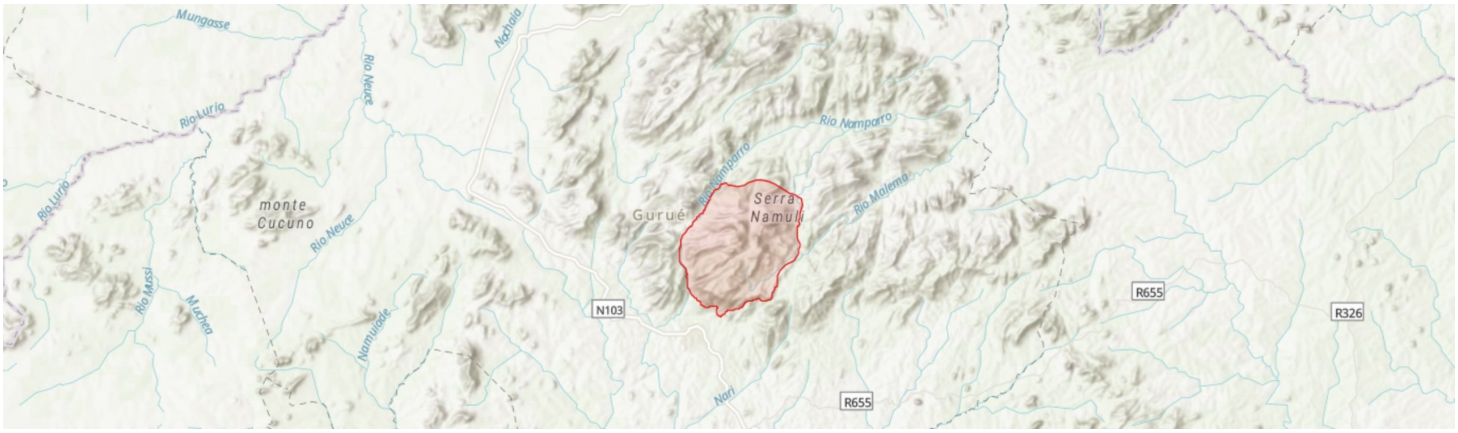
Mount Namuli

Monte Namúli / Serra de Gurué (Test version)

MOZTIPA004



Country: **Mozambique**
Administrative region: **Zambézia (Province)**
Central co-ordinates: **-15.37861 N, 37.03167 E**
Area: **146km²**

Qualifying IPA criteria

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

IPA assessment rationale

Mount Namuli qualifies as an IPA under all three criteria. Under criterion A(i), it supports important populations of 22 globally threatened plant taxa, two of which are Critically Endangered endemics - Isoglossa namuliensis and Tephrosia whyteana subsp. gemina - whilst 10 are Endangered and 11 are Vulnerable. It also supports the entire global population of three species that are currently assessed as Data Deficient and one that has not yet been evaluated on the IUCN Red List, hence these species trigger criterion A(iii). Under criterion B(ii), Mount Namuli supports 40 (ca. 8.4%) of the species on the national list and so is well in excess of the 3% threshold for this criterion; 19 of these taxa are endemic to this IPA. Under criterion C(iii), this site supports nationally important areas of Montane Grassland and Montane Moist Forest, both of which are nationally range-restricted habitats, the latter also being nationally threatened.

Site description

The Mount Namuli IPA is situated in Gurué District of Zambézia Province in northern Mozambique, ca. 250 km inland from the Indian Ocean coastline. It comprises a series of granitic inselbergs linked by a high plateau. With one of its three main peaks rising to 2,419 m asl, Mount Namuli is the second highest point in Mozambique after Mount Binga in the Chimanimani Mountains. Immediately to the south of the massif is the small town of Gurué, a major centre of tea production in Mozambique particularly during the colonial era. Several rivers arise on the massif, the main ones being the Malema River east of the main plateau, which flows north to join the Lúrio, one of the major rivers of northern Mozambique, and the Licungo River to the west which flows southwards to the Indian Ocean near Quelimane. The northern flanks of Namuli are drained by the Namparro River, which joins the Malema further north (Timberlake et al. 2009). The mountain has a number of impressive waterfalls, including the Cascata de Namuli on the Licungo which falls ca. 100 m down a rock face.
Mount Namuli is one of the major components of the proposed montane Mulanje-Namuli-Ribáuè Centre of Plant Endemism (CoE) in southern Malawi and northern Mozambique (Darbyshire et al. 2019a). It supports a rich mosaic of habitats, from lowland riverine forest and succulent-rich rocky slopes, through mid-elevation to montane forests, to montane grasslands and shrublands and extensive areas of rock outcrops. This area has been subject to a range of biodiversity studies, dating as far back as the early exploration of Joseph Last in 1886, but with most of the more intensive surveys conducted within the past 25 years (Timberlake 2021). However, despite being well documented as a site of global biodiversity importance, Namuli is not formally protected and some of its key habitats are highly threatened.

Botanical significance

In view of its high number of endemic and range-restricted plant species, Mount Namuli is one of the most important botanical sites in Mozambique, and indeed in montane southern tropical Africa. Nineteen strict endemic taxa have been described to date (this figure includes Buchnera namuliensis, as a record from Dondo in

Sofala Province is considered to be erroneous). A significant proportion of these endemics have only recently been documented, with eight described since 2010 including the montane herbs Coleus namuliensis, Crepidorhopalon namuliensis and Crotalaria namuliensis (Harris et al. 2011; Downes & Darbyshire 2018; Darbyshire et al. 2019b). The number of endemics is likely to continue to increase as further survey work uncovers additional new species and records; a wet-season survey of the montane geophyte flora may be particularly productive as this has not been surveyed extensively to date (Darbyshire et al. 2019b; Timberlake 2021). Within Mozambique, only the Chimanimani Mountains hold higher numbers of point-endemic species.

In addition to its endemics, this massif supports a high number of range-restricted montane species, including several taxa that are otherwise known from or were previously thought to be endemic to Mount Mulanje in Malawi, for example Gnidia chapmanii, Pimpinella mulanjensis, Senecio peltophorus and Xyris makuensis (Harris et al. 2011). In total, Timberlake (2021) recorded a further 20 taxa known from Namuli and three or fewer mountains in the Mulanje-Namuli-Ribáuè CoE. A significant proportion of the endemic and near-endemic flora is found in the montane grasslands and rocky areas which, fortunately, are amongst the least severely impacted habitats on Namuli (see Threats). Several of these species, including all those listed above, are assessed to be Least Concern on the IUCN Red List despite their narrow ranges. However, a number of rare forest species are also recorded, and most of these are assessed as globally threatened, including the strict-endemic herb Isoglossa namuliensis (CR) and several near-endemics, including two mistletoes Agelanthus patelii (EN) and Helixanthera schizocalyx (EN) and three woody species, Memecylon nubigenum (EN), Pyrostria chapmanii (EN) and Faurea racemosa (EN). The lattermost is commercially exploited as an important local timber source for carpentry (Darbyshire et al. 2018). A small number of endemics are found in woodland and riverine habitats at lower elevations, including the riverine herb Plectranthus guruensis (EN) and the charismatic shrub Dombeya lastii (EN).

In terms of habitats, Namuli holds some of the most extensive areas of montane grassland in Mozambique, a habitat that is particularly species-rich. The remnants of medium-altitude and montane forest are also of national importance given that these habitats are range-restricted and threatened in Mozambique. However, these forests are diminishing at an alarming rate and urgent conservation action is needed if they are to be safeguarded.

A preliminary checklist for the massif above 1,200 m elevation (descending to 1,000 m on the western flanks) recorded 603 taxa of vascular plants (Timberlake 2021). However, this is only a preliminary list and more comprehensive surveys would undoubtedly result in significant increases, in particular the montane herbaceous / grass flora, the remnants of woodland on the lower slopes, and the drier, rocky northern slopes. The latter areas have not been surveyed in detail to date and would likely add a number of succulent species to the list (Timberlake 2021).

Habitat and geology

The Namuli massif is a batholith, a complex of inselbergs or intrusions linked by a high plateau, exposed by millions of years of subsequent erosion (Timberlake et al. 2009). The extensive plateau at ± 1,800 m rises from a pediplain at ± 800 m elevation on the south and west. The large inselbergs are essentially granitic; the peaks and ridges comprise Precambrian granite-porphyrite intrusions into migmatites of the Nampula and Namarroi series, dating from ca. 1,100 – 850 mya (Instituto Nacional de Geológia 1987; Timberlake 2021). Namuli experiences a rainy season between November and March and a dry season from May to October. Mean annual rainfall at Gurué town at the foot of the massif is 1,995 mm. However, rainfall on the high plateau will be considerably higher than this and may reach 3,000 mm, and higher elevations also receive significant moisture year-round from mists. Temperatures peak in October, just before the onset of the rains, and are at their lowest in the middle of the dry season in July; overnight mild frosts are likely to occur at higher elevations between June and August (Timberlake 2021).

The habitats of Mount Namuli have been documented in some detail in previous studies (Dowsett-Lemaire 2008; Timberlake et al. 2009; Timberlake 2021); a summary is given below. Six main vegetation types have been recorded: forest, woodland, montane scrub, montane grassland, rocky slopes and outcrops and cultivated areas. The lattermost is covered under Conservation issues.

Timberlake et al. (2009) estimated a total forest cover on Namuli of ca. 12.5 km2, of which the large majority was montane, over 1,600 m elevation. However, rapid forest losses have occurred in the intervening period (see Threats) and total forest cover is now less than 10 km2 - Darbyshire et al. (2021) estimate a total of ca. 7 km2 of forest remaining over 1,400 m elevation. The largest blocks of forest are found in the broad valleys and on less steep slopes of the high plateau, although smaller patches extend into deeper valleys and steeper slopes of the peaks. The montane forest, from ca. 1,600 – 2,200 m elevation, is characterized by a canopy layer typically 18 – 25 m though lower in some areas, with emergents to 30 (– 40) m tall. Common emergent species are Cryptocarya liebertiana, Ekebergia capensis, Faurea racemosa and Olea capensis. The canopy has a mixed species composition, varying somewhat between patches, with many characteristic Afromontane species such as Albizia gummifera, Aphloia theiformis, Cassipourea malosana, Podocarpus milanjianus, Prunus africana and Syzygium afromontanum in addition to the emergent species which are all frequent; Garcinia kingaensis can also be particularly common. Frequent understorey shrubs include Alchornea laxiflora, Anisotes pubinervis and Lasianthus kilimandscharicus. The herbaceous layer is rich in ferns reflecting the high moisture availability from frequent mists and rains.

At lower elevations, below 1,600 m, small areas of mid-altitude forest remain, estimated at only 1.35 km2 by Timberlake et al. (2009). These differ from the montane forests in having a higher canopy and a greater presence of Albizia gummifera, Ficus spp., Newtonia buchananii, Parinari excelsa, Syzygium cordatum and Sapotaceae species: Englerophytum magalismontanum, Gambeya (formerly Chrysophyllum) gorungosana and Synsepalum muelleri. Riverine fringes can also support forest to lower elevations, with the typical species composition similar to that of the mid-elevation

forest along with characteristic riverine species such as Breonadia salicina.
Woodland is not extensive on Namuli and miombo is essentially absent, though was probably previously present at lower elevations. The most extensive woodland type is found on montane forest margins, where a fire-impacted Erica benguellensis-dominated woodland to 20 m tall can be common. Elsewhere, secondary woodland dominated by Syzygium cordatum was noted by Dowsett-Lemaire (2008).
Montane scrub, found mainly at elevations of over 1,700 m, is extensive in fertile, well-drained areas and typically comprises stands of the bracken fern Pteridium aquilinum together with dense shrubs to 2.5 m tall, including Kotschya recurvifolia and Tetradenia riparia. Regular burning of this habitat was noted by Timberlake et al. (2009), and this is almost certainly a secondary habitat that is increasing due to forest loss and increased frequency of fire.
Montane grassland, mainly at 1,850 – 2,000 m elevation, is extensive with an estimated extent of ca. 2.3 km2 (Timberlake 2017, 2021), but this may be an under-estimate given that this habitat forms a mosaic with both the vegetation on rocky outcrops and the montane scrub. The largest montane grassland area is in the east of the massif on the Muretha Plateau above the Malema valley at ca. 1,850 m, with a second extensive area on the Nachone Plateau on the west slopes of Mounts Pilani and Pesse. The grassland is tussocky, typically growing on deep peats with seasonal waterlogging. The dominant grass species are Loudetia simplex, with Themeda triandra and Eragrostis spp. on better drained areas. A range of herbs and geophytes are common within these grasslands, with characteristic species including Euphorbia depauperata, Helichrysum spp., Kniphofia splendida and a range of terrestrial orchids. The grasslands and associated communities on the drier northern slopes have not been well surveyed to date, and some of them are extensively grazed by cattle. Grasses here are less tussocky; dominant species include Setaria sphacelata in grazed areas.
The montane rocky slopes and outcrops are the most extensive habitats at this site. Coleochloa setifera dominates on the thin soils between exposed rock faces, together with a range of xerophytic taxa such as Aloe mawii, Crassula globularioides and Xerophyta kirkii. On the drier northern slopes, the endemic succulent Euphorbia namuliensis is also frequent alongside other succulent taxa. Areas of seasonal seepage are frequent in the rocky areas, with the thin damp mats supporting a rich flora including geophytes such as Hypoxis nyasica, Merwilla plumbea and terrestrial orchids, together with typical wet grassland herbs such as Drosera and Xyris spp.; the endemic Crepidorhopalon namuliensis is confined to this habitat.
Fast flowing streams and waterfalls are an under-explored habitat on Mount Namuli that may be of interest. The endemic rheophyte Inversodicraea torrei (VU) has not been recorded since the 1940s but has probably been overlooked. Other rheophytes may also be present, although only the widespread Hydrostachys polymorpha has been noted to date (Timberlake 2021).

Conservation issues

Mount Namuli should be considered one of the greatest conservation priorities in Mozambique (Timberlake 2021). Despite this site being internationally renowned as a site of high importance for a range of biodiversity, the entirety of this IPA is unprotected at present, and is one of the most highly threatened montane regions in Mozambique (Timberlake 2017; 2021). Recent decades have seen a significant expansion of agricultural practices on the mountain. The mid-elevation and lower montane forests are being cleared for subsistence and small cash-crop agriculture, with a notable recent expansion in potato cultivation being particularly problematic (Timberlake et al. 2009; Timberlake 2017, 2021). Potato yields are reasonably high in the first year, but quickly diminish in subsequent cycles, and one plot can be farmed for a maximum of five years before the soil fertility is reduced and new areas need to be farmed (Legado, pers. comm.; Darbyshire et al. 2018; Timberlake 2021). Comparisons of satellite image available on Google Earth between September 2013 and November 2015 indicate an estimated forest loss of 10 – 30% over this short time period, and this clearance is ongoing, with clear-felling of many patches of moist forest on the Muretha plateau and upper Nivolo valley noted during recent surveys (Timberlake 2017, 2021). These losses are particularly severe at lower elevations, along forest margins and in smaller patches. Most of the threatened plant species on Namuli are associated with forest and forest margins.
Selective timber extraction is also problematic, specifically impacting the range-restricted and threatened large tree species Faurea racemosa or 'tchetchere' which, whilst common at Namuli, was clearly being logged unsustainably in the mid 2000s for use in local carpentry and construction (Darbyshire et al. 2018; Timberlake 2021). This problem is believed to be ongoing.
Within the montane grasslands, Ryan et al. (1999) reported grazing by goats and feral pigs to be a significant problem, and the impact of the pigs in digging up the delicate, species-rich seepage areas over rock was also noted by Timberlake et al. (2009). However, more recent visits indicate that the pigs and goats have been removed - perhaps because of their damaging impact on the newly established potato plots - and do not appear to have caused lasting damage to the grasslands and seepages (Timberlake 2017, 2021). The drier northern slopes were used for cattle production during the colonial era, and a number of cattle owners remain in this area today (Timberlake et al. 2009; Timberlake 2021). More problematic is the increase in uncontrolled dry-season wildfires, deliberately set for land clearance or to aid hunting. Frequent burning of the grassland and cleared areas between the forests is likely to be causing forest margins to further recede. Such fires also prevent forest regeneration in fallow areas. However, the montane grasslands and rocky areas, where most of the endemic and near-endemic species are located, are likely to be adapted to fire to at least some extent and so the threats to these species are limited.
At lower elevations, very little is left of the natural vegetation, except for narrow woodland and forest fringes along rivers. Much of the lower elevation forests and woodlands (up to c. 1,200 m) around Gurué and in the Licungo Valley were cleared for tea plantations during the colonial era in the early 20th Century (Timberlake et al. 2009; Timberlake 2021). Beyond the tea plantations, there are

extensive areas of subsistence agriculture and fallow lands, with many of the tea workers holding small subsistence plots for cassava, maize and sweet potatoes. The fallow areas are particularly susceptible to dry season fires thus suppressing regeneration of woodland and forest. The extensive losses and degradation of low elevation habitats threaten some of the rare woodland species such as Dombeya lastii and Gymnosporia gurueensis. Neither of these species has been recorded since the 1970s and their continued presence here requires confirmation given the extent of habitat transformation.

To address some of these conservation issues, the international NGO Legado, in partnership with Nitidae and local NGO LUPA, have been working since 2014 with local communities around Namuli to balance livelihoods and sustainable stewardship of the montane ecosystems under their “Thriving Futures” programme (Legado 2021). Work to date has included securing community land rights, increasing access to health care, improving market access for products, and developing sustainable agricultural practices and improved management of natural resources through community leadership (Legado 2021). Nitidae are now working in partnership with the Rainforest Trust to establish a 56 km2 Community Conservation Area (CCA) in the core area of the mountain above 1,200 m elevation, with the reduction of slash-and-burn agriculture a primary aim (Rainforest Trust 2021), and with forest guards established to help reduce deforestation and wildfires (Timberlake 2021).

Beyond its importance for plants, Mount Namuli is also known to be an important site for a range of fauna. It is an Important Bird Area, with the forests being particularly important for a range of bird species including the Namuli Apalis (Apalis lynesi, EN), which was thought to be endemic until it was discovered on nearby Mount Mabu, as well as Spotted Ground Thrush (Geokichla guttata, EN), Thyolo Alethe (Chamaetylas choloensis, VU) and Dapple-throat (Arcanator orostruthus, VU) (Ryan et al. 1999; Dowsett-Lemaire 2008; BirdLife International 2021). Ryan et al. (1999) stated that this site is arguably the most critical IBA in Mozambique, with the remaining forests a particularly high priority for conservation action. Butterfly surveys in 2005 – 2008 recorded 126 species above 1,200 m, including five new species and two new subspecies to science, as well as the first record of three species previously thought to be endemic to Mount Mulanje (Timberlake et al. 2009). Namuli is also an Alliance for Zero Extinction (AZE) site, triggered by the presence of the endemic Vincent’s Bush Squirrel (Paraxerus vincenti, EN) and Mount Namuli Pygmy Chameleon (Rhampholeon tilburyi, EN), although the latter has since been recorded from the Ribáuè Mountains and Mount Socone in Nampula Province. Amongst the plant species on Namuli, Dombeya lastii, Isoglossa namuliensis and Plectranthus guruensis would also trigger AZE status. Most recently, Namuli has been designated as a Key Biodiversity Area based largely on the proposed CCA area, with plants comprising the majority of the qualifying taxa on which the assessment is based. The IPA covers a larger area than that proposed for the KBA, because we include areas outside of the proposed CCA that support threatened and endemic plant species, notably the lower altitude riverine fringes and the drier northern slopes of the mountain.

Site assessor(s)

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Jonathan Timberlake,

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
Isoglossa namuliensis I.Darbysh. & T.Harris	A(i)	✓	✓	✓	✓	–	Unknown
Sclerochiton hirsutus Vollesen	A(i)	✓	✓	✓	–	–	Scarce
Ceropegia nutans (Bruyns) Bruyns	A(i)	✓	✓	✓	✓	–	Scarce
Gymnosporia gurueensis (N.Robson) Jordaan	A(i)	✓	✓	✓	–	–	Unknown
Tephrosia whyteana Baker f. subsp. gemina Brummitt	A(i)	✓	✓	✓	✓	–	Scarce
Plectranthus guruensis A.J.Paton	A(i)	✓	✓	✓	✓	–	Unknown
Plectranthus mandalensis Baker	A(i)	✓	✓	✓	–	–	Frequent
Agelanthus patelii Polhill & Timberlake INED.	A(i)	✓	✓	✓	–	–	Unknown
Helixanthera schizocalyx T.Harris, I.Darbysh. & Polhill	A(i)	✓	✓	✓	–	–	Occasional
Dombeya lastii K.Schum.	A(i)	✓	✓	✓	✓	–	Scarce
Memecylon nubigenum R.D.Stone & I.G.Mona	A(i)	✓	✓	✓	–	–	Unknown
Alloeochaete namuliensis Chippind.	A(i)	✓	✓	✓	✓	–	Frequent
Digitaria megasthenes Goetgh.	A(i)	✓	✓	✓	–	–	Unknown
Inversodicraea torrei (C.Cusset) Cheek	A(i)	✓	✓	✓	✓	–	Scarce
Faurea racemosa Farmar	A(i)	✓	✓	✓	–	✓	Common

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
Pavetta gurueensis Bridson	A(i)	✓	✓	✓	–	–	Unknown
Cissus aristolochiifolia Planch.	A(i)	✓	✓	✓	–	–	Unknown
Encephalartos gratus Prain	A(i)	✓	✓	✓	–	–	Unknown
Pyrostria chapmanii Bridson	A(i)	✓	✓	✓	–	–	Unknown
Indigofera namuliensis Schrire	A(iii)	✓	✓	✓	✓	–	Unknown
Aloe torrei I.Verd. & Christian	A(iii)	✓	✓	✓	✓	–	Unknown
Impatiens psychadelphoides Launert	A(i)	✓	✓	✓	–	–	Unknown
Rhynchosia clivorum S.Moore subsp. gurueensis Verdc.	A(iii)	✓	✓	✓	✓	–	Unknown
Digitaria appropinquata Goetgh.	A(iii)	–	–	–	✓	–	Unknown
Prunus africana (Hook.f.) Kalkman	A(i)	–	–	–	–	✓	Unknown
Gladiolus zambesiacus Baker	A(i)	✓	✓	✓	–	–	Unknown
Asystasia malawiana Brummitt & Chisumpa	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
Montane Moist Forest >1600 m	C(iii)	–			7
Medium Altitude Moist Forest 900-1400 m	C(iii)	–	–	–	1.3

General site habitats

GENERAL SITE HABITAT	PERCENT COVERAGE	IMPORTANCE
Forest - Subtropical/Tropical Moist Montane Forest	—	Major
Savanna - Moist Savanna	—	Minor
Shrubland - Subtropical/Tropical High Altitude Shrubland	—	Major
Grassland - Subtropical/Tropical High Altitude Grassland	—	Major
Wetlands (inland) - Permanent Rivers, Streams, Creeks [includes waterfalls]	—	Minor
Rocky Areas - Rocky Areas [e.g. inland cliffs, mountain peaks]	—	Major
Artificial - Terrestrial - Arable Land	—	Minor
Artificial - Terrestrial - Subtropical/Tropical Heavily Degraded Former Forest	—	Major

Land use types

LAND USE TYPE	PERCENT COVERAGE	IMPORTANCE
Agriculture (arable)	—	Major
Agriculture (pastoral)	—	Minor
Harvesting of wild resources	—	Major

Threats

THREAT	SEVERITY	TIMING
Agriculture & aquaculture - Annual & perennial non-timber crops - Agro-industry farming	Medium	Past, not likely to return
Biological resource use - Logging & wood harvesting	Medium	Ongoing - stable
Agriculture & aquaculture - Annual & perennial non-timber crops - Small-holder farming	High	Ongoing - increasing
Agriculture & aquaculture - Annual & perennial non-timber crops - Shifting agriculture	High	Ongoing - increasing
Natural system modifications - Fire & fire suppression - Increase in fire frequency/intensity	Medium	Ongoing - increasing
Agriculture & aquaculture - Livestock farming & ranching - Nomadic grazing	Low	Ongoing - trend unknown

Conservation designation

DESIGNATION NAME	PROTECTED AREA	RELATIONSHIP WITH IPA	AREAL OVERLAP
Mount Namuli	Important Bird Area	protected/conservation area overlaps with IPA	—
Mount Namuli	Alliance for Zero Extinction Site	protected/conservation area overlaps with IPA	—
Monte Namuli	Key Biodiversity Area	IPA encompasses protected/conservation area	—

Management type

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

Bibliography

Darbyshire, I., Timberlake, J., Osborne, J., Rokni, S., Matimele, H., Langa, C., Datizua, C., de Sousa, C., Alves, T., Massingue, A., Hadj-Hammou, J., Dhanda, S., Shah, T. & Wursten, B. 2019. **The endemic plants of Mozambique: diversity and conservation status.** PhytoKeys, Vol 136, page(s) 45-96

AZE 2018. **Alliance for Zero Extinction 2018 Global AZE map..**

BirdLife International 2021. **Important Bird Areas factsheet: Mount Namuli..**

Darbyshire, I., Matimele, H.A., Alves, M.T., Chelene, I., Cumbula, S., Datizua, C., De Sousa, C., Langa, C., Massingue, A.O., Mucaleque, P.A., Odorico, D., Osborne, J., Rokni, S., Timberlake, J., Viegas, A. & Vilanculos, A. 2018. **Faurea racemosa. The IUCN Red List of Threatened Species 2018: e.T108615447A108620152.**

Darbyshire, I., Polhill, R.M., Magombo, Z. & Timberlake, J.R. 2021. **Two new species from the mountains of southern Malawi and northern Mozambique..** Kew Bulletin, Vol 76, page(s) 63-70

Darbyshire, I., Wursten, B., Luke, Q. & Fischer, E. 2019. **A revision of the Crepidorhopalon whytei complex (Linderniaceae) in eastern Africa..** Blumea, Vol 64, page(s) 165-176

Downes, E. & Darbyshire, I. 2018. **Coleus namuliensis and Coleus caudatus (Lamiaceae): a new species and a new combination in the Afromontane flora of Mozambique and Zimbabwe..** Blumea, Vol 62, page(s) 168-173

Dowsett-Lemaire, F. 2008. **Survey of birds on Namuli Mountain (Mozambique), November 2007, with notes on vegetation and mammals. Dowsett-Lemaire Misc. Report 60, prepared for the Darwin Initiative, the Royal Botanic Gardens, Kew, BirdLife International, Instituto de Investigação Ag.**

Harris, T., Darbyshire, I. & Polhill, R. 2011. **New species and range extensions from Mt Namuli, Mt Mabu and Mt Chiperone in northern Mozambique..** Kew Bulletin, Vol 66, page(s) 241-251

Instituto Nacional de Geológia 1987. **Carta Geológica, scale 1: 1 million..**

Legado 2021. **Legado: Namuli..**

Ryan, P.G., Bento, C., Cohen, C., Graham, J., Parker, V. & Spottiswoode, C. 1999. **The avifauna and conservation status of the Namuli Massif, northern Mozambique..** Bird Conservation International, Vol 9, page(s) 315-331

Timberlake, J. 2021. **A first plant checklist for Mt. Namuli, northern Mozambique..** Kirkia, Vol 19, page(s) 191-225

Timberlake, J.R. 2017. **Mt Namuli - a conservation update. Unpublished report for Legado, Mozambique..**

Timberlake, J., Dowsett-Lemaire, F., Bayliss, J., Alves, T., Baena, S., Bento, C., Cook, K., Francisco, J., Harris, T., Smith, P. & de Sousa, C. 2009. **Mt Namuli, Mozambique: Biodiversity and Conservation. Report produced under Darwin Initiative Award 15/036..**

Rainforest Trust 2021. **Safeguard the Highest Peaks of Mount Namuli.**