

**UNESCO World Heritage Centre
MISSION REPORT**

**Reactive Monitoring mission to Lake Turkana National Parks
Kenya**

6 – 11 March 2020



TABLE OF CONTENTS

ACKNOWLEDGEMENTS	4
EXECUTIVE SUMMARY AND RECOMMENDATIONS	5
ACRONYMS	12
1. BACKGROUND TO THE MISSION	14
2. NATIONAL POLICY FOR THE PRESERVATION AND MANAGEMENT OF THE WORLD HERITAGE	19
3. IDENTIFICATION AND ASSESSMENT OF CONSERVATION AND MANAGEMENT ISSUES	21
3.1 IMPACTS OF INFRASTRUCTURE DEVELOPMENT IN THE WIDER TURKANA BASIN, KENYA	23
3.2 DECLINE IN BIODIVERSITY	37
3.2.1 POACHING	37
3.2.2 LIVESTOCK GRAZING	44
3.2.3 CHANGE IN LAND COVER OF OMO-TURKANA BASIN	53
3.2.4 ILLEGAL FISHING	54
3.2.5 CLIMATE CHANGE	57
3.2.6 COMMUNITY ENGAGEMENT	58
3.2.7 CONCLUSION ON THE STATUS OF CRITERION (x)	59
3.3 MANAGEMENT ISSUES	60
3.4 IMPACT OF THE UPSTREAM DEVELOPMENT (HYDRO-ELECTRIC DAMS, PLANTATIONS)	66
4. ASSESSMENT OF THE STATE OF CONSERVATION OF THE PROPERTY	76
DESIRED STATE OF CONSERVATION FOR THE REMOVAL OF THE PROPERTY FROM THE LIST OF WORLD HERITAGE IN DANGER	78
5. CONCLUSION AND RECOMMENDATIONS	84
REFERENCES	89
ANNEXES	98

LIST OF FIGURES

FIGURE 1: LOCATION OF LAKE TURKANA NATIONAL PARKS IN KENYA (GREEN SITES)	14
FIGURE 2: LOCATION OF THE THREE COMPONENTS OF THE WORLD HERITAGE PROPERTY, I.E. SIBILOI NATIONAL PARK/SNP (TOP RIGHT), CENTRAL ISLAND NATIONAL PARK/CINP (MIDDLE OF LAKE) AND SOUTH ISLAND NATIONAL PARK/SINP (BOTTOM OF LAKE).	15
FIGURE 3: PROPOSED LAPSET INNER INFRASTRUCTURE CORRIDOR	27
FIGURE 4: PROPOSED LAPSET SPECIAL INVESTMENT CORRIDOR	28
FIGURE 5: LOCATION OF BLOCK 10 BA, 10 BB AND 13T	31
FIGURE 6: LOCATION OF OIL WELLS IN THE SOUTH LOKICHAH BASIN AND LAMU-LOKICHAH PIPELINE	32
FIGURE 7: LOCATION OF EXPLORATION WELLS IN BLOCK 10 BA	33
FIGURE 8: POPULATION TRENDS OF 14 MAMMALIAN SPECIES BETWEEN 1978 AND 2009.	39
FIGURE 9: PERCENTAGE CHANGES IN NUMBERS OF EACH LIVESTOCK AND WILDLIFE SPECIES AGGREGATED ACROSS ALL THE 21 RANGELAND COUNTIES OF KENYA BETWEEN 1977–1980 AND 1994–1997 AND BETWEEN 1977–1980 AND 2011–2013.	45
FIGURE 10: LIVESTOCK CORRIDORS IN SNP	47
FIGURE 11: LIVESTOCK ENCROACHMENT IN SNP	49
FIGURE 12: BOMAS FOR LIVESTOCK IN SNP LOCATED ABOUT 4 KM NORTHEAST OF KOOBI FORA CAMP	50
FIGURE 13: TRENDS IN ANNUAL FISH LANDINGS FROM LAKE TURKANA FISHERY 2006-2015	55
FIGURE 14: IMPORTANT FISH BREEDING SITES IN LAKE TURKANA	56
FIGURE 15: LOCATION OF OFFICES OF THE PROPERTY'S AUTHORITIES	61
FIGURE 16: STAFF ALLOCATION FOR SNP, SINP AND CINP	63
FIGURE 17: SATELLITE RADAR ALTIMETRY DATA FOR LAKE TURKANA	68
FIGURE 18: LOCATION OF THE KURAZ SUGARCANE PLANTATIONS	71

LIST OF TABLES

TABLE 1: SPECIES OBSERVED IN SNP DURING STANDARDIZED SURVEYS (PRESENCE-ABSENCE) 2016-2018	40
TABLE 2: OPERATIONAL BUDGETS IN ' 000 KES FOR LAKE TURKANA NATIONAL PARKS FOR THE PERIOD 2014-2020 NOT INCLUDING STAFFING COSTS (APPROXIMATELY 1 US\$ = 100 KES)	62
TABLE 3: DESIRED STATE OF CONSERVATION FOR THE REMOVAL (DSOCR) OF THE LAKE TURKANA NATIONAL PARKS (KENYA) FROM THE LIST OF WORLD HERITAGE IN DANGER	78

ACKNOWLEDGEMENTS

The mission would like to thank the Government of Kenya for its kind invitation, hospitality and assistance throughout the duration of the mission. The team is grateful to the Permanent Secretary, Ministry of Natural Resources and Tourism, the General Director of National Museums of Kenya, the Director of Kenya Wildlife Service (KWS) and all staff, for their support throughout the mission. The team would like to thank in particular Mr. Hoseah Wanderi, Mr. Emmanuel Ndiema and other colleagues of National Museums of Kenya as well as Mr. Solomon Kyalo and Dr. Joseph Edebe of the Kenya Wildlife Service, who organized the mission and accompanied the mission team throughout, as well as provided the mission with reports and documentation to evaluate the state of conservation of the property. Special thanks also to field staff of the Koobi Fora field station and the Sibiloi National Park, who were responsible for all logistics during the field mission. The mission would also like to thank the UNESCO Nairobi Office, and in particular Ms. Karalyn Monteil, for its support. The mission would further like to thank all IUCN experts, and in particular Ms. Mizuki Murei, for their feedback and inputs to the report. The mission would especially like to thank Dr. Sean Avery, who is the global expert on Lake Turkana's hydrology, for providing in-depth scientific advice to the mission. The mission would further also like to thank the following experts for sharing important information on the property: Dr. Louise Leakey; Ms. Marijn Korndewal (UNEP) and Dr. Jack W. K. Harris. The mission would also like to thank the KWS pilots who managed to safely fly the team back from Alia Bay to Nairobi in spite of the challenging weather conditions.

EXECUTIVE SUMMARY AND RECOMMENDATIONS

The Lake Turkana National Parks World Heritage property is composed of the Sibiloi National Park (SNP), the South Island National Park (SINP) and the Central Island National Park (CINP), covering a total area of 161,485 hectares. The property is located within the Lake Turkana basin and the surface area of the lake itself is approximately 7 million hectares.

The property was inscribed on the World Heritage List in 1997 as Sibiloi/Central Island National Parks on the basis of natural criteria (viii) and (x). In 2001, the World Heritage Committee approved a 3,900 ha extension of Sibiloi/Central Island by the addition of the South Island National Park, maintaining the existing criteria (viii) and (x). As requested by the State Party, a new name, i.e. "Lake Turkana National Parks" was adopted for the property.

At its 42th session, the World Heritage Committee requested the State Party of Kenya to invite a joint World Heritage Centre/IUCN Reactive Monitoring mission to the property to assess the property's state of conservation, and review the impacts of the development projects in Ethiopia and Kenya on the property and the progress made to implement the past mission recommendations, and to develop, in consultation with the States Parties of Kenya and Ethiopia, a proposed set of corrective measures and a Desired State of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR), for examination by the Committee at its 43rd session in 2019. At the request of the State Party of Kenya the mission was postponed until 2020.

The Kenyan State Party invited the World Heritage Centre/IUCN monitoring mission from 6 to 11 March 2020. Due to the outbreak of the Covid-19 pandemic, the two team members of the mission team representing IUCN had to cancel their participation. In the consequent discussions between the World Heritage Centre and the Kenyan State Party, it was decided that the mission would continue despite its reduced capacities. This decision was made since both the State Party and the World Heritage Centre considered it important to assess the State of Conservation of the property as well as develop a DSOCR and a proposed set of corrective measures to address the threats to the property as soon as possible.

The mission visited both Lake Turkana National Parks and Nairobi, and held a series of meetings with a wide variety of stakeholders, including Kenyan authorities, civil society, independent experts, scientists and local communities. A number of scheduled meetings and visits had to be cancelled during the field visit due to bad weather conditions. At the invitation of the Government of Kenya, a meeting was also scheduled between the mission, the State Party of Kenya and the State Party of Ethiopia to discuss the transboundary issues impacting the OUV of

the property. Unfortunately, Ethiopia did not attend the meeting, which made impossible for the mission to obtain detailed information regarding a number of development projects in Ethiopia threatening the OUV of the property.

The mission assessed the following key conservation issues:

1. Impacts of infrastructure development in the wider Turkana Basin, Kenya

The Lake Turkana area, which is located in the counties of Marsabit, Turkana and Samburu, ranks amongst the poorest areas in Kenya. There is huge pressure on the government, including the county governments which have received more fiscal autonomy under Kenya's devolution scheme, to deliver improved services and infrastructure for its communities. As part of the Kenya Vision 2030, the Government of Kenya aims to transform the nation into an industrializing middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. To lift the area out of poverty in line with Kenya's 2030 vision, communities will need to have access to the power grid, roads will have to be constructed to improve access to services, as well as other public infrastructure will need to be constructed. The developments assessed by the mission in the Turkana area included oil exploration and exploitation in the South Lokichar Basin, the Lamu Port-South Sudan-Ethiopia Transport (LAPSSET) Corridor and related infrastructure developments (roads, railway, pipeline, power lines, wind farms), including a planned resort city on the western edge of the lake. If not managed carefully, the cumulative impacts of this development path might negatively affect the overall ecology of the lake system and related OUV of the property. Unfortunately, the absence of a long-term and systematic monitoring mechanism collecting limnological and hydrological data makes it difficult to analyse and assess the ecological changes to lake system and the related impact on the OUV of the property. In addition, the lack of a special policy or body governing Lake Turkana exposes the lake more to negative impacts of development activities. However, by fully taking into account the fragile environment of Lake Turkana in development planning and mitigating the impacts on the OUV of the property, the needs for both regional development and the protection of Lake Turkana National Parks can be complementary.

To address this issue, the mission recommends the State Party to:

- Develop a national overarching Master Plan for development in and adjacent to Lake Turkana to avoid any negative impacts on the Lake system and OUV of the property, including prohibiting the use of water from the lake or any important tributaries or the construction and operation of large-scale infrastructure and development projects in the Turkana region;

- Establish intragovernmental Lake Turkana Management Body/Authority that identifies existing conditions and problems, and lays out instructions for short and long-term management of the lake;
- Re-design the property, to include a larger portion of the lake as well as important fossil sites currently outside the property and re-nominate the property under both natural and cultural criteria, as recommended by the 2012 Reactive Monitoring mission. As part of this process, the State Party is recommended to establish a World Heritage (WH) Buffer zone to the property, possibly covering the whole lake and other critical terrestrial areas, as an added layer of protection with complementary legal and/or customary restrictions regarding its use and development.

2. Decline in biodiversity

The steep decline in wildlife populations over the past decades has been extremely worrying to the point that the property might already have lost its values for which it was inscribed as WH under criterion (x). The only wildlife encountered by the mission in the SNP was found close to the park's headquarters in Allia bay. Poaching by local communities is the most serious threat currently faced by the property and has resulted in the local extinction of several flagship species such as Grevy's zebra, reticulated giraffe and lion. The proliferation of semi-automatic weapons in the region makes it extremely difficult and dangerous for park rangers to enforce the law. The mission also received worrying information regarding illegal fishing activities, as well as poaching of crocodiles and hippopotamus within the borders of the World Heritage property. In addition, uncontrolled cattle grazing by encroaching pastoralists is occurring in most of the SNP, especially in the area between the Koobi Fora field station and the northern boundary of the national park. While it remains difficult to analyse the ecological impacts of cattle grazing, cattle grazing is known to lead to competition with wildlife species, land degradation, erosion, the (local) extinction of floral species, and the transmission of diseases between cattle and wildlife species, such as anthrax. Adding an extra layer of complexity to addressing the threats are the socio-economic conditions adjacent to the property. Local communities feel alienated from the property, resulting in conflicts with property authorities. Added to the above existing anthropogenic stresses on the ecological systems of the property, climate change is expected to accelerate damage to the unique ecosystems and wildlife species in the Lake Turkana National Parks.

To urgently address the loss of biodiversity in the property, the mission recommends the State Party to:

- Develop a site-specific Biodiversity Action Plan to restore wildlife populations in Sibiloi NP (population and species baseline should be of the time of inscription or earlier);

- Conduct a comprehensive scientific study to assess the current impacts of grazing and develop a viable grazing pressure reduction strategy based on grazing capacities to address pastoralist encroachment;
- Clearly demarcate physically all terrestrial and aquatic boundaries, as well as important restricted zones, ideally following a possible re-nomination that would change the boundaries of the property (see recommendation under 1);
- Strengthen law enforcement by (1) conducting a multi-agency joint operation (KWS, NMK, police, army, etc.) to halt all poaching and livestock encroachment; (2) allocates sufficient resources, including rangers, equipment (i.e. cars, boats, etc.) and infrastructure (ranger camps on CINP and SINP) to ensure adequate law enforcement; (3) adopts SMART as a patrolling system;
- Establish a co-management system that stipulates clear regulations regarding use of resources in the property and potentially provides payment for environmental services to local communities. The mission recommends that the State Party uses anthropologists to help develop all community engagement interventions in the management plan to ensure that they are socio-culturally appropriate;
- Establish a science-based monitoring system to predict and monitor the ongoing effects of climate change and to establish feedback systems that can prompt required management and policy interventions.

3. Management issues

The mission wishes to commend the State Party in developing a comprehensive Management Plan (2018-2028) for the property, which has been officially endorsed by the Government in 2019. The mission also recognizes the difficulties in managing the property due to a number of challenges, including remoteness, lack of rule of law, and wide availability of guns amongst communities. The management plan, which was funded by KWS and the United States Agency for International Development (USAID) has been developed in a participatory way involving a wide variety of stakeholders under the coordination of a Core Planning Team comprising representatives from SNP, CINP and SINP, KWS HQ planners, National Museums of Kenya, Turkana Basin Institute, and the County Government of Marsabit.

The management plan aims to address a number of issues of concern in the property, which were also identified by the two previous World Heritage Centre-IUCN Reactive Monitoring missions (2012, 2015), including over-grazing by livestock, poaching, unclear management responsibilities on protection and preservation of cultural heritage in Sibiloi National Park, lack of a unified management structure for the Lake Turkana National Parks, lack of stakeholder engagement forums, drought and climate change.

A major concern in the implementation of the management plan is the current absence of a resource allocation strategy and operational plan, including critical intergovernmental coordination and support required for its implementation. The mission also identified that a number of sectoral plans or strategies to adequately address certain threats in the property will need to be developed in support of the implementation of the management plan. The implementation of the management plan will require extra financial and human resources that cannot be covered by the annual budgets of the NPs, which are already not sufficient to adequately protect the property. The property has been receiving almost the same budgetary and human resource allocation during the last five years. Community perceptions regarding Lake Turkana National Parks remain generally negative, and both improved policy interventions and genuine engagement are required to improve the relationship between the property and the local communities.

To ensure the effective implementation of the management plan, the mission recommends the State Party to:

- Bring the three World Heritage components under one integrated management unit to improve coordinated approach to threats;
- Develop a resource mobilization strategy and allocation plan, operational plan, and monitoring and evaluation (M&E) plan for the implementation of the Lake Turkana National Parks Management Plan, and apply for International Assistance under the WH Convention for additional support if required;

4. Impact of the Transboundary threats (GIBE III dam, Omo-Kuraz Sugar Development Project)

As the mission was conducted in Kenya, the mission team was unable to access any direct data and information from the Ethiopian State Party regarding the operations of Gibe III and the Omo-Kuraz Sugar Development Project. As correctly predicted by Avery (2010), the filling of the Gibe III reservoir caused a two-meter reduction in the lake level in the period 2015-2017. When the mission visited the lake in March 2020, the level of the lake was back to pre-filling levels. The increase in lake level since 2017 could be related to sustained release of water of the Gibe III dam after the reservoir had been filled and/or the recent increase in rainfall in the Omo-Turkana Basin caused by Positive Indian Ocean Dipole (PIOD) as well as higher run-off due to increased deforestation in the Omo-Turkana catchment area. Despite certain mitigation measures, it is expected that the Gibe III dam will reduce the strength of the seasonal flood pulse as well as sediment load into the lake, impacting therewith the ecology of the lake.

According to the official website of the Omo-Kuraz Sugar Development Project (<https://www.ethiopiansugar.com/>), the expected size of the plantation will be approximately 100,000 hectares when finalized. Both a 55 km and 43 km long main irrigation canal have already been completed on respectively the left and right bank of the Omo River. Another 91 km of main canal is expected to be constructed on the right bank. Sugar cane plantations have very high water and nutrient requirements (i.e. nitrogen, phosphorus, potassium, magnesium and calcium) to ensure productivity, especially in semi-arid areas with limited rainfall. A possible reduction in lake levels due to extraction for irrigation would increase salinity, which, in addition to increased levels of nitrogen and phosphorus, could have devastating impacts on the lake ecosystem, including algal growth. The reduction of the inflow to the lake, combined with changing nutrient levels could be detrimental for Lake Turkana's biodiversity, which is dependent on specific limnological and hydrological conditions.

As there is no long-term systematic limnological and hydrological data, it is very difficult to adequately assess the impacts of the upstream development. Only long-term monitoring of the lake, the Omo River and the catchment areas will allow to assess the cumulative impacts on the lake of all upstream development Ethiopia. The mission is of the opinion that any large-scale development project in the Omo River basin without adequate and science-based mitigation interventions will have negative and everlasting impacts on the ecology of Lake Turkana and the OUV of the property. The mission further noted that the joint Strategic Environmental Assessment by the States Parties of Kenya and Ethiopia, as requested by the Committee in its Decision 36 COM 7B.3 (2012), has yet to be initiated. As much of the infrastructure development along the Omo River has occurred without taking into consideration Committee Decision 36 COM 7B.3 as well as a number of following decisions, the mission questions whether it is still possible to mitigate some of the impacts caused by the upstream development. The lack of taking into consideration the Committee Decisions, paragraph 169 of the Operational Guidelines for the Implementation of the World Heritage Convention as well as the IUCN World Heritage Advice Note on Environmental Assessment & World Heritage, has severely limited the options for mitigating negative impacts, including the 'no project' option or identifying the least damaging options in relation to the OUV of the property. The mission recommends therefore that both the State Party of Ethiopia and Kenya finalize the SEA within a year from the upcoming Committee meeting (44 COM). The SEA will need to assess the cumulative impacts of already constructed as well as ongoing and planned upstream projects, and identify also post-mitigation alternatives, such as adjusted flow regulations, sediment replenishment etc.

To address the threat of upstream development, the mission recommends the State Party of Kenya to:

- Establish a comprehensive long-term scientific monitoring system (i.e. systematic and periodic collection and analysis of limnological and hydrological data) in Lake Turkana that can lead to mitigation measures based on monitoring results.

To ensure that the impacts of upstream development on Lake Turkana remain within the “limits of natural variation of the lake system”, the mission recommends the State Party of Ethiopia to:

- Provide an update on all planned development projects in the Omo Basin, and ensure that adequate environmental assessments are undertaken in line with paragraph 169 of the Operational Guidelines and following the guidelines stipulated in the IUCN World Heritage Advice Note on Environmental Assessment;
- Share detailed data with the World Heritage Centre (for review by IUCN) on the ‘precautionary measures’ taken by the Ethiopian State Party regarding the operations and management systems of all major upstream projects, including monitoring system, to ensure that impacts on the lake are minimized.

The mission further recommends that the States Parties of Ethiopia and Kenya:

- Finalise and agree on the proposed Desired state of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR), including timeframe, and submit it for the World Heritage Committee’s approval.
- Establish limnological and hydrological parameters with assistance of IUCN that define the “limits of natural variation of the lake system” to ensure effective mitigation of upstream development projects;
- Establish a bilateral data sharing agreement that can act as an early warning system and trigger required managerial and operational interventions of upstream projects, as well as other adaptive managerial and mitigation measures to ensure that impacts remain within the “limits of natural variation of the lake system”;
- Without any further delay, conduct immediately the SEA for assessing the cumulative impacts on Lake Turkana of all finished, ongoing, and planned developments in the Lake Turkana Basin, and to identify urgently needed mitigation measures – as requested by the Committee since 2012. The SEA could be developed under the ongoing UNEP project, pending confirmation from the project partners;

ACRONYMS

AUC: African Union Commission

CINP: Central Island National Park

CMS: Convention on the Conservation of Migratory Species of Wild Animals

COVID: Corona virus disease

CR: Critically endangered

DD: Data Deficient

DSOCR: Desired state of conservation for the removal of the property from the List of World Heritage in Danger

ESC: Ethiopian Sugar Corporation

EIA: Environmental Impact Assessment

EIA/EA: Environmental Impact Assessment and Audit Regulations

EMCA: Environmental Management and Coordination Act

EN: Endangered

ESIA: Environmental and Social Impact Assessment

FID: Final Investment Decision

FEED: Front end engineering design

GCC: Global Change and Conservation

HDI: Human Development Index

HQ: Headquarters

HRW: Human Rights Watch

IBA: Important Bird Area

IBLT: Index-Based Livestock Insurance

ICOMOS: International Council on Monuments and Sites

ICMM: International Council on Mining and Metals

ILRI: International Livestock Research Institute

ISO: International Organization for Standardization

IUCN: International Union for Conservation of Nature

KPA: Kenyan Port Authority

KPHC: Kenya Population and Housing Census

KWS: Kenya Wildlife Service

KTWP: Lake Turkana Wind Power Company

LAPSSET: Lamu Port-South Sudan-Ethiopia Transport

LC: Least concerned

M&E: Monitoring and Evaluation

NEMA: National Environment Management Authority

NBI: Nile Basin Initiative

NBSF: Nile Basin Sustainability Framework
NMK: National Museums of Kenya
NP: National Park
NRM: Natural Resource Management
OKSDP: Omo-Kuraz Sugar Development Project
OUV: Outstanding Universal Value
PIOD: Positive Indian Ocean Dipole
PPP: Private-Public Partnership
SEA: Strategic Environmental Assessment
SINP: South Island National Park
SNP: Sibiloi National Park
SOUV: Statement of Outstanding Universal Value
UNEP: United Nations Environmental Programme
UNESCO: United Nations Educational, Scientific and Cultural Organization
USAID: United States Agency for International Development
VU: Vulnerable
WH: World Heritage
WHC: UNESCO World Heritage Centre
WWF: Worldwide Fund for Nature

1. BACKGROUND TO THE MISSION

The Lake Turkana National Parks World Heritage property constitutes of Sibiloi National Park (SNP), Central Island National Park (CINP) and South Island National Park (SINP), covering a total area of 161,485 ha located within the Lake Turkana basin. The property is located on the northeast lakeshore and within the lake itself whose total surface area is approximately 7 million ha.

The property was inscribed on the World Heritage List in 1997 as Sibiloi/Central Island National Parks under natural criteria (viii) and (x). In 2001, the World Heritage Committee approved a 3,900 ha extension of Sibiloi/Central Island by the addition of South Island National Park, maintaining the existing criteria (viii) and (x). As requested by the State Party a new name, "Lake Turkana National Parks", was adopted for the property.

Figure 1: Location of Lake Turkana National Parks in Kenya (green sites)

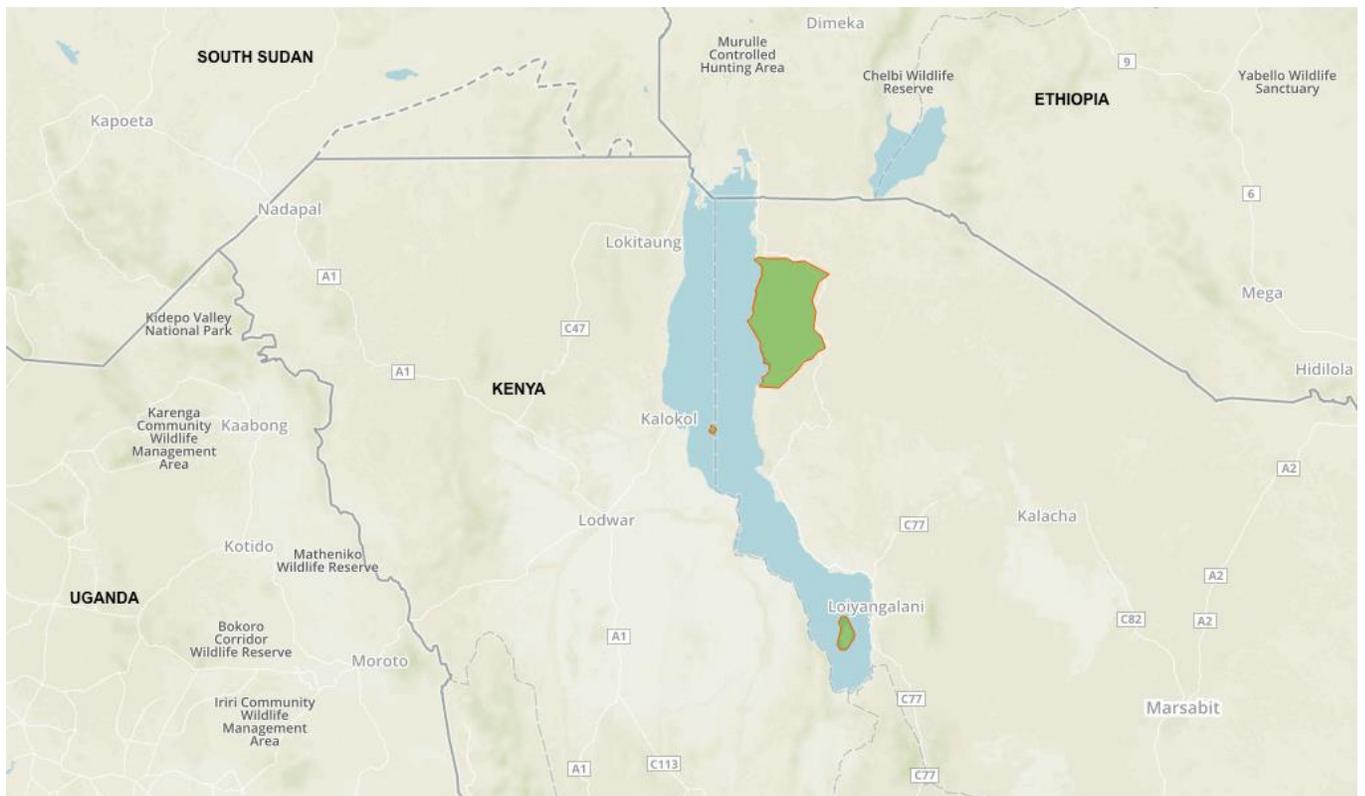
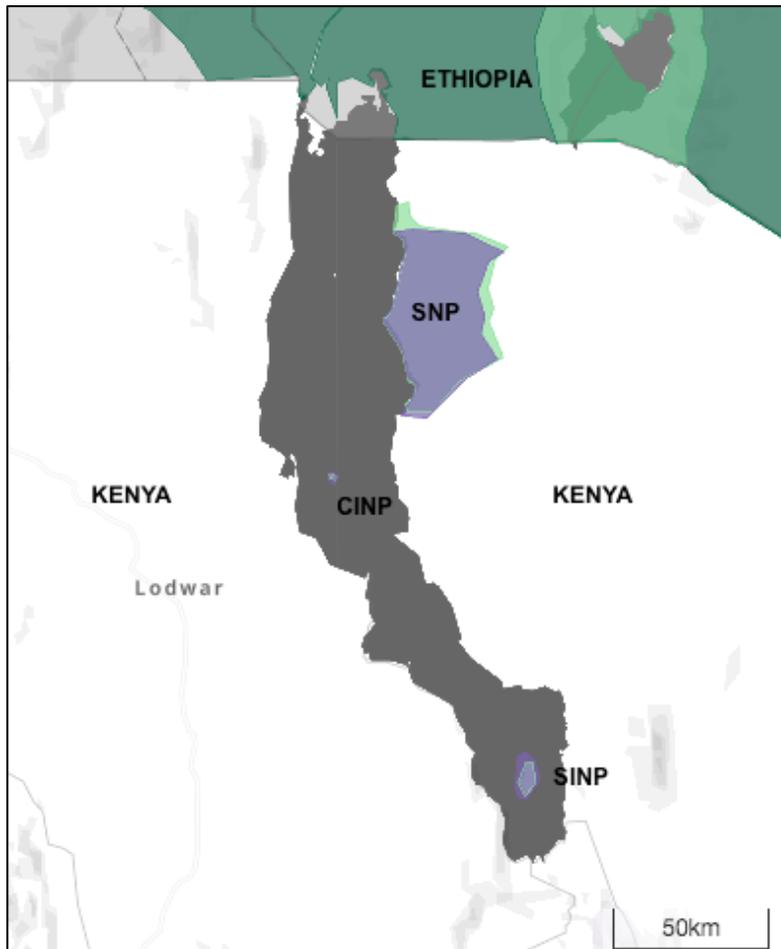


Figure 2: Location of the three components of the World Heritage Property, i.e. Sibiloi National Park/SNP (top right), Central Island National Park/CINP (middle of lake) and South Island National Park/SINP (bottom of lake).



© UNbiodiversitylab.org

The property was inscribed on the World Heritage List on the basis of natural criteria (viii) and (x) for its geology and fossil record from the Pliocene and Holocene periods as well as presence of recent geological process represented by volcanic erosional and sedimentary land forms, its importance in terms of biodiversity, based on its unique and diverse habitats resulting from ecological changes over time inhabited by diverse fauna with a unique desert lake ecosystem, an abundant birdlife and one of Africa's most important breeding areas for the Nile crocodile.

In 2011, the retrospective Statements of Outstanding Universal Value for the property was adopted by the World Heritage Committee. The criteria of the property are described in the SOUV as follows:

Criterion (viii): *The geology and fossil record represents major stages of earth history including records of life represented by hominid discoveries, presence of recent geological process represented by volcanic erosional and sedimentary land forms. This property's main geological features stem from the Pliocene and Holocene periods (4million to 10,000 years old). It has been very valuable in the reconstruction of the paleo-environment of the entire Lake Turkana Basin. The Koobi Fora deposits contain pre-human, mammalian, molluscan and other fossil remains and have contributed more to the understanding of human ancestry and paleo-environment than any other site in the world.*

Criterion (x): *The property features diverse habitats resulting from ecological changes over time and ranging from terrestrial and aquatic, desert to grasslands and is inhabited by diverse fauna. In situ conservation within the protected areas includes threatened species particularly the reticulated giraffe, lions and gray zebras and has over 350 recorded species of aquatic and terrestrial birds. The island parks are the breeding habitats of the Nile crocodile, *Crocodylus niloticus*, the Hippopotamus amphibious and several snake species. Furthermore, the lake is an important flyway passage and stopover for Palaearctic migrant birds, with the South Island Park also being designated as an important bird area under Birdlife International. The protected area around Lake Turkana provides a large and valuable laboratory for the study of plant and animal communities.*

*Remoteness has preserved the area as a natural wilderness. On the grassy plains yellow speargrass *Imperata cylindrica*, *Commiphora sp.*, *Acacia tortilis*, and other acacia species predominate along with *A. elatior*, desert date *Balanites aegyptiaca* and doum palm *Hyphaene coriacea* in sparse gallery woodlands. *Salvadora persica* bush is found on Central and South Islands. The muddy bays of South Island have extensive submerged beds of *Potamogeton pectinatus* which shelter spawning fish. The principal emergent macrophytes in the seasonally exposed shallows are the grasses *Paspalidium geminatum* and *Sporobolus spicatus*.*

The property is part of the Tropical & Subtropical Grasslands, Savannas & Shrublands biome and the only World Heritage property located within the Masai xeric grasslands and shrublands ecoregion. Lake Turkana is further defined by Birdlife International as an Important Bird Area (IBA) KE028 because it represents both a wintering ground and critical stopover point for palearctic migrant waterbirds on the West Asian-East African Flyway. Over 100,000 little stints (*Calidris minuta*) may winter in Lake Turkana, representing more than 10% of the entire East African/South East Asian wintering population (Rose and Scott, 1997). Criteria (x) refers to 350 recorded species of aquatic and terrestrial birds in the property. The Lake Turkana IBA is currently defined as being in danger with a 'very high' threat score under the most recent IBA monitoring assessment conducted in 2017.

Due to a number of threats, including upstream development in Ethiopia (Gibe III dam and large-scale plantation) as well as the loss of biodiversity at site level, the state of conservation of the property has been examined nearly each year since 2011. Since 2011, two Reactive Monitoring missions have examined the state of conservation of the Lake Turkana National Parks World Heritage property: the June/July 2012 mission visited the property in Kenya while the April 2015 mission went to the Gibe III dam site on the Omo River in Ethiopia. Both missions proposed recommendations in order to improve the state of conservation of the property and protect its Outstanding Universal Value (OUV), but based on the Committee's recurring requests to implement the 2012 and 2015 mission recommendations, the States Parties of Kenya and Ethiopia have not fully responded to them.

Given the potential irreversible loss of the property's OUV caused by impacts of the upstream developments on the water flow, the Committee has considered inscribing the property on the List of World Heritage in Danger on four occasions since 2012. On the first three occasions, the Committee gave more time to the States Parties of Ethiopia and Kenya to solve the issue bilaterally, by developing a Strategic Environmental Assessment (SEA) to assess the cumulative impacts of the multiple developments in the Lake Turkana Basin on the OUV of the affected World Heritage properties, and to identify urgently needed mitigation measures. The continuing impacts of the dam and lack of progress in undertaking the necessary impact assessments prior to the commencement of works in accordance with the procedures of the Convention finally led to the decision of the World Heritage Committee to inscribe the property on the List of World Heritage in Danger at its 42nd session in Manama (June 2018).

At its 42th session, the World Heritage Committee also requested the State Party of Kenya to invite a joint World Heritage Centre/IUCN Reactive Monitoring mission to the property to assess the property's state of conservation and review the impacts of the development projects in Ethiopia and Kenya on the property, the progress made to implement the past mission recommendations, and to develop, in consultation with the States Parties of Kenya and Ethiopia, a proposed set of corrective measures and a DSOCR, for examination by the Committee at its 43rd session in 2019. At the request of the State Party of Kenya the mission was postponed until 2020. At its 43rd session in Baku, Azerbaijan (June/July 2019), the Committee deeply regretted that the SEA, which has been repeatedly requested since 2012, continues to be delayed, and noted "the State Party of Kenya's request to postpone the joint World Heritage Centre/IUCN Reactive Monitoring mission to the property until 2020 once the SEA is at [a] more advanced stage", but considered "that the mission should be undertaken as soon as possible to provide an up-to date assessment on the state of conservation of the property under potential severe threat", and "reiterate[d] its request to the State Party of Kenya to invite a joint World Heritage

Centre/IUCN Reactive Monitoring mission to the property to assess the property's state of conservation, to review the impacts of the development projects in Ethiopia and Kenya on the property and the progress made to implement the past mission recommendations, and to develop, in consultation with the State Party of Ethiopia, a proposed set of corrective measures and a DSOCR, for examination by the Committee at its 44th session in 2020".

It is also important to refer to the comments and recommendations of the previous Reactive Monitoring missions (2012 and 2015), including in regard to the outstanding cultural values of the property (or parts of it) and the opportunity to inscribe the property under cultural criteria as a mixed World Heritage property. Though the property was originally also nominated by the State Party under cultural criteria for its "well documented record of human physical and cultural evolution of the last 4 million years", the State Party at the time of nomination did not specify the proposed criteria. At the time of inscription in 1997, the Committee noted that a comparative study of fossil hominid sites by ICOMOS had been completed and gave high importance to Koobi Fora to be nominated. The Committee, however, decided to defer the nomination under cultural criteria to allow the State Party to clearly delineate the cultural sites of this nomination, which might not overlap with the same areas as the natural part. The 2012 mission recommended that the State Party reflect on re-designing the property to include a larger portion of the lake as well as important fossil sites currently outside the property and to consider re-nominating the property under cultural criteria, as an important site for human evolution.

Mission Team

The Kenyan State Party invited the World Heritage Centre/IUCN monitoring mission from 6 to 11 March 2020. However due to the global Covid-19 crisis, the two team members representing IUCN cancelled their participation in the mission. In the consequent discussions between the World Heritage Centre and the Kenyan State Party, it was decided that the mission would continue despite its reduced capacity. This decision was made since it was deemed critical to develop as soon as possible a proposed set of corrective measures and a Desired state of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR).

The mission was comprised of Mr. Koen Meyers, representing the UNESCO World Heritage Centre and accompanied by a delegation composed of representatives of Kenya Wildlife Service (KWS), National Museums of Kenya (NMK), Marsabit County, and the Turkana Basin Institute. Several meetings were held with stakeholders in Nairobi, including the Permanent Secretary of State Department for Wildlife, Ministry of Tourism and Wildlife, the Director of Culture of the Kenyan National Commission for UNESCO, the Director of Wildlife Conservation, Deputy DG of NMK, representatives from the Ministry of Sports, Culture and Heritage, Ministry of Water,

Sanitation and Irrigation, Ministry of Foreign Affairs, Ministry of Fisheries, the Directorate General of the National Environment Management Authority (NEMA), Turkana Basin Institute. The team visited the Sibiloi National Park (SNP) from 7 to 9 March, including Koobi Fora, Kokai area, several fossil sites and petrified forest, as well as Alia Bay. The mission held a meeting with Daasanach communities in Ileret. Due to extreme weather conditions, the mission was not able to meet with communities, including fishermen, in Loyangalani and conduct a fly-over assessing the threats to CINP and SINP.

The terms of reference of the mission, its itinerary and programme and list of the people met can be found in the Annexes to this report.

2. NATIONAL POLICY FOR THE PRESERVATION AND MANAGEMENT OF THE WORLD HERITAGE

The property enjoys the highest level of legal protection under Kenyan legislation by both the Kenya Wildlife Act (No. 47 of 2013) as well as the National Museums and Heritage Act (No. 6 of 2006). One segment of the property, the Sibiloi National Park (SNP), is co-managed by the Kenyan Wildlife Services (KWS) and the National Museums of Kenya (NMK). SNP was legally designated as a national park in 1973 whereas the South Island National Park (SINP) and Central Island National Park (CINP) were legally designated in 1983 and 1985 respectively. During the establishment of the SNP (at the time called the Lake Rudolf National Park and Game Reserve), the National Parks Warden and the Marsabit Council representatives came to an agreement: "That the local inhabitants of the surrounding areas of the National Park will be given access in that area to graze and water stock in case of difficulties, and secondly, that the Marsabit Council should have the right to the Lake shores wherever the Lake boundary is enclosed by the National Park, and thereupon to undertake any sort of activity which may benefit the Council". This provision at the time of the establishment has become difficult to uphold due to societal changes, including population growth. At the time of inscription (21 COM VIII A), the World Heritage Committee expressed its concern regarding the grazing of large herds of domestic livestock.

While SNP is managed by both KWS and NMK, CINP and SINP are solely managed by KWS. In SNP, KWS with its headquarters in Alia Bay is responsible for the protection of the biodiversity and NMK with its headquarters based in Koobi Fora is in charge of the management of the fossil sites.

In terms of the impact of development pressures in the broader landscape on the property, it is important to refer to the Environmental Management and Co-ordination Act (EMCA) - Act No.8 of 1999, Act No.6 of 2006, Act No.17 of 2006, Act No.5 of 2007, Act No.6 of 2009, Act No.5 of 2015, Act No.12 of 2017, Act No.4 of 2018, Act No.18 of 2018, which stipulates and regulates Strategic Environmental Assessments and Environmental Impact Assessments. The designated

authority responsible for EIAs is the National Environment Management Authority (NEMA). The EMCA requires that all Policies, Plans and Programmes for implementation shall be subject to Strategic Environmental Assessment, as well as any project to undertake a full environmental impact assessment study and submit the study report to NEMA prior to being issued with any license.

Taking into account that a large part of the Lake Turkana drainage basin is located in Ethiopia, it is important to note that there are no specific bilateral, regional or multilateral agreements that have been agreed by both Ethiopia and Kenya regarding the management and use of shared freshwater resources in the Lake Turkana Basin. However, some multilateral agreements concerning the management of water resources exist, to which both Kenya and Ethiopia are signatories. The African Convention on the Conservation of Nature and Natural Resources has an article (VII) on water stating that “where surface or underground water resources and related ecosystems, including wetlands, are transboundary to two or more of the Parties, the latter shall act in consultation, and if the need arises, set up inter-State Commissions for their rational management and equitable utilization and to resolve disputes arising from the use of these resources, and for the cooperative development, management and conservation thereof.

While Kenya and Ethiopia are also part of the Nile Basin Initiative (NBI), which is an inter-governmental organization dedicated to equitable and sustainable management and development of the shared water resources of the Nile Basin, the initiative does not cover the Turkana basin.

As recommended in the 2012 Reactive Monitoring Mission report, a number of tools that have been developed by NBI could also be used for the management of the Turkana basin, including the 2011 Nile Basin Sustainability Framework (NBSF) promoting the consideration of the transboundary dimension in riparian states’ approaches to water resources management and provides guidelines for transboundary EIAs.

The World Heritage Committee also has an established policy on impact assessments, compiled in the Convention Policy compendium. This is particularly evident in Paragraph 118bis of the Operational Guidelines, stipulating that “--States Parties shall ensure that Environmental Impact Assessments, Heritage Impact Assessments, and/or Strategic Environmental Assessments be carried out as a pre-requisite for development projects and activities that are planned for implementation within or around a World Heritage property. These assessments should serve to identify development alternatives, as well as both potential positive and negative impacts on the Outstanding Universal Value of the property and to recommend mitigation measures against degradation or other negative impacts on the cultural or natural heritage within the property or

its wider setting. This will ensure the long-term safeguarding of the Outstanding Universal Value, and the strengthening of heritage resilience to disasters and climate change.”

Taking into consideration the property’s importance as a wintering ground and critical stopover point for Palearctic migrant waterbirds on the West Asian-East African Flyway, it is further important to refer to the Convention on the Conservation of Migratory Species of Wild Animals (CMS), especially UNEP/CMS/Resolution 7.2 (Rev. COP12), adopted by the Conference of the Parties at its 12th Meeting in Manila, Philippines, October 2017. The resolution emphasizes the importance of good quality environmental impact assessment (EIA) and strategic environmental assessment (SEA) as tools for implementing Article II (2) of the Convention on avoiding endangerment of migratory species and Article III (4) of the Convention on protection of Appendix I species, and as important elements to include in agreements concluded under Article IV (3) of the Convention in respect of Appendix II species, and in agreements concluded under Article IV (4) of the Convention in respect of Appendix II and other species; and urges Parties to include in EIA and SEA, wherever relevant, as complete a consideration as possible of effects involving impediments to migration, in furtherance of Article III (4) (b) of the Convention, of transboundary effects on migratory species, and of impacts on migratory patterns or on migratory ranges.

In April 2015, Kenya and Ethiopia signed a joint project with UNEP supported by the EU entitled: “Support to Sustainable Development in Lake Turkana and its River Basins”. The project is currently in the process of reviewing all existing data regarding ecosystem services, hydrology and livelihood in the Omo-Turkana Basin. UNEP has been briefing UNESCO on a regular basis regarding the status of the project implementation.

3. IDENTIFICATION AND ASSESSMENT OF CONSERVATION AND MANAGEMENT ISSUES

The reactive monitoring mission assessed the potential impacts of a number of threats on the Outstanding Universal Value (OUV) of the property. However, due to the reduced capacity of the mission team, it was difficult to conduct a detailed assessment of the impacts of certain threats, such as the upstream development in the Omo Basin. In the absence of IUCN participation in the mission, the analysis of the hydrological and limnological impacts was based on interviews with key scientists and informants during the field visit as well as a desk study of secondary data and reports. The analysis, findings and recommendations have to be viewed in light of the mission’s reduced capacities.

The most important identified threats impacting the OUV of the property included infrastructure development, and poaching and livestock grazing. The management effectiveness of the property, including the new management plan, was also evaluated.

With a surface of approximately 6,750 km², Lake Turkana is both the largest desert and alkaline lake in the world with a pH level of about 9.3. It is located in the Great Rift Valley in the north-western part of Kenya, just south of the border with Sudan and Ethiopia. The northern tip of the lake, where the Omo river flows into the lake through the delta wetlands, is located in Ethiopia. Depending on the fluctuating lake levels, the lake's maximum depth is around 110 m and its volume around 200 km³. The Lake Turkana catchment area is estimated to be around 130,000 km² in both the southern highlands of Ethiopia and western highlands of Kenya. Lake Turkana is fed by three major rivers, the Omo in Ethiopia, and the Turkwel and Kerio in Kenya. As about 80 to 90% of the lake surface water inflow is derived from the Omo River in Ethiopia, the lake is almost entirely dependent on this one river basin, and any developments within this basin will thus directly affect the lake (Avery 2010, 2012). Lake Turkana is an endorheic or closed basin, and its water is semi-saline. Water is lost from the lake through evaporation. Evaporation rates of Lake Turkana are more than ten times the rainfall, and a volume equivalent to the entire annual Omo River flow is evaporated annually (Avery, 2010). This means that the lake acts as an evaporation pond and the entire inflow into the lake is returned to the atmosphere through evaporation (UNESCO World Heritage Centre – IUCN, 2012). Water is retained in the lake for only about 12 years leaving behind the minerals carried into the lake by the rivers (Kolding and van Zwieten, 1992; Avery, 2013). All of these above factors contribute to the level of Lake Turkana being extremely sensitive to climatic variations and anthropogenic impacts to the catchment area, including dams, large-scale agricultural project, etc.

Many of the threats driving the loss of biodiversity in the property are related to societal issues, such as 'societal transformation' and 'socio-economic development' occurring outside the property. Many of these threats seem to persist over time, such as poaching, encroachment and illegal fishing, and can only be addressed by non-conservation solutions such as economic diversification and guaranteeing security through disarmament, targeting local communities in the Turkana Landscape. Other threats to the OUV of Lake Turkana National Parks, such as the development of infrastructure, have been steadily increasing over time. Many of these multifaceted and multi-directional threats are found outside the property and are related to East Africa's macro political and socio-economic context. These threats, arising from different stakeholders, exist mostly outside the policy scope of KWS and NMK. Both agencies have a limited mandate to negotiate a halt to threats that occur outside the property, making it also difficult for them to adequately address and mitigate the threats.

Addressing the complex set of threats to the property that are driven by social, economic and political processes will require a careful balance between conservation and non-conservation solutions and the broad involvement of state and non-state actors.

3.1 Impacts of infrastructure development in the wider Turkana Basin, Kenya

Infrastructure development in the Turkana region is a high priority for the Government of Kenya, which if not carefully managed will lead to negative impacts on the OUV of the property. The infrastructure planning processes are often opaque and do not take into account the property and its OUV. While none of the currently planned infrastructure development will occur inside the property, any possible impact on the lake system – even from cumulative and secondary impacts – will require mitigation interventions or even alternative options.

Both Marsabit and Turkana County are the largest counties in Kenya. Both counties are characterized by higher poverty rates, lower literacy levels and more underdeveloped physical infrastructure when compared to the national averages. The serial property consists of SNP and SINP, which are located in Marsabit County and CINP located in Turkana County. SNP is located in the sub-county of North Horr, SINP in the sub-county of Loyangalani and CINP in the Kalokol sub-county.

According to the Kenya Population and Housing Census (KPHC) 2009 results, the Marsabit County population stood at 291,069 while the Turkana County population stood at 855,399. Both the populations of Marsabit and Turkana County were projected to grow respectively to 335,238 and 1,427,797 by 2017. For the sub-county of North Horr, in which the SNP is located, the population based on the 2019 census is 67,154 with the average household consisting of 6.9 members, of which nearly half is younger than 18 years old. The fast growing young population interacting with the national park explains some of the threats to the national park, including livestock and fishing encroachment and poaching.

Both Marsabit and Turkana County register some of the highest levels of poverty and malnutrition in Kenya. The Human Development Index (HDI)¹ for Marsabit and Turkana County is respectively 0.348 (2013 data) and 0.3331 (2009 data) both ranking far worse than Kenya's national HDI of 0.520 (2013 data). The HDI in rural sub-counties such as North Horr will rank worse than urban centres, such as Saku (Marsabit town) or Turkana Central (Lodwar town). Even if many of the rural population is dependent on food aid or are beneficiaries of development

¹ HDI is broken down into four tiers: very high human development (0.8-1.0), high human development (0.7-0.79), medium human development (0.55-.70), and low human development (below 0.55)

project, poverty remains endemic. Marsabit County poverty levels are estimated at 83.2% as compared with national level at 39% as of 2012. Only 7.5 % and 5% of the households in respectively Marsabit and Turkana County have access to electricity. The sources of energy in both counties is wood fuel which is used both for cooking and kerosene used for lighting.

The region's past marginalization and underdevelopment has led to increasing pressure on the Kenyan government, including the county governments which have received more autonomy and funding under Kenya's devolution scheme initiated by the 2010 constitution, to deliver improved services and infrastructure to its communities. As part of its Kenya Vision 2030, the Government of Kenya aims to transform the nation into a newly industrializing, middle income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. Under Kenya's Vision 2030, a number of new infrastructure developments are planned in the Turkana area to lift the area out of poverty. This includes the Lamu Port Sudan Ethiopia Transport Corridor (LAPSSET) and related infrastructure developments (roads, railway, pipeline, power lines, wind farms, and the construction of a resort city on the western edge of the lake). The LAPSSET Project will run from Lamu Port through Marsabit and Turkana Counties into southern Ethiopia and South Sudan. The project is highly supported by the Marsabit and Turkana Counties as it is expected to create employment, business opportunities, as well as expand markets for products, including livestock products, thus improving the socio-economic livelihood of the people of the Turkana area. Turkana's County Investment Plan (2016-2020) states that: "The LAPSSET project will be a game changer for movement of goods from Turkana County. Just as the Uganda Railway opened up the East African region at the beginning of the 20th century, so also is the proposed LAPSSET railway expected to play a major role in stimulating socio-economic growth and development in the areas traversed by it in Kenya, Ethiopia and Southern Sudan".

Taking into account the dire state of the current socio-economic development in both the Marsabit and Turkana Counties, it is unquestionable that increased infrastructure development in the Lake Turkana area will need to occur during the coming years and decades. To lift the area out of poverty in line with Kenya's 2030 vision, communities will need to have access to the power grid, roads will have to be constructed to improve access to services, as well as other public infrastructure will need to be constructed. If not managed carefully, the cumulative impacts of this development path might negatively affect the overall ecology of the Turkana basin. It is general knowledge that the presence of increased infrastructure and extractive industries, which will draw more people to the area, are key drivers of habitat loss. A combination of external factors (hydropower dams, irrigation schemes, climate anomalies) and internal drivers (demography, economic growth) facing the Turkana Basin attest to a rapidly changing environment, which generates great concern for the future persistence and long-term viability

(Ojwang et al. 2016). As the protection and conservation of the property provides a significant contribution to sustainable development of the area, it is important that the Kenyan Government applies the principles of 'precautionary approach' to ensure that the planned development does not impact the OUV of the Lake Turkana National Parks World Heritage.

3.1.1 Turkana Wind Farm Project (LTWP)

Decision 42 COM 7B.92 requests the State Party of Kenya to ensure that all the mitigation measures proposed in the EIA for the Turkana Wind Farm Project (LTWP) are implemented, and to provide a report on progress made to mitigate impacts on the property. The project consists of a concession of more than 60,000 hectares with 365 wind turbines, able to produce 310 MW, occupying 16,200 hectares.

In the State Party's state of conservation report of 2019, Kenya notes that the LTWP respects all the mitigation measures recommended in the EIA. While the mission was unable to visit LTWP, it is of the opinion that collisions with turbines and power lines provide a potential danger for birds and the OUV of the property. LTWP states in its EIA that it has taken strict measures in the design of the wind farm to mitigate collision of birds with turbines by allowing wide corridors between clusters of turbines. It also mentions that the turbines are located more than 10 km from the shores of Lake Turkana, and that the collision risk of birds is expected to be very low as migrating and over wintering birds are normally associated with Lake Turkana's shoreline and aquatic habitats. However, other birds such as large raptors and vultures are known to be prone to collisions with turbines. Though it was impossible to assess the extent of the collision mortality of birds caused by LTWP, systematic monitoring will allow for a better insight regarding the impact of LTWP. The EIA mentions that LTWP will undertake an exhaustive one-year field baseline study to determine the use of the wind farm by birds and to identify, if any, bird species that may be adversely affected. Such study will be highly useful and can help assess the impact of LTWP on the OUV of the property. The mission therefore recommends that the State Party share the study with the World Heritage Centre for review by IUCN as soon as it is finalized.

3.1.2 Lamu Port-South Sudan-Ethiopia Transport Corridor Project (LAPSSET)

Committee Decision 43 COM 7A.12 refers to the ongoing revision of the SEA for Lamu Port-South Sudan-Ethiopia Transport Corridor Project (LAPSSET), the Environmental and Social Impact Assessment (ESIA) for the Lamu-Lokichar Crude Oil pipeline from Turkana county to Lamu and the proposed development of the geothermal power station at the Barrier Volcanic Complex south of the property. The Decision further requests the State Party of Kenya, in accordance with Paragraph 172 of the Operational Guidelines, to submit all related impact assessments of

projects, which may have potential impacts on the property, to the World Heritage Centre for review by IUCN, before taking any decision that may be difficult to reverse. It should also be noted that the LAPSSET project has recently been reviewed in the context of the Lamu Old Town World Heritage property. A Reactive Monitoring mission went to Lamu in 2020, and assessed the impacts of the LAPSSET project from the perspective of the OUV of Lamu Old Town.

The LAPSSET Corridor project is a multi-billion infrastructure project that aims to link Lamu (Kenya) to Juba (South Sudan) and Addis Ababa (Ethiopia) with an objective to ease the movement of goods between Kenya, South Sudan and Ethiopia. The project is expected to stimulate the economy of Northern Kenya, including the Turkana area. The project will consist of a deep sea port in Lamu, a highway connecting Kenya with South Sudan and Ethiopia (including the recently finished 505 km Isiolo-Marsabit-Moyale Highway), an oil pipeline connecting Lamu to the oil fields in South Sudan, three resort cities (including one in Turkana), a standard gauge railway line (Lamu to Isiolo, Isiolo to Nakodok (Kenya/South Sudan border) and Juba (South Sudan), Isiolo to Moyale (Kenya/Ethiopia border) and Addis Ababa (Ethiopia), and Nairobi to Isiolo), a fiber-optic cable, an international airport in Moyale, and a dam on the Tana river.

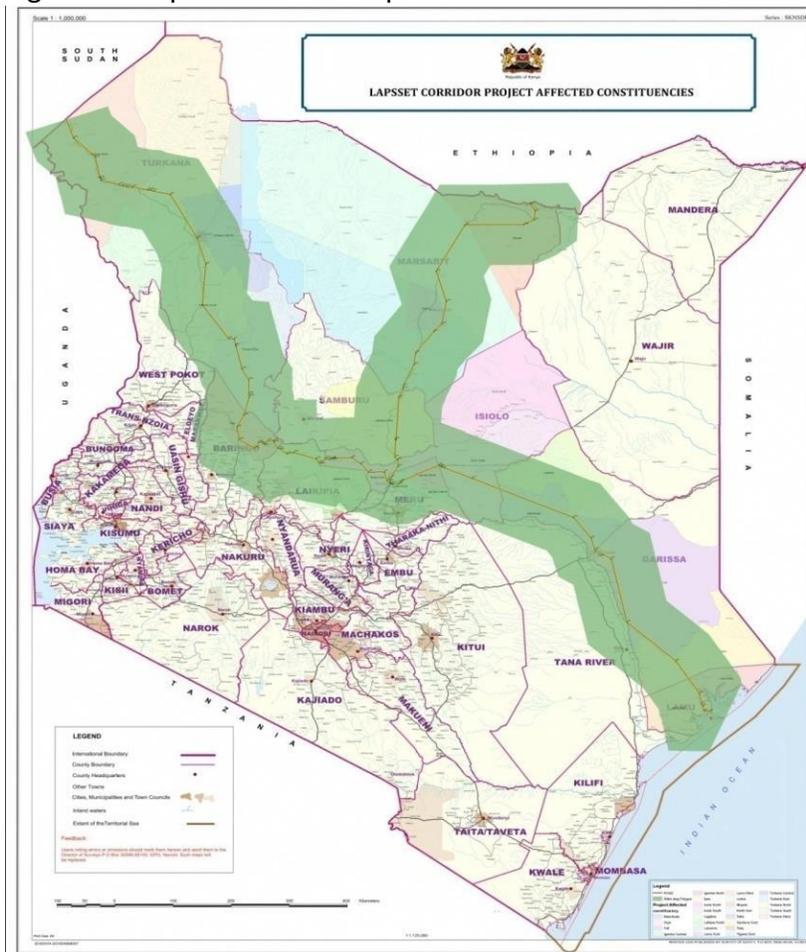
Figure 3: Proposed LAPSSET inner infrastructure corridor



© Lapsset Corridor Development Authority, 2017

The LAPSSET Corridor also aims at stimulating economic development in Northern Kenya. The project will have an inner infrastructure corridor of 500 m, which will include roads, railways and oil pipelines. The 500 m wide infrastructure corridor will not be constructed in the vicinity of the property and will therewith have no direct impact on its OUV. In addition, LAPSSET aims at establishing a broad economic corridor of 100 km wide around the infrastructure corridor to attract investment in industry and other economic sectors. The 100 km wide Special Investment Corridor aims to attract industrial parks, mechanized/industrial farms, and the development of real estate. While the Special Investment Corridor does not reach the vicinity of the property, it includes the western border of Lake Turkana, with amongst others a plan to build a Lake Turkana Resort City. The investment in real estate will be made through private funding or Private-Public Partnership (PPP) schemes.

Figure 4: Proposed LAPSET Special Investment Corridor



© Lapsset Corridor Development Authority, 2017

There is high expectation that the project will lead to tangible economic growth by stimulating local and international trade between Kenya, Ethiopia and South Sudan. However, the project has faced a number of setbacks, which have led to a delay in its implementation. The countries involved in the LAPSET Corridor project are now looking to crowd-funding to raise cash to supplement the national budgetary allocations for the project.

A ruling by the High Court in Malindi in April 2018 regarding the court case Mohamed Ali Baadi v. Attorney General, Petition No. 22 of 2012, required the Kenyan Government to pay KSH 1.76 billion in compensation to 4,600 fishermen in Lamu County affected by the construction of the Lamu Port as part of the LAPSET project. The High Court in Malindi came also to a finding that the controversy presented in this case was not premature for the reason that the Strategic Environmental Assessment (SEA) of the LAPSET Project had not been concluded. The High Court declared that the project proponents "failed to carry out a Strategic Environmental Assessment (SEA) before embarking on the individual components of the LAPSET Project as they were duty-

bound to do. The Court further declared that project proponents of projects which are likely to have significant environmental, social, cultural and other impacts are required to consider and assess external costs of the projects, policies, plans and programmes associated with proposed projects as part of the ESIA and SEA Processes. The Court remanded the EIA License to the National Environment Management Authority (NEMA) for reconsideration, but did not invalidate it. Based on a Notice of Appeal filed by the Kenya Ports Authority (KPA), in November 2018 the Court of Appeal in Nairobi suspended the implementation of the judgment on the ground that the judges gave orders which had not been pleaded. In spite of the judgment, the mission understands that the State Party has commenced the revision work on the SEA, including broad consultations with key stakeholders, as also stated in the State Party's state of conservation report 2020. The mission would like to reiterate and remind the State Party to make sure that the revised SEA takes into consideration the IUCN World Heritage Advice Note Environmental Assessment. By decision 43 COM 7B.107 regarding the Lamu Old Town World Heritage property, the Committee had requested the State Party to revise the SEA, "aligning, as appropriate, the SEA for the LAPSSET project and the SEA for the developments in the Lake Turkana Basin, with a view to assessing all potential direct, indirect and cumulative impacts of the development projects on the OUV of all affected World Heritage properties."

Based on the plans seen by the mission, both the proposed LAPSSET inner infrastructure corridor and the Special Investment Corridor will not occur in the vicinity of the property. The mission therefore is of the opinion that LAPSSET will not directly impact the OUV of the property. However, the mission is also of the opinion that there is a significant risk that the project may result in cumulative and secondary impacts on the property. Any development (or cumulative impacts of development) impacting the lake's ecology, would de facto impact the OUV of the property. A possible cumulative impact of the LAPSSET corridor is a decline in fish stock in the lake. Without imposing and monitoring strict fishing quotas based on a thorough understanding of the lake's ecology, improved road and transportation infrastructure is expected to lead to increased extraction and export of fish from the lake to urban areas. This will certainly result in further exacerbating the already declining fish stock, and therewith negatively impact some of the values for which the property was listed as World Heritage. In its new County Integrated Development Plan (2018-2022), Marsabit County is already planning to develop primary and secondary road networks around the Great North/Isiolo-Moyale road in order to make maximum utilization of the highway.

3.1.3 The South Lokichar oil fields and Lamu-Lokichar Crude Oil pipeline

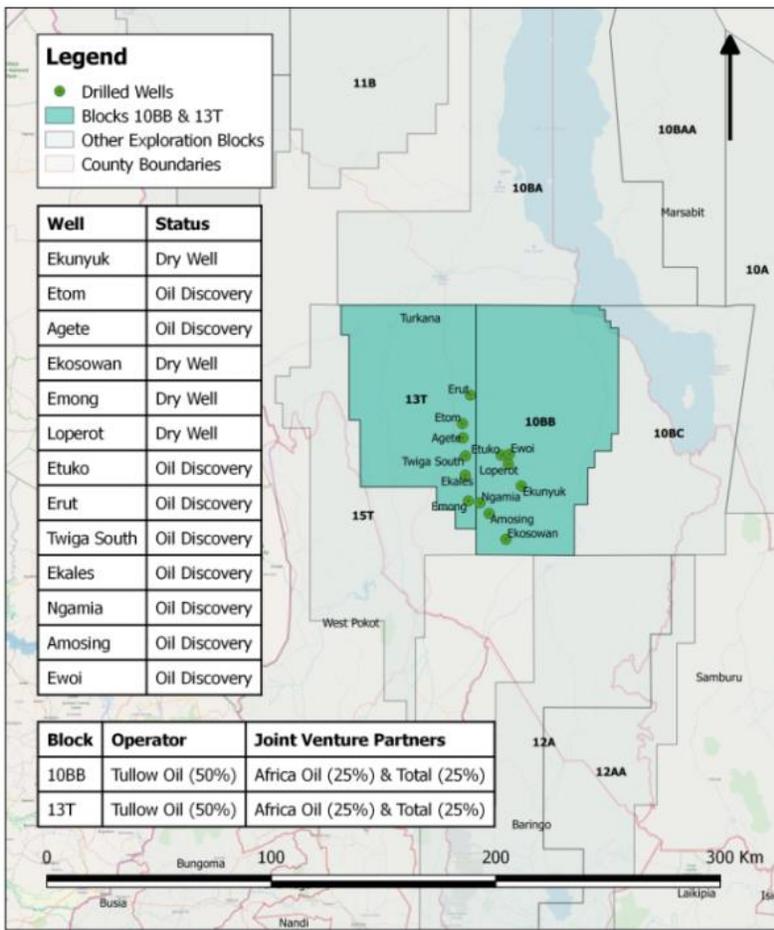
The Lamu-Lokichar Crude Oil pipeline, which is part of a LAPSSET corridor, was initially developed to bring Ugandan and Kenyan oil to global markets. The Blocks 10 BA, 10 BB and 13T in the Turkana area, Kenya, are operated by a consortium of companies which includes Tullow, Total

and Africa Oil. The most promising oil wells are found in the South Lokichar Basin, which is located about 80 km south-west of the property. This is also the location of the starting point of the 800 km Lamu-Lokichar pipeline, which will transport crude oil to the coast. The mission is of the opinion that the exploitation of oil in the South Lokichar Basin and location of the Lamu-Lokichar Crude Oil pipeline would not impact the property's OUV.

While water use for oil exploitation varies depending on the fuel type, the method of extraction, the geology, the degree of processing required, the geography, and the climate of the site under development (Delgado et al. 2016), information received by the mission, shows that the South Lokichar oilfield development and operation will require limited water resources. The latest assessment (Avery, 2020) for the requirements of supplying the South Lokichar water pipeline is 0.46 m³/s, which is foreseen to be extracted from the Turkwel Gorge Dam in West Pokot County, which releases regulated and perennial water into the Turkwel River. To put this into perspective, the mean annual inflow to Turkwel is 18 m³/s, and of this, 1.25 m³/s is already lost to evaporation from the reservoir (Avery, 2020).

Tullow also subscribed in 2015 to the WH "No-Go" commitment, in which it refrains from prospecting or exploiting oil and gas inside World Heritage properties, including the Lake Turkana National Parks. Tullow has further assessed the risks of the potential impacts of their operations in areas adjacent to World Heritage properties as part of the decision-making process prior to any activity, and decided not to extract any water from Lake Turkana due to the above commitment.

Figure 5: Location of Block 10 BA, 10 BB and 13T



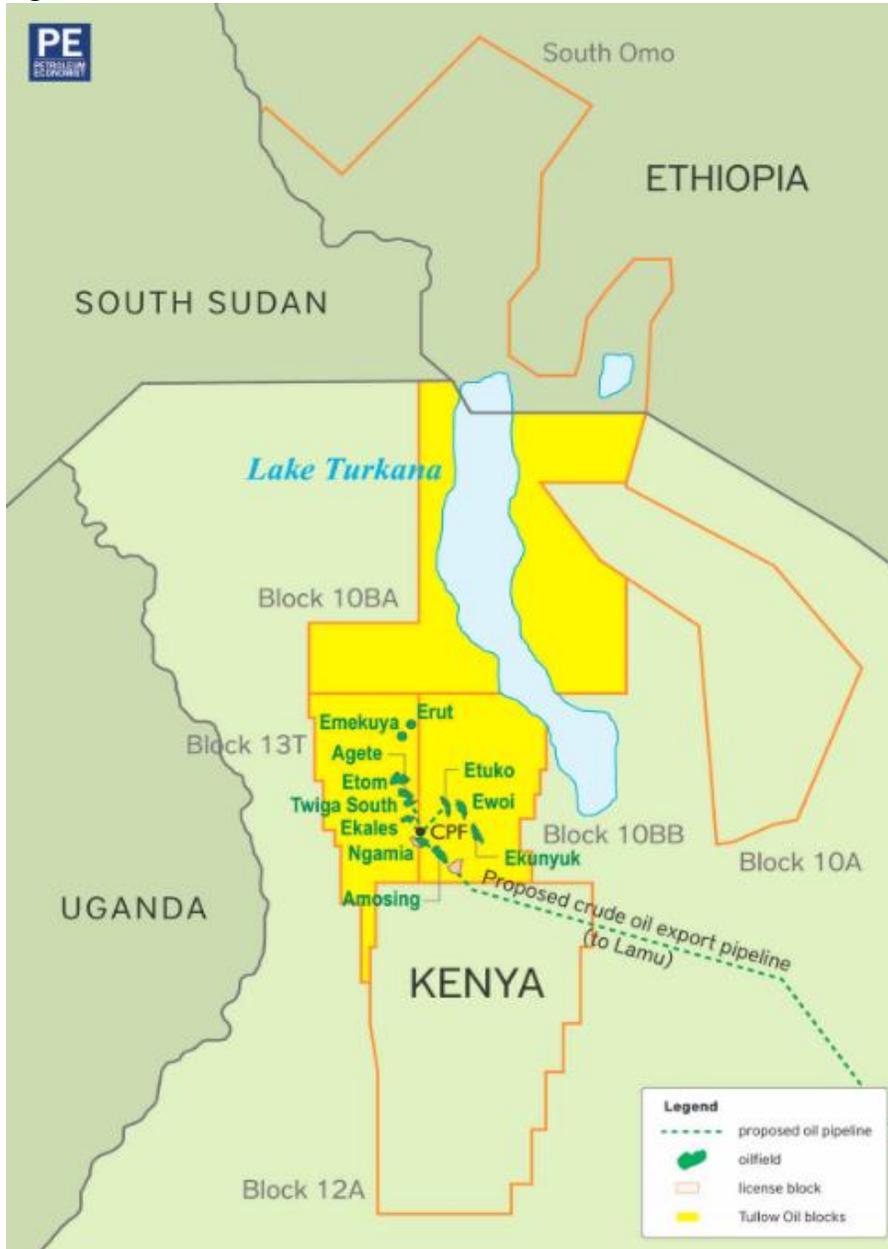
South Lokichar Basin Blocks 10BB and 13T

© Oil in Kenya

Tullow estimates that its blocks contain 560 million barrels in proven and probable reserves. While the oil fields were expected to produce up to 100,000 barrels per day from 2022, the production is facing certain delays due to a range of reasons. According to the information received by the mission, more than 40 oil wells were drilled in the Lokichar Basin in Turkana County (Block 10 BB and 13T), while another estimated 321 oil wells are planned to be drilled in the future. The mission was informed that several exploration sites are located in Block 10 BA, which is the block that includes SNP and CINP. An extension for the exploration period in Block 10 BA has been granted by the Government of Kenya until the end of April 2021. According to information from NMK, none of the exploration sites in Block 10 BA are located in the property. The two exploration wells in Block 10 BA that have currently been identified for drilling are Samaki and Kifarua (see figure 7). The exploratory drilling well of Eng'omo also located in Block BA has already been closed. While the wells' relative closeness to the property (around 40 km to SNP and 30 km to CINP) could be cause for concern, the drilling and even exploitation in Samaki and Kifarua in Block 10 BA (as well as the exploitation in Blocks 10BB and 13T) should not impact

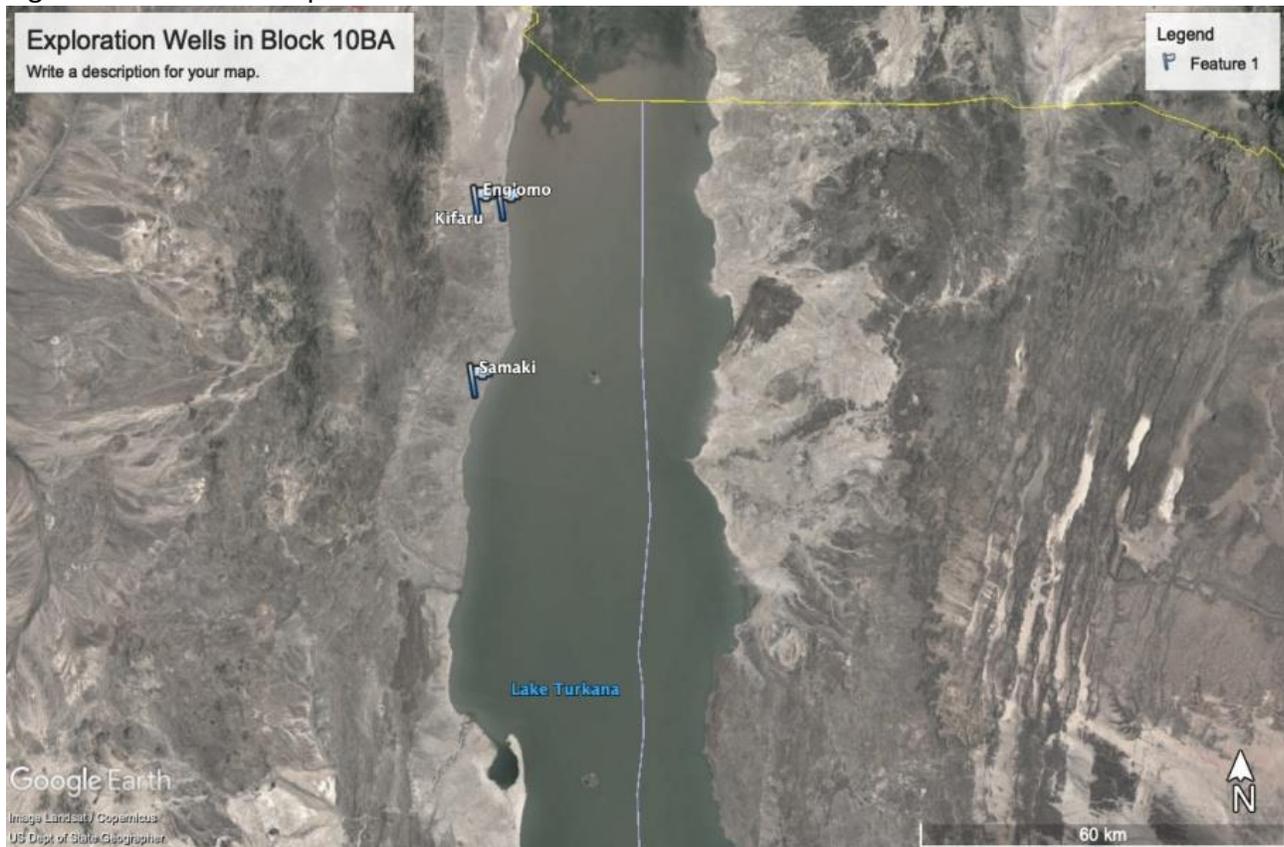
the OUV of the property if done according to ISO standards in the oil and gas industry. The mission would like to recommend that the location as well as EIAs of potential (if any) new exploration and exploitation sites in Block 10 BA, 10 BB and 13T should be shared with the World Heritage Centre to help the State Party to assess if there will be any impact on the OUV of the property. However, Tullow’s “No-Go” commitment provides a strong policy basis for the company to operate in the region without causing any negative impacts to the Lake Turkana National Parks.

Figure 6: Location of oil wells in the South Lokichar Basin and Lamu-Lokichar pipeline



© Petroleum Economist (2020)

Figure 7: Location of exploration wells in Block 10 BA



© NMK, 2020

The Lamu-Lokichar Crude Oil pipeline will be constructed to transport crude oil from the oil fields in the South Lokichar Basin to the deep sea Lamu Port on the Kenyan coast. Tullow was expecting to produce up to 100,000 barrels per day from 2022, and transport them to the coast through the more than 800 km long pipeline. Wood Group Plc has completed the front end engineering design (FEED) providing two options that would cost around \$ 1 billion, including storage facilities. While Kenya was expected to make a decision by the beginning of 2020 for the construction of pipeline to start, the project is facing several setbacks, including difficulties in securing access rights to land and water. In addition, Uganda's decision in 2016 to export oil through Tanzania instead of Kenya has made the whole project also economically less interesting, especially when taking into consideration the falling prices for crude oil on the global market. In 2018, Tullow's operations at its South Lokichar Basin were temporarily halted due to protests from local communities regarding the deteriorating security situation in the area. Recent news in the media indicates that Tullow and Total aim to reduce their stakes in the project with a joint sale that could see Tullow exit completely and Total reduce its stakes by 25% amid uncertainty over the project's launch. In May 2020, Tullow declared a force majeure on its licenses and submitted a notice to the Kenyan Ministry of Petroleum and Mining. The FID of the project had already been postponed several times, and was targeted to be finalized at the end of 2020 will

be further delayed. This means that the construction of the pipeline would optimistically start in 2023, delaying the exploitation of crude oil in Turkana County. Tullow, which is facing financial challenges and has seen its shares plunge during the last year, is also in a dispute with the Kenyan Government over seeking a more than \$ 2 billion compensation for its six-year work in the Turkana. The Kenyan Government is of the opinion that the amount is inflated. Disagreement could lead to a court case, postponing the project even further. The Kenyan Government is keen to start building the pipeline, and NMK was recently tasked to conduct a cultural heritage assessment of the impact of the pipeline.

The mission is of the opinion that the Lamu-Lokichar Crude Oil pipeline, which will be buried two meters below the ground, will not impact the Turkana National Parks World Heritage property, as the pipeline will not cross the property nor any migration routes/wildlife corridors in and out of the property. The mission was informed that the Environmental and Social Impact Assessment (ESIA) scoping report of the Lokichar Lamu Oil pipeline was completed in 2018 and a draft ESIA has been finalized and submitted to NEMA, where it is currently in the process of being validated. The 2020 state of conservation report by the State Party states that the ESIA was conducted in all the six counties through which the pipeline is proposed to traverse, and that both the NMK, KWS and other stakeholders were consulted throughout the process. The state of conservation report further states that the ESIA is under validation with all the interested parties going through the ESIA document to submit their evaluation to NEMA before any license can be issued. The mission recommends that the State Party submit any ESIA documents regarding the Lokichar Lamu Oil pipeline that are already finalized to the World Heritage Centre for review by IUCN in accordance with Paragraph 172 of the Operational Guidelines and Decision 43COM7A.12.

A comprehensive risk assessment of Lokichar Lamu Oil pipeline was also conducted and published by WWF in 2019, and does not identify any direct risks to Lake Turkana or the property. According to the risk assessment, the pipeline is expected to cross the Kalabata and Endo rivers which are seasonal rivers flowing into the Kerio river, which is a tributary of Lake Turkana. However, because of the safety measures of crude oil pipelines today, the probability of an oil spill happening in the Lamu-Lokichar Crude Oil pipeline is fairly low (WWF, 2019). The impact on the flow of the Kerio River into the lake is expected to be very limited – even during construction, as the Kerio River contribution to the water balance of Lake Turkana is likely to be less than 5 m³/s on average per annum (Avery, 2012) with only water reaching the lake during some flash floods. Despite the low risk, the mission encourages the State Party to ensure that the management of the pipeline adheres to ISO 55000 and API RP 1173, which are requirements for an integrated and effective system for asset management, including pipeline safety and integrity management.

3.1.4 Turkana Geothermal Power Station

The Turkana Geothermal Power Station is located in the Barrier Volcanic Complex, which separates Lake Turkana to the north from the Suguta Valley and the small Lake Logipi to the south. The Geothermal project, which has been licensed to Olsuswa Energy Limited (No.1/2016), will be situated about 10 km south of the lake, and about 30 km south of the South Island National Park. The Barrier Volcanic Complex consists of 4 volcanoes, Kaloleyang, Kakorinya, Likaiu East, Likaiu West with the Kakorinya last erupting in 1921. Olsuswa Energy and Turkana County signed a deal for geothermal exploration in 2018, and the company is planning to start its operations in 2022. It will focus in a first development phase on generating 70 MW, which will then be extended in a later phase to 140 MW. The company has received a grant of one million US\$ from the African Union Commission (AUC), towards the development of its Turkana geothermal power plant, including a surface study and upgrading the site's infrastructure. The total cost of the Geothermal project is estimated at \$420 million. The power generated by the Turkana Geothermal Power Station will be fed into the national grid via the 400kV Loyangalani-Suswa transmission line, which is currently under construction by KETRACO. While the physical presence of a geothermal plant located in the Barrier Volcanic Complex will not impact the OUV of the property or even Lake Turkana, the main concern will come from the use of water. As geothermal plants use different technologies to generate electricity (i.e. direct steam, flash, or binary) and for cooling technology (i.e. water-cooled and air-cooled), it is not possible to assess the environmental impact of the power station without having the technical specifications. The mission is of the opinion that all extractive industries operating in the Turkana region, including the Turkana Geothermal Power Station, should follow the example of Tullow and subscribe to the 'no-go' commitment, preventing it from using water from Lake Turkana or any other water resource that might have an impact on the lake and its ecology. The ESIA that is currently being prepared will provide more clarification regarding the technology used and its demand for water resources.

While recognizing the need for development in the Turkana area, the mission considers - based on the information and data available – that out of the three development projects in Kenya highlighted in Decision 43COM7A.12 (Lamu Port-South Sudan-Ethiopia Transport Corridor Project (LAPSET), the Lamu-Lokichar Crude Oil pipeline from Turkana county to Lamu and the proposed development of the geothermal power station at the Barrier Volcanic Complex south of the property), the LAPSET project poses the most significant risk of generating cumulative impacts on the property (this of course if the South Lokichar Oil fields and the Turkana Geothermal Plant do not plan to extract any water from Lake Turkana). The LAPSET project might increase anthropogenic activities in and around the lake, resulting in increased

urbanization, industrial and household pollution, sewage disposal, motorized traffic, boating and fishing, etc. As all three projects are still in their design and planning phase, the mission recommends the State Party to assess all possible cumulative impacts of the projects, and apply the principles of 'precautionary approach' when considering any infrastructure development in the Turkana Basin.

It is however important to note that none of three planned infrastructure development projects will occur in the immediate vicinity of the property. The State Party is regularly requested in Committee Decisions to submit SEAs and IEAs of development projects occurring in the Turkana Area. These requests are the result of a lack of: (1) a comprehensive monitoring mechanism to assess changes in the lake system, (2) an overarching Master Plan regarding the development of infrastructure in the Turkana Basin, as well as (3) the absence of an adequate buffer zone protecting the property.

Comprehensive and long-term hydrological and limnological data sets, including water flow, pulse strength, ecological, biological, biochemical, chemical, physical and geological functions and characteristics of Lake Turkana are absent. The lack of data, and standardized methodologies for collecting and managing data, makes it extremely difficult to monitor the impact of both nationally and transboundary development projects on the lake and develop mitigation interventions in case needed. There is further a lack of an overarching vision and Master Plan for the protection of the lake guiding the development in the Turkana Basin. Such plan is critically needed as Lake Turkana is an extremely vulnerable environment to anthropomorphic activities. Environmental degradation of the lake will not only affect the OUV of the property but also have a major economic impact – as shown in the case of other endorheic lakes globally that are facing environmental degradation. There is currently also no formal coordination and cooperation mechanism between stakeholders that have jurisdiction regarding Lake Turkana and basin. This lack of coherence and coordination is leading to a fragmented vision and response in addressing the threats to the lake. Without an intragovernmental body/agency, comprised of inter-ministerial departments and possibly non-governmental research institutions, that has the authority to monitor and address critical issues and threats in a holistic manner, it will be impossible to strike a balance between much-needed economic development and environmental protection of the lake. Another issue already identified by the 2012 mission is that the current composition of the property is actually inadequate to represent and protect its OUV, including the inclusion of sites under cultural criteria. In addition, the absence of an adequate buffer zone to protect the property from any adverse effects of development at landscape level. The buffer zone should be governed by an adequate legal or policy framework guaranteeing the required added layer of protection for the property. The size, characteristics and authorized uses of the buffer zone should be developed using the procedure for a minor boundary modification (see

Paragraph 164 and Annex 11, Operational Guidelines for the Implementation of the World Heritage Convention). The State Party of Kenya should also engage with the State Party of Ethiopia to having the Buffer zone extend to areas of the lake located in Ethiopia.

In order to address the above issues, the mission recommends the State Party to:

- Develop a national overarching Master Plan for development in and adjacent to Lake Turkana to avoid any negative impacts on the Lake system and OUV of the property, including prohibiting the use of water from the lake or any important tributaries for the construction and operation of large-scale infrastructure and development projects in the Turkana region;
- Establish intragovernmental Lake Turkana Management Body/Authority that identifies existing conditions and problems, and lays out instructions for short and long-term management of the lake;
- Re-design the property, to include a larger portion of the lake as well as important fossil sites currently outside the property and re-nominate the property under both natural and cultural criteria, as recommended by the 2012 Reactive Monitoring mission. As part of this process, the State Party is recommended to establish a World Heritage (WH) Buffer zone to the property, possibly covering the whole lake and other critical terrestrial areas, as an added layer of protection with complementary legal and/or customary restrictions regarding its use and development.

3.2 Decline in biodiversity

3.2.1 Poaching

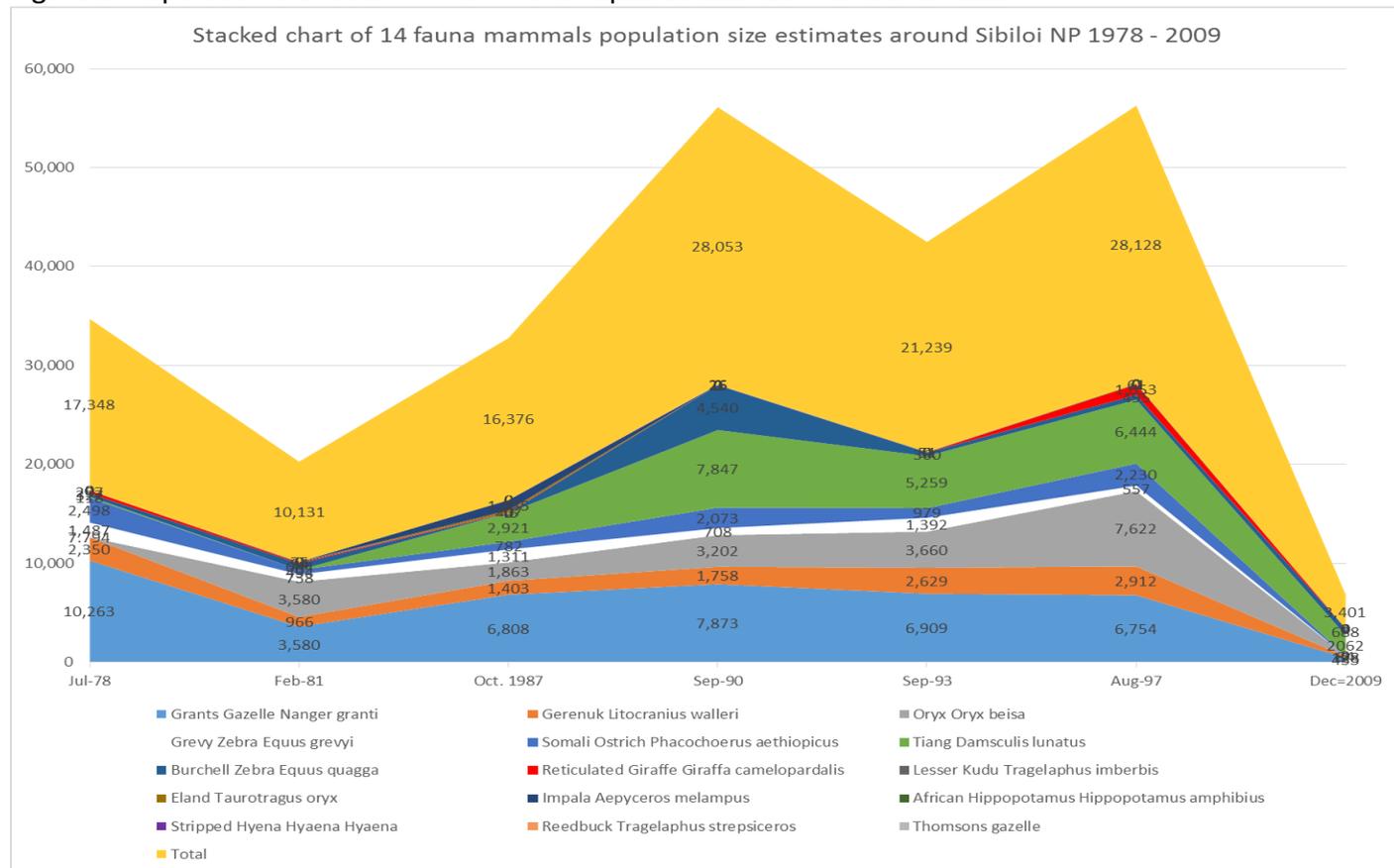
The cataclysmic declining trends in wildlife populations in the property during the last decennia can be regarded as the most serious threat to the property. The defaunation or the disappearance of flagship species in the property has reached worrying levels. In its evaluation at the time of the inscription in 1997, IUCN noted that wildlife populations had been decreasing, that during the dry season many thousands of domestic stock were grazing in the park displacing the already low wildlife populations. The report of the reactive monitoring mission in 2012 also expressed its concern regarding the decline in wildlife populations, and requested the State Party to urgently improve law enforcement and implement other actions to reverse the trends.

The complete collapse of wildlife populations, including the local extinction of several flagship species, in the property, especially in the SNP, has led to an “empty savanna syndrome”. While some of the decline in wildlife populations could be attributed to droughts and diseases, it is

generally accepted that the main driver of the decline is poaching and displacement of wildlife through livestock competition. The Marsabit County Integrated Development Plan (2013-2017) confirms this assumption and states: “Besides natural threats from drought and diseases, the wildlife population in Marsabit County is being decimated by poaching”. The recent proliferation of illegal semi-automatic arms in the region is directly related to the trends in poaching. The decline of wildlife has seriously eroded the values under criterion (x) for which the property was inscribed on the WH List. The only wildlife encountered by the mission during its three-day visit to the SNP were a few individuals of common ungulate species found in the vicinity of the KWS Headquarters in Alia Bay, where they are de facto protected by the rangers’ presence. However, poaching seems omnipresent in SNP with several reports being shared with the mission of pastoralists shooting at wildlife. During an incident in 2010 even within 5 km of the park headquarters at Alia Bay, several poachers with guns were seen shooting at a herd of zebra (Avery, 2012).

Research conducted by Global Change and Conservation (GCC) Lab, Faculty of Biological and Environmental Sciences, University of Helsinki, show that the wildlife populations have drastically declined during the last decades with several species assumed to be locally extinct, including large cats such as lions and leopards. A camera trap of the University of Helsinki team took a picture of a cheetah carrying a grant gazelle in SNP in June 2017. The image was taken at around 7 AM. About 3 hours later, the same camera trap took a picture of a herd of grazing goats. This shows that it would be possible for wildlife to recover in the property, if threats such as poaching and livestock encroachment, can be efficiently dealt with.

Figure 8: Population trends of 14 mammalian species between 1978 and 2009.



© University of Helsinki Research team/Mar Cabeza

Out of the 43 mammals that were initially identified to occupy SNP, an increasing number is becoming locally extinct, including the wild dog *Lycaon pictus* (EN), lion *Panthera leo* (VU), reticulated giraffe *Giraffa camelopardalis reticulata* (EN) and Grevy's zebra *Equus grevyi* (EN). During the visit of the mission, a large carnivore survey was being conducted in the SNP. While the carnivore survey team has yet to publish its findings, they did not encounter any lions or wild dogs in the property, indicating that (1) these species have been poached to extinction, or that (2) they relocated outside the property as there was not enough prey to sustain their existence. Though the mission was not able to access any empirical data regarding the decline of large carnivore populations in the park, it is of the opinion that human-carnivore conflict is the primary driver of the decline in carnivore populations in the property. Large carnivores often require expansive habitats and large prey. These food and habitat requirements are viewed by pastoralist communities living adjacent to the property as a serious threat to their livestock. In spite of the government banning trophy hunting since 1977, the negative perception of pastoralist communities and their retaliatory actions as a result of livestock predation, combined with

limited capacities to enforce the law by management authorities, has killed off many of the top predator species in the property.

Table 1: Species observed in SNP during standardized surveys (presence-absence) 2016-2018

Class	Order	Species	Common name	IUCN Red List	IUCN Red List population trends
Mammalia	Carnivora	<i>Proteles cristata</i>	Aardwolf	LC	stable
Mammalia	Carnivora	<i>Felis silvestris</i>	African wild cat*	LC	decreasing
Mammalia	Carnivora	<i>Otocyon megalotis</i>	Bat-eared fox	LC	stable
Mammalia	Carnivora	<i>Canis mesomelas</i>	Black-backed jackal*	LC	stable
Mammalia	Carnivora	<i>Caracal caracal</i>	Caracal	LC	unknown
Mammalia	Carnivora	<i>Genetta genetta</i>	Common genet*	LC	stable
Mammalia	Carnivora	<i>Canis aureus</i>	Common jackal	LC	increasing
Mammalia	Carnivora	<i>Crocuta crocuta</i>	Spotted hyaena*	LC	decreasing
Mammalia	Carnivora	<i>Hyaena hyaena</i>	Striped hyaena*	NT	decreasing
Mammalia	Carnivora	<i>Ichneumia albicauda</i>	White-tailed mongoose	LC	stable
Mammalia	Carnivora	<i>Acinonyx jubatus</i>	Cheetah	VU	decreasing
Mammalia	Cetartiodactyla	<i>Hippopotamus amphibius</i>	Common hippopotamus**	VU	stable*
Mammalia	Cetartiodactyla	<i>Phacochoerus africanus</i>	Common warthog	LC	decreasing
Mammalia	Cetartiodactyla	<i>Litocranius walleri</i>	Generuk*	NT	decreasing
Mammalia	Cetartiodactyla	<i>Nanger notata</i>	Grant's gazelle*	LC	decreasing
Mammalia	Cetartiodactyla	<i>Madoqua guentheri</i>	Gunther's Dik-dik*	LC	stable
Mammalia	Cetartiodactyla	<i>Damaliscus lunatus</i>	Topi	LC	decreasing
Mammalia	Eulipotyphla	<i>Atelerix albiventris</i>	African hedgehog	LC	decreasing
Mammalia	Lagomorpha	<i>Lepus victoriae</i>	African Savanna hare	LC	unknown
Mammalia	Perissodactyla	<i>Equus quagga</i>	Zebra*	NT	decreasing
Mammalia	Primates	<i>Papio anubis</i>	Olive baboon*	LC	increasing
Mammalia	Primates	<i>Galago senegalensis</i>	Senegal galago*	LC	Stable
Mammalia	Rodentia	<i>Hystrix cristata</i>	Crested porcupine	LC	unknown
Mammalia	Rodentia	<i>Xerus rutilus</i>	Unstriped ground* squirrel	LC	stable
Mammalia	Rodentia	<i>Acomys kemp</i>	Kemp's spiny mouse	LC	stable
Mammalia	Rodentia	<i>Acomys percivali</i>	Percival's spiny mouse	LC	stable
Mammalia	Rodentia	<i>Gerbillus sp.</i>			
Mammalia	Rodentia	<i>Gerbilliscus sp.</i>			
Mammalia	Rodentia	<i>Taterillus sp.</i>			
Mammalia	Rodentia	<i>Heterocephalus glaber</i>	Naked mole rat	LC	stable
Mammalia	Tubulidentata	<i>Orycteropus afer</i>	Aardvark	LC	unknown
Mammalia	Chiroptera	<i>Pipistrellus rueppellii</i>	Rüppel's Pipistrelle,	LC	unknown
Mammalia	Chiroptera	<i>Neoromicia nana</i>	Banana Pipistrelle Bat	LC	unknown

Mammalia	Chiroptera	Nycticeinops schlieffeni	Schlieffen's Bat	LC	unknown
Mammalia	Chiroptera	Lavia frons	Yellow-winged bat	LC	stable
Mammalia	Chiroptera	Cardioderma cor	Heart-nosed Bat	LC	unknown
Mammalia	Chiroptera	Nycteris hispida	Hairy Long-eared Bat	LC	stable
Mammalia	Chiroptera	Nycteris thebaica	Cape Long-eared Bat	LC	unknown
Mammalia	Chiroptera	Taphozous mauritanus	Mauritian Tomb Bat	LC	unknown
Mammalia	Chiroptera	Taphozous hamiltoni	Hamilton's Tomb Bat	DD	unknown
Mammalia	Chiroptera	Taphozous perforatus	Egyptian Tomb Bat	LC	stable
Mammalia	Chiroptera	Coleura afra	African Sheath-tailed Bat	LC	unknown
Mammalia	Chiroptera	Rhinopoma macinnesi	Macinnes's Mouse-tailed Bat	DD	unknown
Mammalia	Chiroptera	Mops condylurus	Angolan Mops Bat	LC	unknown
Mammalia	Chiroptera	Mops demonstrator	Mongalla Mops Bat	LC	decreasing
Mammalia	Chiroptera	Chaerephon pumilus	Little Free-tailed Bat	LC	unknown

© University of Helsinki Research team/Mar Cabeza

*Species recorded near Alia Bay by Sean Avery in December 2019

** Based on information from the field visit and discussion with experts, the mission is of the opinion that the population of Common hippopotamus has drastically decreased during the last decade.

During the mission's visit to Ileret, Daasanach community members referred to the presence of hyenas as a threat to their livestock. This might be related to the steep decline in prey due to poaching in the SNP. Hyena populations are also known to increase when the numbers in big predators, such as lions, are on the decline (pers. comments. Avery, 2020). Poaching has undoubtedly led to a steep decline in ungulates in the park, including the local extinction of the Grevy's zebra and the reticulated giraffe. Other factors leading to the decline in the population of Grevy's zebras have been attributed to competition for resources and habitat degradation caused by expanding human livestock populations (Williams, 2002). Livestock diseases, such as Antrax, are also known to have been impacting Grevy's zebra as well as other wildlife populations (Muoria et al. 2007). The 2012 mission also expressed concern that the loss of seasonal fluctuation of the lake levels would result in the disappearance of flood plain, impacting both fish breeding stocks but also ungulates that depend on grazing on these floodplains.

Poaching is attributed to pastoral communities living in the vicinity of the park, who prefer to kill wildlife for subsistence food rather than their livestock. The mission was informed that the pastoral communities have even poached the population of hippopotamus as well as several bird species to near (local) extinction. Historically, Lake Turkana was known to hold a substantial hippo population (see SOUV of the property). The hippo population in the lake has drastically declined with only a small population remaining near Alia Bay, where the headquarters of KWS

are located. The mission also received information regarding the decline in raptors, including vultures in the property. This is probably linked to the decline in wildlife as well as revenge killing. Poison (toxic carbamate-based pesticides such as carbosulfan) are sprinkled over carcasses by pastoralists to kill hyenas and other predators in retaliation for attacking livestock. If not poisoned, the presence of livestock carcasses in SNP and the adjacent landscape could help to play an important role in maintaining vulture populations in SNP. This was confirmed by an observation of a bird survey team that was reported in the State Party's state of conservation report 2020: "On our way to Koobi Fora we were pleasantly surprised to bump into a flock of vultures feeding on a goat carcass. There was Ruppell's griffon vulture (CR), African white-backed vulture (CR), white-headed vulture (CR) and lappet-faced vulture (EN) competing for food with dwarf raven (LC) and steppe eagle (EN)".

Hunting of Grevy's zebra for meat was widely acknowledged at Ileret (a settlement just north of the SNP) and North Horr, primarily for subsistence use but also for sale, indicating the existence of a local market for bushmeat (Parker et al. 2017). Wildlife parts might also be used for cultural ceremonies or medicines. At a community consultation meeting during the mission, the Daasanach community in Ileret requested to KWS to establish a depository of wildlife parts that could be used for their ceremonies, which require ostrich feathers, giraffe or oryx tails and the skin of leopard or cheetah. It is the mission's opinion that this request should be taken into consideration and be part of a much larger social contract between SNP authorities and the adjacent pastoral communities.

Two recent articles in Swara Magazine regarding the SNP provide a realistic description of the wildlife declines in the park:

- "In a recent expedition in the area, we found only a handful of oryxes, a dozen zebras, a few topis and two gerenuks, all restricted to the southern part of the park. Large birds such as ostrich were missing, though a few bustard species were observed (Crested, Heugling's). Vultures, expected to be abundant, were surprisingly rare." (Cabeza et al. 2016)
- "Our first clue of what was to come were the goats that replaced the gazelles at the national park entrance. After traveling 100 kilometres inside the park we had seen five Grant's gazelle, four dik diks and three golden jackal. Yet aerial surveys by the then game department during the 1960s and 70s indicate that ungulates along this stretch of northern Turkana numbered more than 8,000. Ouch! Clearly, we'd been duped. This was no longer a park, it was a glorified cow pasture. We conversed with the locals to better understand the lack of wildlife and they told a story fit for a Hollywood action drama. Invasions, fighting and drive-by shootings (of wildlife)." (Ogada, 2017)

The proliferation of automatic guns, including AK47s and G3s, in pastoral communities along the Kenyan-Ethiopian border has not only increased inter-ethnic conflicts but also resulted in more effective poaching/hunting practices. The introduction and spread of such sophisticated weapons among these communities has intensified conflict and blurred the line between long-standing ethnic competition-traditionally manifested in cattle theft or rustling-and political violence (HRW, 2002). The price of automatic guns in the Kenyan-Ethiopian border region, which is currently set at about five cows, has stimulated the proliferation of guns in the vicinity of the property. While there are many scientific studies explaining the impacts of the proliferation of guns on the social fabric of society in northern Kenya, limited data is available regarding the impact on wildlife. A study on Grevy's zebra conducted by Parker et al. (2017), shows that illegal hunting of the species appears to be wide-spread and being most prevalent in Ileret, which is located next to the SNP. It can be assumed that other wildlife species suffer from the same hunting pressure. The mission was informed of the decline of hippos in the lake due to poaching with only a population remaining in SNP. A paper by Ogutu et al. (2016) on wildlife declines in Kenya, provides a comprehensive analysis of the decline of wildlife in all Kenyan counties, including Marsabit and Turkana counties. Low wildlife densities in these counties can be attributed to harsh climatic conditions and competition with pastoralists' livestock for forage and water resources, as well as poaching and insecurity (Ojwang et al. 2016). However, as mentioned earlier in the report, the main driver for the decline is assumed to be poaching.

During the mission's visit to SNP, KWS rangers and NMK researchers stated that pastoralist youth are often the main protagonists in poaching. When pastoralist boys in the Turkana area become teenagers, they are initiated into adulthood and allowed to own a gun. Turkana pastoral communities are egalitarian societies with a social systems involving clan lineages and age sets, whereby a group of individuals in the community of roughly the same age (youth) assume the responsibility for their family's herds while the elders will play an advisory role in regard to selection of pastures, etc.

These youths are often more confrontational than the elders to prove their bravery. A SNP ranger informed the mission that these youths kill all the wildlife they encounter when they are encroaching in the SNP with their herds of livestock. The mission was told that rangers have several times been shot at by pastoralist youth, including in a recent incident dealing with illegal fishing. Most pastoralist communities interacting with the property, i.e. Daasanach, Gabbra and Turkana, have an internal political organ that promotes bravery and, if necessary, violence – for example, for the ascension of young men through the age-set system from shepherd boys to warriors (Mkutu, 2007). This imbedded demonstration of masculinity amongst youth might

explain their attitude towards wildlife, or their hostility towards the park authorities managing the property.

The historical wildlife corridors that once connected SNP with other key habitats, including in Ethiopia, have disappeared due to poaching, human settlements, and increased livestock population at landscape level. This isolation poses a threat to the long-term viability of SNP's wildlife population. As the restoration of historic corridors linking the SNP with the remaining key habitats has become more challenging, it is important to develop a long-term plan that re-strategizes conservation at landscape level through the establishment of community conservancies as well as guarantees the reintroduction and genetic health of wildlife populations. If the declining trends in wildlife species cannot be halted in the near future, the property is at risk of losing its values under criterion (x). While Kenya has developed several national recovery and action plans for species that historically occurred in the property (i.e. Grevy's zebra, reticulated giraffe, lion & spotted hyena), as reported in the 2019 and 2020 State Party's state of conservation reports, none of these plans provide specific roadmaps for the recovery of these species within SNP. To help with the reintroduction of wildlife in SNP, the State Party should consider establishing PPP and/or supporting private schemes, as such endeavors will be time-consuming and require long-term funding.

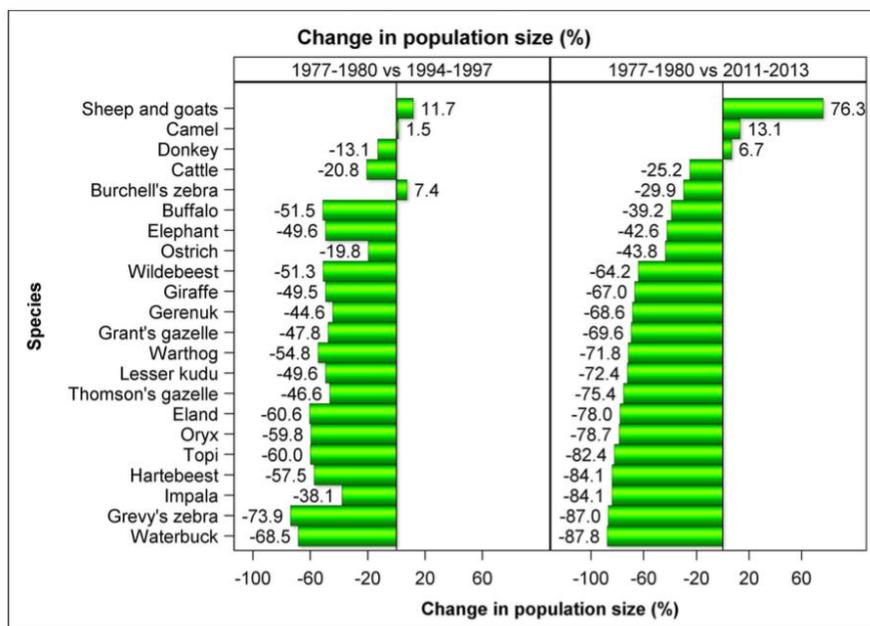
The new management plan for the property includes a section on investigating the feasibility of relocating Grevy's Zebra within a fenced sanctuary in the SNP. The mission is of the opinion that the State Party should try and reintroduce all species that have been locally extinct since the inscription of the property on the WH List to ensure that the values under criterion (x) can be restored. However, the mission is also of the opinion that reintroduction - even within a fenced sanctuary - will only be viable when the threats that were at the origin of the decline in wildlife populations have been adequately addressed by the State Party.

3.2.2 Livestock grazing

One of the main threats to SNP is the rapid increase in both human and livestock populations in the region, which are assumed to cause overgrazing and soil erosion. However, there is a decline in per-capita livestock wealth in the region, and therewith a growing dependence on food aid (Avery, 2013). There are several pastoral communities interacting with the property, including Daasanach, Gabbra and Turkana. These pastoral communities all follow patriarchal and hierarchical socio-economic system, whereby small livestock such as goats and sheep are used for cash and protein, and larger livestock, especially cattle, is denoting status and wealth within the community (Parker et al. 2017).

Livestock keeping is the backbone of Marsabit county's economy with approximately 80 percent (%) of the county's inhabitants deriving their livelihoods from livestock enterprises and close to 70% of the rural labour force employed in the livestock sub-sector (Bridge Africa ADC, 2018). Livestock is also a major contributor to Kenya's economy, providing more than 10% of the national GDP. While there are no figures for the livestock in communities around the SNP, the Marsabit county has a substantial livestock resource base that includes 420,000 cattle, 2,029,490 goats, 1,851,452 sheep, 217,360 camels, 81,900 donkeys and 45,860 chicken (County Government of Marsabit, 2018). While the mission could not assess whether the livestock population has grown over the last decennia, it is assumed that the areas adjacent to the SNP are following the national trends (see figure 9) and increases steadily in line with the increase in human population. It is the general perception that both the population of Daasanach and livestock have dramatically increased during the last decennia (Willnerd, 2018). This could be related to the fact that more sheep and goats are now being raised or that Daasanach in Ethiopia are moving with their livestock south into Kenya due to the Lower Omo developments.

Figure 9: Percentage changes in numbers of each livestock and wildlife species aggregated across all the 21 rangeland counties of Kenya between 1977–1980 and 1994–1997 and between 1977–1980 and 2011–2013.



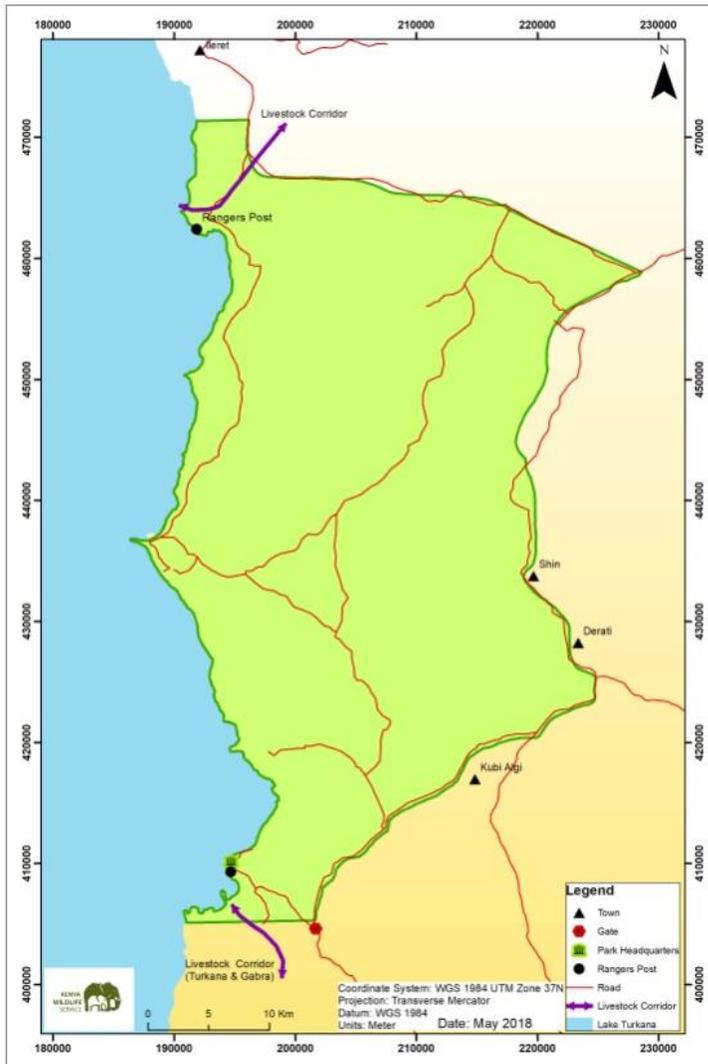
@ Ogutu, et al. (2016)

Since there are limited livelihood opportunities in an arid environment such as the Turkana Basin, pastoralism is still the main mode of production in the area. On top of that there is the cultural aspect, whereby livestock is regarded as measure of wealth by pastoral communities. As the majority of the communities living adjacent to the SNP are fully dependent on livestock for their

livelihood survival, their decisions on where and how to manage their livestock is highly influenced by weather and climatic conditions, as well as the natural environment. Pasture is essential for the herds' survival and many protected areas in Marsabit (including SNP) were strategic grazing areas and particularly important in seasonal movement patterns (Hazard and Adongo, 2015). When the SNP was declared as a national park in 1973, an agreement was established between the Ministry of Tourism and Wildlife and the Marsabit County that included that (1) the local inhabitants of the surrounding areas of the National Park would be given access to water and grazing in times of difficulties, (2) the Marsabit County should have the right of access to the lake shores wherever the lake boundary is enclosed by the national park and thereupon to undertake any sort of activity which may benefit the council. Access to the park was provided to the communities as they had traditionally been using the park as a strategic pasture in their rangeland management. From the discussions by the mission during the visit to SNP, it was understood that pastoral communities were bringing their livestock into the park following seasonal movement patterns (i.e. from the higher elevations during the wet seasons to the lake shores during dry periods) even before the park was established. This fact was confirmed by a recent study examining the governance of the pastoral commons in the case of the Daasanach community (Mwamidi et al. 2018).

During a meeting between the mission and the Daasanach community in Ileret, it was clear that the community perceives that the SNP, as an alien land management concept, which is imposing management systems in the use and of natural resources and restricting their 'rights' to access their traditional pastoral lands. This negative perception of the SNP at community level has resulted in a difficult relationship between NP authorities and the local communities.

Figure 10: Livestock corridors in SNP



© KWS-NMK

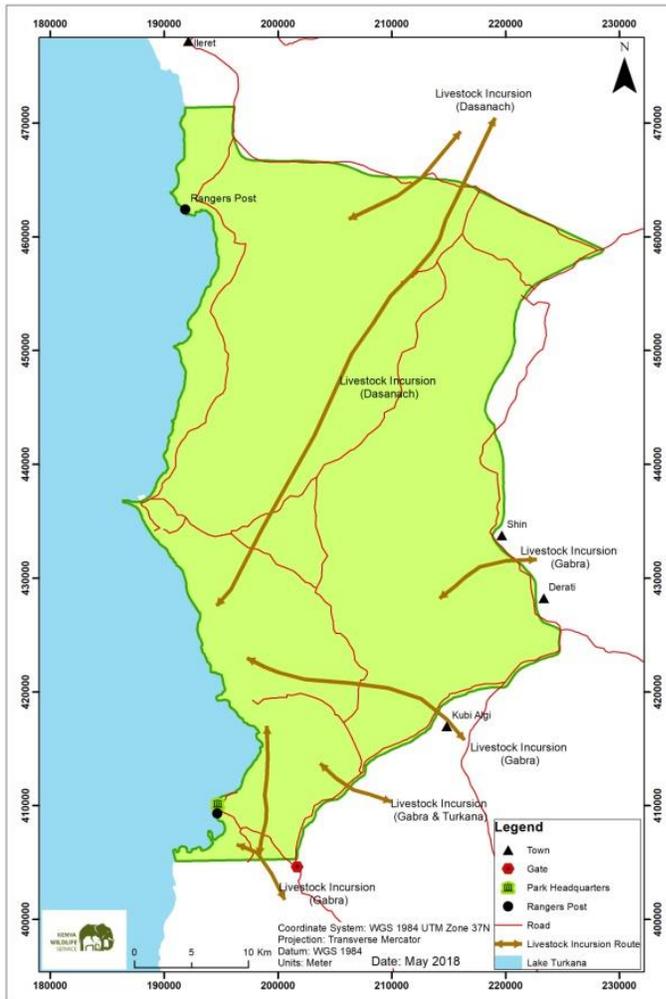
As the legal understanding regarding “times of difficulties” is broadly interpretable, two corridors were established in the north and south of the park to provide communities access to the lake and pasture. However, due to the increasing human and livestock population in the vicinity of the park, these original corridors (from Ileret to the Kimere river in the north for Daasanach community and from the southern border of SNP to the peninsula near Alia Bay for Gabbra and Turkana communities) are no longer respected, as already identified and highlighted in the report of the 2012 Reactive Monitoring Mission. Regulation of access has not been effective and SNP is now used by pastoralists throughout the year (WHC-IUCN, 2012); a factor which should be seen within the whole context of pressures on pastoralism around the lake (Stolton et al. 2019).

During the mission, livestock were encountered in nearly all of the SNP. This despite the efforts of the State Party in addressing Committee Decision 36 COM 7B.3 (requesting the State Party to identify grazing areas outside the property and provide pastoralist communities with access to water) by establishing boreholes outside the park (Darade, North Horr) as a deterrent for livestock incursion into the park (see State Party state of conservation 2019 report).

It is especially the northern part of the park that seems to be suffering from serious livestock encroachment resulting in what is assumed overgrazing, trampling of fossil sites, an increase in shrub vegetation and competition with wildlife. The mission was informed by stakeholders that during drier periods the park is encroached by large numbers of livestock. Cattle bomas, used to protect livestock from predators, especially hyenas can be commonly found within SNP. These bomas, which are built using branches/twigs illegally cut in SNP, can even be seen on Google Earth (see Figure 11).

The encroachment of livestock in the national park is driven by human population growth and most likely also by increased migration from the Lower Omo resulting in increased livestock population and limited availability of pasture land. The situation is worsened by limited livelihood diversification opportunities, but also by increasing aid dependency and changes in human settlement and livestock movement patterns, i.e. from nomadic to semi-settled pastoralism. This rapid societal change or evolution in the pastoral system is very visible in Ileret, located north of SNP, which has become an area with an increasing human population of settled pastoralists. Many of the Daasanach settlements are no longer moving based on the seasons, but staying in place, which has led to an increasing concentration of livestock populations within the park boundaries, and having a noted impact on the vegetation coverage (Willnerd, 2018). These changing patterns are harming SNP's natural habitats as well as possibly resulting in an increase in the spread of diseases from livestock to wildlife. During the rainy season, the livestock herds will stay close to the settlement, as there is enough pasture to feed them. In the dry season, the elders, women and children will remain in the settlement, while the youth/younger people will be given the responsibility to protecting and herding the cattle to dry season pastures, including in the SNP.

Figure 11: Livestock encroachment in SNP

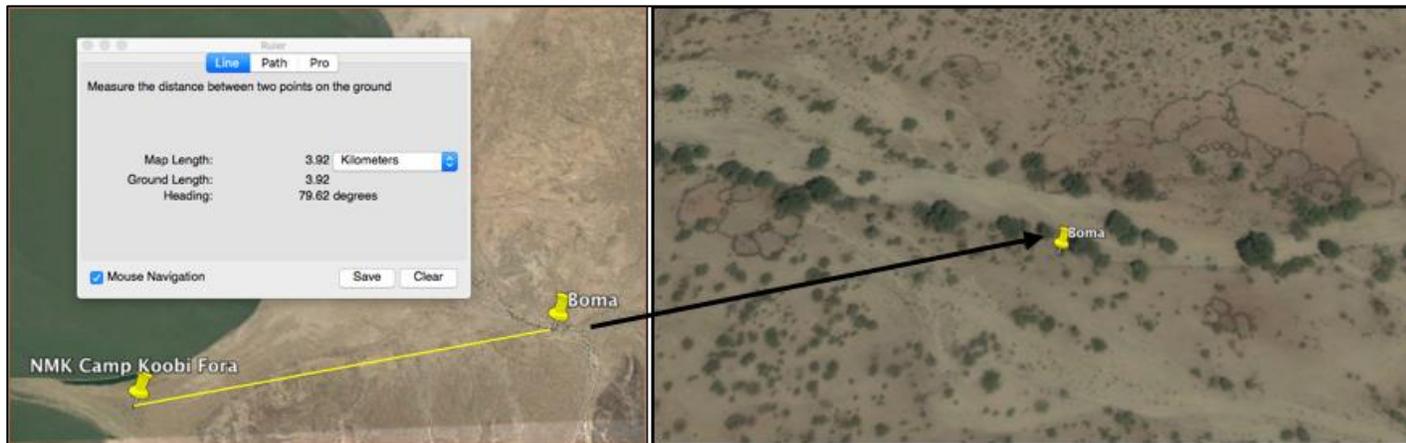


© KWS-NMK

As no in-depth ecological studies regarding the current (over)grazing practices by pastoral communities in SNP have been conducted, it was difficult for the mission to assess the genuine impact of livestock encroachment on the wildlife and ecology of the park, including the lake's riparian areas around the lake. Ecological impacts of (over)grazing by livestock in SNP might result in changes in vegetation cover and structure, including the spread of the invasive mesquite (*Prosopis juliflora*). Soil erosion and soil degradation that follows overgrazing gives mesquite seedlings a competitive advantage in the poorer, nitrogen deficient soils, and browsing and cutting result in the formation of multi-stemmed shrub forms (Pasiiecznik et al. 2001). Mesquite leads then to further pasture or ecosystem degradation by overtaking much of the other vegetation, and is thought to be partly responsible for the local extinction of the Grevys zebra.

Overgrazing and changes in vegetation can also lead to a decline in small mammals and birds, which will become more exposed to birds of prey. A study on small mammals conducted in the Turkana region, including Koobi Fora (Webala et al. 2010), indicates the importance of habitat structural complexity in the conservation of small mammals and suggests that overgrazing could be a major limiting factor for small mammal communities. Species adapted to open habitats, such as the African Savanna Hare, are often positively affected by grazing, while species needing denser cover are negatively affected (Schielz and Rubenstein, 2016). Spatial separation of wildlife and livestock has been observed around water sources and pastures in northern Kenya, with livestock concentrated in areas close to permanent water and pastures, and wildlife further away (de leeuw et al. 2001). This indicates that ungulates might not have access to the same water and pastures as livestock, and thus be in a disadvantaged position during periods of drought. Overgrazing of the lakeshore riparian vegetation/lacustrine grassland might have a serious impact on the ecology of the property, as this is the habitat that hosts the most biological diversity in SNP, including most migratory birds.

Figure 12: Bomas for livestock in SNP located about 4 km northeast of Koobi Fora camp



© Google Earth

However, during the last decennia an increasing number of scientific studies have been published that show the ecological benefit of grazing against the traditionally perceived degradation caused by pastoralists (Lunt, et. al, 2007b; Krätli and Schareika, 2010; Notenbaert et al. 2012). Despite recurrent competition for resources or direct consumption of wild animals, local/traditional herding governance systems can also have positive implications for wildlife and landscape heterogeneity that allows for the creation of different biodiversity pools (Fynn et al. 2015). Especially with adequate measures in place, the impacts from livestock might benefit ecosystem health or wildlife habitat, making a robust case for pursuing conservation objectives through pastoralism rather than seeing conservation and pastoralism as mutually exclusive pursuits (Notenbaert et al. 2012). Positive benefits of well managed grazing practices include control of

biomass of existing potentially dominant, grazing-sensitive plants (native or exotic), (2) prevention of encroachment by undesirable, grazing-sensitive, potential dominants, (3) provision of disturbance niches required by rare or significant plant species, (4) maintenance fauna habitat structure or (5) enhancement of the diversity of species and vegetation structures across the landscape, especially when most of the landscape is ungrazed (Lunt, et. al, 2007b). Livestock grazing in SNP might also help to maintain vulture populations, as they feed on livestock carcasses, but more research will need to assess the importance of cattle carcasses in sustaining vulture populations.

To achieve a sustainable coexistence between pastoralist herds and wild ungulates in SNP, the mission recommends that the State Party conduct a comprehensive scientific study to assess the current impact of grazing and grazing capacity in SNP. The study should outline sustainable grazing practices and regulations to minimize the negative impacts of grazing and ensure a balance between conservation and socio-economic needs of pastoralist communities. The study could assess the impact of current grazing practices by establishing permanent grazing free plots to compare the difference in vegetation between grazing and non-grazing. It is important that such study looks at a wide variety of factors including vegetation type, rainfall variability, length of encroachment, biomass, number of livestock and wildlife populations interacting with the park and provides a set of recommendations for the management of livestock herds within the park that allows for wildlife populations to thrive. The study should also assess the importance of livestock carcasses in SNP in sustaining the wild vulture populations. Sustainable management practices that might be allowed in the park could include limitation on number of cattle and temporary or permanent exclusion of grazing in ecologically fragile and impacted areas.

An indirect impact of livestock encroachment is poaching of wildlife. Most pastoralists possess semi-automatic weapons to protect their livestock from rustling, which is very common in the area. These weapons are also used in opportunistic poaching - mostly for food. The widespread availability of weapons in communities in the Turkana landscape has resulted in a growing militarization of these communities, making law enforcement to secure the SNP very complex. The relationship between the SNP and surrounding pastoral communities, especially the Daasanach, has been strained. This has often resulted in an open conflict, creating a dangerous situation for the park rangers, who are outnumbered and do not possess the same firepower as the local communities. Park authorities informed the mission that especially the Daasanach community does not respect the originally designated SNP corridors to the lake and encroach the park at their own goodwill. The encroaching Daasanach pastoralists are often armed with automatic weapons, making law enforcement extremely dangerous. The mission was informed that in case of a dispute with encroaching pastoralists, they are able to quickly gather a large group of armed youths and outnumber the park rangers. The inadequate policing of the SNP due

to a lack of human resources has led to a situation whereby the pastoralists can encroach with the livestock with impunity.

Due to societal change in the Daasanach community, the authority that elders held over the youth is also being eroded, making it more difficult to conduct negotiations with the community. The decline of customary traditional authority relations most likely results from a combination of influences including government administrative systems imposed on the Turkana, economic disenfranchisement and displacement of communities, access to weapons (providing young Turkana men with a new sense of power and independence), and privatization of Turkana lands and resource 'commons' (Carr, 2017).

Park authorities disclosed to the mission that they are able to engage the Gabbra elders when their youths are encroaching with their livestock in the southern end of the park. The elders will then lead discussions with the youths who as a consequence will often remove their livestock from the park. In the case of the Daasanach, the park authorities said that it was much more difficult to come to an agreed settlement in which the youth will take their livestock out of the park, as the elders do not have the same traditional authority they used to have in the past. Elders and the chiefs of foras (settlement) would traditionally provide advice regarding grazing rotations, but these are being ignored by the younger generation, resulting in the erosion of conservation ethics as many of the younger pastoralists do not think of the future and the preservation of grazing land for future use – as the elders do (Willnerd, 2018). There is also a conflict between the Daasanach and the Gabbra, especially during long dry spells, in regard to pastures located inside SNP with both claiming ownership.

There have been several initiatives by the property authorities to reduce the pressure of grazing within SNP. In 2011, a number of grazing committees were established, comprising members of pastoralist communities adjacent to SNP. In 2013, the Daasanach were assisted in developing a grazing plan for pastures outside the property, and a Natural Resource Management (NRM) team was formed and trained in support of the grazing plan. The failure to implement the 2013 grazing plan and the ineffectiveness of the grazing committees and NRM team in executing their duties (Management Plan 2018-2028) is according to the mission most likely caused by socio-cultural and socio-economic dynamics and environmental factors (see above). The new Management Plan 2018-2028 has several actions that intend to promote, support and increase the capacity of the NRM team and grazing committees so that the grazing plan objectives are achieved for the benefit of the community and conservation agenda. Due to ineffectiveness in the past of these committees and teams, the mission highly recommends that the State Party use anthropologists to help develop all community engagement interventions in the management plan to ensure that they are socio-culturally appropriate.

To halt the current threats of livestock encroachment in the property, the mission recommends that the State Party support a two-fold approach to conservation that is also partly reflected in the management plan of the property (2018-2028), and focusses on enhancing law enforcement while at the same time addressing livelihood issues of local communities. Solutions for addressing livelihood issues could include conditional cash transfers or payments for development services to communities for not encroaching in the park. Such schemes could also include the provision of Index-Based Livestock Insurance (IBLT) for pastoralists adjacent to SNP. IBLT which was designed by ILRI to protect pastoralists against prolonged forage scarcity and triggers payment to pastoralists to help maintain their livestock in the face of severe forage scarcity.

3.2.3 Change in land cover of Omo-Turkana Basin

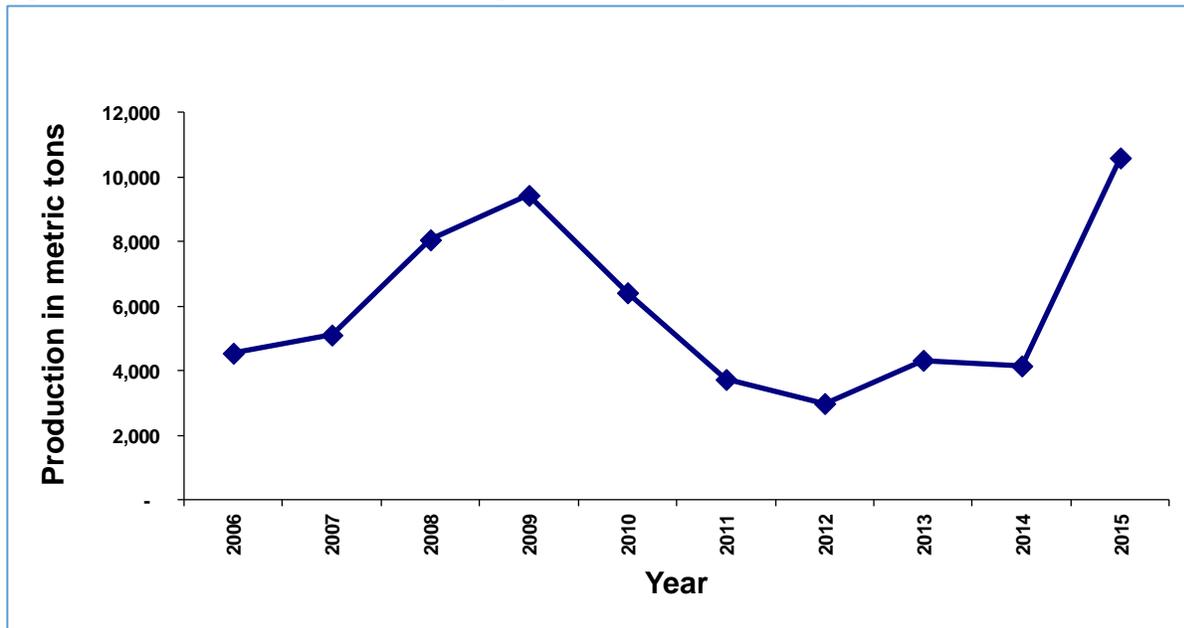
Though the mission was not able to access any recent data regarding the land cover change, including annual deforestation or degradation trends, in the Omo-Turkana Basin, it is generally assumed that this poses a serious threat to the lake system and property. Due to increasing population pressures, the use of natural resources in and adjacent to property has intensified during the last decades. The rapid change in land cover and environmental degradation occurring in the wider Omo-Turkana basin, which is driven by the extraction of fuel wood, conversion of land for agriculture, and overgrazing by livestock, is not only impacting the lake but also results in the loss of habitats and related decline of wildlife populations. The land degradation and desertification is evident in Marsabit county including soil degradation through pulverization, compaction, fertility loss, soil erosion, salinity and acidity, which overall contribute to rangeland degradation (Marsabit County Development Plan 2013-2017). Forests and vegetation have been cleared in the Omo-Turkana Basin through human activity, increasing runoff rates, accompanied by accelerated soil erosion and increased sediment runoff into rivers for conveyance downstream, already noticeable in the changes in the areal extent of the Omo delta (Avery, 2012). The estimated amount of wood extracted in Marsabit County on an annual basis is 16,382 tonnes, with about 416 bags of charcoal bags are sold in Marsabit town daily (Marsabit County Development Plan 2013-2017). The Lake Turkana National Parks Management Plan 2018-2028 proposes an action to address this issue through collaboration and supporting reforestation programmes in Lake Turkana water catchment areas. However, without being part a larger policy framework that promotes sustainable land management at landscape level, such reforestation activities will not be sustainable. The mission advises that a much broader holistic and multi-stakeholder approach should be established that covers the whole catchment area in Kenya, and possibly Ethiopia, where degradation, according to satellite imagery analysis, is even worse. Activities to address vegetation loss might include payments for environmental services (PES) at community level to protect vegetation cover, establishing biogas digesters at village level to replace fuelwood, etc.

3.2.4 Illegal fishing

In comparison with other African Great Lakes, the average total bio-mass of pelagic fish at Lake Turkana (30.1 kg/ha) is relatively low (Muška et al. 2012). The lake holds 48 species of fish of which 12 are endemic and 13 support commercial fishery, including tiger fish, Nile perch, Turkana carp, Nile tilapia, and catfish. The endemic fish are part of the property's OUV, though limited data is available on their population trends with most species being described as Data Deficient or Not Evaluated (NE). The implied endemism of *Chrysichthys turkana* and of other fishes suggest that in-situ diversification has taken place within Lake Turkana since its Miocene-Pliocene origin and in spite of its intermittent connection with the Nile basin during the Pliocene, Pleistocene and Holocene (Hardman 2008), contributing to the highly specific biodiversity of the lake.

The annual yields from 1993-2014 average close to 5,000 metric tons (Ministry of Agriculture, Livestock and Fisheries, 2015), but as not all fishermen offload their catch at official landing sites, some data might go unrecorded. Most of the fish is dried and shipped to western Kenya or the DRC. During the last decennia, there has been a steady increase in the number of boats and nets on the lake. This increase is partly driven by donations of the county governments of Turkana and Marsabit as well as donor agencies with the objective to improve livelihoods by increasing efforts to extract fish from the lake. The mission further received information regarding the possible plans to promote cage fish farming in the lake, which could lead to serious environmental impacts if not carefully managed. In February 2020, the Deputy Governor of Turkana County stated that the lake can produce 8,500 metric tonnes of fish but only 2.5 metric tonnes are caught due to lack of fishing equipment. This shows a limited understanding of policy makers regarding the lake's variations in biological productivity. The productivity of the Lake Turkana fishery is highly variable with tilapia comprising the majority of the fish catch (Ministry of Agriculture, livestock and fisheries, 2015). Apart from salinity, a number of other environmental factors affect fisheries production, including wind, temperature, incoming river floods, lake levels, and invasive species (Avery, 2013) with some factors resulting in "booms" and "busts" of some fish populations (Kolding, 1995; Gownaris, 2015). Despite the variability in fish yields, there has been a continuous decline in the catches since 1976 (KMFRI, 2020). Factors driving the decline have yet to be fully understood. It is assumed that overfishing plays a major role besides the declines in lake level and the magnitude of the flood pulse. This may result in an increase in illegal fishing within the lake's protected areas (e.g. SNP), further threatening the health of fish stocks as these areas constitute important fish breeding sites (Gownaris, 2015).

Figure 13: Trends in annual fish landings from Lake Turkana fishery 2006-2015

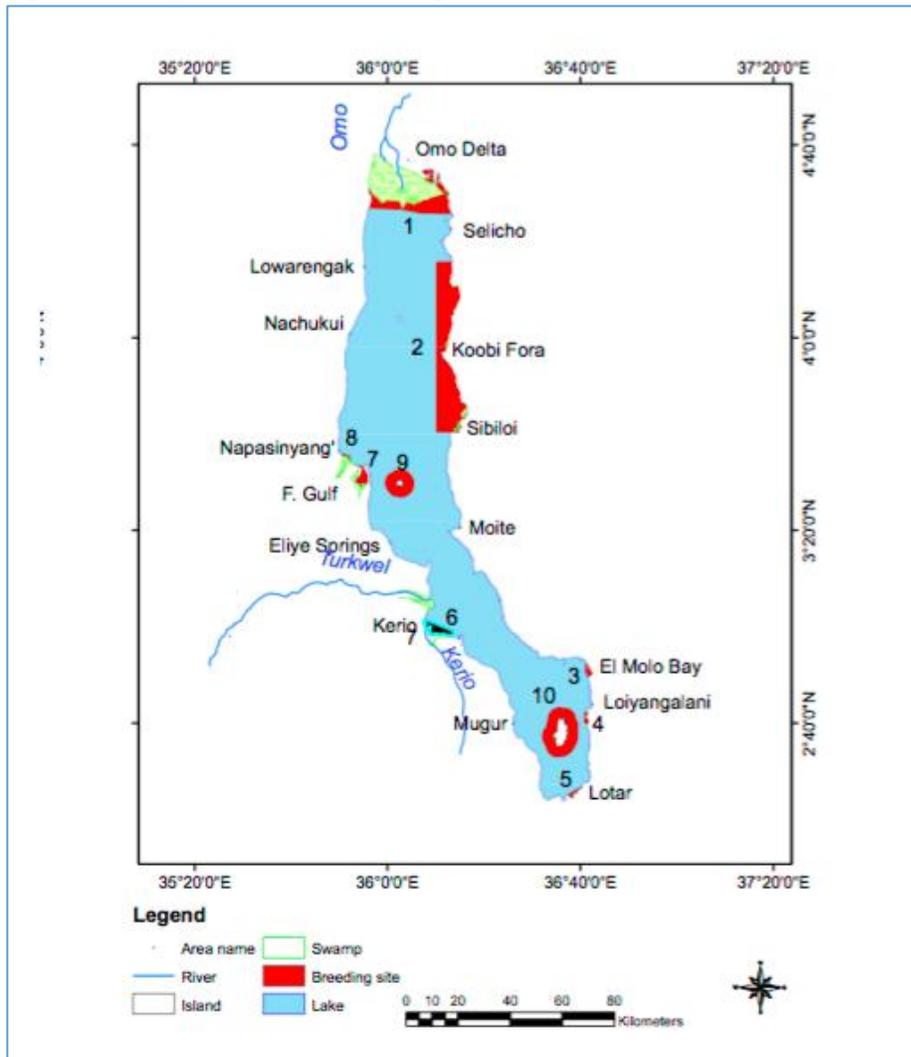


© Ministry of Agriculture, Livestock and Fisheries, 2015

Under the zoning plan for the property, SNP, CINP, and SINP have a two kilometer restrictive zone around their lakeshore to protect the aquatic components, including shore and lake habitats, which constitute important bird, fish and crocodile breeding grounds. The mission also questions whether the two kilometer zone is sufficient enough to preserve the integrity of the aquatic components of the property, and/or capture adequately the OUV of the property. Several important fish breeding and spawning areas, such as the delta, Ferguson Gulf and flood plains are not included in the property, and could be impacted by loss of seasonal flooding as a result of development projects, including dams, on the Omo River.

While the mission could not visit CINP and SINP, it was informed of serious threats posed by fishermen illegally entering and fishing in the national parks with temporary fishing camps established on both SINP and CINP. In 2016, there were 1,650 registered boats and an estimated 7,000 fishermen fishing in the lake (KMFRI, 2018). The mission could not assess the trends in number of fishermen illegally fishing in the property, but it is assumed that the increased regional demand for fish and decline in fish populations in Lake Turkana during the last decennia (Data of Ministry of Agriculture, Livestock and Fisheries, Kenya) has pushed an increasing amount of fishermen to illegally fish in the property (Gownaris, 2015). The wetland areas of SNP function as an important nursery habitat and support the highest fish biomass in Lake Turkana (Gownaris, 2015), making it attractive for illegal fishing.

Figure 14: Important fish breeding sites in Lake Turkana



© Kenya Marine and Fisheries Research Institute

Illegal fishing in the property not only impacts fish population in the property, but also crocodiles and their nesting sites. These are often deliberately targeted by the fishermen or become unwillingly caught up in gill nets, which are now widely used in Turkana. The property, and especially CINP, used to have the highest density of Nile crocodiles in the world with one crater lake revealing over 500 breeding individuals. Like all wildlife in the property, the numbers of crocodiles have decreased drastically during the last decennia. An article in Swara by Patrick Avery (2012) provides more insight regarding the situation on the ground: “We found numerous remains of crocodiles, pelicans and soft-shell turtles in the many fishing camps that we visited around the lake. These are killed, sometimes unintentionally, for food with the added bonus that with fewer crocodiles there is less competition on fish and less danger to the fishermen. We also saw the fishermen digging up crocodile nests and eating the eggs”.

While the property authorities on the ground are very motivated to halt the illegal fishing activities, they are under-resourced to adequately address the threat - both in terms of staff and equipment. “In general, there is a lack of enforcement of fisheries regulations on Lake Turkana due to insufficient staff numbers and funding among local research and management agencies” (Gownaris et al. 2015). The mission was able to witness a number of boats that had been confiscated by KWS rangers during the year 2019 and kept at the SNP headquarters at Alia Bay. Enforcing the law in the property remains a high-risk operation, as fishermen are often equipped with automatic weapons or have guards with automatic weapons on their boats due to intercommunal conflicts (especially between Turkana and Daasanach) over fishing grounds. These automatic weapons are also often used against the rangers who are outnumbered. The mission was informed that during a recent incident in SNP, park rangers on a patrol boat were shot at. The two kilometer exclusion zone has not yet been demarcated with buoys making it difficult for rangers to enforce the law close to the boundary areas. While the mission was informed that a number of buoys were available in Mombasa, they still needed to be transported and installed in the property. There were also no specifications regarding the amount of buoys to be installed. The mission recommends that buoys be installed at a 200-meter interval in the whole of the property. This means that for CINP about 100 buoys should be installed. While it might provide some logistical challenges, the mission further recommends that the State Party establish permanent ranger camps equipped with speedboats on both CINP and SINP.

3.2.5 Climate Change

Climate change is an important environmental issue faced by many WH properties, including Lake Turkana National Parks. Both temperatures and rainfall have increased in the region during the last decades (Government of Kenya, 2010; Avery, 2012; HRW, 2015). But even a predicted 20% increase will not amount to much in volumetric terms since the current rainfall in the region is very low (Avery, 2012). The combination of increasing temperatures and more extreme weather events, including erratic rainfall patterns and prolonged droughts, have most likely already affected the ecology of the property, which is characterized by its aridity (Masai xeric grasslands and shrublands ecoregion). Increased temperatures will result in increased evaporation rates and the intensification of arid conditions. The changes in ecological productivity caused by climate change might consequently result in an increased risk of species extinction (e.g. crocodiles) and loss of ecosystem resilience and related services, including provision of fish and pasture for communities. Stresses in the property caused by extreme weather events such as droughts, storms, and floods are expected to exacerbate the existing anthropogenic stresses and further erode the values of the property under criterion (x). In the management plan of the property the threat of climate change is regarded as ‘low’. The document states that climate monitoring will be initiated in the park, but provides no clear strategy or timeline on how this will be done.

Without an adequate scientific monitoring system, and capacities to predict and address changes, it will be impossible for the property's authorities to address the threat of climate change or consider and plan for possible impacts. The mission recommends therefore that the State Party establishes a science-based monitoring system to predict and monitor the ongoing effects of climate change and to establish feedback systems that can prompt required management and policy interventions.

3.2.6 Community engagement

Without strong support of local communities and the application of rigorous science, strict law enforcement measures will fail and the property authorities will not be able to achieve their objective to restore the property's wildlife populations. Until now, mutual trust between national park authorities and pastoral communities is lacking, as reflected by communities' statement during the community meeting attended by the mission in Ileret. Strong efforts are however being made by the property's management authorities to improve the engagement with communities. The mission welcomes the initiatives in the management plan to include the communities in the management of the property. The management plan includes a section focusing on community partnership and conservation education that aims to enhance community support for conservation and promote conservation sensitive land uses to improve community livelihoods. There are four objectives under the community component in the management plan, Objective 1: LTNPs-community communication and collaboration mechanisms established and strengthened; Objective 2: Community benefits from the LTNPs improved; Objective 3: Understanding and awareness of LTNPs conservation importance improved and Objective 4: Human-wildlife conflict reduced.

The success of community engagement will depend on how and if the actions in the management plan will be implemented. As there is a wide variety of stakes in the property, it is crucial to establish a management path whereby both property authorities and local communities work towards a common goal. One of the requirements to establish a successful collaboration is the presence of sufficient mutual trust between all relevant stakeholders, which is currently absent. It is important to establish a platform, whereby confidence and trust between park authorities and communities can grow over time. To positively change the communities' perception and achieve a situation whereby they are willing to support conservation in the property will require time and can only be accomplished through establishing adequate communication mechanisms.

Working with pastoralist communities, such as the Daasenach and Gabbra, is often a web of complexities – taking into account the political-cultural context and rapid societal change. In a fast changing socio-economic environment, achieving sustainable resource management (where

there is a strong correlation between the management of resources and socio-cultural aspects of communities) will only be possible if the ecological threshold is respected.

The mission is of the opinion that positively engaging communities will fail, if livelihood issues of local communities, who are often dependent on food aid, cannot be addressed successfully and strict law enforcement as a deterrent cannot be guaranteed. It will be very difficult to achieve both due to a number of challenges. Establishing sustainable livelihoods at landscape level surrounding the property will be extremely difficult, due to high social mobility, overdependence on natural resources, and the depletion and degradation of natural resources. As the socio-cultural and economic context of pastoral society adjacent to the property is rapidly changing and becoming more complex, park authorities and conservation actors might have to explore alternative and incentive-based methods to deal with pastoralist encroachers on top of the conventional law enforcement approaches. Such methods might include social contracts for development services (more boreholes outside the park, etc.), payments for environmental services, conditional cash payments, establishing community conservancies adjacent to the property, etc. It is expected that such alternative incentive-based approaches will require additional financial investments, including through public-private partnerships (e.g. CSR of private sector operating in the Lake Turkana area). Special funds or trusts should be set up, with supporting legislation

To support the establishment of such alternative methods, the mission recommends that the State Party conduct an economic valuation of pastoralism in and adjacent to the SNP, and assesses if the economic benefits of livestock encroachment in the park could be replaced or offset by alternative financing schemes or management schemes, such as payment for environmental services or adopting community wildlife conservation models, such as the ones supported by the Northern Rangelands Trust (NRT). At the same time an in-depth socio-anthropological study will need to be conducted to assess whether these schemes are feasible taking into account the communities' socio-political-cultural-economic context, and if there is enough support for such initiatives from the main actors in the landscape driving the threats. One of the main challenges will be to set up alternative methods that are acceptable and can be adhered by youth pastoralists, who are often using force and violence in settling disputes.

3.2.7 Conclusion on the status of criterion (x)

While the property still fully fulfils the values under criterion (viii), the decline in both terrestrial and aquatic wildlife populations has seriously eroded its values under criterion (x). It is expected that under a business as usual scenario, the property will probably lose its values under criterion (x) in the near future. The State Party should ideally start re-defining the boundaries of the property and design a new set-up for the property (including key biodiversity areas of the lake

system), which would enhance the long-term protection of the property's. In the short-term, the mission recommends that the State Party urgently address the loss of biodiversity in the property through the following actions:

- Develop a site-specific Biodiversity Action Plan to restore wildlife populations in Sibilo NP (population and species baseline should be time of inscription);
- Conduct a comprehensive scientific study to assess the current impacts of grazing and develop a viable grazing pressure reduction strategy based on grazing capacities to address pastoralist encroachment;
- Clearly demarcate physically all terrestrial and aquatic boundaries, as well as important restricted zones, ideally following a possible re-nomination that would change the boundaries of the property (see recommendation under 3.1);
- Strengthen law enforcement by (1) conducting a multi-agency joint operation (KWS, NMK, police, army, etc.) to halt all poaching and livestock encroachment; (2) allocates sufficient resources, including rangers, equipment (i.e. cars, boats, etc.) and infrastructure (ranger camps on CINP and SINP) to ensure adequate law enforcement; (3) adopts SMART as a patrolling system;
- Establish a co-management system that stipulates clear regulations regarding use of resources in the property and potentially provides payment for environmental services to local communities. The mission recommends that the State Party uses anthropologists to help develop all community engagement interventions in the management plan to ensure that they are socio-culturally appropriate;
- Establish a science-based monitoring system to predict and monitor the ongoing effects of climate change and to establish feedback systems that can prompt required management and policy interventions.

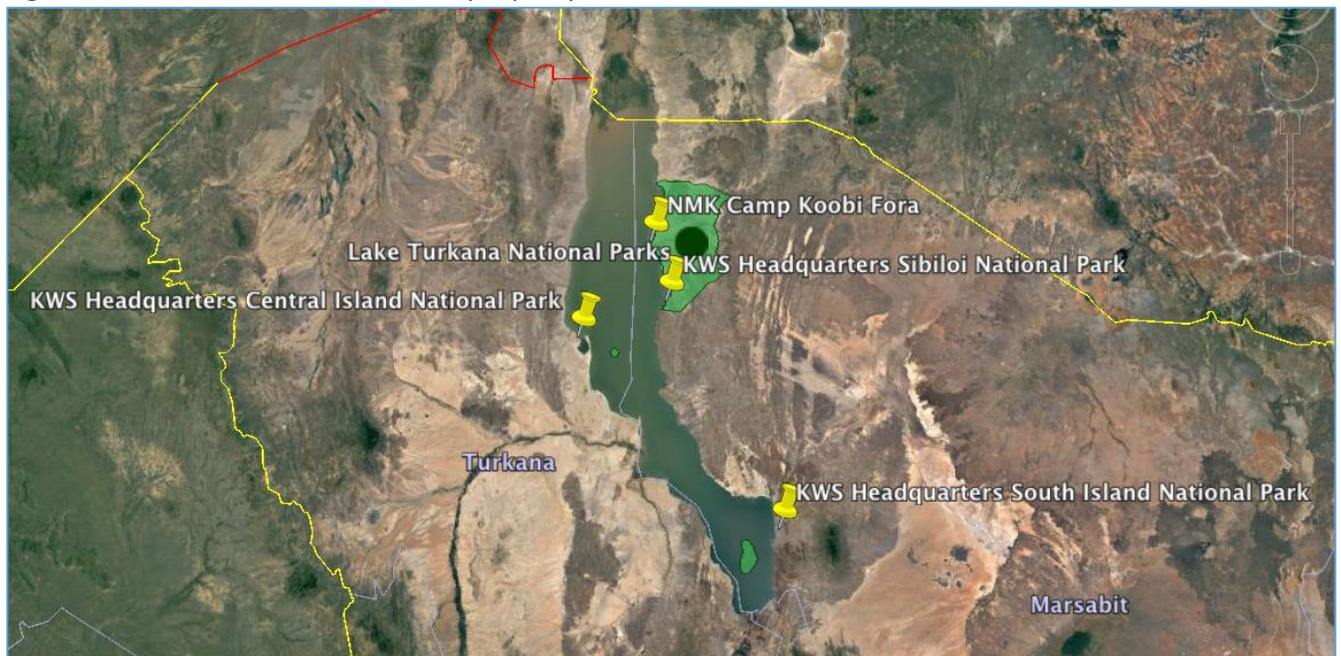
3.3 Management Issues

Two components of the property, i.e. SINP and CINP are managed by KWS, while SNP is jointly managed by KWS and NMK. NMK's role is focused on research and management of fossil sites, while KWS is responsible for the protection and management of the parks. KWS SNP offices are located in Alia Bay with also a ranger station located in Kokai, which is situated along the lake in the north of SNP. The NMK camp is located at Koobi Fora. KWS SINP offices are located in Loyangalani on the western part of the lake, while CINP offices are located in Kalokol beach on the eastern side of the lake. The SINP is currently also managed by the SNP Chief Warden. The management of SINP and SNP falls under the authority of KWS northern conservation area, while CINP falls under the authority of the western conservation area. This is because CINP is located in the Turkana County, while SNP and SINP are located in the Marsabit County. The location of

the parks in different counties has an impact on where law offenders are to be prosecuted. Law offenders caught by rangers in SNP and SINP have to be charged in the court of law in Marsabit, which is located about a 6 to 8-hour drive from Loyangalani and 12 to 14-hour drive from Alia Bay. Perpetrators caught in CINP are prosecuted in Lodwar Law Court, which is much closer and located on the eastern part of the lake. This makes it logistically difficult and expensive to transport law offenders from SNP and SINP to the Marsabit Law Court, and has led to only a limited number of offenders being arrested, and consequently prosecuted. These logistic challenges have unfortunately resulted in a situation whereby the current law enforcement approach with a lack of prosecution does not provide an adequate deterrent against crimes in the property.

The separate administrative management of CINP from SNP and SINP also creates challenges in regard to coordination. The mission recommends to bring the management of the three national parks under one coordinated unit, which would result in a more integrated approach and result in a more optimal use of resources. This recommendation was also reflected in previous RMM mission (2012) as well as the recent management plan (2018-2028) for the property, under objective 1: “Effective management systems and human resource capacity deployed proposes that the three National Parks comprising the Lake Turkana National Parks World Heritage Site are placed under a unified management structure”.

Figure 15: Location of offices of the property’s authorities



© Google Earth

The mission fully recognizes the difficulties in managing the property due to a number of challenges, including extreme remoteness, extreme weather conditions, lack of rule of law, and wide availability of guns amongst communities. The efforts by KWS staff on the ground to address the threats – in spite of the hardship they face - are exemplary and need to be commended. However, with the current budget and staffing allocation, the mission is of the opinion that it is impossible to reverse the current trends of threats and related biodiversity loss in the property.

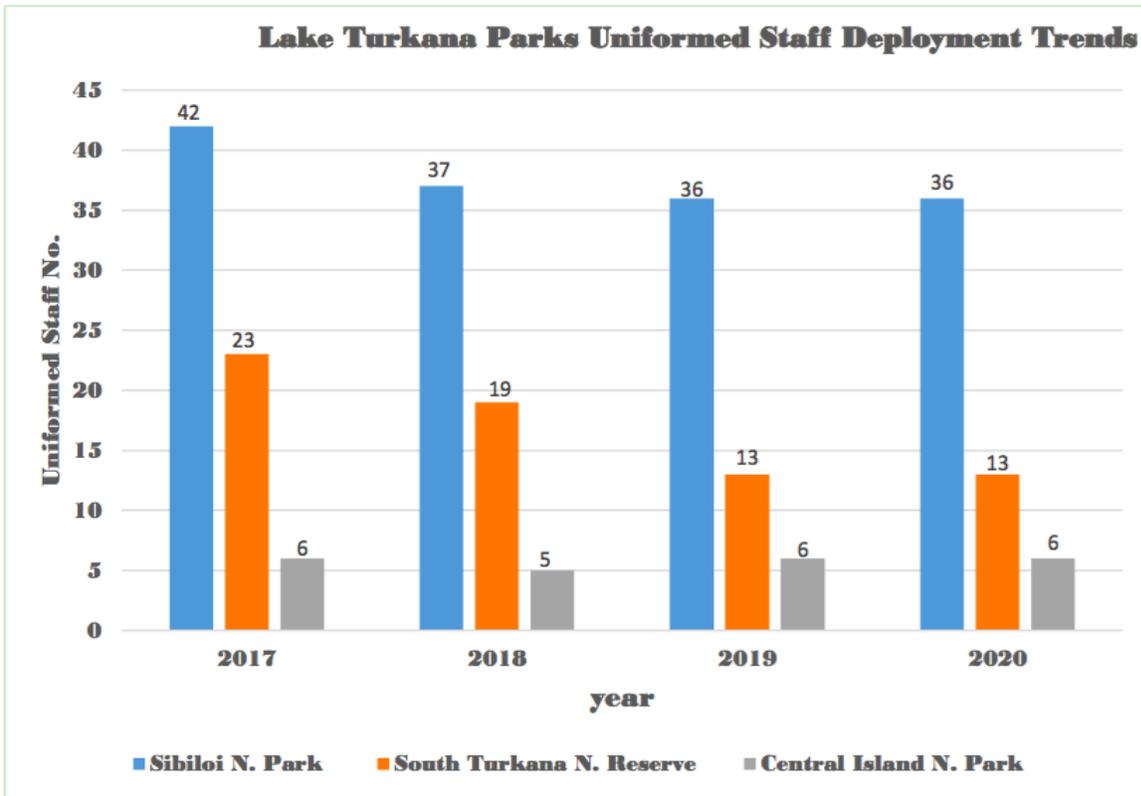
Table 2: Operational Budgets in ‘ 000 KES For Lake Turkana National Parks for the period 2014-2020 not including staffing costs (approximately 1 US\$ = 100 KES)

Park	Financial Year					
	2019-2020	2018-2019	2017-2018	2016-2017	2015-2016	2014-2015
Central Island National Park	1,100.50	1,393.60	937.60	935.40	1,114.60	1,750.50
South Island National Park	1,763.30	2,004.40	2,182.00	1,607.20	2,061.30	3,353.90
Sibiloi National Park	8,139.10	8,086.70	9,012.90	10,273.60	8,048.30	9,772.10
Total for 3 Parks	11,002.90	11,484.70	12,132.50	12,816.20	11,224.20	14,876.50

© KWS

Taking into account the high operational costs, the budgets allocated to the three NPs is regarded as insufficient to effectively address the threats and implement the new management plan 2018-2028. The amount for operational costs in SNP is US\$ 51.84/km², compared to an average annual government spending on protected areas of about US\$150/km² in developing countries and US\$500/km² in South and Southeast Asia (James et al. 1999). Inadequate financial support plays a central role in the loss and degradation of important natural resources, as it limits both the management effectiveness of established protected areas (Bruner et al. 2014). The budget allocation for the three components of the property has been reduced over the last five years. On top of that, no additional human resources were allocated to the property, severely limiting its capacities to adequately deal with the threats on the ground. The mission recommends that a study is conducted to assess the actual budgetary needs for managing the property as a WH property and maintaining its OUV. If the current budget allocation cannot be increased due to governmental budgetary limitations, alternative sources of income should be explored, such as enhancing international cooperation and public-private sector cooperation. As an example, KWS and NMK should try to engage the largest cellular network company in Kenya, Safaricom, to establish a mobile network in the area, through its CSR, to support the protection of the property.

Figure 16: Staff allocation for SNP, SINP and CINP



© KWS 2020

The KWS staff allocated for the protection and management of the property has been reduced during the last four years from a total of 71 to 54 staff members. SNP has currently 36 park staff², which yields a mean of one park staff per 4,361 ha, which is lower than the average global mean of one park staff per 3,703 ha (James et al. 1999). While the difference might not seem significant, the difficult terrain, limited road and communication network in the park and high threat of poaching and livestock encroachment, requires an adequate amount of staff to manage and protect the park. The management plan has one action to increase the amount of staff of SNP and SINP to at least 88 permanent staff members, but fails to outline how this number is required to adequately address threats. As the property authorities do not use Spatial Monitoring and Reporting Tool (SMART), the mission had difficulties to assess whether the rangers were efficiently dispatched to deal with the threats.

It seems – as indicated in previous RMM report (2012), that certain areas in SNP, especially in the northeast, are less monitored and patrolled. Most patrols also occur by car, making it more

² There is some discrepancy in data regarding number of park staff deployed in SNP. While the official number stands at 36 staff members, the mission was informed in the field that there were only 24 staff members deployed in SNP.

difficult to track illegal activities. The mission discussed the possibility to deploy drones to detect illegal fishing and encroachment in the property with authorities. However, Kenya's current legal framework would make it difficult to deploy drones in the property. It is also not certain if the physical deployment of drones would be possible taking into consideration the notorious strong winds over the lake. It remains further difficult to detect illegal activities, including illegal fishing, in both CINP and SINP, as there are no permanent ranger stations on the island. Regular patrolling to SINP and CINP occurs by boats with rangers who are based on the lakeshore. These trips are however dependent on weather conditions on the lake, impacting their effectiveness. The mission recommends that the property authorities develop a law enforcement strategy using a SMART patrolling system, allowing for a more systematized and streamlined method in data collection and analysis.

The fossil sites in SNP are managed by NMK out of the Koobi Fora camp. The mission received information from several experts expressing their concern regarding the trampling of fossil sites by livestock. This threat is also recognized in the new management plan (2018-2028), which has a whole section focusing on the management of prehistoric and cultural heritage: "The perpetual presence of the livestock in the park, as aforementioned, is the single most critical threat to preservation of cultural heritage resources in the area. As such, NMK will support KWS and other stakeholders in their efforts of controlling livestock incursion in the park by backing stakeholders' meetings called to address the livestock incursion problem". The management plan provides a number of interventions, including raising awareness at local community level, promoting alternative livelihoods, support the development of viable grazing system and enhancing the security and protection of sites with the assistance of KWS. The mission recommends that some of the most important fossil sites should be fenced to prevent trampling by livestock.

The mission notes that the zoning map in the new management plan, none of the important fossil, prehistoric or cultural heritage sites designated as restricted use zones are within the boundaries of the SNP. The three restricted sites that are reflected on the map include Kubi Algi, Derati, and Shin, which are all located just outside the property. While in the description of the zoning, the management plan states that also riparian corridors sustained by seasonal rivers, rocky outcrops, hills, and prehistoric sites and fossil exposures are designated as restricted use zones, these areas are not reflected on the zoning map. The zoning maps are very important both in terms of providing guidance to rangers in law enforcement and for communities and other stakeholders to understand the regulations guiding the zones. The mission recommends that the State Party revise the zoning map and clearly designate all important fossil, prehistoric or cultural heritage sites inside SNP as restricted zones. The mission further noticed that none of the restricted zones nor the boundary of SNP were demarcated on the ground. In addition, no public information was displayed in Ileret or in other places in and adjacent to SNP regarding the

boundary or location of these restricted zones, making law enforcement operations in these areas quite ambiguous. The mission recommends that all terrestrial and aquatic boundaries of the SNP as well as important restricted zones are demarcated with visible boundary markers (See also recommendation under 3.2). The boundary demarcation should happen in a participatory way with the involvement of stakeholders, particularly pastoralist and fishermen to ensure that the communities are aware of the location of boundaries and zoning.

The mission welcomes the new Management Plan for the property and commends the State Party for all the work that has been done in preparing the document. The ten-year management plan (2018-2028) was endorsed by the Government at the end of 2019. This means that the management plan will have at least a two-year delay in its implementation. Due to this initial delay, the mission recommends that the timeframe of the management plan will be changed to 2020-2030 to ensure its full implementation. The management plan, which was funded by KWS and the United States Agency for International Development (USAID) has been developed in a participatory way involving a wide variety of stakeholders under the coordination of a Core Planning Team comprising representatives from SNP, CINP and SINP, KWS HQ, National Museums of Kenya, Turkana Basin Institute, and County Government of Marsabit.

According to the mission, the management plan has identified most of the critical issues that are threatening the property, including damming of inflowing rivers and upstream use of waters - changing seasonality and nutrient status of inflowing waters; over-grazing by livestock; drought and climate change; poaching, unclear management responsibilities on protection and preservation of cultural heritage in SNP; lack of a unified management structure for the LTNPs; underutilization of LTNPs; and lack of stakeholder engagement forums.

While the management plan addresses many of the above threats, a major concern in the implementation of the management plan is the current absence of a resource allocation strategy and operational plan, including critical intergovernmental coordination and support required for its implementation. The mission further identified the need to develop a series of sectoral plans/strategies (e.g. grazing strategy, wildlife recovery plan, etc.) that are required to achieve the objectives of the management plan. The plan's actions are often broad and not specific enough to allow an insight on how the threats will be addressed adequately.

The mission is also concerned regarding the limited resources currently available for the successful implementation of the management plan. The implementation of the management plan will require extra financial and human resources that cannot be covered by the annual budgets of the NPs, which are currently already not sufficient enough to protect the property. The implementation of the management plan will require substantial additional financial

resources that have not been allocated to the property's authorities. While the management plan does provide a timeframe for implementation for the first three years of the plan, it does not include a budget to indicate the cost of the proposed interventions. The plan also lacks an outlined monitoring and evaluation (M&E) system, required to monitor and evaluate the effectiveness of the activities implemented, and adapt to changing conditions. The mission is of the opinion that a management plan should be a living document that is regularly evaluated and revised to better address the threats.

To ensure the effective implementation of the management plan, the mission recommends the State Party to:

- Bring the three sites under one integrated management unit to improve coordinated approach to threats;
- Develop a resource mobilization strategy and allocation plan, operational plan, and monitoring and evaluation (M&E) plan for the implementation of the Lake Turkana National Parks Management Plan, and apply for International Assistance under the WH Convention for additional support if required;

3.4 Impact of the Upstream Development (hydro-electric dams, plantations)

Since 2010, there has been increasing concern regarding the impacts on the OUV of the property caused by the rapid increase of development projects along the Omo River in Ethiopia, including Gibe III Dam, Gibe IV and the Kuraz Sugar Plantation. As an endorheic lake, Lake Turkana has a complex ecology, which is highly dependent on the inflow from the Omo River and the ecosystem health of the Omo-Turkana catchment basin. Lake Turkana, which is the world's largest alkaline lake lacks an outflow. Its hydrological budget is nearly entirely dominated by inputs from Omo River and water loss occurs through evaporation. Lake Turkana is a slightly saline lake that has a well-mixed water column and an oxygenated lake floor (Johnson and Malala, 2009). The Omo River carries salts, minerals and essential nutrients into the lake, and its flow patterns vary throughout the year, controlling the cyclical rise and fall in lake level, which causes inundation and recession of the littoral zones of the shore margins (Avery, 2010). The Omo carries 14% of Ethiopia's entire annual runoff and provides about 90% of the lake's annual inflow (Kolding 1993; Avery 2013). The lake's closed-basin nature, arid surroundings, and strong dependence on one inflowing river make it a highly pulsed, variable system (Gownaris et al. 2015). The lake's ecology is largely determined by a flood pulse, which reaches the lake a few months after the seasonal rains in the Omo Basin. Certain fish species also depend on the flood pulse as a breeding cue, indicating their vulnerability if changes occur to the magnitude of the pulse due to upstream development (Gownaris et al. 2015). Historical data also shows that there is a strong correlation

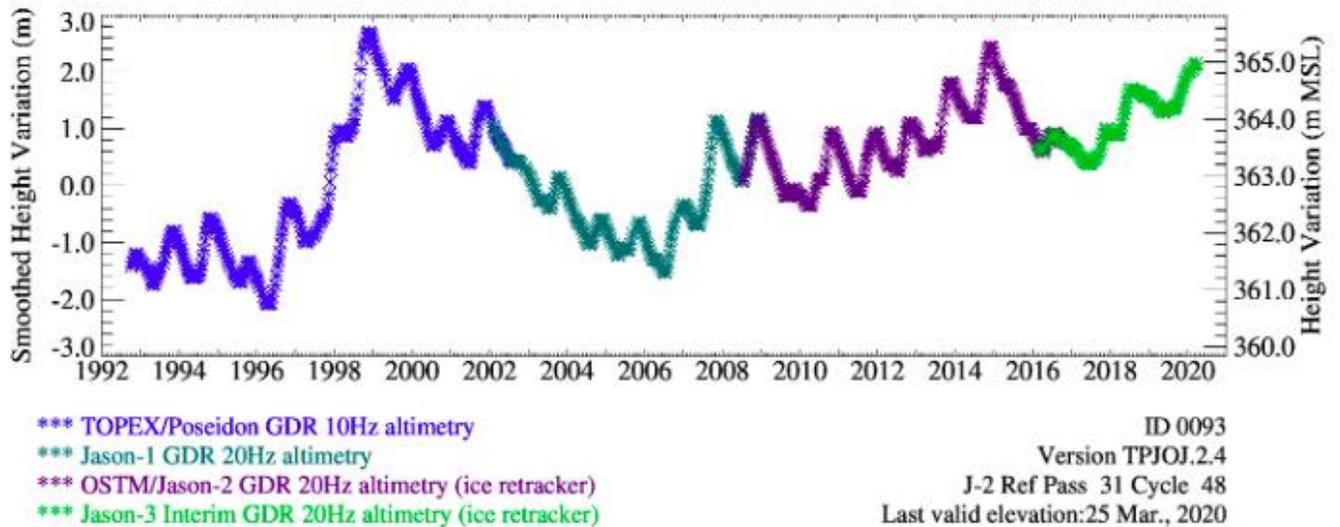
between the hydrological budget, physiochemical changes and fish production in the lake (Hopson, 1982; Kolding, 1993; Avery, 2012; Gownaris et al. 2015). Lake Turkana's strong ecological dependence on the Omo River makes it extremely vulnerable to any large-scale developments, such as of hydroelectric dams and large-scale agricultural projects, affecting the water influx and nutrient inputs from the Omo River and the larger catchment area into the lake.

A number of institutions and scientists (i.e. AfDB, UNEP, Avery, Gownaris, etc.) have published well-informed studies exploring the impacts of upstream development projects on the lake's ecology. Local dam and irrigation development and global climate change will alter the Omo River's flow patterns over the coming decade, with a possibility of terminating freshwater inflow to Lake Turkana, dropping lake level, and dampening intra-annual fluctuations (Gownaris, 2015). While all of the studies express concern regarding the impacts of upstream development on Lake Turkana, they also often highlight that limited long-term hydrological and limnological data sets, as well as limited information regarding upstream operations of dam and irrigation projects, make it difficult to monitor and assess the real impacts on the lake.

The Gibe III dam with a cost of US\$1.8 billion was inaugurated in 2016. The dam, using roller-compacted concrete (RCC) and measuring 243 meters, is the tallest of its kind in the world and boasts an installed capacity of 1,870MW with the potential to generate up to 6,500GWh of electricity per year. The reservoir of Gibe III is 200 km² and has a storage capacity of 14,000,000,000 m³. The Gibe III is part of a series of dams in the Omo Basin, including the constructed Gibe I and Gibe II and the Gibe IV (Koysha, under construction) and the planned Gibe V, that will contribute to Ethiopia's ambition of generating 40,000 MW by 2035. In addition, a high voltage power line will be connecting the Ethiopian and Kenyan grids in an ongoing project called the Eastern Africa Inter Connector Project, which according to plans will not be built in the vicinity of the property.

As correctly predicted by Avery (2010), the filling of the Gibe III reservoir caused a two-meter reduction in the lake level in the period 2015-2017 (see Figure 14, satellite radar altimetry data of USDA Foreign Agricultural Service). When the mission visited the lake in March 2020, the level of the lake was back to pre-filling levels. The increase in lake levels since 2018 could be related to sustained release of water of the Gibe III dam after the reservoir was being filled and the recent increase in rainfall in the Omo-Turkana Basin caused by Positive Indian Ocean Dipole (PIOD). However, during the months of April-May 2019, the water in the reservoir of Gibe III had fallen by more than 16 m from levels recorded in the previous year (2018), leading to a production deficit of 476MW. The erratic rainfall patterns related to climatic change could continue to impact the operations of the dams in the Omo Basin, and the amount of water flowing into the lake.

Figure 17: Satellite radar altimetry data for Lake Turkana



© USDA Foreign Agricultural Service

The 2015 mission noted that the Gibe III dam itself will not be water consumptive and is a mere control structure that regulates the flow of the Omo River, hence after impounding, it cannot store floodwaters or significantly reduce the flow of the river over longer periods of time. However, the fact that the 200km² reservoir had dropped by 16 m in April-May 2019 suggests that it could store a lot of flood water after dry spells, before the need to release it. Even in the case the dam might not significantly reduce the flow of the river, it will result in a more leveled discharge in comparison with the normal hydrological flow of the Omo River with its seasonal variations. It is therefore predicted that the Gibe III dam will reduce the strength of the seasonal flood pulse as well as sediment load into the lake, with Gibe IV even further aggravating the situation and resulting in the complete elimination of the flood pulse. In addition, with a leveled flow, more water will be released (to produce energy) during times of natural low-flow conditions when littoral zones are exposed, impacting species which ecology are dependent on the cycle of lake level fluctuations. The Oakland Institute reports that Mursi communities confirmed that they had not experienced flooding since the construction of the Gibe III dam (2019). However, it was not possible for the mission to crosscheck this statement. The sediments carried by the floods are not only important for the maintenance of the delta zone but are also spread by currents throughout the lake. The delta zone of the lake is an important bird and fish habitat, and includes critical fish spawning areas. The reduction of seasonal inflows from the Omo River is expected to impact aquatic and riparian ecosystems, and related species (e.g. some fish species migrate up the Omo river and other tributaries to breed and spawn during flood pulses). If the scheduled 10-day artificial floods are released from the dam (in August/September; flows of approximately 1,600 m³/s), Lake Turkana's average seasonal fluctuations would decline from 1.1 to 0.7 m

(Avery, 2012). However, creating an artificial flood replacing the loss of the natural flood (10 days, minimum discharge of 1,600 m³/s at the mouth of the Omo river) would lead to an annual financial loss (calculated at US\$ 6 cents per kWh) of US\$7.8 – 10.8 million in electricity production (Sogreah, 2010). This is a serious financial loss on an annual basis, which decision-making parties might not want to incur. However, the absence of the flood pulse might also result in serious financial losses at the Kenyan side due to a possible ecosystem collapse (e.g. to the fishery and livelihoods). The annual artificial floods might further possibly damage the downstream irrigation infrastructure established for large-scale agricultural projects, providing another reason to limit their extent. The mission did not have the means to independently assess whether the 10-day flood - at the extent it had been proposed in the EIA of the Gibe III dam – is currently being implemented.

The flood pulse is known to influence nutrient levels and related phytoplankton concentration in the lake, which is the cause of the lake's distinct jade color. A reduction in nutrients will cause a decline in the lake's productivity, given that the nutrient inputs from the river are essential (Avery, 2009, 2013). Data for 2015–2016 estimated that during the filling of Gibe III annual mean Lake Turkana chlorophyll declined by 30% (Tebbs, Avery and Chadwick, 2019). While there is no long-term limnological data to assess the real impacts of the dam on the lake, the article by Tebbs, Avery and Chadwick (2019) provides a forewarning of the future alterations that might impact the lake's ecology and the OUV of the property.

Another upstream threat highlighted in Committee decisions is the Omo-Kuraz Sugar Development Project (OKSDP). The more leveled hydrological flow of the Omo River as a result of the Gibe III dam has made it possible to develop irrigation systems on the banks of the Omo River. While the State Party of Ethiopia reported that the OKSDP is not part of the Gibe III project, the project might aggravate the impacts on Lake Turkana already caused by the Gibe III dam by abstracting large amounts of water for irrigation, and thereby not only reducing the flood pulse, but also reducing the flow itself.

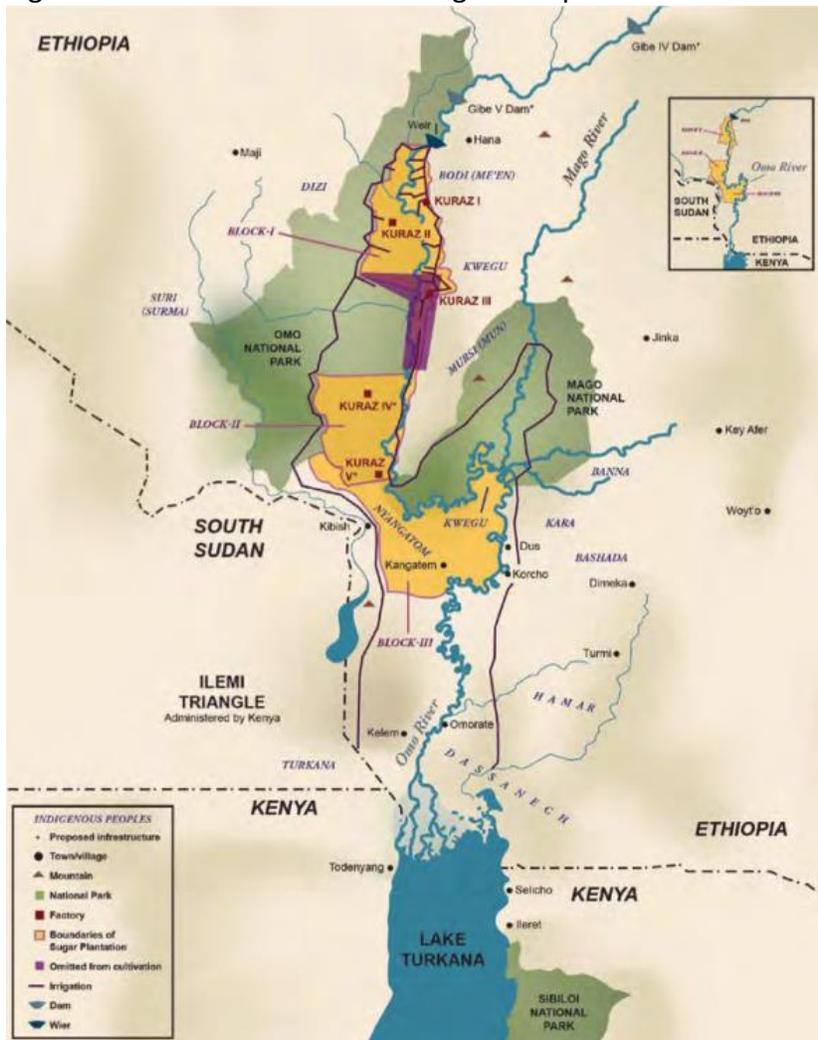
It should be noted that the Omo-Kuraz Sugar Development Project has also been addressed in the state of conservation reports and Committee decisions concerning the Lower Valley of the Omo World Heritage property in Ethiopia, located by the Omo River north from the border with Kenya (<https://whc.unesco.org/en/list/17/documents/>). The 2015 Reactive Monitoring mission to the property had raised its concerns regarding the potential threat that the project posed on the property. In Decision 42 COM 7B.44 (2018) the Committee noted the continued lack of information on the full scope of this project and its ancillary developments and delay in undertaking the impact assessments in order to adequately address the full potential impacts of

the project on the property and its setting. The information provided so far do not include an assessment on the potential downstream impacts on Lake Turkana.

The original plan of establishing 175,000 hectares of sugar cane plantations - the largest scheme ever to be undertaken by the Ethiopian state-owned Ethiopian Sugar Corporation (ESC) - has been downsized in 2016 to 100,000 hectares serving four sugar factories (Kamski, 2016; Hodbod et al. 2019, Ethiopian Sugar Cooperation, 2020). The four factories (Omo Kuraz One, Two, Three and Five) that are already constructed or are under construction have at full capacity a potential capacity to crush 60,000 tons of sugarcane per day. Under the 175,000 hectares scheme, independent experts predicted that 28-40% of the Omo inflow would be used for irrigation (RMM, 2015). While under the new scheme the water intake from the Omo River is predicted to be less, it was not possible for the mission to make a correct estimation – without having access to updated data from the ESC, through the State Party of Ethiopia, regarding the detailed operations of the OKSDP.

The following data from the ESC website state that all Omo Kuraz project will have a productivity potential of 145 tons of sugarcane per hectare. The Omo Kuraz One project, located in the South Omo Zone Selamago District, covers a total area of 20,000. In 2019, 9,519 hectares of land had been converted sugarcane, and 10,400 hectares of land had been irrigated. The Omo Kuraz Two project, also located in the South Omo Zone Selamago District, covers a total land area of 20,000 hectares for sugarcane plantation. In 2019, 4,500 hectares of land had been converted to sugarcane, and 5,700 hectares of land had been irrigated. The Omo Kuraz Three project, which is located in Kaffa and Bench Maji Zones bordering the Omo River covers a total area of 20,000 hectares for sugarcane. In 2019, 2,300 hectares of land had already been converted to sugarcane plantations and 9,000 hectares of land had been irrigated. The Omo Kuraz Five project, which shares its boundaries with South Omo Zone's Nyangatom District, was still in a planning phase in 2019. An area of about 40,000 hectares is planned to be converted to sugarcane. Compared to other Omo Kuraz plantations where annual rainfall ranges from 300 mm to 1900 mm, the annual rainfall in the Kuraz Five plantation is very minimal, and the plantation will require more extraction of water from the Omo River. In September 2011, Ethiopian Water Works Construction Enterprise (EWWCE) began the construction of a cofferdam at the headwaters of the project area and a second embankment further downstream, but in 2013, an external study commissioned by the ESC recommended a radical restructuring of the cofferdam and alterations to the diversion scheme (Kamski, 2016). The main canal infrastructure for the irrigation on the left bank of the river, which is 55 km long, has already been constructed and is said to be operational. Out of the 134 km of the main canal on the right side of the river, 43 km has already been constructed (ESC, 2019).

Figure 18: Location of the Kuraz sugarcane plantations



©The Oakland Institute

The ESC website (<https://www.ethiopiansugar.com>) states that both national as well as internationally registered heritages of the country of natural, cultural and religious nature around the project area have been preserved well all the way since the start of the Project, and that therefore no internationally as well as nationally registered historical, cultural, archeological or religious site were affected due to the project. The website does not provide any explanation on how the assessment was conducted, and the parameters used to come to a conclusion that no nationally and internationally heritage sites were impacted.

The State Party of Ethiopia informed the mission in 2015 that according to its assessment the irrigation of the Kuraz sugarcane plantations when completed will lead to a projected 4-6% reduction of the total flow into the Omo River, of which 30% will go back to the river course after irrigating the sugarcane plantations. It is not possible for the mission to assess whether the

projections are correct without analyzing detailed data regarding the operations of the sugarcane plantations, including their water treatment systems. Sugar cane production is known to need high quantities of water. Especially since the Kuraz plantations are located in dry regions, over extraction from the Omo River could possibly result in a drop in water levels affecting the Omo River delta and lake shore areas and impact wildlife habitats, including fish spawning sites. Relatively minor swings in rates of evaporation and rainfall can generate substantial rise or fall in lake level and in water chemistry, leading to dramatic shifts in lake biota, as well as in the composition of sediments accumulating on the lake floor (Johnson and Malala, 2009). Sugar cane plantations have further very high nutrient requirements (i.e. nitrogen, phosphorus, potassium, magnesium and calcium) to ensure productivity. Especially, increased levels of nitrogen and phosphorus due to run-off can have devastating impacts on lake ecosystems, including uncontrolled algal growth. This combined with pesticides, sediment release, and a possible reduction in the level of the lake, which would increase salinity, could be detrimental as Lake Turkana's ecology and related biodiversity are dependent on specific limnological and hydrological conditions. The sugar cane production could therefore have a direct impact on the values of the property under criterion (x).

It is however, at this stage, difficult to assess the impacts on the OUV of the property without a complete understanding of all cumulative impacts of the upstream development, as well as establishing a long-term monitoring system to assess changes in limnological and hydrological data of Lake Turkana. During the mission's visit to Kenya, a meeting was scheduled between the mission, the State Party of Kenya and the State Party of Ethiopia at the invitation of the Government of Kenya. However, according to the Kenyan State Party, the Ethiopian State Party did not respond to Kenya's invitation. The State Party of Kenya's state of conservation report 2020 states that it finds it a challenge to report on the progress of development projects being undertaken in a neighbouring State Party especially where bilateral meetings on the issue affecting the property have been irregular. It further states that: "the State Party of Kenya has previously updated the World Heritage Committee on the progress of the development of the Terms of Reference (TORs) for the proposed SEA study, the appointment of a Joint Experts Panel (JTEP) and its TORs as well as the preparation of the tendering document for the call for proposal for the SEA consultancy. The outstanding challenge has been in the agreement between two State Parties of Ethiopia and Kenya on the SEA budget and funding sources". The mission was able to look into the communication between the two State Parties, and commends Kenya's proactive engagement in trying to initiate the SEA, including the preparation of a proposed budget that was submitted to the State Party of Ethiopia in May 2019 – but without any response by the latter on the proposal. The State Party of Kenya further reports in its 2020 state of conservation report that it shares the concern of the Committee that the OUV of the Lake Turkana Property continues to be at risk and that the proposed SEA is long overdue.

The scheduled bilateral meeting during the mission would have helped the mission team to obtain a better understanding on the status of (planned) development projects, and the mitigation measures applied by the Ethiopian State Party to minimize any negative impacts on the property. The meeting might also have allowed the mission to obtain more detailed and updated information regarding the operations and management of both Gide III and the OKSDP, as well as plans for other development projects. The impacts of both Gide III and the OKSDP will highly depend on what mitigation measures are put in place by the State Party of Ethiopia to ensure a minimal impact on the property.

The mission was not able to track any communication between the States Parties of Ethiopia and Kenya regarding the ‘precautionary measures’ taken by the Ethiopian State Party, and how the implementation of these measures will be monitored. The lack of adequate data regarding both the operational side of upstream projects (water extraction, artificial flooding, minimum flood release, hydropeaking, sediment transport, nutrient release, etc.) and long-term limnological and hydrological data sets of the Lake Turkana, make it difficult to conduct an in-depth cause and effect analysis. It is therefore critical that a bilateral data-sharing mechanism is established between the States Parties of Kenya and Ethiopia regarding certain data sets that can help to ensure that impacts on the OUV of the property remain in the ‘limits of the natural variation of the lake system’. A data sharing mechanism could provide valuable information to an early warning system needed to avoid negative impacts. Such bilateral agreement could provide feedback loops to temporarily or permanently alter upstream operations and management of projects - even if this might imply some economic costs. The report by the African Studies Center, University of Oxford: “Lake Turkana & The Lower Omo: Hydrological Impacts of Major Dam & Irrigation Developments” (Avery, 2012), provides a number of useful recommendations for improving the collection of critical datasets.

The SEA requested by the Committee in its Decision 36 COM 7B.3 in 2012 to assess the cumulative impacts of all developments impacting on the Lake Turkana basin has yet to be commissioned. As much of the infrastructure development along the Omo River has already occurred without taking into consideration Committee Decision 36 COM 7B.3 as well as its following decisions, the mission questions whether it is still possible to mitigate some of the impacts on the OUV of the property caused by the upstream development. The lack of taking into consideration the Committee Decisions, paragraph 169 of the Operational Guidelines for the Implementation of the World Heritage Convention as well as the IUCN World Heritage Advice Note on Environmental Assessment & World Heritage, has severely limited the options for mitigating negative impacts, including the ‘no project’ option or identifying the least damaging options in relation to the OUV of the property. The mission recommends therefore that both the

State Party of Ethiopia and Kenya finalize the SEA within a year from the upcoming Committee meeting (44 COM). The SEA will need to assess the cumulative impacts of already constructed as well as ongoing and planned developments in the Lake Turkana Basin, and identify also mitigation alternatives, such as adjusted flow regulations, sediment replenishment, etc.

Without a final SEA document that can be assessed, the mission takes a 'Precautionary Approach'. The mission underlines that the current lack of data regarding the detailed impacts of the upstream development projects cannot be used as an excuse for not directly implementing strong mitigation measures to avert risks of serious or irreversible harm to the values of the property. The mission is of the opinion, based on discussions with scientific experts and studying secondary data, that the upstream developments continue to pose an imminent danger to the property's OUV, in line with Paragraph 180(b) (ii) of the Operational Guidelines.

While EIAs for the Gibe III dam and the Kuraz sugar plantation have been submitted by the State Party of Ethiopia to the Committee, an SEA, as requested by the Committee multiple times since 36 COM 7B.3 (2012), would have been able to assess the cumulative impacts of all projects, and able to identify adequate long-term mitigation measures before they were initiated. The lack of follow up to the Committee's Decisions regarding upstream development by the States Parties has limited the future options for mitigating negative impacts on the OUV. The United Nations Environment Programme (UNEP) in collaboration with the governments of Ethiopia and Kenya is currently undertaking a joint project entitled "Support to Sustainable Development in Lake Turkana and its River Basins", with the aim of assessing the basin's ecosystem services and to develop arrangements for sustainable basin management. The foreseen assessment under the project could possibly also encompass an SEA focusing on the impacts of development on the OUV of the property. The requested SEA will help to identify appropriate corrective measures that can ensure that the water level in Lake Turkana and the level of seasonal variation will be maintained, and that a stable nutrient release in the lake is guaranteed; all aspects which are paramount to maintain and protect the OUV of the property. It is however important that both the State Party of Ethiopia and Kenya agree that the assessments conducted under the UNEP project could encompass the SEA as requested by Committee Decision 36 COM 7B.3. The mission recommends that during the implementation of the SEA, the State Party of Ethiopia and Kenya share the findings of the assessment on a regular basis with the World Heritage Centre and IUCN for their inputs and feedback. The Kenya State Party state of conservation report 2020 states that it wishes to point out that it is open to any technical or other support by UNEP in fast tracking the SEA commissioning and a seamless completion of the study, but that a desired tripartite meeting between Kenya, Ethiopia and UNEP has however never been held though much anticipated.

It is further important that all current upstream development plans in the pipeline, including Gibe IV and Gibe V, be halted and that prior impact assessments on the OUV of the property will be conducted and shared by the Ethiopian State Party with the World Heritage Centre (for review by IUCN). Such assessments should use the guidelines stipulated in the IUCN World Heritage Advice Note Environmental Assessment, including an analysis of a 'no project' scenario.

To address the threat of upstream development, the mission recommends the State Party of Kenya to:

- Establish a comprehensive long-term scientific monitoring system (i.e. systematic and periodic collection and analysis of limnological and hydrological data) in Lake Turkana that can lead to mitigation measures based on monitoring results.

To ensure that the impacts of upstream development on Lake Turkana remain within the "limits of natural variation of the lake system", the mission recommends the State Party of Ethiopia to:

- Provide an update on all planned development projects in the Omo Basin, and ensure that adequate environmental assessments are undertaken in line with paragraph 169 of the Operational Guidelines and following the guidelines stipulated in the IUCN World Heritage Advice Note on Environmental Assessment;
- Share detailed data with the World Heritage Centre (for review by IUCN) on the 'precautionary measures' taken by the Ethiopian State Party regarding the operations and management systems of all major upstream projects, including monitoring system, to ensure that impacts on the lake are minimized.

The mission further recommends that the States Parties of Ethiopia and Kenya:

- Establish limnological and hydrological parameters with assistance of IUCN that define the "limits of natural variation of the lake system" to ensure effective mitigation of upstream development projects;
- Establish a bilateral data sharing agreement that can act as an early warning system and trigger required managerial and operational interventions of upstream projects, as well as other adaptive managerial and mitigation measures to ensure that impacts remain within the "limits of natural variation of the lake system";
- Without any further delay, conduct immediately the SEA for assessing the cumulative impacts on Lake Turkana of all finished, ongoing, and planned developments in the Lake Turkana Basin, and to identify urgently needed mitigation measures – as requested by the

Committee since 2012. The SEA could be developed under the ongoing UNEP project, pending confirmation from the project partners;

4. ASSESSMENT OF THE STATE OF CONSERVATION OF THE PROPERTY

The Lake Turkana National Parks was inscribed on the World Heritage List under natural criteria (viii) and (x). The mission concludes that serious threats continue to impact criterion (x). The pressure of poaching, livestock encroachment, and illegal fishing combined with upstream development projects continue to impact the “diverse habitats resulting from ecological changes over time and ranging from terrestrial and aquatic, desert to grasslands and inhabited by diverse fauna”. “In situ conservation within the protected areas includ[ing] threatened species particularly the reticulated giraffe, lions and grevys zebras” have all already been locally extinct and are no longer present in the property.

The ecology of the lake, including “breeding habitats for Nile crocodile, hippopotamus”, fish, and other species, is also being impacted by illegal fishing and upstream development projects. The reduction of the flood pulse and inflow, combined with changing nutrient levels, caused by the cumulative impact of upstream development projects could have detrimental impacts on Lake Turkana’s ecological system and related biodiversity, which are highly dependent on specific hydrological and limnological conditions.

These may impact the “extensive submerged beds of *Potamogeton pectinatus* which shelter spawning fish” and “macrophytes in the seasonally exposed shallows, including *Paspalidium geminatum* and *Sporobolus spicatus*”. Changes to habitats will consequently also impact the “350 recorded species of aquatic and terrestrial birds in the property, which is also an important flyway passage and stopover for palaeartic migrant birds”.

Though the mission identified certain threats related to the trampling by livestock of archaeological and paleontological sites, it is of the opinion that the values under criterion (viii) remain intact for now. The values related to the presence of “pre-human, mammalian, molluscan and other fossil remains that have contributed more to the understanding of human ancestry and paleo-environment than any other site in the world” are still widely found in the property.

Taking into account the seriousness of the threats to criterion (x), the mission considers that these threats represent a potential danger to the property in accordance with Paragraph 180 of the Operational Guidelines. The mission therefore recommends that the property remains on the List of World Heritage in Danger until the DSOCR that addresses these threats has been achieved. If the current negative trends impacting criterion (x) continue in the future, the property will

unquestionably lose its most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of Outstanding Universal Value from the point of view of science or conservation.

The current mission would like to reiterate the concerns of the previous Reactive Monitoring Mission of 2012 that the current management capacity (financial and human resources) of the property authorities is still inadequate to effectively deal with the threats on the ground. Major efforts, including the implementation of the new management plan and the development of a resource mobilization strategy as well as several sectoral plans, are needed to reverse the current negative trends affecting criterion (x). The management of the most important archaeological and paleontological sites in the property could also benefit from more protection through fencing or better demarcation.

Due to pressures, such as poaching, illegal fishing and development projects, the integrity of the property is being severely impacted. The property might no longer be “the largest Nile crocodile breeding ground in the world” as stated in its SOUV. New census data should provide a better insight in all the population trends of flagship species, including the Nile crocodile, and provide the basis for developing species-specific recovery plans.

Regarding the integrity for criteria (viii) and (x), many areas of important value are located outside the property. While the property has a two kilometer restrictive zone around its lakeshore to protect the aquatic components, including shore and lake habitats, several high biodiversity areas are located outside the lake itself such as the Omo Delta. The delta constitutes a critically important ecological component of the property with high biodiversity (fish, birds, amphibian, reptiles) and taking into account anthropogenic and climatic threats, its inclusion in the property (through a Significant Boundary Modification) or in a buffer zone with complementary legal and/or customary restrictions, would significantly strengthen the OUV of the property.

Many important paleontological and archeological sites are also located outside the current boundaries of the property, including many hominid sites on the western shore of the lake and Lomekwi, where the oldest (3.3 million years old) hominid tools were discovered. Several sites inside and outside the property do also fulfil the cultural criteria of human physical and cultural evolution. At the time of the inscription in 1997, the Committee deferred the inscription under cultural criteria and requested the Kenyan State Party to delineate the cultural components of the nomination. Unfortunately, this request has yet to be followed up by State Party and as a consequence, the globally unique cultural components of the Lake Turkana area have not yet received the global recognition and protection they deserve. To better contribute to the long-term protection of the OUV, the mission recommends that the Kenyan State Party develops a

roadmap to identify all important cultural areas and submit a re-nomination, as well as at the same time reviews and revises the boundaries of the natural components and also designates a buffer zone in accordance with paragraphs 103-107 of the Operational Guidelines.

DESIRED STATE OF CONSERVATION FOR THE REMOVAL OF THE PROPERTY FROM THE LIST OF WORLD HERITAGE IN DANGER

Based on extensive discussions with the Kenyan State Party involving different ministries, the mission has developed a draft DSOCR as described below. As earlier explained in this report, the Ethiopian State Party did not attend the meeting in Nairobi, and was unable to contribute to the DSOCR. The draft DSOCR therefore only includes components, which the Kenyan State Party can address. The mission recommends that when international travel can safely resume, a new meeting between the States Parties of Kenya and Ethiopia with the participation of the World Heritage Centre and IUCN is organized to draft the indicators for the removal of the property from the List in Danger that deal with the upstream threats affecting the OUV of the property. The mission further developed, in consultation with the State Party, a set of Corrective Measures to ensure that the property can be removed from the List of World Heritage in Danger. It was decided not to define the proposed timeframe for achieving the DSOCR until the Kenyan State Party has met with the Ethiopian State Party, World Heritage Centre and IUCN to discuss indicators regarding upstream threats.

Table 3: Desired state of conservation for the removal (DSOCR) of the Lake Turkana National Parks (Kenya) from the List of World Heritage in Danger

	No	INDICATOR FOR REMOVAL OF THE PROPERTY FROM THE LIST IN DANGER	RATIONALE	METHOD OF VERIFICATION
	1	<p>Population Trend Data for Key Species of Fauna</p> <p>Populations of reintroduced species that have been locally extinct (i.e. Grevy's zebra, Reticulated giraffe, Somali ostrich, wild dog and several large cats, such as lion and leopard) since the</p>	<p>Several species referred to in the SOUV of the property have become locally extinct and are no longer present in the property, including Grevy's zebra, reticulated giraffe, lion. Other wildlife populations have decreased drastically (see research by University of Helsinki), although for some species the exact</p>	<p>Systematic surveys of key wildlife species conducted every 2-4 years, and compared with baseline data, i.e. year of inscription (if population data is not available for 2001, an estimation of the species population at the</p>

		<p>property was inscribed as World Heritage (2001) show a sustained positive trend in occupancy data, in addition to general wide population growth of the indicator species (northern topi, oryx, grant gazelle, gerenuk, lesser kudu, Nile crocodile, hippopotamus) that are still present in the property, but which population have dramatically decreased since the inscription. The Kenyan State Party should seek the help of the Global Change and Conservation lab, University of Helsinki and IUCN specialist groups to provide estimates of population figures at the date of inscription.</p>	<p>rate of decline is still unknown due to a lack of data (e.g. Nile crocodile, hippopotamus). If the wildlife populations in the property are not able to rebound or show positive trends in the next ten years, the State Party should explore at (re)nominating Lake Turkana National Parks under natural criteria (vii) and (viii) as well as cultural criteria (iii) and (iv).</p>	<p>date of inscription should be made).</p>
	2	<p>Limnological and hydrological parameters remain within identified “limits of natural variation of the lake system”</p> <p>Limnological and hydrological data constitute strong indicators of the ecosystem health of lake Turkana. Any</p>	<p>The reduction of the flood pulse and inflow, combined with changing nutrient levels could be detrimental for Lake Turkana’s biodiversity, which is dependent on specific limnological and hydrological conditions. Establishing limnological and hydrological parameters within “limits of the natural variation of the lake system” will</p>	<p>Systematic and periodical collection and analysis of limnological and hydrological data to assess if parameters occur within possible natural variation of lake system.</p>

		<p>changes in both limnological and hydrological parameters could have detrimental impacts on the lake’s ecology and the OUV of the property. It was not possible for the mission team due to the limited scope of the mission to identify “limits of the natural variation of the lake system”. The mission recommends that the State Party invites experts (i.e. Avery, Gownaris,) and IUCN to identify (1) a range of limnological and hydrological parameters that allow to monitor ecosystem health and the OUV of the property, (2) the range of variation that can occur naturally in the identified limnological and hydrological parameters, and (3) establish benchmarks when parameters fall outside the natural variation/normal range, (4) Identify data collection methods that are both cost-effective and have acceptable levels of accuracy.</p>	<p>allow to monitor the ecosystem health, and OUV of the property.</p>	
	3	<p>No occurrence of livestock outside two</p>	<p>The Sibilo National Park faces serious livestock</p>	<p>Periodical analyses of on the ground</p>

		designated grazing corridors in SNP	encroachment, especially during drier periods, resulting in overgrazing, trampling of fossil sites, an increase in shrub vegetation and competition with wildlife. Cattle bomas, used to protect livestock from predators, are commonly found within SNP, indicating that livestock is omnipresent within the park boundaries. Halting livestock encroachment will also reduce poaching, as it mainly attributed to pastoralists guarding the livestock.	observation and satellite imagery
	4	Boundary and zoning demarcation The boundary is visibly and correctly demarcated in both terrestrial and aquatic components of the property.	The original boundaries of the property are no longer clearly visible, making it difficult for rangers to enforce the law. A clearly visible boundary demarcation (buoys for aquatic and boundary stone/marker for the terrestrial parts) would provide a strong indication to encroaching pastoralists, poachers and fishermen that they are trespassing.	GPS coordinates of all installed boundary markers. The indicator should show that the entire boundary of the property is adequately and accurately demarcated on the ground, at all three component national parks. Monitoring of property boundaries demarcation to ensure boundary demarcation is not removed.
	5	Establishment of Buffer zone	The current property lacks an adequate buffer	Map with buffer zone and description of

		<p>A buffer zone, with complementary legal and/or customary restrictions regarding its use and development, has been established around the property providing an added layer of added layer of protection.</p>	<p>zone to protect it from any adverse effects of development at landscape level. As the property is part of an integrated lake system, any impact to the lake will also impact the OUV of the property. The State Party of Kenya should therefore consider to make the whole lake a buffer zone, governed by a relevant legal/policy/customary framework guaranteeing the required added layer of protection for the property. The size, characteristics and authorized uses of the buffer zone should be developed by the State Party with the technical assistance of IUCN using the procedure for a minor boundary modification (see Paragraph 164 and Annex 11, Operational Guidelines for the Implementation of the World Heritage Convention).</p>	<p>legal, policy or customary regulations governing the buffer zone.</p>
	6	<p>No negative impacts on OUV of property from development activities</p> <p>Any new or planned development activities in the Omo-Turkana Basin (hydro-power, geothermal, oil and</p>	<p>The recent infrastructure development in the Omo-Turkana Basin has led to negative impacts on the lake system and OUV of the property. If these developments are not planned, assessed, constructed and managed using 'precautionary</p>	<p>Comprehensive EIAs/SEAs, based on IUCN World Heritage Advice Note Environmental Assessment & World Heritage, are conducted for all development projects, and no</p>

		<p>gas exploration and extraction, LAPSET, etc.) are assessed (EIA, SEA), constructed and managed using a 'precautionary approach' and not disturbing the 'limits of the natural variation of the lake system' so that they do not cause any negative impact on Lake Turkana system or the OUV of the property.</p>	<p>approach', their cumulative impacts will negatively affect the overall ecology of the Lake Turkana. The State Parties of Kenya and Ethiopia need to identify 'limits of natural variation of the lake system' based on historical limnological and hydrological parameters.</p>	<p>projects that have a potential to negatively impact OUV is allowed; 'Precautionary measures' of the management and operation of development projects are identified and can be independently monitored.</p>
	7	<p>Management Plan is being implemented</p> <p>The Management Plan is being implemented according to the proposed timeline and with the support of adequate resources; Resource mobilization and allocation plan, and operational plans have been developed to support implementation of management plan; Sectoral plans addressing specific threats (i.e. law enforcement; livestock encroachment and grazing; community engagement; etc.) have been developed and implemented.</p>	<p>The Property Authorities developed a comprehensive Management Plan (2018-2018) in a participatory way involving a wide variety of stakeholders, which was officially endorsed by the Government in 2019. While the management plan identifies and addresses a wide variety of threats in the property, a major concern in the implementation of the management plan is the current absence of a resource allocation strategy and operational plan, including critical intergovernmental coordination and support required for its implementation. The plan would further benefit from the development of</p>	<p>Adequate resources are allocated for the implementation of management; periodic monitoring and reporting on implementation of management plan. Documents have been finalized and shared with WHC-IUCN Documents have been finalized and shared with WHC-IUCN; periodic monitoring and reporting on implementation of sectoral plans.</p>

			<p>a number of sectoral plans or strategies to better address certain threats. The implementation of the management plan will further require extra financial and human resources that cannot be covered by the annual budgets of the NPs, which are already not sufficient to adequately protect the property.</p>	
--	--	--	---	--

5. CONCLUSION AND RECOMMENDATIONS

Lake Turkana National Parks was inscribed on the World Heritage List in 1997 on the basis of natural criteria (viii) and (x). Since its inscription, the property has been facing an increasing number of threats, including poaching, illegal fishing, pastoralist encroachment and the accumulative impact of large-scale development projects.

The mission identified several large-scale development schemes occurring or planned within the wider Turkana landscape. Though none of these development schemes is currently impacting the property - if not carefully managed, their cumulative impacts could affect the ecology of the lake system and the related OUV. Develops a national overarching policy for development in and adjacent to Lake Turkana to avoid any negative impacts on the Lake system and OUV of the property

The mission expresses its concern regarding the steep decline in wildlife populations that represent the values for which the property was inscribed under criterion (x). Several flagship species, including Grevy’s zebra, reticulated giraffe and lion, have become locally extinct and are no longer present in the property. The extent of poaching, which is closely related to the proliferation of semi-automatic weapons in the region, makes it extremely dangerous for park rangers to enforce the law. In addition, encroachment by pastoralist herds is most likely leading to competition with wildlife species, land degradation, erosion, the (local) extinction of floral species, as well as increasing the chances of transmitting diseases between cattle and wildlife species. Illegal fishing activities in the aquatic components of the property as well as poaching of crocodiles and hippopotamus have also impacted the OUV of the property.

The mission wishes to commend the State Party in developing a comprehensive Management Plan (2018-2018) for property, which has been officially endorsed by the Government in 2019. The mission also recognizes the difficulties in managing the property due to a number of challenges, including remoteness, lack of rule of law, and wide availability of guns amongst communities. While the management plan addresses many threats in the property, the mission would like to express concern regarding the absence of a resource allocation strategy and operational plan, including intergovernmental coordination and support required for the implementation of the management plan. The mission further recommends that the State Party develops a number of sectoral plans to address issues such as poaching, livestock grazing, illegal fishing, and wildlife population recovery. The mission also identified a lack of adequate resources required to effectively deal with the threats, especially considering that management authorities are operating under extreme difficult circumstances (harsh terrain, security, lack of communication). In addition, many of the threats to the property are beyond the scope of KWS and NMK as they are related to aspects such as regional development, socio-economic development, and security, and require both enhanced intra- and intergovernmental coordination.

Though the mission was unable to access any data and information from the Ethiopian State Party regarding the operations of Gibe III and the Omo-Kuraz Sugar Development Project, scientific studies indicate that reduced flood pulse and inflow, combined with changing nutrient levels caused by upstream development projects, could be detrimental for Lake Turkana's biodiversity and related OUV, which is dependent on specific limnological and hydrological conditions. The mission is of the opinion that without adequate and science-based mitigation interventions, the large-scale development projects in the Omo river basin will have negative and everlasting impacts on the ecology of Lake Turkana. The mission also notes that the joint Strategic Environmental Assessment by the State Parties of Kenya and Ethiopia, as requested by the Committee 36 COM 7B.3 (2012), has yet to be initiated. The lack of follow up of Committee Decisions regarding upstream development by the State Parties has limited the future options for mitigating negative impacts on the OUV, including the 'no project' option.

The mission would like to state that the OUV of the property is at the risk of being lost if the current decline in wildlife populations cannot be reversed in the near future and no adequate mitigation measures can be implemented to ensure the impacts of the different development projects in the wider landscape, in particular the upstream development, do not irreversibly impact the ecology of the lake ecosystem. On the basis of the evidence presented to and analyzed by the mission, the mission concludes that while positive steps are being taken by the State Party of Kenya, the threats to the OUV of the property as recognized under criterion (x) are still present,

and that therefore Lake Turkana National Parks should remain on the List of World Heritage in Danger. The DSOCR provides feasible targets that can be achieved within the next ten years to ensure that the property can be hopefully taken out of the In Danger List by 2030. In discussion with the Kenya State Party, a set of Corrective Measures has been identified, addressing the most urgent and important issues. However, as some of the threats to the OUV of the property also originate from within Ethiopia, the DSOCR and corrective measures should be finalized by the State Party of Kenya (after international travel has been normalized) in consultation with the State Party of Ethiopia and the support of World Heritage Centre and IUCN.

The mission recommends that the following tentative Corrective Measures, as listed below, will be used as the basis for consultation between the State Parties of Kenya and Ethiopia, with the technical support of World Heritage Centre and IUCN:

1. Develop a national overarching Master Plan for development in and adjacent to Lake Turkana to avoid any negative impacts on the Lake system and OUV of the property, including prohibiting the use of water from the lake or any important tributaries for the construction and operation of large-scale infrastructure and development projects in the Turkana region;
2. Establish intragovernmental Lake Turkana Management Body/Authority that identifies existing conditions and problems, and lays out instructions for short and long-term management of the lake;
3. Establish a WH Buffer zone to the property, possibly covering the whole lake and other critical terrestrial areas, as an added layer of protection with complementary legal and/or customary restrictions regarding its use and development;
4. Develop a site-specific Biodiversity Action Plan to restore wildlife populations in Sibiloi NP (population and species baseline should be time of inscription or earlier);
5. Conduct a comprehensive scientific study to assess the current impacts of grazing and develop a viable grazing pressure reduction strategy based on grazing capacities to address pastoralist encroachment;
6. Clearly demarcate physically all terrestrial and aquatic boundaries, as well as important restricted zones, ideally following a possible re-nomination that would change the boundaries of the property;
7. Strengthen law enforcement by (1) conducting a multi-agency joint operation (KWS, NMK, police, army, etc.) to halt all poaching and livestock encroachment; (2) allocates sufficient resources, including rangers, equipment (i.e. cars, boats, etc.) and infrastructure (ranger camps on CINP and SINP) to ensure adequate law enforcement; (3) adopts SMART as a patrolling system;

8. Establish a co-management system that stipulates clear regulations regarding use of resources in the property and potentially provides payment for environmental services to local communities. The mission recommends that the State Party uses anthropologists to help develop all community engagement interventions in the management plan to ensure that they are socio-culturally appropriate;
9. Establish a science-based monitoring system to predict and monitor the ongoing effects of climate change and to establish feedback systems that can prompt required management and policy interventions.
10. Bring the three sites under one integrated management unit to improve coordinated approach to threats;
11. Develop a resource mobilization strategy and allocation plan, operational plan, and monitoring and evaluation (M&E) plan for the implementation of the Lake Turkana National Parks Management Plan, and apply for International Assistance under the WH Convention for additional support if required;
12. Allocate adequate staffing, equipment and other resources to protect the WH Property in line with WH principles.
13. Establish a comprehensive long-term scientific monitoring system (i.e. systematic and periodical collection and analysis of limnological and hydrological data) in Lake Turkana;
14. Conduct and implement findings of a feasibility study regarding the potential boundary extension of the property under both natural and cultural criteria to include all relevant sites with OUV currently located outside the property.

To address the threat of upstream development, the mission recommends the State Party of Kenya to:

- Establish a comprehensive long-term scientific monitoring system (i.e. systematic and periodic collection and analysis of limnological and hydrological data) in Lake Turkana that can lead to mitigation measures based on monitoring results.

To ensure that the impacts of upstream development on Lake Turkana remain within the “limits of natural variation of the lake system”, the mission recommends the State Party of Ethiopia to:

- Provide an update on all planned development projects in the Omo Basin, and ensure that adequate environmental assessments are undertaken in line with paragraph 169 of the Operational Guidelines and following the guidelines stipulated in the IUCN World Heritage Advice Note on Environmental Assessment;
- Share detailed data with the World Heritage Centre (for review by IUCN) on the ‘precautionary measures’ taken by the Ethiopian State Party regarding the operations and

management systems of all major upstream projects, including monitoring system, to ensure that impacts on the lake are minimized.

The mission further recommends that the States Parties of Ethiopia and Kenya jointly:

- Finalise and agree on the proposed Desired state of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR), including timeframe, and submit it for the World Heritage Committee's approval.
- Establish limnological and hydrological parameters with assistance of IUCN that define the "limits of natural variation of the lake system" to ensure effective mitigation of upstream development projects;
- Establish a bilateral data sharing agreement that can act as an early warning system and trigger required managerial and operational interventions of upstream projects, as well as other adaptive managerial and mitigation measures to ensure that impacts remain within the "limits of natural variation of the lake system";
- Without any further delay, conduct immediately the SEA for assessing the cumulative impacts on Lake Turkana of all finished, ongoing, and planned developments in the Lake Turkana Basin and to identify urgently needed mitigation measures – as requested by the Committee since 2012. The SEA could be developed under the ongoing UNEP project, pending confirmation from the project partners;

References

Abbink, J. (2012) Dam controversies: contested governance and developmental discourse on the Ethiopian Omo River dam. *Social anthropology* 20: 125-144. <https://doi.org/10.1111/j.1469-8676.2012.00196.x>

Abiye, AT. (2010). An overview of the transboundary aquifers in East Africa. *Journal of African Earth Sciences* 58: 684–691. <https://doi.org/10.1016/j.jafrearsci.2009.10.003>

Africa Resources Working Group. (2008). Environmental and social impacts of the proposed Gibe III hydroelectric project in Ethiopia's Lower Omo river basin. A commentary by the Africa Resources Working Group. University of Montana. Retrieved from: <http://www.forestpeoples.org/sites/fpp/files/publication/2010/08/ethiopiahydroelecimpactsmy08eng.pdf>

African Development Bank Group. (2011). Updated Environmental and Social Impact Assessment Summary. Retrieved from <https://www.afdb.org/sites/default/files/documents/environmental-and-social-assessments/kenya - lake turkana wind power project - esia summary.pdf>

Agriconsulting S.P.A. and MDI Consulting Engineers. (2008). Gibe III Hydroelectric Project: Environmental Impact Assessment - Additional Study on Downstream Impact.

Avery, P. (2012). Kenya's jade jewel in peril from Ethiopia plans, *SWARA*, May-June Issue: 16-21, Retrieved from: <http://www.mursi.org/documents>

Avery, S.T. (2010). Assessment of hydrological impacts of Ethiopia's Omo Basin on Kenya's Lake Turkana water levels & fisheries. Final Report. African Development Bank. Retrieved from: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Compliance-Review/REPORT_NOV_2010_S_AVERY_TURKANA_Small_file.pdf

Avery, S.T. (2012). Lake Turkana and the Lower Omo: hydrological impacts of Gibe III and lower Omo irrigation development, volume I Report. African Studies Centre, University of Oxford. Retrieved from: https://www.africanstudies.ox.ac.uk/sites/default/files/africanstudies/documents/media/executive_summary_introduction.pdf

Avery, S.T. (2012). Lake Turkana and the Lower Omo: hydrological impacts of Gibe III and lower Omo irrigation development, volume II Annexes. African Studies Centre, University of Oxford. Retrieved from: https://www.africanstudies.ox.ac.uk/sites/default/files/africanstudies/documents/media/volume_ii_annexes.pdf

Avery, S. (2013). The Impact of Hydropower and Irrigation Development on the World's Largest

Desert Lake: What Future Lake Turkana? African Studies Centre, University of Oxford. Retrieved from <http://www.africanstudies.ox.ac.uk/what-future-lake-turkana>

Avery, S. (2014). What future for Lake Turkana and its wildlife? SWARA, Jan–Mar 2014. Retrieved from: http://www.mursi.org/pdf/copy3_of_pastoral-livelihoods.pdf

Avery, S. (2017). Fears over Ethiopian dams' costly impact on environment, people. The Conversation. Retrieved from: <https://theconversation.com/fears-over-ethiopian-dams-costly-impact-on-environment-people-80757>

Avery, S. (2018). How Ethiopia and Kenya have put a World Heritage site in danger. The Conversation. Retrieved from: <https://theconversation.com/how-ethiopia-and-kenya-have-put-a-world-heritage-site-in-danger-99458>

Avery, S.T. (2020). Strategic Water Supply for Development, Turkwel Dam Option, Turkwel Reservoir Hydrology, South Lokichar Development. Tullow Oil Kenya. (report under review)

Avery, S. T. & Tebbs, E. J. (2018). Lake Turkana, major Omo River developments, associated hydrological cycle change and consequent lake physical and ecological change. JOURNAL OF GREAT LAKES RESEARCH, 44(6): 1164-1182. <https://doi.org/10.1016/j.jglr.2018.08.014>

Ayalew, L. (2009). Analyzing the effects of historical and recent floods on channel pattern and the environment in the Lower Omo basin of Ethiopia using satellite images and GIS. Environmental Geology, 58(8): 1713-1726. <https://doi.org/10.1007/s00254-008-1671-8>

Boles, O.J.C., Shoemaker, A., Courtney Mustaphi C.J., Petek, N., Ekblom, A. & Lane, P.J. (2019). Historical Ecologies of Pastoralist Overgrazing in Kenya: Long-Term Perspectives on Cause and Effect. Human Ecology. <https://doi.org/10.1007/s10745-019-0072-9>

Bridge Africa (Agency for Development Concerns) for the Millennium Water Alliance. (2018). Marsabit County Capacity Needs Assessment Report. Livestock Sector. Retrieved from: https://www.academia.edu/37637056/Marsabit_County_Capacity_Needs_Assessment_for_the_Livestock_Sector

Bruner, A. G., Gullison, R.E. & Balmford, A. (2004). Financial Costs and Shortfalls of Managing and Expanding Protected-Area Systems in Developing Countries. BioScience, 54, Issue 12: 1119–1126. [https://doi.org/10.1641/0006-3568\(2004\)054\[1119:FCASOM\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2004)054[1119:FCASOM]2.0.CO;2)

Cabeza, M., Fernandez-Llamazares, A., Fraixedas, S., López-Baucells, A., Burgas, D., Rocha, R. & Ajiko, A. (2016). Winds of Hope for Sibiloi National Park. Swara, (4): 33-37. Retrieved from https://helda.helsinki.fi/bitstream/handle/10138/175357/SWARA_2016_Sibiloi.pdf?sequence

Carr C.J. (2017). River Basin Development and Human Rights in Eastern Africa — A Policy Crossroads. <https://doi.org/10.1007/978-3-319-50469-8>

Cormack, Z. (2019). How Kenya's mega wind power project is hurting communities. The Conversation. Retrieved from: <https://theconversation.com/how-kenyas-mega-wind-power-project-is-hurting-communities-122061>

de Leeuw, J., Waweru, M.N., Okello, O.O., Maloba, M., Nguru, P., Said, M.Y., Aligula, H.M., Heitkönig, I.M.A. & Reid, R.S. (2001). Distribution and diversity of wildlife in northern Kenya in relation to livestock and permanent water points. *Biological conservation*, 100(3): 297-306. [https://doi.org/10.1016/S0006-3207\(01\)00034-9](https://doi.org/10.1016/S0006-3207(01)00034-9)

Delgado, A., Rodriguez, D.J. & Sohns, A.A. (2015). Thirsty Energy: Understanding the Linkages between Energy and Water. *Live Wire*, 2015/41. World Bank, Washington, DC. Retrieved from: <https://openknowledge.worldbank.org/handle/10986/21576>

European Investment Bank. (2010). Independent review and studies regarding the Environmental & Social Impact Assessments for the Gibe III Hydropower Project. Prepared by Sogreah Consultants. Retrieved from: <https://www.eib.org/attachments/complaints/sg-a-2010-01-annex-iii-independent-review-of-esia.pdf>

Ethiopian Sugar Corporation (2020). Retrieved from <https://www.ethiopiansugar.com/>

Ferguson, A. J. D. & Harbott, B. J. (1982). Geographical, physical and chemical aspects of Lake Turkana. In A. J. Hopson (ed.), *Lake Turkana: A Report on the Findings of the Lake Turkana Project, 1972–1975, Volume 1*. London, Overseas Development Administration: 1–108. Retrieved from: <https://www.biodiversitylibrary.org/item/234277#page/28/mode/1up>

Fynn, R.W.S., Augustine, D.J., Peel, M.J.S. & de Garine-Wichatitsky, M. (2016). Strategic management of livestock to improve biodiversity conservation in African savannahs: a conceptual basis for wildlife–livestock coexistence. *Journal of Applied Ecology*, 53: 388-397. <https://doi.org/10.1111/1365-2664.12591>

Government of Kenya (2010). National Climate Change Response Strategy. Retrieved from <http://www.environment.go.ke/wp-content/documents/complete%20nccrs%20executive%20brief.pdf>

Gownaris, N.J. (2015). Understanding the Impacts of Changes in Water Inflow on the Fishes of Lake Turkana, Kenya. Doctoral dissertation, School of Marine and Atmospheric Science, Stony Brook University. Retrieved from: https://ir.stonybrook.edu/xmlui/bitstream/handle/11401/77777/Gownaris_grad.sunysb_0771E_12653.pdf?sequence=1

Gownaris, N.J., Pikitch, E.K., Ojwang, W.O., Michener R., & Kaufman, L. (2015) Predicting Species' Vulnerability in a Massively Perturbed System: The Fishes of Lake Turkana, Kenya. PLoS ONE 10(5): e0127027. <https://doi.org/10.1371/journal.pone.0127027>

Gownaris, N.J., Pikitch, E.K., Aller, J., Kaufman, L., Kolding, J., Lwiza, K., Obiero, K., Ojwang, W., Malala, J. & Rountos, K. (2016). Fisheries and Water Level Fluctuations in the World's Largest Desert Lake: Lake Turkana: Fisheries and Water Level Fluctuations. *Ecohydrology*. <https://doi.org/10.1002/eco.1769>

Harbott, B. J. (1982). Studies on algal dynamics and primary productivity in Lake Turkana. In A. J. Hopson (ed.), *Lake Turkana: A Report on the Findings of the Lake Turkana Project 1972–1975, Volume 1*. London, Overseas Development Administration: 109–162. Retrieved from: <https://www.biodiversitylibrary.org/item/234277#page/28/mode/1up>

Hardman, M. (2008). A new species of *Chrysichthys* (Siluriformes: Claroteidae) from Lake Turkana, Kenya. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 157: 25-36. [https://doi.org/10.1635/0097-3157\(2008\)157\[25:ANSOCS\]2.0.CO;2](https://doi.org/10.1635/0097-3157(2008)157[25:ANSOCS]2.0.CO;2)

Hazard, B. & Adongo, C. (2015). Green grabbing, pastoralism and environmental dynamics in Northern Kenya. An assessment of conservation models and practices in Marsabit County. *Les Cahiers d'Afrique de l'Est / The East African Review*, 50: 40-62. Retrieved from: <http://journals.openedition.org/eastafrica/291>

Hodbod, J., Stevenson, E. G. J., Akall, G., Akuja, T., Angelei, I., Bedasso, E. A., Buffavand L, Derbyshire S., Eulenberger I., Gonwaris N., Kamski, B., Kurewa, A. Lokuruka, M. Fekadu Mulugeta, M., Okenwa D., Rodgers, C. & Tebbs, E. (2019). Social- ecological change in the Omo-Turkana basin: A synthesis of current developments. *AMBIO*, 48(10): 1099-1115. <https://doi.org/10.1007/s13280-018-1139-3>

Hopson, A.J. (ed.) (1982). *Lake Turkana. A Report on the Findings of the Lake Turkana Project 1972–1975*. Overseas Development Administration, London, UK. Retrieved from: <https://www.biodiversitylibrary.org/item/234277#page/28/mode/1up>

Human Rights Watch. (2002). *Playing with Fire: Weapons Proliferation, Political Violence, and Human Rights in Kenya*. Retrieved from: <https://www.hrw.org/reports/2002/kenya/>

Human Rights Watch. (2015). *There is No Time Left. Climate Change, Environmental Threats, and Human Rights in Turkana County, Kenya*. Retrieved from: <https://www.hrw.org/report/2015/10/15/there-no-time-left/climate-change-environmental-threats-and-human-rights-turkana>

James, A., Gaston, K. & Balmford, A. (1999). Balancing the Earth's accounts. *Nature*, 401: 323–324. <https://doi.org/10.1038/43774>

Johnson T.C. & Malala J.O. (2009). Lake Turkana and Its Link to the Nile. In: Dumont H.J. (eds) The Nile. Monographiae Biologicae, vol 89. Springer, Dordrecht. https://doi.org/10.1007/978-1-4020-9726-3_15

Kamski, B. (2016). The Kuraz Sugar Development Project (KSDP) in Ethiopia: between “sweet visions” and mounting challenges. *Journal of Eastern African Studies*, 10(3): 568–580. <https://doi.org/10.1080/17531055.2016.1267602>

Kamski, B. (2016). The Kuraz Sugar Development Project (OTuRN Briefing Note 1). Lansing, Michigan: Omo-Turkana Research Network.

Kangi, G. W., Diels, J., Van Orshoven, J., & Dondeyne, S. (2018). Investigating the land use/land cover changes in the Omo basin and their subsequent effects on the Omo delta. *Young Researchers’ Overseas Day, Abstracts*. Presented at the Young Researchers’ Overseas Day 2018.

Kenya National Bureau of Statistics. (2009). Marsabit District Multiple Indicator Cluster Survey 2008, Nairobi, Kenya: Kenya National Bureau of Statistics.

Kenya Wildlife Service. (2018). Lake Turkana National Parks (Sibilo, Central Island and South Island) Management Plan 2018-2028

Kolding, J. (1992). A summary of Lake Turkana: An ever-changing mixed environment. *SIL Communications*, 1953-1996, 23(1): 25-35. <https://doi.org/10.1080/05384680.1992.11904005>

Kolding, J. (1993). Trophic interrelationships and community structure at two different periods of Lake Turkana, Kenya: a comparison using the ECOPATH II box model. (Proceedings of the Trophic models of aquatic ecosystems. ICLARM Conference Proceedings: 116-123. Retrieved from: https://www.researchgate.net/publication/287661895_Trophic_interrelationships_and_community_structure_at_two_different_periods_of_Lake_Turkana_Kenya_A_comparison_using_the_ECOPATH_II_box_model

Kolding J. (1995). Changes in species composition and abundance of fish populations in Lake Turkana, Kenya. In: Pitcher T.J., Hart P.J.B. (eds) *The Impact of Species Changes in African Lakes*. Chapman & Hall Fish and Fisheries Series, vol 18: 335-363. Springer, Dordrecht. https://doi.org/10.1007/978-94-011-0563-7_16

Kolding, J. & van Zwieten, P.A.M. (2012). Relative lake level fluctuations and their influence on productivity and resilience in tropical lakes and reservoirs. *Fisheries Research*, 115-116: 99-109. <https://doi.org/10.1016/j.fishres.2011.11.008>

Krätli, S. & Schareika, N. (2010). Living *Off* Uncertainty: The Intelligent Animal Production of Dryland Pastoralists. *The European Journal for Development Research* 22: 605–622. <https://doi.org/10.1057/ejdr.2010.41>

Lake Turkana Wind Power. (2019). Lake Turkana Wind Power Project - Updated Environmental and Social Impact Assessment Study Report

LAPSSET Corridor Development Authority. (2017). LAPSSET PPT Presentation. Building Transformative and Game Changer Infrastructure for a Seamless Connected Africa. Retrieved from: <http://www.lapsset.go.ke>

Le Ster, M. (2011). Conflicts over water around Lake Turkana Armed violence between Turkana and Dassanetch. IFFRA-MAMBO. Retrieved from: <https://halshs.archives-ouvertes.fr/halshs-01206597>

Lunt, I.D., Eldridge, D.J., Morgan, J.W., & Witt, G.B. (2007). A framework to predict the effects of livestock grazing and grazing exclusion on conservation values in natural ecosystems in Australia. *Australian Journal of Botany*, 55: 401-415. <https://doi.org/10.1071/BT06178>

Malala, J.O., Olilo, C.O., Keyombe, J.L., Obiero, M.O., Bironga, C.H., Aura, C.M., Wakwabi, E.O. Njiru, J.M. (2018). Catch Assessment Survey (CAS) for Lake Turkana to disseminate the findings. Kenya Marine and Fisheries Research Institute (KMFRI) Technical Report no. KMF/TUR/RS/C1.6(ii). 40 pp.

Marsabit County Government. (2013). Revised First County Integrated Development Plan 2013-2017. Retrieved from: https://www.ke.undp.org/content/kenya/en/home/library/democratic_governance/Marsabit-Revised-CIDP.html

Marsabit County Government. (2018). Second County Integrated Development Plan 2018-2022. Retrieved from: <http://cog.go.ke/media-multimedia/reportss/category/106-county-integrated-development-plans-2018-2022>

Mbaluka, J. K. & Brown, F.H. (2016). Vegetation of the Koobi Fora Region Northeast of Lake Turkana, Marsabit County, Northern Kenya. *Journal of East African Natural History*, 105(1): 21-50. <https://doi.org/10.2982/028.105.0101>

Mkutu, K. (2007). Small Arms and Light Weapons among Pastoral Groups in the Kenya–Uganda Border Area. *African Affairs*, 106 (422): 47–70. <https://doi.org/10.1093/afraf/adl002>

Muoria, P., Muruthi, P., Waititu, K., Hassan, B., Mijeje, D. & Oguge, N. (2007). Anthrax outbreak among Grevy's zebra (*Equus grevyi*) in Samburu, Kenya. *African Journal of Ecology*, 45: 483 - 489. <https://doi.org/10.1111/j.1365-2028.2007.00758.x>

Muška, M., Vašek, M., Modry, D., Jirků, M., Ojwang, W., Malala, J. & Kubecka, J. (2012). The last snapshot of natural pelagic fish assemblage in Lake Turkana, Kenya: A hydroacoustic study. *Journal of Great Lakes Research*, 38: 98–106. <https://doi.org/10.1016/j.jglr.2011.11.014>

Mwamidi, D. M., Renom, J. G., Fernández-Llamazares, Á, Burgas, D., Domínguez, P., & Cabeza, M. (2018). Contemporary pastoral commons in East Africa as OECMs: A case study from the Daasanach community. *Parks*, 24: 79-88.

<https://doi.org/10.2305/IUCN.CH.2018.PARKS-24-SIDMM.en>

Ngotho, Kamau. (2020). Turkwel Dam: Biwott project and thirst for development. Published in Daily Nation on 29 March 2020. Retrieved from:

<https://www.nation.co.ke/dailynation/news/politics/turkwel-dam-biwott-project-and-thirst-for-development-282754>

Notenbaert, A.M.O., Davies, J., De Leeuw, J., Said, M. Herrero, M., Manzano, P., Waithaka, M., Aboud, A. & Omondi, S. (2012). Policies in support of pastoralism and biodiversity in the heterogeneous drylands of East Africa. *Pastoralism: Research, Policy and Practice*, 2:14.

<https://doi.org/10.1186/2041-7136-2-14>

Oakland Institute. (2019). How they tricked us. Living with the Gibe III Dam and Sugarcane Plantations in Southwest Ethiopia. Retrieved from <https://www.oaklandinstitute.org/gibe-dam-sugarcane-plantations-southwest-ethiopia>

Ojwang, W.O., Obiero, K.O., Donde, O.O., Gownaris, N., Pkitch, E.K., Omondi, R, Agembe, S., Malala, J. & Avery, S.T. (2016). Lake Turkana: World's Largest Permanent Desert Lake (Kenya). *The Wetland Book*: 1361-1380. https://doi.org/10.1007/978-94-007-6173-5_254-2

Ogada, D. (2017). Fantastic memories amid concern in northern Kenya. *Swara*, 41: 80-83. Retrieved from:

https://www.eawildlife.org/DigitalSwaraMagazine/swaraJanuary_to_March2017_1.pdf

Ogutu, J.O., Piepho, H.P., Said, M.Y., Ojwang, G.O., Njino, L.W., Kifugo, S.C. & Wargute, P.W. (2016). Extreme Wildlife Declines and Concurrent Increase in Livestock Numbers in Kenya: What Are the Causes? *PLoS ONE* 11(9): e0163249.

<https://doi.org/10.1371/journal.pone.0163249>

Olilo C.O., Malala J.O., Obiero M.O., Bironga, C., Keyombe J.L., Aura C.M., Wakwabi E. & Njiru, J.M. (2018). Monitoring the status of demarcated fish breeding grounds in Lake Turkana. KMFRI Fresh water Systems Fisheries Research. Technical Report KMF/RS/2018/C.2.7.i. pp 30.

Parker, G., Davidson, Z., Low, B., Lalampaa, P., Sundaresan, S., & Fischer, M. (2017). Can pastoral communities offer solutions for conserving the Endangered Grevy's zebra *Equus grevyi* at the periphery of its range? *Oryx*, 51(3): 517-526.

<https://doi.org/10.1017/S0030605315001325>

Pasiecznik, N.M., Felker, P., Harris, P.J.C., Harsh, L.N., Cruz, G., Tewari, J.C., Cadoret, K. & Maldonado, L.J. (2001). *The Prosopis juliflora - Prosopis pallida* Complex: A Monograph. HDRA, Coventry, UK. pp.172. Retrieved from

https://lwecext.rl.ac.uk/PDF/R7295_Prosopis_Monograph.pdf

Rose, P.M. & Scott, D.A. (1997). Waterfowl Population Estimates. Second Edition. Wetlands International Publication No. 44. Wetlands International, Wageningen, The Netherlands.

Sagawa, T. (2010). Automatic Rifles and Social Order Amongst the Daasanach of Conflict Ridden East Africa. *Nomadic Peoples*, Volume 14 (1): 87-109. Retrieved from www.jstor.org/stable/43123864

Schieltz J.M. & Rubenstein, D.I. (2016). Evidence based review: positive versus negative effects of livestock grazing on wildlife. What do we really know? *Environ Research Letters*, 11. <https://doi.org/10.1088/1748-9326/11/11/113003>

Schilling, J., Locham, R. & Scheffran, J. (2018). A local to global perspective on oil and wind exploitation, resource governance and conflict in Northern Kenya, *Conflict, Security & Development*, <https://doi.org/10.1080/14678802.2018.1532642>

Stevenson, E.G.J. (2018). Plantation Development in the Turkana Basin: The Making of a New Desert? *Land* 7, 1: 16. <https://doi.org/10.3390/land7010016>

Stolton, S., Dudley, N. & Zogib, L. (2019). Mobile Pastoralism and World Heritage. A DiversEarth publication. Switzerland. Retrieved from: <https://roads-less-travelled.org/wp-content/uploads/2019/08/Mobile-Pastoralism-and-the-World-Heritage-Convention--For-Web.pdf>

Tebbs, E. J., Avery, S. T., & Chadwick, M. A. (2019). Satellite remote sensing reveals impacts from dam-associated hydrological changes on chlorophyll-*a* in the world's largest desert lake. *River Research and Applications*. <https://doi.org/10.1002/rra.3574>

Torrents-Ticó, M. (2018). Three photographs, an unfinished story. The story behind the first ever documented cheetah in Sibiloi. Retrieved from: <https://sibiloi.wordpress.com/2018/03/18/the-story-behind-the-first-ever-documented-cheetah-in-sibiloi/>

Turkana Government. (2013). Turkana Integrated Development Plan (2013-2017). Retrieved from: <https://devolutionhub.or.ke/index.php?com=resource&dc=county-integrated-development-plan-turkana-county-2013-2017>

UNEP. (2013). Ethiopia's Gibe III Dam: its Potential Impact on Lake Turkana Water Levels (A case study using hydrologic modeling and multi-source satellite data). Division of Early Warning and Assessment (DEWA), United Nations Environment Programme. Retrieved from: https://na.unep.net/siouxfalls/publications/Lake_Turkana.pdf

UNESCO & IUCN. (2012). Reactive Monitoring Mission to Lake Turkana National Parks, Kenya. UNESCO World Heritage Centre and IUCN.

Waila, J. M., Mahero, M. W., Namusisi, S., Hoffman, S. J., & Robertson, C. (2018). Outcomes of Climate Change in a Marginalized Population: An Ethnography on the Turkana Pastoralists in Kenya. *American journal of public health*, 108(S2), S70–S71.
<https://doi.org/10.2105/AJPH.2017.304063>

Webala, P., Carugati, C. & Fasola, M. (2010). Diversity in small mammals from eastern Lake Turkana, Kenya. *Tropical Zoology*, 23: 9-20. Retrieved from
[https://www.researchgate.net/publication/240676495 Diversity in small mammals from eastern Lake Turkana Kenya](https://www.researchgate.net/publication/240676495_Diversity_in_small_mammals_from_ea_s_tern_Lake_Turkana_Kenya)

Williams, S.D. (2002). Status and action plan for the Grevy's zebra *Equus grevyi*). In *Equids: zebras, asses and horses: status survey and conservation action plan*: 11– 27. P.D. Moehlman (Ed.). Gland, Switzerland: IUCN/SSC Equid Specialist Group. Retrieved from:
http://www.equids.org/docs/Moehlman_02_Low.pdf

Willnerd, C. (2018). A Systems Perspective of Changes within Pastoralist Populations in and around Sibiloi National Park, Kenya. *Environmental Studies Undergraduate Student eses*. 249. Retrieved from: <https://digitalcommons.unl.edu/envstudtheses/249>

WWF. (2019). Rapid Risk Assessment of the Lokichar-Lamu Crude Oil Pipeline. Retrieved from
<https://www.wwf.no/assets/attachments/Rapid-Risk-Assessment-of-the-Lokichar---Lamu-Crude-Oil-Pipeline.pdf>

ANNEXES

Annex I: Terms of Reference

The World Heritage Committee at its 42nd session in Manama, Bahrain (June/July 2018) requested the State Party of Kenya to invite a joint World Heritage Centre/IUCN Reactive Monitoring mission to Lake Turkana National Parks World Heritage property to "assess the property's state of conservation, and review the impacts of the development projects in Ethiopia and Kenya on the property and the progress made to implement the past mission recommendations, and to develop, in consultation with the States Parties of Kenya and Ethiopia, a proposed set of corrective measures and a Desired state of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR), for examination by the Committee at its 43rd session in 2019" (Decision 42 COM 7B.92).

At its 43rd session in 2019 in Baku, Azerbaijan (June/July 2019), the Committee deeply regretted that the SEA asked in Decision 42 COM 7B.92 continues to be delayed, noted "the State Party of Kenya's request to postpone the joint World Heritage Centre/IUCN Reactive Monitoring mission to the property until 2020 once the SEA is at [a] more advanced stage", but considered "that the mission should be undertaken as soon as possible to provide an up-to date assessment on the state of conservation of the property under potential severe threat". By Decision 43 COM 7A.12, the Committee reiterates its request to the State Party of Kenya to invite the Reactive Monitoring mission to the property so that the Committee could examine the mission recommendations at its 44th session in 2020. A/ Tasks I).

In this context, the individual consultant shall represent the World Heritage Centre in the joint WHC/IUCN Reactive Monitoring mission to Lake Turkana National Parks World Heritage property from 5 to 12 March 2020 and carry out the following tasks:

- Assess the progress achieved with the Strategies Environmental Assessment (SEA) of the Lake Turkana Basin, which should determine the cumulative impacts of the multiple developments on the Outstanding Universal Value (OUV) of the property;
- Assess the current status of the impounding and operationalization of the Gibe III reservoir in Ethiopia, and Contract N°: 4500415452-A1 Form HR 13-2 (February 2012) page - 2/9 the mitigation measures and monitoring mechanisms that have been implemented to protect the OUV

- Assess the progress with the Environmental Impact Assessment (EIA) for the Kuraz sugar development project in Ethiopia, which should include a comprehensive assessment of potential downstream impacts on the OUV, as well as the current status of the project; ?
- Assess the Progress with the revision of the SEA for Lamu Port-South Sudan-Ethiopia Transport Corridor Project (LAPSSSET), the Environmental and Social Impact Assessment (ESIA) for the Lamu-Lokichar Crude Oil pipeline from Turkana county to Lamu and the proposed development of the geothermal power station at the Barrier Volcanic Complex south of the property, and assess the mitigation measures and monitoring mechanisms that are being implemented and planned to protect the OUV;
- Assess the progress made to implement the 2018-2028 Management Plan for the property and the outstanding 2012 and 2015 Reactive Monitoring mission recommendations;
- Assess other relevant issues, such as plans and status of any anticipated future projects in Kenya and Ethiopia with potential impacts on the OUV of the property, including its conditions of integrity and protection and management, in line with paragraph 173 of the Operational Guidelines.

The purpose of these tasks will be to carry out an inspection and examine the overall state of conservation of the World Heritage property in close collaboration with IUCN and other relevant Kenyan officials and stakeholders.

The individual consultant will also in consultation with the States Parties of Kenya and Ethiopia, propose a set of corrective measures and discuss the way forward on the development of a Desired state of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR), including a costed action plan and timeframe for their implementation. The individual consultant should also hold meetings with the Kenyan authorities at national, regional and local levels, including the Ministry of Foreign Affairs, the Ministry of Environment, Water and Natural Resource, the Ministry of Agriculture, Livestock and Fisheries, County authorities, and the site manager(s) of the property.

In addition to these consultations, the individual consultant should also meet a range of relevant stakeholders, including:

- a. representatives of the Kenya-Ethiopia Joint Technical Experts Panel (JTEP) for the SEA,
- b. representatives of the UN Environment-led project that supports the States Parties of Kenya and Ethiopia in conducting the SEA
- c. representatives of local communities that are directly concerned with the property
- d. NGOs and civil society organizations working in or supporting the property, including Friends of Lake Turkana;

e. Relevant scientists, researchers and experts working in the field of relevance to the conservation of the property.

Annex II: Itinerary and Programme

Date	Item Description	Activity	Time
Thursday 5 March 2020	International travel: Arrival of the IUCN and WHC Experts	Pick up of the team from Jomo Kenyatta International Airport	
Friday 6 March 2020	Meeting with Lead Ministries (Cabinet Secretaries) and Management Authorities based in Nairobi	Ministry of Tourism & Wildlife In attendance at the meetings: Foreign Affairs, NMK, NEMA, KWS and KNATCOM	10hrs00-11hrs00
		Ministry of Sports, Culture & Heritage In attendance at the meetings: Foreign Affairs, NMK, KWS and KNATCOM	11.30hr-12hrs00
		Lunch	13hrs00-14hrs00
	Meeting with Technical Team and other Stakeholders	Ministry of Water Sanitation, NMK, KWS, KNATCOM, NEMA, County Governments of Turkana and Marsabit, representatives of Turkana Basin Institute, Friends of Lake Turkana	14hrs30-16hrs30
Saturday 7 March 2020	Travel to Lake Turkana National Parks	Flight from Nairobi to Illeret Airstrip, Sibilo National Park	09hrs00
		Meeting with Illeret Community and county of Marsabit representatives	11hrs00-13hrs00
		Lunch	13hrs00-14hrs00

		Drive from Illeret to Koobi Fora	14hrs00-16hrs00
		Discussion with representatives of NMK, KWS, Marsabit County and Turkana Basin Institute	
Sunday 8 March 2020	Drive from Koobi Fora to Sibiloi Park headquarters, Alia Bay	Visit of SNP and paleontological sites	09hrs00-12hrs00
	Meet with KWS Alia Bay	Lunch	1.00pm
			2hrs00-4hrs00
Monday 9 March 2020	Fly to Loiyangalani to meet Loiyangalani Community	Overflight of Central and South Islands (Cancelled due to bad weather conditions)	09hrs-10hrs00
		Meeting with Loiyangalani Community and County Government of Turkana (Cancelled due to bad weather conditions)	10hrs00-12hrs30
		Communal Lunch(Cancelled due to bad weather conditions)	12hrs00-14hrs00
		Fly back to Nairobi and Golden Tulip Hotel check in	17hrs00
Tuesday 10 March 2020	Meeting with Ministries (Tourism and Wildlife, Culture and Sports, Environment and Forestry, Foreign Affairs, Water and	<ul style="list-style-type: none"> - Meeting on SEAs, Gibe dams, Kuraz Irrigation scheme (cancelled, as Ethiopia delegation did not attend) - DSCOR and Corrective Measures 	09hrs00-13hrs00

	Sanitation, Energy State Party of Ethiopia(on invitation by UNESCO WHC), UNEP and JTEP		
		Lunch	
	Ministry of Foreign Affairs	- Debriefing: Meeting and close of mission with Ministry Officials	2.30pm
Wednesday 11 March 2020	Meeting with NMK	- Discussion regarding archaeological and paleontological sites, and the cultural values of - Meeting with UNESCO - Meeting with UNEP - Discussion with Dr. Sean Avery	9.00 pm

Annex III, List of people met and/or interviewed

County Government of Marsabit

Ms. Kulamo Bullo-Ikimire, Tourism, Culture and Social Services

Illeret village

Community representatives

KNATCOM

Mr. John Omare, Director of Culture

KWS

Mr. Patrick Omondi, Director of Biodiversity Research and Planning;

Mr. Solomon Kyalo, Head of Multilateral Environmental Agreements and WH (Natural Heritage)
focal point

Dr. Joseph Edebe, Senior Research Scientist

Ministry of Tourism and Wildlife

Prof. Fred Segor, PS State Department for Wildlife;

Mr. Stephen Manengene, Director of Wildlife Conservation

Ms. Polyn Wanja Runyenge, legal officer

NEMA

Mr. Issac Elmi, NEMA

National Museums of Kenya

Dr. Purity Kiura, Deputy DG NMK

Mr. Hoseah Wanderi, National focal point 1972

Mr. Galgalo Rachid (Regional Museums)

Dr. Emmanuel Ndiema (archaeologist)

Ms. Josephine Gitu

Mr. Dennis Milewa;

Mr. Galgalo Rashid Abdi

Prof. Jack Harris

Ministry of Fisheries

Mr Issac Wamalwa

Ministry of Foreign Affairs

Amb. Ann Wanjohi, Director of Cultural Diplomacy Unit

DC Tanui, Office of the RDS

Tiws Maki, Legal division

MS. Michelle Holi, MFA UN & Multilateral directorate

MR. John Wagemu

MR. Patrick Nzusi, Deputy Director

Ms. Martha Kimarna

Ms. Martha Wangeshi

Ministry of Sports, Culture and Heritage (MOSCH)

Mr. Hassan Noor, Chief Administrative Secretary

Ministry of Water, Sanitation and Irrigation

Mr. Joe Omwenga, Hydrologist

Dr. Sean Avery, Hydrologist

Turkana Basin Institute

Dr. Louise Leakey

Timothy Gichunge

UNEP

Ms. Marijn Korndewal

