IUCN Conservation Outlook Assessment 2017 **(archived)**
Finalised on 26 October 2017

Please note: this is an archived Conservation Outlook Assessment for Lake Turkana National Parks. To access the most up-to-date Conservation Outlook Assessment for this site, please visit https://www.worldheritageoutlook.iucn.org.

Lake Turkana National Parks

SITE INFORMATION

Country:
Kenya
Inscribed in: 1997
Criteria:
(viii) (x)

Site description:
The most saline of Africa's large lakes, Turkana is an outstanding laboratory for the study of plant and animal communities. The three National Parks serve as a stopover for migrant waterfowl and are major breeding grounds for the Nile crocodile, hippopotamus and a variety of venomous snakes. The Koobi Fora deposits, rich in mammalian, molluscan and other fossil remains, have contributed more to the understanding of paleo-environments than any other site on the continent. © UNESCO

SUMMARY

2017 Conservation Outlook

Critical

Lake Turkana's unique qualities as a large lake in a desert environment are under threat as the demands for water for development escalate and the financial capital to build major dams becomes available. Historically, the lake's level has been subject to natural fluctuations in response to the vicissitudes of climate, with the inflow of water broadly matching the amount lost through evaporation (as the lake basin has no outflow). The lake's major source of water, Ethiopia's Omo River is being developed with a series of major hydropower dams and irrigated agricultural schemes, in particular sugar and other crop plantations. These commercial sugar plantations, located upstream of the Omo Delta, are now partly under plantation and will have a significant impact on Lake Turkana. Three dams have so far been completed for hydro power generation, with the fourth dam now in the implementation phase. There are still strategic choices to be made on the management of the lake basin's water resources, but it seems inevitable that the ecology and biodiversity values of the property will be adversely affected by these development pressures. Apart from the impact of these major changes, there are numerous challenges at the site management level, with wildlife populations thought to be in decline as a result of increasing human population pressure, extreme poverty, lack of infrastructure investment, poaching pressure, over-grazing by domestic stock and habitat change associated with the receding shore-line. Increased levels of investment in site management and monitoring activities of environmental impacts on Lake Turkana are clearly required.

Current state and trend of VALUES

High Concern
Trend: Deteriorating

Although the property retains its value as one of the world's most important fossil sites, its biodiversity is under escalating pressure from development

activities outside the site as well as local population increase and associated over-grazing, illegal fishing and wildlife poaching. Upstream use of water is lowering the level of the lake, moving the shoreline and thereby exposing lake bed soils that have become saline from soaking by lake water, affecting its ecology, and also increasing the salinity of the lake's water. Although there is little monitoring of the area's biodiversity and resources, local reports suggest that prominent wildlife species are in decline and several species have become locally extirpated as a result of poaching as well as encroachment of livestock and local populace since the property was inscribed.

Overall THREATS

Very High Threat

The values of the property are seriously threatened by the accumulation of different factors, such as the progressive damming of the inflowing rivers and upstream use of water for irrigated agriculture and other uses. Both the hydropower plants and the sugar plantations are having far-reaching ecological consequences, lowering the lake levels, moving the shore-line, exposing saline soils, increasing lake water salinity and reducing the extent of seasonal flooding and nutrient cycling and replenishment. The effect of these large-scale changes is being exacerbated by human population increase and completion for diminishing resources by people living around the shores of the lake, including over-grazing, poaching of wildlife, over-fishing and tree-cutting, and creating ever-increasing demands for resources from within the property. The discovery of significant oil deposits in the lake basin, together with potential infrastructural and energy project create further risks to the integrity of the property.

Overall PROTECTION and MANAGEMENT

Serious Concern

Protection and management of the site is severely constrained by its remote location, lack of infrastructure and low levels of funding. Only a draft management plan exists and the parks' wildlife and other resources seem to be in decline. Data in the form of SEA and wildlife census is unavailable. In recent years, however, the governments of Ethiopia and Kenya signed a few agreements on mitigating impacts of development initiatives and enhancing cross-border collaboration with, among others, the aim to reduce environmental

degradation, but there is no visible progress in implementation.

FULL ASSESSMENT

Description of values

Values

World Heritage values

▶ **Fossil deposits**
Criterion:(viii)

Fossil deposits at Koobi Fora (in Sibiloi National Park) include pre-human, mammalian, molluscan and other fossils that have contributed more to the understanding of human ancestry and palaeo-environments than any other site in Africa (SoOUV, 2012). The fossil remains include a petrified forest thought to have grown seven million years ago (when the area was much wetter than it is today), together with a great diversity of extinct fauna including giant tortoise, crocodile, behemoth mammoth, rhinos, otters and hippos (UNEP-WCMC, 2012). The complexity of the fossil record enables the reconstruction of palaeo-environments dating back four million years (SoOUV, 2012). Five species of hominid fossil have been discovered including the earliest of the australopithecines, Australopithecus anamensis, estimated to be 3.8-4.2 million years old (SoOUV, 2012; Hilton-Barber and Berger, 2002).

▶ **Complex of geological features**
Criterion:(vii)

Lake Turkana is Africa’s fourth largest lake and the most saline of these four (SoOUV, 2012). It is situated in a semi-desert environment, characterized by recent volcanic, erosional and sedimentary land forms. The area’s main geological features stem from the Pliocene and Holocene periods (from four million to 10,000 years ago). The World Heritage property (1,615 km2)

covers three separate National Parks – Sibiloi (on the north-eastern shores of the lake), Central and South Islands, together with an aquatic zone stretching 1 km into the lake. These three areas encompass this diversity of geological features, including extensive sedimentary deposits, volcanic features and geological faulting (SoOUV, 2012).

► Diversity of aquatic and lakeshore habitats in a semi-desert environment

Criterion:(x)

The parks include a great diversity of aquatic, shoreline and semi-desert terrestrial habitats (UNEP-WCMC, 2012). The waters of the lake are 2.5 times saltier than the normal maximum limit of drinking water, but although the lake water is consumed by humans and livestock in the absence of alternative potable sources, the water contains levels of fluoride that are far in excess of acceptable drinking levels, and are hazardous, causing skeletal fluorosis, a crippling disease that is widely seen amongst people living along the lakeshore (AfDB, 2010; University of Oxford, 2012). The lake supports a diversity of freshwater fish species and, where suitable muddy substrate exists, beds of submerged aquatic macrophytes (Potamogeton pectinatus) and shoreline grasses (UNEP-WCMC, 2012). The lakeshore substrates vary from rock to pebble, sand and mud (Birdlife, 2012), while terrestrial habitats include Acacia savannas, Commiphora bushlands, grassy plains, rocky ridges and groves of desert date and doum palms (SoOUV, 2012). A wildlife census with the latest data is foreseen after finalization of the park’s Management Plan (Kenya and Ethiopia, 2016).

► Diversity and abundance of birds

Criterion:(x)

Lake Turkana is an internationally recognized Important Bird Area (Birdlife, 2012), with, according to the latest available data, 84 water bird species, including 34 Palaearctic migrants (for which it serves as an important flyway and stop-over site for birds on passage). More than 10% of the entire East African/South East Asian population of Little Stints (more than 100,000 individuals) may winter here. At least ten regionally threatened species of birds breed, including African skimmer (UNEP-WCMC, 2012). Lesser flamingoes also pass through, feeding on the small saline lakes that

characterise parts of the lak. A wildlife census with the latest data is foreseen after finalization of the park's Management Plan (Kenya and Ethiopia, 2016).

▶ **Rare and endangered fauna**
Criterion:(x)

According to historic data the lake supported the world's largest colony of Nile crocodile (SoOUV, 2012), with an estimated population of 14,000 individuals breeding on Central Island (in 1968; BirdLife, 2012). Recent field observations suggest the crocodile population is a fraction of the size it once was due to increasing anthropogenic pressures (EAWLS, 2014). Rare, endangered and recent extinct mammals include hippopotamus, wild dog, lion, cheetah, reticulated giraffe, Grevy's zebra and Lelwel hartebeest (UNEP-WCMC, 2012). A wildlife census with the latest data is foreseen after finalisation of the park's Management Plan (Kenya and Ethiopia, 2016).

▶ **Fisheries and wildlife including endemic species of fish**
Criterion:(x)

According to the latest available data, the lake supports over 60 species of freshwater fish, including eleven endemic species (FishBase, 2017). A wildlife census with the latest data is foreseen after finalization of the park's Management Plan (Kenya and Ethiopia, 2016).

Assessment information

Threats

Current Threats
Very High Threat

The inflowing rivers are being progressively dammed and an ever-increasing amount of the water that used to flow into the lake is being used upstream for hydropower, irrigation and other purposes. The interaction of climate change and periods of drought with other factors such as water regimes, governance,

environmental degradation and land use makes Lake Turkana a very vulnerable trans-boundary ecosystem. Over-grazing, poaching, over-fishing and tree-cutting all enhance the potential of conflicts between local inhabitants of the region. Although each threat individually doesn't seem to impact the OUV of the lake severely, the accumulated impact of all factors together, especially the impacts of the different uses of the water sources, are likely to significantly affect the OUV of the property.

► Dams/ Water Management or Use

Very High Threat
Outside site

The inflowing rivers are being progressively dammed and water that used to flow into the lake is being captured and river discharges regulated for hydropower generation (UNESCO/IUCN, 2015). River water is also increasingly abstracted for irrigation and other uses (AfDB, 2010; SOC, 2012; Uni. of Oxford, 2012).
The Omo River (which runs through Ethiopia) accounts for 90% of the lake's inflow, and is being transformed through the progressive construction of a cascade of five hyropower projects, named Gibe I to V, the third project being Gibe III dam whose reservoir was filled during 2015 and 2016, with the project being officially inaugurated in December 2016. Meanwhile, work has commenced on the Gibe IV hydropower dam project (KENWEB, 2017).
As had been predicted, the lake level has fallen over two metres during the filling of the Gibe III dam reservoir from 2015 to end 2016. Whilst this fall in lake level can be claimed to be within the lake's natural fluctuation range, it has been demonstrated that without the Gibe III filling, the lake's natural response would otherwise have been to rise (KENWEB, 2017). It is well known that fisheries boom with rising water level and bust with falling lake level.
Several aspects are likely to affect the OUV of the property: 1) The time it will take the lake to regain its natural equilibrium after impounding of Gibe III and IV; 2) The impacts of dampened flow variations on the ecology of the lake (annual lake level fluctuation expected to decline from 1.2 to 0.8 m) (AfDB 2010; Uni. of Oxford 2012; SOC, 2015); 3) The increased irrigation abstractions that will develop downstream to exploit the regulated flows from Gibe III and IV.
The Gibe III and IV reservoirs will trap nutrients that would otherwise flow to the lake, and changes in the flooding regime of the river downstream of Gibe

III and IV will diminish the prospects for traditional flood recession agriculture, and will alter the nutrient scouring effects of the river, and will impact the replenishment of oxbows and other natural depressions that would otherwise be inundated by floodwaters that recharge the underlying aquifers. Furthermore, the reduction of freshwater inflows to the lake due to water capture within the Gibe III and IV reservoirs will lead to an increase in lake salinity.
On the other hand, the Gibe III and IV dams could protect the area against devastating flooding by regulating the levels of the Omo River, although no such evidence appears to exist. Flooding is important for traditional recession cultivation, grazing, replenishment of water sources and fish breeding.
The Omo River is also used for irrigation of sugar plantations, the so-called Kuraz sugar scheme. By early 2017, about 30,000 ha had been cleared. However, the plantations along the river have a limited impact on the OUV of the property at present (UNESCO/IUCN, 2015). According to Ethiopia, the sugar scheme will use 4-6% of the river flow of the Omo River for irrigation purposes once the whole sugar scheme is in operation (SOC, 2015). Predictions of other sources however have been much less conservative, suggesting severe potential danger to the OUV. The draft EIA for the Kuraz project dated 2012 stated that 29% of the river water would be abstracted under full operation. In the later Kuraz feasibility report dated December 2014, it was stated that 18% of the river would be abstracted. The impacts on the OUV on the mid- and long term therefore have to be closely monitored.
Especially the accumulated impact of the different uses of the water sources, together with severe drought and other factors, can significantly affect the OUV of the property, with sources that suggest the lake could drop between 16 and 22 m (Uni. of Oxford, 2012 & 2013; KENWEB, 2017).

► Tourism/ visitors/ recreation

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

Fossils are mainly found in areas without fodder for livestock. They are therefore left alone. In addition, there is an increased awareness among the local population about the value of the fossils as the population is

compensated for any research done on the fossils in the area.

There is no threat from the sugar plantations for the fossils, as the reduction of the plantations to a maximum of 100.000 hectares increased the buffer zone between the plantations and Lake Turkana national parks.

► Other Activities

Data Deficient
Inside site, localised(<5%)
Outside site

Information from 2012 suggests that crocodiles are heavily persecuted by fishermen who destroy nesting sites, including those on South and Central Islands (Mission Report, 2012). No recent data on this topic is available.

► Droughts, Desertification

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

The interaction of climate change and periods of drought with other factors such as water regimes, governance, environmental degradation and land use makes Lake Turkana a very vulnerable trans-boundary ecosystem (Anon., sd). Between the late 1800s and the mid-1900s, the late level fell significantly. Since the mid-1900s, the lake level then rose before falling in the 1980s, and has since fluctuated, being on a general rising water level trend since 1992, and having risen over three metres between 1992 and 2005 when the Gibe III filling commenced (KENWEB, 2017).
Periodic droughts and climate change exacerbate the problems associated with upstream use of water, denying the lake of the fresh water needed to compensate for evaporation losses (since the lake has no outflow). Furthermore, the salinity of the lake can be expected to increase further due to increased evaporation as proof exists that global warming in the area leads to a general rise in temperature and periods of drought around the lake (International Rivers, 2016). On the other hand, there is an increasing catchment runoff trend with anthropogenic activity that tends to offset the increased evaporation loss (Univ. of Oxford, 2012).

► Livestock Farming / Grazing

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

Pastoralism, agro-pastoralism, and fishing are the main sources of livelihood for the ever growing population around the lake. The associated grazing pressures from domestic stock are an ever increasing challenge that is leading to degradation of pastures to the point where the pastures are suffering long-term damage and are not recovering. Poverty among the pastoralist communities increases immediate return activities such as charcoal burning and opportunistic dryland cultivation that exacerbates degradation (UN Country teams of Ethiopia and Kenya and IGAD, sd). These factors are resulting in deterioration of lakeshore habitats, impacting biodiversity (BirdLife, 2012), especially reducing plant diversity. Although local pastoralists are guaranteed grazing and watering rights in the Sibiloi National Park at times of drought, the impact of grazing is affecting a large part of the park permanently, resulting in overgrazing, trampling of vegetation and an increase in woody vegetation (SOC, 2012). Wide grassland of Sporobolus and Dactyloctenium are in many places replaced by patches of weed, and in some paces around the lake rangelands are being encroached by invasive species like Prosopis juiflora.

► Poaching

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

Although the wildlife resources in national parks are protected by law, the protection means are ineffective with little control over poaching and livestock and fishing encroachments into the parks.

In Sibiloi National Park, the inadequate wildlife protection and widely accessible firearms are leading to a decline in wildlife populations, with the few remaining large mammals are concentrated in the most secure parts of the property, confirming that poaching is a significant threat. Reliable recent data is missing, but certain flagship species, such as reticulated giraffe and Grevy’s zebra are reported to have disappeared altogether from the area

since the property was listed (SOC, 2012). Also topi, Grant’s gazelle, lions, oryx and Burchell’s zebra are virtually absent. Another factor that reduces the amount of wild animals in the area is the encroachment of livestock.

Central Island and South Island National Parks are not inhabited and hence pastoralism is not practiced in these parks.

Fishing however is a significant threat to the wildlife populations of the islands, notably the crocodile population.

► Logging/ Wood Harvesting

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

Trees are reportedly taken for fuelwood and charcoal from within Sibiloi National Park and elsewhere (UNEP-WCMC, 2012), exposing the thin soils to strong winds.

► Identity/ Social Cohesion/ Changes in local population and community

High Threat
Outside site

The lake supports livelihoods of more than 300,000 people of different ethnic groups. Most of these people suffer from extreme poverty, a large part of the increasing population is young and the development indices of the region are much lower than the national average in both Kenya and Ethiopia. As the population is quite mobile, cross-border conflicts over water and other natural resources are of concern in the region. Causes and patterns of conflict are complex and intertwined with for example increasing human population, displacement of people from their traditional lands by developments in the Lower Omo, environmental degradation, competition over resources, ethnicity, politics and lack of economic opportunities for the population (UN Country teams of Ethiopia and Kenya and IGAD, sd).

Radar altimetric data from satellites show that water levels in Lake Turkana fell two metres during the filling of Gibe III's reservoir (KENWEB, 2017), and the fisheries is reported to have declined (as reported in the film "Water to Dust"screened on Nation TV in Kenya in 2017), thus enhancing the chances

for conlict. While the Central Island and South Island National Parks are uninhabited, local pastoralists are allowed grazing rights in Sibiloi National Park in the dry season and pressure for resources from the park is likely to escalate (UNEP-WCMC, 2012).

► Other Ecosystem Modifications

Data Deficient
Inside site, throughout(>50%)
Outside site

The loss of seasonality in water inflow resulting from flow regulation by dams on the lake’s tributaries will reduce the extent and quality of floodplain vegetation and impact the ecology of aquatic habitats that are important fish-spawning sites. Furthermore, river-borne silt that would have enriched the floodplains, delta and lake will be deposited in the dams, with major ecological implications for the Lake Turkana ecosystem and biodiversity. Poorly conceived development projects in the Omo River Basin alter the freshwater flow hydrology and associated nutrient passage along the rivers and the lake, as well as the potential for agricultural developments to introduce harmful chemicals. Also the plantations will potentially affect the nutrient status of the lake through the introduction of agricultural developments, chemicals that affect fish and cause eutrophication. The Committee has requested the States Parties of Ethiopia and Kenya to undertake an EIA for the Kuraz Sugar Scheme project using best available hydrological data of the Lower Omo and accurate rainfall data, and submit it as part of the Strategic Environmental Assessment (SEA) by February 2018 (Decision 39 COM 7B.4). However, the States Parties have reported a delay and requested an extension to this deadline.

► Fishing / Harvesting Aquatic Resources

Data Deficient
Inside site, widespread(15-50%)
Outside site

Illegal fishing activities are taking place inside the property and fisheries resources are not being adequately protected. There are, however, no fish stock assessment data to enable assessment of the broader impact of over-fishing on the fisheries resource.
Since the 1960s, fishing has become an important livelihood, being practiced

throughout the lake on an artisanal basis principally by Turkana fishermen. Fisheries experts have correctly predicted that the lake fisheries would be negatively impacted by the development-induced hydrological changes in the Omo. During the filling of the Gibe III reservoir, the lake fell two metres and the fisheries catches declined, as had been predicted.

Due to the major Gibe III and Gibe IV hydro power plants, the annual flooding regime will diminish, resulting in negative effects on the recruitment of young fish and the production of adults of all kinds of species with commercial value.

Potential Threats

High Threat

By far the greatest potential threat to the lake is the progress development induced change to the inflowing hydrology in Ethiopia, in particular the threat of the depletion of inflowing waters for irrigation.

The potential threat from oil exploration and extraction on Lake Turkana is currently unknown, but given its distance from the property, may be limited. However any accidental spills near a tributary of the Lake could lead to significant impacts.

► Oil/ Gas exploration/development

High Threat
Outside site

Oil exploration is taking place across the Lake Turkana basin, (SOC, 2012), and significant finds have been made outside the property. Development of these resources seems set to transform the local economy, with construction of major new infrastructure and significant associated risks. For instance, the government of Kenya is undertaking social and environmental impact assessments for the development of a crude oil export pipeline between Lokichar and Lamu (The Government of the Republic of Kenya through the Ministry of Energy and Petroleum, 2016). Exploration licences for the oil exploration blocks covering Lake Turkana - including some parts of the property - had been attributed to Tullow Oil plc. However in 2015, Tullow Oil declared a policy not to explore or exploit hydrocarbon resources within

World Heritage properties (McDade, 2015). However, potential threat from exploration in the vicinity on within the watershed of Lake Turkana still exists, as well as the possibility of prospecting by other oil companies.

► Commercial/ Industrial Areas

High Threat
Outside site

The governments of Kenya, South Sudan and Ethiopia are collaborating on a major new infrastructure corridor named LAPSSET (Lamu Port, Southern Sudan, Ethiopia Transport Corridor) through northern Kenya, to link a major new port at Lamu with other parts of the region. This ambitious infrastructure project comprises a deep sea port at Lamu, inter-regional railways lines and highways, crude oil pipeline, product oil pipeline, 3 international airports (including at Lake Turkana), 3 resort cities (one at Lake Turkana) and a dam on Tana River (LAPSSET, 2017).

► Renewable Energy

Data Deficient
Outside site

The Lake Turkana Wind Power project, located to the southeast of the lake, comprises of 365 wind turbines, with its facilities occupying approx. 87.5 acres. Construction commenced in October 2014, and by July 2017, its 310 MW capacity is expected to be ready for commercial operations. The project's impact on biodiversity, particularly on birds, is unknown.

► Dams/ Water Management or Use

Very High Threat
Outside site

The progressive development induced change to the inflowing hydrology in Ethiopia, and in particular the threat of the depletion of inflowing waters for irrigation post a major threat to Lake Turkana, not only from Kuraz Sugar Scheme.

Protection and management

Assessing Protection and Management

► Relationships with local people

Some Concern

There is little information on community relations, but circumstantial evidence, such as the decline of wildlife populations, suggest either that they are not as good as they need to be, or that the population pressure is insurmountable. The local population in Kenya has not been consulted about the potential impacts of hydropower and sugar and other plantation developments in the Lower Omo and how to mitigate them. On the other hand, the draft parks' Management Plan by the Kenya Wildlife Services is pending consultation with relevant stakeholders and local communities (SOC, 2016). Moreover, the county government of Marsabit has started a programme of drilling boreholes to provide water for livestock outside the Sibiloi National Park (Kenya and Ethiopia, 2016).

► Legal framework

Some Concern

The property is protected under the Kenya Wildlife Conservation and Management Action 2013. The three National Parks are managed by the Kenya Wildlife Service (KWS) with the National Museums of Kenya (NMK) responsible for the fossil sites. In general, national parks are protected against any settlement or resource use, but special provisions were invoked at the time of creation of Sibiloi NP (SNP) allowing local pastoralist communities access to grazing and water 'at times of difficulty' (Mission Report, 2012). However, these provisions have been interpreted very broadly and most of the northern part of the park is subject to unsustainable year-round grazing of domestic stock (Mission Report, 2012).

► Enforcement

Serious Concern

The national parks are not effectively policed. The biodiversity is not adequately protected and the sites are subject to human encroachment. Authorities don't give priority to violations of the law in the park, which is

leading to illegal fishing and poaching.

▶ Integration into regional and national planning systems

Serious Concern

Lake Turkana and its wider catchment area are shared roughly in equal areas between Kenya and Ethiopia, but with 90% of the lake's inflow coming from the Ethiopian side, via the Omo River delta at the northern end of the lake. In the last few years, the governments of Kenya and Ethiopia worked together on the border region, including Lake Turkana and the utilization of the resources of the Omo River Basin (UNESCO World Heritage Centre - IUCN, 2015). They committed themselves to collaborating under the umbrella of the Joint Ministerial Commission to protect the OUV of the site (Kenya and Ethiopia, 2016).

In 2015, the Governments of Kenya and Ethiopia signed the Memorandum of Understanding Cross Border Integrated Programme for Sustainable Peace and Socioeconomic Transformation between Marsabit County of Kenya and Ethiopia's Borana Zone. The MoU covers, among other topics, environmental protection. One of the goals of the programme is to "improve environmental consideration of sustainable and inclusive use of resources consistent with the new Sustainable Development Goals". It is unclear if the MoU includes provisions to avoid, minimize and mitigate impacts of the Kuraz Sugar Scheme and Gibe III (World Heritage Committee, 2016).

In 2015 the two governments also signed a UNEP coordinated project Support to Sustainable Development in Lake Turkana and its River Basins with the goal to enhance capacity of the governments and stakeholders to sustainably and equitably manage the ecosystem and its ecosystem services in the basin. The aim is, among others, to minimize the pressure on natural resources and monitor the health of the ecosystems and trans-boundary governance of the ecosystem.

▶ Management system

Serious Concern

The property (1,615 km2) comprises three separate components, namely Sibiloi National Park (1,571 km2), South Island NP (SINP) (39 km2) and Central Island NP (CINP) (5 km2) managed by Kenya Wildlife Service (KWS).

The National Museums of Kenya manage the fossil sites. Neither of the islands has a permanent KWS presence, and while SINP falls under the jurisdiction of SNP within Marsabit County, CINP is managed from Kalokol on the other side of the lake within Turkana County. The development of a grazing pressure reduction strategy has been considered, including a feasibility assessment for the reintroduction of flagship species in the parks. In 2014, KWS drafted a management plan that is pending consultation from the local communities and stakeholders (World Heritage Committee, 2016). KWS has indicated that the new Protected Area Planning Framework (PAPF) was applied in order to ensure that all new KWS protected area management plans are developed according to a standardized process and have a similar structure (Consultation, 2013).

► Management effectiveness

Serious Concern

Management faces considerable challenges in such a remote and inhospitable location where poor infrastructure and social facilities make it extremely difficult to operate and maintain a competent and committed staff. At the moment there is no finalised management plan that is being implemented (World Heritage Committee, 2016). All in all, management of the parks is inadequate and ineffective. This is exacerbated by the conflicts arising from the division of responsibility between the devolved county governments and the national government, with KWS and NMK being national institutions.

► Implementation of Committee decisions and recommendations

Some Concern

In the latest World Heritage Committee meeting in 2016, the committee expressed concern over several issues: 1) no update was provided by the state parties on the status of the Kuraz Sugar Scheme and the impounding of the Gibe III reservoir, and the measures taken to mitigate the impact of these two development projects; 2) the elaboration of a SEA has been delayed and so far only Terms of Reference (ToR) have been written. These ToR however don’t take into account indirect or cumulative impacts, in accordance with international standards; 3) the state parties are to collaborate effectively on the UNEP coordinated project Support to Sustainable Development in Lake

Turkana and its River Basins and to provide more information on the Memorandum of Understanding (MoU) Cross Border Integrated Programme for Sustainable Peace and Socioeconomic Transformation. The MoU should include the findings of the SEA and ensure adequate water flow from the Omo River to maintain the OUV of Lake Turkana; 4) a joint expert panel was established for monitoring basin-wide natural resource management. The committee requests the establishment of a baseline of key wildlife species in the property (SOC, 2016).

► Boundaries

Serious Concern

The boundaries of the property lie 1 km offshore, encompassing a relatively small proportion (< 2%) of the lake’s area. SNP protects about 13% of the Lake’s shoreline, including some important shoreline habitats, as well as valuable shoreline habitats around the islands and associated small lakes. However, the bulk of the Lake’s important biodiversity exists outside the property, where it has no special protection status. None of the aquatic boundaries are demarcated in any way, making it difficult to exclude illegal fishing. Furthermore, some of the important fossil sites (including two research sites at Ileret and Turkwel) are not part of the property (UNESCO/IUCN, 2012).

► Sustainable finance

Serious Concern

The property is significantly under-resourced, and financing for management is provided from KWS general resources (mostly generated from tourism at other parks).

► Staff training and development

Serious Concern

Information dating from 2012 indicates that the Lake Turkana World Heritage site has 40 staff members split between the three national parks (Sibiloi, Central and South Island National Parks), the vast majority of which are security personnel. This number is however insufficient to ensure effective management of the entire area especially in more remote areas of the parks (KWS, Consultation, 2013). There is no information on staff training and

development, but it has been noted that the staffing situation at the property is particularly difficult, with many staff positions remaining unfilled and very high levels of staff turn-over (Mission Report, 2012).

Besides being understaffed, the park management has insufficient vehicles and fuel, and are under armed compared to poachers and the local populace.

► Sustainable use

Some Concern

Since the establishment of SNP local pastoralists have been allowed grazing rights within the park during periods of drought. Regulation of this access has, however, not been effective and much of the park is used by pastoralists throughout the year (Mission Report, 2012). Available evidence suggests that wildlife populations are declining, and that local community-use of resources is not organized within the framework of an agreed programme for sustainable use.

► Education and interpretation programs

Some Concern

The Provisional Integrated Management Plan for the parks (Njuguna, 2001) notes that ‘environmental awareness within the park environs has not been undertaken’, and there is no mention of any park education programme coming to the attention of the 2012 joint UNESCO/IUCN reactive monitoring mission team (Mission Report, 2012).

► Tourism and visitation management

Mostly Effective

There are very few visitors to any of the parks, the total for SNP and CINP during the 1990s averaging about 500 visitors per year to each park (Njuguna, 2001). There is however, a small museum at Koobi Fora and three notable fossils (a giant tortoise, crocodile and elephant) are protected in situ within specially-constructed buildings. There are designated camping sites with rudimentary facilities in SNP, and an adequate network of 4x4 tracks to provide for suitably-equipped visitors. The scenic values of the property and its fossil sites clearly present significant opportunities for the development of

tourism.

► Monitoring

Serious Concern

The lack of data, impact assessments or monitoring activities remains a severe problem for the site. Neither has a wildlife census been conducted recently. Furthermore, the impact assessments of significant development projects, such as Gibe III and the Kuraz Sugar Scheme don’t sufficiently take into account the accumulative or cross-border environmental impacts (UNESCO World Heritage Centre - IUCN, 2015).

Although no data is available, the governments of Ethiopia and Kenya recently took several preliminary initiatives to improve the knowledge of the site and its surroundings, in part after strong recommendations of the World Heritage Committee, including the establishment of a joint expert panel (World Heritage Committee, 2015), the adoption of terms of reference for a stock taking exercise on the ecosystem (Anon., sd).The World Heritage Committee urged Ethiopia and Kenya to urgently undertake a SEA regarding the effects on Lake Turkana of big development projects in the region, such as the Kuraz Sugar Scheme and Gibe III and future other hydro power plants (UNESCO World Heritage Centre - IUCN, 2015). The SEA is now planned to be finished in 2018; 3) The state parties have expressed their intention to organise a wildlife census as soon as possible, after strong urges by the World Heritage Committee. The census should serve as a baseline for future reference (World Heritage Committee, 2015).

► Research

Mostly Effective

The rich fossil deposits at Koobi Fora have been the subject of extensive research by scientists since the 1960s and this area continues to yield important fossil finds. National and foreign universities provide expertise in research, monitoring and impact assessment (UNEP-WCMC, 2012) but there is no systematic management-orientated research programme for the parks.

Overall assessment of protection and management

Serious Concern

Protection and management of the site is severely constrained by its remote location, lack of infrastructure and low levels of funding. Only a draft management plan exists and the parks' wildlife and other resources seem to be in decline. Data in the form of SEA and wildlife census is unavailable. In recent years, however, the governments of Ethiopia and Kenya signed a few agreements on mitigating impacts of development initiatives and enhancing cross-border collaboration with, among others, the aim to reduce environmental degradation, but there is no visible progress in implementation.

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

Serious Concern

The main threat to the property arises from the damming of inflowing rivers and the use of water for irrigated agriculture, which will progressively lower the level of the lake, altering its ecology and impacting on its biodiversity values. In recent years the Kenyan and Ethiopian governments signed agreements on several initiatives to enhance collaboration in the border-region, including the impact mitigation of the Kuraz Sugar Scheme, Gibe III and other factors that cause biodiversity and environmental degradation.

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ Fossil deposits

Low Concern
Trend:Stable

The fossil deposits at Koobi Fora and other locations are very vulnerable although most excavation sites are re-buried once investigations are

completed (Mission Report, 2012). Since many of the richest fossil sites are close to the present shore-line it is quite possible that the lowering of lake levels will allow access to further valuable fossil sites currently lying underwater.

► Complex of geological features

Low Concern
Trend:Stable

The existing geological attributes and geomorphological formations of the property are unlikely to be altered significantly by development activities. Rates of sedimentation in the Omo River delta and lake may be reduced if silt is deposited in upstream impoundments rather than being carried into the river’s lower reaches. Meanwhile, increasing pressure on remaining pastures may also lead to erosion.

► Diversity of aquatic and lakeshore habitats in a semi-desert environment

Critical
Trend:Deteriorating

Receding water levels and reduced seasonal fluctuations resulting from the damming of the Omo River and sugar plantations are likely to alter the location and characteristics of the shoreline. Once completed, the development projects will continue to impact the lake, lowering its level and reducing its seasonal fluctuations, reducing the silt deposition into the lake and delta, dampening the beneficial flushing of high river discharges, and by introducing agricultural chemicals and depleting water volumes entering the lake through ongoing abstractions for agriculture. Furthermore, the salinity of lake waters is likely to increase significantly as the balance between rate of inflow and evaporation changes, with unpredictable consequences for the lakeshore and aquatic vegetation (and associated ecology).

► Diversity and abundance of birds

Data Deficient
Trend:Data Deficient

There is no recent data on trends in the diversity and abundance of birds

(World Heritage Committee, 2015).

► Rare and endangered fauna

Critical
Trend:Deteriorating

There are no recent wildlife census data, although stakeholder reports suggest significant declines in the populations of key species of endangered fauna, including crocodile. Certain flagship species, such as reticulated giraffe and Grevy's zebra are reported to have disappeared altogether from the area since the property was listed (SOC, 2012). Also topi, Grant's gazelle, lions, oryx and Burchell's zebra are virtually absent.

► Fisheries and wildlife including endemic species of fish

Critical
Trend:Deteriorating

A recent survey reported that the majority of fishers on Lake Turkana are experiencing declining fish catches attributed to both overfishing and changes in water levels (recent report by KMFRI to African Great Lakes Conference).

Summary of the Values

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

High Concern

Trend: Deteriorating

Although the property retains its value as one of the world's most important fossil sites, its biodiversity is under escalating pressure from development activities outside the site as well as local population increase and associated over-grazing, illegal fishing and wildlife poaching. Upstream use of water is lowering the level of the lake, moving the shoreline and thereby exposing lake bed soils that have become saline from soaking by lake water, affecting its ecology, and also increasing the salinity of the lake's water. Although there is little monitoring of the area's biodiversity and resources, local reports suggest that prominent wildlife species are in decline and several species have become locally extirpated as a result of poaching as well as

encroachment of livestock and local populace since the property was inscribed.

Additional information

Benefits

Understanding Benefits

▶ **Fishing areas and conservation of fish stocks**

Fishing is an important livelihood to lakeshore residents.

Prosopis juliflora is overwhelming the river deltas (Univ. of Oxford, 2012).

▶ **History and tradition**

There are important archaeological sites on both the western and eastern shores of the lake.

Data deficient

▶ **Natural beauty and scenery**

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▶ **Importance for research**

The western and eastern shores of the lake include important sites for archaeological research and especially within the Sibiloi National Park on the northeastern shore (SoOUV, 2012). This mainly benefits people from outside the community, but the local population is compensated when researchers use the site.

▶ **Collection of wild plants and mushrooms**

Data deficient.

▶ **Livestock grazing areas**

Livestock forms an important livelihood for the local population around Lake Turkana (UN Country teams of Ethiopia and Kenya and IGAD, sd).

▶ **Cultural identity and sense of belonging**

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

The waters of the lake are 2.5 times more saline than the normal maximum limit of drinking water and contains excessively high fluoride concentration and is therefore unsuitable for drinking (Avery, 2010 & 2012), but it supports a diversity of freshwater fish species, birds, insects, crocodiles and hippos. Where suitable muddy substrate exists, it also supports beds of submerged aquatic macrophytes (Potamogeton pectinatus) and shoreline grasses (UNEP-WCMC, 2012). The lake is a source of wind energy and the evaporation contributes to the micro-climate within this desert area.

▶ **Collection of timber, e.g. fuelwood**

Trees are reportedly taken from within the protected area for fuelwood and charcoal (UNEP-WCMC, 2012).

▶ **Collection of medicinal resources for local use**

Local people also rely on herbal medicine harvested at the site. There is reportedly also commercial harvesting of Aloe.

▶ **Outdoor recreation and tourism**

Potential as tourist sites but these are not developed to full potential.

▶ **Contribution to education**

South Island National Park is an important site for archaeological research (SoOUV, 2012). This is mainly conducted by people from outside the

community, but the local population is compensated when researchers use the site.

Summary of benefits

The flora and fauna of Lake Turkana National Parks are accessible by the local population and comprise important and diverse natural habitats that include fish, bird, insect and wildlife stocks, wood, fodder for livestock, and wild plants for medicinal use. The site has historical, recreational and cultural value and provides natural beauty for tourism and educational and research benefits. Due to a lack of data, not all the benefits or their extent can be quantified, but the lake is a vast water body that contributes to the micro climate of a desert area. The lake's strong winds are a source of energy, and the water body forms a physical divide between different ethnic communities.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects
1	Friends of Lake Turkana		Friends of Lake Turkana is a Kenyan organization whose objective is to strengthen natural resource management in the Lake Turkana Basin. The organisation has engaged stakeholders from Lake Turkana basin in dialogue about the current status of oil exploration and production, dam construction and other major infrastructural development in the region and the implication of these initiatives on the land rights, environment and culture of the people.
2	Save Lake Turkana Movement		A Kenyan youth-driven organization that raises awareness about Lake Turkana https://www.youtube.com/watch?v=AVskqANY8FE&feature=youtu.be
3	National Museums of Kenya		Fossil and anthropological research

№	Organization/ individuals	Project duration	Brief description of Active Projects
4	Kenya Wildlife Service		Wildlife conservation and management

Compilation of potential site needs

№	Site need title	Brief description of potential site needs	Support needed for following years
1	Clean energy	Develop clean energy initiatives to reduce over exploitation of trees for fuelwood and charcoal (UN Country teams of Ethiopia and Kenya and IGAD, sd).	From: 2017 To: 2030
2	Responsible tourism	Develop and increase responsible tourism in the cross-border region (UN Country teams of Ethiopia and Kenya and IGAD, sd).	From: 2017 To: 2030

№	Site needed title	Brief description of potential site needs	Support needed for following years
3	Impact assessments	Undertake a Strategic Environmental Assessment to supplement existing studies to update the known impacts of the different development projects on Lake Turkana, such as Gibe III and the Kuraz Sugar Scheme, and other plantation irrigation schemes in Kenya and the Omo Basin, and Gibe IV and Gibe V in the future, and undertake Environmental Impact Assessments for all projects on a full consultative basis in accordance with Kenyan, Ethiopian and international standards, for the Kuraz Sugar Scheme and other plantation developments too, and properly evaluate the economic cost of the associated loss of natural capital when determining the feasibility of the proposed developments. Delay any developments in the region until these assessments have taken place (AfDB 2010; Univ. of Oxford 2012; UNESCO/IUCN, 2015).	From: 2017 To: 2030
4	Wildlife census	Conduct a wildlife census to obtain insight in the status of wildlife in the parks and buffer zones to establish a baseline to monitor their recovery (UNESCO World Heritage Centre - IUCN, 2015).	From: 2017 To: 2018
5	Water management	Address and monitor water quality and water flow in the light of the operation of Gibe III and the Kuraz Sugar Scheme, and also in the light of the future of Gibe IV and Gibe V hydropower projects, and other irrigated plantation developments in the Lower Omo. Ensure sufficient water flow to Lake Turkana (UNESCO/IUCN, 2015). Maintain a seasonal flooding regime that conserves the lake ecology.	From: 2017
6	Policy	Implement the transboundary water agreement between the Government of Kenya and the Government of Ethiopia and mobilise an independent Technical Monitoring Committee within the framework of the UNEP project Support to Sustainable Development in Lake Turkana and its River Basins (UNESCO/IUCN, 2015). Moreover, develop an integrated water-resources management plan for the lower Omo.	From: 2017 To: 2019

№	Site needed title	Brief description of potential site needs	Support needed for following years
7	Stakeholders	Involve stakeholders, experts and civil society in any development decisions.	From: 2017 To: 2030
8	World Heritage in Danger Status.	Inscribe the property on the List of World Heritage in Danger	From: 2017 To: 2018
9	Management resources	Allocate sufficient budget and skilled staff to the site.	From: 2017 To: 2030

№	Site needed title	Brief description of potential site needs	Support needed for following years
10	Population growth	Improve literacy levels in the local population through education and investment in local infrastructure and promote family planning and reduce population growth around the parks.	From: 2017 To: 2030
11	Cross-border collaboration	Increase political will and cross-border collaboration (Federal Democratic Republic of Ethiopia, Republic of Kenya and the United Nations Environment Programme, 2015) to conserve natural resources and promote the principle that there is economic value in natural capital. In a similar vein, implement the Joint Project on Support to Sustainable Development in Lake Turkana and its River Basins, based on joint ownership and leadership between Kenya and Ethiopia, an integrated basin development approach that fosters evidence-based decision making and integration of stakeholders, resulting in 1) an institutional coordination mechanism for the sustainable management of the basins; 2) improved knowledge of the ecosystem for its sustainable development and management; 3) harmonized and compatible strategies for its sustainable and integrated management; 4) improved livelihood provisions for local communities; 5) a monitoring mechanism for the basins ecosystem and ecosystem services (Federal Democratic Republic of Ethiopia, Republic of Kenya and The United Nations Environment Programme, 2015). Also implement the Cross-border Integrated Programme for Sustainable Peace and Socioeconomic Transformation: Marsabit County, Kenya and Borana Zone, Ethiopia to strengthen social cohesion and bring sustainable peace and development to the region. Amongst other aims, this programme should enhance sustainable development and effective management of natural resources, whilst decreasing conflict potential over natural resources (UN Country teams of Ethiopia and Kenya and IGAD, sd).	From: 2017 To: 2030

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