

# Mount Kenya National Park/Natural Forest

## 2020 Conservation Outlook Assessment

### SITE INFORMATION

**Country:** Kenya  
**Inscribed in:** 1997  
**Criteria:** (vii) (ix)



At 5,199 m, Mount Kenya is the second highest peak in Africa. It is an ancient extinct volcano, which during its period of activity (3.1-2.6 million years ago) is thought to have risen to 6,500 m. There are 12 remnant glaciers on the mountain, all receding rapidly, and four secondary peaks that sit at the head of the U-shaped glacial valleys. With its rugged glacier-clad summits and forested middle slopes, Mount Kenya is one of the most impressive landscapes in East Africa. The evolution and ecology of its afro-alpine flora provide an outstanding example of ecological and biological processes. Through the Lewa Wildlife Conservancy and Ngare Ndare Forest Reserve, the property also incorporates lower lying scenic foothills and arid habitats of high biodiversity, situated in the ecological transition zone between the mountain ecosystem and the semi-arid savanna grasslands. The area also lies within the traditional migrating route of the African elephant population. © UNESCO

### SUMMARY

#### 2020 Conservation Outlook

Finalised on 01 Dec 2020

#### GOOD WITH SOME CONCERNS

The conservation outlook for Mount Kenya National Park/Natural Forest is good with some concern. The site's remote and rugged geography, combined with its very limited potential for alternative use means it is not highly threatened. However, a series of issues continue to negatively affect the site and require stronger management efforts. Wild fires occur annually and are sometimes difficult to bring under control, causing extensive damage to the natural vegetation. There are also continuing issues with illegal hunting, illegal forest resource extraction and unsustainable subsistence use by local communities and impacts from a growing number of visitors. The ecological resilience of the site is dependent on sustainable management of natural forests at lower elevations beyond its current boundary, where the recent resurgence of illegal forest resource extraction could jeopardize the conservation gains made over the past decades. Moreover, the impacts of climate change are difficult to assess but glaciers are melting and vegetation communities are likely to alter in the long term. A joint KWS-KFS ecosystem management plan that considers adequately the WH Site need to be put in place to reduce the negative impacts, and more resources are required to tackle

all issues appropriately. Maintaining the site's values will require long-term protection of the entire ecosystem, as the ecological resilience of the site and its ability to adapt to a warmer climate, will require landscape connectivity with adjacent mid-elevation forests and other communities at lower altitudes.

## FULL ASSESSMENT

### Description of values

#### Values

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##### World Heritage values

► **Spectacular mountain scenery**

**Criterion:(vii)**

The park protects some of Africa's most spectacular mountain scenery, including Africa's second highest peak (Batian, 5,199m), 12 remnant glaciers, and an abundance of lakes, waterfalls and bog-filled valleys. Mount Kenya is an ancient extinct volcano, which probably reached a height of 6,500m during its formation 3.1-2.6 million years ago (World Heritage Committee, 2013). There are a number of volcanic cones and craters such as Ithanguni and Rutundu cones (Gichuhi,2015). Today, the jagged snow-capped peaks, glaciers and exuberant Afro-alpine vegetation create one of the most impressive landscapes in Africa.

► **Diversity of evolving habitats**

**Criterion:(ix)**

There is a great diversity of habitats on account of the range of altitude (2,400 to 5,200m), equatorial location and high rainfall. The World Heritage Site is particularly noted for its unique afro-alpine flora, which provides an outstanding example of ecological processes in an environment that is characterized by an extreme climate with 'summer every day and winter every night'. The forested lower slopes (below 2,400m) are not included in the site, but the vegetation zones of higher elevations (bamboo, tree heather, Afro-alpine and Nival zones) each has its own special characteristics and associated flora and fauna. This altitudinal zonation and diversity is the product of ongoing ecological interactions, and is in a continuing state of change in response to the erosive force of water and ice, and climate change (World Heritage Committee, 2013).

##### Other important biodiversity values

► **Rich montane flora, with many endemic species**

The park has a rich montane flora, including many endemic species. The giant heather and Afro-alpine vegetation zones that extend from around 3,500m to the snowline (at around 4,400m) represent the rarest vegetation types on the African continent. Prominent constituents of this extraordinary vegetation are several endemic (or near-endemic) giant groundsels (*Senecio*) and *Lobelias* (IBA Factsheet, 2012). The forested lower slopes (outside the World Heritage Site) support a number of rare shrubs and the climber, *Rubus keniensis*.

► **Rare, threatened and endemic fauna**

Mount Kenya is an Important Bird Area (IBA) with 53 of Kenya's 67 African Highland biome species, including the rare and threatened Abbott's Starling. It is home to 6 of the 8 bird species that are endemic to the Kenyan Mountains Endemic Bird Area (GMP, 2010). Mammals of global concern include elephant, bongo, black rhino (probably locally extinct) and a local race of the black-fronted duiker (*Cephalophus nigrifrons hooki*), as well as four globally- threatened small mammals (IBA Factsheet, 2012). Two reptiles (a snake and a chameleon) are endemic to the high altitude zones of Mount Kenya and the nearby Aberdares, while another snake (*Atheris desaixi*) is endemic to Mount Kenya's forested lower slopes.

## Assessment information

### Threats

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#### Current Threats

Low Threat

The site covers steep, cold, high altitude land with little potential for commercial forestry or agricultural use, and has never been subject to significant pressure for any other forms of consumptive use. However, uncontrolled fires, most often of anthropogenic origin, are a frequent threat during drier periods, destroying extensive areas of moorlands and forest. Poaching and illegal logging also continue to impact on the site, alongside the negative influence of invasive alien species. Tourism is increasing and there are some associated problems with litter, waste management and trampling of vegetation. Climate change is likely to impact on the site which is expected to cause the disappearance of the glaciers within a few decades, and result in a general shift in the upper vegetation zones to lower elevations, due to the impacts of frequent fires. The recent development of a specific climate change adaptation plan is thus an important step to reduce potential impacts. Finally, the ecological resilience of the site is dependent on sustainable management of natural forests at lower elevations beyond its current boundary, and illegal forest resources extraction is an increasing threat, together with the potential development of large dams.

#### ► Invasive Non-Native/ Alien Species

Data Deficient

*(Invasive alien species)*

Inside site, extent of threat not known  
Outside site

This is a widespread problem in the wider Mt Kenya ecosystem and so far the efforts have been unable to significantly improve the situation (Report on the Mount Kenya National Park & Natural Forest Stakeholders Meeting, September 2013). However, some successes have been achieved in removing the invasive *Lantana camara* in the Lower Immenti Forest Reserve to pave way for the replating of indigenous trees.

#### ► Fire/ Fire Suppression

High Threat

*(Fire)*

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

Wild fires are a major problem and may be started accidentally or deliberately. As much as 10% of the natural forest (mostly outside the World Heritage Site) was lost to fire in 2012 alone (IUCN Consultation, 2020). In 2019, wild fires burnt over 20,000 hectares of the moorlands inside the site. Moorlands fires most often affect the upper ericaceous forest belt and in some cases, the upper hagenia forest belt. The ericaceous forest is tolerant to some fire activity but require longer recovery time than grasslands. When fires are too frequent, grasses may invade resulting in conversion from forests to grasslands (Henry, 2019).

Most fires are triggered by human activities, in particular charcoal burners, honey collectors and livestock grazers (Nyongesa, 2018). Deliberate fires are sometimes set by neighbouring communities in the hope of being allowed to cultivate the area affected once it has been destroyed by fire (IBA Factsheet, 2012). In other cases, fires are set in the higher altitude bamboo belt to clear the land for the illegal cultivation of marijuana (Martin, 2019). More financial and human resources are required to implement the Fire Management Plan that was developed.

In the meanwhile, the Mount Kenya Trust together with Rhino Ark have trained and equipped a team of 60 officers in combating wild fires. However, there are still a number of critical areas to be addressed, particularly clearing and maintaining fire breaks, training and equipping members of the Community Forest Associations as first respondents in the lower forest belt, improving coordination and securing access to an emergency funds to be able to mobilize resources without delays.

#### ► Hunting and trapping

Low Threat

*(Poaching)*

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

Subsistence hunting is carried out in the forested lower slopes, 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 (Mission Report, 2008). The few remaining critically endangered mountain bongo antelopes are at high risk to subsistence hunting (KWS, 2019). The African elephant remain also at high risk due to ivory poaching.

► **Tourism/ Recreation Areas**

**Low Threat**

*(Impacts of tourism)*

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

With some 25-30,000 visitors annually, tourism numbers are still low compared with Mount Kilimanjaro. Nevertheless some areas are affected by unsustainable firewood collection; litter and waste management.

In August 2020, KWS introduced a new system aiming at ensuring that waste generated by visitors are brought back down the mountain. Upon entry in the park, visitors must record on a form all the goods (including packaging) they bring inside the park. Upon exit, the form is checked to confirm that no waste is left inside the park.

► **Other Biological Resource Use**

**Data Deficient**

*(Unsustainable use of minor forest produce)*

Inside site, extent of threat not known  
Outside site

Minor forest produce, notably bamboo, natural fibres, mushrooms, honey and the like, make an important contribution to local livelihoods, but there are few data on which to base sustainability decisions and harvesting quotas (Mission Report, 2008, GMP, 2010)

► **Other**

**Low Threat**

*(Ecological isolation due to land use changes, including degradation of the 'Buffer Zone')*

Inside site, localised(<5%)  
Outside site

The site is 'buffered' from adjacent settlements by a 5-10 km wide belt of protected natural forest and plantations, but the land beyond this (below about 2,000 m) is becoming more intensively settled and cultivated, eliminating previous landscape connectivity with nearby natural habitats, especially to the west (Aberdares), north-west (Laikipia plateau), north (Ngare-Ndare Forest Reserve, Lewa Conservancy) and north-east (Imenti Forest Reserve, Meru National Park) (Mission Report, 2008). Thus historical migration routes of keystone species, such as elephants, have been lost.

To address such an issue, several interventions have been implemented. A wildlife corridor has been established between Mt. Kenya Forest/National Reserve and Ngare Ndare Forest Reserve. The corridor led to the extension of the Mount Kenya National Park / Natural Forest World Heritage Site to include Ngare Ndare Forest Reserve and Lewa Wildlife Conservancy. Today, not only elephants but many other wildlife are frequently recorded including bushbuck, duicker, jackal, leopard, zebras, porcupine, reedbuck, serval cat, spotted hyena, warthog, wild dog. (Mount Kenya Trust, 2020). In addition, two one-way automatic elephant gates have been built along the Imenti Forest Electric Fence to allow elephants to move from the north into the Mt. Kenya forest ecosystem. Furthermore, work has been initiated to re-establish a wildlife corridor between Mt. Kenya and the Aberdares, through Thego Forest, Sangare Conservancy and Nyeri Forest.

► **Habitat Shifting/ Alteration**

**High Threat**

*(Climate change Decrease in the extent of glaciers (Prinz, 2016)  
Increased vulnerability of the moorlands and the forests to fire)*

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

Increasing temperatures, reduced rainfall and reduced cloudiness (Prinz, 2016) as a result of climate change are contributing to the melting the park's glaciers, which are expected to disappear altogether with the next few decades. These three factors are also increasing the vulnerability of the moorlands and the forest belt to fire. In contrast to common belief, climate change may not necessarily cause an upward shift of plants and animals. As observed on Kilimanjaro which has much similarities with Mt. Kenya, increased fire frequency has led to a downward shift of the upper forest line by several hundred metres (Hemp, 2009). There may also be an increased incidence of landslides and flooding due to increasing extreme rainfall events. While data is deficient to assess these potential developments, the Mount Kenya World Heritage Site Climate Change Adaptation Programme was developed in June 2013,

which recommends a number of activities to help reduce the potential impacts of climate change.

► **Logging/ Wood Harvesting**

**High Threat**

*(Illegal logging of indigenous trees)*

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

Illegal logging of indigenous trees was a major threat to the ecological integrity of Mt. Kenya forest ecosystem, in particular in the 1990s.

Following the aerial survey undertaken in 1999 (KWS, 1999) and the designation of the forest as a National Reserve, illegal logging decreased significantly (Vanleeuwe, 2002) with an recorded reduction of illegal logging activities of 73% to 96% depending upon the tree species between 1999 and 2002. However, over the past few years, there has been a noticeable resurgence of illegal activities as observed during two elephant censuses and forest health surveys conducted in 2006 and 2020. Illegal logging increased by 3.5 fold, charcoal production by 74% and livestock grazing by 75% between 2006 and 2020. Snare traps did not increase in number but became more spread. Charcoal production also increased by 74%. Four small marijuana fields were destroyed in 2020 as opposed to two in 2016. The highest concentrations of these illegal activities were found around the commercial forest plantations, located outside the site. But logging was also found deep inside the forest on the south-eastern slopes, inside the site. (Vanleeuwe, 2016; Vanleeuwe, 2020).

**Potential Threats**

**High Threat**

The potential development of large dams both in and outside the site is a major concern. The increasing water abstraction can also lead to a significantly negative development both in and outside the WH site if not managed properly.

► **Dams/ Water Management or Use**

**Low Threat**

*(Unsustainable levels of water abstraction)*

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

Water abstraction from the Mt Kenya catchment has reached unsustainable levels. If this continues unchanged, this development could significantly harm the wildlife, ecosystem health and the communities. Moreover, a water shortage lower in the catchment could result in people moving higher into the catchment which then may result in clashes over water resources. This could threaten the future of the site (Report on the Mount Kenya National Park & Natural Forest Stakeholders Meeting, September 2013).

► **Dams/ Water Management or Use**

**High Threat**

*(Construction of large dams)*

Inside site, localised(<5%)  
Outside site

There are several proposals for the construction of large dams in the National Park and the Forest / National Reserve within and outside the site. Those proposed within the site are: (1) Naro Moru Dam on the Naro Moru River with a reservoir of 38.76 hectares; and (2) Kamburaini Dam on the Nanyuki River with a reservoir of 17.29 hectares. The one outside the site is Tinga I Dam on the Nanyuki River with a reservoir of 18.50 hectares. These dams could impacts adversely on the site, in particular the Naro Moru Dam to be located on the valley next to the Park Headquarters (NIB, 2013).

**Overall assessment of threats**

**Low Threat**

The site's remote and rugged geography, combined with its very limited potential for alternative use means it is not highly threatened. However, a series of issues continue to negatively affect the site and require stronger management efforts. Wild fires occur annually and are sometimes difficult to bring under control, causing extensive damage to the natural vegetation. There are also continuing issues with illegal hunting, and other resource use by local communities and impacts from a growing number of visitors. The ecological resilience of the site is dependent on sustainable management of natural forests at lower elevations beyond its current boundary, and the threat of illegal resource extraction is increasing. Particularly the potential construction of large dams is a major concern and

the increasing water abstraction requires more attention. Moreover, the impacts of climate change are difficult to assess but glaciers are melting (which are expected to disappear altogether within a few decades), and vegetation communities are likely to alter in the long term. Management plans are to be renewed to reduce the impact of these threats, and more resources are required to tackle these issues appropriately.

## Protection and management

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### Assessing Protection and Management

#### ► Management system

Some Concern

Following the designation of the National Reserve, KWS drafted a new management plan in 2002, but it was not until 2010 that a 2010-2020 General Management Plan for the entire Mount Kenya Ecosystem (MKE) was prepared by KWS and KFS but was never signed. Management is structured around seven programmes focused on ecological management, forest resources, water resources, security, protected area operations, tourism and community partnerships (GMP, 2010). Significantly, the MKE plan encompasses three important areas at lower elevations, beyond the boundaries of the Mount Kenya Forest/National Reserve, namely the Ngare Ndare and Imenti Forest Reserves and the Lewa Conservancy. Operationally, KWS divides the area into 6 sectors, while KFS has 16 management sectors, known as forest stations (GMP, 2010). The GMP provides for six management zone categories, of which the World Heritage Site includes Wilderness Activity, Low Use and High Use areas, while Plantations, Multiple Use Zones and 'Influence' Zones all lie outside the Site in the wider MKE area (GMP, 2010). As the GMP expires in 2020, it is important that KWS and KFS initiate promptly the revision of the plan, execute and implement it jointly.

The forest of Mt. Kenya which include the lower part of the site is managed under 16 separate forest station-level management plans that do not reflect adequately the existence of the World Heritage Site.

#### ► Effectiveness of management system

Some Concern

Management is significantly constrained by budgetary and staffing levels (SOC, 2011). This situation has worsen over the past two years due the moratorium on the harvesting of forest plantations impacting on KFS since February 2018 and a 97% reduction in park entrance due to Covid-19 impacting on KWS. Although, the World Heritage Site is characteristically resilient and requires only relatively low levels of management input to retain its values and ecological integrity, management constraints impact on the ability of KWS and KFS in tackling effectively illegal extractive activities within the lower part of the site, which have increased over the past three years. The use of the Management Effectiveness tracking tool (METT) to improve on the management is recommended (Gichuhi,2015).

#### ► Boundaries

Mostly Effective

The site is not demarcated, its boundary following approximately the 2,400m contour, within the Mount Kenya National/Forest Reserve. It encloses the Mount Kenya National Park, a smaller area covering the moorlands and the peaks zone above 3,200m and part of the surrounding forest belt. The lower boundary of the National/Forest Reserve is demarcated at around 2,000m, providing protection for natural forest and plantations on the mountains mid-level slopes, below the Site (serving as a buffer zone). There is need to extend the Site to include some of the lower elevation forested slopes in order to maintain animal migration corridors, protect the more bio-diverse lower forest belt and improve ecological resilience to climate change. The Mt. Kenya Electric Fence currently being constructed do not follow the site boundary, but follows the lower boundary of the National/Forest Reserve.

#### ► Integration into regional and national planning systems

Mostly Effective

The site is managed together with other protected areas within the KWS and KFS regional management structures. However, the site falls under two separate regional structures of KFS (Central Highlands and

Eastern Conservancies) making unified management more difficult.

► **Relationships with local people**

**Mostly Effective**

Community relations are generally good in respect of the World Heritage Site, with the economic benefits of tourism accruing to local people who provide porter and guiding services. The World Heritage Site borders protected forest land and is at least 5km from the nearest area of settlement. However, there are significant issues of human-wildlife conflict adjacent to the lower forest boundary where elephant crop damage and livestock depredations occur. A 450 km electric fence is currently being built of which 200 km was completed by mid 2020, addressing effectively the problem of human-wildlife conflicts (UTaNRMP, 2019). The long term future of the WH Site is dependent on the ability of the management approach ensuring that the site is known and recognized by the local communities and that it can continue to generate benefits to the local communities living around it. While so far this has been partially successful, continued and increasing efforts are needed given the growing pressures. Moreover, local communities, organized as community forest associations require capacity building and support to be able to successfully co-manage the forest and its wildlife.

► **Legal framework**

**Some Concern**

The legal framework is fairly strong. Originally protected as a Forest Reserve in 1932 the uppermost section of the mountain (715 km<sup>2</sup>, mostly above the 3,200m contour) became a National Park in 1949 (with extensions in 1968). The entire Forest Reserve was designated as a National Reserve (2124 km<sup>2</sup>) in 2000 following a landmark aerial survey which exposed the extent of encroachment and degradation of the ecosystem (KWS, 1999). This conferred co-management status on the lower part of the World Heritage Site (between 2,400 and 3,200m) as well as the forested flanks of the mountain below it (between 2,000 and 2,400m). No cultivation or settlement is permitted within the Forest/National Reserve, except under special permit (which may be granted as a way of clearing land in preparation for the establishment of forestry plantations under the controversial 'shamba' system). The national park is managed by the semi-autonomous Kenya Wildlife Service (KWS), while the Forest/National Reserve portion is co-managed by KWS and the newly-formed Kenya Forest Service (KFS). However, the recognition by KFS of the National Reserve under the management of KWS remains problematic.

► **Law enforcement**

**Some Concern**

Although reports have been made about the need to increase the number of law enforcement officers (rangers) (Gichuhi, 2015), key gaps in law enforcement include:

- 1) Adequate supervision of the rangers to ensure effective patrols;
- 2) Establishment of a patrol monitoring system that enables tracking where patrols are carried out;
- 3) Close collaboration between KWS and KFS.

► **Implementation of Committee decisions and recommendations**

**Mostly Effective**

Recent committee decisions and recommendations have focused on (1) fencing the lower boundary of the natural forest to create a 'de facto' buffer zone around the Site; (2) extending the Site to include more natural habitat at lower elevations; (3) completion of the GMP and improvement of management effectiveness (4) development of a sustainable financing strategy and (5) mitigation of climate change impacts. Progress is reported on all these issues (SP Report, 2010; SP report, 2011; SOC, 2011). Fencing is ongoing and making significant progress and Rhino Ark (a local NGO, [www.rhinoark.org](http://www.rhinoark.org)) aims to complete the fence within five years. The proposal to extend the site was approved by the WHC in 2013. The GMP was completed in 2010 and is now being implemented (SP Report, 2011). The stakeholders meeting in September 2013 directly engaged with the recent committee recommendations and a report by the SP is expected by February 2014 (Report on the Mount Kenya National Park & Natural Forest Stakeholders Meeting, September 2013).

► **Sustainable use**

**Data Deficient**

The protected natural forest and lands of the mid-slopes (below the World Heritage Site) are extensively used by local communities for a variety of permitted and illegal extraction of timber and non-timber

forest products, and for grazing livestock. The Site itself, lying some 5-10km from the nearest areas of settlements is under much less pressure for resources, but some tree species (in particular camphor and cedar), bamboos and other products are harvested. In addition, the illegal growing of marijuana is taking place in the mixed bamboo forest on the south-eastern slopes of the site. In line with the 2016 Forest Conservation and Management Act, Community Forest Associations (CFA) have been established in each of the 16 forest stations on Mt. Kenya, and community use of forest products allowed within designated multiple-use zones. However, there is still a need for much engagement with the CFAs to ensure that only permitted activities are undertaken within the protected forests and only within the designated multi-use zones.

► **Sustainable finance**

**Some Concern**

Under existing arrangements, both management agencies (KWS and KFS) are self-financing semi-autonomous agencies so revenue generated from tourism and forestry activities are retained and can be re-invested in site management. There remain significant unmet management needs and concerns over sustainable financing.

Although the Site has a high degree of natural protection against human influence on account of its remote and inhospitable location at the very top of the mountain, a higher level of management intervention could improve its protection. The World Heritage Site (approximately 1,420 km<sup>2</sup>; UNEP-WCMC, 2012) is not managed as a discrete unit, falling within the much broader Mount Kenya Ecosystem (MKE) management unit (which covers an area about twice the size, and includes adjacent natural forest and forestry plantations connected via a narrow corridor to a low-lying savanna wildlife conservancy; GMP, 2010-20).

► **Staff capacity, training, and development**

**Some Concern**

Present staffing levels are considered to be inadequate. KFS rangers currently cover on average 972 hectares (often on foot), whilst the internationally recommended ratio is 1 ranger per 400 hectares (where rangers have access to a vehicle) (Ministry of Environment, 2018). Mount Kenya Trust is assisting in patrolling the protected areas on the northern and eastern slopes through the deployment of foot and horse-back patrol teams.

► **Education and interpretation programs**

**Mostly Effective**

Community Partnership and Education is one of the seven core programmes described in the 2010-20 management plan (GMP, 2010). The aim is to ensure that nearby communities are supporting conservation and their livelihoods are improving as a result of sustainable use of resources. There is no recent information on the extent of implementation of prescribed GMP actions. Conservation awareness activities are supported by several NGOs including the Mount Kenya Trust, William Holden Education Centre, Nature Kenya and the Wildlife Clubs of Kenya (GMP, 2010)

► **Tourism and visitation management**

**Data Deficient**

Tourism Development and Management is one of the seven core programmes described in the 2010-20 management plan (GMP, 2010). Approximately, 26,000 visitors came to Mt. Kenya in 2019 (pers. comms). Tourism for the ecosystem as a whole is estimated to generate the equivalent of approximately US \$ 750,000 and provide employment to 1000 people (GMP, 2010).

► **Monitoring**

**Mostly Effective**

Ecological monitoring has been carried out on an ad hoc basis for some time (GMP, 2010). Since 2016, under a partnership involving the Wildlife Conservation Society, KWS, KFS, Rhino Ark, Mount Kenya Trust and the Bongo Surveillance Project, a comprehensive elephant census is carried out every three years, that includes a forest health survey.

► **Research**

**Data Deficient**

Thirteen priority research topics have been identified to aid management decision-making (GMP, 2010). These include studies on topics as diverse as fire ecology, hydrological systems and invasive species. It

is not known how many of these research topics are currently being investigated.

### Overall assessment of protection and management

Mostly Effective

The remote and rugged nature of the terrain ensures a high degree of natural protection against unsustainable resource use, so the need for management intervention in this respect is limited. However, the site is impacted by threats, including climate change, fires, illegal forest resources extraction and large-scale infrastructure development that are not adequately addressed, partly due to the lack of a joint KFS-KWS management plan that considers the World Heritage Site, and the lack of financial and staff capacities. Increased involvement of non-state stakeholders are contributing positively to fill the gaps in protection and management.

Improved protection and restoration of forest on the mid-slopes of the mountain, and construction of an 450-km electric fence along the lower forest boundary to minimize conflict between the protected area and adjacent communities are effectively reducing threats from outside the site. Efforts need to be continued to ensure benefits for local communities and to support them in their ability to effectively manage and co-manage the protected areas.

#### ► Assessment of the effectiveness of protection and management in addressing threats outside the site

Mostly Effective

The development of a joint KFS-KWS comprehensive management plan for the period 2020-2030 that considers the World Heritage Site in a wider ecosystem context will facilitate further required action to address key threats, including climate change, fires, illegal forest resources extraction and large-scale infrastructure development. Protection and restoration of forest on the mid-slopes of the mountain must continue and be improved. The on-going construction of an electric fence (of which 200 kilometres are completed) on the lower forest boundary to minimize conflict between the protected area and adjacent communities are effectively reducing threats from outside the site.

## State and trend of values

### Assessing the current state and trend of values

#### World Heritage values

##### ► Spectacular mountain scenery

Low Concern  
Trend:Deteriorating

For many visitors a significant element in the scenic values of the site is the existence of glaciers and snowfields very close to the equator. Their disappearance will reduce the scenic value and visual impact of the site. Furthermore, as visitor numbers increase there will be a need for further infrastructure, including visitor accommodation, bridges and walkways through the high altitude bogs, all of which may compromise the wilderness values of the hiking experience around the central peaks (UNESCO/ IUCN Mission Report, 2008)

##### ► Diversity of evolving habitats

Low Concern  
Trend:Deteriorating

Although there are no long-term studies of vegetation change, it is likely that vegetation communities are evolving at a faster-than-normal rate. As observed on Kilimanjaro which has much similarities with Mt. Kenya, increased fire frequency is likely to impact on the vegetation communities and cause a downward shift of the upper forest line by several hundred metres (Hemp, 2009). Illegal extraction of hardwood tree species, such as camphor, remain a concern as it contributes to a change in forest composition with some dominant species being replaced with pioneer species. Due to the extension of properties to include the Lewa Conservancy and Ngare Ndare forest, their ecosystems have added value

to the heritage (State Party of Kenya, 2013; World Heritage Committee, 2013).

## Summary of the Values

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

Low Concern  
Trend: Data Deficient

World Heritage values are largely being maintained on account of the remote location and rugged terrain of the site. However, on one side, climate change could potentially alter the scenic values of the site, epitomized by the occurrence of glaciers and snowfields on the Equator, which are being compromised as the ice melts (the glaciers are expected to disappear altogether within a few decades). Although difficult to substantiate, it is likely that conditions in the high-elevation habitats are warming and may become less suitable for the iconic Afro-alpine species that now characterize the high glacial valleys and bogs. On the other side, some of the current threats, such as fires, unsustainable water abstraction, poaching and invasive alien species all have the potential to deteriorate the values of this site if not managed appropriately.

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

Low Concern  
Trend: Data Deficient

The biodiversity values of the site are likely to be responding to (1) climate change and (2) improvements in the protection of habitat in the forested 'buffer zone'. Water catchment values are also likely to have improved as a result of the restoration of forest cover on the mid-slopes of the mountain over the past decade. However, there is a recent resurgence in illegal forest resource extraction that could jeopardize the conservation gains made over the past decades.

## Additional information

## Benefits

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### Understanding Benefits

#### ► History and tradition, Sacred natural sites or landscapes, Sacred or symbolic plants or animals, Cultural identity and sense of belonging

The mountain is symbolic to the culture and religious beliefs of the people. Communities living in close proximity to Mt. Kenya believe that the mountain is sacred and should be conserved for that purpose (Akker, 2016).

Factors negatively affecting provision of this benefit :

- Climate change : Impact level - High, Trend - Continuing
- Pollution : Impact level - Moderate, Trend - Continuing
- Overexploitation : Impact level - Moderate, Trend - Increasing
- Invasive species : Impact level - Moderate, Trend - Continuing
- Habitat change : Impact level - High, Trend - Increasing

Reduction of the above negative factors will improve the cultural and spiritual values. The local communities will embrace and share the sacred belief from generation to generation

#### ► Access to drinking water

Mount Kenya serves an invaluable role as a water catchment, maintaining biodiversity and life-support systems downstream, providing water to millions of households in the rural areas, key urban centers, as well as to economically important hydro-electric facilities and irrigation schemes.

Factors negatively affecting provision of this benefit :

- Climate change : Impact level - High, Trend - Continuing
- Pollution : Impact level - Moderate, Trend - Continuing
- Overexploitation : Impact level - High, Trend - Increasing
- Invasive species : Impact level - Moderate, Trend - Continuing
- Habitat change : Impact level - High, Trend - Increasing

The above factors combined may impact tremendously on water availability in the lowlands, in particular in the dry seasons.

► **Carbon sequestration,  
Soil stabilisation,  
Flood prevention,  
Water provision (importance for water quantity and  
quality),  
Pollination**

These benefits are all part of the ecosystem services provided by Mt. Kenya Heritage site. Together, the services provided by the entire protected forest areas generate annual benefits to Kenya valued at over US\$ 1 billion.

Factors negatively affecting provision of this benefit :

- Climate change : Impact level - High, Trend - Increasing
- Pollution : Impact level - Moderate, Trend - Continuing
- Overexploitation : Impact level - Moderate, Trend - Continuing
- Invasive species : Impact level - Moderate, Trend - Continuing
- Habitat change : Impact level - High, Trend - Increasing

The reduction of the above negative factors will improve on the environmental services

► **Direct employment,  
Tourism-related income,  
Provision of jobs**

Communities benefit through working as tour guides and porters to tourists. They also benefit from infrastructure community projects initiated by the park management.

Factors negatively affecting provision of this benefit :

- Climate change : Impact level - High, Trend - Increasing
- Pollution : Impact level - Moderate, Trend - Continuing
- Overexploitation : Impact level - Moderate, Trend - Continuing
- Invasive species : Impact level - Moderate, Trend - Continuing
- Habitat change : Impact level - High, Trend - Continuing

The reduction of the negative impacts will increase benefits to the local economy.

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

This contributes to the well being and aesthetic values to the community

Factors negatively affecting provision of this benefit :

- Climate change : Impact level - High, Trend - Increasing
- Pollution : Impact level - Moderate, Trend - Continuing
- Overexploitation : Impact level - Moderate, Trend - Continuing
- Invasive species : Impact level - Moderate, Trend - Continuing
- Habitat change : Impact level - High, Trend - Continuing

Reduction of the impacts will improve on the resources being used for the aesthetic, medicinal and research purposes



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