Blue and John Crow Mountains

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: Jamaica
Inscribed in: 2015
Criteria: (iii) (vi) (x)

The site encompasses a rugged and extensively forested mountainous region in the south-east of Jamaica, which provided refuge first for the indigenous Tainos fleeing slavery and then for Maroons (former enslaved peoples). They resisted the European colonial system in this isolated region by establishing a network of trails, hiding places and settlements, which form the Nanny Town Heritage Route. The forests offered the Maroons everything they needed for their survival. They developed strong spiritual connections with the mountains, still manifest through the intangible cultural legacy of, for example, religious rites, traditional medicine and dances. The site is also a biodiversity hotspot for the Caribbean Islands with a high proportion of endemic plant species, especially lichens, mosses and certain flowering plants.

SUMMARY

2020 Conservation Outlook

Finalised on 02 Dec 2020

GOOD WITH SOME CONCERNS

The impressive dedication of many non-governmental and governmental actors and external supporters—and, of course, the local Maroon Community—are fully acknowledged through the governance structures and management of the site. The World Heritage initiative and eventual inscription as a mixed World Heritage site have generated further momentum and visibility, including in exemplary form as regards the culture-nature nexus. Responses to Committee requests have made progress but need to be fully implemented. The severity and large number of threats, likely to be aggravated by anticipated climate change, combined with limited management resources, are of concern. Permanent and increased management responses will be needed in order to maintain the extraordinary cultural and natural heritage of the property and restore buffer zone habitats. The updated management plan, approved in 2019, along with a growing portfolio of projects aimed at improving management capacity and effectiveness are encouraging in this regard.

FULL ASSESSMENT

Description of values

Values

World Heritage values

▶ Important centre of Caribbean plant endemism **Criterion:(x)**

The Blue and John Crow Mountains belongs to the Caribbean Islands biodiversity hotspot and is an important centre for plant endemism in the Caribbean displaying 50% endemicity in the flowering plants at elevations above 900-1000 m asl with between 30-40 % of these species found only within the property's boundaries (World Heritage Committee, 2015). There are 1,357 recorded species of flowering plant within the property despite its relatively small size. Some 294 of these species are Jamaican endemics and 87 of them are restricted to the property. An impressive number of Jamaica's more than 500 fern species is also found in the property. Noteworthy bryophytes, non-vascular "lower" plants, encompass 61 recorded species of mosses and liverworts (Anadón-Irizarry et al. 2012, Bertzky et al. 2013, Davis et al. 1997, World Heritage Committee, 2015). The site boasts an impressive number of endangered and critically endangered species of flora, including three critically endangered endemics: Blue Mountain Yacca (Podocarpus urbanii), one of the rarest conifers in the world, Eugenia kellyana and Psychotria danceri.

▶ Significant populations of globally (critically) endangered animal species **Criterion:(x)**

Noteworthy vertebrates include the Jamaican Peak Frog (Eleutherodactylus alticola), which has triggered a so-called Alliance for Zero Extinction (AZE). It is hoped that the critically endangered Arntully Robber Frog (Eleutherodactylus orcutti) continues to have its probably last refuge in the national park, as detailed in IUCN Red List information (Hedges, 2010).

▶ Globally significant populations of bird species **Criterion:(x)**

The property hosts globally significant populations of bird species and represents a key part of the Jamaican Endemic Bird Area. It is important for a number of restricted-range species as well as a large number of migratory birds such as the Petchary (Tyrannus domenciensis), Bicknell's Thrush (Catharus bicknellii) and Swainson's Warbler (Limnothlypis swainsonii) (World Heritage Commitee, 2015). Endangered bird species include the Jamaican Blackbird (Nesopsar nigerrimus) (State Party of Jamaica, 2014). Another bird species, listed as critically endangered in the IUCN Red List, but possibly extinct, is the Jamaican Petrel (Pterodroma caribbaea). What is today the site is the species' only proven nesting site. While the last confirmed record dates back to 1879, the IUCN Red List concludes that it "may conceivably survive" in the Blue and John Crow Mountains (BirdLIfe International, 2018).

Other important biodiversity values

▶ Rare and relatively intact forest and other vegetation types

The highest and mostly rugged elevations of the property are home to unique forest types and other vegetation types. There are patches of cloud forests and elfin forests which not remnant forests but naturally occur as small "islands" restricted to particular micro-climates and other ecological conditions and which may have a degree of plant endemism of around 50 % (IUCN, 2015, see also Dinerstein et al., 1995). There are also rare high altitude grasslands, sometimes, referred to as "montane summit savannas", featuring local endemic plants with extremely small ranges (JCDT, 2011).

▶ **Mosaic of diverse forest types**

While the altitudinal gradient of the historically uninterrupted forests from the coast to the summits does not exist anymore, there continues to be a relatively intact mosaic of remarkably diverse forest types within the property. In essence, the mosaic is restricted to the high and rugged parts of the much larger national park (IUCN, 2015). However, it is assumed that the remnant forest patches in the lower elevations continue to be of high conservation value and there is potential for natural regeneration and active restoration in the long run (IUCN Consultation, 2014).

▶ **Recognised importance for migratory birds**

Besides the high degree of endemism of the Jamaican avifauna and the importance of the property for the survival of many of these endemic species, the property is also known as a haven for migratory bird species both from the Northern and Southern Hemispheres. According to Devenish (2009) , there are more than 170 species of wintering Neotropical migrants, transients or vagrants. Haynes et al. (1989) referred to the montane forests of Eastern Jamaica as "the largest intact wintering habitat blocks for migratory birds in the insular Caribbean".

▶ **Noteworthy endemic freshwater fauna**

The numerous creeks and small rivers contain a high number of endemic freshwater biodiversity, in particular invertebrates (JCDT, 2011). Many species have historically been used by the Maroon as an important source of protein. Such use continues to this day, some of the used species are local specialties, the most famous one being the mollusk "Bussu" (Neritina punctulata).

▶ **Highly diverse and largely endemic terrestrial invertebrate fauna**

A large number of Jamaica's more than 500 endemic land snail species are believed to occur in the property; many of them remain to be described scientifically (JCDT, 2011). Other particularities include rare velvet worm species, some of which are likewise endemic (State Party of Jamaica, 2014).

▶ **Critical habitat for Giant Swallowtail**

The property is critical for the survival of the endemic Homerus or Jamaican Swallowtail Butterfly (Papilio homerus), the largest butterfly in the Western Hemisphere. The species is today restricted to two locations on Jamaica (JCDT, 2011), the national park and one other location, the Cockpit Country (State Party of Jamaica, 2014). It is a flagship species and an explicit conservation target species.

Assessment information

Threats

Current Threats

High Threat

Alien invasive species, both flora and fauna and both on land and in freshwater systems, pose a complex and severe direct and indirect threat through competition for habitat, nest predation and other forms of predation of a range of diverse species, including reptiles and amphibians. There is further concern that several alien invasive plants directly increase the fire risks in and around the property. Natural regeneration of the large areas of degraded forests and deforested land is impeded and/or compromised by competing plants but also by seed predation by introduced rodents. Consumptive use of wild terrestrial and freshwater species is not well known but a major challenge, buffered only by the inhospitable terrain. The extent of harvesting of freshwater species is insufficiently known, the priority is to stop use of toxic chemicals as a destructive harvesting method. Compared to these fundamental challenges, fire and tourism and recreation appear secondary. Nevertheless, all of the above threats require permanent management attention. Anticipated climate change is another key concern. As the exact implications remain cloudy, it is considered as a potential threat for the purpose of this assessment.

▶ **Hunting and trapping, Logging/ Wood Harvesting, Fishing / Harvesting Aquatic Resources**

(Hunting, fishing and logging)

High Threat
Inside site, scattered(5-15%)
Outside site

Hunting appears to focus on non-native mammals and as such would appear to be a contribution to managing some of those species, in particular feral pigs. Pig hunting has elements of both commercial and subsistence hunting and also has cultural importance attached to it. Hunting of Jamaica's only native non-flying mammal, the Hutia or Coney, for meat is reported, both for consumption and for sale (JCDT, 2011; 2020). The same source expresses concern about destruction of coney holes as part of he hunting technique. Following massive historic logging (see for example Evelyn et al., 2003), there is some illegal logging and wood collection for local construction and fuelwood, valuable timber resources in accessible locations have been exhausted. Commercial extraction of orchids and other plants as well as birds, reptiles, amphibians and butterflies for sale as ornamental plants, pets or souvenirs, is also known to occur. Harvesting of freshwater fish and crustaceans and mollusks is an integral part of local livelihood systems and part of traditional dishes. There is a risk of overharvesting and there a particular concern as regards the direct and indirect impacts of the apparently common use of toxic chemicals to harvest shrimp and crayfish (JCDT, 2011).

▶ **Invasive Non-Native/ Alien Species, Problematic Native Species**

(Invasive alien species)

Very High Threat
Inside site, widespread(15-50%)
Outside site

Alien invasive species of both fauna and flora are major conservation concerns across the property and its surroundings, as they are across all of Jamaica and the entire Insular Caribbean, including in the diverse freshwater systems. The following brief overview draws on CEPF (2010), Goodland et al. (1996), IUCN (2015), Jamaican Government (2014), JCDT (2011) and references therein. There are more than 10 recorded non-native mammals in the property, which include rats, mongoose, feral pigs and dogs and possibly white-tailed deer, all well-known to heavily impact on island systems across the world. In the deforested and/or degraded lower elevations of the national park, which serves as the buffer zone of the property, and on adjacent land, invasive plants are omnipresent and in many places hyper-abundant, for example Bracken Fern and Wild Ginger. The nomination dossier singles out Pittosporum undulatum, an Australian tree species sometimes called Mock Orange, as particularly damaging by out-competing native trees and thereby preventing natural forest regeneration (Jamaican Government, 2014, see also Goodland et al. 1996; and Bellingham, et al. 2019). With the exception of higher elevations in remote and rugged locations with intact native vegetation, even the property itself is affected by a large number of invasive species. There are also remnants of domestic species stemming from past agriculture and failed attempts to establish timber plantations using non-native pine species. An additional concern is that non-native grasses, such as Molasses or Wynne Grass (Melinus minutiflora) and bamboo species may provide entry points for fire. Fire is commonly used in the agricultural areas around the property. It is believed that the Maroon, and possibly indigenous Peoples prior and during the times of maroonage, influenced species distribution by promoting or planting preferred species for use as food or medicine.

▶ **Water Pollution**

(Water pollution)

Low Threat
Inside site, extent of threat not known
Outside site

While most of the property is upriver of any agricultural use and generally difficult to access, there are some concerns about agro-chemicals entering rivers and creeks (JCDT, 2011). Even more alarming is the unacceptable use of chemicals as a technique to harvest freshwater species for food (see biological resource use).

▶ **Droughts, Storms/Flooding**

(Extreme weather events)

High Threat
Inside site, throughout(>50%)
Outside site

The threats are occurring in a heavily modified environment. With the exception of the more resilient remnant native forests, the degraded forests are known to be very vulnerable to heavy rains and

resulting erosion and to tropical storms.

▶ **Fire/ Fire Suppression** **High Threat**

(Fires)

Inside site, scattered(5-15%)
Outside site

Fires pose a high threat to the property, as large parts of the once much larger forest ecosystem have been lost or degraded, thereby decreasing their resilience. Changed micro-climate, a consequence of forest loss and degradation, more pronounced droughts and invasive grass and bamboo species favouring the spreading of fires all contribute to elevating the risks. Sources of wildfires can be natural but fire is not considered a major natural disturbance factor of the forest types under consideration (JCDT, 2011). Typically, fires are related to the widespread use of fire in agriculture or unintentionally caused by visitors with an additional risk of arson as a form of vandalism. The 2010-2016 management plan even refers to fires started for "entertainment" (JCDT, 2011). A major concern is that fires not only prevent natural regeneration but appear to favour several alien invasive plant species (JCDT, 2011).

▶ **Crops, Other Ecosystem Modifications** **High Threat**

(Conversion of forests into agricultural land)

Outside site

Conversion of forests into agricultural land is part of the broader land use dynamics of the mountainous Eastern part of Jamaica (JCDT, 2011, Weis, 2000). This process has visibly affected large parts of the lower elevations of the national park. Small-scale agricultural activities along the boundaries of the property reach into the property, which coincides with the higher elevations of the national park. JCDT (2011) argues that such unexpected cultivation in hardly accessible remote areas is a response to fear of crop theft.

Potential Threats

High Threat

It is difficult to draw a line between current and potential threats. In principle, most concerns about the future of the property can be described as a feared aggravation of existing threats. It is also important to understand that both the likelihood of the threat becoming a reality and the severity of the possible impacts are factors to be considered. At this stage, mining or quarrying appears highly unlikely given the corresponding governmental commitment in 2015. Similarly, there is no indication of acute plans to promote tourism in ways which would raise environmental or other concerns. The same holds true for possible pressure to extend coffee cultivation. If some of such threats were to become reality, they would have to be re-assessed at that point in time. The low likelihood of several of the potential threats becoming a reality in the foreseeable future is acknowledged. Given the multitude of potential threats and the high vulnerability of the small property surrounded by highly degraded land, the current assessment concludes that the potential threats are high overall.

▶ **Mining/ Quarrying** **Low Threat**

(Mineral exploration and extraction)

Outside site

There is a legal possibility of mineral exploration and extraction despite national park status. According to applicable national park regulations, mining is only illegal when occurring "without written permission of the Authority" (JCDT, 2011). The management plan notes prospecting licenses which were apparently granted prior to the formal establishment of the national park. Given the direct vicinity of the property and the larger national park to Jamaica's capital some observers have pointed out that there are incentives to extract construction material from the national park even though the Forest Act stipulates that extraction of "soil, sand or gravel" are not permitted (JCDT, 2011).

▶ **Tourism/ visitors/ recreation** **Low Threat**

(Tourism and recreation)

Inside site, localised(<5%)
Outside site

Given its localized occurrence and overall adequate management, tourism and recreation are not considered major threats. There is a well-managed visitor centre and recreation area (Holywell) easily accessible from the capital city of Kingston and a number of well-known trails, such as the renowned Blue Mountain Peak Trail. Limited numbers of hikers enter the few trails into the more remote areas of

the property. On the contrary, there is further potential to use tourism and recreation as a vehicle for visitor education, conservation financing and to generate local economic benefits. At the same time, hiking to remote areas can pose severe threats in terms of invasive species, accidental fires, and damage to or even destruction of rare habitats and requires adequate regulation, patrolling and enforcement. The biggest threat is likely to be the possible opening of hitherto inaccessible remote locations which have the highest degree of naturalness and as thus are among the most valuable and fragile areas within the property.

▶ **Crops** — **High Threat**
(Coffee plantations) — Outside site

Most coffee farmers are probably aware of the critical importance of maintaining forest cover in the highest elevations to ensure reliable water provision and to prevent flooding and erosion after heavy rains. Nevertheless, there have been controversial attempts to expand lucrative coffee plantations. While there is no indication of acute pressure, further price increases of the already highly priced Blue Mountain coffee would most likely result in pressure.

▶ **Habitat Shifting/ Alteration, Droughts, Temperature extremes, Storms/Flooding** — **High Threat**
(Climate change) — Inside site, throughout(>50%); Outside site

It is impossible to quantify the future impacts and there is no clear analysis of existing impacts which may be attributable to climate change. The current management plan plausibly argues that climate change is likely to increase the effects of existing impacts, such as land degradation which per se are not caused by climate change (JDCT, 2011). Detailed research by Bellingham et al. (1995, 1994, 1992) indicates that the remaining intact montane forests were remarkably resilient to Hurricane Gilbert which heavily hit Jamaica in 1988. The concern is that droughts, heavy precipitation events and storms may increase in frequency and intensity. Parts of the World Heritage site are more resilient to hurricanes than others, due to forest species composition (McLaren, et al., 2019).

Overall assessment of threats — **High Threat**

There is reason for cautious optimism given the dedicated support to the World Heritage site on the part of the Jamaican conservation and research community. The successful World Heritage nomination is evidence of a strong governmental commitment which came with an explicit declaration to refrain from any mineral exploration and extraction. Nevertheless, due to the small size and vulnerability combined with the multitude of severe and potential threats, the World Heritage site is considered to be under high threat.

Protection and management

Assessing Protection and Management

▶ **Management system** — **Some Concern**

The management system of Jamaica's only national park is noteworthy in that the government has delegated management authority to a national NGO, the Jamaica Conservation and Development Trust (JCDT). Key guidance is provided in management plans since the national park was established in 1993. JCDT is the key actor as regards operational management and the elaboration of management plans. JCDT's work focuses on the national park and institutionally is guided by its own strategic planning and the following mission statement: "to promote environmental conservation and sustainable development, with particular emphasis on the BJCMNP for the benefit of Jamaica and our people." As an innovative governance arrangement, the property and the larger national park are promising examples of taking advantage of the dedication and expertise of highly committed and fully qualified members of civil

society. At the same time, it can also be interpreted as a certain evasion of governmental responsibility, as the governmental support to JCDT appears very limited, in particular financially. This creates a heavy reliance on successful fund-raising efforts by one non-governmental actor, which may imply a certain vulnerability in the longer term.

▶ Effectiveness of management system

Some Concern

The management by JCDT is highly dedicated and there is effective communication, coordination and cooperation with the multiple governmental institutions involved, domestic and foreign research institutions and local stakeholders and rightsholders. Chai et al. (2009) noted deforestation after the establishment of the national park. The evaluation by both Advisory Bodies noted concerns about staffing and funding levels which can reasonably be interpreted as bottlenecks to management effectiveness (ICOMOS, 2015; IUCN, 2015). The World Heritage nomination and inscription helped to further raise the profile of the site and it is hoped that this will translate into a consolidation of support as a basis for improving management effectiveness. From the strict perspective of the World Heritage property within the larger national park, the concerns about management effectiveness are limited, as the area inscribed as a mixed World Heritage property coincides with rugged mountainous terrain that is mostly difficult to access and does not lend itself for conversion to land uses other than forest. When the entire national park is taken into account, it is undeniable that much of the land in the lower elevations is degraded and impacted by a variety of ongoing threats. The Management Plan 2017-2027 has now been formally approved as of January 2019 (JCDT, 2018; IUCN Consultation, 2020). Projects such as the BIOPAMA "Improving management effectiveness – Blue & John Crow Mountains National Park and World Heritage Site", among others (see 'Projects') will likely improve the effectiveness of the management system further in the coming years.

▶ Boundaries

Some Concern

It is somewhat unusual that the property is located within a national park but that only selected areas of that nationally protected area were considered worthy of World Heritage status. This is conceivable in light of major integrity concerns across large parts of the lower elevations of the national park. It can be argued that this setting creates the opportunity to manage (and restore) the buffer zone of the World Heritage property with the legal backing that comes with national park status. At the same time, the situation indicates implementation challenges, as the conservation status of large parts of the national park are hardly compatible with its legal status. The World Heritage inscription had coincided with the national park's preservation zone boundary. An assessment was completed in 2017 and, as a result, the newly delineated preservation zone of 26,615 is now slightly larger than the World Heritage area of 26,252 ha. Both are still buffered by other areas of the national park, forest reserves, or the overarching Protected National Heritage designation (State Party of Jamaica, 2018).

▶ Integration into regional and national planning systems

Some Concern

As stated in the previous section, it is important to recall that the immediate surroundings of the property, including the entire buffer zone, are formally located within a national park. In this sense, there is a strong legal basis to extend conservation and management beyond the boundaries of the property. Much of the national park outside of the property, however, is heavily and visibly affected by deforestation, forest degradation, erosion, past and current agricultural activity and alien invasive plant species. The legal protection of the immediate surroundings of the property therefore does not translate into an effective conservation and management regime. The nomination dossier (Jamaican Government, 2014) mentions that overall planning in all three Parishes (administrative units) to which the national park belongs refer to conservation objectives and as such are in principle supportive. A broader planning framework bringing together the three Parishes does not appear to exist though. In terms of thematic planning schemes, a national Master Plan for Protected Areas and national level tourism planning deserve to be mentioned (JCDT, 2011).

▶ Relationships with local people

Mostly Effective

Besides historic relationships between the mountain environment and the extirpated Indigenous inhabitants of Jamaica, the most intricate relationship between the property and local people is without

doubt the critical role the mountains and forests have been playing for the Windward Maroon - and continue to play to this day, both in terms of culture and livelihood systems. This is fully reflected in the very approach of the World Heritage nomination. Historic cooperation between the Maroon and the Indigenous Taíno is documented and it is thus fair to say that some of the indigenous heritage became part of the Maroon culture (Jamaican Government, 2014). Without the rugged mountain terrain covered in almost impenetrable forests, the Maroon would not have survived their impressive journey from slavery to freedom. This history and meaning of the place is well known in Jamaica, not at least through the legendary leader Queen Nanny or Nanny of the Maroons, who was declared a national heroine in 1975. The Maroon are respected stakeholders and rightsholders and hold much of the land of the Rio Grande Valley adjacent to the national park. The Maroon significantly contributed to the mixed World Heritage initiative. There are many other local communities in the mostly poor rural surroundings of the property. Tensions stem from illegal and partially unsustainable resource use of wild biodiversity for food, construction, energy and sale of ornamental plants and pet birds. One particular stakeholder group are coffee farmers who benefit from and even depend on the park's environmental services. Tourism and recreation play a localized role and modestly contribute to the local economy. Given the limited number of visitors, no major conflicts are known to occur. While it is simplistic to generalize across the heterogeneous stakeholder groups, there are no known major tensions between park management and local people beyond common and manageable resource use conflicts, well-known from protected areas around the world. The Maroon are an example of direct and explicit support to cultural and natural heritage conservation on the part of a local community, including an active role in the World Heritage nomination efforts. Garraway, et al., (2017) document a successful case of community-based conservation of the critically endangered Giant Swallowtail Butterfly (Papilio homerus). The JCDT works through Local Advisory Committees to enlist community support (Otuokon, 2019).

▶ Legal framework

Some Concern

There is concern that mineral exploration and extraction are in principle not excluded by law despite national park status of both the property and the buffer zone (ICOMOS, 2015; IUCN, 2015; JCDT, 2011). A National Minerals Policy has been drafted but not finalized (State Party of Jamaica, 2018). Thereby, some are concerned that threats may arise in the future regardless of existing and strong commitments made by the government at the time of World Heritage inscription. Otherwise, there are multiple designations and layers of protection through a number of laws which raises some concerns about consistency of the legal framework. In addition to national park status, there is overlap with a formally designated forest reserve and an area of “Protected National Heritage”. A clear affirmation of the extraordinary significance of the site, the overlap of designations raises questions in terms of clarity of the legal framework and the exact roles among and between involved institutions. Given that only a part of the larger national park was inscribed as a World Heritage property, the de facto buffer zone is located within a national park which legally ensures a high level of protection. A detailed analysis of a possible need to harmonize the complex framework would be desirable. Overarching Protected Area legislation is in an early stage of the legislative process. Similarly, the Jamaica National Heritage Act has been under review to incorporate World Heritage since 2016 but has not been finalized (State Party of Jamaica, 2018).

▶ Law enforcement

Mostly Effective

Both the Forestry Department and JCDT Rangers patrol the national park. These patrols include community outreach stops, which has led to more community reporting of infractions (State Party of Jamaica, 2018). Site management is currently in the process of finalising an agreement for a 3 year BIOPAMA project to strengthen management effectiveness, addressing Enforcement & Conservation in particular (IUCN Consultation, 2020).

▶ Implementation of Committee decisions and recommendations

Some Concern

Given the very recent inscription in 2015 there is a short history of interaction with the World Heritage Committee. The deferral of an earlier nomination in 2011 deserves to be mentioned. In its decision 35

COM 8B.16 (Paris, 2011), the Committee provided guidance for further considerations in subsequent nomination efforts. Much of this guidance was considered in the de facto process which eventually led to the inscription of the mixed property in 2015. The inscription decision 39 COM 8B.7 (Bonn, 2015) "encouraged" the State Party to increase its budget for the property to ensure effective protection and management. The inscription decision further requested the State Party to "integrate into the interpretation and presentation programme of the property the “satellite sites” related to Maroon tangible and intangible heritage and located outside the property and its buffer zone as well as the heritage of the wider Jamaican Maroonage phenomenon." In light of the visible deforestation in the buffer zone of the property, the Committee also requested the State Party to "strengthen measures to combat the threat of small-scale and commercial agricultural encroachments impacting on the property". The latter has been addressed to some extent by the Yallahs & Hope Watershed Management Project, which was implemented 2016 – 2020 and focused heavily on the slopes just outside the National Park in terms of reforestation and targeting of farmers.
The 2017 Decision 41 COM 7B.35 included four requests, to adopt and implement a) the Draft National Minerals Policy; b) new overarching protected area policy and legislation; c) a Maroon Cultural Assistants training programme; and d) a new Management Plan 2017-2027. Of these the training program has been fully implemented; and the the management plan was approved Jan 2019 (JCDT, 2018); with the remaining legislative improvements still in draft (various sources, including State Party of Jamaica, 2018; IUCN Consultation, 2020).

▶ Sustainable use — Serious Concern

Natural resource use for food, medicine and shelter was the very basis for the survival of the Maroon which the mixed property honours and celebrates. Use of a wide range of plant and animal species from land and water for wood, construction material, medicine etc. continues to be a reality, including for cultural purposes (Jamaican Government, 2014). In a rural setting with considerable poverty, this is unlikely to change. The management challenge is to prevent excess, such as illegal use of rare species facing extinction or the use of toxic chemicals as a method to harvest freshwater species. Granting defined local user rights based on agreements and accompanied by monitoring are likely to be the most promising management framework, including as an incentive to control external users. Given that the much of the land within property enjoys a high degree of natural protection due to the ruggedness of the terrain and dense vegetation, the pressure on wild biodiversity is less pronounced than in the buffer zone. Nevertheless, the potentially devastating impacts of extraction on rare species is a serious concern and the monitoring, law enforcement and the overall effectiveness of management responses in this regard appear limited.

▶ Sustainable finance — Serious Concern

As stated, the management responsibility assumed by JCDT encompasses the need for fundraising. JCDT has been successful to some extent in securing financial support from diverse sources, for example JCDT has in the last few months secured new funding which will contribute to improving management effectiveness, with a focus on the areas on the southern slopes of greatest concern in terms of encroachment of farmers. However, the long term reliability is far from certain. In line with the ICOMOS and IUCN evaluations (ICOMOS, 2015; IUCN, 2015), the Committee decision at the time of inscription (39 COM 8B.7, Bonn, 2015) noted under-funding and explicitly encouraged the State Party to step up its budget allocations as a basis for effective management in the long term. The Committee made reference to "current estimates" suggesting a need to double the budget and resources. This is interpreted as a justification to assess a serious concern. During the period 2017-2019 the Government of Jamaica provided approximately US$100,000-120,000 annually for management of the national park, with a further US$60,000/year from user fees and recreational operations. The JCDT supplements this small budget through project fundraising from philanthropic, bilateral and multilateral sources (State Party of Jamaica, 2018; Jamaica Conservation & Development Trust, 2020).

▶ Staff capacity, training, and development — Some Concern

Related to the previous point on financing, one limiting factor is the budget. While this can to a certain degree be buffered through the strong personal commitment of NGO staff, it is clear that additional

governmental funding would help to address needs to further develop capacities. The needs are clearly identified and specified in the latest management plan (JCDT, 2011). As an institution, JDCT has managed to secure staff training, often in cooperation with external partners and supporters. The involvement of several governmental and academic Jamaican partners contributes to a wide range of expertise being available to inform decisions, thereby also contributing to capacity development on the job. In 2018 the Jamaica National Heritage Trust initiated a training program for Maroon Cultural Assistants, which included local community members and rangers (State Party of Jamaica, 2018).

▶ Education and interpretation programs — Mostly Effective

The well managed visitor centre at Holywell and modest infrastructure and signposts at key trails are noteworthy. The new visitors' ("Discovery") Centre built in 2018/19 with exhibits installed with funding from the Government's Tourism Enhancement Fund draws further attention the story of the Maroon and its significance, including their relationship with the Blue and John Crow Mountains and also the adjacent Port Royal Mountains. However, more work could still be done both for school curricula and informal education.

▶ Tourism and visitation management — Some Concern

The major hub for tourism and visitation is Holywell, a recreational area used mostly by residents of nearby Kingston. While hiking is in its infancy as a domestic leisure activity, an increasing number of domestic and foreign visitors make use of the attractive trail network. Significant improvements to facilities on the Blue Mountain Peak Trail and at Holywell have recently been made with support from the Government's Tourism Enhancement Fund (TEF) and the government agency, which will enhance recreation & tourism (2016 – 2020). A Trail Project was launched in late 2019 with assistance from the US Peace Corps Volunteers – which will explore expanding the trail network (IUCN Consultation, 2020). Forms of tourism adapted to the culturally and ecologically sensitive setting are encouraged, also as a means to educate visitors and to gain supporters. There are promising efforts to this effect, including the New Visitors' ("Discovery") Centre built in 2018/19 with exhibits to provide more of the Maroon story (IUCN Consultation, 2020).

▶ Monitoring — Some Concern

Of the many forms of monitoring, the monitoring of the use of natural resources (particularly biodiversity) comes to mind as a priority need. As it is difficult to envisage any workable mechanisms to prevent resource use in remote areas, the most promising avenue appears to be joint monitoring involving user communities. A number of community-based forest monitoring and restoration projects have been conducted by the JCDT (State Party of Jamaica, 2018). A Jamaican Hutia (Geocapromys brownii) assessment has been completed (2018 – 2020) and the Management Plan (JCDT, 2018) has now been approved. There are plans to retain camera traps for on-going monitoring of this and other species (IUCN Consultation, 2020).

▶ Research — Mostly Effective

There is excellent, albeit selective research on forest ecology and many individual species. Several decades of systematic data collection permit a rare glimpse into the montane forests of the Insular Caribbean which have been lost in their great majority since European arrival. The property and its buffer zone have been and continue to be the training ground and site of field research of numerous Jamaicans who have grown into strong members of the governmental, non-governmental and academic environmental community. There is regular exchange with renowned foreign research institutions. The World Heritage nomination provided a useful opportunity to take stock of the wealth of information generated over many decades.

Overall assessment of protection and management — Some Concern

When strictly referring to the property, protection and management are effective overall. This is largely a function of the inaccessible terrain and inhospitable vegetation. On the other hand, the

Jamaica Conservation & Development Trust and its partners deserve credit for many years of hard work under often adverse circumstances.

▶ **Assessment of the effectiveness of protection and management in addressing threats outside the site** — **Some Concern**

Despite laudable efforts, it must not be forgotten that the property itself to a large extent owes its good state of conservation to the remote location and rugged terrain coupled with dense vegetation. The surroundings of the property, including but not limited to the lower elevations of the national park, which serve as the property's buffer zone, are visibly degraded. It can be argued that the establishment of the national park in 1993 has prevented even more severe degradation. At the same time, degradation could not decisively be halted or reversed. Therefore, the effectiveness of protection efforts is limited. The property itself would benefit from further investment in participatory monitoring and law enforcement. In the buffer zone, there is major potential for restoration.

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **Important centre of Caribbean plant endemism** — **Low Concern** / **Trend:Deteriorating**

As long as there will be no new hiking trails facilitating access to high altitude plant habitats, the extraordinary and rare montane forests and the small patches of treeless summit savannas will continue to benefit from the high degree of natural protection. The property continues to protect many of Jamaica's endemic plant genera (Commock, et al., 2018). However, plants in the lower elevations, including easily accessible parts of the property and the entire buffer zone, have been suffering from multiple direct and indirect human impacts and continue to do so.

▶ **Significant populations of globally (critically) endangered animal species** — **Low Concern** / **Trend:Data Deficient**

Based on limited available data, it would appear that several plant species in the highest elevations are under no immediate threat. In those cases, especially as regards the local endemics, the small range is a natural condition which inevitably comes with an increased vulnerability. Rareness in those cases is not necessarily human-induced. The various critically endangered frog species are extremely vulnerable. In the case of the Arntully Robber Frog (Eleutherodactylus orcutti), for example, there is concern that the species may in fact be extinct. The combination of shrinking habitat, competition with and predation by alien invasive species and extraction for food or trade makes a wide range of species vulnerable. There are also data gaps which make it difficult to comment on the exact status and trends with a high degree of certainty, for example for most of the avifauna.

▶ **Globally significant populations of bird species** — **Data Deficient** / **Trend:Data Deficient**

Limited information is available on avifauna in the national park. Judy, 2018, found that the population of the Black-billed Streamertail (Trochilus polytmus scitulus) may be larger than previously thought.

Summary of the Values

▶ Assessment of the current state and trend of World Heritage values

Low Concern
Trend: Deteriorating

The establishment of the national park and the perseverance and dedication of many supporters are very encouraging. The property and the larger national park are unique in Jamaica and thus have a high profile. The decision to selectively nominate only the highest elevations of the national park according to their integrity means that the property per se is in a comparatively good state of conservation. This approach leaves the inscribed property in stark contrasts to the larger national park, which includes large areas of deforested or otherwise visibly degraded land. Even though the property continues to boast impressive and globally important conservation values, these are very vulnerable. The laudable management efforts significantly contribute to addressing the many threats but they fall short of reversing the overall trend of deterioration.

▶ Assessment of the current state and trend of other important biodiversity values

Low Concern
Trend: Deteriorating

The assessment of other important biodiversity values is of low concern overall, but the trend for some of these values is deteriorating. Additionally, for some values there is insufficient data available to determine state and trend status. For the rare and relatively intact forest and other vegetation values, the extension of some rare forest types in the high elevations is naturally restricted. It is therefore important to distinguish between the extreme reduction of overall forest cover and the status of individual forest types. Some of the latter continue to occur in their small but original extent. The same holds true for summit savannas. With the exception of summits accessible by trail, which poses severe threats to fragile treeless vegetation, the summit savannas benefit from their inaccessibility. For the mosaic of diverse forest types values, it is a historic fact that the current forest cover of Jamaica constitutes a very small leftover of the situation prior to European colonization and resource extraction. The remaining forests in a good state of conservation in essence owe their existence to remoteness and inaccessibility. As the property boundaries explicitly exclude visibly degraded lands, the forests within the property are in a comparatively good state of conservation. Nevertheless, in light of the historic destruction of the much larger mosaic of forest types, the ongoing high vulnerability and overall mounting pressure, there are severe concerns about the future of the montane forests. For the critical habitat for the Giant Swallowtail Butterfly, it is known that the species is rare and affected by illegal extraction and trade (JCDT, 2011). To date, the information on the status appears anecdotal and this assessment therefore concludes that the data does not permit a definitive assessment. However, recent studies have been completed on this species and so more detailed and up to date information will soon become available (IUCN Consultation, 2020). For the recognized importance for migratory birds values, the literature leaves no doubt about the importance of Jamaica and specifically the mountainous East of the island for many migratory birds. The situation and trends in the property are insufficiently known. Therefore, a definitive statement cannot be offered. For the noteworthy endemic freshwater fauna values, the headwaters of the many small creeks within the property are in a good state of conservation. The easier the access to freshwater the more intense is the use of the many edible species. There is concern about overuse of some species and about destructive harvesting practices using chemicals. In the lower elevations of the buffer zone and the surroundings, water contamination has been identified as a conservation and health concern (JCDT, 2011). For the highly diverse and largely endemic terrestrial invertebrate fauna values, strictly referring to the property, there is reason for cautious optimism as the invertebrates restricted to higher elevations have good conservation prospects. The situation in the lower elevations differs and there is concern that habitat loss and conversion and chemicals used in agriculture pose severe threats.

Additional information

Benefits

Understanding Benefits

▶ **Legal subsistence hunting of wild game,**
Collection of wild plants and mushrooms,
Fishing areas and conservation of fish stocks

Hunting and harvesting of wild biodiversity for food and medicine plays an important role locally and so does harvesting of a wide range of freshwater organisms. It must be stressed once more that while all of the above activities occur in the property, the bulk of it takes place in the easily accessible and less rugged buffer zone. Local communities have a high degree of resource dependence. Communities outside may benefit from using some of the natural resources as food.

Factors negatively affecting provision of this benefit :
- Overexploitation : Impact level - High, Trend - Continuing

▶ **Water provision (importance for water quantity and quality)**

The still forested higher elevations of the various mountain ranges of Eastern Jamaica are textbook examples of the ecosystem service of water provision and regulation. Beneficiaries include downstream users, including the residents of Jamaica's capital of Kingston and agricultural users, including in the renowned coffee plantations. The nomination dossier states that about 40% of Jamaica's population depend on the water of the national park (State Party of Jamaica, 2011).

▶ **History and tradition,**
Sacred natural sites or landscapes,
Cultural identity and sense of belonging

As reflected in the explicit mixed approach, the property is a prime example of a cultural values attached to a natural environment. The physical location is inseparable from the history and tradition of the Maroon and Jamaica more broadly and the identify of Jamaicans. The contemporary Maroon have a strong sense of belonging to the place that enabled their survival and eventual freedom

▶ **Health and recreation,**
Collection of medicinal resources for local use,
Outdoor recreation and tourism,
Natural beauty and scenery

The local communities and in particular the Maroon continue to use wild biodiversity for medicinal purposes. Nature-based tourism and recreation is limited but there are international visitors and an increasing number of domestic visitors engaged in hiking etc. The Holywell area is a well-established recreational area used by visitors and residents of nearby Kingston alike. It is not known to what degree the potential of wild resources and/or traditional knowledge for commercial pharmaceutical purposes may have been realized

Factors negatively affecting provision of this benefit :
- Overexploitation : Impact level - High, Trend - Continuing

▶ **Knowledge,**
Importance for research,
Contribution to education

The forests and other rare and comparatively intact ecosystems of the property provide one of the few opportunities across the Insular Caribbean to understand the ecology of systems which have disappeared or which have been radically altered throughout most of the Caribbean since European

arrival. The vicinity to the capital provides a major educational opportunity.

▶ **Environmental services,**
Carbon sequestration,
Soil stabilisation,
Coastal protection,
Flood prevention,
Water provision (importance for water quantity and quality),
Pollination

The above services are all conceivable and widely acknowledged. Given the relatively humble spatial scale, the importance is highest at the local level. While it can be argued that the site provides important services at the national level, the above services are not significant at an international level.

▶ **Materials,**
Collection of timber, e.g. fuelwood,
Sustainable extraction of materials (e.g. coral, shells, resin, rubber, grass, rattan, etc)

Commercial timber extraction is not permitted, the only forestry activities are the unfortunate planting of exotic pine species. In a setting of rural poverty, a large number of products are used as materials, including fuelwood.

▶ **Contribution to local economy,**
Direct employment,
Tourism-related income

There are limited direct employment opportunities generated by the property and the larger national park. There are promising local tourism offers which create jobs and income. Overall, the realization of the potential appears limited.

Summary of benefits

Among a wealth of benefits, the global conservation importance of rare and irreplaceable habitats and species and the cultural meaning for the Maroon and Jamaicans more broadly, stand out. Furthermore, the forested higher elevations secure many crucial environmental services, such as providing and regulating water, erosion control and pollination. Locally, the property and the larger national park continue to be of utmost importance in local livelihood systems.

Projects

Compilation of active conservation projects

№	Organization	Project duration	Brief description of Active Projects
1	National Environment and Planning Agency (NEPA)		There are longstanding efforts to establish a national network or system of protected areas.
2	Jamaica Conservation & Development Trust (JCDT)		JCDT, which is in charge of the property's operational management, is engaged in a number of partnerships and projects supported by various domestic, bilateral and international sources.
3	BIOPAMA		Improving management effectiveness – Blue & John Crow Mountains National Park and World Heritage Site - medium sized grant
4	Franklinia Foundation		Propagation and planting of threatened and endemic & native trees- 3 year project funded by the Franklinia Foundation

№	Organization	Project duration	Brief description of Active Projects
5	Jamaica Conservation Partners		Boundaries- 3 Year Phase 2 of an earlier project to clearly mark 9.4km of boundary in area of greatest concern with: firebreak, signs and ribbon of trees.
6	American Birds Conservancy		Fire Prevention & Management – 1 yr project focused on establishing an early warning system and community training and equipment

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