implementation	More effective use of human and financial resources. Ensure activities address issues.	Agencies and communities do not engage in process or support implementation. Adequate resources not available to support implementation or plans are unrealistic.
3. Report on dry forest education and outreach	Increased awareness of the importance of biodiversity	Increased compliance Increased support	
4. PBPA Forest Management Council	Coordination of activities	Increased effectiveness	Agencies do not participate or want to coordinate activities.
5. Report on C-CAM capacity and implementation of conservation activities	C-CAM can carry out its functions C-CAM's dry forest activities enhanced and expanded	Threats to forests are reduced.	C-CAM cannot find suitable staff. Technical difficulties limit expansion of programmes

v. How the action will improve the situation of the target groups and final beneficiaries and the technical and management capacities of target groups

The project will benefit the forest stakeholders in several innovative ways. Community monitors/data collectors will be employed to carry out biodiversity surveys and will benefit from training as well as income. The small grants programme will provide advice and resources for community persons to invest in activities that are consistent with forest conservation as outlined in the management plan. The Conservation Garden programme, which is to be further developed under the project is an innovative way to include community members in forest conservation while providing them with a potential sustainable income stream. The PBPA community monitoring programme to be enhanced under the project is a way to have community members become stewards of the environment and develop a positive relationship with the forest and a way to build a conservation ethos in their community. Involvement of community members in biological surveys will provide income, build capacity and increase engagement in conservation.

This project will establish, get acceptance for and begin implementation of an updated management framework for conservation of the dry forests of the Portland Bight Protected Area (PBPA), through:

- Reviewing existing data and using them to prepare a “State of the Dry Forests of the PBPA report” which will assess dry forest data, programmes, conservation needs, indicators, monitoring, the extent to which data support adaptive management/ecosystems-based management and identify gaps. This document will be used as the basis for planning, promoting the PBPA and fund-raising
- Filling major data gaps through biodiversity and Knowledge, Attitudes and Practices (KAP) assessments, using latest technology and community assessment. This will include a comprehensive assessment of the Braziletto Mountains and of selected Red Listed species (e.g. Kite Swallowtail *Protographium marcellinus*, Jamaican Hutia *Geocapromys brownei* and Portland Ridge Land Frog *Eleutherodactylus cavernicola*). These studies could contribute to a scientific paper on the state of the biodiversity of the PBPA.
- Build C-CAM's capacity to implement monitoring, project development, community outreach, enforcement and administration of small grants through salary support, purchase of essential equipment

and supplies

- Provide the framework for implementation of the plan through establishing a Portland Bight Protected Area Forest Management Council, engaging communities on the periphery of the forests through workshops, outreach, sustainable livelihoods training and small grants to community members.

The relationships between these activities are shown in Figure 1 (green is the conservation target, red shows major issues and the project activities in orange). The arrows show relationships.

vi. Small grants programme

The small grants programme will provide financial support to members of the community who live in the PBPA in the immediate vicinity of the forests who have participated in a training workshop, and submitted proposals to carry out projects that are compatible with sustainable use and conservation of forest resources.

Improved livelihoods

(i) the overall objectives, the specific objective(s) and the outputs[2] (i.e. the results) to be achieved with the financial support

Overall objectives - Improve sustainable forest use

Specific objectives - Sustainable livelihood support

Reduction of negative impacts on biodiversity

Build awareness of the value and importance of forests and sustainable use

Outputs- Reports on Livelihood projects completed

Project deliverables

(ii) the different types of activities eligible for financial support, on the basis of a fixed list

Beekeeping

Native tree seedling nurseries and cultivation (e.g. thatch)

Tree planting

Greening

Public awareness session about forests

Crafts based on sustainable use of forest resources

nature or heritage tourism – e.g. eco-heritage trail

craft production

(iii) the types of persons or categories of persons which may receive financial support

Persons living in Portland Bight.

Women

Young people

Persons who rely on the forest

(iv) the criteria for selecting these entities and giving the financial support

Grantees will be qualified applicants selected by the project advisory committee based on the

following criteria:

- Relevance of proposed eligible activity to dry forest management (5 points)
- Project submitted by a woman or a person under 25, mainly benefitting females or young persons (5 points)
- Proposal form properly completed, explaining what they plan to do, including a brief business plan and explaining how this will contribute to their livelihoods and to forest conservation (20 points)

Qualified applicants must:

Supply proof of bank account (if they don't have a bank account, they cannot get funds)

Be a person in good standing (reference letter from JP, doctor, teacher, employer) (if they do not have a good reference, they cannot get funds)

Supply proof of residence or work in the PBPA (utility bill or reference letter from a reputable person)

(v) the criteria for determining the exact amount of financial support for each third entity, and Simple proposal using template including budget for activity clearly justifying the need for funds and how they will be spent (payment schedule) and accounted for, as well as the in-kind support the person will contribute

(vi) the maximum amount which may be given.

2500 Euros to any one project

In all events, the mandatory conditions set above for giving financial support (points (i) to (vi)) have to be strictly defined in the grant contract as to avoid any exercise of discretion

vi. Studies conducted in view of defining the scope of the action.

The scope of this action was informed through many discussions with community members, including a Vulnerability Risk Assessment exercise held with vulnerable women in 2021 (Haynes-Sutton 2021).

1.1.1. Methodology (max 5 pages)

C-CAM capacity development

The first step will be to establish C-CAM's capacity to carry out its responsibilities in relation to the forests of the PBPA, and to manage the projects. C-CAM's organizational needs were defined in its strategic plan (C-CAM 2013) and re-assessed in 2018 (MacDonald-Gayle & Sutton 2018). These documents were used to guide the institutional strengthening aspects of the project including employing additional FTEs staff members (a project coordinator, 1 CDO, assistant science officer, nursery manager, as well as partial salary support for other staff. The general activities to be carried out by these staff members will be supported by the provision of office furniture, computers, tablets, vehicle and field equipment where appropriate. The vehicles will be used to transport the staff to the study sites, meetings and workshops. Tablets will be used for data collection in the field. Field equipment including UV light for insect collection, drones for forest assessment, and passive acoustic monitoring devices will be used initially for the assessment and at the end of the project for monitoring.

- The overall methodological framework of the project is shown in Figure 4. The main steps are
- i. literature search and field assessments (including data collected by community data collectors) that support the development of the state of the dry forest report plus the results of a detailed functional and climate change adaptation assessment (including a review of the extent to which the previous plans addressed issues related to conservation of forest functions, and climate change),
 - ii. development of best practices for the plant nursery and business planning for the Conservation Garden programme.
 - iii. These reports plus participatory planning workshops will contribute to the preparation of the Dry Forest Management Plan, which will update previous plans including the previous PBPA Management Plan 2013-2018, (which included chapters on the Dry Forest and Forest Resource Management) (C-CAM 2013b) and the Biodiversity action plans for Portland Ridge, Hellshire Hills and Goat Islands (C-CAM 2013c,d). PBPA management plan, BIOPAMA project, CEPF project, Canari Capacity assessment. This action will be supported through a parallel project funded by BIOPAMA, which is expected to produce a comprehensive State of the PBPA environment report by the end of January 2022. The plan will inform the implementation aspects of the project, including improvements to the plant nursery, implementation of the Conservation Garden programme, small grants for sustainable use of forest resources and the inclusion of recommendations in annual Operations Plans.

EU budgetary support for Forestry Department. Importantly this project will be used to inform the development of a project proposal for the next call for projects from major donors including BIOPAMA and Critical Ecosystem Partnership Fund.

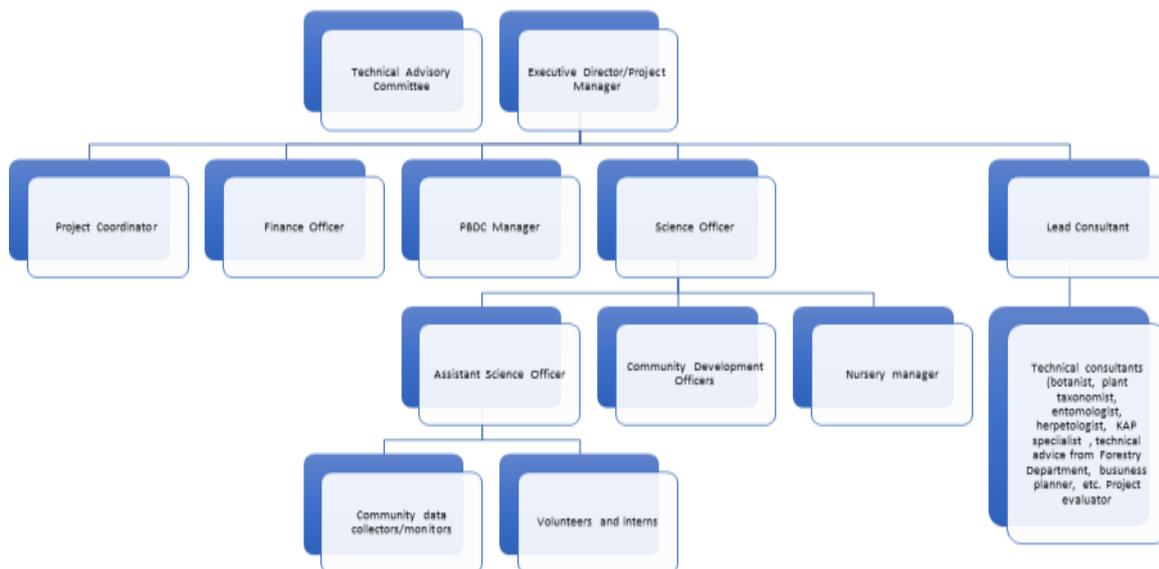


Figure 5: C-CAM organisational structure for action

The Forestry Department and the National Environment and Planning Agency will be a key government agency partners involved in providing guidance at all levels of the project from the Management Committee to providing specific technical advice. The Forestry Departments experience and expertise in nursery design and operation as well as plant propagation and replanting programmes will help to advise C-CAM nursery staff and members of the Conservation Garden Programme.

The Urban Development Corporation are the owners and managers of the Hellshire Hills and Goat Islands which are home to important biodiversity such as the Jamaican Iguana. They currently collaborate with various stakeholders including C-CAM on developing a Management Plan and implementation of its

strategies to conserve the areas wildlife. The development of a Wildlife Refuge on the Great Goat Island is the key project aimed at conservation of several important species in the area. We will continue to collaborate with them to develop the Goat Islands project but for this project the population assessment and development of conservation strategies for the Jamaican Hutia. The assessment and planning for the Hutia has been identified as an important goal for the management of the PBPA but as yet it remains a significant gap in the activities thus far.

Local community groups and individuals will be a part of the management and planning committees and will be invited to be involved in all aspects of the project from design to implementation. Persons will also be trained and supported to perform as data collectors and resource persons so they can contribute their knowledge of the local area and people to improve our field assessments. They will also be engaging in climate friendly activities for livelihood support.

The projects Technical Advisory Committee will provide overall guidance and direction for the entire project. The C-CAM Executive Director will supervise all other project personnel and activities and will directly supervise the C-CAM Managers as well as the Project Coordinator and any external consultants. The Project Coordinator will primarily be responsible for managing the various personnel and activities occurring under the project and will work closely with the accounting staff to guide the project procurement and financial management and with the Science Officer to source and direct external consultants and monitor all other activities being conducted by the external consultants, community data collectors and C-CAM staff.

The Management Committee will utilize their own expertise as well as data collected during the project to assess and direct the project e.g., the Knowledge, Attitude and Perceptions (KAP) study. The KAP study will collect important information on the occurrence and abundance of species from local informants. It will evaluate the current value of the species of conservation importance among local people and reveal any perceptions that may either pose a threat or provide an opportunity for greater conservation of these species.

A local auditing firm will be hired to conduct a financial audit of the project to verify that funds have been expended according to the project activities and procedures. A final project evaluator will be hired to provide an independent evaluation of the projects success in achieving its specified goals.

A communications consultant will be hired under the project to maintain a continuous social media and other communications presence throughout the project duration.

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Sustainability of the action

Expected impact of the action on the target groups

Target group	Technical impacts	Economic impacts	Social impacts
C-CAM	Increased technical capacity to implement surveys and monitoring		
	Increased capacity to manage the plant nursery including best practices		
	Increased capacity to implement conservation garden programme	Potential for income from plant sales enhanced	Improved community relationships
PBPA biodiversity	Improved management plans leading to better operations planning, better project development and more targeted conservation actions	Increased support for enforcement, management and conservation of habitats and species	
	Improved partnerships with communities and key agencies leading to more effective use of resources for conservation and management		
PBPA forest users and communities in adjacent areas	Increased awareness		Improved quality of life through increased educational and recreational opportunities (trail and visits to PBPA)
	Increased technical skills	Increased employment	
		Funding for small projects	
	Enhanced ecological services including protection from adverse effects of climate change.		

Physical risks include the risk to infrastructure and equipment of natural disasters, vandalism or theft. These risks are being addressed through good design and security measures.

Environmental risks include the impacts of climate change in the area, such as hurricanes and severe storms that could damage infrastructure (e.g. the PBPC or nursery, impede access to sites and delay fieldwork and workshops. Mitigating measures include timing field work and allowing for extra time for activities during hurricane season, as well as ensuring that the nursery and nature trail are designed to sufficiently high standards. Drought could affect the availability of seeds for planting, survival of seedlings that are planted out and the availability of water for watering at the nursery. This is being addressed by increasing the number of storage tanks and extending gutters for water collection.

Economic risks include the risk of changing exchange rates, which might affect the costs of items, the possibility that salary and consultancy rates are too low to attract the types of people needed, or that prices for items and shipping escalate before purchases can be made.

Social risks include the risk that suitable community data collectors cannot be found, and that the data

they collect is not of a sufficiently high standard. This can be mitigated through training, verification of data and spot checks.

Another risk is that community members do not engage in the workshops, either because they do not have time, because they are not interested, do not have smart phones, lack credit, or because of COVID restrictions. This will be addressed through attracting people through social media. In addition, there could be a problem at a higher level if some of the agency partners do not engage with the PPFCC or do not send suitable persons to the meetings. This will be addressed through high-level outreach to agencies and partners.

The risks of the small grant programme are that either there are too many applications (which would present a large burden to identify the best ones) or too few, that the applicants do not follow the instructions, so do not qualify or that they have problems with implementation. This will be addressed through mentoring through every step of the process.

Table 2: Summary of physical, environmental economic and social impacts of actions

Action	Physical	Environmental	Economic	Social
1. Enhance C-CAM capacity				
2. Collect and collate data needed for the management plan				
3 Prepare the PBPA dry forest management plan				
4. Engage the community in conservation of dry forests				
4.1 Enhance the conservation nursery				
4.2 Implement the conservation gardens programme				
4.3 Develop the nature trail				
4.4. Increase awareness of dry forests				
4.5 Promote sustainable use of forest resources				
5.0 Improve coordination of forest conservation				
6.0 Increase visibility of action				
7.0 Project Evaluation				

Sustainability

Financial sustainability will be ensured through the expected recovery of government funding post-COVID as well as through follow-up projects and fund-raising. Institutional sustainability will be through continued cooperation among partners in the implementation of the management plan. Policy level sustainability will be achieved because C-CAM is represented on many national committees and will continue to take every available opportunity to incorporate the recommendations of the plan in national policies and plans. The project is environmentally sustainable because it will benefit forests in many ways and will have no negative effects.

Dissemination plan

The communications consultant will be responsible for developing a dissemination plan, which will include posts of photographs, videos and reports throughout the project on social media. There is a lot of interest in the plant nursery and the conservation gardens programme, which are new for Jamaica, and are expected to provide opportunities for knowledge sharing. Scientific presentations and papers may also be developed as a result of the biodiversity assessments.