Moving from assessment to planning for threatened plants of Jamaica

22ND – 26TH JULY 2024

National Environment and Planning Agency | IUCN SSC Species Survival Commission | Conservation Planning Specialist Group | The University of the West Indies | Critical Ecosystem Partnership Fund | CANARI serves as CEPF's regional implementation team for the Caribbean Islands Biodiversity Hotspot. | Royal Botanic Gardens Kew

Editorial

CONTACT POINT:
For individuals and organizations wanting to support the development or implementation of this plan: CEO of NEPA (ceo@nepa.gov.jm) and Public Education and Corporate Communication Branch (pubed@nepa.gov.jm).

ORGANISING TEAM:
Keron Campbell, Neil Cox, Monique Curtis, Andrea Donaldson, Samantha Grant, Simone Lee, Caroline Lees, Mariah Mosquera, Natasha Peters, Dwight Robinson, Ashleigh Sanderson.

PROJECT CONTRIBUTORS (ALPHABETICALLY):
Amy Barker, Alexander Beckford, Swaine Beckles, Nikita Billet, Deon Brown, Damany Calder, Keron Campbell, Christopher Creary, Arlette Dunkley-Fullerton, Comoeya Edwards, Herbert Foster, Timmera Grant, Nordia Hamilton, Shemere Lawes, Simone Lee, Denneko Luke, Jodie-Anne Mcfarlane, Jeffery Mckenzie, Janelle Morris, Mariah Mosquera, Carla Myrie, Shanti Persaud, David Picking, Kamilea Russell, Ashleigh Sanderson, Derrick Simon, Alex Simpson, Michka-May Small, Vida Svahnström, Adrian Thomas, Theo Watson, Damion Whyte, Lorna Williams.

DOCUMENT EDITORS:
Natasha Peters, Keron Campbell, Monique Curtis, Samantha Grant, Simone Lee, Caroline Lees, Mariah Mosquera, Ashleigh Sanderson.

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- **IUCN:** is a membership union uniquely composed of both government and civil society organizations. It provides public, private, and non-governmental organizations with the knowledge and tools that enable human progress, economic development, and nature conservation to take place together.
- **IUCN SSC CONSERVATION PLANNING SPECIALIST GROUP (CPSG):** was established in 1979. It facilitates scientifically sound, collaborative planning that brings together people with diverse perspectives and knowledge to catalyze positive change for species. CPSG provides species conservation planning expertise to governments, other IUCN SSC Specialist Groups, zoos and aquariums, and other wildlife organizations.
- **NEPA:** The National Environment and Planning Agency (NEPA) is an Executive Agency of the Ministry of Economic Growth and Job Creation. The Agency became operational on April 1, 2001 as an Executive Agency under the Executive Agencies Act. NEPA is the lead government agency with the mandate for environmental protection, natural resource management, land use and spatial planning in Jamaica.
- **UWI:** The Department of Life Sciences, University of West Indies, makes available, through excellence in teaching, research and outreach, high quality education and training for students of biology such that they are prepared to function as biologists in the regional and global arena.
- **KEW:** Royal Botanic Gardens, Kew (RBG Kew) is an internationally important botanical research and education institution, and a UK non-departmental public body. RBG Kew's mission is to understand and protect plants and fungi for the well-being of people and the future of all life on Earth.

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A2P	ASSESS TO PLAN
BGCI	BOTANIC GARDENS CONSERVATION INTERNATIONAL
CANARI	CARIBBEAN NATURAL RESOURCES INSTITUTE
CASE	COLLEGE OF AGRICULTURE, SCIENCE AND EDUCATION
CBF	CARIBBEAN BIODIVERSITY FUND
CBO	COMMUNITY-BASED ORGANISATIONS
CCAM	CARIBBEAN COASTAL AREA MANAGEMENT FOUNDATION
CEPF	CRITICAL ECOSYSTEM PARTNERSHIP FUND
CPSG	CONSERVATION PLANNING SPECIALIST GROUP
DHLFMC	DOLPHIN HEAD LOCAL FOREST MANAGEMENT COMMITTEE
EBA	ECOSYSTEMS BASED ADAPTATION
EFJ	ENVIRONMENTAL FOUNDATION OF JAMAICA
FD	FORESTRY DEPARTMENT
GOJ	GOVERNMENT OF JAMAICA
IAP	INSTITUTE OF ADVANCED PLACEMENT
IAS	INVASIVE ALIEN SPECIES
IAS WG	INVASIVE ALIEN SPECIES WORKING GROUP
IOJ	INSTITUTE OF JAMAICA
ICENS	INTERNATIONAL CENTRE FOR ENVIRONMENTAL AND NUCLEAR SCIENCES
IUCN	INTERNATIONAL UNION FOR CONSERVATION OF NATURE
JAS	JAMAICA AGRICULTURAL SOCIETY
JA-CHM	JAMAICA CLEARING-HOUSE MECHANISM
JBI	JAMAICA BAUXITE INSTITUTE
JCDT	JAMAICA CONSERVATION AND DEVELOPMENT TRUST
JET	JAMAICA ENVIRONMENT TRUST
JOAM	JAMAICA ORGANIC AGRICULTURE MOVEMENT
KBA	KEY BIODIVERSITY AREA
LFMC	LOCAL FOREST MANAGEMENT COMMITTEE
MBZ	MOHAMMED BIN ZAHED SPECIES CONSERVATION FUND
MEGJC	MINISTRY OF ECONOMIC GROWTH AND JOB CREATION
MGD	MINES AND GEOLOGY DIVISION
AFM	MINISTRY OF AGRICULTURE, FISHERIES AND MINING
MNS	MINISTRY OF NATIONAL SECURITY
NCCLFMC	NORTH COCKPIT COUNTRY LOCAL FOREST MANAGEMENT COMMITTEE

Acronyms & Abbreviations 2/2

NCTFJ	NATIONAL CONSERVATION TRUST FUND OF JAMAICA
NEPA	NATIONAL ENVIRONMENT AND PLANNING AGENCY
NGO	NON-GOVERNMENT ORGANIZATION
NLA	NATIONAL LAND AGENCY
NPF	THE NATURE PRESERVATION FOUNDATION
NSDMB	NATIONAL SPATIAL DATA MANAGEMENT BRANCH
PA	PROTECTED AREA
PAC	PROTECTED AREAS COMMITTEE
PCA	PESTICIDE CONTROL AUTHORITY
PIOJ	PLANNING INSTITUTE OF JAMAICA
RADA	RURAL AGRICULTURAL DEVELOPMENT AUTHORITY
SDC	SOCIAL DEVELOPMENT COMMISSION
SECCLFMC	SOUTH EAST COCKPIT COUNTRY LOCAL FOREST MANAGEMENT COMMITTEE
SRC	SCIENTIFIC RESEARCH COUNCIL
SSC	SPECIES SPECIALIST COMMISSION
STATIN	STATISTICAL INSTITUTE OF JAMAICA
STEA	SOUTHERN TRELAWNY ENVIRONMENTAL AGENCY
TEF	TOURISM ENHANCEMENT FUND
TIU	TRANSFORMATION IMPLEMENTATION UNIT
TPDCo	TOURISM PRODUCT DEVELOPMENT COMPANY
UDC	URBAN DEVELOPMENT CORPORATION
UWI	UNIVERSITY OF WEST INDIES

1. Executive Summary

Jamaica is ranked 11th among the world's marine islands for plant endemism[1]. Though only 10,830 km^2 in area, the island is home to a diverse range of landscapes and ecosystems that support more than 3000 vascular plant species, of which roughly 800 occur nowhere else. Many of these species are under pressure from human activities and urgent action is needed to prevent their extinction. There is an urgent need to develop clear and focused Conservation Action Plans for Jamaican plant species using the best available knowledge, though many species have limited historical and/or contemporary data. Without the proposed conservation actions, it is anticipated that many priority Jamaican plant species will not receive the conservation attention often urgently needed, potentially pushing many already highly imperiled species closer to global extinction.

This workshop forms part of a Critical Ecosystem Partnership Fund (CEPF) funded project aimed at establishing site-based conservation action plans for multiple threatened endemic plants.

1.1 | Project scope

In April 2024, an International Union for Conservation of Nature (IUCN) Red List workshop was held in Jamaica to assess 106 (80 endemic, 26 non-endemic) plant species in in families Arecaceae (Palms), Melastomataceae (Melastomes) and Orchidaceae (Orchids) known to occur in a series of Key Biodiversity Areas (KBAs) across the island. As a result of that workshop, 45 orchids, 13 melastomes, and one palm (Appendix II) were identified as the most at risk and were selected as the focus of the action planning initiative described here.

1.2 | Planning process

A planning workshop was held at the University of the West Indies (UWI) in Jamaica, from July 22-26, 2024. Thirty-one participants from 16 institutions participated, including representatives from relevant government agencies and departments, academia and non-government organizations. Information on species distribution, ecology and threats had been gathered during the 5-day assessment workshop and these data were provided as briefing materials. The workshop was facilitated by the IUCN Species Survival Commission (SSC) Conservation Planning Specialist Group (CPSG) and followed its science-based, participatory planning methods.

During the five days of the workshop, participants worked collaboratively towards recommending well-targeted, achievable actions for advancing the conservation status of this group of species.

To facilitate discussions, three working groups were formed: one focused on communities, one on industry and one on technical and technological challenges. Regular reporting and discussion sessions supported cross-fertilization of ideas between groups. On the final day, two additional cross-cutting groups were formed: one focused on plan implementation and integration into existing initiatives, and the other on developing adequate *ex situ* capacity in Jamaica to rescue and recover species whose extinction may not be preventable with solely *in situ* action.

Vision

By 2054, Jamaica will be following an established protocol for protecting our endangered and native plants, creating strong policies to safeguard these natural treasures. We will work together to understand and nurture our flora, ensuring they thrive in the wild and in nurseries.

By fostering a love for our plants, we will inspire everyone to protect our environment and create sustainable livelihoods for future generations.

Mek wi tek care a dem cause dem belong to all a wi

[1] BSchrader, J., Weigelt, P., Cai, L. *et al*. Islands are key for protecting the world's plant endemism. *Nature* **634**, 868–874 (2024). https://doi.org/10.1038/s41586-024-08036-1

1.3 | Conservation challenges and recommended solutions

Conservation challenges discussed by workshop participants included: invasive alien species, small and large-scale conversion of land for agriculture, illegal settlements, infrastructure development, mining, logging and wood cutting, charcoal making, over-collection for local and international trade, urbanization, pollution and climate change. Addressing these challenges is made more difficult in Jamaica because of its small area and the competition for different land uses, the lack of awareness of many of these species, lack of capacity for effective law enforcement and the current lack of legal protections for threatened plant species.

To address these challenges, the participants recommended 15 goals and 52 actions focused on: improving regulation of large-scale agriculture, mining and development as well as capacity building to embed biodiversity-friendly practices; engaging and empowering communities to play a bigger role in conservation of these species, in ways that bring measurable benefits; filling key information gaps about these species and the pressures driving their declines; building *ex situ* capacity; modernizing approaches and tools for surveying and monitoring these species; and collaborating on the pursuit of resources for this work.

Five goals recommended by participants as most important for the conservation of these species

1. *To have all members – from youth to elders – of in situ communities aware that there are important plant species in and around their homes and areas of livelihood, and for them to be knowledgeable about their value.*
2. *To have a legal framework and resourced enforcement system in place that provides accountability and authority for the conservation and protection of plant species.*
3. *Increased species protection, abundance and habitat interconnection through interplanting in development infrastructures.*
4. *Establish these species' ecology, phenology, propagation techniques and population trends and pressures.*
5. *Approve procedures for agricultural practices which considers conservation objectives of the target species*

Finally, participants developed and agreed a Vision Statement to reflect their long-term aspirations for this group of species and a smaller group used this to craft short-term measurable targets that could be used to track progress towards the Vision, over the next few years.

Action recommendations are presented in this document in two ways: 1) organized by working group topic; 2) organized by priority sites: Dolphin Head, Peckham Woods, North Coast Forest, Cockpit Country, Black River Great Morass, Catadupa, Blue and John Crow Mountains, and Bull Bay.

1.4 | Evaluation of the planning workshop

A CPSG post workshop survey evaluated participants' experience of the workshop to ensure that it conformed to CPSG planning principles. The results are provided in Appendix III. A survey by CPSG at 36 months is planned, to capture post-workshop changes in activity, progress with plan delivery and any short-term progress towards improved outcomes for species.

1.5 | Implementation and monitoring

To ensure the successful implementation and ongoing monitoring of the action plan, a collaborative approach will be taken, beginning with the formation of a dedicated working group. The National Environment and Planning Agency (NEPA) is proposed to serve as the Secretariat, coordinating efforts across various stakeholders. Organizations (both government and non-governmental) involved in the CPSG workshop will be formally engaged and commit to the plan by assigning focal points and integrating key actions into their operational and individual work plans. Establishing strong partnerships between government agencies, NGOs, and CSOs will be critical in accessing diverse funding sources and leveraging expertise to support the execution of projects and programs arising from the action plan. Additionally, to bolster broader institutional support for implementation, these actions will be integrated into updated national strategies, such as the National Strategy and Action Plan for Biological Diversity in Jamaica and the Plant Conservation Strategy for Jamaica.

2. Introduction to the species and their conservation context

2.1 | Project scope

In April 2024, the Royal Botanic Gardens, Kew (RBG KEW) and University of the West Indies (UWI), facilitated an International Union for Conservation of Nature (IUCN) Red List workshop in Jamaica. Over the following months, 106 plant species were assessed (80 endemic, 26 non-endemic) known to occur in a series of Key Biodiversity Areas (KBAs) across the island (Figure 1). As a result of that workshop, 45 orchids, 13 melastomes, and one palm have been provisionally categorized as either Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Data Deficient (DD) and identified as among the Jamaican species most at risk from those families. These were selected as the focus of the action planning initiative described here. A full list of the species and their provisional categories is provided in Appendix II (at this time **all Red List categories listed in the report are provisional).**

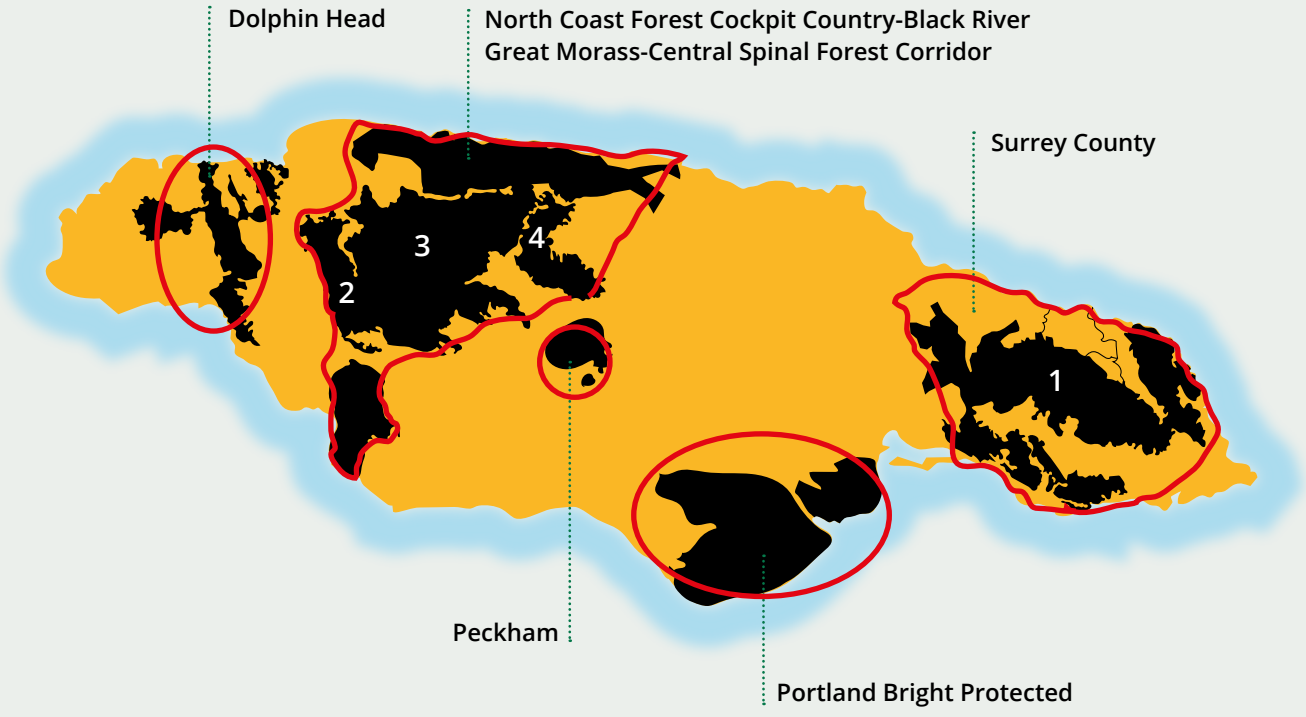


Figure 1: Map showing the KBAs and Protected Areas (PAs) in the CEPF Areas of Interest. Areas are labelled, and those with numbers are:
1. Blue and John Crow Mountains Protected National Heritage and surroundings;
2. Catadupa;
3. Cockpit Country;
4. Litchfield Mountain- Matheson's Run.

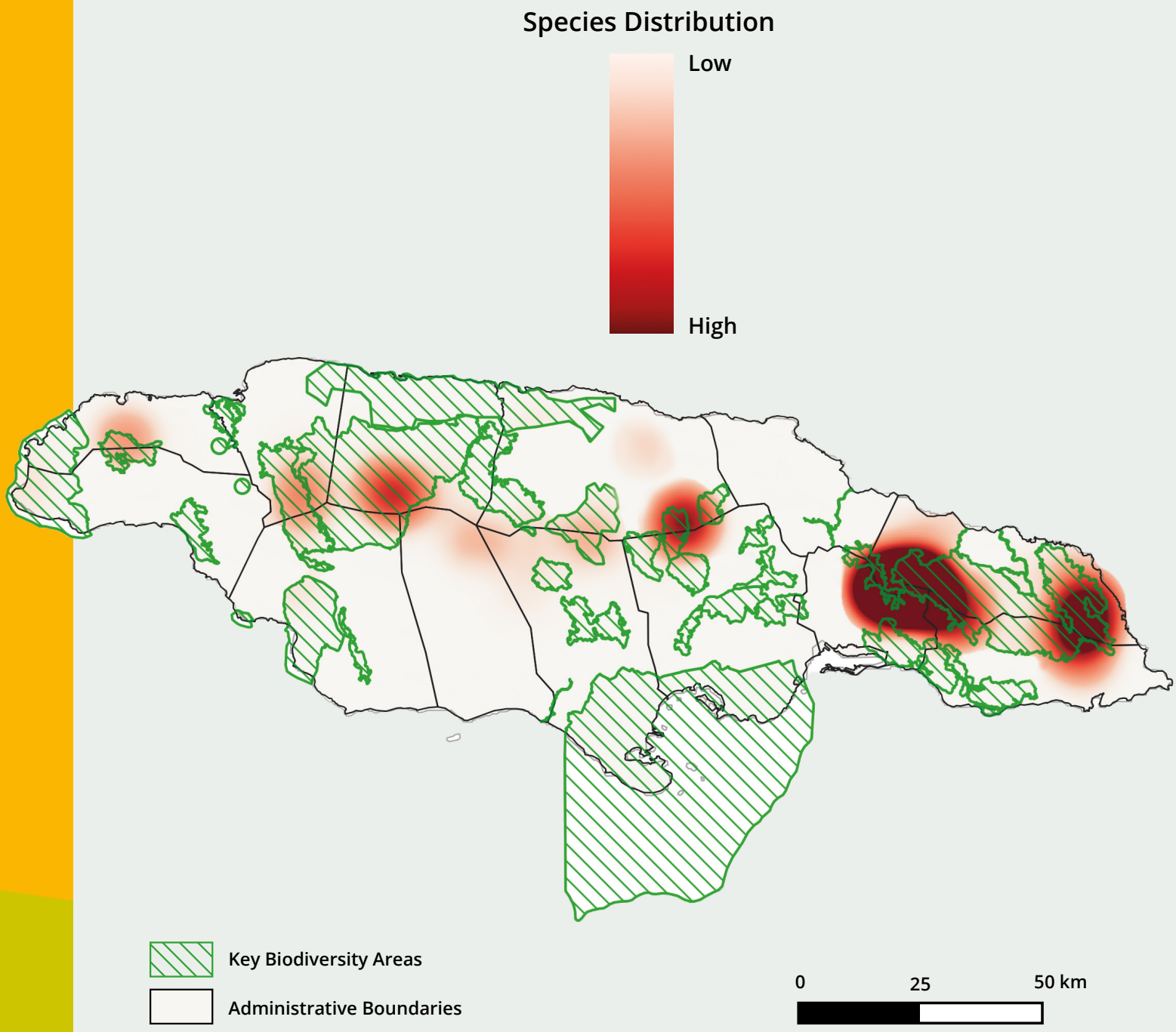


Figure 2: Map showing a distribution heatmap for 55 of the 59 focal species: data derived from point data collated to inform IUCN Red List assessments. Some species are only known from a few data points that are more than 15 years old, 3 species are known from only 1 locality, and 4 species lack distribution data completely. Most records of species are found in the east of Jamaica in the Surrey County Corridor (Blue and John Crow Mountain KBA), in central Jamaica in the Mount Diablo KBA, and in the West in Catadupa, Cockpit Country, and Dolphin Head KBA.

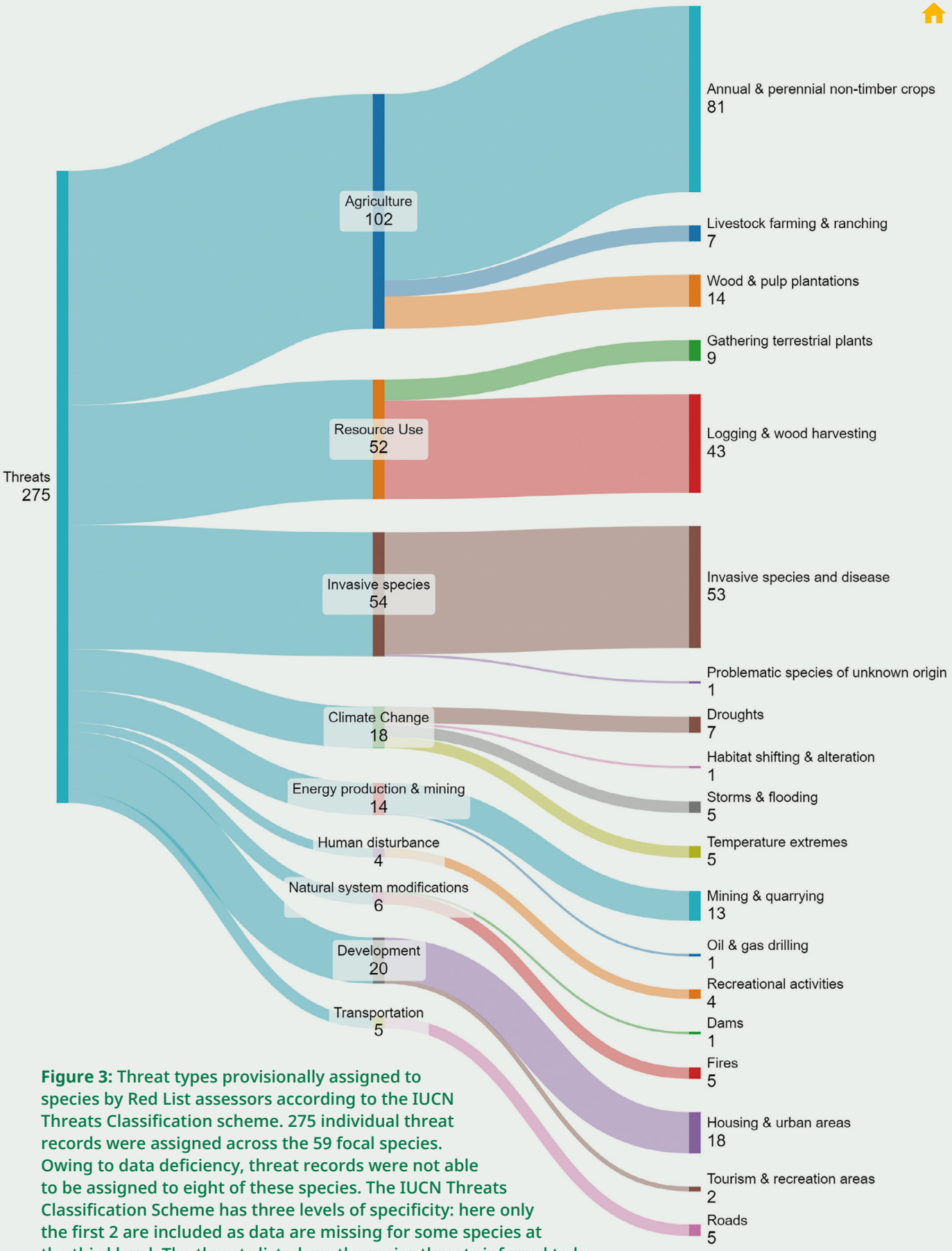


Figure 3: Threat types provisionally assigned to species by Red List assessors according to the IUCN Threats Classification scheme. 275 individual threat records were assigned across the 59 focal species. Owing to data deficiency, threat records were not able to be assigned to eight of these species. The IUCN Threats Classification Scheme has three levels of specificity: here only the first 2 are included as data are missing for some species at the third level. The threats listed are the major threats inferred to be impacting the species currently or projected to constrain their recovery. Each species may have multiple level 3 threats (not shown) in each level 2 category. As illustrated, the threat that affects most species is agriculture, specifically for crops.

2.2 | Background on species ecology

Author: Vida Svahnström

Orchids

Orchids are highly diverse across most habitats in Jamaica, with over 80 genera and 200 species known to occur on the island. Most of the species assessed as part of this project are restricted to mid- to high elevation wet, montane forest, with a few genera such as *Broughtonia* and *Dendrophylax* also occurring in coastal dry forests. Rare and threatened Jamaican orchid species often have extremely small distributions, restricted by elevation and soil type. Species endemic to limestone soils often occur either in the Central Highlands or John Crow Mountains. Species restricted to non-calcareous soils occur in the Blue Mountains. In the Central Highlands, many species are only found in one or several of the few large remaining blocks of intact, protected moist limestone forest; the Cockpit Country, Mount Diablo, and Dolphin Head. Blue Mountain species may be restricted to elfin and mossy cloud forests at the peaks of the highest mountains or found up to mid-elevations in the wet broadleaf forests of the foothills and lower slopes.

Most of the orchids assessed for this project are epiphytes, which grow non-parasitically on host trees. While Jamaican orchids do not typically exhibit species-specific host preferences, they are often restricted to specific strata and associated microclimates on a host; for instance, collection notes for many species of Jamaican *Lepanthes* indicate that they are only found on the trunks of trees. While species-specific preferences are uncommon, the texture of some tree species may cause them to be unsuitable as hosts; the prevalent, invasive species *Pittosporum undulatum* has been noted as a particularly unsuitable host for epiphytes in Jamaica[2]. Jamaican orchids which are not epiphytic are terrestrial, geophytic herbs, including such species as *Pterichis proctorii* and members of the genus *Habenaria*. While the pollination ecology and specific pollinators of Jamaican orchid species is poorly known, the diversity of floral morphology in orchids is linked to a wide range of pollinator syndromes, with many orchid species relying on just one or a few pollinating species. Many Pleurothallid genera represented in Jamaica, including *Trichosalpinx*, *Specklinia*, *Acianthera*, *Anathallis*, and *Lepanthes* have been found to be pollinated by various groups of diptera flies[3]. Guayaquil, Ecuador: Asociación Ecuatoriana de Orquideología.).

Melastomes

Most of the species of *Melastomataceae* assessed for this project are shrubs or small trees, with a few growing as woody epiphytes or scramblers. They typically comprise a component of the understory in wet, montane forests and are most diverse in the Blue and John Crow Mountains. Like orchids, rare species are often limited to either calcareous (e.g. the John Crow Mountains) or non-calcareous soils (Blue Mountains). Some species can be locally abundant; for instance, *Miconia rigida* and *Meriania purpurea* are both endemic but common in high elevation cloud forest in the Blue Mountains. Other species are rare and known from few collections; they are often difficult to identify in the field, especially when not in flower or fruit, and are likely under-recorded as a result.

Palm

Jamaica's endemic palm, *Roystonea princeps*, is a characteristic species of seasonally inundated Amazonian-type peat swamp forests, a threatened habitat that occurs in small, scattered patches within the Negril Great Morass regions in western Jamaica. It is a dominant, pioneer species in these 'swamp forests' of the Black River and Negril morasses, growing up to 20 meters tall. While it can reach high densities within this highly threatened habitat, it rarely occurs naturally elsewhere.

2.3 | Conservation challenges and opportunities

WORKING GROUP 1: INDUSTRY

WORKING GROUP: Alexander Beckford, Deon Brown, Timmera Grant, Nordia Hamilton, Shanti Persaud, Ashleigh Sanderson, Derrick Simon, Alex Simpson, Adrian Thomas, Theo Watson.

Industrial activities worldwide have significantly impacted biodiversity through habitat destruction, pollution, and climate change. In Jamaica, key industries such as agriculture, urbanization, and mining are vital to the economy but also pose substantial threats to the country's plant life and biodiversity. The expansion of these industries has led to intense competition for land, resulting in deforestation, habitat fragmentation, and ecosystem degradation, directly threatening native plant species.

Agriculture, while essential, often leads to habitat loss through the clearing of forests for crop production. The use of fertilizers, pesticides, and poor land management practices further degrade these ecosystems by contributing to soil erosion and pollution. Similarly, mining activities, which may involve extensive vegetation clearing in key areas for the species, cause severe habitat destruction and

[2]Bellingham, P.J., Tanner, E.V., Martin, P.H., Healey, J.R. and Burge, O.R., 2018. Endemic trees in a tropical biodiversity hotspot imperilled by an invasive tree. Biological Conservation, 217, pp.47-53
[3]Karremans, A.P. & Díaz-Morales, M. 2019. The Pleurothallidinae: extremely high speciation driven by pollinator adaptation. In: A. M. Pridgeon & A. R. Arosemena (Eds.), Proceedings of the 22nd World Orchid Conference, vol. 1 (pp. 363–388)

fragmentation with post-mining restoration frequently failing to restore original biodiversity and community structure. Expansion of urban development intensifies these issues by fragmenting habitats, converting natural landscapes into urban environments, and disrupting plant ecosystems. Additionally, informal settlements encroach on vulnerable ecosystems, further depleting native plant species and exacerbating habitat degradation.

Achieving a balance between industrial growth and conservation is crucial for maintaining sustainable ecosystems. This requires industries to adopt sustainable practices, reduce emissions, and protect natural habitats. Integrating conservation strategies, such as creating protected areas and promoting biodiversity-friendly practices, along with fostering innovation in green technologies, can help mitigate negative impacts. Collaboration among governments, businesses, and communities is vital to protect biodiversity while supporting economic growth. Sustainable land use planning, industrial reform, and stringent regulations are essential to mitigate industrial impacts and preserve Jamaica's unique plant ecosystems.

CHALLENGES

Urbanization and Roads

Urbanization and road expansion are significant drivers of habitat degradation, leading to deforestation and the loss of sensitive plant species, including both target and host species. Habitat change often begins with increased road access for more convenient transportation, paving the way for urban sprawl driven by the demand for housing, infrastructure and other amenities. Roadways fragment habitats, creating barriers to wildlife movement and affecting pollination and seed dispersal, which are critical for plant reproduction. As urban areas expand and the total amount of habitat reduces, these impacts intensify, forcing wildlife to migrate and reducing the carrying capacity of nearby forested areas.

Furthermore, urban growth introduces pollutants, affecting essential abiotic resources like soil and water. Light pollution further contributes to the decline of pollinators, impacting plant reproduction. Additionally, increased access may lead to the exploitation of native plant species for personal use, such as medicinal purposes or personal collection, adding to the stress on these ecosystems.

In the expansion of urban developments, native plant species are often cleared prior to construction and are rarely reintroduced for inclusion in green spaces or landscaping, which instead typically feature exotic and invasive alien species. These species can outcompete native plants, leading to further biodiversity loss. Additionally, green spaces in urban areas are often designed more to meet planning requirements as amenities rather than serve as ecological reservoirs, further reducing opportunities to preserve native flora.

Unpermitted land clearance and the proliferation of informal settlements also undermine efforts to regulate urban development. In permitted developments, poor compliance with the approved conditions of the permit and limited resources to carry out consistent enforcement tends to result in inadequate protection for plant species.

Agriculture

Habitat is also degraded though agricultural cultivation techniques. This begins with the initial land preparation methods such as slash and burn or indiscriminate use of chemicals (herbicides and pesticides) and continues through agricultural production activities such as monocropping and overgrazing with livestock. These practices strip the land of its natural vegetation, leading to a reduction in biodiversity and eliminating focal species and, in the case of epiphytes, their hosts'. Certain agricultural practices also facilitate the spread of invasive species. Plants grown for use as fence posts, yam sticks, or livestock fodder can quickly proliferate, outcompeting native flora and further disrupting local ecosystems.

For example, in Jamaica's Surrey County Corridor (here referencing areas encompassing key biodiversity areas including the Blue Mountains, John Crow Mountains, Rio Grande, Wag Water River, Swift River, Yallahs, Citron Valley, Bull Bay, and Rio Pedro), coffee cultivation often relies on agricultural chemicals that can have harmful effects on native species. Similarly, yam cultivation, a staple in Jamaica, involves the harvesting of yam sticks – wooden supports for the growing plants. The harvesting of these sticks can remove habitat and host species that epiphytic orchids rely on, thereby negatively impacting biodiversity.

Shifts in family structures have led women to take on farming responsibilities as men increasingly step away from traditional breadwinner roles. This transition raises gender and equity issues, as women often lack access to traditional farming knowledge and are underrepresented in agricultural extension services and cooperatives. As a result, they may miss out on developments like climate-smart techniques and technological advancements, leaving them with fewer resources and opportunities to adapt and improve their farming operations effectively.

Mining

Mining remains a critical industry for Jamaica due to the demand for bulk (quarried) materials essential for national development. The geology of the region

dictates that ores are found only in specific areas which may coincide with vulnerable habitats, which complicates policy and regulation. The concentration of valuable resources in particular localities can lead to increased pressure for exploitation, making it harder to balance development with environmental protection and sustainable land use. Legal mining areas are designated, but illegal mining poses an additional threat to the environment as these smaller scale, unregulated operations are more difficult to monitor and can be numerous.

Mining activities in Jamaica have profound landscape impacts, which, in turn, affect the microclimate and habitats that are crucial for both the target plant species and their hosts. The alteration of landscapes for certain mining operations often leads to changes in the soil's physical and chemical characteristics, making it less hospitable for native plant species. As habitats are disrupted, the migration of fauna can occur, affecting the ecosystem's balance and carrying capacity. The construction of access roads further contributes to these changes by fragmenting habitats and altering microclimates, which can lead to challenges in plant reproduction due to the loss of ecological corridors and disrupted ecological networks.

The environmental pollution associated with mining is another significant concern. Fugitive dust generated during mining operations, as well as emissions from vehicles and the use of chemicals in certain types of mining (such as gold mining), can have detrimental effects on plant life. These pollutants can settle on plant surfaces, interfering with photosynthesis and other vital processes.

OPPORTUNITIES

Progress has been made with the inclusion of species-specific protections for plants in the drafting instructions for amendments to the Wild Life Protection Act, 1945. This inclusion is a crucial step toward addressing regulatory gaps and reforming permitted industrial activities to prioritize the preservation of focal species as a legislative requirement.

The protected areas system – including forest reserves, game reserves, and national parks – plays a crucial role in ecosystem protection, nonetheless, there is potential to enhance its effectiveness in safeguarding plant species. The Overarching Policy for Jamaica's Protected Areas System (Green Paper), 2024, highlights the need for plans to be periodically updated and flexible to address changing circumstances and emerging issues. This provides an opportunity to align management strategies with the current ecological landscape and incorporate specific conservation measures for target plant species.

More effective conservation could involve integrating these conservation measures more broadly into land management and development plans. This may include enforcing strict conservation of habitats where these species are found or relocating vulnerable plants during development activities. Implementing robust decision-making tools, regulatory instruments, and compliance monitoring will be key to this process.

Urban development in Jamaica, overseen by municipal corporations and the National Environment and Planning Agency (NEPA), is guided by national policies, legislation and local plans. Development projects must align with land-use regulations and zoning requirements, regulated through building permits, environmental permits, and licenses. There is an opportunity to refine these permits to better prioritize plant conservation. This could involve revising permit conditions related to ecological inventories, species tagging, and ecosystem restoration.

Adjustments to Terms of Reference (TORs) for Environmental Impact Assessments (EIAs) to include detailed species data, supported by georeferencing to establish population densities and distributions, may be facilitated. This is particularly important in mining operations and large-scale developments. Ensuring qualified professionals conduct surveys and include all species of concern will enhance the protection of sensitive plant species. Although regulations currently mandate post-mining rehabilitation, biodiversity restoration is often inadequate. Recent permits have started to include requirements for mitigation and compensation for vegetation removal by way of nursery establishment, reforestation activities and incorporating native species in the footprint of the development. However, more rigorous enforcement and follow-through are necessary to ensure effective rehabilitation.

Satellite imagery and spatial data collected by agencies such as the Ministry with responsibility for Agriculture, the Forestry Department, and the Rural Agricultural Development Authority (RADA) are valuable tools for monitoring industrial activities, tracking unplanned or illegal developments, and assessing landscape fragmentation. Cross-referencing this data with botanical surveys can help identify areas where species conservation efforts should be focused.

There is also a clear need for more research on the impacts of industrial farming on plant species, particularly regarding chemicals like pesticides and herbicides. Ongoing research at the University of the West Indies (UWI) is examining these effects, and findings could inform regulations to better protect sensitive plant species. Expanding research efforts and integrating these insights into permits, licenses, and land-use policies will be crucial for improving conservation outcomes.

WORKING GROUP 2: COMMUNITY

WORKING GROUP: Christopher Creary, Comoeya Edwards, Herbert Foster, Arlett Fullerton, Shemere Lawes, Simone Lee, Jeffery Mckenize, Janelle Morris, Mariah Mosquera, Lara Williams.

In Jamaica, communities have both positive and negative impacts on biodiversity. As communities expand, they often contribute to habitat loss and fragmentation through activities such as land development, agriculture, and deforestation. This transformation disrupts ecological balance and diminishes the natural habitats that many species rely on for survival.

However, community-led conservation initiatives can play a significant role in preserving Jamaica's biodiversity by encouraging a shift in perspectives that reduces negative impacts and fosters positive contributions to the ecosystem. Many communities are actively involved in initiatives to protect and restore natural habitats, such as reforestation projects and the establishment of community-managed protected areas. Environmental education programs within communities focus on raising awareness about the importance of biodiversity and encourage sustainable practices that reduce human impact on ecosystems. Traditional knowledge and practices passed down through generations can play a crucial role in conserving biodiversity, as they may promote the sustainable use of natural resources. By engaging communities in conservation efforts, Jamaica can harness local knowledge and commitment to protect its unique biodiversity while promoting sustainable development.

CHALLENGES

Unsustainable Livelihoods

Communities based in the rural, forested areas of interest depend more heavily on their immediate environment and natural resources for their livelihoods and have fewer options for alternative ways of living or additional support that is not based on their natural resources. Livelihoods such as logging for timber and small-scale agriculture are well known to include destructive practices, but other livelihoods such as ecotourism can also have adverse impacts through destruction of habitat for trails or providing access to persons who may remove plants. Ease of access to land through urbanization and road development increases opportunities for small-scale and opportunistic agriculture, that may be unregulated and encroaching into protected areas.

Small-scale livelihood practices can have the same impact locally as large-scale industry: the destruction of habitat and loss of both target species and their hosts, habitat degradation using agricultural chemicals, and erosion of soil after land clearing. Cumulative impacts of these can be seen through a resulting decreased land stability and quality of habitat, which also affects the ability to maximize crop and livelihood outputs. Sustainable options for farming (such as manual labor instead of broad-spectrum chemicals) are more expensive and thus not an available option for most farmers. Lack of awareness of the short-term and long-term impacts of their actions may also be contributing to the detrimental effects on the species.

Land Tenureship and Valuation

Rural community members tend to reside on land and in homes in a more informal manner than urban areas. Often this is because of family connections rather than on a legal basis. In many cases the legal owner of the land is not known, or emigration means land tends to be 'left behind' or unattended. Some activities such as bauxite mining around the Cockpit Country Protected Area follow a process whereby the mining company can lease or purchase land from community members. In other cases, land is owned privately by persons not residing in the area, and destructive activities may be occurring on the land without their knowledge. Combined, this means that community members who are the direct users of the land are not aware of what they can legally and ethically do with their land, and how their activities in the short term may impact the value of the land in the long-term.

This can lead to negative impacts for plant species through land use changes, deforestation and direct removal of species through intensive industrial activities and illegal extractive activities (e.g. logging), and degrading of habitat quality (e.g. soil) through intensive mining activities. Additionally, these activities can facilitate the entry of external businesses into the country, often without prioritizing Jamaican mining firms. Furthermore, decisions may be made without considering thorough negotiation or impact evaluation in advance.

Lack of Knowledge and Awareness

Considering those human communities located directly within the forest areas, or the areas of interest based on the plant distribution (referred to as *in situ* communities in this report), most don't know the value and medicinal properties of the focal species, or of how their actions may impact the species or habitat in general. This includes a lack of appreciation for nature in general. This information needs to drive behavioral and cultural changes.

Priorities in education and awareness may not be focused on biodiversity, but rather topics more applicable to communities and their livelihoods in the short-term. The concrete, foundational and interesting

information on the species of interest is limited, and there has been no informative media sharing these details with communities to stay informed and engaged.

Due to this lack of awareness, persons may unknowingly and unnecessarily destroy plant individuals and their supporting environment through their actions. Moreover, traditional knowledge, especially on plant medicinal purposes, may be declining and not passed down through generations and has not yet been properly documented.

Without education and awareness of the species in communities, there is loss of opportunity for including the community in proactive measures (e.g. propagation) and preventative actions (e.g. removal of IAS such as Sand Box and Flame of the Forest) measures.

Lack of Enforcement

Specific to the plant species, there needs to be a robust framework with authority that would allow for action to be taken to conserve species. This comes from two aspects, the first being the existence of legislation that supports conservation and prevents destructive activities. The second relates to enforcement of the legislation which is minimal. In some cases, there is an added layer that outside enforcement officers may be unwelcome in communities. Without proper enforcement, the motivation for community persons to adhere to good practices and follow regulations is low, and the benefits of the negative action could outweigh the possible and minimal consequences.

With limited resources (budgetary and personnel) to fund enforcement and a lack of political interest in these plant species, forming and passing of legislation to protect them is difficult, and currently community members who are on the ground persons are not empowered with the knowledge or training to conduct enforcement themselves. Protected areas may also lack proper supervision or monitoring which can lead to increased fragmentation, often driven by illegal mining activities.

OPPORTUNITIES

Livelihood data exists through Forestry Department, Rural Agricultural Development Authority, National Environment and Planning Agency, Social Development Commission and possibly Statistical Institute of Jamaica. Land ownership and title information is currently available (at cost) through electronic portal at National Land Agency and the land portfolio of Ministry of Economic Growth and Job Creation would have records information on informal settlements ('squatting'). Data on land arrangements between bauxite companies and communities would exist but may not be accessible. However, it is unclear whether the livelihood and land ownership data above exists for the specific geographic areas that are of interest. Having specific geographic locality information on land use from GIS sources and open access to a data collection database would help to identify where these activities are occurring.

Research into these small-scale livelihoods practices and any actions that may be associated with them, such as overharvesting of the target species (i.e. orchids), would help to understand the possible impact they may be having and what conservation intervention might be necessary. Detailed studies are also needed on the long-term socio-economic and environmental impacts of resource extraction related activities (see also Section 1 on Industry).

Without proper surveys, it is assumed that the communities lack knowledge on these species. Moreover, observations from those who live within the communities confirm that the general knowledge on the focal species is low. What specific information the community is lacking or would drive change still needs to be clarified. Once this has been done, education and awareness should include the legal and ethical rights for community members to conduct activities on their land, as this may help to strengthen their ownership and help to prevent destruction from external parties.

Understanding current legislation around legal land activities, species-specific legislation, existing trained personnel and/or training options (ex. warden training through NEPA or ranger training through Forestry Department), and the budget for enforcement would help to understand the required resources to conduct efficient enforcement in the target areas.

WORKING GROUP 3: KNOWLEDGE & TECHNICAL EXPERTISE

WORKING GROUP: Swayne Beckles, Nikita Billet, Damany Calder, Keron Campbell, Denneko Luke, David Picking, Kamilea Russell, Michka-May Small, Damion Whyte.

The lack of knowledge, technical expertise, and funding for plant research in Jamaica presents significant challenges to the preservation and understanding of the island's unique biodiversity. While Jamaica is home to a rich array of plant species, including many endemics, insufficient research limits the understanding of these species and their ecological roles. This gap in knowledge hinders effective conservation strategies and sustainable agricultural practices. Without a comprehensive understanding of plant genetics, distribution, and

interactions with their ecosystems, it becomes difficult to develop policies and practices that protect these vital resources.

Technical expertise in plant research is also limited, which restricts the ability to conduct detailed studies and implement advanced conservation techniques. The shortage of trained botanists, ecologists, and conservationists means that many research initiatives cannot be fully developed or maintained. This lack of expertise also affects the ability to leverage modern technologies such as GIS mapping, genetic analysis, and climate modeling, which are crucial for understanding and mitigating the impacts of environmental changes on plant species.

Funding for plant research in Jamaica is often insufficient, affecting the scope and scale of research projects. Limited financial resources mean that essential equipment, field studies, and long-term monitoring programs are often underfunded or not funded at all. This scarcity of funds also impacts the ability to attract and retain qualified researchers and to support educational programs that could build local expertise. Moreover, the competition for scarce funding often prioritizes immediate economic concerns over long-term environmental research, further limiting investment in plant studies. Increasing financial support from both governmental and non-governmental sources is crucial for advancing plant research and ensuring the conservation of Jamaica's botanical diversity.

CHALLENGES

Lack of Technical Support and Training

Currently there is a significant lack of capacity and personnel that are knowledgeable and trained on the focal species. There is a lack of both trained experts, and training in taxonomy and identifying the species in the wild. This leads to a significant absence of technical data on the species such as ecology, habitat requirements, and distribution that are not available to inform conservation. Surveys and periodic assessments are constrained by both this absence of trained personnel and a lack of funding and resources to carry them out. These deficiencies result in the inability to properly protect, assess and manage the targeted species and areas.

Exacerbating issues such as 'brain drain' (where highly educated persons leave from their country due to economic, political, or social factors), ineffective management plans and strategies, and failure of implementation can be compounding factors that hinder the growth of technical knowledge. A general lack of interest among prospective recruits and in plant conservation among key stakeholders also makes capacity building harder.

Without enough trained botanists and conservationists, critical studies are often not undertaken. This gap in expertise prevents the implementation of informed conservation strategies that could help protect these species from further decline.

Invasive Alien Species (IAS)

Uncontrolled growth and proliferation of non-native species negatively affects the ecosystem and focal species. Invasives like White-tail deer (*Odocoileus virginianus*) that were introduced after escaping enclosures and continue to spread through the pet trade, can destroy habitat through their uncontrolled grazing and spread other invasive plants. Invasive plants like Bamboo (*Bambusoideae*) and Wild Coffee (also known as Australian cheesewood- *Pittosporum undulatum*) are aggressive colonizers and can outcompete native plant species. Many invasives are spread through human introduction like farming practices or through other wildlife like birds or deer and have no eradication program.

Although the distribution of some of these species may be known (such as the presence of *Pittosporum undulatum* in the Surrey corridor), it is still not fully understood what the impact they may be having on the focal species and what changes they may be causing. For instance, it is thought that deer indiscriminately eat and affect melastome seedlings, but there has been no research into this. The cause, spread, and impact of IAS on the focal species still needs additional investigation.

Understanding the known and perceived benefits vs. the disadvantages of invasive species to both communities and other species will be important to creating proper management plans. Invasive species benefit many communities through providing services like fodder for livestock (see section 2 on community), and some flowering IAS (like Wild Coffee) may be beneficial to native pollinators.

Lack of Research and Information

The lack of information on the ecology of target plant species in Jamaica significantly hampers conservation efforts. Research is still needed on the species reproductive viable population, population, generational length, and phenology. Without a clear understanding of the species' ecological roles, it is difficult to develop effective planning and conservation actions. This deficiency reduces the effectiveness of local organizations, non-governmental organizations (NGOs), and government entities in managing these species and their habitats. As a result, many species are not adequately conserved or protected, leading to a decline in their populations. The absence of crucial data on species ecology contributes to this reduction, as conservation

strategies cannot be tailored to the specific needs of each species.

The absence of comprehensive data on species ecology and populations hampers effective conservation efforts as decisions are often made without a complete understanding of the needs and challenges facing these species.

Lack of Funding and Long-Term Investment for Conservation of Selective Threatened Species

The lack of funding for plant research and conservation in Jamaica leads to significant biodiversity loss and insufficient protection of species. Without adequate financial resources, monitoring programs cannot be properly implemented, leaving many plant species vulnerable to overharvesting and habitat degradation. This lack of monitoring and protection increases the risk of species decline and extinction, as there is limited capacity to respond to environmental threats or illegal activities.

Several factors contribute to the funding shortfall for plant conservation. One major issue is the lack of buy-in from stakeholders, who may not fully appreciate the value of biodiversity or recognize its long-term importance to Jamaica's ecosystems and economy. Additionally, there is often a lack of long-term vision and funding commitment, leading to short-lived projects that fail to make a lasting impact. Misguided priorities, such as focusing primarily on immediate economic gains over environmental sustainability, further exacerbate the problem, diverting attention and resources away from essential conservation efforts.

Compounding these issues is the limited capacity to secure funding through grants. Many organizations and researchers may lack the skills or experience needed to write effective grant proposals, resulting in missed opportunities for financial support. This lack of expertise in grant writing prevents access to potential funding sources that could otherwise support critical research and conservation initiatives.

The shortage of funding also poses a major obstacle to plant research and conservation in Jamaica. Limited financial resources make it challenging to acquire essential field equipment and support comprehensive research projects. Without adequate funding, research efforts are often constrained, and important ecological and species data remain unknown. Increasing financial support for plant research and conservation is crucial for understanding and preserving Jamaica's unique biodiversity. More funding would enable targeted studies that inform effective conservation actions and support the sustainable management of these vital resources.

Addressing these challenges requires a concerted effort to raise awareness about the value of biodiversity, build stakeholder engagement, and enhance the skills needed to secure funding and implement effective, long-term conservation strategies.

Lack of *ex situ* conservation sites, protocols and management

Presently *ex situ* conservation is not significantly employed as a tool in the conservation and management of Jamaica's threatened species. In the case of orchids some of the species have been collected in the wild and live collections reside in private orchid collections and in some instances, these holdings represent unintentional *ex situ* collections outside of the formal conservation and management mechanism. Ideally, records of all these *ex situ* holdings would be an asset to NEPA and supporting entities who would be able to prioritize collections of species not yet held in *ex situ* sites.

Ex situ sites, protocols for collecting, removal and/or transfer, propagation and reintroduction do not exist presently for these species, and these need to be established and applied in a standardized manner to improve the success of any and all *ex situ* actions.

There have been efforts to propagate some endemic and threatened species, however to date these have been without much success. These efforts were led by NEPA in collaboration with the IOJ, FD, SRC, and Public Gardens (MOAFM). NGOs such as JCDT and CCAM have also attempted *ex situ* propagation of threatened species within their respective management areas. Further efforts need to be made to build upon what was done in the past through renewed MOUs and agreements with both GOJ supporting entities, academia, NGOs, CBOs and international research institutions where applicable, to further the goal of having an effective *ex situ* conservation program.

OPPORTUNITIES

The conservation and protection of Jamaica's threatened species can greatly benefit from the integration of cutting-edge technologies, including 3D scanning, drone technology, GIS analysis, and remote sensing. Various Government of Jamaica (GOJ) entities such as the Forestry Department and the National Spatial Data Management Branch possess significant GIS capabilities and expertise, presenting a valuable opportunity for new partnerships. Additionally, many GOJ entities along with NGOs and community groups already utilize spatial data in their regular operations, and this application could be expanded. By integrating more technology into the overall conservation and management efforts for threatened species data collection, management, and expertise could be improved, leading to enhanced conservation outcomes.

An existing IAS list managed by the Jamaica Clearing-House Mechanism (JA-CHM) under the Natural History Museum of Jamaica, has been developed and updated over several years by the Invasive Alien Species Working Group. This group, established by the National Environment and Planning Agency (NEPA), includes stakeholders from various sectors, including academia, government, NGOs, and other experts. Consultations within this group, as well as with the broader public, have been instrumental in creating the current IAS list. The list is scheduled for inclusion in the Wild Life Protection Act, which is currently being updated. Incorporating invasive species into the Wild Life Protection Act will facilitate better management and control, potentially reducing their impact on native species. A National Invasive Species Strategy and Action Plan has also been developed, and the goals and actions outlined in this report could help to update that action plan accordingly. Images of IAS species are available and could be used with local groups and NGOs to play a more integral role in monitoring the spread and presence of invasives within KBAs, where they are or potentially can adversely impact threatened species.

To increase awareness of existing funding opportunities and grant writing programs among stakeholders involved in the conservation and management of these species, applicable funding sources, donor agencies, and bodies can be compiled and shared by the GOJ Lead (NEPA) with various working groups, committees, and authorities directly involved in these efforts.

Currently, there are existing ex situ collections of these threatened species held both locally by private entities and internationally by other organizations, which may contain valuable information on propagation techniques and species management. Collaboration with these private holders and international entities could provide critical data that is not currently available within NEPA's existing species protection and management framework. Information on distribution, population, phenology, and other vital aspects is likely to be found in these collections, and NEPA could take the lead in facilitating collaboration and information sharing with these private holders and institutions.

3. Species Conservation Action Plan

3.1 | Vision

Participants agreed the following long-term vision for the focal species:

By 2054, Jamaica will be following an established protocol for protecting our endangered and native plants, creating strong policies to safeguard these natural treasures. We will work together to understand and nurture our flora, ensuring they thrive in the wild and in nurseries. By fostering a love for our plants, we will inspire everyone to protect our environment and create sustainable livelihoods for future generations.

Mek wi tek care a dem cause dem belong to all a wi

3.2 | Measurable targets

Following the workshop, a small group developed the following aspirational but measurable targets to track progress towards the Vision for these focal species over the next few years. These should be reviewed and revised regularly.

TARGETS:

- **By 2025, national laws and policies that protect these species are in place and actively implemented, supported by robust compliance monitoring and enforcement systems.**
- **Plant husbandry and propagation protocols for all species are produced by 2025 and used to support population restoration efforts.**
- **Local communities and authorities are educated on the species in their area and are participating in recovery actions from 2025, with sustainable use by local communities supported and recognized as a valid conservation approach.**
- **Funds for *ex situ* activities, to be carried out in partnership with local communities, have been identified and requested by 2026.**
- **By 2030, research on focal species distributions and ecology has been conducted and is used to inform both *in situ* and *ex situ* conservation actions and support IUCN Red List assessments, ensuring no species is listed as Data Deficient.**
- **All focal species, through active conservation and population recovery programs, have improved their status on the IUCN Red List by at least one threat category by 2030.**
- **The key threats to the populations of all focal species have been minimized through targeted mitigation measures by 2030, with early indicators of population recovery observed.**
- **From 2030, no population of Critically Endangered species has been lost in Jamaica.**
- **By 2030, there are multiple stable and genetically representative *ex situ* populations of all Endangered and Critically Endangered species established in designated conservation facilities, supporting long-term recovery and reintroduction efforts.**
- **By 2030, sustainable livelihoods based on conservation-friendly practices, such as eco-tourism, sustainable agriculture, and native plant nurseries, are actively supported and implemented in local communities, contributing to both species recovery and community economic resilience.**

3.3 | 5-10 year goals

The following 5-10 year goals were developed by the three working groups. Recommended actions for achieving each of these goals are detailed below:

WORKING GROUP 1

Goal 1:
Increased species protection, abundance and habitat interconnection through interplanting in development infrastructures.

Goal 2:
Improved regulatory procedures for agricultural practices that consider the conservation objectives of the focal species.

Goal 3:
Promote innovation in agricultural practices to reduce the occurrence of harmful pesticides/ herbicides leaching near focal species.

Goal 4:
A well-regulated mining industry that has special consideration for focal species.

WORKING GROUP 2

Goal 1:
Community members maintain or enhance their livelihoods whilst reducing the destruction of plant species and their dependent habitats in their area.

Goal 2:
Community members knowledgeable about their land status, their legal and ethical rights and the impact of activities on the value of their land so that informed decisions can be made.

Goal 3:
All members – from youth to elders – of *in situ* communities aware that there are important plant species in and around their homes and areas of livelihood, and for them to be knowledgeable about their value.

Goal 4:
Communities to utilize their increased knowledge to actively conserve and protect the plant species.

Goal 5:
To have a legal framework and resourced enforcement system in place that provides accountability and authority for the conservation and protection of species.

Goal 6:
To have *in situ* communities empowered through awareness, training, resources, and legal backing to enforce those laws that protect the plant species.

WORKING GROUP 3

Goal 1:
To build and increase technical capacity within stakeholder organizations.

Goal 2:
To reduce the impact and mitigate the spread of IAS.

Goal 3:
To establish species ecology, phenology, propagation techniques, population trends and pressures, and requirements (habitat, abiotic, biotic preferences).

Goal 4:
To increase funding for conservation.

Goal 5:
To establish *ex situ* localities and protocols for the proper removal and/or transfer of these species to secure localities.

3.4 | WORKING GROUP 1: Recommended actions

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
GOAL 1: Increased species protection, abundance and habitat interconnection through interplanting in development infrastructures.	
Map and publish where developments are occurring and where target species are located, towards the determination of high-risk areas for threatened species.	**NEPA,** Forestry Department, National Spatial Data Management Branch (NSDMB)
Require pre-construction survey of species, collection, and replanting at appropriate localities after activity, including: • ecological inventories are done and species are collected, put in nurseries, and replaced at the end, with 70% survival required.	**NEPA**
Improve urban development policies through reserving and enforcing ecological reservoirs and conservation areas within housing developments and encourage urban forestry to promote species protection in proximity to cities, roads, and houses.	**NEPA, Municipal corporations,** Forestry Department, Orchid Society, SRC, Public Gardens Division
Use species data and physical requirements of epiphytic plants to drive policies for relocation and rehabilitation activities (which will require improved knowledge of the physical requirements for epiphytic plants).	**Mines and Geology Division, FD, NEPA, Public Gardens Division**
GOAL 2: Improved regulatory procedures for agricultural practices that consider the conservation objectives of the target species.	
Identify funding mechanisms to hire additional staff with improved competencies, in areas such as Sustainable Land Management and Ecosystem-based Adaptation in Agriculture, to ensure improved adoption of existing regulations.	MOAFM, RADA, JAS
Increase farmer registration in the Ministry with responsibility for Agriculture's registrations system, to facilitate more robust agricultural monitoring.	MOAFM, RADA, JAS
Review policy and legal framework to ensure inclusion of conservation objectives for focal/target species, as well as for their host in the case of epiphytes.	MOAFM, NEPA
Map and publish where agriculture is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), MOAFM

3.4 | WORKING GROUP 1: Recommended actions continued

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
GOAL 3: Promote innovation in agricultural practices to reduce the occurrence of harmful pesticides/herbicides leaching near focal species.	
Build capacity of farmers using a gender-inclusive approach to sensitization and training in international agricultural best practices, ecosystem-based adaptation techniques, and climate-smart agriculture.	MOAFM, RADA, JAS, JOAM
Monitor pesticide usage among farmers through soil testing, bioaccumulation, record keeping, and associated biodiversity.	**PCA (UWI), RADA,** MOAFM, Government Chemist, ICENS, JOAM
Implement programs to educate and train local farmers in agricultural enforcement practices and provide incentives for reporting incidents.	PCA (UWI), MOAFM, RADA, ICENS, JOAM, NEPA
GOAL 4: A well-regulated mining industry that has special consideration for focal species.	
Create, review, and implement standard conditions (legal environmental requirements) for mining permits, to ensure objective for species protection and management.	NEPA, Mines and Geology Division, JBI
Create and adhere to schedules for audits and monitoring of permits and licenses.	NEPA, Mines and Geology Division, JBI
Identify small-scale mining operations and engage local enforcement for monitoring and management.	JCF, NEPA, JBI, Mines and Geology Division
Map and publish where mining is occurring and where focal species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), JBI

3.5 | Working Group 2: Recommended actions

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
GOAL 1: Community members maintain or enhance their livelihoods whilst reducing the destruction of plant species and their dependent habitats in their area.	
Promote and encourage sustainable alternative livelihoods.	**Rural Agricultural Development Authority,** National Environment and Planning Agency, Tourism Product Development Company, 4-H Clubs, MOAFM
Promote, enhance and encourage existing livelihoods that have minimum impact on plant species and dependent habitats.	SDC, PIOJ and STATIN
Research into small-scale livelihoods practices and impacts on the species.	**National Environment Planning Agency,** JCDT, CANARI, Jamaica Environmental Trust, University of the West Indies
GOAL 2: Community members knowledgeable about their land status, their legal and ethical rights and the impact of activities on the value of their land so that informed decisions can be made.	
Provide community members with information on how to assess their land ownership status and understand their rights and responsibilities as landowners. This should include insights into the conservation value and status of their land to foster informed decision-making.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit
Develop and implement a behavioral change campaign focused on promoting conservation-supporting activities and outlining practices to avoid and prevent environmental damage. This campaign should use targeted educational programs and resources to enhance practical understanding of effective land management and conservation practices.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit
GOAL 3: All members – from youth to elders – of *in situ* communities aware that there are important plant species in and around their homes and areas of livelihood, and for them to be knowledgeable about their value.	
Establish community watch groups (a community-driven, citizen group that would monitor for infractions and report to the appropriate authority).	NEPA, Forestry Department Community based organizations

3.5 | Working Group 2: Recommended actions continued

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Training community members on protected species threats and implementation of the law.	NEPA, Forestry Department, SDC and other municipal corporations
GOAL 4: Communities to utilize their increased knowledge to actively conserve and protect the plant species.	
Continuous knowledge sharing through local community groups.	**LFMCs, SDC, NEPA**
Establish programs to get hands-on conservation experience (e.g. Naval String Project).	**LFMCs** (School Clubs)
GOAL 5: To have a legal framework and resourced enforcement system in place that provides accountability and authority for the conservation and protection of species.	
Review existing regulations/policies to identify gaps in enforcement e.g. penalties.	**National Environment and Planning Agency,** Ministry of Economic Growth and Job Creation, MNS, Forestry Department
Recruitment and training of existing and additional personnel.	**National Environment and Planning Agency,** Forestry Department, Jamaica Constabulary Force
Assign/deploy trained personnel to specific conservation areas.	**National Environment and Planning Agency,** Forestry Department
GOAL 6: To have *in situ* communities empowered through awareness, training, resources, and legal backing to enforce those laws that protect the plant species.	
Conduct sensitization sessions for community members.	**NEPA,** Forestry Department, RADA, 4H Clubs, Jamaica Agricultural Society, Ministry of Agriculture, LFMCs, Jamaica Environment Trust, Orchid Society

3.5 | Working Group 2: Recommended actions continued

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Incorporate educational components into plant conservation projects.	**Funding Agencies,** National Conservation Trust Fund of Jamaica, Environmental Foundation of Jamaica, Caribbean Natural Resources Institute
Streamline biodiversity topics inclusive of species conservation into school curriculums across various levels.	**Ministry of Education,** Environmental Agencies

3.6 | Working Group 3: Recommended actions

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
GOAL 1: To build and increase technical capacity within stakeholder organizations.	
Train more plant specialists or interested persons in taxonomy.	**NEPA**-overseer, **Academia**-execute, **TIU**-capacity building, NGOs, GOJs
Train taxonomists to be trainers (to teach taxonomy and identification of plants for general audience).	**NEPA**-overseer, **Academia**-execute**, TIU**-capacity building, NGOs, GOJs, FD
Establish a protocol for continuous training of stakeholders for future training of communities in plant ID.	NEPA, TIU, FD, SDC, Academia, NGOs, GOJs, NPF
Increase access, availability, and training in modern software, hardware, and techniques for data gathering and analysis.	Academia, FD, National Spatial Data Management Branch
Build capacity in data collection and analysis techniques.	NEPA, FD, Academia

3.6 | Working Group 3: Recommended actions continued

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
GOAL 2: Reduce the impact and mitigate the spread of IAS.	
Use communication professionals to create a public awareness campaign around the impact of IAS on the target species, including media posts, educational material materials in schools (printed, electronic, face to face), an integrative university syllabus, and running community fairs/sessions.	**IAS WG,** NEPA- Public Education and Corporate Communications Branch, NGOs, FD, JCDT, Schools, Communities, LFMCs, SDC, communication professionals
Create species survey methodology and survey/map the areas where IAS are found, produce distribution maps.	**NEPA, UWI/Academia, IOJ,** JCDT, FD, Windsor Research Centre, NGOs, Community groups, LFMCs
Establish collaboration with community groups through projects and formalize a local surveillance mechanism.	**NEPA, UWI/Academia, IOJ,** JCDT, FD, Windsor Research Centre, NGOs, Community groups, LFMCs
Put in place site-specific IAS management plans to monitor, remove, and reduce IAS', targeting critical habitats of key plant species.	NEPA/IAS WG, NGOs, CBOs, FD, LFMCs, Academia
Increase research on IAS: the impact on target species and possible benefits they may have to communities.	NEPA/IAS WG, NGOs, Academia
GOAL 3: Establish species ecology, phenology, propagation techniques, population trends and pressures, and requirements (habitat, abiotic, biotic preferences).	
Conduct data gap analysis to identify what knowledge and research is needed for the species and prioritize.	**NEPA, Academia,** Scientific Research Council, Public Gardens Division, FD, Orchid Society, Horticultural Society
Once data gaps are identified and prioritized, gather and collate all the necessary data to fill remaining gaps of the target species assessments.	**NEPA,** Academia, FD, NGOs, IOJ
Research and monitoring of species ecology, phenology, propagation techniques, population trends and pressures, and requirements (habitat, abiotic, biotic preferences)	**NEPA** (Academia, FD, NGOs), IOJ

3.6 | Working Group 3: Recommended actions continued

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Create an independent database with closed access (not open source) within JA-CHM to host ecological data of target species.	**IOJ/CHM,** Academia, NEPA, Citizen, GOJ, site specific NGOs
GOAL 4: Increase funding for conservation.	
Increase grant writing capabilities within stakeholder entities (communities, NGOs, GOJs) by employing professional consultants.	**NEPA-Projects Branch, FD,** EFJ, GOJ, NGOs, Academia (leads depend on grant) • many internationals org. offer courses-sometimes project concepts include these details.
Increase partnership with local private sector to fund conservation projects, such as the Green Bond (Jamaica Stock Exchange).	Forestry Department, Other GOJs, NGOs, CBOs, JET, private sector, NEPA
Increase partnerships with international funding agencies/ donors/diaspora to fund conservation projects.	NEPA, PIOJ, Jamaica National Conservation Trust Fund, Forestry Department, Other GOJs, NGOs, CBOs, CANARI, CBF
Raise research funding for target species ecology and other research gaps.	**Academia,** NEPA, PIOJ (FD, NGOs), Windsor Research Centre, JCDT, STEA, SECCLFMC, NCCLMFC, DHLMFC, CCAM
Develop an overall plan for securing funding beyond the present short-term funding cycle that exists within individual donor entities, through the creation of a steering committee that will drive this process.	**PIOJ,** NCTFJ, NEPA (NGOs, GOJ, local stakeholders),
GOAL 5: Establish *ex situ* locations and protocols for the proper removal and/or transfer of these species to secure locations.	
Create standardized protocols for the collection, transfer, and housing of species.	**NEPA, Orchid Society, SRC,** Academia
Identify organizations with the capacity to house the species and create database detailing organizations' capability.	SRC, NEPA, Public Gardens Division, JBI, Academia

3.6 | Working Group 3: Recommended actions continued

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Create a Memorandum of Understanding between organizations responsible for the collection, transfer, and housing of species that clearly outlines and identifies their roles.	SRC, NEPA, Orchid Society, JBI, Nature Preservation, Public Gardens Division, FD
Create standardized protocols for the reintroduction of species back into suitable habitat.	NEPA, Academia

4. Site-based Action Plans

Information developed by participants was used to construct the following eight site-based conservation action plans for CEPF KBA areas of interest (*see Figure 1 for reference*). Litchfield Mountain-Matheson's Run KBA was excluded as no species of interest are known to occur there. Of the 59 species of interest, 48 of these occur in the following KBAs of interest. Four species (*Acianthera monophylla, Anathallis jamaicensis, Habenaria socialis, Miconia ecostata*) are not included in the following plans as they currently have no locality information available. 11 single site endemics (species that are found only within that KBA) are identified in their respective site plans. It should be noted that five species (*Epidendrum swartzii, Lepanthes jesupii, Lepanthes tubuliflora, Miconia hirtellicaulis, Miconia proctorii*) occur only outside KBAs, and one of these species is also data deficient and lacks information on threats (*Lepanthes jesupii*). These species should be prioritized for further conservation work to address these issues. All Red List categories and data used here are provisional.

4.1 | Plan for: Dolphin Head

INTRODUCTION TO THE SITE

The Dolphin Head Key Biodiversity Area (KBA) is a significant ecological site located in western Jamaica of 53 km², specifically in the Dolphin Head Mountain range of Hanover Parish. This forested area represents one of Jamaica's most important remaining stands of native vegetation, rising to approximately 545 meters above sea level and encompassing a unique limestone formation that creates distinct microhabitats. The forests of Dolphin Head have been broadly classified as evergreen seasonal and closed broadleaf forest (Beard 1955[1]). Floristic surveys have been conducted in the Dolphin Head Mountain since the 1950s.

[1] Beard, J.S. 1955. *The classification of Tropical American vegetation-types*. Ecology 36(1): 89-100.

Dolphin Head Mountain is a designated Forest Reserve with a high species diversity and endemism. The area is particularly notable for its high level of invertebrate, vertebrate, and plant endemism, hosting several species that are found nowhere else in the world. The combination of its elevation, limestone geology, and climate creates conditions that have allowed for the evolution of specialized flora adapted to its specific environmental conditions. This includes several rare orchid species and other distinctive plant life that make the area a priority for conservation efforts.

The Dolphin Head KBA serves as a critical watershed for surrounding communities and provides essential ecosystem services to the region. Beyond its botanical significance, the area supports various endemic bird species and other wildlife that depend on its intact forest habitat. Local conservation initiatives, including the work of the Dolphin Head Local Forest Management Committee (LFMC), have been instrumental in protecting this unique ecosystem while promoting sustainable use of forest resources.

SPECIES LIST (Red List categories listed are provisional)

- *Miconia crossosepala* (VU)
- *Tolumnia gauntlettii* (EN)
- *Dendrophylax funalis* (NT)

KBA SITE ENDEMIC SPECIES

- *Blakea urbaniana* (CR)
- *Encyclia parviloba* (CR)

SITE SPECIFIC THREATS

Threats from provisional red list data at the most specific level available (level 2 and 3) for species at the site.

- Annual & perennial non-timber crops: Shifting agriculture
- Annual & perennial non-timber crops: Small-holder farming
- Droughts
- Gathering terrestrial plants: Intentional use (species is the target)
- Gathering terrestrial plants: Unintentional effects (species is not the target)
- Housing & urban areas
- Invasive non-native/alien species/diseases: Named species
- Invasive non-native/alien species/diseases: Unspecified species
- Logging & wood harvesting Unintentional effects: (large scale) [harvest]
- Logging & wood harvesting Unintentional effects: (subsistence/small scale) [harvest]
- Mining & quarrying
- Temperature extremes
- Wood & pulp plantations Small-holder plantations

SPECIES THREATS TABLE

Major (Level 1) threats provisionally assigned to each of the focal species in this area according to the IUCN Threats Classification Scheme. For each species, assessors have listed the major threats that lead to the species being listed as threatened with extinction or that are expected to constrain their recovery.

SPECIES	Agriculture	Resource use	Residential & commercial development	Human disturbance	Invasive species	Transportation	Energy production & mining	Climate change & severe weather	Natural system modifications
• *Blakea urbaniana*	YES	YES	NO	NO	YES	NO	NO	NO	NO
• *Dendrophylax funalis*	YES	YES	YES	NO	YES	NO	YES	NO	NO
• *Encyclia parviloba*	YES	NO	YES	NO	YES	NO	NO	YES	NO
• *Miconia crossosepala*	YES	YES	NO	NO	YES	NO	YES	NO	NO
• *Tolumnia gauntlettii*	YES	YES	NO	NO	NO	NO	YES	YES	NO

GOALS AND RECOMMENDED ACTIONS

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Increased species protection, abundance and habitat interconnection through interplanting in development infrastructures	
Map and publish where developments are occurring and where target species are located, towards the determination of high-risk areas for threatened species.	**NEPA,** Forestry Department, National Spatial Data Management Branch (NSDMB)
Require pre-construction survey of species, collection, and replanting at appropriate locations after activity, including: • ecological inventories are done and species are collected, put in nurseries, and replaced at the end, with 70% survival required.	**NEPA**
Improve urban development policies through reserving and enforcing ecological reservoirs and conservation areas within housing developments and encourage urban forestry to promote species protection in proximity to cities, roads, and houses.	**NEPA, Municipal corporations,** Forestry Department, Orchid Society, SRC, Public Gardens Division
Use species data and physical requirements of epiphytic plants to drive policies for relocation and rehabilitation activities (which will require improved knowledge of the physical requirements for epiphytic plants).	**Mines and Geology Division, FD, NEPA, Public Gardens Division**
Implement reforestation and rehabilitation projects within natural forested areas	**Forestry Department, NEPA**
Improved regulatory procedures for agricultural practices that consider the conservation objectives of the target species.	
Identify funding mechanisms to hire additional staff with improved competencies, in areas such as Sustainable Land Management and Ecosystem-based Adaptation in Agriculture, to ensure improved adoption of existing regulations.	MOAFM, RADA, JAS
Increase farmer registration in the Ministry with responsibility for Agriculture's registrations system, to facilitate more robust agricultural monitoring.	MOAFM, RADA, JAS
Review policy and legal framework to ensure inclusion of conservation objectives for focal/target species, as well as for their host in the case of epiphytes.	MOAFM, NEPA

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Map and publish where agriculture is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), MOAFM
Promote innovation in agricultural practices to reduce the occurrence of harmful pesticides/herbicides leaching near target species.	
Build capacity of farmers using a gender-inclusive approach to sensitization and training in international agricultural best practices, ecosystem-based adaptation techniques, and climate-smart agriculture.	MOAFM, RADA, JAS, JOAM
Monitor pesticide usage among farmers through soil testing, bioaccumulation, record keeping, and associated biodiversity.	**PCA (UWI), RADA,** MOAFM, Government Chemist, ICENS, JOAM
Implement programs to educate and train local farmers in agricultural enforcement practices and provide incentives for reporting incidents.	PCA (UWI), MOAFM, RADA, ICENS, JOAM, NEPA
A well-regulated mining industry that has special consideration for target species.	
Create, review, and implement standard conditions (legal environmental requirements) for mining permits, to ensure objective for species protection and management.	NEPA, Mines and Geology Division, JBI
Create and adhere to schedules for audits and monitoring of permits and licenses.	NEPA, Mines and Geology Division, JBI
Identify small-scale mining operations and engage local enforcement for monitoring and management.	JCF, NEPA, JBI, Mines and Geology Division
Map and publish where mining is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), JBI

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
A healthy ecosystem resilient to climate change, drought and temperature extremes.	
Reforesting degraded areas with drought tolerant native species.	Forestry Department, Mine and Geology Division , NEPA
Promote species and structural diversity in forests in order to increase the resilience by reducing the impact of species specific drought stress.	Forestry Department, NEPA
Community members maintain or enhance their livelihoods whilst reducing the destruction of plant species and their dependent habitats in their area.	
Promote and encourage sustainable alternative livelihoods.	**Rural Agricultural Development Authority,** National Environment and Planning Agency, Tourism Product Development Company, 4-H Clubs, MOAFM
Promote, enhance and encourage existing livelihoods that have minimum impact on plant species and dependent habitats.	SDC, PIOJ and STATIN
Research into small-scale livelihoods practices and impacts on the species.	**National Environment and Planning Agency,** JCDT, CANARI, Jamaica Environmental Trust, University of the West Indies
Community members knowledgeable about their land status, their legal and ethical rights and the impact of activities on the value of their land so that informed decisions can be made.	
Provide community members with information on how to assess their land ownership status and understand their rights and responsibilities as landowners. This should include insights into the conservation value and status of their land to foster informed decision-making.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Develop and implement a behavioral change campaign focused on promoting conservation-supporting activities and outlining practices to avoid and prevent environmental damage. This campaign should use targeted educational programs and resources to enhance practical understanding of effective land management and conservation practices.	**National Land Agency**, Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit
All members – from youth to elders – of *in situ* communities aware that there are important plant species in and around their homes and areas of livelihood, and for them to be knowledgeable about their value.	
Establish community watch groups (a community-driven, citizen group that would monitor for infractions and report to the appropriate authority).	NEPA, Forestry Department Community based organizations
Training community members on protected species threats and implementation of the law.	NEPA, Forestry Department, SDC and other municipal corporations
Communities to utilize their increased knowledge to actively conserve and protect the plant species.	
Continuous knowledge sharing through local community groups.	**LFMCs, SDC, NEPA**
Establish programs to get hands-on conservation experience (e.g. Naval String Project).	**LFMCs** (School Clubs)
To have a legal framework and resourced enforcement system in place that provides accountability and authority for the conservation and protection of species.	
Review existing regulations/policies to identify gaps in enforcement e.g. penalties.	**National Environment and Planning Agency,** Ministry of Economic Growth and Job Creation, MNS, Forestry Department
Recruitment and training of existing and additional personnel.	**National Environment and Planning Agency,** Forestry Department, Jamaica Constabulary Force

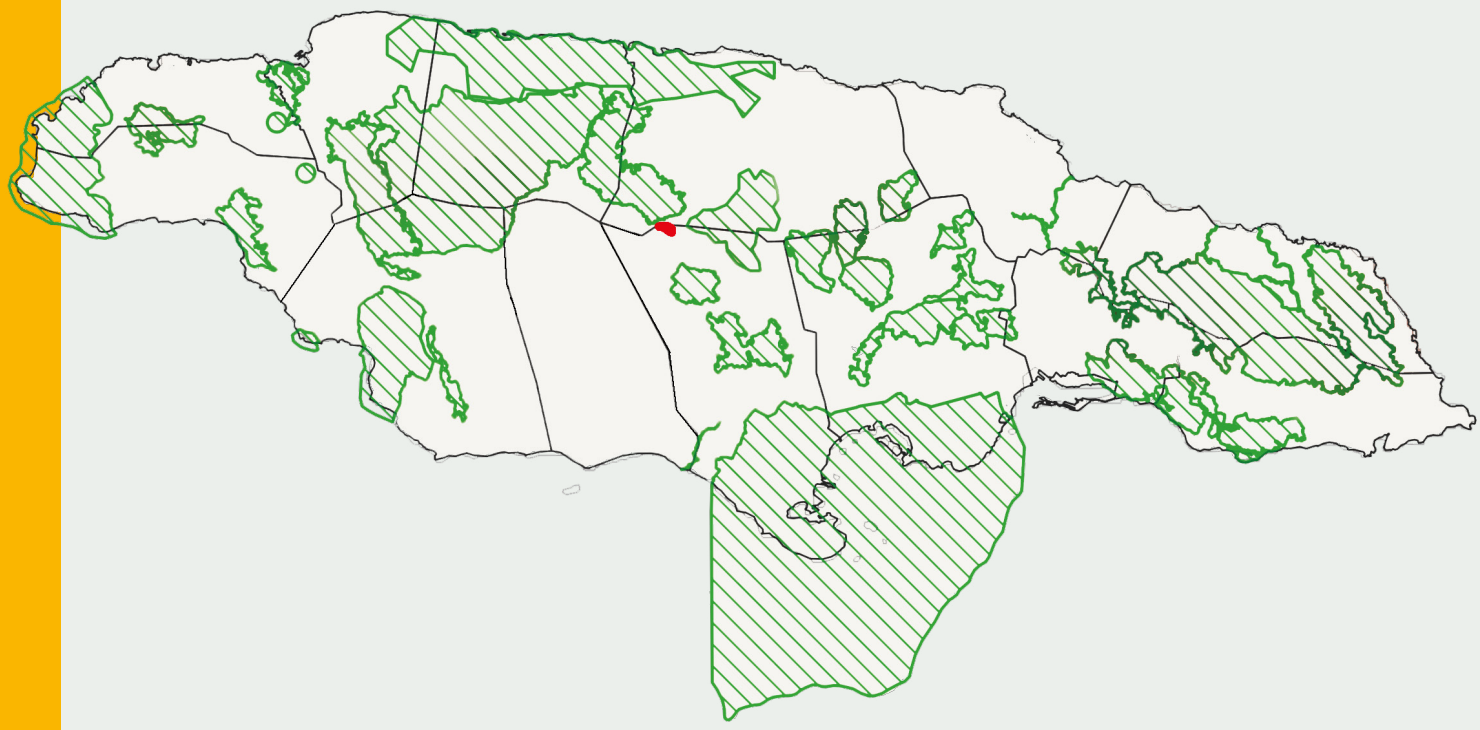
GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Assign/deploy trained personnel to specific conservation areas.	**National Environment and Planning Agency,** Forestry Department
To have *in situ* communities empowered through awareness, training, resources, and legal backing to enforce those laws that protect the plant species.	
Conduct sensitization sessions for community members.	**NEPA,** Forestry Department, RADA, 4H Clubs, Jamaica Agricultural Society, Ministry of Agriculture, LFMCs, Jamaica Environment Trust, Orchid Society
Incorporate educational components into plant conservation projects.	**Funding Agencies,** National Conservation Trust Fund of Jamaica, Environmental Foundation of Jamaica, Caribbean Natural Resources Institute
Streamline biodiversity topics inclusive of species conservation into school curriculums across various levels.	**Ministry of Education and Youth,** Environmental Agencies
Reduce the impact and mitigate the spread of IAS.	
Use communication professionals to create a public awareness campaign around the impact of IAS on the target species, including media posts, educational material materials in schools (printed, electronic, face to face), an integrative university syllabus, and running community fairs/sessions.	**IAS WG,** NEPA- Public Education and Corporate Communications Branch, NGOs, FD, JCDT, Schools, Communities, LFMCs, SDC, communication professionals
Create species survey methodology and survey/map the areas where IAS are found, produce distribution maps.	**NEPA, UWI/Academia, IOJ,** JCDT, FD, Windsor Research Centre, NGOs, Community groups, LFMCs

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Establish collaboration with community groups through projects and formalize a local surveillance mechanism.	**NEPA, UWI/Academia, IOJ,** JCDT, FD, Windsor Research Centre, NGOs, Community groups, LFMCs
Put in place site-specific IAS management plans to monitor, remove, and reduce IAS', targeting critical habitats of key plant species.	NEPA/IAS WG, NGOs, CBOs, FD, LFMCs, Academia
Increase research on IAS: the impact on focal species and possible benefits they may have to communities.	NEPA/IAS WG, NGOs, Academia

4.2 | Plan for: Peckham Woods



INTRODUCTION TO THE SITE

Peckham Woods is a Key Biodiversity Area (KBA) situated in northern Clarendon Parish, Jamaica. The KBA is a small, 2.4 km² isolated patch of largely old-growth forest and is identified as having one of the highest densities of site-specific endemic plants per unit area in the island (Sutton 2016)[2]. The area also contains a .71 km² forest reserve, called the Peckham Woods Forest Reserve.

This KBA is particularly significant for its role in preserving Jamaica's unique karst forest ecosystems, characterized by its limestone outcrops and specialized vegetation adapted to the rocky, well-drained soil conditions. The woodland area, though fragmented, maintains populations of several endemic plant species and provides crucial habitat for native wildlife, including various bird species that depend on these forest patches for survival.

The preservation of Peckham Woods has become increasingly important as surrounding areas face pressure from agricultural expansion and urban development. Local conservation efforts focus on maintaining the ecological integrity of this forest fragment while working with surrounding communities to promote sustainable land use practices. The site also serves as an important study area for understanding the ecology of Jamaica's dry limestone forests and their resilience to environmental change.

SPECIES LIST (Red List categories listed are provisional)

- *Lepanthes sanguinea* (VU)
- *Miconia sp.*

[2] https://www.canari.org/wp-content/uploads/2014/12/CAPACITE-14-English.pdf
https://www.usforacle.com/2015/03/10/usf-professor-raises-awareness-for-threatened-jamaican-forest/

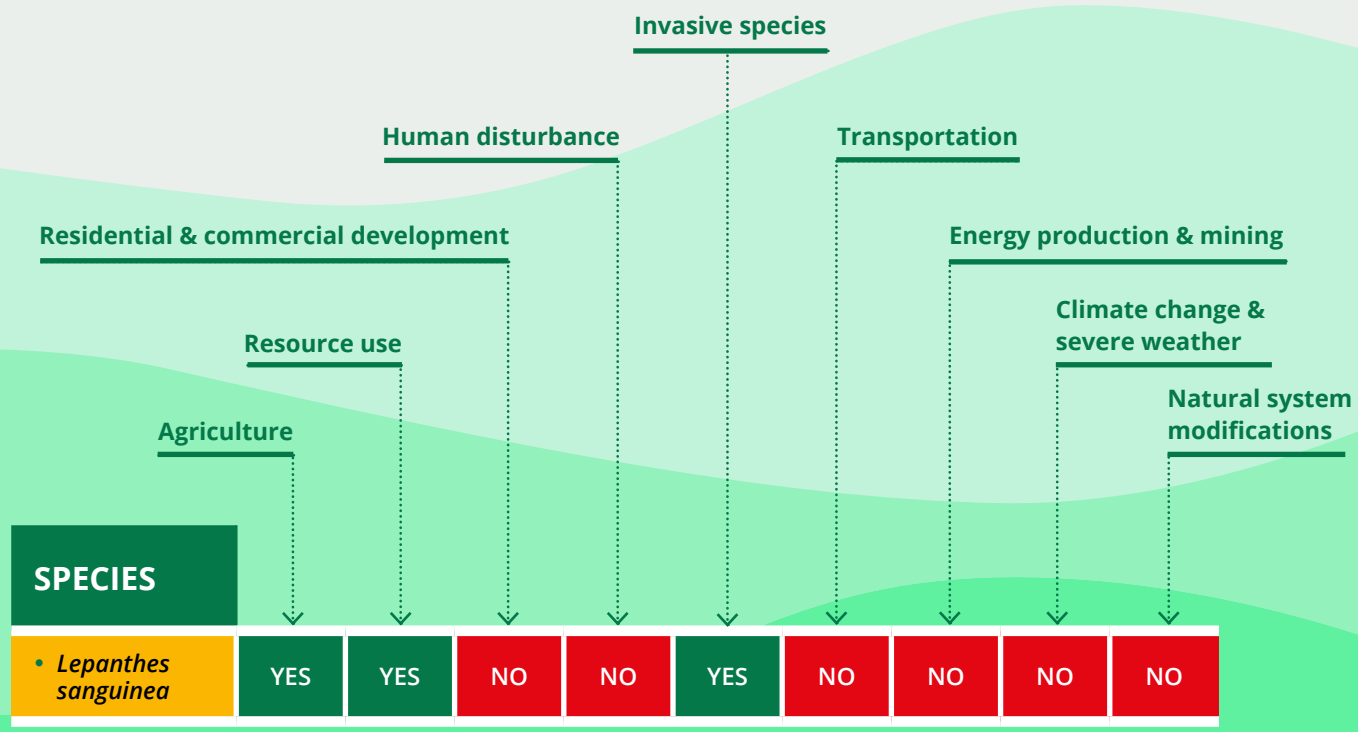
SITE SPECIFIC THREATS

Threats from the provisional red list data at the most specific level available (level 2 and 3) for species at the site.

- Annual & perennial non-timber crops: Shifting agriculture
- Annual & perennial non-timber crops: Small-holder farming
- Logging & wood harvesting: Unintentional effects: (subsistence/small scale) [harvest]
- Invasive non-native/alien species/diseases: Named species
- Invasive non-native/alien species/diseases: Unspecified species
- Wood & pulp plantations: Industry plantations
- Wood & pulp plantations: Small-holder plantations
- Fire
- Extraction of Yam Sticks

SPECIES THREATS TABLE

Major (Level 1) threats provisionally assigned to each of the focal species in this area according to the IUCN Threats Classification Scheme. For each species, assessors have listed the major threats that lead to the species being listed as threatened with extinction or that are expected to constrain their recovery.



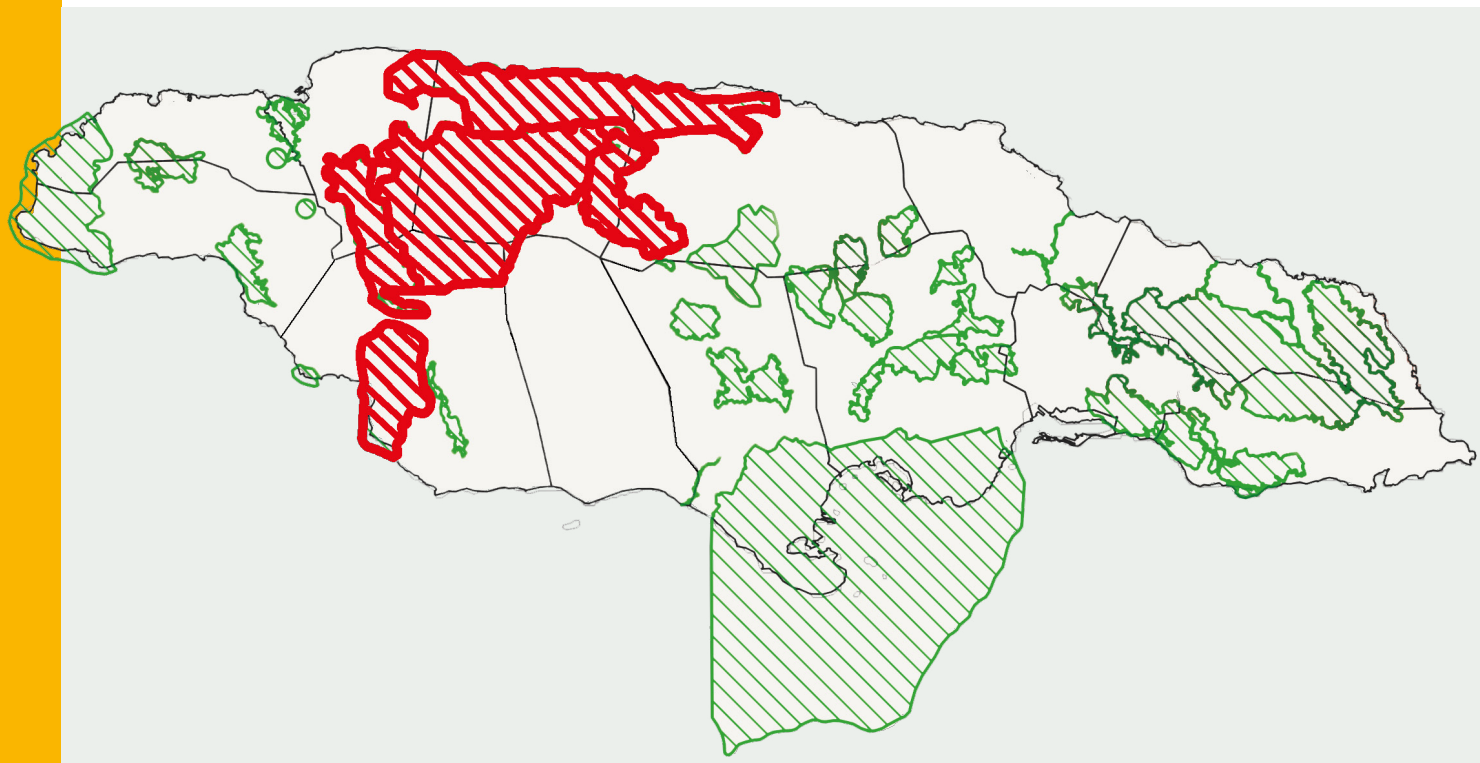
GOALS AND RECOMMENDED ACTIONS

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Increased species protection, abundance and habitat interconnection through interplanting in development infrastructures.	
Map and publish where developments are occurring and where target species are located, towards the determination of high-risk areas for threatened species.	**NEPA,** Forestry Department, National Spatial Data Management Branch (NSDMB)
Require pre-construction survey of species, collection, and replanting at appropriate locations after activity, including: • ecological inventories are done and species are collected, put in nurseries, and replaced at the end, with 70% survival required.	**NEPA**
Improve urban development policies through reserving and enforcing ecological reservoirs and conservation areas within housing developments and encourage urban forestry to promote species protection in proximity to cities, roads, and houses.	**NEPA, Municipal corporations,** Forestry Department, Orchid Society, SRC, Public Gardens Division
Use species data and physical requirements of epiphytic plants to drive policies for relocation and rehabilitation activities (which will require improved knowledge of the physical requirements for epiphytic plants).	**Mines and Geology Division, FD, NEPA, Public Gardens Division**
Improved regulatory procedures for agricultural practices that consider the conservation objectives of the target species.	
Identify funding mechanisms to hire additional staff with improved competencies, in areas such as Sustainable Land Management and Ecosystem-based Adaptation in Agriculture, to ensure improved adoption of existing regulations.	MOAFM, RADA, JAS
Increase farmer registration in the Ministry with responsibility for Agriculture's registrations system, to facilitate more robust agricultural monitoring.	MOAFM, RADA, JAS
Review policy and legal framework to ensure inclusion of conservation objectives for focal/target species, as well as for their host in the case of epiphytes.	MOAFM, NEPA
Map and publish where agriculture is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), MOAFM

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Promote innovation in agricultural practices to reduce the occurrence of harmful pesticides/herbicides leaching near focal species.	
Build capacity of farmers using a gender-inclusive approach to sensitization and training in international agricultural best practices, ecosystem-based adaptation techniques, and climate-smart agriculture.	MOAFM, RADA, JAS, JOAM
Monitor pesticide usage among farmers through soil testing, bioaccumulation, record keeping, and associated biodiversity.	**PCA (UWI), RADA,** MOAFM, Government Chemist, ICENS, JOAM
Implement programs to educate and train local farmers in agricultural enforcement practices and provide incentives for reporting incidents.	PCA (UWI), MOAFM, RADA, ICENS, JOAM, NEPA
Reduce the impact and mitigate the spread of IAS.	
Use communication professionals to create a public awareness campaign around the impact of IAS on the focal species, including media posts, educational material materials in schools (printed, electronic, face to face), an integrative university syllabus, and running community fairs/sessions.	**IAS WG,** NEPA- Public Education and Corporate Communications Branch, NGOs, FD, Schools, Communities, SDC, communication professionals
Create species survey methodology and survey/map the areas where IAS are found, produce distribution maps.	**NEPA, UWI/Academia, IOJ, F**D, NGOs, Community groups
Establish collaboration with community groups through projects and formalize a local surveillance mechanism.	**NEPA, UWI/Academia, IOJ,** FD, NGOs, Community groups
Put in place site-specific IAS management plans to monitor, remove, and reduce IAS', targeting critical habitats of key plant species.	NEPA/IAS WG, NGOs, CBOs, FD, local community group, Academia
Increase research on IAS: their impact on focal species and possible benefits they may have to communities.	NEPA/IAS WG, NGOs, Academia

4.3 | North Coast Forest-Cockpit Country-Black River Great Morass-Central Spinal Forest Corridor



INTRODUCTION TO THE SITE

The North Coast Forest-Cockpit Country-Black River Great Morass-Central Spinal Forest Corridor represents one of Jamaica's most ambitious and extensive ecological connectivity initiatives, linking several of the island's most significant natural areas into a continuous protected landscape. This corridor system connects multiple distinct ecosystems, from the northern coastal forests through the legendary Cockpit Country karst region, extending to the Black River Great Morass wetlands and incorporating the central mountain spine of Jamaica.

At the heart of this corridor lies the Cockpit Country, a rugged karst landscape characterized by its distinctive cone-shaped hills and deep depressions, which transitions into the island's largest wetland system, the Black River Great Morass. This connectivity is crucial for maintaining ecological processes, facilitating species movement, and ensuring genetic exchange between populations of Jamaica's unique wildlife. The corridor encompasses varying elevations and habitat types, from lowland swamps to upland forests, providing critical routes for both resident and migratory species.

The establishment and maintenance of this corridor system represents a cornerstone of Jamaica's biodiversity conservation strategy, addressing the critical need to maintain landscape connectivity in the face of increasing development pressures. This integrated approach to conservation recognizes that isolated protected areas are insufficient for long-term species survival and ecosystem resilience. The corridor not only serves as a wildlife pathway but also helps maintain essential ecosystem services, including watershed protection, flood control, and climate change mitigation through carbon sequestration.

4.3.1 | Plan for: Catadupa

SPECIES LIST (Red list categories listed are provisional)

- *Acianthera hirsutula* (NT)
- *Dendrophylax funalis* (NT)
- *Lepanthes lanceolata* (EN)
- *Lepanthes loddigesiana* (EN)
- *Lepanthes multiflora* (EN)
- *Lepanthes simplex* (EN)
- *Lepanthes unguicularis* (CR)
- *Lepanthes wullschlaegelii* (VU)
- *Miconia pilosa* (VU)

KBA SITE ENDEMIC SPECIES

- *Bletia hamiltoniana* (CR)

SITE SPECIFIC THREATS

Threats from the provisional red list data at the most specific level available (level 2 and 3) for species at the site.

- Annual & perennial non-timber crops: Shifting agriculture
- Annual & perennial non-timber crops: Small-holder farming
- Gathering terrestrial plants: Intentional use (species is the target)
- Gathering terrestrial plants: Unintentional effects (species is not the target)
- Housing & urban areas
- Invasive non-native/alien species/diseases: Unspecified species
- Logging & wood harvesting Intentional use: (subsistence/small scale) [harvest]
- Logging & wood harvesting Unintentional effects: (subsistence/small scale) [harvest]
- Mining & quarrying
- Wood & pulp plantations: Small-holder plantations

SPECIES THREATS TABLE

Major (Level 1) threats provisionally assigned to each of the focal species in this area according to the IUCN Threats Classification Scheme. For each species, assessors have listed the major threats that lead to the species being listed as threatened with extinction or that are expected to constrain their recovery.

SPECIES	Agriculture	Resource use	Residential & commercial development	Human disturbance	Invasive species	Transportation	Energy production & mining	Climate change & severe weather	Natural system modifications
• *Acianthera hirsutula*	YES	YES	NO	NO	NO	NO	NO	NO	NO
• *Bletia hamiltoniana*	NO	YES	NO	NO	NO	NO	NO	NO	NO
• *Dendrophylax funalis*	YES	YES	YES	NO	YES	NO	YES	NO	NO
• *Lepanthes lanceolata*	YES	YES	NO	NO	YES	NO	NO	NO	NO
• *Lepanthes loddigesiana*	YES	YES	NO	NO	NO	NO	NO	NO	NO
• *Lepanthes multiflora*	YES	YES	NO	NO	NO	NO	NO	NO	NO
• *Lepanthes simplex*	YES	YES	NO	NO	NO	NO	NO	NO	NO
• *Lepanthes unguicularis*	YES	YES	NO	NO	NO	NO	NO	NO	NO
• *Lepanthes wullschlaegelii*	YES	YES	NO	NO	NO	NO	NO	NO	NO
• *Miconia pilosa*	YES	YES	NO	NO	YES	NO	NO	NO	NO

GOALS AND RECOMMENDED ACTIONS

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Increased species protection, abundance and habitat interconnection through interplanting in development infrastructures.	
Map and publish where developments are occurring and where target species are located, towards the determination of high-risk areas for threatened species.	**NEPA,** Forestry Department, National Spatial Data Management Branch (NSDMB)
Require pre-construction survey of species, collection, and replanting at appropriate locations after activity, including: • ecological inventories are done and species are collected, put in nurseries, and replaced at the end, with 70% survival required.	**NEPA**
Improve urban development policies through reserving and enforcing ecological reservoirs and conservation areas within housing developments and encourage urban forestry to promote species protection in proximity to cities, roads, and houses.	**NEPA, Municipal corporations,** Forestry Department, Orchid Society, SRC, Public Gardens Division
Use species data and physical requirements of epiphytic plants to drive policies for relocation and rehabilitation activities (which will require improved knowledge of the physical requirements for epiphytic plants).	**Mines and Geology Division, FD, NEPA, Public Gardens Division**
Improved regulatory procedures for agricultural practices that consider the conservation objectives of the target species.	
Identify funding mechanisms to hire additional staff with improved competencies, in areas such as Sustainable Land Management and Ecosystem-based Adaptation in Agriculture, to ensure improved adoption of existing regulations.	MOAFM, RADA, JAS
Increase farmer registration in the Ministry with responsibility for Agriculture's registrations system, to facilitate more robust agricultural monitoring.	MOAFM, RADA, JAS
Review policy and legal framework to ensure inclusion of conservation objectives for focal/target species, as well as for their host in the case of epiphytes.	MOAFM, NEPA
Map and publish where agriculture is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), MOAFM

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Promote innovation in agricultural practices to reduce the occurrence of harmful pesticides/herbicides leaching near target species.	
Build capacity of farmers using a gender-inclusive approach to sensitization and training in international agricultural best practices, ecosystem-based adaptation techniques, and climate-smart agriculture.	MOAFM, RADA, JAS, JOAM
Monitor pesticide usage among farmers through soil testing, bioaccumulation, record keeping, and associated biodiversity.	**PCA (UWI), RADA,** MOAFM, Government Chemist, ICENS, JOAM
Implement programs to educate and train local farmers in agricultural enforcement practices and provide incentives for reporting incidents.	PCA (UWI), MOAFM, RADA, ICENS, JOAM, NEPA, Forestry Department
A well-regulated mining industry that has special consideration for target species.	
Create, review, and implement standard conditions (legal environmental requirements) for mining permits, to ensure objective for species protection and management.	NEPA, Mines and Geology Division, JBI
Create and adhere to schedules for audits and monitoring of permits and licenses.	NEPA, Mines and Geology Division, JBI
Identify small-scale mining operations and engage local enforcement for monitoring and management.	JCF, NEPA, JBI, Mines and Geology Division
Map and publish where mining is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), JBI

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Community members maintain or enhance their livelihoods whilst reducing the destruction of plant species and their dependent habitats in their area.	
Promote and encourage sustainable alternative livelihoods.	**Rural Agricultural Development Authority,** National Environment and Planning Agency, Tourism Product Development Company, 4-H Clubs, MOAFM
Promote, enhance and encourage existing livelihoods that have minimum impact on plant species and dependent habitats.	SDC, PIOJ and STATIN
Research into small-scale livelihoods practices and impacts on the species.	**National Environment Planning Agency,** JCDT, CANARI, Jamaica Environmental Trust, University of the West Indies
Community members knowledgeable about their land status, their legal and ethical rights and the impact of activities on the value of their land so that informed decisions can be made.	
Provide community members with information on how to assess their land ownership status and understand their rights and responsibilities as landowners. This should include insights into the conservation value and status of their land to foster informed decision-making.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit
Develop and implement a behavioral change campaign focused on promoting conservation-supporting activities and outlining practices to avoid and prevent environmental damage. This campaign should use targeted educational programs and resources to enhance practical understanding of effective land management and conservation practices.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
All members – from youth to elders – of *in situ* communities aware that there are important plant species in and around their homes and areas of livelihood, and for them to be knowledgeable about their value.	
Establish community watch groups (a community-driven, citizen group that would monitor for infractions and report to the appropriate authority).	NEPA, Forestry Department, Community based organizations
Training community members on protected species threats and implementation of the law.	NEPA, Forestry Department, SDC and other municipal corporations
Communities to utilize their increased knowledge to actively conserve and protect the plant species.	
Continuous knowledge sharing through local community groups.	**LFMCs, SDC, NEPA**
Establish programs to get hands-on conservation experience (e.g. Naval String Project).	**LFMCs** (School Clubs)
To have a legal framework and resourced enforcement system in place that provides accountability and authority for the conservation and protection of species.	
Review existing regulations/policies to identify gaps in enforcement e.g. penalties.	**National Environment and Planning Agency,** Ministry of Economic Growth and Job Creation, MNS, Forestry Department
Recruitment and training of existing and additional personnel.	**National Environment and Planning Agency,** Forestry Department, Jamaica Constabulary Force
Assign/deploy trained personnel to specific conservation areas.	**National Environment and Planning Agency,** Forestry Department

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
To have *in situ* communities empowered through awareness, training, resources, and legal backing to enforce those laws that protect the plant species.	
Conduct sensitization sessions for community members.	**NEPA,** Forestry Department, RADA, 4H Clubs, Jamaica Agricultural Society, Ministry of Agriculture, LFMCs, Jamaica Environment Trust, Orchid Society
Incorporate educational components into plant conservation projects.	**Funding Agencies,** National Conservation Trust Fund of Jamaica, Environmental Foundation of Jamaica, Caribbean Natural Resources Institute
Streamline biodiversity topics inclusive of species conservation into school curriculums across various levels.	**Ministry of Education and Youth,** Environmental Agencies
Reduce the impact and mitigate the spread of IAS.	
Use communication professionals to create a public awareness campaign around the impact of IAS on the focal species, including media posts, educational material materials in schools (printed, electronic, face to face), an integrative university syllabus, and running community fairs/sessions.	**IAS WG,** NEPA- Public Education and Corporate Communications Branch, NGOs, FD, Schools, Communities, LFMCs, SDC, communication professionals
Create species survey methodology and survey/map the areas where IAS are found, produce distribution maps.	**NEPA, UWI/Academia, IOJ,** FD, Windsor Research Centre, NGOs, Community groups, LFMCs
Establish collaboration with community groups through projects and formalize a local surveillance mechanism.	**NEPA, UWI/Academia, IOJ,** FD, Windsor Research Centre, NGOs, Community groups, LFMCs

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Put in place site-specific IAS management plans to monitor, remove, and reduce IAS, targeting critical habitats of key plant species.	NEPA/IAS WG, NGOs, CBOs, FD, LFMCs, Academia
Increase research on IAS: the impact on focal species and possible benefits they may have to communities.	NEPA/IAS WG, NGOs, Academia

4.3.2 | Plan for: Cockpit Country

SPECIES LIST (Red list categories listed are provisional)
• *Acianthera hirsutula* (NT)
• *Andreettaea delicatula* (VU)
• *Dendrophylax funalis* (NT)
• *Lepanthes convexa* (EN)
• *Lepanthes multiflora* (EN)
• *Lepanthes obtusipetala* (NT)
• *Lepanthes simplex* (EN)
• *Lepanthes woodiana* (EN)
• *Lepanthes wullschlaegelii* (VU)
• *Liparis viridipurpurea* (VU)
• *Miconia crossosepala* (VU)
• *Tolumnia hamiltonii* (EN)

SITE SPECIFIC THREATS
Threats from the provisional red list data at the most specific level available (level 2 and 3) for species at the site.
• Annual & perennial non-timber crops: Small-holder farming/ subsistence farming
• Forest clearance for charcoal production, goat grazing
• Species exploitation for roots for root drink production
• Bauxite mining
• Droughts
• Fire & fire suppression: Increase in fire frequency/intensity
• Gathering terrestrial plants: Intentional use (species is the target)
• Gathering terrestrial plants: Unintentional effects (species is not the target)
• Housing & urban areas
• Invasive non-native/alien species/diseases: Named species
• Invasive non-native/alien species/diseases: Unspecified species
• Livestock farming & ranching: Small-holder grazing, ranching or farming
• Logging & wood harvesting Intentional use: (subsistence/small scale) [harvest]
• Logging & wood harvesting Unintentional effects: (subsistence/small scale) [harvest]
• Mining & quarrying
• Storms & flooding
• Temperature extremes
• Wood & pulp plantations: Small-holder plantations

SPECIES THREATS TABLE

Major (Level 1) threats provisionally assigned to each of the focal species in this area according to the IUCN Threats Classification Scheme. For each species, assessors have listed the major threats that lead to the species being listed as threatened with extinction or that are expected to constrain their recovery.

SPECIES	Agriculture	Resource use	Residential & commercial development	Human disturbance	Invasive species	Transportation	Energy production & mining	Climate change & severe weather	Natural system modifications
• *Acianthera hirsutula*	YES	YES	NO	NO	NO	NO	NO	NO	NO
• *Andreettaea delicatula*	YES	YES	YES	NO	YES	NO	YES	NO	NO
• *Dendrophylax funalis*	YES	YES	YES	NO	YES	NO	YES	NO	NO
• *Lepanthes convexa*	YES	YES	YES	NO	NO	NO	YES	NO	NO
• *Lepanthes multiflora*	YES	YES	NO	NO	NO	NO	NO	NO	NO
• *Lepanthes obtusipetala*	YES	YES	YES	NO	YES	NO	YES	NO	NO
• *Lepanthes simplex*	YES	YES	NO	NO	NO	NO	NO	NO	NO
• *Lepanthes woodiana*	YES	YES	NO	NO	YES	NO	NO	YES	NO
• *Lepanthes wullschlaegelii*	YES	YES	NO	NO	NO	NO	NO	NO	NO
• *Liparis viridipurpurea*	YES	YES	YES	NO	YES	NO	YES	NO	YES
• *Miconia crossosepala*	YES	YES	NO	NO	YES	NO	YES	NO	NO
• *Tolumnia hamiltonii*	YES	YES	YES	NO	YES	NO	YES	NO	NO

GOALS AND RECOMMENDED ACTIONS

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Increased species protection, abundance and habitat interconnection through interplanting in development infrastructures.	
Map and publish where developments are occurring and where target species are located, towards the determination of high-risk areas for threatened species.	**NEPA,** Forestry Department, National Spatial Data Management Branch (NSDMB)
Require pre-construction survey of species, collection, and replanting at appropriate locations after activity, including: • ecological inventories are done and species are collected, put in nurseries, and replaced at the end, with 70% survival required.	**NEPA**
Improve urban development policies through reserving and enforcing ecological reservoirs and conservation areas within housing developments and encourage urban forestry to promote species protection in proximity to cities, roads, and houses.	**NEPA, Municipal corporations,** Forestry Department, Orchid Society, SRC, Public Gardens Division
Use species data and physical requirements of epiphytic plants to drive policies for relocation and rehabilitation activities (which will require improved knowledge of the physical requirements for epiphytic plants).	**Mines and Geology Division, FD, NEPA, Public Gardens Division**
Improved regulatory procedures for agricultural practices that consider the conservation objectives of the target species.	
Identify funding mechanisms to hire additional staff with improved competencies, in areas such as Sustainable Land Management and Ecosystem-based Adaptation in Agriculture, to ensure improved adoption of existing regulations.	MOAFM, RADA, JAS
Increase farmer registration in the Ministry with responsibility for Agriculture's registrations system, to facilitate more robust agricultural monitoring.	MOAFM, RADA, JAS
Review policy and legal framework to ensure inclusion of conservation objectives for focal/target species, as well as for their host in the case of epiphytes.	MOAFM, NEPA
Map and publish where agriculture is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), MOAFM

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Promote innovation in agricultural practices to reduce the occurrence of harmful pesticides/herbicides leaching near target species.	
Build capacity of farmers using a gender-inclusive approach to sensitization and training in international agricultural best practices, ecosystem-based adaptation techniques, and climate-smart agriculture.	MOAFM, RADA, JAS, JOAM
Monitor pesticide usage among farmers through soil testing, bioaccumulation, record keeping, and associated biodiversity.	**PCA (UWI), RADA,** MOAFM, Government Chemist, ICENS, JOAM
Implement programs to educate and train local farmers in agricultural enforcement practices and provide incentives for reporting incidents.	PCA (UWI), MOAFM, RADA, ICENS, JOAM, NEPA, Forestry Department
A well-regulated mining industry that has special consideration for target species.	
Create, review, and implement standard conditions (legal environmental requirements) for mining permits, to ensure objective for species protection and management.	NEPA, Mines and Geology Division, JBI
Create and adhere to schedules for audits and monitoring of permits and licenses.	NEPA, Mines and Geology Division, JBI
Identify small-scale mining operations and engage local enforcement for monitoring and management.	JCF, NEPA, JBI, Mines and Geology Division
Map and publish where mining is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), JBI

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Community members maintain or enhance their livelihoods whilst reducing the destruction of plant species and their dependent habitats in their area.	
Promote and encourage sustainable alternative livelihoods.	**Rural Agricultural Development Authority,** National Environment and Planning Agency, Tourism Product Development Company, 4-H Clubs, MOAFM
Promote, enhance and encourage existing livelihoods that have minimum impact on plant species and dependent habitats.	SDC, PIOJ and STATIN
Research into small-scale livelihoods practices and impacts on the species.	**National Environment Planning Agency,** JCDT, CANARI, Jamaica Environmental Trust, University of the West Indies
Community members knowledgeable about their land status, their legal and ethical rights and the impact of activities on the value of their land so that informed decisions can be made.	
Provide community members with information on how to assess their land ownership status and understand their rights and responsibilities as landowners. This should include insights into the conservation value and status of their land to foster informed decision-making.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit
Develop and implement a behavioral change campaign focused on promoting conservation-supporting activities and outlining practices to avoid and prevent environmental damage. This campaign should use targeted educational programs and resources to enhance practical understanding of effective land management and conservation practices.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
All members – from youth to elders – of *in situ* communities aware that there are important plant species in and around their homes and areas of livelihood, and for them to be knowledgeable about their value.	
Establish community watch groups (a community-driven, citizen group that would monitor for infractions and report to the appropriate authority).	**NEPA,** Forestry Department, Community based organizations
Training community members on protected species threats and implementation of the law.	NEPA, Forestry Department, SDC and other municipal corporations
Communities to utilize their increased knowledge to actively conserve and protect the plant species.	
Continuous knowledge sharing through local community groups.	**LFMCs, SDC, NEPA**
Establish programs to get hands-on conservation experience (e.g. Naval String Project).	**LFMCs** (School Clubs)
To have a legal framework and resourced enforcement system in place that provides accountability and authority for the conservation and protection of species.	
Review existing regulations/policies to identify gaps in enforcement e.g. penalties.	**National Environment and Planning Agency,** Ministry of Economic Growth and Job Creation, MNS, Forestry Department
Recruitment and training of existing and additional personnel.	**National Environment and Planning Agency,** Forestry Department, Jamaica Constabulary Force
Assign/deploy trained personnel to specific conservation areas.	**National Environment and Planning Agency,** Forestry Department

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
To have *in situ* communities empowered through awareness, training, resources, and legal backing to enforce those laws that protect the plant species.	
Conduct sensitization sessions for community members.	**NEPA,** Forestry Department, RADA, 4H Clubs, Jamaica Agricultural Society, Ministry of Agriculture, LFMCs, Jamaica Environment Trust, Orchid Society
Incorporate educational components into plant conservation projects.	**Funding Agencies,** National Conservation Trust Fund of Jamaica, Environmental Foundation of Jamaica, Caribbean Natural Resources Institute
Streamline biodiversity topics inclusive of species conservation into school curriculums across various levels.	**Ministry of Education and Youth,** Environmental Agencies
Reduce the impact and mitigate the spread of IAS.	
Use communication professionals to create a public awareness campaign around the impact of IAS on the target species, including media posts, educational material materials in schools (printed, electronic, face to face), an integrative university syllabus, and running community fairs/sessions.	**IAS WG,** NEPA- Public Education and Corporate Communications Branch, NGOs, FD, Schools, Communities, LFMCs, SDC, communication professionals
Create species survey methodology and survey/map the areas where IAS are found, produce distribution maps.	**NEPA, UWI/Academia, IOJ,** FD, Windsor Research Centre, NGOs, Community groups, LFMCs
Establish collaboration with community groups through projects and formalize a local surveillance mechanism.	**NEPA, UWI/Academia, IOJ,** FD, Windsor Research Centre, NGOs, Community groups, LFMCs
Put in place site-specific IAS management plans to monitor, remove, and reduce IAS, targeting critical habitats of key plant species.	NEPA/IAS WG, NGOs, CBOs, FD, LFMCs, Academia

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Increase research on IAS: the impact on focal species and possible benefits they may have to communities.	NEPA/IAS WG, NGOs, Academia
A healthy ecosystem resilient to climate change, drought and temperature extremes.	
Reforesting degraded areas with drought tolerant native species.	Forestry Department, Mine and Geology Division , NEPA
Promote species and structural diversity in forests in order to increase the resilience by reducing the impact of species specific drought stress.	Forestry Department, NEPA

4.3.3 | Plan for: North Coast Forest

SPECIES LIST (Red list category is provisional)

- *Dendrophylax funalis* (NT)

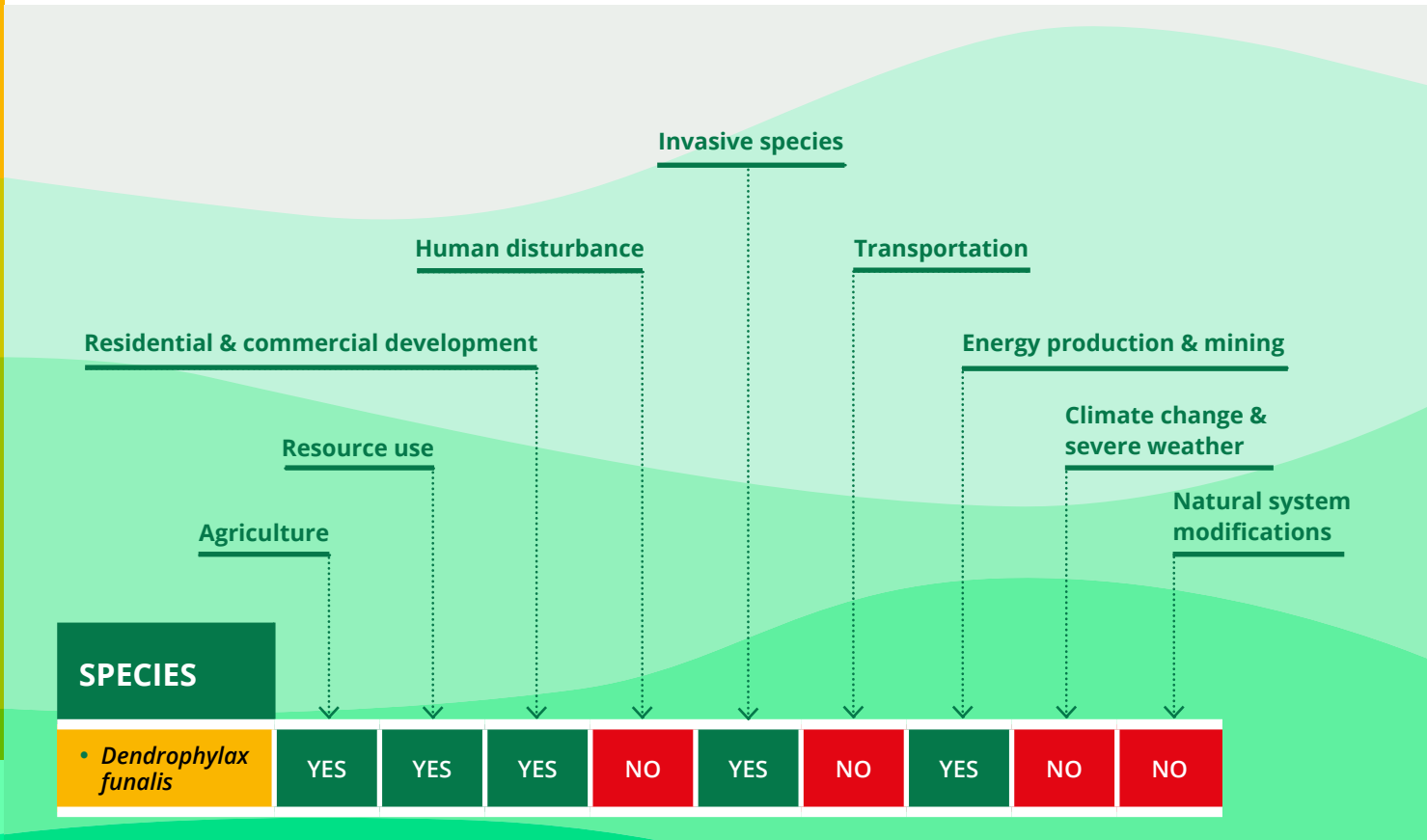
SITE SPECIFIC THREATS

Threats from the provisional red list data at the most specific level available (level 2 and 3) for species at the site.

- Annual & perennial non-timber crops: Shifting agriculture
- Annual & perennial non-timber crops: Small-holder farming
- Gathering terrestrial plants: Intentional use (species is the target)
- Housing & urban areas
- Invasive non-native/alien species/diseases: Unspecified speciess
- Logging & wood harvesting Unintentional effects: (subsistence/small scale) [harvest]
- Mining & quarrying

SPECIES THREATS TABLE

Major (Level 1) threats provisionally assigned to each of the focal species in this area according to the IUCN Threats Classification Scheme. For each species, assessors have listed the major threats that lead to the species being listed as threatened with extinction or that are expected to constrain their recovery.



GOALS AND RECOMMENDED ACTIONS

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Increased species protection, abundance and habitat interconnection through interplanting in development infrastructures.	
Map and publish where developments are occurring and where target species are located, towards the determination of high-risk areas for threatened species.	**NEPA**, Forestry Department, National Spatial Data Management Branch (NSDMB)
Require pre-construction survey of species, collection, and replanting at appropriate locations after activity, including: • ecological inventories are done and species are collected, put in nurseries, and replaced at the end, with 70% survival required.	**NEPA**
Improve urban development policies through reserving and enforcing ecological reservoirs and conservation areas within housing developments and encourage urban forestry to promote species protection in proximity to cities, roads, and houses.	**NEPA, Municipal corporations,** Forestry Department, Orchid Society, SRC, Public Gardens Division
Use species data and physical requirements of epiphytic plants to drive policies for relocation and rehabilitation activities (which will require improved knowledge of the physical requirements for epiphytic plants).	**Mines and Geology Division, FD, NEPA, Public Gardens Division**
Improved regulatory procedures for agricultural practices that consider the conservation objectives of the target species.	
Identify funding mechanisms to hire additional staff with improved competencies, in areas such as Sustainable Land Management and Ecosystem-based Adaptation in Agriculture, to ensure improved adoption of existing regulations.	MOAFM, RADA, JAS
Increase farmer registration in the Ministry with responsibility for Agriculture's registrations system, to facilitate more robust agricultural monitoring.	MOAFM, RADA, JAS
Review policy and legal framework to ensure inclusion of conservation objectives for focal/target species, as well as for their host in the case of epiphytes.	MOAFM, NEPA
Map and publish where agriculture is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), MOAFM

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Promote innovation in agricultural practices to reduce the occurrence of harmful pesticides/herbicides leaching near target species.	
Build capacity of farmers using a gender-inclusive approach to sensitization and training in international agricultural best practices, ecosystem-based adaptation techniques, and climate-smart agriculture.	MOAFM, RADA, JAS, JOAM
Monitor pesticide usage among farmers through soil testing, bioaccumulation, record keeping, and associated biodiversity.	**PCA (UWI), RADA,** MOAFM, Government Chemist, ICENS, JOAM
Implement programs to educate and train local farmers in agricultural enforcement practices and provide incentives for reporting incidents.	PCA (UWI), MOAFM, RADA, ICENS, JOAM, NEPA, Forestry Department
A well-regulated mining industry that has special consideration for target species.	
Create, review, and implement standard conditions (legal environmental requirements) for mining permits, to ensure objective for species protection and management.	NEPA, Mines and Geology Division, JBI
Create and adhere to schedules for audits and monitoring of permits and licenses.	NEPA, Mines and Geology Division, JBI
Identify small-scale mining operations and engage local enforcement for monitoring and management.	JCF, NEPA, JBI, Mines and Geology Division
Map and publish where mining is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), JBI

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Community members maintain or enhance their livelihoods whilst reducing the destruction of plant species and their dependent habitats in their area.	
Promote and encourage sustainable alternative livelihoods.	**Rural Agricultural Development Authority,** National Environment and Planning Agency, Tourism Product Development Company, 4-H Clubs, MOAFM
Promote, enhance and encourage existing livelihoods that have minimum impact on plant species and dependent habitats.	SDC, PIOJ and STATIN
Research into small-scale livelihoods practices and impacts on the species.	**National Environment Planning Agency,** JCDT, CANARI, Jamaica Environmental Trust, University of the West Indies
Community members knowledgeable about their land status, their legal and ethical rights and the impact of activities on the value of their land so that informed decisions can be made.	
Provide community members with information on how to assess their land ownership status and understand their rights and responsibilities as landowners. This should include insights into the conservation value and status of their land to foster informed decision-making.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit
Develop and implement a behavioral change campaign focused on promoting conservation-supporting activities and outlining practices to avoid and prevent environmental damage. This campaign should use targeted educational programs and resources to enhance practical understanding of effective land management and conservation practices.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit
All members – from youth to elders – of *in situ* communities aware that there are important plant species in and around their homes and areas of livelihood, and for them to be knowledgeable about their value.	
Establish community watch groups (a communitydriven, citizen group that would monitor for infractions and report to the appropriate authority).	NEPA, Forestry Department, Community based organizations

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Training community members on protected species threats and implementation of the law.	NEPA, Forestry Department, SDC and other municipal corporations
Communities to utilize their increased knowledge to actively conserve and protect the plant species.	
Continuous knowledge sharing through local community groups.	**LFMCs, SDC, NEPA**
Establish programs to get hands-on conservation experience (e.g. Naval String Project).	**LFMCs** (School Clubs)
To have a legal framework and resourced enforcement system in place that provides accountability and authority for the conservation and protection of species.	
Review existing regulations/policies to identify gaps in enforcement e.g. penalties.	**National Environment and Planning Agency,** Ministry of Economic Growth and Job Creation, MNS, Forestry Department
Recruitment and training of existing and additional personnel.	**National Environment and Planning Agency,** Forestry Department, Jamaica Constabulary Force
Assign/deploy trained personnel to specific conservation areas.	**National Environment and Planning Agency,** Forestry Department
To have *in situ* communities empowered through awareness, training, resources, and legal backing to enforce those laws that protect the plant species.	
Conduct sensitization sessions for community members.	**NEPA,** Forestry Department, RADA, 4H Clubs, Jamaica Agricultural Society, Ministry of Agriculture, LFMCs, Jamaica Environment Trust, Orchid Society

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Incorporate educational components into plant conservation projects.	**Funding Agencies,** National Conservation Trust Fund of Jamaica, Environmental Foundation of Jamaica, Caribbean Natural Resources Institute
Streamline biodiversity topics inclusive of species conservation into school curriculums across various levels.	**Ministry of Education and Youth,** Environmental Agencies
Reduce the impact and mitigate the spread of IAS.	
Use communication professionals to create a public awareness campaign around the impact of IAS on the focal species, including media posts, educational material materials in schools (printed, electronic, face to face), an integrative university syllabus, and running community fairs/sessions.	**IAS WG,** NEPA- Public Education and Corporate Communications Branch, NGOs, FD, Schools, Communities, LFMCs, SDC, communication professionals
Create species survey methodology and survey/map the areas where IAS are found, produce distribution maps.	**NEPA, UWI/Academia, IOJ,** FD, Windsor Research Centre, NGOs, Community groups, LFMCs
Establish collaboration with community groups through projects and formalize a local surveillance mechanism.	**NEPA, UWI/Academia, IOJ,** FD, Windsor Research Centre, NGOs, Community groups, LFMCs
Put in place site-specific IAS management plans to monitor, remove, and reduce IAS, targeting critical habitats of key plant species.	NEPA/IAS WG, NGOs, CBOs, FD, LFMCs, Academia
Increase research on IAS: their impact on focal species and possible benefits they may have to communities.	NEPA/IAS WG, NGOs, Academia

4.3.4 | Plan for: Black River Great Morass

SPECIES LIST (Red list category is provisional)

- *Roystonea princeps* (EN)

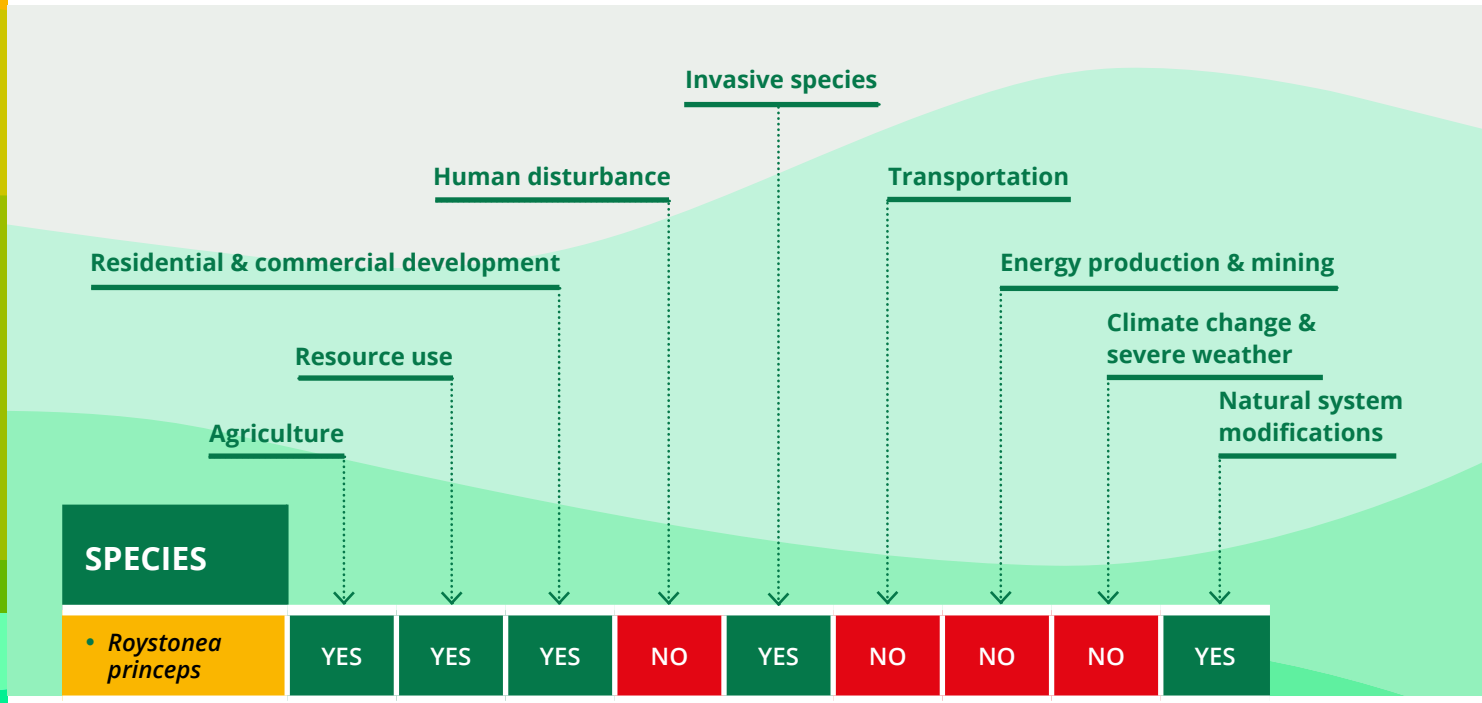
SITE SPECIFIC THREATS

Threats from the provisional red list data at the most specific level available (level 2 and 3) for species at the site.

- Annual & perennial non-timber crops: Shifting agriculture
- Annual & perennial non-timber crops: Small-holder farming
- Dams & water management/use: Abstraction of ground water (unknown use)
- Fire & fire suppression: Increase in fire frequency/intensity
- Fishing & harvesting aquatic resources: Unintentional effects: (subsistence/small scale) harvest
- Gathering terrestrial plants: Unintentional effects (species is not the target)
- Housing & urban areas
- Invasive non-native/alien species/diseases: Named species
- Invasive non-native/alien species/diseases: Unspecified species
- Livestock farming & ranching: Small-holder grazing, ranching or farming
- Logging & wood harvesting: Unintentional effects: (subsistence/small scale) harvest

SPECIES THREATS TABLE

Major (Level 1) threats provisionally assigned to each of the focal species in this area according to the IUCN Threats Classification Scheme. For each species, assessors have listed the major threats that lead to the species being listed as threatened with extinction or that are expected to constrain their recovery.



GOALS AND RECOMMENDED ACTIONS

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Increased species protection, abundance and habitat interconnection through interplanting in development infrastructures.	
Map and publish where developments are occurring and where target species are located, towards the determination of high-risk areas for threatened species.	**NEPA,** Forestry Department, National Spatial Data Management Branch (NSDMB)
Require pre-construction survey of species, collection, and replanting at appropriate locations after activity, including: • ecological inventories are done and species are collected, put in nurseries, and replaced at the end, with 70% survival required.	**NEPA**
Improve urban development policies through reserving and enforcing ecological reservoirs and conservation areas within housing developments and encourage urban forestry to promote species protection in proximity to cities, roads, and houses.	**NEPA, Municipal corporations,** Forestry Department, Orchid Society, SRC, Public Gardens Division
Use species data and physical requirements of epiphytic plants to drive policies for relocation and rehabilitation activities (which will require improved knowledge of the physical requirements for epiphytic plants).	**Mines and Geology Division, FD, NEPA, Public Gardens Division**
Improved regulatory procedures for agricultural practices that consider the conservation objectives of the target species.	
Identify funding mechanisms to hire additional staff with improved competencies, in areas such as Sustainable Land Management and Ecosystem-based Adaptation in Agriculture, to ensure improved adoption of existing regulations.	MOAFM, RADA, JAS
Increase farmer registration in the Ministry with responsibility for Agriculture's registrations system, to facilitate more robust agricultural monitoring.	MOAFM, RADA, JAS
Review policy and legal framework to ensure inclusion of conservation objectives for focal/target species, as well as for their host in the case of epiphytes.	MOAFM, NEPA

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Map and publish where agriculture is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), MOAFM
Promote innovation in agricultural practices to reduce the occurrence of harmful pesticides/herbicides leaching near target species.	
Build capacity of farmers using a gender-inclusive approach to sensitization and training in international agricultural best practices, ecosystem-based adaptation techniques, and climate-smart agriculture.	MOAFM, RADA, JAS, JOAM
Monitor pesticide usage among farmers through soil testing, bioaccumulation, record keeping, and associated biodiversity.	**PCA (UWI), RADA,** MOAFM, Government Chemist, ICENS, JOAM
Implement programs to educate and train local farmers in agricultural enforcement practices and provide incentives for reporting incidents.	PCA (UWI), MOAFM, RADA, ICENS, JOAM, NEPA, Forestry Department
A well-regulated mining industry that has special consideration for target species.	
Create, review, and implement standard conditions (legal environmental requirements) for mining permits, to ensure objective for species protection and management.	NEPA, Mines and Geology Division, JBI
Create and adhere to schedules for audits and monitoring of permits and licenses.	NEPA, Mines and Geology Division, JBI
Identify small-scale mining operations and engage local enforcement for monitoring and management.	JCF, NEPA, JBI, Mines and Geology Division
Map and publish where mining is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), JBI

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Community members maintain or enhance their livelihoods whilst reducing the destruction of plant species and their dependent habitats in their area.	
Promote and encourage sustainable alternative livelihoods.	**Rural Agricultural Development Authority,** National Environment and Planning Agency, Tourism Product Development Company, 4-H Clubs, MOAFM
Promote, enhance and encourage existing livelihoods that have minimum impact on plant species and dependent habitats.	SDC, PIOJ and STATIN
Research into small-scale livelihoods practices and impacts on the species.	**National Environment Planning Agency,** JCDT, CANARI, Jamaica Environmental Trust, University of the West Indies
Community members knowledgeable about their land status, their legal and ethical rights and the impact of activities on the value of their land so that informed decisions can be made.	
Provide community members with information on how to assess their land ownership status and understand their rights and responsibilities as landowners. This should include insights into the conservation value and status of their land to foster informed decision-making.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit
Develop and implement a behavioral change campaign focused on promoting conservation-supporting activities and outlining practices to avoid and prevent environmental damage. This campaign should use targeted educational programs and resources to enhance practical understanding of effective land management and conservation practices.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
All members – from youth to elders – of *in situ* communities aware that there are important plant species in and around their homes and areas of livelihood, and for them to be knowledgeable about their value.	
Establish community watch groups (a community-driven, citizen group that would monitor for infractions and report to the appropriate authority).	NEPA, Forestry Department, Community based organizations
Training community members on protected species threats and implementation of the law.	NEPA, Forestry Department, SDC and other municipal corporations
Communities to utilize their increased knowledge to actively conserve and protect the plant species.	
Continuous knowledge sharing through local community groups.	**LFMCs, SDC, NEPA**
Establish programs to get hands-on conservation experience (e.g. Naval String Project).	**LFMCs** (School Clubs)
To have a legal framework and resourced enforcement system in place that provides accountability and authority for the conservation and protection of species.	
Review existing regulations/policies to identify gaps in enforcement e.g. penalties.	**National Environment and Planning Agency,** Ministry of Economic Growth and Job Creation, MNS, Forestry Department
Recruitment and training of existing and additional personnel.	**National Environment and Planning Agency,** Forestry Department, Jamaica Constabulary Force
Assign/deploy trained personnel to specific conservation areas.	**National Environment and Planning Agency,** Forestry Department

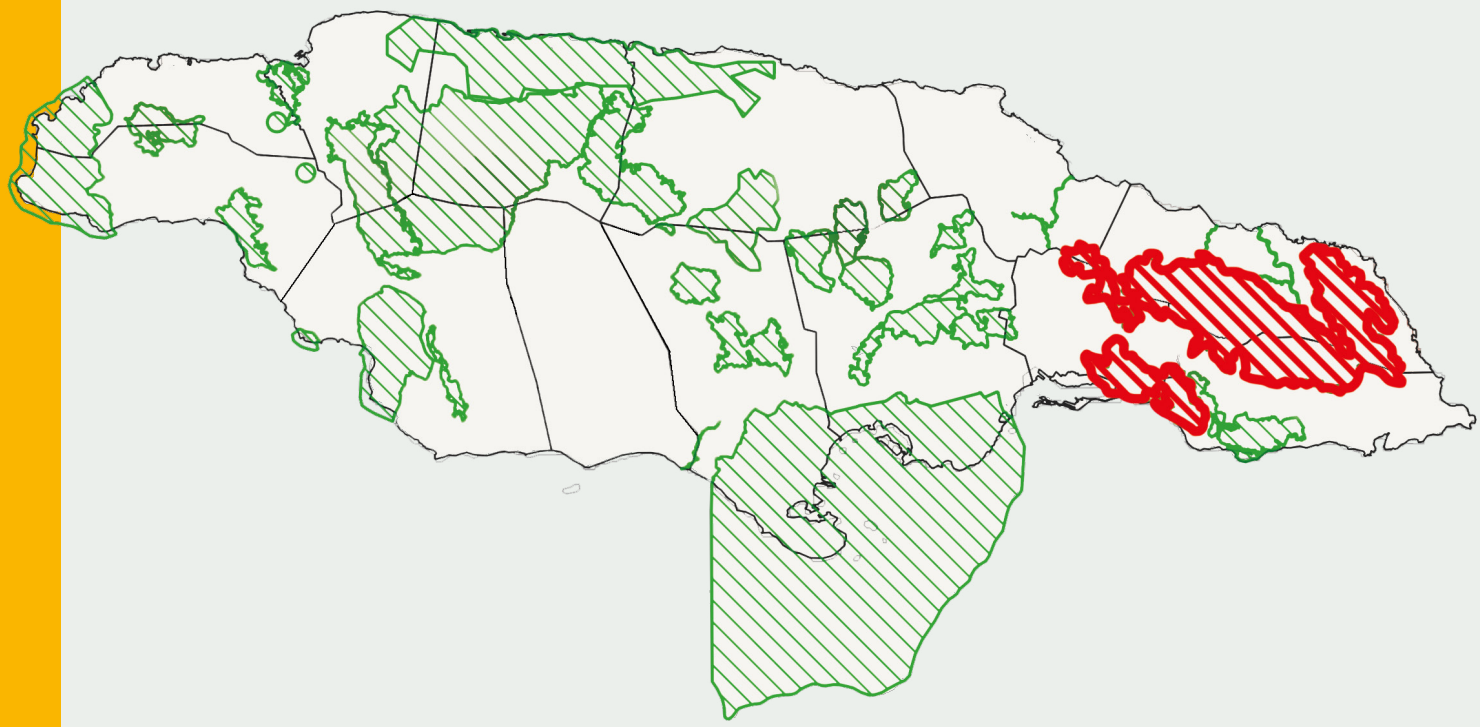
GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
To have *in situ* communities empowered through awareness, training, resources, and legal backing to enforce those laws that protect the plant species.	
Conduct sensitization sessions for community members.	**NEPA,** Forestry Department, RADA, 4H Clubs, Jamaica Agricultural Society, Ministry of Agriculture, LFMCs, Jamaica Environment Trust, Orchid Society
Incorporate educational components into plant conservation projects.	**Funding Agencies,** National Conservation Trust Fund of Jamaica, Environmental Foundation of Jamaica, Caribbean Natural Resources Institute
Streamline biodiversity topics inclusive of species conservation into school curriculums across various levels.	**Ministry of Education and Youth,** Environmental Agencies
Reduce the impact and mitigate the spread of IAS.	
Use communication professionals to create a public awareness campaign around the impact of IAS on the target species, including media posts, educational material materials in schools (printed, electronic, face to face), an integrative university syllabus, and running community fairs/sessions.	**IAS WG,** NEPA- Public Education and Corporate Communications Branch, NGOs, FD, Schools, Communities, LFMCs, SDC, communication professionals
Create species survey methodology and survey/map the areas where IAS are found, produce distribution maps.	**NEPA, UWI/Academia, IOJ,** FD, Windsor Research Centre, NGOs, Community groups, LFMCs
Establish collaboration with community groups through projects and formalize a local surveillance mechanism.	**NEPA, UWI/Academia, IOJ,** FD, Windsor Research Centre, NGOs, Community groups, LFMCs

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Put in place site-specific IAS management plans to monitor, remove, and reduce IAS, targeting critical habitats of key plant species.	NEPA/IAS WG, NGOs, CBOs, FD, LFMCs, Academia
Increase research on IAS: the impact on focal species and possible benefits they may have to communities.	NEPA/IAS WG, NGOs, CBOs, FD, LFMCs, Academia
A healthy ecosystem resilient to climate change, drought and temperature extremes.	
Reforesting degraded areas with drought tolerant native species.	Forestry Department, Mine and Geology Division , NEPA
Promote species and structural diversity in forests in order to increase the resilience by reducing the impact of species specific drought stress.	Forestry Department, NEPA

4.4 | Surrey County Corridor



INTRODUCTION TO THE SITE

he Surrey County Corridor is an important ecological connectivity zone in eastern Jamaica, spanning Surrey County and linking several important natural areas and forest reserves. This corridor system plays a crucial role in maintaining biological connections between the John Crow Mountains, the Blue Mountains, and various lowland forest patches, creating a network of habitats that allows for wildlife movement and genetic exchange across the eastern portion of the island.

The corridor encompasses diverse ecosystems ranging from montane rainforests to lower elevation woodlands, creating a gradient of habitats that support numerous endemic species of flora and fauna. This connectivity is particularly important for Jamaica's native birds, including species like the Jamaican Blackbird and Blue-and-white Warbler, as well as various reptiles and amphibians that require connected forest habitats for their survival. The varying elevations within the corridor also create important climate refugia, allowing species to move in response to environmental changes.

Conservation efforts in the Surrey County Corridor focus on maintaining and enhancing forest connectivity while balancing the needs of local communities who depend on these landscapes for their livelihoods. The corridor serves multiple ecological functions, including watershed protection for eastern Jamaica's river systems, soil conservation on steep slopes, and the preservation of important cultural heritage sites associated with the region's Maroon communities. This integrated landscape approach to conservation recognizes the interconnected nature of ecological and social systems in Jamaica's eastern region.

4.4.1 | Plan for: Blue and John Crow Mountains

SPECIES LIST (Red list categories listed are provisional)

- *Acianthera alpestris* (VU)
- *Acianthera odontotepala* (VU)
- *Andreettaea delicatula* (VU)
- *Bulbophyllum jamaicense* (EN)
- *Dendrophylax funalis* (NT)
- *Lepanthes adamsii* (EN)
- *Lepanthes bilabiata* (EN)
- *Lepanthes cochleariifolia* (VU)
- *Lepanthes lanceolata* (EN)
- *Lepanthes obtusipetala* (NT)
- *Lepanthes pulchella* (EN)
- *Lepanthes rotundata* (EN)
- *Lepanthes sanguinea* (VU)
- *Lepanthes woodiana* (EN)
- *Liparis saundersiana* (VU)
- *Liparis viridipurpurea* (VU)
- *Maxillaria swartziana* (EN)
- *Meriania leucantha* (NT)
- *Meriania purpurea* (VU)
- *Miconia augustgrisebachii* (EN)
- *Miconia crossosepala* (VU)
- *Miconia gloriosa* (EN)
- *Miconia hirsuta* (VU)
- *Miconia pilosa* (VU)
- *Miconia pyxidata* (EN)
- *Neocogniauxia monophylla* (EN)
- *Pseudocentrum minus* (EN)

KBA SITE ENDEMIC SPECIES

- *Acianthera laxa* (EN)
- *Epidendrum morrisii* (EN)
- *Lepanthes byfieldii* (DD)
- *Lepanthes tridentata* (EN)

KBA SITE ENDEMIC SPECIES CONTINUED

- *Lepanthes vinacea (EN)*
- *Miconia nubicola (CR)*
- *Pterichis proctorii (CR)*
- *Trichosalpinx trilobata (CR)*

SITE SPECIFIC THREATS

Threats from the provisional red list data at the most specific level available (level 2 and 3) for species at the site.

- Annual & perennial non-timber crops: Agro-industry farming
- Annual & perennial non-timber crops: Shifting agriculture
- Annual & perennial non-timber crops: Small-holder farming
- Droughts
- Fire & fire suppression: Increase in fire frequency/intensity
- Gathering terrestrial plants: Intentional use (species is the target)
- Gathering terrestrial plants: Unintentional effects (species is not the target)
- Habitat shifting & alteration
- Housing & urban areas
- Invasive non-native/alien species/diseases: Named species
- Invasive non-native/alien species/diseases: Unspecified species
- Livestock farming & ranching: Small-holder grazing, ranching or farming
- Logging & wood harvesting: Intentional use: (subsistence/small scale) harvest
- Logging & wood harvesting: Unintentional effects: (large scale) harvest
- Logging & wood harvesting: Unintentional effects: (subsistence/small scale) harvest
- Mining & quarrying
- Problematic species/disease of unknown origin: Named species
- Recreational activities
- Roads & railroads
- Storms & flooding
- Temperature extremes
- Tourism & recreation areas
- Wood & pulp plantations: Agro-industry plantations
- Wood & pulp plantations: Small-holder plantations

SPECIES THREATS TABLE

Major (Level 1) threats provisionally assigned to each of the focal species in this area according to the IUCN Threats Classification Scheme. For each species, assessors have listed the major threats that lead to the species being listed as threatened with extinction or that are expected to constrain their recovery.

SPECIES 1/2	Agriculture	Resource use	Residential & commercial development	Human disturbance	Invasive species	Transportation	Energy production & mining	Climate change & severe weather	Natural system modifications
• *Acianthera alpestris*	YES	YES	YES	NO	NO	NO	NO	NO	NO
• *Acianthera laxa*	YES	YES	YES	YES	YES	NO	NO	NO	NO
• *Acianthera odontotepala*	YES	YES	YES	NO	YES	YES	NO	NO	NO
• *Andreettaea delicatula*	YES	YES	YES	NO	YES	NO	YES	NO	NO
• *Bulbophyllum jamaicense*	YES	YES	YES	NO	YES	NO	NO	NO	NO
• *Dendrophylax funalis*	YES	YES	YES	NO	YES	NO	YES	NO	NO
• *Epidendrum morrisii*	YES	NO	YES	NO	YES	NO	NO	NO	NO
• *Lepanthes adamsii*	YES	NO	YES	NO	YES	NO	YES	NO	NO
• *Lepanthes bilabiata*	YES	NO	YES	NO	YES	NO	NO	YES	YES
• *Lepanthes cochleariifolia*	YES	YES	NO	NO	YES	NO	NO	NO	NO
• *Lepanthes lanceolata*	YES	YES	NO	NO	YES	NO	NO	NO	NO
• *Lepanthes obtusipetala*	YES	YES	YES	NO	YES	NO	YES	NO	NO
• *Lepanthes pulchella*	YES	YES	NO	NO	YES	NO	NO	NO	NO
• *Lepanthes rotundata*	YES	YES	YES	NO	YES	NO	NO	YES	NO
• *Lepanthes sanguinea*	YES	YES	NO	NO	YES	NO	NO	NO	NO
• *Lepanthes tridentata*	YES	YES	NO	YES	YES	YES	NO	NO	NO
• *Lepanthes vinacea*	YES	YES	NO	NO	YES	NO	NO	NO	NO

SPECIES THREATS TABLE CONTINUED

SPECIES 2/2	Agriculture	Resource use	Residential & commercial development	Human disturbance	Invasive species	Transportation	Energy production & mining	Climate change & severe weather	Natural system modifications
• *Lepanthes woodiana*	YES	YES	NO	NO	YES	NO	NO	YES	NO
• *Liparis saundersiana*	YES	YES	YES	NO	YES	NO	YES	NO	YES
• *Liparis viridipurpurea*	YES	YES	YES	NO	YES	NO	YES	NO	YES
• *Maxillaria swartziana*	YES	YES	NO	NO	YES	NO	NO	NO	NO
• *Meriania leucantha*	YES	YES	NO	NO	YES	NO	NO	NO	NO
• *Meriania purpurea*	YES	NO	NO	YES	YES	NO	NO	NO	NO
• *Miconia augustgrisebachii*	YES	YES	NO	NO	NO	NO	YES	NO	NO
• *Miconia crossosepala*	YES	YES	NO	NO	YES	NO	YES	NO	NO
• *Miconia gloriosa*	YES	NO	NO	NO	YES	NO	NO	YES	YES
• *Miconia hirsuta*	YES	YES	YES	NO	YES	NO	NO	NO	NO
• *Miconia nubicola*	YES	YES	NO	YES	YES	YES	NO	NO	NO
• *Miconia pilosa*	YES	YES	NO	NO	YES	NO	NO	NO	NO
• *Miconia pyxidata*	YES	YES	NO	NO	NO	NO	NO	NO	NO
• *Neocogniauxia monophylla*	YES	YES	NO	NO	YES	NO	NO	NO	NO
• *Pseudocentrum minus*	YES	YES	NO	NO	NO	YES	NO	NO	NO
• *Pterichis proctorii*	NO	NO	YES	NO	YES	NO	NO	YES	NO
• *Trichosalpinx trilobata*	YES	NO	YES	NO	YES	YES	NO	YES	NO

GOALS AND RECOMMENDED ACTIONS

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Increased species protection, abundance and habitat interconnection through interplanting in development infrastructures.	
Map and publish where developments are occurring and where target species are located, towards the determination of high-risk areas for threatened species.	**NEPA,** Forestry Department, National Spatial Data Management Branch (NSDMB)
Require pre-construction survey of species, collection, and replanting at appropriate locations after activity, including: • ecological inventories are done and species are collected, put in nurseries, and replaced at the end, with 70% survival required.	**NEPA**
Improve urban development policies through reserving and enforcing ecological reservoirs and conservation areas within housing developments and encourage urban forestry to promote species protection in proximity to cities, roads, and houses.	**NEPA, Municipal corporations,** Forestry Department, Orchid Society, SRC, Public Gardens Division
Use species data and physical requirements of epiphytic plants to drive policies for relocation and rehabilitation activities (which will require improved knowledge of the physical requirements for epiphytic plants).	**Mines and Geology Division, FD, NEPA, Public Gardens Division**
Improved regulatory procedures for agricultural practices that consider the conservation objectives of the target species.	
Identify funding mechanisms to hire additional staff with improved competencies, in areas such as Sustainable Land Management and Ecosystem-based Adaptation in Agriculture, to ensure improved adoption of existing regulations.	MOAFM, RADA, JAS
Increase farmer registration in the Ministry with responsibility for Agriculture's registrations system, to facilitate more robust agricultural monitoring.	MOAFM, RADA, JAS
Review policy and legal framework to ensure inclusion of conservation objectives for focal/target species, as well as for their host in the case of epiphytes.	MOAFM, NEPA

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Map and publish where agriculture is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), MOAFM
Promote innovation in agricultural practices to reduce the occurrence of harmful pesticides/herbicides leaching near target species.	
Build capacity of farmers using a gender-inclusive approach to sensitization and training in international agricultural best practices, ecosystem-based adaptation techniques, and climate-smart agriculture.	MOAFM, RADA, JAS, JOAM
Monitor pesticide usage among farmers through soil testing, bioaccumulation, record keeping, and associated biodiversity.	**PCA (UWI), RADA,** MOAFM, Government Chemist, ICENS, JOAM
Implement programs to educate and train local farmers in agricultural enforcement practices and provide incentives for reporting incidents.	PCA (UWI), MOAFM, RADA, ICENS, JOAM, NEPA
A well-regulated mining industry that has special consideration for target species.	
Create, review, and implement standard conditions (legal environmental requirements) for mining permits, to ensure objective for species protection and management.	NEPA, Mines and Geology Division, JBI
Create and adhere to schedules for audits and monitoring of permits and licenses.	NEPA, Mines and Geology Division, JBI
Identify small-scale mining operations and engage local enforcement for monitoring and management.	JCF, NEPA, JBI, Mines and Geology Division
Map and publish where mining is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), JBI

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Community members maintain or enhance their livelihoods whilst reducing the destruction of plant species and their dependent habitats in their area.	
Promote and encourage sustainable alternative livelihoods.	**Rural Agricultural Development Authority,** National Environment and Planning Agency, Tourism Product Development Company, 4-H Clubs, MOAFM
Promote, enhance and encourage existing livelihoods that have minimum impact on plant species and dependent habitats.	SDC, PIOJ and STATIN
Research into small-scale livelihoods practices and impacts on the species.	**National Environment and Planning Agency,** JCDT, CANARI, Jamaica Environmental Trust, University of the West Indies
Community members knowledgeable about their land status, their legal and ethical rights and the impact of activities on the value of their land so that informed decisions can be made.	
Provide community members with information on how to assess their land ownership status and understand their rights and responsibilities as landowners. This should include insights into the conservation value and status of their land to foster informed decision-making.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit
Develop and implement a behavioral change campaign focused on promoting conservation-supporting activities and outlining practices to avoid and prevent environmental damage. This campaign should use targeted educational programs and resources to enhance practical understanding of effective land management and conservation practices.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
All members – from youth to elders – of *in situ* communities aware that there are important plant species in and around their homes and areas of livelihood, and for them to be knowledgeable about their value.	
Establish community watch groups (a community-driven, citizen group that would monitor for infractions and report to the appropriate authority).	NEPA, Forestry Department, JCDT Community based organizations
Training community members on protected species threats and implementation of the law.	NEPA, JCDT, Forestry Department, SDC and other municipal corporations
Communities to utilize their increased knowledge to actively conserve and protect the plant species.	
Continuous knowledge sharing through local community groups.	**LFMCs, JCDT, SDC, NEPA**
Establish programs to get hands-on conservation experience (e.g. Naval String Project).	**LFMCs** (School Clubs), JCDT
To have a legal framework and resourced enforcement system in place that provides accountability and authority for the conservation and protection of species.	
Review existing regulations/policies to identify gaps in enforcement e.g. penalties.	**National Environment and Planning Agency,** Ministry of Economic Growth and Job Creation, MNS, Forestry Department
Recruitment and training of existing and additional personnel.	**National Environment and Planning Agency,** Forestry Department, Jamaica Constabulary Force
Assign/deploy trained personnel to specific conservation areas.	**National Environment and Planning Agency,** Forestry Department

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
To have *in situ* communities empowered through awareness, training, resources, and legal backing to enforce those laws that protect the plant species.	
Conduct sensitization sessions for community members.	**JCDT, NEPA,** Forestry Department, RADA, 4H Clubs, Jamaica Agricultural Society, Ministry of Agriculture, LFMCs, Jamaica Environment Trust, Orchid Society
Incorporate educational components into plant conservation projects.	**Funding Agencies,** National Conservation Trust Fund of Jamaica, Environmental Foundation of Jamaica, Caribbean Natural Resources Institute
Streamline biodiversity topics inclusive of species conservation into school curriculums across various levels.	**Ministry of Education and Youth,** Environmental Agencies
Reduce the impact and mitigate the spread of IAS.	
Use communication professionals to create a public awareness campaign around the impact of IAS on the target species, including media posts, educational material materials in schools (printed, electronic, face to face), an integrative university syllabus, and running community fairs/sessions.	**IAS WG,** NEPA- Public Education and Corporate Communications Branch, NGOs, FD, JCDT, Schools, Communities, LFMCs, SDC, communication professionals
Create species survey methodology and survey/map the areas where IAS are found, produce distribution maps.	**NEPA, UWI/Academia, IOJ,** JCDT, FD, Windsor Research Centre, NGOs, Community groups, LFMCs
Establish collaboration with community groups through projects and formalize a local surveillance mechanism.	**NEPA, UWI/Academia, IOJ,** JCDT, FD, Windsor Research Centre, NGOs, Community groups, LFMCs

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Put in place site-specific IAS management plans to monitor, remove, and reduce IAS', targeting critical habitats of key plant species.	JCDT, NEPA/IAS WG, NGOs, CBOs, FD, LFMCs, Academia
Increase research on IAS: the impact on focal species and possible benefits they may have to communities.	NEPA/IAS WG, NGOs, Academia
A healthy ecosystem resilient to climate change, drought and temperature extremes.	
Reforesting degraded areas with drought tolerant native species.	Forestry Department, Mine and Geology Division , NEPA
Promote species and structural diversity in forests in order to increase the resilience by reducing the impact of species specific drought stress.	Forestry Department, Mine and Forestry Department, NEPA

4.4.2 | Plan for: Bull Bay

SPECIES LIST (Red list category is provisional)

- *Dendrophylax funalis* (NT)

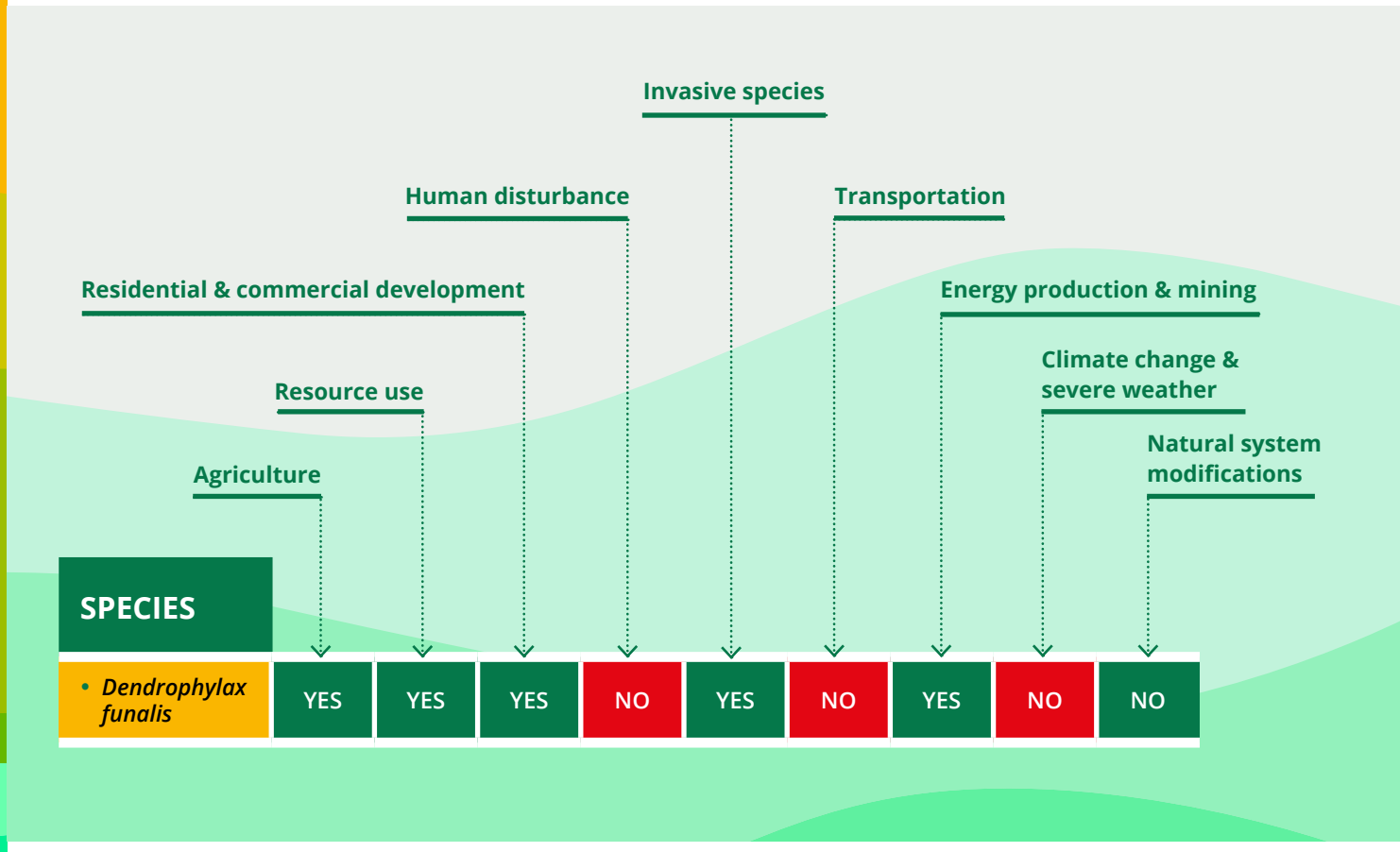
SITE SPECIFIC THREATS

Threats from the provisional red list data at the most specific level available (level 2 and 3) for species at the site.

- Annual & perennial non-timber crops: Shifting agriculture
- Annual & perennial non-timber crops: Small-holder farming
- Gathering terrestrial plants: Intentional use (species is the target)
- Housing & urban areas
- Invasive non-native/alien species/diseases: Unspecified species
- Logging & wood harvesting: Unintentional effects (subsistence/small scale) [harvest]
- Mining & quarrying

SPECIES THREATS TABLE

Major (Level 1) threats provisionally assigned to each of the focal species in this area according to the IUCN Threats Classification Scheme. For each species, assessors have listed the major threats that lead to the species being listed as threatened with extinction or that are expected to constrain their recovery.



GOALS AND RECOMMENDED ACTIONS

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Increased species protection, abundance and habitat interconnection through interplanting in development infrastructures.	
Map and publish where developments are occurring and where target species are located, towards the determination of high-risk areas for threatened species.	**NEPA,** Forestry Department, National Spatial Data Management Branch (NSDMB)
Require pre-construction survey of species, collection, and replanting at appropriate locations after activity, including: • ecological inventories are done and species are collected, put in nurseries, and replaced at the end, with 70% survival required.	**NEPA**
Improve urban development policies through reserving and enforcing ecological reservoirs and conservation areas within housing developments and encourage urban forestry to promote species protection in proximity to cities, roads, and houses.	**NEPA, Municipal corporations,** Forestry Department, Orchid Society, SRC, Public Gardens Division
Use species data and physical requirements of epiphytic plants to drive policies for relocation and rehabilitation activities (which will require improved knowledge of the physical requirements for epiphytic plants).	**Mines and Geology Division, FD, NEPA, Public Gardens Division**
Improved regulatory procedures for agricultural practices that consider the conservation objectives of the target species.	
Identify funding mechanisms to hire additional staff with improved competencies, in areas such as Sustainable Land Management and Ecosystem-based Adaptation in Agriculture, to ensure improved adoption of existing regulations.	MOAFM, RADA, JAS
Increase farmer registration in the Ministry with responsibility for Agriculture's registrations system, to facilitate more robust agricultural monitoring.	MOAFM, RADA, JAS
Review policy and legal framework to ensure inclusion of conservation objectives for focal/target species, as well as for their host in the case of epiphytes.	MOAFM, NEPA
Map and publish where agriculture is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), MOAFM

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Promote innovation in agricultural practices to reduce the occurrence of harmful pesticides/herbicides leaching near target species.	
Build capacity of farmers using a gender-inclusive approach to sensitization and training in international agricultural best practices, ecosystem-based adaptation techniques, and climate-smart agriculture.	MOAFM, RADA, JAS, JOAM
Monitor pesticide usage among farmers through soil testing, bioaccumulation, record keeping, and associated biodiversity.	**PCA (UWI), RADA,** MOAFM, Government Chemist, ICENS, JOAM
Implement programs to educate and train local farmers in agricultural enforcement practices and provide incentives for reporting incidents.	PCA (UWI), MOAFM, RADA, ICENS, JOAM, NEPA
A well-regulated mining industry that has special consideration for target species.	
Create, review, and implement standard conditions (legal environmental requirements) for mining permits, to ensure objective for species protection and management.	NEPA, Mines and Geology Division, JBI
Create and adhere to schedules for audits and monitoring of permits and licenses.	NEPA, Mines and Geology Division, JBI
Identify small-scale mining operations and engage local enforcement for monitoring and management.	JCF, NEPA, JBI, Mines and Geology Division
Map and publish where mining is occurring and where target species are located, towards the determination of high-risk areas for threatened species.	NEPA, Forestry Department, National Spatial Data Management Branch (NSDMB), JBI

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Community members maintain or enhance their livelihoods whilst reducing the destruction of plant species and their dependent habitats in their area.	
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Community members knowledgeable about their land status, their legal and ethical rights and the impact of activities on the value of their land so that informed decisions can be made.	
Provide community members with information on how to assess their land ownership status and understand their rights and responsibilities as landowners. This should include insights into the conservation value and status of their land to foster informed decision-making.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit
Develop and implement a behavioral change campaign focused on promoting conservation-supporting activities and outlining practices to avoid and prevent environmental damage. This campaign should use targeted educational programs and resources to enhance practical understanding of effective land management and conservation practices.	**National Land Agency,** Tax Authority of Jamaica, NEPA, Municipal Corporations and MEGJC Squatter Management Unit

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
All members – from youth to elders – of *in situ* communities aware that there are important plant species in and around their homes and areas of livelihood, and for them to be knowledgeable about their value.	
Establish community watch groups (a community-driven, citizen group that would monitor for infractions and report to the appropriate authority).	NEPA, Forestry Department, JCDT Community based organizations
Training community members on protected species threats and implementation of the law.	NEPA, JCDT, Forestry Department, SDC and other municipal corporations
Communities to utilize their increased knowledge to actively conserve and protect the plant species.	
Continuous knowledge sharing through local community groups.	**LFMCs, JCDT, SDC, NEPA**
Establish programs to get hands-on conservation experience (e.g. Naval String Project).	**LFMCs** (School Clubs), JCDT
To have a legal framework and resourced enforcement system in place that provides accountability and authority for the conservation and protection of species.	
Review existing regulations/policies to identify gaps in enforcement e.g. penalties.	**National Environment and Planning Agency,** Ministry of Economic Growth and Job Creation, MNS, Forestry Department
Recruitment and training of existing and additional personnel.	**National Environment and Planning Agency,** Forestry Department, Jamaica Constabulary Force
Assign/deploy trained personnel to specific conservation areas.	**National Environment and Planning Agency,** Forestry Department

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
To have *in situ* communities empowered through awareness, training, resources, and legal backing to enforce those laws that protect the plant species.	
Conduct sensitization sessions for community members.	**JCDT, NEPA,** Forestry Department, RADA, 4H Clubs, Jamaica Agricultural Society, Ministry of Agriculture, LFMCs, Jamaica Environment Trust, Orchid Society
Incorporate educational components into plant conservation projects.	**Funding Agencies,** National Conservation Trust Fund of Jamaica, Environmental Foundation of Jamaica, Caribbean Natural Resources Institute
Streamline biodiversity topics inclusive of species conservation into school curriculums across various levels.	**Ministry of Education and Youth,** Environmental Agencies
Reduce the impact and mitigate the spread of IAS.	
Use communication professionals to create a public awareness campaign around the impact of IAS on the target species, including media posts, educational material materials in schools (printed, electronic, face to face), an integrative university syllabus, and running community fairs/sessions.	**IAS WG,** NEPA- Public Education and Corporate Communications Branch, NGOs, FD, JCDT, Schools, Communities, LFMCs, SDC, communication professionals
Create species survey methodology and survey/map the areas where IAS are found, produce distribution maps.	**NEPA, UWI/Academia, IOJ,** JCDT, FD, Windsor Research Centre, NGOs, Community groups, LFMCs
Establish collaboration with community groups through projects and formalize a local surveillance mechanism.	**NEPA, UWI/Academia, IOJ,** JCDT, FD, Windsor Research Centre, NGOs, Community groups, LFMCs

GOALS AND RECOMMENDED ACTIONS CONTINUED

CONSERVATION ACTIONS 2025-2030	ACTION LEAD & COLLABORATORS
Put in place site-specific IAS management plans to monitor, remove, and reduce IAS', targeting critical habitats of key plant species.	JCDT, NEPA/IAS WG, NGOs, CBOs, FD, LFMCs, Academia
Increase research on IAS: the impact on focal species and possible benefits they may have to communities.	NEPA/IAS WG, NGOs, Academia

5. Directions for *ex situ* management

WORKING GROUP: Nikita Billet, Damany Calder, Keron Campbell, Denneko Luke, Kamilea Russell, Jodi-Anne Mcfarlane, Michka-May Small, Carla Myrie.

INTRODUCTION

The species focused on during the workshop are at a high risk of near future extinction. Around 25% are known from a single wild location, which increases their vulnerability, and during the IUCN Red List assessment workshop only two were identified as currently present in *ex situ* collections. As a result, there is little or no insurance in the event of a catastrophe.

Ex situ management in nurseries has been used to provide temporary refuge and a source of specimens for re-establishment, for species under pressure from mining, development or large-scale agriculture projects. However, low rates of specimen survival or repatriation were reported. It was generally agreed that for many or most of the species discussed, existing ecological and husbandry knowledge, infrastructure and capacity are not sufficient to meet current and future needs. On the final day of the workshop a group convened to discuss this and to draft an initial design for a project that could address this.

GOAL: To establish sufficient *ex situ* locations and activities to reliably secure, propagate, and re-establish focal species, wherever needed.

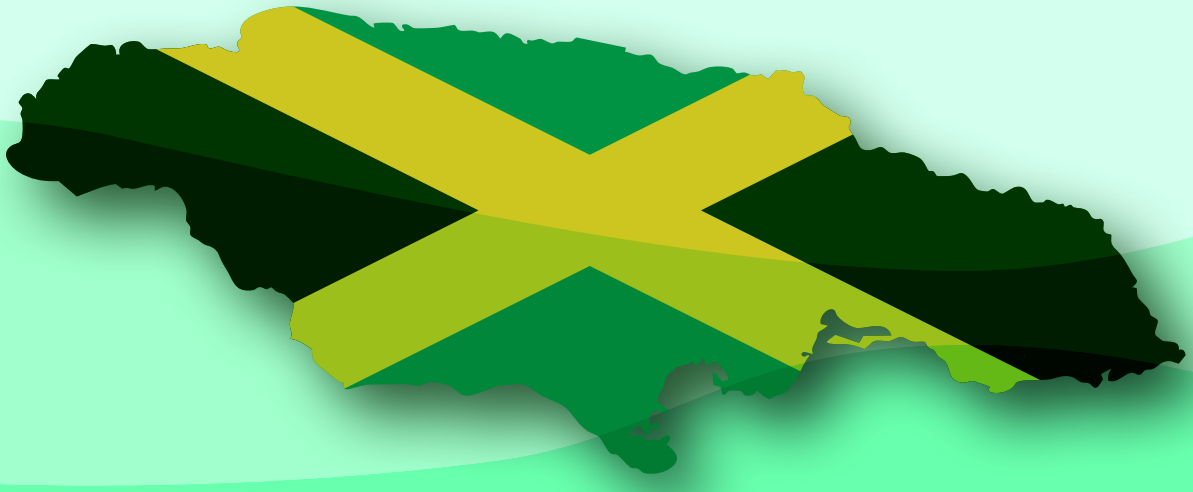

Figure 4. Draft concept for a project aimed at establishing sufficient *ex situ* capacity to meet the needs of threatened plant species in Jamaica.

CONCEPT

The group discussed a four-pronged approach involving multiple partners:

1. **NURSERIES:**
   Established at strategic locations covering a representative range of environmental conditions, so that harvested plants can be housed locally, in the environmental conditions they are used to. These nurseries would be in relatively remote locations. Day-to-day management would ideally be carried out by local communities to generate livelihoods, new skills and local support for the project.

2. **PUBLIC GARDENS DIVISION:**
   (Ministry with responsibility for agriculture) would provide technical support to nurseries, and would also display specimens to the public as part of education and awareness programs. They could also play a fund-raising role through support of any funding available to government bodies.

3. **ACADEMIA:**
   Would provide technical support, by developing plant husbandry and propagation protocols, helping to monitor populations, analyze and curate data, etc.

4. **NEPA:**
   Would provide an enabling role, in particular by facilitating the necessary permits to move plants and plant materials (as these will shortly fall under protected species legislation).

LOCATIONS

To provide enough capacity as well as a representative range of environmental conditions the group suggested establishing at least three facilities in each of the three regions showing a concentration of threatened plant species: i.e. three in the East, three in the West and three in the northern Central regional (*see Figure 1 for KBA map*).

EXAMPLE PROJECT – EASTERN REGION

The highest density of threatened and Critically Endangered species is found in the Eastern region. This region also has some existing infrastructure that could be mobilized and so is a potential priority. The group discussed in greater detail the building blocks of a project in that region.

Recommendations for sites, project stakeholders and for possible sources of funding, were as follows:

POSSIBLE SITES

- Holywell
- Millbank
- Portland Gap

STAKEHOLDERS

ACADEMIA:

- UWI
- CASE (agricultural college)
- SRC

PUBLIC GARDENS (MINISTRY OF AGRICULTURE, FISHERIES AND MINING):

- Hope
- Castleton
- Bath and Cinchona Gardens

POTENTIAL SOURCES OF FUNDING

- MBZ
- Franklinia
- CEPF
- EFJ
- NCTFJ
- BGCI
- TEF
- Climate Change Funds (e.g. for restoration, storm damage, studies of microhabitat change)

Note that any funding applications would need coordination and clear messaging

6. Implementation

WORKING GROUP: Simone Lee, Shanti Persaud, Natasha Peters, Ashleigh Sanderson, Damion Whyte.

On the final day of the workshop a small working group discussed the matter of implementation and how the actions outlined in this document may be taken forward after its publication. It was identified that NEPA, possibly through the NEPA Endangered Species Working Group, would take the lead on facilitating the implementation, which would include assisting in the creation of a technical working group to lead on this report. NEPA is to coordinate the creation of the working group by identifying important stakeholders and participants and to invite them to join. Stakeholders already identified as important to include are:

- **Communications specialist**
- **Private sector representation (ex. Planning Institute of Jamaica)**
- **University of West Indies and other willing academic institutions**
- **Institute of Jamaica**
- **Forestry Department**
- **Amaica Bauxite Institute**
- **Mines and Geology Division**
- **Urban Development Corporation**
- **Caribbean Coastal Area Management Foundation**
- **Jamaica Conservation and Development Trust**
- **The Nature Preservation Foundation**
- **Municipal corporations**
- **Ministry of Agriculture, Fisheries and Mining**

It was identified that it is important to invite policy focused persons from these organizations that would have the ability to make decisions.

NEPA intends to coordinate implementation across these various entities (lead and support), with responsibilities for implementing actions. This is process will involve annual sensitization of ministries, departments and agencies (MDAs) on the activities to be implemented in the respective years for incorporation in various operational plans during the planning cycle.

It is also recommended that targets related to threatened species be incorporated into the country's National Biodiversity Strategies and Action Plan (NBSAP) by ensuring that these targets align with relevant Global Biodiversity Framework (GBF) targets, such as those related to species conservation. It will also be critical to secure funding for the conservation of threatened plant species. Government funded programs can be vital but exploring funds available through international agreements and bilateral aid programs would increase the likelihood of advancing the implementation of the plan.

EXISTING INITIATIVES THAT MAY COMPLEMENT OR OVERLAP WITH ACTIONS OUTLINED IN THIS REPORT WERE ALSO IDENTIFIED:

- NEPA Endangered Species Working Group is currently very animal focused, NEPA can push to include more plant persons and plant species - can include species list from this workshop.
- The Royal Palm Reserve in Negril needs restoring and revitalizing – this could be pushed with botanical gardens to lead on restoration in collaboration with NEPA and Negril Chamber of Commerce who can execute project. Previous drainage of this area has resulted in more fires in the area and a renewed interest from stakeholders looking to re-wetland.
- This report could help support work to be pursued in the recently declared Cockpit Country Protected Area under NEPA. This area still needs delegation/identification of an NGO to manage this area (needing a recommendation) and subsequent site management plan. This management could be the same as Peckham Woods (which is Clarendon Parish Development Committee).
- Orchid sanctuaries from the bauxite industry overlap with ex situ actions; CASE students could be used for orchid identification and rehabbing in sanctuaries (but will need more training in species ID).
- Community managed greenhouses may be option for *ex situ* actions
- The Endangered Species (Protection, Conservation, and Regulation of Trade) Act of 2000 regulates both international and domestic trade in endangered species through four Schedules. Orchids are listed in Schedules I and II, while Schedule IV includes several other threatened and endemic plants. By controlling the trade of these listed species, the Act provides an avenue for conserving and protecting targeted species from over-exploitation and may offer opportunities to include additional species in future amendments.

POSSIBILITIES FOR FUNDING THESE ACTIONS:

- CASE could apply for CEPF grants for actions outlined in the report (government not allowed)
- SDC & FD have a social branch that could organize community to create group that could apply for CEPF grant (CEPF also funds the formation of these community groups but would need a CSO to lead on that-this is more difficult). NEPA's Ecosystems Management Branch has been working towards the establishment of local community groups to enable sustainable use of watershed areas and incorporation of conservation strategies. Such groups could benefit from CEPF grants.

APPENDIX I.

Participants of the 2024 Threatened Plants of Jamaica Planning Workshop

NAME	COMMUNITY / ORGANIZATION
SIMONE LEE	CANARI/CEPF
ALEX SIMPSON	CARIBBEAN COASTAL AREA MANAGEMENT FUND
DAMION WHYTE	ENDANGERED SPECIES WORKING GROUP
ALEXANDER BECKFORD	FORESTRY DEPARTMENT
SWAINE BECKLES	FORESTRY DEPARTMENT
DEON BROWN	FORESTRY DEPARTMENT
KERON CAMPBELL	INSTITUTE OF JAMAICA
SHEMERE LAWES	INSTITUTE OF JAMAICA
JANELLE MORRIS	INSTITUTE OF JAMAICA
CAROLINE LEES (CO-FACILITATOR)	IUCN SSC CPSG
NATASHA PETERS (FACILITATOR)	IUCN SSC CPSG
SHANTI PERSAUD	JAMAICA BAUXITE INSTITUTE
MICHKA-MAY SMALL	JAMAICA CONSERVATION AND DEVELOPMENT TRUST
KAMILEA RUSSELL	JAMAICA HORTICULTURAL SOCIETY
DAMANY CALDER	NATIONAL ENVIRONMENT AND PLANNING AGENCY
JODIE-ANNE MCFARLANE	NATIONAL ENVIRONMENT AND PLANNING AGENCY
ASHLEIGH SANDERSON	NATIONAL ENVIRONMENT AND PLANNING AGENCY

APPENDIX I. Participants of the 2024 Threatened Plants of Jamaica Planning Workshop continued

NAME	COMMUNITY / ORGANIZATION
NIKITA BILLET	NATURAL HISTORY SOCIETY OF JAMAICA
DAVID PICKING	NATURAL HISTORY SOCIETY OF JAMAICA
CHRISTOPHER CREARY	NATURE PRESERVATION FOUNDATION
TIMMERA GRANT	NATURE PRESERVATION FOUNDATION
JEFFERY MCKENZIE	NATURE PRESERVATION FOUNDATION
CARLA MYRIE	NATURE PRESERVATION FOUNDATION
DERRICK SIMON	NATURE PRESERVATION FOUNDATION
LORNA WILLIAMS	NORTHERN COCKPIT COUNTRY LOCAL FOREST MANAGEMENT COMMITTEE
NORDIA HAMILTON	PUBLIC GARDENS DIVISION
THEO WATSON	PUBLIC GARDENS DIVISION
ARLETTE DUNKLEY-FULLERTON	SOUTH EAST COCKPIT COUNTRY LOCAL FOREST MANAGEMENT COMMITTEE
COMOEYA EDWARDS	SOUTH EAST COCKPIT COUNTRY LOCAL FOREST MANAGEMENT COMMITTEE
HERBERT FOSTER	SOUTH EAST COCKPIT COUNTRY LOCAL FOREST MANAGEMENT COMMITTEE
DENNEKO LUKE	UNIVERSITY OF THE WEST INDIES
MARIAH MOSQUERA	UNIVERSITY OF THE WEST INDIES
ADRIAN THOMAS	URBAN DEVELOPMENT CORPORATION

APPENDIX II.

Species List (all Red List categories listed are provisional)

Following an IUCN Red List training workshop hosted in Jamaica in April 2024, newly trained scientists from UWI collaborated with Species Conservation Assessors at RBG Kew to assess the extinction risk of 106 Jamaican plant species (see 1.1 and 2.1 for Project Scope). Appendix II lists the 59 species prioritized for incorporation into conservation action planning, and their provisional IUCN Red List status.

FAMILY	LATIN NAME	ENDEMIC	RED LIST CATEGORY
Orchidaceae	*Acianthera alpestris*	Y	VU
Orchidaceae	*Acianthera hirsutula*	Y	NT
Orchidaceae	*Acianthera laxa*	Y	EN
Orchidaceae	*Acianthera monophylla*	Y	DD
Orchidaceae	*Acianthera odontotepala*	N	VU
Orchidaceae	*Anathallis jamaicensis*	Y	DD
Orchidaceae	*Andreettaea delicatula*	Y	VU
Melastomataceae	*Blakea urbaniana*	Y	CR
Orchidaceae	*Bletia hamiltoniana*	Y	CR
Orchidaceae	*Bulbophyllum jamaicense*	N	EN
Orchidaceae	*Dendrophylax funalis*	Y	NT
Orchidaceae	*Encyclia parviloba*	Y	CR
Orchidaceae	*Epidendrum morrisii*	Y	EN
Orchidaceae	*Epidendrum swartzii*	N	EN
Orchidaceae	*Habenaria socialis*	Y	DD
Orchidaceae	*Lepanthes adamsii*	Y	EN
Orchidaceae	*Lepanthes bilabiata*	Y	EN
Orchidaceae	*Lepanthes byfieldii*	Y	DD
Orchidaceae	*Lepanthes cochleariifolia*	Y	VU
Orchidaceae	*Lepanthes convexa*	Y	EN
Orchidaceae	*Lepanthes hollymountensis*	Y	EN
Orchidaceae	*Lepanthes interiorubra*	Y	EN
Orchidaceae	*Lepanthes jesupii*	Y	DD
Orchidaceae	*Lepanthes lanceolata*	Y	EN
Orchidaceae	*Lepanthes loddigesiana*	Y	EN
Orchidaceae	*Lepanthes multiflora*	Y	EN

APPENDIX II. Species List continued

FAMILY	LATIN NAME	ENDEMIC	RED LIST CATEGORY
Orchidaceae	*Lepanthes obtusipetala*	Y	NT
Orchidaceae	*Lepanthes pulchella*	Y	EN
Orchidaceae	*Lepanthes rotundata*	Y	EN
Orchidaceae	*Lepanthes sanguinea*	Y	VU
Orchidaceae	*Lepanthes simplex*	Y	EN
Orchidaceae	*Lepanthes tridentata*	Y	EN
Orchidaceae	*Lepanthes tubuliflora*	Y	CR
Orchidaceae	*Lepanthes unguicularis*	Y	CR
Orchidaceae	*Lepanthes vinacea*	Y	EN
Orchidaceae	*Lepanthes woodiana*	Y	EN
Orchidaceae	*Lepanthes wullschlaegelii*	Y	VU
Orchidaceae	*Liparis saundersiana*	N	VU
Orchidaceae	*Liparis viridipurpurea*	N	VU
Orchidaceae	*Maxillaria swartziana*	Y	EN
Melastomataceae	*Meriania purpurea*	Y	VU
Melastomataceae	*Meriania leucantha*	Y	NT
Melastomataceae	*Miconia augustgrisebachii*	Y	EN
Melastomataceae	*Miconia crossosepala*	Y	VU
Melastomataceae	*Miconia ecostata*	Y	DD
Melastomataceae	*Miconia gloriosa*	Y	EN
Melastomataceae	*Miconia hirsuta*	Y	VU
Melastomataceae	*Miconia hirtellicaulis*	Y	CR
Melastomataceae	*Miconia nubicola*	Y	CR
Melastomataceae	*Miconia pilosa*	Y	VU
Melastomataceae	*Miconia proctorii*	Y	CR
Melastomataceae	*Miconia pyxidata*	Y	EN
Orchidaceae	*Neocogniauxia monophylla*	Y	EN
Orchidaceae	*Pseudocentrum minus*	N	EN
Orchidaceae	*Pterichia proctorii*	Y	CR
Arecaceae	*Roystonea princeps*	Y	EN
Orchidaceae	*Tolumnia gauntletti*	Y	EN
Orchidaceae	*Tolumnia hamiltonii*	Y	EN
Orchidaceae	*Karma trilobata*	Y	CR

APPENDIX III.

Survey Results

SURVEY QUESTIONS CIRCULATION: 30 | NUMBER OF RESPONSES: 25 **Number of responses where people offered comments*		WEIGHTED AVERAGE / % / **No. responses*
General		
Q1	**I am willing to provide my information for CPSG use as described above:** (percentage)	
	Yes	**100.00%**
	No	**0.00%**
Q2	**Overall, how satisfied are you with this workshop?** 1 = extremely dissatisfied | 7 = extremely satisfied	**6.08**
Plan to Act		
Q3	**As a result of my workshop experience:** 1 = strongly disagree | 7 = strongly agree	
	I have been introduced to new points of view regarding conservation of this species.	**6.00**
	I have much new information about the species or its conservation.	**5.44**
	Priorities for management and conservation of the species are clearer to me.	**6.32**
	I believe I can contribute more effectively to managing and conserving the species.	**5.92**
	I have a bigger network of people to contact for advice or input to help with my work with the species.	**6.40**
	I believe that collaboration on conservation activities for the species will improve.	**6.40**
Promote Inclusive Participation		
Q4	**Were key experts and stakeholders in the conservation of the species present at the workshop?** **(e.g. people, government agencies, organizations, community groups).** 1 = non were present | 7 = all were present N/A (percentage)	**6.04**
Q5	**List any stakeholders who could have made a valuable contribution but were not present at this workshop.** **(e.g. people, community groups, organizations, government agencies).** Number of responses	**20 responses (below)**

APPENDIX III. Survey Results continued

SURVEY QUESTIONS CIRCULATION: 30 | NUMBER OF RESPONSES: 25 **Number of responses where people offered comments*	WEIGHTED AVERAGE / % / **No. responses*
Use Sound Science	
Q6 **In my view during the workshop:** 1 = strongly disagree | 4 = no opinion | 7 = strongly agree	
We used the best available information.	5.83
Enough time was spent evaluating the quality of the available information.	5.71
The analytical tools used were a good fit for the required tasks.	5.71
Outputs from the analytical tools added value to decision-making.	5.79
Scientific concepts and outputs were communicated effectively.	5.96
Important gaps in the knowledge we need to protect or manage this species were identified.	5.92
The planning process encouraged the use of information and evidence from a range of sources.	6.04
Ensure Good Design and Neutral Facilitation	
Q7 **Describe your overall satisfaction with the following workshop elements:** 1 = extremely dissatisfied | 7 = extremely satisfied	
Pre-workshop briefing materials and agenda.	5.83
Quality and delivery of workshop presentations.	6.33
Clarity and organization of working group discussions.	6.25
Clarity and organization of entire group (plenary) discussions.	6.29
How the workshop was concluded.	6.63
Q8 **Please rate the following statements: "In my view, during the workshop...."** 1 = strongly disagree | 7= strongly agree	
The workshop leader seemed to be open to all viewpoints regarding effective conservation or management strategies for the species.	6.79
The facilitator(s) worked to ensure all participants had an equal opportunity to be heard.	6.83
Whenever I had something to say, I was able to get my point across.	6.75
Participants were comfortable working with each other.	6.50
Any conflict between participants was resolved to everyone's satisfaction.	6.50
Technical difficulties did not limit my participation.	6.58
Language difficulties did not limit my participation.	6.71

APPENDIX III. Survey Results continued

SURVEY QUESTIONS CIRCULATION: 30 | NUMBER OF RESPONSES: 25 **Number of responses where people offered comments*	WEIGHTED AVERAGE / % / **No. responses*
Reach Decisions Through Consensus	
Q9 **In your view, by the end of the workshop, how much agreement existed on the following topics:** 1 = no agreement | 7 = complete agreement	
A shared definition of what stakeholders want to achieve.	6.38
The challenges involved in conserving or managing the species.	6.42
Priority conservation activities needed to protect or manage the species.	6.46
How implementation of the recommended conservation activities should be coordinated or managed.	6.29
Personal Details	
Q10 **How many IUCN SSC CPSG workshops had you attended before this one?** % of respondents that have attended previous workshops	37.50%
Q11 **Have you ever attended a CPSG training course?** percentage	
Yes	21.74
No	78.26
Q12 **For approximately how many years have you been working with the species?** percentage	
0 years	43.48
1-5 years	21.74
6-10 years	8.70
10+ years	26.09
Q13 **Before the CPSG workshop(s), approximately how many of the participants had you met (in-person or on-line)?** percentage	
All or most	8.70
More than half	8.70
About half	8.70
Less than half	52.17
Very few or none	21.74

APPENDIX III. Survey Results continued

SURVEY QUESTIONS CIRCULATION: 30 | NUMBER OF RESPONSES: 25 **Number of responses where people offered comments*		WEIGHTED AVERAGE / % / **No. responses*
Q14	**Before the CPSG workshop(s), approximately how many of the participants had you exchanged information with about the species?** percentage	
	All or most	0.00
	More than half	4.35
	About half	4.35
	Less than half	26.09
	Very few or none	65.22
Q15–Q17	**Below**	
Q18	**Language: the workshop was held in my native language?** percentage	
	Yes	100%
	No	0.00%
Q19	**Language: to what extent do you agree with the following statements?** 1 = strongly disagree | 7 = strongly agree	
	I was always able to communicate effectively in the main language of the workshop.	6.91
	Enough translation and interpretation support were provided to help me communicate effectively throughout the workshop.	6.96
Other Comments		
Q20	**Is there anything else you would like to say about the planning workshop?** Number of responses	16 responses (below)

CONSERVATION PLANNING SPECIALISTS GROUP:
www.cpsg.org

DESIGN:
Alison Harvey
www.linkedin.com/in/alison-harvey-graphic-design