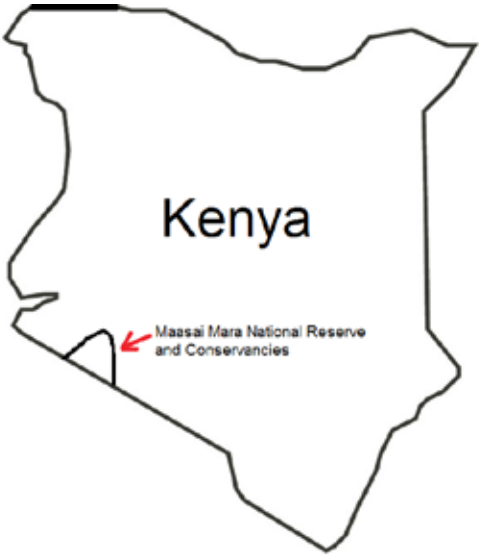
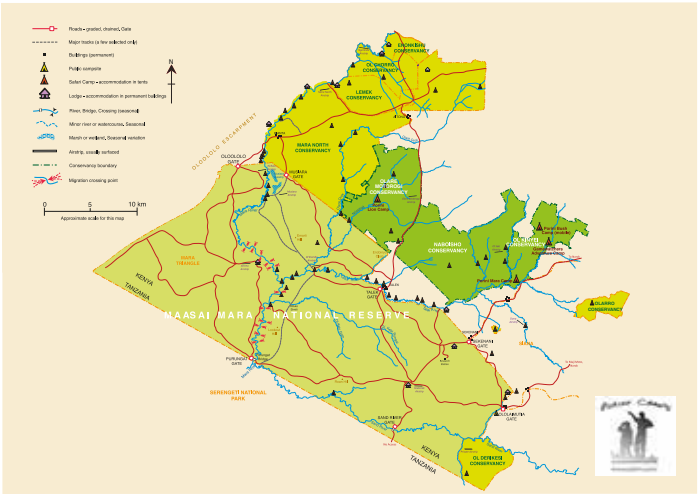


Male Boomslang
Dispholidus typus



or from

Stephen Spawls, 7 Crostwick Lane, Spixworth, Norwich NR10 3PE, U.K.; Email stevespawls@hotmail.com

Cover picture: Mara Black-necked Spitting Cobra by Anthony Childs

Designed by: Norfolk Educational Services, City College Norwich

A Guide to

Amphibians and Reptiles of the Maasai Mara Ecosystem

By
Stephen Spawls

Printed by
Norwich City College Print Room

Contents

Introduction

"The natural resources of this country – its wildlife which offers such an attraction to beautiful places...the mighty forests which guard the water catchment areas so vital to the survival of man and beast – are a priceless heritage for the future. The government of Kenya...pledges itself to conserve them for posterity with all the means at its disposal."

Mzee Jomo Kenyatta, First President of the Republic of Kenya
(inscription at the entrance of Nairobi National Park 1964)

As far as I am aware, this book is the first guide to the reptiles and amphibians of any large conservation area in Kenya. I hope there will be many more.

I thank Jake Grieves-Cook, of Gamewatchers Safaris, whose vision, enthusiasm and support has made it possible. We sincerely hope it will be useful to all whose work or pleasure takes them into the Maasai Mara, one of Africa's most spectacular and stunning wild places. I have tried to keep it as simple as possible, with Swahili and Maa (Maasai) names, where they exist.

The introductory section provides some basic information on the reptiles and amphibians of Kenya, conservation and techniques for working with these interesting creatures, including some aspects of safety and snakebite.

The rest of this book describes the amphibians and reptiles of the Maasai Mara ecosystem. We also include a listing of further resources, and contact details.

So use this book. Take it into the field, and identify reptiles and amphibians. Find out what's there. Spread your knowledge.

Copies of this book are available, free in some circumstances or for a nominal price, from Gamewatchers Safaris or from Stephen Spawls; details inside the front cover.

Foreword

By Jake Grieves-Cook, Chairman of Gamewatchers Safaris and Porini Camps

I am delighted that we have had the opportunity to sponsor the publication of this new guide to the amphibians and reptiles of the Maasai Mara by the well-known herpetologist, Stephen Spawls.

We hope that this guidebook will encourage greater appreciation of all that is to be found within the Mara. I believe it will provide useful new information for professional safari guides, lodge and camp staff, students with an interest in the natural world and its wildlife species, as well as for visitors coming to enjoy the experience that the Maasai Mara has to offer.

At Gamewatchers Safaris and Porini Camps we are committed to supporting the conservation of Kenya's remaining wildlife habitat and the incredible diversity of species found in places like the Mara. This field guide highlights some of the other living creatures that are present in the Mara ecosystem alongside the well-known mammals that are so often the main focus of attention.

Amphibians and reptiles are an important part of every ecosystem as they are part of the food chain and prey on insects and other animals which may be harmful to humans, while at the same time many are the vital prey species of larger vertebrates. They can be fascinating to observe and this guide will help us to identify them and learn more about them.

I would like to thank Stephen Spawls for his work in producing this Field Guide and making it possible for all who are interested in the Maasai Mara to have a valuable reference and source of information to increase their knowledge.

Why conservation and the conservancies are important

The natural world is under threat from the demands of an expanding population. But it is vitally important that we protect our wild places, for two reasons, economic and aesthetic. Economic arguments for conservation are straightforward; wild places provide income from visitors and employment to those who work in tourism. And at the most basic level, we need animals and plants because we eat them, and plants give us oxygen.

The aesthetic argument is equally important. We need wild places because they are good for our well-being, and spiritually restoring. A day in wild country is better than a day indoors. We owe it to our young people, and to future generations, to preserve the wilderness, so that they may benefit. And Kenya is unique in this respect. It is a stable, pleasant land, and a showcase – I am tempted to say the showcase – of African wildlife. Within half a day's drive of the capital city, there are more than 10 world class conservation areas. Visitors come from all over the world to see Kenya's wildlife. Despite the difficulties attached to a developing country, Kenya has managed to preserve and protect its wild places and their inhabitants. And, fascinatingly, in Kenya both the state and the private sector have combined in managing this priceless resource. Nowhere is this more obvious than in the Maasai Mara ecosystem, which itself is part of a larger ecosystem extending to the Serengeti. In the Mara the conservancies, efficiently run with the participation and approval of their Maasai owners, act as a crucial adjunct to the main reserve; protecting the integrity of a big ecosystem; with all its inhabitants. The results are obvious to all who visit; this is a still-functioning and healthy wilderness, where the visitor may gather something of the flavour of the original 'wild Africa'; and leave refreshed. It is all visible, from the plants, insects, reptiles and amphibians (the subjects of this book) to the birds, and the magnificent megafauna, the lions, hippos, giraffes and elephants, which form the highlight of most visits. Long may it continue.

People sometimes ask; 'what use are reptiles and amphibians?'. They are important in all natural ecosystems. Without them, the ecosystem becomes lop-sided. They are also of direct benefit to humanity. For example, frogs and lizards feed mostly on insects and are thus the farmers' friends. In Kenya, many reptiles are feared. But they are important in the big web of life. Many people fear snakes, a natural reaction. Some are dangerous. But snakes keep the rat population down and thus benefit humans. Those whose work takes them into remote areas of Kenya should get to know which snakes are dangerous and which are not, rather than indiscriminately killing all snakes. See and appreciate, live and let live.

Observing and Collecting reptiles and Amphibians: the Techniques

Watching wild reptiles and amphibians is enjoyable. It is also sometimes useful to collect reptiles and amphibians for research or photography, particularly in an area like the Mara; the reptile and amphibian faunas of this important area are poorly known. Little research has been done. If you do collect a specimen, please deposit it at the Herpetology Section of the National Museum in Nairobi (details in 'Further Resources' on page 35). You may well make an important discovery. But you are advised not to collect living snakes unless you are an expert.

Use your camera to photograph reptiles and amphibians. Get as close as is safely possible. Use flash if light is low. Make sure the animal's head is in focus. Activate the GPS system. Submit your photo to a suitable forum on the internet or to the herpetologists at the National Museum (details in 'Further Resources' on page 39).

Reptiles and amphibians are secretive. You are mostly likely to find them in the rainy season. Look carefully. You can look underneath objects like logs, rocks or vegetation heaps (but be careful where you put your fingers). Raking through leaf litter may reveal specimens. Reptiles and amphibians may hide in rock cracks or under bark. Rocky hills, termite mounds, tree trunks and water sources are often good places; a reptile may bask there in the sun. Sometimes a bird or a squirrel may lead you to a snake by its alarm calls. You can collect reptiles and amphibians at night, when many are active, but be very careful; at night you may meet security personnel, or big game, or may get lost. Take a powerful torch, wear strong closed shoes and long trousers. Some animals show up clearly in torchlight, for example chameleons and sleeping green snakes. Look in drains and ditches, and along walls, which may act as traps. Geckoes may be active around lamps, and frogs near dripping taps. At night, frogs are active around pools and other water sources (but beware of crocodiles). You can also find reptiles and amphibians by driving slowly at night on quiet tarred roads, but take great care; in Kenya night driving can be hazardous.

Useful equipment for the collector includes a hooked stick, a pair of tongs, cloth bags with drawstrings and some screw-topped plastic jars. A pair of gloves and a trowel may be useful. For collecting dangerous snakes, a grab stick ('snake tong') is essential; for spitting cobras safety goggles will be needed. A pair of binoculars may be useful.

Make use of local expertise; the people of the area often know where reptiles are living. You may reward them for showing you reptiles. But never allow anyone to catch a dangerous snake for you. Serious scientific collectors will need preservative and containers. Valuable specimens are often found dead. A 10% formalin solution or a 70% alcohol solution can be used to preserve specimens (although in an emergency you can use gin). Tie a label with the data (locality, date and collector's name) on your specimen. Deposit it at the National Museum in Nairobi.

1: Herpetologists collecting in the field

2: A selection of collecting equipment

3: Preserved specimens in the National Museum in Nairobi

4: Training session at Porini Lion Camp

Safety and Reptiles/Amphibians

In Kenya, a small number of snakes (about 20% of all species) are dangerous. The Nile Crocodile is also dangerous. No lizard or frog is dangerous, although remember that some large lizards can bite and scratch, and some frogs have toxic skin secretions.

In Kenya every year a number of people are killed by crocodiles. So they must be treated with respect. Do not swim or enter rivers or lakes, and always stay ten metres or more away from the edge of the water. Never go near open water at night.

Some snakes are dangerous; in the Maasai Mara the really dangerous snakes are the Black Mamba, Black-necked Spitting Cobra and Puff Adder; all have killed people. Some other venomous species in the area include the East African Garter Snake, Velvety-green Night Adder, Small-scaled Burrowing Asp and Boomslang; but the first three have never caused fatalities. The Boomslang (although it has a deadly venom) is totally unaggressive and unlikely to ever bite, unless restrained.

Snakes usually avoid confrontation. Most human snakebites result from someone either trying to kill the snake, or treading on it without seeing it. If you are careful, you are unlikely to be bitten. To avoid snakebite; always look where you are going. Never put your limbs or any other part of your body into places you cannot see. If you are moving through bush, tall grass or thick cover, look where you are putting your feet. Step onto rocks or logs, rather than over them. Be careful if cutting or moving vegetation. Always use a torch at night and shine it where you are going, even if you are only moving a short distance. Be very careful when moving equipment, in case a snake is hiding underneath. Never gather firewood at night. If possible wear strong shoes and long trousers. The most dangerous time is just after darkness, when night snakes have emerged and many snakebite accidents occur.

At home, do not sleep on the ground. Try to make sure that snakes cannot get into where you are sleeping. Close doors and block gaps under them. Zip your tent shut. Clear suitable hiding places for snakes around your home; cut vegetation short, block holes (especially squirrel warrens and termite hills). Be careful when moving firewood or piles of any material that has been lying on the ground.

If you find yourself close to a snake, stay calm and move backwards slowly. Don't try to hit it or threaten it. Snakes never make unprovoked attacks. They only bite in self-defence. Never tease or play with a snake, even a tiny one. Do not pick up a dead snake, it may not be dead and may bite. If you have to kill a snake, use something long like a stick, hosepipe, jembe, whip or a gun, or throw a rock. Do not play with the body, or allow anyone else to do so.

Snakebite

If someone is bitten by a snake, it must be treated as a medical emergency. It is most important that you abandon other plans and organise safe, rapid transport to a hospital. If someone has been bitten, find out if possible if they saw the snake, and what it looked like, as this may be useful for treatment. If the snake has been killed, take the body along in a hard, closed container. Scoop it in, don't handle the body. But if the snake has disappeared, don't waste time looking for it or try to kill it (two bites are worse than one). If the snake is visible, photograph it if possible (but don't get too close). Write down the details the victim tells you, in case they lose consciousness.

Some first aid may be helpful. However, do not start cutting around the bite, do not apply a tourniquet, don't pack the wound with ice, or give an electric shock with a stun gun or other improvised electrical device, don't rub anything into the bite puncture, do not visit a local healer, do not give alcohol or aspirin; all these may worsen the situation. What you can do is stay with the patient and calmly reassure them (most snakebite victims recover with little treatment). If the victim was bitten by a snake with a neurotoxin (nerve poison), for example a mamba, then it may be helpful to put on a pressure bandage; this is done by strapping a splint to the bitten limb, about as tightly as for a sprained ankle, to ensure the limb does not move. See the photograph. If the bite site is kept immobile, less venom will enter the bloodstream. When you arrive at hospital, stay with the patient and ensure the doctor knows that the victim has been bitten by a snake. For some snake bites, for example burrowing asps and night adders, antivenom is not useful and should not be used.

If someone has venom in their eyes from a spitting cobra, gently wash the eye out with large quantities of water, and keep doing so for 20 minutes. Milk can also be used. Let the victim hold the eye open under a gently running tap, or with their face in a large bowl of water. Then visit a hospital to check for damage to the cornea.

Left: an immobilised limb to reduce uptake of venom

The Maasai-Mara Ecosystem and its reptile and amphibian fauna

The Maasai Mara Reserve, the Mara conservancies, the Serengeti National Park and the Ngorongoro Conservation Area together form one of the most important protected areas in Africa. It is a huge, coherent and largely intact ecosystem, where massive concentrations and large-scale movements of game animals, in particular wildebeest and zebra, still occur much as they have done for thousands of years.

On the Kenyan side, the Mara area itself is characterised by an annual rainfall regime of 500 mm (eastern side) to 1000 mm (western side); most of this rain falls between December and May. The vegetation is savanna and grassland, with riverine woodland. The geology is largely ancient, well-weathered Precambrian crystalline rocks, over 2 billion years old, overlain in the northwest by Tertiary volcanic material deposited in the last 20 million years.
The landscape appears generally subdued, with low hills and a prominent 400 m escarpment to the northwest, following a fault line. Most of the Mara lies between 1 500 and 2000 m altitude. The reptile and amphibian fauna of this area is a typical mid-to-upland African savanna assemblage. Most reptiles and amphibians there are 'generalists', animals typical of African savannas as a whole, such as the Puff Adder, Egg-eating Snake, Nile Monitor and the Mascarene Rocket Frog. However, there are also a number of species associated with the savannas of southeastern Africa; animals such as the Leopard Tortoise, Southern African Rock Python and the Striped Skink.

Representatives of the 'Somali-Maasai' fauna, typical creatures of arid northeastern Africa, are also found here, for example the Short-necked Skink and the Eastern Small-scaled Burrowing Asp. There are also some near-endemic species with restricted ranges, only found in East Africa, for example the East African Garter Snake, the Blue-tailed Snake-eyed Skink and the Mwanza Flat-headed Agama.

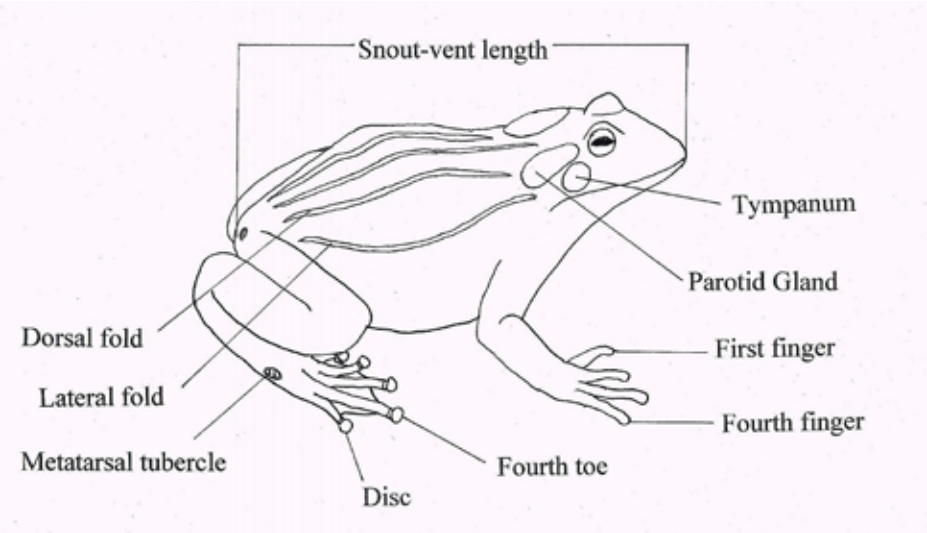
The Amphibians

Amphibians are vertebrates. The class Amphibia contains the newts and salamanders (none of which occur in tropical Africa), the frogs and the caecilians.

About 110 species of frog and six species of caecilian occur in Kenya. So far, sixteen species of amphibian are recorded from the Maasai Mara, but there are probably more. Amphibians do not have a waterproof skin, they are dependent upon water, they are not very large. Most have external fertilisation and no parental care.

They lay eggs which hatch into a larval stage a (tadpole) which breathes by gills and doesn't look like the adult. They are active at night. In the breeding season the males call to attract females.

Most East African frogs bury themselves during the dry season and emerge to breed during the rainy season, often in temporary pools. In general, female frogs are larger than the males, (up to twice the size); the maximum length given is for the female.



The names given here are as follows: English Name, Swahili Name (where known), Maa name (where known), scientific name. But remember that local names may vary.

Guttural Toad

Chura wa Shambani/Chura Matomvu (Sw) **Otuaa** (Maa)
Sclerophrys gutturalis

A big toad, up to 12 cm. Often has red patches behind the thighs. Widespread and common. It lives on the ground. It has a loud snore-like call.

If irritated, it secretes a toxic white fluid from the parotid glands. Breeds in permanent and large temporary pools.

Marbled Snout-burrower

Chura mwenye pua la kuchimba (Sw)
Hemisus marmoratus

A little frog with a pointed snout and a fold behind the eyes. Maximum size 60 mm. Mottled shades of brown above. It lives on the ground and in holes. The call is a long quiet buzz, like a cricket. Burrows into the ground nose-first, unusually. The females lay eggs in a burrow and stay with them.

Striped Leaf-folding Frog

Afrixalus quadrivittatus

A tiny striped frog with big eyes. Maximum size about 3 cm.

Sits on vegetation near water; hides between plant leaves and stem. The call is a series of clicks.

It lives and breed by pools (temporary and permanent) in the savanna.

Common Reed Frog

Chura miti wa kawaida (Sw)
Hyperolius viridiflavus

A very small frog with large eyes. Maximum size just over 3-4 cm. Sits on vegetation near water. The call is a series of distinctive clicks or chirps, usually made by the male sitting on a reed or grass stem, and audible over large distances. It lives and breeds by both temporary and permanent water sources. Able to change colour, from light to dark. Note: there are several 'forms' in this group, they may be separate species.

Senegal Kassina

Chura madoadoa (Sw)
Kassina senegalensis

A small frog, distinctly striped and spotted. Maximum size about 5 cm. It lives on the ground; often underground in termite hills. It can run and jump. The call is a distinctive 'quoip', like water drops falling into a bucket, audible over large distances. It lives and breeds by both temporary and permanent water sources.

Bocage's Ground Tree Frog

Leptopelis bocagei

A medium sized frog, reaching 6 cm. It lives on the ground but may climb. Buries itself in the dry season and secrets a cocoon around itself to prevent water loss.

The call is a slow 'kwaak'. Eggs laid in deep holes during rainstorms.

Banded Rubber Frog
Phrynomantis bifasciatus

A medium-size, distinctly marked frog, reaching 7 cm. It lives on the ground. It walks rather than jumps. Produces a very toxic skin secretion which can cause pain and neurotoxic reactions if it enters a cut. The call is an electronic-sounding long trill.

Northern Clawed Frog
Chura gando (Sw)
Xenopus borealis

A fairly big, flat frog, with claws on the toes, may reach 10 cm in length. An aquatic species, nearly always in water, It lives in slow streams and near-permanent pools. Calls under water.

Nutt's River Frog
Chura mto (Sw)
Amietia nutti

A big frog, (originally called Afrana angolensis), up to 11 cm; colour very variable. A powerful jumper. Usually near permanent rivers or streams, where it often sits on the banks at night. It has a double call; a series of clicks and then a croak. It breeds throughout the year.

Plimpton's Dainty Frog
Cacosternum plimptoni

A tiny frog, it can be green, brown or striped; the underside is spotted. Size 2.5 cm maximum. It breeds in temporary flooded depressions where there is grass. Its call is a rapid series of high-pitched clicks.

Eastern Groove-crowned Bullfrog
Hoplobatrachus occipitalis

A huge frog, up to 16 cm; the biggest frog in the Mara. Its eyes reflect red at night. Usually near permanent rivers, swamps or streams, where it floats on the surface at night. Surprisingly, it eats a range of prey, including other frogs and snakes, and when startled can jump across the water surface. It has a deep booming call. It breeds throughout the year.

Natal Puddle Frog
Chura ya kidimbwi (Sw)
Phrynobatrachus natalensis

A small frog, usually brown or grey, sometimes striped. Maximum size 4 cm. It breeds in streams and temporary flooded depressions. Sometimes very common. It calls by both day and night, the call sounds like a quiet snore.

Anchieta's Rocket Frog
Ptychadena anchietae

A medium-sized frog, usually brown or grey. A powerful jumper. Maximum size 7 cm. It inhabits savanna (including quite dry areas) and breeds in temporary pools. Widespread and often common, even around habitation. The call is often heard at night, it is a high-pitched trill.

Mascarene Rocket Frog
Chura kigongo (Sw)
Ptychadena mascareniensis

A medium-sized frog, variable in colour, often with a broad vertebral stripe. A powerful jumper. Maximum size 7 cm. It inhabits savanna, in rivers, streams and breeds in permanent and temporary pools. The call is a series of rapid clucks. Sometimes feeds on other frogs.

Cryptic Sand Frog
Chura mchanga (Sw)
Tomopterna cryptotis

A medium sized frog, very variable in colour, often with a fine vertebral stripe. Maximum length 6 cm. It lives on the ground. Usually found along watercourses, breeds in temporary pools. The call is a long series of short, high-pitched notes.

Peters' Foam-nest Tree Frog
Chiromantis petersii

A smallish frog, usually brown or white, it can change colour. Maximum size 6 cm. It It lives on trees and bushes in savanna (including quite dry areas) and can resist desiccation. Widespread. It makes a foamy white nest in deep holes and lays its eggs there. The call is a series of quiet, single creaks.

The Reptiles

Reptiles have a backbone; they are vertebrates. The class Reptilia includes the crocodiles, tortoises and turtles, lizards and snakes. Reptiles have a dry waterproof skin, usually covered in scales, and they are ectotherms, meaning they gain their body heat from outside. They have no fur or feathers, but they reproduce by internal fertilisation and most lay eggs; the hatchlings are identical to the adults. Most show no parental care. Just under 280 species of reptile are known from Kenya: 135 species of snake, 125 lizards, 17 turtles and tortoises and one species of crocodile. Kenya's reptiles range in size from the Nile Crocodile (5 m, 600 kg) and Rock Python (6 m, 100 kg) to tiny worm snakes less than 10 cm and geckoes less than 5cm long.

Some scientists regard birds as reptiles, since they have a common ancestor. Within the Mara, at present there are two species of turtle or tortoise, twenty-one species of lizard, one crocodile and twenty-five snake species, but these numbers are certain to increase as the area becomes better studied.

As above, the names given here are as follows: English Name, Swahili Name (where known), Maa name (where known), scientific name (in italics).
But remember that local names may vary and there is debate about what their status; for example some Maa speakers use the name Empurr for a gecko, others for a skink.

The following symbols are used for the dangerous snakes:

Venomous snakes whose bite can be fatal to humans

Venomous snakes whose bite is not known to be fatal

Leopard Tortoise
Mzee kobe (Sw)
Oloikuma (Maa)
Stigmochelys pardalis

A big tortoise, up to 50 cm in length (laarger elsewhere). Usually black and yellow. Active by day in savanna, especially in mornings during the rainy season. Lays up to 30 eggs.
It eats plants.

Helmeted Terrapin
Kasa (Sw)
Enkoikuma Enkare (Maa)
Pelomedusa subrufa

A small flat water tortoise, up to 30 cm in length. Usually dull brown, often green with algae. Active by day and night, It lives in temporary pools, Buries itself in the dry season, emerges in the wet. Basks in the sun. Lays up to 40 eggs. Carnivorous, It eats anything it can catch, including insects, frogs, and even birds. It will also take carrion.

East African House Gecko
Mjombakaka wa nyumba (Sw)
Olbaripo (Maa)
Hemidactylus angulatus

A fairly large gecko, up to 15 cm total length. Usually speckled brown. It lives in savanna, active at night, on the ground and on trees, rocks and buildings; hides during the day in rock cracks, under logs etc. Lays two hard-shelled eggs.
It eats insects.

Tropical House Gecko
Mjombakaka (Sw)
Hemidactylus mabouia

A fairly large gecko, up to 15 cm total length. Changes colour, may be brown, pink or white. It lives in savanna, active at night, very often in buildings but also on the ground, on trees and rocks. Hides during the day. Makes a clicking noise at night. Lays two hard-shelled eggs. It eats insects.

Nyika Gecko
Hemidactylus squamulatus

A medium-sized gecko, up to 9 cm total length. Colour variable, Mara specimens usually brown, speckled black, with white crossbars. It lives in rocky areas in savanna, hunts at night on the ground; under rocks during the day. Lays two hard-shelled eggs. It eats insects.

Chevron-throated Dwarf Gecko
Mjombakaka wa msitu (Sw)
Lygodactylus gutturalis

A small, diurnal gecko, up to 9 cm total length. Body streaked grey, with ocellate flank spots; yellow below, males have heavy black V-shapes on the chin. Active by day, usually in riverine woodland, on trees but sometimes on fences and buildings. Shelters in cracks at night. Lays two hard-shelled eggs.
It eats insects.

Short-necked Skink
Nanigwanzula kubwa (Sw)
Trachylepis brevicollis

A big diurnal skink, up to 32 cm total length. Males brown with black lines, females mottled. Active by day in savanna, often in termite hills but also on tree trunks or rock piles. Shelters in holes at night. Gives live birth to 2 or 3 babies, which are black with yellow spotting. It eats insects.

Zebra Skink
Nanigwanzula wa punda milia (Sw)
Trachylepis dichroma

A big diurnal skink, up to 38 cm total length. Males brown with a black throat and red flanks, females and juveniles striped. Active by day in savanna, often in termite hills but also on tree trunks or rock piles. Shelters in holes at night. Breeding details unknown.

Striped Skink
Nanigwanzula milia (Sw)
Empurr (Maa)
Trachylepis striata

A fairly big diurnal skink, up to 25 cm total length. Striped. Kenya's most common lizard. Active by day in savanna, on trees and rocks, but very quick to colonise buildings and other man-made structures. Shelters in holes at night. Gives live birth, up to nine babies. It eats insects.

Variable Skink
Trachylepis varia

A small diurnal skink, fast moving and secretive, up to 18 cm total length. Striped. Active by day in savanna, on the ground; hides in holes and under rocks. Gives live birth, 3 to 10 babies. It eats insects.

Peters' Writhing Skink
Mochlus afer

A medium-sized burrowing skink, up to 20 cm total length. Bronzy above with speckling; males have a yellow underside. Has tiny limbs, it looks like a snake. When held it writhes and jabs with its snout. Burrows underground, sometimes found on the surface at dusk. Lays 4 to 7 eggs. It eats insects.

Wahlberg's Snake Eyed Skink
Panaspis wahlbergi

A tiny slim burrowing skink, up to 14 cm total length. Shiny bronze above with a black flank stripe and blue-grey tail. Has no eyelids. It lives on the ground and in holes, shelters under rocks. Lays 2 to 6 eggs. It eats insects.

Blue-tailed Snake Eyed Skink
Panaspis megalura

A tiny slim burrowing skink, up to 17 cm total length, with tiny limbs and an extremely long tail. Shiny brown above with a yellow and black side stripe and the tail is bluish below. Has no eyelids. It lives on the ground and in holes, shelters under rocks. No breeding details known. It eats insects.

Western Serpentiform Skink
Mjusi bila miguu (Sw)
Eumecia anchietae

A big, slim skink, with minute limbs (it looks legless, like a snake) up to 55 cm total length. Active by day. Rufous, distinctly striped with broken black crossbars. It lives on the ground in savanna and grassland where it slides through vegetation. Gives live birth to up to 5 babies. It eats insects.

Jackson's Forest Lizard
Adolfus jacksoni

A small spotted forest lizard, active on trees. Maximum size 25 cm. Quite variable in colour; usually with a greenish vertebral stripe, flanks spotted. Lives on tree, usually on the trunk or branches above 2 m height, but sometimes lower down or on buildings. Usually in riverine woodland or thick stands of trees. Lays 3-5 eggs, eats insects.

Boulenger's Scrub Lizard
Mjusi pori (Sw)
Nucras boulengeri

A slim, fast-moving diurnal long-tailed lizard with a short head. Maximum 18 cm. A fine yellow vertebral stripe and lines of dots; the tail is uniform. Juveniles are striped black and yellow with a red tail. It lives on the ground in grassland and savanna, hides in holes and under rocks. Lays eggs. It eats insects.

Yellow-throated Plated Lizard
Ologilalem (Maa)
Gerrhosaurus flavigularis

A big, slim, fast-moving diurnal long-tailed lizard. Maximum size 40 cm. Brown with yellow or cream stripes. It lives on the ground in woodland and savanna, hides in holes and under rocks. Lays eggs.
It eats insects.

Flap-necked Chameleon
Kinyonga/lumbwi (Sw) **Tanki** (Maa)
Chamaeleo dilepis

A big diurnal chameleon, without horns, but with ear flaps. Maximum size about 40 cm. May be any shade of green, plain, spotted or barred. Goes black when angry. It lives in bushes and trees in the savanna. Sleeps at night on the outer branches of trees.
Lays up to 40 eggs.
It eats insects.

Blue-headed Tree Agama
Gonda/Balabala (Sw)
Olmukua (pus lukunya) (Maa)
Acanthocercus atricollis

A large fast moving diurnal agama, up to 37 cm long. The males have blue heads; the females are grey or brown. It lives on trees and bushes in the savanna, but may hunt on the ground (and even lives in holes on the ground). Lives in structured colonies with a dominant male. They have a powerful bite, but are harmless. Lay 4 to 15 eggs in a hole. It eats insects, especially ants.

Tropical Spiny Agama
Agama armata

A medium-sized, fast moving diurnal agama, up to 20 cm long. Both sexes are brown, rufous or grey. A solitary species (sometimes in pairs), living on open plains and hiding in holes. Lay 9-16 eggs in a hole. It eats insects, especially ants and grasshoppers.

Mwanza Flat-headed Agama
Mjusi kaffiri (Sw)
Olmukua (odo lukunya) (Maa)
Agama mwanzae

A large, flat-bodied fast moving diurnal agama, up to 32 cm long. The males have pink heads and blue bodies; the females are dull speckled brown. Lives on rocky hills, sheet rock and rock outcrops. Lives in structured colonies with a dominant male. Lay eggs in a rock crack. Usually it eats insects, especially ants, but may eat flowers.

Nile Monitor
Kenge (Sw)
Ormaima (Maa)
Varanus niloticus

A huge yellow and black lizard, up to 2.5 m long, the biggest lizard in the Mara (and in Africa). The Juveniles are green and yellow, adults darker. Active by day. It lives near water sources. On the ground, in trees and in the water, swims well. Can bite, claw and lash with its tail. Lays around 30 eggs. It eats any small animal it can catch, raids crocodile nests and steals the eggs.

Lineolate Blind Snake
Nyoka kipofu (Sw)
Enkolupa (Maa)
Afrotyphlops lineolatus

Harmless. A relatively large blind snake, up to 60 cm, usually 20-40 cm. Usually speckled grey or brown. Sometimes called a 'two-headed' snake, as its blunt tail looks like its head. Widespread in savanna and woodland. It lives underground, may emerge on wet nights. It eats invertebrates, usually termites. Lays eggs.

Nile Crocodile
Mamba (Sw) **Olkinos** (Maa)
Crocodylus niloticus

A big thickset crocodile, up to 5 m long, weight up to 700 kg. Usually brown or yellowish; juveniles more bright. They live in and beside water sources, although they will walk long distances across country at night. Basks in the sun. Lays around 30-50 eggs. Juveniles eat insects and amphibians, adults eat fish and game. Nile Crocodiles are dangerous and may attack people. You should never swim or wash in or near rivers with crocodiles.

Black-tipped Worm Snake
Nyoka minyoo (Sw)
Leptotyphlops nigroterminus

Harmless. A tiny slim little snake, usually 12-18 cm long. Looks black from a distance, close up it is speckled. The tail is blunt like the head. Widespread in savanna and woodland in the Mara and Serengeti. It lives underground, may emerge on wet nights; it can be found under stones. It eats invertebrates, usually termites. Lays eggs.

Brown House Snake
Nyoka wa nyumbani (Sw)
Boaedon fuliginosus

Harmless, although it bites readily. Length up to 1 m, although 50-80 cm more usual. Usually shades of brown with light stripes on the head. Widespread in savanna and woodland. Active at night on the ground; during the day hides in holes, under ground cover etc. Quite fast moving. One of Kenya's most common snakes, even near human habitation. It eats rodents and lizards. Lays 2-16 eggs.

Southern African Rock Python
Chatu (Sw) **Emeu** (Maa)
Python natalensis

Harmless. A huge snake, can be 5m long, although 2-4 m more usual. Beautifully mottled black, yellow, brown and grey, although big adults can look very dark. Widespread in savanna and woodland, often near water. Active by day and night, shelters in thickets in holes and among rocks; usually on the ground but may climb trees. Swims readily, and may spend the day in water. It eats mostly mammals, including rodents, monkeys and small antelope. Lays 30-50 eggs. Pythons can bite savagely and also constrict; so large ones need to be treated with care.

Cape Wolf Snake
Lycophidion capense

Harmless. Length up to 60 cm, although 20-40 cm more usual. Usually grey or brown, looks speckled. Widespread in savanna and woodland. Active at night on the ground, hides in holes and under cover by day. Slow moving and innocuous. It eats lizards, mostly skinks. Lays 3-8 eggs.

Slug-eating Snake
Duberria lutrix

Harmless. A small brown snake, length up to 45 cm, although 15-30 cm usual. Usually brown, with a fine vertebral stripe. Widespread in grassland and savanna. Active on the ground by day in the rainy season. Slow moving and gentle. It eats slugs and snails. Gives live birth to 5-12 babies.

Semi-ornate Snake
Meizodon semiornatus

Harmless. Length up to 80 cm, although 50-70 cm more usual. Usually grey or brown, juveniles have black half-bars; in Mara specimens the throat is often yellow. Rare, in savanna. Fast moving and active by day on the ground. It eats lizards, occasionally frogs. Lays 2-3 eggs.

Battersby's Green Snake
Nyoka kijani (Sw)
Olasurai Onyore (Maa)
Philothamnus battersbyi

Harmless. Length up to 90 cm, although 50-70 cm more usual. Vivid uniform green. Fairly common in savanna, usually near water sources. Fast moving and active by day, usually in reeds, bushes and small trees near water. May bask in the sun. When angry, inflates body exposing white spots. It eats frogs and small fish. Lays 3-11 eggs.

Spotted Bush Snake
Philothamnus semivariegatus

Harmless. Length up to 1.2 m, although 60-90 cm more usual. Vivid green with black bars. Fairly common in savanna, often in acacia trees. Very fast moving and active by day, at night sleeps in the branches. It eats arboreal lizards (geckoes and chameleons), sometimes frogs. Lays 3-12 eggs.

Jackson's Tree Snake
Nyoka nyeusi ya miti (Sw)
Thrasops jacksoni

Harmless. A big black tree snake, length up to 2.3 m, although 1-1.6 m more usual. Black, and smells of liquorice; juveniles are black, green, orange and yellow. In woodland along rivers. Fast moving and active by day, climbs high in trees. When angry, inflates throat. Almost identical to the black colour form of the boomslang (which is dangerous). It eats mammals, lizard, bats and birds. Lays 7-12 eggs.

Tiger Snake
Telescopus semiannulatus

Rear-fanged but harmless. An orange snake, length up to 90 cm although 50-80 cm more usual. Orange with black bands. It lives in savanna and woodland, slow-moving, active at night, on ground but may climb trees. Flattens head and strikes if molested; if handled bites slowly and deliberately. It eats mostly lizards, sometimes mammals. Lays 6-20 eggs.

White-lip
Crotaphopeltis hotamboeia

Rear-fanged but harmless. A small dark snake, length up to 80 cm although 40-70 cm more usual. Usually black or olive. Very common, It lives in savanna and woodland, often near water sources. Slow-moving, active at night, on ground. Flattens head, hisses loudly and strikes if molested, looking dangerous. It eats mostly frogs. Lays 6-19 eggs.

Boomslang
Ngole/moma (Sw) **Aragole** (Maa)
Dispholidus typus

Rear-fanged, highly venomous but non-aggressive. Length up to 1.8 m, although 1.2 to 1.5 m is more usual. Colour variable, may be green, green with black bars, brown or grey. It lives in savanna and woodland, very fast moving, active by day in trees. Inflates body if molested. It eats mostly chameleons, agamas and birds. The venom is slow-acting but causes internal haemorrhage. It lays 8-25 eggs.

Kenyan Striped Skaapsteker
Psammophylax multisquamis

Rear-fanged but harmless. Length up to 1.4 m but 70-90 cm more usual. Distinctly striped. It lives in savanna and woodland, active by day on the ground. Fast moving, may bask in a curious kinked fashion. It eats most small vertebrates. Lays 4-16 eggs; the female may coil around them.

Olive Sand Snake
Psammophis mossambicus

Rear-fanged but harmless. Length up to 1.7 m although 1 to 1.3 m more usual. Brown above, yellow below. . It lives in savanna and woodland. Very fast moving, active by day, on ground but may climb bushes. It eats mostly lizards but will take any small vertebrate. Lays 8-30 eggs.

Northern Stripe-bellied Sand Snake
Psammaophis sudanensis

Rear-fanged but harmless. Length up to 1.2 m although 70 cm to 1 m more usual. Brown above with yellow stripes, yellow and white with a black stripe below. Common in the Mara, in savanna and woodland. Very fast moving, active by day, on ground but may climb bushes. It eats mostly lizards but will take any small vertebrate.

Olive Marsh Snake
Natriciteres olivacea

Harmless. Length up to 45 cm, although 25 to 40 cm more usual. Usually brown or rufous with a green vertebral stripe; lips barred black. It lives in savanna, often near watercourses. Slow moving, usually active by day, sometimes at twilight, on ground It eats frogs and fish. Lays 4-11 eggs.

Common Egg-eating Snake
Dasypeltis scabra

Harmless, but looks dangerous, it has a dramatic threat display. Length up to 1 m, although 50-80 cm usual. Usually brown with rhombic markings Widespread in savanna and woodland. Active at night on the ground, but may climb trees; hides in holes and under cover by day. Slow moving and innocuous. It eats birds' eggs which it locates by smell. Lays 6-25 eggs.

Montane Egg-eating Snake
Dasypeltis atra

Harmless, but looks dangerous, it has a dramatic threat display. Length up to 1 m, although 50-80 cm usual. Usually brown with faint crossbars. Widespread in savanna and woodland. Active at night on the ground, but may climb trees; hides in holes and under cover by day. Slow moving and innocuous. It eats birds' eggs which it locates by smell. Lays 7-14 eggs.

Eastern Small-scaled Burrowing Asp *Atractaspis fallax*

A dangerous burrowing snake, venomous. Head short; tail also short. Length up to 1 m, although 40-70 cm more usual in western Kenya. Uniform black, grey or brown above. Rather rare, It lives in savanna. Usually underground but may emerge onto the ground on rainy season nights. Can move quickly for a burrowing snake. It eats snakes and lizards. Lays 3-8 eggs. Venom unlikely to be life-threatening (no antivenom is available) but causes pain and swelling. Not aggressive, only likely to bite if trodden on.

East African Garter Snake *Elapsoidea loveridgei*

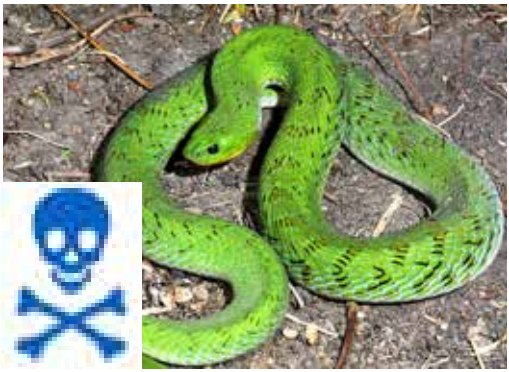
A mildly venomous snake. Head and tail short. Length up to 60 cm, although 30-50 cm more usual. Banded black and white, in adults the bands may fade. Hides in holes; may emerge on wet evenings and nights. It eats snakes, frogs and lizards. Lays eggs. Venom unlikely to be life-threatening (no antivenom is available) but causes local pain and swelling. Not aggressive, only likely to bite if trodden on.

Black-necked Spitting Cobra Swila (Sw) Olasurai Orok (Maa) *Naja nigricollis*

A dangerously venomous snake; it can bite and spit. Length up to 2.3 m, although 1.2-1.5 m more usual. Black or grey above, adults black below, juveniles banded black and reddish below. Active by day or night, when not active it lives in holes, termite hills etc. It eats frogs, snakes, lizards and small mammals. Lays 8-20 eggs. If encountered, it may spit venom, which can cause intense pain and damage if it enters the eyes; which should be gently washed out with large quantities of water. A bite from this snake causes pain, swelling and considerable local tissue damage and must be treated in hospital.

Black Mamba
Koboko (Sw) **Olasurai Ng'iro** (Maa)
Dendroaspis polylepis

Dangerously venomous. Length up to 3.2 m, although 1.8-2.5 m more usual. Thin, fast-moving and alert. Usually grey or olive above (not black), sometimes with yellow/ grey crossbars or dark speckling. Active by day on the ground, in trees or on rocks. When not active it lives in holes, tree cracks, termite hills etc., known to enter buildings. It eats mammals and birds. Lays 6-17 eggs. When angered it can spread a modified hood, hiss and demonstrate with open mouth. A bite from this snake is a medical emergency; it causes a rapid paralysis, victims must be rushed to hospital.



Puff Adder
Bafu/Moma/Bafwe (Sw)
Entara/ Enturububwa (Maa)
Bitis arietans

A dangerously venomous viper. Length up to 1.3 m in the Mara, although 70 cm to 1.2 m more usual, may get larger in eastern and northern Kenya. Usually grey, brown or yellow, with dark V-shapes. Active by night on the ground, hides under cover or in vegetation during the day Hisses loudly if molested. It eats most vertebrates, especially small mammals. Gives live birth, usually 20-40 babies. It can strike very quickly. Venom causes intense local pain, swelling, blistering, bleeding and tissue destruction. A bite needs rapid hospital treatment.

Velvety-green Night Adder
Enturububwa (Maa)
Causus resimus

A mildly venomous viper. Length up to 70 cm, although 30-60 cm more usual. Green, juveniles often have black markings and a V-shape on the head. Active by day and night on the ground, hides under cover. Often hisses and puffs loudly if molested. It eats frogs. Lays eggs. Venom cause local pain and swelling. No antivenom is available.

Some species that might be found in the Maasai Mara but are as yet unrecorded

Red-backed Toad
Schismaderma carens

Flat-backed Toad
Sclerophrys maculatus

Garman's Toad
Sclerophrys garmani

Sharp-nosed Reed Frog
Hyperolius acuticeps

Golden-backed Frog
Amnirana galamensis

Coast Puddle Frog
Phrynobatrachus acridoides

Sharp-nosed Rocket Frog
Ptychadena oxyrhynchus

Lake Victoria Clawed Frog
Xenopus victorianus

Speke's Hinged Tortoise
Kinixys spekii

William's Hinged Terrapin
Pelusios williamsi

Long-tailed Skink
Trachylepis megalura

Side-striped Chameleon
Trioceros bitaeniatus

Speke's Sand Lizard
Heliobolus spekii

Kakamega Agama
Agama kaimosae

Chanler's File Snake
Gonionotophis chanleri

Jackson's Centipede-eater
Aparallactus jacksoni

Rufous Beaked-snake
Rhamphiophis rostratus

Miombo Shovel-snout
Prosymna ambigua

Egyptian Cobra
Naja haje

Forest Cobra
Naja melanoleuca

Jameson's Mamba
Dendroaspis jamesoni

Rhombic Night Adder
Causus rhombeatus

Gaboon Viper
Bitis gabonica

Green Bush Viper
Atheris squamigera

Acknowledgments

First and foremost, I should like to thank Jake Grieves-Cook and his team at Gamewatchers Safaris, who vision and sponsorship has made it possible. My thanks are also due to the teams within the Mara, at Porini Mara and Porini Lion Camps, for their enthusiastic field assistance; without which I would not have been able to photograph a number of animals illustrated here; in particular I thank Patrick Wachira and Jimmy Lemara, the managers; Jimmy pulled me out of the swamp! I also thank Jake, and Ben Leroy, for field assistance.

I would also like to express my gratitude to my colleagues at City College for their support; in particular Jon Holland in the Print Shop, for his kindly expertise, my managers, Jerry White and Corienne Peasgood, for their enthusiastic support; and my fellow lecturers Janet Cross and Ian Cummings for their stimulating repartee. My thanks are due to my fellow herpetologists who offered expertise and advice; in particular Alan Channing, Victor Wasonga, Patrick Malonza, Bill Branch, Asuka Takita and Bob Drewes. In Kenya, I thank Zarek Cockar for his knowledge and photographs of the Mara frogs, and Conrad and Linda Thorpe for their hospitality. I also wish to thank those skilled photographers who allowed me to use their superb images; namely Bill Branch, Femke Broekhuis, Anthony Childs, Zarek Cockar, James Culverwell, Max Dehling, Bob Drewes, Jake Grieves-Cook, Harald Hinkel, Daniel Hollands, Johan Marais, Jesse Mathews, Michele Menegon, Steve Russell, Vicki Scott-Kennedy, Roberto Sindaco, Louisa Spawls and Philipp Wagner. And finally my dear wife, Laura, for her forbearance, kindly advice and support, my sons Timothy and Jonathan, and my nephew Daniel Hollands, for field assistance.

Photo Credits: All pictures by Stephen Spawls except: Bill Branch (Zebra Skink, male Peters' Writhing Skink, Boulenger's Scrub Lizard, Lineolate Blind Snake, Black-tipped Worm Snake, Slug-eating Snake, Long-tailed Skink, Miombo Shovel-snout); Anthony Childs (Semi-ornate Snake, East African Garter Snake, Black-necked Spitting Cobra, Jackson's Centipede-eater); Zarek Cockar (Marbled Snout Burrower, Plimpton's Dainty Frog), James Culverwell (Herpetologists in field), Max Dehling (Olive Marsh Snake); Bob Drewes (Coast Puddle Frog, Bocage's Ground Tree Frog, Banded Rubber Frog); Jake Grieves-Cook (author, author training), Harald Hinkel (Jackson's Tree Snake, Spotted Bush Snake head, Chanler's File Snake); Daniel Hollands (male Blue-headed Tree Agama, Montane Egg-eater); Johan Marais (Black Mamba); Jesse Mathews (juvenile East African Garter Snake), Michele Menegon (Bocage's Ground Tree Frog, Semi-ornate Snake, Brown Boomslang, Nile Crocodile, Eastern Small-scaled Burrowing Asp); Steve Russell (Nile Monitor); Roberto Sindaco (Nutt's River frog), Vicki Scott Kennedy (Spotted Bush Snake) Louisa Spawls (Kakamega Agama); Philipp Wagner (Western Serpentiform Skink)

Further Resources

On the Internet:

The Kenya Reptile Atlas (www.kenyareptileatlas.com)

Facebook forum; East African Snakes and other reptiles, at https://www.facebook.com/groups/662521540444058/

Inaturalist project on the Herpetofauna of the Eastern Afromontane at http://www.inaturalist.org/projects/eastern-afromontane-herpetofauna

Books:

A Field Guide to East African Reptiles: Stephen Spawls, Kim Howell, Harald Hinkel and Michele Menegon. Bloomsbury Publishers: 2017: ISBN: 9781472935618

A Pocket Guide to the Reptiles and Amphibians of East Africa. Spawls, Howell and Drewes. Bloomsbury Publishers: ISBN 9780713674255

A Photographic Guide to the Snakes, Other Reptiles and Amphibians of East Africa. Bill Branch. Struik Publishers: ISBN 9781775841654

Amphibians of East Africa: Alan Channing and Kim Howell. Chimaira Publishers: ISBN 3930612534

Museums and Institutes:

In Kenya contact the Herpetology Section at the National Museum in Nairobi, on Museum Hill, Nairobi Tel:+254-20-8164134/35/36 +254 20 3742131/4

Bio-Ken Snake Farm; Watamu, Kenya. Will help in a snakebite emergency: contact emergency phone 254 718 290324.

Juvenile Blue-headed Tree Agama

East African Garter Snake

Brown Boomslang

Mwanza Flat-headed Agama

Puff Adder

The author (right) with Johnmark Kisemie (left) and a Mara python

Male Mwanza Agama

Baby Leopard Tortoise

As far as we are aware, this compact guide is the first book to comprehensively cover the reptiles and amphibians of any major conservation area within Kenya. The high quality photographs and succinct text should aid the rapid identification of any amphibians or reptile within the Maasai Mara ecosystem. We have provided both Swahili and Maa names, where known, to assist local naturalists. This book should be useful to students, medical personnel, naturalists, guides, conservationists and all whose work and pleasure takes them into this magnificent protected area.

Stephen Spawls was born in London in 1953 but in 1957 he went to live in Kenya. He lived there 17 years, in Meru and Nairobi, where he attended St Mary's School. Herpetology is his major hobby and he has published a number of scientific papers and seven books, including a Field Guide to East Africa's reptiles and a comprehensive guide to Kenya's natural history. He has lived and worked in Ghana, Egypt, Botswana and Ethiopia; spending nearly 40 years in Africa. He now lectures in science and mathematics at City College, Norwich, and returns to Kenya whenever he can.

The printing and publication of this guide was sponsored by Gamewatchers Safaris Ltd of Nairobi, Kenya, which owns and manages the Porini Safari Camps in the Ol Kinyei Conservancy and Olare Motorogi Conservancy in the Mara ecosystem, in Selenkay Conservancy in Amboseli and Ol Pejeta Conservancy in Laikipia. For more information on the services of Gamewatchers Safaris and Porini Camps, see the website at www.porini.com or contact them by e-mail at info@porini.com. The printing costs were subsidised by the kindly administrators of City College Norwich; where Jon Holland and his team kindly gave freely of their expertise.

Price: 300/- Kenya Shillings; where sold.