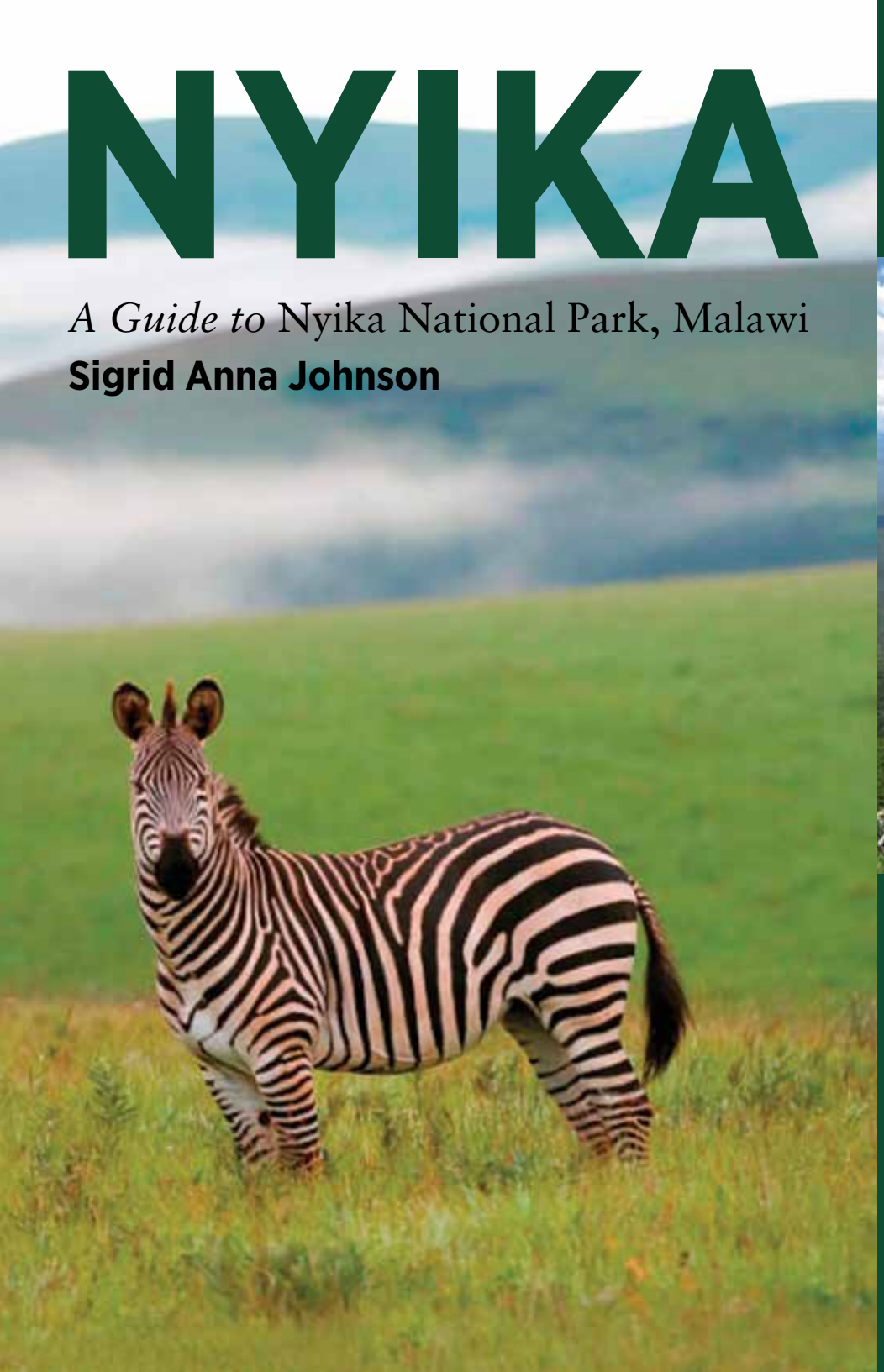
NYIKA

A Guide to Nyika National Park, Malawi

Sigrid Anna Johnson



Nyika National Park is an important part of Malawi's future as a genetic reservoir, a water catchment area, a centre for research and environmental education, and a creator of employment. But Nyika is threatened by poaching, deforestation, encroachment and climate change. Its survival depends on the will and actions of individuals who choose to become its champion.

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Sigrid Anna Johnson

Orchid
Disa erubescens

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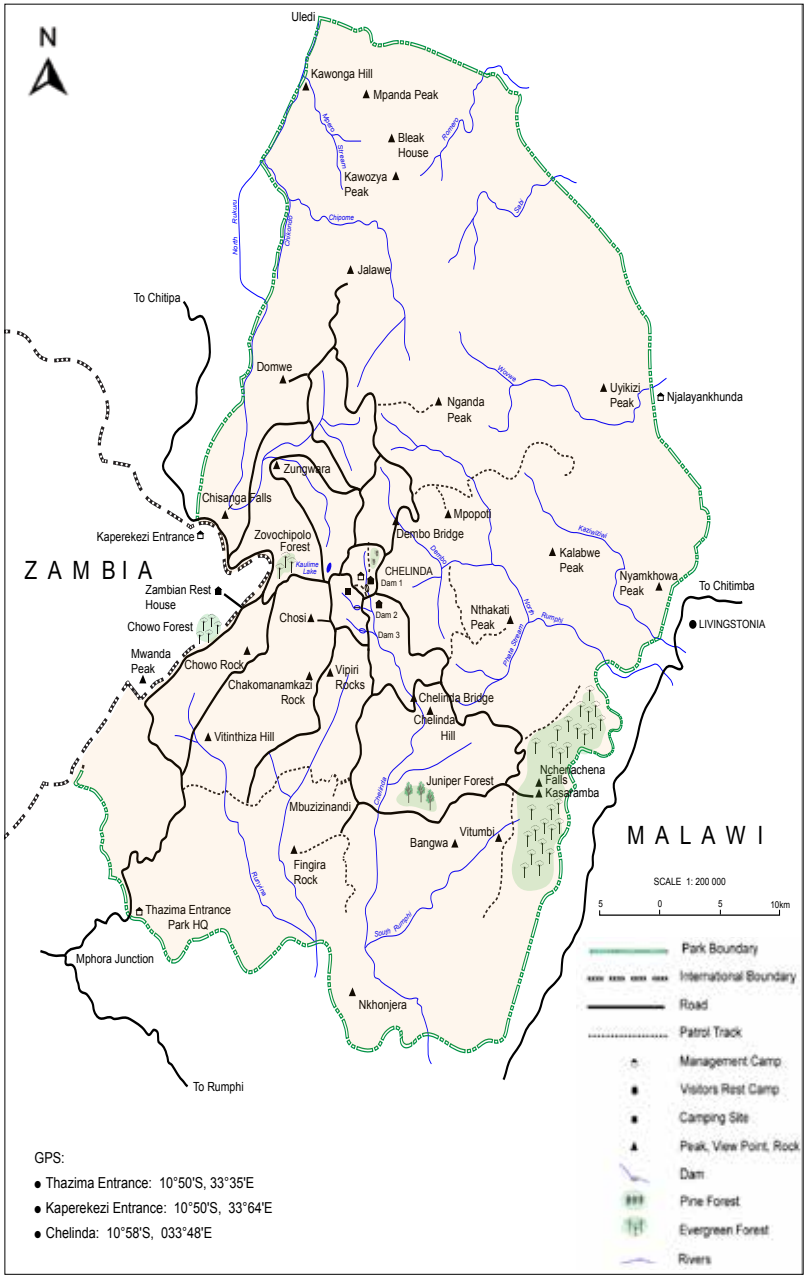
This book is dedicated to

Malawi's environmental educators...

... it is because of your efforts
that new generations
will understand the value of
conserving wild places.

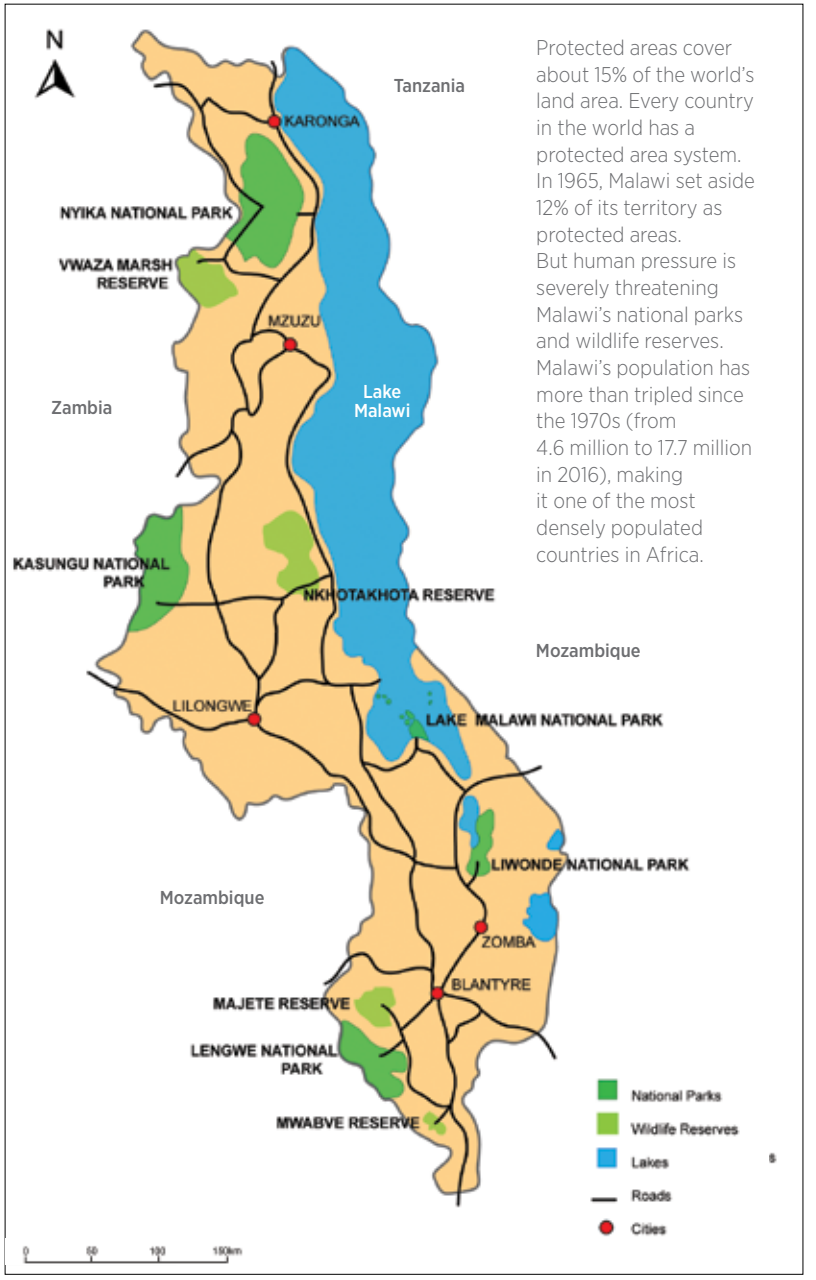
Nyika National Park

The park is centred on the 2,600 m high Nyika Plateau. The park can be accessed only from the south at Thazima Gate and the west at Kaperekezi Gate



Malawi's National Parks and Wildlife Reserves

Nyika was Malawi's first national park. It is the largest and highest of Malawi's parks, covering an area of over 3,000 sq. km, reaching over 2,600 m in elevation



Protected areas cover about 15% of the world's land area. Every country in the world has a protected area system. In 1965, Malawi set aside 12% of its territory as protected areas. But human pressure is severely threatening Malawi's national parks and wildlife reserves. Malawi's population has more than tripled since the 1970s (from 4.6 million to 17.7 million in 2016), making it one of the most densely populated countries in Africa.

Greater Double-collared Sunbird
Nectarinia afra

Overleaf:
Kasaramba Viewpoint

Contents

Jane Mtumbuka, Malawi Department of National Parks and Wildlife (DNPW) Education Officer, daughter of Lewis Mtumbuka, long-time Nyika DNPW Ranger

Welcome

to Nyika National Park

Nyika National Park is the largest of Malawi's five national parks. The central feature of the park, the Nyika Plateau, was formally declared Malawi's first national park in 1965. The park was expanded in 1978 and covers an area of 3,134 km² in northern Malawi. It is centred on 10°33"S and 33°50"E and lies astride the Chitipa, Karonga and Rumphi Districts of the Northern Region. Part of its western boundary is the Malawi-Zambia border, adjoining a section of the Zambian Nyika National Park.

Description

Nyika is one of the most beautiful montane plateaux to be found in Central Africa. Rolling grassland interspersed with small streams and valleys harbour patches of tropical montane evergreen forest in sheltered hollows; plateau escarpments are covered with broad-leafed woodland, the characteristic savannah woodland of Central Africa. On the wetter eastern escarpment are large areas of sub-montane evergreen forest. Waterfalls cascade hundreds of metres over the plateau edge.

The atmosphere of the plateau offers complete contrast to the protected areas of Malawi's lowlands. Mosquitoes are minimal and the climate is cool; temperatures rarely exceed 26°C, even during the warmest months from September to December. Frosts can occur between June and August.

From the edge of the plateau there are extraordinary views: north and east over Lake Malawi to Tanzania; south to Vwaza Marsh Wildlife Reserve and the Viphya Plateau; and west to the hills of Zambia.

Wildlife

The park contains a diverse array of mammals, amphibians, reptiles, fish and butterflies. Several species and sub-species are endemic, found nowhere else in the

world. Common large mammals are zebra, eland, roan, reedbuck, warthog, bushbuck, common duiker and leopard. Wildlife viewing is excellent on the short grassland.

Nyika is home to more than 430 bird species. This can be attributed to the wide range of habitats within the park. Throughout this book, the first time a plant or animal with a common name is mentioned, the Latin name is included as well. Thereafter, only the common name is used.

Wildflowers

Nyika is renowned for its spectacular wildflowers. After the grasslands burn during the dry season, the Nyika Plateau erupts into a profusion of colour that lasts through the rainy season. More than 200 terrestrial and epiphytic orchid species have been identified, seven of which are found nowhere else in the world.

Historic sites

The park has numerous sites of spiritual and cultural importance to Malawians, including prehistoric rock paintings. Evidence of the Iron Age is present in the form of pit mines and smelting kilns. Traditional beliefs suggest that an enormous serpent with spiritual powers lives in the only naturally occurring lake on the plateau.

Outdoor activities

Rainbow trout in several rivers and dams on the plateau can provide interesting sport fishing. Visitors can walk, overnight hike and bike safely in the park, accompanied by a guide. Certain times of the year are best for different activities:

Walking - May through November
Birding - October through March
Wildlife Viewing - October through March
Wildflowers - October through March
Views - November through May

Knowledgeable guides can be organised through the DNPW office at Chelinda, or through the various tourist accommodation facilities, to take visitors to sites of interest.

Full species lists for mammals, reptiles, amphibians, birds, butterflies, fish and orchids are included as appendices

The first time a plant or animal with a common name is mentioned, the Latin name is included as well. Thereafter, only the common name is used

Roan Antelope in the Nyika grasslands. Roan Antelope are one of the largest species of antelope, found in woodland and grassland savanna

Why protect Nyika?

Global populations of mammals, birds, fish, amphibians and reptiles have plunged by almost 60 per cent since 1970. The activities of our rising human population are threatening the very place we call home, our planet Earth. Land clearance for farming and urban development, toxic pollution from industrial development, climate change, invasive species and unregulated hunting are pushing much of our natural world to extinction. But with concerted effort by citizens, national and community leadership, there are still chances to reverse this trend.

Governments and citizens decide to set aside protected areas like Nyika National Park because they are viewed as valuable. They serve as water catchment areas supporting agriculture, fisheries and hydroelectric power; as genetic reservoirs and centres of research; as centres of environmental education and recreation; as sources of employment; and for the storage of climate change-causing greenhouse gases (an estimated 15 percent of global greenhouse gases are stored in protected areas). The living resources within protected areas are also incredibly valuable - it may seem extraordinary, but one living elephant brings an estimated US$1.6 million to Malawi's economy over its lifetime, compared to the pittance that a local poacher may get for killing that same elephant for its ivory tusks.

Since 1965, Malawi has set aside 12% of its territory as protected areas. This is good news, except that Malawi's population has more than tripled since the 1970s (from 4.6 million to 17.7 million in 2016), making it one of the most densely populated countries in Africa. Human pressure on Malawi's national parks, wildlife reserves and forest reserves means that many of these are now "protected areas" in name only.

Protection versus use of natural resources in protected areas can be technically and emotionally difficult to manage. Rising populations need access to rapidly declining resources. The balance begins with mutual respect for the needs and interests of all parties, whether they be villagers trying to support their families, park managers, tourism operators, donors or local and international visitors. Opposing views are often entrenched. Bluntly put, "Azungu" (foreigners or "people from away" in the Chichewa language) may be seen by some as valuing Malawi's nature more than the needs and interests of local people. And local people may be seen by those from away, as seeing plants, animals and trees simply as resources to be consumed.

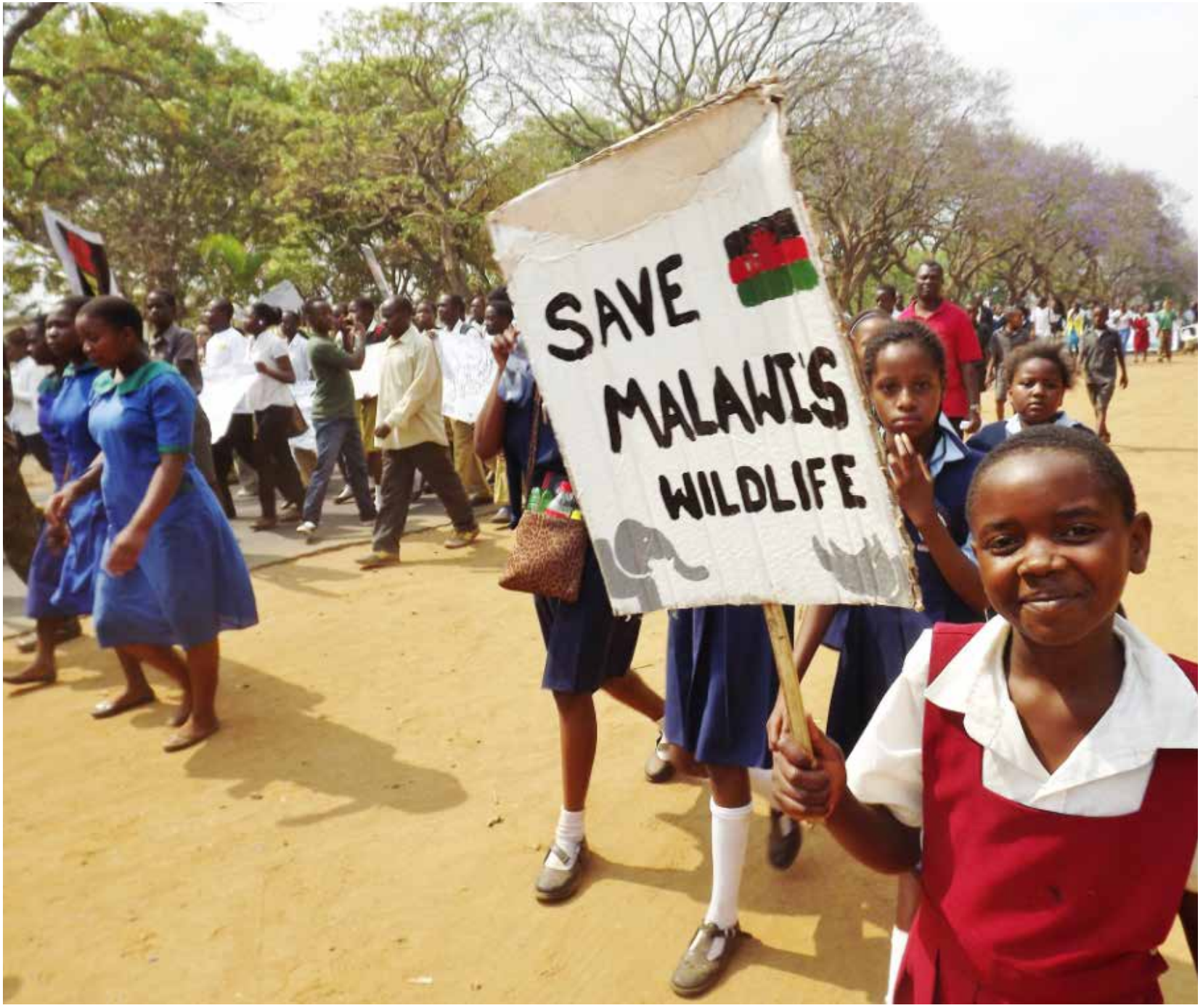
Globally, there are some 200,000 protected areas covering almost 16% of the world's land mass and 4% of its oceans. In fact, every single country in the world now has some form of protected area system

Reality is far more complex. Subsistence agriculture is the basis of life in Malawi and much of the rest of Africa. When Stone Age hunter-gatherers transitioned to Iron Age agriculturalists, wildlife became a threat to crops. These threats continue today. Baboon and vervet monkey raid village gardens during the day. Porcupine, hippopotamus, kudu and bushpig raid them at night. Large elephants and small rodents create havoc day and night, eating fresh produce, destroying fields and consuming maize stored in granaries for lean times. Wandering lion, leopard and hyaena threaten the physical safety of livestock and villagers.

Despite these negative realities, wildlife has a traditional, positive role in the cultural and spiritual lives of Malawians. Since the Stone Age, African hunter-gatherers have viewed wild animals with respect and kinship. Excessive killing was said to anger ancestral spirits, with dire results to follow. This hunting culture, as well as the dependence on forests and woodlands for herbal medicine, firewood, building materials and wild food such as honey, fruit and mushrooms, means that Malawians have traditionally had a deep understanding of their natural environment.

Wildlife has a traditional, positive role in the cultural and spiritual lives of Malawians. Since the Stone Age, African hunter-gatherers have viewed wild animals with respect and kinship

This spiritual connection to nature is Malawi's past. With leadership from Malawian citizens, environmental organisations, the private sector and government, it can also be part of Malawi's future. People throughout the world care about the future of all remaining wild areas, and their international contributions through research and funding can play an important supporting role. But Nyika is a Malawian protected area. It is individual Malawians who must choose to become protected area champions because, simply, caring for and nurturing the limited and critically threatened natural resources remaining in Nyika National Park and Malawi's other protected areas, is an intrinsic part of what it means to be Malawian.



Children support the Save Malawi's Wildlife Campaign, for the Lilongwe Wildlife Trust

Above:
Nyika Orchid
Disa erubescens

Overleaf: North Rukuru River before it cascades off the Nyika Plateau at Chisanga Falls

Ecology

Biodiversity, the rich variations among living things, is the world's natural wealth. One of the most fundamental aspects of biodiversity is species diversity. In Africa, almost 200 animal species have become extinct in the last 600 years because of over-hunting and loss of habitat. Some 2,000 additional animal species and 1,750 plants are threatened. Species need whole populations with diverse characteristics and genetics and adequate space to ensure that the species does not weaken and die from in-breeding.

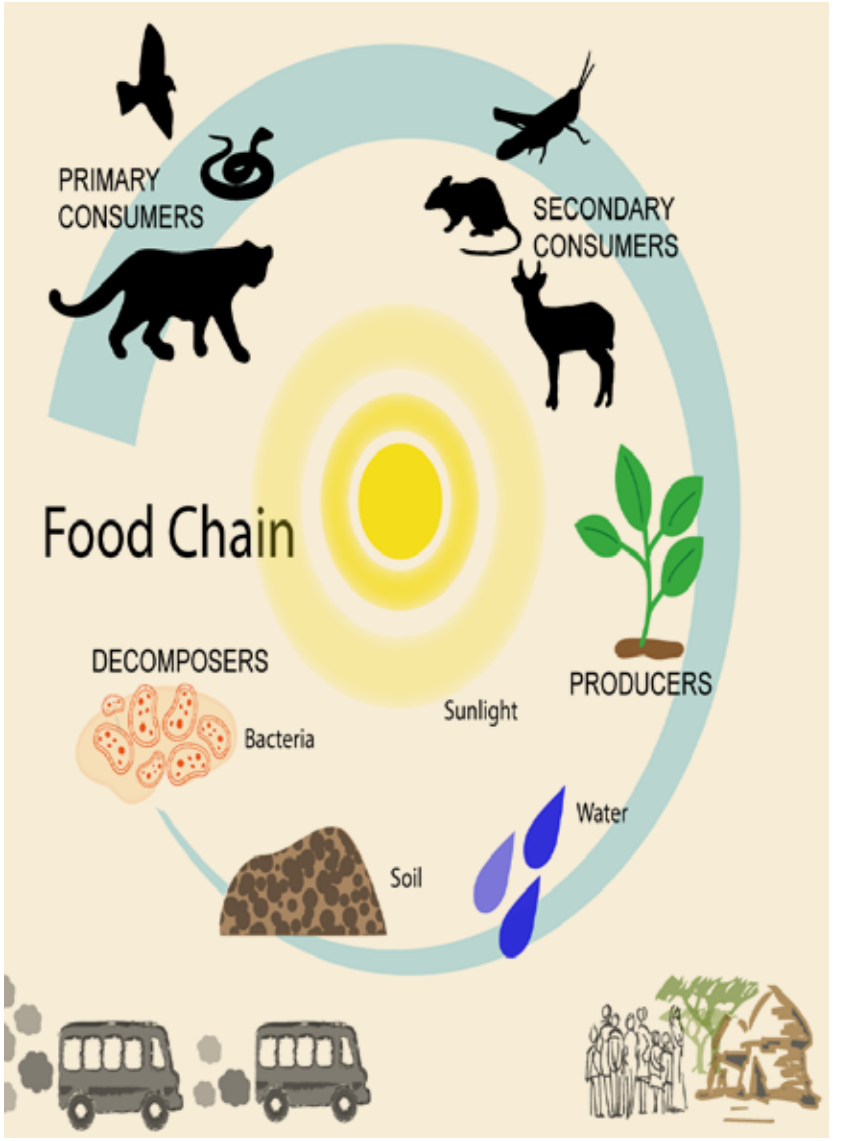
These populations depend on healthy ecosystems. The ecosystem cycle or food chain begins from the soil, where decomposers (bacteria, fungi and insect larvae) turn animal droppings and the remains of dead plants and animals into nutrients, which make the soil fertile.

Through a process called photosynthesis, green plants (producers) harness moisture and the sun's energy to make their leaves, flowers, fruits and woody stems, taking the raw materials they need from the soil.

The green plants provide food for herbivores (secondary consumers) such as insects, rodents and antelope. The secondary consumers in turn provide food for meat-eating animals called carnivores (the primary consumers). The remains of dead animals are processed by the decomposers into nutrients, starting the ecosystem cycle again.

The ecology of Nyika is affected by ever-growing surrounding communities. Wildlife poaching can make species locally extinct. Land encroachment and deforestation can lead to flooding, erosion and drought. Without careful management these local pressures, combined with global system pressures like climate change, can push the ecosystem balance to the point of collapse. It is the role of Nyika's managers to work with local communities to preserve local biodiversity.

The Nyika Ecosystem Cycle
The role of Nyika's managers is to work with local communities to preserve the local biodiversity



Climate and weather

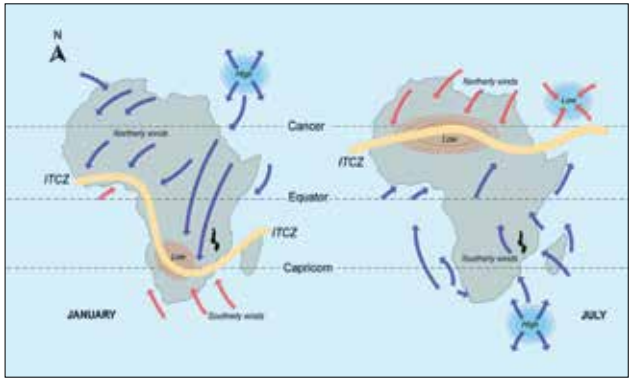
Thousands of years ago, global climate shifts resulted from natural causes such as changes in the earth's orbit, solar activity or volcanic eruptions. Since the mid-20th century, greenhouse gas emissions from the burning of fossil fuels (coal, oil, gas, diesel), industrial agriculture (methane release) and deforestation (a major concern in Malawi), have accelerated climate change. Resulting extreme weather events, like droughts and floods, are causing great hardship in many countries. In Malawi, planting and harvesting cycles have changed, affecting local food supplies and commercial crops like cotton and rubber.

Two main factors influence weather in Malawi. First, the rainy season is dictated by the movement of hot humid air between the Equator and the Tropics of Cancer and Capricorn - the Inter-Tropical Convergence Zone (ITCZ). The ITCZ moves south in the first six months of the year and back north for the last six months of the year.

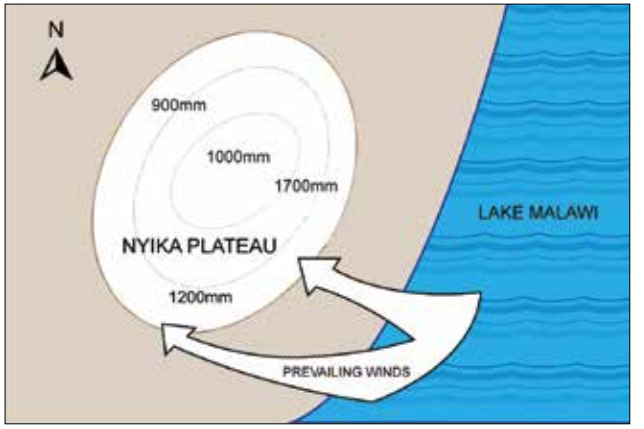
Climate refers to weather patterns measured over years, centuries and millennia. Weather is the condition of the atmosphere (temperature, humidity, precipitation, cloudiness, brightness, visibility, wind, and air pressure) measured over minutes, days and weeks

Left: Deforestation is a major concern in Malawi and affects the local climate and moisture retention

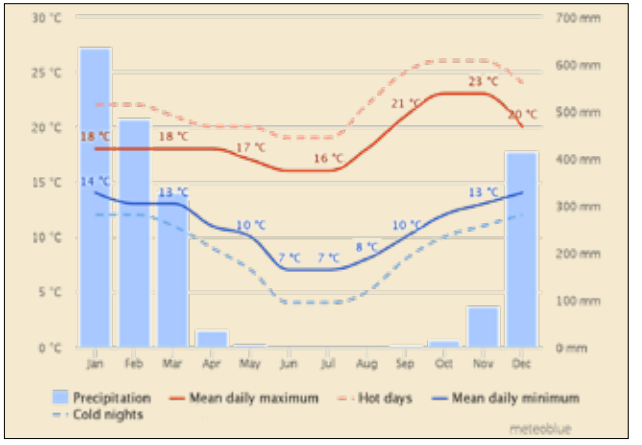
The Inter-Tropical Convergence Zone (ITCZ)



Prevailing winds from Lake Malawi



Average temperatures and precipitation, Nyika 10º64"S 33º69"E, 2045 m



Left: Drought destroyed fields of maize in Katsumwa

Below left: Severe flooding, Malawi, 2015

Below: Lake Malawi coastline. The third largest and second deepest lake in Africa and the ninth largest in the world

The second factor is the country's proximity to Lake Malawi (the third largest and second deepest lake in Africa and the ninth largest in the world). Prevailing winds from the south-east pick up moisture as they pass over the lake. When the winds meet the high eastern escarpment of the plateau, rain clouds form and drop their moisture. Kasaramba Viewpoint on the eastern edge of the Nyika escarpment has the highest rainfall in the park (1,700 mm/yr) and is often in cloud when the rest of the plateau is in full sunshine.

The southern hill zone also receives relatively high precipitation (1,200 mm/yr), but much of the moisture in the clouds falls before it reaches Chelinda, on the central plateau (1,000 mm/yr). Precipitation is least in the rain shadow, the north and north-western escarpment (900 mm/yr).

The lowland hill areas of the park experience temperatures typical of tropical Africa. The high plateau is much cooler, verging on temperate conditions. The prevailing winds ensure at least a mild breeze on the plateau throughout the year. The late dry season (August to November) can be very windy.

Nyika seasons

Early Wet Season December-January

Traditionally the first rains fall on Nyika in early to mid-November. With climate change this pattern is shifting later into December. Often, thunder and lightning storms build up for days before the first raindrops fall. The weather is as warm as it ever gets on the plateau, reaching 27°C or more. The lowland areas of the park are hot and humid. The first rains clear the dry season smoke and dust haze. Views of Lake Malawi, the plateau edges and peaks emerge again. Wildflowers flourish on the grasslands. Orchids appear every day and Brachystegia trees sport new red foliage. Eland, roan and zebra migrate to the plateau to eat the fresh new grass. Wildlife viewing is excellent. Bird activity is high.

Late Wet Season February-April

Traditionally the rains continue through February and March, tapering off in April. The mean daily temperature is 17°C on the plateau, much warmer in the lowlands. The streams and rivers are full and the dambos, the seasonally waterlogged valleys that crisscross the plateau, are sodden. Everything is lush and green. The grasses and many wildflowers are blooming and the progression of orchid species continues. Wildlife viewing is still good though the bracken has grown and can now conceal animals such as the common duiker, serval and even leopard.

Left: Early wet season. Eland returning to grassland

Above: Late wet season. Lush green grassland

Above: Early dry season. Golden grassland

Right: Late dry season. Misty morning cooling conditions at Chelinda Camp known as 'chiperone'

Early Dry Season May-July

The weather gradually becomes cooler, beginning in late June. The mean daily temperature at Chelinda is 12°C. On 25/26 July 1985 a record low of -6.7°C was measured at Chelinda. Snow has never been recorded. Herbivores traditionally leave the plateau at this time of year for the warmer woodlands at lower elevation, in search of better forage. However, increased poaching pressure around the park edges and also the increased dryness of the soils at lower levels have led many of these larger species to choose to stay closer to Chelinda. Aloes, protea and fields of papery yellow "everlastings" flower at this time and the grass is golden brown, until early burning by park staff begins. The views from the plateau, across Lake Malawi to the east and Zambia to the west become hazy with smoke from fires and the increasing dust of the dry season.

Late Dry Season August-November

The weather is still cool but gradually warms up as November approaches. The mean daily temperature at Chelinda rises to 15°C. The days are windy and the sky is very hazy. Views from the plateau are often obscured. There is little or no rain although the plateau may experience several days of cool, misty 'chiperone'. Extensive burning, usually caused by poachers flushing wildlife, leaves blackened hillsides. However, areas of the park which were pre-burnt by park staff May-July sprout wildflowers and tender green grass, leading herbivores to congregate. Woodland trees have new leaves, many of them red, turning to green. October and November are probably the best months for birding with breeding at its peak and an influx of migratory species.

Late dry season. Grassland fires

Geology and geomorphology

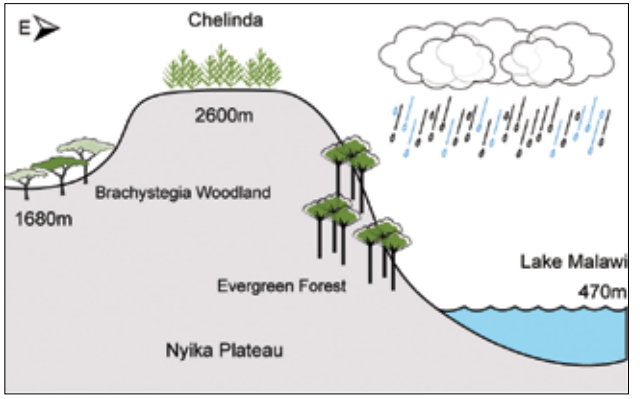
Nyika National Park encompasses almost all of the Nyika Plateau as well as its associated hills and escarpments. It is one of the highest and largest of the high plateaux in Central Africa. It is roughly oval in shape, oriented in a north-east direction.

The plateau is the western margin of the East African Rift Valley system. This system of faults and disjointed valleys reflects the dynamic nature of the earth's shifting tectonic plates. It is related to the same process that produced the continents as we know them today which, 175 million years ago, broke away from the huge land mass known as Pangea.

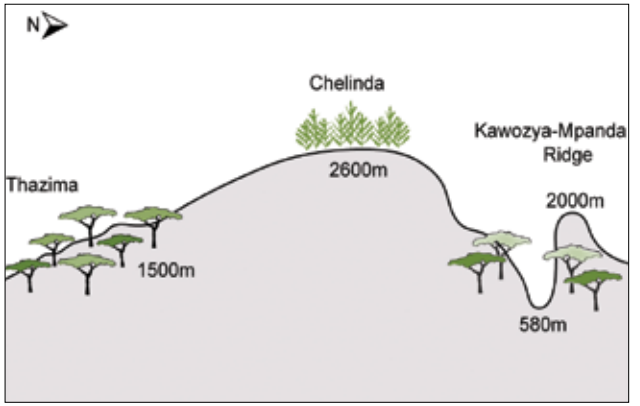
The park covers 3,134 km² ranging in altitude from 2,440 m in the west to 2,135 m in the east. The lowest point, along the Ruwile River in the north-east, is 582 m while the highest peak, Nganda, is 2,606 m. On the gently undulating plateau surface, ridges alternate with wide, deep and level valleys with poorly drained marshy floors partially filled with peat and other sediments. The 10 km long Kawozya-Mpanda Ridge which runs north-east from the north end of the plateau, reaches between 2,000 and 2,500 m and joins the summits of the Kawozya and Mpanda peaks. To the south of the plateau another long ridge slowly descends through a series of hills to the southern park entrance, Thazima Gate. The road into the park follows this ridge, gradually climbing from 1,600 m to 2,600 m over 56 km to Chelinda.

Geologically, most of Malawi is underlain by metamorphic rocks of sedimentary and igneous origins known collectively as the "Malawi Basement Complex," from the Archean period (4,000-2,500 million years ago). The plateau is a massive upfolded block of hard igneous rock, intruded granite and granitic gneiss which survived weathering over millennia, while less resistant surrounding metamorphic rocks of the escarpments and lowland gradually eroded away. The most abundant rock types are biotite and hornblende granite gneisses. Surveys have found a number of minerals occurring in small amounts in the park area: manganese, iron nepheline, syenite bauxite. None of these finds have been considered economically exploitable. Soils are rather poor and acidic.

East-west profile, Nyika Plateau



North-south profile, Nyika Plateau



Seismic activity and landslips

The Nyika Plateau is part of the southern portion of the western branch of the African Rift Valley, which is largely non-volcanic, in marked contrast to the highly volcanic eastern branch rift of Ethiopia, Kenya and northern Tanzania.

However, the park's position along the Rift Valley leads to frequent earth tremors. In fact, northern Malawi is the most seismically active portion of the country with one event of 3.0 - 3.9 (on the Richter Scale) occurring every 2.5 months; one event of 4.0-4.9 occurring every 5 months; and one event of greater than 5.0 occurring every 10 years. The country has been hit by a number of

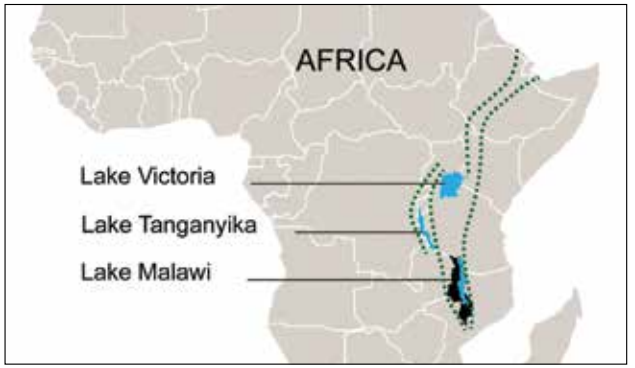
significant earthquakes including the 1989 magnitude 6.0 Salima earthquake and the 2009 series of Karonga earthquakes which ranged as high as magnitude 6.2.

Earth tremors, as well as waterlogged soil in the rainy season, have played an important role in the shaping of the Nyika landscape. Rainfall helps to dissolve and chemically change the underlying rocks, as well as physically carry away the surface soil. When the ground becomes saturated, it becomes unstable and large areas simply slide away.

Numerous scars from landslips in the previously inhabited escarpment and hill zones of the park indicate that woodland clearance, poor cultivation practices and repeated wildfires have also likely contributed to the occurrence of landslips. Any removal or change in vegetation cover can make landscapes unstable and prone to landslides and slumps.

Top: A recent view of Chelinda landslip

Above: Chelinda landslip, April 23, 1960, viewed by a visiting Catholic White Father



The African Rift Valley System

One of the largest landslides to occur on the Nyika took place on April 23, 1960. It began in the pine plantation on the hill between what is now Chelinda Camp and Chelinda Lodge and slid to the Chelinda-Rumphi River below the outflow of Dam 1. The area is now completely re-vegetated with indigenous tree species, which took over when the pines slid away.

Rivers

The rivers of the Nyika Plateau have also played a role in the evolution of the landscape, eroding deep valleys into the plateau, principally in the weaker rocks which surround the central hard granite core. Several spectacular waterfalls have developed along the Chelinda-Rumphi River and on the North Rukuru River, including where it cascades 120 m over the western edge of the plateau at Chisanga Falls.

Nyika National Park contains seven major water catchment areas (Runyinya, Chelinda-Rumphi, North Rumphi, Wovwe, Nyungwe, North Rukuru and Hewe) that drain into Lake Malawi and onward via the Shire and Zambezi rivers to the Indian Ocean. The western boundary of the park lies on the watershed between the Lake Malawi-Shire drainage system and the Luangwa drainage system of Zambia. The Chire River in the Zambian Nyika National Park flows westward into the Luangwa.

The Nyika Plateau is a water catchment area of considerable economic value to Malawi. It is used for domestic consumption and irrigation as well as for hydropower generation.

Most streams and rivers on the Nyika Plateau run throughout the year, due to low evaporation, cloudiness, relatively low temperatures and good vegetation cover.

However, the extensive fires that sweep across much of the plateau annually are threatening the value of Nyika as a water catchment area. Late season, very hot fires destroy riverbank vegetation leading to erosion. In some areas the original riverbank vegetation has been replaced by colonising species, less susceptible to fire damage, such as bracken fern, which because of their root structure do little to prevent run-off and erosion. River channels are

Overleaf: Lake Kaulime, late dry season

becoming wider and shallower and silt is being deposited over gravel beds.

There is only one natural lake within the park, Lake Kaulime near Chelinda. It was formed by a landslide which blocked the outflow from one of the headwaters of the North Rukuru River. Its size depends very much on the season.

North Rukuru River, Nyika Plateau

Soil

Soil is made up of particles of rock broken down by the activities of air, temperature and water in a process called weathering. Added to these particles are organic material and minerals from decaying animals and plants.

The two most important characteristics of soil, which determine which community of plants and animals can be supported, are fertility and ability to hold water. Fertility is determined by the mineral content of the rock plus the amount of decaying material present.

Generally, darker and finer-grained soils are more fertile. Sandy soils with pale, coarse particles are less fertile. The ability of soil to hold water is largely determined by the size of soil particles produced by the weathering process and the amount of organic material present. Soils which possess particles of different sizes will absorb water better and thus encourage richer plant growth. Clay soils with fine particles hold water well but also become waterlogged. Sandy soils with larger particles are good at absorbing water but are unable to hold it. Extensive vegetation cover and decaying plant material on the surface and in the soil also help the soil to hold water.

Below: The African stone line, Nyika roadside

Overleaf: Submontane forest tree *Poutaria adolfi-friederici*

The soil of the Nyika grassland varies in colour from grey-brown to red and contains a moderate amount of organic matter. It has little potential for sustained agriculture but is able to support its naturally occurring grassland ecosystem. The stone line, which is found throughout Africa and is believed to be the result of termite activity, is close to the surface and in some places is even exposed. This indicates rapid erosion caused by excessive run-off during the rainy season and the action of wind in the dry season. This is shown by patches of loose sand and by the bases of grass tufts and stones standing above the soil surface. Fine earth is stripped from the surface faster than it is replaced by termite activity therefore the surface of the grassland soil is continually new.

The soil eroded from the surface of the grassland is washed down into the Nyika dambos. Coarse sand particles remain at the edge of the dambos (see page 47) while fine clays and silts are transported to the centre. The fine clays become waterlogged, encouraging organic matter to collect. The cool temperatures of the Nyika slow down the decomposition rate of this material. Over the years, layers of rich black peat have formed encouraging lusher plant growth than on the grassland.

The soil under the Nyika tropical evergreen forests is deeper, more porous, has more organic matter and therefore a better capacity for holding water, than the grassland soil. The thick vegetation cover helps to keep water run-off to a minimum, resulting in little soil erosion. However, its fertility depends on the continued presence of the forest because many of the nutrients are bound up in a cycle of growth and decay. If the forest is cut down or destroyed by fire the soil type will quickly change to that of the grassland.

Finally, the broad-leafed woodland community of the Nyika Park occurs on soil that is shallow (less than 50 cm), has little organic matter and is usually very stony. It is sandy and pale in colour because it originates from the granite-gneisses of the plateau edge. Consequently, it has low fertility and does not hold water well. This type of soil generally supports low densities of wildlife.

Vegetation communities

Fire has played a significant role in the distribution and abundance of Nyika's vegetation communities. While the broad-leafed woodlands of the plateau escarpments have evolved by developing fire-resistant bark and rootstocks, huge annual wildfires and a drying climate mean that tropical montane evergreen forests have been reduced to fragments.

Acacia abyssinica trees are found only in high altitude woodland and forested mountain gullies

Healthy tropical evergreen forests tend to have very dense canopies, keeping sunlight from the forest floor, restricting the growth of grasses.

Once the forest has been burned through, the canopy is destroyed and sunlight enters, allowing grass to grow.

If there are no subsequent fires, shrubs and first re-growth trees like *Hagenia abyssinica*, called "emergents", will again colonise the area, shading out the grass.

However, if the area suffers regular burning, the grassland will be maintained with patches of bracken fern and fire resistant shrubs, such as protea.

Montane grassland

For most people the most outstanding feature of Nyika is the open rolling grassland covering the hills and ridges of the plateau. The grassland is brilliant green and studded with wildflowers during the rains, rich golden brown in dry season and black following massive fires before the rains.

Montane grassland is one of the most fragmented and threatened habitat types in Africa. Nyika Plateau is one of the few protected areas of grassland in this part of the continent, which makes the continued conservation of the national park critical. Similar grassland systems in southern Tanzania, with the exception of the area covered by the Kitulo National Park, are almost entirely unprotected and are considered to be in a state of rapid decline. Most of Malawi's second largest plateau, the Viphya, has been converted into timber plantations.

Unlike lowland Africa where grasses often reach more than 3 m in height, the Nyika grassland supports short, montane varieties, which seldom exceed 1 m. Today, the short grassland covers more than a third of the park area. There are differing views on whether the plateau was once all tropical evergreen forest or all grassland. Most likely it was a combination of both, but with larger areas of tropical evergreen forest than occur today.

Nyika montane grassland. One of the most fragmented and threatened habitat types in Africa

The grassland of the high plateau is in fact made up of hundreds of species of legumes, wildflowers and shrubs as well as grass. Distribution and abundance of the different plants depends on variations in soil, exposure, climate, elevation, moisture availability and elapsed time since the forest cover was destroyed by fire. Russet Grass *Loudetia simplex* and *Exotheca abyssinica* are two of the more common and widespread grasses; Shire Bluestem *Andropogon schirensis* and *Trachypogon spicatus* are locally common; Silverspike *Imperata cylindrica, Elionurus muticus,* and *Microchloa altera* are some of the first species to reappear after fires.

Though less conspicuous than the grasses, herbaceous plants, particularly the legumes, play a critical role in supporting the wildlife of the grasslands. They are very important for their significance in contributing nitrogen to the soil and protein to the diet of the herbivores. The four most widely distributed herbaceous legume families in the park are Jointvetch *Aeschynomene,* Hyacinth *Dolichos,* Sand Pea *Eriosema* and Snout Bean *Rhynchosia*.

During the rains wildflowers, including orchids, bloom in profusion on the grassland. Hardy fire-resistant grassland shrubs include Bergianum *Anthospermum usambarense,* Yellow Heads *Gnidia kraussiana* and the Dwarf Protea *Protea heckmanniana*.

Many animals can be found feeding in the montane grassland. Southern Reedbuck *Redunca arundinum* is the most common large animal but Side-striped Jackal *Canus adustus,* Common Duiker *Sylvicapra grimmia*, Spotted Hyaena *Crocuta crocuta,* Serval *Leptailurus serval*, Common Warthog *Phacochoerus africanus* and Cape Crested Porcupine *Hystrix africaeaustralis* also belong in this community. Roan Antelope *Hippotragus equinus*, Common Eland *Taurotragus oryx*, and Zebra *Equus quagga* have also adapted to this special habitat. Hares, shrews and many rodents find shelter, food and nest material in the short grass. Klipspringer *Oreotragus oreotragus* is commonly seen silhouetted on rocky outcrops. Characteristic grassland birds include Stonechat *Saxicola torquatus*, Richard's Pipit *Anthus richardi* and Red-winged Francolin *Francolinus levaillanti*. Denham's Bustard *Neotis denhami* and Wattled Crane *Grus carunculatus* are also important members of this community.

Bracken fern

Bracken Fern *Pteridium aquilinum* is found on every continent except Antarctica. It occurs naturally and widely on the Nyika Plateau in grassland areas and on forest margins. Bracken can colonise quickly, with the potential to extend its area by as much as 1–3 % per year. It negatively affects seed germination of other plant species through the release of toxic compounds into the soil and its ability to withstand frequent surface fires. It is very difficult to control because it reproduces both by spores and rhizomes, its creeping roots which are protected from hot fires, underground. The dense fronds and deep litter produced by bracken also inhibit other plant species from establishing.

Removing bracken encourages primary habitats to re-establish, which is of great importance for endemic wildlife. However, bracken is notoriously difficult to eradicate or even control, despite much global research. In other parts of the world, management efforts have included mowing, crushing or rolling the fronds twice a year or using herbicide. Efforts have been made on the Nyika Plateau, in recent years, to remove bracken fields by cutting the fronds by hand or with a tractor-towed mower.

Bracken fiddleheads (the tightly curled young fronds) are eaten by many cultures as a vegetable, consumed fresh, cooked or preserved by salting, pickling or sun drying. Both fronds and rhizomes have been used to brew beer. Dried and powdered rhizome starch also has been used as a substitute for arrowroot and as bread flour.

Bracken Fern *Pteridium aquilinum,* is eaten by many cultures as a vegetable, consumed fresh, cooked or preserved by salting, pickling, or sun drying

However, bracken has been shown to be carcinogenic in some animals and may play a role in the high incidence of stomach cancer in Japan.

On a more positive note, bracken often grows near Stinging Nettle *Laportea alatipes* and can be used as a quick and easy remedy for the sting, by rubbing the juice in crushed fronds on the affected area.

Dambos

Typical Nyika dambo where people have been known to sink to their waists in the boggy mud

Between the undulating hill slopes of the Nyika grassland are peaty dambos. These marshy areas are the habitat of numerous frogs and toads, exquisite orchids, birds, rodents and shrews.

Most dambos are broad and relatively flat. Some have stream channels, and others are just permanently boggy, subject to seasonal flooding. Dambo vegetation usually grows in tall tussocks. Dambo walking can be a hilarious challenge. Be wary of the deep, black, peaty mud between the tussocks – people have been known to sink to their waists.

The edge between marshy dambos and well-drained grassland is marked by a distinct change in vegetation. Bracken grows in profusion as do clumps of the large ferns *Blechnum tabulare* and *Osmunda regalis*. The heaths *Erica patula* and *E. kiwuensis* also flourish.

Inside the dambo, sedges are the dominant vegetation type though herbaceous plants are also widespread. Wildflowers flourish in the damp environment. Of special interest is the giant *Lobelia mildbraedii,* which keeps its 2.5 m brown column long after flowering. Spectacular flushes of orchids appear during the rains, including many different species of *Eulophia, Habenaria, Satyrium* and *Disa*.

Because dambos are permanently boggy, fires usually stop at their edge. For this reason, the sloping heads of dambo valleys often harbour small patches of tropical montane evergreen forest, which have been protected by the combination of steep slope and moist ground. Though somewhat inconspicuous, animals such as Bushbuck *Tragelaphus scriptus*, Southern Reedbuck, Leopard *Panthera pardus*, Serval and Egyptian Mongoose *Herpestes ichneumon* forage and find shelter in the thick bushes and bracken along the dambo streams. Toads and frogs thrive in the damp bogs. Two of the subspecies found here, the Black-striped Sedge Frog *Hyperolius quinquevittatus mertensi* and the Nyika Dwarf Toad *Mertensophryne nyikae* are endemic to the plateau. Several interesting birds also inhabit the dambos – Grass Owl *Tyto capensis*, Mountain Marsh Whydah *Euplectes psammocromius* and African Marsh Harrier *Circus ranivorus*. Grass Owls and Marsh Harriers fly low over the broad valleys in search of mice and other small animals, which are part of this community.

Brachystegia woodland — new red leaves in the late dry season

Broad-leafed woodland

Broad-leafed (or "miombo" in Swahili) woodland is the characteristic vegetation of much of Africa. The trees are semi-deciduous, partially losing their leaves in the dry season.

This woodland covers nearly 60% (1,800 km2) of Nyika National Park. The 1978 park extension included this community because of the important role it plays in water conservation: the trees protect the soil of the steep plateau escarpments and keep it from eroding and silting up rivers, important for Northern Region irrigation and fish conservation. Prior to the park expansion, the area was inhabited by several small communities, some of which are now encroaching back inside the park boundary, threatening the woodland and waterways.

Unfortunately, woodland also has been destroyed outside of the park, along the main road that leads from Rumphi to the Thazima park entrance. This means that there is no longer a woodland corridor between Vwaza Marsh Wildlife Reserve and Nyika National Park, for wildlife migration.

The Nyika woodlands are dominated by the tree genus *Brachystegia*; hence they are often referred to as Brachystegia woodlands. This woodland generally extends to 1,800 m but in several locations at Nyika it reaches 2,050 m. The trees of the woodland are usually 10-20 m tall, but stunted growth at higher elevations can produce trees as short as 3 m.

The genus *Brachystegia* has a couple of interesting characteristics. Hybridisation, whereby two different species crossbreed to produce a tree with the features of both, is common. In addition, when the trees get their new leaves in the late dry season, they emerge red or pink, turning to green when the rains come. This prevents the new leaves from scorching and withering in the late dry season sun.

The trees form a relatively open canopy with an understory of tall *Hyparrhenia* grassland, dotted with small trees and shrubs such as *Protea petiolaris* and *Erica benguelensis*.

Locally dominant species, reflecting differences in rainfall and altitude are *Brachystegia allenii, B. longifolia, B. taxifolia, Julbernardia globiflora* and *Dicrostachys cinerea. Brachystegia boehmii, B. bussei*

and *B. spiciformis* are widespread as well as *Isoberlinia angolensis*, *Combretum erythrophyllum*, *Monotes africanus* and *Parinari curatellifolia*.

The very distinctive, flat-topped acacia *Acacia abyssinica* is found only in high altitude woodland and forested mountain gullies. Its distribution in Malawi is limited – in fact Nyika is the only national park or wildlife reserve in Malawi which gives it protection. This large, conspicuous tree occurs in three locations within the park. The first is a small stand on the ridge south-east of Mpanda Peak in the north of the park. The second stand is quite small, about 26 km north of Thazima near the main road. The third stand is spread over several locations in the Katizi Valley, along the south road to Chelinda. These trees are of special importance because the Brown Parisoma (Warbler) *Sylvia lugens* is found only where flat-topped acacia occurs.

Nyika is the only national park or wildlife reserve which gives Flat-topped Acacia *Acacia abyssinica* protection (see photograph pages 42-43)

Tropical evergreen forests

Tropical evergreen forests are an endangered community the world over. Each year large areas are destroyed by agriculture, logging and fire. Preserving tropical forests helps protect the millions of plant and animal species – many of which have been invaluable to human medicine – that are indigenous to tropical forests and in danger of extinction. Keeping forests intact also helps prevent floods and drought by regulating regional rainfall. Tropical forests also play an important role in climate change processes. Tropical forest trees, like all green plants, take in carbon dioxide and release oxygen during photosynthesis. Plants also carry out the opposite process – known as respiration – in which they emit carbon dioxide, but generally in smaller amounts than they take in during photosynthesis. The surplus carbon is stored in the plant, helping it to grow.

When trees are cut down or burned, their stored carbon is released into the air as carbon dioxide. This is how deforestation and forest degradation contribute to global warming. Deforestation is estimated to be responsible for about 10 percent of all global warming emissions. Deforestation is happening at an alarming rate – an acre of tropical forest every second.

Nyika National Park protects the last remaining stronghold of tropical evergreen forest left in Malawi. This rich community is largely believed to have been more extensive in the past, but a combination of devastating fires and a drier climate, inhibiting forest recovery, have reduced it to small patches covering less than 5% of the park.

The extent and timing of the change from more extensive tropical evergreen forest to grassland on the Nyika is still a matter of debate. Analyses of charcoal-laden soil samples indicate severe fires raged through great forests across the plateau as recently as 4,900 years ago. Endemic species and subspecies of birds, amphibians, reptiles and plants are present giving support to the theory that the high plateau grassland must have been extensive for several thousand years to allow for their evolution. However, it is believed that forest destruction by fire proceeded at a much slower rate within the wetter, less exposed, low altitude submontane forests on the south-western side of the park, near the Zambian border. These forest patches may have been more extensive as recently as 1,000 years ago.

While insignificant in total size, the Nyika tropical evergreen forests provide a critical habitat for many rare plants and animals. Blue Monkeys may be seen moving about in the canopy, feeding on the fruits of the trees. Both Harvey's Duiker *Cephalophus harveyi* and Blue Duiker *Philatomba monticola* are residents, as well as the Black and Red Bush Squirrel *Paraxerus Lucifer* and the Chequered Giant Sengi *Rhyncocyon cirnei*. Bush Pig *Potamochoerus larvatus* root in the undergrowth for food, Common Eland *Taurotragus oryx* and Bushbuck browse on leaves, Leopard have dens under fallen trees and among rocks in the forests. The thicket surrounding forests recovering from fire is an important habitat in its own right. Several birds with very limited distribution and an endemic race of the Greater Double-collared Sunbird *Nectarinia afra whytei* make their home here (photograph p6). Destruction of these forests would lead to the destruction of all the wildlife they support.

Preserving tropical forests helps protect the millions of plant and animal species, many of which have been invaluable to human medicine, that are indigenous to tropical forests and in danger of extinction

The structure and composition of the tropical evergreen forests of the Nyika vary markedly depending on location. Local differences in temperature, altitude, amount of rainfall, incidence of dry season mist and exposure to wind are all important influences.

The forests can be divided into two main types, montane and submontane. The montane forests of the

Lush submontane forest on the Eastern Escarpment, Nyika Plateau

Nyika occur at higher elevations, between 2,250 m and 2,600 m. The trees in these forests are stunted in growth, vegetation is sparser, and fewer species occur. Submontane forests occur at lower elevations between 1,900 m and 2,250 m. They support a taller, denser and richer variety of vegetation.

There are six different sub-types of tropical evergreen forest within Nyika. Four can be classified as submontane and one as montane. A sixth type, Riparian Forest, occurs in low-lying woodland areas along rivers and streams.

Submontane forests of the Eastern Escarpment

The forests on the eastern escarpment of the plateau are practically inaccessible but support an especially lush and diverse community of plants. The combination of high annual rainfall (1,700 mm) and prolonged dry season mists keep the forest interior moist and dripping throughout the year. Under these conditions mosses, lichens, ferns and epiphytic orchids thrive, giving the forests a dense jungle-like atmosphere.

The forests extend from near Livingstonia to Kasaramba Viewpoint, on the very steep escarpment. They end abruptly at the plateau edge where they meet the grassland. The total area of these patches is 34 km^2, the largest patch being Mwenembwe Forest (13.5 km^2). These forests probably once formed a much larger single stretch of evergreen trees but have been seriously damaged by fire and cutting. When the Livingstonia Mission was built in the late 1800s much of the timber came from here.

The dominant trees are *Ocotea usambarensis* and *Ficalhoa laurifolia*, which grow to over 30 m and have massive buttressed trunks to support their great weight. Many project higher than the other forest trees and therefore these species are known as "emergent". *Ternstroemia polypetala* is also found in these forests, its most southerly distribution in Africa.

Submontane Juniper Forest

Located in the southeast corner of the park, the Juniper Forest is of special importance because it represents the most southerly viable stand of *Juniperus procera* in Africa. This small tropical evergreen forest was the first area of Nyika to receive official protection when it was declared a Forest Reserve in 1948. Most of the surviving trees occur in two stands along the Uyaghaya Stream, the largest patch covering 9 ha. Several other very small patches and individual juniper trees are scattered within a radius of 16 km indicating an evergreen forest of considerable size may have filled the whole valley before it was ravaged by fire. Some attempts have been made to cultivate and plant juniper seedlings on the forest edges. The largest trees in the forest reach 30-50 m tall. Many are juniper but other evergreen forest species are common as well including the emergent *Olea capensis welwitschii, Ekebergia capensis, Hagenia abyssinica, Podocarpus milanjianus* and *Acokanthera laevigata. Hagenia abyssinica* reaches its southern limit in the park. *Acokanthera laevigata* is found nowhere else in Malawi and is otherwise known only from highland areas in Tanzania. The relatively open canopy of the forest allows sunlight to penetrate to the forest floor encouraging fairly rich undergrowth.

Juniper tree
Juniperus procera

Submontane forests of Nkhonjera Hill

These three small patches of evergreen forest lie on the gentle slopes below the grassy peak of Nkhonjera Hill on the southern park boundary. The forests have been severely damaged by fire. The largest patch covers 19 ha. *Ekebergia capensis* and *Parinari excelsa* are common trees, as is the emergent *Entandrophragma excelsum*, which reaches 30-35 m. The giant succulent *Euphorbia obovalifolia* is abundant. This species is widespread in East Africa but reaches its southern limit on the Nyika. There are fewer *epiphytes* and tree ferns than in the other Nyika submontane forests, probably because of a warmer and dryer climate (the forests are on the lee side of the hill) and exposure to wind.

The abundant and giant succulant *Euphorbia obovalifolia*

Submontane forests of the south-western slopes

The evergreen forests on the south-western slopes of Nyika, along the Zambian border, receive fair rainfall (1,500 mm/year), are at a lower altitude (1,950-2,200 m) and are sheltered from the prevailing easterly winds. Thus, these forests have tree species varying between 20 and 35 m.

Many of the forest patches in this area are very small (less than one ha) but several are more extensive, including Manyenjere, Chowo and Kasyula (the former two on the Zambian side of the border). The Zovochipolo Forest, located near the junction of the road from Thazima to Kaperekezi, is small but easily accessible. The forest patches remain extremely vulnerable to wildfire, despite attempts to protect them with fire breaks. *Hagenia abyssinica*, the pioneer species which reaches its southern limit in the park, occurs in large numbers around the edge of these patches. Other forest edge species include *Catha edulis, Cussonia spicata, Gnidia glauca* and *Buddleja salicifolia*.

Several emergents occur including Cape Olive (favourite food of the Rameron Pigeon *Columba arquatrix* and Schalow's Turaco *Tauraco schalowi*), *Entandrophragma excelsum* and *Pouteria adolfi-friederici*. The latter two species often have impressive buttresses extending 4-8 m away from the trunk. There are many species of vines and lianas, including *Asparagus sp*. and *Clematis sp*. *Toddalia asiatica*, a large woody creeper is easily recognised by the knobbly thorns on the bark and the thorny foliage. Thorns, tendrils and hooked petioles (leaf stalks) are devices used by creepers to support themselves on trees. Large tree ferns, such as *Cyathea mannians*, are also typical of the south-western slope forests.

These forests provide excellent birding. The call of the Moustached Green Tinkerbird *Pogoniulus leucomystax* is often the first heard. Bar-tailed Trogon *Apaloderma vittatum* are common and vociferous.

The forest patches remain extremely vulnerable to wildfire, despite attempts to protect them with fire breaks

Zovochipolo Forest Trail. Forests provide excellent birding. The call of the Moustached Green Tinkerbird *Pogoniulus leucomystax* is often heard. Bar-tailed Trogon *Apaloderma vittatum* are common and vociferous

Montane forests of the high plateau

The evergreen forests of the high plateau are confined to the heads of dambos and streams or where rocky outcrops have given some protection from fire. Because of high altitude, wind, cooler temperatures and lower precipitation, the trees are stunted, averaging only 8 m in height, with few emergents. Most of the patches are limited to 1-2 ha. Few of them have firebreaks and consequently their edges have been subjected to repeated burning. This has led to the growth of thickets surrounding the forests, dominated by fire-resistant species such as *Buddleja salicifolia, Kotschya recurvifolia* and *Philippia benguelensis*. Many of the original tree species of the forest interiors have been burnt out and replaced by succession species like *Agarista salicifolia, Cussonia spicata, Hagenia abyssinica* and *Morella salicifolia*. In areas where fire has wiped out forest patches the vegetation has changed to bracken, grass and half-burnt shrubs.

The undergrowth in these forests tends to be sparse with few shrubs, vines, ferns and epiphytes. Thus the forests are fairly open encouraging animals such as eland, bushbuck and bush pig to visit for shelter and browsing. The forests contain a high variety of birds, some of them reaching the southern limit of their range in the park.

Above: Riparian evergreen forest growing along streams or rivers

Left: Montane forests of the Nyika Plateau. Because of the high altitude, wind, cooler temperatures and lower precipitation, the trees are stunted

Riparian forest

The term "riparian" describes vegetation which grows along streams or rivers. The moister atmosphere in such locations encourages the growth of evergreen forest, even in dry areas which otherwise would only support poor quality woodland. Riparian evergreen forest occurs in several locations along the Zambian border but the best example is found along the fast-flowing North Rukuru River and its tributaries on the western escarpment. The only emergent in these forests is *Newtonia buchananii*, occasionally reaching 30 m in height. The general canopy level is 20 - 25 m and such species as *Agauria salicifolia, Cussonia spicata, Olea africana* and *Syzygium cordatum* are common. Vines and lianas are prolific as are various ferns and epiphytes.

Exotics

In the 1950s six species of exotic timber trees were planted on the plateau to test their potential for commercial exploitation: primarily Black Wattle *Acacia mearnsii* and Mexican Pine *Pinus patula* (the most common tree in the Chelinda plantation, identified by its long droopy needles). Slash Pine *P. elliotii*, Apple Box Eucalyptus *Eucalyptus bridgesiana*, Maiden's Gum *E. maidenii* and Sydney Blue Gum *E. saligna* were also planted in smaller quantities. Clusters of these exotics can be found across the park, their seeds having been transported by wind or animals. Other introduced plants such as tomato, tree tomato, Cape Gooseberry, sisal, banana, peach, mango, cassia and cedar can also be found around the plantation and in a few old village sites. Himalayan Raspberry *Rubus ellipticus* has also spread extensively through the park.

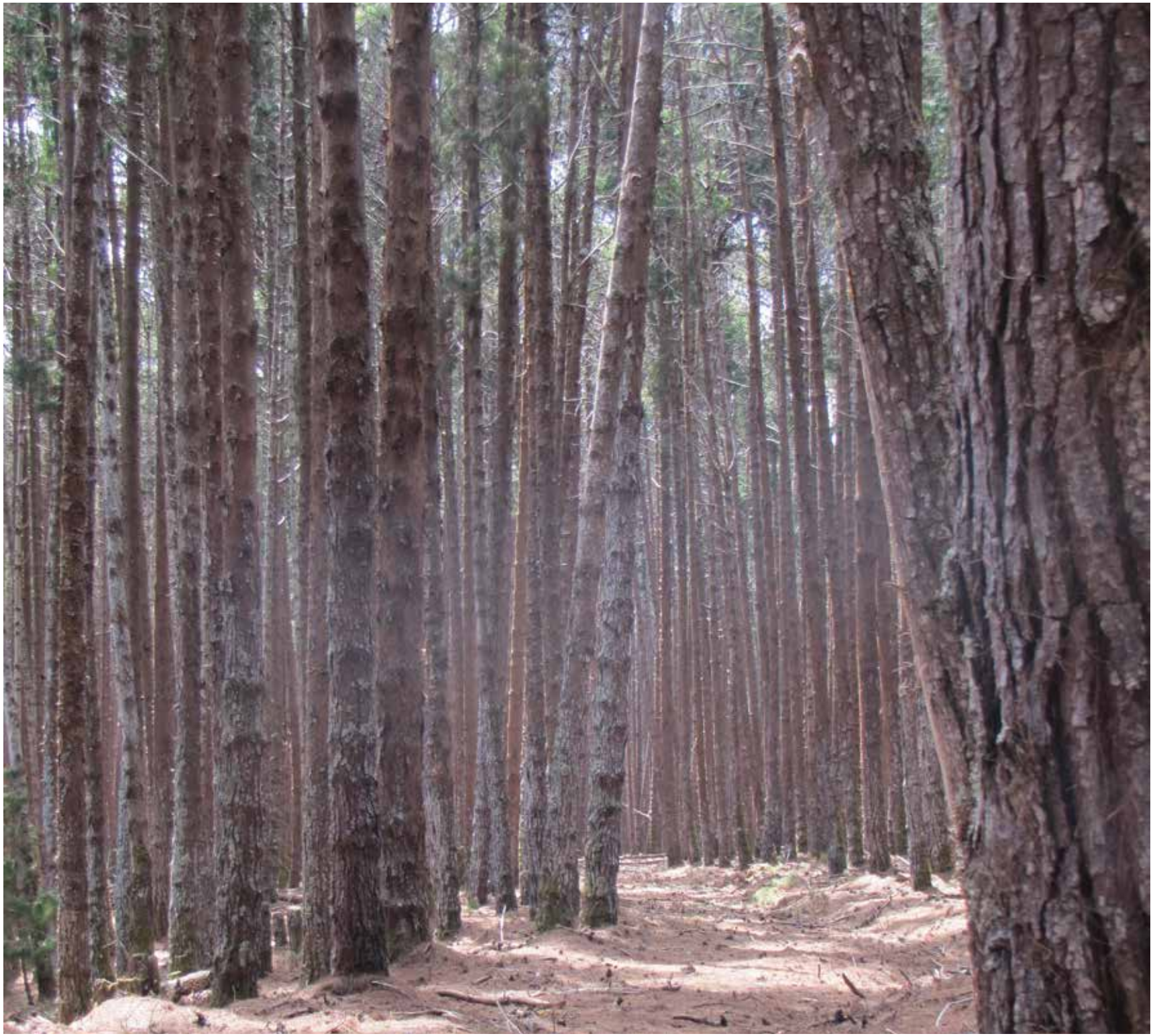
In 2012 the Department of National Parks and Wildlife issued concessions to a private company to log part of the pine plantation. These areas are being overgrown with *P. patula* again, as well as with bracken fern. Remnants of dambos which formerly meandered through the plantation, are now silting up because of erosion related to the logging.

In the remaining pine plantation near Dam 1, the dense canopy of upper branches reduces sunlight, restricting growth of plant life on the forest floor. Only a few grasses and creepers survive in the deep litter of pine needles, which make the soil very acid. The rainy season brings the deadly poisonous bright red and white-spotted *Amanita muscaria* mushrooms. The spores of this fungus were originally brought to the Nyika on the young pine seedlings. The mushrooms are "fly agarics" – flies are attracted to their smell and when they move from mushroom to mushroom, aid in the spread of their reproductive spores.

Several shade-loving terrestrial orchids also bloom among the pines in the late rainy season. Bushbuck, eland, zebra, roan and leopard shelter in the forest. The white-breasted Augur Buzzard *Bateo augur* with its distinctive red tail can regularly be spotted perched high in the trees at the edge of the plantation.

Mexican Weeping Pine *Pinus patula* Introduced onto the plateau to test their potential for commercial exploitation

The deadly poisonous bright red and white-spotted Fly Agaric Mushroom *Amanita muscaria*



Inside the Chelinda Pine Plantation, planted in the 1950s

The aftermath of logging at Chelinda Plantation

Black Wattle Tree
Acacia mearnsii

Flame Lilies
Gloriosa superba
Found south of Dam 3 with their spiky red and yellow heads that emerge in the rainy season

Wildflowers

Nyika National Park is known for its outstanding seasonal wildflowers, found particularly in the dambo and grassland vegetation communities. After the dry season fires, the grassland quickly becomes a mass of colour as thousands of small flowers emerge from the ash. Several reasons have been suggested as to why this happens, despite the lack of rain at this time of year. Some plants may actually require the heat from the flames to enable seed germination. Others may benefit from the minerals in the ash, which filter down into the soil. And still others may be encouraged to grow by the increased sunlight they are exposed to when the thick grass cover is burned off. Once the flowers have emerged they are able to survive on the evening dew, which increases as the rainy season approaches. Some also have underground root systems that reach deep into the ground where moisture is still retained. Other species such as *Dolichos kilimandscharicus* have horizontally creeping underground stems called rhizomes which can retain moisture.

Commonly found wildflowers of the grassland include the miniature purple Iris, *Moraea stricta*, the small red *Hibiscus rhodanthus,* and two yellow *Gnidias - G. kraussiana and G. involucrata*. The compact blue *Pentanisia schweinfurthii* is widespread along roadsides. *Boophane disticha* with its large pink spherical head is also occasionally seen.

When the rains begin in November, other species emerge to dominate the grassland wildflowers. The large purple Iris *Moraea schimperi* is common, as well as several species of Gladioli, including the yellow-red *Gladiolus dalenii. Dierama longistylum*, the delicate pink bell-like Iris is widespread as are several species of brightly coloured Commelina. Of special interest are the Red-hot Pokers *Kniphofia sp*., which colour the hillsides south of Dam 3 with their spiky red and yellow heads, and the Flame Lilies *Gloriosa superba*.

Masses of the invasive European Foxglove *Digitalis purpurea* grow on the slopes near the plantation at Chelinda Camp.

Waterlogged dambos generally have some species of flowers blooming year-round, but with the coming

of the rains this community explodes with colour. The Pineapple Lily *Eucomis autumnalis* is common as well as the delicate white Geranium vagans and various species of the daisy-like, yellow or pink Gerbera. The fragile pink *Gladiolus laxiflorus* and many orchids flourish in the very wet areas. This is also the habitat of the sticky, red *Drosera madagascarensis*, an insect-eating plant, which grows in large clumps in sunny seepage areas.

The rainy season also sees the emergence of wildflowers in the broad-leafed woodlands. The Flame Lily *G. superba* and the Iris *Moraea macranta* are typical species.

The dense canopy of most tropical evergreen forest patches prevents sunlight from reaching the forest floor, so wildflowers are few. Epiphytic orchids survive, hanging from tree trunks and branches. Several flowering shrubs flourish around the outside of forest edges. *Hypericum revolutum,* a shrub with small yellow flowers, gives off a strong smell of curry, which curiously can't be detected once it is picked. *Gnidia glauca* with large clumps of yellow flowers is also common.

As the rainy season ends in late April, many flowers fade, but their colours are soon replaced by the pinks and whites of the bushy *Protea sp*. shrubs. There are at least seven species of protea within the park. Common in the woodlands are the large red *Protea rupestris* and the white *P. petiolaris*. Their large dry flowers stay on the shrubs long after blooming. A dwarf fire-resistant variety, *P. heckmanniana*, is found in the grassland.

Twenty four species of *Helichrysum,* the "ever-lasting flowers", are known to occur at Nyika. Most are yellow, but several species are tinged with red, green or black. Touch them and feel their paper-like crispness. These also bloom at the end of the rains, holding their colour until late in the dry season.

During June and July, rocky outcrops add splashes of colour with their stands of the brilliant red succulent, *Aloe mzimbana*. Road verges, firebreaks and other disturbed ground are brightened throughout the dry season with carpets of small blue *Lobelia trullifolia (p231)*.

Drosera madagascarensis, an insect-eating plant which grows in large clumps in sunny seepage areas

The common daisy-like, yellow or pink Gerbera *Gerbera veridifolia*

Left: *Gladiolus dalenii*

Top: *Crinum macowanii*

Above: *Moraea shrimperii*

Top: Red Hot Poker *Kniphofia grantii*

Above: *Spermacoce dibrachiata*

Top: *Alloxylon flammeum*

Above: Foxglove, *Digitalis purpurea* European origin, found widely around Chelinda Camp

Top: *Imaptiens gomphophylla*

Above: *Helichrysum flammiceps*

Right: *Dolichos kilimandcharicus*

Left: *Lobelia giberroa*

Top: *Protea petiolaris*

Above left: Yellow everlasting flowers *Helichrysum sp.*

Above: *Boophane disticha*

Orchids

Appendix 3 lists the known orchids of Nyika National Park

Orchid
Disa erubescens
also shown opposite the title page

Nyika Plateau is the richest orchid area in south central Africa. More than 200 species have been identified within the park. These represent only a fraction of the worldwide orchid family, which has over 25,000 species occurring in both tropical and temperate zones. Many of the orchids found within the park are common throughout Central Africa. However, 30 species are known only within Malawi, from Nyika, and seven, of which two are subspecies, are found nowhere else in the world.

The orchid flower differs from those of other plant families in several ways. At least one of the petals is very different in shape to the sepals. It is known as the lip. The male portion of the flower (stamen) and female portion (pistil) are combined into one structure called the column – often visible protruding from the center. Instead of being in separate grains, the pollen of orchids is stuck together in a mass known as pollinia.

In addition, the extremely minute seeds of the orchid cannot germinate without the aid of an associated fungus, thus leading to a very low success rate of reproduction. Orchids are divided into two types: terrestrial and epiphytic.

Terrestrial orchids grow out of the ground. From September, before the rains, when the sky-blue flowers of *Disa baurii* appear, until late March when the deep rose-pink flowers of *Satyrium princeae* arrive, the montane grassland and dambos produce a wealth of colour. *Disa* and *Satyrium* are probably the most colourful, though *Eulophia* are also particularly striking with their multi-flowered heads.

There are 26 species of *Disa* in Malawi and only four of these do not occur in the Nyika National Park. *D. praecox* is a Nyika endemic, occurring in both Malawi and Zambia but nowhere else. One of the most striking species is *D. ochrostachya*, with its slender, gold, candle-like flowers. It has also been recorded from Mulanje and is widespread in Africa, but still seems to be one of Nyika's most distinctive plants. Other notable species of *Disa* are *D. welwitschii* and *D. ornithantha*, both of which can be found in the Nyika dambos. *D. hircicornis* is another that likes marshy ground; its flowers are rich purple with a grapelike bloom.

Orchid
Disa welwitschii

Twenty eight species of *Satyrium* are known from Malawi. Twenty one species are recorded in the park. These are distinctive orchids with twin spurs on the lip, which unusually is held at the top of the flower. Three species, *S. princeae*, *S. monadenum* and *S. microcorys*, are known only from Nyika and southern Tanzania. The reddish-orange *S. sceptrum* (formerly known as *S. acutirostrum*) is frequent in the montane grassland, usually occurring as scattered plants rather than in colonies. *S. buchananii*, a bog dweller, has white flowers with a strong, sweet scent.

The largest orchid genus in the Nyika is *Habenaria*, with over 40 species recorded. Most have small green flowers but some, such as *H. praestans* and *H. insolita*, are large, handsome plants. Many of the *Habenaria* species are found in the woodland areas but others occur in dambos and grassland. *H. nyikensis* has a single round, fleshy leaf, bright green with a whitish edge. Its leaves form a carpet on the grassland.

Epiphytic orchids grow on the trunks or branches of trees and sometimes on rocks. They are not parasites but simply use the trees for support. The tropical evergreen forest patches are the main strongholds of these orchids. *Mystacidium tanganyikense*, one of the common delicate white epiphytes found in Zovochipolo Forest, blooms from January to March. Epiphytic orchids are also found growing on trees in the wetter areas of woodland and on stunted *Brachystegia*. Several species of epiphytic orchid are known only from northern Malawi, the Zambian Nyika and southern Tanzania. These include the beautiful *Aerangis montana*, which occurs in most of the Nyika forest patches almost always over 1,500 m and up to 2,450 m.

Orchid *Eulophia thomsonii*

Above: Orchid
Eulophia
ovalis var. bainesii

Right: Orchid
Disa ukingensis

Above: Orchid
Habenaria praestans

Above: Orchid
Disa baurii

Top: Orchid
Satyrium sceptrum

Above: Orchid
Disa satyriopsis

Top: Orchid
Satyrium buchananii

Above: Orchid
Disa equestris

Orchid
Habenaria cornuta

Epyphitic Orchid
Mystacidium tanganyikense

Epyphitic Orchid
Aerangis montana

Wildlife

The large mammals of Nyika have always been one of the park's major visitor attractions. However, Nyika's varied vegetation communities also support a wide range of other types of wildlife including birds, reptiles, amphibians, fish and butterflies. Each plays an important role in the Nyika ecosystem. Some occur widely throughout Central Africa but others are rare and endangered, found nowhere else in Malawi or the world.

Mammals

Mammals are warm-blooded, suckle their young on milk from the mother's mammary glands and have body hair.

The many varied habitats in Nyika National Park, and its large size, result in a rich diversity of mammalian species, some 55% of the 187 recorded in Malawi. The total number of mammalian species identified for Nyika National Park is 100 (including humans). Nearly all the species in the park are widespread in Malawi and in neighbouring countries where there is appropriate habitat. Special species include the Four-striped Grass Mouse *Rhabdomys pumilio* (found only on Nyika and Mt. Mulanje) and Gnoske's Mouse Shrew *Myosorex gnoskei* (endemic to Nyika), as well as many species of smaller mammals which in Malawi occur only in highland areas.

A selection of common mammal silhouettes found within the park are conveniently included inside the back cover of this book, to help with identification. Important characteristics to look for are body shape, length of legs and shape of tail, as well as shape and size of special features like tusks, warts, or horns, if present.

Wildlife droppings are also a useful way to identify wildlife. Each must be examined for size, shape, colour, content (fur, bones, grass, shells, millipede segments etc.), how they are placed (in a large pile or individually), and where they are found (e.g. typical hare droppings found in rocky outcrops would most likely belong to the Red Rock Hare *Pronolagus rupestris*, as opposed to the African Savanna Hare *Lepus victoriae*).

Appendix 1 lists the known mammals of Nyika National Park

Comparative track illustrations are also included at the back of the book. Tracks of animals of the same species can vary depending on the age of the animal, speed, ground type and how long ago the tracks were left

The following sections provide general information on some of the mammals of note within the park. Local language Chewa and/or Tumbuka names for these animals are noted after the common and Latin names of each, where they are known.

Wildlife droppings are also a useful way to identify wildlife.
Each must be examined for arrangement, location, size, shape, colour, content (fur, bones, grass, shells, millipede segments etc)

Top: Hyaena *Crocuta crocuta* droppings, white from bone consumption

Above: Old Leopard *Panthera pardus* droppings, likely from a meal of Warthog

The symbols indicate the usual habitat of the animals on the following pages

Woodland

Pine plantation

Grassland

Dambo

Water

Evergreen forest

Blue Monkey
Cercopithecus mitis
Found only in tropical evergreen forest patches. Lives in troops and spends most of its time in the high canopy of the forest trees

Primates *Primates*

Animal names include the common name, Latin name and local names, if known

Members of this order have well developed brains and consequently, a high degree of intelligence. All species have an opposable thumb meaning they are able to grasp things. Their senses of sight and hearing are more important than scent. They have flat nails on their fingers and toes instead of claws. Primates living in the park are humans, Yellow Baboon, Blue Monkey and Vervet.

Humans *Homo sapiens*

Homo sapiens is the only surviving species of the primate genus Hominidae. Modern humans are the subspecies Homo sapiens sapiens. The scientific name *Homo sapiens* is Latin for "Wise one", given to humans by Carl Linnaeus, the Swedish botanist who was the architect of the scientific naming process, developed in the 1700s.

Of all the species in the world, humans continue to have the largest impact on earth. Homo sapiens are on the "Species of Least Concern" part of the International Union for the Conservation of Nature (IUCN) Red List of Endangered Species.

The number of people living in the park has varied over the years. The park has three communities – Thazima Gate, Kaperekezi Gate and Chelinda. DNPW headquarters is located at Thazima, with a population generally between 50-100 people, including children. Kaperekezi has the smallest population, 20-30 people. Chelinda generally has a population of several hundred park and visitor accommodation staff but exceeded that during the years when the pine plantation was being heavily logged and processed at a sawmill.

Yellow Baboon *Papio cynocephalus*
Nyani, Mnkhwele and Nkhwele

Of the baboon family, only the Yellow Baboon occurs in Nyika National Park. It is powerfully built with a dog-like head, naked face and longish tail. Males can weigh up to 30 kg, females up to 15 kg. Yellow Baboons are yellowish-brown to grey in colour. The buttocks and genital region of baboons are often brightly coloured.

Yellow Baboon
Papio cynocephalus
Baboons favour woodland habitats and at Nyika are commonly seen along the road north of Thazima Gate

One way to quickly identify a baboon from a monkey is to look at the tail. A baboon has a distinct hump in its tail where it joins the rump. A monkey's tail drops straight down.

Baboons are very social and often live in large groups of 40 or more. The young cling to the mother's stomach or back as she lopes along. Baboons are omnivores, eating a wide variety of vegetation, insects, birds' eggs and even young antelope. They communicate with each other by grunting, barking, squealing and screaming. Baboons favour woodland habitats and at Nyika are commonly seen along the road north of Thazima Gate. Their enemies are leopard and man.

The tracks of a baboon are similar to those of a human hand but smaller. The front foot looks like a shortened palm and clearly shows knuckle marks. The back foot, which is 15-16 cm, looks like an extended palm.

Blue Monkey *Cercopithecus mitis*
Ntchima

The Blue Monkey is blue-grey in colour with the limbs, lower end of its long tail and its face darker than the rest. It is found only in tropical evergreen forest patches.

Males weigh about 8 kg, females 6 kg. They live in troops and spend most of their time in the high canopy of the forest trees, foraging for fruit, leaves, flowers, insects, eggs and baby birds. They are diurnal. On a walk through Zovochipolo or the Juniper Forest, you can sometimes see these monkeys jumping from tree to tree, crying like babies as they investigate intruders. It is preyed upon by the Crowned Eagle *Stephanoaetus coronatus*.

The tracks of monkeys are similar to those of baboons but the fingers are more splayed and smaller, measuring up to 6 cm in length.

Vervet Monkey *Cercopithecus pygerythrus*
Pusi

This monkey is found in woodlands. It is smaller than the Blue Monkey, has a slightly shorter tail and is lighter grey in colour with dark hands and feet. It has a naked black face with a band of white hair across the forehead and on the sides of the head. It has a dark tip to its tail. Males weigh about 7 kg and females 5 kg. The Vervet Monkey often lives in troops of 20 or more. It is basically vegetarian but also eats insects, eggs and birds, if available. It is preyed upon by leopards and Crowned Eagles. Its tracks are similar to those of the Blue Monkey measuring up to 6 cm in length. It is commonly seen in the lower elevations in the park.

Vervet Monkey
Cercopithecus pygerythrus
Found in woodlands.
It is commonly seen in the lower elevations in the park

Sengi (Elephant Shrews) *Macroscelidea*

Chequered Giant Sengi
Rhynchocyon cirnei

Also known as the Giant Elephant Shrew, this small animal is found only on the tropical evergreen forest slopes of the eastern Nyika Plateau. It has a long tapering snout, resembling the trunk of an elephant, as well as long back legs which enable it to hop around like a small kangaroo. It has large ears and eyes and a long tail and is the size of a rabbit. Its colour ranges from yellow to reddish-brown with a distinct chequered pattern on its back. Its underside is creamy white. This sengi is mainly diurnal and feeds on insects, termites and ants. Its presence can often be detected in forests by the shuffling noise it makes as it searches the leaf litter for insects with its long snout. The Chequered Giant Sengi lives in small burrows, under logs or in old termite mounds. It leaves small dark droppings, which contain the remains of its insect diet.

Short-snouted Sengi
Elephantulus brachyrhynchus
Zumbi

The nose and tail of this sengi are similar to those of the Chequered Giant Sengi but shorter. It is also much smaller, the size of a mouse. It has thick fur, reddish-brown on the back and whitish on the belly. It has long back legs and large eyes and ears. It is diurnal and feeds on insects. It leaves tiny dark droppings, which contain the remains of its insect diet. It is uncommonly seen at Nyika but occurs in grassland and woodland and sometimes in rocky areas.

Bats *Chiroptera*
Mleme, Kasuska and Nanzeze

Bats are the only mammal capable of true flight. Bats are divided into two easily distinguishable groups - fruit-eating bats and insect-eating bats. Fruit bats are usually larger, with dog-like heads and large eyes which shine red in torch light. They have a claw on the first and second fingers of each wing, and small or non-existent tails.

Insect-eating bats have small eyes, curiously formed faces and elaborately developed ears. They have a claw only on the first finger of each wing and all but one species has a tail.

Bats are well-known for their ability to navigate in the dark. They do this through a process called "echo-location"; the bat gives out high-pitched squeaks, which bounce off any objects in the vicinity and return to the bat, who interprets their meaning and adjusts its flight direction accordingly. Bats are active only at night, beginning their feeding at dusk. Many species hang upside-down to sleep, in the foliage of trees, in hollow tree trunks, caves, culverts and buildings. The bats at Nyika are found mainly around the pine plantation at Chelinda, in the tropical evergreen forest patches and in the woodland of the plateau escarpments.

There are almost one thousand species of bats in the world. Malawi alone has at least 55 different species. More study needs to be done on bats within the park. Only 10 species have been recorded.

Wahlberg's Epauletted Fruit Bat E*pomophorus wahlbergi*
The bats at Nyika are found mainly around the pine plantation at Chelinda, in the tropical evergreen forest patches and in the woodland of the plateau escarpment

Hares *Lagomorpha*

Rabbits and hares both belong to this order but only hares occur in Malawi and Nyika. Hares can be distinguished from rabbits by their longer hind legs and ears. They have short tails and coats. They rely on their keen senses of smell and hearing as well as their characteristic fast, zig-zagging bounding, to escape their many predators. They are usually solitary and nocturnal. Two kinds of hares occur at Nyika: the African Savanna Hare and the Red Rock Hare.

African Savanna Hare *Lepus victoriae*
Kalulu and Kafumbwe

This is the common hare of the Nyika, often spotted in the grassland, the edges of woodland or running along the road (frequently and frustratingly just ahead of one's vehicle, at night). Its body is grey with a white chest and belly. The top of its short bushy tail is black whereas the bottom is white. It usually weighs less than 2 kg. It emerges from its hiding place in shrubs or bushes at night, to feed on vegetation. It leaves faint, often indistinct tracks, especially if it is running (front foot 2 cm long, back foot 3 cm). Its presence can be detected by heaps of pale round droppings in grassland. It is commonly seen at Nyika.

Red Rock Hare *Pronolagus rupestris*
Kalulu

This hare can be found in rocky areas usually with scrub cover nearby. Its back and head are reddish-brown with black streaks. Its underside is paler speckled with white. The short bushy tail is brownish-black. It is slightly larger than the Savanna Hare, weighing up to 2.5 kg. Its presence can be detected by large heaps of pale round droppings between rocks. It is uncommonly seen at Nyika.

Rodents *Rodentia*

Rodents form the largest order of mammals in the world. They are characterised by a single pair of incisors in each jaw, which continue to grow throughout the animal's life. The animals must continually use their teeth for gnawing or they will grow in a curve back into their head causing death. There are 34 known species of rodents recorded in the park among which are porcupine, squirrels, rats and mice.

Cape Crested Porcupine *Hystrix africae australis*
Nungu and Chiningu

The porcupine is the largest African rodent, weighing up to 15 kg. It is common in the park but uncommonly seen because of its nocturnal habits. It is identified by the distinctive black and white quills, which cover its back and tail. It uses these quills for self-defence, first rattling them and then rushing backwards to stab the predator. The quills easily come out of the porcupine and stay embedded in the unfortunate attacker.

Porcupine are seen singly or in pairs. They feed on roots, bark, wild fruit and berries. During the day they hide in rock crevices or burrows. Their presence is indicated by narrow, fibrous, black droppings (4 cm) full of chewed grass. Drag marks left by quills (and even quills themselves) are frequently found on sandy roads or paths. The tracks are distinctive - the back foot is larger and vaguely triangular in shape whereas the front is almost square. Both feet show toe and claw marks - the front foot is 5-6 cm long and the hind foot 5-9 cm.

Cape Crested Porcupine *Hystrix africae australis.* Presence is indicated by narrow, fibrous, black droppings full of chewed grass. Drag marks left by quills are frequently found on sandy roads or paths

Black-and-red Bush Squirrel *Paraxerus lucifer*
Kasira and Benga

This squirrel, found only in tropical evergreen forests, is brilliant orange and black. Its bushy tail has several black rings. It is rarely seen as there are few of the submontane trees present in the park on whose fruit it depends. It can be found in the Zovochipolo forests of the Malawian side of the park and in Chowo Forest in Zambia.

Smith's Bush Squirrel *Paraxerus cepapi*
Kalikongwe

This bush squirrel is a small (0.2 kg) greyish yellow squirrel, paler on the under parts and inside the legs. It has a bushy tail usually darker than the body. It is common in woodland at Nyika occurring singly, in pairs or in small family parties. It is diurnal and lives in trees, but feeds on seeds, fruit, roots and nuts on the ground. It chatters excitedly when alarmed, curling its tail over its back. Its tracks are very small, 2-2.5 cm long, distinct only in wet ground, showing toe and claw marks. Bush squirrel droppings are rough, dark, oblong and usually less than 1 cm long.

Smith's Bush Squirrel
Paraxerus cepapi
Common in woodland at Nyika occurring singly, in pairs or in small family parties. It is diurnal and lives in trees

Carnivores *Carnivora*

Members of this order are adapted for killing and eating prey. Their teeth and claws are well developed for both attack and defence. They have good senses of hearing and smell.

African Clawless Otter *Aonyx capensis*
Katumbu

The African Clawless Otter is solidly built with short legs, small rounded ears, a thick pointed tail and distinct whiskers. It is dark brown with very smooth fur. Its chest, throat and sides of face are white. It can weigh up to 18 kg. It gets its name from the fact that its front feet have no claws and its back feet only very small ones. It lives alone, in pairs or in small family parties, usually by streams or dams, making its den in thick vegetation at the water's edge. It can be nocturnal or diurnal. Sometimes it travels far from water in search of food which includes crabs, molluscs, fish, frogs, mice, insects and occasionally water birds. The African Clawless Otter is an excellent swimmer. Its droppings are long and narrow (5-8 cm) with many crushed shells. Its tracks are distinctive - its hind feet are partially webbed and its 7-8 cm long fore feet are clawless. This animal is rarely seen at Nyika.

Ratel *Mellivora capensis*
Chiwuli, Chimbuli and Mchoncho

Ratel
Mellivora capensis
Usually nocturnal and lives singly or in pairs. The Ratel can be very aggressive and is best avoided

The Ratel, also known as the Honey Badger, is heavily built with a short tail and legs, and small ears. It has thick fur with a distinctive pattern of black on the lower parts and greyish white above. It weighs up to 9 kg. It is usually nocturnal and lives singly or in pairs. Its skin is loose and baggy which enables it to turn on anything that attacks it. Though it feeds on a wide variety of foods such as small mammals, insects, birds, eggs and fruit its favourite food is honey. It is known to follow the lead of the Honeyguide bird, of which there are four species, to bees' nests, which it rips open with its powerful claws to eat the honey.

This animal is uncommonly seen at Nyika, usually on the grassland or in the woodland. Its 8 cm long tracks show distinct claw marks. Its droppings resemble those of porcupine (long, thin and black) only slightly larger.

Two-spotted Palm Civet *Nandinia binotata*

Also known as Palm Civet, this animal resembles a stockier, furrier genet (*Genetta sp*). It has brown fur with faint dark spots on the back, a pair of light spots on the shoulders (hence the name), short legs and a thick ringed tail. It weighs about 2 kg. It lives in the trees of evergreen forests but is rarely seen because of its nocturnal habits. It eats fruit as well as birds, rodents and rats.

African Civet *Civettictis civetta*
Fungwe, Chombwe and Chiwalala

The African Civet is a very handsome animal with black spots on a grey body, black legs and neck collar, and a black mask on its cat-like face. It has a long bushy tail, short legs and carries its head lower than its shoulders. It weighs up to 15 kg. It is largely a fruit-eater but is also known to enjoy carrion, rodents, birds, insects and reptiles. It is usually solitary and wanders great distances at night in search of food. It returns to the same place each night to deposit its droppings in a midden. Each dropping is cylindrical in shape and contains a roll of coarse grass as well as millipede segments. The civet is territorial, staking its claim to an area with a musky secretion from glands below the tail, commercially marketed to manufacture perfume. The tracks of the civet are very cat-like, with nail marks, similar to leopard or serval but smaller, measuring about 4 cm.

African Civet
Civettictis civetta
Largely a fruit-eater but is also known to enjoy carrion, rodents, birds, insects and reptiles. Civets are uncommonly seen along the roads of the Nyika woodland at night

Bushy-tailed Mongoose
Bdeogale crassicaudata

This is a medium-sized mongoose weighing up to 2.5 kg. Its back is greyish-brown and it has a pale chest and face. It has a very bushy tail, which is usually darker than the rest of its body. It feeds on insects, small animals, lizards and snakes. It is shy and nocturnal, preferring woodland and rocky hills. The tracks of all mongoose species are dog-like with distinct claw marks, only smaller and narrower. They vary in size with the species. The droppings of mongoose vary depending on what they've been eating. Rarely seen at Nyika.

Egyptian Mongoose *Herpestes ichneumon*
Nyenga and Musukwe

Egyptian Mongoose
Herpestes ichneumon

Also known as the Ichneumon, Large Grey Mongoose and Greater Grey Mongoose, it is one of the largest of all African mongooses, weighing up to 3 kg. It has long grey fur on its body, a black face and feet and a black tip to its tail. It swims well and is usually found near streams or dams, living in thick bush at the water's edge. It is mainly diurnal, usually seen singly or in pairs. It feeds on fish, frogs, mice, birds and insects. It is rarely seen on the Nyika. Its tracks are dog-like with claws (4 cm long), resembling those of other mongooses, except that the Egyptian Mongoose has five toes on each foot instead of four. Its droppings are usually narrow, 5-8 cm long.

Dwarf Mongoose *Helogale parvula*
Nyenga, Musukwe and Kasisibi

Sometimes called the Pygmy Mongoose, this is the smallest mongoose found in Africa, weighing only 0.3 kg. It is a uniform brown colour and very social, often living in groups of 10 or more. It is diurnal and found mainly in woodland habitats. Colonies can frequently be seen sunning themselves outside their retreat of dead trees or hollow logs. They are very curious and will sit up on their hind legs to get a better look at intruders. They feed primarily on insects but also on rodents, snakes, fruit and eggs. They are rarely seen at Nyika. They have small (2 cm) tracks with claws and 2-4 cm long droppings.

Slender Mongoose *Herpestes sanguineus*
Nyenga and Musukwe

Alternatively known as Lesser Mongoose and Black-tipped Mongoose, this little carnivore is gold to reddish-brown in colour with a long tail ending in a distinct black tip. It is small and slender, weighing about 0.5 kg. It is mainly diurnal, usually seen singly in woodland or grassland. It feeds on rats, mice, insects, birds, snakes and sometimes fruit. The Slender Mongoose is uncommonly seen at Nyika. It has neat narrow 3 cm long tracks. The fore feet have claws. Its droppings are long (8 cm) and narrow.

African Striped Weasel *Poecigale albinucha*
Kanyimbi

The African Striped Weasel is a long, slender animal with distinct white stripes along the back of its black body. The top of its head and neck is white. It weighs about 0.3 kg. It is nocturnal, occurring singly as well as in family groups. Its preferred habitat is woodland where it feeds on rodents, reptiles and birds. It runs with a distinctive bobbing motion. The African Striped Weasel is rarely seen at Nyika. Its tracks are 2 cm long and have indistinct claw marks.

African Striped Weasel P*oecilogale albinucha.* Runs with a distinctive bobbing motion

African Wild Dog *Lycaon pictus*
Mbulu

The African Wild Dog is one of Africa's most endangered carnivores. They are Red Listed as Endangered by the International Union for the Conservation of Nature (IUCN). Wild dogs have disappeared from 25 of the 39 countries in which they were once resident, as human populations have expanded. They are transient, rarely staying in the same place for more than a day. Hunts take place in the morning and early evening in grassland and open woodland. Prey is located by sight, approached silently, and then pursued at speeds of up to 66 km/hr (41 mph) for up to one hour. Pack members generally cooperate in hunting large mammals, but individuals sometimes pursue hares, rodents, or other small animals. While the African Wild Dog generally weighs only 17-36 kg, because they hunt in packs, most prey species weigh between 20-90 kg. Small animals such as rats and as large as kudu have been reported in their diet. Main prey species in the park are likely to be duiker and reedbuck.

The dogs are long-legged with only four toes per foot, unlike other dogs, which have five toes on their forefeet. The dog's Latin name means "painted wolf," referring to the animal's irregular, mottled coat, which features patches of red, black, brown, white, and yellow fur. Each animal has its own unique coat pattern, and all have big, rounded ears.

African Wild Dog *Lycaon pictus* (painted wolf). Has only four toes per foot. It is one of Africa's most endangered carnivores

Spotted Hyaena *Crocuta crocuta*
Chimbwi and Fisi

The Spotted Hyaena resembles a large powerful dog with a massive head and shoulders and a sloping back. Females are larger than males and can weigh as much as 65 kg. They are yellow-brown to dark-grey in colour with dark irregular blotches and spots. Their muzzles are dark as well as their lower limbs. They have a short stubby tail. The hyaena is mainly a scavenger but is also capable of killing its own prey taking very young, old or wounded zebra or antelope. It has very powerful teeth and jaws enabling it to crush skin and bone, which other predators may leave behind. The hyaena has been known to attack humans, as happened near Mt. Mulanje during the 1950s. It is largely nocturnal and lives in small packs, a number of which are associated in a clan. Each clan has its own territory, with a communal den. At Nyika the hyaena is uncommonly seen in the early evening and morning on the grasslands, as it heads out for or returns from a night of hunting. Its presence can be detected by its characteristic whooping call. If one is spotted stop the car, roll up all the windows and wait. Hyaenas are very curious animals and will usually walk straight to the car to investigate. Under no circumstances open the windows or tease them, as they can be aggressive if annoyed or hungry. Because of the large amount of bones and hair present, hyaenas' droppings usually turn white as they dry out. Hyaena tracks are similar to leopard but are larger with distinct claw marks. The hind foot is smaller than the fore foot.

Spotted Hyaena *Crocuta crocuta* Hyaenas are very curious animals and will usually walk straight to the car to investigate. Under no circumstances open the windows or tease them, as they can be aggressive if annoyed or hungry

Side-striped Jackal *Canis adustus*
Kambwe and Nkhandwe

The Side-striped Jackal resembles a small dog both in shape and size. It is greyish in colour with a faint black and white stripe down its side, hence its name. The tip of its bushy tail is white. It weighs up to 10 kg. It is found singly or in pairs. It is a scavenger, feeding mainly on dead animals but also on rodents, insects, birds, reptiles and sometimes vegetation. It is uncommonly seen on the grassland and around the pine plantation at night. Its tracks are like those of a small dog, about 5 cm long, showing distinct claw marks. Its droppings are also very similar to those of a small dog.

Above: Side-striped Jackal *Canis adustus* Seen on the grassland and around the pine plantation at night

Serval *Leptailurus serval*
Njuzi

The Serval is sometimes mistaken for leopard but is much smaller, with a slender body, long legs, large pointed ears and a short tail. It weighs up to 15 kg. It is yellow-gold in colour with streaks of dark spots. It is mainly nocturnal, usually seen singly or in pairs, often along stream banks or near water. It feeds mainly on rodents, birds, insects and reptiles. The Serval is uncommonly seen at Nyika.

Its tracks are cat-like with no claws, intermediate in size between leopard and civet (4.0-4.5 cm long). Its droppings are long, slender and tapered, similar to leopard but smaller.

Serval
Leptailurus serval
Rarely seen, it feeds mainly on rodents, birds, insects and reptiles

Caracal *Caracal caracal*
Gologolo

The Caracal is sometimes called the African lynx. It resembles the serval but is stockier, weighing up to 16 kg and has a reddish tan colour with no spots. It has a fairly short, bushy tail and long tufts on its ears. The backs of its ears are darker in colour than the rest of the body. It feeds on rats and mice, game birds and young antelope. It is solitary and nocturnal. Caracal can be very aggressive if cornered. They are very rarely seen at Nyika. The droppings and tracks of caracal are similar to serval, though slightly larger.

Caracal
Caracal caracal
It is solitary and nocturnal and can be very aggressive if cornered

Leopard *Panthera pardus*
Nyalugwe and Nyalubwe

The Leopard is the most important predator at Nyika due to the lack of lions and the infrequence of wild dogs. It is usually nocturnal but at Nyika is also active during the day because of lack of persecution. It is commonly seen in rocky outcrops, around the Chelinda pine plantation and near evergreen forest patches. The Leopard has a solid body with relatively short legs, a large head and a long tail usually carried curled up at the end, showing the white underside at the tip. A large male can weigh up to 80 kg. A leopard's colour varies from light yellow to dark gold with groups of dark spots clustered into rosettes. It is a shy animal usually seen alone or, occasionally, a female with her cubs. It eats a wide variety of food from antelope to insects. Reedbuck carcasses can occasionally be seen hanging in a tree where the leopard has dragged it to protect it from scavengers. The call of a Leopard is a rasping cough, somewhat like the sound of the sawing of wood. Leopard and hyaena tracks can be confused except that the leopard does not leave claw marks. They are usually between 6.5 and 9 cm long. Leopard droppings are slim with hair and small bone and taper to a point at one end.

Leopard *Panthera pardus* is usually nocturnal but at Nyika is also active during the day because of a lack of persecution. It is commonly seen in rocky outcrops, around the Chelinda pine plantation and near evergreen forest patches

Elephants *Proboscidea*

At one time elephants ranged over the entire world, excepting South America and Australia. Today there are only two types remaining - the African elephant and the Asian elephant, which has smaller ears and a different shaped head. Two species of the African Elephant exist - the Savanna Elephant of southern and eastern Africa (including Malawi), and the Forest (or round-eared) Elephant of the west and mid-African forest regions.

Savanna Elephant *Loxodonta africana*

Njovu and Zovu

The African Elephant is the largest living land mammal. A male can weigh up to 5,000 kg and measure 3.5 m at the shoulder. The elephant has a huge body with wrinkled grey skin, large ears, a long trunk and thick legs. The female has a more pronounced and pointed forehead. Both male and female elephant usually have tusks but occasionally, for genetic reasons, some do not. The elephant uses its trunk for collecting food, sucking up water, smelling, breathing, trumpeting and as a weapon. Its huge ears are not only used for hearing, but for cooling body temperature by facilitating heat loss over their large surface area.

The tusks of an elephant are used for digging or scraping bark off trees. Most elephants show more wear on one tusk or the other as a result of being "right tusked" or "left tusked". The tusks of a female elephant are usually smaller than those of a male (25 kg as opposed to 45 kg).

The elephant is a social animal and usually lives in herds. Females and young herd together, as do bachelor males. Old bulls are often solitary. Elephants eat grass, leaves, trees, bark, fruit and seed pods. An adult male African Elephant can eat up to 250 kg of food a day and produce a similar amount of droppings. Elephants can live up to 70 years.

The African Elephant is an endangered species. In the early 20th century an estimated 3-5 million elephants roamed Africa. Between 250,000 and 500,000 remain. The results of a three-year 18 country aerial study published in September 2016 show that African elephant populations decreased by 30% between 2007 and 2014, equivalent to 144,000 elephants. More African elephant are now being killed for ivory than are being born, due to the high levels of poaching.

In the past, the animals were free to roam vast, unspoiled areas. Elephants generally require one square kilometre per animal to ensure a sustainable habitat. If food ran out in one place, they moved to another, but with surging human populations, this is no longer possible.

Elephants in Nyika National Park were formerly found only in the extension area to the north of the plateau. However, extreme poaching pressure now means that the elephants climb the steep sides of the plateau to take shelter in the woodlands. Fewer than one hundred elephants are believed to live within the park.

The soles of the elephant's large round feet resemble crepe-soled shoes and leave tracks accordingly. The front foot is slightly larger and rounder than the back foot. An interesting feature of elephant feet is their ability to contract in size when lifted from the ground, enabling them to keep from getting stuck in mud.

Elephant droppings are large round balls (15 cm diameter), light brown in colour, full of seeds and coarse grass.

Elephants should always be approached with caution as they can reach speeds of 40 km per hour when charging. They have poor eyesight and thus consider anything moving or out of the ordinary, a threat.

African Elephants in the Nyika are in decline: poaching now means that the elephants climb the steep sides of the plateau to take shelter in the woodlands

Hyraxes *Hyracoidea*

Despite the small size of the hyraxes and their resemblance to rabbits or guinea pigs, their closest relatives are elephants and sea-cows. The soles of their feet are rubbery and moist which allows them to grip near vertical surfaces. Their toes have small blunt hoof-like nails, inner toe of their hind feet which has a longer nail used for grooming. Hyraxes have a scent gland on their backs which is used for identification.

Bush Hyrax *Heterohyrax brucei*
Mbila

Also known as Yellow-spotted Dassie this hyrax has a grey coat with a yellowish dorsal spot. It weighs up to 3 kg. At Nyika it can be found in rocky habitats at lower elevations. Like the Tree Hyrax it is vegetarian, eating leaves, grass, fruit, bark and twigs. It gives a shrill whistle if threatened. It is a social animal and usually lives in small colonies. It has four toes on its narrow front foot and three on its hind. It leaves its small (1.0-1.5 cm) droppings in a midden. The Bush Hyrax is uncommonly seen at Nyika.

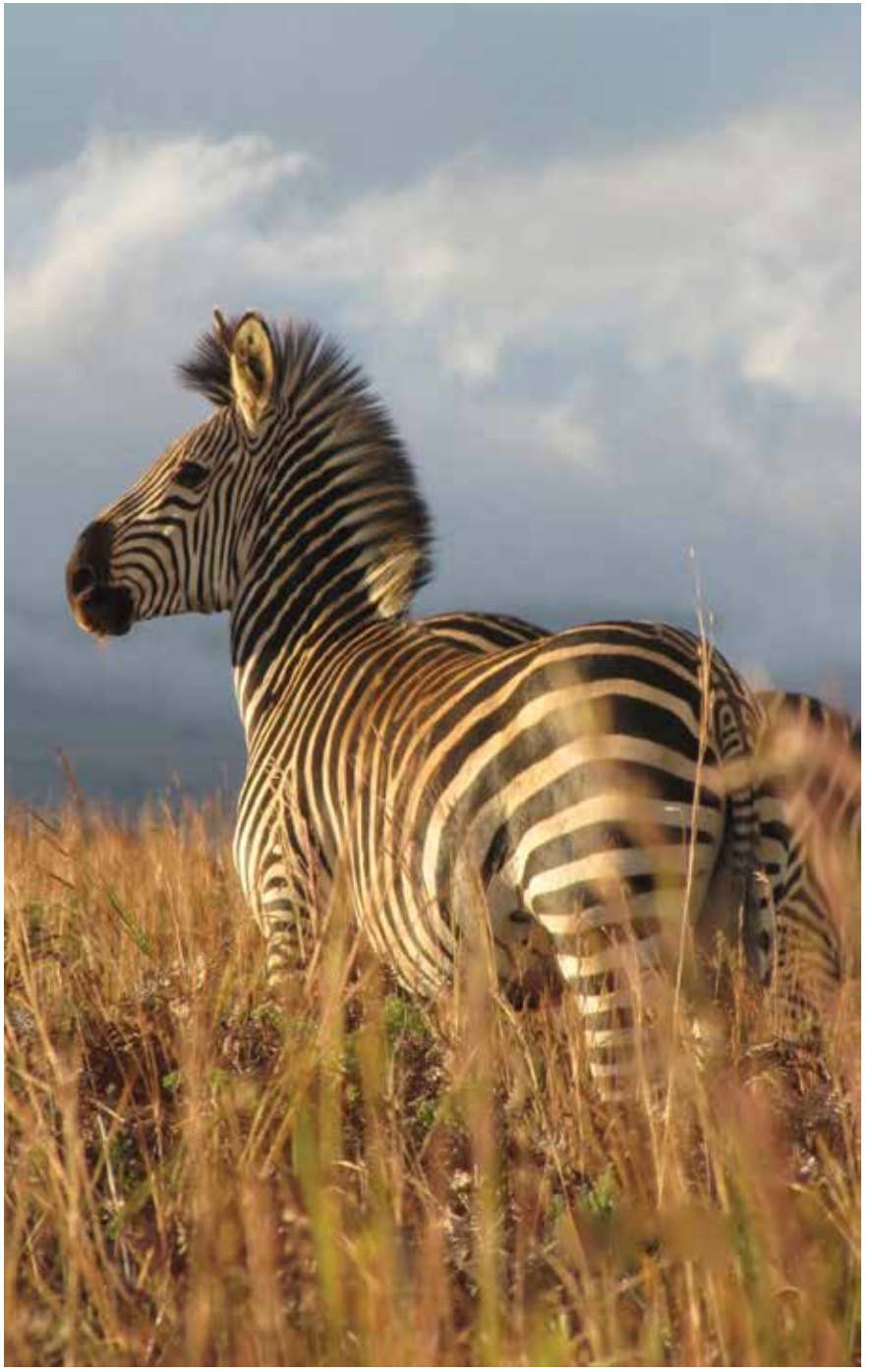
Right: Nyika Zebra *Equus quagga crawshayi*

Odd-toed ungulates *Perissodactyla*

There are only three families of this order of mammals left in the world - rhinos, tapirs and horses. Each has an odd number of toes on at least two of its four feet. Only the horse family is represented at Nyika.

Zebra *Equus quagga crawshayi*
Mbidzi and Boli

The Nyika zebra belongs to the subspecies *E. quagga crawshayi*. It has the same distinctive features as other subspecies of zebra - black and white stripes, an upright mane and a black tufted tail used for swatting flies - but it has a darker overall colour than other forms of the species. Some believe this may be due to the colour of the Nyika soil it rolls in. The actual pattern of the zebra's stripes varies from one region to another. Zebra weigh up to 275 kg. They live in small herds usually consisting of several females and young accompanied by a stallion. Young males form bachelor herds. Zebra can live for up



to 30 years. They occasionally mix with herds of antelope and warthog. They are primarily coarse grazers, meaning they eat tough grasses ignored by other animals. They also browse and dig roots. During the rainy season zebra are found throughout the grassland. However, during the cold dry months of June, July and August many leave the plateau for the shelter of woodlands at lower elevations. Zebra droppings, closely resembling horse manure, are clusters of dark grass balls, usually about 6 cm across. Their hoof prints look like the tracks of unshod horses, about 10 cm long.

Even-toed ungulates *Artiodactyla*

Bush Pig
Potamochoerus larvatus
They should not be approached too closely as they can be ferocious when defending their young

The distinctive characteristic of mammals in this group is that they always have an even number of toes (two or four). The majority of them also have complicated stomachs with two or four chambers. The animals with four chambers in their stomachs 'chew the cud'. In other words, they swallow their food quickly with little chewing and then cough it back up later to chew at leisure, when they feel safe from predators. As is true with a number of species in other families of this order, a special characteristic of the antelope family is the absence of upper incisors. Instead, the bottom teeth chew against a hard pad on the roof of the mouth. Most mammals in this group have unbranched, hollow horns which are never shed (as opposed to temperate climate deer which lose their antlers every year).

Even-toed ungulates found at Nyika are Bushpig, Common Warthog, Hippopotamus, Buffalo, Bushbuck, Greater Kudu, Common Eland, Common Duiker, Blue Duiker, Harvey's Duiker, Southern Reedbuck, Puku, Roan Antelope, Hartebeest and Klipspringer.

Bushpig *Potamochoerus larvatus*
Nguluwe

Bushpig are handsome animals with reddish-brown hair and a flowing white mane. They have distinctive black and white facial patterns and are more rounded looking than warthogs, weighing up to 80 kg. Both sexes have small, very sharp tusks. They are largely nocturnal, living in family parties with a dominant boar. They feed on roots, fruit, grass, eggs, insects and sometimes carrion. They root with their hard rubbery snouts. The Nyika Bushpig live in evergreen forest patches but can sometimes be seen feeding on the grassland. They should not be approached too closely as they can be ferocious when defending their young. Bushpig tracks are similar to warthog but are larger and more rounded. Their droppings are also similar, 3.4 cm in diameter, containing much fibrous material. Bushpig are uncommonly seen at Nyika.

Common Warthog *Phacochoerus africanus*
Njiri and Kaphulika

Common Warthog are slimmer and more angular than Bushpig, with sparse coarse hair and skinny legs. They have two large wart-like protuberances on the face and upturned tusks. Their skin is grey but sometimes appears reddish-brown from the Nyika mud in which they roll. Warthogs live in family parties and when alarmed run away in single file with their tails lifted vertically raised like signal flags. They are diurnal and widespread in

Warthog
Phacochoerus africanus
Warthogs live in family parties and when alarmed run away in single file with their tails lifted vertically raised like signal flags

woodlands and grasslands. They feed on grass, roots and tubers which they dig up with their hard noses. They are known to eat ash following dry season fires, presumably for the minerals it contains. They often use abandoned porcupine holes as dens. Warthog tracks are 5-6 cm long, more angular than those of Bushpig. Their droppings are large brown spheres with lots of grassy material present, somewhat like the elongated droppings of zebra. Warthog are commonly seen at Nyika.

Hippopotamus *Hippopotamus amphibious*
Mvuu

Hippopotami are known to occur only in the North Rukuru River along the north-western boundary of the park. They have very stout pink-grey bodies with huge heads and short stubby legs. Males can weigh over 2,000 kg. Hippos are specially adapted to spending much of their time in water – their eyes, ears and nose are on the same horizontal plane, and so stick out of the water when the rest of the body is under the surface. They can remain submerged for up to six minutes. Hippos usually live in herds of 20 or more animals. They are strict vegetarians, emerging from the water at night to graze on river banks. When they defecate they mark their territory by vigorously wagging their tail to scatter the dung over a wide area. Males are known to fight fiercely. Hippos are rarely seen at Nyika. Their tracks are up to 25 cm long with four pointed toes, all equal in length.

Buffalo *Syncerus caffer*
Njati

Buffalo are only found in the northern and southern extensions areas of the park and consequently are only rarely seen by visitors. However, with binoculars it is sometimes possible to spot a small herd 1,000 m below Jalawe Viewpoint in the Chipome Valley. Buffalo are massive, solidly built animals with dark hides, long tufted tails, large drooping ears and broad wet noses. Both sexes have heavy curved horns and can weigh up to 600 kg. They are social animals and sometimes live in herds of several hundred. Males may be solitary, and if wounded, can be very aggressive. Buffalo feed mainly on

grass but also include herbs and woody plant in their diet. The tracks of buffalo are large, round and split, very similar to those of cattle, 12-15 cm long. Their droppings are large, black, wet "pats".

Greater Kudu *Tragelaphus strepsiceros*
Ngoma

Greater Kudu are restricted to the northern extension woodlands below Jalawe Viewpoint and therefore are rarely seen. They are large grey-brown antelope with long legs, large ears and vertical white stripes on their sides. Males have heavy manes on their throats and along the crest of their backs. Only the male kudu has the characteristic and magnificent spiralled horns, which sometimes reach 1.5 m in length. Males weigh up to 300 kg, females 210 kg. Greater Kudu usually live in small herds though occasionally older bulls will live apart. Their warning call is similar to the dog-like bark of the bushbuck, only louder and deeper. They are mainly browsers, feeding on trees, shrubs and occasionally grass. Their tracks are long (7-9 cm), narrow and vaguely heart-shaped. Their droppings are separate rounded pellets, 4 cm in diameter.

Lower right:
Bushbuck
Tragelaphus scriptus
Commonly seen around the pine plantations and thick scrub along dambo streams

Bushbuck *Tragelaphus scriptus*
Mbawala

Bushbuck are medium-sized, round-backed antelope varying in colour from gold to bright chestnut with white stripes on the back and white spots on the shoulders, hindquarters and face. Males weigh up to 60 kg, females 30 kg. Males usually have more distinctive markings with a black neck, white dorsal crest and a shaggy coat. Short, spiralled, sharply pointed horns are found only on the males. Bushbuck live singly, in pairs or in small family groups. Their preferred habitat is woodland, thick bush or forest patches. At Nyika they are commonly seen around the pine plantations and thick scrub along dambo streams. They are browsers, eating leaves and twigs of small bushes. They are known to knock the tops off the poisonous red fly agaric mushrooms at Nyika and eat the white stems. When alarmed they give a deep bark, very similar to a dog. Males can be very aggressive. Their tracks are long and narrow (3-5 cm) and vaguely heart-shaped. Bushbuck droppings are small pellets, 1-2 cm in diameter, sometimes found in clusters.

Common Eland *Taurotragus oryx*
Nchefu and Mpofu

The Giant Eland is the largest of all the antelope; the Common Eland is quite a bit smaller. It is light brown to red in colour with vertical white stripes on its back. Males can weigh up to 950 kg, and have a prominent dewlap on the throat as well as a noticeable shoulder hump. Females can weigh up to 450 kg. The males turn much darker than females with age. Both sexes have spiralled horns. Eland range over considerable distances. During the rainy season at Nyika, herds of 100 or more are commonly seen on the grassland, but during the cold dry season when forage quality is poor, the herds break up into smaller groups (10-50) and move to the lower elevation woodlands. There are estimated to be 800 elands within the park. Eland are mainly browsers but also eat grass. Young elands are always kept in a cluster in the centre of the herd for protection, even when it is on the move. Eland are usually difficult to approach because at the first sign of potential danger the whole herd quickly and gracefully trots off. Eland can leap incredibly high for animals of their size and often do so, over each other's backs. The tracks of eland are bovine in shape, up to 14 cm long. Droppings are individual oblong pellets, 2-3 cm long, sometimes clustered together like a small cowpat.

Left:
Common Eland
Taurotragus oryx
During the rainy season at Nyika, herds of 100 or more are commonly seen on the grassland

Common Duiker *Sylvicapra grimmia*
Gwape

Also known as Grey Duiker, Bush Duiker and Grimm's Duiker, this is the largest and most frequently seen of the three species of duiker present in Nyika National Park. The name 'duiker' comes from the Afrikaans word for 'diver', referring to the stretched-out bounding leaps the animal uses when alarmed or fleeing danger. It weighs up to 15 kg. It has a yellowish to grey-brown coat with a black blaze from nose to forehead and dark lines down its front legs. Its tail is black above and white below. Short straight horns are present only in males. Both sexes have a distinct tuft of hair on the crown. They are unusually solitary and feed mainly on bushes and leaves but they also eat flowers and roots. They are commonly seen in the grassland and woodland of Nyika. Their tracks are narrow and heart-shaped, up to 3.5 cm long, and their droppings are 1.0-1.5 cm oval pellets.

Roan Antelope
Hippotragus equinus
Common on the grassland during the rainy season but some migrate to the woodland at the height of the dry season.
They can be seen foraging for aquatic vegetation in the Chelinda dams

Blue Duiker *Philatomba monticola*
Kaduma

This is the smallest of the duikers, weighing only 4-6 kg. It has a small hunched body, which enables it to move quickly through the dense forest habitat it prefers. It is grey-brown, the back usually darker than the rest of the body. Both sexes have short, pointed horns, which curve together at the tips. Their faces have a dark line from nose to forehead and some white is present on the chin and throat. Blue Duikers are browsers living on leaves, twigs and berries. They are preyed upon by Crowned Eagles and pythons. They leave very small (2 cm) heart-shaped tracks. Their droppings are small pellets, 0.5-1.0 cm long. The Blue Duiker is uncommonly seen at Nyika, usually in or near evergreen forest patches.

Harvey's Duiker *Cephalophus harveyi*
Zombang'oma

Sometimes also known as the Natal Red Duiker (*C. natalensis*), this duiker is larger than the Blue Duiker (up to 13 kg) but also has a hunched body suited to dense bush. As its alternate name suggests, Harvey's Duiker is bright chestnut to dark brown in colour, its underside usually paler. Both sexes have short thick horns. The small crest on the crown of their heads is brownish-black. The tuft on the tip of the tail is white. Harvey's Duikers are also browsers. Tracks and droppings are similar to those of the Blue Duiker, though slightly larger. Their droppings are more pointed and slightly longer than those of the Blue Duiker, 0.75-1.0 cm long. These duikers are rarely seen at Nyika, but occasionally spotted near forest patches and in woodland.

Roan Antelope *Hippotragus equinus*
Chilembwe

After eland, the Roan Antelope is the largest antelope in Africa, weighing up to 230 kg. The Roan Antelope is similar to Sable Antelope in character but is reddish-brown with distinctive black and white facial markings. They have long, backward curving horns in both sexes. Their ears stick out sideways with dark tufts of hair at the tips, resembling "court jester" hats. They usually live in herds of 5-25, but bulls are sometimes solitary. Roan Antelope are common on the grassland during the rainy season but some migrate to the woodland at the height of the dry season. They eat mostly grass but also occasionally browse for aquatic vegetation in the Chelinda dams. They have large heart-shaped tracks (9 cm) and slightly elongated black droppings (2 cm), flat on one end gently pointed on the other.

Southern Reedbuck *Redunca arundinum*
Mphoyo

Southern Reedbuck are by far the most common mammal at Nyika. As recently as 1950 there were believed to be fewer than 20 Southern Reedbuck in the park area. With the beginning of legislated protection for these animals in 1965, their populations increased, but are now vulnerable to increasing poaching.

The Southern Reedbuck is a medium-sized antelope (65 kg), usually grey-brown in colour but occasionally blue-grey. It has a long muzzle, fairly large ears and a bushy tail, the white underside of which flashes when the animal is bouncing away. Males have ringed horns up to 35 cm, which curve backwards and then forwards. They are heavily preyed upon by leopard. When alarmed, Southern Reedbuck give a loud whistle and hop off with a curious short bouncing leap, called "stotting".
They usually congregate in small groups, favouring the grasslands and dambos. Their tracks are heart-shaped. Their droppings are clusters of oval pellets (6 cm and 1.5 cm respectively).

Southern Reedbuck *Redunca arundinum.* By far the most common mammal at Nyika. When alarmed Southern Reedbuck give a loud whistle and hop off with a curious short bouncing leap, called "stotting"

Klipspringer *Oreotragus oreotragus*
Chinkhoma and Chingoma

Klipspringer are small (15 kg) grey-brown antelope with short noses and stumpy tails. Males have short, pointed, parallel horns. Both sexes have a distinct black and white pattern inside their ears. They are very agile and can be found on or around rocky outcrops throughout Nyika. Their hooves, which are the consistency of hard rubber, are specially adapted for this habitat, enabling them to secure firm footholds on steep slopes. Klipspringer are usually found in twos or threes, and often in their characteristic humped-back stance, perched on rocky outcrops. They are browsers but also include wild fruit and seed pods in their diet. They deposit small oblong-shaped (1 cm) droppings in middens. Their tracks, two small oval marks, are about 4 cm long. When alarmed, they give a shrill whistle. Klipspringer are commonly seen at Nyika, if carefully looked for around rocky outcrops.

Klipspringer *Oreotragus oreotragus* Commonly seen at Nyika, if carefully looked for around rocky outcrops

Birds

Appendix 2 lists the known birds of Nyika National Park

Previous page: Bar-tailed Trogon *Apoloderma vittatum*

Nyika National Park has some 430 recorded species of birds, about 60 of which are vagrants or very rare. This is the highest number recorded in any of Malawi's national parks or game reserves and can be attributed to the variety of vegetation communities which exist in the park. Many migrants pass through the park each year on their way south from breeding areas in Europe and Asia. They are normally present or passing through between September and April. The relatively large size of the park with its diversity of habitats provides an important haven for these birds. The following montane species reach their southern limits of range on the Nyika Plateau:

Dusky Turtle-dove *Streptopelia lugens*,
Mountain Yellow Warbler *Chloropeta similis*,
Churring Cisticola *Cisticola njombe*,
Grey Apalis *Apalis cinerea*,
Scarlet-tufted Malachite Sunbird *Nectarinia johnstoni*,
Baglafecht Weaver *Ploceus baglafecht*,
Buff-shouldered Widowbird *Euplectes psammocromius*.

The Baglafecht Weaver is endemic, present nowhere else in northern Malawi; it inhabits the bush along the Nyika dambos. The Scaret-tufted Malachite Sunbird belongs to the race *nyikensis*, which is also probably endemic to the Nyika. Another two species are distinctive endemic races, isolated from other populations on the continent: the Red-winged Francolin *Francolinus levaillantii crawshayi* and the Greater Double-collared Sunbird *Nectarinia afra*. Both are very common in the park. The Mountain Illadopsis *Illadopsis pyrrhoptera nyasae* is endemic to the eastern Nyika and adjacent North Viphya Plateau, isolated from populations in western Tanzania by some 650 km. The Rufous-naped Lark *Mirafra africana nyikae*, lives and nests on the grassland slopes of the park. It is found nowhere else in Malawi but is shared with some highlands areas of southern Tanzania.

Several montane bird species occurring on the Nyika are limited to the highlands of northern Malawi and southern Tanzania. These include:
Sharpe's Akalat *Sheppardia sharpei*, Black-lored Cisticola *Cisticola nigriloris*, Yellow-streaked Bulbul *Phyllastrephus flavostriatus alfredi*. Yellow-billed Duck *Anas undulata*, Little Grebe *Tachybaptus ruficollis*, and Red-knobbed Coot *Fulica cristata*, are frequently seen on the dams at Chelinda.

The Nyika tropical evergreen forests contain more species than any of Malawi's other evergreen forests. Many of the forest birds live in the high canopy and can be difficult to see. However, patient visitors to Zovochipolo on the Malawian side and Chowo Forest on the Zambian side may be rewarded with sightings of:

Bar-tailed Trogon *Apaloderma vittatum*,
Cinnamon Dove *Aplopelia larvata*,
Starred Robin *Pogonocichla stellata*,
White-chested Alethe *Alethe fuelleborni*,
Olive-flanked Robin *Cossypha anomala,*
Sharpe's Akalat.

Bird activity in the forest patches peaks in December (at the beginning of the rains) when nesting occurs.

The broad-leafed woodlands on the slopes of the Nyika Plateau also harbour a wide variety of birds. Of special interest are:

Miombo Rock Thrush *Monticola angolensis*,
Miombo Pied Barbet *Tricholaema frontata*,
Stripe-breasted Seed-eater *Serinus reichardi*,
Souza's Shrike *Lanius souzae*,
Arnot's Chat *Myrmecocichla arnotti*,
Trilling Cisticola *Cisticola woosnami*.

Blue Swallow *Hirundo atrocaerulea*

Birds of prey

Common birds of prey are the Augur Buzzard *Buteo augur*, often seen perched on the edge of the Chelinda pine plantation; Bateleur *Terathopius ecaudatus*; and Black-breasted Snake Eagle *Circaetus pectoralis*. The latter specialises in catching snakes and consuming them whilst in flight.

A number of species of global conservation concern breed on the Nyika including: the Blue Swallow *Hirundo atrocaerulea*. Nyika National Park supports an estimated 300 pairs of these birds of which the total global population is 1,500-4,000. Healthy montane grasslands are critical for its survival.

The Churring Cisticola is also dependent upon healthy montane grasslands. The Wattled Crane *Grus carunculatus*, with its long legs, graceful white neck and grey body, can often be seen in pairs quietly feeding in the dambos near Chelinda. A very limited number of breeding pairs remain in the park.

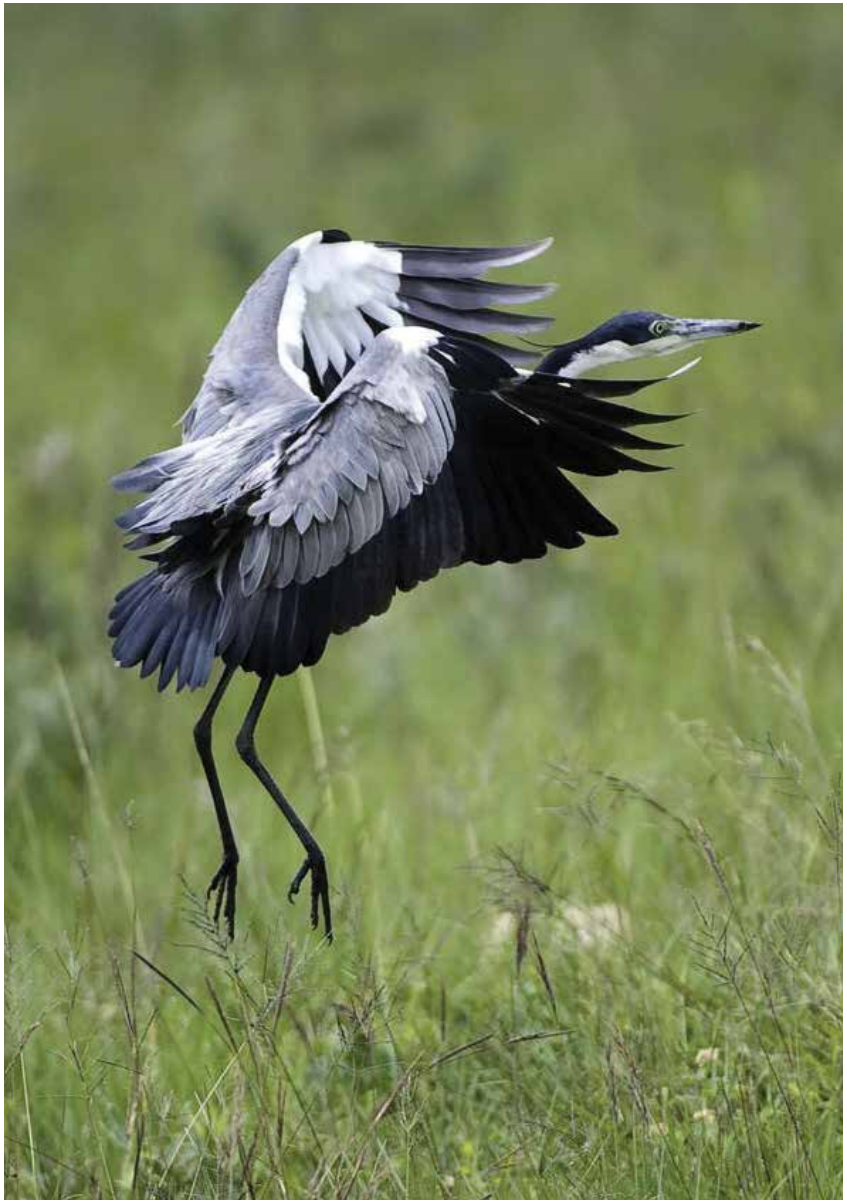
Denham's Bustard *Neotis denhami* (photograph p207) is resident on the plateau grassland with occasional sightings of groups numbering 15-24. Denham's Bustard has a long white neck, shorter legs than the Wattled Crane and a mottled brown, black and yellow body. When approached, it usually walks away with its head uplifted before flying off. It has an interesting courtship display, performed before breeding at the beginning of the rains. The male inflates his neck pouch like a big balloon and then daintily dances around while giving out a distinctly low call. The Pallid Harrier *Circus macrourus*, known for its long tail and circular flying pattern and the Great Snipe *Gallinago media*, are found around marshy dambos.

Lappet-faced Vultures *Torgos tracheliotis* and White-backed Vulture *Gyps africanus*

Opposite: Bataleur Eagle *Terathopius ecaudatus*

Above: Wattled Crane *Grus carunculatus*

Right: Augur Buzzard *Buteo augur*



Black-headed Heron *Ardea melanocephala*

Pin-tailed Whydah
Vidua macroura

Spotted Eagle Owl
Bubo africanus

Opposite above:
Great Snipe
Gallinago media

Opposite below:
Churring Cisticola
Cisticola njombe

Top left:
Black-breasted
Snake Eagle
Circaetus pectoralis

Top right:
Long-crested Eagle
Lophaetus
occipitalis

Above: African
Marsh Harrier
Circus ranivorus

Amphibians

Appendix 6 lists the known amphibians of Nyika National Park

Black-Striped Sedge Frog *Hyperolius quinquevittatus mertensi*

Nyika Dwarf Toad *Mertensophryne nyikae*

Amphibians are cold-blooded vertebrates whose body temperature depends on the temperature of the air and water in which they live. Frogs, toads, newts and salamanders and caecilians (worm-like creatures which live underground) are amphibians.

Amphibians generally live on land but at least one period of their life cycle always occurs in the water, where their tadpoles hatch and grow. Unlike fish and reptiles, amphibians do not have scales. Because the lungs of amphibians are quite small they also use their skin to breathe. For this reason their skin must be kept moist, so they like to live in cool dark places like the Nyika dambos and are most active during the rains and at night.

The life cycle of most amphibians begins in water when the female lays eggs that are fertilised outside of her body, though some salamanders live their entire lives on land. The eggs then hatch into larvae, or tadpoles, that breathe through external gills. The larvae grow flat tails and feed on vegetation. During a process called metamorphosis, physical changes occur and external gills give way to lungs. The tadpoles also change from plant-eating animals to meat eaters (generally insects, but large frogs and toads also eat small mammals, birds, fish, and other amphibians). Amphibians usually reach full adulthood at three to four years.

Toad members of this group have poisonous or distasteful skin secretions, used to discourage predators. When in danger they attempt to appear larger and more threatening by standing on their short legs and puffing up their bodies. Some amphibians also have loud distinctive calls.

While much more research remains to be done on the amphibians of Nyika National Park, 24 species have been identified, two of which are endemic – the Black-Striped Sedge Frog *Hyperolius quinquevittatus mertensi* and the Nyika Dwarf Toad *Mertensophryne nyikae*. The former is recognised by black longitudinal stripes on the back and by pink toes and feet. The other sedge frogs on the Nyika have yellow feet.

Reptiles

Appendix 7 lists the known reptiles of Nyika National Park

Reptiles are vertebrates which evolved from amphibians. Birds and mammals, in turn, evolved from reptiles. Reptiles lay their eggs on land. Their young do not go through a larva stage like amphibians but instead look like small versions of the adults when they hatch. They are covered in scales which keep their bodies from drying out. They are "crawlers" and breathe only through their lungs. They are ectotherms, so they must bask in the sun or find a warm spot to get warm and become active, and they must find shade or a cool spot to cool off. In cold conditions they become sluggish and move minimally, and some enter a state of torpor or hibernation if they are cold for a long time. Reptile tracks range from the "S" shaped wavy patterns in sandy ground left by snakes, to tail drag marks with footprints on either side, characteristic of lizards.

Reptiles of Nyika include geckos, chameleons, skinks, lizards and snakes. Many are only found in the lower elevations of the park.There are at least 40 known reptiles listed for the park. One species is known to be endemic to the Nyika - Nyika Serpentiform Skink *Eumecia johnstoni*.

Common Flap-necked Chameleon *Chamaeleo dilepis*

Fish

Appendix 5 lists the known fish of Nyika National Park

Malawi's national parks and reserves play an important role in the conservation of fish and preservation of fish habitats. Nyika Plateau is the catchment area for streams feeding three major rivers flowing into Lake Malawi - the South Rukuru, North Rumphi and North Rukuru Rivers - while many smaller streams drain the northern extension area. Most Malawi rivers have been severely degraded as a result of deforestation and land clearance leading to increased frequency of flash floods, loss of riparian vegetation, and reduction of fish habitat through extensive erosion leading to siltation of the rivers. Nyika rivers and streams are also being degraded by late season hot bush fires. The result is a reduction in fish biodiversity and a loss of species from many rivers, particularly those that depend on vegetated river-bank habitats. Fish poaching may also be contributing to species loss.

About 30 species of indigenous fishes are found in the lower reaches of these rivers along the lakeshore, most notably the Mpasa *Opsaridium microlepis*, that spawns in the North Rukuru River. Only one indigenous species, however, occurs on top of the plateau. This is the Mountain Catfish *Amphilius cf. uranoscopus*.

The range of Mountain Catfish on the plateau is limited to the shallower stretches of rapids in the streams because of the presence of predatory, alien, Rainbow Trout *Oncorhynchus mykiss*. The catfish are a major food source for trout and hence are absent from the slower, deeper parts of the streams frequented by trout.

Trout were introduced on the Nyika Plateau for fly-fishing in 1949

Mountain Catfish *Amphilius cf. uranoscopus* The only indigenous fish species found on the Nyika Plateau

Rainbow Trout *Oncorhynchus mykiss* Introduced fish species found in Dams 2 and 3

Rainbow and Brown Trout *Salmo trutta* were introduced to the Chelinda dams for sport angling in late 1949. Further fish were introduced in the Chelinda-Rumphi, North Rukuru and Dembo rivers in the 1960s and 70s. In 1974, an attempt was made to start a trout hatchery at Chelinda. Both Rainbow and Brown Trout ova were reared, but there were heavy mortalities in severe frosts. In 1976, one Brown Trout was caught (38 cm long) and released but none have been seen since and thus they have not become established. Rainbow Trout in the streams are small, but specimens have been known to grow to about 1.5 kg in Dams 2 and 3.

Butterflies

Appendix 4 lists the known butterflies of Nyika National Park

A butterfly's life cycle is made up of four parts; egg, larva (caterpillars), pupa (chrysalis if it is a butterfly, cocoon if it is a moth) and adult. Butterflies attach their eggs to leaves with a special glue. Many caterpillars are covered with stinging hairs which carry a toxin that can be quite painful to humans if touched. Fully grown caterpillars attach themselves to a suitable twig or leaf before shedding their outside layer of skin to reveal a hard skin underneath known as a chrysalis. An adult butterfly will eventually emerge from the chrysalis where it will wait a few hours for its wings to fill with blood and dry, before flying for the first time.

Butterflies can live in the adult stage from anywhere between a week and a year, depending on the species. Butterflies have four wings which are often brightly coloured with unique patterns. Millions of shingle-like, overlapping scales give butterfly wings their colour.

Most butterflies feed on nectar from flowers. Their taste receptors are on their feet and they smell with their antennae. They can't hear, but they can feel vibrations. They breathe through openings on their abdomen called 'spiracles'. Female butterflies are usually bigger and live longer than male butterflies. Butterflies are the second largest group of pollinators after bees.

There are over 24,000 species of butterfly in the world, 4,000 of which live in Africa. The Nyika supports 223 species of butterfly of which around 120 are forest species. At least 13 species are endemic, including *Charaxes dowsetti, Charaxes nyikensis, Papilio thuraui cyclopis, Mylothris crawshayi crawshayi, Axioceres karinae, Alaena sp nov.* (Chisanga Falls), *Alaena sp. nov.* (Nyika Plateau), *Iolaus (Epamera) helenae, Metisella medea nyika, Metisella perexcellens perexcellens, Lepidochrysops chalceus, Lepidochrysops intermedia cottrelli,* and *Lepidochrysops nyika.*

Top: Large Blue Emperor *Charaxes bohemani*

Above: Angola White Lady *Graphium angolanus angolanus*

Top: Painted Lady
Vanessa cardui

Above: Long-tailed Admiral
Antanartia schaeneia

Blue Pansy
Junonia orythia

Exotic wildlife species

A number of domestic animals have been introduced to the park over the years - horses, chickens, cats and livestock often enter lower lying parts of the park from neighbouring villages. Horse safaris were offered in the park in the 1990s. At one time over 20 horses were stabled at Chelinda.

The Brown Rat *Rattus rattus* has become established at Chelinda, apparently after being introduced in bundles of thatching grass from Vwaza Marsh.

Human history

Stone Age

The earliest record of human presence in Malawi is an early Stone Age site near Karonga, 70 km north of the Nyika Plateau, dated 73,000 BC. These hunter-gatherers lived in rock shelters and collected their food from the wild, searching out delicacies such as honey, birds, roots, caterpillars and termites.

People have a long association with the Nyika Plateau. Hunting and gathering communities inhabited the area until around the 2nd century AD. Hunting involved large groups of men and boys armed with spears, bows and arrows, knobkerries (carved short wooden clubs with a heavy knob on one end) and dogs, as well as the use of nets, lines of beaters and fire. It was very organised, led by the "guardian of the hunt" who was also responsible for the formal communal sharing of the meat taken – usually duiker, hare, bushbuck, bushpig, porcupine, monkey and larger antelope. Prior to the hunt, offerings were made to the ancestor's spirits, for a successful hunt. Social relations in the village at the time of the hunt had to be harmonious, otherwise the hunt would be unsuccessful. Medicines were used for good luck and to give protection from lions and elephants during the hunt. It was believed that if the larger, more spiritually potent animals such as kudu, eland, lion, elephant and roan were killed without proper ritual preparation, the hunter and the village would suffer adverse consequences.

Five rock shelters, first used in the Stone Age, have been identified within the present boundaries of Nyika National Park. Fingira Rock contains red and white rock paintings of animals, from this era. Excavation of two of the rock shelters revealed wildlife bone, shell, human skeletal remains and tools, dated to 3,300 years ago.

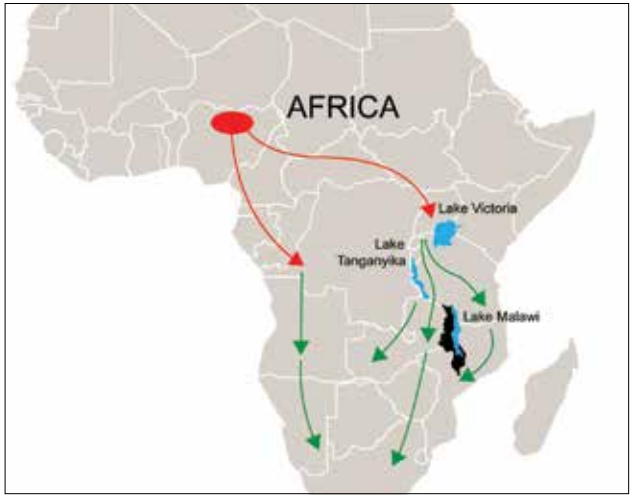
Stone Age red and white rock painting at Fingira Rock

Iron Age

The Iron Age brought major cultural changes to the Stone Age people of central Africa. Improved agricultural productivity increased populations, which combined with environmental stresses put pressure on land resources. Small groups of Bantu language-speaking people began a slow movement southward from western Africa. They brought with them the traditions of cultivation, herding of livestock, house-building, village living and iron-making.

The earliest record of the Iron Age in Malawi comes from a site on Phopo Hill, near Vwaza Marsh Game Reserve, only 30 km south of today's Nyika National Park. Fragments of pottery, iron slag and bone from this site have been dated to around 200 AD. Numerous later iron smelting sites have been found across the Nyika Plateau, undoubtedly because of its abundance of iron ore-rich stone and the evergreen trees necessary for making charcoal.

Bantu migrations through Africa
The earliest shown by red arrows, the later by green



Iron mining and charcoal making

The iron-smelting process produced solid iron with only small amounts of slag remains, which were then pounded out by hammer. This iron was later fashioned into hoes, axes, arrows, spears and knives

Oral tradition describes two types of stone collected for smelting. The first, believed to have been magnetite, was known as 'mitali'. It was a lighter ore and produced iron too weak for cutting trees, but suitable for other tools. The second type of stone was called 'mbili'. It was very heavy and black and produced a very strong iron when smelted. It is believed to have been haematite. Several iron ore mines, consisting of trenches or narrow vertical shafts several metres deep, occur in the south east of the park. These can be visited with a park guide.

The iron ore had to be mined, the clay for the furnaces collected and the proper trees cut for making the charcoal. The preferred wood used for charcoal production was the hardwood *Philippia benguelensis* 'musankhanya in Tumbuka' but *Faurea speciosa* 'msese' and *Syzygium cordatum* 'katope' were also used. A tonne of charcoal (the product of about 200 trees) was needed for each smelt. The impact on Nyika Plateau vegetation was undoubtedly significant.

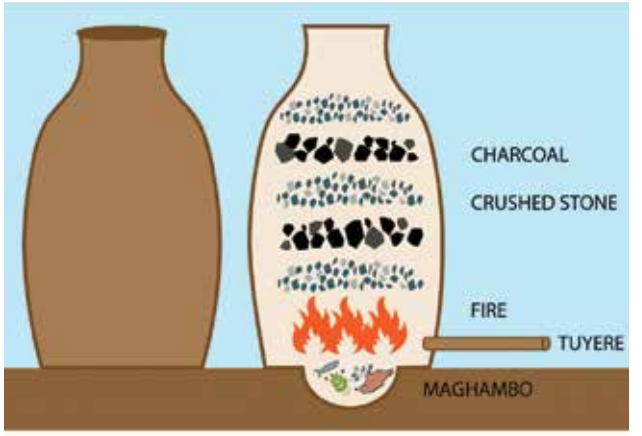
Iron smelting

The process of iron smelting was surrounded by ritual. Only men were allowed at the kiln. They were not allowed to wash, have intimate relations with their wives or eat meat during smelting. Wives were allowed to bring food to a chosen site near the kiln, but had to leave before one of the smelters came to retrieve it. Beer was brewed by the men and offered to their ancestors, for their blessings. If customs were violated, it was believed that the smelting would fail.

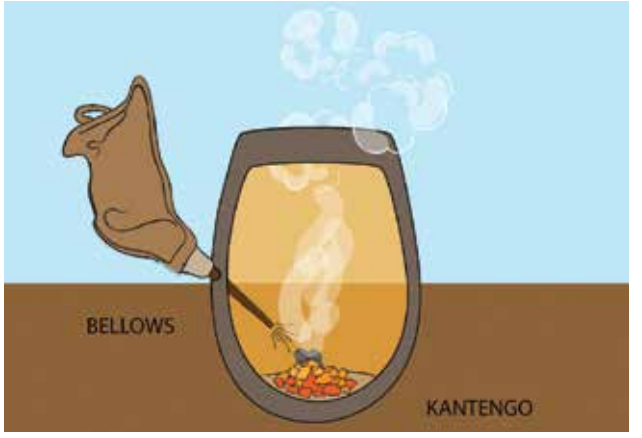
The primary kiln was known as 'ng'anjo', located close to the source of iron ore, built beside an ant hill for its preferred clay and near running water, to wet the clay, and for cooking and drinking. Few furnaces are still standing; there is one in fairly good condition about 16 km south west of Chelinda which can be visited in the company of a park guide.

The construction of the kilns was simple yet refined. Once the form of the kiln had been made, air pipes known as tuyeres, made from wet clay moulded around a wooden stick, were inserted to provide ventilation. Articles such as a sacrificial rooster, fish, plants, insects and rocks, known as 'maghambo' and considered magical, were placed below ground level in each kiln,

Original iron smelting furnace known as Ng'anjo. Each furnace produced only enough iron to make about four hoes or axes and several smaller tools



Iron-smelting furnace known as Ng'anjo



Re-smelting furnace known as Kantengo

necessary to ensure the success of the smelt. A fire was then lit in the bottom of the kiln and filled with alternating layers of charcoal and the crushed iron ore stone. This was fired for three days and then cooled for two more. The process resulted in a sponge-like chunk of slag containing small chunks of iron called 'nkhama'.

The nkhama was then re-smelted in a second specially constructed furnace known as a 'kantengo', 'chiramba' or 'kathengu'. Goatskin bellows attached to earthen pipes were used to blow air into the fire making it much hotter than in the larger kiln. If operated successfully the temperature in the furnace would rise to over 1,500°C.

This process produced solid iron with only small amounts of slag remains, which were then pounded out by hammer. This iron was later fashioned into hoes, axes, arrows, spears and knives. When the entire smelting process was finished, having involved many people and months of preparation, each furnace produced only enough iron to make about four hoes or axes and several smaller tools.

Phoka people

Between the 14th and 16th centuries AD, the Phoka/Tumbuka people migrated into the area from what is now southern Tanzania. The Tumbuka observed patrilineal inheritance and patrilocal marriage but the chieftainship was inherited matrilineally. The language of the Tumbuka is Chitumbuku, a Bantu language similar in structure to Swahili. The use of the name "Nyika" likely comes from this period, though its origins are somewhat disputed – it may mean "where the water comes from", the plateau being the headwaters of a number of important rivers in the Northern Region; "wilderness", due to its remote location; and/or "short grassland", a characteristic of montane plateau in both Malawi and Tanzania (formerly Tanganyika).

In the 1700s, the Nyika area was much disturbed by Ngoni raids from southern Africa. The Ngoni were part of the Zulu nation forced into long-distance migrations during the political and military revolution initiated by King Tshaka in the 1820s, the so-called *Mfecane* (The Time of Crushing). The Ngoni subsequently split into several groups settling in Zimbabwe, Zambia, Tanzania and Malawi. Some settled on the southern edge of the Nyika Plateau.

The high elevations of the eastern escarpment of the Nyika Plateau became a place of refuge for people escaping the Ngoni, as well as Arab slave traders who patrolled the shores of Lake Nyasa (later "Lake Malawi"). The terrain was steep so people were forced to dig ledges, usually about 5 m wide and 4 m deep, for shelter. They grew crops of millet, beans and peas on the upper slopes and hunted on the plateau.

As late as the 1940s, the Phoka continued to smelt handmade iron hoes and would take them down to the lakeshore with ivory, lion and leopard skins, big balls of tobacco and gourds of honey, to trade for cloth and beads. Villages such as Mbuzinandi, Nkonjera, Bangwa and Vitumbi were located in the foothills of the Nyika Plateau.

Phoka huts on hillsides. As late as the 1940s, the Phoka continued to smelt handmade iron hoes and would take them down to the lakeshore with ivory, lion and leopard skins, big balls of tobacco and gourds of honey, to trade for cloth and beads

Colonial period

In 1894 the Livingstonia Missionaries of the Free Church of Scotland settled on the Khondowe Plateau, one of the lower ridges of the Nyika escarpment, after suffering prolonged ill health at their previous two sites on the lakeshore. The missionaries constructed a huge church, complete with stained-glass windows, as well as a school, hospital, farm and the first hydroelectric plant in Malawi. The site, which has a magnificent view of Lake Malawi 750 m below, is outside the park boundary but can be seen from several points along the plateau's eastern edge. Missionaries from Livingstonia made many trips up onto the Nyika Plateau during the late 1800s - early 1900s, exploring and making botanical collections. In several locations along the plateau edge they also tried to plant gardens of cold weather vegetables and sunflowers. The terraces of these old gardens can still be seen near Kasaramba Viewpoint.

Adventurers like Laurens van der Post, whose book *Venture to the Interior* describes the Nyika Plateau, as well as numerous scientific expeditions collecting plant, bird and wildlife samples, began to visit the Nyika Plateau in the late 19th and early 20th century, and have continued until the present day.

The stained glass window in The Livingstonia Missionaries of the Free Church of Scotland, built on the Khondowe Plateau. Missionaries from Livingstonia made many trips up onto the Nyika Plateau exploring and making botanical collections

Early conservation attempts

The first attempts at conservation focused on the small patch of relict Juniper Forest, located in what is now the southeast corner of the park. Protection was recommended for this small forest in 1937 because of its status as the most southerly viable stand of *Juniperus procera* in Africa, but it wasn't until 1948 that the area was made into a forest reserve by legislation.

In 1951 the National Fauna Preservation Society of Nyasaland proposed to the Government that the Nyika Plateau should be preserved as a national park. However, during this same period, a proposal was made to cultivate pulpwood on the Nyika. A decision on the Fauna Society proposal was deferred until an evaluation could be made of the feasibility of establishing a plantation.

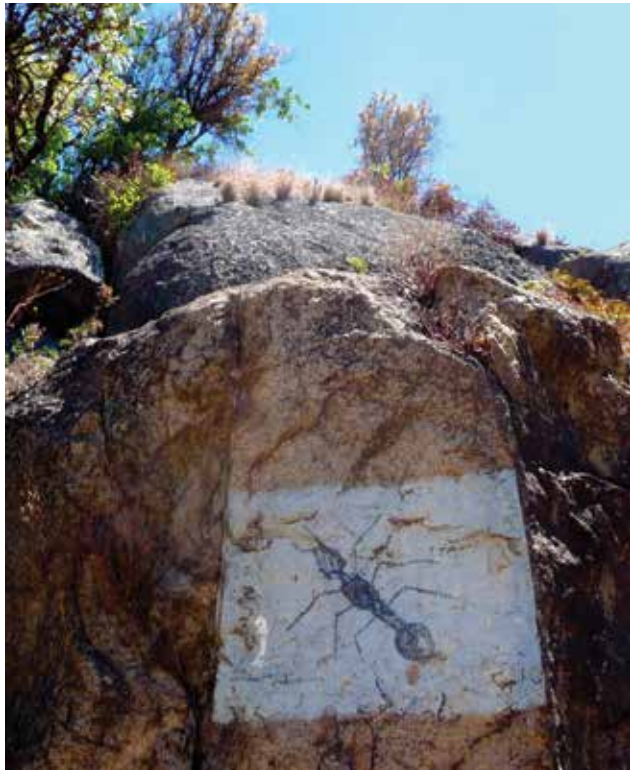
As an interim gesture, the Nyika Plateau was declared a non-hunting zone, under the terms of the Natural Resources Rules (Cap. 137). Unfortunately, large numbers of animals continued to be killed, because there was little enforcement of this regulation.

The Plantation

Between 1952 and 1958 a syndicate of three organisations - the Colonial (later Commonwealth) Development Corporation, Albert Reed and Co, and the Imperial Tobacco Co. - known as the Nyika Forestry Development Syndicate (NFDS), planted nearly 570 hectares of pines (mainly *Pinus patula*) and some small stands of Blue Gums *Eucalyptus sp*. and Black Wattle *Acacia mearnsii*. Trial plots were established in different exposures and elevations to test the feasibility of large-scale forestry development. The results of the experimental plantations were fair but transport difficulties prevented further development. In 1958 the project was withdrawn and the plantations were handed over to the Forestry Department; they later became the responsibility of the DNPW. The syndicate left behind the

pine plantations, three major loop roads with bridges, firebreaks, kikuyu grass planted around Chelinda camp (and spread beyond by game animals through their droppings), Trout in the Chelinda dams (excavated by ox-drawn scrapes) and river, and semi-permanent housing which lasted for many years.

Visit of His Excellency The Life President Hastings Kamuzu Banda to Nyika National Park In 1973



The British Royal Engineers Blue Ant by the Kaperekezi Road, painted to commemorate completion of the road in 1972

Post-independence

In 1965, following Malawi's independence, 940 km² of the Nyika Plateau was formally declared Malawi's first national park. The name was changed from Malawi National Park to Nyika National Park in 1969.

In 1972, a team from the 21 Field Squadron British Royal Engineers arrived on the Nyika Plateau with 225 men and a huge quantity of equipment, to build a road down the north-western escarpment towards Nthalire. The road was completed in 10 weeks, with the team working six days a week, two 12 hours shifts each day.

On August 25, 1973, His Excellency the Life President Hastings Kamuzu Banda arrived at Chelinda by air to inspect the new road. Two hundred dignitaries in 13 planes accompanied him, undoubtedly the most attended event in the park's history!

In 1978 the park boundary was extended to include all of the plateau escarpments and most of the north-east and south hill zones, increasing the area of the park to 3,134 km². This necessitated the resettlement of several local villages (about 5,000 people) outside the new boundary. There were two reasons for the extension. The first was to further protect the water catchments of the four major rivers originating on the plateau. These rivers are of major importance to northern Malawi as a source of dry season water for irrigation.

Secondly, eland, roan and zebra traditionally moved from the plateau down to the woodlands during the dry season to escape the cold and search for better forage; elephant, kudu and buffalo live there year-round and until the extension were not represented in the park. The evictions took place over a protracted period, largely implemented by district government officials. Many of the evicted families lost their property during the resettlement, resulting in difficult relations between the park and its neighbouring communities. There continues to be pressure on the DNPW to allow villagers to move back to their former communities.

Malawi-Zambia Transfrontier Conservation Area (TFCA)

Protected areas are increasingly like tiny islands in a sea of humanity. This isolation is exacerbated by habitat loss, fences, roads, overhunting and disease. Wildlife must travel through unprotected areas as they migrate, posing a serious threat to the long-term viability of many wild populations and migrations in Africa. Wildlife agencies, governments and communities find themselves in the nearly impossible situation of having vast ecological regions to protect and manage, which often straddle the boundaries of two or more countries, without adequate legal frameworks, staff or funding.

In recognition of these issues, in 1999, the Southern Africa Development Community (SADC) adopted the concept of Transfrontier Conservation Areas (TFCA), under the auspices of its Protocol on Wildlife Conservation and Law Enforcement. Already in use in other areas of the world, TFCAs support the collaborative management of shared natural and cultural resources across international boundaries for improved biodiversity conservation and socio-economic development.

in 1999, the Southern Africa Development Community (SADC) adopted the concept of Transfrontier Conservation Areas, under the auspices of its Protocol on Wildlife Conservation and Law Enforcement

In August 2004, the Malawi-Zambia Transfrontier Conservation Area (MZTFCA) was established to better protect an area of more than 35,000 km², incorporating Malawi's Nyika National Park and Zambia's Nyika National Park. A number of other transfrontier protected areas are included in the Malawi-Zambia ("Nyika") TFCA - Vwaza Marsh Wildlife Reserve, Kasungu National Park in Malawi, the Lundazi, Mitenge and Mikuti Forest Reserves, the Musalangu Game Management Area and Lukusuzi National Park in Zambia.

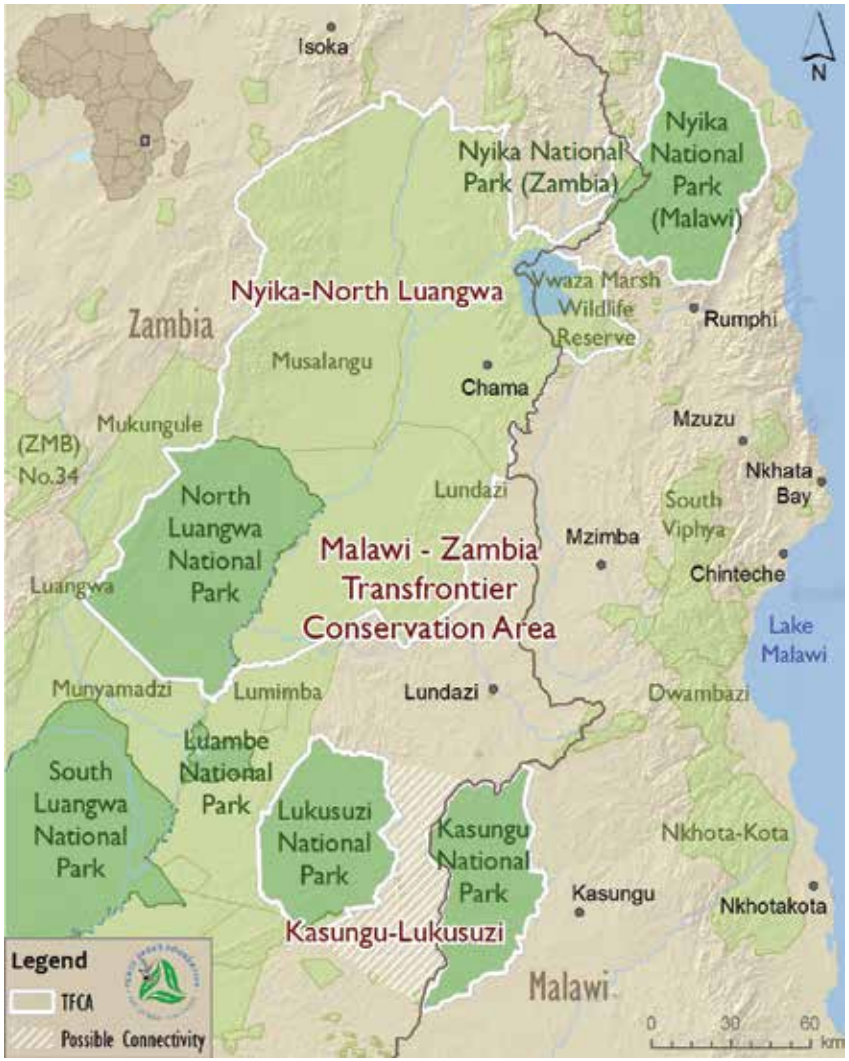
The Nyika TFCA is managed by the Peace Parks Foundation (PPF), a non-governmental organisation operating within the SADC Region, for the purpose of biodiversity conservation, socio-economic development, regional co-operation and peace building.
For further information, see www.peaceparks.org.

For further information, www.nyika-vwaza-trust.org

Nyika-Vwaza Trust (Malawi and UK)

In 2004, interested parties in Malawi and the United Kingdom agreed to establish two legally separate trusts to support the long-term feasibility of Nyika National Park and nearby Vwaza Marsh Wildlife Reserve. While initial efforts focused on supporting DNPW management, efforts have now shifted to environmental education and research. The Nyika-Vwaza (UK) Trust (NVT) works in partnership with other conservation NGOs in Malawi, as well as with the education arm of the DNPW in Mzuzu. NVT is the publisher of this book, which will be available to visitors to the park, as well as used for conservation education programmes in the region.

Malawi Zambia Transfrontier Conservation Area (TFCA)



Park management

Simply setting aside an area for a national park does not ensure its preservation. Protected area systems that are effectively planned, managed, governed and integrated maintain the environment in as natural a state as possible while contributing to people's livelihoods and wellbeing. This is called park management.

Management structure

Nyika National Park is administered by the Department of National Parks and Wildlife (DNPW). This is a government department under the Ministry of Information and Tourism. The DNPW has its headquarters in the capital city, Lilongwe. There is an office in Mzuzu, the provincial capital of the northern province, dealing mainly with general administration and information. Nyika National Park is administered by a resident Divisional Manager, a Park Manager and a complement of staff operating from an office complex at Thazima, the southern entrance to the park. A sub-office at Chelinda, 56 km to the north inside the park, is responsible for the northern zone. There are three service departments, Research and Planning, Wildlife Management and Education and Extension Services.

Community-based resource management

Human pressure on protected areas is increasing. Troubled relationships between protected area managers and surrounding communities can arise if adequate consultation and shared planning does not occur before decisions are taken.

Today the emphasis is shifting from central decision-making towards discussions with stakeholders and joint decisions about how land should be set aside and managed. Such negotiations are never easy but usually produce more positive and longer-lasting results for both conservation and people.

This approach is part of a global shift towards collaborative wildlife management, which enables the park administration and stakeholders to share the benefits, risks and responsibilities of protected areas. Stakeholders include local communities, tourism operators, government agencies, schools and universities, conservation and development NGOs and the private sector.

Chelinda DNPW Management Offices, built from logs in 1972 when there was a shortage of cement

In Nyika National Park, collaborative management began with a beekeeping project in 1989 with technical assistance from Germany. The project enabled people from villages surrounding the park to form beekeeping clubs which placed hives inside the park boundary, for honey and for the beeswax, which was made into candles for sale in local markets.

In 1995, the honey collection concept was expanded to include a range of other forest products such as thatch grass, reeds, palm fronds and bamboo for fences, building and roofing needs; fish, mushrooms, wild fruit, medicinal plants and Masuku termites and Ngumbi/Mphata caterpillars for food (termites and caterpillars are both important sources of protein in local diets). Villagers are permitted to collect these from a resource use zone that extends 5 km into the park.

More than 90 Natural Resource Committees have been established in communities around the park. The committees work with the DNPW to issue permits for local resource collection; run anti-poaching programmes, including the encouragement of local people to surrender muzzle loader guns and wire; and teach about conservation.

The committees also help the park administration and tour operators to employ people from the surrounding communities as contract labour for management activities such as firebreak preparation, road maintenance,

plantation management, exotic plant control, boundary clearing and tourism operations.

Neighbouring communities are now also included in revenue sharing programmes with DNPW and park tourism operators.

Law enforcement/anti-poaching

Anti-poaching is one of the most important functions of park management

Wildlife crime is the largest direct threat to the future of many wild species, second only to habitat destruction. The illegal wildlife trade is annually worth many billions of dollars worldwide, with most of the profits going to transnational organised criminal networks closely tied to militarised conflict and government corruption.

Global attempts to limit the trade in endangered species are guided by the multilateral treaty known as CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora. CITES came into force on July 1, 1975 and accords varying degrees of protection to more than 35,000 species of animals and plants. Malawi ratified the convention in 1982.

CITES works by subjecting international trade in endangered species to licensing controls. All import and export of species covered by the Convention has to be authorised through a licensing system. In Malawi, the DNPW is both the Management Authority and the Scientific Authority for decisions related to issuing CITES licenses. Unfortunately, Malawi has become one of the leading transit hubs in Africa for the shipping of ivory to Asian markets. Between 2009 and 2014 criminal networks in Africa trafficked an estimated 170 tonnes of ivory.

ILLEGAL ACTIVITIES include picking flowers, collecting butterflies, the hunting of large animals like elephant, buffalo and kudu for bush meat and trophies, illegal fishing, digging clay for pots, cutting down trees for firewood and building poles, and the unauthorised collection of wild honey, insects or plants for food, or the herding of cattle within the park boundaries

Anti-poaching is one of the most important functions of park management. Illegal activities include picking flowers, collecting butterflies, the hunting of large animals like elephant, buffalo and kudu for bush meat and trophies, illegal fishing, digging clay for pots, cutting down trees for firewood and building poles, unauthorised collecting of insects or plants for food, herding cattle within park boundaries and harvesting wild honey.

Hunting in the Nyika area is mainly done with handmade muzzle-loading guns, copied from the old 19th century military muskets and made in the village from piping. Bullets and gunpowder are also made locally and frequently cause injury to the hunters when they explode. Bows and arrows, spears and snares are also popular poaching tools at Nyika.

The poaching of orchids, first seen in the 1990s, has also become a problem in the park. Orchid tubers, known as 'chikanda', are considered a delicacy in Zambia, Tanzania and Malawi. The orchid bulbs are also ground into flour to make bread. Elevated financial rewards due to the increasing scarcity of orchid tubers has exacerbated the problem. The trade in chikanda is illegal as orchids are listed in Appendix II of CITES and therefore the uncertified passage of material over international borders (i.e. from Malawi to Zambia) is prohibited. The main species under threat come from the genera *Habenaria*, *Satyrium* and *Disa*. In Nyika *Disa satyriopsis* is the most commonly collected species and remaining plant numbers are now so low there are concerns that the population is no longer viable.

Poachers are also a menace to the cultural sites in the park. Caves and rock shelters are used by the poachers for lodging and meat drying over open fires.

DNPW rangers patrol the park on foot for days at a time. However, law enforcement efforts in the park are hindered by insufficient staff and patrol camps around the park boundary, poor staff morale, low penalties for convicted poachers because of one or a combination of either poorly investigated or presented cases, protection of transnational organised crime by corrupt senior officials, inadequate penalties in the Act, and insufficient training for magistrates. Other problems are shortages of patrol equipment due to wear and tear and insufficient resources for its maintenance, the use of routine patrol routes and the use of cell phones to alert poachers of patrols.

Poacher's shoes, used to disguise footprints, Thazima Gate Interpretation Centre

Fire management

For millennia, lightning was the major cause of wildfire in Africa. Since pre-historic times, humans have become the main perpetrators, with fires started by iron-smelters; honey gatherers attempting to smoke bees from their hives; hunters driving game; farmers clearing land; and people carelessly throwing away lit cigarettes. Thus, fire management has become one of the main responsibilities of park management.

At the end of May each year pre-emptive fires are started on purpose by park workers. Dry season hot grass fires cause considerable damage to both the flora and fauna of the park. Cool burns set early in the year, however, cause little damage to the plateau's forest areas. Small animals and reptiles can escape from slow moving fires, while grasses and plants recover quickly. These early burnt areas quickly grow fresh young shoots, resistant to fire. The burn programme continues throughout June and July.

Firebreaks around vulnerable areas of the plateau are also traditionally cleared in May-July. The Juniper Forest and forest patches on south-east facing slopes are given priority, as these are often the driest. The firebreaks generally follow roads and management tracks on the periphery of the plateau.

An early burn (May to July) is also applied to one third of the grasslands each year to inhibit the build-up of several years' worth of dry dead vegetation, which is the most devastating fuel for fires.

Timing of these early burns is critical. The vegetation has to be sufficiently dry to burn but not so dry that the fires get out of control. Particular attention must be paid to wind speeds and ambient temperatures.

Unfortunately, management issues in recent years have resulted in inconsistent early burn programmes, resulting in severe degradation of the remnant montane tropical evergreen forest patches.

Park staff carrying out early burns cause little damage. The slow-moving fire allows small animals and reptiles to escape

Environmental education

Successful park management inspires people to care about and protect their natural heritage for the benefit of wildlife, local communities and future generations.

Environmental groups supported by the Nyika-Vwaza (UK) Trust are working in partnership with the DNPW Education Extension office to deliver programmes in communities around Nyika National Park and Vwaza Marsh Wildlife Reserve, to address the specific issues affecting those communities, with particular emphasis on human-wildlife conflict, wildlife crime and wildlife welfare and conservation.

Efforts are not restricted to wildlife projects within the park. Important initiatives include afforestation along rivers and other degraded areas of local communities; the establishment of sustainable wood lots, briquette enterprises and cooperatives to produce and sell fuel efficient eco-stoves; and the creation of community permaculture plots, all with the aim of reducing firewood poaching.

Conflict mitigation workshops are also held with the specific aim of advising and assisting farmers in predator-friendly livestock management techniques, in order to reduce conflict with elephants, lions and other large carnivores, and increase tolerance.

Wildlife clubs in schools and villages are supported, as are school trips to the park, so that people can learn about the importance of the wildlife and biodiversity that surrounds them. Materials specific to the interests of these local communities are prepared to ensure that the programmes are relevant. Students visiting the park can stay at the student hostel at Chelinda and use the associated classroom facilities for

Top: building the Chisanga bridge from felled trees

Above: Zebra Warriors football team

Right: Felix Panjani, Department of National Parks and Wildlife Officer

workshops and research.

A small museum at Thazima Gate contains an assortment of wildlife displays and artefacts. Publications on Nyika are available here and at Chelinda, including park maps, interpretive booklets and hiking and biking maps. Knowledgeable DNPW staff can be hired to accompany visitors on walking, cycling and driving safaris.

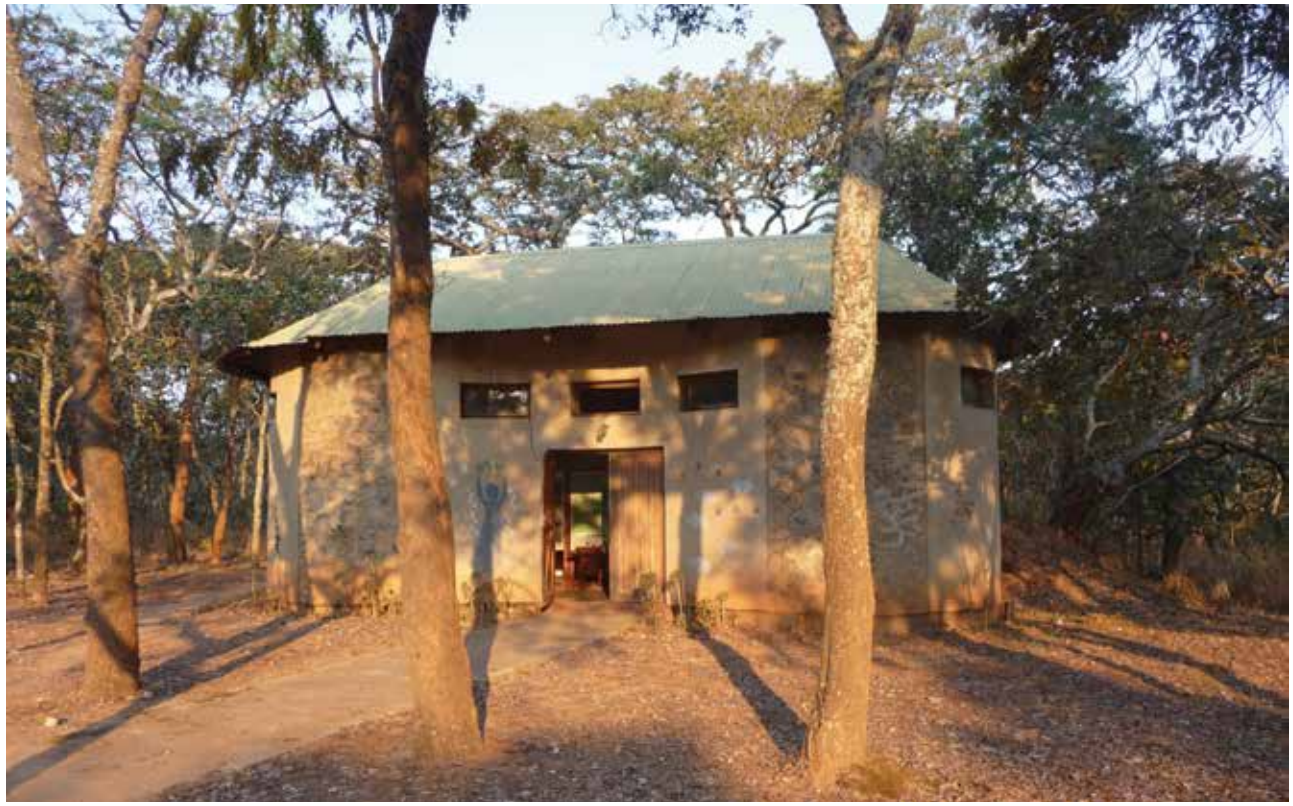
Research

Park research includes monitoring wildlife population trends and their seasonal movements, examining the composition and distribution of vegetation communities, monitoring trial fire plots set up to aid in determining the historic and contemporary influence of fire, studying the tropical evergreen forest patches for changes in size and species content and monitoring changes in bracken distribution.

Climate is also continually monitored at two Stevenson Screens/weather stations and eight additional rain gauges located throughout the park.

Both Malawian university students and international students are encouraged to visit the park to carry out research projects. The Nyika-Vwaza (UK) Trust works in partnership with other local and international environmental non-governmental organisations to provide some funding for this important work.

Left: Community outreach



Above: Nyika National Park Museum, Thazima Gate. Exhibits and publications on Nyika are available here

Researcher with Common Waxbill *Estrilda astrild*. Both Malawian university students and international students are encouraged to visit the park to carry out research projects

Identifying *Sysigium,* a genus of flowering plants that belongs to the myrtle family, *Myrtacea*

Visitor services

Protected areas exist to conserve biodiversity, but also to enable people to experience wild areas and learn about the importance of conservation. The enjoyment and safety of the increasing numbers of visitors to the park each year must be managed alongside community natural resource management initiatives, infrastructure maintainance, anti-poaching and fire management programmes, environmental education and research.

The majority of visitors are from Malawi, followed by South Africa, the Netherlands, Germany, the United States, the United Kingdom and Canada. On average, visitors stay for 3 days, with peaks over Christmas, Easter and the July/August holidays. The DNPW charges daily entrance fees for visitors and vehicles. Check Malawi tourism websites for the most up-to-date information. Additional fees must be paid to enter the Zambian Nyika National Park, at the Zambian Rest House.

The park can be entered by road at Thazima (southern entrance), and Kaperekezi (western entrance). Both gates close at 6pm and reopen at 6am. The main park facilities are located at Chelinda, 56 km from Thazima and 29 km from Kaperekezi.

Park maps are usually available at the park gates or at Chelinda. Northern Malawi and the park area are also covered by a number of Malawi Department of Surveys topographic maps. These can be ordered online

All visitors must arrive at Chelinda with sufficient fuel for their return journey to Rumphi or Chitipa, as well as for any driving they plan to do while in the park

Roads

A network of roads totalling 322.5 km covers the central and southern parts of the park, of which 232 km are tourist roads and 91 km unmaintained management roads (requiring permission from DNPW staff at Chelinda prior to use). Road, drain and bridge maintenance is a continual challenge for DNPW. All-wheel drive vehicles are advised year-round. "Road Closed" and "No Entry" signs have been erected for safety and should be respected.

All visitors must arrive at Chelinda with sufficient fuel for their return journey to Rumphi or Chitipa, as well as for any driving they plan to do while in the park. Many of the popular drives within the Park take visitors more than 30 km away from Chelinda. In the event of breakdown it may be hours or overnight before another vehicle passes, so it is advisable to take various precautions. Water (for drinking and for the radiator), food, a charged cell phone, maps, a blanket (the nights on the plateau can dip below freezing point), as well as a spare tyre and tools should be in the vehicle at all times.

Park maps are usually available at the park gates or at Chelinda. Northern Malawi and the park area are also covered by a number of Malawi Department of Surveys topographic maps in scales 1:50,000, 1:250,000 and 1:1,000,000. These can be ordered online, as can various downloadable interactive maps (e.g. Google maps, Tracks4Africa, etc.).

Airstrip

There is a grass airstrip at Chelinda. It is 1,100 m long, 50 m wide, at an elevation of 2,362 m.
Runway bearings are 0800 and 2600.
GPS coordinates are 10°33'29"S by 33°47'59"E.
The runway is licensed for aircraft up to 5700 kg MAUW (maximum all up weight).
The airstrip is maintained by the DNPW.
Conditions should be verified before use.

Distances from major airports are:
Mzuzu: 71 km (39 N.M.)
Lilongwe: 355 km (194 N.M.)
Blantyre: 575 km (315 N.M.)

Chelinda Camp. Three two-bedroom self-catering chalets were constructed next to Dam 1 for visitor accommodation

Accommodation

Please check Malawi tourism websites (for example, www.malawitourism.com, www.cawsmw.com, www.visitmalawi.mw) for the latest information on accommodation and other visitor services information.

Chelinda Lodge Cabins

Chelinda Camp: In 1963-4, three two-bedroom self-catering chalets were constructed next to Dam 1 for visitor accommodation. In 1967 a four-unit double bedroom block and optional dining room were added, as was a fourth chalet in 1975.

Chelinda Campsite: In 1983 a camping site was constructed by the DNPW on a hillside south of Chelinda. It has several covered eating areas as well as an ablution block.

Chelinda Lodge: Seven luxury log cabins plus a reception area/full service dining room were added in 1998, on the hillside above Chelinda Camp. All facilities were managed by DNPW until 1992, when private operators began to lease the tourist facilities. In the late 1990s-early 2000s, horse safaris were offered to visitors, but ceased with a change of management.

Student hostel: A student hostel with basic bunkhouses, kitchen, latrines and meeting room was built in 1987 for the use of official Malawian school groups and wildlife clubs. For more information, please contact the DNPW Environmental Education unit in Mzuzu.

Electricity (220V) is provided at Chelinda in the evenings by generator with paraffin lamps as back-up. Wood from the pine plantation is used for heating and cooking. Water is sourced from local streams and is filtered at the tourist accommodations. Water is heated by wood boilers. Mobile phone reception is good on the plateau. Self-catering visitors must bring all necessary provisions for self-catering into the park.

Mobile phone reception is good on the plateau

Self-catering visitors must bring all necessary provisions into the park

Above: Chelinda Camp. Electricity (220V) is provided in the evenings by generator with paraffin lamps as back-up. Wood from the plantation is used for heating and cooking. Water is from local streams and filtered at the tourist accommodation. Water is heated by wood boilers

Above: Chelinda Student Hostel, with basic bunkhouses, kitchen and latrines

Left: Chelinda Campground has several covered eating areas as well as an ablution block

Domwe Viewpoint. The edge of the Nyika Plateau

Special interest sites

There are many features of interest within the park. These include viewpoints, historic sites, places of local beauty and areas with interesting plant or animal communities. Many of these sites of interest are identified on the park map; those that are not can be located with the help of guides organized through the DNPW or visitor accommodation offices.

Domwe Viewpoint

Perched on the north-west edge of the Nyika Plateau, 29 km from Chelinda, Domwe provides excellent views west, over the village of Nthalire and beyond to the Makutu Mountains of Zambia.

Jalawe Viewpoint

Jalawe is 34 km north of Chelinda. On a clear day, Lake Malawi and the mountains of Tanzania can be seen to the north-east. To the north is the Kawozya-Mpanda Ridge. Elephant, kudu and buffalo can sometimes be seen through binoculars, 1,000 m below in the Chipome

Valley. Klipspringer can sometimes be seen on the rocky outcrops near the viewpoint.

Nganda Peak

Nganda (2,606 m) is the highest point in Nyika National Park. On a clear day views can be had of Lake Malawi and the mountains of Tanzania to the north-east, as well as the rest of Nyika Plateau to the south and west. The 4 km track from the main road turn-off to the turnaround point is quite rough. Nganda is 29 km from Chelinda.

Kasaramba

From Kasaramba Viewpoint, on clear days, there are excellent views of Lake Malawi, Tanzania, the shiny tin roofs of Livingstonia, and the Chilumba Spit sticking out into the lake to the north-east. The lake steamer, *Ilala*, can sometimes be seen on its journey to or from Chilumba. Directly below Kasaramba is a section of the very steep eastern escarpment montane evergreen forest. It was here that 6 people lost their lives in 2007 on their way to Chelinda, when their small plane crashed into the steep slope. The rare Forest Buzzard *Buteo oreophilus* nests in this forest. Several old terraced gardens used by the Livingstonia missionaries are located on the hillslopes around Kasaramba. The viewpoint is 43 km from Chelinda and can be reached by car. A marked path leads 1.5 km from the turnaround point to the actual viewpoint.

Looking towards Jalawe Rock with the Kawozya-Mpanda Ridge in the distance

Nchenachena Falls

Situated just north of Kasaramba, on the eastern edge of the plateau, the Nchenachena Falls cascade 30 m straight down into the very dense and often misty eastern escarpment tropical evergreen forest. Permission to drive the very steep and bumpy management road to the falls, which branches left, 100 m before Kasaramba Viewpoint, is required in advance from the DPNW Officer-in-Charge. Visitors can also follow the 3 km track on foot. There is a rain gauge near the falls, which should not be disturbed.

Chelinda Dams

There are three man-made dams near Chelinda. Water birds such as Yellow-billed Duck, Dabchick and Red-knobbed Coot are frequently spotted swimming on the dams. Various other migrant birds visit on their way north or south. During the rainy season orchids flourish in the wet areas surrounding the dams. Roan Antelope visit to swim and eat aquatic vegetation. Sometimes their presence is detected only by a pair of curved horns and ears projecting above the water surface.

Dam 1 is in front of the visitor chalets
Dam 2 is 1.5 km south of the chalets
Dam 3 is 4 km south of the chalets

There has been an on-going concern at the amount of silt collecting in Dam 1. This has been aggravated by run-off from the logging of the pine plantation at Chelinda.

Roan foraging In Dam 3, 4 km south of the Chelinda chalets

Fingira Rock and Cave. The cave was used as a Stone Age shelter and contained artefacts when originally excavated

Fingira Rock

Fingira Rock, a large conical granite dome that can be seen from afar, is about 22 km south of Chelinda. About halfway up the eastern side of the rock is a cave, used as a shelter by Stone Age people.

The cave is about 11 m deep and 18 m long. Archaeologists who excavated the shelter in 1968 discovered many artefacts from the Stone Age: quartz scrapers, flakes and blades; large stones with hollow dimples probably used for grinding; pieces of worked bone made into points and awls; shell beads and ornaments.

A complete human skeleton except for hand and foot bones was also uncovered in the excavation. The skeleton was lying in a very curious position, spread-eagled over huge rocks near the cave entrance. Many of the bones were fractured, the breaks directly beneath large rocks. The death or burial of the person was undoubtedly very dramatic. Curiously, the excavation yielded no grave goods.

Fingira is believed to have been abandoned as a shelter around 900 BC, except for its use as a sacred site for rainmaking and other important ceremonies. On the back wall of Fingira Cave are some geometric paintings in red and white. It is the only rock art site in the Nyika area known today and belongs to what is known as the Central African Schematic Art Tradition, usually a series of circles and parallel lines. The paintings are very different from paintings found in Southern Africa, which often depict hunting scenes and wildlife. They are very old and weathered and should not be touched. The cave is 500 m from the end of the vehicle track on the eastern side of the dome, reached by scrambling up the jumble of stone below the rock.

Juniper Forest

Located 43 km southeast of Chelinda, the Juniper Forest represents the most southerly naturally occurring stand of *Juniperus procera* in Africa. This small forest was the first area of Nyika to receive official protection when it was declared a Forest Reserve in 1948.

A 1.0 km trail winds through the Juniper Forest for visitor use. Quiet visitors may be rewarded with sightings of some of the forest animals - Bushbuck, Checquered Giant Sengi, Harvey's Duiker and Bushpig are known to occur here. A rustic wooden cabin on the edge of the forest was available for visitor use until it was burned by poachers in 2005. Down the hill from where the cabin was located is the Uyagaiya stream. Nearby grows a curved tree. Fresh claw marks and wood shavings indicate leopards regularly use the tree as a scratching post. Visitors can also walk on the firebreaks which surround the forest patches though some of them are quite steep.

Juniper Forest, the first area of Nyika to receive official protection when it was declared a Forest Reserve in 1948

Zovochipolo Forest

All areas of montane tropical evergreen forest are designated areas of special interest at Nyika. One of these, the Zovochipolo Forest near the Malawi-Zambia border, has a 1.5 km self-guided trail. The name Zovochipolo commemorates the shooting of an elephant in the forest in the early 1900s - *Zovo yachipolwe* means "the elephant of Chipolwe".

Throughout the year the forest is damp and lush with heavy vines, huge buttressed trees, giant ferns, clinging epiphytes and mosses. During the rainy season delicate orchids bloom on the trunks of many of the trees and exotically coloured birds sing and twitter through their breeding season. Many animals live in the forest.

Quiet walkers may be rewarded with sightings of a troop of Blue Monkeys high in the tree tops, a Chequered Giant Sengi shuffling in the leaf litter, the brilliant red tail of a Black and Red Bush Squirrel disappearing up a tree trunk, or a Blue Duiker motionless in the undergrowth. Bushpig, Bushbuck and Leopard also sometimes inhabit the undergrowth. Watch out for biting ants which occasionally sneak up on the unaware visitor wearing sandals.

A Zovochipolo Forest Nature Trail guide is available at the Chelinda shop. Zovochipolo is located 16 km from Chelinda, just west of the Thazima-Kaperekezi road junction.

Zovochipolo Forest. Sightings could include a troop of Blue Monkeys high in the tree tops, a Chequered Giant Sengi, the Black and Red Bush Squirrel, or a Blue Duiker motionless in the undergrowth. Bushpig, Bushbuck and Leopard also sometimes inhabit the undergrowth

Chelinda Bridge

The Chelinda River sweeps its way off the Nyika Plateau through the southern hill zone in a series of turbulent rapids and tumbling waterfalls. Experienced fishermen can try for trout in one of the quieter pools. Others can wander 1.5 km downstream from Chelinda Bridge to the 10 m high Chelinda Falls. This is a lovely picnic spot. Chelinda Bridge is located 17 km south of Chelinda.

Chisanga Falls

The Chisanga Falls are a series of waterfalls and rapids on the North Rukuru River where it drops down the western escarpment. There are three principal falls, with the longest plunging 120 m. The falls are about 2.3 km off the S77 road to Kaperekezi Gate. The falls have special importance to local people as a rain shrine. An Iron Age site is located on a path leading to the falls at a distance of about 100 m from the falls. Potsherds and tuyere pipes indicate that there was once an iron-smelting kiln in the vicinity. A pile of stones brought by people who visit the shrine marks the site.

Evergreen riverine forests fringe the cascades, giving shelter to Harvey's Duiker and many birds. The falls are reached by a fairly steep 2.3 km trail, which winds through Brachystegia woodland, giving bird watchers a chance to pick out many of the resident species. From the trail there are excellent views west into Zambia and north along the North Rukuru River valley.

Chisanga Falls. An Iron Age site is located on a path leading to the falls

View towards Chelinda Plantation from Chosi Rock. To the south is Fingira Rock, to the south-west is Vitinthiza hill and Mwanda Peak, to the north-east is Chelinda and Nganda Peak, to the north-west is Domwe hill. Stone Age artefacts have been found around the base of Chosi Rock

Research team visiting Bleak House. Livingstonia missionaries built the single-storey four-room brick house in the late 1800s as a retreat, for its refreshing weather and lack of mosquitos

Bleak House

On the Kawozya-Mpanda Ridge, inside the northern boundary of the park, there stand the ruins of a small house, built high above Lake Malawi. It is known as "Bleak House" though the setting is perhaps one of the most beautiful in Malawi, with views east across the lake to Tanzania as well as south to the Nyika Plateau. Livingstonia missionaries built the single-storey four-room brick house in the late 1800s as a retreat, for its refreshing weather and lack of mosquitos. Beside the main house is a smaller building probably built as a kitchen. In later years a local Scottish cotton gin owner named Mr. Maxwell used it as a hunting lodge. Bleak House can only be reached on foot. The route of one of the wilderness hikes passes by this lovely spot.

Phoka platforms

The scars of earthen platforms or ledges can still be seen on the steep valley walls, 1.5 km north of the Nganda Peak turnoff along the road towards the Jalawe junction. Several other groups of platforms can also be seen at various locations along the eastern portion of the North Rumphi Road. These platforms were carved out of the plateau escarpments by the Nyika area Phoka people in their attempts to evade the Ngoni warriors and Arab slave traders in the late 19th century.

Park guides are available to guide interested parties to these sites

Rock shelters

Numerous Stone Age rock shelters are scattered throughout the park. These include Chowo Rock, Champaninga Rock and Chipokabawole Rock (where tradition says that if women passing by do not leave white beads at the site they will disappear, particularly if the woman is pregnant or has given birth to twins). Nyankhufuntha Cave (which means "insane") implies it was used in the past to shelter one or more people suffering some kind of mental illness. Rukwerero Hill has extensive evidence of Stone Age as well as Iron Age occupation. There are hut sites marked by circular depressions that represent the remains of shelters known as *toros*. A *toro* is a small (2.5 metres diameter) beehive shaped erection constructed of thin saplings bent together at the apex to form the framework. The outside is thatched, but there is often earth thrown against the base of the walls, and this forms the bank. When such a structure collapses, over time all trace of it will disappear except the earth that was banked against the outer walls and this will produce the effect of a circular depression. On the same hill, but at the southern end of it, there is a level area of approximately 20 acres surrounded by large rocks. Within this area twenty places were noted where one or two pots had been smashed on the ground. It seems very possible that this place was abandoned in haste, perhaps due to Ngoni raids.

Chosi Rock

This hill is located 12 km southwest of Chelinda. It provides a pleasant view of the rolling grasslands in all directions. To the south is Fingira Rock, to the south-west are Mwanda and Vitinthiza hills, to the north-east is Chelinda and Nganda Peak, and to the north-west is Domwe hill. Late Stone Age artefacts have been found around the base of Chosi Rock.

Lake Kaulime

Just outside of Chelinda lies Lake Kaulime (photograph p36-37), the only naturally occurring lake on the plateau. Revered as a sacred site, it is traditionally used for rain making ceremonies and is home to a powerful spirit in the form of an enormous serpent, said to be the guardian of Nyika wildlife, rationing the kills that any hunter could take.

Nyika hiking

Chelinda Crater/Landslip

Local lore says that in 1960 a meteorite fell from the sky into the Chelinda pine planation, behind Chelinda Camp, near Chalet 4. A bright light was followed by a loud explosion and wind burst which flattened trees 100 m from the crater centre and caused a small landslide. The crater was reported to be 80 m in diameter and 6 m deep. Studies more recently suggest that instead of a meteorite, the crater and flattened forest were caused by an earth tremor and resulting landslip.

Mwanda Peak

This mountain (2,147 m) is located on the border between Malawi and Zambia to the north-west of Chisimuka in the Hewe valley, viewed from Jalawe Viewpoint. Iron smelting furnace remains are present and the peak was known as a refuge for people fleeing the Ngoni raids. A rain shrine is located on the mountain, but those who continue to carry out the ceremonies keep its exact site secret. It is said that it is located in a 'mphanji' (rock shelter). The ceremonies are held whenever there is drought or flooding severe enough to destroy crops and homes.

Royal Corps of Engineers "Ant" Emblem

The large blue ant painted on a prominent rock halfway down the road between Kaperekezi Gate and the Chisanga Falls trailhead, is the emblem of the Royal Corps of Engineers unit which built the road in 1972.

The faceless monument at the road junction also used to commemorate this event.

Iron smelting kilns

One furnace is located on the southern bank of Dembo River. The furnace wall is thin as compared to the ones existing elsewhere in the area. The kiln measures 4.47 m in circumference at the base, 1.14 m high. The base diameter measures 1.4 m while the top diameter is 0.67 m. The holes at the base of the furnace are 13 in number and most of them have the tuyere pipes tacked in.

A second kiln is on a ridge west of Vipiri Hill and comprises the ruins of a kiln and the foundation of a shelter. The whole area is littered with numerous tuyere pipes and iron slag. This indicates that the smelting process and the refinery process were done at the same spot. Potsherds have also been found here dating from the 19th century.

Mountain biking on the Nyika Plateau

Fishing licenses are available at Chelinda for a fee. Rental equipment may be available from local tourism operators

Mountain biking

Several mountain bike routes have been created in the park. Bicycles may be available for rent at Chelinda. More information regarding individual trails (distance, duration, elevation, difficulty, condition etc.) can be obtained from the Chelinda tourism operators.

Angling

The catch and release Rainbow Trout fly-fishing season on the three Chelinda dams extends from September 1 to April 30. The season is open year-round on rivers and streams in the park. The principal fishing streams on the plateau are the North Rumphi, Chelinda, Dembo, Phata and North Rukuru. The rivers and streams of the plateau are often narrow and overgrown, requiring skilled tactics. The quality of fishing has declined in recent years, due to erosion.

Driving in the park

For more information, see the Special Interest sites section of this book, page 172

Please check with DNPW staff prior to departure, to verify conditions

Day drives

Some of the popular day outings at Nyika are described below. The roads and bridges within the park are maintained by the DNPW.

Route 1

Chelinda - Domwe Viewpoint - Jalawe Viewpoint - Nganda Peak - Dembo Bridge - Chelinda
Distance 70 km

Route 2

Chelinda - Kasaramba Viewpoint - Juniper Forest - Chelinda Bridge and Falls - Chelinda
Distance 90 km

Route 3

Chelinda - North Rumphi Road - Return. The North Rumphi Road is a management road and permission must be granted from the Officer-in-Charge at Chelinda before visitors can make this trip.
Distance 65 km

Route 4

Chelinda - Zovochipolo - Chisanga Falls - Chelinda
Distance 40 km

Short Drives

Around the pine plantation
16 km
Chosi Circuit
24 km
Zungwara return
25 km
Chelinda Bridge Circuit
42 km
Dembo Bridge/North Circuit Cut-Off
35 km
Mwajimbura return
42 km
Chakomanamkazi return
44 km

Walking in the park

Please check with DNPW staff to determine the condition of the trails, prior to departure. All trails are maintained by the DNPW

Knowledgeable guides can be hired at the DNPW office at Chelinda or at the visitor accommodations, to assist visitors in seeing points of interest

Chelinda area walks

Students, researchers and visitors, accompanied by a guide, are welcome to walk along the roads or through the pine plantation. Round-trip distances from Chelinda Camp and approximate duration of some of the more popular walks in the Chelinda area are as follows:

To Dam 2 along the road, and back:
3 km; 40 min.

To Dam 3 along the road, and back:
8 km; 2 hours.

To Chosi Viewpoint via Dam 3, back by Lake Kaulime:
24 km; 6 hours.

Up the hill behind Chalet 4 to the Kasaramba turn-off; left to the Forest Drive; through the pine plantation to Chalet 4:
4 km; 1 hour.

Around the outside of the pine plantation:
16 km; 5 hours.

Along the Forest Drive up past Chalet 3; veer right through the pine plantation to the main road; right, along the road to the Kasaramba turn-off; right, down the hill:
7 km; 2 hours.

To Dembo Bridge and back along the road:
24 km; 6 hours.

Short trails

For more information on these six short trails in the park and each of these destinations, see the Special Interest Sites section, page 172

Zovochipolo Forest
This trail is 1.5 km long, through one of the patches of sub-montane tropical evergreen forest that dot the plateau. It is an easy walk of half an hour to one hour.
A Zovochipolo Forest Nature Trail Guide is for sale at Chelinda shop. The trailhead is 16 km from Chelinda.

Juniper Forest
This 1.0 km trail winds through a patch of juniper trees, protected in the south-east corner of the park. Due to shading from the canopy the understory is not well developed, and walking in the

Above: Nyika grassland

Previous pages: Zebras posing

cathedral-like forest is relatively easy. Visitors can also follow the firebreaks around the two patches of juniper forest, some of which are quite steep. The trailhead is 43 km from Chelinda.

Chisanga Falls

This 2.3 km trail is steep in places. It follows one of the ridges of the western escarpment to where the North Rukuru River cascades over the edge of the escarpment. The trailhead is 20 km from Chelinda.

Jalawe Viewpoint

This trail is 1.0 km in length and is steep in places. A short metal ladder is used to climb one section of steep rock. The trailhead is 43 km north of Chelinda.

Nganda Peak

This 1.5 km trail leads to the summit of Nganda Peak, the highest point in the park. The trailhead is 29 km from Chelinda.

Ntakhati Peak

The trailhead is 1.5 km from the peak and climbs 300 m to the top. The views east down into the broad North Rumphi valley and beyond to Lake Malawi are impressive. The peak provides panoramic views west of the rolling Nyika grasslands.

Longer trails

Mwanda Peak (Zambia)
Distance: 15 km round trip
Altitude range: 460 m
The trail begins 29 km south-west of Chelinda, on the Malawi-Zambia border. It follows the ridge to Mwanda Peak (2,147 m), the highest point in Zambia. There are interesting rocks and the remains of iron smelting furnaces. Views from the top are impressive: Vwaza Marsh Wildlife Reserve to the south-west; the hills of Zambia to the west; and the Nyika Plateau grasslands to the north-east. The return is by the same route.

Zungwara to Domwe
Distance: 13 km one way
Altitude range: 1,000 m
The trail begins 15 km north-west of Chelinda at Zungwara. It follows the western edge of the plateau on grassland. There are several short, steep sections where small streams must be crossed. It can be very windy but is an extraordinarily beautiful walk with incredible views down the escarpment and across to Zambia. Waves of migrating birds such as swallows, swifts and eagles are commonly seen in late dry season as they make their way south, following the edge of the plateau. The walk ends at a different point from where it begins. A driver can be hired at Chelinda to do the transfer.

Wilderness hiking trips

A number of overnight hiking trips have been designated in the park, ranging in duration from one to five days. Guides must accompany visitors. The routes do not follow set paths but usually stick to the many game trails along the ridges and streams. Advance reservations for use of wilderness trails can be made through Malawi tourism providers, including the tourism operators at Chelinda.

Zambian Nyika National Park

There are many other features of interest in the northern region of Malawi besides Nyika National Park. Immediately next door, of course, is the Zambian Nyika National Park. This park has no direct access from its own country, but can be entered from the main road which passes through the Malawi Nyika National Park. Visitors should stop at the Zambian National Parks guard's house at the Zambian Rest House location, to pay the daily entrance fee (please check the Zambian Department of National Parks or Zambian tourism websites for current rates). Because visitors must enter through the Malawi park they will also be charged the daily Malawi park fees for the duration of their stay.

The Zambian rest house was built in 1953 and has splendid views west. It can only be reached from the

Previous pages: looking towards Nthalire

Elephants drinking, Vwaza Marsh Wildlife Reserve

main road entering the Malawian park. Please check Zambian tourism websites for up-to-date information on the rest house.

Two special features of interest on the Zambian side are Chowo Forest and Manyenjere Forest (see the Nyika National Park map for locations). Both are excellent examples of submontane tropical evergreen forest. Manyenjere Forest, covering 75 ha, can be reached by a dirt track leading south-west from the Kaperekezi road. Chowo Forest, at 90 ha, is the largest forest on the whole of the Nyika Plateau and has a 4 km walking trail through it for visitor use (trail maintenance can vary). There should be a sign indicating Chowo Forest, south of the Zambian Rest House.

Vwaza Marsh Wildlife Reserve

To the south of the Nyika Plateau is Vwaza Marsh Wildlife Reserve. This reserve offers excellent wildlife viewing of typical lowland wildlife such as elephant, warthog, kudu, hartebeest, impala, buffalo, hippo, lion, puku, sable and waterbuck and over 200 species of birds. Of particular interest is Swainson's Francolin *Pternistis swainsonii* which occurs nowhere else in Malawi and the White-winged Starling *Neocichla gutturalis*.A tented camp operates overlooking Lake Kazuni. Please check Malawi tourism websites for up-to-date information.

Glossary

Arboreal a plant or animal which lives in trees
Aspect the direction a given landscape faces
BC Before Christ
Browser an animal which feeds on leaves and twigs of shrubs and trees
Community a group of plants or animals which live together
Canopy the top leafy part of a tree
Carnivore an animal which eats meat
Catchment the area from which water collects to flow into a particular river
Dambo a seasonally waterlogged area, sometimes with a permanent stream-bed
Deciduous a tree which sheds its leaves annually
Decomposer organisms in the soil which aid in the decay of organic matter
Diurnal active in the daytime
Dorsal on the back
Ecology the study of the inter-relationships between plants and animals and their surroundings
Ecosystem a particular group of plants and animals and the environmental factors which influence them
Emergent a tree taller than surrounding trees
Endemic found nowhere else in the world
Epiphyte a plant which grows on another plant for support
Escarpment the long steep side of a plateau
Gneiss a coarse-grained metamorphic rock in which bands of light-coloured minerals (quartz, feldspar), alternate with dark-coloured ones (amphibole, biotite)
Granite a coarse to fine-grained igneous rock made up largely of potassium feldspar, sodium-rich plagioclase, quartz and micas
Habitat the natural home of a plant or animal
Herbaceous a plant the growth of which dies down annually but whose roots survive
Herbivore an animal which eats plants
Igneous rock rocks which have solidified from molten material originating from below the earth's surface
Intrusion a rock which formed from molten material and solidified below the earth's surface
Legume a plant with protein-rich seeds or pods
Liana a vine with a stem diameter of more than 3 cm
Mass movement the movement of rock material downslope carried by the effect of gravity
Mean temperature average temperature
Metamorphic rock rock formed from previously-existing rock through extreme heat or pressure
Midden a specific place which an animal regularly visits to deposit its droppings
Nocturnal active at night
Parasite animal or plant living in or on another, drawing nutrients from it
Producer something which provides food for another
Relict plant or animal which has remained unchanged for millions of years
Rhizome underground perennial root which holds water
Riparian vegetation which grows along streams or rivers
Seismic activity earthquake
Stone line a horizontal line of sorted stones which exists throughout Africa in the soil; it is believed to be the result of termite activity
Terrestrial a plant or animal which lives on the ground
Ungulate a hoofed-mammal
Weathering the mechanical and chemical disintegration of rocks

Appendix 1 **Mammals**

Endemic to Nyika

Elephant shrews *Macroscelididea*
Short-snouted Sengi
Elephantulus brachyrhynchus
Four-toed Sengi *Petrodromus tetradactylus*
Chequered Giant Sengi *Rhynchocyon cirnei*

Hyraxes or dassies *Hyracoidea*
Bush Hyrax *Heterohyrax brucei*

Antbear *Tubulidentata*
Aardvark *Orycteropus afer*

Elephants *Proboscidea*
African Elephant *Loxodonta africana*

Monkeys and apes *Primates*
Long-eared Greater Galago
Otolemur crassicaudatus
Vervet Monkey *Cercopithecus pygerythrus*
Blue Monkey *Cercopithecus mitis*
Yellow Baboon *Papio cynocephalus*
Galago *Galago* sp.
Human *Homo sapiens sapiens*

Rodents *Rodentia*
Mutable Sun Squirrel
Heliosciurus mutabilis
Smith's Bush Squirrel *Paraxerus cepapi*
Black-and-red Bush Squirrel
Paraxerus lucifer
African Forest Dormouse
Graphiurus murinus
Noak's African Dormouse
Graphiurus microtis
Boehm's Gerbil *Tatera boehmi*
Long-tailed Pouched Rat *Beamys hindei*
Giant Pouched Rat *Cricetomys gambianus*
Cape Pouched Rat *Saccostomus campestris*
Yellow-spotted Brush-furred Rat
Lophuromys flavopunctatus
Least Spiny Mouse *Acomys spinosissimus*
Red Veld Rat *Aethomys chrysophilu*
Nyika Veld Rat *Aethomys nyikae*
Grey-bellied Pygmy Mouse *Mus triton*
Nyika African Climbing Mouse
Dendromus nyikae
Grey African Climbing Mouse
Dendromus melanotis
Brants' African Climbing Mouse
Dendromus mesomelas
Chestnut African Climbing Mouse
Dendromys mysticalis
Common Shaggy Rat *Dasymys incomtus*
Single-striped Grass Mouse
Lemniscomys rosalia
Four-striped Grass Mouse
Rhabdomys pumilio
East African Thicket Rat
Grammomys ibeanus
Woodland Thicket Rat
Grammomys dolichurus
Delicate Soft-furred Mouse
Praomys delectorum
Natal Multimammate Rat
Mastomys natalensis
East African Creek Rat *Pelomys fallax*
Black Rat *Rattus rattus*
Hildegarde's Broad-headed Mouse
Zelotomys hildegardeae
Angoni Vlei Rat *Otomys angoniensis*
Dent's Vlei Rat *Otomys denti*
Ethiopian Vlei Rat *Otomys typus*
Silvery Mole-rat
Heliophobius argenteocinereus
Whyte's Mole-rat *Fukomys whytei*
Lesser Cane Rat *Thryonomys gregorianus*
Cape Crested Porcupine
Hystrix africaeaustralis

Rabbits and Hares *Lagomorpha*
African Savanna Hare *Lepus victoriae*
Red Rock Hare *Pronolagus rupestris*

Shrews *Soricomorpha*
African Giant Shrew *Crocidura olivieri*
Moonshine Shrew *Crocidura luna*
Hildegarde's Shrew *Crocidura hildegardeae*
African Black Shrew *Crocidura nigrofusca*
Greater Dwarf Shrew *Suncus lixus*
Lesser Dwarf Shrew *Suncus varilla*
E Gnoske's Mouse Shrew *Myosorex gnoskei*

Bats *Chiroptera*
African Straw-coloured Fruit Bat
Eidolon helvum
Wahlberg's Epauletted Fruit Bat
Epomophorus wahlbergi
Peters' Epauletted Fruit Bat
Epomophorus crypturus
Anchieta's Broad-faced Fruit Bat
Plerotes anchietae
Geoffroy's Horseshoe Bat
Rhinolophus clivosus
Blasius' Horseshoe Bat
Rhinolophys blasii
Hildebrandt's Horseshoe Bat
Rhinolophus hildebrandti
Natal Long-fingered Bat
Miniopterus natalensis
Dusk Pipistrelle *Pipistrellus hesperidus*
Giant Free-tailed Bat *Tadarida ventralis*

Carnivores *Carnivora*
Side-striped Jackal *Canis adustus*
African Wild Dog *Lycaon pictus*
African Clawless Otter *Aonyx capensis*
Ratel *Mellivora capensis*
African Striped Weasel *Poecigale albinucha*
Two-spotted Palm Civet *Nandinia binotata*
African Civet *Civetticus civetta*
Bushy-tailed Mongoose
Bdeogale crassicaudata
Egyptian Mongoose *Herpestesi ichneumon*
Slender Mongoose *Herpestes sanguineus*
Dwarf Mongoose *Helogale parvula*
Spotted Hyaena *Crocuta crocuta*
Caracal *Caracal caracal*
Wild Cat *Felis lybica*
Serval *Leptailurus serval*
Leopard *Panthera pardus*
Lion *Panthera leo*

Odd-toed ungulates *Perissodactyla*
Zebra *Equus quagga*

Even-toed ungulates (antelopes) *Artiodactyla*
Bushpig *Potamochoerus larvatus*
Common Warthog *Phacochoerus africanus*
Hippopotamus *Hippopotamus amphibius*
Hartebeest *Alcelaphus buselaphus*
Harvey's Duiker *Cephalophus harveyi*
Blue Duiker *Philatomba monticola*
Common Duiker *Sylvicapra grimmia*
Klipspringer *Oreotragus oreotragus*
Sharpe's Grysbok *Raphicerus sharpei*
Roan Antelope *Hippotragus equinus*
Greater Kudu *Tragelaphus strepsiceros*
Bushbuck *Tragelaphus scriptus*
Common Eland *Taurotragus oryx*
Puku *Kobus vardoni*
Southern Reedbuck *Redunca arundinum*
Buffalo *Syncerus caffer*

Appendix 2 **Birds**

Status is shown in brackets:
PM = Palaearctic migrant;
AM = intra-African migrant;
R = resident (not excluding some local movements);
V = vagrant or irregular visitor;
R/M species normally resident in Malawi but shows regular seasonal movements on the Nyika.

Grebes *Podicipedidae*
Little Grebe *Tachybaptus ruficollis* (R)
Cormorants *Phalacrocoracidae*
Reed Cormorant *Phalacrocorax africanus* (V)
Darters *Anhingidae*
African Darter *Anhinga rufa* (V)
Pelicans *Pelecanidae*
White Pelican *Pelecanus onocrotalus* (V)
Herons and Egrets *Ardeidae*
Common Squacco Heron *Ardeola ralloides* (V)
Cattle Egret *Bubulcus ibis* (V)
Green-backed Heron *Butorides striata* (V)
Little Egret *Egretta garzetta* (V)
Yellow-billed Egret *Egretta intermedia* (V)
Great White Egret *Egretta alba* (V)
Purple Heron *Ardea purpurea* (V)
Grey Heron *Ardea cinerea* (V)
Black-headed Heron *Ardea melanocephala* (V/R)
Hamerkop *Scopidae*
Hamerkop *Scopus umbretta* (V/R?)
Storks *Ciconiidae*
Yellow-billed Stork *Mycteria ibis* (V)
Openbill Stork *Anastomus lamelligerus* (AM)
Black Stork *Ciconia nigra* (R?)
Abdim's Stork *Ciconia abdimii* (AM)
Woolly-necked Stork *Ciconia episcopus* (V)
White Stork *Ciconia ciconia* (PM)
Saddlebill *Ephippiorhynchus senegalensis* (V)
Marabou Stork *Leptoptilos crumeniferus* (V)
Ibises and Spoonbills *Plataleidae*
Sacred Ibis *Threskiornis aethiopicus* (V)
Glossy Ibis *Plegadis falcinellus* (V)
Hadada Ibis *Bostrychia hagedash* (V)
African Spoonbill *Platalea alba* (V)
Flamingos *Phoenicopteridae*
Greater Flamingo *Phoenicopterus roseus* (V)
Ducks and Geese *Anatidae*
Fulvous Tree Duck *Dendrocygna bicolor* (V)
Spur-winged Goose *Plectropterus gambensis* (V)
Knob-billed Duck *Sarkidiornis melanotos* (AM)
African Black Duck *Anas sparsa* (R)
Yellow-billed Duck *Anas undulata* (R)
Red-billed Teal *Anas erythrorhyncha* (V)
Hottentot Teal *Anas hottentota* (V)
Garganey *Anas querquedula* (PV)
Northern Shoveler *Anas clypeata* (PV)
Southern Pochard *Netta erythrophthalma* (V)
Maccoa Duck *Oxyura maccoa* (V)
Vultures, Harriers, Eagles, Hawks etc. *Accipitridae*
Honey Buzzard *Pernis apivorus* (PV)
Bat Hawk *Macheiramphus alcinus* (V)
Black-shouldered Kite *Elanus caeruleus* (R)
Eurasian Black Kite *Milvus milvus migrans* (PM)
Yellow-billed Kite *Milvus migrans parasitus* (AM)
African Fish Eagle *Haliaeetus vocifer* (V)
Palm-nut Vulture *Gypohierax angolensis* (V)
Hooded Vulture *Necrosyrtes monachus* (R)
White-backed Vulture *Gyps africanus* (R)
Lappet-faced Vulture *Torgos tracheliotus* (R)
White-headed Vulture *Trigonoceps occipitalis* (R)
Black-breasted Snake Eagle *Circaetus pectoralis* (R)
Brown Snake Eagle *Circaetus cinereus* (R)
Western Banded Snake Eagle *Circaetus cinerascens* (V)
Bateleur *Terathopius ecaudatus* (R)
Gymnogene *Polyboroides typus* (R)
Eurasian Marsh Harrier *Circus aeruginosus* (PM)
African Marsh Harrier *Circus ranivorus* (R?)
Pallid Harrier *Circus macrourus* (PM)
Montagu's Harrier *Circus pygargus* (PM)
Dark Chanting Goshawk *Melierax metabates* (R)
Black Goshawk *Accipiter melanoleucus* (R)
Red-breasted Sparrowhawk *Accipiter rufiventris* (R)
African Goshawk *Accipiter tachiro* (R)
Shikra *Accipiter badius* (V)
Lizard Buzzard *Kaupifalco monogrammicus* (R/M)
Common Buzzard *Buteo buteo* (PM)
Forest Buzzard *Buteo oreophilus* (R)
Augur Buzzard *Buteo augur* (R)
Wahlberg's Eagle *Aquila wahlbergi* (AM)
Lesser Spotted Eagle *Aquila pomarina* (PM)
Steppe Eagle *Aquila nipalensis* (PM)
Black Eagle *Aquila verreauxii* (V)
African Hawk Eagle *Hieraaetus spilogaster* (V)
Booted Eagle *Hieraaetus pennatus* (PM)
Ayres's Hawk Eagle *Hieraaetus ayresii* (R)
Long-crested Eagle *Lophaetus occipitalis* (R)
Crowned Eagle *Stephanoaetus coronatus* (R)
Martial Eagle *Polemaetus bellicosus* (R)
Osprey *Pandionidae*
Osprey *Pandion haliaetus* (PV)
Secretarybird *Sagattariidae*
Secretary Bird *Sagittarius serpentarius* (V)
Falcons and Kestrels *Falconidae*
Lesser Kestrel *Falco naumanni* (PM)
Rock Kestrel *Falco tinnunculus* (V?)
Dickinson's Kestrel *Falco dickinsoni* (V)
Western Red-footed Falcon *Falco vespertinus* (PV)
Eastern Red-footed Falcon *Falco amurensis* (PM)
Eurasian Hobby *Falco subbuteo* (PM)
Lanner Falcon *Falco biarmicus* (R)
Peregrine Falcon *Falco peregrinus* (R/PV)
Francolins and Quails *Phasianidae*
Coqui Francolin *Francolinus coqui* (R)
Shelley's Francolin *Francolinus shelleyi* (R)
Red-winged Francolin *Francolinus levaillantii* (R)
Hildebrandt's Francolin *Francolinus hildebrandti* (R)
Red-necked Francolin *Francolinus afer* (R)
Common Quail *Coturnix coturnix* (R)
Blue Quail *Coturnix chinensis* (V)
Guineafowls *Numididae*
Helmeted Guineafowl *Numida meleagris* (R)
Buttonquails *Turnicidae*
Kurrichane Buttonquail *Turnix sylvaticus* (R)
Rails, Crakes, Flufftails etc. *Rallidae*
Red-chested Flufftail *Sarothrura rufa* (R)
Red-tailed Flufftail *Sarothrura affinis* (R)
Corn Crake *Crex crex* (PM)
African Crake *Crecopsis egregia* (V)
Red-knobbed Coot *Fulica cristata* (R)
Cranes *Gruidae*
Wattled Crane *Grus carunculatus* (R)
Southern Crowned Crane *Balearica regulorum* (V)
Bustards and Korhaans *Otididae*
Black-bellied Bustard *Eupodotis melanogaster* (R)
Denham's Bustard *Neotis denhami* (R)
Stilts and Avocets *Recurvirostridae*
Black-winged Stilt *Himantopus himantopus* (V)
Dikkops *Burhinidae*
Spotted Dikkop *Burhinus capensis* (R)

Coursers and Pratincoles *Glareolidae*
Bronze-winged Courser
Rhinoptilus chalcopterus (V)
Temminck's Courser
Cursorius temminckii (R)
Common Pratincole *Glareola pratincola* (V)
Plovers *Charadriidae*
Ringed Plover *Charadrius hiaticula* (PV)
Three-banded Plover
Charadrius tricollaris (V)
Caspian Plover *Charadrius asiaticus* (PM)
Senegal Wattled Plover
Vanellus senegallus (V)
Sandpipers, Snipes, etc. *Scolopacidae*
Ethiopian Snipe *Gallinago nigripennis* (R)
Great Snipe *Gallinago media* (PM)
Marsh Sandpiper *Tringa stagnatilis* (PV)
Greenshank *Tringa nebularia* (PM)
Green Sandpiper *Tringa ochropus* (PM)
Wood Sandpiper *Tringa glareola* (PM)
Common Sandpiper *Actitis hypoleucos* (PM)
Sanderling *Calidris alba* (PV)
Little Stint *Calidris minuta* (PM)
Curlew Sandpiper *Calidris ferruginea* (PV)
Broad-billed Sandpiper
Limicola falcinellus (PV)
Ruff *Philomachus pugnax* (PV)
Gulls and Terns *Laridae*
Grey-headed Gull *Larus cirrocephalus* (V)
White-winged Black Tern
Chlidonias leucopterus (PV)
Pigeons and Doves *Columbidae*
Rameron Pigeon *Columba arquatrix* (AM)
Cinnamon Dove *Aplopelia larvata* (R)
Pink-breasted Turtle Dove
Streptopelia lugens (R)
Laughing Dove *Streptopelia senegalensis* (V)
Cape Turtle Dove
Streptopelia capicola (R/V)
Red-eyed Dove
Streptopelia semitorquata (R)
Emerald-spotted Wood Dove
Turtur chalcospilos (R)
Blue-spotted Wood Dove *Turtur afer* (R)
Tambourine Dove *Turtur tympanistria* (R)
Namaqua Dove *Oena capensis* (V)
African Green Pigeon *Treron calvus* (R/M)
Parrots and Lovebirds *Psittacidae*
Brown-necked (Cape) Parrot
Poicephalus robustus (R/M)
Meyer's Parrot *Poicephalus meyeri* (R)
Louries *Musophagidae*
Schalow's Turaco *Tauraco schalowi* (R)
Purple-crested Turaco
Tauraco porphyreolophus (R)
Cuckoos and Coucals *Cuculidae*
Great Spotted Cuckoo *Clamator glandarius* (V)
Jacobin Cuckoo *Clamator jacobinus* (AM)
Striped Crested Cuckoo
Clamator levaillantii (V)
Red-chested Cuckoo *Cuculus solitarius* (AM)
Black Cuckoo *Cuculus clamosus* (AM)
Eurasian Grey Cuckoo
Cuculus canorus (PM)
African Grey Cuckoo *Cuculus gularis* (AM)
Emerald Cuckoo
Chrysococcyx cupreus (AM)
Klaas's Cuckoo *Chrysococcyx klaas* (R/M)
Didric Cuckoo
Chrysococcyx caprius (V/AM)
African Black Coucal *Centropus grillii* (V)
Senegal Coucal *Centropus senegalensis* (R?)
White-browed Coucal
Centropus superciliosus (R)
Barn Owls *Tytonidae*
Grass Owl *Tyto capensis* (R)
Owls *Strigidae*
African Scops Owl *Otus senegalensis* (R)
White-faced Owl *Otus leucotis* (V)
Spotted Eagle Owl *Bubo africanus* (R)
Giant Eagle Owl *Bubo lacteus* (R)
Wood Owl *Strix woodfordii* (R)
Marsh Owl *Asio capensis* (R)

Nightjars *Caprimulgidae*
Eurasian Nightjar
Caprimulgus europaeus (PM)
Fiery-necked Nightjar
Caprimulgus pectoralis (R)
Mountain Nightjar
Caprimulgus poliocephalus (R)
Freckled Rock Nightjar
Caprimulgus tristigma (R)
Pennant-winged Nightjar
Macrodipteryx vexillarius (AM)
Swifts and Spinetails *Apodidae*
Scarce Swift
Schoutedenapus myoptilus (AM)
African Palm Swift *Cypsiurus parvus* (R/V)
Alpine Swift *Apus melba* (AM)
Mottled Swift *Apus aequatorialis* (R?)
Eurasian Swift *Apus apus* (PM)
African Black Swift *Apus barbatus* (R?)
Little Swift *Apus affinis* (V/R?)
African White-rumped Swift
Apus caffer (AM)
Mousebirds *Coliidae*
Speckled Mousebird *Colius striatus* (R)
Trogons *Trogonidae*
Narina's Trogon *Apaloderma narina* (R)
Bar-tailed Trogon *Apaloderma vittatum* (R)
Kingfishers *Halcyonidae*
Half-collared Kingfisher
Alcedo semitorquata (R)
Malachite Kingfisher *Alcedo cristata* (R)/V
Pygmy Kingfisher *Ceyx pictus* (AM)
Brown-hooded Kingfisher
Halcyon albiventris (R)
Chestnut-bellied Kingfisher
Halcyon leucocephala (AM/V)
Senegal Kingfisher
Halcyon senegalensis (AM/V)
Giant Kingfisher *Megaceryle maxima* (R/V)
Pied Kingfisher *Ceryle rudis* (R/V)
Bee-eaters *Meropidae*
Little Bee-eater *Merops pusillus* (R)
Swallow-tailed Bee-eater
Merops hirundineus (AM)
White-fronted Bee-eater
Merops bullockoides (V/R)
Madagascar Bee-eater
Merops superciliosus (AM)
Blue-cheeked Bee-eater
Merops persicus (PM)
Eurasian Bee-eater *Merops apiaster* (PM)
Southern Carmine Bee-eater
Merops nubicoides (V)
Rollers *Coraciidae*
Eurasian Roller *Coracias garrulus* (PM)
Lilac-breasted Roller
Coracias caudatus (R/V)
Broad-billed Roller
Eurystomus glaucurus (AM)
Woodhoopoes *Phoeniculidae*
Red-billed Wood Hoopoe
Phoeniculus purpureus (R)
Scimitarbill *Phoeniculus cyanomelas* (R)
Hoopoes *Upupidae*
Hoopoe *Upupa epops* (R)
Hornbills *Bucerotidae*
Crowned Hornbill
Tockus alboterminatus (R)
Pale-billed Hornbill *Tockus pallidirostris* (R)
African Grey Hornbill *Tockus nasutus* (R)
Trumpeter Hornbill
Bycanistes bucinator (R/M)
Silvery-cheeked Hornbill
Bycanistes brevis (V)
Southern Ground Hornbill
Bucorvus leadbeateri (R)
Barbets *Capitonidae*
Whyte's Barbet *Stactolaema whytii* (R)
Moustached Green Tinkerbird
Pogoniulus leucomystax (R)
Yellow-fronted Tinkerbird
Pogoniulus chrysoconus (R)
Golden-rumped Tinkerbird

Pogoniulus bilineatus (R)
Miombo Pied Barbet
Tricholaema frontata (R)
Black-collared Barbet *Lybius torquatus* (R)
Black-backed Barbet *Lybius minor* (R)
Crested Barbet *Trachyphonus vaillantii* (R)
Honeyguides *Indicatoridae*
Green-backed Honeyguide
Prodotiscus zambesiae (R)
Scaly-throated Honeyguide
Indicator variegatus (R)
Greater Honeyguide
Indicator indicator (R/V)
Lesser Honeyguide *Indicator minor* (R?)
Eastern Least Honeyguide
Indicator meliphilus (R)
Woodpeckers *Picidae*
Bennett's Woodpecker
Campethera bennettii (R)
Golden-tailed Woodpecker
Campethera abingoni (R)
Little Spotted Woodpecker
Campethera cailliautii (R)
Cardinal Woodpecker
Dendropicos fuscescens (R)
Bearded Woodpecker
Thripias namaquus (R)
Olive Woodpecker
Mesopicos griseocephalus (R)
Broadbills *Eurylamidae*
African Broadbill *Smithornis capensis* (R)
Pittas *Pittidae*
African Pitta *Pitta angolensis* (V)
Larks *Alaudidae*
Rufous-naped Lark *Mirafra africana* (R)
Flappet Lark *Mirafra rufocinnamomea* (R)
Red-capped Lark *Calandrella cinerea* (AM)
Martins and Swallows *Hirundinidae*
Black Saw-wing
Psalidoprocne pristoptera (AM/R)
White-headed Saw-wing
Pristoptera albiceps (AM)
Eurasian Sand Martin *Riparia riparia* (PM)
African Sand Martin *Riparia paludicola* (V)
Banded Martin *Riparia cincta* (AM)
Grey-rumped Swallow
Pseudhirundo griseopyga (AM)
Mosque Swallow *Hirundo senegalensis* (R)
Lesser Striped Swallow
Hirundo abyssinica (R)
Greater Striped Swallow
Hirundo cucullata (V)
Red-rumped Swallow *Hirundo daurica* (R)
African Rock Martin *Hirundo fuligula* (R)
Blue Swallow *Hirundoatrocaerulea* (AM)
Wire-tailed Swallow *Hirundo smithii* (R)
White-throated Swallow
Hirundo albigularis (V)
Eurasian (Barn) Swallow
Hirundo rustica (PM)
Angola Swallow *Hirundo angolensis* (AM)
Eurasian House Martin
Delichon urbicum (PM)
Wagtails, Pipits and Longclaws *Motacillidae*
Yellow Wagtail *Motacilla flava* (PM)
Long-tailed Wagtail *Motacilla clara* (R)
African Pied Wagtail *Motacilla aguimp* (R)
Richard's Pipit *Anthus richardi* (R)
Long-billed Pipit *Anthus similis* (R)
Buffy Pipit *Anthus vaalensis* (AM)
Tree Pipit *Anthus trivialis* (PM)
Cuckooshrikes *Campephagidae*
Black Cuckoo-shrike
Campephaga flava (AM)
White-breasted Cuckoo-shrike *Coracina pectoralis* (R)
Bulbuls *Pycnotidae*
Eastern Mountain Greenbul *Andropadus nigriceps* (R)
Stripe-cheeked Greenbul *Andropadus milanjensis* (R)
Little Greenbul *Andropadus virens* (R)
Yellow-bellied Bulbul
Chlorocichla flaviventris (R)
Terrestrial Bulbul
Phyllastrephus terrestris (R)
Grey-olive Bulbul
Phyllastrephus cerviniventris (R)
Yellow-streaked Bulbul
Phyllastrephus flavostriatus (R)
Black-eyed Bulbul *Pycnonotus barbatus* (R)
Chats, Robins, Thrushes, etc. *Turdidae*
Eurasian Rock Thrush
Monticola saxatilis (PM)
Miombo Rock Thrush
Monticola angolensis (R)
Olive Thrush *Turdus olivaceus* (R)
Kurrichane Thrush *Turdus libonyana* (R)
Groundscraper Thrush
Psophocichla litsitsirupa (R)
Orange Thrush *Zoothera gurneyi* (R)
White-chested Alethe *Alethe fuelleborni* (R)
Starred Robin *Pogonocichla stellata* (R/M)
Sharpe's Akalat *Sheppardia sharpei* (R)
Thrush Nightingale *Luscinia luscinia* (PM)
Olive-flanked Robin *Cossypha anomala* (R)
Cape Robin *Cossypha caffra* (R)
Heuglin's Robin *Cossypha heuglini* (R)
Red-capped Robin
Cossypha natalensis (R/AM?)
Central Bearded Scrub Robin
Erythropygia barbata (R)
White-browed Scrub Robin
Erythropygia leucophrys (R)
Stonechat *Saxicola torquatus* (R)
Whinchat *Saxicola rubetra* (PM)
Northern (Eurasian) Wheatear
Oenanthe oenanthe (PM)
Capped Wheatear *Oenanthe pileata* (AM)
Familiar Chat *Cercomela familiaris* (R)
Arnot's Chat *Myrmecocichla arnotti* (R)
Mocking Chat
Myrmecocichla cinnamomeiventris (R)
Warblers *Sylviidae*
Broad-tailed Warbler
Schoenicola platyurus (R)
Little Rush Warbler
Bradypterus baboecala (V)
Cinnamon Bracken Warbler
Bradypterus cinnamomeus (R)
Evergreen Forest Warbler
Bradypterus lopezi (R)
Sedge Warbler
Acrocephalus schoenobaenus (PM)
African Yellow Warbler
Chloropeta natalensis (R)
Mountain Yellow Warbler
Chloropeta similis (R)
Green-capped Eremomela
Eremomela scotops (R)
Yellow-bellied Eremomela
Eremomela icteropygialis (R)
Red-capped Crombec
Sylvietta ruficapilla (R)
Long-billed Crombec
Sylvietta rufescens (R/V)
Willow Warbler *Phylloscopus trochilus* (PM)
Yellow-throated Warbler
Phylloscopus ruficapilla (R)
Yellow-bellied Hyliota *Hyliota flavigaster* (R)
Garden Warbler *Sylvia borin* (PM)
Blackcap *Sylvia atricapilla* (PM)
Brown Parisoma *Sylvia lugens* (R)
Ayres's Cisticola *Cisticola ayresii* (R)
Croaking Cisticola *Cisticola natalensis* (R)
Wailing Cisticola *Cisticola lais* (R)
Churring Cisticola *Cisticola njombe* (R)
Short-winged Cisticola
Cisticola brachypterus (R)
Neddicky *Cisticola fulvicapilla* (R)
Rock Cisticola *Cisticola aberrans* (R)
Trilling Cisticola *Cisticola woosnami* (R)
Red-faced Cisticola *Cisticola erythrops* (R)
Singing Cisticola *Cisticola cantans* (R)
Black-lored Cisticola *Cisticola nigriloris* (R)
Tawny-flanked Prinia *Prinia subflava* (R)

Red-winged Warbler
Heliolais erythropterus (R)
Yellow-breasted Apalis *Apalis flavida* (R)
Bar-throated Apalis *Apalis thoracica* (R)
Grey Apalis *Apalis cinerea* (R)
Chestnut-headed Apalis *Apalis chapini* (R)
Bleating Bush Warbler
Camaroptera brachyura (R)
Miombo Barred Warbler
Camaroptera undosa (R)

Flycatchers *Muscicapidae*
Pallid Flycatcher *Bradornis pallidus* (R)
Slaty Flycatcher *Melaenornis chocolatinus* (R)
Southern Black Flycatcher
Melaenornis pammelaina (R)
Collared Flycatcher *Ficedula albicollis* (PM)
Spotted Flycatcher *Muscicapa striata* (PM)
Dusky Flycatcher *Muscicapa adusta* (R/M)
Ashy Flycatcher *Muscicapa caerulescens* (R)
Böhm's Flycatcher *Muscicapa boehmi* (R)
Lead-coloured Flycatcher
Myioparus plumbeus (R)
Cape Batis *Batis capensis* (R)
Chinspot Batis *Batis molitor* (R)
Black-throated Wattle-eye
Platysteira peltata (R)
White-tailed Blue Flycatcher
Elminia albicauda (R)
White-tailed Crested Flycatcher
Elminia albonotata (R)
African Paradise Flycatcher
Terpsiphone viridis (AM)

Ground Babblers *Pellorneidae*
Mountain Illadopsis
Illadopsis pyrrhoptera (R)

Babblers *Timaliidae*
African (Abyssinian) Hill Babbler
Pseudoalcippe abyssinica (R)
Arrow-marked Babbler
Turdoides jardineii (R)

Tits *Paridae*
White-winged Black Tit *Parus leucomelas* (R)
Miombo Grey Tit *Parus griseiventris* (R)
Rufous-bellied Tit *Parus rufiventris* (R)
Grey Penduline Tit *Anthoscopus caroli* (R)

Creepers *Salornithidae*
Spotted Creeper *Salpornis spilonotus* (R)

Sunbirds *Nectariniidae*
Red-and-blue Sunbird
Anthreptes anchietae (R)
Violet-backed Sunbird
Anthreptes longuemarei (R)
Collared Sunbird *Anthreptes collaris* (R)
Olive Sunbird *Nectarinia olivacea* (R)
Green-headed Sunbird
Nectarinia verticalis (R)
Black Sunbird *Nectarinia amethystina* (R)
Scarlet-chested Sunbird
Nectarinia senegalensis (R)
Yellow-bellied Sunbird *Nectarinia venusta* (R)
White-bellied Sunbird *Nectarinia talatala* (R)
Greater Double-collared Sunbird
Nectarinia afra (R)
Miombo Double-collared Sunbird
Nectarinia manoensis (R)
Eastern Double-collared Sunbird
Nectarinia mediocris (R)
Yellow-tufted Malachite Sunbird
Nectarinia famosa (R)
Scarlet-tufted Malachite Sunbird
Nectarinia johnstoni (R)
Bronze Sunbird *Nectarinia kilimensis* (R)

White-eyes *Zosteropidae*
Yellow White-eye *Zosterops senegalensis* (R)

Orioles *Oriolidae*
Eurasian Golden Oriole *Oriolus oriolus* (PM)
African Golden Oriole *Oriolus auratus* (R)
Eastern Black-headed Oriole
Oriolus larvatus (R/M)

Shrikes *Laniidae*
Sousa's Shrike *Lanius souzae* (R)
Red-backed Shrike *Lanius collurio* (PM)
Red-tailed Shrike *Lanius isabellinus* (PV)
Lesser Grey Shrike *Lanius minor* (PM)
Fiscal Shrike *Lanius collaris* (R)

Tchagras and Bush Shrikes *Malaconotidiae*
Brubru *Nilaus afer* (R)
Southern Puffback *Dryoscopus cubla* (R)
Marsh Tchagra *Tchagra minutus* (R)
Brown-headed Tchagra *Tchagra australis* (R)
Black-crowned Tchagra
Tchagra senegalus (R)
Tropical Boubou *Laniarius aethiopicus* (R)
Fülleborn's Black Boubou
Laniarius fuelleborni (R)
Orange-breasted Bush Shrike
Malaconotus sulfureopectus (R)
Many-coloured Bush Shrike
Malaconotus multicolor (R)
Grey-headed Bush Shrike
Malaconotus blanchoti (R)

Helmetshrikes *Prionopidae*
White Helmet Shrike *Prionops plumatus* (R)
Red-billed Helmet Shrike *Prionops retzii* (R)

Drongos *Dicruridae*
Fork-tailed Drongo *Dicrurus adsimilis* (R)

Crows *Corvidae*
Pied Crow *Corvus albus* (R)
White-necked Raven *Corvus albicollis* (R)

Starlings *Sturnidae*
Waller's Red-winged Starling
Onychognathus walleri (R)
African Red-winged Starling
Onychognathus morio (R)
Slender-billed Starling
Onychognathus tenuirostris (R)
Lesser Blue-eared Starling
Lamprotornis chloropterus (R)
Amethyst Starling
Cinnyricinclus leucogaster (AM)
Wattled Starling *Creatophora cinerea* (V)

Oxpeckers *Buphagidae*
Yellow-billed Oxpecker
Buphagus africanus (R?)

Weavers and Queleas *Ploceidae*
Northern Grey-headed Sparrow *Passer griseus* (R)
Yellow-throated Petronia
Petronia superciliaris (R)
Chestnut-mantled Sparrow-weaver
Plocepasser rufoscapulatus (V)
Baglafecht Weaver *Ploceus baglafecht* (R)
Bertram's Weaver *Ploceus bertrandi* (R)
Spectacled Weaver *Ploceus ocularis* (R)
Large Golden Weaver *Ploceus xanthops* (R)
Red-headed Weaver *Anaplectes melanotis* (R)
Red-billed Quelea *Quelea quelea* (V)
Black-winged Bishop *Euplectes hordeaceus* (R)
Yellow-rumped Bishop *Euplectes capensis* (R)

Whydahs and Widowfinches *Viduidae*
White-winged Whydah
Euplectes albonotatus (R)
Red-collared Whydah *Euplectes ardens* (R)
Mountain Marsh Whydah
Euplectes psammocromius (R)
Variable Indigobird *Vidua funerea* (R)
Pin-tailed Widow *Vidua macroura* (R?)

Pytilias, Waxbills, Mannikins, etc *Estrildidae*
Green-winged Pytilia *Pytilia melba* (R)
Orange-winged Pytilia *Pytilia afra* (R)
Red-faced Crimsonwing
Cryptospiza reichenovii (R)
Red-throated Twinspot
Hypargos niveoguttatus (R)
Green Twinspot *Mandingoa nitidula* (V/R)
Blue-billed Firefinch *Lagonosticta rubricata* (R)
Black-tailed Grey Waxbill *Estrilda perreini* (R)
Swee Waxbill *Estrilda melanotis* (R)
Common Waxbill *Estrilda astrild* (R)
Blue Waxbill *Uraeginthus angolensis* (R)
Zebra (Orange) Waxbill
Amandava subflava (R/V?)
Bronze Mannikin *Spermestes cucullata* (R)
Red-backed Mannikin *Spermestes bicolor* (R)

Buntings, Canaries and Seedeaters
Fringillidae

Cape Canary *Serinus canicollis* (R)
African Citril *Serinus citrinelloides* (R)
Yellow-eyed Canary *Serinus mozambicus* (R)
Bully Canary *Serinus sulphuratus* (R)
Black-eared Seedeater *Serinus mennelli* (R)
Stripe-breasted Seedeater *Serinus reichardi* (R)
Streaky Seedeater *Serinus striolatus* (R)
Oriole Finch *Linurgus olivaceus* (R)
Cinnamon-breasted Rock Bunting *Emberiza tahapisi* (AM)
Golden-breasted Bunting *Emberiza flaviventris* (R)
Cabanis's Bunting *Emberiza cabanisi* (R)

Below: Eastern Double-collared Sunbird *Nectarinia mediocris*

Right: Denham's Bustard *Neotis denhami* strutting its stuff

Appendix 3: **Orchids**

A full listing of all the plants, including orchids, which have been identified on the Nyika can be found at www.nyika-vwaza-trust.org. No common names available

Endemic to Nyika
Near-endemic to Nyika

Orchidaceae

Aerangis carnea
Aerangis montana
Aerangis somalensis
Aerangis verdickii
Angraecopsis malawiensis
Angraecopsis parva
Angraecum chamaeanthus
Angraecum sacciferum
Angraecum stolzii
Bolusiella iridifolia
Brachycorythis friesii.
Brachycorythis inhambanensis
Brachycorythis ovata subsp. welwitschii.
Brachycorythis pleisto phylla subsp. leipoldii
Brachycorythis pleisto phylla subsp. pleistophylla
Brachycorythis pubescens
Brachycorythis rhodos tachys
Brachycorythis tenuior
Brownleea parviflora
Bulbophyllum bavonis
Bulbophyllum cochleatum
Bulbophyllum elliotii
Bulbophyllum expallidum
Bulbophyllum josephi
Bulbophyllum maximum
Bulbophyllum rugosibulbum
Bulbophyllum sandersonii
Bulbophyllum stolzii
Calanthe sylvatica
Cardiochilos williamsoniib
Cynorkis anacamptoides var. anacamptoides
E *Cynorkis anacamptoides var. ecalcarata*
Cynorkis hanningtonii
Cynorkis kassneriana
Cyrtorchis arcuata subsp. whytei
Cyrtorchis crassifolia
Diaphananthe oxycentron
Diaphananthe pulchella
Diaphananthe xantho pollinia
Disa aconitoides subsp. concinna
Disa baurii
Disa caffras
Disa celata.
Disa engleriana.
Disa equestris
Disa erubescens subsp. carsonii
Disa erubescens var. erubescens
Disa hircicornis.
Disa longilabris.
Disa miniata.
Disa nyikensis
Disa ochrostachya
Disa ornithantha.
Disa perplexa
E *Disa praecox*
Disa robusta
Disa rungweensis
Disa satyriopsis
Disa saxicola
Disa ukingensis
Disa welwitschii subsp. occultans
Disa welwitschii subsp. welwitschii
Disa zombica
Disperis anthoceros.
Disperis aphylla subsp. bifolia.
E *Disperis bifida*
Disperis bifida x D. dicerochila [hybrid]
Disperis breviloba — endemic
Disperis dicerochila.
Disperis kilimanjarica
Disperis mac□owanii
Disperis nemorosa
Disperis parvifolia
Disperis reichenbachiana.
Disperis thomensis
Epipactis africana
Eulophia acutilabra
Eulophia arenicola.
Eulophia coeloglossa.
Eulophia cucullata
Eulophia euantha
Eulophia fridericii
Eulophia hians var. nutans
Eulophia horsfallii.
Eulophia milnei
Eulophia odontoglossa
Eulophia orthoplectra
Eulophia ovalis var. bainesii
Eulophia rara
Eulophia schweinfurthii
Eulophia seleensis
Eulophia streptopetala
Eulophia subsaprophytica
Eulophia thomsonii
Habenaria anaphysema
Habenaria arianae
Habenaria clavata
Habenaria cornuta.
Habenaria debeerstiana.
Habenaria diselloides.
Habenaria filicornis
Habenaria goetzeana
Habenaria gonatosiphon
Habenaria hirsutitrunci
Habenaria hologlossa.
Habenaria insolita
Habenaria kilimanjari.
Habenaria kyimbilae
Habenaria leucoceras.
Habenaria leucotricha var. leucotricha
Habenaria lithophila
E *Habenaria livingstoniana*
Habenaria macrura.
Habenaria mechowii.
Habenaria njamnjamica
N *Habenaria nyikensis*
Habenaria odorata
Habenaria papyracea.
Habenaria petitiana
N *Habenaria petraea*
Habenaria praestans var. praestans
N *Habenaria pubidens*
Habenaria retinervis
E *Habenaria riparia*
Habenaria schimperiana
Habenaria splendens
Habenaria stenorhynchos.
Habenaria tentaculigera
Habenaria tenuispica
Habenaria trachypetala.
Habenaria uhehensis
Habenaria unicicalcar
Habenaria verdickii
Habenaria welwitschii
Habenaria xanthochlora
Habenaria zambesina
Habeneria laurentii
Holothrix buchananii.
Holothrix longiflora
Holothrix nyasae
Holothrix papillosa
Holothrix pleistodactyla
Holothrix puberula
Holothrix tridactylites
Liparis bowkeri
Liparis mulindana
Liparis nervosa
Liparis nyikana
Liparis rungweensis
Malaxis katangensis
Microcoelia globulosa
Microcoelia stolzii
Mystacidium tanganyikense
Neobolusia stolzii var. stolzii
Nervilia ballii
Nervilia crociformis
Nervilia pectinata
Nervilia stolziana
Nervillia shirensis
Platycoryne crocea
Platycoryne protearum var. protearum
Polystachya brassii
Polystachya dendrobiiflora
Polystachya fusiformis
Polystachya goetzeana
Polystachya heckmanniana.
Polystachya holmesiana
Polystachya malilaensis
Polystachya modesta
Polystachya transvaalensis
Rangaeris muscicola
oeperocharis bennettiana
Roeperocharis wentzeliana
Satyrium amblyosaccos
Satyrium breve
Satyrium buchananii
Satyrium carsonii
Satyrium chlorocorys
Satyrium coriophoroides
Satyrium crassicaule
Satyrium kitimboense
Satyrium microcorys
Satyrium monadenum
Satyrium neglectum subsp. neglectum
Satyrium neglectum subsp. woodii
Satyrium orbiculare
Satyrium princeae
Satyrium rhynchantoides
Satyrium riparium
Satyrium sceptrum
Satyrium shirense
Satyrium sphaeranthum
Satyrium trinerve
Satyrium volkensii
Schizochilus sulphureus
Schwartzkopffia lastii
Stenoglottis zambesiaca
Stolzia compacta subsp. compacta — endemic
Stolzia repens var. repens
Stolzia williamsonii
Tridactyle anthomaniaca
Tridactyle citrina
Tridactyle inaequilonga
Tridactyle tricuspis

Appendix 4 **Butterflies**

No common names available
Endemic to Nyika

Superfamily Papilionoidea
Family *Papilionidae*
Papilio dardanus dardanus
Papilio demodocus grassland
apilio jacksoni nyika
Papilio mackinnoni theodori
Papilio nireus lyaeus
Papilio ophidicephalus mkuwadzi
Papilio pelodurus pelodurus
E *Papilio thuraui cyclopis*
Graphium angolanus angolanus
Family *Pieridae*
Colias electo hecate
Eurema brigitta brigitta
Eurema desjardinsi regularis Kasungu Mt.
Eurema hecabe setifera
Catopsilia florella
Nepheronia argia mhondana
Appias sabina phoebe
Belenois rubrosignata kongwana
Belenois thysa thysa
Belenois zochalia agrippinides
E *Mylothris crawshayi crawshayi*
Mylothris rueppellii rhodesiana
Mylothris sagala dentatus
Family *Nymphalidae*
Subfamily Danaidae
Danaus chrysippus aegyptius
Amauris albimaculata latifascia
Amauris echeria serica
Amauris ellioti junia
Subfamily Heliconiidae
Acraea aganice nicega
Acraea anacreon anacreon
Acraea ansorgei acuta
Acraea caecilia pudora
Acraea epaea melina
Acraea eponina
Acraea goetzei
Acraea insignis insignis
Acraea johnstoni johnstoni
Acraea periphanes
Acraea pharsalus pharsaloides
Acraea pudorella
Acraea scalivittata
Acraea ventura ventura
Subfamily Satyrinae
Aphysoneura pigmentaria latilimba
Bicyclus anynana anynana
Bicyclus campinus campinus
Bicyclus danckelmani
Bicyclus simulacris
Henotesia ubenica
Ypthimomorpha itonia
Neita extensa
Neocoenyra gregorii
Neocoenyra parallelopupillata
Subfamily Charaxinae
Charaxes achaemenes achaemenes
Charaxes acuminatus nyika
Charaxes ansorgei levicki
Charaxes aubyni australis
Charaxes baumanni whytei
Charaxes bohemani
Charaxes brutus natalensis
Charaxes canidope canidope
Charaxes dilutes dilutus
E *Charaxes dowsetti*
Charaxes druceanus proximans
Charaxes eupale
Charaxes guderianus guderianus
Charaxes macclounii
E *Charaxes nyikensis*
Charaxes pollux geminus
Charaxes varanes vologeses
Charaxes violetta violetta
Charaxes xiphares brevicaudatus
Subfamily Nymphalinae
Cymothoe cottrelli
Harma theobene blassi
Crenidomimas concordia
Bebearia mardania orientis
Euphaedra zaddachi
Hamanumida daedalus
Pseudargynnis hegemone
Pseudacraea deludens deludens
Pseudacraea lucretia expansa
Neptis incongrua incongrua
Neptis laeta
Neptis melicerta
Cyrestis camillus sublineata
Sevenia amulia rosa
Sevenia moranti moranti
Eurytela hyarbas lita
Junonia hierta cebrene
Junonia orithya orithya
Precis cuama
Precis octavia sesamus
Precis tugela aurorina
Vanessa cardui
Antanartia dimorphica dimorphica
Antanartia schaeneia dubia
Lachnoptera ayresi
Phalanta phalantha ethiopica
Issoria smaragdifera smaragdifera
Pardopsis punctatissima
Family *Lycaenidae*
E *Alaena sp. nov.*
E *Alaena sp. Nov.*
Spalgis lemolea
Aphnaeus erikssoni mashunae
Aphnaeus marshalli
Cigaritis homeyeri
Cigaritis mozambica
Cigaritis natalensi
Cigaritis victoriae
Lipaphneus aderna spindasoides
Axiocerses amanga
Axiocerses bambana
E *Axiocerses karinae*
Axiocerses punicea
Aloeides griseus
Iolaus (Argiolaus) lalos lalos
Iolaus (Argiolaus) silarus
Iolaus (Epamera) congdoni
E *Iolaus (Epamera) helenae [sp. nov. of Bampton]*
Iolaus (Epamera) nasisii
Iolaus (Epamera) sidus
Iolaus (Epamera) violacea
Iolaus (Philiolaus) stewarti
Iolaus (Philiolaus) pamae
Stugeta bowkeri nyasana
Hemiolaus caeculus caeculus
Hypolycaena auricostalis
Hypolycaena pachalica
Hypolycaena philippus
Pilodeudorix caerulea
Pilodeudorix camerona katanga
Pilodeudorix zeloides
Deudorix (Virachola) antalus
Deudorix (Virachola) caliginosa
Deudorix (Virachola) ecaudata
Deudorix lorisona coffea
Capysdis connexivus
Lycaena abbotti
Anthene definita definita
Anthene hobleyi
Anthene kersteni
Anthene lasti
Anthene ligures
Anthene liodes
Anthene rubricinctus anadema
Triclema nigeriae
Cupidopsis cissus
Cupidopsis jobates jobates
Pseudonacaduba sichela sichela
Lampides boeticus
Uranothauma antinorii felthami
Uranothauma cordatus
Uranothauma crawshayi
Uranothauma cuneatum
Uranothauma falkensteini
Uranothauma heritsia virgo
Uranothauma nubifer

Uranothauma poggei
Uranothauma vansomereni
Uranothauma williamsi
Cacyreus fracta
Cacyreus virilis
Harpendyreus juno
Harpendyreus hazelae
Harpendyreus marungensis marungensis
Leptotes jeanneli
Leptotes marginalis
Tuxentius ertli
Zizeeria knysna
Actizera stellata
Azanus mirza
Azanus moriqua
Azanus natalensis
Eicochrysops eicotrochilus
Eicochrysops messapus mahallakoena
Euchrysops unigemmata
Lepidochrysops barkeri
E *Lepidochrysops chalceus*
Lepidochrysops cupreus
Lepidochrysops dolorosa
E *Lepidochrysops intermedia cottrelli*
E *Lepidochrysops nyika*
Lepidochrysops pampolis

Superfamily Hesperioidea

Family *Hesperiidae*

Coeliades forestan
Celaenorrhinus galenus
Celaenorrhinus zanqua
Eagris sabadius ochreana
Calleagris hollandi
Calleagris jamesoni
Eretis djaelaelae
Eretis melania
Sarangesa lucidella
Abantis paradisea
Abantis zambisiaca
Spialia spio Zambian
Metisella decipiens
Metisella formosa formosa
E *Metisella medea nyika Kasungu Mt. (1890 m?)*
Metisella orientalis orientalis
E *Metisella perexcellens perexcellens*
Metisella quadrisignatus quadrisignatus
Ampittia capenas capenas
Kedestes barberae barberae
Kedestes brunneostriga
Kedestes wallengrenii fenestratus
Gorgyra bibulus
Gorgyra johnstoni
Parosmodes moranti moranti
Acleros mackenii
Semelea arela
Semelea pulvina
Chondrolepis telisignata
Artitropa milleri
Artitropa reducta
Platylesches langa
Platylesches picanini
Platylesches rasta rasta
Platylesches robustus robustus
Zenonia zeno
Borbo borbonica borbonica
Borbo fallax
Borbo gemella
Borbo micans
Borbo perobscura
Borbo sirena
Gegenes niso brevicorni

Appendix 5 **Fish**

Family *Salmonidae*

Rainbow Trout *Oncorhynchus mykiss*

Family *Mormyridae*

Nyika Stonebasher *Hippopotamyrus cf. ansorgii*

Family *Cyprinidae*

Dwarf Sanjika *Opsaridium tweddleorum*
Malawi Short-barbel Yellowfish *Labeobar bus johnstonii*
Nthuwa South Rukuru Yellowfish *Labeobarbus nthuwa*
Threespot Barb *'Barbus' trimaculatus*
Redspot Barb *'Barbus' kerstenii*
Linespot Barb *'Barbus' lineomaculatus*
(new species - small spotted) *'Barbus' sp.*
Straightfin Barb *'Barbus' paludinosus*
Seymour's Barb *'Barbus' seymouri*
Beira Barb *'Barbus' radiates*
Redeye Labeo *Labeo cylindricus*

Family *Mastacembelidae*

Malawi Spiny Eel *Mastacembelus shiranus*

Family *Amphilidae*

Mountain Catfish *Amphilius cf. uranoscopus*
Malawi Sand Catlet *Zaireichthys maravensis*
Monomotapa Sand Catlet *Zaireichthys monomotapa*

Family *Mochokidae*

Labeobarbus johnstonii
Suckermouth Catfish *Chiloglanis sp.*(new species)

Family *Clariidae*

Sharptooth Catfish *Clarias gariepinus*
Smoothhead Catfish *Clarias liocephalus*

Family *Cichlidae*

Eastern River Bream *Astatotilapia calliptera*
Southern Mouthbrooder *Pseudocrenilabrus philander*
Makumba *Oreochromis shiranus shiranus*

Appendix 6 **Amphibians**

Endemic to Nyika

Family *Pipidae*
Common Platanna or Clawed Frog
Xenopus laevi
Family *Bufonidae*
Guttural Toad *Amietophrynus gutturalis*
Flat-backed Toad
Amietophrynus maculatus
Black-chested Dwarf Toad
Mertensophryne taitana
E Nyika Dwarf Toad
Mertensophryne nyikae
Red Toad *Schismaderma carens*
Family *Pyxicephalidae*
Angolan River Frog *Amietia angolensis*
Highland River Frog
Amietia viridireticulata
Poroto Long-toed Frog
Strongylopus fuelleborni
Family *Ptychadenidae*
Sharp-snouted Grass Frog
Ptychadena oxyrhynchus
Striped Grass Frog
Ptychadaena porosissima
Udzungwe Grass Frog
Ptychadaena uzungwensis
Family *Phrynobatrachidae*
Snoring Puddle Frog
Phrynobatrachus natalensis
Mababe Puddle Frog
Phrynobatrachus mababiensis
Dwarf Puddle Frog
Phrynobatrachus parvulus
Ukinga Puddle Frog
Phrynobatrachus ukingensis
Family *Arthroleptidae*
Shovel-footed Squeaker
Arthroleptis stenodactylus
Plain Squeaker *Arthroleptis xenochirus*
Dwarf Squeaker
Arthroleptis xenodactyloides
Family *Hyperoliidae*
Long Reed Frog *Hyperolius nasutus*
Orange Sedge Frog *Hyperolius substriatus*
E Black-striped Sedge Frog
Hyperolius quinquevittatus mertensi
Variable Montane Sedge Frog
Hyperolius pictus
Margined Sedge Frog
Hyperolius marmoratus marginatus

Appendix 7 **Reptiles**

Endemic to Nyika

Family *Agamidae*
Branch's Tree Agama
Acanthocercus branchi
Eastern Spiny Agama *Agama armata*
Family *Chamaeleonidae*
Nchisi Pygmy Chameleon
Rhampholeon nchisiensis
Common Flap-necked Chameleon
Chamaeleo dilepis
Nyika Whistling Chameleon
Trioceros goetzei nyikae
Ukinga Hornless Chameleon
Trioceros incornutus
Family *Gekkonidae*
Angle-throated Dwarf Gecko
Lygodactylus angularis
Cape Dwarf Gecko *Lygodactylus capensis*
Tropical House Gecko
Hemidactylus mabouia
Family *Scincidae*
E Variable Skink *Trachylepis varia*
Ukinga Montane Skink *Trachylepis brauni*
Common Striped Skink *Trachylepis striata*
Wahlberg's Snake-eyed Skink
Afroablepharus wahlbergii
E Nyika Serpentiform Skink
Eumecia johnstoni
Family *Cordylidae*
Tropical Girdled Lizard
Cordylus tropidosternum
Nyika Girdled Lizard *Cordylus nyikae*
Zambian Snake Lizard
Chamaesaura miopropus
Family *Gerrhosauridae*
Yellow-throated Plated Lizard
Gerrhosaurus flavigularis
Family *Gerrhosauridae*
Yellow-throated Plated Lizard
Gerrhosaurus flavigularis
Family *Pythonidae*
Southern African Python
Python natalensis
Family *Viperidae*
Rhombic Night-Adder *Causus rhombeatus*
Snouted Night-Adder *Causus defilippii*
Puff-Adder *Bitis arietans*
Rungwe Sedge-Viper *Atheris rungweensis*
Family *Elapidae*
Black-necked Spitting Cobra
Naja (Afronaja) nigricollis
Family *Psammophiidae*
Rhamphiophis rostratus (Rufous Beaked Snake) *Psammophylax variabilis* (Variable Grass-Snake)
Psammophis phillipsii (Olive Whip Snake)
Family *Pseudoxyrhophiidae*
Subfamily Amplorhininae
Shire Slug-eater *Duberria shirana*
Family *Pseudaspididae*
Mole Snake *Pseudaspis cana*
Family *Lamprophiidae*
Cape Wolf Snake *Lycophidion capense*
Brown House Snake *Boaedon capensis*
Family *Natricidae*
Olive Marsh Snake *Natriciteres olivacea*
Family *Colubridae*
South-eastern Green Snake
Philothamnus hoplogaster
Angolan Green Snake
Philothamnus angolensis
Common Rhombic Egg-eater
Dasypeltis scabra
Common Boomslang *Dispholidus typus*

Overleaf: Walking in the uplands

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Sigrid Johnson with DNPW officers, Felix Panjani and Mike Siska, Nyika 2014
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Sigrid Johnson with Bear
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This book, "NYIKA", is a revised edition of "A Visitor's Guide to Nyika National Park", first published in Malawi in 1991 by the Mbadzi Book Trust.

This edition is published by the Nyika-Vwaza UK Trust (NVT). Established in 2004, the NVT is dedicated to using education and research to conserve the wildlife and habitats of northern Malawi, in particular in Nyika National Park and Vwaza Marsh Wildlife Reserve.

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Overleaf: Eland at sunset on the northern edge of the Nyika Plateau

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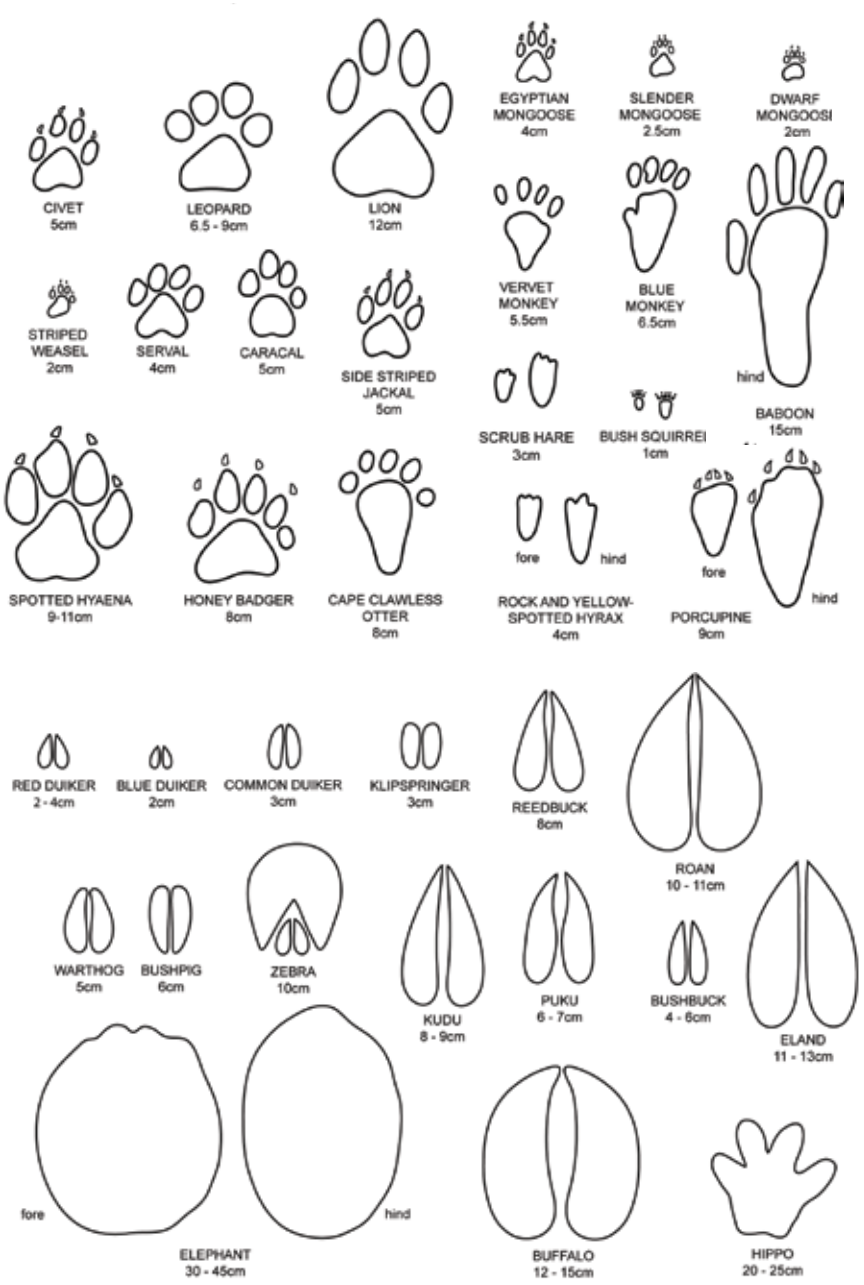
Road verges, firebreaks and other disturbed ground are brightened throughout the dry season with carpets of small blue *Lobelia trullifolia*

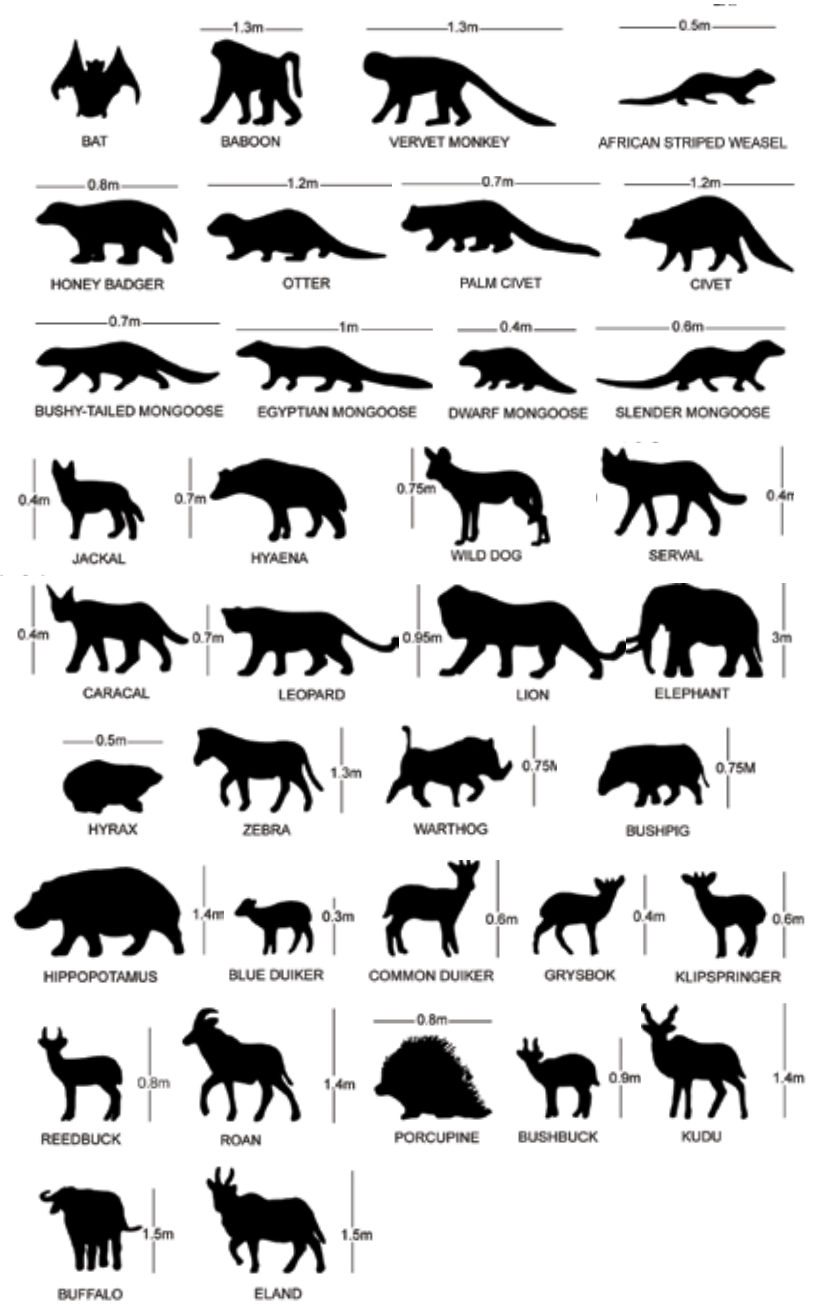
Animal tracks

Illustrations not to scale. The ruler below can be used to measure found tracks

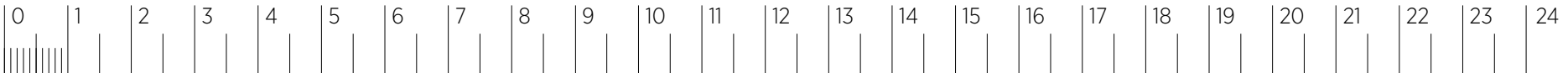


Animal silhouettes

Illustrations not to scale



Scale Centimetres



Nyika National Park coordinates

Thazima Gate	10°50'S 33°35'E
Kaperekezi Gate	10º53'S 33º66'E
Chelinda	10°35'S 33°48'E
Dam 2	10°35'S 33°48'E
Dam 3	10°36'S 33°48'E
Chisanga Falls	10°32'S 33°4'1E
Chosi Rock	10°37'S 33°4'6E
Chowo Forest (Zambia)	10°35'S 33°41'E
Chowo Rock (Zambia)	10°35'S 33°4'2E
Domwe	10°25'S 33°44'E
Fingira	10°47'S 33°46'E
Jalawe	10°21'S 33°47'E
Juniper Forest	10°45'S 33°53'E
Kasaramba	10°44'S 33°58'E
Lake Kaulime	10°34'S 33°45'E
Mpanda Mountain	10°12'S 33°48'E
Mwanda Peak (Zambia)	10°40'S 33°35'E
Nganda Peak	10°27'S 33°52'E
Vwaza Marsh Game Reserve	11°07'S 33°39'E
Zambian Rest House	10°34'S 33°42'E
Zovochipolo Forest	10°31'S 33°43'E
Zungwara	10°31'S 33°43'E

Knowledgeable Guides can be hired at the DNPW office at Chelinda or at the visitor accommodations, to assist visitors in seeing points of interest

Notes

Sigrid Anna Johnson

The author worked for the Malawi Department of National Parks and Wildlife from 1985-88, the first two years based at Chelinda in Nyika National Park, the last year based at Kasungu National Park. Prior to this assignment she worked with Parks Canada and the Canadian Wildlife Service. She joined the Canadian Foreign Service in 1990 and served as a diplomat for 23 years, including assignments to the Privy Council Office in Ottawa, and abroad in Europe, Africa and Washington (USA). From 2007-10 she was Canada's Ambassador to the Republic of the Congo and the Democratic Republic of the Congo. She received the Queen's Diamond Jubilee Award in 2013. She is married to Donald McMaster and they have three children, Alex, Andrew and Erica.

Nyika National Park

This park is one of Africa's most beautiful and important protected areas. The park has Stone Age rock paintings as well as Iron Age mines and kilns. It is home to more than 430 bird species, important populations of leopard, roan, eland, elephant and zebra and has the richest concentration of orchids in south-central Africa. The park is centred on the 2,600m high Nyika Plateau. Thus, the climate is temperate; temperatures rarely exceed 26°C, even during the warmest months from September to December.

This book is for environmental educators as well as for park visitors. It includes chapters on the history, ecology, climate, landscape, flora and fauna of Nyika National Park, as well as background on protected area conservation and management principles. Comprehensive lists of the mammals, birds, reptiles, amphibians, butterflies and orchids are included as appendices for readers with specific interests.

Sigrid Anna Johnson with DNPW Officers Felix Panjani and Mike Siska

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