

Bwindi Impenetrable National Park

UGATIPA13

Country: **Uganda**

Administrative region: **Western (Region)**

Central co-ordinates: **-1.01280 N, 29.67900 E**

Area: **327km²**

Qualifying IPA criteria

A(i), B(ii), C(iii)

IPA assessment rationale

Bwindi Impenetrable National Park qualifies as an IPA under criterion A(i) on the basis of supporting important populations of 47 threatened species, for all but three of which the site is considered to meet the threshold of having over 1% of the global population. Of these, 12 taxa are Endangered and 35 are Vulnerable; several are unique to this site within the Ugandan IPA network whilst for several others, such as *Dasylepis eggelingii*, this is likely to be amongst the most important sites globally. It also qualifies under criterion B(ii) as it supports 14 taxa on the list of conservation priority species, well in excess of the 3% threshold; these include three described species that are endemic to this site: *Solanecio gynuroides* (VU), *Diaphanathe eggelingii* (LC-pending) and *Polystachya isabelae* (LC), as well as several undescribed species that are so far known only from Bwindi. Finally, it qualifies under criterion C(iii) on the basis of its extent of Afromontane rainforest (EN), for which this IPA has around 20% of Uganda's national resource, representing one of the best sites nationally.

Site description

Bwindi Impenetrable National Park is situated in the Kigezi (Rukiga) Highlands of southwest Uganda to the east of the Albertine Rift and covers an area of 327 km² within the Districts of Kanungu, Kisoro and Rubanda. The site has a large altitudinal range, from 1,190 to over 2,600 m with steep and rugged mountain terrain, particularly in the southern section of the park, and is dominated throughout by a range of moist forest types. The mountains here are deeply dissected by numerous rivers and streams; these include the major Ishasha and Ivi Rivers which flow onto the Albertine Rift plains to the northwest (Howard 1991), the former of which forms the botanically important Ishasha Gorge in the northern Kayonza sector of Bwindi. At the western boundary, the park follows the border with D.R. Congo for ca. 5 km; there is very little remaining forest vegetation on the Congo side of the border here, underlying the regional importance of this site. Bwindi is famed for its population of Eastern

(mountain) gorilla and associated ecotourism but it is also home to a rich and varied wider biodiversity.

Botanical significance

Bwindi ranks amongst the most important sites for biodiversity conservation in East Africa, due primarily to the large and uninterrupted extent of species-rich moist forest over a wide altitudinal gradient, from mid-elevation through to montane forest. Both the Lake Victoria transitional semi-evergreen rainforest (CR) at medium altitudes and the Afromontane rainforest (EN) at higher altitudes are nationally threatened. While there are greater extents of Lake Victoria transitional semi-evergreen rainforest at other sites in Uganda, and so this site does not trigger IPA sub-criterion C(iii) for this habitat, this IPA has around 20% of Uganda's Afromontane rainforest, representing one of the best sites nationally and triggering C(iii) (Richards et al., in review). Palynological evidence in sediment cores from Mubwindi Swamp in the southeast of the Park indicate that Bwindi is likely to have supported a late-glacial montane forest refugium, possibly surviving this cool, dry period as a result of favourable soils and topography (Marchant et al. 1997). This may help to account for the high species richness today, and the wealth of rare and threatened biodiversity across multiple taxa. Based on survey data for birds, mammals, lepidoptera and trees, Bwindi ranks as the second most species-rich site, the fourth for rarity value and number one for overall biodiversity importance within the Ugandan forest reserve network (Howard et al. 2000).

Bwindi is home to over 45 globally threatened plant species, and for many of these it can be considered amongst the most important sites globally given the large extent of intact forest habitat and the relatively low levels of threat at this site. In terms of the woody flora, it is the only known site globally for *Solanecio gynuroides* (VU)*, an understory shrub known only from the type collection (Purseglove #2395), collected in 1947 from Ishasha Gorge. It is also likely to be the most important site globally for the Endangered fig *Ficus katendei*, given that it is threatened at its only other known site at Kasyoha-Kitomi CFR. Further, it is the only known Ugandan site for eight other threatened trees and shrubs, namely *Allanblackia kimbiliensis* (EN)*, *Balthasaria schliebenii* var. *intermedia* (VU)*, *Brazzeia longipedicellata* (EN)*, *Ficus tremula* subsp. *acuta* (VU), *Gymnanthes leonardii-crispi* (EN – pending)*, *Rytigynia bridsoniae* subsp. *bridsoniae* (VU), *Sabicea bequaertii* (VU), and *Warneckea bequaertii* (EN), the lattermost being recorded as a "dominant understory tree" at 1525 m elevation (Purseglove #2679). Of these species, those marked with an asterisk are all known at Bwindi only or primarily from the Ishasha Gorge, underlining the exceptional importance of this forested gorge for plant diversity. Bwindi is also a

major site of national importance for a number of timber species, notably *Leplaea mayombensis* (NT, recently downgraded from VU) as one of its few known Ugandan sites, although some of these timber trees have suffered past declines from over-harvesting prior to establishment of the National Park. In total, over 320 tree and shrub species have been recorded (Davenport et al. 1996), making it one of the most species-rich sites for woody species in East Africa.

Bwindi is very rich in pteridophytes, and it is the only site within the Ugandan IPA network for three threatened species: the tree fern *Alsophila camerooniana* var. *ugandensis* (EN), and the terrestrial ferns *Odontosoria africana* (VU) and *Pneumatopteris* (*Thelypteris*) *blastophora* (VU).

This site is also globally important for a number of highly range restricted but unthreatened species. It is particularly notable for its epiphytic orchid diversity, including two point-endemics, *Diaphanthe eggelingii* and *Polystachya isabelae* known only from the type collections from 1940 and 1998 respectively, and *Rhipidoglossum* (*Rhaesteria*) *eggelingii*, known from the outskirts of Bwindi and otherwise only from Nyungwe National Park in Rwanda. Other notable range-restricted species include the rare epiphytic climber *Epistemma neuerburgii* at its only Ugandan site, again otherwise restricted to Nyungwe. In all these cases, it is on the basis of the effective protection and conservation management at their known sites that they have been assessed as of Least Concern.

Although Bwindi has been subject to a number of botanical surveys, the large size and rugged terrain mean that there are still many unbotanised areas and there is likely to be much more to discover at this site botanically. For example, several undescribed but potentially distinct species were noted from this site in the Flora of Tropical East Africa such as *Beilschmedia* sp. A in the laurel family and the acanthaceous shrub *Mimulopsis* sp. A.

Habitat and geology

The climate of Bwindi is bimodal, with two rainfall peaks in March to May and September to November and intervening dry periods in December-January and June to August. Annual rainfall varies between 1,400 – 1,900 mm, but regular mists supplement the rainfall, and result in the moist forest assemblages rich in epiphytes and ferns (Davenport et al. 1996; Marchant et al. 1997). The underlying geology is generally of phyllites and shales, with some quartz, quartzite and granitic outcrops of the mesoproterozoic Karagwe-Ankolean system (Davenport et al. 1996).

Of the ca. 320 km² of forest at the site, ca. 11% lies below 1,500 m, 39% at 1,500 – 2,000 m, and 50% above 2,000 m (Howard 1991; Davenport et al. 1996). This results in a range of forest assemblages and dominant tree species. The lower altitude and less rugged northern portion of the park receives lower rainfall and supports a medium-elevation forest with some lowland forest indicators such as *Entandrophragma excelsum*, *Newtonia buchananii* (can be locally

dominant), *Parinari excelsa* (can be dominant below 1,500 m), and *Symphonia globulifera* (Marchant et al. 1997), and with some deciduous elements (Babaasa et al. 2004). The higher elevation and more rugged, wetter southern sector supports typical evergreen Afromontane rainforest assemblages, but with some stratification of forest types depending on slope position. Important species of the mid-slopes include *Cassipourea ruwensorensis*, *Gambeya albida*, *G. gorungosana*, *Prunus africana* and *Strombosia scheffleri* (Howard 1991; Marchant et al. 1997; Chaigneau et al. 2009). At higher elevations, species such as *Faurea wentzeliana*, *Hagenia abyssinica* and *Nuxia congesta* become more frequent (Marchant et al. 1997). Hilltop forests would likely have been dominated by *Podocarpus milanjanus* and *Olea capensis* subsp. *macrocarpa* but these have largely been extracted for timber (Howard 1991).

Some extensive areas of secondary forest occur, with indicators including *Alchornea hirtella*, *Macaranga kilimandscharica*, *Neoboutonia macrocalyx* and *Polyscias fulva*; disturbed or secondary assemblages occupy ca. 30% of the National Park. Bamboo (*Oldeania alpina*) forest occupies only 1% of the site. Babaasa et al. (2004) noted that even in the relatively undisturbed areas of the forest there are large gaps in the canopy, possibly due to frequent treefall associated with the steep terrain; these gaps – both natural and as a result of past logging – are often dominated by dense successional tangles of herbs, shrubs and climbers.

The only sizable unforested area is the ca. 0.8 km² Mubwindi Swamp at ca. 2,100 m elevation in the southeast of the Park, positioned at the confluence of four river valleys. The margins support swamp forest with *Myrica salicifolia*, *Neoboutonia macrocalyx* and *Syzygium cordatum*. The swamp grass *Miscanthidium violaceum* is frequent, and much of the open swampland is dominated by *Cyperus* spp. (Marchant et al. 1997).

Conservation issues

Bwindi was originally gazetted as two Forest Reserves (*Kasatoro* and *Kayonza*) in 1932 before being combined in 1942, with several subsequent revisions of the boundaries. It was given the status of an Animal Sanctuary in 1961 and elevated to National Park status in 1991. The park was also designated in 1994 as a UNESCO World Heritage on account of its exceptional biodiversity and natural landscapes (UNESCO 2023). The site has been assessed as a KBA based upon its important populations of three threatened mammal species including Eastern (mountain) gorilla (*Gorilla beringei* subsp. *beringei*; CR) for which Bwindi holds more than half of the world's population; two threatened bird species; and a range restricted lizard species, Hackars's five-toed skink (*Leptosiphos hackarsi*). Only two range-restricted plant species - *Ficus katendei* and *Rytigynia ruwenzoriensis* - were included as trigger species in that assessment (Plumptre et al. 2019).

The surrounding highlands are one of the most densely populated areas in Africa, with 100 – 450 individuals per km² (Birdlife

International 2023) and are intensively farmed such that the park boundary is very abrupt with cultivation right up to its limits and with no connectivity to other nearby protected or forested areas; it is by far the largest remaining area of natural forest in south-western Uganda. Prior to the establishment of the National Park, a range of threats were in evidence, most notably widespread timber harvesting by pitsawyers (i.e., cutting the trees and converting to planks within the forest), which heavily impacted over 60% of the Forest Reserve (Howard 1991). Many of these logged areas are still in the process of succession, with tree regeneration hindered in the former logged areas relative to within natural gaps (Babaasa et al. 2004). Bracken fern (*Pteridium aquilinum*) is particularly frequent and rapidly colonises gaps thus outcompeting some tree seedlings. Other threats included hunting, gold mining, gathering wood for poles and harvesting of other forest resources (Howard 1991; Olupot et al. 2009). Only ca. 10%, situated in the core of the southern sector of the Park, was deemed to be essentially intact by the 1990s (Howard 1991). Study of satellite imagery spanning the period 1973 – 2010 revealed a decline in forest cover within the National Park of 7.8% over that time, with most losses attributed to expansion of small-scale farming and tea plantations along the edges of the site. However, natural habitat losses were much higher in the surrounding unprotected areas (Twongyirwe et al. 2011).

Since establishing the National Park, the principal conservation challenge has been conflict with local communities who were initially prevented from continuing the traditional harvesting of forest resources and being excluded from planning and management of the forest, resulting in some hostility by local people towards park authorities (Hamilton et al. 2000; Birdlife International 2023). A more recent threat analysis of the National Park (Olupot et al. 2009) found that the ongoing conflicts were all found to be most common within 300 - 350 m from the park boundary. The primary issue was harvesting of wood for poles, but also the occurrence of exotic species such as *Lantana camara*, *Cupressus lusitanica* and *Camellia sinensis* (tea), and damage to neighbouring community properties and crops by wild animals. The same study found that illegal resource harvesting within the internal parts of the park appear to have been effectively reduced (Olupot et al. 2009).

More recently, much effort has been applied to building stronger connections with the local communities through establishment of collaborative forest management approaches, promoting benefit-sharing and sustainable use of local resources, for example through the establishment of multiple-use zones (MUZs; Hamilton et al. 2000; Bitariho et al. 2006). This has included more of the proceeds from the lucrative UWA-managed gorilla ecotourism being directed back to the communities. The Park is now considered to be a model for community-supported sustainable resource management, although wildlife poaching remains a threat (UNESCO 2023).

Bwindi is the focus of ongoing research and monitoring of conservation and sustainable management, and the Institute of Tropical Forest Conservation of the Mbarara University of Science and Technology, is based at Ruhija on the southwest side of the

Park.

Site assessor(s)

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IPA criterion A species

SPECIES	QUALIFYING SUB-CRITERION	≥ 1% OF GLOBAL POPULATION	≥ 5% OF NATIONAL POPULATION	1 OF 5 BEST SITES NATIONALLY	ENTIRE GLOBAL POPULATION	SOCIO-ECONOMICALLY IMPORTANT	ABUNDANCE AT SITE
<i>Afroligusticum runssoricum</i> (Engl.) P.J.D.Winter	A(i)	✓	✓	✓	—	—	Unknown
<i>Allanblackia kimbiliensis</i> Spirlet	A(i)	✓	✓	✓	—	—	Occasional
<i>Alsophila camerooniana</i> (Hook.) R.M.Tryon var. <i>ugandensis</i> (Holtum) J.P.Roux	A(i)	✓	✓	✓	—	—	Unknown
<i>Ancistrohynchus tenuicaulis</i> Orchidaceae	A(i)	✓	✓	✓	—	—	Occasional
<i>Balthasaria schliebenii</i> (Melch.) Verdc. var. <i>intermedia</i> (Boutique & Troupin) Verdc.	A(i)	✓	✓	✓	—	—	Frequent
<i>Bothriocline ruwenzoriensis</i> (S.Moore) C.Jeffrey	A(i)	✓	✓	✓	—	—	Unknown
<i>Brachystephanus glaberrimus</i> Champl.	A(i)	✓	✓	✓	—	—	Frequent
<i>Brachystephanus roseus</i> Champl.	A(i)	✓	✓	✓	—	—	Occasional
<i>Brazzeia longipedicellata</i> Verdc.	A(i)	✓	✓	✓	—	—	Occasional
<i>Cissus humbertii</i> Robyns & Lawalrée	A(i)	✓	✓	✓	—	—	Unknown
<i>Cnestis mildbraedii</i> Gilg	A(i)	—	—	—	—	—	Unknown
<i>Dasylepis eggelingii</i> J.B.Gillett	A(i)	✓	✓	✓	—	—	Occasional
<i>Eggelingia ligulifolia</i> Summerh.	A(i)	✓	✓	✓	—	—	Occasional
<i>Englerina schubotziana</i> (Engl. & K.Krause)	A(i)	✓	✓	✓	—	—	Unknown

SPECIES	QUALIFYING SUB-CRITERION	≥ 1% OF GLOBAL POPULATION	≥ 5% OF NATIONAL POPULATION	1 OF 5 BEST SITES NATIONALLY	ENTIRE GLOBAL POPULATION	SOCIO-ECONOMICALLY IMPORTANT	ABUNDANCE AT SITE
<i>Polhill & Wiens</i>							
<i>Entandrophragma utile</i> (Dawe & Sprague) Sprague	A(i)	–	–	–	–	✓	Unknown
<i>Ficus katendei</i> Verdc.	A(i)	✓	✓	✓	–	–	Scarce
<i>Ficus tremula</i> Warb. subsp. <i>acuta</i> (De Wild.) C.C.Berg	A(i)	✓	✓	✓	–	–	Unknown
<i>Globimetula kivuensis</i> (Balle) Wiens & Polhill	A(i)	✓	✓	✓	–	–	Unknown
<i>Gymnanthes leonardii-crispi</i> (J.Léonard) Esser	A(i)	✓	✓	✓	–	–	Unknown
<i>Mimusops bagshawei</i> S.Moore	A(i)	–	–	–	–	✓	Unknown
<i>Musanga leoerrerae</i> Hauman & J.Léonard	A(i)	✓	✓	✓	–	–	Unknown
<i>Ocotea kenyensis</i> (Chiov.) Robyns & R.Wilczek	A(i)	–	✓	✓	–	✓	Unknown
<i>Odontosoria africana</i> F.Ballard	A(i)	✓	✓	✓	–	–	Occasional
<i>Oxyanthus troupinii</i> Bridson	A(i)	✓	✓	✓	–	–	Unknown
<i>Pavetta urundensis</i> Bremek.	A(i)	✓	✓	✓	–	–	Unknown
<i>Pneumatopteris blastophora</i> (Alston) Holttum	A(i)	✓	✓	✓	–	–	Frequent
<i>Polystachya fallax</i> Kraenzl.	A(i)	✓	✓	✓	–	–	Unknown
<i>Polystachya hastata</i> Summerh.	A(i)	✓	✓	✓	–	–	Unknown
<i>Polystachya meyeri</i> P.J.Cribb & Podz.	A(i)	✓	✓	✓	–	–	Occasional
<i>Polystachya nyanzensis</i> Rendle	A(i)	✓	✓	✓	–	–	Occasional
<i>Polystachya poikilantha</i> Kraenzl. var.	A(i)	✓	✓	✓	–	–	Unknown

SPECIES	QUALIFYING SUB-CRITERION	≥ 1% OF GLOBAL POPULATION	≥ 5% OF NATIONAL POPULATION	1 OF 5 BEST SITES NATIONALLY	ENTIRE GLOBAL POPULATION	SOCIO-ECONOMICALLY IMPORTANT	ABUNDANCE AT SITE
<i>leucorhoda</i> (Kraenzl.) P.J.Cribb & Podz.							
<i>Polystachya woosnamii</i> Rendle var. <i>woosnamii</i>	A(i)	✓	✓	✓	–	–	Unknown
<i>Prunus africana</i> (Hook.f.) Kalkman	A(i)	–	–	–	–	✓	Unknown
<i>Rhipidoglossum bilobatum</i> (Summerh.) Szlach. & Olszewski	A(i)	✓	✓	✓	–	–	Frequent
<i>Rinorea beniensis</i> Engl.	A(i)	–	–	–	–	–	Unknown
<i>Rinorea tshingandaensis</i> Taton	A(i)	✓	✓	✓	–	–	Occasional
<i>Rytigynia bridsoniae</i> Verdc. subsp. <i>bridsoniae</i>	A(i)	✓	✓	✓	–	–	Unknown
<i>Rytigynia kigeziensis</i> Verdc.	A(i)	✓	✓	✓	–	–	Occasional
<i>Rytigynia ruwenzoriensis</i> (De Wild.) Robyns	A(i)	✓	✓	✓	–	–	Occasional
<i>Sabicea bequaertii</i> De Wild.	A(i)	✓	✓	✓	–	–	Unknown
<i>Solanecio gynuroides</i> C.Jeffrey	A(i)	✓	✓	✓	✓	–	Scarce
<i>Strophanthus bequaertii</i> Staner & Michotte	A(i)	✓	✓	✓	–	–	Unknown
<i>Tiliacora latifolia</i> Troupin	A(i)	✓	✓	✓	–	–	Unknown
<i>Tridactyle virgula</i> (Kraenzl.) Schltr.	A(i)	✓	✓	✓	–	–	Unknown
<i>Warneckea bequaertii</i> (De Wild.) Jacq.-Fél.	A(i)	✓	✓	✓	–	–	Common
<i>Zanthoxylum mildbraedii</i> (Engl.) P.G.Waterman	A(i)	–	–	–	–	✓	Unknown
<i>Mikaniopsis vitalba</i> (S.Moore) Milne-Redh.	A(i)	–	✓	✓	–	–	Unknown

SPECIES	QUALIFYING SUB-CRITERION	≥ 1% OF GLOBAL POPULATION	≥ 5% OF NATIONAL POPULATION	1 OF 5 BEST SITES NATIONALLY	ENTIRE GLOBAL POPULATION	SOCIO-ECONOMICALLY IMPORTANT	ABUNDANCE AT SITE
<i>Secamone racemosa</i> (Benth.) Klack.	A(i)	–	✓	✓	–	–	Unknown

IPA criterion C qualifying habitats

HABITAT	QUALIFYING SUB-CRITERION	≥ 5% OF NATIONAL RESOURCE	≥ 10% OF NATIONAL RESOURCE	1 OF 5 BEST SITES NATIONALLY	AREAL COVERAGE AT SITE
Lake Victoria drier peripheral semi-evergreen Guineo-Congolian rainforest (CR)	C(iii)	–	–	–	108.8

General site habitats

GENERAL SITE HABITAT	PERCENT COVERAGE	IMPORTANCE
Forest - Subtropical/Tropical Moist Lowland Forest	–	Minor
Forest - Subtropical/Tropical Moist Montane Forest	–	Major
Forest - Subtropical/Tropical Swamp Forest	–	Minor
Wetlands (inland) - Permanent Rivers, Streams, Creeks [includes waterfalls]	–	Major
Wetlands (inland) - Bogs, Marshes, Swamps, Fens, Peatlands [generally over 8 ha]	–	Major
Artificial - Terrestrial - Subtropical/Tropical Heavily Degraded Former Forest	–	Minor

Land use types

LAND USE TYPE	PERCENT COVERAGE	IMPORTANCE
Nature conservation	–	Major
Tourism / Recreation	–	Major
Harvesting of wild resources	–	Minor

Threats

THREAT	SEVERITY	TIMING
Biological resource use - Hunting & collecting terrestrial animals	Medium	Ongoing - trend unknown
Biological resource use - Gathering terrestrial plants	Low	Ongoing - trend unknown
Biological resource use - Logging & wood harvesting	Low	Ongoing - trend unknown
Agriculture & aquaculture - Annual & perennial non-timber crops - Small-holder farming	Low	Ongoing - trend unknown

THREAT	SEVERITY	TIMING
Invasive & other problematic species, genes & diseases - Invasive non-native/alien species/diseases	Low	Ongoing - trend unknown

Protected areas

PROTECTED AREA NAME	PROTECTED AREA TYPE	RELATIONSHIP WITH IPA	AREAL OVERLAP
Bwindi Impenetrable National Park	National Park	protected/conservation area matches IPA	327
Bwindi Impenetrable National Park	UNESCO World Heritage Site	protected/conservation area matches IPA	327

Conservation designation

DESIGNATION NAME	PROTECTED AREA	RELATIONSHIP WITH IPA	AREAL OVERLAP
Bwindi Impenetrable National Park	Key Biodiversity Area	protected/conservation area matches IPA	327
Bwindi Impenetrable National Park	Important Bird Area	protected/conservation area matches IPA	327

Management type

MANAGEMENT TYPE	DESCRIPTION	YEAR STARTED	YEAR FINISHED
Site management plan in place		–	–

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