HERPETOFAUNA OF THE CUBANGO-OKOVANGO RIVER CATCHMENT

A report on a rapid biodiversity survey conducted in May 2012

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BAYWORLD

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Contents

1. BACKGROUND

The herpetofauna of Angola remains one of the most poorly documented on the African continent. The only synthesis dates from the 19th Century (Bocage 1895) and this is now very out-of-date. Due to the protracted civil war, modern biodiversity surveys in the country are just beginning, (e.g. Huntley 2009 & 2011) and large areas of the country have never been scientifically surveyed. Most previous reports on the country's herpetofauna have been restricted to the western or southern regions, e.g. Boulenger (1905), Monard (1931, 1937), Schmidt (1933), Parker (1936), Mertens (1938), Bogert (1940), Hellmich (1957a,b), FitzSimons (1959), Branch & McCartney (1992) and Poynton & Haacke (1993). An exception to the regional neglect of the herpetofauna of northeast Angola is a series of reports in by Laurent (1950, 1954, & 1964), based on collections in the Museo du Dundo. No formal surveys had been undertaken to the Cubango-Okovango river catchments, except of some random collections reported by Bocage (1889), Monrad (1930, 1937), Laurent (1964) and Branch & McCartney (1992).

Reptiles and amphibians are declining globally because of habitat loss and degradation, alien invasive species, environmental pollution, disease, unsustainable use and global climate change (Gibbons et al. 2000). It has also been shown that management actions within protected areas could affect herpetofaunal ecology (Measey et al. 2009, Russel et al. 1999). The recording of baseline biodiversity information on these groups is thus a critical component of conservation management of protected areas. This data assists in informed decision support, measurement of conservation management effectiveness, and forms baselines for measurement of the effect of global climate change (Kessler et al. 2011).

2. STUDY AREA

The geographical scope of the survey is defined by the watershed of the Cubango-Okavango basin. The area consists out of two main rivers systems: the Cubango and the Cuito rivers, both draining eastward into the Okavango Delta. The Cubango River and its tributaries lay to the west of the basin and are underlain by granite outcrops and characterised by a series of rapids and some waterfalls in places. The Cuito River and its tributaries to the eastern side of the basin are characterised by Kalahari sands and large slow flowing rivers which act as a 'sponge' slowly releasing water into the system. The eastern topography is very flat with isolated higher grounds to the north. The vegetation is open woodland savannah. The soil is extremely sandy, with no stones or rocky outcrops.

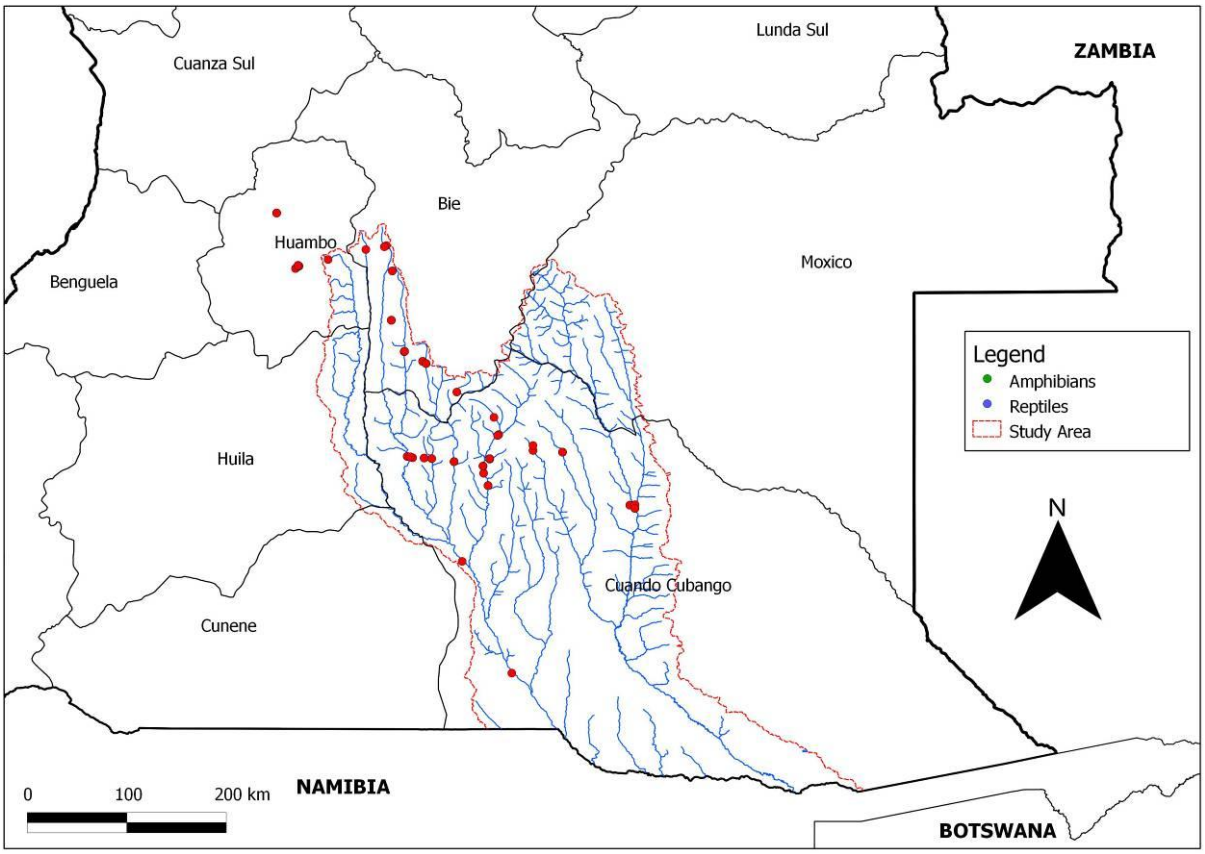

Figure 1. Sampling sites during May 2012 survey.

3. METHODS

The current herpetological survey was undertaken by Werner Conradie, based at Port Elizabeth Museum (Bayworld), South Africa. Opportunistic specimens were also collected by other members of the survey, particularly during the fish surveys (Roger Bills and Paul Skelton). Due to the dry, relatively cool evening conditions and lack of reptile movement no traplines were employed and most collections were done by active searching. Amphibian call surveys were done using a Nagra ARES-ML digital recording device and a Sony F-V4T Microphone. The following literature was consulted to compile historical records for the study area: Monrad (1937), Laurent (1964), Poynton & Haacke (1993), and Branch & McCartney (1998). Collections of specimens have been deposited in Port Elizabeth Museum (South Africa) and South African Aquatic Biodiversity Institute (South Africa) and a representative collection will be returned to Angola.

4. AMPHIBIAN AND REPTILE SPECIES LISTS

The following are updated species lists for amphibians and reptiles based on historical records as well as data from the new survey within the boundaries of the Cubango-Okavango Angola river basin. The IUCN- Redlist Categories are: NE = Not evaluated, DD = Data deficient and LC = Least concern. Type of sample: V = Voucher, A = Auditory, T = Tadpole, O = Observation, L = Literature record.

AMPHIBIANS

ARTHROLEPTIDAE					
Leptopelis	*anchietae*	Anchieta's Tree Frog*	T	LC	Monrad 1937
BREVICIPTIDAE					
Breviceps	*adspersus*	Common Rain Frog	L	LC	Monrad 1937
BUFONIDAE					
Amietophrynus	*funereus*	Angola Toad	L	LC	Monrad 1937
Amietophrynus	*gutturalis*	Guttural Toad*	V	LC	
Amietophrynus	*lemairii*	Lemaire's Toad*	V, T	LC	
Amietophrynus	*maculatus*	Flat-backed Toad*	V	LC	
HYPEROLIIDAE					
Hyperolius	*angolensis* complex	Angolan Read Frog*	V, A, T, L	LC	Ahl 1931; Monrad 1937; Poynton & Haacke 1993
Hyperolius	*benguellensis*	Benguella Reed Frog*	V, A, T, L	LC	Monrad 1937
Hyperolius	*nasutus*	Sharp-nosed Reed Frog*	V, A, T, L	LC	Monrad 1937
Hyperolius	*seabrai*	Quilombo Reed Frog	L	**DD**	Monrad 1937
Hyperolius	*cinereus*	Ashy Reed Frog*	V, A, T	**DD**	
Kassina	*kuvangensis*	Kuvangu Kassina*	T, L	LC	Monrad 1933, 1937
Kassina	*senegalensis*	Bubbling Kassina*	T	LC	
HEMISOTIDAE					
Hemisus	*marmoratus*	Mottled Shovel-nosed Frog	L	LC	Monard 1937
PHRYNOBATRACHIDAE					
Phrynobatrachus	*mababiensis*	Dwarf Puddle Frog*	V, T	LC	
Phrynobatrachus	*natalensis*	Snoring Puddle Frog*	V, T, L	LC	Monrad 1937
PTYCHADENIDAE					
Hildebrandtia	*ornatissima*	Angola Ornate Frog	L	DD	Monrad 1937
Ptychadena	*bunoderma*	Rough Grass Frog	L	LC	Monrad 1937
Ptychadena	*mascareniensis*	Mascarene grass Frog*	V, L	LC	Monrad 1937
Ptychadena	*keilingi*	Dala Grass Frog	L	LC	Monrad 1937
Ptychadena	*oxyrhynchus*	Sharp-nosed Grass Frog*	V, A, T, L	LC	Monrad 1937
Ptychadena	*subpunctata*	Speckled-bellied Grass Frog*	V, A, T	LC	
Ptychadena	*uzungwensis*	Udzungwa Grass Frog	L	LC	Laurent 1964
Ptychadena	*taenioscelis*	Dwarf Grass Frog*	V, A, T	LC	
PIPIDAE					
Xenopus	*petersi*	Peter's Clawed Frog*	V, T, L	LC	Monrad 1937
PYXICEPHALIDAE					
Amietia	*angolensis*	Common River Frog*	V, A, T, L	LC	Monrad 1937
Tomopterna	*tubercolosa*	Beaded Sand Frog*	V, T, L	LC	Monrad 1937
RANIDAE					
Hylarana	*darlingi*	Golden-backed Toad*	T, L	LC	Monrad 1937

** sampled during this survey* Total = 28 (20*)

REPTILES

ORDER: SQUAMATA

COLUBRIDAE

Crotaphopeltis	*hotamboeia*	White-lipped Herald Snake*	V, L	NE	Monard 1937; Branch & McCartney 1992
Dasypeltis	*scabra scabra*	Common Egg Eater	L	NE	Monard 1937
Dipsadoboa	*shervei shervei*	Sherve's Tree Snake	L	NE	Loveridge 1932
Dispholidus	*typus punctatus*	Boomslang	L	NE	Monard 1937; Bocage 1895; Branch & McCartney 1992
Limnophis	*bicolour*	Bicolored Swamp Snake	L	NE	Monard 1937
Philothamnus	*semivariegatus*	Spotted Bush Snake	L	NE	Monard 1937
Philothamnus	*heterolepidotus*	Slender Green Snake	L	NE	Monard 1937
Philothamnus	*irregularis*	Northern Green Bush Snake	L	NE	Monard 1937
Philothamnus	*ornatus*	Ornate Green Snake *	V	NE	
Thelotornis	*capensis oatsei*	Western Vine Snake	L	NE	Monard 1937

ELAPIDAE

Elapsoidea	*guntherii*	Gunther's Garter Snake	L	NE	Bocage 1895
Naja	*anchietae*	Anchieta's Cobra	L	NE	Monrad 1937
Naja	*melanoleuca*	Forest Cobra	L	NE	Bocage 1895
Naja	*nigrocollis*	Black-necked Spitting Cobra	L	NE	Monrad 1937

LAMPROPHIIDAE

Aparallactus	*capensis*	Cape Centipede Eater	L	NE	Branch & McCartney 1992
Boaedon	*lineatus*	Striped House Snake	L	NE	Monard 1937
Gonionotophis	*capensis*	Cape File Snake	L	NE	Monard 1937; Branch & McCartney 1992
Lycophidion	*capense capense*	Cape Wolf Snake	L	NE	Bocage 1895
Lycophidion	*multimaculatum*	Spotted Wolf Snake	L	NE	Branch & McCartney 1992
Prosymna	*ambigua ambigua*	East Africa Shovelsnout Snake	L	NE	Monard 1937
Psammophis	*phillipsi*	Phillips' Sand Snake	L	NE	Branch & McCartney 1992
Psammophis	*mossambicus*	Olive Whip Snake *	V	NE	
Psammophis	*brevirostris*	Short-snouted Grass Snake	L	NE	Monrad 1937
Psammophis	*sibilans*		L		Monard 1937
Psammophylax	*tritaeniatus*	Striped Skaapsteker*	V, L	NE	Monard 1937
Pseudaspis	*cana*	Mole Snake	L	NE	Bocage 1895
Xenocalamus	*mechowii inornatus*	Elongate Quill-snouted Snake	L	NE	Branch & McCartney 1992

TYPHLOPIDAE

Megatyphlops	*anomalus*	Angola Giant Blind-snake	L	NE	Monard 1937

LEPTOTYPHLOPIDAE

Leptotyphlops	*scutifrons scutifrons*	Peter's Thread Snake	L	NE	Monard 1937
Leptotyphlops	*sp.*	Thread Snake*	V	NE	

PYTHONIDAE

Python	*sebae*	African Rock Python*	V, L	CITES II	Monard 1937

VIPERIDAE					
Bitis	*arietans*	Puff Adder*	V, L	NE	Monard 1937; Branch & McCartney 1992
Bitis	*heraldica*	Angolan adder	L	NE	Bocage 1889
Causus	*rhombeatus*	Common Night Adder	L	NE	Monrad 1937
AMPHISBAENIDAE					
Dalophia	*angolensis*	Worm Lizard	L	NE	Monard 1937
Dalophia	*pistillum*	Worm Lizard	L	NE	Monard 1937; Branch & McCartney 1992
Zagaspis	*quadrifrons*	Kalahari Round-snouted Worm Lizard	L	NE	Monard 1937
Monopeltis	*anchietae*	Angola Spade-snouted Worm Lizard	L	NE	Monrad 1937
VARANIDAE					
Varanus	*albigularis*	Rock Monitor	L	CITES II	Monrad 1937
Varanus	*niloticus*	Water Monitor Lizard*	O, L	CITES II	Monard 1937
CHAMAELEONIDAE					
Chamaeleo	*dilepis*	Flapneck Chameleon	L	CITES II	Monard 1937
AGAMIDAE					
Acanthocercus	*cyancephalus*	Western Tree Agama*	V, L	NE	Monard 1937
Agama	*aculeata*	Ground Agama*	V, L	NE	Monard 1937
SCINCIDAE					
Eumecia	*anchietae anchietae*	Western Serpentiform Skink	L	NE	Monrad 1937
Sepsina	*angolensis*	Angola Skink	L	NE	Monard 1937; Branch & McCartney 1992
Trachylepis	*angolensis*	Skink	L	NE	Monard 1937; Laurent, 1964
Trachylepis	*ivensii*	Iven's skink*	V	NE	
Trachylepis	*varia*	Variable Skink	L	NE	Monard 1937
Trachylepis	*striata*	Striped Skink	L	NE	Monard 1937
Trachylepis	*wahlbergi*	Wahlberg's Striped Skink*	V, L	NE	Monrad, 1937; Branch & McCartney 1992
GEKKONIDAE					
Pachydactulys	*scutatus*	Large-scaled gecko	L	NE	Monard 1937
GERRHOSAURIDAE					
Gerrhosaurus	*nigrolineatus*	Black-lined Plated Lizard	L	NE	Monard 1937
Gerrhosaurus	*bulsi*	Laurent's Plated Lizard *	V	NE	
Tetradactylus	*ellenbergeri*	Ellen's Whip Lizard*	V	NE	
LACERTIDAE					
Ichnotropis	*bivatatta*	Angola Rough-scaled Lizard	L	NE	Monard 1937
Ichnotropis	*capensis capensis*	Cape Rough-scales Lizard	L	NE	Monard 1937; Branch & McCartney 1992
Ichnotropis	*grandiceps*	Caprivi Rough-scaled Lizard *	V	NE	
CROCODYLIDAE					
Mecistops	*cataphractus*	African Slender-snouted Crocodile	L	DD, CITES I	Monard 1937

Crocodylus	*niloticus*	Nile Crocodile	L	LC, CITES II	Monard 1937; Branch & McCartney 1992
ORDER: TESTUDINES					
TESTUDINIDAE					
Pelusios	*subniger subniger*	East Africa Black Mud Terrapin	L	NE	Monard 1937
Pelusios	*sinuatus*	Serrated Hinged Terrapin	L	NE	Monard 1937
Kinixys	*belliana*	Bell's Hinged-back Tortoise*	V, L	CITES II	Monard 1937

** sampled during this survey* Total = 62 (16*)

5. RESULTS

A total of 90 species of amphibians and reptiles occur in the study area. During the May 2012 survey eight new amphibian and seven new reptile species records were added to the study area (see species lists Paragraph 4). Figure 1 indicates the gap in the herpetofauna of Angola that the current survey filled. Figure 3 and 4 represent a compilation of all the current records of reptiles and amphibians for southern Angola.

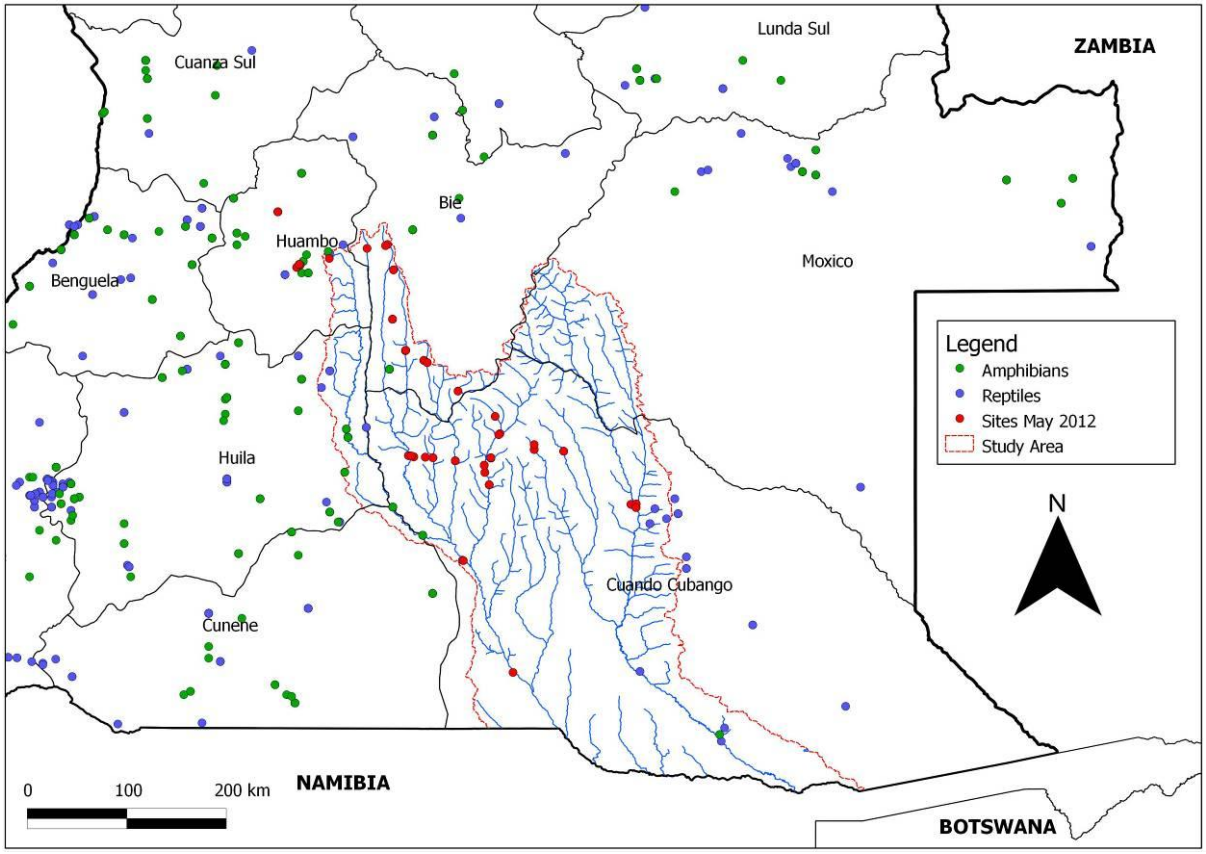

Figure 1. Map indicating the gap in the distribution of reptiles and amphibians in southern Angola filed by the current survey.

5.1 Cubango River Basin

In total 81 species of amphibians and reptiles were associated with the Cubanago river basin catchments to the west of the study area.

Lizards (21 species):

Acanthocerus cyanocephalus, Agama aculeata, Chamaeleo dilepis, Dalophia pistillum, Dalophia angolensis, Monopeltis anchietae, Zygaspis quadrifrons, Eumecia anchietae, Gerrhosaurus bulsi, Gerrhosaurus nigrolineatus, Ichnotrophis bivittata, Ichnotropis capensis, Pachydactylus scutatus, Sepsisna angolensis, Trachylepis angolensis, Trachylepis ivensii, Trachylepis striata, Trachylepis varia, Trachylepis wahlbergi, Varanus albigularis and Varanus niloticus.

Snakes (29 species):

Bitis arietans, Bitis heraldica, Boaedon lineatus, Causus rhombeatus, Crotaphopeltis hotamboeia, Dasypeltis scabra, Dipsadoboa shervei, Dispholidus typus, Elapsoidea guentherii, Gonionotophis capensis, Leptotyphlops scutifrons, Leptoptyphlops sp., Limnophis bicolor, Lycophidion capense, Megatyphlops anomalus, Naja anchietae, Naja melanoleuca, Naja nigricollis, Phillothamnus irregularis, Philothamnus heterolepidotus, Philothamnus semivariegatus, Prosymna ambigua, Psammophis brevirostris, Psammophis mossambicus, Psammophis sibilans, Psammophylax tritaeniatus, Pseudaspis cana, Python sebae and Thelotornis capensis.

Crocodilians (2 species):

Crocodylus niloticus & Mecistops cataphractus

Tortoise & Terrapins (3 species):

Kinixys belliana, Pelusios sinuatus & Pelusios subniger subniger

Amphibians (26 species):

Amietia angolensis, Amietophrynus funereus, Amietophrynus maculatus, Amietophrynus gutturalis, Amietophrynus lemairei, Breviceps adsperus, Hemisus marmoratus, Hildebrandtia ornatissima, Hylarana darlingi, Hyperolius angolensis (parrallelus complex), Hyperolius benguellensis (nasutus complex), Hyperolius cinereus, Hyperolius seabrai, Kassina kuvangensis, Kassina senegalensis, Leptopelis anchietae, Phrynobatrachus natalensis, Phrynobatrachus mababiensis, Ptychadena oxyrhynchus, Ptychadena bunoderma, Ptychadena keilingi, Ptychadena mascareniensis, Ptychadena taenioscelis, Ptychadena uzungwensis, Tomopterna tuberculosa & Xenopus petersii.

5.2 Cuito River Basin

In total 24 species of amphibians and reptiles were associated with the Cuito river basin catchments to the east of the study area.

Lizards (7 species):

Dalophia pistillum, Gerrhosaurus nigrolineatus, Ichnotropis capensis capensis, Ichnotropis grandiceps, Sepsina angolensis, Trachylepis striata & Trachylepis wahlbergi.

Snakes (10 species):

Aparallactus capensis, Bitis arietans, Crotaphopeltis hotamboeia, Disopholidus typus, Goniotophis capensis, Lycophidion multimaculatus, Philothamnus ornatus, Psammophis mossambicus, Psammophis phillipsi, Psammophylax tritaeniatus & Xenocalamus mechowii inornatus.

Crocodilians (1 species):

Cordylus niloticus

Amphibians (6 species):

Hyperolius angolensis (parallelus complex), Hyperolius benguellensis (nasutus complex), Kassina senegalensis, Ptychadena mascareniensis, Ptychadena subpunctata & Xenopus petersii.

5.3 Important Discoveries

Although relatively few reptiles were collected, the survey revealed a number of exciting discoveries, including:

- The first record for Angola of the Caprivi Rough-scaled Lizard (*Ichnotropis grandiceps*). Two sub adult (see Addendum B) was collected at the HALO operational camp on the outskirts of Cuito Cuanavalle. Species belonging to this genus have been reported to have annual live cylcles. It is unclear if this specific species does the same as both adults and juveniles have been collected together (Broadley 1967).
- A rarely sampled aquatic skink (*Trachylepis ivensii*) was recorded. It is a new record for the Cubango-Okovango system (previously only known to occur in the Zambezi, Kwanza and Congo drainage systems), from the floodplains of the Cuebe River north of Menongue (see Addendum B). Further surveys of the floodplains will add considerately to the knowledge of this species.
- The fourth record of Ellenberger's Long-tailed Seps (*Tetradactylus ellenbergeri*) (see Addendum B) from Angola.
- The following seven species are new for the study area (see Addendum C): *Gerrhosaurus bulsi, Ichnotrophis grandiceps, Leptotyphlops sp., Psammophis mossambicus, Philothamnus ornatus, Tetradactylus ellenbergeri & Trachylepis ivensii.*

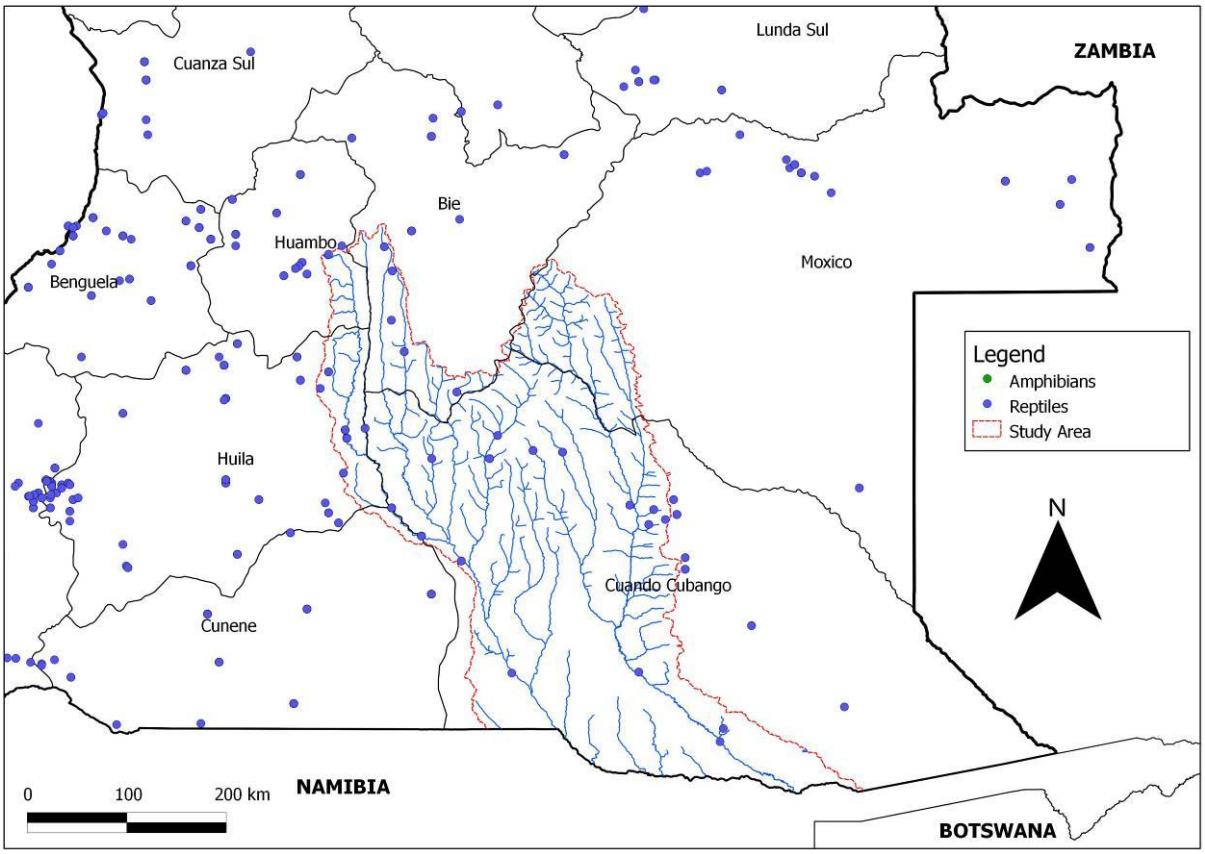

Figure 3. All known reptile records for southern Angola.

Amphibian activities was reduced. Most species had already bred, although some individuals were still present. Winter breeding species were abundant. The following exciting discoveries were made:

- Four new populations of the poorly known Ashy Reed Frog (*Hyperolius cinereus*) were made ((see Addendum A). The species was described in 1937 by Monard and was only known from two sites (Culaqumbe and Bimbi). Subsequently Laurent (1964) assigned a population of reed frogs in Dundo (Lunda Norte) to this species. In 2009 this species was re-discovered at Humpata (Huila), this representing the most southerly distribution for the species. The new records from the current survey expand the distribution 300 km east. They also represent the first records for the Cubango-Okovango river system. The new data will help better understanding of the species' distribution and conservation status.
- Near topotypic material was collected for the Kuvangu Kassina (*Kassina kuvangensis;* see Addendum A). The type locality is Kuvangu [= Cubango]. This sample will be valuable for ongoing taxonomical studies.
- The following eight records are new for the study area (see Addendum C): *Amietophrynus maculatus, Amietophrynus gutturalis, Amietophrynus lemairei, Hyperolius cinereus, Kassina senegalensis, Phrynobatrachus mababiensis, Ptychadena subpunctata & Ptychadena taenioscelis.*

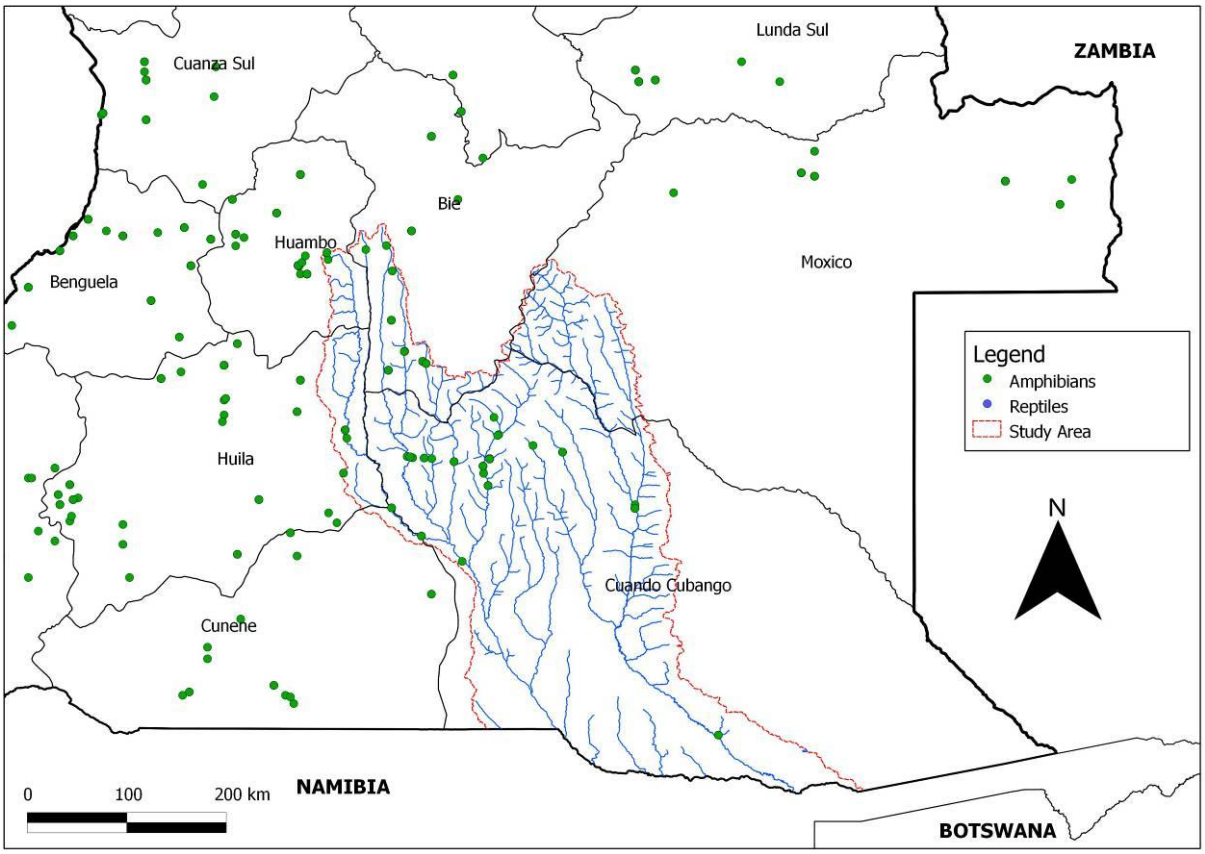

Figure 4. All known amphibian records for southern Angola.

6. CONCLUSION

Unfortunately reptile and amphibian activity during the survey period was relatively quiet as breeding activity had declined and many species were entering a period of seasonal dormancy. The present collection made only a preliminary assessment of amphibian and reptiles diversity in the region, and future surveys can be expected to considerably increase the regional diversity. A decline in number of species from west (n=81) to east (n=25) is observed as the habitat change from rocky habitats in the west to sand environment in the east. Further surveys in different seasons need to be conducted to give a more accurate idea of species richness and abundance to allow great prediction of any conservation implications.

7. ACKNOWLEDGMENTS

I would like to thank Professor Bill Branch in providing expert advice, confirming species identifications and proof reading this report.

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ADDENDUM A: PHOTOS OF IMPORTANT AMPHIBIANS

Hyperolius cinereus (Huambo).

Hyperolius cinereus (Menongue).

Kassina kuvangensis (Menongue).

ADDENDUM B: PHOTOS OF IMPORTANT REPTILES

Tetradactylus ellenbergeri (Luissingua River).

Ichnotrophis grandiceps (Cuito Cunavale).

Trachylepis ivensii (Menongue).

ADDENDUM C: PHOTOS OF NEW RECORDS

Ptychadena subpunctata

Ptychadena taeniocelis

Amietophrynus maculatus

Amietophrynus gutturalis

Amietophrynus lemairei

Phrynobatrachus mababiensis

Gerrhosaurus bulsi

Leptoptyhyplos sp.