



miombo, are widespread, despite the unique species associated with this habitat on Mount Yao.

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## Habitat and geology

Mount Yao is a largely wooded IPA, ranging from lowland miombo to dense montane miombo on the slopes, with some areas of gallery forest around rivers on the mountain (Spottiswoode et al. 2016). The inselberg is a granite intrusion of 1,313 m near the border of the Marrupa and Unango geological complexes, both of which are primarily dominated by orthogneisses (Boyd et al. 2010).

Temperatures for Mavago district range from 15 – 22°C in June and July to 21 – 29°C in October and November, while average annual rainfall is 1,887 mm, with most of this precipitation falling between December and March (World Weather Online 2021). The upper slopes and summit of the mountain also receive moisture through mists, as is evident by the high number of *Usnea* epiphytic lichens. Despite its interesting botany and pristine habitats, few botanical collections have been made on Mount Yao. One zoological visit was made in 2012 (Congdon & Bayliss 2013), focussing primarily on butterfly taxa, during which the few botanical specimens from this site were collected.

The plain surrounding Mount Yao is categorised by Lötter et al. (2021) as moist miombo, typical of this part of northern Mozambique, although Congdon & Bayliss (2013) describe this vegetation as more like coastal woodland. There is no species inventory for this area, but the plains and lower slopes are dominated by *Brachystegia*, most likely *B. boehmii* (C. Congdon, pers. comm. 2021).

The montane habitats were documented by Congdon & Bayliss (2013) and the description below is based upon this account and personal communications with C. Congdon (2021).

The slopes of the inselberg are steep around the base with a rocky substrate. Soils here are poor, likely due to natural erosion (C. Congdon, pers. comm. 2021). *Uapaca kirkiana* and *U. sansibarica* dominates miombo here, with a more open canopy, patches of suffruticose *Cryptosepalum* (likely *C. maraviense*) and a short, grassy understorey. Herbaceous understorey species have not yet been documented; however, grass species such as *Hyparrhenia filipendula*, *Themeda triandra*, *Panicum* and *Urochloa* spp. are known from montane miombo in this part of Mozambique (Lötter et al. 2021). At altitudes of around 1,000 m, this woodland also hosts the only known population of *Moraea niassensis* (VU).

Gallery forests, featuring species such as *Parinari excelsa*, *Bersama abyssinica* and *Anthocleista grandiflora*, occur near rivers and in gullies. The understorey includes shrubs such as *Drypetes gerrardii* while herbs such as *Justicia striolata* and *Afromomum* sp. occur beneath. A red flowered legume, that appeared similar to a *Desmodium*, was found to dominate the forest floor within these areas. Collection of this legume is recommended in order to identify the species. Due to their strong association with rivers and streams, the boundaries of these riverine forests are well defined with *Albizia*, probably *A. adianthifolia*, occurring in the ecotone between forest and woodland.

The gallery forests are likely underlain by deep, nutrient-rich, moist soils, as have been reported from similar forests on Serra Mecula (Timberlake et al. 2004), with swamp forest occurring in areas of poor drainage. The species composition of these swamps has not yet been recorded, however, one patch was noted to have open pools of water, with little understorey growth, and tree species with aerial and buttress roots. It is possible that *Uapaca lissopyrena*, a swamp tree with stilt roots, occurs in these areas as this species was recorded from swamps on the nearest inselberg, Serra Mecula (Timberlake et al. 2004).

Around the summit, vegetation cover is open, with a rocky substrate, and may be categorised as cloud or elfin woodland. The area receives moisture through frequent mists and, as such, *Usnea* lichens, known from several moist montane habitats in Mozambique, are common epiphytes in the area. These epiphytes were observed on large, old *Brachystegia spiciformis* trees. The presence of these old trees may suggest that the vegetation in this area has remained undisturbed for some time. The woodland also features species such as *Parinari curatellifolia*, *Uapaca kirkiana*, *U. sansibarica* alongside *Bridelia*, *Pericopsis* (likely *P. angolensis*), *Monotes* and *Vitex* species. The understorey features shrubs such as *Maesa lanceolata*, *Annona senegalensis* and *Dombeya* (possibly *D. burgessiae*) with tussocky grasses in crevices in the rock. Hemiparasitic *Agelanthus* sp. (on *Pericopsis*) and *Viscum shirensis* (on *Bridelia*) were observed in this woodland, as were a number of epiphytic orchids. At higher altitudes the woodland thins, the shrub *Protea angolensis* becomes more prevalent, and in rockier areas closer to the peak, *Protea welwitschii* and *Combretum* species were observed.

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## Conservation issues

Mount Yao IPA falls within Niassa Special Reserve, with the southwestern portion, around 100 km<sup>2</sup> in area, falling inside the reserve buffer zone where a number of small villages are located. In addition, this IPA falls within the wider Niassa Special Reserve Key Biodiversity Area.

This site and surrounding areas have been categorised as receiving “limited conservation efforts” by the Wildlife Conservation Agency (Luwire Wildlife Conservancy 2019). However, the habitats throughout this IPA are largely pristine and have seen little disturbance - an abandoned Portuguese helicopter base is the only major sign of previous human activity on the inselberg itself (Congdon & Bayliss 2013). This area of Mozambique was largely depopulated due to conflict relating to the independence struggle and later the Mozambican Civil War (C. Congdon, pers. comm. 2021), so the anthropogenic threats in this area are generally quite low, particularly in comparison to other parts of Mozambique. While anthropogenic disturbance within the IPA is currently minimal, the nearby town of Mataca, and associated agriculture, has continued to expand over recent decades, as has Msawise village, on the eastern side, to a lesser degree (Google Inc. 2020; World Resources Institute 2021). It is thought that, with continued population expansion in the area, anthropogenic disturbance may

increase within the IPA, including cutting of woodland for fuel, clearance of land for agriculture and increased fire frequency (Datizua 2020).

The soils in the reserve are known to be generally of poor fertility and rainfall is low (Timberlake et al. 2004). Abandonment of exhausted agricultural land may, therefore, become an issue as it could result in further agricultural expansion, possibly onto the hills in the south of the IPA or on the mountain itself. Soils on the lower slopes of Mount Yao are thin and rocky (C. Congdon, pers. comm. 2021), and are unlikely to be highly productive, however there may be greater or more consistent moisture availability on the mountain, due to frequent mists, which may encourage small scale cultivation of these areas.

Although there was no evidence of fire within the forests at the time of the 2012 visit (Congdon & Bayliss 2013), fire has been reported elsewhere in the reserve as a method for clearing land for machambas and for subduing bees to allow for honey collection (Timberlake et al. 2004; T. Alves, pers. comm. 2021), and so there may be an additional threat of unintentional burning of huge swathes of land. It is particularly important that, if land is opened up for tourism, the practice of burning vegetation to create and maintain walking trails and vehicle access, as has previously been reported on and around Serra Mecula, is not also employed within this IPA.

Niassa Reserve does not currently receive much tourism, with only 183 visitors in 2013. The reserve, therefore, has limited income for funding conservation projects or supporting alternative livelihoods for local people. As well as providing income, tourism could incentivise the protection of wilderness areas such as Mount Yao which contribute to the visitor experience. More recently, there has been government-backed promotion of Niassa, including specific mention of Mount Yao, as a tourist destination (ANAC 2018), which may lead to greater interest or investment into the site.

As well as hosting *Moraea niassensis*, a Vulnerable Iridaceae known only from this IPA, Mount Yao is the only known location for an as yet undescribed butterfly species in the genus *Baliochila* (Congdon & Bayliss 2013). In addition, a species of freshwater crab, *Potamonautes bellarussus*, described in 2014, is thought to be endemic to the Yao and Mecula inselbergs within Niassa Special Reserve (Daniels et al. 2014). It is possible that the isolated montane habitats created by the inselbergs in the reserve has allowed for the evolution of highly range-restricted species. As the botany of this site is yet to be inventoried, we may expect that more range limited, or even site endemic, species will be documented.

There are a number of sightings of threatened animal taxa around the IPA, including African wild dog (*Lycaon pictus* - EN), African elephant (*Loxodonta africana* - VU) and African lion (*Panthera leo* - VU). However, these species would likely only enter lower altitudes within this IPA and the montane mammalian fauna of this site is yet to be inventoried (van Berkel et al. 2019).

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## 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>Moraea niassensis</i> Goldblatt & J.C.Manning	A(i)	✓	✓	✓	✓	—	Occasional

## 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
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## General site habitats

GENERAL SITE HABITAT	PERCENT COVERAGE	IMPORTANCE
Savanna - Moist Savanna	—	Major
Forest - Subtropical/Tropical Swamp Forest	—	Minor

## Land use types

LAND USE TYPE	PERCENT COVERAGE	IMPORTANCE
Nature conservation	100	Major
Tourism / Recreation	—	Minor
Agriculture (arable)	—	Minor

## Threats

THREAT	SEVERITY	TIMING
Transportation & service corridors - Roads & railroads	Low	Past, not likely to return
Agriculture & aquaculture - Annual & perennial non-timber crops - Small-holder farming	Low	Ongoing - increasing
Residential & commercial development - Housing & urban areas	Low	Future - inferred threat
Natural system modifications - Fire & fire suppression - Increase in fire frequency/intensity	Medium	Future - inferred threat
Biological resource use - Logging & wood harvesting	Low	Ongoing - trend unknown

## Protected areas

PROTECTED AREA NAME	PROTECTED AREA TYPE	RELATIONSHIP WITH IPA	AREAL OVERLAP
Niassa Special Reserve	National Reserve	protected/conservation area encompasses IPA	373

## Conservation designation

DESIGNATION NAME	PROTECTED AREA	RELATIONSHIP WITH IPA	AREAL OVERLAP
Niassa Special Reserve	Key Biodiversity Area	protected/conservation area encompasses IPA	373

## Management type

MANAGEMENT TYPE	DESCRIPTION	YEAR STARTED	YEAR FINISHED
No management plan in place		–	–

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