IUCN Conservation Outlook Assessment 2017 **(archived)**
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Kilimanjaro National Park

SITE INFORMATION

Country:
Tanzania (United Republic of)
Inscribed in: 1987
Criteria:
(vii)

Site description:
At 5,895 m, Kilimanjaro is the highest point in Africa. This volcanic massif stands in splendid isolation above the surrounding plains, with its snowy peak looming over the savannah. The mountain is encircled by mountain forest. Numerous mammals, many of them endangered species, live in the park. © UNESCO

SUMMARY

2017 Conservation Outlook

Good with some concerns

The World Heritage property occupies the higher elevation parts of the Kilimanjaro National Park (above the tree line at 2,700 m). It is an area that is ‘buffered’ from the intensively cultivated lower slopes of the mountain by a wide belt of protected forest (formerly forest reserve but incorporated into the National Park since 2005). This ensures that the World Heritage site remains remote, inaccessible and relatively unaffected by human activities. The most significant threat to its scenic value (for which it was inscribed) is climate change. The mountain’s glaciers are melting fast, and are expected to disappear altogether within a couple of decades. Furthermore, the characteristic altitudinal zonation of vegetation communities will inevitably shift in the medium-to-long term as the climate warms. Maintaining the site’s values will require long-term protection of the entire ecosystem, as the ecological resilience of the property and its ability to adapt to a warmer climate, will require landscape connectivity with adjacent mid-elevation forests and other habitats at lower altitudes.

Current state and trend of VALUES

Low Concern
Trend: Deteriorating

The scenic values of the site, which are intimately linked to the occurrence of glaciers and snowfields close to the Equator, are being compromised as the ice melts. The glaciers are expected to disappear altogether from Kilimanjaro within a couple of decades, possibly as soon as 2015-2020. A four-fold increase in visitor numbers since the property was listed is creating the demand for further infrastructure and problems associated with litter and sanitation, all of which diminishes the outstanding natural beauty of the place.

Overall THREATS

Low Threat

The property’s remote and rugged geography, combined with its very limited potential for alternative use means it is not highly threatened. Climate change is melting the glaciers (which are expected to disappear altogether within a couple of decades), and will alter vegetation communities in the long term. Wild fires occur annually and are sometimes difficult to bring under control, causing extensive damage to the natural vegetation. There is a limited amount of illegal hunting and collection of some minor forest products, but there are no data to indicate whether this is within sustainable limits, and it mainly affects the forested areas of the park (outside the property). Tourism pressures are high and increasing, creating associated problems with litter, waste management and trampling of vegetation.

Overall PROTECTION and MANAGEMENT

Mostly Effective

The remote location and rugged terrain of the property ensures a high degree of natural protection against unsustainable resource use, limiting the need for management intervention. The 2005-2015 General Management Plan was considered effective, but little recent information on the level of its implementation is available, and it is not known whether an updated GMP has been developed. The development of a comprehensive management plan that considers the World Heritage property in a wider ecosystem context will facilitate further required action to mitigate the effects of climate change.

FULL ASSESSMENT

Description of values

Values

World Heritage values

- **Africa’s highest peak in and one of the world’s largest free-standing mountains**
  Criterion:(vii)

  Kilimanjaro is not only the highest mountain in Africa, but also one of the largest volcanoes in the world (IUCN, 1987; UNEP-WCMC, 2012; World Heritage Committee, 2010). It stands isolated on the surrounding plains of East Africa, rising 4,877 m above the plains so that its summit attains an elevation of 5,895 m asl. Its massive bulk covers a land area of almost 4,000 km2 (World Heritage Committee, 2010)

- **Spectacular mountain scenery**
  Criterion:(vii)

  The property includes some of Africa’s most spectacular mountain scenery, including Africa’s highest point (Uhuru Peak, 5,895m), remnant glaciers, and a number of lakes, waterfalls and bog-filled valleys. It is a relatively young extinct volcano, with three main peaks, Kibo, Mawenzi and Shira (World Heritage Committee, 2010). The central area of the youngest peak (Kibo) consists of two concentric craters with a 350m-deep ash pit in the centre and some spectacular ice fields and glaciers around the rim.

Other important biodiversity values

► Rare and endemic species

By comparison with Africa’s other high mountains, Kilimanjaro is relatively species-poor on account of its recent origins (450-750,000 years) and comparatively dry climate. However, its biodiversity values are nevertheless important. The whole mountain including the montane forest belt is very rich in species, in particular mammals, many of them endangered species (World Heritage Committee, 2010). Recently, Africa’s tallest trees have been discovered in a river gorge outside but adjacent to the national park limits (Hemp et al., 2017). Kilimanjaro is part of the Kenyan Mountains Endemic Bird Area (EBA), and a Birdlife Important Bird Area (IBA) (Baker, 2002). It supports four species of bird that are considered globally Vulnerable and two species that are near-threatened, as well as three of the restricted-range species of the Kenyan Mountains EBA. The World Heritage property does not cover any of the forested habitats where most of the mammal, bird and plant biodiversity is concentrated but it does include the more unique ecological communities of the heaths, moorlands and high-altitude deserts. These areas support some notable endemic species including the giant groundsel, Dendrosenecio kilimanjari, and the giant Lobelia deckenii.

► Africa's highest forest

Subalpine cloud forest composed mainly of the giant heather Erica trimera represents the highest forest in Africa at an elevation of about 4000 m a.s.l. (Hemp, 2006).

Assessment information

Threats

Current Threats

Low Threat

The biggest long-term threat is climate change which is expected to cause the

disappearance of the glaciers within a few decades, and result in a general shift in vegetation zones to higher elevations. Importantly, this is likely to reduce the area of the unique Afro-alpine communities. Uncontrolled fire is a frequent threat during drier periods, destroying extensive areas of forest and heath. The property covers the upper reaches of the mountain above the tree-line, so threats to the forest cover on the mid-level and lower slopes have an indirect effect on the property. Illegal hunting and collection of some minor forest products are common along the national park borders, but it appears to be within sustainable limits. However, population growth will likely lead to overexploitation in the near future. This mainly affects the forested areas of the park (outside the property). Tourism pressures are high and increasing, creating associated problems with litter, water pollution and soil erosion.

► Invasive Non-Native/ Alien Species

Very Low Threat
Inside site, localised(<5%)

Along the tourist climbing routes, weeds as Poa annua occur that are introduced by tourists arriving. However, vegetation surveys along the mountain revealed that those species do not invade natural systems (Hemp, 2008).

► Fire/ Fire Suppression

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

Wild fires are a major problem and most are started by people (Tanzania National Parks, 2005). This may be intentional, for example when fire is used by poachers, cattle herders or honey gatherers, or accidental (e.g. in the case of visitor camp fires). The unnaturally frequent fires are likely to be having an adverse effect on natural community dynamics, particularly in the heath zones where fires are most extensive, but there is currently little understanding of the effects of fire (Tanzania National Parks, 2005)

► Logging/ Wood Harvesting

High Threat

Outside site

The forested slopes at elevations below about 1,800 m (which lie outside the world heritage property and below the lower boundary of the (extended) National Park) are under increasingly-intensive cultivation, thus reducing the functioning and ecological resilience of the entire ecosystem. Deforestation of the lower slopes is thought to be partially responsible for the retreat of the glaciers, by reducing the flow of moisture up the mountainside and depleting the mountain’s icy hood (Pepin et al., 2010). Illegal logging for valuable timber species is common at the mountain, with about 8000 small-scale logging sites found in an aerial survey in 2001 (Hemp, 2006b). Due to the rugged terrain and the vigilance of the national park borders, it seems however unlikely that logging activities will substantially change the present-day forest composition. Previously selectively logged sites have been shown to recover through seed rain from adjacent sites (Rutten et al., 2015). Collection of firewood is very common at the lower national park border. In a recent survey, 57 % of all households on the southern slopes of Mount Kilimanjaro indicated they regularly extract (dead) wood from the forest. Additionally, about 18 "forest villages" exist at the Western and Northern Slopes of the mountain, whose inhabitants make use of a variety of forest products (UNEP-WCMC, 2012). The continued growth of the villages on the mountain slopes makes it likely that overexploitation will take place in the near future.

► Hunting (commercial/subsistence)

Low Threat
Outside site

Subsistence and commercial hunting is carried out in the forested lower slopes (GMP, 2005), and to a lesser extent at higher elevations where its impact is limited due to the extremely rugged terrain and difficulty of capturing prey species (Tanzania, 2009).

► Habitat Shifting/ Alteration, Temperature extremes

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

Ice loss as a result of increasing average global temperatures is well

documented. The total surface area of glacial ice on top of Mount Kilimanjaro has decreased by 88.3% from 1912 to 2013 (Burkhart et al., 2017). Furthermore, the rate of retreat accelerated from 2000 to 2013, when ice decreased by 40% (Burkhart et al., 2017). Some researches have shows that it is unlikely that any ice will remain by 2016 (Cullen et al., 2013).

In general, climate change is likely to cause a general shift of vegetation zones to higher elevations reducing the area of the rare high-altitude Afro-alpine vegetation communities. In the case of Mount Kilimanjaro, increasing fire incidence due to decreasing precipitation leads to loss of subalpine cloud forest at its upper (fire) and lower (ingression of low-elevation species) boundaries (Hemp, 2006a). Some studies have also already demonstrated a change in bird species and abundance in 20 years between 1991 and 2001 (Dulle et al., 2015).

There may also be an increased incidence of landslides and flash-flooding if precipitation falls as rain instead of snow.

► Other Ecosystem Modifications

Low Threat
Inside site, localised(<5%)
Outside site

The property is ‘buffered’ from adjacent settlements by a 5-10 km wide belt of protected natural forest and plantations, but the land beyond the lower boundary of the park (at about 1,800 m) is becoming more intensively settled and cultivated, eliminating previous landscape connectivity with nearby natural habitats, especially to the west (Arusha National Park) and north-west (Amboseli National Park, Kenya). Thus historical migration routes of keystone species, such as elephants, are being lost (Tanzania, 2001; Noe, 2003). Other reports have also reported reduction in connectivity for ungulates such as wildebeest (Morisson and Bolger, 2014). This increasing isolation requires urgent measures to ensure ecological viability of species.

► Tourism/ visitors/ recreation

High Threat

Inside site, extent of threat not known
Outside site

Excessive tourism creates a number of problems related to litter and waste management; erosion of paths and trampling of vegetation (EoH Report, 2012). A 2003-2005 study identified a direct link between trail erosion and hiking pressure, and water contamination found at lower elevations (Wakibara et al. 2009). The number of tourists using Kilimanjaro International Airport reportedly increased by 10% in one year between 2015 and 2016 (Mugarula, 2017). This increase cannot of course be used to accurately estimate the number of tourists visiting Kilimanjaro National Park World Heritage property, but it can be assumed that visitor to the Park also increased. According to the 2013 World Bank report, key areas of the park have experienced increased environmental degradation around the slopes, including land degradation and loss of biodiversity. Given increasing tourism to the region, impacts from tourism is of great concern.

Potential Threats

Protection and management

Assessing Protection and Management

► Relationships with local people

Some Concern

Community relations are generally good in respect of the World Heritage property, with the economic benefits of tourism accruing to local people who provide porter and guiding services. The World Heritage property is currently limited to the upper reaches of the mountain (above 2,700 m) so there is a wide swathe of protected forest land between it and the areas of farming settlement below the National Park boundary (at around the 1,800 m contour). Community Outreach is one of the four main programmes detailed in the General Management Plan (2005-15), and the intention to scale-up conservation education and improve park-community communication are stated management objectives. The GMP also identifies a need to re-invigorate support for community-initiated projects, focusing on conservation-

friendly income-generating activities, mitigation of human-wildlife conflicts and supporting resource management activities in the buffer zones. However, by 2014 no substantial implementations of these programs could be discerned (Minja, 2014). There is also some evidence that local communities do not support decision-making by the national park authorities and do not feel to be seriously involved (Conradin, 2014). Presumably villagers caught extracting forest resources within the southern borders of the national park have been maltreated by national park staff, an indication for the difficult relationship between the park authorities and the local population.

► Legal framework

Mostly Effective

The legal framework is fairly strong. Originally protected as a Forest Reserve in 1921 the uppermost section of the mountain, together with six corridors down to lower elevations (totaling 753 km2, mostly above the 2,700m contour) became a National Park in 1973 (World Heritage Committee, 2010). This was extended in 2005 to include the remaining natural forest down to the 1,800 m contour, adding a further 926 km2 to the Park. The national park is managed by the semi-autonomous Tanzania National Parks Authority (TANAPA) with its own Board of Trustees and financial sustainability is based on full revenue retention. The SP identifies low levels of penalties and ineffective implementation of wildlife laws outside the park as significant limitations (Tanzania, 2009). Recommendations have been given on lowering the national park boundaries to include some high-value biodiversity sites at deep river gorges (Hemp et al., 2017).

► Enforcement

Some Concern

The national park staff effectively controls the access of tourists to the protected parts of the mountain including the world heritage site. The "green" boundary of the national park away from the large roads is however impossible to survey effectively because of the difficult terrain including many steep gorges and the large extent of the area, given the relatively small numbers of rangers available to the park. Apart from this, the integration of park staff in local communities may hinder effective law

enforcement due to conflicts of interest.

▶ Integration into regional and national planning systems

Mostly Effective

The property is managed by TANAPA as one of Tanzania's 14 National Parks. Its management is carried out in accordance with TANAPA's new national-level strategic planning processes and integrated with regional systems through the involvement of district government, local communities and a wide range of other stakeholders in planning at the site level (GMP, 2005-15)

▶ Management system

Some Concern

The first comprehensive management plan of Kilimanjaro National Park (the World Heritage property covers 40% of the park) was approved in May 1993 (GMP, 1993). This was replaced with a new one in 2005, following extension of the park to include the forested slopes of the mountain, which more than doubled its size (GMP, 2005-15). This 2005-15 GMP established High- and Low-Use Hiking Zones (comprising about 17% of the park's area), with the remainder of the park (83%) designated as a Wilderness Zone. Management is structured around four major programmes, each aligned to one of the park's departments, and dealing with (1) Ecosystem Management, (2) Tourism Management, (3) Community Outreach and (4) Park Operations. This GMP however is now out-dated, and it is unclear whether a new GMP has been developed.

▶ Management effectiveness

Some Concern

Management is significantly constrained by budgetary and staffing levels (Tanzania, 2009). In 2008/9 the park's annual operating budget was US$ 2.7million and it had a staff of 185 full-time employees (Tanzania, 2009). There is an identified need for almost 300 staff. Despite these inadequacies, however, the World Heritage property (covering about 40% of the park, at higher elevations) is characteristically resilient and requires only relatively low levels of management input to retain its values and ecological integrity.

▶ Implementation of Committee decisions and recommendations

Data Deficient

There have been no committee decisions or recommendations requiring implementation since the property was listed in 1987

▶ Boundaries

Some Concern

The World Heritage property is not demarcated, its boundary following approximately the 2,700m contour, within the Kilimanjaro National Park. The lower boundary of the National Park (following its extension in 2005) is partially demarcated at around 1,800m, providing protection for natural forest on the mountain's mid-level slopes, below the property (which serve as a de facto buffer zone). There is scope to extend the property to include some of the lower elevation forested slopes in order to enhance protection of animal migration corridors and improve ecological resilience to climate change.

▶ Sustainable finance

Mostly Effective

TANAPA is a self-financing semi-autonomous agency so revenue generated from tourism is retained and re-invested in park management. Kilimanjaro has been financially self-sustaining since 1984 (UNEP-WCMC, 2012), and currently generates a substantial surplus which is used to cross-subsidise other aspects of TANAPA operations, including the less profitable elements in the park network. There remain significant unmet management needs and concerns over sustainable financing at all parks, including Kilimanjaro (Tanzania, 2009).

▶ Staff training and development

Some Concern

Present staffing levels are considered to be inadequate (Tanzania, 2009), but no plan for staff development was available for this assessment. In 2008/9 the park had a staff of 185 full-time employees (Tanzania, 2009). There is an identified need for almost 300 staff. The level of training of existing staff is

assessed as ‘Good’ for 9 categories of staff, ‘Fair’ for 5 categories (technicians, secretaries, drivers, rangers and office assistants) and ‘Poor’ for one category (park assistants) (Tanzania, 2009).

► Sustainable use

Mostly Effective

There is no consumptive use of resources allowed within the property or parts of the park beyond its boundaries on the forested mid-slopes. However, under the GMP, Wildlife Management Areas are supported in communal areas beyond the park boundary in order to ensure sustainable use of resources and protect wildlife that moves between these areas and the park (GMP, 2005-15).

► Education and interpretation programs

Some Concern

Community Outreach is one of the four core programmes described in the 2005-15 management plan (GMP, 2005), and scaling up the conservation education programme is one of its main objectives. Eight specific actions are identified, but implementation appears not to have happened to date, despite its increasing necessity (Minja, 2014).

► Tourism and visitation management

Some Concern

Tourism Management is one of the four core programmes described in the 2005-15 management plan (GMP, 2005). The most recent official visitor statistics show that 40-42,000 visitors were reported annually for the years 2006-8, up from around 21,000 in 2000 (Tanzania, 2009), and 12,000 in 1991 (GMP, 1993). In 2014, National Park authorities stated that about 50,000 visitors came to Mount Kilimanjaro in 2013, accompanied by about 300,000 guides and porters (Tanzania Daily News, 02/10/2014). The trend of increasing visitor numbers despite increased climbing fees poses a threat to the ecosystems along the climbing routes through littering, increased fire incidence, and wildlife disturbance. However, because of the strict regulations, only designated trails and camp sites are affected (Hemp, 2008). Existing park interpretation facilities are rudimentary, but the GMP envisages development of a new visitor centre at the Marangu park headquarters and

‘mini-interpretation’ sites at selected locations elsewhere. The GMP provides for further upgrading of visitor facilities, concentrating on upgrading water supplies, sanitation and providing accommodation to suit local (Tanzanian) visitors.

► Monitoring

Data Deficient

The park’s ten-year GMP (2005-15) was based on a ‘Logical Framework Approach’ that allows for easy development of three-year action plans and annual operations plans that can be readily monitored and evaluated, thereby facilitating adaptive management. There is no information on the success of this new approach to planning at the park. Under the GMP’s Ecosystem Management Programme, an Ecological Monitoring Plan was to be formulated, focusing on five specific ‘conservation targets’, namely (1) the elephant population, (2) mammalian biodiversity, (3) eco-climatic zones, (4) glaciers and (5) water and catchment values. This plan was not available for the current assessment, nor was there any further information on its implementation. Furthermore, it is unknown whether a new updated GMP has been developed.

► Research

Mostly Effective

The property does not have a comprehensive research programme, but there are a number of externally-supported long-term research activities including research on vegetation (University of Bayreuth, Germany), elephants of west Kilimanjaro (African Wildlife Foundation) and glacial ice (University of Ohio) (Tanzania, 2009). From 2010 to 2016, the multidisciplinary research group FOR 1246 "KiLi - Kilimanjaro ecosystems under global change - Linking biodiversity, biotic interactions and biogeochemical ecosystem processes" founded by the German Research Council (DFG) investigated many aspects of ecosystem functioning within the 12 twelve major vegetation types on the mountain (https://www.kilimanjaro.biozentrum.uni-wuerzburg.de/).

Overall assessment of protection and management

Mostly Effective

The remote location and rugged terrain of the property ensures a high degree of natural protection against unsustainable resource use, limiting the need for management intervention. The 2005-2015 General Management Plan was considered effective, but little recent information on the level of its implementation is available, and it is not known whether an updated GMP has been developed. The development of a comprehensive management plan that considers the World Heritage property in a wider ecosystem context will facilitate further required action to mitigate the effects of climate change.

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

Some Concern

The extension of the park in 2005 is enabling improved protection and restoration of forest on the mid-slopes of the mountain. However, educational efforts targeting the uncontrolled and unsustainable use of the natural resources by adjacent communities are rare and in need of improvement (Minja, 2014). If no action is taken, detrimental effects on the forest zone may affect the world heritage site in the long run, directly through resource extraction, and indirectly through changes in local climate (Pepin, 2010)

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **Africa’s highest peak in and one of the world’s largest free-standing mountains**

Good
Trend:Stable

The last major period of volcanic activity was 450,000 years ago (Stewart, 2004), and its status as Africa’s highest peak is unlikely to change in the foreseeable future

► Spectacular mountain scenery

Low Concern
Trend:Deteriorating

For many visitors a significant element in the scenic values of Kilimanjaro is the existence of glaciers and snowfields close to the equator. Their disappearance will reduce the scenic value and impact of the property. Furthermore, as visitor numbers increase there will be a need for further infrastructure, including visitor accommodation, campsites, trails, toilets etc which will compromise the scenic values of the property

Summary of the Values

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

Low Concern

Trend: Deteriorating

The scenic values of the site, which are intimately linked to the occurrence of glaciers and snowfields close to the Equator, are being compromised as the ice melts. The glaciers are expected to disappear altogether from Kilimanjaro within a couple of decades, possibly as soon as 2015-2020. A four-fold increase in visitor numbers since the property was listed is creating the demand for further infrastructure and problems associated with litter and sanitation, all of which diminishes the outstanding natural beauty of the place.

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

Low Concern

Trend: Deteriorating

The biodiversity values of the property are likely to be responding to (1) climate change and (2) improvements in the protection of habitat in the forested ‘buffer zone’. As the lower national park border is not effectively protected and some high-value biodiversity areas even lie outside the park, their disappearance is likely. Still, this will not have a strong effect on the

property itself.

Additional information

Benefits

Understanding Benefits

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

Mount Kilimanjaro serves an invaluable role as a water catchment, maintaining biodiversity and life-support systems downstream, as well as economically important hydro-electric facilities and irrigation schemes.

Decreasing precipitation on the whole mountain and ongoing population growth associated with land clearing are having a negative impact on the amount of water available from the mountain (Hemp, 2009). In a 2010 survey of stakeholders of the property including villagers and park employees of their perception of Mount Kilimanjaro, the authors found that they considered the non-consumptive forest uses, including ecosystem services, the top priority above consumptive use (Kijazi & Kant, 2010). This therefore illustrates the potentially significant impact any degradation of the forest, water and glacier will have on the local communities, economies and wildlife.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects
1	Data deficient		Data deficient

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