
DEPARTMENT OF NATIONAL PARKS AND WILDLIFE

LENGWE NATIONAL PARK GENERAL MANAGEMENT PLAN (2021 TO 2026)



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List of acronyms and abbreviations

ABRI	African Butterfly Research Institute
AIDS	Acquired Immune Deficiency Syndrome
APWO	Assistant Parks and Wildlife Officer
CBO	Community Based Organization
CEPA	Centre for Environmental Policy and Advocacy
DM	Division Manager
DNPW	department of National Parks and Wildlife
EE	Education and Extension
GEF	Global Environment Facility
GMO	General Management Plan
HIV	Human-Immuno-deficiency Virus
HQ	Headquarters
IGA	Income Generating Activity
METT	Management Effectiveness Tracking Tool
MGDS	Malawi Growth and Development Strategy
MOMS	Management Oriented Monitoring System
MTR	Mid-Term Review
NP	National Park
PA	Protected Area
PWA	Parks and Wildlife Assistant
PWO	Parks and Wildlife Officer
SMART	Spatial Monitoring and Reporting Tool
SPWA	Senior Parks and Wildlife Assistant
SPWO	Senior Parks and Wildlife Assistant
SRBMP	Shire River Basin Management Program
SVTP	Shire Valley Transformation Program
SWOT	Strengths, Weaknesses, Opportunities and Threats
UNESCO	United Nations Education Scientific and Cultural Organization
USACOL	Upper Shire Association for Conservation Liwonde
WCP	World Commission on Protected Areas

WB	Word Bank
WESM	Wildlife and Environmental Society of Malawi
WMU	Wildlife Management Unit
WWF	World Wildlife Fund

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Preface

Malawi is endowed with a rich and diverse wildlife resource base that provides the much-needed ecosystem services and goods for the socio-economic development of the country. The Malawi Growth and Development Strategy III (MGDS III) and the Vision 2063 identifies wildlife as one of the sectors that could potentially contribute to the sustainable economic growth of the country, and calls for conservation and management of wildlife in protected areas and outside natural habitats. Most of the wildlife and its habitat largely occur inside protected areas, which require careful planning and management to maximise their socio-economic and ecological potential.

The Lengwe National Park General Management Plan (GMP) provides the framework within which the private sector, local communities, development partners, civil society and all other stakeholders in the wildlife sector must operate and interact in order to sustainably conserve and develop the wildlife resource base in Lengwe National Park, for the sustainable socio-economic contribution to the overall socio-economic growth of Malawi.

This management plan is intended as a working document that will change and adapt to circumstances as support to Lengwe National Park and the Department of National Parks and Wildlife (DNPW), particularly through the World Bank (WB) funded Shire Valley Transformation Program (SVTP 1), is implemented. It builds on the previous General Management Plan that was developed in 2016 under the Shire River Basin Management Program (SRBMP) whose investment focused on Old Lengwe. Selected infrastructure developments are planned as part of a series of investments at New Lengwe NP, which will include new ranger patrol stations, waterholes, provision of office and field equipment, maintenance of existing road network and development, strengthening protected area management and community engagement.

The GMP is divided into four chapters. The first chapter presents the Background including the history of establishment and an overview of its ecology; the second chapter focuses on Situation and Problem Analysis (*Current situation*), the third chapter on Management Objectives and Strategies (*the way forward*); and finally, the fourth chapter is concerned with Implementation and Development plans (*Proposed Activities*). Up to date species lists are also given in the Appendices as well as workplans and budgets for the various protected area management units. The vision is to make Lengwe National Park a place where the wildlife is well conserved and managed, and visitor numbers are significantly higher than present. The Department of National Parks and Wildlife therefore, appeals to all stakeholders to join hands with Government in this noble task of wildlife conservation and management.

Approval

.....

Brighton K. Kumchedwa

DIRECTOR OF NATIONAL PARKS AND WILDLIFE

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Citation:

DNPW (2021). Lengwe National Park - General Management Plan 2021 – 2026. Report produced by DNPW with support from SVTP.

Executive Summary

Lengwe National Park is one of the first protected areas to be gazetted in Malawi. The Park is currently 887 km². This area is composed of the Old (Initial) Lengwe and the Extension Area. The Old Lengwe was gazetted in 1928 as a Game Reserve, and the Extension Area in 1970, and the whole area made a National Park in 1975. Figure 1 below shows location of Lengwe National in relation to other protected areas.

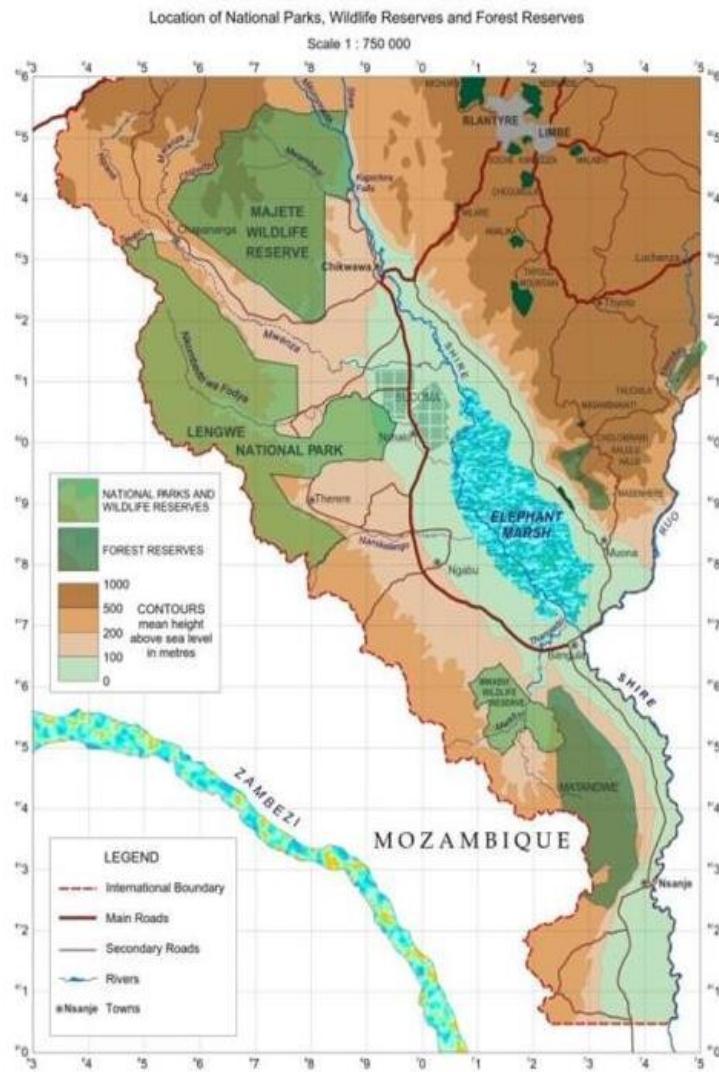


Figure 1: Location of Lengwe National Park in relation to other protected areas

The Park has several strengths, weaknesses, opportunities, threats and challenges. The major management challenges are encroachment, poaching, deforestation, and charcoal making occurring throughout the park. Before 2017 when the Department of National Parks and Wildlife signed a co-management agreement with communities via Lengwe Wildlife Association, community relations were poor, resulting in rampant poaching in the park.

Lengwe National Park is rich in biodiversity, harbouring some endangered animal species such as pangolins (*Smutsia temminckii*), plant species such as mopane woodland and endemic species such as Nyala antelope (*Tragelaphus angasi*). The Nyala antelope, along with other animal species have declined rapidly over the last 10 years; as a result an urgent conservation programme is now required to address these declines.

With respect to tourism, the park is not very attractive due to poor access, low animal numbers and poor tourism facilities including accommodation. Such lack of attractiveness has resulted the declining trends of paying (international) visitors in recent years. Consequently, measures are required to make the park more attractive, to increase these numbers and generate more revenue to sustain activities such as law enforcement, maintaining and upgrading the park and support to the local communities.

To address the above challenges, strategic management and specific objectives were set for the park. The overall strategic objective is to restore, conserve and manage wildlife for the benefit of the present and future generations. There are five sub-objectives as follows:

1. To adequately monitor wildlife resource for efficient monitoring of the PA
2. Improve Park management and eco-tourism infrastructure
3. To develop sustainable finance mechanism for efficient management of the park
4. Reduce illegal wild life use through increased law enforcement
5. To Improve community engagement, participation and provision of sustainable IGAs and conservation-based investment

To meet the above objectives strategies were developed based on park zonation a to facilitate law enforcement, infrastructure development, education and extension, research and monitoring, community engagement, staff, tourism

1. Section 1: Background

1.1 Establishment

Name: Lengwe National Park

The word *Lengwe* comes from the Man'ganja language and refers to a type of thicket composed of thorny plants that is difficult to penetrate. This thicket is characteristic of the 'Old Lengwe' portion of the park in the eastern salient. Throughout this document, 'New Lengwe' has been regarded as the Extension Area.

1.2 Legal Status

Lengwe was declared a National Park in its present form by the National Park Establishment Amendment Order 26 August 1975, under the National Parks Act (Cap. 66:07), and published in Government Notice No.149 of 1975.

1.3 History of Establishment

The importance of Lengwe National Park (NP) was recognised a long time before it was first declared a Protected Area in 1928. This importance was based on the occurrence of the Nyala antelope (one of only two locations at that time in British Colonial Africa). In 1928 its size was 520 km², however only 6 years later in 1934 a significant tract was excised from the park for agriculture. During World War II, an influx of people from Mozambique occurred and gardens were established within the area (Hayes 1967). After the war, further excisions were made reducing the reserve to 104 km² which included the main nyala habitat. Government restructuring at the time of independence in 1963 led to fresh political and managerial approaches resulting in the area being proclaimed as a national park in 1970. In 1975 the park was expanded to its present size (88700ha) so increasing the area to about 8 times its original size. The eastern salient of the park, known as 'Old Lengwe', is approximately the park as it existed in 1975. The extension area is described as 'New Lengwe.' Figure 2 below shows the two areas of Lengwe National Park.

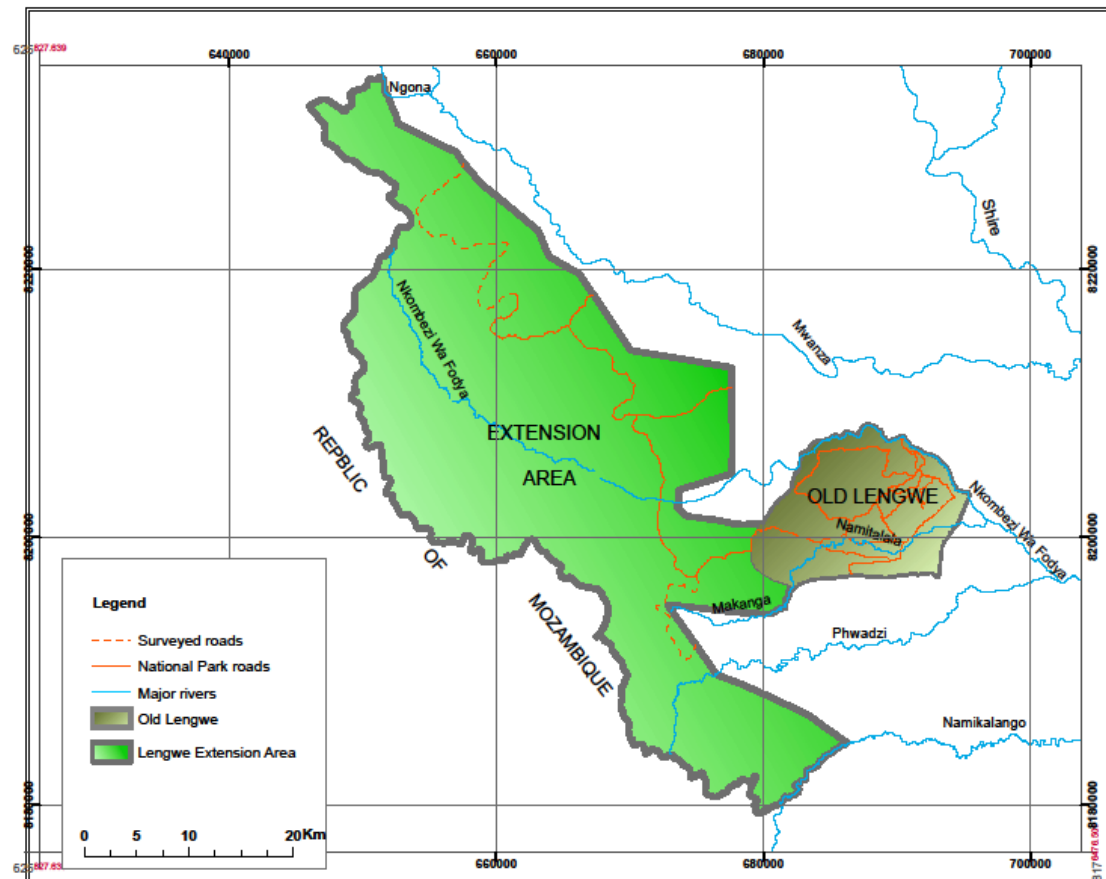


Figure 2: Map of Lengwe National Park showing Old Lengwe and New Lengwe (Extension Area).

1.4 Location and Size

Lengwe NP (88700ha) is located about 20kms south of Chikwawa District, southern Malawi (Figure 1) off the M1 road main highway. The distance from Blantyre to Lengwe National Park is 84 kilometres, of which 75 kilometres is tarred and 9 kilometres is earth road that passes through Nchalo (Sucoma) sugar estate. The Nchalo estate is also where the nearest airstrip is in case of emergencies. The park falls under the following Ordnance Survey Maps (Figure 3) published through the Department of Surveys:

1. 1:250000, Sheet 9 (BLANTYRE); Sheet 10 (NSANJE)
2. 1:50000, 1534C4 (Salambidwe); 1634A2 (Nkadana Market); 1634B1 (Ndakwera); 1634B2 (Chikwawa); 1634B3 & part of A4 (Therere); 1634B4 (Ngabu).

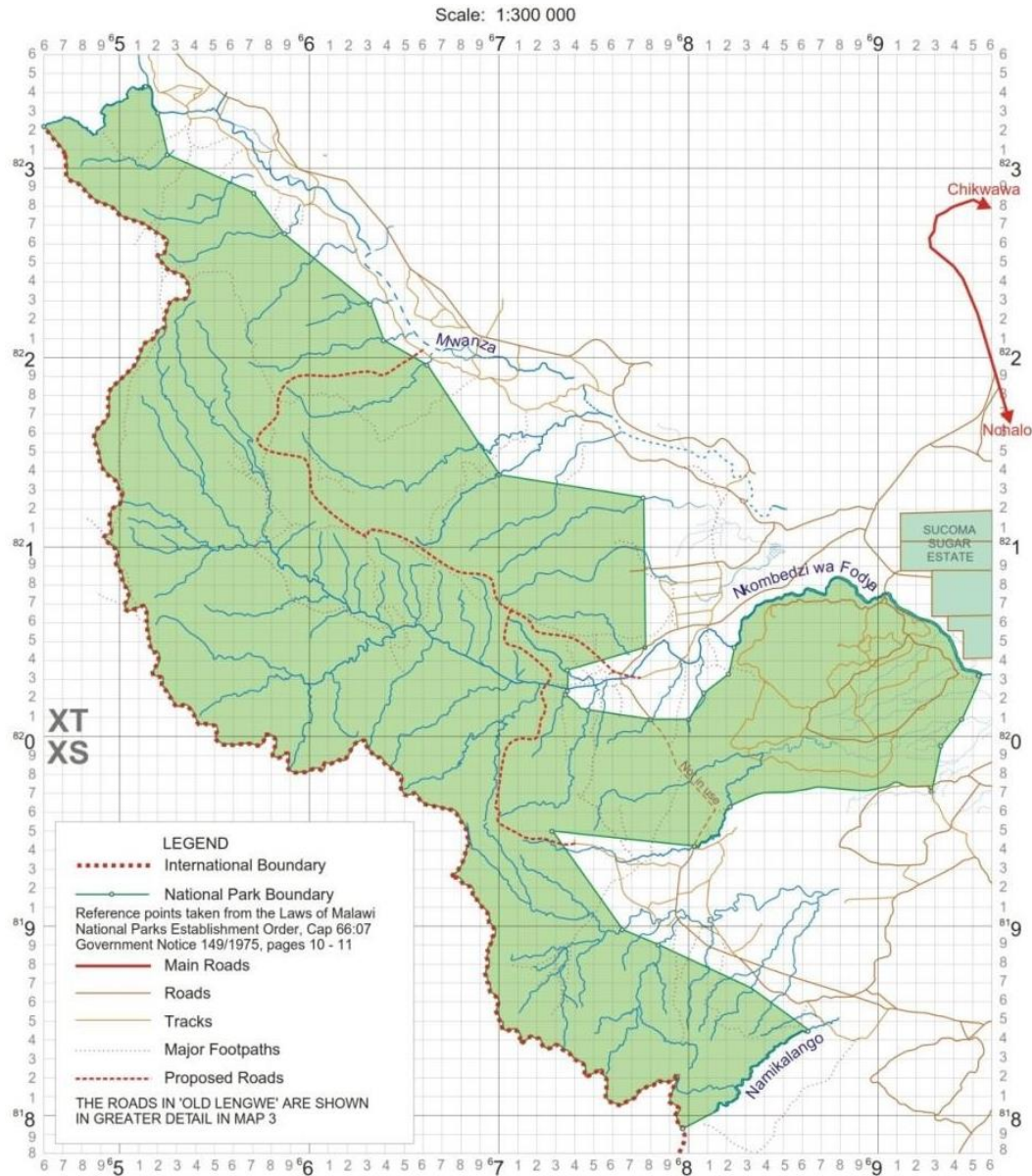


Figure 3: Map showing boundary of Lengwe NP, rivers, and roads inside and outside the park

1.5 Previous Plans

The first outline plan for Lengwe after the park was declared a National Park under the current boundaries was by Clarke (1983) as part of the Master Plan for the Southern Region. In 1995 a development plan was drafted for the Department of National Parks and Wildlife (DNPW) by Chris Huxley but it was never approved. As part of a previous World Bank project entitled the 'Lower Shire Protected Areas Project' a complete revision of the General Management Plan for Lengwe NP was drafted by Rowan Martin (Anon 2000b), although this plan was also never formally accepted. Dowsett in 2002 also presented recommendations for improved management of Lengwe with notes on the previous park management plans, especially those relating to Rowen Martin in the draft management

plan (Anon 2000b). The most recent plan was developed in 2015 through the World Bank (WB) that funded the Shire River Basin Management Programme (SRBMP). This management plan was mostly focusing on the interventions in Old Lengwe that protected animal species such as the Nyala. There was little focus on Extension Area which covers 783 km². The Extension Area is also a major catchment area for Mkombezi river.

1.6 Climate

Overall in the Shire Valley, the climate is hot and dry from September to November, hot and wet from December to March or April, cooler and dry from May to August. In some years, the rains break in November, in others in December. Heavy rains in January-February may result in extensive flooding of the alluvial plain in the north of Old Lengwe.

Lengwe National Park has not been recording meteorological data for about two decades. Based on a period of 24 years (1996-2019) the average annual rainfall at the nearest meteorological station in the Lower Shire (Ngabu) is 735.1mm.

The temperatures of the Lower Shire Valley are the highest in Malawi. Based on a 20-year period (1999-2019) data obtained from Ngabu, the mean minimum temperature in June and December is 16.1°C and 24.2°C, while the mean maximum for the same period is 21.8°C and 33.7°C. Daily maxima exceeding 40°C are quite common in October-November.

1.7 Physiography

The range in elevation across the Old Lengwe changes from 200 to 500 feet above sea level (asl). Thus, the Initial Longwe is a relatively flat area. This is in contrast to the Extension Area which shows a large altitudinal variation of between 400 to 1300 feet asl (*Figure 4*). The highest areas are generally found in the North West areas of the Extension Area, and the lowest areas are in the eastern side of Old Lengwe.

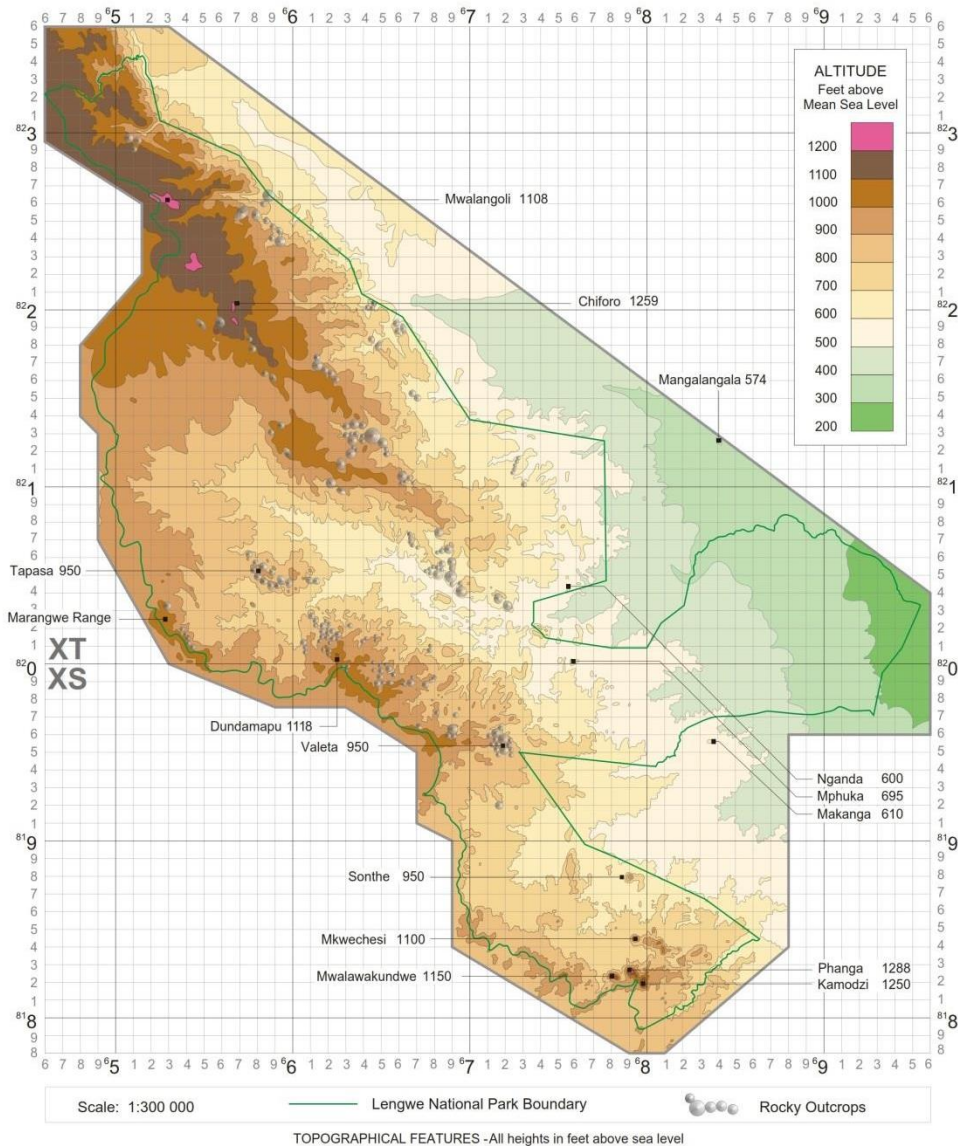


Figure 4: Broad topographical elevation zones of Lengwe National Park.

1.8 Biodiversity

1.8.1 Flora

The flora of Lengwe NP is best described by Dowsett-Lemaire & Dowsett (2002) who collate, review, and correct previous botanical studies based on expert knowledge. Their botanical description represents the most up-to-date and comprehensive botanical assessment of the plant communities of Lengwe NP. In general, the broad vegetation types range from “Broad leaved relatively dry woodlands and intergrades to savanna” (Shaxon, 1977) consisting of Mopane Woodlands (11%), Woodlands of fertile areas (<1%), Thicket/Savannah of poorer areas (18%), and Woodland/Savannah (71%).

1.8.1.1 Riparian Vegetation

The best developed types of riparian forest are found along the Nkombedzi-wa-Fodya on the northern boundary and the Makanga in the south. On the Nkombedzi, strips of fairly dense forest are interrupted by more open riverine woodland, where *Acacia* spp. (especially *albida*, *xanthophloea*, also locally *A. polyacantha*), *Combretum imberbe*, *Hyphaene benguellensis*, *Kigelia africana*, *Lonchocarpus capassa* etc. occur. These vegetation types can also be found in more closed formations.

From the North Hide area downstream to the entrance gate, the tallest and most conspicuous trees of riparian forest are *Albizia glaberrima* (almost evergreen, up to 30 m), *Diospyros mespiliformis* (evergreen, 20-30 m) and *Sterculia appendiculata* (deciduous, up to 35 m); *Trichilia emetica* is also evergreen. *Lecaniodiscus fraxinifolius* (deciduous) is the dominant medium-sized tree. Large trees (reaching over 15 m) include: *Acacia albida*, *A. robusta*, *A. tortilis*, *A. xanthophloea*, *Adansonia digitata*, *Albizia glaberrima*, *Combretum imberbe*, *Cordyla africana*, *Diospyros mespiliformis*, *Drypetes mossambicensis*, *Ficus sycomorus*, *Hyphaene benguellensis*, *Kigelia africana*, *Lannea stuhlmannii*, *Lecaniodiscus fraxinifolius*, *Lonchocarpus capassa*, *Sclerocarya caffra*, *Sterculia appendiculata*, *Tamarindus indica*, *Trichilia emetica*, *Xanthocercis zambesiaca*, *Ziziphus mucronata*, *Z. pubescens* (usually smaller than 12 m but may reach 15 m).

Of the species of smaller trees and woody shrubs, *Grewia* spp. and *Allophylus* spp. are locally dominant. *Dalbergia arbutifolia* is the most frequent large liane. Overall the list includes: *Acacia schweinfurthii* (scandent), *Alchornea laxiflora*, *Allophylus africanus*, *A. alnifolius*, *Antidesma venosum*, *Artabotrys brachypetalus*, *Bridelia cathartica*, *Byrsocarpus orientalis*, *Capparis* spp. (scandent), *Cassine schlechteriana*, *Cardiogyne africana* (scandent), *Cissus* spp. (scandent), *Cleistochlamys kirkii*, *Clerodendrum* sp., *Combretum mossambicense* (and other spp., climbing), *Cordia goetzei*, *Croton megalobotrys*, *Dalbergia arbutifolia* (small tree or liane reaching the canopy), *Deinbollia xanthocarpa*, *Diospyros senensis*, *Drypetes reticulata*, *Ficus capreifolia*, *Garcinia livingstonei*, *Grewia inaequilatera*, *G. microcarpa*, *G. truncata*, *Hippocratea* spp. (including *indica*, scandent), *Markhamia obtusifolia*, *Oncoba spinosa*, *Pavetta* sp., *Phyllanthus kirkianus* (also ?*reticulatus*), *Premna senensis*, *Securinega virosa*, *Strophanthus courmontii* (scandent), *Strychnos potatorum*, *Tapura fischeri*, *Tiliacora funifera* (scandent), *Tricalysia allenii*, *Trichilia capitata*.

Riparian forest along the Makanga stream (west and east of Makanga Hide) is very tall locally, as *Sterculia appendiculata* is well developed, to 35 m, closely followed by *Terminalia sambesiaca*. Other large trees include: *Acacia robusta*, *A. welwitschii*, *Albizia glaberrima*, *Balanites maughamii*, *Berchemia discolor*, *Cordyla africana*, *Diospyros mespiliformis*, *Drypetes mossambicensis*, *Ficus zambesiaca*, *Lannea stuhlmannii*, *Manilkara mochisia*, *Newtonia hildebrandtii*, *Tamarindus indica*, *Xanthocercis zambesiaca*. The most frequent medium-sized trees are *Lecaniodiscus fraxinifolius* (to 10-12 m); *Cola clavata* and *Drypetes reticulata* are also particularly frequent. Other species include: *Alchornea laxiflora*, *Allophylus africanus*, *A. alnifolius*, *Artabotrys brachypetalus*, *Cladostemon kirkii*, *Cleistochlamys kirkii*, *Dombeya kirkii*, *Garcinia livingstonei*, *Mimusops* sp. (probably *fruticosa*), *Monodora junodii*, *Premna senensis*, *Strychnos potatorum*, *Tapura fischeri*, *Ziziphus pubescens* (to 10-12 m). Of the lianes *Strophanthus courmontii* is conspicuous when flowering (Dec.); *Combretum* spp., *Hippocratea indica* also occur.

The riparian vegetation along the Namitalala stream was examined briefly in the area of Namitalala link road (downstream from the road crossing). *Lecaniodiscus fraxinifolius* is again the most frequent tree, *Drypetes reticulata* is also very common. Also noted: *Adansonia digitata*, *Azizelia quanzensis*, *Allophylus africanus*, *Balanites maughamii*, *Cladostemon kirkii*, *Diospyros quiloensis*, *D. senensis*, *Dombeya kirkii*, *Drypetes mossambicensis*, *Manilkara mochisia*, *Markhamia obtusifolia*, *Monodora junodii*, *Newtonia hildebrandtii*, *Strychnos potatorum*, *Teclea myrei*, *Trichilia capitata*, *Ziziphus pubescens*. Thicket communities with *Commiphora* spp., *Grewia* spp., *Thilacium africanum* etc. grow fairly close to the stream. The Namichenga stream crosses the whole of the big thicket in the northwest (west of Link road) before emerging as a narrower strip of vegetation to the east (crossed by the main road). Most species occurring alongside it are also found elsewhere in the north west thicket, but *Lecaniodiscus* and *Drypetes reticulata* are particularly frequent; *Cola clavata* is also found in several places.

1.8.1.2 The *Sterculia appendiculata* forest

This forest is mainly located along Nkombedzi stream and includes the big “north-west thicket” to the south. There are several good patches within easy reach of the North Thicket road, just to the north, also some near the footpath between North Hide and the Nkombedzi, and a very good example can be examined on the edge of Bush Camp 6. This forest is very tall as the dominant tree (*Sterculia*) reaches heights of at least 35 m; patches may be 2-300 m across and there are little pockets of evergreen canopy (c. 25-30 m tall) with *Diospyros mespiliformis*. Other large trees encountered include *Acacia robusta*, *A. welwitschii*, *Azizelia quanzensis*, *Balanites maughamii*, *Berchemia discolor*, *Cordyla africana*, *Drypetes mossambicensis*, *Kirkia acuminata*, *Lannea stuhlmannii*, *Newtonia hildebrandtii*, *Pterocarpus antunesii*, *Tamarindus indica*, *Ziziphus pubescens* (up to 20 m!). The understorey is usually more open than in deciduous thicket, especially under closed canopy of *Sterculia* and *Diospyros*; its species composition is very similar to that of dry thicket with also some riparian species, e.g. *Acacia ataxacantha*, *Acalypha ornata*, *Alchornea laxiflora*, *Azima tetracantha*, *Canthium* sp., *Cladostemon kirkii*, *Cordia goetzei*, *Diospyros quiloensis*, *Grewia flavescens*, *G. sp. aff. microcarpa*, *Manilkara mochisia*, *Markhamia acuminata*, *Monodora junodii*, *M. stenopetala*, *Phyllanthus kirkianus*, *Strychnos potatorum*, *S. usambarensis*, *Tabernaemontana elegans*, *Tapura fischeri*, *Thilacium africanum*, *Trichilia capitata*, etc. A few *Ficus zambesiaca* can be seen strangling other trees along the North Thicket road.

1.8.1.3 The “North-west Thicket”

The largest block of thicket remaining today in Old Lengwe is about 5 km wide from west to east, between North Thicket road (near the western boundary of Old Lengwe) and Link road. It is bordered to the north and north-west (between the road and the Nkombedzi) by tall *Sterculia appendiculata* forest and *Hyphaene* thicket-clump savanna. It stretches to the south-east exactly to the Nyanga Drive (or Nyanga Loop road). At that point the thicket has an almost closed canopy and is more appropriately called forest. However, most of it has an open, discontinuous canopy and is appropriately qualified as thicket rather than forest. This big thicket is crossed from west to east by the Namichenga stream which continues eastwards (east of Link road) into more open country (thicket-clump savanna).

Hall-Martin (1975) described these thicket communities in detail. Worth noting is that names of some species have changed between Hall-Martin (1975) and Hall-Martin & Drummond (1980). For example, *Grewia stolzii*—which was evidently in error and was corrected in the later publication and *Maerua edulis*, which was later placed in the genus *Courbonia*, as *C. glauca*. The commonest large tree (15-20 m) is by far *Pterocarpus (lucens) antunesii*. *Acacia welwitschii*, *Adansonia digitata*, *Newtonia hildebrandtii* are also widespread; other canopy or emergent trees include *Acacia robusta*, *Azalia quanzensis*, *Balanites maughamii*, *Berchemia discolor*, *Cordyla africana*, *Diospyros quiloensis*, *Drypetes mossambicensis*, *Erythrina livingstoniana*, *Excoecaria bussei*, *Garcinia livingstonei*, *Kirkia acuminata*, *Lannea stuhlmannii*, *Lecaniodiscus fraxinifolius*, *Manilkara mochisia*, *Tamarindus indica*, *Xanthocercis zambesiaca* (usually on a termite mound), *Ziziphus mucronata*, *Z. pubescens*. Smaller trees or shrubs are dominated by *Acacia* spp. (*adenocalyx* and *ataxacantha*, both scandent), *Grewia* spp., *Phyllanthus kirkianus*, *Thilacium africanum*, and *Acanthaceae*. A fairly extensive list would include: *Acacia adenocalyx*, *A. ataxacantha*, *Acalypha* spp., *Alchornea laxiflora*, *Allophylus africanus*, *Azima tetracantha*, *Balanites pedicellaris*, *Bauhinia tomentosa*, *Canthium* sp., *Capparis* spp., *Chazaliella abrupta*, *Cissus* spp. (scandent), *Cladostemon kirkii*, *Cleistochlamys kirkii*, *Combretum mossambicense* and others (scandent, several species), *Commiphora pteleifolia*, *C. pyracanthoides*, *Cordia pilosissima* (rare, one tree of 10 m found on a dry stream), *Courbonia glauca*, *Croton menyhartii*, *Dalbergia melanoxylon*, *Diospyros squarrosa* (at edges), *Dombeya kirkii*, *Drypetes reticulata*, *Euphorbia lividiflora*, *Gardenia resiniflua*, *Grewia flavescens*, *G. inaequilatera*, *G. lepidopetala*, *G. truncata*, *Grewia* sp. 1 (aff. *microcarpa*), *Hippocratea* spp. (scandent, most commonly *indica*), *Holmskioldia tettensis* (edges), *Maerua triphylla*, *Markhamia acuminata*, *M. obtusifolia*, *Monodora junodii*, *M. stenopetala*, *Ochna rovimensis*, *Pavetta gardeniifolia*, *Phyllanthus kirkianus*, *Salvadora persica*, *Solanum* sp., *Strychnos madagascariensis*, *S. usambarensis*, *Strophanthus kombe* (large liane), *Tragia benthamii* (stinging creeper), *Teclea myrei*, *Thilacium africanum*, *Tricalysia allenii*, *Vepris zambesiaca*, *Vitex buehneri*, *Xeromphis obovata*.

1.8.1.4 Thicket-clump savannah

Thicket-clump savanna dominates the landscape in the north-east of Old Lengwe; even in the south and south-west, large expanses of wooded grassland are dotted about with small thickets, some on the edge of seasonal pans. Among the more frequent large trees of small clumps are *Adansonia digitata*, *Drypetes mossambicensis*, *Lannea stuhlmannii*, *Ziziphus mucronata*. The list of constituent species is very long and the following certainly not exhaustive: *Acacia nigrescens*, *A. nilotica* (may form monodominant thickets), *A. robusta*, *A. welwitschii*, *Adansonia digitata*, *Albizia anthelmintica*, *A. harveyi*, *Allophylus africanus*, *Azanza garckeana*, *Balanites maughamii*, *Berchemia discolor*, *Capparis* spp. (scandent), *Cassia abbreviata*, *Cassine schlechteriana*, *Chazaliella abrupta*, *Cissus* spp. (scandent), *Cleistochlamys kirkii*, *Combretum imberbe*, *Combretum* spp. (scandent), *Commiphora africana*, *C. pyracanthoides*, *C. zanzibarica*, *Cordyla africana*, *Dalbergia melanoxylon*, *Dichrostachys cinerea*, *Diospyros mespiliformis*, *D. quiloensis*, *D. usambarensis*, *Drypetes mossambicensis*, *Ehretia amoena*, *Euphorbia candelabrum*, *Ficus zambesiaca*, *Grewia bicolor* (especially Makanga area), *G. flavescens*, *G. inaequilatera*, *G. truncata*, *G. sp. aff. microcarpa*, *Hippocratea indica* (and other spp.), *Holmskioldia tettensis*, *Lannea stuhlmannii*, *Lecaniodiscus fraxinifolius*, *Lonchocarpus capassa*, *Maerua angolensis*, *M. triphylla*, *Manilkara mochisia*, *Markhamia acuminata*, *Monodora junodii*, *M. stenopetala*, *Newtonia hildebrandtii*, *Pavetta klotzchiana*, *Phyllanthus kirkianus*, *Pterocarpus antunesii*, *Salvadora persica*, *Sclerocarya caffra*, *Sterculia africana*, *S. appendiculata*, *Strychnos madagascariensis*, *Tamarindus indica*, *Thilacium africanum*, *Vangueria esculenta*, *Vepris zambesiaca*, *Xanthocercis*

zambesiaca, *Xeromphis obovata*, *Ziziphus mucronata*. Also, several climbers not listed above among Cucurbitaceae, Convolvulaceae and Asclepiads (e.g. *Sarcostemma viminale*).

A small patch of under 1 ha examined on the edge of a seasonal pan a few hundred metres west of Makanga Hide had the following: *Acacia welwitschii*, *Adansonia digitata*, *Berchemia discolor*, *Cleistochlamys kirkii*, *Combretum imberbe*, *Cordyla africana*, *Diospyros mespiliformis*, *Grewia truncata*, *Lannea stuhlmannii*, *Lecaniodiscus fraxinifolius*, *Maerua triphylla*, *Manilkara mochisia*, *Ziziphus mucronata*; also, several *Cola clavata*, a tree found very commonly in riparian vegetation on the Makanga.

1.8.1.5 Woodland and wooded grassland

General. *Acacia nigrescens* is generally very widespread in Old Lengwe and is often the most frequent tree in open wooded grassland, as in the north-east (e.g. road to Njati). In the south-west, around the Makanga area and several kilometers to the north-west, it forms almost pure stands, interrupted occasionally by small thicket clumps or low shrubby growth of *Diospyros usambarensis*. *Dalbergia melanoxylon* is another widespread species, becoming dominant locally in the south-east (from Njati Drift southwards), thus forming a type of woodland (i.e. canopy cover of at least 40%) rather than wooded grassland. An impressive number of *Dalbergia* trees died some years ago in that area, apparently as a consequence of the bad droughts of 1992 and 1994.

Other large trees occurring in open savanna include *Acacia nilotica*, *A. tortilis*, *A. welwitschii*, (more locally *A. sieberiana*), *Albizia harveyi*, *Amblygonocarpus andongensis*, *Boscia salicifolia*, *Combretum imberbe*, *Hyphaene benguellensis*, *Kigelia africana*, *Piliostigma thonningii*, *Sclerocarya caffra*, *Xeroderris stuhlmannii*. *Ziziphus mauritiana* (introduced) grows mainly near scout camps and in open woodland near the Nkombedzi. The main grass species in open grassland in the north and east of Old Lengwe is *Urochloa mossambicensis*, often in association with *Digitaria milaniana*; *Heteropogon contortus* is more frequent in the south and south-west. On partly water-logged soils and in moister depressions as at Njati Drift, near S. Thicket pan, in the big expanse of wooded grassland in 1634B1, the dominant species is *Setaria incrassata* [Hall-Martin & Drummond (1980) give the specific name of “*S. palustris Stapf*” which is a synonym of *S. incrassata* (Hochst.) Hackel, itself difficult to distinguish from (and hybridising with) *S. sphacelata*]. *Echinochloa pyramidalis* is very common on the edge of pans or anywhere with standing water, and *Panicum maximum* is the commonest species in partial shade, as on the edge of thickets.

1.8.1.6 West Makanga

According to the vegetation map of Hall-Martin (1972), there is extensive *Combretum* woodland in the extreme south-east and south-west of Old Lengwe, intermixed with patches of mopane woodland in the south-west. These woodlands used to be accessible from the Tsanya Drive and West Makanga Drive (see Sherry & Ridgeway 1984). The former is no longer in existence, and a stretch of just 4 km of the West Makanga Drive was re-opened in the dry season of 2001 west of Makanga Hide. The road crosses several patches of mopane from km 2 to km 4 on that road; beyond the end of the road, a small area of mixed *Combretum-Diospyros* woodland was examined to the northwest.

Mopane woodland is found in the West Makanga area in patches of one to a few ha, reaching a height of 12-15 m, rarely more (20 m). Under a canopy of monodominant *Colophospermum mopane*, shrubs of *Euclea divinorum* and *Ximenia americana* are common; *Grewia bicolor* can also be found under mopane, but is more conspicuous in small thicket clumps in association with *Acacia nilotoca*, *Diospyros usambarensis* (and to a lesser degree *Commiphora africana*) outside the mopane.

The mixed woodland to the north-west (beyond the end of the present road) is dominated by *Combretum fragrans* (c. 10 m tall), followed by *Bolusanthus speciosus* and *Diospyros kirkii*; larger, more scattered trees are of *Acacia nigrescens*, *Albizia harveyi*, *Combretum imberbe*, *Lonchocarpus capassa*, *Sclerocarya caffra*, *Xeroderris stuhlmannii*. There are little pockets of *Dalbergia melanoxylon* and *Pterocarpus brenanii*, and some other medium-sized trees include *Cassia abbreviata* and *Terminalia sericea*. *Hyphaene benguellensis* is common towards the start of the old Tsanya Drive, in open woodland as well as in riverine thicket.

The vegetation map of Hall-Martin (1972) also shows an important area of mopane woodland in the north-west (in map square 1634B1) between North Thicket road and the park's boundary. This seems to be an error as this section contains *Sterculia appendiculata* forest next to thicket-clump savannah when investigated. Figure 5 below presents broad vegetation types of Lengwe National Park described above.

Lengwe National Park - Land Cover 2019

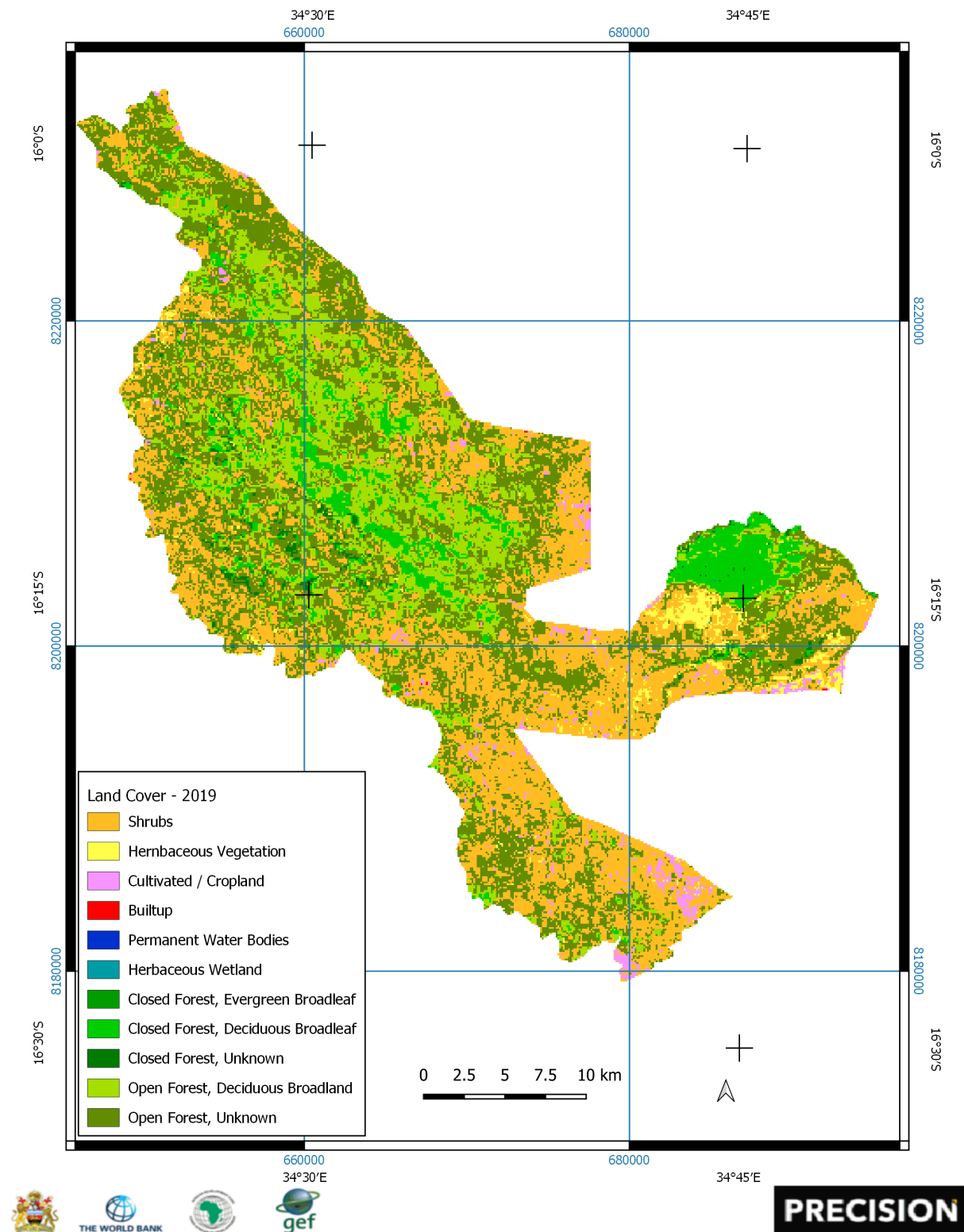


Figure 5: Map of landcover types of Lengwe National Park

1.8.1.7 Sandstone Woodland

This vegetation type is found in the area to the north-west of the Extension Area close to Kamzimbi Camp where altitude varies from 200 to 300 m. This is a special type of woodland which grows on sandstone, among rock cracks, at the foot of cliffs and on the thin layer of sand covering some of the outcrops. The canopy is dominated by *Brachystegia* sp. no. 1 (in Coates Palgrave 1977), a very distinctive tree with smooth, grey bark, peeling off into round, orange discs. It has a wide spreading crown reaching a height of 20-25 m and often forms pure stands. It is closely related to *B. glaucescens*, but has consistently fewer leaflets (from 6 to 9 pairs), and examination of herbarium specimens has convinced me that this is a distinct species. Other trees found in association with this *Brachystegia* (but always fewer in numbers) include *Brachystegia manga* and *Burkea africana*, with *Bridelia mollis*, *Croton gratissimus*, *C. pseudopulchellus*, *Xylothea tettensis* in the understory, and *Ficus soldanella* strangling rocks.

Away from rocky outcrops, woodlands on well-drained, gravelly soils are very mixed, with no clear dominant species although *Combretum fragrans* is common locally along with *Diplorhynchus condylocarpon*, *Pseudolachnostylis maprouneifolia*, *Pterocarpus angolensis*, *Terminalia* spp. are not frequent, and *Brachystegia manga* is uncommon away from rocks. Mopane trees occur in loose associations in one or two areas and are too few to form “mopane woodland” as such. A species list from woodland seen on ridges west of Kamzimbi includes: *Afzelia quanzensis*, *Albizia anthelminthica*, *Antidesma venosum*, *Boscia salicifolia*, *Brachystegia manga*, *Burkea africana*, *Cassia abbreviata*, *Colophospermum mopane*, *Combretum fragrans*, *C. molle*, *Crossopteryx febrifuga*, *Dichrostachys cinerea*, *Diospyros kirkii*, *Diplorhynchus condylocarpon*, *Erythrophleum africanum* (more common than *Burkea*), *Holarrhena pubescens*, *Kirkia acuminata*, *Lannea discolor*, *Lonchocarpus bussei*, *Parinari curatellifolia* (one clump, very local), *Pseudolachnostylis maprouneifolia*, *Pterocarpus angolensis*, *Schrebera trichoclada*, *Securidaca longepedunculata*, *Sterculia africana*, *Strychnos madagascariensis*, *Terminalia sericea*, *T. stenostachya*, *Xeroderris stuhlmannii*, *Zanha africana*; shrubs include *Byrsocarpus orientalis*, *Ximenia caffra*, *Xylothea tettensis*.

Woodland on alluvial flats next to the Nthembe stream is characterized by *Acacia nigrescens*, *Albizia harveyi*, *Combretum imberbe*, *Dalbergia melanoxylon*, *Piliostigma thonningii*, *Scleroscarya caffra*; *Cordyla africana* and *Tamarindus indica* confined to anthills.

Riparian forest or woodland on the Nthembe (seasonal) stream below Kamzimbi Camp has *Acacia polyacantha*, *A. tortilis*, *Albizia glaberrima*, *Combretum imberbe*, *Diospyros mespiliformis*, *Ficus exasperata*, *F. sycomorus*, *Kigelia africana*, *Lonchocarpus capassa*, *Sterculia africana*, *S. appendiculata*, *Trichilia emetica*. Furthermore, a thicket of *Acacia nilotica* occurs on a sandy flat by the stream.

The Nankhwali stream to the west of Kamzimbi flows year-round, forming some important pools among rocks. *Phoenix reclinata* and some reedbeds (*Phragmites australis*) are found on its banks, as well as *Acacia polyacantha*, *Ficus ingens*, *Trichilia emetica*, etc. Narrow strips of semi-evergreen forest grow in the vicinity in rocky gullies, with the following tree species being prevalent: *Artabotrys brachypetalus* (scandent), *Cleistochlamys kirkii*, *Cola clavata*, *Dalbergia arbutifolia* (climber), *Drypetes reticulata*, *Ficus ingens*, *Friesodielsa obovata*, *Gyrocarpus americanus* (to 18 m), *Mimusops* sp. (20 m),

Newtonia hildebrandtii (25 m), *Strychnos henningsii*, *Tamarindus indica*, *Teclea myrei*, *Terminalia sambesiaca* (25 m). The flora of this interesting area deserves further study.

1.8.2 Fauna

Lengwe National Park contains the northern most naturally occurring population of the Nyala antelope (*Tragelaphus angasii*) originating in South Africa and extending to Zimbabwe and Mozambique before finally reaching southern Malawi. It is also home to populations of rare birds such as the Gorgeous Bush Shrike *Malaconotus viridis*, Rudd's *Apalis ruddi*, Grey Sunbird *Nectarinia veroxii*, Woodward's Batis *fratrum*; and the Lemonbreasted Canary *Serinus citrinipectus*. Additionally, besides the Nyala, there are interesting mammal species such as the Red Squirrel *Paraxerus palliatus*, Reedbuck *Redunca arundinum*, Suni *Neotragus moschatus*, the Tree Hyrax *Dendrohyrax arboreus*, and the Night Ape *Galago moholi*.

1.8.2.1 Mammals

The large mammals of Lengwe National Park have been studied in some detail over the years through the annual game counts that are undertaken by DNPW and Wildlife and Environmental Society of Malawi (WESM). Animal population estimates show that impala has been the species with the highest population over the last decade, followed by buffalo (*Syncerus Caffé*). The Nyala Antelope *Tragelaphus angasi* is the third most populated species whose population has not recovered since the culling that occurred in 1990s. Nyala represents the northern most naturally occurring range for this species and has been the prime focus for the protection of the Old Lengwe. Other animal species of interest that are found but in small numbers include kudu (*Tragelaphus strepsiceros*), warthog (*Phacochoerus africanus*), suni (*Neotragus moschatus*) and porcupine (*Erethizon Dorsaum*). Areas around Lengwe are also well known as a habitat for Temminck's Ground pangolins (*Smutsia temminckii*) which have been released into Lengwe. However, there are no records for its population estimates but only its mortality. Lengwe does not have prominent carnivores, however there are some species of nocturnal carnivores such as genet (*Genetta genetta*), civet (*Civettictis civetta*) and serval cat (*Leptailurus serval*). There are also a number of other interesting mammal species to be found at Lengwe such as the Tree Hyrax *Dendrohyrax arboreus*, the Red Squirrel *Paraxerus palliatus*, the Reedbuck *Redunca arundinum*, and the Night Ape *Galago moholi*. Though there has been little effort to study mammals in the Extension Area of Lengwe, the first game count in 2019 showed that there are some remnant populations of at least klipspringer (*Oreotragus oreotragus*), bush buck (*Tragelaphus sylvaticus*) and common duiker (*Sylvicapra grimmia*). Section on 'Large Mammal Monitoring Program (2.3.1)' has details of the results from animal count that shows trend for mammals at Lengwe.

1.8.2.2 Birds

Lengwe National Park is one of the important bird areas in Malawi with number MW021 on Bird Life International. In about 1994 the Wildlife Environmental Society of Malawi (WESM) produced a checklist compiled by R.D. Medland, largely based on working lists prepared in the 1980s by Mrs D.B. Hanmer from Nchalo, which also appeared in Sherry & Ridgeway (1984). According to Dowsett (2000) about 312 species were recorded in the park while other records indicate there are about 350 species mostly in Old Lengwe.

There have been many records of bird species that have not been confirmed for years where additional information was not provided or the information on conformation is not available. The first list of such species was produced by Hanmer (1981). In *Nyala* 2001, Haugaard summarised the few new species records added to Medland's Lengwe list since 1994. Basing on Medland's and Haugaard's lists altogether, 27 species were also added to Lengwe avifauna. These lists were used for consolidating the list for Lengwe in 2002 that suggested there are about 354 bird species. However, only 124 of these are confirmed suggesting the need to conduct a comprehensive study to refine the bird list for Lengwe. This list has been updated using the bird surveys conducted by WESM and Lengwe.



Figure 6: Crested guinea fowl during 2019 annual waterhole animals count by WESM

Wildlife and Environmental Society of Malawi (WESM) compiled the list of bird species in 2015 led by Dr John Wilson and Philip Pile using the bird recording for over 50 years mostly during annual animal water hole counts. A total of 368 species were recorded by 2015. Even though the WESM list has not been updated since 2015, WESM has continued to record bird sightings up to 2020 led by Dr. Tiwonde Gawa generating up to date information. In 2020, 79 species were recorded that included the rarely seen Crested Guinea fowl *Guttera pucherani*, Swallow-tailed Bee-eater *Merops hirundineus*, Cinnamon-breasted Bunting *Emberiza tahapisi*. Lengwe officers led by the WESM Ornithologist conducted a first known bird survey in Extension Area in 2020 where 778 birds were sighted comprising of 153 species. The rare species included the Rudd's Apalis *ruddi*, which is common in Mozambique but rarely seen in Southern Malawi and was thought to be extinct in Lengwe. Vincent's Bunting *Emberiza vincenti* was also recorded for the first time near the Mozambique boundary. These records have been incorporated into the list on the Appendix 2. The list has records of 374 species, out of these 203 species were recorded in 2020 alone during bird surveys by Lengwe and WESM while 129 species have not been recorded since 2015. There are also 10 species that were only recorded for the first time after 2002 and do not appear on Dowsett list while 41 species have not yet been recorded since 2002.

Though the majority of recorded bird species fall under the least concern on IUCN Red List Category while about 19 species are under vulnerable, near threatened, endangered and critically endangered (IUCN 3.1). The populations for these species which are mostly birds of prey (eagles and falcons) and scavengers (vultures) have been declining due to a variety of threats including poisoning, persecution

and ecosystem alterations. Such species have small populations and local extinctions may be accelerated by major poisoning events in isolated localised subpopulations. (Datazone Bird Life <http://datazone.birdlife.org/species/factsheet>) The critically endangered species found in Lengwe include Basra Reed Warbler *Acrocephalus griseldis* and Hooded Vulture *Necrosyrtes monachus* while the vulnerable species include Woolly-necked Stork *Ciconia episcopus*, Lanner Falcon *Falco biarmicus* and Southern Ground Hornbill *Bucorvus leadbeateri*. These list of bird species in Lengwe have been indicated in the appendix 2.

These species require deliberate efforts to reduce further population decline. Lilongwe Wildlife Trust in collaboration with DNPW and African Parks has embarked on a study on African White-backed Vulture *Gyps africanus* and Hooded Vulture *Necrosyrtes monachus* frequently visit Lengwe on their way to and from Majete and Liwonde National Park and across the border. These migratory species are among the Endangered species on the IUCN Red List and were once considered extinct.

1.8.2.3 Reptiles and Amphibians

There are no records available at this stage. The National Museums of Malawi also does not have specimens from Lengwe NP. A full Herpetological survey of Lengwe NP is therefore required.

1.8.2.4 Butterflies

There are very few records on the butterflies of Lengwe NP prior to observations made by Sherry and Ridgeway (1984), and those collated by Bob Dowsett in 2002. Generally, the Lower Shire has been overlooked in terms of butterfly surveys. Gifford (1965) mentions J. D. Handman collecting intensively around Nsanje. More recently observations made by J. Bayliss and specimens collected by Steve Collins (ABRI) through the SRBMP surveys have added to the database of butterflies recorded from Lengwe NP.

Between November and January and March-April (2015-2016) observations by J. Bayliss on butterflies was carried out in all areas visited with selective collection of specimens for correct identification (247 specimens of 93 species, with an additional 11 species based on sight records).

One butterfly hitherto unrecorded from Malawi was collected in Lengwe, *Acraea atergatis* (Acraeidae), a dry country species known further west in south-central Africa. Other interesting records include *Euxanthe wakefieldi* (Nymphalidae) in Lengwe and the neighbouring Nyala Park at Sucoma. This Eastern biome lowland forest-associated species was previously known in Malawi only from the Malawi Hills and the Nkhata Bay lakeshore, though there is apparently an unpublished record of a vagrant from Blantyre. Also unexpected were the Eastern biome *Hypolimnias deceptor* from Lengwe and Mwabvi, and *Neptidopsis ophione* from Lengwe (both Nymphalidae). These are also unrecorded from southern Malawi. Among the Lycaenidae, *Pentila tropicalis* is an Eastern forest associated species (known hitherto from Malawi only in the Malawi Hills), while a number of species are newly reported from the Lower Shire Valley, including such scarce butterflies as *Baliochila hildegarda* and *Lachnocnema durbani*.

The combined list of 104 species (Appendix 3) is far from complete and an additional survey of the butterflies of Lengwe NP would be recommended. One would expect 150-200 species in such an area. Based on the mix of habitat types and the large area that the park occupies the area could yield rare and interesting species.

1.9 Relationship to surrounding areas

1.9.1 Regional Characteristics

Hall-Martin (1974) indicates that the Lower Shire Valley was probably inhabited between 10,000 and 35,000 years ago. It is likely that the park has experienced at least one or two millennia of human impacts during the period when Iron Age peoples lived in the valley. Norse (1969) suggested that occupation of Lengwe dates back at least to the sixteenth century when the old Maravi Empire was at its peak. The people lived primarily by subsistence agriculture and a limited amount of trading. Even in these times the area was fairly populated and it is likely that the large wild mammal population was fragmented.

During the 18th century, Maravi power declined as Portuguese influence increased and Yao and Arab slavers took a toll on the human population. As a result of the decrease in cultivation, wildlife populations are thought to have increased in the 19th century. However, Sherry and Ridgeway (1984) state that the human influence on wildlife remained strong and wildlife distribution was not continuous.

More recently, the human population in the Lower Shire Valley has increased to unprecedented levels. The population of Chikwawa and Nsanje Districts was 246,000 people in 1966 and about 312,000 in mid-1974 (SVADP 1975). At a rate of population increase of 3-3.5% the current population is likely to lie between 673,000 and 763,000. The population of Chapananga (the Traditional Authority area in which the major part of Lengwe National Park lies) increased from 36,528 persons in 1977 to 62,605 persons in 1998 (Munthali 2000) – a growth rate of 2.6% per annum. The 2008 population census indicated that the population of Chikwawa district was at 437,892 people and this has increased to 564,684 in 2018.

The population in the surrounding communities of Chapananga, Ngabu, Ndakwera, Lundu has also shown some increase. According to the 2018 population census, the population in the four traditional authorities surrounding the park is at 332, 793. That is, Chapananga population is at 88,641, Lundu is at 62,176, Ndakwera is at 24,234 and that of Ngabu is at 157,742. This is showing a population growth rate of 2.3 (NSO report 2018) and also an increased population density of 116 persons per square kilometre (sq. km²) in 2018 from that of 90 persons/sq. km² in 2008. On the west of the park is Mozambique where human densities are beginning to increase following the return of many subsistence communities after the war. It is therefore important to note that the increasing surrounding population will always be a threat to wildlife conservation inside and outside of Lengwe if they (communities) are not provided with sustainable and meaningful livelihoods.

1.9.2 Surrounding Land Use

The surrounding land is a mosaic of different land uses. To the north is Majete Wildlife Reserve which is currently managed by the African Parks Foundation (APF) since 2003. Majete is a large area (70,000ha) which has undergone considerable investment and restocking of animals, particularly elephants, since APF were awarded the management contract (http://www.african-parks.org/Park_1_Majete.html). Majete Wildlife Reserve is close to Lengwe only separated by a distance of 4kms at the shortest point. The Shire Valley Transformation Programme (SVTP) is undertaking a feasibility study to identify the possibility of a wildlife corridor between the two protected areas to allow interaction and movement of wild animals. The communities around Lengwe and Majete solely depend on subsistence farming through rain fed agriculture and winter cropping supported by the residual moisture found in perennial Mwanza river which also runs in between the two protected areas. The land between the two protected areas is under Traditional Authority Chapananga and to some extent this area receives some good amount of rain to support agriculture which is different from other areas which surround Lengwe in terms of rainfall. The other areas adjoining Lengwe are under Paramount Chief Lundu where there are sugar estates belonging to the Illovo Sugar Limited (<http://www.illovosugar.co.za/home>). These are the main employers in the area. The areas TA Ndakwera and Senior Chief Ngabu border with Lengwe NP. Communities in these areas do not possess enough farm land and as such they are a threat to Lengwe. Communities in this area are involved in various illegal activities such as charcoal production, illegal tree logging and encroachment.

To the east are the Elephant Marshes wetland, a large area of seasonal floodplain that varies in size as a result from 400 to 1200 kms. It is an important economic area for local livelihoods and there is much fishing, cattle grazing, and farming (particularly maize) through the marshes. As a result, the area is heavily encroached and degraded. Large herbivores such as hippopotamus (*Hippopotamus amphibious*) are frequently hunted, and the area is probably overfished. There are no elephants remaining despite its name. In an effort to sustainably manage the wetland, Elephant Marsh was declared a Ramsar Site in 2017 and is being earmarked for Malawi's first Community Conservation Area under SVTP.

The western boundary, as with the rest of the Extension Area, currently has no perimeter fence. To the west is Mozambique (Tete Province). This international boundary forms the majority of the western side of Lengwe NP, and especially that of the Extension Area. There is no protected area on the Mozambican side, only forest which is a habitat for some animals (see details in the next section)

1.9.3 Local Relations

Lengwe National Park is surrounded by four traditional leaders namely: Paramount Chief Lundu to the South East, Ngabu southern part, Chapananga and Ndakwera to the eastern part and north western part where there is an international boundary with Mozambique (**Error! Reference source not found.**).

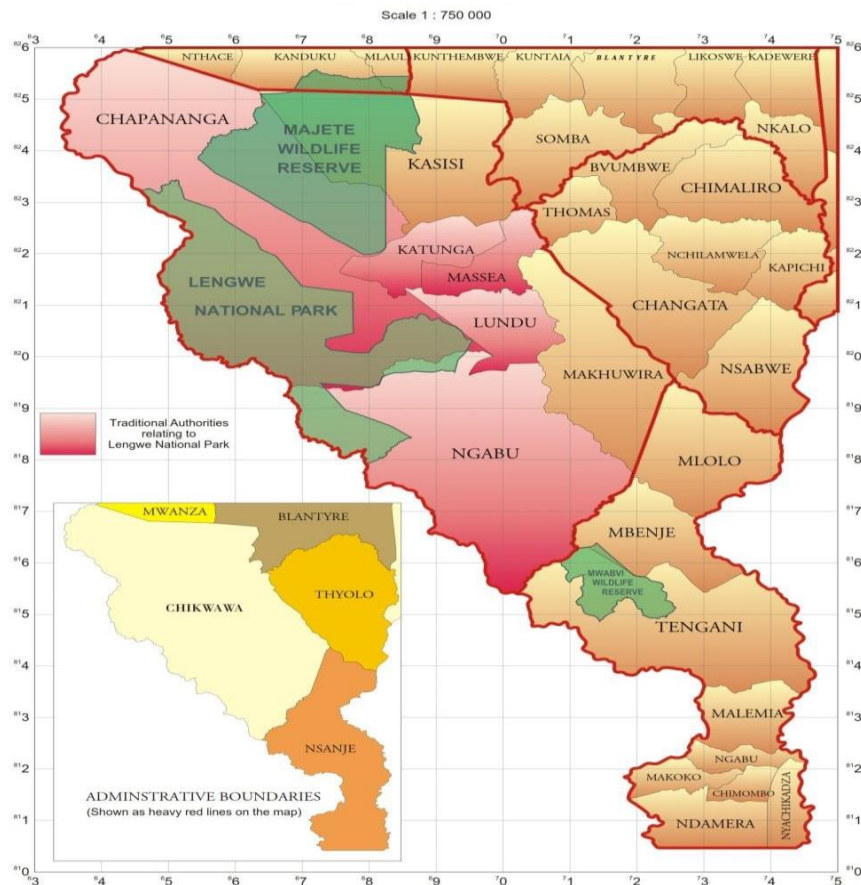


Figure 7: Map of Lengwe NP and the surrounding Traditional Authorities

Over the past years starting from the year 2000, there has been a policy shift from command and control to collaborative management with neighbouring communities. Lengwe's relations with surrounding communities have had a chequered history but were formalized in the year 2017 through the signing of a co-management agreement between the DNPW and surrounding communities through the Lengwe Wildlife Association. Through this agreement, communities get 25% of the revenue accrued from Lengwe National Park through gate collections and concession fees. These communities are also allowed to obtain from the park some permitted and harvestable natural resources such as thatch grass and wild fruits.

The formalized community structures comprise of: Lengwe Wildlife Association as the umbrella body for community structures; the Zone Committees at TA level; and the 32 Community Based Organizations/NRCs which are under the Zone Committees. These structures are used to engage communities during sensitizations and awareness meetings, capacity building programs, livelihood initiatives as well as community development projects.

The relations between Lengwe and its surrounding communities are sometimes tested due to boundary issues where some communities especially in the extensions area deny the existence of

Lengwe in their areas. It is therefore important to conduct boundary verification exercises together with the communities.

Communities also face various challenges such as lack of food, as Chikwawa area in general does not receive much rain to support food crop production. As a result, this puts a lot of pressure on Lengwe National Park as the communities view the wildlife resources as a direct source of livelihood. Communities are involved in various illegal activities inside the park, mostly encroachment, charcoal burning, animal poaching and tree logging. Providing sustainable livelihood support packages and promoting conservation related interventions will make sure that these communities do not depend on the park for a living and will in turn encourage these communities to support conservation initiatives.

1.9.4 International Cooperation

Even though there is no protected area on Mozambican side, there have been incidences of animals crossing the border. In 2021 buffaloes were reported invading the areas around Gola mountains in Senior Chief Chapananga which were observed to come from Mozambique while some three buffaloes were traced from Ngabu area to Mozambique. Though rare incident, elephants were observed in 2021 visiting Lengwe adjacent to Therere in Ngabu area. There have also been similar reports in the past on lions. However, there are also reports on illegal trafficking of pangolins from Mozambique that have resulted to some Mozambique nationals being arrested.

The western side of Lengwe forms an international boundary with Mozambique. This gives rise to many management challenges as there are no adjacent protected areas on the Mozambique side of the border. Lengwe is also home to commercially viable tree species including the mopane (*Colophospermum mopane*), locally known as the Tsanya, whereas on the Mozambican part all these mopane trees have been logged, and this poses a threat to the existence of the mopane trees in Lengwe NP especially those close to the Mozambique border. A serious IWT case occurred in 2016 when an illegal commercial logging operation (led by a group of Chinese and Mozambique nationals) encroached Lengwe National Park with heavy machinery and cut down more than 250000 mopane trees, which were being trafficked to China via the port of Beira. Some communities informed the park officials and these illegal loggers were arrested, convicted, and all of the heavy machinery was forfeited to Malawi government. There is need for trans-frontier cooperation with Mozambique in order to ensure that Lengwe National Park is properly managed.

There exists bilateral cooperation between Malawi and Mozambique, a Joint Permanent Commission of Defence and Security (JPCDS) that was established in 2006 with the aim of fostering peace, unity and cooperation between Malawi and Mozambique. The commission is composed of different defence and security organs of Malawi and Mozambique; these organs include Defence Forces, Police, Immigration, Prisons, Forestry and Wildlife among others. The commission meets every year to update progress made from the previous JPCDS and map forward the issues raised or emerged during the current JPCDS meeting. During the 13th session of JPCDS held in Malawi in 2020, DNPW presented on pangolin trafficking from Mozambique into Malawi, illegal logging of mopane trees in Lengwe, stolen water pumps and fencing materials which are allegedly, trafficked and sold in Mozambique. However,

the Mozambican counterpart did not attend the meeting to address the matter. This opportunity needs to be utilised to address the cross-border wildlife crime and trafficking. The increased incidences of animals crossing the border also requires further attention through trans frontier conservation efforts.

2 Section 2: Situation Analysis

This section presents the information collected over the past few years by the staff at Lengwe National Park responsible for various sections. The information can be used as part of the situation analysis, to identify problems, and also as part of the monitoring and evaluation system. A summary of the key issues isolated from annual reports produced by Lengwe staff is presented in the sections below.

2.1 Wildlife Management and Utilisation

Wildlife Management and Utilisation is composed of Law Enforcement, Problem Animal Control, Fence Maintenance, Tourism Management and general infrastructure management. The sections below elaborate these components in more detail.

2.1.1 Law Enforcement

For the purposes of law enforcement, Lengwe NP is divided into 60 5km x 5km grid squares with the intention that law enforcement patrols will be able to record effort and illegal activities according to this sampling grid (Figure 9). This is a recognised approach and an appropriate manner of undertaking law enforcement activities within Lengwe NP. Results show clearly which areas are being visited on a regular basis by law enforcement patrols and which areas (grid squares) are being neglected. How the park scores under METT (Management Effectiveness Tracking Tool) is primarily dependent on the performance of wildlife law enforcement since this is the core activity of the DNPW.

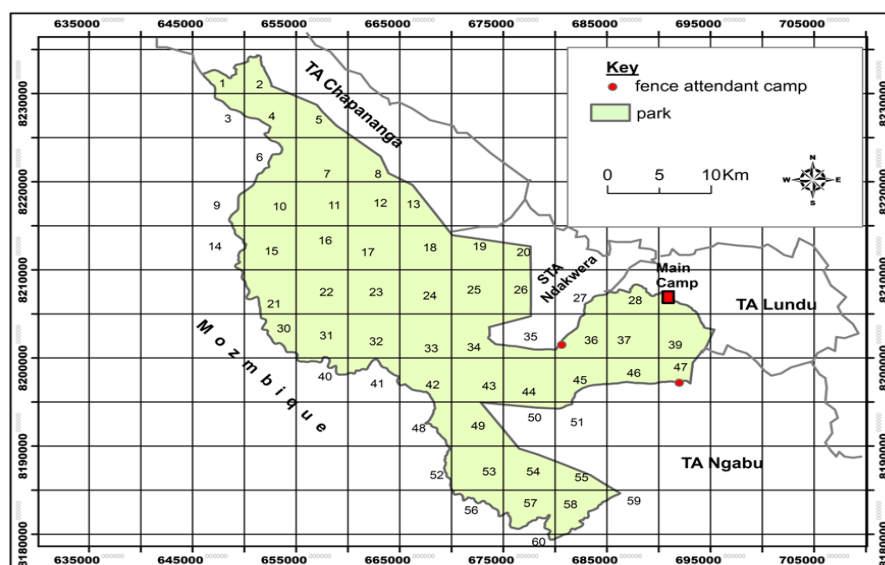


Figure 8: Map of Lengwe NP showing the 5x5km numbered grid squares which are used for recording law enforcement intensity and also animal distribution.

2.1.1.1 Patrol Reports analysis

As indicated in section 2.1.1 above, law enforcement teams at Lengwe NP use a 5x5 km square grid for navigation and reporting. Parameters such as Effective Patrol Days, Catch per Effort, Patrol Coverage and Intensity, Mortality and Animal Distribution are all recorded in relation to the 5x5 km grid. Each grid square is numbered (*Figure 8*) and each patrol records where it went and what it found as a measure of patrol effectiveness. Senior management staff in the law enforcement section provide a routine program detailing where to patrol.

2.1.1.1.1 Effective Patrol Day (EPD)

Effective patrol day (EPD) is here regarded as a day on which a patrol is thought to have a reasonable probability of encountering illegal activity within the park, that is, the patrol is not in a place or activity that an offender might be expected to avoid (Bell, 1981). This is also roughly taken as a day at least half of which (that is, 6 hours) is spent on effective patrol time i.e. on foot in the bush (Bell, 1984). Each short patrol day constitutes half EPD (0.5)

The Effective Patrol Days (EPD) have been used to measure effort as described in Dyer (1986). For long patrols 0.5 has been awarded for placement and another 0.5 for effectiveness if a patrol was conducted thereafter. For a patrol day, 1 has been awarded while 0.5 has been given for effectiveness of short patrol. This is given the term 'Effort'. A long patrol is an overnight activity where a patrol team operates away from ranger camp for a number of days/nights. A short patrol is a day's activity in which a patrol team on foot operates from main base (ranger camp).

2.1.1.1.2 Catch per Effort (C/E)

Catch per Effort index relates to the rate of encounter of illegal activities to effort deployed (Bell, 1984). It is found by dividing the total individual illegal activities (catch) by the total EPDs recorded (effort).

To illustrate usage of C/E in Lengwe, 2010 to 2019 data (*Table 1*) was used. From this table, it is clear that tree cutting had the highest catch per effort (21.09), followed by encroachment [cultivation and settlement combined (10.78) and (0.94)], and charcoal burning kilns and possession of charcoal (5.75 and 3.42 respectively).

Table 1: Illegal activities expressed as catch per effort (2010-2019)

Illegal activities	Total	Catch/Effort
Tree cutting	1917	21.09
Encroachment (cultivation)	803	8.83
Charcoal burning kilns	523	5.75
Encroachment (settlement)	177	1.95
Shacks	37	0.41

Setting Gin traps	6	0.07
Gun shot	1	0.01
Snare	1	0.01
Possession of charcoal	311	3.42
Cattle grazing	47	0.52
Possession of poles	38	0.42
Possession of planks	38	0.42
Stray dogs	4	0.04
Firewood collection	2	0.02

2.1.1.1.3 Man-days

Another important parameter related to C/E is a man-day. A man-day is calculated by multiplying the effective patrol days (EPDs) by the patrol personnel (team size).

2.1.1.1.4 Patrol Coverage

In Lengwe National Park, patrol teams adopted the use of Global Positioning System (GPS) hand set in 2016, an advanced method of using technology for data collection. Area coverage worked out from data covering the period from July 2016 to June 2020 show that 11 (22.5%) out of 49 grid squares in New Lengwe were not visited (*Figure 9*). These grid squares are close to Mozambique side of the boundary which has no road network. Those that are closer to the main camp received considerable number of visits. The intensity of patrol team visiting a particular square can be judged by the number of dots shown in the square. Grid squares that received the highest number of visits are 8, 13, 18, 24, 34, 43 and 49.

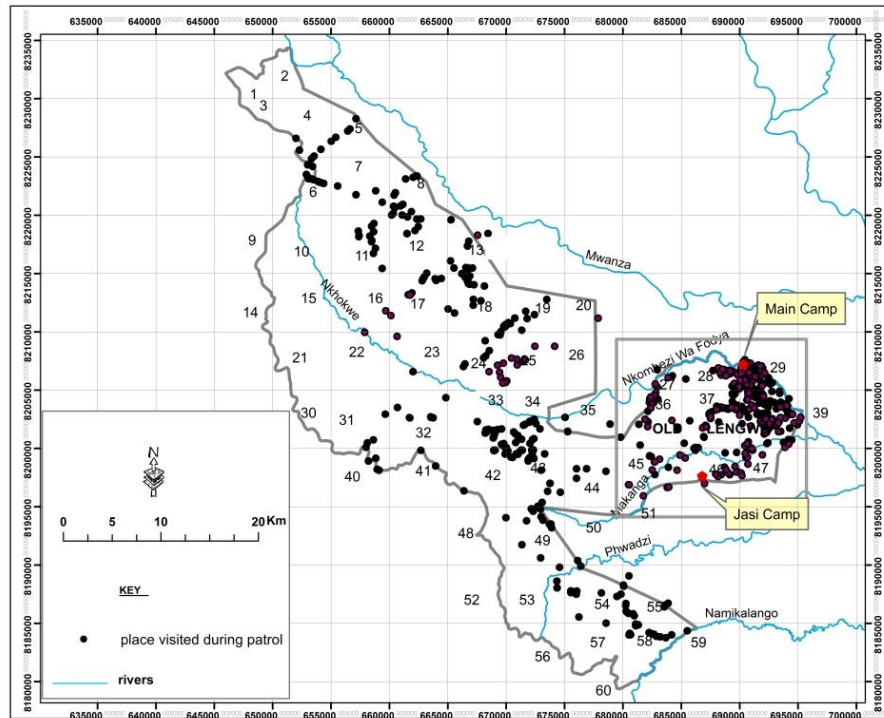


Figure 9: Map depicting frequency of patrols according to 5x5 grid squares in Lengwe NP

2.1.2 Problem Animal Control

Problem animals are defined as wild animals that generally escape from the protected area, or their wild environment, and are a threat to public health or property (such as livestock and crops). The occurrence of these species sometimes leads to conflicts with humans and may require special management measures.

The function of managing these conflicts is currently performed by Problem Animal Control Units whose rangers are located at different points throughout the southern region. However, for the areas which are in close proximity to Lengwe National Park, problem animal control is the responsibility of the park management.

Between 2018 and 2020, Lengwe management responded to 138 problem animal reports from within its catchment area (Table 2). The main problem animals were hippopotamus (*Hippopotamus amphibius*), buffalos (*Syncerus Caffer*) and crocodiles (*Crocodylus niloticus*) – these reports were mainly from the Elephant Marsh which is close to Lengwe NP. During the period four people lost their lives to these problem animals.

Table 2: Problem animal reports attended by Lengwe National Park (2018- 2020)

Problem animal	2018	2019	2020	Grand Total
Crocodiles	2	5	8	15
Baboons	0	1	2	3
Buffalo	2	12	15	29
Bush back	0	1	0	1
Bush Pig	0	1	0	1
Stray Dogs	1	0	0	1
Hippo	25	32	23	80
Lion	1	0	1	2
Hyena	0	0	2	2
Leopard	0	0	1	1
Python	0	1	1	2
Turtle	0	0	1	1
Grand Total	31	53	54	138

2.1.3 Maintenance of the park

This section provides a summary of major challenges associated with park infrastructure. These challenges are discussed in much greater detail in section 4 (Implementation) of this management plan in terms of how they can be addressed.

2.1.3.1 Tracks and Trails

Old Lengwe has an extensive network of tracks and trails that cover a good proportion of the park. Such trails are also historically connected to a network of water holes for tourist activities such as game viewing. They are also strategically placed to assist law enforcement patrols to protect wildlife. However, over the last 20 years, the trail network has slowly been degraded due to a lack of resources and appropriate management to an extent that trails were either badly overgrown or lost completely and only known by old maps and the knowledge of elders still working in the park.

2.1.3.2 Perimeter Fencing

Government of Malawi embarked on the construction of solar powered electric fencing of Old Lengwe to reduce human wildlife conflicts mostly resulting from buffaloes. The buffaloes invade the adjacent sugar cane fields and then later get killed because they cannot be chased back to the park.

In 2010, GoM funded fence construction of 15 km from East to West through the main administration Camp, while Illovo funded 5km on the east side. In 2012, GoM continued the fence construction by 10

km in Jasi and 5 km in TA Ndakwera. In 2015, the fence perimeter was extended by 10 km (5 km at Utumbe in TA Ngabu and 5 km at Mankhokwe in TA Ndakwera) through SRBMP resulting to a total fence perimeter of 45 km. Three Fence Attendant (FA) camps i.e. Mankhokwe, Ndakwera and Jasi were also put in place as flying camps for effective management of the fence (see Figure 32 for the perimeter fence). Staff Housing (Staff requirement-housing linkage)

The staff housing at Old Lengwe NP needs extensive renovations. The buildings have not received a great deal of attention in recent years and require heavy maintenance. The status of the plumbing, electrics, windows, doors and roofing needs to be looked at. Some of the houses are in dilapidated state and condemned but people still occupy them at their own risk. Further to this, there is not enough staff accommodation to house the current number of staff such that 23 out of 65 members of staff stay outside the park which is not ideal for law enforcement as it leads to leakage of patrol information.

In early 2019, government completed construction of a new duplex house using development fund but the initiative did not continue due to limited funds. Additional houses of the same standard are required at the administration camp to bring all staff inside. In the extension area, construction of six duplex houses similar to those at Jasi camp is expected to commence soon at Kanzimbi ranger camp with support from the SVTP-1. This will accommodate 12 members of staff and additional houses will be required to make it a sub-station.

2.1.3.3 Water Supplies

Lengwe National Park is supplied with two systems of domestic water: from nearby irrigation canal of Illovo sugar estate and boreholes sunk within the park. The long-time system that feeds the staff houses at the main camp and park offices is old and defunct. The untreated water is pumped directly from the canal through a silt-filtering unit into a 10,000 litres elevated steel tank and then supplied to offices and staff houses. However, the pipes are frequently broken. The pump at the intake requires replacement and the water filtration tank is badly rusted and silted up and sometimes leaks. The steel tank is also rusted and leaking water. As a result of the silt filter not working properly, the steel tank is now half filled with mud because the water is untreated, unfiltered, and highly turbid hence limiting its usage to bathing, washing and in flush toilets since the pressure is very good. The whole system needs to be replaced. Under the SRBMP-1, two boreholes were sunk at Park HQ and Jasi camp with a pump each installed to pump water into a 5000L tank respectively which supply drinking water to staff. The Nyala lodge has also a similar system of water supply. The one at the Park HQ is supplying drinking water though slightly salty while the water supply from Illovo is still used for toilets. However, water at Jasi is very salty and not fit for drinking. With the current SVTP1, the ranger camp to be constructed at Kanzimbi camp will include drilling of a borehole and installation of a solar powered water pump which will pump water into a 5000-litre tank for domestic supply.

2.1.3.4 Offices and Workshops

The Park offices and workshop at Lengwe NP also needs some basic renovations. The last maintenance was done in 2019 and focused much on replacing ceiling boards in offices. Currently, the walls require painting and office chairs need to be replaced. The working pit at the workshop is in unusable state and requires rehabilitation. The workshop also requires a compressor, drilling machine, tracer, and a welding machine.

Through the SRBMP (phase 1), new Information and Technology (IT) equipment was procured for the staff and offices at Lengwe NP (desktops, laptops, scanners, photocopiers, laser printers) at a significant cost. However, the laser printers have developed faults and consideration has to be made to procuring new ones. With the current SVTP-1, 2 laptops and 3 desktops were procured.

2.1.3.5 Transport and Equipment

Lengwe has 9 vehicles, 1 bought by government, 2 bought under SRBMP, 1 impounded, and 1 by SVTP, and four tractors, 2 of which were impounded together with other vehicles including a front-loading digger which were all used for illegal logging in the Extension Area. The tractors greatly assist in mobility during the rainy season due to water logging and floods as well as passing through poorly maintained roads and tracks for law enforcement, road opening and road maintenance. One tractor has a grass cutter for road maintenance but is not used as much now as the Grader is preferred. The SRMBP provided 3 motor bikes and recently the SVTP supplied another 5 motorbikes for Lengwe management. The Grader was also supplied for the opening and maintenance of roads especially in the extension area that historically has had no road network until 2020.



Figure 10:Photos of Nissan Double Cabin bought under the SRBMP (left) and Komatsu Grader (right) bought through the SVTP.

The maintenance of the equipment has been a challenge as it is undertaken depending on the availability of funds and not on the need due to poor ORT funds and declining revenue collection. This has also resulted in the use of two tractors that are manageable and then leaving the other 4 tractors unattended to. If funding level does not significantly improve, they can be boarded off.

2.1.3.6 Tourist Facilities

There is currently one facility (Nyala Lodge) for visitors to stay at in Lengwe NP. For more information on Nyala Lodge, consult the following website: <http://www.jambo-africa.com/lengwe.html>.

The Park has a modern conference centre which is present at Nyala Lodge. The conference centre was built with support from the Shire River Basin Management Program phase 1. The current SVTP project procured information and communication equipment, furniture and cutlery for the facility (refer to section 4.9 for further details).

2.1.3.7 Educational and Interpretative Facilities

2.1.3.7.1 Tisunge! Lower Shire Heritage Trust and Centre

Tisunge is Chichewa for ‘Let’s Preserve’. The main construction work was completed in 2010 for the promotion of conservation of the Cultural and Natural Resources of the Lower Shire and to ensure the equitable sharing of benefits. The Tisunge! Lower Shire Heritage Trust handed over the Tisunge! Lower Shire Heritage Complex which is situated at the main gate entrance to Lengwe NP in 2017 (*Figure 11*). The complex composes of the two semidetached rooms (not fully completed), a house, a bed seater, ablution block, a museum, a library, an office, a store room and a shop. The center was handed over to Lengwe Wildlife Association (LWA) at the time when the center was not yet fully operational because of untimely withdraw from their programs. This center brought the opportunity for increased revenue for LWA through accommodation for tourists and cultural display. Currently, LWA is only using the shop while the rest of the facility has not been generating money due to low visitor turn out, lack of capacity to manage, lack of potable water worsened by its dilapidated condition (also see 4.2). LWA made some attempts at maintenance but did not manage to lift it to the desired state to attract visitors. Through SVTP, DNPW is supporting LWA to maintain the infrastructure but also build capacity on its management while facilitating linkages to its ecotourism partners. Apart from using the funds for supporting the community projects for LWA sustainability, the heritage would also provide employment to communities.



Figure 11: Photograph of the main Tisunge (museum) building at the entrance of Lengwe NP

2.2 Extension and Education Services

The Extension and Education Section’s strategic objectives are:

1. To promote the conservation and sustainable management of the natural and cultural resources of the Lower Shire Valley, in close co-operation with the Government of Malawi;
2. To promote the involvement of village communities in the conservation and sustainable management of the cultural and natural resources of the Lower Shire Valley, and to assist them in benefiting from such conservation and sustainable management;
3. To promote the collection and dissemination of environmental, cultural and social information and advice concerning the Lower Shire Valley;
4. To raise public awareness on conservation and sustainable management of the Lower Shire.
5. To incorporate the cultural, spiritual and socio-economic values of the local communities into the development and management of the Lower Shire.
6. To cooperate with, become a member of or otherwise assist anybody within or outside Malawi with objectives altogether or in part similar to those of Tisunge!

2.2.1 Extension

The Education and Extension section is tasked to achieve increased understanding and public awareness in respect of conservation issues. Public education and extension are undertaken to improve understanding and a positive public response with the purpose of gaining public support for wildlife conservation and management. The awareness meetings under the four areas of traditional authorities of Lundu, Ndakwera, Chapananga and Ngabu are made in collaboration with Lengwe Wildlife Association (LWA). The association is always present in planning and implementation of all community activities to ensure that the desired information is properly delivered and understood by the local people. Literacy levels are low in communities surrounding Lengwe National parks and awareness meetings are frequent and intensified. The most common awareness themes are:

1. Wildlife legislations, illegal activities and their penalties
2. Resource Utilisation Programs - purpose and procedures
3. Protected trees and animal species found inside and outside Lengwe (regulation of species).
4. The role of park bordering communities and the general public in conservation

2.2.2 Education

Education and Extension (EE) section also provides environmental education to nursery, primary and secondary schools in wildlife clubs. This is achieved through:

1. In-reach programs whereby wildlife clubs visit Lengwe for wildlife viewing and have environmental education lessons.

By the year 2021, Lengwe National Park was working with 264 Wildlife Clubs present in 264 schools. A wide range of topics is presented to wildlife clubs and some of these are shown in table Table 3 .

Table 3: Topics and materials for wildlife clubs

Topics	Materials
Protected areas in Malawi	Booklets
Wildlife found in Protected areas	Magazines
Park interpretation	Discs
Nursery establishment	Brochures
Vegetation and its importance	Leaflets/magazine and calendars

Out-reach programs where EE Section conducts visits to wildlife clubs, mostly in schools, to provide environmental education. The process of forming wildlife clubs, activities of the club and the constitution are outlined in *Table 4*.

Table 4: Wildlife formation and activities

Environmental Awareness	Wildlife Club Formation
1. Call for a gathering at a school or community	1. Approach the school authorities to assign a patron
2. Define environment	2. Invite pupils to join a wildlife club
3. What is the relationship between environment and humans?	3. Set a meeting for SWC members
4. What are the environmental problems in the areas?	4. Set up a SWC committee
5. How can they be addressed?	5. Define SWC activities
	6. Draw a work plan
	7. Develop the club constitution
Wildlife Club Activities Examples	Wildlife Club Constitution
1. Develop State of Environment and Outlook Report	1. Wildlife reasons for establishing a wildlife club to formulate aims and objectives.
2. Re-afforestation	2. Guidance maybe sought on constitution writing
3. Local field trips	Fundraising activities
4. Talks by members	1. Contribution by members
5. Visiting speakers	2. Big walk etc.
6. Contact with other clubs	Affiliation
7. Question box	

8.	Drawing/ painting competition	1.	Department of national parks and wildlife
9.	Display	2.	Wildlife Environmental Society of Malawi (WESM- Lilongwe)
10.	Drama and poems	1.	Benefits include technical support on running a club, access to materials, facilitation on park visits, participation on activities, etc
11.	Songs and choir		
12.	Discuss history with elders in the community		
13.	Making the school beautiful –plant flowers and collect rubbish		
14.	Demonstration garden		
15.	Rubbish collecting in local area		
16.	Debate		
17.	Do a fun activity e.g. Bingo		
18.	Organize rallies		
19.	Commemorate Environment Day		
20.	Watching environmental and wildlife documentaries		

2.2.3 Lengwe Wildlife Association

This Association provides a linkage for communicating with the various institutions, NGOs, and other interested donors to support community livelihood as well as conservation of natural resources in and outside Lengwe National Park. Through this Wildlife Association Trust DNPW will be able to manage and implement its Wildlife Conservation Fund Order (Annex 4) on revenue sharing schemes at Lengwe NP.

2.2.4 Community Based Organisations (CBOs)

Community Based Organisations (CBOs) are development oriented local institutions established at a Group Village Headman (GVH) level which are the main points of contact between the local communities and NGOs or Government Departments. The CBOs are only recognized by the District Assembly whenever the GVH has the licence from the District Commissioner, and have a committee composed of a Chairperson, Vice Secretary, Vice Treasurer, and committee members. In the context of the DNPW and Lengwe NP, the CBOs assist:

1. To develop a mechanism to manage their natural resources.
2. To foster good public relations by working with the park officers to conserve natural resources
3. Communities to benefit from National Parks through Income Generating Activities [IGA] and Resource Utilization Programmes [RUP].

Lengwe National Park is surrounded by 4 Traditional Authorities (TAs) namely, TA Ngabu, TA Lundu, Sub-Traditional Authority (STA) Ndakwera and TA Chapananga. The CBOs work closely with the Traditional leaders. For example, there are 9 CBOs under TA Ngabu, 4 CBOs under TA Lundu, 11 CBOs under STA Ndakwera, and 4 CBOs under TA Chapananga. Therefore, there are currently 28 CBOs surrounding Lengwe NP which represent approximately 100 villages (Figure 12).

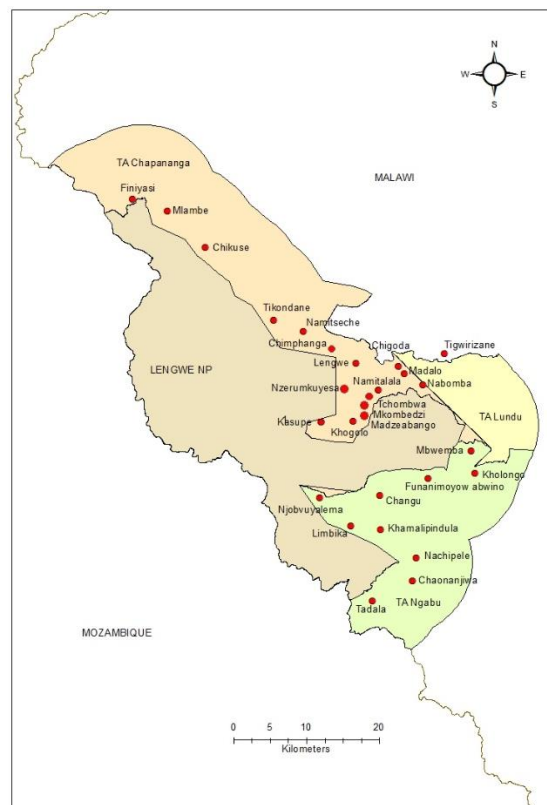


Figure 12: Community Base Organizations around Lengwe National Park

2.2.5 Zone Committees

Zone Committees and CBOs adjacent to Lengwe National Park have recently been established through the Education and Extension section with the funding from the Shire River Basin Management Programme. The objective of these Zone Committees is to empower CBO members to represent their

respective Zone Committees. The formation of the 4 Zone Committees is considered as a platform for the implementation of the long-term benefit sharing arrangement under which communities receive a proportion of revenue generated by Lengwe. In order to enable the effective implementation of the revenue sharing scheme, CBOs have been mobilised into Zone Committees after which they will further establish a Wildlife Association.

Specifically, the objectives of the Zone Committees are to:

1. Conserve and protect natural resources in Lengwe NP and surrounding areas in collaboration with the DNPW.
2. Initiate and manage development in CBOs around Lengwe NP.

The criteria for choosing zone committee members were literacy level, trustworthiness and ability to present and articulate the association manifesto.

The Zone Committee is represented by members from all CBOs. The Lundu/Mbewe Zone committee is composed of 7 members, the Ndakwera Zone committee is composed of 6 members, the Ngabu Zone committee is composed of 4 members, and the Chapanga Zone committee is composed of 7 members. An agreed and legalised constitution will be developed after which appropriate revenue sharing mechanisms can be developed.

2.3 Research and Monitoring

The Research and Monitoring programme at Lengwe NP focuses mainly on large mammal population counts (Nyala, Impala, Buffalo, Kudu, and Warthog). These are recorded whenever there is a law enforcement patrol (observations according to the grid square visited), and in more detail through quarterly and annual game counts undertaken by DNPW staff, and also in collaboration with the Wildlife and Environmental Society (WESM) in the month of September. In 2019, the game count was extended to Extension Area for the first time to generate data for monitoring the animals while law enforcement is being intensified. The findings are compared with the population estimates from previous years to show population trends.

2.3.1 Large Mammal Monitoring Programme

2.3.1.1 *Methods*

A strip transect method, also known as King's method, is used to determine large mammal populations in Lengwe NP. A total of 6 transects, 200 meters wide, of varying lengths are employed in Old Lengwe and 14 transects have been established on Extension Area in 2019. Data for animal population is collected by walking through the transect, recording on the data sheet parameters such as: species seen, numbers, sex, age ratios, vegetation type of the site, animal behaviour and the coordinates. Each transect is walked twice to ensure animal records are captured in more detail. The data collected is then analysed through 'Jolly's' method to determine population estimate of each species (Norton Griffith, 1975).

Parameters such as encounter rate are also calculated by dividing the total number of each animal species encountered in each particular 5x5km grid square (See section 2.1.1, Figure 8) by the total number of visits to same grid square. As a result, encounter rates are derived on annual and quarterly (seasonal) bases to indicate areas of high and low animal encounter rates (distribution pattern) of each animal species. The results of encounter rates are then presented graphically.

Wildlife Environmental Society of Malawi in collaboration with Lengwe has been conducting the annual water hole count for 54 years with focus on Nyala which has generated data useful for monitoring the populations. The method involves having teams at hides for water holes with 3 hour shifts from 6 am to 6 pm for 2 to 3 days. Data is recorded for animals sighted and daily average of sighted animals is calculated.

2.3.1.2 Animal Population Trends

Animal censuses are carried out each year in Lengwe National Park. There are two major methods that are applied for counting animals in the park: the waterhole count method and the line transect method. This has ensured that if some species of animals are not detected in one method then they are detected in another. Table 5 and Table 6 provide population trends of key mammals in Lengwe using transect walk and water hole counts by DNPW and WESM respectively.

Table 5: The trends of animal population for key species covering a period of ten years (2011-2020) obtained from the line transect method conducted by the DNPW

Year	Buffalo (<i>Syncerus caffer</i>)	Impala (<i>Aepyceros melampus</i>)	Nyala (<i>Tragelaphus angasii</i>)	Warthog (<i>Phacochoerus africanus</i>)	Kudu (<i>Tragelaphus strepsiceros</i>)	Bush pig (<i>Potamochoerus larvatus</i>)	Bushbuck (<i>Tragelaphus scriptus</i>)	Grysbok (<i>Raphicerus sharpie</i>)	Common duiker (<i>Moschus grimmia</i>)	Suni (<i>Nesotragus moschatus</i>)
2011	1047	2533	565	199	144	0	0	0	0	0
2013	2118	3098	511	168	120	0	24	24	6	24
2014	1362	3105	327	43	105	86	31	0	18	37
2015	850	3396	296	62	12	12	105	12	49	12
2016	936	3031	101	99	37	25	111	12	0	62
2017	776	2009	136	99	12	0	37	12	37	37
2018	904	2073	154	104	36	0	81	36	63	58
2019	936	1060	148	197	0	0	25	0	12	62
2020	1678	1392	86	62	99	0	49	12	49	12

Note: in 2012, there was no count

Table 6: The trends of animal population estimates covering a period of ten years (2011-2020) obtained from the waterhole count method conducted by the WESM

Year	Buffalo (<i>Syncerus caffer</i>)	Impala (<i>Aepyceros melampus</i>)	Nyala (<i>Tragelaphus angasii</i>)	Warthog (<i>Phacochoerus africanus</i>)	Kudu (<i>Tragelaphus strepsiceros</i>)	Bush pig (<i>Potamochoerus larvatus</i>)	Bushbuck (<i>Tragelaphus scriptus</i>)	Grysbok (<i>Raphicerus sharpie</i>)	Common duiker (<i>Moschus grimmia</i>)	Suni (<i>Nesotragus moschatus</i>)
2011*	-	-	-	-	-	-	-	-	-	-
2012	40	418	432	80	17	0	101	0	0	3
2013	20	64	212	116	3	0	17	0	0	0
2014	0	335	321	53	11	0	118	0	0	11
2015	0	104	200	24	1	0	28	0	0	5
2016	0	260	149	59	5	0	140	0	0	12
2017	37	127	89	5	6	0	48	0	0	4
2018	3	172	86	28	10	0	71	0	0	4
2019	45	99	85	23	0	5	40	0	0	5
2020	3	309	125	23	13	8	111	0	0	15

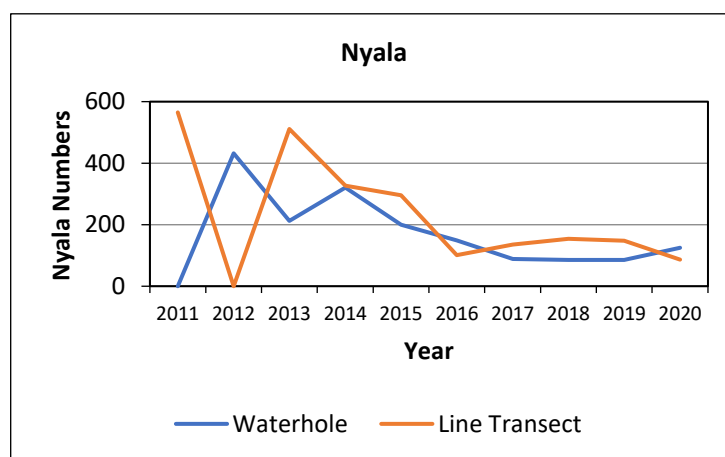
*2011 count ended early due to rain

The tables above show mammals of Lengwe which have been recorded from 2011 to 2020 using transect count method by Lengwe (*Table 5*) and Water hole Count by WESM (*Table 6*). The data shows that the species with high populations are impalas, buffaloes and nyala. In 2020, the transect count data indicates 1,678 buffaloes which could be an over-estimate calculated based on density and extrapolated to the whole park. However, the sightings of 245 buffaloes in a single day still shows the population of buffaloes has increased. Of special interest is the nyala whose population is being observed to increase from 2019 basing on the water hole count while kudu which was missed in 2019 was sighted in 2020 in both counts.

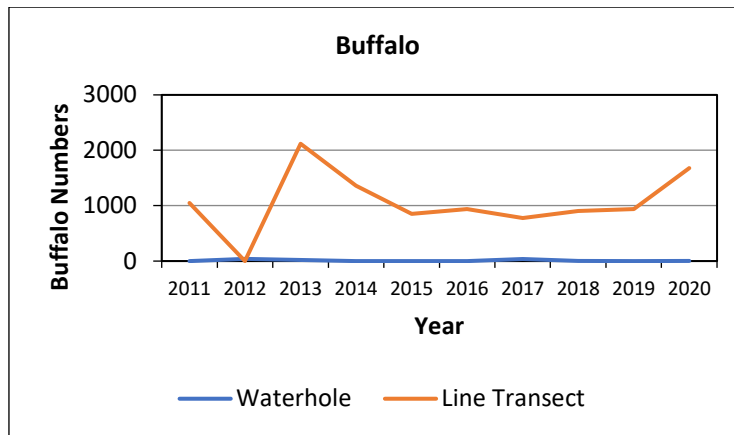
2.3.1.2.1 Trend for three Key Species

The results of the large mammal census show that in the long term the populations of all species in the Park are declining, especially Nyala which is a flagship species. Such a large decline is probably attributed to poaching but it could also be affected by drought and the wider impacts of climate change as these induce changes in habitat and food supply. Sichali and Kamanga (2001) observed that Nyala drinks water more often than other species at Lengwe. If this is the case then the water supply (and the lack of) might also be affecting the population of this species. Similarly, Nyala is a thicket dweller and thus highly susceptible to poaching using wire snares hidden in the thicket.

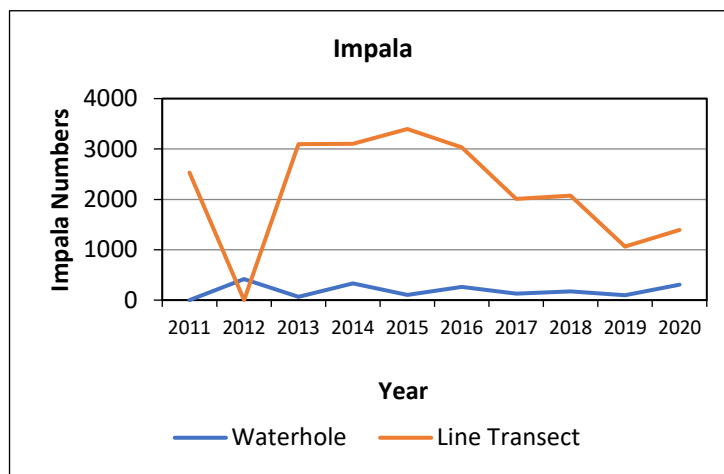
Figure 13 below shows numbers of three key species (nyala, buffalo and impala) counted by using line transect method and waterhole count over a period of ten years (2011-2020). The figure shows that for both methods nyala numbers declined sharply in 2013 and kept that trend up until 2017 when the numbers remained in a somewhat constant trend. For buffalo the trend remains constant for waterhole count method while in the line transect method the numbers are increasing. The Buffalo (*Syncerus caffer*) is a species of particular interest as it is the only representative of the big five that is currently known to occur in Lengwe National Park. There were over 2,500 buffaloes in the year 2000, after which population trends dropped significantly to less than 1000 animals.



(a)



(b)



(c)

Figure 13: Trends of key animal species nyala (a), buffalo (b), and impala (c), in Lengwe National Park

2.3.1.3 Animal mortality (July 2010 to June 2019)

Annual animal mortality in Old Lengwe from 2010 to 2019 shows an overall declining trend (*Table 7*). This table indicates that:

1. 663 animals were recorded dead for a period of 10 years (2010-19) mostly in Old Lengwe.
2. Nyala (305) and impala (148) are the most affected species, most of them died between 2010 and 2016, which might be due to study effort. For Impala, the higher mortality corresponds to its relative high population compared to Nyala.

Table 7: The trend of animal mortality in Lengwe from 2010 to 2019

Species	Year										Total
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Buffalo	10	12	7	13	3	8	6	2	5	12	78
Bushbuck	7	6	4	4	2	2	-	-	2	2	29
Bush pig	3	4	1	19	-	-	-	-	1	1	29
Impala	57	37	37	41	28	59	9	12	6	19	305
Kudu	4	1	-	-	2	1	0	-	-	-	8
Nyala	24	28	31	23	7	12	14	1	6	2	148
Porcupine	-	2	2	1	-	1	-	0	-	-	6
Suni	-	-	3	3	1	-	-	-	-	1	8
Velvet Monkey	3	2		1	0	0	0	1	0	0	7
Warthog	9	8	3	8	3	3	3	-	1	-	38
Total/Year	110	99	89	107	43	86	31	18	20	37	663

2.3.1.3.1 Causes of Mortality

Data covering the period from 2010 to 2019 reveal six major causes of animal mortality in Lengwe. From the data, wire snaring is the leading cause. For this particular period, it accounted for about 50% of all recorded dead animals. Other causes include gin traps, gun shots, killing by spears, pit falls. There have been reports of stray dogs and baboons feeding on the young ones of small antelopes such as nyala, bush buck and impala.

2.3.1.3.1.1 Animal Poaching

Wire snares account for highest number of mortality (375, 54%) of all causes of animal deaths in Old Lengwe mostly targeting impala (182), nyala (82), warthog (26), bush pig (25) and buffalo (24). That wire snares are major causes of death is supported by the WMU Biannual Report (2018) which reported that 6 animals were poached using wire snares and 5 using gin traps between July and December 2018. Wire snare sweeping helps reduce the number of wire snares set in the park. Poaching with guns is the second major cause of mortality mostly targeting buffalo (25), impala (24) and nyala (18). Other methods of poaching include dogs, gin traps, pit traps and spears.

2.3.1.3.1.2 Other Causes of Animal Mortality

There have been incidences of baboons (*Papio ursinus*) feeding on newly born nyala and other smaller antelopes around the main camp and office. These baboons have also been seen feeding on the newly born goats and chicken in the nearby villages (Mphampha village).

Stray dogs have been seen chasing nyala at the administration camp and suspected to be one of the causes of animal mortality (see Figure 14). Stray dogs are shot on sight if found inside the park. They also carry rabies so are a threat to everyone (people and animals). There are also causes of animal mortality such as mud during wet season where weak animals get stuck whose proportion is negligible.



Figure 14: Photos of dead bushbucks suspected to be killed by stray dogs close to the office.

2.3.1.3.1.3 Unknown Causes

Unknown death accounted for 192 animals (28%) which affected Impala (90) and Nyala (31). Below are figures of some dead nyala from unknown causes (Figure 15)



Figure 15: Photos of dead Nyala close to the office: A Male Nyala in July 2017 (a) and a female Nyala in November 2019 (b).

The unknown cause of death for Nyala found dead around the office recently is a concern and raises a lot of questions since this can have negative impact on nyala population in addition to poaching. For instance, five nyala (3 males and 2 females) have been recorded dead around the administration camp

between 2016 and 2019. Furthermore, reports show that culling of nyala that was initiated in 1981 and then for five other years (1983 to 1988) culling at least 2,500 nyala, reduced the population to about 3,400. Since then nyala population has been declining. These unknown deaths therefore require monitoring with better methods to generate data. A veterinary specialist may be required to analyse the dead nyalas to determine actual cause of death.

2.4 Tourism

2.4.1 Tourism Statistics

All visitors going to Lengwe give their particulars at the main gate entrance to the park which are recorded into a visitors' book. The particulars are recorded based on country of origin of the visitor, nationality, resident and non-resident, paying and non-paying.

These data are then extracted and analysed on an annual basis by the Research and Development team at Lengwe National Park. Paying visitors are generally international and national tourists, while non-paying visitors are government employees, educational visitors, Illovo staff, and researchers.

2.4.1.1 Paying Visitor Statistics

A total of 6,385 visited Lengwe from 2010 to 2019 with the average of 639 per year while highest number of 1,017 during 2011/2012 and lowest was 142 during 2019/2020. The number of paying visitors to Lengwe has been going down (Figure 16). In the last three years, the number of visitors declined from 668 to merely 142, the lowest in a period of 10 years (2010/2011-2019/2020) and this could be due to COVID-19 pandemic (See Figure 16). The floods that occurred in 2015 in the Lower Shire Valley made the park receive visitors lower than the previous years. Another hindering factor is the absence of a bridge at Nkombezi Wa Fodya river which is blocking paying visitors from reaching Nyala Lodge. Park visitation by paying customers could be improved only if the bridge could be rebuilt.

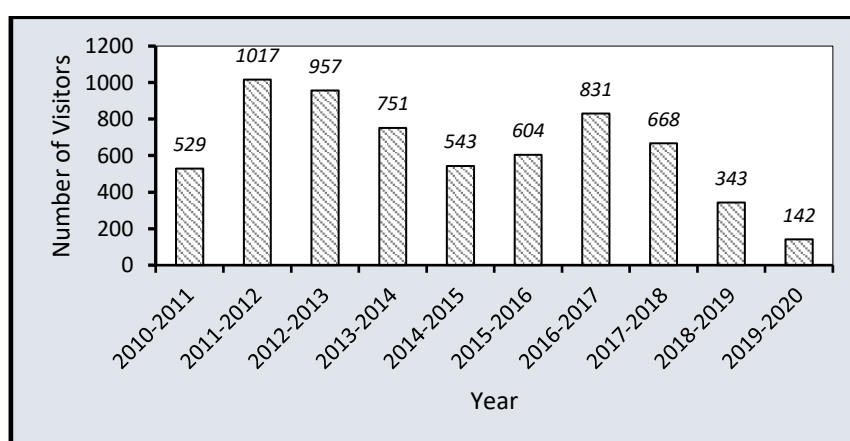


Figure 16: Graph showing summary of total number of paying visitors from 2010/2011 to 2019/2020

Monthly visitation trend in Lengwe National Park is shown in Figure 17. There is a general pattern to the number of visitors to the park which is reflected in the annual weather patterns for this part of

Malawi. During wet season (which starts around November and goes through December, January, February and ends in March or early April) visits to the park are very low mainly because of poor road network. Even the 4X4 vehicles cannot pass through. However, there was a good visitation in the months from April to December because this period is dry season and the accessibility improves with road maintenance in most cases. However, the contributing factors for peak season for visitation may be due to favourable temperatures since Chikwawa has hot weather from August to December. The visitation is also lower before July probably because the park is usually bushy at this time of the year affecting game viewing. Further study on this may be required to establish the actual factors contributing to this scenario.

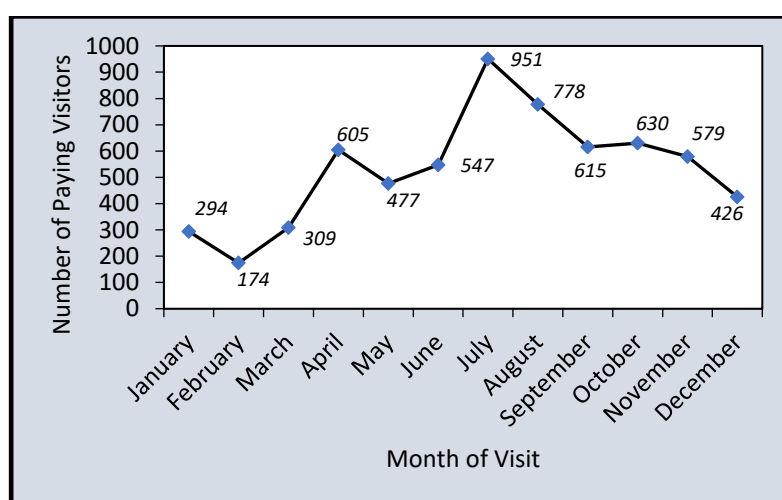


Figure 17: Trends of paying visitors from 2010/2011 to 2019/2020 in months

2.4.1.2 Non-paying visitors

The non-paying category of visitors comprises of visitors from Malawi Government, Illovo Sugar Company, schools and wildlife clubs and researchers. There are 62 wildlife clubs registered with the Wildlife and Environmental Society of Malawi (WESM), and are thus recognised by Lengwe. Wildlife club registration in the park has risen to 80% from 44 clubs in 2015 to 62 by June 2020. The majority of the visitors in this category are those who visit the park on educational purpose.

For a period of ten years (2010/2011 – 2019/2020) the park received 17164 visitors of which 10688 (62%) visited the park for educational purpose. Other visitors (Illovo, Government, and children who accompanied paying parents) ranged from 1233 to 2797 (see Figure 18 below)

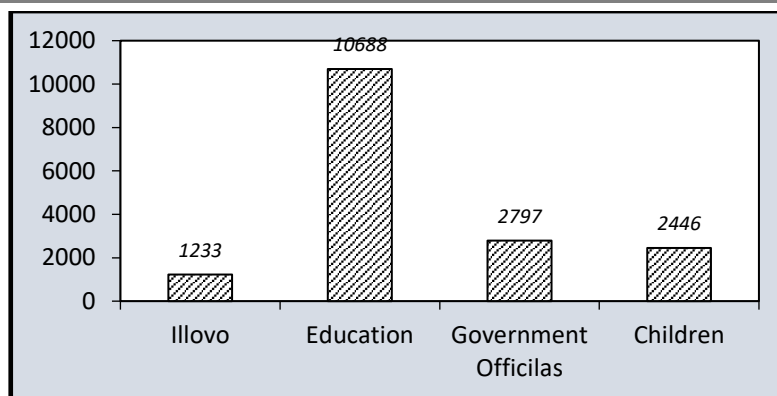


Figure 18: Numbers of non-paying visitors in Lengwe from 2010/2011-2019/2020

A total of 17164 people visited Lengwe between 2010/2011 to 2019/2020 financial years. The highest visitation being in 2018/2019 and lowest in 2019/2020. The Park received most of the visitors in the first half of 2018/2019. The number of visitors dwindled dramatically in 2019/2020 due to COVID-19. The floods that occurred in 2015 made the park receive visitors lower than the previous and the next four years.

2.4.2 Leases

There is currently only one tourism concession for Lengwe NP awarded to JamboAfrica LTD in 2001 to manage and coordinate tourism activities at Nyala Lodge. The initial agreement was for 20 years and extended by 5 years to end in December 2026 in order to give room for Jambo Africa to improve tourism services with the increased investments at the lodge.

Nyala Lodge offers 9 en-suite chalets (family rooms and double rooms) which blend in with the surroundings. All rooms have cold and hot water showers, electricity, mosquito nets and ceiling fan, and two rooms are equipped with air conditioners. The main building consists of a restaurant and bar area with a Khonde overlooking a water hole where animals frequently come to drink. There is a small pool where one can cool down on hot days. Nyala Lodge also has a campsite with ablutions and barbeque facilities and two newly built non-en-suite 2-person chalets.

During SRBMP, Nyala Conference Hall was constructed to improve the park visitation which has been declining (see Section 2.5.1) since government handed over the management of Majete Wildlife Reserve to African Parks in 2003. The installation of the audio-visual equipment and the fittings were completed in November 2020 under SVTP and became fully operational.

Number of visitors to the lodge has been much lower from 2020 due to Covid 19 pandemic that has even affected a number of staff working at the Lodge. Currently, the lodge has 4 staff members when it used to have up to 15 during the past years. The Covid 19, coupled with rainy season worsened by collapsed bridge at Mkombezi river (Section 4.4.3.1) have affected the use of the Conference Centre

since it became operational. Jambo Africa is currently marketing the Conference Centre which requires competitive services and prices to attract organizations to use it.

For further details about Nyala Lodge, including the Conference Centre follow the links below:

<http://www.jambo-africa.com/lengwe.html>

<https://www.malawitourism.com/tours-safaris-activities-operators/jambo-africa/>

2.4.3 Marketing and Publicity

There are a number of references to provide further information about Lengwe and these include:

http://www.malawitourism.com/pages/attractions/the_attraction.asp?AttractionsID=36

<https://destinationmalawi.wordpress.com/category/lengwe-national-park/>

<http://wildlife.gov.mw>

As part of the renewed investments into the park, largely through the SVTP, the park should be advertised and marketed through a variety of different outputs (posters, brochures, websites, mobile phone apps, travel magazines, and popular news articles) that were produced during the SRBMP

2.4.4 Finances

2.4.4.1 Financial Allocations from Government

Lengwe NP is headquarters to the Lower Shire Division (LSD), which is composed of three protected areas (Lengwe National Park, Mwabvi Wildlife Reserve and Michiru Nature Sanctuary) a Problem Animal Control Office at Limbe and two border offices at Chileka and Mwanza. The principal sources of government funding allocated for Lengwe NP are Other Recurrent Transactions (ORT) and the Treasury Fund (TF).

ORT funding is the financial allocation provided by the Treasury on a monthly basis and allocated to Lower Shire Division as a Cost Center. The first priority is payment of Field Allowances for rangers who accumulate 15 nights while working in the field to motivate them. This amount required is at least half of the allocation and the amount. For instance, in 2020/21, Lower Shire was allocated approximately K58m (\$73,000) where by K30m (\$38,000) was for FAs for all stations. This amount had increased by 63 percent from previous year when K36m was allocated to accommodate the upward revision of Field Allowances. Table provides further details about ORT situations.

The balance from the allocation is shared among all the stations for operations except Mwanza Border Office using the agreed proportions. Lengwe gets the largest proportion of 60 percent owing to its largest park and staff size in the Lower Shire but also administrative functions for all other protected areas. Such funds cover the operations (law enforcement, research and extension), minor vehicle maintenance, utility bills and a few other functions (see the table below). The table shows the doubling of ORT funding from 2019/20 to 2020/21 which is an encouraging development and processing of fund at Treasury office has also improved without experiencing rejection of payments to access the funds. However, the funding estimates for 2022 is likely to reduce due to negative impacts on government revenue.

Table 8:ORT funding for Lengwe for 2019/20 and 2020/21 fiscal years

Category	2019/20	2020/21
Field Allowances	7,128,000	12,960,000
Operations	11,956,879	20,236,951
Total Funding (MK)	19,084,879	33,196,951
Total Funding (USD)	24,006.14	41,757.17

Note. The exchange rate used is \$1 to MK795.00

There was an improved allocation in 2020/21 with an increase of 74 percent that has enabled Lengwe to cover the requirements on law enforcement activities at least for Old Lengwe, Problem animal control, outreach programs for selected communities and schools, some research, minor vehicle and

house maintenance. This funding still creates a funding gap in conservation which is worsened by erratic funding that has resulted in:

1. Failure to reach 100 percent annual patrol coverage for Lengwe
2. Failure to attend to all problem animals worsening negative attitude on conservation by communities
3. Failure to properly maintain fencing, buildings and roads
4. Failure to procure office equipment, and field equipment for various uses.
5. Failure to develop the infrastructure such as roads and housing

In an effort to improve the financial sustainability for Lengwe, a business plan was developed in 2017 but has not been implemented. Currently, the major source of funding for Lengwe is SVTP 1 which covers all the crucial areas in developing the park until 2023. These include developing the road infrastructure and building ranger camps in the extension area. However, the funding is not adequate to uplift Lengwe to a self-sustaining status, so DNPW is proposing the involvement of private sector especially for the management of the Extension Area under Public Private Partnership arrangement.

2.4.5 Revenue collection

The revenue generated by the park currently falls into three main categories: that generated at the entrance Gate (in the form of entrance fees); that generated by the tourist concession; and that generated by the sale of game meat from killed problem animals, by game licences as well as sanctuary permits.

2.4.5.1 Gate and Concession Fees

Revenue trends followed the visitor pattern and therefore more revenue is generated in the dry season when the park is accessible. The Park entry fee is categorised as personal entry fees, vehicle entry fees and guide fees (see table below). The revenue generation has been declining due to reduced number of tourists visiting the park. In 2018, K1,197,670 (\$1,507) was collected from 404 visitors which reduced to K1,035,000 in 2019 (see Table 9). The contributing factors have already been highlighted in Section (2.5.1.1). Additionally, DNPW granted a waiver on park entry fees to overnight visitors to Nyala Lodge in April 2020 as way of mitigating impacts of Covid-19 for the survival of the Lodge operations. However, the general downward trend of revenue generation is because of low park attractions to compete with the nearby African Parks' Majete (see also Section 2.5.2). Half of this revenue is allocated for the park management while 25 percent is shared to communities under revenue sharing scheme (see section 4.1).

Table 9: Gate Entry Fees Collection from 2018 to 2020 at Lengwe National Park

Category	2018	2019	2020
Personal Entry Fee	694,465	722,650	358,080
Vehicle Entry Fee	475,405	290,150	171,550
Guide Fee	27,800	22,500	15,000
TOTAL MK	1,197,670	1,035,300	544,630
Totals USD	1,507	1,302	685

2.4.5.2 Game and Meat sales

Game meat sales is mostly from hippos in Shire River whereby communities lodge complaints when their crops are destroyed. Most of these reports are received after the rainy season. For instance, K448,000 was realised from game meat sales on hippos killed in March 2020 from Balaka to Nsanje which is a worrisome development. Another source of revenue from consumptive use of wildlife products is the occasional sale of hippo teeth for export. Even though there is little wildlife remaining outside protected areas, there are a few hunters who still renew their hunting licences for small antelopes and birds at K10,000/year. Lengwe also collects the annual permit fees of K300,000 every year for three sanctuaries at Kaombe and Bereu.

2.5 Administration

2.5.1 Staff Management

There are about 67 officers currently working at Lengwe NP with 48 technical staff members and headed by the Division Manager (DM), who is also Senior Parks and Wildlife Officer (SPWO), who reports to the Director of Parks and Wildlife (DPW). The DM is also responsible for general administration and infrastructure maintenance. The technical sections are headed by Parks Wildlife Officer (PWO) for Wildlife Management and Utilisation Unit who is also the Park Manager and is responsible for law enforcement and problem animal control (PWO-WMU); Parks and Wildlife Officer responsible for Education and Extension (PWO-EE) and Senior Assistant Parks and Wildlife Officers (SAPWO) responsible for Research and Development. Of all the three technical sections, only PWO-EE has Assistant Parks and Wildlife Officers (APWO). WMU has a total of 3 Senior Parks and Wildlife Assistants (SPWAs) responsible for supervising 23 Parks and Wildlife Assistants (PWAs) and 11 fence attendants (FAs) while RD has 1 (SPWA). There are 20 support staff members which include the drivers/mechanics (5) of which 3 are also technical officers, ground labourers (8), security guards (4), a brick layer, carpenter, messenger and accounts assistant.

The number of officers is inadequate, there are a total of 70 vacant posts of which 53 are technical positions based on the staff establishment. Furthermore, all staff members are located at the park's headquarters except 5 at Jasi Camp and 3 extension officers following the close down of all remote camps. Initially, it was hoped there was always going to be transportation to take patrol teams to and from the patrolling areas of the park. When the project phased out the park failed to sustain transportation of patrollers on a regular basis due to fuel problems and poor access roads. This has resulted in poor park management resulting in further poaching and encroachment, as reaching the remote places of the park has been almost impossible. There is need to re-establish remote ranger

camp located in the peripherals of the park to enable the park staff to prevent illegal activities and to engage with the local communities.

2.5.2 Maintenance of Infrastructure and Equipment

In 2014 the park staff received a significant amount of office equipment in the form of desktop and laptop computers, scanners, printers, photocopiers. Most of the desktops have been malfunctioning frequently and getting costly to maintain. One laptop has also started giving problems and the other with battery not functioning. In 2020, SVTP provided 3 desktop computers and 1 laptop that has improved the situation. However, one photocopier is malfunctioning and services of repair are not readily available.

Currently, the park has a plumber, a carpenter and a brick layer that are involved in the maintenance of office buildings and staff houses. These workers are also responsible for other stations within the southern division. However, due to inadequate funds maintenance of infrastructure is slow and only covers basic needs. In terms of vehicles, the park has a mechanic who is supervised by the mechanical supervisor based in Blantyre. Due to lack of spare parts vehicle maintenance is difficult. There is no electrician employed to fix electrical faults.

2.5.3 Financial Management

DNPW has only an accounts assistant who collects and banks revenue, delivers payment vouchers for ORT processing at Treasury Cashier, while the processing of funds from revenue collection is done at DNPW. There is need to have an Accounts Officer who can process payments.

2.5.4 Reports

The annual reports are produced by the senior park officers detailing the results of the main sections within the park management structure. These are:

1. Wildlife Management and Utilisation. The section conducts a number of activities such as Law enforcement, Fence Maintenance, Problem Animal Control, Tourism Management and general infrastructure management. This report presents the basic facts and figures as a result of the law enforcement patrols;
2. Research and Monitoring. Animal encounter statistics and population dynamics;
3. Tourism Statistics. This report includes Gate fees, Concession agreements, and Revenue sharing;
4. Education and Extension. This report details the progress in working with the CBOs, establishing Zone Committees and Wildlife Associations, undertaking IGA surveys, and community investments.

Future reporting needs to be directed towards analysing whether the strategic objectives of the park plan are being met.

2.6 Five-Year and Annual Work Plan

A Five-year work-plan is presented in section 6 of this management plan. From the five-year plan, annual work plans will be produced at the end of every fiscal year (June / July) in preparation for the following year. These cover all aspects of park management and detail activities to be undertaken within the various sections together with associated budgets and costs.

2.6.1 Strengths, Weaknesses, Opportunities and Threat (SWOT) Analysis

A SWOT analysis evaluates the internal strengths and weaknesses, and the external opportunities and threats in an organization's environment (Sammut-Bonnici and Galea, 2017). On one hand, the internal analysis is used to identify resources, capabilities, core competencies, and competitive advantages inherent to the organization. On the other hand, the external analysis identifies market opportunities and threats by looking at competitors' resources, the industry environment, and the general environment. The objective of a SWOT analysis is to use the knowledge an organization has about its internal and external environments and to formulate its strategy accordingly.

For this management plan, SWOT analysis presented in the 2015 management plan was reviewed and was found to be generally the same. The analysis only required some updates and incorporation of issues from the extension area. Table 10 below presents results of a SWOT analysis for the park.

Table 10: SWOT Analysis / Situational Analysis for Lengwe

Strengths	Weaknesses	Opportunities	Threats
Unique natural Habitat and terrain (e.g. Thickets, rock outcrops in the extension area)	Low animal numbers and diversity (refer to section 2.3.1.2)	Development Partners and NGO support-e.g. Wildlife and Environmental Society of Malawi (WESM) which sponsors annual animal water hole counts in the park	Habitat loss and degradation due to charcoal production, illegal logging, timber sawing and encroachment
Strong legislation to combat wildlife crime. For example, the 2018 National Parks and Wildlife Act has stiffer and more deterrent penalties than the earlier act)	Unclear boundaries in the extension area (New Lengwe) since there is no fence line. Communities take advantage of this-	Inter-agency collaboration to combat wildlife trade (Police, Immigration, Malawi Defense Forces Judiciary). This is due to massive awareness training done by DNPW to various law enforcement agents on the value of wildlife	Land promises to communities particularly during campaign at political podiums to garner support and win votes
Well established community structures including Lengwe Wildlife Association, Zone Committees and Area Development Committees (See section 2.2.2 for more details)	Inadequate community participation and servicing. Surrounding communities are generally negative towards Lengwe since the park does not provide adequate benefits like Majete. Funding constraints have led to weak support by DNPW to community members	Community engagement in conservation of Lengwe National Park through Lengwe Wildlife Association, Zone Committees and Area Development Committees (See section 2.2.2. for more details)	Increasing human population around the park, leading to increased demand for land natural resources (see section 1.9.3 for further details)
Presence of Nyala Lodge and conference center which provide accommodation and conference	Inadequate Road network in the New Lengwe and poor accessibility during rainy season	Involvement of Private sector in conservation of the park	Presence of illegal access roads

room for meetings and workshops, respectively			
	Inadequate financial resources, field vehicles and equipment for protected area management		Cross border trafficking of logs planks and animal species such as pangolins
	Subsistence and commercial poaching		Climate change which leads to loss of habitat. For example, extreme temperature and heat have contributed to drying of perennial rivers in the park
	Poor housing in Old Lengwe and inadequate ranger camps in the extension area		Increasing corruption levels for wildlife species, Corruption may have resulted in reduced park management funding levels
	Poor tourist facilities in the extension area		Existence of ready markets for wildlife species in both Malawi and neighboring Mozambique
	Lack of water supply for wildlife in the extension area		
	Inadequate training (skills and knowledge)		
	Weak monitoring system for effective protected area management		

2.6.2 Problem Analysis

Problem analysis identifies the overriding problem and establishes the causes and effects related to that problem. An important aspect of problem analysis is to ensure that “root causes,” and not just symptoms of the problem, are identified and subsequently addressed in the project design. For Lengwe National Park, several problems and their underlying causes were identified (Figure 19)

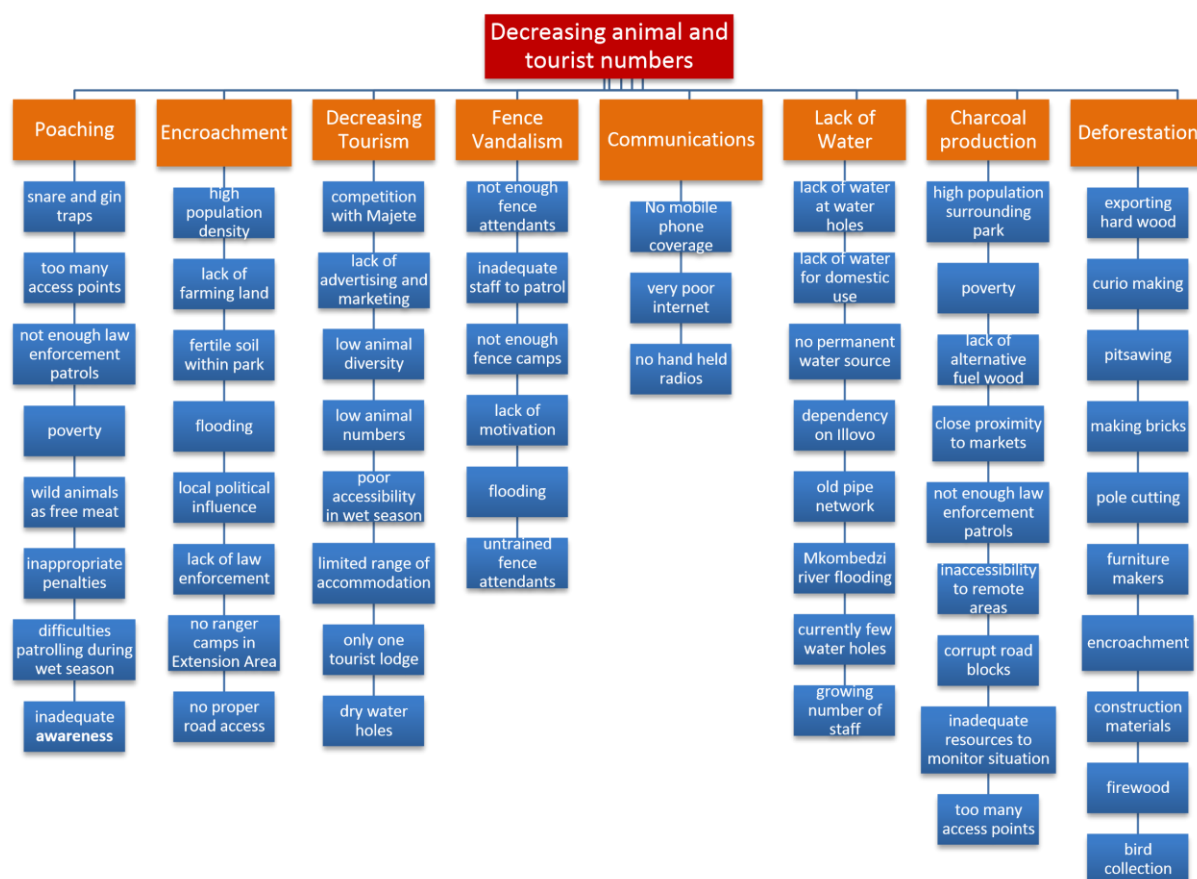


Figure 19: Results of the Problem Analysis conducted with senior staff at Lengwe NP.

Further details about problems and their root causes facing Lengwe National Park are presented below:

2.6.3 Deforestation and illegal charcoal making

Large areas of the park are experiencing the illegal and unsustainable pressure of deforestation for charcoal making. These activities are mainly confined to areas of the park where the DNPW law enforcement teams are not able to patrol due to inaccessibility and a lack of resources. The incidences of tree cutting have greatly reduced in Old Lengwe for the past decade based on patrol data. In 2011, 639 tree cutting incidences were recorded and 534 in 2012 while 31 were cut in 2018 and 33 in 2019. This might be the results of recent efforts to strengthen law enforcement efforts. Currently, tree cutting for charcoal production, poles, timber sawing etc is still high in Extension Area due to poor

road network and low presence of rangers. In 2011, 405 tree cutting incidences were recorded and 1099 in 2012 while 27 were cut in 2018 and 103 in 2019. 15 charcoal kilns were recorded in 2011 and 36 in 2012 while 21 were recorded in 2018 and 90 in 2019. Even though there is an improvement currently in road network and patrols these are not adequate to prevent the charcoal production because of increasing demand for charcoal and its high price especially mopane charcoal. Charcoal trafficking has become more organized and even containers mostly on Chapananga road (*Figure 20*). Furthermore, the large number of cut trees in extension area is also increased by encroachment especially cultivation.



Figure 20: Two containers impounded for illegal trafficking of charcoal (above) and a lorry for trafficking planks (below).

2.6.4 Poaching

The incidence of poaching generally falls into two main categories: through the use of traps such as wire snares and gin traps; and through the use of firearms which often take the form of homemade ‘muzzle loaders’. As with many sites in Malawi the use of wire snares and gin traps is particularly high in protected areas. Snares are often made from the surrounding perimeter fence and gin traps from bent over vehicle leaf springs. Both are very significant threats to the wildlife at Lengwe NP and resulted in over 86 casualties in year 2012/2013 (see section on Law Enforcement). The wire snaring had been increasing from 2010 to 2012 which coincided with the period of first fence construction in 2010 (Figure 21). There are also some wire snares are made of winch wire which is freely available

on the Illovo Nchalo sugar estate. Even though setting of wire snares had begun declining from 2012, the incidences were still high risking high poaching. The records indicate that fence vandalism was high in 2015 where a culprit was arrested and alleged that he was conniving with a Fence Attendant. The wire snaring is seen to decrease by 2018 and increased in 2019.

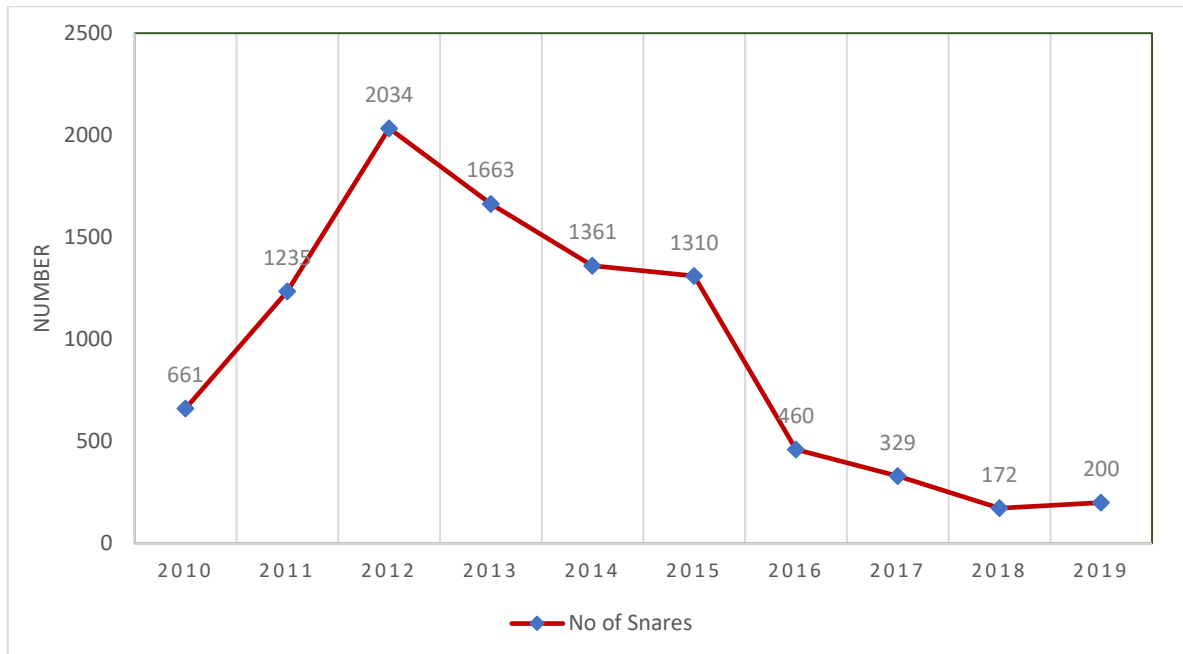


Figure 21: Trend of wire snares removed within Lengwe NP between 2010 and 2019.

Gin traps are also made locally and are very effective – it is an example of a platform trap. They are buried below the ground and the unsuspecting animals' step on the trap thus releasing the closing mechanism trapping the animal by the foot. Even though gin traps incidences seem relatively low, the highest number of gin traps in the park was 46 in 2015 (*Figure 22*). Even though gun shots have remained low this continues to be a threat. WMU Annual Report (2016) indicate that 12 muzzle loaders were confiscated between January and March 2016 reflecting intensified law enforcement. These efforts have not reduced poaching by muzzle loaders suggesting that they are still being manufactured.

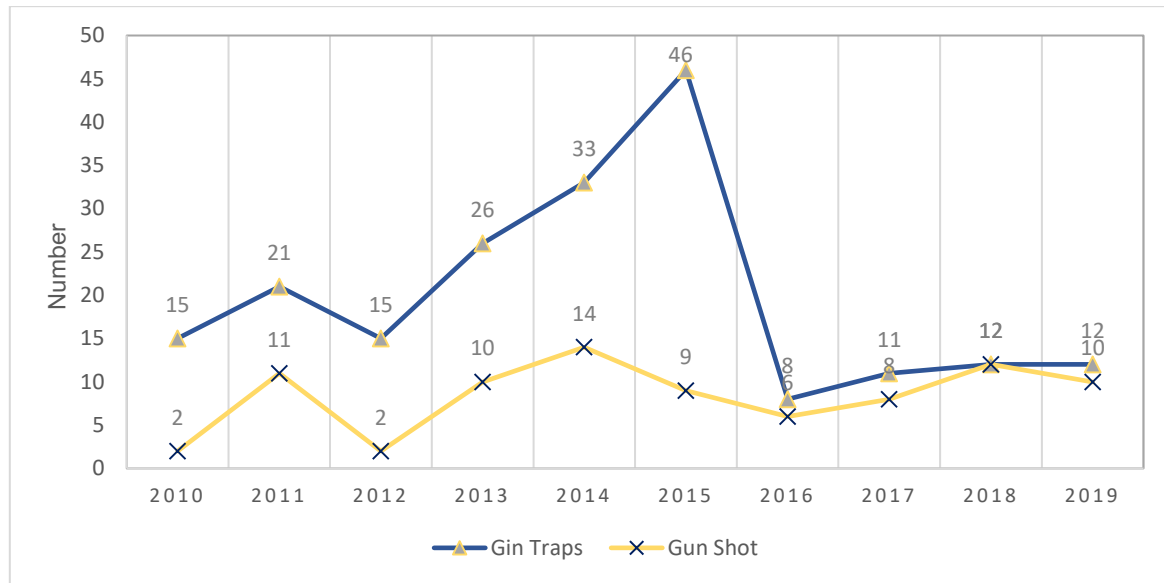


Figure 22: Trend of gin traps and gun shots from 2010 to 2019 for Lengwe.

2.6.5 Encroachment

There is significant encroachment currently occurring within Lengwe NP. It is largely confined to the Extension Area, although the exact size of the encroachment is not known and needs to be assessed using satellite imagery and a ground truthing exercise. It is known that such encroachment has been evident over a number of years and is not a new development.

Areas of encroachment can be clearly seen on the satellite maps (Figure 23 and 24) in the areas highlighted in red. Prior to the inclusion of the Extension Area as part of Lengwe NP there were a number of villages already established in this area, which were subsequently relocated outside the protected area when the area was gazetted as a NP. However, many people from these villages continued to farm on this land which has resulted in a lot of the encroachment we see today.

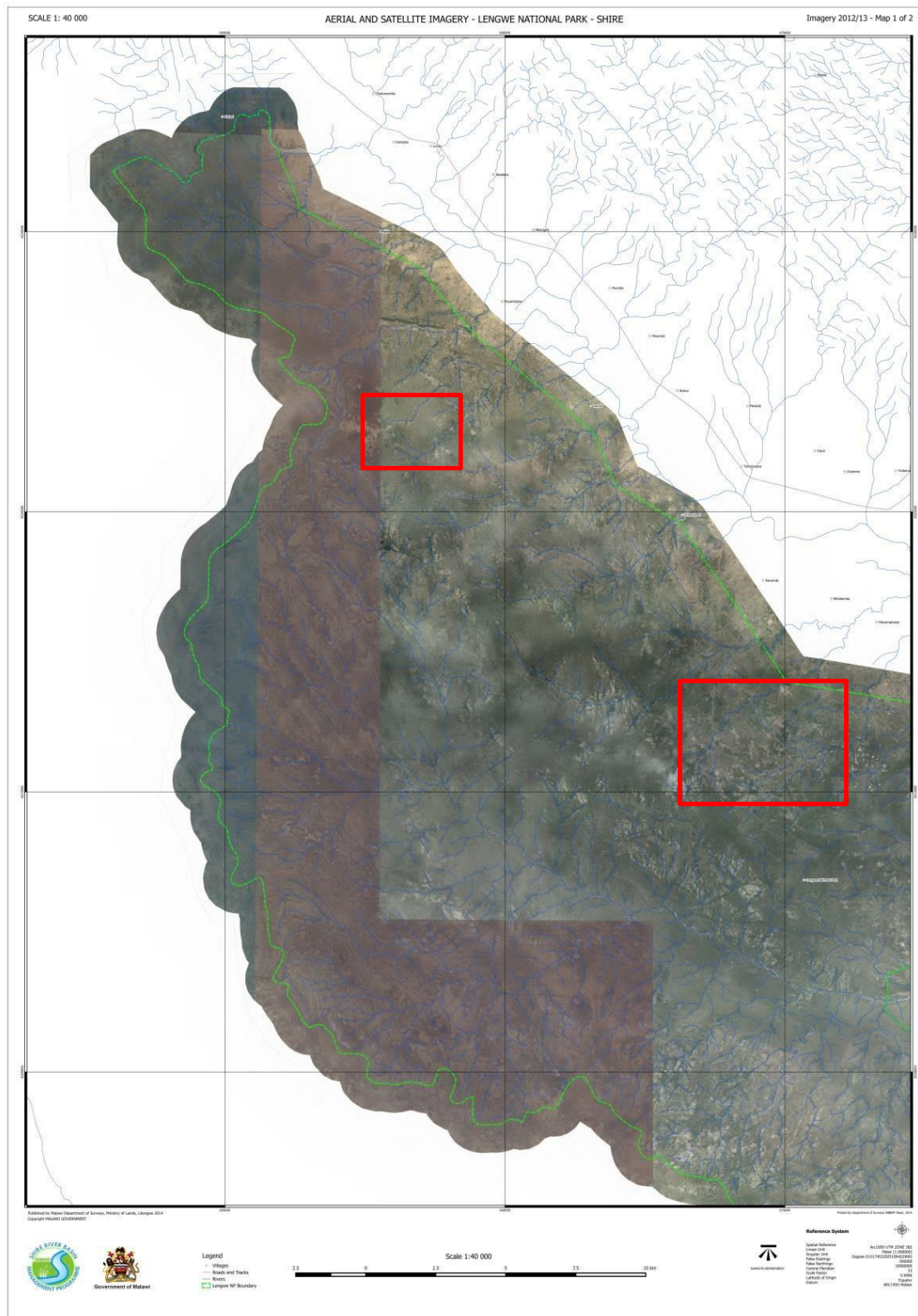


Figure 23: Satellite map of the Central and Western portion of the Extension Area showing significant areas of encroachment.

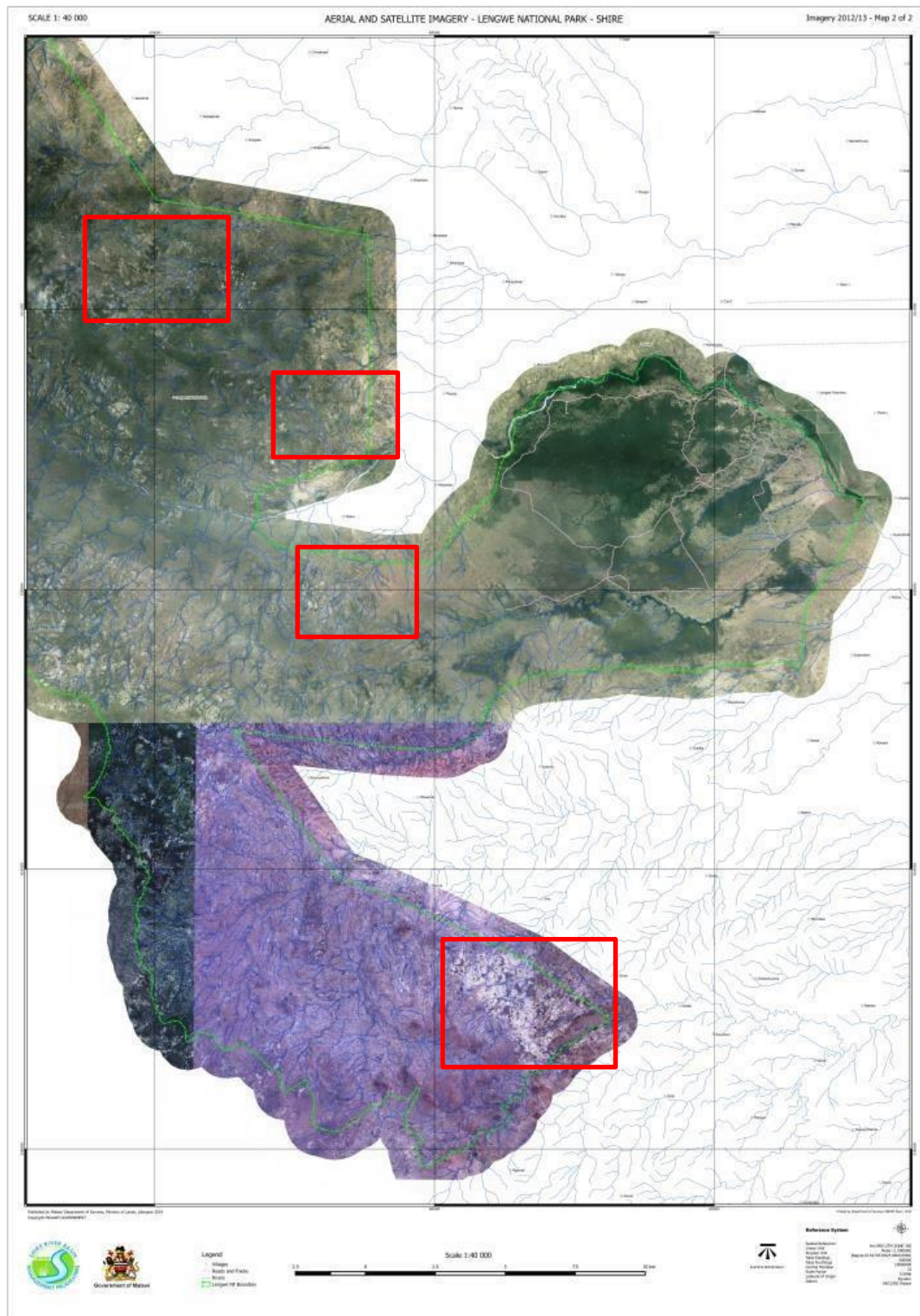


Figure 24: Map showing the eastern half of the Extension area and Old Lengwe depicting areas of significant encroachment within the park (red squares).

3 Section 3: Management objectives & strategies

This section outlines the current government objectives, policy, and legislation in terms of managing National Parks within Malawi, and thereafter identifies the management objectives for Lengwe NP. The section also outlines what is working well and what is wrong with Lengwe NP. Strengths Weaknesses and overall Problems introduced in section 2 are described in more detail. Strategies are also suggested to tackle these park management constraints. Detailed practical steps to resolve these issues will be presented in section 4 (Implementation).

3.1 Management objectives

Vision

To make Lengwe a national park where wildlife is protected and well managed with full participation of all stake- holders for the social and economic development of the communities and the whole country.

Mission

Protecting wildlife through improved law enforcement, monitoring (research) and community engagement, in order to reduce illegal activities and attract more tourists.

3.1.1 DNPW Policy Direction

The National Wildlife Policy (2018) of the Department of National Parks and Wildlife has the following broad policy directions:

3.1.2 Policy Goal

To conserve and manage Malawi's wildlife resources for sustainable development of the country.

3.1.3 Policy Outcomes

1. Improved conservation and management of Malawi's wildlife resources.
2. Improved private sector investment in wildlife conservation and management
3. Increased stakeholder participation in collaborative management of wildlife resources.
4. Mainstreamed climate change, gender, HIV and AIDS in wildlife programs and policies.

3.1.4 Policy Objectives

- To reduce illegal wildlife use.
- To reduce Human Wildlife conflict.

- To raise awareness and enhance stakeholder participation in wildlife conservation and management.
- To improve and develop protected area infrastructure.
- To promote private sector and community involvement in wildlife conservation and management
- To promote wildlife research and monitoring.
- To minimize effects of climate change on wildlife and PA boundary communities.
- To mainstream gender and HIV/AIDS in wildlife conservation and management.

3.1.5 Strategic Management Objectives for Lengwe National Park

The overall strategic objective for Lengwe National Park is to restore, conserve and manage wildlife for the benefit of the present and future generations.

3.1.5.1 Sub Objectives

- To adequately monitor wildlife resource for efficient monitoring of the PA
- Improve Park management & eco-tourism infrastructure
- To develop sustainable finance mechanism for efficient management of the park
- Reduce illegal wild life use through increased law enforcement
- To Improve community engagement, participation and provision of sustainable IGAs and conservation-based investment

3.1.6 Park zonation

Lengwe National Park has two zones. The first is the delineation of compartments for ecological management based on the landscape classification and the second is the designation of zones for public use and development. These zones are presented in Figure 25 and described in sub-sections 3.1.7 and 3.3.

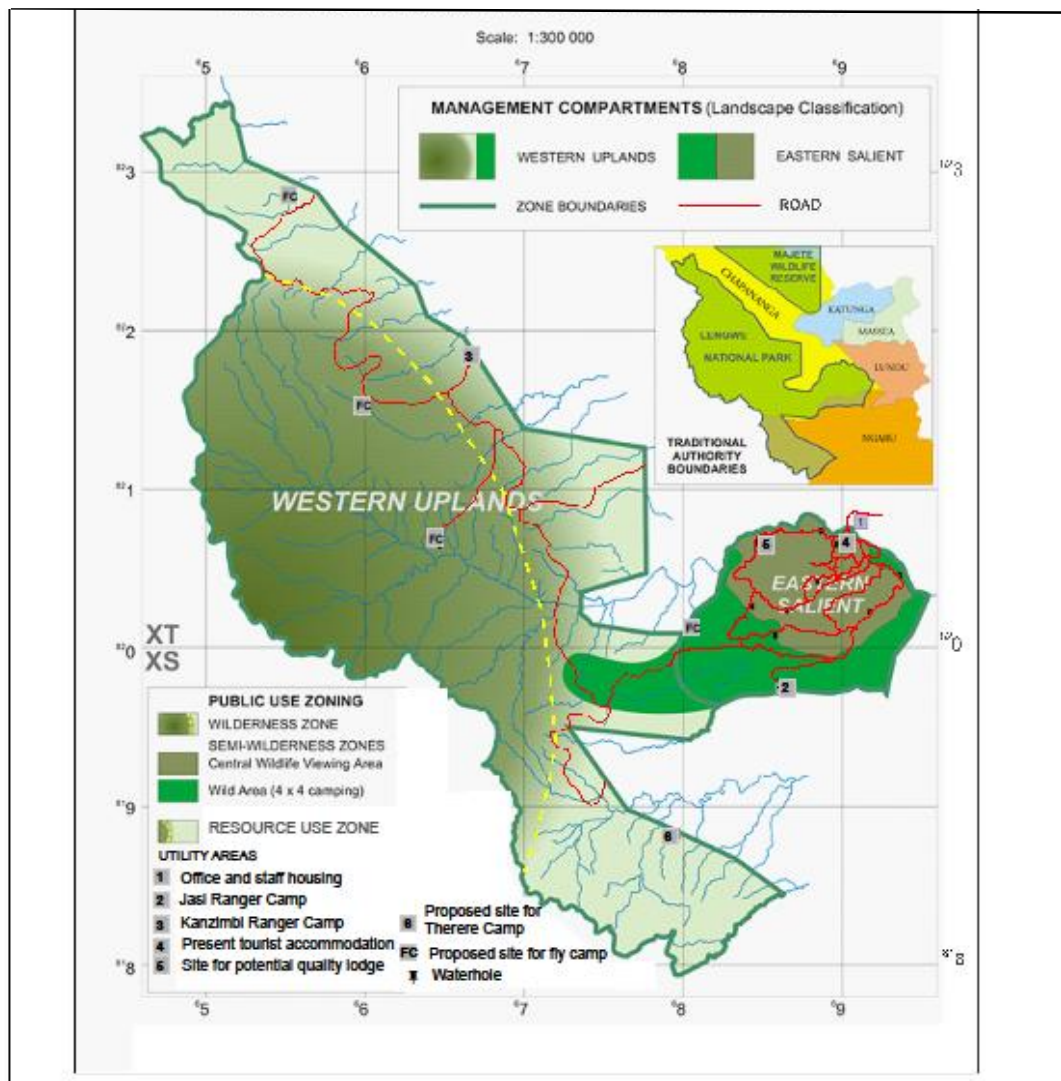


Figure 25: Broad ecological management zones for Lengwe NP

3.1.7 Ecological Management Compartments

Clarke (1983d) established two units (Western Uplands and Eastern Salient) and these should continue to be the main subdivisions of the park.

3.1.8 The Western Uplands

Western Uplands, also known as 'Extension Area' (783 km²) includes the entire western area of Lengwe National Park above 160 meters (525 feet) in altitude. It consists mainly of Miombo and mixed woodlands but also includes important patches of thicket forest and savanna as already discussed in section **Error! Reference source not found.** The separation of the Miombo woodlands from the medium-short open woodlands occurs more or less along the 260 meters (800 feet) contour.

3.1.9 The Eastern Salient

Known as 'Old Lengwe' has the area of 104 km² which contains a substantial area of unique lowland thicket forest and various savanna and dambo habitats as already explained in section 1.8.1.

3.2 Specific Objectives individual Management Compartments

3.2.1 The Uplands Unit

Clarke (1983d) gives fairly detailed technical specifications for the conditions under which the Upland Unit (plateau) woodlands should be maintained. In practice, it has proved impossible to carry out the monitoring associated with achieving these objectives and it may be best to focus on objectives aimed at conserving the water catchments – particularly that of the Nkombedzi wa Fodya River. Clarke also specified that the objective for the large herbivores should be to achieve populations at about 80% of carrying capacity – which has almost certainly not been achieved.

Since it is challenging to meet objectives set by Clarke (1983d), the objectives are revised as follows:

1. Maintain the two main woodland types of the Uplands Unit and all riverine fringes for maximum canopy tree cover and soil protection;
2. Show positive growth rates for large mammal populations of the Uplands Unit;
3. Reduce or eliminate illegal settlement and cultivation in the Uplands Unit

3.2.2 The Eastern Salient

At the time Clarke (1983) specified the conditions in which the habitats of the Eastern Salient should be maintained, there was concern that an overpopulation of nyala antelope was causing the opening up of the forest and thicket communities. Since then the nyala have declined to less than 10% of their former numbers. Of considerable interest is the increase taking place in the impala population (whose numbers were very low in the early 1980s). Whether there is competition taking place between the nyala and impala which could be contributing to the nyala decline is a matter for experimental research. The importance of the nyala population both from a conservation perspective and as a tourism attraction remains a priority and the objectives should focus for the time being solely on achieving an increase in their present numbers. Clearly this will also have implications for maintaining the nyala habitats.

3.2.3 The objectives for the Eastern Salient are –

1. Effectively manage the forest and thicket vegetation communities to restore them to the conditions which pertained in the early 1980s;
2. Effectively manage the nyala population to achieve a marked positive population growth rate;
3. Monitor and conduct experimental research to establish whether there is any causality between the impala increase and nyala decline.

4. Monitor numbers in the other large mammal populations of the Eastern Salient present results at the time of the mandatory review of the present park plan.

Since both management compartments are presently severely affected by illegal hunting (DNPW 2000), it is essential that an overall objective for management is to reduce illegal hunting to the level at which all large mammal species populations can achieve increase rates close to their maximum.

The management, education and extension and research procedures to achieve these objectives are detailed in section 4 of this management plan.

3.3 Public Use and Development Zones

DNPW (1998) specifies five categories of zones to cover uses of parks and wildlife areas and these are fundamentally the same as those proposed by Clarke (1983). The definitions and constraints attached to each type of zone are outlined below and the recommended zones are shown in Figure 25: Broad ecological management zones for Lengwe NP. The zoning process is consistent with the tourism development potential identified in Annex 6.

3.3.1 Special Areas

These are relatively small sites designated to protect unique, unusual or otherwise important biotic, abiotic or cultural features. At present, special areas are not yet designated in Lengwe National Park.

3.3.2 Wilderness Areas

These are relatively large tracts of undisturbed land intended for aesthetic recreational experience and conservation of biological diversity, which may also be valuable for scientific benchmarks. The major part of the Western Uplands Unit should be designated as a Wilderness Area (Figure 25) other than the small 'neck' of savanna and mixed woodland connecting the Uplands Unit to the Eastern Salient. Much of the vegetation destruction is in the periphery of the park, leaving the interior almost intact.

The boundary of this wilderness area should be finalized in conjunction with the process of designating the boundaries of peripheral community resource use zones in the Uplands Unit. (see subsection 3.3.6)

Clarke (1983) proposed that a large part of the Uplands Unit should be a Wilderness Zone and this plan suggests that, with the important watershed conservation objective and the difficulties and dangers of making roads in the area, the entire area be designated as such. Two tracks, useable by vehicles for management purposes, are proposed within the zone.

However, for management purposes, one major road should be made along the entire length of the area – i.e. from where The Western Uplands meet with The Eastern Salient with feeder roads entering at Kanzimbi and Mandlade villages (see Figure 3).

The only permitted development within the zone would be the construction of ranger camps and fly camps for patrolling purposes (Utility Areas 3, 6 and FC on Figure 25). It is considered unnecessary to specify any formal wilderness trails as, in the early stages of development, these would be likely to follow existing footpaths. Tour operators or tourists intending to make visits longer than two days may be permitted to use the proposed management tracks to enter the area and establish base camps but all travel within the Wilderness Zone would be on foot

3.3.3 Semi-Wilderness Areas

These are tracts of relatively undisturbed but accessible land designated primarily for public use but also available for scientific study. The entire Eastern Salient and the part of the Western Uplands Unit connecting to the Eastern Salient are designated as a Semi-Wilderness Area. Within this Semi-Wilderness Area, two sub-zones are identified:

3.3.4 The Central Wild Area

This is the main part of 'Old Lengwe' containing the present internal road network and used primarily for wildlife viewing from vehicles and hides. The boundary chosen on Figure 25 coincides with the outer perimeter of the road network and includes the entire area of thicket-forest vegetation.

Permitted development in this area includes roads, trails, hides, picnic sites and firebreaks. Access is by vehicle or on foot and vehicles may not leave the existing roads. The present game scouts' base camps within the zone would be removed.

3.3.5 The Outer Wild Area

This is the remainder of the Semi-Wilderness Area and it consists of the area surrounding the Central Wild Area extending as far as the Western Uplands Wilderness Zone. It has been designated as an area for exclusive self-catering camps which will be used primarily by the four-wheel drive wildlife and outdoor enthusiasts.

In the early stages while the number of visitors to the park is low, parties of campers could be allowed a high degree of freedom in their choice of places to camp in the designated zone. The conditions which such tourists would be required to meet would be – (a) all camps would be out of sight of any roads; (b) there would be no more than three vehicles at any camp; (c) all litter would be removed from the park; (d) tourists would transport their own water to the camp; and (e) all toilet paper would be burnt and human faeces buried. As the number of visitors choosing this type of experience builds up, it would be necessary to direct visitors to particular areas to maintain the exclusivity of camps.

Campers would be allowed to walk within a radius of about one kilometer of their camp sites and further afield under the escort of a guide.

3.3.6 Resource Use Zones

These are areas where controlled consumptive use of wild resources is permitted. A peripheral resource use zone around the central wilderness area is recommended. The use of the phrase “Buffer Zone” is not recommended in this park plan because the term has a defined connotation relating to land use categories in Malawi outside of this park planning exercise. For this reason, the preferred term is “Resource Use Zone”.

DNPW is facilitating a resource mapping and resource use program in which resource utilization laws and guidelines should be adhered to by the communities bordering the park for controlled use of selected wild resources. Local communities should be allowed to harvest/collect resources within a distance of five kilometers from the park’s boundary. So far 60% of the resource use zones have been mapped. However, this process is likely to result in:

1. the delineation of an overall peripheral resource use zone around the Western Uplands Management Unit, the extent of which will be balanced with the requirement for a substantial central Wilderness Area and which will effectively decide the boundary of the Wilderness Area (Figure 25);
2. the designation of a number of subdivisions within the resource use zone, each closely linked to an individual village or group of villages;
3. the allocation of use rights and responsibilities within these ‘sub-zones’ being based on the original landholding of traditional authorities within the gazetted park area (see inset on Figure 25).
4. the restriction of all consumptive use within the park to this resource use zone; and
5. the benefits of the resource use zone will lie strictly in the consumptive use of particular plant and animal resources and will not, at this stage, pertain to the sharing of income from tourism use.

Munthali (2000) points out the difficult, if not impossible, task of maintaining a sustained yield of wild products from the park in the face of the high human population densities around the park and the expectations and needs of local people. He points out that there are no buffer zones around the park and that all demands for resources will have to be met within the park. This recommendation effectively creates a ‘buffer zone’ within the park which will simultaneously satisfy local communities’ tenure requirements under the co-management system and provide the needed incentives for sustainable use.

3.4 Utility Areas

These are sites for management and visitor purposes where substantial infrastructure may be located. Four main categories of such areas are envisaged for Lengwe National Park (Figure 25).

3.4.1 Office and Staff Housing

Because of the present periodic flooding of the offices and staff houses by the Nkombedzi wa Fodya River it is recommended that the entire complex is removed to a site on higher ground immediately outside the park entrance.²

3.4.2 Present Tourist Accommodation

The existing tourist camp located near the entrance gate has not yet been flooded to the extent of the offices and housing complex. It is recommended that it remain at the present site and be refurbished.

3.4.3 Development Site for a ‘High-End’ Tourism Lodge

A potential site is identified in the vicinity of North Thicket hide. However, this is not a rigid prescription and the site could be anywhere within the Central Wild Area subject to the advice of senior staff and the approval of the Director. It is envisaged that this lodge might be based on the ‘Tree-Tops’ design (i.e. raised from the ground on poles) with accommodation limited to about 16-20 beds. However, it is recommended that the design should be subject to concept proposals from the private sector followed by formal tender.

3.4.4 Public Private Partnership Protected Area Management Investment Model for Extension Area

In order to secure the long-term viability and financial sustainability of the protected area, there is need to engage and involve the private sector in wildlife conservation and management. The Policy and legal framework provide an enabling environment for the involvement of the private sector and other stakeholders in the conservation and management of wildlife. Protected area management requires a significant cost in terms of infrastructure development and maintenance for protected area management and ecotourism to improve service delivery, law enforcement including anti-poaching, human-wildlife conflicts, surrounding communities’ collaborative management as well as research and monitoring programs.

The sustainable financing study for Lengwe National Park (Munthali, 2017) highlights key issues to ensure effective biodiversity management, and sustenance of the ecosystems’ services for the benefit of biodiversity. The study documented the funding status of the target protected areas in terms of investments, management constraints and opportunities for funding and recommended the strategies and best practice for bridging the financial gaps for effective protected areas management; and developed the business plans as the basis for identifying sources of funding to mitigate threats to the protected areas’ biodiversity assets, and meet the overall objectives of the target protected areas.

Generally, the annual Government budgetary allocations are far below the expected thresholds (See section 2.4.4.1). For Lengwe National Park, it is estimated at US\$6,122 which translates into about US\$7/km²/annum. Similarly, also the revenue generating capacity is very low and an estimated at

US\$10,576 is generated per annum. These earnings are much lower when compared to Majete Wildlife Reserve in the same landscape which earns from ecotourism about US\$600,978/year.

The DNPW has developed a protected area management and eco-tourism investment strategy for Malawi to guide and direct the strategic vision for the next five years in promoting investments that will enhance management of protected areas and wildlife conservation for effective protected area management and ensure financial sustainability through improved revenue generation. For the Extension area of Lengwe National Park, there is a plan to enter into a Public-Private Partnership protected area management investment concession delegated model. The Government and the non-profit company or foundation will create a special purpose vehicle (SPV) to develop and manage the conservation area.

3.4.5 Ranger Camps

It is recommended that two permanent ranger camps and three satellite camps be constructed in the Western Uplands management compartment at strategic locations that would enable maximum patrol area coverage. Possible sites for these camps are shown in Figure 25. The final selection of these sites should be decided by the presence of perennial surface water as it is not envisaged that any domestic water supplies would be developed.

3.4.6 Management strategies

As a result of the SWOT and Problem Analysis (see sections 2.6.1 and 2.6.2) it was possible to address the causal factors of the current management deficiencies at Lengwe NP and start to formulate possible management strategies to address these factors (Figure 26). As with the SWOT analysis, some of these are internal and within the control of DNPW staff and some are external factors such as police and judiciary support.

The main problem analysis issues are those identified in the SWOT analysis. These were Poaching, Encroachment, Decreasing Tourism, Fence Vandalism, Communications, Lack of Water, Charcoal Production, and Deforestation. Most of these are linked in one way or another, and by addressing some common themes, they can resolve several problems that are preventing an improvement in the management of Lengwe NP. Some of these will be addressed in detail in the following section (Implementation and Developments), however some of the common themes include:

1. more resources for law enforcement patrols (equipment & staff)
2. invest in infrastructure development (infrastructure & tourism)
3. all-weather roads (infrastructure)
4. more ranger camps (infrastructure)
5. water hole rehabilitation (infrastructure)
6. improved fence maintenance (staff)
7. judiciary support

8. smart marketing (tourism)
9. building check dams to prevent flooding (infrastructure)
10. install communications (radios, mobile phone mast, internet) (infrastructure)
11. invest in sustainable livelihoods for the local communities (communities)
12. install alternative technology for local communities (communities)
13. translocate new wildlife into Lengwe' NP for visitor attraction (tourism)
14. environmental education (staff)

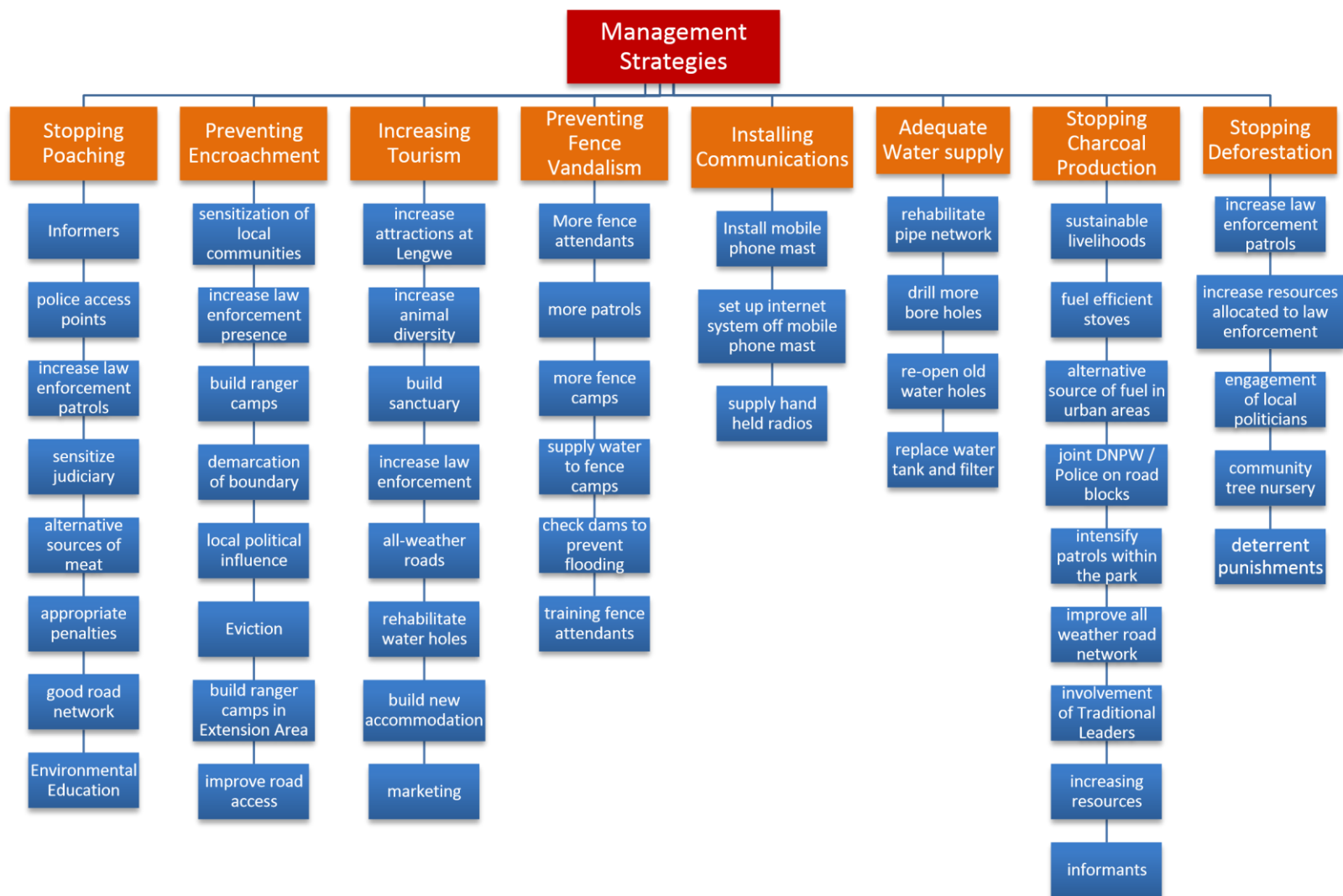


Figure 26: Results for the management strategies formulated as a result of the problem analysis

4 Section 4: Implementation and Developments

This section presents the planned activities within Lengwe NP over the next five years in accordance with the management strategies identified in the previous section. The section is divided into the main focal areas according to the vision of DNPW in rejuvenating Lengwe NP over the next few years.

The investments into the surrounding communities are crucial if incidences of poaching, deforestation, charcoal production, fence vandalism, and encroachment are to be addressed. The long-term success of Lengwe NP will be greatly affected by the relationship between the park and the surrounding communities, and it is important that these local communities feel they are benefiting from living adjacent to a park which safeguards its wildlife and attracts visitors.

There are several major infrastructure developments planned for Lengwe NP. These will focus on the construction of new scout camps (which will increase the efficiency of law enforcement operations), new tourist accommodation to offer a greater range of facilities and the renovation at the main entrance including the Tisunge Heritage Centre. These are scheduled to be completed by the end of 2022, after this time additional sources of funding also need to be identified.

There is a need for DNPW to effectively implement the National Wildlife Conservation Fund Order at Lengwe NP, and to adhere strictly to its mandate of revenue sharing. Currently the annual income generated through revenue collection at Lengwe NP (at the main gate and through the tourism concession) is relatively small (see section 2.4.5). An increase in visitor numbers to Lengwe NP would mean more available funds that could also be distributed through revenue sharing with the local communities. It is therefore important that the allocated 50% for park management and 25% for community investment (through the newly formed Wildlife Association Trust) is returned to the park for these purposes.

4.1 Community engagement

Community Wildlife Extension is important in promoting wildlife conservation and management by involving local communities living close to protected areas as partners and beneficiaries in the ownership and management of wildlife through collaborative management. On the other hand, Public Environmental Conservation Education enhances the general public awareness and understanding of the importance of wildlife conservation and management, and assists in gaining public support since the value of the resources is not adequately appreciated by a large segment of the society (See section 2.2). Collaborative management entails sharing of benefits, accountability and decision making among stakeholders who are to assume clearly defined roles, rights and responsibilities. Acknowledging that wildlife conservation and management inside and outside protected areas is unlikely to succeed without involving stakeholders especially local communities, Government is committed to enhance collaborative management of wildlife resources through improved wildlife conservation education, communication and awareness. These collaborative management efforts are aimed at addressing the

challenges of lack of appreciation of the value of wildlife resources by a large segment of the Malawian society, and low levels of stakeholder participation in conservation and management of wildlife resources.

An obvious problem arises with co-management of Lengwe National Park. Local communities are being invited to enter into a partnership with the State to assist in managing a failed business venture. It is not justified to expect local communities to display any form of altruistic behaviour simply because there are conservation issues at stake. At best, the enticements for the local communities will have to lie in a promise of future worthwhile benefits because there are few immediate benefits which can be sustainably delivered. Any dialogue with local communities which is not honest on this score is likely to cause the 'project' to founder very quickly.

4.2 Current ecomanagement agreement

Currently the park is under a co-management agreement signed between the Department of National Parks and Wildlife and Lengwe Wildlife Association on 19th May, 2017. (Refer to annex 6.4 for a summary of the content of the current co-management agreement with the surrounding communities).

There are definite stages involved in engaging the local community to support the management of Lengwe NP in a sustainable manner. Currently, Lengwe has well organized community structures as already described in sections 2.2.3, 2.2.4 and 2.2.5). To reflect on these sections, Lengwe has a registered association called Lengwe Wildlife Association, with 32 CBOS which are organized into four zone committees at traditional authority level. LWA is not actively participating in conservation of wildlife at Lengwe despite signing the collaborative management (CM) with DNPW. The CM highlights the rights and obligations for LWA and DNPW (Annex 4) which include:

1. The access for communities to selected harvestable wildlife resources such as thatch grass, wild fruit, palm, leaves, honey (beekeeping), medicinal plants (e.g. *Strophanthus kombe*)
2. The use by communities of allocated proportion of revenue accrued from the Lengwe National Park as defined in the Public Finance Management (Wildlife Conservation Fund) Order 2013.
3. The rights for communities to participate in decision making process in management of the park, particularly on community resource management activities as outlined in the Wildlife Policy
4. Contribute to the conservation of wildlife in and around Lengwe NP through reporting illegal activities, conducting awareness programs and supporting conservation initiatives.

There is need to assess the contributing factors to the low participation and find ways for improvement. Communities can assist the park through:

4.3 Supporting law enforcement

DNPW has two options to achieve effective law enforcement. Either it increases its numbers of game rangers to levels which will result in protection of the wildlife resource or it turns to the communities for assistance in this crucial aspect of management. Government is going to be extremely reluctant to authorise an increase in staff numbers so that the second option appears a more likely alternative. It is a desirable option for other reasons too: even if DNPW were able to secure additional staff, this would perpetuate the 'fortress' model of wildlife conservation and result in the continued alienation of neighbouring communities – who ultimately have the power to overcome all law enforcement efforts. The form this assistance should take should be a genuine, formalised responsibility for law enforcement in defined areas of the park. It should not be on a basis of any *quid pro quo*s, i.e. there should be no expectation that, as a result of benefits delivered from the park to neighbouring communities, in return the communities will curtail illegal activity. Equally, it should not be based on any idealistic extension messages: for local peoples whose survival is at stake, 'hearts and minds' approaches are unlikely to be effective

The process is not one of bribing communities with resources in order to persuade them to desist from illegal activity. It is the entering into a mature partnership where both parties take a portion of the responsibility for reducing illegal resource use.

There may be simplistic expectations from the local communities that, if they undertake law enforcement work which is similar to that done by game scouts, they will be paid accordingly. This will not be the case – unless the community trust decides to pay them from monies earned under the project. It is here that the tenure issues become critically important: the participating communities need to be empowered to the extent that they genuinely feel they have proprietorship over the resources– in which case, logically, no-one is going to pay them to look after their own resources. No-one pays them to herd their cattle or goats and the same principle applies to their wildlife.

An aspect of law enforcement where the communities could play a very significant role is in the provision of information to an Investigations Unit. Such information should lead to an increase in the number of arrests for illegal activity and payments should be made for it. Jachmann (1998) discusses the levels of reward which result in effective incentives.

4.4 Fire Control

By far the majority of fires which occur in the park are set either deliberately or negligently by neighbouring communities and it is within their power to reduce the incidence of fire. It would also be possible for local communities to form a fire-fighting unit which, assisted by DNPW, could put out fires after they have been started. Mechanisms to achieve this should be explored under the co-management system.

4.5 Encroachment control

The removal of existing fields and settlements within the park is a sensitive issue and any high-handed unilateral action by DNPW is likely to precipitate political consequences. This topic needs to be tackled

as a mutual problem facing the co-management institution and there is need for thorough consultation with all the involved stakeholders in order to arrive at a final and lasting solution.

4.6 Human traffic control

Human traffic through the park on foot and on bicycles greatly reduces its wilderness and aesthetic values and has a negative impact on tourism. Some of the major footpaths through the park are shown in Figure 3. Under Malawian law there are fundamental transit rights for persons to pass through state protected conservation areas so that the problem is unlikely to be solved by DNPW on its own. This too, is a subject which should be placed on the agenda of the co-management institution and tackled incrementally.

4.7 Sustainable use of natural resources within the park

There is a high expectation from local communities that the formation of Village Natural Resource Committees is directed primarily at enabling access to the park's resources. Munthali (2000) pointed out the near impossibility of achieving sustainable consumptive use within the park given the levels of demand. Whilst the park could provide sustainable offtakes of a number of resources and, with careful planning, this could be achieved without a conflict with tourism, the dangers of a spiral of positive feedback resulting in an unsustainable situation are very real.

Many traditional conservationists will have great difficulty accepting the concept of direct exploitation of resources in a national park. The greatest concern, however, should not lie with the consumptive use *per se* but with the danger of losing sight of the primary land use objectives for Lengwe National Park (see section 0). Exploiting wildlife and its habitats for their commodity value is the lowest valued use for any savanna habitat in southern Africa. The highest valued uses come from tourism and it is only through such value-added use that the park can justify its existence in any competitive land use situation. It is the duty of all persons involved in the development of the park and its co-management institutions, especially extension staff, to sell this higher vision of the potential for Lengwe to local communities. It should not be assumed that local communities will only be interested in the direct benefits they can receive from the park: given an understanding of higher possible benefits that would be available through the earnings of tourism it is very likely they will be prepared to make the investment to obtain these.

Logging of certain species of timber has been proposed (e.g. *Combretum imberbe* and *Pterocarpus angiogenesis* which are in demand in the curio and furniture market). Such a practice will almost certainly conflict with the main objective of watershed conservation in the Uplands management compartment and, based on experiences elsewhere in southern Africa, is most unlikely to be a sustainable practice.

Whilst Lengwe National Park once might have been able to provide a sustainable offtake of wildlife meat, this is no longer a practical option due to the decline in the large mammal species populations. If any experimental research programme involving an offtake of impala is undertaken this would provide a finite and limited supply for the duration of the experiment.

Sherry (1996) and Mwanyambo *et al* (2000) have carried out studies on the potential of various plant resources which might be harvested by communities adjacent to the park. There is no reason why many of their recommendations should not be implemented provided the harvesting is carried out under an adaptive management system and in a manner which does not conflict with tourism.

One non-financial benefit which could be delivered immediately to local communities is the admission of cattle to the parks with the purpose of reducing the very large overburden of coarse grass. This would have to be carried out under controlled circumstances once community co-management institutions were established. It would require the full understanding of the communities that it is an interim and transitional management measure to be pursued while wildlife populations are increasing.

Problem: The communities are not engaged and they do not benefit from the park, the conservation of the animals, and the visitors that come.

Solution: A series of IGAs and community investments will be implemented in the 28 CBOs surrounding the park. A revenue sharing scheme will also be continued.

4.8 Approach

When communities are not engaged and they do not benefit from the park, they do not support the conservation of the wildlife. To gain their support, communities can be supported on various livelihoods that provide income and reduce pressure on wildlife resources. Communities should always be supported with livelihoods of their own preference and also on pilot livelihood interventions which are successful in other communities. A strategy for livelihood interventions has been prepared for Lengwe. Among others, it emphasizes the need to establish linkage between the livelihood and the conservation of Lengwe to achieve its objective (See annex 4). Based on the consultations by Lengwe with the bordering communities in 2020, preferred livelihood interventions include livestock, beekeeping, juice making, arts and craft, maize mills and irrigation (See the Table 11 below).

Table 11: Preferred Livelihood Interventions for Bordering Communities at Lengwe

Income Generation Activity	Example/Comment	Status
Livestock pass on approach	Goat, Guinea fowls, Chicken, pig rearing	Implemented in 26 CBOs- but need to be scaled up
Bee Keeping	Beehives could be hung inside the PA	Also implemented in some CBOs/Not functioning now
Juice Making	From wild fruits found inside and outside the PA	Not yet

Weaving	Weaving from palm leaves found inside and outside the protected area	Not Yet
Maize Mills	Proceeds can contribute to community development e.g. construction of teachers houses, under-five clinics etc.	Implemented – One at every zone Level—now not functioning well
Irrigation schemes	Such investments would improve food security there by reducing encroachment, illegal logging and charcoal burning. There is need to engage other government departments and NGOs for this intervention	Not yet

4.9 Infrastructure Developments

Most of the infrastructure at Lengwe NP is old and requires renovation. There is also a need for the construction of new buildings for various purposes such as new staff and tourist accommodation, ranger camps, and renovation of the conference centre.

The current staff housing is not sufficient to house the number of staffs present at Lengwe NP and conditions in existing buildings are not of a good standard. The government has plans to build more staff housing. New accommodation is also required for tourists. The current available tourist accommodation is of a good en suite standard; however it does not have cooking facilities to cater for family groups or visitors that wish to be self-contained. More accommodation is also required to serve the conference centre once it is renovated. This type of accommodation would be at a simpler level than currently exists – single en suite rooms that would be occupied for short periods for conference services only.

To assist with law enforcement to combat poaching and fence vandalism there is a need for at least two ranger scout camps to be built in Old Lengwe and strategically placed along the perimeter fence line. These are vital if the park is to address these problems. These ranger camps also have to be accessible during the wet season so they are in operation all year round.

The main entrance gate and Tisunge Heritage Centre need renovation. A new entrance gate would be more attractive to visitors and could be an impressive first impression upon arriving at the park. The Tisunge Heritage Centre is a collection of tastefully constructed thatched buildings, however, they need new thatched roofs, electrical wiring, and plumbing.

Over the next few years these activities will be addressed through a design and supervision construction consultancy (supported by the SVTP and GEF funding).

Problem: Existing buildings are in a state of disrepair and in need of rehabilitation. The entrance gate and conference centre need to be renovated. The existing staff housing is not in good condition and needs to be upgraded.

Solution: All existing buildings will be assessed through a construction consultancy to outline what work needs to be undertaken, after which the renovation will be started. All works will be finished by end of 2025 which is the the final implementation year of this management plan.

4.10 Tisunge! Lower Shire Heritage Trust and Centre

The Tisunge Lower Shire Heritage Trust manages the Tisunge Lower Shire Heritage Centre and Museum, which is situated at the main entrance gate to Lengwe NP (see section 2.1.3.7.1). It was opened in 2007 and the current buildings were completed in 2010. The plan is for the Tisunge buildings to undergo basic renovations to attract tourists.

4.10.1 Main Gate

The existing gate house (as of April 2015) can be seen in *Figure 27*– the building on the right-hand side is currently the gate house and the entrance barrier stretches between this building and the Tisunge Heritage Centre to the left. The main gate at Lengwe NP is scheduled for a re-design chosen as part of the infrastructure development consultancy at Lengwe NP. Once a design has been discussed and accepted by DNPW the existing main entrance gate house at Lengwe NP will be removed and a new structure built to replace it.



Figure 27: Photograph showing the Tisunge Heritage Centre buildings (right) and the main gate entrance (left) at Lengwe NP

4.10.2 Conference Centre

Approximately 10 years ago, there were a number of enquiries through Nyala Lodge if Lengwe NP and the lodge facilities could host conferences. The construction of the conference centre was delivered through the Shire River Basin Management Program (SRBMP) and financed by the World Bank. Construction was completed in 2018 as a final deliverable from the SRBMP for Lengwe NP.

Figure 28 below shows completed conference centre.



Figure 28: Photographs of the exterior view of the newly constructed Conference Centre at Nyala Lodge (a) and the rangers attending a training at the Conference in October, 2020 (b)

The conference centre is currently under-utilized due to several factors including Covid-19, poor accessibility during rainy season, poor marketing, and declining animal numbers. The presence of the well managed Majete Wildlife Reserve is also a threat to full use of the centre as most visitors prefer going to Majete than to Lengwe. The installation of audio-visual equipment, internet, as well as other items such as furniture have been finalised under Shire Valley Transformation Program. The aim is to boost tourism by attracting conference organisers and participants to utilise the conference centre and therefore visit the park.

4.10.3 Staff accommodation

The current staff accommodation is in a dilapidated state and in need of renovation. There is also a need for more staff housing as there is currently more staff than available accommodation. This has been recognised by the Government of Malawi and funds have been released from the Treasury, following a recent state visit, to build new accommodation at Lengwe (next to the existing staff houses) to provide sufficient for the number of staff based at Lengwe.

4.10.4 New Buildings – Tourist Accommodation and Ranger Patrol Camps

Problem: There is an inadequate range of accommodation for tourists, staff, and there are currently no working ranger camps

Solution: New accommodation is required for visitors to the park and also for potential conferences. New ranger camps are also required strategically placed along the fence line. All new accommodation should be built by the end of 2025 which is the final operationalization year of this management plan.

There are several new buildings to be constructed at Lengwe NP under the available funding through the SVTP phase 1. Specifically, two new ranger camps will be constructed before the end of 2022.

4.10.5 Tourist Accommodation

There were plans to construct additional tourist accommodation at Lengwe NP under the SRBMP to be used by the project until the end of the phase 1 (2018). After completion, the accommodation would become part of the Nyala Lodge tourist concession. It was hoped that buildings would be constructed of a high standard, which in themselves would attract visitors to come and stay at Lengwe NP. The plans were not fulfilled. However, phase II of the SVTP has planned to improve overall tourist facilities in Lengwe and this includes accommodation.

4.10.6 Ranger / Patrol Camps

In 2016, the SRBMP constructed Jasi camp (Figure 29) which is positioned close to the fence line in order to protect the perimeter fence. One of the major constraints facing the law enforcement team at Lengwe NP is the inability to access areas further into the park especially in the Extension area. DNPW would like to have two more camps at Kamzimbi and at Therere. The camp at Kamzimbi will be constructed by SVTP while for Therere, DNPW will have to secure funding from other sources. The new ranger and patrol camps will enable law enforcement teams to operate more effectively, to conduct longer patrols deeper into the park.



Figure 29: Newly constructed Jasi camp

4.11 The Shire Valley Transformation Programme Phase II Irrigation Canal Construction

Under the Shire Valley Transformation Program Phase II, a 13-kilometre-long open canal is expected to be constructed across the landscape section of Lengwe National Park that connects the Old Lengwe portion (Eastern salient 104km²) and the Extension Area (Western upland 783km²).

Malawi's Environmental Policy and Legal framework provide for undertaking of environmental and social impact assessments on all proposed activities likely to have significant adverse impact on the environment. There are several policies and legislations on environmental management that have been developed, of which the overarching Policy and legislation is the National Environmental Policy (2004) and Environment Management Act (2017). Similarly, the National Wildlife Policy (2018) and the National Parks and Wildlife Act (2017) requires that environmental and social impact studies should be undertaken for any work that could have impacts on the biophysical and socio-economic environment in any protected areas in Malawi. The studies will screen and assess existing or anticipated impacts upon wildlife, including an account of the species, communities, and habitats to be affected and the extent to which they are or may be threatened; a statement of whether rare, endangered or endemic species are or may be affected; and a list of solutions that will be taken to remove or lessen adverse impacts.

Mitigation measures will have to be included in the Environmental and Social Clauses for Contractors in the Terms of Reference for compliance by the Contractors to construct the canal. However, even before Environmental and Social Impact Assessments are done, based on knowledge and experience about wildlife in Lengwe National Park, negative impacts are already anticipated and these are described in the following section.

4.11.1 Anticipated impacts of the canal on Wildlife

During the construction and operational phases, the most significant impact on wildlife will be those related to habitat changes and animal movements. The irrigation canal will create a wet environment that favours riparian vegetation or vegetation of wet fringes such as *Terminalia sericea*. The Lengwe flora and fauna are adapted to a semi-arid climate. Changes in the microclimate will certainly change vegetation species composition leading to changes in animal utilization of the habitat. There is a likelihood of exotic plants being introduced into the canal and transported to the protected areas where they would establish themselves in the park at the expense of the indigenous species.

4.11.2 Anticipated effects of the canal on animal movements and mortality

Before the park size was extended, research had shown a regular movement of animals from eastern salient into the Mopane woodland on the western side of the eastern salient (Hall Martin, 1972; Zimmerman, 1969). Also, current sightings of animal movements into the area had been recorded. The bisection of the park into two will lead to overcrowding of wildlife and over usage of foliage and induced changes to the plant community structure. In extreme cases animal mortality may occur. The best mitigation against interrupting normal animal movement between the Eastern Salient and

Western Upland is to provide crossing points directly opposite drinking water points within the larger western upland ecosystem.

4.11.3 Severing of the park into two sections

Due to the canal dividing the park into two sections, ranger law enforcement deployment programs will be limited and increase placement time and distance of travel to the possible few crossing points thereby reducing ranger patrol effective day and catch per unit effort. This may aggravate poaching especially the cross border illegal logging of the endangered mopane tree. Opening of the canal maintenance road in the area will also lead to poaching and cutting of trees in the area. Furthermore, the current GEF support under SVTP 1, the objective is to strengthen protected area management by developing and improving road network in the Western upland area of the park, and a road grader was procured for this purpose. Therefore, as a mitigation measure there is need to provide ranger camps to enhance rapid response and improved efficiency for surveillance and general protected area management. There is need to also monitor the activities along the 13km irrigation canal hence the need as well for an operation budget and vehicle mobility.

4.11.4 Disturbance of wildlife habitats, vegetation and drowning hazard for animals

The irrigation canal is expected to cut across the wilderness zone which is an important ecological component of the park for ecotourism and catchment conservation. The vegetation will be cleared for a distance of 13km long and approximately 10m wide. This area comprises of the mopane woodland vegetation type which is an endangered species with a high economic value of K8.5million per tree. Therefore, the total expected loss of trees will need to be calculated and its associated financial value which can then be reinvested into protected area management

Other mitigation measures include:

1. Need for the restoration of the cleared area to establish nurseries for indigenous trees
2. Monitoring of wildlife during construction and operation phases- Need for aerial census, impact of canal on wildlife before and after construction (undertake aerial census, monitoring of dead animals in the canal) which is to be done by DNPW.
3. Need for housing for the rangers for law enforcement and monitoring. There is need for camp at the entrance of the irrigation canal into the park and exit, vehicle mobility, radio communication etc
4. Blasting to be limited to period of less animal activity and tourists visits (11am to 2pm)

4.12 Maintenance

4.12.1 Tracks and Trails

Problem: Most of the tracks and trails have become overgrown and unusable on a regular basis. Currently there are also no tracks into the Extension Area which makes law enforcement difficult in this part of the park.

Solution: Grade the tracks and trails on annual basis. Upgrade tracks and trails to all-weather roads using gravel. Create tracks and trails into the Extension Area for law enforcement and tourism.

Old Lengwe has an extensive network of tracks and trails that cover a good proportion of this part of the park (Figure 30). Such trails are also historically connected to a network of water holes for tourist attractions such as game viewing. They are also strategically placed to assist law enforcement patrols to protect wildlife. However, over the last 20 years the trail network has slowly been degraded due to a lack of resources and appropriate management to an extent that trails were either badly overgrown or lost completely by 2012, and only known by maps and the knowledge of elders still working in the park.

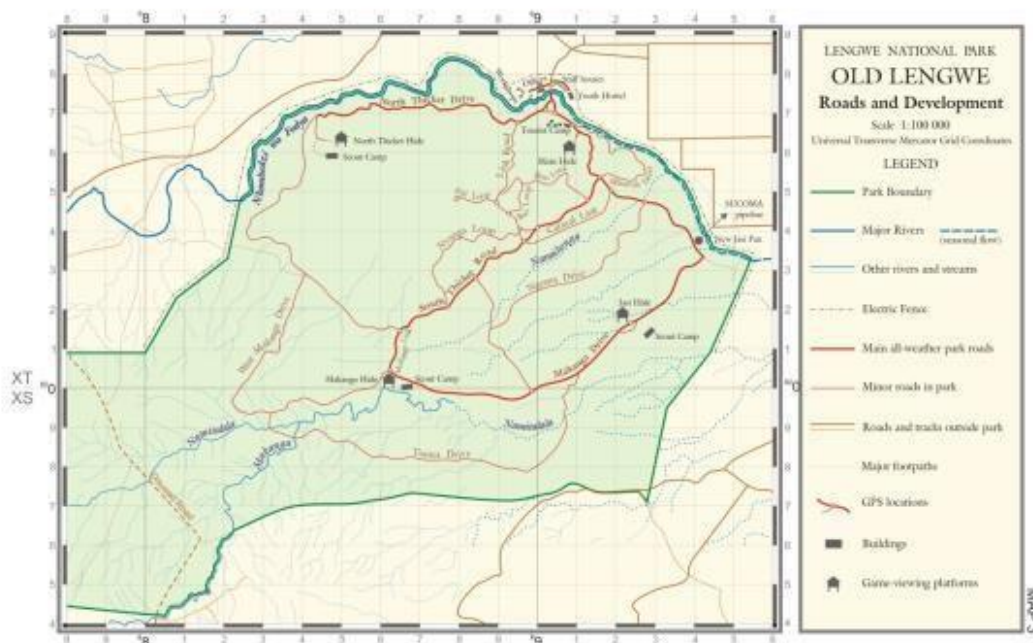


Figure 30: The track and trail network of Old Lengwe.

The situation was assessed in 2014 following the end of the wet season (April). At this time the first task was to re-map and mark the old trail network (Figure 34). This involved marking the overgrown trails with a GPS based on known grid references while often driving blindly through the tall grass (Figure 31). Once marked the park tractor and cutter could follow and create a visible route for the road grader driver to follow.

After the tracks and trails had been marked and the grass cut, a road grader was employed to create a drivable surface. Due to the state of the trails in Lengwe several rounds of road grading were commissioned throughout 2014. The first round was aimed at opening out the trail and clearing the vegetation, while the second round was more aimed at constructing a good camber and creating sufficient drainage ditches from the graded trails.



Figure 31: Photograph showing the road grading in Old Lengwe.

By the end of 2014 all of the historical tracks and trails throughout Old Lengwe had been graded to a standard with a 'camber' and an appropriate number of drainage ditches. An exploratory trail into the Extension Area was also created in 2014. A minimum of 30 days of road grading will now be commissioned every year following the end of the wet season in preparation for the dry season when the park receives the maximum number of visitors, and is therefore regarded as the High Season. It is hoped that existing tracks and trails will require only minor works in future years to create a standard that is drivable by a normal vehicle. After the tracks and trails have been graded to a high standard the next stage will be to make the tracks and trails all-weather by putting a layer of gravel on the surface. It is the intention is to complete Old Lengwe to a standard that requires minimum maintenance thus enabling resources to be directed towards the Extension Area in future years in order to open a trail network throughout this area of the park. Additional resources will probably have to be sourced to cover such a large area as the Extension Area.

4.12.2 Perimeter Fencing

Problem: Old Lengwe is not completely fenced. A lot of the existing fence is vandalised. None of the extension area is fenced.

Solution: Address this issue in stages. Aim to fence Old Lengwe first to protect the fence line and create a drivable track on the inside of the fence to aid fence monitoring. Create more fence camps with better conditions, train fence attendants, and employ more local people for this job. Once Old Lengwe is secure, these issues need to be addressed in the Extension Area.

Since the construction began, there have been few incidences of fence vandalism (see *Figure 32* and *Figure 33* for illustration). According to MWU annual reports, 2 incidences reported in 2013-14 fiscal year, involving the breaking of cut switch boxes at Ndakwera. In 2015, about 100m was vandalized at Jasi and culprits were arrested and one was convicted with 52 months imprisonment with hard labour (IHL). Other than vandalism, the fence had also been damaged in the past, especially by floods in 2015.

However, the fence vandalism became massive in 2018 such that by May 2019, at least 25km fence had been vandalized. This further put a risk of continued vandalism of the remaining fence including Illovo side which protects cane fields from buffaloes. The management in 2019 resolved to step up efforts to curb the illegal activities. The fence vandalism has decreased with the operations and arrests of some culprits who have been convicted. Furthermore, some communities have also assisted by reporting on fence vandalism and recovered fence materials.

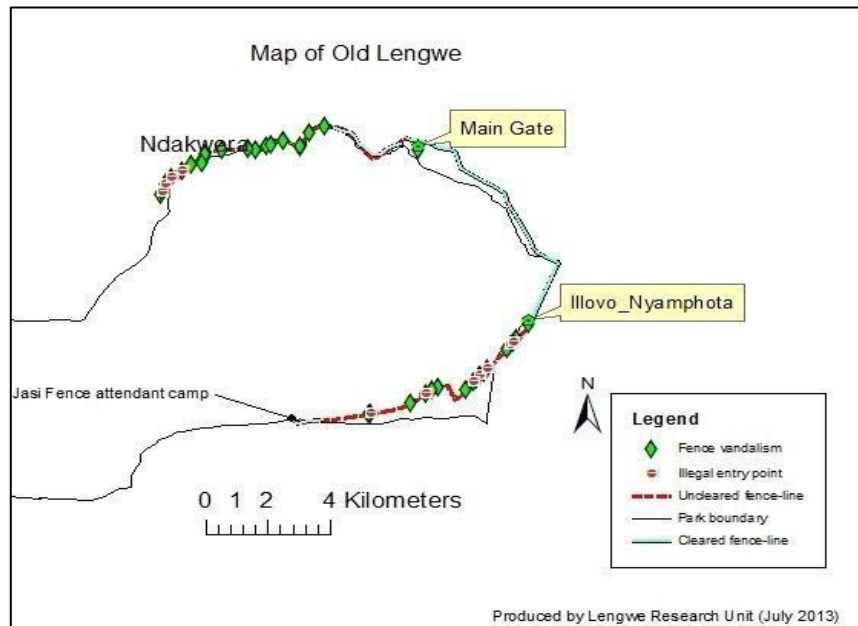


Figure 32: Map depicting Boundary and Perimeter Fence line as of July 2013 which shows areas of fence vandalism



Figure 33: Photographs of the vandalised fence on Billiat Side, Ndakwera (left) and apprehended culprit (Right)

4.12.3 Staff Housing

The existing staff housing at Lengwe NP requires some basic renovations. The buildings have not received a great deal of attention in recent years and require maintenance; the status of the plumbing, electrical wiring, and roofing need to be assessed and repaired if necessary (see Figure 34 illustrating poor state of housing).



Figure 34: Example of staff housing at Lengwe NP

4.12.4 Domestic Water Supply

Problem: The domestic water system by Illovo that feeds the staff houses and park offices is old and defunct. Pipes frequently break and the water filtration tank of 10,000 litres is badly rusted and has silted up resulting to unhygienic turbid water because of poor filtration. During the SRBMP program additional water supply system was constructed at the main office that supplies clean water. However, the demand is much higher than can be supplied by this additional system.

Solution: The whole system needs to be replaced with filtration system.

4.13 Water holes for Wildlife

Problem: Extension area does not have water for animals such that many animals cannot stay even when it is secure.

Solution: Install solar powered water supply system in Extension with enhanced security system and intelligence. Installation of the water supply system close to the camp and frequent monitoring visits would contribute to the improved security of the water supply system.

For more than 20 years, Illovo water supply has been supplying water for the water holes which is a vital part of animal survival providing a lifeline to the wildlife in the dry season (as there is no perennial river at Lengwe). Due to the continuous breaking of pipes and vandalism, many of the water holes were not receiving water properly while Makanga, South Thicket, and West Makanga had completely stopped for years. This resulted to animals being confined to the Nyala Lodge area. In 2016, nine solar powered systems were installed with the support of the SRBMP and GEF funding thereby increasing animal distribution. The installation involved technical study on two options of either maintaining the same water supply system from Illovo or drilling boreholes to install new water supply system. This second option was calculated as the cheapest and most desirable option as long as a security system is embedded to protect the bore hole pumps and solar panels. Interlock Company in South Africa was engaged to produce theft and vandal proof protection units for bore hole pumps and solar panels (Figure 36). Figure 35 below shows location of water holes in Old Lengwe National Park.



Figure 35: Map depicting location of Water Holes and new Ranger (Fence) Camps within Old Lengwe.



Figure 36: Solar powered waterhole at Njati hide, Lengwe NP

The first stage in the process of rehabilitating the water holes is for a geophysical survey to determine whether there is sufficient ground water to drill a bore hole. This is the first system to be installed in a National Park within Malawi and it is being closely monitored for its effective protection of solar panels and bore hole pumps from theft and vandalism.

A first failure of this system occurred at Link Pan in 2019 when the pump stopped working, suspected to be damaged by mud. The most disturbing one was the vandalism of the Mankhokwe solar powered system after rainy season in 2020 when the pump was dug up, bypassing the security lock and the tower was later cut. The contributing factors included poor monitoring, staff conniving with thieves and lack of intelligence for quick response. When an investigation was set up, it found that the pump was smuggled to Mozambique. Monitoring visits have been enhanced and officers warned while one officer involved in similar malpractice was arrested to set an example.

Under SVTP, a contract has been awarded to drill a solar powered borehole that will be supplying water to staff houses as well as a waterhole at Kamzimbi so that animals stay around the area and are secured with the rangers' presence.

4.13.1 Flood control

Problem: The main Mkombedzi river floods on an annual basis which often prevents access to the park, washes away parts of the fence line, washes away the water pipes between the park and the sugar estate, and damages buildings.

Solution: Create a series of check dams further upstream to reduce the flood impact downstream, especially by the main entrance gate and offices. A large check dam in the Extension Area would be a good place as proposed by a previous project. This should be implemented.

Flooding is not just a major problem in Lengwe NP but throughout the wider Shire River Catchment area. Several important tributaries to the main Shire River originate or border Lengwe NP – notably

the Mwanza and Mkombedzi river tributaries. The latter is particularly relevant to Lengwe NP as it flows straight past the Tourist Lodge (Nyala Lodge) and the DNPW park offices. The Mkombedzi River annually floods causing problems with the main entrance access and staff buildings at Lengwe NP.

In the wider picture the flooding causes large amounts of sediment and siltation to be carried into the Shire River and further downstream. However, the causes of the flooding at Lengwe NP are also as a result of significant deforestation further upstream in Neno and Mwanza Districts. One mechanism of addressing these seasonal floods is to create a series of check dams to help reduce the impact of flooding before and as it occurs (*Figure 37*).

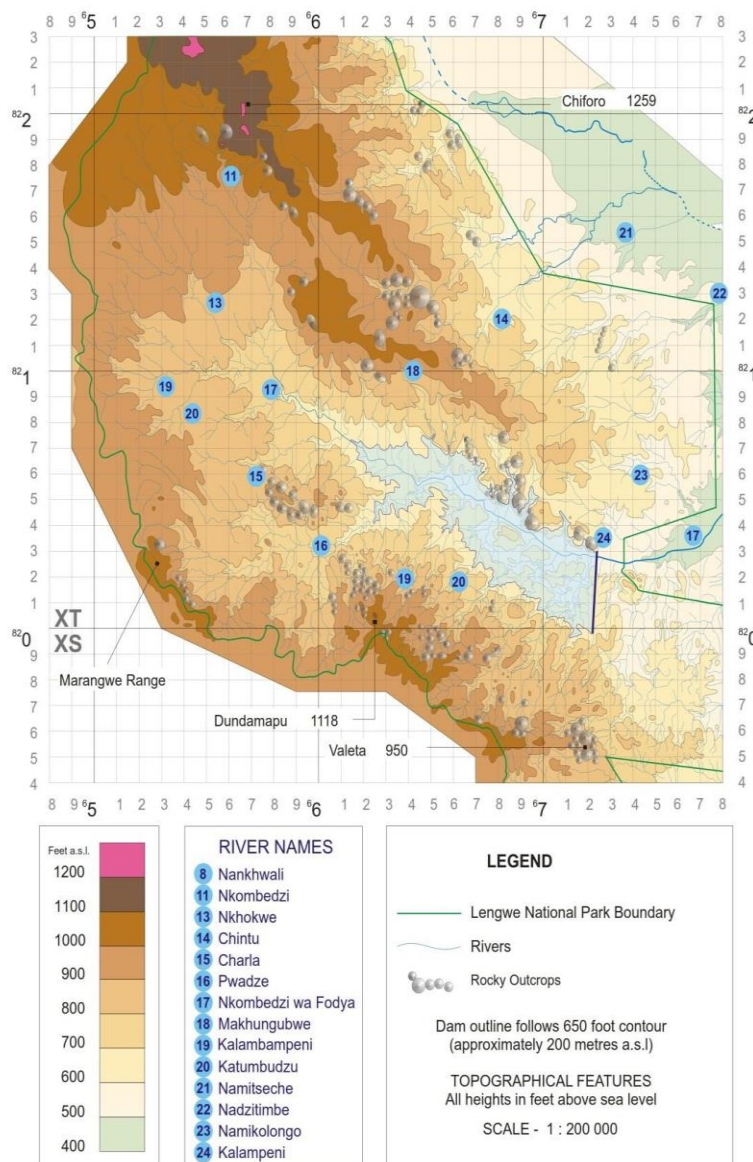


Figure 37: Proposed Check Dams in the Extension Area of Lengwe NP

4.13.2 Flood control at the entrance bridge

The main entrance bridge into Lengwe NP crosses over the Mkombedzi River, which floods on an annual basis. In early 2015 the entrance bridge at Lengwe NP collapsed as the river washed away the footings supporting the bridge. Therefore, an emergency solution was required and the idea of erecting a Bailey Bridge was conceived. The Department of Works was approached by the Director of National Parks and Wildlife, and an agreement was reached in March 2015 for the Department of Works to supply a Bailey Bridge on a temporary basis provided the costs involved in its supply and installation were covered. In January, 2019 the river bank began to collapse and eventually the bridge collapsed in 2020 January (Figure 38).



Figure 38: Entrance Bridge at Lengwe NP that collapsed in January 2020 due to flooding of Mkombezi.

The Bailey Bridge, however, was a temporary solution until DNPW could source sufficient funds to construct a new stone and wood bridge. It was envisaged that the Bailey Bridge would remain for a few years until this is possible but funds need to be sourced to eventually replace this bridge. The supports also needed to be rebuilt before the start of the next rains to prevent its collapse during the wet seasons. The SVTP has planned to construct a more durable bridge to contain the flood and improve accessibility to the park.

4.14 Staff

4.14.1 Staff Requirements

Problem: There is a general lack of field equipment, vehicles, monitoring and recording equipment, animal census equipment, the staff housing is in poor condition.

Solution: Funds need to be sourced to procure new field equipment, and additional vehicles; there needs to be an increase in operational budget, staff housing needs to be renovated and new accommodation built.

There are several requirements for the staff at Lengwe NP. A lot of these requirements have already been addressed in previous sections of this report (such as staff housing). Field equipment such as radio communication has just been improved and this needs to be extended to Kamzimbi when the ranger camp is constructed.

4.14.2 Training and capacity building

Training is required in several sections. Most importantly there is a need for:

1. Regular law enforcement training and capacity building. One such training, anti-poaching training was conducted in June and July 2020 to improve the performance of rangers. More training courses are required to strengthen skills in investigation and prosecution. The current staff capacity to effectively patrol and protect the park is not adequate and more personnel and resources are required (Section 2.6.1)
2. Animal census training. The current sampling methods need to be assessed to see if they are accurate and appropriate. A new sampling strategy needs to be developed which samples a greater proportion of the park.
3. Staff to understand the basics of using a GPS whilst out in the field to georeference records which they can download back at the office within a GIS to plot these records and create maps.
4. GIS training is required. The SVTP is supporting some training and capacity building sessions in Lengwe. The sessions include training in law enforcement, Management Effectiveness Tracking Tool, Spatial Monitoring and Reporting Tool, GIS and Remote Sensing, Drone Technology (basics). In phase II of the SVTP, capacity building and training for staff and communities will continue.

4.15 Equipment

Even though SVTP I has provided some equipment to effectively manage the park there is still a great need for more investment into Lengwe NP.

4.15.1 Field Equipment

Law Enforcement teams require good quality field equipment to motivate staff and for data collection. SVTP has so far provided uniform, tents, boots, tents, rucksacks, GPS, cyber tracking gadgets and radio communication.

4.15.2 Vehicles

There is a need for more 4x4 vehicles that are strong enough for field activities such as Toyota Land Cruiser pickups. One of these was procured through the SRBMP (Figure 39) which is used for law enforcement and gets overused because it is the only vehicle for law enforcement. Furthermore, the vehicle has not been adequately serviced due to poor funding (See Section 2.5).



Figure 39: Photograph of the new Land Cruiser procured for Lengwe NP by the SRBMP

4.15.3 Communication equipment

Communication Equipment is also desperately required by field staff at Lengwe NP. Currently there are no hand-held radios or base stations at the park offices and in the park vehicles, and the park does not have mobile phone coverage. Therefore, communication on all fronts at Lengwe NP is a challenge. The SRBMP procured short wave radio equipment in 2015. A mobile phone mast should also be installed to increase communication within the park to facilitate management efficiency.

4.16 Budgets

The current budget allocations are not adequate to manage the park effectively. It is often the case that park staff do not have enough funds to buy the fuel to undertake basic law enforcement patrols, and it seems without external funding from projects such as SVTP, Lengwe NP would not be able to function properly. The allocation of sufficient funds in a regular and timely manner for basic operational activities needs to be carefully looked at by DNPW Headquarters (HQ).

4.16.1 Operating Costs

On average Lengwe NP receives about half of the operational budget it is supposed to receive from Government through ORT and TF funding in order to effectively manage the park. This is negatively affecting the efficient management of the staff as well as staff motivation and morale. For further details, refer to a section 2.4.4 on finances

4.17 Economic viability

4.17.1 Revenue sharing

Problem: Revenue generated by the park through gate and concession fees is returned to park headquarters in Lilongwe and the government treasury, and very little returns to the park for management purposes or to the local communities. Unless the local communities feel they benefit from the park it will be difficult for them to respect the boundaries and the wildlife within.

Solution: Financial mechanisms need to be investigated which see much more of the revenue generated in the park reinvested into management and conservation. This will also install instil a sense of ownership, responsibility, and pride amongst the staff who work there. Revenue sharing schemes need to be created whereby the local communities also benefit from a well-managed park.

4.17.2 National Wildlife Conservation Fund Order

One mechanism that has been employed in other NPs in Malawi by DNPW is the implementation of a National Wildlife Conservation Fund Order in 2013 (Appendix 4). This divides the revenue taken at regional divisional level (northern, central, and southern) by National Parks and Wildlife Reserves into 50% for park management, 25% for local communities, and 25% for Government Account No. 1. This revenue sharing is administered through the DNPW headquarters based in Lilongwe.

The National Wildlife Conservation Fund Order has been implemented for Lengwe NP in 2017 after fulfilling the prerequisites of establishing a community trust, Lengwe Wildlife Association Trust (LWA). LWA was registered in 2017 representing the 28 CBOs that surround Lengwe NP specifically for the benefit sharing scheme and active participation in conservation of Lengwe.

The benefits are shared to the communities through revenue sharing and resource use program. LWA is a legal institution entrusted to receive and distribute funds to the local communities (through the Zone Committees and the CBOs). The use of such funds as a result of revenue sharing complements the efforts by DNPW such as the promotion of sustainable IGAs. Once LWA receives the funds from DNPW, it calls for proposals from CBOs and select one project at a time in one zone and then another project from a different zone. Since the implementation of the Fund Order at Lengwe in 2018, K1,762,000 (\$2,200) has been shared to the communities by June 2021. This has been used for construction of a messenger's house for Ndakwera Zone, a guardian shelter at Chipwaila Clinic in Ngabu Zone and some funds are also used to meet on administration costs such as stationery, project

selection and supervision. The major challenges are low revenue to show the impact of the scheme; and inadequate capacity such that DNPW officers have to assist in managing the funds.

4.17.3 Economic Evaluation – Sustainable Finance

An economic evaluation of Lengwe NP will be undertaken through a consultancy on Sustainable Finance supported by the GEF. A finance strategy and a business plan was developed and focuses on revenue sharing mechanisms (Wildlife Conservation Fund Order), fundraising, and entrance gate and concession fees. Alternative management models should be investigated which also link to mechanisms of revenue sharing and sustainable finance. Ultimately Lengwe NP needs to have a degree of self-sufficiency and generate enough funds from park activities and paying visitors so that it can fund basic operational activities.

4.17.4 Economic Evaluation – Nature-based Tourism

There is a need for a comprehensive study to be undertaken on nature-based tourism that also links to the study on Sustainable Finance (this can be considered an element of possible sustainable financing).

The overall objective of this study would be to identify constraints and opportunities for the effective financing of selected Protected Areas such as Lengwe NP in the Shire Basin. Specifically, the study should:

1. Generate and document baseline data for Protected Areas financing.
2. Analyse and document PA/FR financing constraints and opportunities
3. Develop recommendations to address these issues based on international and regional best practice.
4. Develop and reach agreement with DNPW/DoF on financing plans for Lengwe National Park, the Elephant Marshes, and Mwabvi Wildlife Reserve, that link financing to priority management activities identified in the management plans for each site.

Lengwe NP as a destination for nature-based tourist visitors needs to be assessed and marketed as part of a package that also links with neighbouring sites (such as the Elephant Marshes, Mwabvi), possibly using Lengwe as a base through Nyala Lodge.

New attractions such as camel or horseback riding through the park need to be considered. New tourist accommodation will be important for attracting a range of visitors, as will the renovation of the conference centre. New animal species should be considered such as Giraffe and Zebra which are available from Nyala Park (Illovo estate). Possible satellite camps need to be made deeper into the park where visitors can also experience a sense of the wild (but safely). The more visitors the park attracts the more revenue will be generated that can go towards management, conservation, and revenue sharing schemes with the local communities.

4.18 Monitoring and evaluation

Currently there are several existing aspects to monitoring and evaluation occurring at Lengwe NP that should be noted. The first of these has been presented in some detail in section 2.3. Situation Analysis, which gives accounts of the various statistics relating to law enforcement and animal census which should be undertaken on a regular and annual basis. Results will be analysed and reports written to show trends in illegal activities and animal population numbers, and how the two possibly interact. Basic management decisions will be made based on these results. There is still need for greater and more comprehensive monitoring and evaluation at Lengwe NP.

There are a number of monitoring tools to be use in wildlife management. The ones relevant to this management plan include:

1. Spatial Monitoring and Reporting Tool (SMART) and Cyber Trackers
2. Management Oriented Monitoring System (MOMS)
3. Management Effectiveness Tracking Tool

These tools are described in the following sections.

4.18.1 SMART

SMART was introduced in the park in March 2021 when rangers underwent a training on how to use the tool along with Cyber Trackers for digital patrol design, data collection and analysis sponsored by the SVTP I. Six cyber Trackers were issued to patrol teams and are currently used side by side with GPS handsets. There are five essential stages of SMART (Figure 40). Data is still being collected and is yet to be analysed. Although SMART is being used, there are still challenges in using the tool. For example, the software requires large computer space. Most laptops are failing to install the software. Where installation was successful, it has led to reduction of operating speed. SVTP should consider conducting a refresher course and procure an additional laptop for research to be used solely for SMART.

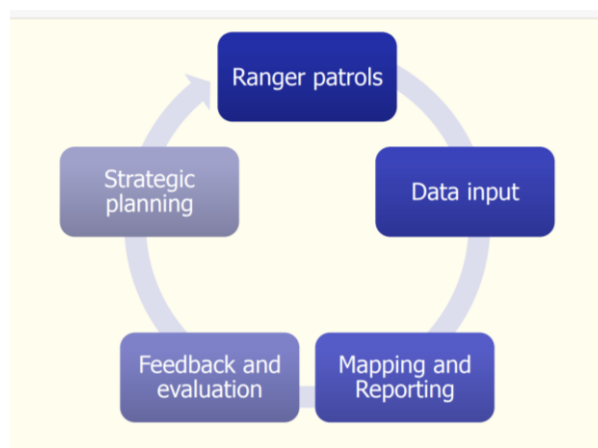


Figure 40: Five essential stages of SMART **Source:** SMART Partnerships, 2019

4.18.2 Management Effectiveness Tracking Tool (METT)

The Management Effectiveness Tracking Tool is one of a series of management effectiveness assessment tools built around the World Commission on Protected Areas (WCPA) Framework, which range from the WWF Rapid Assessment and Prioritisation Methodology used to identify key protected areas at threat within a protected area system, to detailed monitoring systems such as that developed by the Enhancing our Heritage project for UNESCO natural World Heritage sites. It is commonly used on GEF projects to assess the effectiveness of the investments.

The Tracking Tool has two main sections: Datasheets and Assessment form. Data sheets record details of the assessment and some basic information about the site, such as name, size and location and provide a generic list of threats which protected areas can face. On the data sheet the assessors are asked to identify threats and rank their impact on the protected area. The Assessment form is structured around 30 questions presented in table format which includes three columns for recording details of the assessment, all of which should be completed. The assessment is made by assigning a simple score ranging between 0 (poor) to 3 (excellent). A series of four alternative answers are provided against each question to help assessors to make judgements as to the level of score given. In addition, there are supplementary questions which elaborate on key themes in the previous questions and provide additional information and points. The maximum score of the 30 questions and supplementary questions is 99. A final total of the score from completing the assessment form can be calculated as a percentage of 99 or of the total score from those questions that were relevant to a particular protected area.

This approach was applied to Old Lengwe NP at the start of the SRBMP. A score of 45 was awarded in February 2012. . In October 2015 assessment was conducted for MTR and Old Lengwe was given 58 while 71 was given at the end of the SRBMP in January 2018.

The major drivers of change were the presence of regular workplans which were being followed, various training courses occurring (law enforcement, community engagement and procurement), some new and improved equipment, a budget for maintenance of vehicles, a community engagement and investment strategy, and the presence of the Lengwe Management Plan.

A similar approach is being followed to measure the impact of the SVTP in Extension Area that started being implemented in October 2018. At the onset of SVTP, an assessment was conducted by DNPW and the Protected Area specialist in April 2017 and the score given was 13 and projected 40 for MTR in 2020 and 65 at End of Project in 2023. An assessment was conducted in November 2020 by DNPW that included Lengwe Officers where Extension Area was given higher score of 55 for the improvement of the protected area management through increased area under effective management, improved planning and budget, additional equipment, education and awareness programs, increased economic benefits for communities and monitoring. This score was reviewed in July 2021 by DNPW, Lengwe officers and Protected Area Specialists when it was observed that it was much higher than the projected resulting to a revised score of 42 at MTR.

4.18.3 Management Oriented Monitoring System

MOMS is a simple monitoring system developed for community groups in Namibia to enable them to easily collect and analyse data and interpret the results themselves. Such results would help them make informed-decision on whether they are making progress or not. While traditional monitoring systems are designed, implemented and results implemented by 'experts' other than community members themselves, MOMS empower community members. By empowering community members, monitoring results are generally accepted.

There are three fundamental principles of MOMS namely:

1. It is entirely paper- based which means it must be done on paper although later on data could be copied into electronic databases for more sophisticated analyses and reporting.
2. It is all done at local level which means that data should be collected and analysed by communities, including interpretation of results.
3. It is modular which means there is a complete and agreed set of modules and/or subjects that communities mutually agree to monitor all the time. Information is recorded in yellow forms (daily basis), blue forms (monthly summaries) and red forms (annual summaries). The colour codes help community members to easily locate data in the files.

For community members, MOMS help them to know if:

1. their goals and targets are being met or not;
2. they are working effectively and efficiently;
3. they have ample information and/or data which can help them in decision-making;
4. if they have ample information and/or data that can help them advocate and lobby for review of policies and more resources from the government and other stakeholders to address problems and challenges that they encounter during the course of their work.

A summary of MOMS levels is presented in Figure 41 below

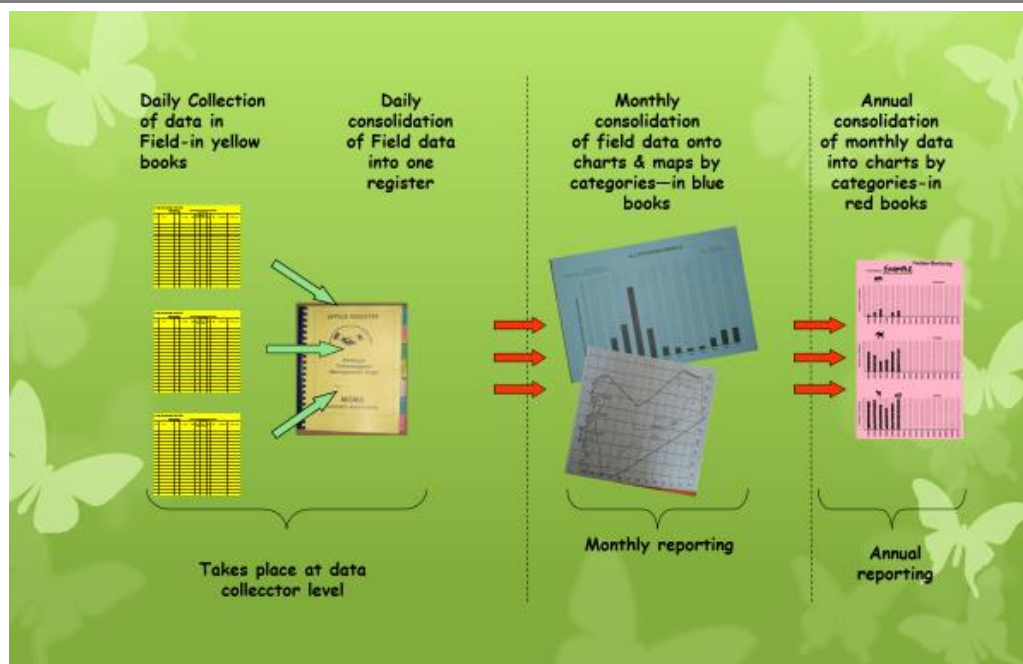


Figure 41: Summary of MOMS levels

Source: Stuart-Hill et. al., 2005.

4.19 Biological Indicators

Biological Indicators or Bioindicators are statistical measures of biodiversity which help scientists, managers, and politicians understand the condition of biodiversity at a site and the factors that affect it. For Lengwe NP good historical data already exists on the flora and fauna which can be used as a basis from which to measure the state of the park (and management action effectiveness) today. Some indicators are quick to measure forest/woodland cover as these are remote sensing exercises for which the data is available. Other possibilities are the IUCN Red list species especially birds and mammals at the selected sites. Some types of indicators would take longer to monitor if they are based on natural processes which take years before a change is noticed. Examples of bioindicators include:

Species related: e.g. the number of IUCN Red Listed threatened species / Change over time. This will work for some species, especially birds, as they are already very well documented by Dowsett in the 1990s. WESM also have been undertaking wildlife counts of large mammals in the NPs since 1990. At certain sites a baseline for other taxa may exist.

Biological Processes: e.g. distribution in relation to environmental disturbance (link to fire), flow rates and quality of rivers from PAs and species movements.

Communities: encompassing a broad range of environmental tolerances representing multiple sources of data to assess environmental condition in a biotic index or multimeric approach e.g. forest assemblages, aquatic assemblages.

Vegetation Cover: forest \ woodland \ land use change. A remote sensing and GIS exercise which is already part of the existing overall M&E. The higher resolution of the imagery used the better the results. There is a need for a suitable trained technician to undertake the analysis.

Pollution: Water quality and temperature can affect species distribution. This can be treated as separate indicators and also linked to Biological Processes. This could form part of the work at the Elephant Marshes (MRAG, Anchor Environmental, and Southern Waters).

Fire: frequency and extent over time in relation to management regimes.

This is a remote sensing and GIS exercise that is often used in environmental monitoring - <https://modaps.modaps.eosdis.nasa.gov/>. Figure 42 shows the annual fire distribution for Lengwe NP for 2019. It can be seen that the frequency of fire is much less in the months of November to May, which corresponds to the wet season, and more frequent during the dry season June to October. Also, can be seen that the fires are clustered which can also guide management interventions to prevent these fires. The thermal anomalies (fires) are represented as red points (approximate centre of a 375m pixel).

The satellite sensor VIIRS (Visible Infrared Imaging Radiometer Suite) detects these fires in near real time. The fire layer is useful for studying the spatial and temporal distribution of fire, to locate persistent hot spots. VIIRS is the successor to MODIS for Earth science data product generation. The 375m I-band data complements the MODIS fire detections; they both show good agreement in hotspot detection but the improved spatial resolution of the 375m data provides a greater response over fires of relatively small areas and provides improved mapping of large fire perimeters. The 375m data also has improved night time performance. Consequently, these data are well suited for use in support of fire management (e.g., near real-time alert systems), as well as other science applications requiring improved fire mapping fidelity. The VIIRS Fire and Thermal Anomalies product is available from the joint NASA/NOAA Suomi-National Polar orbiting Partnership (S-NPP) and NOAA-20 (JPSS-1) satellites. The sensor resolution is 375 m, imagery resolution is 250 m, and the temporal resolution is twice daily.

Lengwe National Park - Fires 2019



Source: Fire Information management System (FIRMS) - NASA



Figure 42: Annual fires distribution map for Lengwe NP for 2019.

Carbon storage and sequestration: this indicator links with ecosystem services but is still a good solid measure. One could measure change over time according to different vegetation types – this would also be linked closely with vegetation cover change.

Most of the above requires a comprehensive land use / habitat type GIS data base from which to extract the relevant information. The accuracy of the indicators will be intrinsically linked to the resolution and quality of this land use database.

5 Conclusions

All recorded large mammal populations are declining in Lengwe NP except the Impala. The Nyala is particularly threatened with less than 400 individuals (compared to more than 4000 in 1991). A conservation programme needs to be developed to address these declines, especially for the Nyala as this species is the reason the park was created in the first instance.

The number of paying visitors to Lengwe National Park is still low. To boost tourism, the following recommendations are suggested:

1. Introduction of new wildlife species to improve populations and expand the species diversity. These new species include blue wildebeest and black rhino initially under sanctuary management. They will be released later when recommendation number 2 below is met.
2. Improvement of law enforcement to rebuild the existing wildlife populations, and jointly market the park with the neighbouring protected areas in the Shire Basin to diversify the tourism products. One way to improve law enforcement will be to recruit more law enforcement staff and construct new ranger stations in strategic sites (those with evidence of the most illegal activity) to combat poaching. For this management plan, a ranger camp will be constructed at Kanzimbi in the Extension Area. Another way will be to develop tools to aid law enforcement. For example, laminated maps which can be used on multiple occasions for recording data, tracker devices, short wave radios, night vision goggles.
3. Access roads are poor and they should be maintained. New roads, especially those going into New Lengwe (the Extension Area), need to be created.
4. Communities need to be further engaged in the management of the park. They should be actively involved in fence maintenance and rewarded through community investments at the CBO level in poaching and fence vandalism is greatly reduced in areas of the park.
5. Field guides, maps, brochures and posters produced by the SRBMP will have to be put into full use to market the park. Furthermore, mobile phone apps all need to be created.
6. Strengthen and establish linkages between Lengwe National Park and other eco-tourism operators in Malawi and beyond. This will create visibility of the park potentially leading to more visitation into the park.

6. Five-Year Work-plan

Output/Activity Planned	Indicator	Target	2021	2022				2023				2024				2025				2026		
			Q1	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Infrastructure Development and Maintenance																						
Construct park buildings and patrol stations	No. of stations	4																				
Bridge Construction at Mkombezi river	No. of bridges	3																				
Open new roads in Extension Area	No. of Kms	100																				
Road upgrading and maintenance	No. of Kms	250																				
Erect sign posts along new roads	No of sign posts	30																				
Construction of culverts and depressions along new roads	No. of culverts & depressions constructed	10																				
Maintain buildings (office, youth hostel and houses)	No	Various																				
Construct office at Kamzimbi	No. of offices	1																				
Construct Information room	No. of information rooms	1																				

Construct ecotourism infrastructure	No, of lodges	1																		
Conduct boundary verification and beacon planting in Extension Area	Perimeter covered	110km																		
Install Solar powered water holes	No. of sites	3																		
Construct hides for animal water holes	No. of structures constructed	3																		
Construct breeding sanctuary	Perimeter covered	32km																		
Conduct feasibility study for Lengwe extension and offer management concession	No of study	1																		
Equipment																				
Procure Field Vehicles	No. of vehicles	3																		
Procure equipment for Wildlife Management and Monitoring	Various	Various																		
Procure Communication Equipment (base station and Repeaters)	No. of sets	3																		

Motor vehicle and plant maintenance	No. of vehicles	8																				
Trainings and Stakeholder Collaboration																						
Conduct national and trans-frontier cooperation on combating wildlife crime (eg. interagency committee, JPCDS, etc)	Number of meetings	5																				
Conduct sensitization workshop for stakeholders on wildlife crime prosecution (DNPW, magistrates, police, forestry, and Wildlife prosecutors)	Number of meetings	5																				
Conduct capacity building on law enforcement and monitoring	Number of trainings	3																				
Law Enforcement																						
Conduct law enforcement activities to reduce illegal wildlife crime and illegal logging (patrols, prosecution, scene visits and law	Number of patrols & meetings	204 patrols & 10 meetings																				

enforcement meetings)																							
Education and Extension Programs																							
Conduct training on CBNRM for frontline staff and communities	No of trainees	30																					
Scaling up livelihood interventions	Various																						
Conduct capacity building for communities on IGAs	Number of groups	12																					
Strengthen existing community structures in collaborative managemen	No. of meetings conducted	20																					
Establish wildlife clubs and strengthen them	Number of wildlife clubs	60																					
Produce IEC materials conservation issues	Ste of IEC Materials	10																					
Research and Development																							
Conduct biodiversity survey (animals)	Survey reports	5																					

[illegible]

7. Five-Year Budget with possible funding sources

Output/Activity Planned	Remarks (If any)	Budget (MK)	Possible Funding sources
Infrastructure Development and Maintenance			
Construct park buildings and patrol stations	Kamzimbi, Mankhokwe, Mandrade and Therere	304,200,000	GEF
Bridge Construction at Mkombezi river	Both Old aand New Lengwe	77,600,000	GEF
Open new roads in Extension Area	Focus on feeder roads	4,348,320	GEF
Road upgrading and maintenance	Road grading and applying gravel	37,782,800	GEF/DNPW
Erect sign posts along new roads		3,815,000	DNPW

Construction of culverts and depressions along new roads	Current allocation not adequate to cover the whole stretch	33,500,000	DNPW
Maintain buildings (office, youth hostel and houses)		65,600,000	GEF/DNPW
Construct office at Kamzimbi		82,000,000	GEF/DNPW
Construct Information room		69,700,000	GEF/DNPW
Construct ecotourism infrastucture		23,000,000	GEF/DNPW
Conduct boundary verification and beacon planting in Extension Area		15,470,386	GEF
Install Solar powered water holes	1 at Kamzimbi and 2 other locations	24,000,000	GEF
Construct hides for animal water holes	1 at Old lengwe and 2 in Extension Area	14,340,000	GEF/DNPW
Construct breeding sanctuary	1 at Old lengwe and 2 in Extension Area	164,000,000	GEF/ADB
Conduct feasibility study for Lengwe extension and offer management concession	1 at Old lengwe and 2 in Extension Area	12,300,000	GEF
Equipment			
Procure Field Vehicles	Required during canal operations	184,500,000	ADB
Procure equipment for Wildlife Management and Monitoring	Uniform worn out within 2 years	19,720,000	GEF/ADB
Procure Communication Equipment (base station and Repeaters)	For New Camps	11,972,000	GEF/ADB

Motor vehicle and plant maintenance		59,696,000	GEF/ADB/DNPW
Trainings and Stakeholder Collaboration			
Conduct national and trans-frontier cooperation on combating wildlife crime (eg. interagency committee, JPCDS, etc)		108,600,000	GEF/ADB/DNPW
Conduct sensitization workshop for stakeholders on wildlife crime prosecution (DNPW, magistrates, police, forestry, and Wildlife prosecutors)	Required once in a while to address prosecution matters	32,088,000	GEF/DNPW
Conduct capacity building on law enforcement and monitoring		73,800,000	GEF/ADB/DNPW
Law Enforcement			
Conduct law enforcement activities to reduce illegal wildlife crime and illegal logging (patrols, prosecution, scene visits and law enforcement meetings)	This is on going	157,652,000	GEF/ADB/DNPW
Education and Extension Programs			
Conduct training on CBNRM for frontline staff and communities	To engage MCFW	94,300,000	GEF
Scaling up livelihood interventions		57,220,000	GEF/DNPW

Conduct capacity building for communities on IGAs	Depends on education groups received	16,564,000	GEF/ADB/DNPW
Strengthen existing community structures in collaborative management		19,680,000	GEF/ADB/DNPW
Establish wildlife clubs and strengthen them		20,500,000	GEF/ADB/DNPW
Produce IEC materials conservation issues		24,600,000	GEF/ADB/DNPW
Research and Development			
Conduct biodiversity survey (animals)	One aerial and 4 ground counts	57,400,000	GEF/ADB/DNPW
Habitat management and monitoring	In collaboration with Forestry Dept	27,000,000	DNPW
Conduct carbon inventories	In collaboration with Forestry Dept	49,200,000	GEF/DNPW
Strengthen monitoring of law enforcement effectiveness and protected area management	Annual assessment	12,500,000	GEF/DNPW
Monitoring resource use program (RUP)	Kamzimbi, Mankhokwe, Mandrade and Therere	11,690,000	GEF/DNPW

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9. Annexes

9.1 Annex 1: Mammals of Lengwe NP

The list below refers to firm records as determined by Dowsett-Lemaire & Dowsett (2002). Reference should also be made to the maps in Ansell & Dowsett (1988) that cover Lengwe NP, and to more recent publications. Records of small mammals collected in Lengwe are mainly from Happold & Happold (1991) and Happold *et al.* (1987).

Soricidae (shrews)

Crocidura hirta. Present in Old Lengwe, apparently in small numbers, in various thicket and savanna habitats (Happold & Happold 1991).

Pteropodidae (fruit bats)

Rousettus aegyptiacus. Specimens have been collected in Lengwe (Bergmans 1994).

Nycteridae (slit-nosed bats)

Nycteris macrotis. One specimen has been collected in Lengwe (Happold *et al.* 1987).

Nycteris thebaica. One was collected from a pit-latrine in Lengwe (Happold *et al.* 1987).

Rhinolophidae (nose-leafed bats)

Rhinolophus clivosus. Has been collected from a hollow baobab tree in Lengwe (Happold *et al.* 1987).

Hipposideros commersoni. This enormous insectivorous bat has once been collected in riparian forest in Lengwe (Happold *et al.* 1987).

Hipposideros caffer. Two specimens are known from Lengwe (Happold *et al.* 1987). This species might be expected in the bat colony in caves at Nankhwali in the Lengwe extension, but high-water levels prevented any captures to confirm this.

Vespertilionidae (pipistrelle bats)

Scotophilus viridis. Two specimens were collected in riparian woodland in **Lengwe** (Happold *et al.* 1987).

Pipistrellus nanus. Quite common in thicket clump savanna in Lengwe (Happold *et al.* 1987). - *Nycticeius schlieffenii*. Several have been collected in riparian and woodland in Lengwe (Happold *et al.* 1987).

Scotoecus albofuscus. An individual of this distinctive species was well seen in Lengwe (pers. obs.).

Molossidae (free-tailed bats)

Tadarida pumila. As with the last species, occurs in the roofs of buildings in **Lengwe**, but only in small groups (Happold *et al.* 1987, pers. obs.).

Tadarida condylura. There are large colonies, of up to 200 bats, in the roofs of buildings in **Lengwe** rest camp (Happold *et al.* 1987, pers. obs.).

Lorisidae (galagos)

Greater Bushbaby *Otolemur crassicaudatus*. Common in thicket and woodland.

Lesser Bushbaby *Galago moholi / senegalensis*. Heard in the West Makanga area and once near Main Camp (both in Nov.). although likely to occur, confusion with the next species means there is no definite record.

Zanzibar Galago *Galagoides zanzibaricus*. Not mentioned at all by Rowan Martin, but records previously attributed to Lesser Bushbaby will often have referred to *G. zanzibaricus*. Occurs commonly in thickets. Its distinctive call is uttered mainly in the early evening. Easy to watch at Bush Camp n° 6 at **Lengwe** in Dec., when they came to the edge of the forest to eat the fruit of *Drypetes mossambicensis*.

Cercopithecidae (monkeys and baboons)

Yellow Baboon *Papio cynocephalus*. It is very common in all habitats of reserve, in groups of up to 50 or more. Very fond of the fruit of *Cordyla*, baobab, *Ximenia*, *Strychnos*.

Vervet Monkey *Cercopithecus pygerythrus*. Present in rather small numbers overall (less frequently noted in forest and thicket than Blue Monkeys).

Blue Monkey *Cercopithecus albogularis*. Locally common in forest and thicket in **Lengwe** in groups of 20 or more at times.

Canidae (dogs)

Side-striped Jackal *Canis adustus*. The status of this species is uncertain. It certainly occurs in Lengwe, judging by scout reports (e.g. Austin Msonda pers. comm. 2001), though is no longer “common” (Hayes n.d.). There is a general scarcity of rodents, the type of grassland seeming not very suitable, and this may explain the few Jackals present.

Mustelidae (mustelids)

Honey Badger *Mellivora capensis*. A skull of an immature found in the Nkombedzi stream bed, **Lengwe**.

Viverridae (civets etc.)

African Civet *Civettictis civetta*. Present in reserve.

Rusty-spotted Genet *Genetta rubiginosa*. Common in reserve, and the specific identity confirmed in Mwabvi, where one was found dead in 1975 (M. Davies’s diary). Records are attributed to this species, although the rarer *G. angolensis* might also occur.

Bushy-tailed Mongoose *Bdeogale crassicauda* or Meller’s Mongoose *Rhynchogale melleri*. These two species appear very similar in the field. Bushy-tailed was reported from several areas of Lengwe by A.J. Hall-Martin (Ansell & Dowsett 1988).

Large Grey Mongoose *Herpestes ichneumon*. One seen in Lengwe (Namichenga, 20 Nov. 2000).

Slender Mongoose *Galerella sanguinea*. Quite common in woodlands.

White-tailed Mongoose *Ichneumia albicauda*. Sherry & Ridgeway (1984) wrote that it “may be seen” in Lengwe, which implies they had definite sightings. Otherwise known from the Lower Shire only near Chiromo (Sweeney 1959).

Banded Mongoose *Mungos mungo*. Small numbers occur locally in Lengwe in thicket and woodland, in groups of up to 20 or so. A concentration of no fewer than 78 was reported in Lengwe by Hayes (n.d. = 1971); recent observations do not suggest it is as numerous as that.

Hyaenidae (hyaenas)

Spotted Hyaena *Crocuta crocuta*. Small numbers throughout Lengwe.

Felidae (cats)

Leopard *Panthera pardus*. In Old Lengwe there is still the odd animal (Dowsett observed fresh spoor on the Nkombedzi in 2002), and in the north-west extension in the Kamzimbi area scouts report them still as quite common, feeding on Bushbuck in particular. They are probably still present, though there is no definite record in recent years.

Lion *Panthera leo*. Lions were common in the Lower Shire, including the Lengwe area, to at least the end of the 1930s (Hayes 1979). Two “young” lions turned up at Sucoma in 1974 (Hanmer 1980), and in 1975 a male had to be killed there, after falling into a canal (Nyala 1975, 1 (2): 15). A pride moved into Lengwe during the dry season of 1977, being seen several times (Nyala 1977, 3 (2): 50). In the north-western area of the extension, two were present in 1994, and killed a Kudu at the Katawara stream source, but there is no recent report.

Caracal *Felis caracal*. In spite of there being a “Caracal link” in Lengwe, there are no definite records of this species, and even Hayes (n.d.) wrote no more than that it was “thought to be present”. It has, however, been reportedly seen as close as the Nyala park at Sucoma (J.C. Margeot in Hanmer 1989).]

Serval *Felis serval*. Known from Lengwe, including the north-western area of the extension.

Wild Cat *Felis libyca*. Listed for Lengwe (Carter 1987).

Elephantidae (elephants)

African Elephant *Loxodonta africana*. There were good numbers in Lengwe in the 1930s (Hunter 1978), but they have been extinct there since 1964 (Sherry & Ridgeway 1984).

Rhinocerotidae (rhinoceroses)

Black Rhino *Diceros bicornis*. Reported from Lengwe in the past, but long extinct there.

Equidae (horses)

Burchell’s Zebra *Equus burchelli*. There were good numbers in Lengwe in the 1930s (Hunter 1978), but they are extinct now.

Procaviidae (hyraxes)

Yellow-spotted Dassie *Heterohyrax brucei*. Common on all rocky hills in the Kamzimbi area of northwestern Lengwe.

Tree Hyrax *Dendrohyrax arboreus*. Small numbers present in tall *Sterculia* forest in the north of Lengwe (they were noisy in December at Bush Camp n° 6). These are the first definite records from within the Lower Shire reserves.

Orycteropodidae (Ant bear)

Ant bear *Orycteropus afer*. Present in suitable sandy areas.

Suidae (pigs)

Wart Hog *Phacochoerus aethiopicus*. Very common throughout Lengwe (up to six young seen with two adults, and even once a single female with eight young).

Bush Pig *Potamochoerus porcus*. Widespread in forest and thicket in Lengwe, in family groups of up to seven.

Bovidae (antelope etc.)

Wildebeest *Connochaetes taurinus*. Rowan Martin (Anon. 2000b) suggests this species might be “re-introduced” to the Lower Shire reserves. But Ansell (1982) showed that the species (which became extinct in Malawi in or soon after 1925) was only present before that east of the Shire Valley, especially in the area of Lake Chiuta and the plains south of Lake Chilwa.]

Lichtenstein’s Hartebeest *Sigmoceros lichtensteinii*. In Lengwe, present in small numbers before and after the second World War (Hayes n.d.), three are reported to have appeared in 1966 (Hayes 1967), and the odd ones were observed to 1973 (Hutson 1977). The extension to Lengwe gazetted in 1975 was said to include Hartebeest (Nyala 1976, 2: 61), but the species has probably been long extinct now.

Grey Duiker *Sylvicapra grimmia*. Quite common in open woodland in parts of Lengwe.

Klipspringer *Oreotragus oreotragus*. Present on rocky hills in the north-west of the Lengwe extension (Kamzimbi).

Sharpe’s Grysbok *Raphicerus sharpei*. Present in woodland and small thickets.

Suni *Neotragus moschatus*. Widespread wherever there is suitable thicket in Lengwe, singly or in pairs, the total population being several hundreds. Not often seen at water-holes.

Impala *Aepyceros melampus*. In Old Lengwe it is locally very numerous in open grassland and the edge of thicket clumps (more so than in the 1970s). It ranges even in small numbers to the West Makanga area, and is also reported from the Katawara area of the north-western extension.

Roan Antelope *Hippotragus equinus*. A group of seven was reported to have been seen in Lengwe by two different observers in Dec. 1975 and May 1976 (Nyala 1976, 2: 65), but we are not convinced that there was not confusion with Sable. Apart from one shot more than a century ago between Zomba and Blantyre, there is no other acceptable record from the whole of southern Malawi, a report from Majete being rejected too (Ansell & Dowsett 1988, cf. Anon. 2000a). Roan are also unknown from neighbouring areas of Mozambique (Smithers & Tello 1976).]

Sable Antelope *Hippotragus niger*. Not known now from Old Lengwe, but it apparently occurred up to at least the 1970s, and 3-4 were present in the Nchalo area in 1984 (Hanmer 1984).

Buffalo *Syncerus caffer*. In Lengwe they were in the past secretive and mobile (Hayes n.d. = 1971). A herd of 70 was noted in 1977, the biggest group reported there to that date (Nyala 1977, 3 (2): 50). At least one herd of similar size was present in the area between the Nkombedzi-chalets-Bush Camp n° 1, and another towards Makanga. The total population in Lengwe appears to be in the low hundreds, estimates by DWNP staff of 4144 in 1998 and then 2485 in 1999 (Kamanga 2000) showing clearly the shortcomings of their census techniques. Buffalo usually visit the water-holes at dusk or during the night, so counts at the hides are ineffective as a rule.

Greater Kudu *Tragelaphus strepsiceros*. Quite numerous in Old Lengwe (though far less so than Nyala). One of the few species encountered often in the tree savanna of the south-west, and numerous still in the north-western extension area.

Nyala *Tragelaphus angasii*. In Old Lengwe locally numerous in thicket and thicket clumps (though noticeably less common than in the 1970s, prior to the culling exercise). Munthali (1991) has shown that Nyala in Lengwe feed mainly by grazing and foraging, with little browsing, and that they graze

from 20% of the time (in the late dry season) to as much as 50% in the rains. Some of the plant species eaten by Nyala are listed by Hall-Martin (1977).

Bushbuck *Tragelaphus scriptus*. Widespread in thicket and riparian, usually singly or in pairs.

Eland *Taurotragus oryx*. There were good numbers in Lengwe in the 1930s (Hunter 1978), but extinct by the 1970s.

Reedbuck *Redunca arundinum*. There have always been very few in Lengwe, mainly in the Makanga area (perhaps only there now), a pair being seen occasionally in West Makanga. Bell (1989) estimated a population of c. 50 in Lengwe, and there are unlikely to be more of this easily-hunted species. Unusually, Hayes (1967) reported that Reedbuck visited the water hole at what is now main Hide (Magomero) in 1964, soon after a borehole was sunk to keep it supplied with water.

Waterbuck *Kobus ellipsiprymnus*. Ansell & Dowsett (1988) map historical records from Lengwe, but it is not clear what its past status was (Sherry & Ridgeway 1984).

Manidae (pangolins)

Pangolin *Manis temminckii*. Known from **Lengwe** (Austin Msanda, pers. comm. 2001).

Sciuridae (squirrels)

Sun Squirrel *Heliosciurus mutabilis*. Common in forest and thicket clumps in all three reserves. These animals (of the race “*shirensis*”) are variable in colour, but are usually predominantly pale ginger, with the brown tail showing signs of rings, often rather faint.

Bush Squirrel *Paraxerus cepapi*. Common in woodland, especially abundant in mopane.

Red Squirrel *Paraxerus palliatus*. Lengwe: small numbers present in thicket and especially in forest (e.g. along the Nkombedzi). Note that this forest-associated species is not closely related to the woodland *P. cepapi*, and the suggestion that they might hybridise is refuted (Ansell & Dowsett 1988), being based on superficial interpretation of museum skins.

Hystriidae (porcupines)

Porcupine *Hystrix africaeaustralis*. Common and widespread.

Thryonomyidae (cane rats)

Greater Cane Rat *Thryonomys swinderianus*. Common in grassland and on the edge of thicket along the Shire river (not collected, but a very small juvenile and adults seen closely, and certainly this species).

Muridae (rats and mice)

Tatera leucogaster. Occurs locally in Lengwe in grassland (Happold & Happold 1991).

Saccostomus campestris. Common and widespread in Lengwe, especially in thicket clumps (Happold & Happold 1991).

Steatomys pratensis. Known by a single specimen from riverine vegetation in Old Lengwe (Happold & Happold 1991).

Acomys spinosissimus. Very common throughout Lengwe, in all habitats (Happold & Happold 1991).

Lemniscomys rosalia. Known from grassland in a few places in Old Lengwe (Happold & Happold 1991, Anon. 1975, resp.).

Grammomys cometes. Has been collected rarely in thicket clumps in Old Lengwe (Happold & Happold 1991).

Grammomys dolichurus. Known from two specimens from Old Lengwe, in thicket and riverine vegetation (Happold & Happold 1991).

Mastomys natalensis. Abundant, throughout Lengwe in all habitats (including habitation).

Aethomys chrysophilus. Quite common in Old Lengwe, mainly in thicket clumps and grassland (Happold & Happold 1991).

Rattus rattus. Known from Old Lengwe by two specimens collected in thicket clumps (Happold & Happold 1991).

Leporidae (hares)

1. Hare *Lepus saxatilis*. Present and locally common in woodland.

Red Rock Hare *Pronolagus rupestris*. “Present” in Lengwe according to Rowan Martin (Anon. 2000b, 2001), but Dowsett unaware of the evidence for this, and the species is completely unknown west of the Shire Valley in Malawi (Ansell & Dowsett 1988).

Macroscelididae (elephant-shrews)

Four-toed Elephant-shrew *Petrodromus tetradactylus*. Quite common in thicket and thicket clumps in Lengwe.

Peters’s Short-snouted Elephant-shrew *Elephantulus fuscus*. It is listed for Lengwe (Sherry & Ridgeway 1984), but it is not clear what records there are, if any.

Checkered Elephant-shrew *Rhynchocyon cirnei*. Reported from Lengwe (Sherry & Ridgeway 1984).

9.2 Annex 2. Birds of Lengwe NP

No.	ENGLISH NAME	SCIENTIFIC NAME	LAST RECORDED	OCCURRENCE	REMARKS
1	Abdim's Stork	<i>Ciconia abdimii</i>	2015	Resident, Rare	unconfirmed
2	African Barred Owlet	<i>Glaucidium capense</i>	2015	Resident, Rare	
3	African Black Swift	<i>Apus barbatus</i>	2015	Resident, Rare	unconfirmed
4	African Broadbill	<i>Smithornis capensis</i>	2015	Resident, Rare	unconfirmed
5	African Crake	<i>Crexopsis egregia</i>	2015	Resident, Rare	unconfirmed
6	African Crowned Eagle	<i>Stephanoaetus coronatus</i>	2020	Resident, Common	unconfirmed, NTH*
7	African Cuckoo	<i>Cuculus gularis</i>	2015	Resident, Rare	unconfirmed
8	African Cuckoo-Hawk	<i>Aviceda cuculoides</i>	2015	Resident, Rare	unconfirmed
9	African Firefinch	<i>Lagonosticta rubricata</i>	2020	Resident, Rare	
10	African fish Eagle	<i>Haliaeetus vocifer</i>	2020	Resident, Rare	confirmed
11	African Golden Oriole	<i>Oriolus auratus</i>	2002	Resident, Common	unconfirmed
12	African Goshawk	<i>Accipiter tachiro</i>	2020	Resident, Common	confirmed
13	African Grey Hornbill	<i>Lophoceros nasutus</i>	2020	Resident, Common	confirmed
14	African Hawk Eagle	<i>Aquila spilogaster</i>	2020	Resident, Rare	confirmed
15	African Hoopoe	<i>Upupa Africana</i>	2020	Resident, Common	unconfirmed
16	African Jacana	<i>Actophilornis africanus</i>	2020	Resident, Rare	confirmed
17	African Marsh Harrier	<i>Circus ranivorus</i>	2020		
18	African Mourning Dove	<i>Streptopelia decipiens</i>	2015	Resident, Common	unconfirmed
19	African Moustached Warbler	<i>Melocichla mentalis</i>	2002	Resident, Rare	unconfirmed
20	African Openbill Stork	<i>Anastomus lamelligerus</i>	2020	Resident, Common	confirmed
21	African Palm Swift	<i>Cypsiurus parvus</i>	2020	Resident, Common	confirmed
22	African Paradise Flycatcher	<i>Terpsiphone viridis</i>	2020	African Migrant, Common	
23	African Penduline-Tit	<i>Anthoscopus caroli</i>	2020	Resident, Common	
24	African Pied Wagtail	<i>Motacilla aguimp</i>	2015	Resident, Common	unconfirmed
25	African Pipit	<i>Anthus cinnamomeus</i>	2020		
26	African Pygmy Kingfisher	<i>Ispidina picta</i>	2020	African Migrant, Rare	confirmed
27	African Reed Warbler	<i>Acrocephalus baeticatus</i>	2002	African Migrant	unconfirmed
28	African Rock Martin	<i>Hirundo fuligula</i>	2002	Resident, Rare	unconfirmed
29	African Scops Owl	<i>Otus senegalensis</i>	2015	Resident, Rare	unconfirmed

30	African-barred owlet	<i>Glaucidium capense</i>	2002	Resident, Rare	unconfirmed
31	Amethyst Sunbird	<i>Chalcomitra amethystina</i>	2020	Resident, Rare	confirmed
32	Arnot's Chat	<i>Myrmecocichla arnoti</i>	2020	Resident, Common	confirmed
33	Arrow-marked Babbler	<i>Turdoides jardineii</i>	2020	Resident, Rare	confirmed
34	Ashy Flycatcher	<i>Muscicapa caerulescens</i>	2020	Resident, Common	unconfirmed
35	Ayres's Hawk Eagle	<i>Hieraaetus ayresii</i>	2015	Resident, Rare	unconfirmed
36	Barn Owl	<i>Tyto alba</i>	2002	Resident, Common	unconfirmed
37	Barn Swallow	<i>Hirundo rustica</i>	2015	Migrant, Common	unconfirmed
38	Barred Long-tailed Cuckoo	<i>Cercococcyx montanus</i>	2015	African Migrant, Rare	unconfirmed
39	Basra Reed Warbler	<i>Acrocephalus griseldis</i>	2015	Migrant, Rare,	unconfirmed, CEN*
40	Bateleur	<i>Terathopius ecaudatus</i>	2020	Resident, Common.	confirmed, END*
41	Bat-like Spinetail	<i>Neafrapus boehmi</i>	1983	Resident, Rare	unconfirmed
42	Bearded Scrub-robin	<i>Cercotrichas quadrivirgata</i>	2020		
43	Bearded Woodpecker	<i>Thripias namaquus</i>	2020	Resident, Common	confirmed
44	Bennett's Woodpecker	<i>Campethera bennettii</i>	2020	Resident, Rare	confirmed
45	Black (Yellow-billed) Kite	<i>Milvus migrans</i>	2002	African Migrant	unconfirmed
46	Black Cuckoo	<i>Cuculus clamosus</i>	2015	African Migrant, Common	unconfirmed
47	Black Cuckoo Shrike	<i>Campephaga flava</i>	2015	Resident, Common	unconfirmed
48	Black Goshawk	<i>Accipiter melanoleucus</i>	2002	Resident, Rare	unconfirmed
49	Black Saw-wing	<i>Psalidoprocne pristoptera</i>	2015	African Migrant, Common	unconfirmed
50	Black Stork	<i>Ciconia nigra</i>	2015	Resident, Rare	unconfirmed
51	Black-and-white Flycatcher	<i>Bias musicus</i>	2015	Resident, Rare	unconfirmed
52	Black-backed puffback	<i>Dryoscopus cubla</i>	2020	Resident, Common	unconfirmed
53	Black-bellied Bustard	<i>Eupodotis melanogaster</i>	2020	Resident, Rare	confirmed
54	Black-breasted Snake Eagle	<i>Circaetus gallicus pectoralis</i>	2020	Resident, Rare	
55	Black-collared Barbet	<i>Lybius torquatus</i>	2020	Resident, Common	confirmed
56	Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	2015	Resident, Rare	unconfirmed
57	Black-crowned Tchagra	<i>Tchagra senegalus</i>	2020	Resident, Common	
58	Black-headed Heron	<i>ardea melanocephala</i>	2015	Resident, Rare	unconfirmed
59	Black-rumped Buttonquail	<i>Turnix nanus</i>	2015	African Migrant, Rare	unconfirmed

60	Black-shouldered Kite	<i>Elanus axillaris</i>	2015	Resident, Rare	unconfirmed
61	Black-throated Wattle-eye	<i>Platysteira peltata</i>	2020	Resident, Common	confirmed
62	Black-winged Red Bishop	<i>Euplectes hordeaceus</i>	2015	Resident, Common	unconfirmed
63	Black-winged Stilt	<i>Himantopus himantopus</i>	2015	Resident, Rare	unconfirmed
64	Bleating camaroptera	<i>Camaroptera brachyura</i>	2015	Resident, Common	unconfirmed
65	Blue Quail	<i>Excalfactoria adansonii</i>	2015	African Migrant	unconfirmed
66	Blue-cheeked Bee-eater	<i>Merops persicus</i>	2015	Parlearctic Common	Migrant, unconfirmed
67	Blue-mantled Flycatcher	<i>Trochocercus cyanomelas</i>	2015	Resident, Common	unconfirmed
68	Blue-spotted Dove	<i>Turtur afer</i>	2020	Resident, Rare	confirmed
69	Böhm's Bee-eater	<i>Merops boehmi</i>	2020	Resident, Common	confirmed
70	Booted Eagle	<i>Hieraetus pennatus</i>	2015	Parlearctic Rare	Migrant, unconfirmed
71	Broad-billed Roller	<i>Eurystomus glaucurus</i>	2015	African Common	Migrant, unconfirmed
72	Broad-tailed whydah	paradise <i>Vidua obtusa</i>	2015	Resident, Rare	unconfirmed
73	Bronze Mannikin	<i>Lonchura cucullata</i>	2020	Resident, Rare	confirmed
74	Bronze-winged Courser	<i>Rhinoptilus chalcopterus</i>	2020	Resident, Common	confirmed
75	Brown-backed Honeyguide	<i>Prodotiscus regulus</i>	2015	Resident, Rare	unconfirmed
76	Brown-crowned tchagra	<i>Tchagra australis</i>	2015	Resident, Common	unconfirmed
77	Brown-headed Parrot	<i>Poicephalus cryptoxanthus</i>	2020	Resident, Rare	confirmed
78	Brown-hooded Kingfisher	<i>Halcyon albiventris</i>	2020	Resident, Common	unconfirmed
79	Brown-necked (Cape) Parrot	<i>P. fuscicollis fuscicollis</i>	2015	Resident, Rare	unconfirmed
80	Brubru	<i>Nilaus afer</i>	2020	Resident, Common	confirmed
81	Bully Canary	<i>Crithagra sulphurata</i>	2020	Resident, Rare	confirmed
82	Burchell's Coucal	<i>Centropus burchellii</i>	2020	Resident, Common	confirmed
83	Burnt-necked Eremomela	<i>Eremomela usticollis</i>	2020	Resident, Common	confirmed
84	Bushveld Pipitica	<i>Anthus caffer</i>	2020	Resident, Common	unconfirmed
85	Cabanis bunting	<i>Emberiza cabanis</i>	2020	Resident, Rare	unconfirmed
86	Cape bunting	<i>Emberiza capensis</i>	2020	Resident, Rare	unconfirmed
87	Cape Turtle Dove	<i>Streptopelia capicola</i>	2020	Resident, Common	confirmed
88	Cardinal Woodpecker	<i>Dendropicos fuscescens</i>	2020	Resident, Common	confirmed
89	Cattle Egret	<i>Bubulcus ibis</i>	2015	Resident, Rare	unconfirmed

90	Chestnut-backed Finch Lark	<i>Eremopterix leucotis</i>	2002	Resident, Common	unconfirmed
91	Chinspot Batis	<i>Batis molitor</i>	2020	Resident, Common	confirmed
92	Cinnamon-breasted Bunting	Rock <i>Emberiza tahapisi</i>	2020	African Common	Migrant, confirmed
93	Collared Palm Thrush	<i>Cichladusa arquata</i>	2015	Resident, Common	unconfirmed
94	Collared Sunbird	<i>Hedydipna collaris</i>	2020	Resident, Common	confirmed
95	Common Bulbul	<i>Pycnonotus barbatus</i>	2002	Resident, Common	unconfirmed
96	Common Buzzard	<i>Buteo buteo</i>	2015	Parlearctic Common	Migrant, unconfirmed
97	Common Cuckoo	<i>Cuculus canorus</i>	2015	Parlearctic Common	Migrant, unconfirmed
98	Common Moorhen	<i>Gallinula chloropus</i>	2015	Resident, Rare	unconfirmed
99	Common Sandpiper	<i>Actitis hypoleucos</i>	2020	Parleactic Rare	Migrant, confirmed
100	Common Scimitarbill	<i>Rhinopomastus cyanomelas</i>	2015	Resident, Rare	unconfirmed
101	Common Swift	<i>Apus apus</i>	2015	Parlearctic Common	Migrant, unconfirmed
102	Common Waxbill	<i>Estrilda astrild</i>	2020	Resident, Common	confirmed
103	Coppery Sunbird	<i>Nectarinia cuprea</i>	2015	Resident, Common	unconfirmed
104	Crested Barbet	<i>Trachyphonus vaillantii</i>	2020	Resident, Common	confirmed
105	Crested Francolin	<i>Dendroperdix sephaena</i>	2015	Resident, Common	unconfirmed
106	Crested Guinea fowl	<i>Guttera pucherani</i>	2020	Resident, Common	confirmed
107	Croaking Cisticola	<i>Cisticola natalensis</i>	2015	Resident, Rare	unconfirmed
108	Crowned Hornbill	<i>Lophoceros alboterminatus</i>	2020	Resident, Common	confirmed
109	Cut-throat Finch	<i>Amadina fasciata</i>	2020	Resident, Rare	confirmed
110	Dabchick	<i>Tachybaptus ruficollis</i>	2020	Resident, Rare	unconfirmed
111	Dark-backed Weaver	<i>Ploceus bicolor</i>	2020	Resident, Common	confirmed
112	Dark-caped Bulbul	<i>Pycnonotus capensis</i>	2020	Resident, Common	
113	Dickinson's Kestrel	<i>Falco dickinsoni</i>	2020	Resident, Rare	confirmed
114	Diederick Cuckoo	<i>Chrysococcyx caprius</i>	2020	African Common	Migrant, confirmed
115	Dusky Flycatcher	<i>Muscicapa adusta</i>	2002	Resident, Rare	unconfirmed
116	Dwarf Bittern	<i>Ixobrychus sturmii</i>	2015	African Migrant, Rare	unconfirmed
117	Eastern Bearded Scrub Robin	<i>Erythropygia quadrivirgata</i>	2002	Resident, Rare	unconfirmed
118	Eastern Black-headed Oriole	<i>Oriolus larvatus</i>	2020	Resident, Common	unconfirmed

119	Eastern Nicator	<i>Nicator gularis</i>	2020	Resident, Common	
120	Eastern Red-footed Falcon	<i>Falco amurensis</i>	2015	Parleartic Common	Migrant, unconfirmed, NTH*
121	Egyptian Goose	<i>Alopochen aegyptiaca</i>	2015	Resident, Rare	unconfirmed
122	Emerald Cuckoo	<i>Chrysococcyx cupreus</i>	2002	African Common	Migrant, unconfirmed
123	Emerald-spotted Dove	<i>Turtur chalcospilos</i>	2020	Resident, Common	confirmed
124	European Bee-eater	<i>Merops apiaster</i>	2015	Parleartic Common	Migrant, unconfirmed
125	European Golden Oriole	<i>Oriolus oriolus</i>	2015	Parleartic Rare	Migrant, unconfirmed
126	European Hobby	<i>Falco subbuteo</i>	2015	Parleartic Common	Migrant, unconfirmed
127	European Marsh Warbler	<i>Acrocephalus palustris</i>	2002	Parleartic Common	Migrant, unconfirmed
128	European Nightjar	<i>Caprimulgus europaeus</i>	2015	Parleartic Rare	Migrant, unconfirmed
129	European Roller	<i>Coracias garrulus</i>	2020	Migrant, Common	confirmed, NTH*
130	European Sand Martin	<i>Riparia riparia</i>	2015	Parleartic Rare	Migrant, unconfirmed
131	Familiar Chat	<i>Cercomela familiaris</i>	2015	Resident, Rare	unconfirmed
132	Fan-tailed Widowbird	<i>Euplectes axillaris</i>	2020		
133	Fiery-necked Nightjar	<i>Caprimulgus pectoralis</i>	2015	Resident, Common	unconfirmed
134	Flappet Lark	<i>Mirafraga rufocinnamomea</i>	2020	Resident, Common	confirmed
135	Fork-tailed Drongo	<i>Dicrurus adsimilis</i>	2020	Resident, Common	confirmed
136	Freckled Rock Nightjar	<i>Caprimulgus tristigma</i>	2015	Resident, Rare	unconfirmed
137	Gabar Goshawk	<i>Micronisus gabar</i>	2020	Resident, Rare	confirmed
138	Gaboon Nightjar	<i>Caprimulgus fossii</i>	2002	Resident, Common	unconfirmed
139	Garden Warbler	<i>Sylvia borin</i>	2015	Parleartic Rare	Migrant, unconfirmed
140	Giant Eagle Owl	<i>Bubo lacteus</i>	2002	Resident, Common	unconfirmed
141	Giant Kingfisher	<i>Megaceryle maxima</i>	2002	Resident, Rare	unconfirmed
142	Glossy Ibis	<i>Plegadis falcinellus</i>	2015	Resident, Rare	unconfirmed
143	Golden-rumped Tinkerbird	<i>Pogoniulus bilineatus</i>	2002	Resident, Common	unconfirmed
144	Golden-tailed Woodpecker	<i>Campethera abingoni</i>	2020	Resident, Rare	confirmed
145	Goliath Heron	<i>Ardea goliath</i>	2015	Resident, Rare	unconfirmed

146	Great Reed Warbler	<i>Acrocephalus arundinaceus</i>	2015	Migrant, Rare	unconfirmed
147	Great Spotted Cuckoo	<i>Clamator glandarius</i>	2015	African Migrant, Rare	unconfirmed
148	Great Spotted Eagle	<i>Clanga clanga</i>	2002	Parleactic Rare	Migrant, unconfirmed, VUL*
149	Great White Egret	<i>Ardea alba</i>	2015	Resident, Rare	unconfirmed
150	Great White Pelican	<i>Pelecanus onocrotalus</i>	2015	Resident, Rare	unconfirmed
151	Greater Black-backed Cisticola	<i>Cisticola galactotes</i>	2002	Resident, Common	unconfirmed
152	Greater Blue-eared Starling	<i>Lamprotornis chalybaeus</i>	2020	Resident, Common	confirmed
153	Greater Honeyguide	<i>Indicator indicator</i>	2020	Resident, Common	confirmed
154	Greater-painted Snipe	<i>Rostratula benghalensis</i>	2015	Resident, Rare	unconfirmed
155	Green Coucal	<i>Ceuthmochares aereus</i>	2015	Resident, Common	unconfirmed
156	Green Indigo bird	<i>Vidua codringtoni</i>	1991	Resident, Rare	unconfirmed
157	Green Pigeon	<i>Treron australis</i>	2020	Resident, Rare	unconfirmed
158	Green Sandpiper	<i>Tringa ochropus</i>	2002	Parleactic Common	Migrant, unconfirmed
159	Green Shank	<i>Tringa nebularia</i>	1981	Parleactic Rare	Migrant, unconfirmed
160	Green Twinspot	<i>Mandingoa nitidula</i>	2015	Resident, Rare	unconfirmed
161	Green Wood Hoopoe	<i>Phoeniculus purpureus</i>	2020	Resident, Common	
162	Green-backed Camaroptera	<i>Camaroptera brachyura</i>	2020	Resident, Common	confirmed
163	Green-backed Heron	<i>Butorides striatus</i>	2015	Resident, Rare	unconfirmed
164	Green-capped Eremomela	<i>Eremomela scotops</i>	2020	Resident, Common	unconfirmed
165	Green-winged Pytilia	<i>Pytilia melba</i>	2020	Resident, Common	
166	Grey Go-away Bird	<i>Crinifer concolor</i>	2020		
167	Grey Heron	<i>Ardea cinerea</i>	2020	Resident, Rare	confirmed
168	Grey Hornbill	<i>Tockus nasutus</i>	2020	Resident, Common	
169	Grey Lourie	<i>Corythaixoides concolor</i>	2020	Resident, Common	confirmed
170	Grey Penduline Tit	<i>Anthoscopus caroli</i>	2020	Resident, Common	confirmed
171	Grey Sunbird	<i>Cyanomitra verreauxii</i>	2015	Resident, Common	unconfirmed
172	Grey-backed Camaroptera	<i>Camaroptera brevicaudata</i>	2020	Resident, Common	unconfirmed
173	Grey-headed Bush Shrike	<i>Malaconotus blanchoti</i>	2020	Resident, Common	
174	Grey-headed Sparrow	<i>Passer griseus</i>	2020	Resident, Common	
175	Grey-headed Kingfisher	<i>Halcyon leucocephala</i>	2015	African Migrant, Rare	unconfirmed

176	Grey-rumped Swallow	<i>Pseudhirundo griseopyga</i>	2020		
177	Gymnogene	<i>Polyboroides typus</i>	2020	Resident, Common	unconfirmed
178	Hadedda Ibis	<i>Bostrychia hagedash</i>	2020	Resident, Common	confirmed
179	Half-collared Kingfisher	<i>Alcedo semitorquata</i>	2020	Resident, Common	confirmed
180	Harlequin Quail	<i>Coturnix delegorguei</i>	2020	Resident, Common	unconfirmed
181	Harmekop Scopus	<i>Scopus umbrette</i>	2020	Resident, Common	confirmed
182	Helmeted Guineafowl	<i>Numida meleagris</i>	2020	Resident, Rare	unconfirmed
183	Heuglin's Robin	<i>Cossypha heuglini</i>	2002	Resident, Common	unconfirmed
184	Hildebrandt's Francolin	<i>Pternistis hildebrandti</i>	2015	Parleactic Rare	Migrant, unconfirmed
185	Holub's Golden Weaver	<i>Ploceus xanthops</i>	2002	Resident, Rare	unconfirmed
186	Honey Buzzard	<i>Pernis apivorus</i>	2020	Migrant, Rare	confirmed
187	Hooded Vulture	<i>Necrosyrtes monachus</i>	2015	Resident, Rare	unconfirmed, CEN*
188	Horus Swift	<i>Apus horus</i>	2015	Parleactic Rare	Migrant, unconfirmed
189	House Martin	<i>Delichon urbicum</i>	2015	Parleactic Rare	Migrant, unconfirmed
190	Icterine Warbler	<i>Hippolais icterina</i>	2015	Parleactic Rare	Migrant, unconfirmed
191	Jacobin Cuckoo	<i>Clamator jacobinus</i>	2020	Resident, Common	confirmed
192	Jameson's Firefinch	<i>Lagonosticta rhodopareia</i>	2020	Resident, Common	unconfirmed
193	Klaas's Cuckoo	<i>Chrysococcyx klaas</i>	2015	Resident, Common	unconfirmed
194	Knob-billed Duck	<i>Sarkidiornis melanotos</i>	2019	Resident, Rare	unconfirmed
195	Kurrichane Buttonquail	<i>Turnix sylvaticus</i>	2020	Resident, Common	confirmed
196	Kurrichane Thrush	<i>Turdus libonyana</i>	2020	Resident, Rare	unconfirmed
197	Lanner Falcon	<i>Falco biarmicus</i>	2015	Resident, Rare	unconfirmed
198	Lappet-faced Vulture	<i>Torgos tracheliotos</i>	2015	Resident, Rare	unconfirmed, VUL*
199	Large-striped Pipit	<i>Anthus lineiventris</i>	2020	Resident, Rare	confirmed
200	Laughing Dove	<i>Spilopelia senegalensis</i>	2020	Resident, Common	unconfirmed
201	Lazy Cisticola	<i>Cisticola aberrans</i>	2020		
202	Lead-coloured Flycatcher	<i>Myioparus plumbeus</i>	2020	Resident, Rare	confirmed
203	Lemon-breasted Canary	<i>Crithagra citrinpectus</i>	2020	Resident, Common	unconfirmed
204	Lesser Black-winged Plover	<i>Vanellus lugubris</i>	2002	Resident, Common	unconfirmed

205	Lesser Blue-eared Starling	<i>Lamprotornis chloropterus</i>	2002	Resident, Common	unconfirmed
206	Lesser cuckoo	<i>Cuculus poliocephalus</i>	2002	Migrant, Rare	unconfirmed
207	Lesser Honeyguide	<i>Indicator minor</i>	2020	Parlearctic Rare	Migrant, confirmed
208	Lesser Masked Weaver	<i>Ploceus intermedius</i>	2020	Resident, Common	confirmed
209	Lesser Spotted Eagle	<i>Clanga pomarina</i>	2020	Parleactic Rare	Migrant, confirmed
210	Lesser Swamp Warbler	<i>Acrocephalus gracilirostris</i>	2020	Resident, Rare	confirmed
211	Levaillant's cisticola	<i>Cisticola tinniens</i>	2020	Resident, Common	confirmed
212	Lilac-breasted Roller	<i>Coracias caudatus</i>	2020	Resident, Common	confirmed
213	Little Bee-eater	<i>Merops pusillus</i>	2020	Resident, Rare	unconfirmed
214	Little Egret	<i>Egretta garzetta</i>	2002	Resident, Rare	unconfirmed
215	Little Sparrowhawk	<i>Accipiter minullus</i>	2015	Resident, Rare	unconfirmed
216	Little Spotted Woodpecker	<i>Campethera cailliautii</i>	2002	Resident, Common	unconfirmed
217	Livingstone's Flycatcher	<i>Erythrocercus livingstonei</i>	2020	Resident, Common	confirmed
218	Lizard Buzzard	<i>Kaupifalco monogrammicus</i>	2020	Resident, Common	confirmed
219	Long-billed Crombec	<i>Sylvietta rufescens</i>	2020	Resident, Rare	unconfirmed
220	Long-crested Eagle	<i>Lophaetus occipitalis</i>	2015	Resident, Rare	unconfirmed
221	Long-tailed (Mountain) Wagtail	<i>Motacilla clara</i>	2002	Resident, Rare	unconfirmed
222	Long-tailed Paradise Whydah	<i>Vidua paradisaea</i>	2015	Resident, Common	unconfirmed
223	Madagascar Bee-eater	<i>Merops superciliosus</i>	2015	Resident, Common	unconfirmed
224	Malachite Kingfisher	<i>Corythornis cristatus</i>	2015	Resident, Rare	unconfirmed
225	Marabou Stork	<i>Leptoptilos crumenifer</i>	2020	Resident, Common	
226	Marsh Sandpiper	<i>Tringa stagnatilis</i>	2020	Parleactic Rare	Migrant, unconfirmed
227	Martial Eagle	<i>Polemaetus bellicosus</i>	2020	Resident, Rare	unconfirmed, END*
228	Mascarene Martin	<i>Phedina borbonica</i>	2015	Resident, Common	unconfirmed
229	Miombo Barred Warbler	<i>Calamonastes undosus</i>	2002	Migrant, Rare	unconfirmed
230	Miombo Blue-eared Starling	<i>Lamprotornis elisabeth</i>	2020		
231	Montagu's Harrier	<i>Circus pygargus</i>	2015	Parleactic Rare	Migrant, unconfirmed
232	Mosque Swallow	<i>Cecropis senegalensis</i>	2015	Resident, Rare	unconfirmed
233	Mottled Spinetail	<i>Telacanthura ussheri</i>	2020	Resident, Rare	confirmed

234	Mourning Dove	<i>Zenaida macroura</i>	2020	Resident, Common	confirmed
235	Namaqua Dove	<i>Oena capensis</i>	2020	Resident, Common	unconfirmed
236	Narina Trogon	<i>Apaloderma narina</i>	2015	Resident, Common	unconfirmed
237	Neddicky	<i>Cisticola fulvicapilla</i>	2015	Resident, Common	unconfirmed
238	Olive Tree Warbler	<i>Hippolais olivetorum</i>	2015	Resident, Rare	unconfirmed
239	Orange-breasted Bush Shrike	<i>Chlorophoneus sulfureopectus</i>	2020	Resident, Rare	confirmed
240	Orange-winged Pytilia	<i>Pytilia afra</i>	2020	Resident, Rare	unconfirmed
241	Ovambo Sparrowhawk	<i>Accipiter ovampensis</i>	2015	Resident, Rare	unconfirmed
242	Pale-billed Hornbill	<i>Lophoceros pallidirostris</i>	2020	Resident, Common	confirmed
243	Pale-chanting goshawk	<i>Melierax canorus</i>	2020	Resident	unconfirmed
244	Pallid Flycatcher	<i>Melaenornis pallidus</i>	2015	Resident, Common	unconfirmed
245	Paradise Flycatcher	<i>Terpsiphone</i>	2002	African Common	Migrant, unconfirmed, VUL*
246	Parasitic Weaver	<i>Anomalospiza imberbis</i>	2002	Resident, Common	unconfirmed
247	Pearl-spotted Owlet	<i>Glaucidium perlatum</i>	2015	Resident, Rare	unconfirmed
248	Pel's Fishing Owl	<i>Scotopelia peli</i>	2015	Resident, Common	unconfirmed
249	Pennant-winged Nightjar	<i>Caprimulgus vexillarius</i>	2015	Resident, Common	unconfirmed
250	Pied Crow	<i>Corvus albus</i>	2015	Resident, Rare	unconfirmed
251	Pied Kingfisher	<i>Ceryle rudis</i>	2015	Resident, Rare	unconfirmed
252	Pink-backed Pelican	<i>Pelecanus rufescens</i>	2015	Resident, Rare	unconfirmed
253	Pin-tailed whydah	<i>Vidua macroura</i>	2015	Resident, Rare	unconfirmed
254	Purple Heron	<i>Ardea purpurea</i>	2020	Resident, Rare	confirmed
255	Purple Indigobird	<i>Vidua purpurascens</i>	2020	Resident, Rare	unconfirmed
256	Purple Roller	<i>Eurystomus azureus</i>	2015	African Migrant, Rare	unconfirmed
257	Purple-banded Sunbird	<i>Cinnyris bifasciatus</i>	2015	Resident, Common	unconfirmed
258	Purple-crested Turaco	<i>Gallirex porphyreolophus</i>	2015	Resident, Common	unconfirmed
259	Racket-tailed Roller	<i>Coracias spatulatus</i>	2020	Resident, Common	confirmed
260	Rattling Cisticola	<i>Cisticola chiniana</i>	2020	Resident, Common	unconfirmed
261	Red-backed Mannikin	<i>Spermestes nigriceps</i>	2020	Parleactic Common	Migrant, confirmed
262	Red-backed Shrike	<i>Lanius collurio</i>	2020	Parleactic Common	Migrant, confirmed
263	Red-bellied Helmet Shrike	<i>Prionops caniceps</i>	2020		

264	Red-billed Firefinch	<i>Lagonosticta senegala</i>	2020	Resident, Rare	unconfirmed
265	Red-billed Oxpecker	<i>Buphagus erythrorhynchus</i>	2020	Resident, Common	confirmed
266	Red-billed Quelea	<i>Quelea quelea</i>	2020	Resident, Common	unconfirmed
267	Red-capped Robin Chat	<i>Cossypha natalensis</i>	2020	Resident, Common	unconfirmed
268	Red-chested Cuckoo	<i>Cuculus solitarius</i>	2015	Resident, Rare	unconfirmed
269	Red-collared Wydah	<i>Euplectes ardens</i>	2020	Resident, Common	confirmed
270	Red-eyed Dove	<i>Streptopelia semitorquata</i>	2020	Resident, Common	confirmed
271	Red-faced Cisticola	<i>Cisticola erythrops</i>	2020	Resident, Common	confirmed
272	Red-faced Crombec	<i>Sylvietta whytii</i>	2020		
273	Red-faced Mousebird	<i>Urocolius indicus</i>	2020	Resident, Common	unconfirmed
274	Red-headed Quelea	<i>Quelea erythrops</i>	2020	African Common	Migrant, confirmed
275	Red-headed Weaver	<i>Anaplectes rubriceps</i>	2020	Resident, Rare	unconfirmed
276	Red-necked Falcon	<i>Falco chicquera</i>	2002	Resident, Common	unconfirmed, NTH*
277	Red-necked Francolin	<i>Pternistis afer</i>	2015	Resident, Common	unconfirmed
278	Red-throated Twinspot	<i>Hypargos niveoguttatus</i>	2020	Resident, Common	unconfirmed
279	Red-winged Starling	<i>Onychognathus morio</i>	2015	Resident, Rare	unconfirmed
280	Reed Cormorant	<i>Microcarbo africanus</i>	2015	Resident, Common	unconfirmed
281	Retz's Red-billed Shrike	Helmet <i>Prionops retzii</i>	2015	Resident, Common	unconfirmed
282	Richard's Pipit	<i>Anthus richardi</i>	2015	Resident, Rare	unconfirmed
283	River Warbler	<i>Locustella fluviatilis</i>	2015	Resident, Rare	unconfirmed
284	Rudd's Apalis	<i>Apalis ruddi</i>	2020	Resident, Rare	unconfirmed
285	Saddle-billed stork	<i>Ephippiorhynchus senegalensis</i>	2015	Resident, Rare	unconfirmed
286	Scaly-throated Honeyguide	<i>Indicator variegatus</i>	2020	Resident, Common	confirmed
287	Scarlet-chested Sunbird	<i>Chalcomitra senegalensis</i>	2020	Resident, Common	confirmed
288	Secretary Bird	<i>Sagittarius serpentarius</i>	2015	Rare	unconfirmed, END*
289	Shelley's Francolin	<i>Scleroptila shelleyi</i>	2015	Resident, Rare	unconfirmed
290	Shikra	<i>Accipiter badius</i>	2020	Resident, Common	confirmed
291	Short-winged Cisticola	<i>Cisticola brachypterus</i>	2020	Resident, Common	unconfirmed
292	Sombre Bulbul	<i>Andropadus importunus</i>	2020	Resident, Common	confirmed
293	Sourthen Masked Weaver	<i>Ploceus velatus</i>	2015	Resident, Rare	unconfirmed

294	Southern Black Flycatcher	<i>Melaenornis pammelaina</i>	2020	Resident, Common	confirmed
295	Southern Black Tit	<i>Melaniparus niger</i>	2020	Resident, Rare	confirmed
296	Southern Blue Waxbill	<i>Uraeginthus angolensis</i>	2020	Resident, Common	confirmed
297	Southern Brown-throated Weaver	<i>Ploceus xanthopterus</i>	2020	Resident, Common	unconfirmed
298	Southern Carmine Bee-eater	<i>merops nubicoides</i>	2020	Resident, Common	confirmed
299	Southern Grey-headed Sparrow	<i>Passer diffuses</i>	2020	Resident, Common	unconfirmed
300	Southern Ground Hornbill	<i>Bucorvus leadbeateri</i>	2015	Resident, Common	unconfirmed, VUL*
301	Southern Hyliota	<i>Hyliota australis</i>	2015	Resident, Common	unconfirmed
302	Southern Red Bishop	<i>Euplectes orix</i>	2020	Resident, Rare	confirmed
303	southern Red-billed Hornbill	<i>Tockus rufirostris</i>	2020	Resident, Common	confirmed
304	Southern Yellow-billed Hornbill	<i>Tockus leucomelas</i>	2020	Resident, Common	confirmed
305	Southern-banded Eagle	Snake <i>Circaetus fasciolatus</i>	2002	Resident, Common	unconfirmed
306	Speckled Mousebird	<i>Colius striatus</i>	2020	Resident, Common	confirmed
307	Spectacled Weaver	<i>Ploceus ocularis</i>	2020	Resident, Rare	unconfirmed
308	Spotted Dikkop	<i>Burhinus capensis</i>	2015	Resident, Common	unconfirmed
309	Spotted Eagle Owl	<i>Bubo africanus</i>	2015	Resident, Common	unconfirmed
310	Spotted Flycatcher	<i>Muscicapa striata</i>	2020	Parleactic Common	Migrant, confirmed
311	Spur-winged goose	<i>Plectropterus gambensis</i>	2020	Resident, Common	confirmed
312	Squaco Heron	<i>Ardeola ralloides</i>	2000	Resident, Rare	unconfirmed
313	Square-tailed Drongo	<i>Dicrurus ludwigii</i>	2020	Resident, Common	unconfirmed
314	Starred Robin	<i>Erithacus rubecula</i>	2002	Parleactic Rare	Migrant, unconfirmed
315	Steppe Eagle	<i>Aquila nipalensis</i>	2015	Parleactic Rare	Migrant, unconfirmed, END*
316	Striped Cuckoo	<i>Tapera naevia</i>	2020	Resident, Common	confirmed
317	Striped Kingfisher	<i>Halcyon chelicuti</i>	2020	Resident, Common	confirmed
318	Swallow-tailed Bee-eater	<i>Merops hirundineus</i>	2020	Resident, Rare	unconfirmed
319	Tambourine Dove	<i>Turtur tympanistria</i>	2020	Resident, Rare	confirmed
320	Tawny Eagle	<i>Aquila rapax</i>	2020	Resident, Common	confirmed
321	Tawny-flanked Prinia	<i>Prinia subflava</i>	2020	Resident, Common	unconfirmed

322	Temminck's Courser	<i>Cursorius temminckii</i>	2020	African Migrant, Rare	confirmed
323	Thick-billed Cuckoo	<i>Pachycoccyx audeberti</i>	2015	Resident, Common	unconfirmed
324	Thick-billed Weaver	<i>Amblyospiza albifrons</i>	2015	Resident, Rare	unconfirmed
325	Three-banded Plover	<i>Charadrius tricollaris</i>	2015	Parleactic Common	Migrant, unconfirmed
326	Thrush-Nightingale	<i>Luscinia luscinia</i>	2020	Resident, Common	confirmed
327	Tropical Boubou	<i>Laniarius major</i>	2020	Resident, Common	confirmed
328	Trumpeter Hornbill	<i>Bycanistes bucinator</i>	2020	Resident, Rare	unconfirmed
329	Variable Indigo bird	<i>Vidua funereal</i>	2020	Resident, Rare	confirmed
330	Variable Sunbird	<i>Cinnyris venustus</i>	2020	Resident, Rare	
331	Verreaux's eagle-owl	<i>Bubo lacteus</i>	2015	Resident, Common	
332	Village Indigo bird	<i>Vidua chalybeata</i>	2020	Resident, Rare	confirmed
333	Village Weaver	<i>Ploceus cucullatus</i>	2020	Resident, Rare	
334	Vincent Bunting	<i>Emberiza vincenti</i>	2020	Resident, Rare	unconfirmed
335	Violet-backed Starling	<i>Cinnyricinclus leucogaster</i>	2020	Resident, Rare	confirmed
336	Violet-backed Sunbird	<i>Anthreptes orientalis</i>	2020	Resident, Rare	confirmed
337	Wahlberg's Eagle	<i>Hieraaetus wahlbergi</i>	2020	African Migrant, Rare	unconfirmed
338	Wattled Starling	<i>Creatophora cinerea</i>	2020	African Migrant, Rare	confirmed
339	Western Banded Snake Eagle	<i>Circaetus cinereus</i>	2020	Resident, Common	confirmed
340	Western Banded Snake Eagle	<i>Circaetus cinerascens</i>	2020	Resident, Common	unconfirmed
341	Western Red-footed Falcon	<i>Falco vespertinus</i>	2020	Resident, Common	confirmed, NTH*
342	White Stork	<i>Ciconia Ciconia</i>	2020	Parleactic Common	Migrant, confirmed
343	White-backed Vulture	<i>Gyps africanus</i>	2020	Resident, CEN*	Common, confirmed
344	White-bellied Sunbird	<i>Cinnyris talatala</i>	2020	Resident, Common	unconfirmed
345	White-breasted shrike	Cuckoo- <i>Cebalepyris pectoralis</i>	2020	Resident, Common	confirmed
346	White-browed Scrub Robin	<i>Cercotrichas leucophrys</i>	2020	Resident, Common	confirmed
347	White-browed weaver	Sparrow- <i>Plocepasser mahali</i>	2020	Resident, Common	unconfirmed
348	White-crested Helmet Shrike	<i>Prionops plumatus</i>	2020	Resident, Common	
349	White-faced Duck	<i>Dendrocygna viduata</i>	2015	Resident, Rare	unconfirmed
350	White-faced Owl	<i>Otus leucotis</i>	1989	Resident, Rare	unconfirmed

351	White-headed Vulture	<i>Trigonoceps occipitalis</i>	2015	Resident, Common	unconfirmed, CEN*
352	White-throated Swallow	<i>Hirundo albigularis</i>	2020	African Migrant, Rare	confirmed
353	White-winged Whydah	<i>Euplectes albonotatus</i>	2020	Parlearctic Migrant, Common	unconfirmed
354	Willow Warbler	<i>Phylloscopus trochilus</i>	2015	Resident, Common	unconfirmed
355	Wood Owl	<i>Strix woodfordii</i>	2020	Parlearctic Migrant, Rare	unconfirmed
356	Wood Sandpiper	<i>Batis fratrurn</i>	2020	Resident, Rare	confirmed
357	Woodwards' Batis	<i>Batis Batis fratrurn</i>	2020	Resident, Rare	unconfirmed
358	Woolly-necked Stork	<i>Ciconia episcopus</i>	2015	Resident, Rare	confirmed, VUL*
359	Yellow Bishop	<i>Euplectes afer</i>	2015	Migrant, Rare	unconfirmed
360	Yellow Wagtail	<i>Motacilla flava</i>	2015	Resident, Rare	unconfirmed
361	Yellow White-eye	<i>Zosterops senegalensis</i>	2020	Resident, Common	unconfirmed
362	Yellow-bellied Eremomela	<i>Chlorocichla flaviventris</i>	2020	Resident, Common	confirmed
363	Yellow-bellied Greenbul	<i>Nectarinia venusta</i>	2020	Resident, Rare	confirmed
364	Yellow-bellied Sunbird	<i>Neodrepanis hypoxantha</i>	1981	Resident, Rare	unconfirmed
365	Yellow-billed Bulbul	<i>Alophoixus phaeocephalus</i>	2020		
366	Yellow-billed Egret	<i>Ardea aythya brachyrh</i>	2015	Resident, Rare	unconfirmed
367	Yellow-billed Kite	<i>Milvus aegyptius</i>	2020		
368	Yellow-billed Oxpecker	<i>Buphagus africanus</i>	2015	Resident, Common	unconfirmed
369	Yellow-billed Stork	<i>Mycteria ibis</i>	2015	Resident, Common	unconfirmed
370	Yellow-breasted Apalis	<i>Apalis flavida</i>	2020	Resident, Common	
371	Yellow-fronted Canary	<i>Serinus mozambicus</i>	2020	Resident, Common	confirmed
372	Yellow-fronted Tinkerbird	<i>Pogoniulus chrysoconus</i>	2020	Resident, Common	
373	Yellow-throated Sparrow	Bush <i>Gymnoris superciliaris</i>	2020	Resident, Common	unconfirmed
374	Yellow-throated Petronia	<i>Pytilia hypogrammica</i>	2020	Resident, Common	

Note. The abbreviations in remark column with an asterisk denotes: END = Endangered Species; CEN = Critically Endangered Species, NTH = Near Threatened and VUL = Vulnerable Species

9.3 Annex 3. Butterflies of Lengwe NP

Preliminary list of Butterflies from Lengwe National park

This list is adapted from Dowsett 2002. Where there is ‘?’ it means that the species is known to be occurring in the areas surrounding Lengwe NP but has not yet been confirmed from inside the park boundaries. One would expect these records to also occur within Lengwe NP although this needs to be confirmed through additional survey.

Hesperiidae (skippers) –

Coeliades forestan. Dowsett.

Tagiades flesus. Observed.

Calleagris jamesoni.

Sarangesa motozi. Dowsett. The possibility exists that some of these specimens are *S. ruona*, as the hyaline hindwing spot is often very small.

Sarangesa ruona – observed (JB) in numbers below North Hide and subsequently identified by Torben Larsen.

Netrobalane canopus. Dowsett.

Spialia dromus

Acada biseriata

Borbo fatuellus. Dowsett.

Papilionidae (swallowtails)

Papilio dardanus. Reported from **Lengwe** (Sherry & Ridgeway 1984) but evidently scarce.

Papilio constantinus. Observed (Dowsett).

Papilio nireus. Observed.

Papilio demodocus. Observed.

Graphium angolanus. Observed (Dowsett).

Graphium leonidas. Observed (Dowsett).

Graphium antheus. Observed (Dowsett).

Graphium porthaon. Dowsett. This Eastern nearendemic is recorded elsewhere in the Shire Valley only from Nsanje (Gifford 1965). Its known foodplants (e.g. *Artabotrys* Annonaceae) are common.

Pieridae (whites)

Catopsilia florella. Observed (Dowsett).

Eurema hecabe. Observed (Dowsett).

Eurema brigitta. Observed (Dowsett).

Eurema hapale. Observed (Dowsett).

Pinacopteryx eriphia. Observed (Dowsett).

Nepheronia argia. Observed.

Nepheronia thalassina. Observed.

Nepheronia buqueti. Dowsett. “Uncommon in Lower River” (Gifford 1965), but known also from Liwonde (Dudley 1992).

Eronia leda. Observed.

Colotis calais. Observed.

Colotis vesta. Dowsett.

Colotis ione. Observed.

Colotis regina. Dowsett.

Colotis danae. Observed (Dowsett).

Colotis antevippe. Dowsett.

Colotis evenina. Dudley) Seems to be scarce in the Shire Valley, whence otherwise known from Nsanje (Gifford 1965) and Liwonde (Dudley 1992), but its known foodplants (Capparidaceae) are common.

Colotis evippe. Observed.

Colotis evagore

Belenois zochalia. Observed (Dowsett).

Belenois aurota. Observed.

Belenois creona. Dowsett.

Belenois thysa

Belenois gidica. Dowsett.

Appias epaphia. Dowsett.

Leptosia alcesta. Dowsett.

Lycaenidae (blues) [The more difficult identifications are thanks to M. Libert]

Alaena nyassa.

Pentila tropicalis. Dowsett. This Eastern biome forest-associated species was known previously in Malawi only from the Malawi hills (Gifford 1965).

Baliochila hildegarda

Cnodontes vansomerani. Dowsett.

Lachnocnema durhani

Axiocerces bambana

Hypolycaena philippus. Observed.

Virachola sp. Dowsett (too damaged to identify with certainty).

Anthene amarah. Dowsett.

Petrelea sichela. Dowsett.

Cacyreus lingeus

Leptotes telicanus Observed.

Castalius calice. Dowsett.

Zizeeria knysna. Dowsett.

Zizula hylax. Dowsett.

Azanus moriqua.

Euchrysops malathana. Dowsett.

Euchrysops barkeri

Libytheidae(snouts)

Libythea labdaca.

Nymphalidae (nymphalids)

Charaxes jahlusa. Observed.

Charaxes achaemenes. Observed.

Charaxes jasius. Observed.

Charaxes castor. Observed.

Charaxes brutus. Dowsett.

Charaxes guderiana. Dowsett.

Charaxes phaeus. Dowsett.

Charaxes ethalion. ?

Charaxes bohemani. Observed (Dowsett).

Charaxes varanes. Observed.

Charaxes candiope. Observed (Dowsett).

Charaxes zoolina. Dowsett.

Euxanthe wakefieldi. Dowsett. (in forest on the Nkombedzi, near Bush Camp n° 6).

Euphaedra neophron. Observed.

Hamanumida daedalus. Observed.

Pseudacraea lucretia. Observed.

Neptis cf. *saclava*. Dowsett.

Neptis cf. *alta*. Observed.

Byblia anvatara. Dowsett.

Neptidopsis ophione. Dowsett. (Nkombedzi and South Thicket), Mar. and Apr. Otherwise known in southern Malawi only from Mulanje and Thyolo (Gifford 1965), although it occurs at low altitude in Mozambique (Dickson & Kroon 1978).

Eurytela dryope. Coll. Lengwe, being locally quite common.

Hypolimnias misippus. Seen in small numbers.

Hypolimnias deceptor. Coll. Lengwe (and quite common). This Eastern biome species has also been coll. in Liwonde National Park (Dudley 1992), although Gifford (1965) had no record from the Lower Shire Valley. Known foodplants are Urticaceae.

Salamis anacardii. Coll. Lengwe (where local in small numbers). This mainly evergreen-associated species was known previously from the Lower Shire in the Malawi Hills (Gifford 1965). Its known foodplants are various

Acanthaceae.

Salamis parhassus. Seen occasionally **Lengwe** (North Thicket).

Junonia oenone., coll. Lengwe; quite common.

Junonia hierta. Seen commonly.

Junonia orithya. Seen but not numerous.

Junonia natalica. Seen commonly, coll. Lengwe.

Catacroptera cloanthe. Seen occasionally, coll. Lengwe.

Vanessa cardui Seen once only in **Lengwe**. Dowsett.

[– *Antanartia* spp. Sherry & Ridgeway (1984) mention “admirals” from Lengwe, but the two species that occur in Malawi, *A. dimorphica* and *A. schaeneia*, are montane (Gifford 1965; pers. obs.)] – *Phalanta phalantha*. Observed. Dowsett.

Acraeidae (acraeas)

Acraea eponina. Seen commonly in all three reserves, coll. Lengwe, Majete.

Acraea encedon. Seen in all three reserves, coll. Lengwe.

Acraea natalica. Coll. in all three reserves, where common.

Acraea oncaea. Observed. Dowsett.

Satyridae (browns)

Melanitis leda. Seen Lengwe.

Bicyclus anynana. Coll. in all three reserves.

Bicyclus safitza. Coll. in all three reserves.

Danaidae

Danaus chrysippus. Observed.

Amauris echeria. Listed for Lengwe by Sherry & Ridgeway (1984), but as it is otherwise known from Malawi only in high-altitude forest (Gifford 1965; pers. obs.). This record needs confirmation.]

9.4 Annex 4: Wildlife Fund Order



GOVERNMENT NOTICE...

PUBLIC FINANCE MANAGEMENT ACT

(Cap. 37:02)

PUBLIC FINANCE MANAGEMENT (WILDLIFE CONSERVATION FUND)
ORDER, 2013

ARRANGEMENT OF PARAGRAPHS

ORDER

1. Citation and commencement
2. Establishment of the Fund
3. Purpose of the Fund
4. Capital of the Fund
5. Expenditure from the Fund
6. Responsibility for the Fund
7. Use of an overdraft facility
8. Annual estimates
9. Surpluses and deficiencies
10. Remittances to the Consolidated Fund

SCHEDULE

IN EXERCISE of the powers conferred by section 30 of the Public Finance

Management Act, I, DR. KEN LIPENGA, Minister of Finance, make the following order-

Citation and commencement	1. This order may be cited as the Public Finance Management (Wildlife Conservation Fund) Order, 2013, and shall come into operation on 1 st July, 2013.
Establishment of the Fund	2. There is hereby established the Public Finance Management (Wildlife Conservation Fund) (hereinafter referred to as the Fund), which shall consist of the Treasury Funds set out in the Schedule.
Purpose of the Fund	3. The Fund shall be used for purposes of conserving wildlife and promoting ecotourism in Malawi.
Capital of the Fund	4. The Fund shall consist of such moneys received for the purpose of the Fund, including such sums as may be received from park entry fees, concession fees, sale of souvenirs and other miscellaneous fees.
Expenditure from the Fund	5. Any payment from each of the Treasury Funds of an amount exceeding ten million kwacha (K10, 000,000) shall only be made upon approval of the Secretary to the Treasury.
Responsibility for the Fund	6. The Secretary for Tourism, Wildlife and Culture shall be responsible for administering the Fund, and shall, subject to the supervision and direction of the Treasury, maintain all necessary books and accounts to enable him produce annually, or at such other period as the Secretary to the Treasury may direct, an Income and Expenditure Account and such other accounts as may be required.

Use of an overdraft facility	7. No money shall be raised for the purposes of the Fund by means of an overdraft at any bank unless the permission of the Secretary to the Treasury has first been obtained.
Annual estimates	8. Annual Estimates of Income and Expenditure of the Fund shall be submitted, in quadruplicate, by the Secretary for Tourism, Wildlife and Culture for the approval of the Secretary to the Treasury.
Surpluses and deficiencies	9. When submitting Estimates in accordance with Paragraph 8, the Secretary for Tourism, Wildlife and Culture shall submit proposals for dealing with any actual or expected surplus or deficiency of the Fund and shall conform to such directions as the Secretary to the Treasury may think fit to give in relation thereto.
Remittances to the Consolidated Fund	10. Each Treasury Fund shall remit 25% of its revenue to the Consolidated Fund, 25% to the local communities living in areas surrounding the respective Treasury Fund's protected area, and the remaining 50% shall be retained by the Treasury Fund for the operational costs of its protected area.

SCHEDULE

(para. 2)

1. Kasungu Treasury Fund (made up of Kasungu National Park, Nkhotakota Wildlife Reserve and Lilongwe Nature Sanctuary);
2. Nyika Treasury Fund (made up of Nyika National Park, Vwaza Marsh Wildlife Reserve and Mzuzu Nature Sanctuary);
3. Lengwe Treasury Fund (made up of Lengwe National Park, Mwavi and Majete Wildlife Reserves and Michiru Nature Sanctuary);



4. Liwonde Treasury Fund; and

5. Lake Malawi Treasury Fund.

Dated this 17th day of July, 2013.


HON. KEN LIPENGA
Minister of Finance

(FILE NO. ...)

Table 12: Extract from the co-management agreement between DNPW and LWA

ARTICLE 2

RIGHTS AND OBLIGATIONS OF THE ASSOCIATION

1. The Association shall have access to selected harvestable wildlife resources as outlined in annex 4.
2. The Association shall have access to part of revenue accrued from the Lengwe National Park as defined in the Public Finance Management (Wildlife Conservation Fund) Order 2013.
3. The Association shall have a right to participate in decision making process in management of the park, particularly on community resource management activities as outlined in the Wildlife Policy.
- iv. Nothing in this agreement shall be taken to absolve the Association from compliance with the National Parks and Wildlife Act as amended from time to time, attendant regulations, the approved Lengwe National Park Management Plan and other pertinent laws of Malawi.
1. The Association has an obligation to ensure compliance with the National Parks and Wildlife Act, terms of this agreement and approved Lengwe National Park Management Plan, on the part of the Association members and employees of the Association and the local communities. In the event that the Association is unable to ensure compliance, the Association shall inform the appropriate government agency in writing to DNPW, which shall act to ensure compliance.

2. In fulfilling the terms of this agreement, the Association may seek advice from an appropriate government agency, or from any other appropriate source such as an NGO, or may employ an independent consultant.

Provided that the Director is informed in advance where an NGO or independent consultant are to be engaged.

3. The Association shall periodically present books of accounts to the Director concerning business activities such as maize mills, carbon trade and money from revenue sharing referred to in this agreement.
4. In order to carry out these rights and obligations, the Association shall develop a work plan and reports on annual basis of their activities as set out in Annex 2.

ARTICLE 3

RIGHTS AND OBLIGATIONS OF THE DNPW

1. The Director may suspend any benefit sharing scheme if there is a violation of the provisions of National Parks and Wildlife Act as amended, the terms of this agreement and Lengwe National Park Management Plan
2. The Director retains the right to ensure that wildlife resources are managed in the best interest of the nation as a whole.
3. The Director has an obligation to enforce National Parks and Wildlife Act as amended, the terms of this agreement and Lengwe National Park Management Plan, giving priority to written requests to this effect from the Association.
4. Where deemed appropriate, the Director shall support income generating activities for the Association.
5. The Director shall ensure that revenue sharing is implemented in a transparent and accountable manner.
6. The Director shall ensure that all benefits accrued from the park are properly recorded and reported
7. The Director shall ensure that there is effective joint monitoring of the activities of the Association under this agreement.
8. The Director shall have the powers to suspend part, any part or the whole of the agreement.

ARTICLE 4

DURATION OF THE AGREEMENT

1. This agreement shall have a duration of five years from the date of signing, unless terminated under the provision of Article 6 of this agreement.
2. This agreement shall be comprehensively reviewed after two years.

3. At the expiry of this agreement, it may be renewed for a further period of five years after a joint review by the parties of its terms.

ARTICLE 5

CONFLICT RESOLUTION

A dispute between the Parties arising out of the interpretation or implementation of this Agreement shall be settled amicably through consultation or negotiation. Where the Parties are unable to reach an agreement through such negotiation, the dispute shall be settled through arbitration using a third party.

In the event of any dispute arising under this agreement, which cannot be resolved by parties through steps above the aggrieved party shall refer the matter to the Minister. If the matter is not resolved by the Minister within a reasonable time, the parties may consider dissolution of the Agreement through a High Court order.

ARTICLE 6

TERMINATION OF THE AGREEMENT

1. This agreement may be terminated by the Association for whatever reasons following a three-month notification in writing to the Director.
2. This agreement may be terminated by the Director following a three month notice in writing to the Association on the following conditions:
 - i. The Association ceases to function effectively in compliance with its constitution.
 - ii. There is serious breach of the provisions of this agreement.
 - iii. If the continued operation of this agreement is not in the national interest.

ARTICLE 7

AMENDMENT OF THIS AGREEMENT

A Party may amend this Agreement through mutual consent and such amendments shall be signed and form part of the agreement.

ARTICLE 8

GENERAL INDEMNITY

Notwithstanding the provision of this agreement, no action shall lie against the government for recovery of any damage caused to any person or property by any animal in the Park

ANNEX 2

In accordance to section 7 and 8 of the Lengwe wildlife association, listed below are some of the activities of the association which the association is to undertake in order to fulfil its objective

GENERAL ACTIVITIES OF THE ASSOCIATION

1. Encourage the traditional /local leaders to sensitize the local communities to combat illegal activities.
2. To encourage tree planting in villages to combat deforestation inside and outside the park
3. To sensitize the ADCs on conservation issues
4. To report illegal resource users to community policing
5. To inform Lengwe park management about suspicious activities e.g. vehicles entering the park of trafficking illegal material .e.g timber, charcoal, wild animals
6. To encourage traditional/local leaders to discuss conservation issues at any gatherings of the village or area
7. To work with other stakeholders in management of wildlife resources.

9.5 Annex 5: Resources allowed to be harvested

Demand for park resources in all protected areas by local communities surrounding them is vast and, on the increase, due to depletion of such natural resources elsewhere. Hence to maintain a healthy and balanced ecosystem a proper research was conducted and some resources are restricted, quotas are set for others and proper mode of harvesting is outlined. The following are currently allowable harvestable resources in the park.

1. Thatch Grass
2. Wild Fruits
3. Palms leaves
4. Honey (Bee Keeping)
5. Medicinal plants (e.g. Strophanthus Kombe)
6. Any other resource which management can agree to be harvested.

Table 13: Strategy for livelihood interventions in lengwe NP

NO	ACTION	DETAILS
1	Assess previous implemented livelihoods (if any)	1. The targeted are maize mills, goat pass on, bee keeping, Tisunge heritage at Lengwe 2. Engage an expert on beekeeping but also target other beekeepers in Chikwawa. 3. Find out how many have benefited 4. Identify successes realized and challenged encountered 5. How best to run the existing ones 6. What other livelihood interventions are preferred

		7.	The lessons will be applied at Mwabvi since it's going to be the first time.
		8.	Link between the livelihood and conservation
2	Resource Use Program	9.	This is aimed to demonstrate the contribution of natural resources to peoples' livelihood and encourage them to participate in the protection of the wildlife resources
		10.	Guidelines have been developed for the implementation of the program for protected areas
		11.	This is already implemented at Lengwe where communities mostly harvest thatch grass.
		12.	Though not harvested, value addition for palm leaves can be considered through making of basket, chairs, etc.
		13.	At Mwabvi, an assessment has been done
		14.	Demarcation of resource use zone is required
3	Identify new livelihoods that contribute to conservation or has direct link to conservation	1.	There are a number of livelihoods that can be derived on natural resources.
		2.	The fruits commonly available are jujube (masau) especially in TA Ndakwera that can be made into juice
		3.	Bamboos and reeds are occurring in areas around Mwabvi that can be promoted for selling and value addition.
4	Livestock pass on	4.	Goat pass on is one of the most popular and successful livelihood programs
		5.	Guinea fowl which is already raised by some communities and can be considered
5	Solar powered irrigation	6.	Lower Shire dry spells which is worsened by climate change effects resulting poor harvest. As such most households (89%) do not have food throughout the year.
		7.	However, funds are not adequate under GEF to support this.
		8.	We need to seek support from other institutions/project including SVTP to support communities who will not benefit from the canal
6	Village Savings and Loans	9.	This has become popular intervention that provides loans for communities used for business that increase income generation
		10.	Need to be cautious when providing seed money for communities especially PA bordering communities and also forming groups specifically on VSL.

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|----|--|-----|---|
| | | 11. | The best approach is to build capacity for existing groups and provide them with VSL materials especially cash box and ledgers. |
| | | 12. | At Lengwe, existing groups are 6 tree nurseries groups |
| | | 13. | Need to consider training them in areas of managing meetings and shares, records keeping, business management, etc. |
| 7 | Community awareness- to make communities understand and link the livelihoods to conservation | 1. | Communities are not able to appreciate the link between existing livelihoods and conservation |
| | | 2. | This requires sensitization involving local leaders when initiating the livelihood intervention in a community. |
| | | 3. | There is need to brief key stakeholders especially local leaders, ADCs and LWA. This will include approach in identifying beneficiaries. |
| | | 4. | Conduct a rally when presenting support to beneficiaries |
| 8 | Involvement of other organisations on livelihood programs | 1. | Enhance collaboration of livelihood groups with LWA and other stakeholders |
| | | 2. | Provide support mostly technical and also capacity building for the success of the livelihood programs. Study/exchange visits should also be considered |
| | | 3. | Engage Forestry Department on bamboo propagation at Mwabvi |
| | | 4. | Where other NGOs are operating in the communities there is need to synchronize support in the communities. |
| | | 5. | NGOs supporting livelihood programs include CICCOT at Lengwe and CARD at Mwabvi under EU project. |
| | | 6. | Lobby support from such NGOs to support other livelihoods such as conservation agriculture and solar powered irrigation. |
| 10 | Develop monitoring indicators and implemented to be used when assessing the livelihoods | 1. | This will assist in tracking progress, success and addressing the challenges |
| | | 2. | The impacts of the livelihood on conservation can also be determined |
| | | 3. | Beneficiaries will be assessed on their level of income prior to receiving livelihood |
| | | 4. | Monitoring and evaluation should always be an ongoing activity |
| | | 5. | Monitoring should be done using the set indicators |
| | | 6. | It's also important to do participatory monitoring with the communities/livelihood beneficiaries as well as LWA |

7. In GEF women beneficiaries should always be 50% across all sectors (Parks, Fisheries and Forestry)
11. Continuously write reports on the progress /impacts of the implemented livelihoods
 1. Report writing should also be an ongoing activity
 2. It's important to keep record on the direct and indirect beneficiaries and also write report on the progress of the livelihoods/or how the livelihoods have changed the lives of the beneficiaries
 3. The reports could be: monthly, quarterly, semi-annually and annually
 4. The reports may include cost of livelihood at initial stages, economic value of the benefits realised from the livelihoods etc

Table 14: Monitoring indicators for measuring impact livelihood interventions at lengwe NP

No	Livelihood type	Indicators	Elements of measure	Target	Remarks
1	Livestock pass on	Natural resources	Conservation of wildlife resources: Reduced poaching; Tips on illegal wildlife crime; Reduced hectarage on encroachment		- goat pass on provides meat which is an alternative to animals poaching
		Status	Current number of goats		
		Leve of Income	Stocks of money: Goats sold; annual income		- reduction of illegal wildlife harvesting for economic gains
		Savings	Amount saved		Reflects financial stability
		Assets created	Assets bought e.g. motor bikes 1. Infrastructure e.g. house construction		
2	Village bank (Bank Mkonde)	Natural resources	Conservation of wildlife resources: Reduced poaching; Tips on illegal wildlife crime;		- reduction of illegal wildlife harvesting for economic gains

			Reduced hectarage on encroachment		
		Level of Income	Stocks of money: annual income		reduction of illegal wildlife harvesting for economic gains
		Assets created	Assets bought e.g. motor bikes 2. Infrastructure eg house construction		-
3.	Bee keeping	Natural resources	Conservation of wildlife resources: Reduced poaching; Tips on illegal wildlife crime; Reduced hectarage on encroachment; Size of woodlot or number trees planted		- encourages communities to retain vegetation for bee pasture
		Level of Income	Stocks of money: Number of hives; Annual production; annual income		reduction of illegal wildlife harvesting for economic gains
		Assets created	Assets bought e.g. motor bikes 3. Infrastructure eg house construction		-
4.	Bamboo growing and enterprise (Mwabvi)	Natural resources	Conservation of wildlife resources: Reduced poaching; Tips on illegal wildlife crime; Number of bamboos planted and hectarage		- Bamboos also provides ecosystem services and
		Level of Income	Stocks of money: annual income		Provides raw materials for chairs, baskets etc.
		Assets created	Assets bought e.g. motor bikes 4. Infrastructure e.g. house construction		-
5.	RUP	Monitoring for RUP has already been developed			

Annex 5: Maintenance requirements for Tisunge Heritage Centre

NO.	ITEM DESCRIPTION	UNITS	QTY
A	Plumbing		
1	pvc pipes-110mm	each	6
2	pvc pan connectors-110mm	each	5
3	pvc tee joint -110mm	each	2
4	pvc bends-110mm	each	6
5	pvc y-joint 110mm	each	2
6	toilet pan	each	2
7	elf cistern	each	3
8	hand wash basin	each	3
9	toilet tissue holders	each	5
10	soap holders	each	3
11	towel rails	each	4
12	towel rails holders	pairs	4
13	hdpe pipes 40mm (100m rolls)	rolls	4
14	hdpe t-joint 40mm	each	3
15	reducing bush (40mm to 0.75)	each	2
16	reducing bush (0.75 to 0.5 inch)	each	2
17	flexible connector	each	5
18	airvent cover-110mm	each	2
19	galv. fm bend -0.5 inches	each	4
20	galv. socket-0.5 inches	each	10
21	gate valve-0.5 inches	each	4
22	galv. bend-0.5 inches	each	10
23	man hole covers c/w frame	each	4
24	solvent cement-500mm	bottles	3
25	pillar taps-0.5 inches	each	11
26	flexible showers	each	4

27	shower traps	each	4
28	bath tubs	each	2
29	gully traps	each	2
30	pvc pipes-50mm	each	4
31	urinal shower	set	1
32	bip tap-0.75 inches	each	5
33	bip tap-0.5 inches	each	10
34	gate valve-0.75 inches	each	3
35	toilet seat cover	each	2
36	galv. pipes-0.5 inches	each	5
37	gate valve-40mm	each	2
38	galv. gate valve-32mm	each	2
39	adaptor (male & female)-40mm	each	2
40	adaptor (male & female)-32mm	each	2
41	hdpe t-joint-32mm	each	2
42	thread tape-large	each	3
43	p-traps	each	2
44	putty	kg	5

B CARPENTRY WORK

1	english doors	each	3
2	rim locks	each	35
3	tower bolts-6 inches	each	5
4	wooden door frames	each	2
5	block board	sheets	20
6	cabinet handle	each	10
7	cabinet locks	each	10
8	timber- 8 x 2 x fl	each	40
9	cover sticks	each	20
10	gause wire (durable)	rolls	7

11	chicken wire (durable)	rolls	5
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C PAINTING WORKS

1	cream high gross paint (5ltrs)	tins	12
2	thinners (5ltrs)	tins	8
3	cream pva paint	tins	32
4	anti-poison	ltrs	5
5	hydrated lime	bags	10
6	duracrate cement	bags	30
7	Bricks	each	1500

D THATCHING

1	thatch grass	bundles	114000
2	soft wire	kg	70
3	duracrate cement	bags	13
4	twine tread-48ply	units	100
5	scaffold poles	each	200
6	chicken wire	metres	50

