

EXECUTIVE SUMMARY

There are 85 species of amphibians recorded in Zambia. The species belong to one order Anura, 13 families and 25 genera. There are 2 endemic species of amphibians recorded in Zambia. These are the Barotse Shovel-snout Frog *Hemissus barotseensis* and the Kafue Reed Frog *Hyperolius pyrrhodictyon*. One species of amphibian the Nyika Dwarf Toad *Mertensophryne nyikae* is rare and restricted to the Nyika Plateau. Eighty species (94%) of amphibians are of least conservation concern. The rare Nyika Dwarf Toad is near threatened while 3 species are data deficient. The data deficient species are the Urungu Toad *Sclerophrys urunguensis*, the endemic Barotse Shovel-snout Frog and De Witte's Shovel-snout Frog *Hemissus wittei*. One species, *Hyperolius dartevelliei* has not yet been evaluated against the IUCN criteria. Five families of amphibians are of social and cultural importance. These are Pyxicephalidae, Dicroglossidae and Ranidae which are used as food because of their large size and absence of poison glands. Two families are used in medicine/pharmaceutical industry and these are Pipidae used in the production of antibiotics and Bufonidae which is used in the production of poisons. Amphibians are used widely in education and research especially in biological dissections. The families Bufonidae and Pipidae are traded internationally for education and research. Amphibians are popular pets especially those with striking patterns and colours and are traded internationally in the pet trade. In terms of ecosystem function, amphibians are important prey species for many predatory species such as snakes, wetlands bird populations, aquatic mammals and fish populations. As predatory species, they are useful in regulating insect populations. They are also important bio-indicators of aquatic ecosystem health. Centres of amphibian species richness in Zambia are the Evergreen forest at the source of the Zambezi River in Ikelenge District, Kalabo and Lukulu Districts in Western Province, Mweru-wa-ntipa in Kaputa District and the southern tip of Lake Tanganyika in Mpulungu District. In the 1998 country wide study on biodiversity, there were 67 species of amphibians recorded as occurring in Zambia. Ten species from this list are excluded from this study list based on current herpetological knowledge. An additional 28 species have been included in the country species list of amphibians with this study.

There are 193 species of reptiles in Zambia belonging to 2 orders, 21 families and 86 genera. The order Squamata (scaled reptiles) constitutes 95.9% (185 species) of the reptilian species richness while the remaining 8 species belong to the order Testudines (Tortoises and turtles). Snakes are the dominant group among the reptiles with 53.9% of species followed by lizards

with 41.4%. There are 3 endemic species of reptiles recorded in Zambia. These are the Kafue Round-snouted Worm Lizard *Zygaspis kafuensis*, Kataba Legless Skink *Acontias schmitzi* and Branch's Tree Agama *Acanthocercus branchi*. There are 5 species with restricted distribution and these are the Zambian Whip Snake *Psammodromus zambiensis*, Barotse Water Snake *Crotaphopeltis barotseensis*, Worm Lizard *Dalophia ellenbergeri*, Legless Skink *Acontias jappi* and Goetze's Chameleon *Trioceros goetzei nyikae*. Over 80.8% (156 species) of reptiles have not yet been evaluated against the IUCN criteria while 33 species (17.1%) are of least conservation concern. One species, the African Slender-snouted Crocodile *Mecistops cataphractus* is critically endangered. The Pancake Tortoise *Malacochersus tornieri* is vulnerable, the Zambezi Soft-shelled Turtle *Cycloderma frenatum* is near threatened while the endemic Kafue Round-snouted Worm Lizard is data deficient. Reptiles are a source of food, traded as pets, and are valuable in tourism and hunting. Snakes being carnivorous are important predators that regulate populations of rodents, frogs, toads and lizards in terrestrial ecosystems. Crocodiles are top predators in aquatic ecosystems where they control mammalian, bird and fish populations. Testudines and the family Varanidae (monitor lizards) are important sources of food while the skins of the families Pythonidae, Crocodylidae, Varanidae, Elapidae and Viperidae are used in cultural dress. The fat of Pythonidae is used in traditional medicine while Elapidae and Viperidae are used for production of anti venom. Families used in the pet trade include Pythonidae, Crocodylidae, Viperidae and Varanidae and the order Testudines. Centres of snake species richness include Kalabo District, the southern end of South Luangwa National Park and the middle Zambezi Valley. For non snake reptiles, the centres of species richness are the Luangwa Valley and middle Zambezi Valley with Sesheke District having the highest species richness of non snakes species. The 1998 country wide study on biodiversity recorded 150 species of reptiles. Twenty four species from the old list have been excluded from the country list based on the current herpetological knowledge. Of the 24 excluded species, 21 species have no confirmed occurrence records in Zambia whereas 3 species were synonyms of species already included in the country list. An additional 67 species of reptiles have been included in the country species list.

There are 760 species of birds occurring naturally in Zambia belonging to 25 orders, 81 families and 311 genera. The Common Ostrich *Struthio camelus* is extinct in the wild but has been re-introduced in private game ranches under domestication. Of the 760 species, 724 are native to Zambia while 30 species are vagrant. There are 4 species whose present origins in the country are uncertain while 2 species, the Common Pigeon *Columba livia* and House Sparrow *Passer*

domesticus are introduced species that have successfully established themselves in the wild. The Order Passeriformes is the largest order constituting 49.5% of the overall avian species richness. Of the 760 species, 95% (720) are of least conservation concern while 2 species the White-chested Tinkerbird *Pogoniulus makawai* and Grimwood's Longclaw *Macronyx grimwoodi* are data deficient. There are 38 threatened species of birds of which one is critically endangered, the White-winged Flufftail *Sarothrura ayresi*. Five species are endangered and these are the Madagascar Squacco Heron *Ardeola idae*, African White-backed Vulture *Gyps africanus*, Rupell's Vulture *Gyps ruepellii*, Hooded Vulture *Neocrocytes monachus* and Southern Crowned Crane *Balearica regulorum*. Fifteen species are vulnerable while 17 species are near threatened. There is one endemic bird species the Zambian Barbet *Lybius chaplini* which is currently threatened and falls under the vulnerable category. The Black-cheeked Lovebird *Agapornis nigrigens* is near endemic. There are 2 rare bird species, the White-chested Tinkerbird *Pogoniulus makawai*, a relict species restricted to the Evergreen forest in North Western Zambia and the Shoebill *Balaeniceps rex*, a vulnerable species restricted to the Bangweulu swamps. Birds are important as a source of protein and are important for the economy through revenue earned from game viewing and hunting. They play critical functions in ecosystems as predators, prey species, pollinators and seed dispersers among other functions. They are also good indicators of habitat change in ecosystems. In terms of health, they play a role in the transmission of zoonotic diseases. The centres of species richness for wetland birds are the Kafue Flats, Liuwa Plains National Park, Barotse Floodplains, Busanga Swamps, Lukanga Swamps, Bangweulu Swamps, Kafue National Park, South Luangwa National Park and Mweru-wa-ntipa National Park. For birds of prey, the centres of species richness are the Kafue Flats, Kafue National Park, South Luangwa National Park, North Luangwa National Park and the Bangweulu Swamps. For woodland birds, the centres of species richness are Kafue National Park, South Luangwa National Park, North Luangwa National Park and the source of the Zambezi River in Ikelenge District. The 1998 country study on biodiversity recorded 733 species of birds as occurring in Zambia. From this list, 37 species have been excluded from the current list based on the current ornithological knowledge. An additional 64 species were added to the current species list.

There are 243 species of mammals in Zambia with confirmed records. Two species are non native. The introduced species are the House Mouse *Mus musculus* and the Black Rat *Rattus rattus*. The 243 species belong to 13 orders, 40 families and 131 genera. The largest mammalian order is Rodentia (Rodents) followed by Chiroptera (Bats). Of the 243 species, 84% are of least

concern, 6% are data deficient and 4% have not been evaluated against the IUCN criteria. There are 21 threatened mammal species in Zambia of which 1 species the Black Rhino *Diceros bicornis* is critically endangered. Three species are endangered and these are Ansell's Shrew *Crocidura ansellorum*, African Wild Dog *Lycaon pictus* and Uzungwe Vlei Rat *Otomys uzungwensis*. Eight species are vulnerable and 9 species are near threatened. There are 10 endemic species of mammals in Zambia. All the endemic species are either threatened or have not yet been evaluated against the IUCN criteria. There are 6 species of mammals with restricted distribution. All the rare species have not been evaluated against the IUCN criteria. Mammals are important for the economy through revenue earned from game viewing and game hunting. Mammals also play important roles in ecosystem function and structure. Top predators in terrestrial systems are mostly mammals and mammalian herbivores are keystone species which influence the primary productivity of terrestrial ecosystems as well as plant species richness and diversity. In terms of human health, they are important because of the role they play in the transmission of wildlife zoonotic diseases. The centres of species richness for mammals are found in the Evergreen Forest in Ikelenge District, Kabompo and Zambezi Districts in North-western Province, Kafue National Park, Kafue Flats around Blue Lagoon and Lochinvar National Parks, and the Southern part of South Luangwa National Park. In the 1998 country wide study on biodiversity, 224 species of mammals were recorded as occurring in the country. From this list, 16 species have been excluded from the current list based on the current knowledge on mammalian biosystematics. An additional 35 species have been included in the current country species list.

The centres of high endemism in Zambia include the Kafue Flats from Namwala to Blue Lagoon and Lochinvar National Parks, Ikelenge District, Mulobezi, and the Nyika Plateau. The Kafue Flats has 5 endemic species and these are Kafue Round-snouted Worm Lizard *Zygaspis kafuensis*, Chaplin's Barbet *Lybius chaplini*, Black-cheeked Lovebird *Agapornis nigrigens*, Kafue Mole Rat *Fukomys kafuensis* and Kafue Lechwe *Kobus leche kafuensis*. Ikelenge District has 3 endemic small mammal species and these are Ansell's Shrew *Crocidura ansellorum*, Sakeji Horseshoe Bat *Rhinolophus sakejiensis* and Monard's Dormouse *Graphiurus monardi*. Mulobezi also has 3 endemic species and these are the Kafue Reed Frog *Hyperolius pyrrhodictyon*, Chaplin's Barbet *Lybius chaplini*, and Black-cheeked Lovebird *Agapornis nigrigens*. The Nyika Plateau has 3 species with restricted distribution not found anywhere else in the country. These species are Nyika Dwarf Toad, *Mertensophryne nyikae*,

Goetze's Chameleon *Trioceros goetzei nyikae* and Black and Red Bush Squirrel *Paraxerus lucifer*.

The weaknesses and gaps that were found in the existing data and knowledge on biodiversity in Zambia are:

- (i) The baseline data on which the species lists of the country were compiled are based on old surveys with some species having old names with no current equivalents. There have been a lot of changes in species nomenclature and classification since the species lists were compiled and some of these new changes have not been incorporated in the available country species lists. The baseline data for the country has species which have been excluded from the country species list by world renowned organizations like IUCN after extensive research by experts in biosystematics. Some species in the baseline data were wrongly identified or assigned to the wrong taxa making some past records unreliable.
- (ii) Past biodiversity surveys were restricted to or concentrated in areas of interest by particular collectors/researchers. Certain areas have been surveyed more than others due to accessibility issues or because they were within the vicinity of the collectors/researchers. This results in skewed species richness data as such areas give the impression that they are areas of high species diversity than the less surveyed areas.
- (iii) Lack of systematic repeated collections from the same area has resulted in some species only having few voucher specimens and once these are damaged or lost then there is nothing to verify with or confirm the occurrence of the species. The once-off surveys raise a lot of questions about the authenticity of occurrence data of some species when questions arise regarding the mis-identification of certain species.
- (iv) There is no standardized database of specimen collections in Zambian Museums. The records are not readily available unless one goes to Livingstone physically. The database at the museum does not have degree data of longitude and latitude for some specimens. Many specimens collected in Zambia are located in foreign museum where they cannot be easily accessed by local investigators or researchers.
- (v) There is generally lack of distribution data for many species. Distribution data for many species is recorded by province without specifying habitat restrictions. Data on populations or abundance data is also non-existent for many species especially for reptiles and amphibians therefore it is difficult to assess the threat levels to species.

In order to address the weaknesses and gaps in the existing data, the following need to be undertaken:

1. The systematic establishment of sites country wide where standardized methodologies of data collection, storage, analyses and database management will be used to collect data on biodiversity, population sizes and structure in the different groups repeatedly. Such data will allow comparative studies on species richness, species diversity and population dynamics and other studies to be done over the short term and long term.
2. Training of manpower to carry out biodiversity surveys as well as museum staff to preserve and store specimens. Before such sites are set up country wide, there is need to equip the manpower with the necessary tools and knowledge in taxonomy, specimen collection, storage and database management. This will make it easier for anyone who requires information on biodiversity in the country to have access to it.
3. Funding to carry out biodiversity surveys should be availed to the relevant government institutions and research institutions by the Government. Over reliance on foreign funding should be minimised.
4. The less known or studied groups of animals such as amphibians, reptiles, fossorial and small mammals as well as data deficient species, threatened species, endemic and rare species should be prioritised in any biodiversity inventorying and monitoring programme.