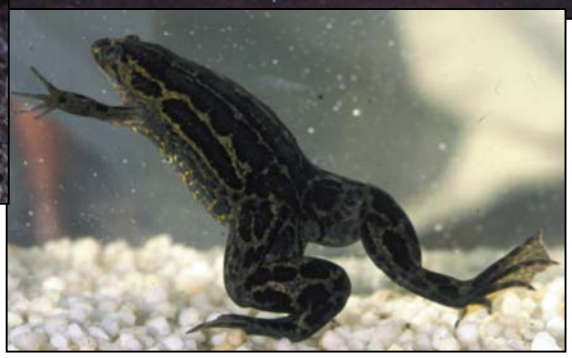
Conservation Assessment and Management Plan

for Southern African Frogs

Workshop Report

Cape Town, South Africa
24-27 July 2000



A Collaborative Workshop
Southern African Frog Atlas Project
Avian Demography Unit, University of Cape Town
Declining Amphibian Populations Task Force, IUCN/SSC
Conservation Breeding Specialist Group, IUCN/SSC

Sponsored by Sea World, Inc.

SeaWorld
ADVENTURE PARK

Conservation Assessment and Management Plan

for Southern African Frogs

FINAL REPORT

Cape Town, South Africa
24-27 July 2000

A contribution of the IUCN/SSC Conservation Breeding Specialist Group.

Harrison J.A., Burger M., Minter L.R., De Villiers A.L., Baard E.H.W., Scott E., Bishop P.J. & Ellis S. *2001. Conservation Assessment and Management Plan for Southern African Frogs. Final Report.* IUCN/SSC Conservation Breeding Specialist Group: Apple Valley, MN.

Additional copies of this publication can be ordered through the IUCN/SSC Conservation Breeding Specialist Group, 12101 Johnny Cake Ridge Road, Apple Valley, MN 55124 USA. Send checks for US$35 (for printing and shipping costs) payable to CBSG; checks must be drawn on a US bank. Funds may be wired to First Bank NA ABA 091000022, for credit to CBSG Account No. 1100 1210 1736. VISA or Mastercard also are accepted.

The CBSG Conservation Council

These generous contributors make the work of CBSG possible

Benefactors ($20,000 and above)

Columbus Zoological Gardens
Minnesota Zoological Gardens
Omaha's Henry Doorly Zoo
SeaWorld, Inc.
Toronto Zoo

Conservators ($15,000 -$19,999)

Saint Louis Zoo
Walt Disney's Animal Kingdom
Wildlife Conservation Society - NYZS
World Association of Zoos & Aquariums -WAZA
Zoological Society of London

Guardians ($7,000-$14,999)

Chicago Zoological Society
Cincinnati Zoo
Cleveland Zoological Society
Nan Schaffer
Toledo Zoological Society
White Oak Conservation Center
Zoological Society of San Diego

Protectors ($1,000-$6,999)

Albuquerque Biological Park
Allwetter Zoo Munster
ARAZPA
Audubon Zoological Gardens
Bristol Zoo
Caldwell Zoo
Calgary Zoo
Chester Zoo
Copenhagen Zoo
Denver Zoological Gardens
Detroit Zoological Park
Durrell Wildlife Conservation Trust
Everland Zoo
Federation of Zoological Gardens of Great Britain & Ireland
Fort Wayne Zoological Society
Fort Worth Zoo
Fossil Rim Wildlife Center
Gladys Porter Zoo
Greater Los Angeles Zoo Association
Houston Zoological Garden
Japanese Association of Zoological Parks & Aquariums –JAZGA
Leisure & Cultural Services Department of Hong Kong
Living Desert
Loro Parque
Marwell Zoological Park
Memphis Zoo
Milwaukee County Zoo
National Tropical Botanical Garden
North Carolina Zoological Park
Oklahoma City Zoo
Oregon Zoo
Paignton Zool. & Botanical Gardens
Parco Natura Viva Garda Zool. Park
Philadelphia Zoological Garden
Phoenix Zoo
Pittsburgh Zoo
Rotterdam Zoo
Royal Zoological Society of Antwerp
Royal Zoological Society of Australia
Royal Zoological Society of Scotland
Saitama Children's Zoo
San Antonio Zoo
San Francisco Zoo
Schonbrunner Tiergarten
Sedgwick County Zoo
Sunset Zoo (10 year commitment)
Taipei Zoo
Thrigby Hall Wildlife Gardens
Twycross Zoo
Union of German Zoo Directors
Wassenaar Wildlife Breeding Centre
Wilhelma Zoological Garden
Woodland Park Zoo
Zoologischer Garten Koln
Zoologischer Garten Zurich

Stewards ($500-$999)

Aalborg Zoo
Alameda Park Zoo
Arizona-Sonora Desert Museum
Banham Zoo & Sanctuary
Cotswold Wildlife Park
Dickerson Park Zoo
Dutch Federation of Zoological Gardens
Fota Wildlife Park
Givskud Zoo
Granby Zoo
Great Plains Zoo
Knoxville Zoo
Little Rock Zoo
Lowry Park
National Aviary in Pittsburgh
National Zoological Gardens of Pretoria
Odense Zoo
Ouwehands Dierenpark
Perth Zoo
Potter Park Zoo
Riverbanks Zoological Park
Rolling Hills Refuge Conservation Center
Staten Island Zoo
Tierpark Rheine
Wellington Zoo
Welsh Mountain Zoo
Zoologischer Garten Rostock

Curators ($250-$499)

Dr. Edward & Marie Plotka
Emporia Zoo
Lee Richardson Zoo
Lincoln Park Zoo
Racine Zoological Society
Roger Williams Park Zoo
Tokyo Zoological Park Society
Topeka Zoo, Friends of
Zoo de la Casa de Campo

Sponsors ($50-$249)

African Safari
American Loriinae Conservancy
Apenheul Zoo
Arbeitskreis Natur-u Artenschutz in den
Bighorn Institute
Brandywine Zoo
Darmstadt Zoo
Elaine Douglas
Folsom Children's Zoo
Jardin aux Oiseaux
Jean P. LeDanff
Kew Royal Botanic Gardens
Lisbon Zoo
Miller Park Zoo
National Birds of Prey Centre
Nigel Hewston
Steven J. Olson
Palm Beach Zoo at Dreher Park
Parc Zoologique de Thoiry
Prudence P. Perry
Safari Parc de Peaugres
Teruko Shimizu
Steinhart Aquarium
Tautphaus Park Zoo
Touro Parc-France

Supporters ($15-$49)

Oglebay's Good Children's Zoo
Judy Steenberg

Thank You!
July 2002

Conservation Assessment and Management Plan for Southern African Frogs

Cape Town, South Africa
24-27 July 2000

Final Report

Contents

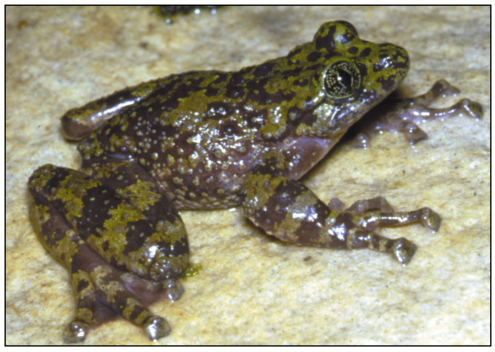
Section 1
Introduction and Background

Conservation Assessment and Management Plan

for Southern African Frogs

FINAL REPORT

Cape Town, South Africa
24-27 July 2000



CAMP for South African Frogs

Section 1. INTRODUCTION AND BACKGROUND

Conservation efforts to protect the planet's vertebrate biodiversity have been disproportionate for the various groups and have tended to favour mammals and birds. The so-called 'lower vertebrates', i.e., fish, amphibians and reptiles, generally have a lower public appeal and are typically neglected in conservation programmes, yet these groups are of fundamental importance at an ecosystem level. In terms of species richness, amphibians outnumber mammals with more than 4700 living species currently recognised and with an expected total exceeding 5000 (Glaw & Kohler 1998). Ironically, at a time when taxonomists are unravelling and describing this richness at an unprecedented rate, alarming reports of amphibian population declines and species extinctions are being recorded around the world. Amphibia is proportionally the most threatened group of vertebrates (Branch 1994).

With the world's human population more than doubling during the second half of the 20th century to reach six billion in October 1999 (Brown et al. 1999), a concurrent increase in the rate of habitat loss and species extinction has become the greatest conservation concern. Biologists and wildlife managers realise that strategies geared to reducing the risk and rate of extinction need to be implemented to ensure viable ecosystem functioning in the long term. These strategies can be at a global as well as at a regional or national level, and include habitat preservation, intensified legislation and regulation, additional field research, investigations into the ecological roles of key species, the development of improved biological monitoring techniques and, in some cases, scientifically managed captive populations for potential restocking of wild populations. Another important strategy is the identification and highlighting of those species that are most threatened and thus in greatest need of ameliorative conservation action. Such assessments of threatened plants and animals during the past few decades have typically been presented as national or international Red Data species lists.

Conservation threats and priorities are ever changing and a dynamic system is called for to keep abreast of developments. The concept of Red Data species listing has evolved over the years and today it serves as a model for monitoring the conservation status of species. Although the methods and approaches in achieving these listings have differed over time and between countries, the principles followed were generally the same. For example, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) meets regularly to update species accounts when needed. Drawing from this resource, Seburn and Seburn (2000) took the process an important step further and compiled a document detailing conservation priorities and action plans for Canadian herpetofauna. Such details can also be obtained in the course of a Conservation Assessment and Management Plan (CAMP) for a specific region, such as was done for the amphibians of India (BCPP CAMP Report 1998).

The first assessment of threatened frogs occurring in South Africa, Swaziland and Lesotho was presented in the *South African Red Data Book – Reptiles and Amphibians* (McLachlan 1978) which listed nine species. This was updated 10 years later by Branch (1988). A total of 17 frog species, comprising four Endangered, one Vulnerable, two Rare, eight Restricted, one Peripheral and one Indeterminate species, was included. More than a decade later it again become important to re-evaluate the threatened status of frogs in this region and to this end a CAMP workshop was held in

Cape Town during 24–27 July 2000. Arising from that workshop, the present report has been compiled for southern African frogs (see page 15 for details of the CAMP process). The results presented in this document should serve as the basis for compiling the next Red Data Book for this faunal group and region. It is anticipated that this will be done in conjunction with the forthcoming atlas publication which will mark the end of the Southern African Frog Atlas Project (SAFAP).

FROGS AND WETLANDS (largely excerpted from Cowan 1995, especially Channing & Van Dijk 1995).

The World Conservation Strategy (IUCN 1980) identified wetlands as the third most important life support system on Earth. In South Africa, which has relatively few wetlands, it has been estimated that more than one-third have been destroyed or lost (Breen & Begg 1989). Those that remain are in some of the most threatened areas (Zaloumis 1987; Begg 1990).

Besides amphibians, wetlands support an enormous variety of plants, invertebrates, fish, reptiles, birds and mammals, many of which can survive nowhere else. Wetlands help to regulate water quality and flow. Acting as natural filters and sponges, wetlands take up runoff, attenuate floods, reduce erosion, re-charge groundwater, trap sediments, recycle nutrients, oxygenate water and release the purified water gradually back into the system.

South Africa is an arid country in which most wetlands tend to be seasonal. Specific wetlands become biologically active at different times, depending on the seasonality and unpredictable occurrence of rain. Nevertheless, the biotic diversity of the wetlands in South Africa make them particularly important ecosystems, and they are a high priority for protection. South Africa is a signatory to the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (RAMSAR Convention), adopted in 1971, which provides a framework for the international conservation of wetland habitats. The conservation of these areas is essential to the long-term survival of an enormous number of species, including many species of frogs.

Frogs have soft, permeable skin and although they have many adaptations to assist in the reduction of water loss, in general they are confined to damp places when they are active. Most species of frogs, except those living in permanent wetlands, spend a large portion of the year inactive, as dictated by the risk of desiccation and/or a shortage of prey. During the dry periods in wetlands, some species may burrow into the mud or damp subsoil of places where water accumulates in the wet season. Other types of shelter used by frogs include reeds, grass tufts, under rocks, rock crevices, or the burrows of other animals such as rodents (Channing & Van Dijk 1995).

Tadpoles and adult frogs are preyed upon by their own kind and by other animals such as dragonfly nymphs, fishes, water birds, snakes and wetland mammals, such as otters. As both predators and prey, anurans are an important link in many food chains, especially those of wetland ecosystems.

Despite their importance in food chains and as ecological indicators, little attention has been paid to amphibians in the milieu of wetlands in Africa, as well as in the rest of the world. Most South African frogs are terrestrial, with an aquatic larval stage, and are associated with the interface between terrestrial and freshwater aquatic systems. The majority of frogs utilise wetlands for breeding, and many are found in or near bodies of water outside the breeding season. They occur in nearly all wetlands in South Africa: 88 of the 105 described species use wetland habitat. As such, frogs can provide important information pertinent to the ecology of these areas. In South Africa, 19 frog species are permanent residents of wetlands or surrounding areas, 60 use wetlands for breeding and feeding during the rainy season, and 17 species do not use wetlands (see Table 1 in Channing & Van Dijk 1995).

Frogs use a wide range of freshwater wetlands, from rivers, lakes and swamps, through temporary pans and puddles to seepages on mountain slopes and mossy banks. For frogs, the definition of wetlands needs to include very small bodies of water, many of which are shallow and temporary. Small wetlands are especially important for frogs and play a greater role in the metapopulation dynamics of certain taxa than the modest area of small wetlands might suggest (Gibbs 1993).

The onset of rain initiates breeding in most species, with many different breeding strategies being employed. The eggs develop rapidly into free-swimming, feeding tadpoles, with the length of larval life correlated with the stability of the wetland (Channing & Van Dijk 1995). Tadpoles in permanent ponds and streams may take two years to reach metamorphosis, while those developing in temporary pools in dry areas may complete their tadpole life in as little as three weeks (Wager 1965; Channing 1976). Many anurans choose oviposition sites in temporary waters to minimise predation and competition for their tadpoles (Van Dijk 1971b, 1972b). Tadpoles display a range of morphologies related to the phylogeny of each genus, and which enable successful occupation of widely differing habitats (Channing & Van Dijk 1995). Tadpoles generally feed on algae, other plant matter and detritus; adults feed mostly on insects and small invertebrates. Some frogs are completely terrestrial and able to complete their life cycles without using standing water at all. Such species are well represented in southern Africa.

Frog distributions can be classified into two broad categories: those restricted to relatively small areas or specialised habitats, and those with very wide distributions. Both categories are important in wetlands and merit conservation attention. This is particularly important because the viability of tadpoles determines the distribution of the various species: only in those wetlands that can support tadpoles will adult frogs occur on a sustainable basis. The eggs and embryos of anurans in wetlands are sensitive to changes in water conditions. These changes may include presence of herbicides or pesticides or other poisons that may have a deleterious effect (Channing & Van Dijk 1995).

THE DIVERSITY AND ENDEMISM OF FROGS IN SOUTH AFRICA, LESOTHO AND SWAZILAND

The exceptional biodiversity of South Africa, Lesotho and Swaziland (hereafter referred to as “the region”) is apparent in the unusually large number of biomes or distinctive broad vegetation types which are present (Cowling et al. 1997). Seven biomes can be recognized: Succulent Karoo (arid shrublands dominated by succulent plants), Nama Karoo (arid shrublands with a large grassy component), Evergreen Forest, Thicket (inclusive of “Valley Bushveld”), Fynbos (montane and lowland forms), Savannah (woodlands, of various types), and Grasslands (including the sour grasslands and alpine heaths of the Afromontane highlands, and the highveld sweet and mixed grasslands of the plains). This schema is based on those of White (1983), Huntley (1984), Rutherford & Westfall (1986), Low & Rebelo (1996). The biomes are made up of many vegetation types: 70 described by Acocks (1988) and 68 by Low & Rebelo (1996). In a sense, the biomes “summarise” the variation in the many physical factors which have gradients across the region, e.g., precipitation, temperature, altitude, topography and geological substrate, as well as the evolutionary history of the region.

As a group, the frogs of the region are relatively diverse. There are 108 described species, and at least one additional known species awaits description (L.R. Minter in prep.; see Table 1). If the recent trend in taxonomic research is sustained, it is anticipated that several further species will be discovered and described in years to come (Channing 1999). This level of species richness places the region above the global average in relation to land area and is in line with the high species richness in other groups (Siegfried 1989).

The species richness, coupled with the diversity of habitats in the region, is reflected in a diversity of life history traits. For example, there are completely aquatic species (e.g., *Xenopus* spp.) and completely terrestrial species (e.g., *Breviceps* spp.), and a number of groups with intermediate levels of dependence on water for reproduction (e.g., *Arthroleptella* spp. and *Hemisus* spp.). There is also a broad spectrum of reproductive strategies with respect to K and r selection, and rate of tadpole development, depending mainly on the type of oviposition site used (Wager 1986; Harrison 1998). Although there is a marked drop in species richness in the arid west, in comparison with the relatively mesic east, there are species which are adapted to even the most arid parts of the region (Bates 1998).

Given that all the biomes of the region are populated with frogs, a relatively high diversity of species could be predicted. If one also takes into account that the Fynbos and Thicket biomes are restricted to South Africa, that the two Karoo biomes are restricted to the southern African subcontinent (i.e., south of the Kunene and Zambezi rivers), and that the Grassland Biome is completely isolated from other such areas in Africa, it could be further predicted that high levels of endemism may be present amongst the region's frogs.

Endemism with respect to the region (South Africa, Lesotho and Swaziland), and the subcontinent (south of the Kunene and Zambezi rivers) was checked using the interim distribution maps of the Southern African Frog Atlas Project (Minter et al. 2000) as well as the distribution maps of Poynton (1964), Poynton & Broadley (1991) and Channing & Griffin (1993). Species were deemed endemic if at least 90% of their distribution range fell within the region. As predicted, the level of endemism is high (Tables 2 and 3) with 60 of the 109 listed species (55%) being endemic to the region, and a further 12 (11%) being endemic to the southern African subcontinent, i.e., a total of 72 (66%).

Table 2. Species list for the region spanning South Africa, Lesotho and Swaziland. Endemic status: 0 indicates no endemism to southern Africa; 1 indicates endemism to southern Africa; 2 indicates endemism to the region (South Africa, Lesotho and Swaziland). Two species whose status in the region is unclear, and which probably occur only marginally, are indicated as "marginal". The relevant IUCN status categories are Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Data Deficient (DD) and Least Concern (LC). All species without a category shown are Not Evaluated (NE).

SPECIES	FAMILY	Endemic Status	Revised Status
Arthroleptis stenodactylus	Arthroleptidae	0	
Arthroleptis wahlbergi	Arthroleptidae	2	
Bufo amatolicus	Bufonidae	2	NT
Bufo angusticeps	Bufonidae	2	LC
Bufo fenoulheti	Bufonidae	1	
Bufo gariepensis	Bufonidae	2	
Bufo garmani	Bufonidae	0	
Bufo gutturalis	Bufonidae	0	
Bufo maculatus	Bufonidae	0	
Bufo pantherinus	Bufonidae	2	EN
Bufo pardalis	Bufonidae	2	LC
Bufo poweri	Bufonidae	1	
Bufo rangeri	Bufonidae	2	
Bufo robinsoni	Bufonidae	2	DD
Bufo vertebralis	Bufonidae	2	
Capensibufo rosei	Bufonidae	2	VU
Capensibufo tradouwi	Bufonidae	2	

SPECIES	FAMILY	Endemic Status	Revised Status
Schismaderma carens	Bufonidae	0	
Heleophryne hewitti	Heleophrynidae	2	CR
Heleophryne natalensis	Heleophrynidae	2	
Heleophryne purcelli	Heleophrynidae	2	
Heleophryne regis	Heleophrynidae	2	
Heleophryne rosei	Heleophrynidae	2	CR
Hemisus guineensis	Hemisotidae	0	
Hemisus guttatus	Hemisotidae	2	NT
Hemisus marmoratus	Hemisotidae	0	
Afrixalus aureus	Hyperoliidae	1	
Afrixalus delicatus	Hyperoliidae	1	
Afrixalus fornasinii	Hyperoliidae	0	
Afrixalus knysnae	Hyperoliidae	2	DD
Afrixalus spinifrons	Hyperoliidae	2	
Hyperolius argus	Hyperoliidae	0	
Hyperolius horstockii	Hyperoliidae	2	
Hyperolius marmoratus	Hyperoliidae	0	
Hyperolius nasutus	Hyperoliidae	0	
Hyperolius pickersgilli	Hyperoliidae	2	EN
Hyperolius pusillus	Hyperoliidae	0	
Hyperolius semidiscus	Hyperoliidae	2	
Hyperolius tuberilinguis	Hyperoliidae	0	
Kassina maculata	Hyperoliidae	0	
Kassina senegalensis	Hyperoliidae	0	
Leptopelis mossambicus	Hyperoliidae	1	
Leptopelis natalensis	Hyperoliidae	2	
Leptopelis xenodactylus	Hyperoliidae	2	EN
Semnodactylus wealii	Hyperoliidae	2	
Breviceps acutirostris	Microhylidae	2	
Breviceps adspersus	Microhylidae	0	
Breviceps fuscus	Microhylidae	2	
Breviceps gibbosus	Microhylidae	2	NT
Breviceps macrops	Microhylidae	1	NT
Breviceps montanus	Microhylidae	2	
Breviceps mossambicus	Microhylidae	0	
Breviceps namaquensis	Microhylidae	2	
Breviceps rosei	Microhylidae	2	
Breviceps sp. (sopranus)	Microhylidae	2	
Breviceps sylvestris	Microhylidae	2	NT
Breviceps verrucosus	Microhylidae	2	
Phrynomantis annectens	Microhylidae	1	
Phrynomantis bifasciatus	Microhylidae	0	
Xenopus gilli	Pipidae	2	EN
Xenopus laevis	Pipidae	0	
Xenopus muelleri	Pipidae	0	
Anhydrophryne rattrayi	Petropedetidae	2	NT
Arthroleptella bicolor	Petropedetidae	2	
Arthroleptella drewesii	Petropedetidae	2	NT

SPECIES	FAMILY	Endemic Status	Revised Status
Arthroleptella hewitti	Petropedetidae	2	
Arthroleptella lightfooti	Petropedetidae	2	NT
Arthroleptella ngongoniensis	Petropedetidae	2	CR
Arthroleptella landdrosia	Petropedetidae	2	NT
Arthroleptella villiersi	Petropedetidae	2	
Cacosternum boettgeri	Petropedetidae	1	
Cacosternum capense	Petropedetidae	2	VU
Cacosternum namaquense	Petropedetidae	2	
Cacosternum nanum	Petropedetidae	2	
Cacosternum striatum	Petropedetidae	2	DD
Microbatrachella capensis	Petropedetidae	2	CR
Natalobatrachus bonebergi	Petropedetidae	2	EN
Phrynobatrachus acridoides	Petropedetidae	0	
Phrynobatrachus mababiensis	Petropedetidae	0	
Phrynobatrachus natalensis	Petropedetidae	0	
Poyntonia paludicola	Petropedetidae	2	NT
Afrana angolensis	Ranidae	0	
Afrana dracomontana	Ranidae	2	
Afrana fuscigula	Ranidae	1	
Afrana vandijki	Ranidae	2	DD
Amietia vertebralis	Ranidae	2	
Hildebrandtia ornata	Ranidae	0	
Ptychadena anchietae	Ranidae	0	
Ptychadena mascareniensis	Ranidae	0	
Ptychadena mossambica	Ranidae	0	
Ptychadena oxyrhynchus	Ranidae	0	
Ptychadena porosissima	Ranidae	0	
Ptychadena taenioscelis	Ranidae	0	
Ptychadena uzungwensis	Ranidae	0	
Pyxicephalus adspersus	Ranidae	0	NT
Pyxicephalus edulis	Ranidae	0	
Strongylopus bonaespei	Ranidae	2	
Strongylopus fasciatus	Ranidae	1	
Strongylopus grayii	Ranidae	2	
Strongylopus hymenopus	Ranidae	2	
Strongylopus springbokensis	Ranidae	2	DD
Strongylopus wageri	Ranidae	2	NT
Tomopterna cryptotis	Ranidae	0	
Tomopterna delalandii	Ranidae	2	
Tomopterna krugerensis	Ranidae	1	
Tomopterna marmorata	Ranidae	1	
Tomopterna natalensis	Ranidae	2	
Tomopterna tandyi	Ranidae	0	
Chiromantis xerampelina	Rhacophoridae	0	

Species richness and endemism are summarised in Table 3. Ten families occur within the region, of which five families, Ranidae (27 spp.), Petropedetidae (19 spp.), Hyperoliidae (19 spp.), Bufonidae (16 spp.) and Microhylidae (14 spp.), are dominant in terms of numbers of species (Table 3).

Proportionately speaking, regional endemism is approximately evenly spread over the families, except in the cases of the family Rhacophoridae which has no endemic species, and the family Heleophrynidae (5 spp.) which is entirely endemic to the region. Threatened and near-threatened taxa are spread across most of the families, but the Petropedetidae with 9 (47%) threatened and near-threatened species, and the endemic family Heleophrynidae with 2 (40%), must be singled out as being of special concern (Table 3). The largest number of widespread species is found in the family Ranidae, which also has the lowest percentage of threatened and near-threatened species, apart from the Arthroleptidae and Rhacophoridae which have no threatened or near-threatened species (Table 3).

Table 3. Summary of endemism and threatened taxa by family. Abbreviations and codes for endemism (column 2), and categories of threat, are the same as in Table 2. Note that regional endemism (column 2) is based on national boundaries. The totals (column 3) apply to the sum of regional endemism codes (column 2). Percentages in columns 2 and 4 are based on the species totals in column 3, and the percentages in column 3 are based on the overall species total of 109.

1. Family	2. Regional endemism: codes 2 + 1 + 0	3. Total species richness	4. Threatened taxa CR+EN+ VU+NT
Arthroleptidae	1 (50%) + 0 + 1 (50%)	2 (2%)	0+0+0+0=0
Bufonidae	10 (63%) +2 (13%) + 4 (25%)	16 (15%)	0+1+1+1=3 (19%)
Heleophrynidae	5 (100%) + 0 + 0	5 (5%)	2+0+0+0=2 (40%)
Hemisotidae	1 (33%) + 0 + 2 (67%)	3 (3%)	0+0+0+1=1 (33%)
Hyperoliidae	8 (42%) + 3 (16%) + 8 (42%)	19 (17%)	0+2+0+0=2 (11%)
Microhylidae	9 (64%) + 2 (14%) + 3 (21%)	14 (13%)	0+0+0+3=3 (21%)
Pipidae	1 (33%) + 0 + 2 (67%)	3 (3%)	0+1+0+0=1 (33%)
Petropedetidae	15 (79%) +1 (5%) +3 (16%)	19 (17%)	2+1+1+5=9 (47%)
Ranidae	10 (37%) + 4 (15%) +13 (48%)	27 (25%)	0+0+0+2=2 (7%)
Rhacophoridae	0 + 0 + 1 (100%)	1 (1%)	0+0+0+0=0
TOTALS	**60(55%) + 12(11%) + 37(34%)**	**109 spp. (100%)**	**4+5+2+12=23 (21%)**

The biogeographic patterning of endemism within the region has been extensively analysed and described (Poynton 1960, 1964, 1990, 1992, 1995, 2000; Poynton & Boycott 1996; Poynton & Broadley 1978, 1991; Van Dijk 1972a, 1982).

Focussing on the relevance of our findings for conservation, if one tallies the species which do not occur in the region, i.e., are not amongst the 109 species listed for South Africa, Lesotho and Swaziland in Table 1, but which do occur in subcontinental southern Africa, not more than 20 species can be added to the category of southern African endemics, despite the fact that the land area is more than doubled by the addition of Namibia, Botswana, Zimbabwe and Mozambique south of the Zambezi (Poynton & Broadley 1991; Channing & Griffin 1993). This clearly indicates that South Africa, together with the enclaves of Lesotho and Swaziland, is an important centre of endemism for African anurans. Not only that, but of the 23 threatened and near-threatened species on the Red List (Tables 2 & 3), all but two are endemic to the region, and one of those two is endemic to subcontinental southern Africa. Of the 23, no less than 20 (87%) occur in the winter-rainfall region in the south western corner of South Africa, and in the Grassland Biome (cf. Drinkrow & Cherry 1995). Thus we see that the relevant provinces of South Africa, and Lesotho, undoubtedly have an important responsibility to conserve anuran biodiversity in Africa.

GLOBALLY DECLINING AMPHIBIAN POPULATIONS

At the First World Congress of Herpetology in 1989, many of the participants expressed concern regarding the marked declines in amphibian populations observed in many parts of the world over the previous several decades. This led to a series of scientific meetings and workshops and to the establishment, in 1991, of the Declining Amphibian Populations Task Force (DAPTF) by the Species Survival Commission (SSC) of the International Union for the Conservation of Nature (IUCN). For early reports and reviews of this phenomenon, see Blaustein & Wake (1990, 1995), Bradford (1991), Pechmann et al. (1991), Tyler (1991), Crump et al. 1992, Blaustein et al. (1994). An extensive record of the literature on declining amphibians may be found in the issues of *Froglog*, newsletter of the DAPTF. The current DAPTF Working Group Chair for Southern Africa is Dr Les Minter, University of the North, P/Bag X1106, Sovenga 0727, South Africa.

It is evident that the declines cannot be attributed to a single cause but are the result of a variety of factors acting in isolation or in combination. The principal and most widespread local cause appears to be habitat loss, degradation and fragmentation, while other local factors include pollution by agricultural and industrial chemicals, the introduction of exotic predators and road kills. Examples of more widespread or global causes of declines are: an increase in UV radiation due to ozone depletion in the upper atmosphere, acid precipitation and global warming. The discovery that a novel frog pathogen, a chytrid fungus, is responsible for mass mortalities and extinctions of numerous frog species in Australia and Central America (Berger et al. 1998; Longcore et al. 1999), has created even more consternation in herpetological and conservation circles. This fungus is now known to have caused amphibian declines in several countries in Europe and South America, as well as the USA, Canada and New Zealand, i.e. the spread of this disease has reached pandemic proportions. Iridoviral infections are similarly implicated in mass amphibian mortalities (Daszak et al. 1999).

THREATS TO SOUTHERN AFRICAN FROGS

Evidence for amphibian declines in southern Africa

Channing and Van Dijk (1995) found no evidence for a “country-wide decline in frog populations” in South Africa, and attributed observed local declines to habitat destruction, pollution and other factors, such as a general disregard for amphibians by the public.

In the Western Cape province, the Western Cape Nature Conservation Board has an ongoing monitoring programme for threatened species of frog. Unfortunately this is not replicated in other provinces although there is a clear need, especially in KwaZulu-Natal and Eastern Cape provinces.

Monitoring in the Western Cape includes annual visits by conservation officials to key localities during the breeding seasons of the species concerned (De Villiers 1997; Baard et al. 1999). The most threatened montane frog in this region is *Heleophryne rosei*. Despite the discovery of a new, but small, breeding site of this species in recent years, the number of breeding localities has declined from a total of eight streams to six. The most threatened lowland frog is *Microbatrachella capensis*, followed by *Xenopus gilli* and *Bufo pantherinus*. In particular, *M. capensis* and *X. gilli* have suffered dramatic habitat loss. On the Cape Flats, *X. gilli* is probably now extinct and only one *M. capensis* breeding site remains, surrounded by a sea of urban development. This site supports a healthy population of *M. capensis* but it must still be confirmed whether there is a population of the often sympatric *X. gilli* present there. Further population declines in both of these species have been recorded near Kleinmond, mainly as a result of sand mining activities, alien vegetation encroachment (De Villiers 1997b) and, in the Betty's Bay area, development and general habitat degradation. Although *B. pantherinus* can tolerate a certain amount of habitat modification, urban

expansion has lead to dramatic declines in population densities in some places. The above four frogs include two Critically Endangered and two Endangered species. Population declines have also been documented for the two Vulnerable frogs in this region, *Cacosternum capense* and, to a lesser extent, *Capensibufo rosei.*

In Gauteng, a severe decline in the number of breeding sites and adult individuals of *Pyxicephalus adspersus* has occurred over the last two decades, owing to the spread of housing developments, shopping malls and industries (Cook 1996).

A continuous, long-term frog monitoring project, initiated by Dr Les Minter, University of the North, was established at Hans Merensky Provincial Nature Reserve in October 2000, and currently represents the only project of this kind in southern Africa. In order to effectively monitor frog population fluctuations, it is essential that additional frog monitoring stations be established, particularly in areas where threatened species occur.

There are, to date, no published records of chytridiomycosis in southern Africa, but this possibility is presently being investigated (R. Speare & L. du Preez pers. comm.). Local herpetologists and conservationists should be provided with information and materials that will enable them to react quickly and effectively to reports of mass mortalities (eg. *Amietia vertebralis*) which occur from time to time, so that these events can be properly documented and investigated.

Threats identified by CAMP participants

An analysis of the perceived (present or predicted) threats to the 30 species reviewed in this workshop (taxon data sheets, Item 7A), shows that loss of habitat is by far the most significant (26/30). Habitat loss may be a consequence of wetland drainage and infilling, habitat fragmentation (23/30), afforestation, crop farming, and invasive alien vegetation (19/30). Activities associated with afforestation often result in the siltation of streams, reduction of surface water, and altered fire regimes. Alien plant growth also increases the frequency and intensity of fires, which were cited as a threat to 11/30 species.

Other threats included pesticides (9/30), pollution (9/30), damming (7/30), road kills (6/30), introduced predators (4/30), grazing (3/30) and disease (2/30). Altered drainage patterns were cited as additional threats for several species.

Climatic change was also cited as a probable future threat for several species, but this threat was not included in the taxon data sheets because it is believed to be potentially relevant to all species and it is not yet clear which species are at higher risk from climatic changes than others. Climate change is likely to take the form of global warming, altered rainfall patterns, longer periods of drought, and the drying out of frog habitats.

Management recommendations

Since habitat loss, fragmentation and degradation are perceived to be the greatest threats facing southern African frogs, it is obvious that habitat management is of paramount importance, and was recommended for 28 of the 30 species assessed. However, we know very little about the specific ecological requirements of most species, hence limiting factor research was deemed necessary in 26/30 species, in order to identify factors critical to the survival of the species.

A distinct problem is that most, if not all of the habitat of some species, falls outside protected areas and cannot be managed effectively. For these species, it is important that statutory conservation areas be established to encompass as much of their respective areas of habitat as possible. Failing this, attempts should be made to create conservancies, Natural Heritage Sites and similar partnerships of understanding with the relevant landowners and managers and thus ensure appropriate habitat management.

Monitoring allows one to track changes in population size; this is especially important in the case of species with small distributions, because disease or some other catastrophic event could cause extinction of the species within a relatively short period of time. Monitoring was recommended for 27/30 species.

In 11/30 cases, it was felt that community-based environmental education programmes could be useful in raising public awareness of problems such as pollution and habitat loss and encourage the public to be more supportive of conservation initiatives.

Translocation was recommended as a management option for two species and sustainable utilization, for one species.

Population and Habitat Viability Assessment (PHVA) workshops were recommended for most of the threatened species, in order to develop comprehensive and achievable management plans. PHVA workshops provide a means of assembling available detailed biological information on the respective taxa, evaluating the threats to their habitat, the development of management scenarios with immediate and 100-year time-scales, and the formulation of specific management plans with the aid of simulation models. For those species that were indicated as being in need of a PHVA workshop in the near future, we wish to urge immediate planning for those evaluations.

With only partial understanding of the underlying causes of population declines in some species, it is often difficult to clearly define specific management actions needed for conservation. In such cases, research should precede management action, followed by surveys to evaluate the effectiveness of the actions taken. This information should then be fed back to researchers for modification of the management action, if necessary.

Captive breeding recommendations

A captive breeding programme was not recommended for any of the species assessed in this workshop.

THE SOUTHERN AFRICAN FROG ATLAS PROJECT (SAFAP)

With broad support from the herpetological community, the Southern African Frog Atlas Project (SAFAP) was launched in November 1995. Since then, SAFAP has gained the monetary backing of the South African Department of Environmental Affairs and Tourism, WWF-SA, the Mazda Wildlife

Fund, Total South Africa, the Declining Amphibian Populations Task Force and the South African National Research Foundation, putting the project on a firm financial footing. The project is co-ordinated from the Avian Demography Unit (ADU) at the University of Cape Town, assisted by regional organisers in the various provinces of South Africa, and in Lesotho and Swaziland.

Data are collected by volunteer members of the public and by professional herpetologists. Data are submitted mainly in the form of audio recordings of calling frogs. Being species specific and stereotyped, calls are a reliable form of evidence on which to base taxon identification. (Frogs are generally cryptic and hard to find, but even when in the hand, they tend to be difficult to identify because of variability in skin colour, markings and size.) All identifications are handled by experts – usually the regional organisers – unless a particular observer has proven ability. This approach ensures a high degree of reliability of the data. Supplementary sources of data are photographs and specimens of eggs, tadpoles and frogs. The tadpoles of most species can be reliably identified using features of gross morphology and mouth parts. Collection of adult specimens is generally discouraged for obvious conservation reasons.

SAFAP aims to comprehensively cover all 109 species of frogs in South Africa, Lesotho and Swaziland, on a quarter-degree (15'X15') grid; there are c. 2000 grid cells in the region. Because exact locations are often recorded using GPS technology, much of the data has good spatial accuracy. Where reliable pre-atlas data are available, e.g. from the literature and museum records, these are included in the SAFAP database; for some areas this may provide a useful historical dimension.

Frogs are neither popular nor easy to observe, with the result that relatively few volunteers contribute records of frogs; this places a heavy burden on the professional herpetologists to achieve adequate coverage of all areas and species. These fundamental problems are greatly exacerbated by the need to do most of the fieldwork at night when frogs are calling, and the fact that frogs cannot be found calling at all times of the year. The unpredictability of rain, and of the various species' responses to rain, are major stumbling blocks because a meticulously planned and expensive expedition can turn out to be a dismal failure if conditions are not right.

Despite the difficulties, to date (July 2000), c. 23 650 records, including c. 9000 pre-atlas records, have been entered for 75% of the grid cells, although many of these cells will require further visits to record additional species (Fig. 1). The greatest need is for more data from the arid western parts of South Africa where rainfall is both scarce and unpredictable, but where, nevertheless, several interesting species of frogs occur, and also from inaccessible montane areas. The quantity of records accumulated thus far already far exceeds anything compiled previously for frogs in southern Africa (e.g., Poynton 1964). From 2000 to 2002, gaps must be filled to achieve near-complete coverage of all grid cells, thereby creating one of the most detailed, comprehensive and large-scale distributional databases for amphibians in the world.

As should be the case in all modern biodiversity surveys, the aim is to survey all grid cells, thereby creating information in which negative data, i.e., the absence of records of species, is nearly as reliable as positive data, i.e., the recorded presence of species. Such completeness is an essential element of modern methodology because it allows one to interpret the data and reach conclusions which are of direct relevance to the conservation and macro-ecology of species. Other *ad hoc* data sets, which are often used to describe distribution, are bedevilled by the uncertainty surrounding the issues of how much missing information to interpolate and what the gaps in information might mean, if anything.

CONSERVATION ASSESSMENT AND MANAGEMENT PLANS (CAMPs)

Within the Species Survival Commission (SSC) of IUCN, The World Conservation Union, the primary goal of the Conservation Breeding Specialist Group (CBSG) is to contribute to the development of holistic and viable conservation strategies and management action plans. Toward this goal, CBSG is collaborating with agencies and other Specialist Groups worldwide in the development of scientifically based processes, on both a global and regional basis, with the goal of facilitating an integrated approach to species management for conservation. One of these tools is called the Conservation Assessment and Management Plan (CAMP).

CAMPs provide strategic guidance for the conservation of threatened taxa. This may include recommendations for field investigations and improved data-gathering methods, and the application of intensive management techniques that increasingly are required for survival and recovery of threatened taxa. The CAMP process ensures an objective overall view of the status of the taxa in question with the intent of improving the effectiveness and synergy of conservation efforts. CAMPs also are one means of testing the applicability of the new IUCN Red List criteria for threat (IUCN 2000) as well as the scope of their applicability. Additionally, CAMPs are an attempt to produce ongoing summaries of current data for groups of taxa, providing a mechanism for recording and tracking of species' status.

CAMP recommendations are broad-based: of paramount importance are those recommendations related to field surveys, applied investigations and *in situ* conservation and management programs. Ultimately, the survival of taxa in the wild will depend on the availability of field data regarding the status of natural populations, the ecological role of the species (and its interdependence on other taxa), life history parameters, and applied investigations related to management and conservation. Where such data are lacking, a primary recommendation of the CAMP will be to stimulate their collection.

In addition to management of taxa in their natural habitat, conservation programs leading to viable populations of threatened species may sometimes need a captive component. In general, captive populations and programs can serve several roles in holistic conservation: (1) as genetic and demographic reservoirs that can be used to reinforce wild populations either by revitalising populations that are languishing in natural habitats or by re-establishing by translocation populations that have become depleted or extinct; (2) by providing scientific resources for information and technology that can be used to protect and manage wild populations; and (3) as living ambassadors that can educate the public as well as generate interest in and funds for *in situ* conservation. Additionally, non-threatened taxa can serve as "surrogate" species, which can be used to develop husbandry and propagation techniques that later can be applied to threatened species.

Captive management programs should only be developed in conjunction with ongoing field investigations and holistic conservation initiatives. It should be emphasised that captive breeding is not the answer to the extinction crisis and should not be viewed as a complete solution. It is one option along a continuum of strategic options for population recovery. If implemented, these programs should be part of an integrated species management plan that includes habitat management, limiting factors management, field research, and public education. A recovery effort that is not part of a holistic population management program in the wild does not have a high probability of making a meaningful contribution to conservation.

THE SOUTHERN AFRICAN FROG CAMP PROCESS

CAMP workshop goals

The goals of the CAMP workshop were:

- To review the population status and demographic trends for the selected Southern African frog species and to apply the newest IUCN Red List criteria for threat (IUCN 2000; see Appendix II).
- To provide recommendations for *in situ* management, research and information-gathering for all reviewed taxa, including: field investigations; surveys, population monitoring and investigation of limiting factors; taxonomic studies; recommendations for PHVA workshops; more intensive management in the wild; or other specific research.
- To provide recommendations for *ex situ* management and research for the taxa, including husbandry, maintenance of viable captive populations of the more threatened species (where appropriate, feasible, and desirable) and the development of collaborative captive/field programs.
- Produce a review draft Conservation Assessment and Management Plan, presenting the assessments and recommendations from the workshop for distribution to and review by workshop participants and all parties interested in frog conservation.

Scope of the CAMP

Although only 30 species were discussed in detail during the workshop, the whole species assemblage (109 species) was considered in a selection process prior to the workshop. All the workshop participants were involved in the selection process, and the 30 selected species were those deemed to require a detailed assessment. By implication, therefore, the other 79 species are considered to be of Least Concern, although this cannot be stated categorically because they were not subjected to the assessment process of the CAMP, and therefore have to be categorized as Not Evaluated.

Of the 30 species assessed, 29 are endemic to the region comprising South Africa, Lesotho and Swaziland, i.e., the region covered by SAFAP and the CAMP. For those 29 species, therefore, the assessment of status in terms of the IUCN criteria was a *global assessment*. The single exception is the Giant Bullfrog *Pyxicephalus adspersus* which is not endemic to the region, and was therefore given a *regional assessment*.

CAMP procedure

The CAMP process assembles expertise on wild and captive management for the taxonomic group under review in an intensive and interactive workshop format. The purpose of the Southern African Frog Conservation Assessment and Management Plan (CAMP) workshop was to assist in the development of a database for 30 selected southern African frog species, and to assist in the further development of a conservation strategy for these species. This process was designed to be complementary to SAFAP. Twenty-two people (see Appendix I) participated in the 4-day event, which was hosted by SAFAP and the Avian Demography Unit (ADU), University of Cape Town. The ADU, SAFAP and Sea World Inc., generously sponsored the workshop.

Prior to the workshop, the taxon data forms were distributed to the participants so that each could assemble appropriate data for the species to be evaluated. Using that material as background, the workshop focused on compiling all available information concerning the status of the 30 species. The completed Taxon Data Sheets can be found in Section 2 of this report.

Participants in the CAMP worked in three groups to make the assessments and recommendations contained within this document. These assessments and the recommendations of the working groups were discussed in plenary sessions during which the group reached consensus on the data. Subsequently, a draft report was produced and distributed to the editors. The editors refined the wording and added missing information to the Taxon Data Sheets for the final report. Although the criteria were modified in a number of cases, in only one case, that of *Strongylopus wageri*, was the original classification changed, namely from Least Concern to Near Threatened.

The classification of frogs as presented in the Taxon Data Sheets follows Frost (2000) in respect of family, genus and species, the only exceptions being our acceptance of the genera *Afrana, Amietia* and *Strongylopus* being separated from the cosmopolitan genus *Rana* (see Dubois 1992). Synonyms were selected from those listed by Frost (2000).

Maps

Distribution maps for the species considered by this workshop can be found with the Taxon Data Sheets. These are interim maps, provided by SAFAP, and will be updated when SAFAP publishes an atlas of the frogs of the region in 2003. The maps use a quarter-degree grid (15 minutes of latitude by 15 minutes of longitude) which yields approximately 2000 grid cells for the region. The maps show the presence/absence of species per grid cell.

Most of the data in the database has been collected specifically for SAFAP since 1995. The SAFAP database includes data obtained from museum and other collections and most of these records pre-date SAFAP. To distinguish between recent and older records, the distribution maps use a cross (X) for all pre-1990 records, and a filled circle for all post-1989 records. Interim (July 2000) atlas maps are presented in this report, except for three species, *Athroleptella ngongoniensis, Hemisus guttatus Hyperolius pickersgilli* and *Strongylopus wageri*, which have more recent (June 2001) interim maps.

Camp document review

The preliminary CAMP document generated at the workshop was reviewed by a group of volunteer editors who participated in the CAMP workshop. IUCN Red List Assessments were forwarded to the SSC Red Listing Authority in Cambridge, U.K. Additional review and comment may take place after the distribution of the final report from this workshop to a broader audience, which includes amphibian biologists, wildlife managers, Specialist Group members, academic scientists, regional captive programs, and other interested parties worldwide. This document may be revised and updated as necessary. As with all CAMPs, this should be considered a “living” document to be updated as situations change.

THE NEW IUCN RED LIST CATEGORIES

The threatened species categories now used in IUCN Red Data Books and Red Lists have been in place, with some modification, for almost 30 years (Mace et al. 1992). The Mace-Lande criteria (Mace and Lande 1991) were an early developmental step in an attempt to make those categories more explicit. These criteria subsequently have been revised and formulated several times into the current IUCN Red List Categories (IUCN 2000).

During the workshop, the 30 frog taxa were evaluated on a taxon-by-taxon basis, in terms of their current and projected status in the wild, in order to assign priorities for conservation action or information-gathering activities. Data used in this evaluation were based primarily on a best-estimate basis as gathered by workshop participants, and may be subject to further review by other experts in the field.

The New IUCN Red List Categories provide a system that facilitates comparisons across widely different taxa, and is based both on population and distribution criteria. These criteria can be applied to any taxonomic unit at or below the species level, with sufficient range among the different criteria to enable the appropriate listing of taxa from the complete spectrum of taxa, with the exception of micro-organisms (Mace et al. 1994).

The complete reference for the new IUCN Red List Categories of Threat can be found in Appendix II. The New IUCN Red List Categories are: Extinct (EX); Extinct in the Wild (EW); Critically Endangered (CR); Endangered (EN); Vulnerable (VU); Near Threatened (NT); Least Concern (LC); Data Deficient (DD); and Not Evaluated (NE). Definitions of these categories are based on population viability theory. In assessing threat according to the New IUCN Red List criteria, workshop participants also used information on the status and interaction of habitat and other characteristics. Information about population trends, fragmentation, range, threats, stochastic environmental events, real and potential, were also considered.

To assist in making recommendations, participants in the workshop were encouraged to be as quantitative or numerate as possible for two reasons: (1) CAMPs ultimately must establish numerical objectives for viable population sizes and distributions; (2) numbers provide for more objectivity, less ambiguity, more comparability, better communication, and, hence, co-operation. During the workshop, there often were attempts to estimate if the total population of each taxon was greater or less than the numerical thresholds for the numeric criteria for the IUCN Categories of Threat, where applicable. In most cases, current population estimates for taxa were unavailable or available for species/subspecies within a limited part of their distribution. In all cases, if presented, conservative numerical estimates were used. **When population numbers were estimated or inferred from data present at the workshop, these estimates generally represented first-attempt, order-of-magnitude, educated guesses that can serve as hypotheses for falsification. As such, the workshop participants emphasised that these estimates should not be regarded as authoritative for any purpose other than the CAMP process.**

The new IUCN Red List status classifications for the 30 taxa examined during this CAMP exercise are presented in Table 1. Several of these assessments represent changes from the assessments reported in the national Red Data book (Branch 1988), the 1996 IUCN Red List, and the 2000 IUCN Red List.

Table 1. Selected southern African frog species assessed during the CAMP workshop, and their newly assigned IUCN Red List Categories of Threat.

SPECIES	IUCN CATEGORY ASSIGNED	IUCN CRITERIA MET
Arthroleptella ngongoniensis	CR	B2ab(ii,iii,iv,v)
Heleophryne hewitti	CR	B1ab(ii,iii,iv,v)
Heleophryne rosei	CR	B1ab(ii,iii,v)+2ab(ii,iii,v)
Microbatrachella capensis	CR	B2ab(i,ii,iii,iv,v)
Bufo pantherinus	EN	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)
Hyperolius pickersgilli	EN	B2ab(ii,iii,iv)
Leptopelis xenodactylus	EN	B2ab(ii,iii,iv)
Natalobatrachus bonebergi	EN	B2ab(ii,iii,iv)
Xenopus gilli	EN	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)
Cacosternum capense	VU	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)
Capensibufo rosei	VU	B1ab(ii,iii,iv)+2ab(ii,iii,iv)
Anhydrophryne rattrayi	NT	
Arthroleptella drewesii	NT	
Arthroleptella landdrosia	NT	
Arthroleptella lightfooti	NT	
Breviceps gibbosus	NT	
Breviceps macrops	NT	
Breviceps sylvestris	NT	
Bufo amatolicus	NT	
Hemisus guttatus	NT	
Poyntonia paludicola	NT	
Pyxicephalus adspersus	NT	
Strongylopus wageri	NT	
Afrana vandijki	DD	
Afrixalus knysnae	DD	
Bufo robinsoni	DD	
Cacosternum striatum	DD	
Strongylopus springbokensis	DD	
Bufo angusticeps	LC	
Bufo pardalis	LC	

30 SPECIES EVALUATED	**see Taxon Data Sheets on pages**
4 Critically Endangered (CR)	**31-51**
5 Endangered (EN)	**52-78**
2 Vulnerable (VU)	**79-90**
12 Near Threatened (NT)	**91-152**
5 Data Deficient (DD)	**153-177**
2 Least Concern (LC)	**178-187**

DEVELOPING A PLAN OF ACTION FOR SOUTHERN AFRICAN FROGS

After CAMP assessments were completed, participants used the remaining time to work together to identify the broad issues and problems affecting the conservation of southern African frogs. Three working groups were set up: Conservation Planning and Implementation, Monitoring, and Research. Each group was asked to examine the issues identified under its topic and to group issues under common themes, and to prioritise and describe each issue in more detail.

Each group then identified promising solutions that could address each issue, prioritised the solution(s) and indicated a timeline for when the solution(s) should be begun and completed, and a group or individual to take on the role of a "champion", whether it is to carry out the task personally or to recruit others to help.

WORKING GROUP ON CONSERVATION PLANNING AND IMPLEMENTATION

Issue 1: Legislation

There is currently a process underway to consolidate national policy on the conservation and utilisation of reptiles and amphibians. Participation in policy review and drafting is recommended. The following issues are considered to be important:

- trade in amphibians
- commercial utilisation
- herpetological collecting
- Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) reports should include amphibians. Relevant results from these studies should feed back to conservation planning agencies.
- Water Reserve Determinations must be done to maintain amphibian habitat.

Solution 1:
Participation by all provincial and other conservation agencies in the process of consolidation and review of national policy on the conservation and utilization of reptiles and amphibians in South Africa. National legislative strategy must be adopted by the provincial authorities.
Champion: Ernst Baard of the Western Cape Nature Conservation Board.
Time Line: from 2001, ongoing.

Issue 2: Conservation planning

1 Additional data are needed for conservation. For example,
   a) What taxa do we have?
   b) Where do these taxa occur?
   c) Which taxa are threatened?
   d) What are the threats? Where do these threats operate?
   e) What areas are especially important for frog conservation?
   f) What is the conservation status of those areas?
   g) Where are the conservation gaps?
   h) How do the frog distributions relate to the spatial arrangement of other environmental factors?
2 A new Red Data book for South African frogs is needed.
3 Population and Habitat Viability Assessments (PHVAs) are needed for several species.

Solution 2.1a:
Undertake a taxonomic review of this group.
Champions: Alan Channing and Bill Branch.
Time Line: 2000 to end of 2001.

Solution 2.1b:
Continue data collection for the Southern African Frog Atlas Project and publish the atlas.
Champions: James Harrison, Marius Burger and Les Minter
Time Line: 2000 to end of 2002.

Solution 2.1c&d:
Publish the CAMP report.
Champions: James Harrison, Marius Burger, Les Minter, Susie Ellis.
Time Line: 2000 to mid-2001.

Solution 2.1e, f, g & h:
Undertake an analysis of distribution to identify patterns of distribution, endemism "hotspots", "Important Frog Areas", etc., as part of the atlas publication.
Champions: James Harrison, Marius Burger, Graham Alexander and Les Underhill.
Time Line: 2000 to end of 2002.

Solution 2.2:
Publish a new Red Data book. Explore the potential for doing this as part of the atlas publication. Further data may be needed for certain taxa.
Champions: James Harrison, Marius Burger, Les Minter and Bill Branch.
Time Line: 2000 to end of 2002.

Solution 2.3:
Organize PHVAs for selected species.
Champions: James Harrison, Andrew Turner, Atherton de Villiers and Ernst Baard, and Bill Branch, with assistance from IUCN.
Time Line: 2001 and beyond.

Issue 3: Funding for conservation action

Actions which need funding include:
- research into taxonomy, life histories, limiting factors
- surveys of taxa
- populations monitoring
- education and awareness programmes
- enlargement and establishment of protected areas
- management of existing protected areas
- control of trade and utilisation
- herpetological capacity building in conservation agencies.

Solution 3:
- Cape Action Plan for the Environment (CAPE) is a probable source of funding for the Cape Floristic kingdom (biodiversity research, baseline surveys, planning, monitoring).
- International donor funding (via Department of Environmental Affairs and Tourism).
- Paper companies for sponsorship of Red Data book and atlas.

Champion: Ernst Baard (for CAPE), Geoff Cowan (foreign donors), James Harrison to send proposal to Cowan.

Time Line: 2000 to the end of 2003.

Issue 4: Frogs as a resource

The conservation of frogs can be promoted by highlighting their value as a resource, in the following areas:

- indicator species, especially for wetland health
- ecological value as predators and prey
- commercial value, derived from their ecological value, but also as a food resource for human consumption, medical use, etc.
- educational resource
- ecotourism attractions.

Sustainable levels of utlilsation need to be ascertained.

Issue 5: Education and awareness

The conservation of frogs is promoted by education and greater awareness. Aspects to focus on include:

- ecological value of frogs as predators and prey
- the diversity of the South African amphibian fauna
- the biological interest of the fauna (e.g., habitats, life cycles, etc.)
- frogs and tadpoles as examples of biological and environmental concepts
- myths about frogs
- potential for urban conservation of amphibians
- ecotourism value (e.g. Giant Bullfrog).

WORKING GROUP ON MONITORING

Why monitor frogs in South Africa?

- In general we lack baseline data for population studies, especially for potentially endangered species.
- We have no idea how the well-documented global decline in amphibians is affecting Africa, and thus cannot make informed statements about South African frog populations.
- South Africa has a high level of endemism, especially in the south-western Cape, and this warrants special attention be paid to the conservation status of endemics.
- As changes in climate have been predicted, we need to start or intensify monitoring so we can detect change, especially in the endemic species of the winter-rainfall region, as they may be especially vulnerable to change.
- We have a growing human population with a high rate of urbanisation and are thus losing natural habitat rapidly.
- We lack data on environmental quality and habitat viability, especially in agricultural and forestry areas.
- We need to determine how stable populations are, including metapopulation dynamics, and distinguish source from sink populations, etc.
- We lack long-term ecological data sets which are essential to sound conservation planning.

Two basic issues were identified:
1. surveying distributions,

2. monitoring the populations and habitats of threatened and sensitive species.

1. Issues in distribution surveys

- Past distribution surveys have been erratic and scarce, with SAFAP being the first comprehensive effort to assess the distributions of southern African frogs on the basis of recently collected data.
- Accurate distribution maps are essential to initiate conservation planning for individual species.
- In southern Africa, we have a large frog fauna, but a small population of herpetologists, and the fauna remains largely understudied, unlike the situation in America and Europe. We are seriously behind in basic studies, with Anura being one of the least studied vertebrate groups in Africa. In addition, we have lost 50% of the herpetological posts in South Africa in the last 5 years.

Accurate patterns of distribution and macro-ecology of frogs need to be documented and studied so that we can

a) accurately detemine range contraction and expansion;
b) identify habitat requirements;
c) identify declining and threatened populations which need monitoring;
d) plan conservation and management;
e) identify patterns of endemism.

Solutions:

SAFAP will solve most of the distribution problems.
Champions: Marius Burger, James Harrison, Les Minter.
Timeline: 2000 to end of 2002.

2. Issues in populations monitoring

1. Habitat loss to development necessitates that Environmental Impact Assessments (EIAs) include wetlands and that relevant species of frogs be highlighted.
2. Endemic species should enjoy special attention.
3. Long term ecological data sets need to be established as a basis for future research.
4. The success of rehabilitation attempts, e.g., quarry sites at Kleinmond, needs to be evaluated. (Funding for this should be the responsibility of the company and be written into the “resource consent” document.)

Problems:

a. In South Africa there is a lack of funding to support monitoring efforts, even for species where we know it is imperative, e.g., *Arthroleptella ngongoniensis*.
b. There is a lack of local expertise in standard monitoring techniques used in other countries.
c. There is a lack of baseline information.
d. Lack of equipment for monitoring, e.g., automatic data loggers.
e. Concerns about safety in the field, and theft of equipment left out in the field.

Solutions:
First priority: long-term ecological monitoring stations. Four initial sites suggested, but more sites recommended:
Mtunzini, in the coastal dune forest in northern KwaZulu-Natal (resuscitate existing set-up)
Champion: Phil Bishop
Timeline: Underway, initiated in 1994.
Hans Merensky, savannah
Champion: Les Minter
Timeline: In place.
Royal Natal National Park, sour grasslands
Champion: Angelo Lambiris and/or KwaZulu-Natal Conservation Service
Timeline: Unknown, perhaps 5 years.
Western Cape (low to high altitude gradient)
Champion: Atherton de Villiers
Timeline: Unknown, perhaps 3 years.

Funding and manpower are limiting factors, but overseas funding could be sought after detailed proposals have been written.

The South African Long Term Ecological Research (LTER) committee is considering a network of LTER sites, e.g., grassland, savannah, fynbos, as part of the international LTER. Selection is based on global issues such as climatic change. National Research Foundation (NRF) was identified as the primary funder and driver for South Africa (Chairperson: Albert Van Jaarsveld, University of Pretoria). A herpetologist(s) should join this effort.

Bill Branch suggested that monitoring studies be initiated in National Parks throughout the country, and an attempt be made to get the National Parks Board to become involved and eventually take over responsibility. Provincial nature conservation agencies have the responsibility to study their biota in the same manner as the Western Cape Nature Conservation Board, both inside and outside protected areas; the NRF should be approached for support.

Partnerships between interested parties need to be established, e.g., university or technicon students (zoology, nature conservation) could be used in the annual surveys of nature conservation agencies, as part of their coursework component.

Starting a long-term Anuran monitoring programme may require a national coordinator with three to five full-time employed workers at different stations. The latter individuals will do most of the monitoring and also liaise with universities, etc. to compliment these efforts. Methods as per Heyer et al. (1993). Information from diverse institutions, e.g., the Weather Bureau, needs to be assimilated.

Individual herpetologists and/or zoology/nature conservation departments of universities/technicons, and/or natural history museums, could monitor populations at specific sites, using standardized procedures, in collaboration with the national long-term monitoring coordinator. Previously unsurveyed areas should be identified and prioritized for initial, exploratory surveys, especially by museums. Surveys and monitoring could be relatively easy to do with minimal costs, as volunteer students can easily be found for data collection. Overseas funding may be needed as the government has cut budgets and frozen posts dramatically.

WORKING GROUP ON RESEARCH

An analysis of the taxon data sheets (Item 14. Supporting research recommended for the taxon), shows that little basic information is available for most of the 30 frog species reviewed in this workshop. Participants felt that field surveys were need for all species in order to clarify distribution patterns, population densities etc., limiting factor research i.e., ecological studies, were recommended for 18, life history studies for 16, genetic studies for 9 and taxonomic research for 8 species. Information on the life history and ecology of most other frog species in the region is also incomplete or totally unknown.

The Working Group on Research identified and prioritised the following issues:

Issue 1. Life history & ecology

The lack of knowledge of the life histories and ecology of most of our frog species, and the importance of this information for planning conservation strategies, places this category of research high on the priority list. Of the 30 frog species assessed during the workshop, supporting research into life histories was recommended for 16 species and limiting factor research (ecological study) for 18. A specific concern was the effect of stocking dams and rivers with exotic predatory fish which pose a potential threat to indigenous species of frogs at all stages of their life cycles. This threat needs to be investigated to determine the extent and effect of this predation on local frog populations.

Solution 1.1:
The CAMP report and recommendations identify specific research needs for species dealt with in the CAMP workshop and could inform the planning of new, or revision of existing research projects.
Champions: authors & editors of the CAMP Report
Timeline: 2001

Solution 1.2:
The Southern African Frog Atlas and Red Data Book will identify certain research needs for all southern African frog species.
Champions: SAFAP authors & editors.
Time line: 2003.

Issue 2. Taxonomy

An established, stable classification is a basic prerequisite in all areas of biological research. This stage has not yet been reached in southern Africa as new frog species are still being discovered and described at a steady rate (alpha taxonomy) and their inter-relationships at generic and family levels have not been satisfactorily resolved (beta taxonomy). Taxonomic research was recommended for 8 of the frog species assessed during the workshop. Without increased funding for taxonomic research and the creation of posts for taxonomists, the potential for tapping the rich biodiversity of this country will not be fully realised.

Solution 2.1:
The opportunity should be taken, whenever possible, to highlight the importance of taxonomic research, in order to inform and influence research facilitators at research institutions, and funding bodies. Also see 4.1, 5.1 & 5.2 below.
Champions: all workshop participants.
Timeline: ongoing.

Issue 3. Applied research

Areas of applied research such as the use of adult frogs and tadpoles as bio-indicators of habitat quality, the pharmacological properties of frog skin secretions, and the potential for sustainable utilization of certain species, have received too little attention in southern Africa.

Solution 3.1:
Applied research attracts more funding than pure research because of its more obvious short-term benefits. This fact sould be used to advantage by combining both pure and applied aspects within one research project.
Champions: researchers and research facilitators.
Timeline: ongoing.

Solution 3.2:
Local herpetologists should familiarise themselves with the current use of amphibians in applied research and establish linkages with the appropriate scientific disciplines to investigate the potential of our local fauna.
Champions: researchers and research facilitators.
Timeline: ongoing.

Issue 4. Funding

Increased levels of funding are required from the National Research Foundation (NRF), the Department of Environmental Affairs & Tourism (DEAT), universities & NGOs to address the research needs identified in this workshop.

Solution 4.1:
Efforts should be made to raise the level of funding and seek new sources. Progress in this respect should be communicated to researchers.
Champions: G. Cowan and J. Dini (DEAT), Les Minter, James Harrison.
Time line: As and when projects are identified.

Solution 4.2:
Improve the image of herpetology through articles, public lectures, posters, books, contributions to textbooks, articles in teaching journals, etc.
Champions: All CAMP delegates, also with the aid of the communications sections of the conservation agencies.

Issue 5. National research capacity and output

A scarcity of local herpetologists seriously limits research output. This is due to, and exacerbated by staff reductions at museums, universities, national and provincial conservation departments and other governmental research institutes. With such poor prospects for finding employment it is not surprising that few young scientists are attracted to, or remain in this area of research. The number of active herpetologists can therefore be expected to dwindle with the passage of time.

Solution 5.1:
Letters of concern should be sent to people in positions of authority, such as the Minister of Environment and Tourism (Valli Moosa), the chairperson of the Portfolio Committee for the Environment (Gwen Mahlangu) and Provincial MECs (Environment). The importance of maintaining and utilizing local biodiversity, and our commitments in respect of international agreements pertaining to the environment should be stressed.

Champions: James Harrison, Bill Branch.
Time line: To coincide with the publication of the CAMP document.

Solution 5.2:
The establishment of an African Amphibian Research Centre would stimulate interest in the study of amphibians, facilitate research on amphibians here and in other African countries, focus effort on high priority research projects and provide employment for local herpetologists and facilities for visiting herpetologists. The Centre could also co-ordinate monitoring projects at various sites throughout the country, maintain an atlas database, a reference collection of preserved specimens and tissues, a tape library of calls, and a collection of published works on African amphibians.
Champion: Les Minter
Timeline: ongoing.

REFERENCES

Acocks J.P.H. 1988. Veld types of South Africa. Memoirs of the Botanical Survey of South Africa 57: 1-146.

Allan D.G., Harrison J.A., Herremans M., Navarro R.A., & Underhill L.G. 1997. Southern African geography: its relevance to birds. In: The atlas of southern African birds. Vol. I: Non-passerines. Harrison J.A., Allan D.G., Underhill L.G., Herremans M., Tree A.J., Parker V. & Brown C.J. (eds), pp. lxv-ci. BirdLife South Africa, Johannesburg.

Alexander G. 1998. Understanding distribution. In: Frogs and frog atlasing in southern Africa. Harrison J.A. & Burger M. (eds). ADU Guide 4, Avian Demography Unit, Cape Town. pp. 29-31.

Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux A. & Mouton P. le F.N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublish Report of Cape Nature Conservation.

Bates M.F. 1991. New distribution records for amphibians and reptiles from the Cape Province, South Africa. J. Herp. Assoc. Afr. 39: 14-18.

Bates M.F. 1995. Distribution and diversity of amphibians in the Free State, South Africa. Madoqua 19(1): 3-14.

Bates M.F. 1995. Atlas of frog distribution in the Free State, South Africa. Afr. Herp. News 23: 15-31.

Bates M.F. 1997. Herpetofauna of the nature reserves and national parks of the Free State province of South Africa. Afr. J. Herpetol. 46(1): 13-29).

Bates M.F. 1998. Frogs of the arid regions. In: Frogs and frog atlasing in southern Africa. Harrison J.A. & Burger M. (eds). ADU Guide 4, Avian Demography Unit, Cape Town. Pp. 49-52.

Begg G.W. 1990. Policy proposals for the wetlands of Natal and KwaZulu. Natal Town and Regional Planning Commision report 75.

BCPP CAMP Report 1998. Amphibians of India. Zoo Outreach Organisation, India.

Berger L., Speare R., Daszak P., Green D., Cunningham A., Goggin L., Slocombe R., Ragan M., Hyatt A., McDonald K., Hines H., Lips K., Marantelli G. & Parkes H. 1998. Chytridiomycosis causes amphibian mortality associated with population declines in the rain forests of Australia and Central America. Proceedings of the National Academy of Science 95: 9031-9036.

Blaustein A.R. & Wake D.B. 1990. Declining amphibian populations. A global phenomenon? Trends Ecol. Evol., 5: 203-204.

Blaustein A.R. & Wake D.B. 1995. The puzzle of declining amphibian populations. Scientific American. 1995(April): 56-61.

Blaustein A.R., Wake D.B. & Sousa W.P. 1994. Amphibian declines: Judging stability, persistence and susceptibility of populations to local and global extinction. Conserv. Biol., 8: 60-71.

Boycott R.C. 1982. On the taxonomic status of *Heleophryne regis* Hewitt, 1909 (Anura: Leptodactylidae). Ann. Cape Prov. Mus. 14(3): 89-108.

Boycott R.C. 1988. Description of a new species of *Heleophryne* Sclater, 1899 from the Cape Province, South Africa (Anura: Heleophrynidae). Ann. Cape Prov. Mus. 16(11): 309-319.

Boycott R.C. 1988. *Heleophryne hewitti*: species account. P 33-35. In: South African Red Data Book - Reptiles and Amphibians. Branch, W.R. (ed.), S. Afr. Nat. Sci. Prog. Rpt. 151.

Boycott R.C. & De Villiers A.L. 1986. The status of *Heleophryne rosei* Hewitt (Anura: Leptodactylidae) on Table Mountain and recommendations for its conservation. S. Afr. J. Wildl. Res. 16: 129-134.

Bradford D.F. 1991. Mass mortality and extinction in a high-elevation population of *Rana muscosa.* J. Herpetol., 25(2): 174-177.

Branch W.R. (ed.) 1988. South African Red Data Book - Reptiles and Amphibians. S. Afr. Nat. Sci. Prog. Rpt. 151, iv, 109 pp.

Branch W.R. 1988. Terrestrial reptiles and amphibians. p 251-264. In: A Field Guide to the Eastern Cape Coast. Lubke R.A., Gess F.W. & Bruton M.N. Wildlife Soc. S. Afr. (Grahamstown centre), 520 pp.
Branch W.R. 1990. The Herpetofauna of the Cape Province, South Africa: New distribution records and zoogeography. J. Herpetol. Assoc. Afr. 37: 17-44.
Branch W.R. & Bauer A.M. 1995. Herpetofauna of the Little Karoo, Western Cape, South Africa with notes on life history and taxonomy. Herpetol. Nat. Hist. 3(1): 47-89.
Branch W.R. & Braack H.H. 1987. Reptiles and amphibians of the Addo Elephant National Park. Koedoe 30: 61-111.
Branch W.R. & Braack H.H. 1989. Reptiles and amphibians of the Karoo National Park: A surprising diversity. In: Proceeding of the first HAA Conference, Stellenbosch, W.R. Branch (ed.) J. Herpetol. Assoc. Afr. 36: 26-35.
Branch W.R. & Hanekom N. 1987. The Herpetofauna of the Tsitsikamma Coastal and Forest National Parks. Koedoe 30: 49-60.
Branch W.R. 1994. Let their songs be heard: frogs – jewels of the wetlands. Africa, Environment and Wildlife. 2: 40-47.
Breen C.M. & Begg G.W. 1989. Conservation status of southern African wetlands. In: Huntley B.J. (ed.) Biotic diversity in southern Africa: concepts and conservation. pp. 254-263. Oxford University Press, Cape Town.
Brown L.R., Gardner G. & Halweil B. 1999. Beyond Malthus: Nineteen dimensions of the population challenge. Washington, DC: Worldwatch Institute.
Burger M. 1997. The current status of amphibians and reptiles in the Eastern Cape. The Naturalist 41(3): 31-34.
Carruthers V.C. & Robinson G.A. 1977. Notes on amphibia in the Tsitsikamma National Parks. Koedoe 20: 115-123.
Channing A. 1976. Life Histories of Frogs in the Namib Desert. Zool. Afr. 11: 299-312.
Channing A. 1998. Tadpoles as bio-indicators of stream quality: A baseline study. WRC Report 718/1/98, 78 pp.
Channing A. 1999. Historical overview of amphibian systematics in southern Africa. Trans. Roy. Soc. S. Afr. 54(1): 121-135.
Channing A. & Bogart J.P. 1996. Description of a tetraploid *Tomopterna* (Anura: Ranidae) from South Africa. S. Afr. J. Zool. 31(2): 80-85.
Channing A., Boycott R.C. & Van Hensbergen H.J. 1988. Morphological variation of *Heleophryne* tadpoles from the Cape Province, South Africa (Anura: Heleophrynidae). J. Zool., Lond. 215: 205-216.
Channing A. & Griffin M. 1993. An annotated checklist of the frogs of Namibia. Madoqua 18(2): 101-116.
Channing A. & Van Dijk D.E. 1995. Amphibia. In: Cowan G.I. (ed.) Wetlands of South Africa. Department of Environmental Affairs and Tourism, Pretoria.
Cook C. 1996. Aspects of the breeding biology and ecology of the Giant Bullfrog, *Pyxicephalus adspersus.* Unpublished M.Sc. Thesis.
Cowan G.I. (ed) 1995. Wetlands of South Africa. Dept. Enviro. Affairs & Tourism, Pretoria, 291 pp.
Cowling R. & Richardson D. 1995. Fynbos, South Africa's unique floral kingdom. Fernwood Press, Cape Town.
Crump M.L., Hensley F.R. & Clark K.L. 1992. Apparent decline of the golden toad: underground or extinct? Copeia 1992(2): 413-420.
Daszak P., Berger L., Cunningham A.A., Hyatt A.D., Green D.E., & Speare R. 1999. Emerging infectious diseases and amphibian declines. Imerging Infectious Diseases 5: 735-748.
De Villiers A.L. 1988. *Microbatrachella capensis*: species account. pp. 29-32. In: South African Red Data Book - reptiles and amphibians. Branch W.R. (ed.), S. Afr. Nat. Sci. *Prog. Rpt.* 151.
De Villiers A.L. 1988. *Breviceps gibbosus*: species account. pp. 46-48. In: South African Red Data book - reptiles and amphibians. Branch, W.R. (ed.), S. Afr. Nat. Sci. Prog. Rpt. 151.

De Villiers A.L. 1988. *Cacosternum capense*: species account. pp. 123-125. In: *South* African Red Data Book - reptiles and amphibians. Branch, W.R. (ed.), S. Afr. Nat. Sci. Prog. Rpt. 151.
De Villiers A.L. 1997. Monitoring the distribution and conservation status of threatened amphibians in the southwestern Cape. pp. 142-148 In: Proceedings of the Third H.A.A. Symposium, 1993, Pretoria. Van Wyk J.H. (Ed.), RotaPress, Cape Town.
Drinkrow D.R. & Cherry M.I. 1995. Anuran distribution, diversity and conservation in South Africa, Lesotho and Swaziland. S. Afr. J. Zool. 30(3): 82-90.
Dubois A. 1992. Notes sur la classification des Ranidae (Amphibiens Anoures). Bull. Mens. Soc. Linn. Lyon. 61: 305-352.
Dunson W.A., Wyman R.L. & Corbett E.S. 1992. A Symposium on Amphibian Declines and Habitat Acidification. J. Herpetol. 26: 349-352.
Frost D.R. 2000. Amphibian Species of the World: An online reference. V2.20 (1 September 2000). [http://research.amnh.org/herpetology/amphibia/index.html]
Gibbs J.P. 1993. Importance of small wetlands for the persistence of local populations of wetland-associated animals. Wetlands 13: 25-31.
Glaw F. & Kohler J. 1998. Amphibian species diversity exceeds that of mammals. Herp Review 29: 11-14.
Greig J.C., Boycott R.C. & De Villiers A.L. 1979. Notes on the elevation of *Rana fasciata montana* FitzSimons, 1946 to specific rank, and on the identity of *Rana fasciata sensu* Burchell, 1824 (Anura: Ranidae). Ann. Cape Prov. Mus. 13(1): 1-29.
Greig J.C. 1981. The reptiles, amphibians and fish of the coastal lowlands of the Western Cape. P 27-29. In: Proceedings of a Symposium on Coastal Lowlands of the Western Cape. Moll E. (ed.), Univ. Western Cape.
Harrison J.A. 1998. Breeding strategies in southern African frogs. In: Frogs and frog atlasing in southern Africa. Harrison J.A. & Burger M. (eds). ADU Guide 4, Avian Demography Unit, Cape Town. pp. 32-35.
Harrison J.A. & Burger M. (eds) 1998. Frogs and frog atlasing in southern Africa. ADU Guide 4, Avian Demography Unit, Cape Town.
Harrison J.A., Burger M. & Ellis S. (eds) 2000. Conservation assessment and management plan for southern African frogs. Draft Report. IUCN/SSC Conservation Breeding Specialist Group: Apple Valley, MN.
Hewitt J. 1937. A Guide to the Vertebrate Fauna of the Eastern Cape Province. Part II. Reptiles, Amphibians and Freaswater Fishes. Albany Mus., Grahamstown.
Heyer W.R., Donelly M.A., McDiarmid R.W., Hayek L.C. & Foster M.S. (eds) 1994. Measuring and monitoring biological diversity - standard methods for amphibians. Smithsonian Institution Press, Washington, 364 pp.
Huntley B.J. 1984. Characteristics of South African biomes. In: Ecological effects of fire in South African ecosystems. Booysen P. de V. and Tainton N.M. (eds). Springer, Berlin. pp 2-17.
IUCN. 1996. 1996 IUCN Red List of Threatened Animals. IUCN, Gland, Switzerland.
IUCN. 2000. IUCN Red List Categories. Approved by the IUCN Council, Gland, Switzerland, February 2000.
Jacobsen N.H.G. 1989. A herpetological survey of the Transvaal. Unpublished Ph.D. thesis, University on Natal, Durban.
Kok D.J. & Seaman M.T. 1991. Aspects of the biology, habitat requirements and conservation status of *Natalobatrachus bonebergi* (Anura: Ranidae). Lammergeyer 40: 10-17.
Lambiris A.J.L. 1990. A review of the Amphibians of Natal. Lammergeyer 39: 1-210.
Longcore J.E., Pessier A.P. & Nichols D.K. 1999. *Batrachiochytrium dendrobatidis* gen. et sp. nov., a chytrid pathogenic to amphibians. Mycologica 91: 219-227.
Low A.B. & Rebelo A.G. 1996. Vegetation of South Africa, Lesotho and Swaziland. Dept. of Environmental Affairs & Tourism, Pretoria.
Mace G.M. & Lande R. 1991. Assessing extinction threats: toward a reevaluation of the IUCN threatened species categories. Conservation Biology 5: 148-157.

Mace G.M., Collar N., Cooke J., Gaston K., Ginsberg J., Leader-Williams N., Maunder M., & Milner Gulland E.J. 1992. The development of the new criteria for listing species on the IUCN Red List. Species 19: 16-22
Mace G.M. & Stuart S.N.. 1994. IUCN Red List Categories. IUCN, Gland, Switzerland.
McLachlan G.R. 1978. South African Red Data book – reptiles and amphibians. S. Afr. Nat. Sci. Prog. Rpt. 23, vi, 53 pp.
Minter L.R., Burger M. & Harrison J.A. 2000. Progress and interim results of the Southern African Frog Atlas Project. Afr. J. Herpetol. 49(1): 3-8.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs - A complete guide (Revised Edition). Southern Book Publishers, Halfway House, and Witwatersrand University Press, Johannesburg, 322 pp.
Pechmann J.H.K., Scott D.E., Semlitsch R.D., Caldwell J.P., Vitt L.J. & Gibbons J.W. 1991. Declining amphibian populations: the problem of separating human impacts from natural fluctuations. Science 253: 892-895.
Picker M.D. 1985. Hybridization and habitat selection in *Xenopus gilli* and *Xenopus laevis* in the south-western Cape Province. Copeia 1985(3): 574-580.
Picker M.D. & De Villiers A.L. 1988. *Xenopus gilli*: species account. pp. 25-28. In: South African Red Data Book - Reptiles and Amphibians. Branch W.R. (ed.), S. Afr. Nat. Sci. Prog. Rpt. 151.
Poynton J.C. 1960. Preliminary note on the zoogeography of the amphibia in southern Africa. S.A. Journal of Science 56(12): 307-312.
Poynton J.C. 1964. The Amphibia of southern Africa: A faunal study. Ann. Natal Mus. 17: 1-334.
Poynton J.C. 1990. Composition and subtraction margins of the East African lowland amphibian fauna. pp. 285-296. In G. Peters and R. Hutterer (eds), Vertebrates in the Tropics. Alexander Koenig Research Institute and Zoological Museum, Bonn.
Poynton J.C. 1992. Amphibian diversity and species turnover in southern Africa: investigation by means of a Bloemfontein-Durban transect. J. Herpetol. Assoc. Afr. 40:2-8.
Poynton J.C. 1999. Distribution of amphibians in sub-Saharan Africa, Madagascar and Seychelles. Pp. 483-539. In W.E. Duellman (Ed.), Patterns of distribution of amphibians: a global perspective. Johns Hopkins Univ. Press, Baltimore & London.
Poynton J.C. 2000. Evidence for an Afrotemperate amphibian fauna. Afr. J. of Herpetology 49: 33-41.
Poynton J.C. 1995. The “arid corridor” distribution in Africa: a search for instances among the Amphibia. Madoqua 19: 45-48.
Poynton J.C. & Boycott R.C. 1996. Species turnover between Afromontane and eastern African lowland faunas: patterns shown by amphibians. J. Biogeogr. 23: 669-680.
Poynton J.C. & Broadley D.G. 1978. The herpetofauna. pp. 927-948. In M.J.A. Werger (Ed.), Biogeography and ecology of southern Africa. W. Junk, The Hague.
Poynton J.C. & Broadley D.G. 1985. Amphibia Zambesiaca 1: Scolecomorphidae, Pipidae, Microhylidae, Hemisidae, Arthroleptidae. Ann. Natal Mus. 26: 503-553.
Poynton J.C. & Broadley D.G. 1985. Amphibia Zambesiaca 2: Ranidae. Ann. Natal Mus. 27(1): 115-181.
Poynton J.C. & Broadley D.G. 1987. Amphibia Zambesiaca 3: Rhacophoridae and Hyperoliidae. Ann. Natal Mus. 28(1): 161-229.
Poynton J.C. & Broadley D.G. 1988. Amphibia Zambesiaca 4: Bufonidae. Ann. Natal Mus. 29(2): 447-490.
Poynton J.C. & Broadley D.G. 1991. Amphibia Zambesiaca 5: Zoogeography. Ann. Natal Mus. 32: 221-277.
Poynton J.C. & Lambiris A.J.L. 1998. On *Bufo pantherinus* A. Smith, 1828 (Anura: Bufonidae), the leopard toad of the southwestern Cape, South Africa, with the description of the neotype. Afr. J. Herpetol. 47(1): 3-12.
Rose W. 1962. The Reptiles and Amphibians of Southern Africa. Rev. ed. Maskew Miller, Cape Town, xxix, 424 pp.

Rutherford M.C. & Westfall R.H. 1986. Biomes of southern Africa – an objective categorization. Memoirs of the Botanical Survey of South Africa 54: 1-98.
Rutherford M.C. & Westfall R.H. 1993. Biomes of southern Africa – an objective categorization. Memoirs of the Botanical Survey of South Africa 63: 1-94.
Seburn D. & Seburn C. 2000. Conservation Priorities for the Amphibians and Reptiles of Canada. World Wildlife Fund Canada and the Canadian Amphibian and Reptile Conservation Network. 92 pp.
Siegfried W.R. 1989. Preservation of species in southern African nature reserves. In: Huntley, B.J. (Ed.) Biotic diversity in southern Africa: concepts and conservation. Oxford University Press, Cape Town.
Tyler M.J. 1991. Species at risk: our vanishing frogs. Habitat Australia 19(2): 20-25.
Van Dijk D.E. 1971a. A further contribution to the systematics of southern African anuran tadpoles – genus *Bufo*. Annals of the Natal Museum 21(1): 71-76.
Van Dijk D.E. 1971b. Anuran ecology in relation particularly to oviposition and development out of water. Zool. Afr. 6: 119-132.
Van Dijk D.E. 1972a. A zoocartographic approach to anuran ecology. Zoologica Africana 6(1): 85-118.
Van Dijk D.E. 1972b. The behaviour of southern African anuran tadpoles with particular reference to their ecology and related external morphological features. Zool. Afr. 7: 49-55.
Van Dijk D.E. 1982. Anuran distribution, rainfall and soils in southern Africa. S.A. J. Science 78: 401-406.
Visser J.D. & Channing A. 1997. A new species of river frog from the Swartberg, South Africa (Ranidae: Afrana). J. African Zool. 111(3): 191-198.
Wager V.A. 1965. The frogs of South Africa. Purnell & Sons, Cape Town, 242 pp.
Wager V.A. 1986. Frogs of South Africa: their fascinating life stories. Delta Books, Johannesburg.
Wake D.B. & Morowitz H.J.1991. Declining amphibian populations: a global phenomenon? Findings and recommendations. Alytes 9(2): 33-42.
White F. 1983. The vegetation of Africa: a descriptive memoir to accompany the UNESCO/AETFAT/UNISO vegetation map of Africa. Natural Resources Research 20. UNESCO, Paris.
Zaloumis E.A. 1987. Don't pull the plug! African Wildlife 41:(5): 216-217.

Section 2
Taxon Data Sheets

Conservation Assessment and Management Plan

for Southern African Frogs

FINAL REPORT

Cape Town, South Africa
24-27 July 2000

CAMP for Southern African Frogs

SECTION 2. TAXON DATA SHEETS

The Taxon Data Sheets (TDSs) which follow are for the 30 selected species which were included in the CAMP process. All other species were assumed not to be threatened and therefore of Least Concern. However, only species which have been through the CAMP process are eligible for official IUCN categorization. Nevertheless, the status of all species will be reviewed from time to time. It is possible that some of the c. 80 species which were not subjected to this CAMP process were overlooked in error and should have TDSs completed for them by groups of knowledgeable herpetologists, and that some of these species will emerge as threatened or near threatened.

The editors encourage the users of this report to apply the questions on the TDS, together with the new IUCN criteria (see Appendix II), to species of interest to them, and to inform the editors (see Appendix 1) should it appear that other species need to be added to this document.

Conservation Assessment Management Plan Taxon Data Sheet for *Arthroleptella ngongoniensis* Status: Critically Endangered

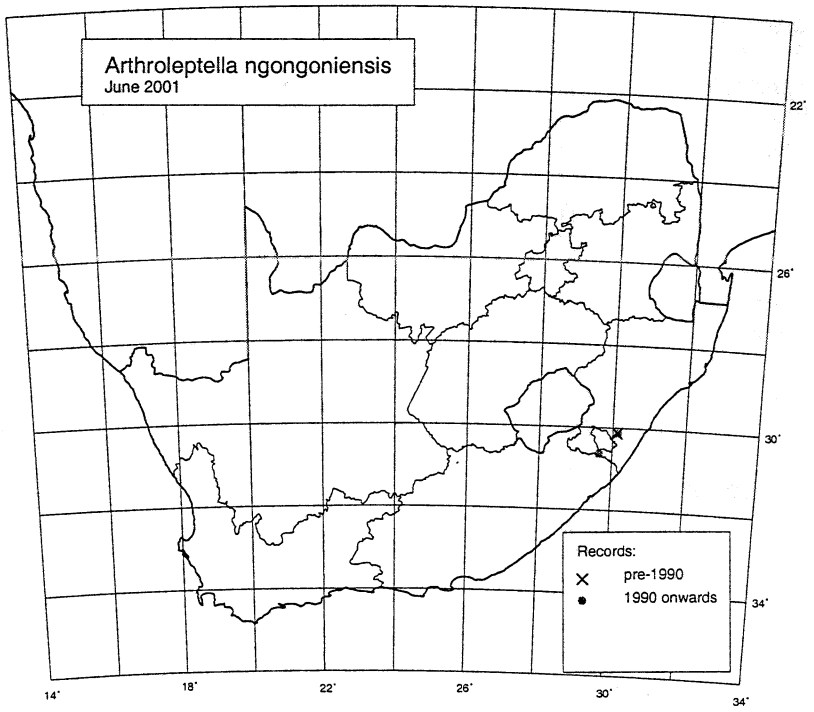
PART ONE

1. Scientific name: *Arthroleptella ngongoniensis* Bishop & Passmore 1993

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Petropedetidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Mistbelt Moss Frog, Ngongoni Moss Frog, Mistbelt Chirping Frog.
1D. Taxonomic level of assessment: ■ Species • Subspecies • Variety • Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Grassland Biome, especially Moist Upland Grassland; Afromontane Forest; indigenous grass-covered hillsides and forests in the mistbelt of the eastern escarpment.
2C. Habitat specificity (niche, elevation, etc.): Adults spend most of their time concealed at the base of grass and sedge tussocks in decaying vegetation. Most have been found on moist grass-covered slopes above 1000 m elevation.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Is known only from a few localities in the Ixopo and Weza districts of KwaZulu-Natal.
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 ■ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/sighting/collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

■ <10 km^2 □ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Four sub-populations at four localities: three in the Ixopo district and one in the Weza district.

6. **Habitat status:**

6A. Within the range of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

The habitat has become fragmented by encroachment of alien wattles *Acacia* sp.

6B. Is there any change in habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease in habitat (approximately, in percent) in the last ? years?
□ <20% □ >20% ■ >50% □ >80% in the last 50 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Deliberate afforestation and spread of invasive alien trees.

6F Is there any change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Surrounding alien trees cause changes in availability of surface water and alter fire regimes.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Pollution [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Interspecific competition -livestock [P] **[F]** ■
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire **[P]** ■ **[F]** ■
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]

Habitat los: exotic animals [P] [F]	Edaphic changes [P] [F]	Volcano [P] [F]
Habitat loss: exotic plants **[P]** ■ **[F]** ■	Genetic problems [P] [F]	
Overexploitation [P] [F]	Hybridization [P] [F]	
Pesticides **[P]** ■ **[F]** ■ herbicide	Interspecific competition [P] [F]	
Poisoning [P] [F]	Interspecific competition from exotics [P] [F]	

Other threats: In future, possible surface disturbance and damage of habitat during the harvesting of trees.

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?:
■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: See 7A.
Ongoing encroachment of alien trees and plantations are likely to alter moisture regimes and the presence of quantities of woody vegetation can cause damagingly hot burns during wild fires. Future harvesting of timber has the potential to do serious damage to the habitat over a short period of time.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:	□ Skin	□ Bones	□ Fur
□ Hair	□ Horn	□ Organs	□ Glands
□ Meat	□ Taxidermy models	□ Live animal	□ Products
□ Whole plants	□ Flowers	□ Seeds	□ Roots
□ Other			

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: <2500
9B. Subpopulations (no. of individuals in each): Unknown, but likely to be <500 in each of the four subpopulations (Weza, and three around Ixopo).
9C. Number of mature individuals (in all populations): □ <50 □ <250 ■ <2,500 □ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% □ >80% in the last ? years/ generations ■ Unknown

10C. If stable or unknown, do you predict a future decline in the population? ■ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ < 20% □ > 20% □ > 50% □ > 80% in the next ? years/ generations
Unknown, but one catastrophic event (e.g. fire, harvesting of trees, planting of trees, vehicular traffic, herbicide spraying, etc.) has the potential to destroy a subpopulation in the short term, because each occupies a very small area. The size of the subpopulations themselves may be below the threshold for longterm genetic viability.

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study □ Informal field sighting ■ Literature
□ Indirect information, such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
P.J. Bishop	Ixopo district	1991-92	taxon survey
A. Channing	Ixopo district	1999	taxon survey
M. Burger	Ixopo district	1999	atlas survey
M. Burger	Weza district	2001	atlas survey

PART TWO

13. Conservation status:

Current status:
13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: KwaZulu-Natal Nature Conservation Ordinance, No. 15 of 1974, as amended.
13G. Known presence in protected areas: Weza locality may fall within a protected area; confirmation required.
13H. National or regionally endorsed protection plan: Species of conservation importance in Goodman, P.S. (ed.) 2000. Determining the conservation value of land in KwaZulu-Natal. Unpublished report, Biodiversity Division, KwaZulu-Natal Nature Conservation Service, Pietermaritzburg.

Assigned status:
13I. Assigned IUCN Red List Category: Critically Endangered
13J. IUCN Criteria based on: B2ab(ii,iii,iv,v); area of occupancy less than 10km^2, together with fragmentation of area of occupancy and evidence of continuing decline in area of occupancy, extent and quality of habitat, number of locations, and number of mature individuals.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it
■ Survey ■ Genetic research □ Taxonomic research ■ Life history studies
□Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? ■ Yes □ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management ■ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization ■ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased □ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years □ D. Initiate captive program in 3 years
■ E. Pending recommendation from a PHVA workshop □ F. No captive program recommended

19. Are techniques established to propagate the taxon?

□ Techniques known for this taxon or similar taxon □ Some techniques known for taxon or similar taxa
■ Techniques not known at all □ Information not available in this group of compilers

20. Other comments:

We recommend urgent action on the above recommendations as the situation with regard to this species could deteriorate very rapidly.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Bishop P.J. & Passmore N.I. 1993. A new species of *Arthroleptella* Hewitt (Ranidae: Phrynobatrachinae) from the mist belt of the Natal highlands, South Africa. Annals of the Transvaal Museum 36(3): 17-20.
Lambiris A.J.L. 1989. A review of the amphibians of Natal. Lammergeyer 39:1-210.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Witwatersrand University Press.

22. Compilers (members of the working group):
Phil Bishop, Bill Branch, Marius Burger, Mike Coke, James Harrison, Andrew Turner.

23. Reviewers:
Phil Bishop, Marius Burger, James Harrison.

Conservation Assessment Management Plan Taxon Data Sheet for *Heleophryne hewitti*
Status: Critically Endangered

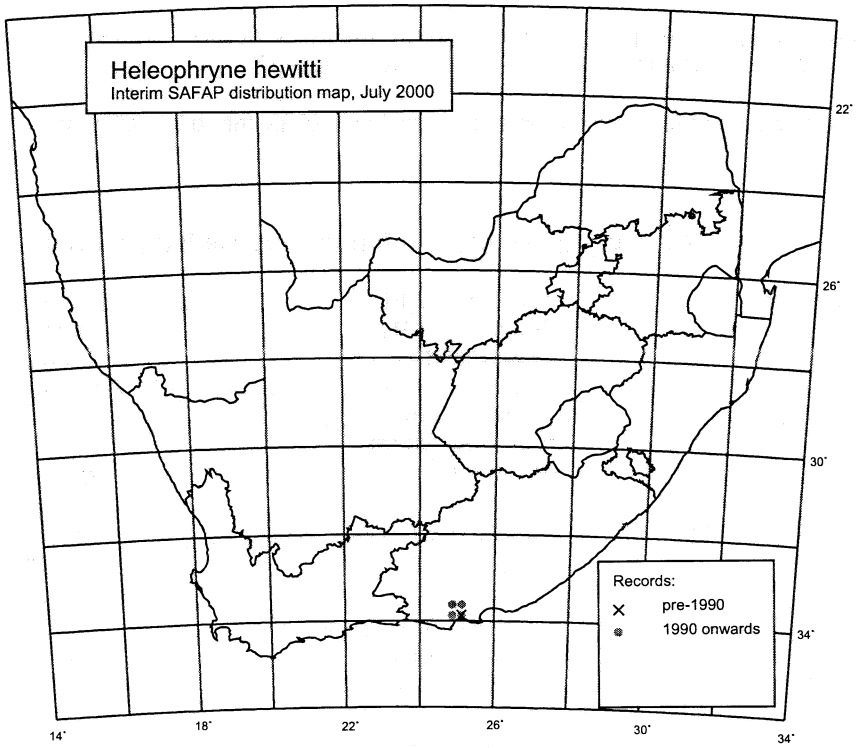
PART ONE

1. Scientific name: *Heleophryne hewitti* Boycott 1988

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Heleophrynidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Hewitt's Ghost Frog
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Fynbos Biome, Mountain Fynbos.
2C. Habitat specificity (niche, elevation, etc.): Perennial fast-flowing rocky mountain streams, at 400-550 m a.s.l.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Eastern Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

■ <100 km^2 □ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Distributed over 10 km in four perennial rivers; not divided into subpopulations.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous □ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? □ Yes □ No □ Unknown
If yes, is it a: □ Decrease in area □ Increase in area?

6C. If decreasing, what has been the decrease in area (approximately, in percent) in the last ? years?
□ <20% □ >20% □ >50% □ >80% in the last 50 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Afforestation with alien trees, viz. pines and eucalypts.

6F. Is there any change in the quality of habitat where the taxon occurs? □ Yes □ No □ Unknown
If yes, is it a □ Decrease in quality □ Increase in quality?

6G. State primary cause of change: Afforestation and especially the felling of trees.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants **[P]** ■ **[F]** ■
Overexploitation [P] [F]
Pollution [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Hybridization [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] **[F]** ■
Siltation **[P]** ■ **[F]** ■

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire **[P]** ■ **[F]** ■
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]

Pesticides **[P]** ■ **[F]** ■ Interspecific competition [P] [F]
Poisoning [P] [F] Interspecific competition from exotics [P] [F]
Other threats:

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline? ■ Yes □ No If yes, indicate which threats are resulting or may result in population decline: All of the above, especially habitat loss and disturbance related to forestry practices.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:

□ Hair	□ Horn	□ Organs	□ Glands
□ Meat	□ Taxidermy models	□ Live animal	□ Products
□ Whole plants	□ Flowers	□ Seeds	□ Roots
□ Others			

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown, but may be less than 2500.
9B. Subpopulations (no. of individuals in each): See 5.
9C. Number of mature individuals (in all populations): □ <50 □ <250 ■ <2,500 □ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
■ <20% □ >20% □ >50% □ >80% in the last 50 years.

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:

■ Census or monitoring	■ General field study
□ Indirect information such as from trade, etc.	□ Informal field sighting
□ Hearsay/ popular belief	■ Literature
	□ Museum/herbarium studies/records

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Burger, M.	Elandsberg Mountains	1996-2001	Field survey
Cape Nature Conservation	Elandsberg Mountains	1972-present	Field survey

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): EN B1+2abc
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Endangered
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: None.
13H. National or regionally endorsed protection plan: South African Forestry Company Limited (SAFCOL) Environmental Policy, according to the standards of the Forest Stewardship Council (FSC).

Assigned status:

13I. Assigned IUCN Red List Category: Critically Endangered
13J. IUCN Criteria based on: B1ab(ii,iii,iv,v); extent of occurrence less than 100km^2 and fragmented, together with a projected decline in area of occupancy, area and quality of habitat, number of locations, and population size.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey	■ Genetic research	□ Taxonomic research	□ Life history studies
■ Limiting factor research		□ Epidemiology	□ Trade
□ Others (taxon specific)			

14A. Is Population and Habitat Viability Assessment recommended? ■ Yes □ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management	□ Wild population management	■ Monitoring	□ Translocation
□ Sustainable utilization	■ Public education	□ Genome Resource Banking	
■ Limiting factor management	□ Captive breeding	□ Work in local communities	
□ Others			

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery	□ Education	□ Reintroduction	□ Benign introduction
□ Research	□ Husbandry	□ Preservation of live genome	

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

☐ A. Ongoing captive program intensified or increased
☐ B. Ongoing captive program decreased
☐ C. Initiate captive program within 3 years
☐ D. Initiate captive program in 3 years
☐ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon?

☐ Techniques known for this taxon or similar taxon
☐ Some techniques known for taxon or similar taxa
☐ Techniques not known at all
■ Information not available in this group of compilers

20. Other comments:

Heleophryne populations from the Kouga and Baviaanskloof mountains need to be compared genetically to *H. hewitti* so that the distribution, and therefore also the threatened status of *H. hewitti,* can be confirmed.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux A. & Mouton P. le F.N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Conservation, Stellenbosch.
Boycott R.C. 1988 Description of a new species of *Heleophryne* Sclater 1899 from the Cape Province, South Africa (Anura: Heleophrynidae). Ann. Cape. Prov. Mus. (Nat. Hist.) 16: 309-319.
Boycott R.C. & Branch W.R. 1988 *Heleophryne hewitti* species account. In: W.R. Branch (Ed.) South African Red Data Book – reptiles and amphibians, pp. 33-35. S. Afr. Nat. Sci. Prog. Rep. No. 151, CSIR, Pretoria.
Burger M. 2001. Towards a management plan for the Hewitt's Ghost Frog. Unpublished report, Sungazer cc, Cape Town.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Witwatersrand University Press.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

James Harrison and Marius Burger.

Conservation Assessment Management Plan Taxon Data Sheet for *Heleophryne rosei*
Status: Critically Endangered

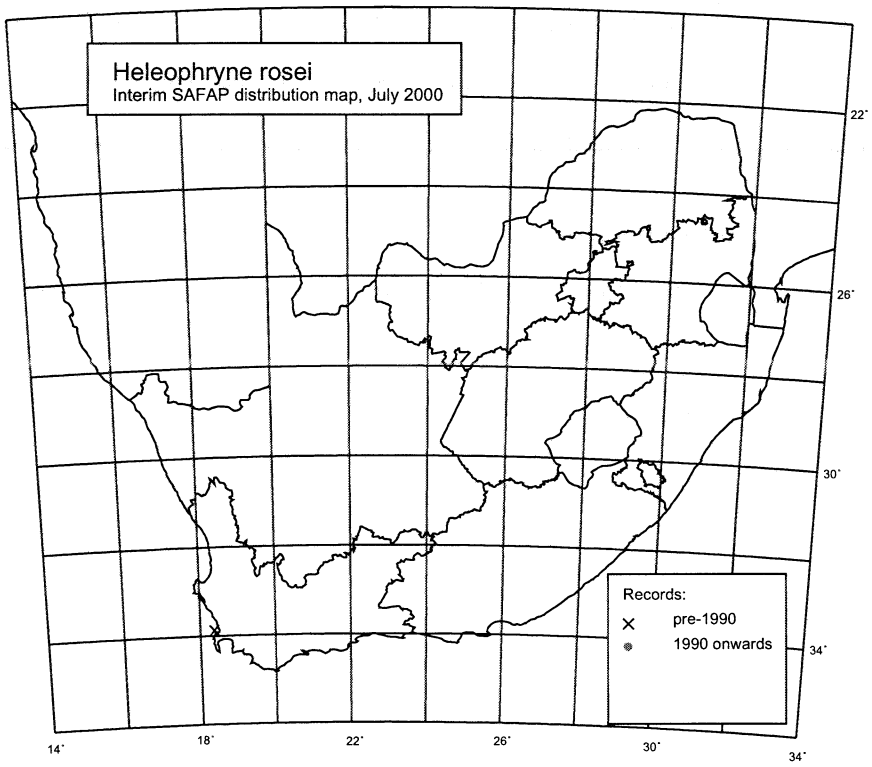
PART ONE

1. Scientific name: *Heleophryne rosei* Hewitt 1925

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Heleophrynidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Table Mountain Ghost Frog, Rose's Ghost Frog, Thumbed Ghost Frog.
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Fynbos Biome, in Mountain Fynbos vegetation.
2C. Habitat specificity (niche, elevation, etc.): Perennial, fast-flowing, rocky mountain streams, mainly in forested gorges.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Western Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

■ <100 km^2 □ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

■ <10 km^2 □ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

No subpopulations: the whole population is restricted to <9 km^2 of Table Mountain.

6. **Habitat status:**

6A. Within the range of the subpopulations, is the habitat ■ Contiguous □ Fragmented □ Not known?

6B. Is there any change in habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area

6C. If decreasing, what has been the decrease in habitat (approximately, in percent) in the last ? years?
■ <20% □ >20% □ >50% □ >80% in the last 20 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Invasion by non-indigenous vegetation, water abstraction, reduced perennial run-off and siltation.

6F Is there any change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Invasion by non-indigenous vegetation, water abstraction, reduced perennial run-off and siltation, but does not apply to all streams. Habitat quality may improve now that the entire distribution area falls within the recently established Cape Peninsula National Park.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming **[P]** ■ **[F]** ■
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation [P] [F]
Pollution [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling **[P]** ■ **[F]** ■
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] **[F]** ■
Decline in prey species [P] [F]
Drowning [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation **[P]** ■ **[F]** ■

Catastrophes
Drought **[P]** ■ **[F]** ■
El Nino [P] [F]
Fire **[P]** ■ **[F]** ■
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]

Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants **[P]** ■ **[F]** ■
Overexploitation [P] **[F]** ■
Pesticides [P] [F]
Poisoning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Hybridization [P] [F]
Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]

Other threats: The cumulative effect of some of the related threats above, e.g. loss of habitat through damming and invasive alien vegetation (reduced perennial run-off), overexploitation through collection, trampling by hikers resulting in siltation of streams through erosion, and fire, could be severe. The present entire distribution falls within a protected area and with proper environmental management, these threats could be largely eliminated. Nevertheless, it remains under severe natural threat from global climate change and catastrophic droughts, as well as the introduction of disease through human presence in its habitat.

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: All of the above. Maintenance of natural perennial streamflow below dams is critically important for tadpole development and survival of the species.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □Domestic □ Commercial □ International?

8B. Parts in trade:
□ Hair
□ Meat
□ Whole plants
□ Other
□ Skin
□ Horn
□ Taxidermy models
□ Flowers
□ Bones
□ Organs
□ Live animal
□ Seeds
□ Fur
□ Glands
□ Products
□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown. Data available for tadpole population (1997-2000). Adults are rarely seen, and tadpoles survive in low numbers.
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 □ >2,500 ■ Unknown
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
■ <20% □ >20% □ >50% □ >80% in the last 20 years.

10C. If stable or unknown, do you predict a future decline in the population?
□ Yes □ No If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years

11. Data quality:

The above estimates are based on:

■ Census or monitoring ■ General field study □ Informal field sighting ■ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Cape Nature Conservation	Table Mountain	1997-present	monitoring

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): Global: VU A1ce + 2ce, B1+2abc, D2
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Endangered
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: Cape Peninsula National Park.
13H. National or regionally endorsed protection plan: Cape Nature Conservation threatened-frog monitoring programme.

Assigned status:

13I. Assigned IUCN Red List Category: Critically Endangered
13J. IUCN Criteria based on: B1ab(ii,iii,v)+2ab(ii,iii,v); small extent of occurrence and area of occupancy, single location, and a projected decline in area of occupancy, quality of habitat, and number of mature individuals.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey □ Genetic research □ Taxonomic research □ Life history studies
■ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? ■ Yes □ No □ Pending, but sufficient data may be lacking at this stage.

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization ■ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

☐ Species recovery ☐ Education ☐ Reintroduction ☐ Benign introduction
☐ Research ☐ Husbandry ☐ Preservation of live genome

17. Do captive stocks already exist?

☐ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total ☐ Not known
17C. Does a coordinated **Species Management Program** exist for this species: ☐ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
☐ Yes ■ No (specify countries):

18. Level of captive breeding/cultivation recommended:

☐ A. Ongoing captive program intensified or increased ☐ B. Ongoing captive program decreased
☐ C. Initiate captive program within 3 years ☐ D. Initiate captive program in 3 years
☐ E. Pending recommendation from a PHVA workshop ■ F. No captive program recommended

19. Are techniques established to propagate the taxon?

☐ Techniques known for this taxon or similar taxon ☐ Some techniques known for taxon or similar taxa
■ Techniques not known at all ☐ Information not available in this group of compilers

20. Other comments:

Over-emphasizing the uniqueness and rarity of this taxon could potentially lead to its decline at the hands of unscrupulous collectors. This has to be borne in mind in educational programmes and publicity materials.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W. 1989. The status of some rare and endangered endemic reptiles and amphibians of the southwestern Cape Province, South Africa. Biol. Conserv. 49:161-168.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux A. & Mouton P. le Fras N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Cons., Stellenbosch.
Boycott R.C. & De Villiers A.L. 1986. The status of *Heleophryne rosei* Hewitt (Anura: Leptodactylidae) on Table Mountain and recommendations for its conservation. S.A. J. Wildl. Res. 16(4): 129-134.
Boycott R.C. 1988. *Heleophryne rosei* species account. In: W.R. Branch (Ed.) South African Red Data Book – reptiles and amphibians, pp. 36-38. S. Afr. Nat. Sci. Prog. Rep. No. 151, CSIR, Pretoria.
De Villiers A.L. 1997. Monitoring the distribution and conservation status of threatened amphibians in the southwestern Cape. Proceedings of the Third Herp. Ass. of Africa Sym., Pretoria, 1993. pp. 142-148.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Pub. and W.U.P.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Mus. 17: 1-334.
Wager V.A. 1986. Frogs of South Africa: their fascinating life stories. Delta Books, Johannesburg.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Atherton de Villiers, Ernst Baard.

Conservation Assessment Management Plan Taxon Data Sheet for *Microbatrachella capensis* Status: Critically Endangered

PART ONE

1. **Scientific name**: *Microbatrachella capensis* (Boulenger 1910)

1A. Synonyms: *Phrynobatrachus capensis* Boulenger 1910
Microbatrachus capensis Hewitt 1926

1B. Scientific nomenclature:
$1B_1$. Family: Petropedetidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia

1C. Common name(s): Micro Frog, Cape Flats Frog.

1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form

1E. Country: South Africa

2. **Distribution of the taxon**:

2A. Habit or life form (only plants): n/a

2B. Habitat of the taxon (ecosystem level): Fynbos Biome, mostly in Mountain Fynbos and Sand Plain Fynbos vegetation.

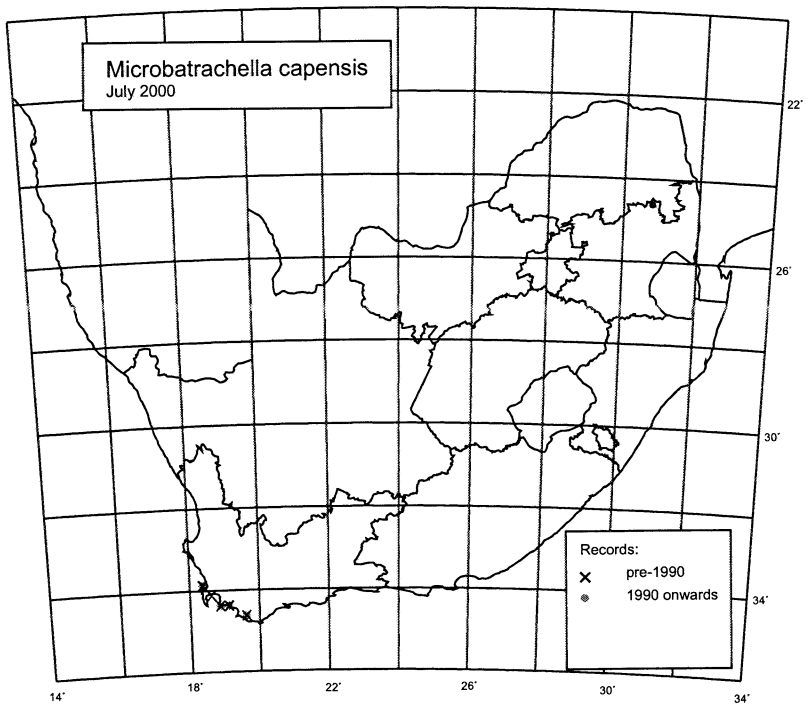
2C. Habitat specificity (niche, elevation, etc.): Seasonal, acidic, blackwater waterbodies in sandy, coastal lowlands.

2D. Historical distribution (Global -- in past 100 years described by country): South Africa

2E. Current distribution (listed by country): South Africa

2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Western Cape Province

2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 ■ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

■ <10 km^2 □ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Four subpopulations: Cape Flats, Betty's Bay area, Kleinmond area, and Gansbaai to Cape Agulhas area.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
□ <20% □ >20% □ >50% ■ >80% in the last 90 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Habitat degradation and loss.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Non-indigenous invasive plants, alteration of catchment drainage, drainage of wetland breeding habitat, and siltation of habitat.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Habitat loss: exotic animals [P] [F]
Pollution **[P]** ■ **[F]** ■
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation **[P]** ■ **[F]** ■

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire **[P]** ■ **[F]** ■
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

Habitat loss: exotic plants **[P]** ■ **[F]** ■ Genetic problems [P] [F]
Overexploitation [P] [F] Hybridization [P] [F]
Pesticides [P] [F] Interspecific competition [P] [F]
Poisoning [P] [F] Interspecific competition from exotics [P] [F]
Other threats: Alteration of catchment drainage through canalization. Although fire is a natural occurrence, too frequent fires may pose a threat to Micro Frog habitat.

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: All of the above.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:

□ Hair	□ Skin	□ Bones	□ Fur
□ Meat	□ Horn	□ Organs	□ Glands
□ Whole plants	□ Taxidermy models	□ Live animal	□ Products
□ Other	□ Flowers	□ Seeds	□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: >2,500
9B. Subpopulations (no. of individuals in each): Breeding aggregations of over 500 in prime habitat.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% ■ >80% in the last 90 years.

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:
■ Census or monitoring ■ General field study □ Informal field sighting ■ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Cape Nature Conservation	species' range	1990-present	monitoring

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): EN A1ce+2ce; B2abc+3b
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Endangered
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: Kleinmond Local Authority N.R., Kenilworth Racecourse.
13H. National or regionally endorsed protection plan: Cape Nature Conservation threatened frog monitoring programme.

Assigned status:

13I. Assigned IUCN Red List Category: Critically Endangered
13J. IUCN Criteria based on: B2ab(i,ii,iii,iv,v); area of occupancy <10km^2 and severely fragmented, and inferred continuing decline in extent of occurrence, area of occupancy, quality of habitat, and number of locations and mature individuals.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey	■ Genetic research	□ Taxonomic research	□ Life history studies
■ Limiting factor research		□ Epidemiology	□ Trade
□ Others (taxon specific)			

14A. Is Population and Habitat Viability Assessment recommended? ■ Yes □ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management	■ Wild population management	■ Monitoring	■ Translocation
□ Sustainable utilization	□ Public education	□ Genome Resource Banking	
■ Limiting factor management	□ Captive breeding	□ Work in local communities	
□ Others			

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery	□ Education	□ Reintroduction	□ Benign introduction
□ Research	□ Husbandry	□ Preservation of live genome	

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon
■ Some techniques known for taxon or similar taxa
□ Techniques not known at all
□ Information not available in this group of compilers

20. Other comments:

Translocation experiment awaiting results. Although Section 6A indicates a >80% decline in habitat extent during the past 100 years, it needs to be pointed out that over the last 30 years, there has been a decline of <20%.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W. 1989. The status of some rare and endangered endemic reptiles and amphibians of the southwestern Cape Province, South Africa. Biol. Conserv. 49:161-168.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A., Le Roux A.L. & Mouton P. le F.N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Conservation, Stellenbosch.
De Villiers A.L. 1988. *Microbatrachella capensis* species account. In: W.R. Branch (Ed.), South African Red Data Book – reptiles and amphibians, pp. 29-32. S. Afr. Nat. Sci. Prog. Rep. No. 151, CSIR, Pretoria.
De Villiers A.L. 1997. Monitoring the distribution and conservation status of threatened amphibians in the southwestern Cape. Proceedings of the Third Herpetological Association of Africa Symposium, 1993, Pretoria. pp. 142-148.
De Villiers A.L. 1997. The endangered micro frog threatened by mining. African Herp. News 26: 6-7.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Mus. 17: 1-334.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Atherton de Villiers, Ernst Baard.

Conservation Assessment Management Plan Taxon Data Sheet for *Bufo pantherinus* Status: Endangered

PART ONE

1. Scientific name: *Bufo pantherinus* Smith 1828

1A. Synonyms: *Bufo pardalis* Hewitt 1935
Bufo cruciger Schmidt 1846

1B. Scientific nomenclature:
$1B_1$. Family: Bufonidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia

1C. Common name(s): Western Leopard Toad, August Frog, Snoring Toad.

1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form

1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a

2B. Habitat of the taxon (ecosystem level): Fynbos Biome, mostly Mountain Fynbos and Sand Plain Fynbos; Thicket Biome, in Dune Thicket vegetation type.

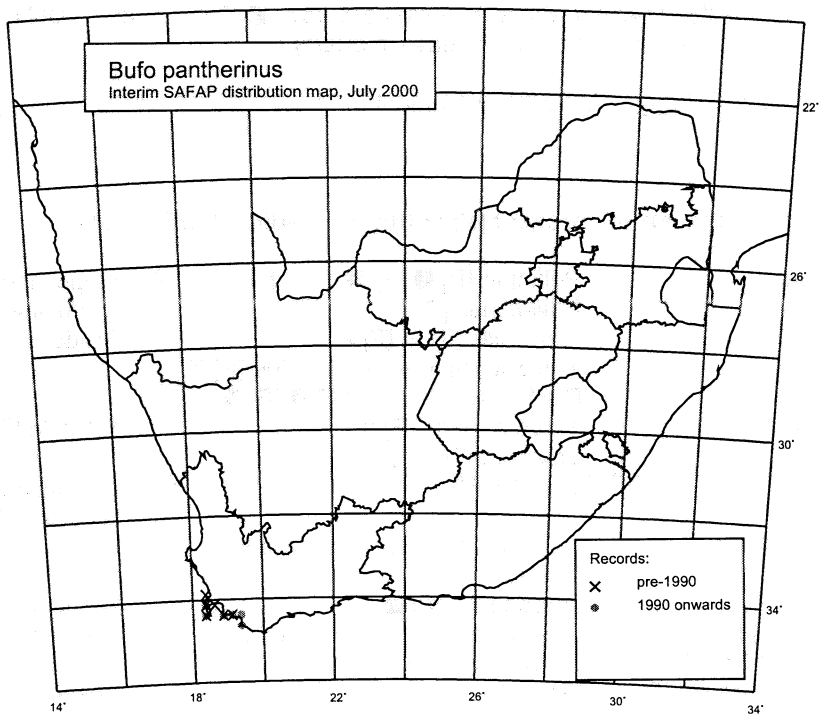
2C. Habitat specificity (niche, elevation, etc.): Sandy coastal lowlands that include permanent wetland habitats.

2D. Historical distribution (Global -- in past 100 years described by country): South Africa

2E. Current distribution (listed by country): South Africa

2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Western Cape province

2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 ■ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Four subpopulations: southern Cape Peninsula area, Cape Flats/Constantia/Hout Bay area, Pringle Bay/Kleinmond area, Hermanus/Gansbaai area.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
□ <20% □ >20% ■ >50% □ >80% in the last 100 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Habitat degradation and loss.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Urban development.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]

Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Habitat loss: exotic animals [P] [F]

Pollution **[P]** ■ **[F]** ■
Powerlines [P] [F]
Road kills **[P]** ■ **[F]** ■
Trade for market or medicine [P] [F]
Predation by exotics**[P]** ■ **[F]** ■
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] **[F]** ■
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]

Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]

Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

Habitat loss: exotic plants [P][F]	Genetic problems [P] [F]
Overexploitation [P] [F]	Hybridization [P] [F]
Pesticides [P] **[F]** ■	Interspecific competition [P] [F]
Poisoning [P] [F]	Interspecific competition from exotics [P] [F]

Other threats:

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline? ■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: All of the above.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:	□ Skin	□ Bones	□ Fur
□ Hair	□ Horn	□ Organs	□ Glands
□ Meat	□ Taxidermy models	□ Live animal	□ Products
□ Whole plants	□ Flowers	□ Seeds	□ Roots
□ Other			

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown, but probably <5000.
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500, but probably <5000.
9D. Average age of parents in population: Males have an average age of 1-3 years, based on 16 specimens, and females 2-6 years, based on 12 specimens.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% ■ >50% □ >80% in the last 100 years.

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:

■ Census or monitoring	■ General field study	■ Informal field sighting	■ Literature
□ Indirect information such as from trade, etc.		□ Museum/herbarium studies/records	
□ Hearsay/ popular belief			

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Cape Nature Conservation	species' range	1996-present	monitoring

PART TWO

13. Conservation status:

Current status:
13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: Cape Peninsula National Park, Rondevlei Nature Reserve, and other small regional reserves.
13H. National or regionally endorsed protection plan: Cape Nature Conservation threatened-frog monitoring programme.

Assigned status:
13I. Assigned IUCN Red List Category: Endangered
13J. IUCN Criteria based on: B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v); small extent of occurrence and area of occupancy, together with fragmentation and evidence of continuing decline in area of occupancy, extent and quality of habitat, and number of locations and mature individuals.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it
■ Survey □ Genetic research ■ Taxonomic research □ Life history studies
□ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific): Taxonomic research must include acoustic analysis.

14A. Is Population and Habitat Viability Assessment recommended? ■ Yes □ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management ■ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization ■ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding ■ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon?

□ Techniques known for this taxon or similar taxon
□ Some techniques known for taxon or similar taxa
□ Techniques not known at all
■ Information not available in this group of compilers

20. Other comments:

These large frogs are long-lived and potentially easily extirpated, endangered by poor land use and lack of co-ordinated bioregional planning.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux A. & Mouton P. le F.N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Conservation, Stellenbosch.
Cherry M.I. 1992. Sexual selection in the leopard toad, *Bufo pardalis*. Behaviour 120(3-4): 164-176.
Cherry M.I. & Francillion Vieillot H. 1992. Body size, age and reproduction in the leopard toad, *Bufo pardalis*. Journal of Zoology (London) 228: 41-52.
De Villiers A. 1997 Monitoring the distribution and conservation status of threatened amphibians in the southwestern Cape. Proceedings of the third Herpetological Association of Africa Symposium, Pretoria, 1993. pp. 142-148
Eick B.N., Harley E.H. & Cherry M.I. 2001. Molecular analysis supports specific status for *Bufo pardalis* and *Bufo pantherinus*. J. Herpetology 35(1): 113-114.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Poynton J.C. & Lambiris A.J.L. 1998. On *Bufo pantherinus* A Smith, 1828 (Anura: Bufonidae), the leopard toad of the southwestern Cape, South Africa, with the designation of a neotype. African Journal of Herpetology 47(1): 3-12
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Mus. 17: 1-334.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Atherton de Villiers, Ernst Baard.

Conservation Assessment Management Plan Taxon Data Sheet for *Hyperolius pickersgilli*
Status: Endangered

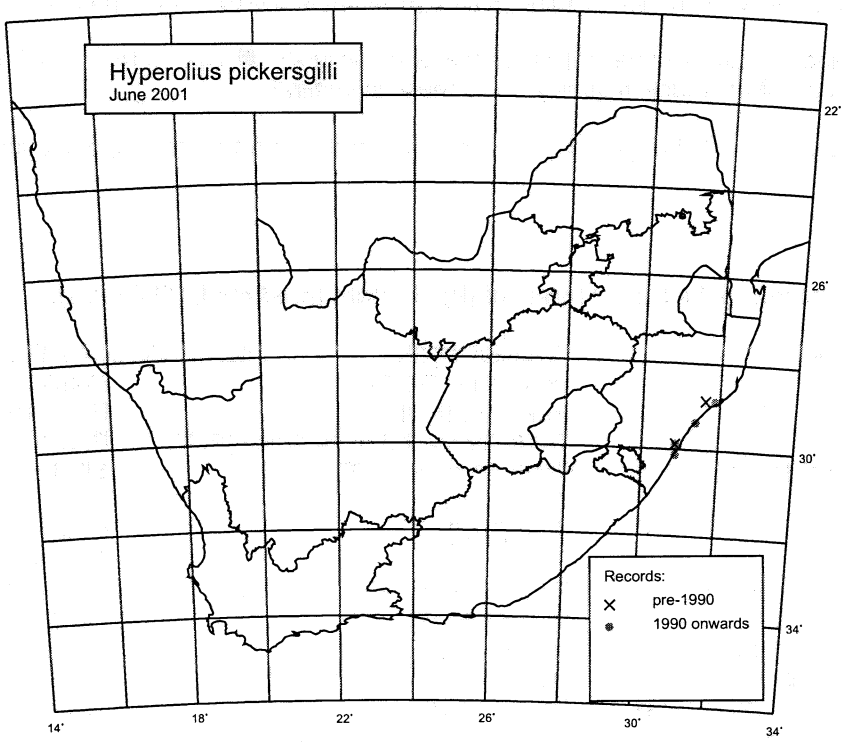
PART ONE

1. Scientific name: *Hyperolius pickersgilli* Raw 1982

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Hyperoliidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Pickersgill's Reed Frog, Avoca Reed Frog, Pickersgill se Rietpadda (Afrikaans).
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Savannah Biome, in Coastal Bushveld/Grassland.
2C. Habitat specificity (niche, elevation, etc.): Coastal swamps, wetlands and still waterbodies with dense sedge growth.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Coastal KwaZulu-Natal.
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 ■ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Apparently specialized habitat requirements suggest that the population is divided into at least eight subpopulations.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
□ <20% ■ >20% □ >50% □ >80% in the last 30 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Drainage for agriculture and urban development.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Drainage for agriculture and urban development, and probable pollution.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Habitat loss: exotic animals [P] [F]
Pollution [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

Habitat loss: exotic plants **[P]** ■ **[F]** ■
Overexploitation [P] [F]
Pesticides **[P]** ■ **[F]** ■
Poisoning [P] [F]
Other threats:

Genetic problems [P] [F]
Hybridization [P] [F]
Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline? ■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: Ongoing increases in human habitation and land use are likely to have negative impacts on habitat, and alien vegetation is likely to invade habitat.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Hair
□ Meat
□ Whole plants
□ Other
□ Skin
□ Horn
□ Taxidermy models
□ Flowers
□ Bones
□ Organs
□ Live animal
□ Seeds
□ Fur
□ Glands
□ Products
□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown but, based on numbers of calling males, probably <3000 adults.
9B. Subpopulations (no. of individuals in each): See 5; sizes unknown but believed to be <500 each.
9C. Number of mature individuals (in all populations): See 9A.
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
□ Declining □ Increasing □ Stable ■ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% □ >80% in the last ? years/ generations

10C. If stable or unknown, do you predict a future decline in the population? ■Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
■ <20% □ >20% □ >50% □ >80% in the next 10 years, through habitat loss.

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study
□ Indirect information such as from trade, etc.
□ Hearsay/ popular belief
□ Informal field sighting ■ Literature
□ Museum/herbarium studies/records

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
M. Burger	West of Kingsbrough	2001	atlas survey

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): VU B1+2abc
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Rare
13E. International Red Data Book: Not listed.
13F. Other legislation: KwaZulu-Natal Nature Conservation Ordinance, No. 15 of 1974, as amended.
13G. Known presence in protected areas: Greater St Lucia Wetland Park, Twinstreams-Mtunzini Natural Heritage Site.
13H. National or regionally endorsed protection plan: Species of conservation importance in Goodman, P.S. (ed.) 2000. Determining the conservation value of land in KwaZulu-Natal. Unpublished report, Biodiversity Division, KwaZulu-Natal Nature Conservation Service, Pietermaritzburg.

Assigned status:

13I. Assigned IUCN Red List Category: Endangered
13J. IUCN Criteria based on: B2ab(ii,iii,iv); small area of occupancy, together with fragmentation and evidence of continuing decline in area of occupancy, extent and quality of habitat, and number of locations.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey □ Genetic research □ Taxonomic research ■ Life history studies
■ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending
Premature in the light of inadequacy of available information.

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization ■ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon
■ Some techniques known for taxon or similar taxa
□ Techniques not known at all
□ Information not available in this group of compilers

20. Other comments:

The species is easily overlooked; there are few records from protected areas; there is a need to identify and protect remaining breeding habitats, as well as populations and habitat at known breeding sites. A pre-requisite is a thorough survey of the species' distribution, and a description of its habitat requirements.

PART FOUR

21. Sources of data:

Alexander G.J. 1990. Reptiles and amphibians of Durban. Durban Museum Novitates 15: 1-41.
Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Johnson P.A. & Raw L.R.G. 1988. The herpetofauna of sugarcane fields and their environs on the north coast of Natal. Proceedings of the first HAA Conference, Stellenbosch, April 1987. J. Herpetological Assoc. of Africa 36:11-18.
Lambiris A.J.L. 1988. *Hyperolius pickersgilli* species account. In: W.R. Branch (Ed.). South African Red Data Book – reptiles and amphibians, pp. 88-89. S. Afr. Nat. Sci. Prog. Rep. No. 151, CSIR, Pretoria.
Lambiris A.J.L. 1989. A review of the amphibians of Natal. Lammergeyer 39: 1-210.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Raw L.R.G. 1982. A new species of Reed Frog (Amphibia: Hyperoliidae) from the coastal lowlands of Natal, South Africa. Durban Museum Novitates 13: 117-126.

22. Compilers (members of the working group):

Phil Bishop, Bill Branch, Marius Burger, Mike Coke, James Harrison, Andrew Turner.

23. Reviewers:

Phil Bishop, Marius Burger, James Harrison.

Conservation Assessment Management Plan Taxon Data Sheet for *Leptopelis xenodactylus* Status: Endangered

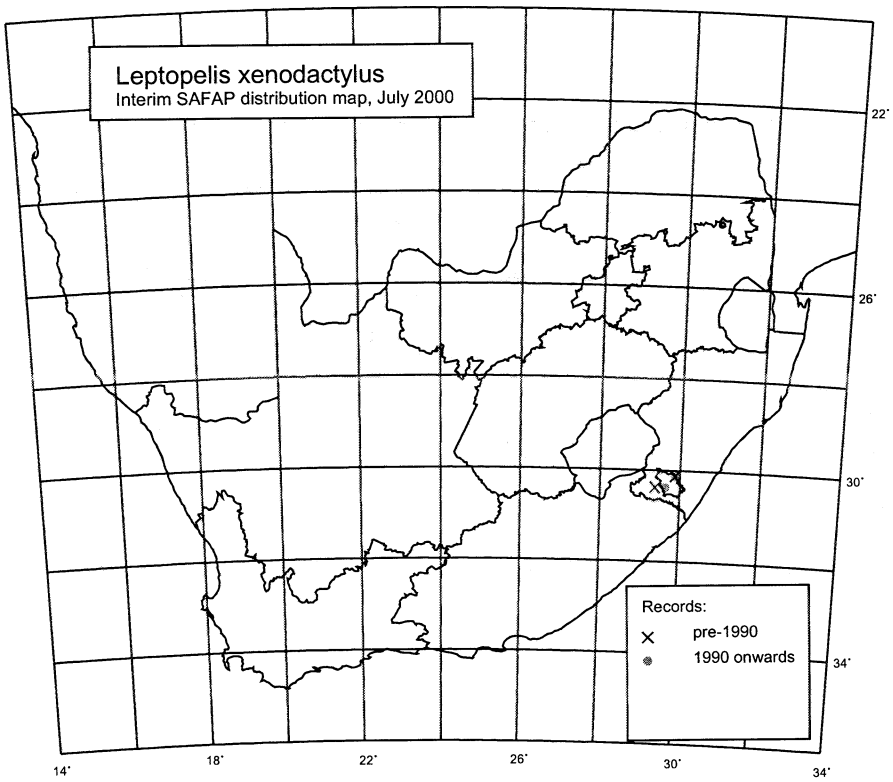
PART ONE

1. Scientific name: *Leptopelis xenodactylus* Poynton 1963

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Hyperoliidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Long-toed Tree Frog, Weza Forest Tree Frog, Langtoon-boompadda (Afrikaans)
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Grassland Biome.
2C. Habitat specificity (niche, elevation, etc.): Upland marshes in Short Mistbelt Grassland, Moist Upland Grassland and Northeastern Mountain Grassland.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): KwaZulu-Natal and Eastern Cape provinces.
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 ■ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2
Known breeding habitat is less than 10 km^2

5. **Number of subpopulations in which the taxon is distributed:**

At least six subpopulations (Highmoor, Underberg, Franklin, Weza, Giant's Castle, Minerva).

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
■ <20% □ >20% □ >50% □ >80% in the last 10 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Afforestation and changes in water regime.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Afforestation leads to reduction in runoff, hence reduced water supply to wetlands. This, in turn, can cause wetlands to shrink, become more vulnerable to fire, and their ecology to change. It is known that some of the localities for this taxon have been impacted by afforestation. Furthermore, logging has the potential to bring about severe ecological damage in the short term.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Pollution [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Interspecific competition: livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]

Habitat fragmentation **[P] ■ [F] ■**
Habitat loss: exotic animals [P][F]
Habitat loss: exotic plants **[P] ■ [F] ■**
Overexploitation [P] [F]
Pesticides [P] [F]
Poisoning [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Hybridization [P] [F]
Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Tsunami [P] [F]
Volcano [P] [F]
Other threats: Changes to water regime due to aforestation.

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline? ■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: Habitat loss and degradation resulting from afforestation.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Hair
□ Meat
□ Whole plants
□ Other
□ Skin
□ Horn
□ Taxidermy models
□ Flowers
□ Bones
□ Organs
□ Live animal
□ Seeds
□ Fur
□ Glands
□ Products
□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown, but almost certainly <10 000.
9B. Subpopulations (no. of individuals in each): See 5; sizes unknown but probably <500 individuals in each subpopulation.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 □ >2,500 ■ Unknown
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
□ Declining □ Increasing □ Stable ■ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% □ >80% in the last ? years/ generations

10C. If stable or unknown, do you predict a future decline in the population? ■ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% ■ >20% □ >50% □ >80% in the next 30 years, through habitat loss.

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study ■ Informal field sighting ■ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
M. Burger	near Franklin	Nov. 1999	atlas survey

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): VU A2c
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Restricted
13E. International Red Data Book: Not listed.
13F. Other legislation: KwaZulu-Natal Nature Conservation Ordinance, No. 15 of 1974, as amended.
13G. Known presence in protected areas: Giant's Castle Game Reserve, Weza Forest Reserve, Minerva Private Nature Reserve (Richmond), Highmoor Nature Reserve.
13H. National or regionally endorsed protection plan: Species of conservation importance in Goodman, P.S. (ed.) 2000. Determining the conservation value of land in KwaZulu-Natal. Unpublished report, Biodiversity Division, KwaZulu-Natal Nature Conservation Service, Pietermaritzburg.

Assigned status:

13I. Assigned IUCN Red List Category: Endangered
13J. IUCN Criteria based on: B2ab(ii,iii,iv); small area of occupancy, together with fragmentation and evidence of continuing decline in area of occupancy, extent and quality of habitat, and number of locations.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey □ Genetic research □ Taxonomic research ■ Life history studies
■ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? ■ Yes □ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization ■ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon
■ Some techniques known for taxon or similar taxa
□ Techniques not known at all
□ Information not available in this group of compilers

20. Other comments:

The species is easily overlooked, and there are few records from protected areas. There is a need to identify and protect the remaining breeding populations. A thorough survey should also identify the factors limiting population growth.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Lambiris A.J.L. 1988. *Leptopelis xenodactylus* species account. In: W.R. Branch (Ed.). South African Red Data Book – reptiles and amphibians, pp. 125-126. S. Afr. Nat. Sci. Prog. Rep. No. 151, CSIR, Pretoria.
Lambiris A.J.L. 1989. A review of the amphibians of Natal. Lammergeyer 39: 1-210.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Poynton J.C. 1963. Descriptions of southern African amphibians. Annals of Natal Museum 15: 319-332.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Mus. 17: 1-334.
Van Dijk D.E. 1966. Systematic and field keys to the families, genera and described species of Southern African Anuran tadpoles. Annals of the Natal Museum 18(2): 231-286.
Van Dijk D.E. 1978. A second specimen of *Leptopelis xenodactylus* Poynton. J. Herpetological Assoc. of Africa 18: 2.

22. Compilers (members of the working group):

Phil Bishop, Bill Branch, Marius Burger, Mike Coke, James Harrison, Andrew Turner.

23. Reviewers:

Phil Bishop, Marius Burger, James Harrison.

Conservation Assessment Management Plan Taxon Data Sheet for *Natalobatrachus bonebergi*
Status: Endangered

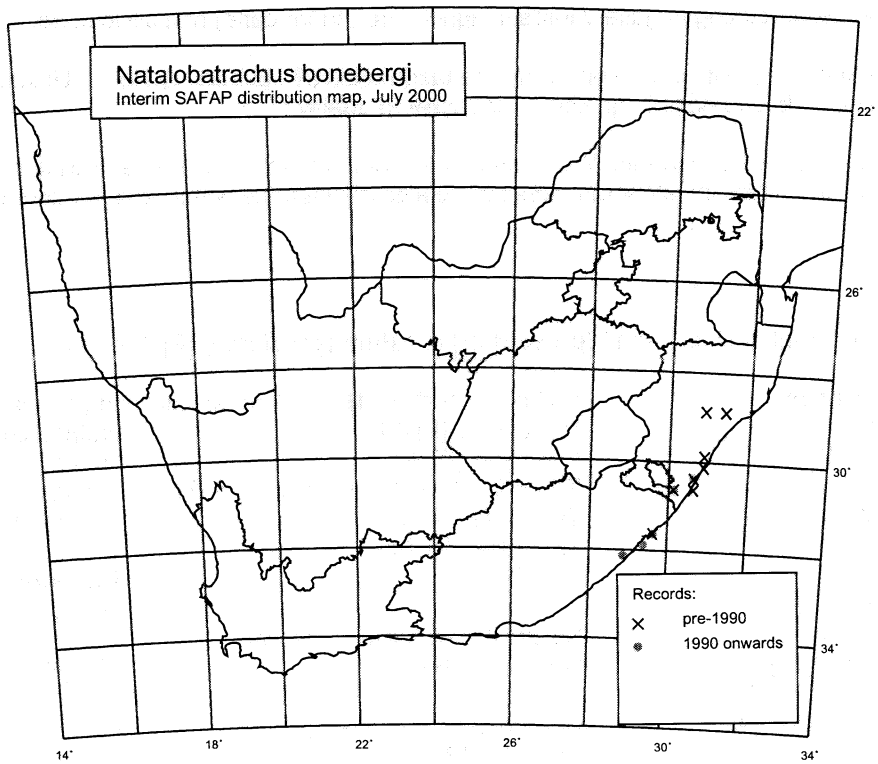
PART ONE

1. Scientific name: *Natalobatrachus bonebergi* Hewitt and Methuen 1913

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Petropedetidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Kloof Frog, Boneberg's Frog, Natal Diving Frog.
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Forest Biome (Afromontane and Coastal).
2C. Habitat specificity (niche, elevation, etc.): Forested streams with rocky beds, especially but not exclusively in ravines.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): provinces of Eastern Cape and KwaZulu-Natal.
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 ■ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

>10 subpopulations associated with particular rivers and their tributaries.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
□ <20% □ >20% ■ >50% □ >80% in the last 100 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Loss of habitat resulting from urbanization along the south coast of KwaZulu-Natal, wood-cutting in gallery forests; agriculture (sugar cane) and silviculture.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Water abstraction and damming, as well as pollution and siltation. Agriculture and silviculture in catchment areas have also affected the water regimes and water quality of the streams.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation [P] [F]
Pollution **[P]** ■ **[F]** ■
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation **[P]** ■ **[F]** ■

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]

Habitat loss: exotic animals [P] [F]	Edaphic changes [P] [F]	Volcano [P] [F]
Habitat loss: exotic plants [P][F]	Genetic problems [P] [F]	
Overexploitation [P] [F]	Hybridization [P] [F]	
Pesticides **[P] ■ [F] ■**	Interspecific competition [P] [F]	
Poisoning [P] [F]	Interspecific competition from exotics [P] [F]	

Other threats: Water abstraction and damming.

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: As above

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International

8B. Parts in trade:	□ Skin	□ Bones	□ Fur
□ Hair	□ Horn	□ Organs	□ Glands
□ Meat	□ Taxidermy models	□ Live animal	□ Products
□ Whole plants	□ Flowers	□ Seeds	□ Roots
□ Other			

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown, but probably exceeds 10 000 individuals.
9B. Subpopulations (no. of individuals in each): See 5 and 13G; unknown, but probably <2000 in each subpopulation.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% ■ >20% □ >50% □ >80% in the last 50 years.

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□<20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:

□ Census or monitoring	■ General field study	■ Informal field sighting	■ Literature
□ Indirect information such as from trade, etc.		□ Museum/herbarium studies/records	
□ Hearsay/ popular belief			

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
M. Burger	Dwesa, Cwebe, Port St Johns areas	1996, 1998	atlas survey
L. du Preez	Vernon Crookes N.R.	1995(?)	taxon survey

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces); KwaZulu-Natal Nature Conservation Ordinance, No. 15 of 1974, as amended.
13G. Known presence in protected areas: Vernon Crookes Nature Reserve, Krantzkloof N.R., Ngoye State Forest, Oribi Gorge N.R., Umtamvuna N.R., Dwesa N.R., Silaka N.R., Cwebe N. R.
13H. National or regionally endorsed protection plan: None.

Assigned status:

13I. Assigned IUCN Red List Category: Endangered
13J. IUCN Criteria based on: B2ab(ii,iii,iv); small area of occupancy, together with fragmentation and evidence of continuing decline in area of occupancy, extent and quality of habitat, and number of locations.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey	□ Genetic research	□ Taxonomic research	□ Life history studies
■ Limiting factor research		□ Epidemiology	□ Trade
□ Others (taxon specific)			

14A. Is Population and Habitat Viability Assessment recommended? ■ Yes □ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management	□ Wild population management	■ Monitoring	□ Translocation
□ Sustainable utilization	■ Public education	□ Genome Resource Banking	
■ Limiting factor management	□ Captive breeding	□ Work in local communities	
□ Others			

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery	□ Education	□ Reintroduction	□ Benign introduction
□ Research	□ Husbandry	□ Preservation of live genome	

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon
□ Some techniques known for taxon or similar taxa
■ Techniques not known at all
□ Information not available in this group of compilers

20. Other comments:

There is a need to document the remaining breeding localities by means of a thorough field survey, and to identify the factors limiting population growth.

PART FOUR

21. Sources of data:

Alexander G.J. 1990. Reptiles and amphibians of Durban. Durban Museum Novitates 15: 1-41.
Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Bourquin O. & Mathias I. 1984. The vertebrates of Oribi Gorge Nature Reserve: I. Lammergeyer 33: 35-44.
Kok D.J. & Seaman M.T. 1988. *Natalobatrachus bonebergi* (Anura: Ranidae): aspects of early development and adult size. S.A. Journal of Zoology 23: 238-241.
Kok D.J. & Seaman M.T. 1989. Aspects of the biology, habitat requirements and conservation status of *Natalobatrachus bonebergi* (Anura: Ranidae). Lammergeyer 40: 10-17.
Lambiris A.J.L. 1989. A review of the amphibians of Natal. Lammergeyer 39: 1-210.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Mus. 17: 1-334.
Wager V.A. 1931. The breeding habits and life-histories of two rare South African Amphibia. I. *Hylambates natalensis* A. Smith. II. *Natalobatrachus bonebergi* Hewitt and Methuen. Trans. Roy. Soc. of S.A. 19: 79-91.
Wager V.A. 1952. The gloomy-kloof frog. African Wildlife 6: 139-142.
Wager V.A. 1986. Frogs of South Africa: their fascinating life stories. Delta Books, Johannesburg.

22. Compilers (members of the working group):

Phil Bishop, Bill Branch, Marius Burger, Mike Coke, James Harrison, Andrew Turner.

23. Reviewers:

Phil Bishop, Marius Burger, James Harrison.

Conservation Assessment Management Plan Taxon Data Sheet for *Xenopus gilli*
Status: Endangered

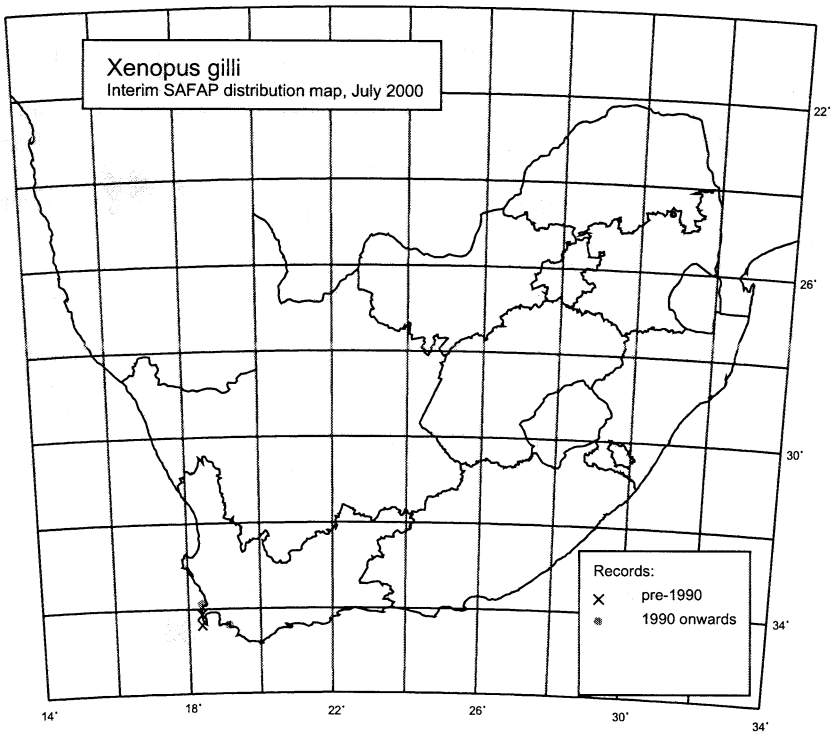
PART ONE

1. Scientific name: *Xenopus gilli* Rose and Hewitt 1927

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Pipidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Cape Platanna, Cape Clawed Frog, Gill's Platanna, Gill's Frog.
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Fynbos Biome, mostly in Mountain Fynbos and Sand Plain Fynbos vegetation.
2C. Habitat specificity (niche, elevation, etc.): Blackwater, mainly acidic waterbodies in the coastal lowlands, as well as seepages.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Western Cape Province.
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 ■ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Five subpopulations: Cape Peninsula, Cape Flats, Betty's Bay area, Kleinmond area, Gansbaai to Cape Agulhas area.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
□ <20% □ >20% ■ >50% □ >80% in the last 70 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next 30 years.

6E. State primary cause of change: Habitat degradation and loss.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Non-indigenous invasive plants, alteration of catchment drainage, drainage of wetland breeding habitat, and siltation of habitat.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Habitat loss: exotic animals [P][F]
Pollution **[P]** ■ **[F]** ■
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation **[P]** ■ **[F]** ■

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire **[P]** ■ **[F]** ■
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

Habitat loss: exotic plants **[P]** ■ **[F]** ■ Genetic problems [P] [F]
Overexploitation [P] [F] Hybridization **[P]** ■ **[F]** ■
Pesticides [P] [F] Interspecific competition [P] [F]
Poisoning [P] [F] Interspecific competition from exotics [P] [F]
Other threats: Alteration of catchment drainage through canalization. Although fire is a natural occurrence, too frequent fires may pose a threat to Cape Platanna habitat.

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline? ■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: All of the above.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:

□ Hair	□ Skin	□ Bones	□ Fur
□ Meat	□ Horn	□ Organs	□ Glands
□ Whole plants	□ Taxidermy models	□ Live animal	□ Products
□ Others	□ Flowers	□ Seeds	□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: <2,500
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 ■ <2,500 □ >2,500
9D. Average age of parents in population: Unknown

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% ■ >50% □ >80% in the last 70 years/ generations

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:

■ Census or monitoring	■ General field study
□ Indirect information such as from trade, etc.	□ Informal field sighting
□ Hearsay/ popular belief	■ Literature
	□ Museum/herbarium studies/records

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Cape Nature Conservation	species' range	1990-present	monitoring
Picker	Cape Point NR	1990-present	field surveys

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): VU A1ce+2ce, B1+2abc+3b
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Endangered
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: Cape Peninsula National Park
13H. National or regionally endorsed protection plan: Cape Nature Conservation threatened frog monitoring programme.

Assigned status:

13I. Assigned IUCN Red List Category: Endangered
13J. IUCN Criteria based on: B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v); extent of occurrence <5000km^2 , and area of occupancy <500km^2 , and severely fragmented, and continuing decline in extent of occurrence, area of occupancy, extent and quality of habitat, and number of locations and mature individuals.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey □ Genetic research □ Taxonomic research □ Life history studies
□ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? ■ Yes □ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management ■ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization □ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

■ Yes □ No If yes,
17A. Names of facilities: European research institutions, e.g. University of Bristol, and Geneva.
17B. Number in captivity: Male Female Unsexed Total ■ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions): South Africa, Cape Nature Conservation
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries):

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

■ Techniques known for this taxon or similar taxon
□ Some techniques known for taxon or similar taxa
□ Techniques not known at all
□ Information not available in this group of compilers

20. Other comments:

It has been shown by Evans et al. (1997) that the western and eastern *X. gilli* populations are genetically distinct and should be treated as separate conservation units (not taxonomic). This would tend to raise the threatened status of both units.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W. 1989. The status of some rare and endangered endemic reptiles and amphibians of the southwestern Cape Province, South Africa. Biol. Conserv. 49:161-168.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux, A. & Mouton, P. le F.N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Conservation, Stellenbosch.
De Villiers A.L. 1997. Monitoring the distribution and conservation status of threatened amphibians in the southwestern Cape. Proceedings of the Third Herpetological Association of Africa Symposium, 1993, Pretoria. pp. 142-148.
Evans B.J., Morales J.C., Picker M.D., Kelley D.B. & Melnick D.J. 1997. Comparative molecular phylogeography of two *Xenopus* species, *X. gilli* and *X. laevis*, in the south-western Cape Province, South Africa. Molecular Ecology 6: 333-343.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Picker M.D. 1985. Hybridization and habitat selection in *Xenopus gilli* and *Xenopus laevis* in the South-western Cape Province. Copeia 1985(3): 574-580.
Picker M.D & De Villiers A.L. 1988. *Xenopus gilli* species account. In: W.R. Branch (Ed.) South African Red Data Book – reptiles and amphibians, pp. 25-28. S. Afr. Nat. Sci. Prog. Rep. No. 151, CSIR, Pretoria.
Picker M.D & De Villiers A.L. 1989. The distribution and conservation status of *Xenopus gilli* (Anura: Pipidae). Biol. Conserv. 49: 169-183.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Mus. 17: 1-334.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Atherton de Villiers, Ernst Baard.

Conservation Assessment Management Plan Taxon Data Sheet for *Cacosternum capense* Status: Vulnerable

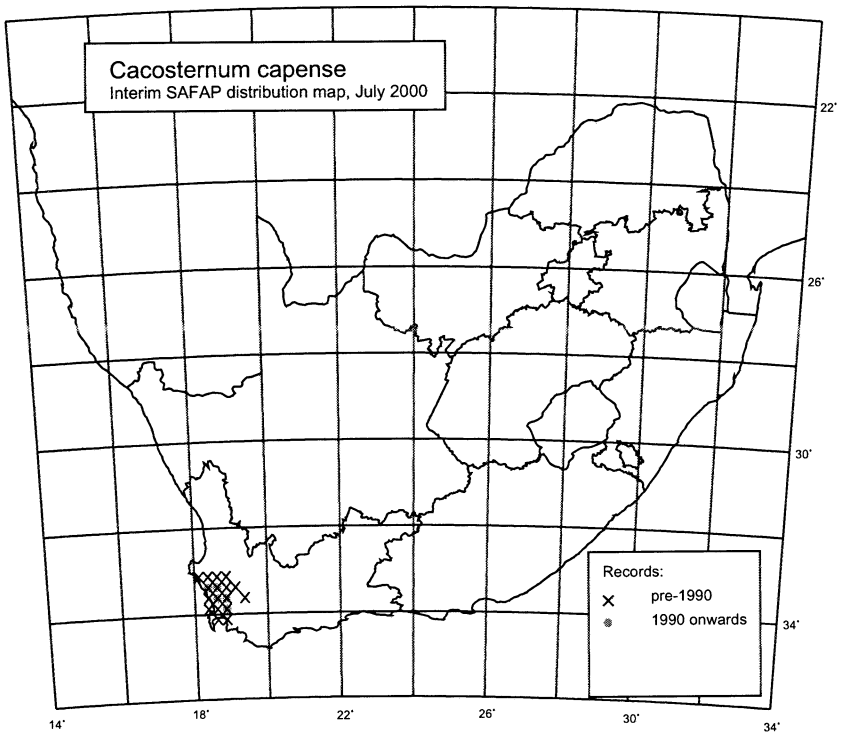
PART ONE

1. Scientific name: *Cacosternum capense* Hewitt 1925

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Petropedetidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Cape Caco, Cross-marked Frog
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Fynbos Biome, predominantly in West Coast Renosterveld and, to a far lesser extent, in Central Mountain Renosterveld.
2C. Habitat specificity (niche, elevation, etc.): Clay and loamy soils in low-lying flat to gently undulating areas; breeds in seasonally flooded depressions, pans and puddles.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Western Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 ■ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 □ 11 – 500 km^2 ■ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Three subpopulations: Swartland area, Faure, and Breede River valley.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
□ <20% □ >20% ■ >50% □ >80% in the last 70 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Habitat degradation and loss mainly due to urban and agricultural development.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Intensive agriculture, use of agrochemicals, and draining of habitat in agricultural lands.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■**[F]** ■
Habitat loss: exotic animals [P] [F]
Pollution **[P]** ■ **[F]** ■
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Interspecific competition -livestock [P][F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

Habitat loss: exotic plants **[P]** ■ **[F]** ■ Genetic problems [P] [F]
Overexploitation [P] [F] Hybridization [P] [F]
Pesticides **[P]** ■ **[F]** ■ Interspecific competition [P] [F]
Poisoning [P] [F] Interspecific competition from exotics [P] [F]
Other threats: Urbanisation and intensive agricultural landuse resulting in further habitat deterioration and destruction, also ploughing methods affecting drainage patterns.

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: All of the above.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Skin □ Bones □ Fur
□ Hair □ Horn □ Organs □ Glands
□ Meat □ Taxidermy models □ Live animal □ Products
□ Whole plants □ Flowers □ Seeds □ Roots
□ Other

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: On the basis of auditory data, there are at least 2000 males.
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% ■ >50% □ >80% in the last 70 years

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:
■ Census or monitoring ■ General field study □ Informal field sighting □ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Cape Nature Conservation	species' range	1990-present	monitoring
M. Burger & J. Harrison	Piketberg district	2000	atlas survey
E. Scott & A. Channing	Kraaifontein, Klipheuwel, Stellenbosch	1999	field surveys

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): LR/nt
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Restricted
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: JN Briers-Louw Nature Reserve, Elandsberg Private Nature Reserve.
13H. National or regionally endorsed protection plan: Cape Nature Conservation threatened-frog monitoring programme.

Assigned status:

13I. Assigned IUCN Red List Category: Vulnerable
13J. IUCN Criteria based on: B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v); small extent of occurrence and area of occupancy, together with fragmentation and evidence of continuing decline in extent of occurrence, area of occupancy, extent and quality of habitat, and number of locations and mature individuals.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey	□ Genetic research	□ Taxonomic research	□ Life history studies
■ Limiting factor research		□ Epidemiology	□ Trade

■ Others (taxon specific): Sustainability in agricultural areas.

14A. Is Population and Habitat Viability Assessment recommended? ■ Yes □ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management	□ Wild population management	■ Monitoring	□ Translocation
□ Sustainable utilization	■ Public education	□ Genome Resource Banking	
■ Limiting factor management	□ Captive breeding	■ Work in local communities	
□ Others			

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased □ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years □ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop ■ F. No captive program recommended

19. Are techniques established to propagate the taxon?

□ Techniques known for this taxon or similar taxon ■ Some techniques known for taxon or similar taxa
□ Techniques not known at all □ Information not available in this group of compilers

20. Other comments:

This species appears to be dependent on marginal and altered habitat inside and on the fringes of wheat fields in the Swartland agricultural district. A study is urgently needed to determine what the exact habitat requirements and limiting factors of this species are, followed by a programme to institute the necessary protective measures on agricultural lands.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux A. & Mouton P. le F.N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Conservation, Stellenbosch.
De Villiers A.L. 1988. *Cacosternum capense* species account. In: W.R. Branch (Ed.), South African Red Data Book – reptiles and amphibians, pp. 123-125. S. Afr. Nat. Sci. Prog. Rep. No. 151, CSIR, Pretoria.
De Villiers A.L. 1997 Monitoring the distribution and conservation status of threatened amphibians in the southwestern Cape, Proceedings of the Third Herpetological Association of Africa Symposium, Pretoria, 1993. pp. 142-148.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals Natal Museum 17: 1-334.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Atherton de Villiers, Ernst Baard.

Conservation Assessment Management Plan Taxon Data Sheet for *Capensibufo rosei* Status: Vulnerable

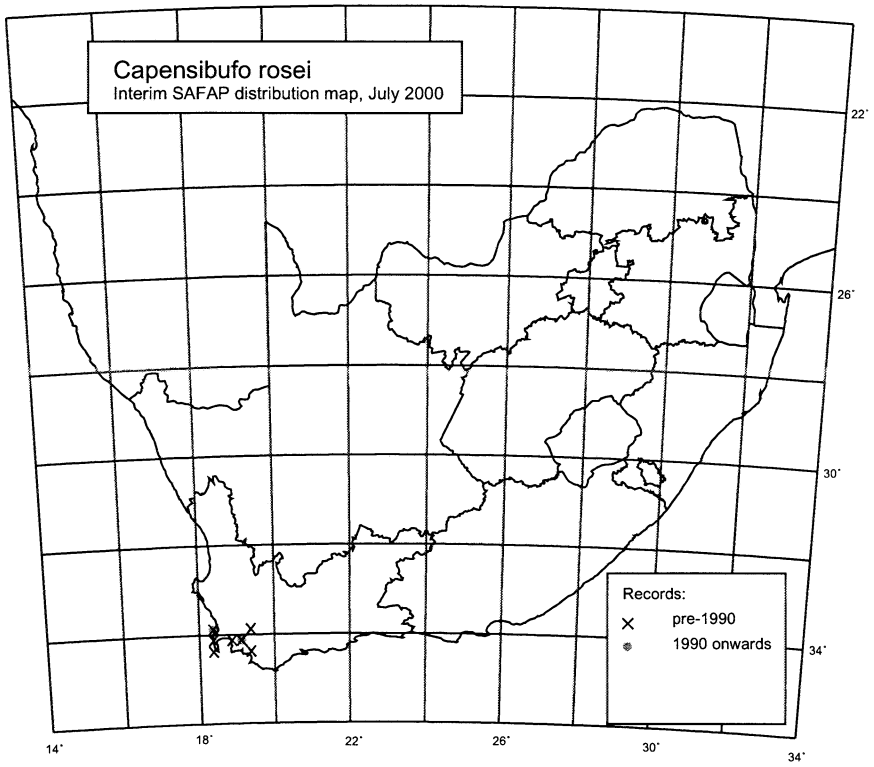
PART ONE

1. Scientific name: *Capensibufo rosei* (Hewitt 1926)

1A. Synonyms: *Bufo rosei* Hewitt 1926
1B. Scientific nomenclature:
$1B_1$. Family: Bufonidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Cape Mountain Toad, Rose's Toad, Rose's Toadlet, Striped Mountain Toad.
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Fynbos Biome in Mountain Fynbos vegetation.
2C. Habitat specificity (niche, elevation, etc.): Mainly high altitude (500-1500 m. a.s.l.) seepage areas, where it breeds in small, shallow, seasonal pools.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Western Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 ■ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 □ 11 – 500 km^2 ■ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Six subpopulations: Table Mountain, southern Cape Peninsula, Hottentots Holland/Kogelberg mountains, Kleinrivier Mountains, Riviersonderend Mountains, Du Toit's Kloof mountain complex. This is a conservative estimate and there could be additional subpopulations within the known range.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
■ <20% □ >20% □ >50% □ >80% in the last 30 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Habitat loss through invasive alien vegetation, plantations, roads, lowering of the water table, alteration of drainage, and at least one location through damming, and at another through urban development.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ decrease in quality □ increase in quality?

6G. State primary cause of change: In some areas one or more of the following factors are believed to have had an adverse effect on habitat quality: invasive alien vegetation, plantations, lowering of the watertable, building developments (e.g. roads), alteration of drainage patterns, and too frequent fires.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming **[P]** ■ **[F]** ■
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Pollution [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire **[P]** ■ **[F]** ■

Harvest for timber [P] [F]	Disease [P] [F]	Hurricane [P] [F]
Loss of habitat **[P] ■ [F] ■**	Decline in prey species [P] [F]	Landslide [P] [F]
Habitat fragmentation **[P] ■ [F] ■**	Drowning [P] [F]	Tsunami [P] [F]
Habitat loss: exotic animals [P] [F]	Edaphic changes [P] [F]	
Habitat loss: exotic plants **[P] ■ [F] ■**	Genetic problems [P] [F]	
Overexploitation [P] [F]	Hybridization [P] [F]	
Pesticides [P] [F]	Interspecific competition [P] [F]	
Poisoning [P] [F]	Interspecific competition from exotics [P] [F]	

Other threats: The species breeds at select sites where relatively dense breeding aggregations can occur. Local populatioins could possibly become seriously threatened if these sites are degraded or destroyed.

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline? ■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: All of the above.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International

8B. Parts in trade:	□ Skin	□ Bones	□ Fur
□ Hair	□ Horn	□ Organs	□ Glands
□ Meat	□ Taxidermy models	□ Live animal	□ Products
□ Whole plants	□ Flowers	□ Seeds	□ Roots
□ Other			

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown.
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500 (probably)
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
■ <20% □ >20% □ >50% □ >80% in the last 30 years

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:

■ Census or monitoring	■ General field study
■ Informal field sighting	■ Literature
□ Indirect information such as from trade, etc.	
□ Museum/herbarium studies/records	
□ Hearsay/ popular belief	

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Cape Nature Conservation	species' range	1990-present	monitoring
Scott E.	Cape Point	1999	field surveys
Channing A.	Hottentots Holland Mnts	1998	field surveys

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): LR/nt
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Restricted.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: Hottentots Holland Nature Reserve, Cape Peninsula National Park, Fernkloof Nature Reserve, Kogelberg Nature Reserve, Limietberg Nature Reserve, Riviersonderend Nature Reserve, Maanschynkop Nature Reserve.
13H. National or regionally endorsed protection plan: Cape Nature Conservation threatened-frog monitoring programme.

Assigned status:

13I. Assigned IUCN Red List Category: Vulnerable
13J. IUCN Criteria based on: B1ab(ii,iii,iv)+2ab(ii,iii,iv); small extent of occurrence and area of occupancy, together with fragmentation and evidence of continuing decline in area of occupancy, extent and quality of habitat, and number of locations.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey ■ Genetic research □ Taxonomic research ■ Life history studies
□ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization □ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased □ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years □ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop ■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon □ Some techniques known for taxon or similar taxa
■ Techniques not known at all □ Information not available in this group of compilers

20. Other comments: The small, voiceless species occupies generally remote upland terrain and is highly cryptic. Consequently, it can be difficult to find in the field and, although it has been known to science for over 70 years, there is a general lack of locality records. However, the limits of its range are not expected to change much with further data.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux A. & Mouton P. le F.N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Conservation, Stellenbosch.
Boycott R.C. 1988. *Capensibufo rosei* species account. In: W.R. Branch (Ed.) South African Red Data Book – reptiles and amphibians, pp. 113-115. S. Afr. Nat. Sci. Prog. Rep. No. 151, CSIR, Pretoria.
De Villiers A.L. 1997. Monitoring the distribution and conservation status of threatened amphibians in the southwestern Cape. Proceedings of the Third Herpetological Association of Africa Symposium, Pretoria, 1993. pp. 142-148.
Grandison A.G.C. 1980. A new genus of toad (Anura: Bufonidae) from the Republic of South Africa with remarks on its relationships. Bull. Br. Mus. nat. Hist. (Zool.). 39(5): 293-298.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Atherton de Villiers, Ernst Baard.

Conservation Assessment Management Plan Taxon Data Sheet for *Anhydrophryne rattrayi*
Status: Near Threatened

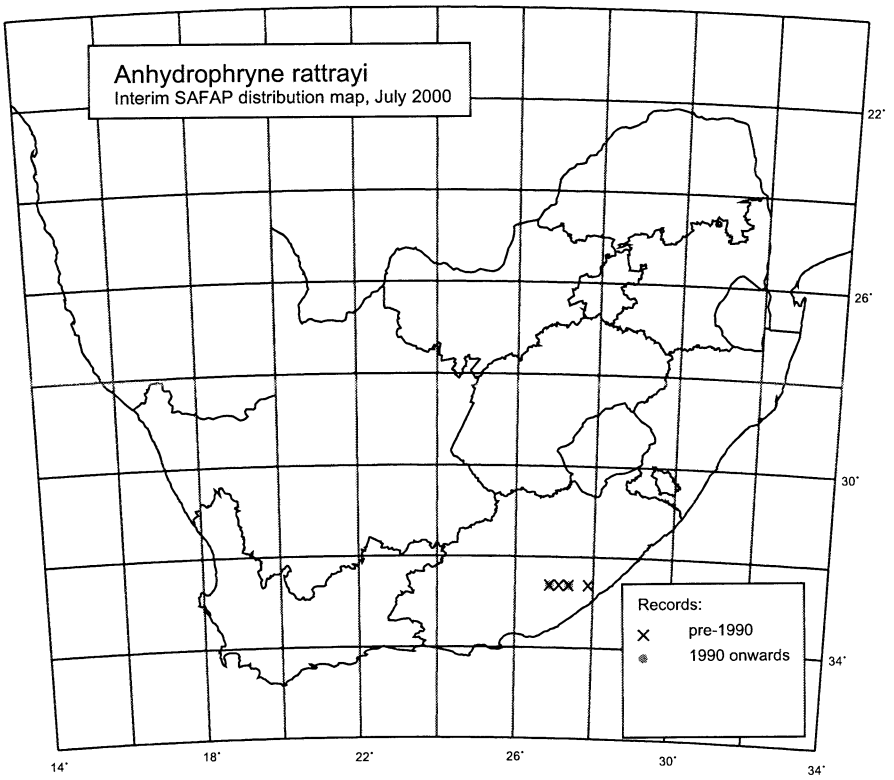
PART ONE

1. Scientific name: *Anhydrophryne rattrayi* Hewitt 1919

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Petropedetidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Hogsback Frog
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Forest Biome, Afromontane Forest
2C. Habitat specificity (niche, elevation, etc.): Damp leaf litter on forest floor, near streams; grassy wetland on forest fringe; above1100 m a.s.l.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Eastern Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 ■ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Five known subpopulations: Hogsback, Katberg, Keiskammahoek, Peddie, Stutterheim.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat: □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ Decrease in area □ Increase in area

6C. If decreasing, what has been the decrease in area (approximately, in percent) in the last ? years?
■ <20% □ >20% □ >50% □ >80% in the last 30 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Afforestation.

6F. Is there any change in the quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ Decrease in quality □ Increase in quality?

6G. State primary cause of change: Surrounding alien plantations cause reduction in the availability of surface water in the remaining forest patches, and altered fire regimes.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants **[P]** ■ **[F]** ■
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Hybridization [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]

Overexploitation [P] [F]
Pesticides [P] [F]
Poisoning [P] [F]
Pollution [P] [F]
Other threats:

Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Interspecific competition - livestock [P] [F]
Nutritional disorders [P] [F]

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No If yes, indicate which threats are resulting or may result in population decline: Afforestation is the primary cause of habitat loss and change in quality of remaining habitat.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it: □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Hair
□ Meat
□ Whole plants
□ Other
□ Skin
□ Horn
□ Taxidermy models
□ Flowers
□ Bones
□ Organs
□ Live animal
□ Seeds
□ Fur
□ Glands
□ Products
□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown
9B. Subpopulations (no. of individuals in each): Unknown
9C. Number of mature individuals in population: □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown

10. Population trends:

10A. Is the population size/ numbers of the taxon
□ Declining □ Increasing □ Stable ■ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% □ >80% in the last ? years/ generations

10C. If stable or unknown, do you predict a future decline in the population? ■ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
■ <20% □ >20% □ >50% □ >80% in the next 30 years, due to habitat loss and change in quality of remaining habitat.

11. Data quality:

The above estimates are based on:
□ Census or monitoring □ General field study ■ Informal field sighting ■ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
J.G. Castley	species' range	1995-96	survey

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): LR/nt
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Restricted
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces); National Forests Act 19408 of 1998, Section 7.
13G. Known presence in protected areas: State forests between Keiskammahoek and Hogsback; Hogsback Indigenous Forest – SAFCOL Forestry area, Katberg Forest, Stutterheim Nature Reserve.
13H. National or regionally endorsed protection plan: None..

Assigned status:

13I. Assigned IUCN Red List Category: Near Threatened
13J. IUCN Criteria based on: This species has a small extent of occurrence and area of occupancy, and current threats are believed to have the potential to cause the species' status to deteriorate in the future.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey □ Genetic research □ Taxonomic research □ Life history studies
■ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization □ Public education □ Genome Resource Banking
□ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon?

□ Techniques known for this taxon or similar taxon
□ Some techniques known for taxon or similar taxa
■ Techniques not known at all
□ Information not available in this group of compilers

20. Other comments:

There are reports of this species occurring in the Patensie district, which is distant from the areas of known occurrence. It is important that these reports be verified.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Castley J.G. 1997. Vertebrate diversity in indigenous forests of the Eastern Cape. Unpublished thesis, University of Port Elizabeth.
Lambiris A.J.L. 1988. Hogsback Frog species account. In: W.R. Branch (Ed.) South African Red Data Book – reptiles and amphibians. S. Afr. Nat. Sci. Prog. Rep. No. 151, CSIR, Pretoria.
Passmore N.I. & Carruthers V.C., 1995. South African Frogs. Southern Book Publishers and Witwatersrand University Press, Johannesburg.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals Natal Museum 17: 1-334.
Wager V.A. 1965. The frogs of South Africa: their fascinating life stories. Cape Town, Purnell.

22. Compilers (members of the working group):

Mike Bates, Harold Braack, Clayton Cook, Louis du Preez, Niels Jacobsen, Les Minter, Ché Weldon.

23. Reviewers:

Les Minter.

Conservation Assessment Management Plan Taxon Data Sheet for *Arthroleptella drewesii*
Status: Near Threatened

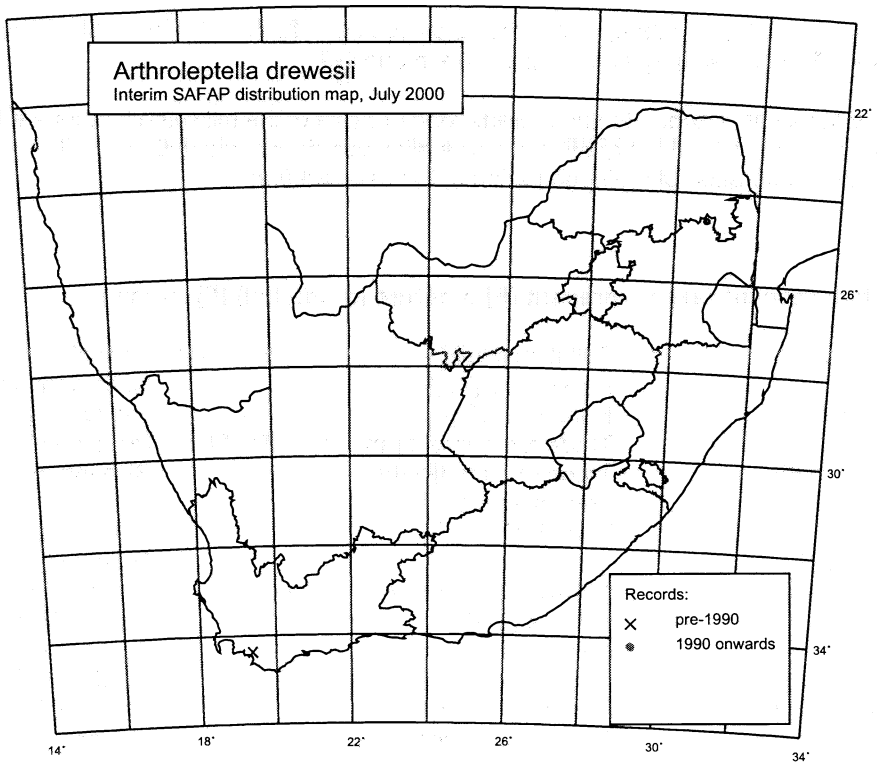
PART ONE

1. Scientific name: *Arthroleptella drewesii* Channing, Hendricks and Dawood 1994

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Petropedetidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Drewes' Moss Frog
1D. Taxonomic level of assessment: ■ Species □ Sub species □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Fynbos Biome in Mountain Fynbos vegetation.
2C. Habitat specificity (niche, elevation, etc.): Seepages in the Klein River Mountains, mostly above 200 m a.s.l.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Western Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 ■ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

No subpopulations are apparent; the whole population is restricted to the Klein River Mountains.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat ■ Contiguous □ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
■ <20% □ >20% □ >50% □ >80% in the last 60 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: See 6G.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in quality □ increase in quality?

6G. State primary cause of change: In some areas, one or more of the following factors are believed to have had an adverse effect on habitat quality: invasive alien vegetation, plantations, building developments (e.g. roads and dams), alteration of drainage patterns, too frequent fires.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation [P] **[F]** ■
Habitat loss: exotic animals [P] [F]
Pollution [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Interspecific competition: livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire **[P]** ■ **[F]** ■
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

Habitat loss: exotic plants **[P]** ■ **[F]** ■ Genetic problems [P] [F]
Overexploitation [P] [F] Hybridization [P] [F]
Pesticides [P] [F] Interspecific competition [P] [F]
Poisoning [P] [F] Interspecific competition from exotics [P] [F]
Other threats:

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No If yes, indicate which threats are resulting or may result in population decline: All of the above.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:

□ Hair	□ Skin	□ Bones	□ Fur
□ Meat	□ Horn	□ Organs	□ Glands
□ Whole plants	□ Taxidermy models	□ Live animal	□ Products
□ Other	□ Flowers	□ Seeds	□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown.
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
■ <20% □ >20% □ >50% □ >80% in the last 60 years

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next years/ generations

11. Data quality:

The above estimates are based on:

□ Census or monitoring	■ General field study
□ Indirect information such as from trade, etc.	□ Museum/herbarium studies/records
□ Hearsay/ popular belief	
□ Informal field sighting	■ Literature

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Alan Channing et al.	Klein River Mountains	1993	taxonomy
Andrew Turner	Fern Kloof N.R.	2000	atlas survey

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: Fernkloof Nature Reserve, Maanschynkop Nature Reserve, Vogelgat Nature Reserve.
13H. National or regionally endorsed protection plan: None.

Assigned status:

13I. Assigned IUCN Red List Category: Near Threatened
13J. IUCN Criteria based on: Small extent of occurrence and area of occupancy, together with some negative impacts on habitat, but population not severely fragmented and major declines are not projected.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey	□ Genetic research	□ Taxonomic research	□ Life history studies
■ Limiting factor research		□ Epidemiology	□ Trade
□ Others (taxon specific)			

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management	□ Wild population management	■ Monitoring	□ Translocation
□ Sustainable utilization	□ Public education	□ Genome Resource Banking	
■ Limiting factor management	□ Captive breeding	□ Work in local communities	
□ Others			

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery	□ Education	□ Reintroduction	□ Benign introduction
□ Research	□ Husbandry	□ Preservation of live genome	

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased □ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years □ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop ■ F. No captive program recommended

19. Are techniques established to propagate the taxon?

□ Techniques known for this taxon or similar taxon □ Some techniques known for taxon or similar taxa
■ Techniques not known at all □ Information not available in this group of compilers

20. Other comments:

Owing to its occurrence in generally rugged and inaccessible terrain, the species is not considered to be under immediate threat, but appropriate conservation management practices are called for.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux, A. & Mouton P. le F.N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Conservation, Stellenbosch.
Channing A., Hendricks D. & Dawood A. 1994. Description of a new moss frog from the south-western Cape (Anura: Ranidae: *Arthroleptella*). S. Afr. J. Zool. 29(4): 240-243.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Atherton de Villiers, Ernst Baard.

Conservation Assessment Management Plan Taxon Data Sheet for *Arthroleptella landdrosia*
Status: Near Threatened

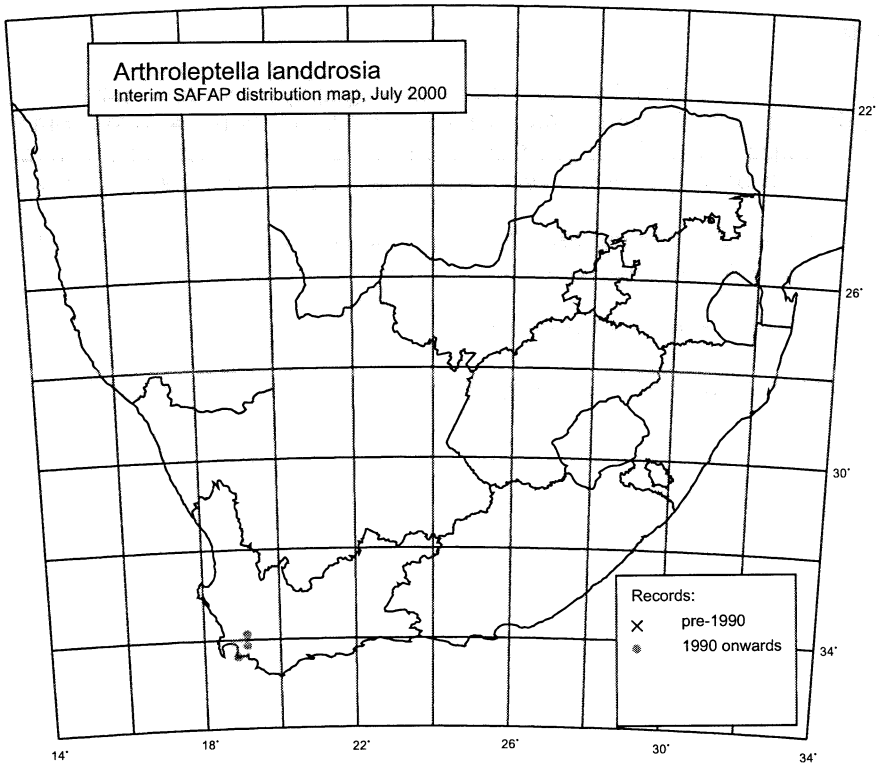
PART ONE

1. Scientific name: *Arthroleptella landdrosia* Dawood & Channing 2000

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Petropedetidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Landdroskop Moss Frog
1D. Taxonomic level of assessment: ■ Species □ Sub species □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Fynbos Biome in Mountain Fynbos vegetation.
2C. Habitat specificity (niche, elevation, etc.): Seepages in the Hottentot's Holland Mountain Range. Has a wide altitudinal range from peaks to sea level.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Western Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 ■ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

No subpopulations – whole population restricted to the Hottentots Holland/Kogelberg Mountains complex.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat ■ Contiguous □ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
■ <20% □ >20% □ >50% □ >80% in the last 60 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: See 6G.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in quality □ increase in quality?

6G. State primary cause of change: In some areas, one or more of the following factors are believed to have had an adverse effect on habitat quality: invasive alien vegetation, plantations, building developments (e.g. roads and dams), alteration of drainage patterns, too frequent fires.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming **[P]** ■ **[F]** ■
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation [P] **[F]** ■
Habitat loss: exotic animals [P] [F]
Pollution [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Interspecific competition: livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire **[P]** ■ **[F]** ■
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]

Habitat loss: exotic plants **[P]** ■ **[F]** ■ Genetic problems [P] [F]
Overexploitation [P] [F] Hybridization [P] [F]
Pesticides [P] [F] Interspecific competition [P] [F]
Poisoning [P] [F] Interspecific competition from exotics [P] [F]
Other threats:

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: All of the above.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:

□Hair	□ Skin	□ Bones	□ Fur
□ Meat	□ Horn	□ Organs	□ Glands
□ Whole plants	□ Taxidermy models	□ Live animal	□ Products
□ Other	□ Flowers	□ Seeds	□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown.
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
■ <20% □ >20% □ >50% □ >80% in the last 60 years

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study □ Informal field sighting ■ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Alan Channing	Landdroskop	1998-2000	taxonomic collection
Marius Burger	Betty's Bay	1998	atlas survey
Atherton de Villiers	Groenlandberg	2000	atlas survey

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: Hottentots Holland Nature Reserve, Kogelberg Nature Reserve, Kogelberg Biosphere Reserve.
13H. National or regionally endorsed protection plan: None.

Assigned status:

13I. Assigned IUCN Red List Category: Near Threatened
13J. IUCN Criteria based on: Small extent of occurrence and area of occupancy, together with some negative impacts on habitat, but the population is not severely fragmented and major declines not projected.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey □ Genetic research □ Taxonomic research □ Life history studies
■ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization □ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon
□ Some techniques known for taxon or similar taxa
■ Techniques not known at all
□ Information not available in this group of compilers

20. Other comments:

Owing to its occurrence in generally rugged and inaccessible terrain, the species is not considered to be under immediate threat, but appropriate conservation management practices are called for.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux A. & Mouton P. le F.N. 1999. *A* review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Conservation, Stellenbosch.
Dawood A. & Channing A. 2000. A molecular phylogeny of moss frogs from the Western Cape, South Africa, with a description of a new species. J. Herpetogy 34(3): 375-379.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Atherton de Villiers, Ernst Baard.

Conservation Assessment Management Plan Taxon Data Sheet for *Arthroleptella lightfooti*
Status: Near Threatened

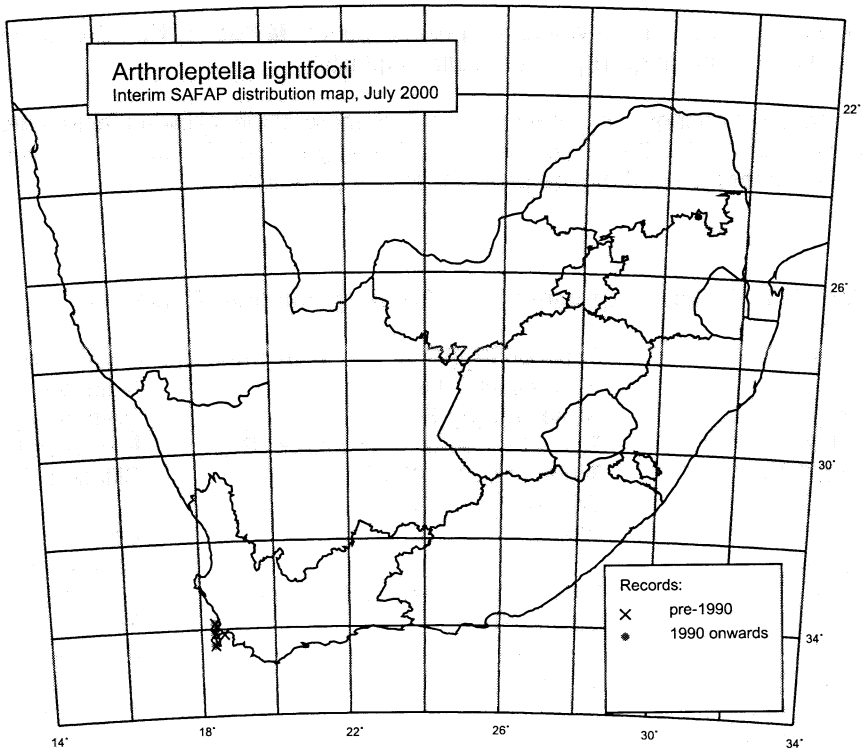
PART ONE

1. Scientific name: *Arthroleptella lightfooti* (Boulenger 1910)

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Petropedetidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Cape Moss Frog, Cape Chirping Frog, Cape Peninsula Chirping Frog.
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Fynbos Biome in Mountain Fynbos vegetation.
2C. Habitat specificity (niche, elevation, etc.): Seepages on the Cape Peninsula, from mountain tops to near sea level.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa.
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Western Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 ■ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Two subpopulations: Table Mountain/Constantiaberg, and southern Cape Pensinsula.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
■ <20% □ >20% □ >50% □ >80% in the last 60 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: See 6G.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in quality □ increase in quality?

6G. State primary cause of change: In some areas, one or more of the following factors are believed to have had an adverse effect on habitat quality: invasive alien vegetation, plantations, building developments (e.g. roads and dams), alteration of drainage patterns, too frequent fires.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming **[P]** ■ **[F]** ■
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation [P] **[F]** ■
Habitat loss: exotic animals [P] [F]
Pollution [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire **[P]** ■ **[F]** ■
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

Habitat loss: exotic plants **[P]** ■ **[F]** ■ Genetic problems [P] [F]
Overexploitation [P] [F] Hybridization [P] [F]
Pesticides [P] [F] Interspecific competition [P] [F]
Poisoning [P] [F] Interspecific competition from exotics [P] [F]
Other threats:

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline? ■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: All of the above.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:

□ Hair	□ Skin	□ Bones	□ Fur
□ Meat	□ Horn	□ Organs	□ Glands
□ Whole plants	□ Taxidermy models	□ Live animal	□ Products
□ Other	□ Flowers	□ Seeds	□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown, but common in places.
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
■ <20% □ >20% □ >50% □ >80% in the last 60 years

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study ■ Informal field sighting ■ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Alan Channing et al	Cape Peninsula	1993	taxonomy
Cape Nature Conservation	Cape Peninsula	1990-present	field surveys

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: Cape Peninsula National Park, Cape Peninsula Protected Natural Environment, Kirstenbosch Botanical Garden.
13H. National or regionally endorsed protection plan: None.

Assigned status:

13I. Assigned IUCN Red List Category: Near Threatened
13J. IUCN Criteria based on: Small extent of occurrence and area of occupancy, together with some negative impacts on habitat, but the population is not severely fragmented and major declines not projected.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey □ Genetic research □ Taxonomic research □ Life history studies □ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization □ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,

17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

☐ A. Ongoing captive program intensified or increased
☐ B. Ongoing captive program decreased
☐ C. Initiate captive program within 3 years
☐ D. Initiate captive program in 3 years
☐ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

☐ Techniques known for this taxon or similar taxon
☐ Some techniques known for taxon or similar taxa
■ Techniques not known at all
☐ Information not available in this group of compilers

20. Other comments:

Owing to its occurrence in generally rugged and inaccessible terrain, the species is not considered to be under immediate threat, but appropriate conservation management practices are called for.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux A. & Mouton P. le F.N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Conservation, Stellenbosch.
Channing A., Hendricks D. & Dawood A. 1994. Description of a new moss frog from the south western Cape (Anura: Ranidae: *Arthroleptella*). S. Afr. J. Zool. 29(4): 240-243.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Mus. 17: 1-334.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Atherton de Villiers, Ernst Baard.

Conservation Assessment Management Plan Taxon Data Sheet for *Breviceps gibbosus*
Status: Near Threatened

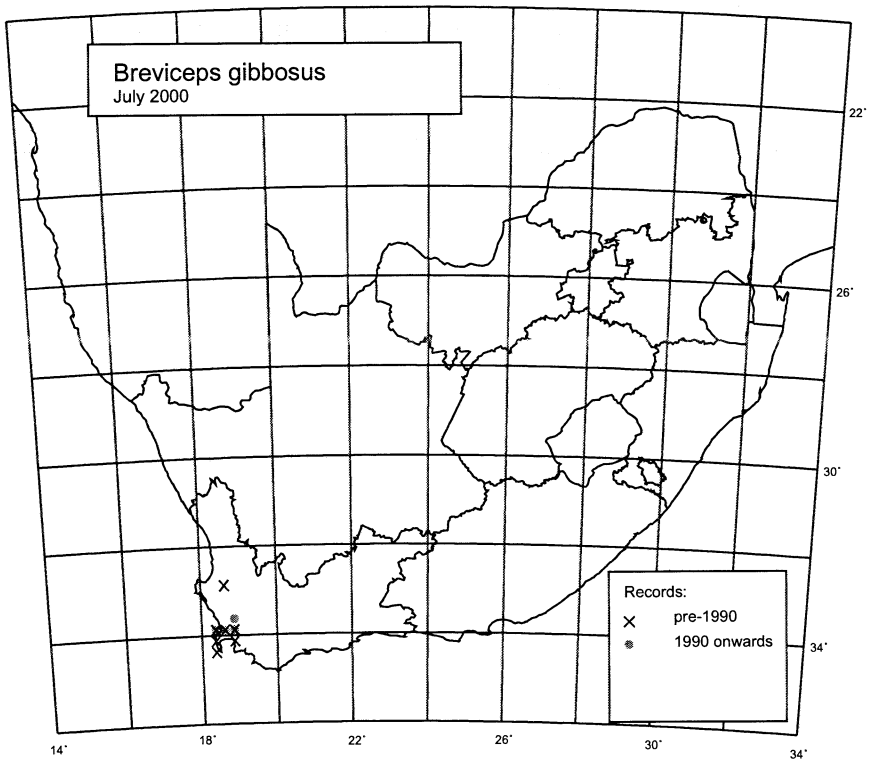
PART ONE

1. Scientific name: *Breviceps gibbosus* (Linnaeus 1758)

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Microhylidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Cape Rain Frog, Giant Rain Frog, Cape Shorthead, S.A. Shortheaded Frog
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Fynbos Biome, predominantly in West Coast Renosterveld.
2C. Habitat specificity (niche, elevation, etc.): A burrowing species that lays its eggs underground, away from wetland habitats. Inhabits well-drained, loamy soils, especially along certain mountain foothills and in hilly terrain. Occupies modified habitats such as suburban gardens and plantations.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Western Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 ■ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 □ 11 – 500 km^2 □ 501 – 2,000 km^2 ■ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Two subpopulations: Cape Peninsula and Swartland (Somerset West district to Piketberg district).

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
□ <20% □ >20% □ >50% ■ >80% in the last 100 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Urban and agricultural development.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Greater density of urban development, and intensive agriculture, which both lead to habitat degradation, as well as loss of localities and further fragmentation of subpopulations.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants [P] [F]
Pollution [P] **[F]** ■
Powerlines [P] [F]
Road kills [P] **[F]** ■
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire **[P]** ■ **[F]** ■
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

Overexploitation [P] [F] | Hybridization [P] [F]
Pesticides **[P] [F]** ■ | Interspecific competition [P] [F]
Poisoning [P] [F] | Interspecific competition from exotics [P] [F]
Other threats: Intensive agriculture/ploughing and increased urban development in general.
7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: All the above.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International

8B. Parts in trade:

□ Hair	□ Horn	□ Organs	□ Glands
□ Meat	□ Taxidermy models	□ Live animal	□ Products
□ Whole plants	□ Flowers	□ Seeds	□ Roots
□ Other			

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown.
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
□ Declining □ Increasing □ Stable ■ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% □ >80% in the last ? years/ generations

10C. If stable or unknown, do you predict a future decline in the population? ■ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
■ <20% □ >20% □ >50% □ >80% in the next 20 years, due to high density housing developments, expanding urban and agricultural development.

11. Data quality:

The above estimates are based on:
■ Census or monitoring □ General field study ■ Informal field sighting □ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Cape Nature Conservation	species' range	1990-present	monitoring
M. Burger, J. Harrison & A. Pauw	Piketberg, northward	2000	atlas survey

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): VU A2c
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Vulnerable.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: Cape Peninsula National Park and other provincial and local authority nature reserves or conservation areas, such as Tygerberg Hills Nature Reserve, Voelvlei Nature Reserve, Limietberg Nature Reserve, Paarl Mountain Nature Reserve.
13H. National or regionally endorsed protection plan: Cape Nature Conservation threatened-frog monitoring programme.

Assigned status:

13I. Assigned IUCN Red List Category: Near Threatened
13J. IUCN Criteria based on: Small extent of occurrence, together with massive declines in area of occupancy in the past, and further projected declines, but the extent of occurrence is larger than previously thought, including upland areas which are relatively secure.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey	□ Genetic research	□ Taxonomic research	□ Life history studies
□ Limiting factor research		□ Epidemiology	□ Trade
□ Others (taxon specific)			

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management	□ Wild population management	■ Monitoring	□ Translocation
□ Sustainable utilization	□ Public education	□ Genome Resource Banking	
■ Limiting factor management	□ Captive breeding	□ Work in local communities	
□ Others			

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery	□ Education	□ Reintroduction	□ Benign introduction
□ Research	□ Husbandry	□ Preservation of live genome	

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):

17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon
□ Some techniques known for taxon or similar taxa
■ Techniques not known at all
□ Information not available in this group of compilers

20. Other comments:

High density urban housing policy may lead to decreases in gardens on the Cape Peninsula.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux A. & Mouton P. le F.N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Conservation, Stellenbosch.
De Villiers A.L. 1988. *Breviceps gibbosus* species account. In: W.R. Branch (ed.) South African Red Data Book – reptiles and amphibians, pp. 46-48. S. Afr. Nat. Sci. Prog. Rep. No. 151, CSIR, Pretoria.
De Villiers A.L. 1997. Monitoring the distribution and conservation status of threatened amphibians in the southwestern Cape. pp. 142-148. Proceedings of the third HAA Symposium, Herpetological Association of Africa, Pretoria, 1993.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Mus. 17: 1-334.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Atherton de Villiers, Ernst Baard.

Conservation Assessment Management Plan Taxon Data Sheet for *Breviceps macrops*
Status: Near Threatened

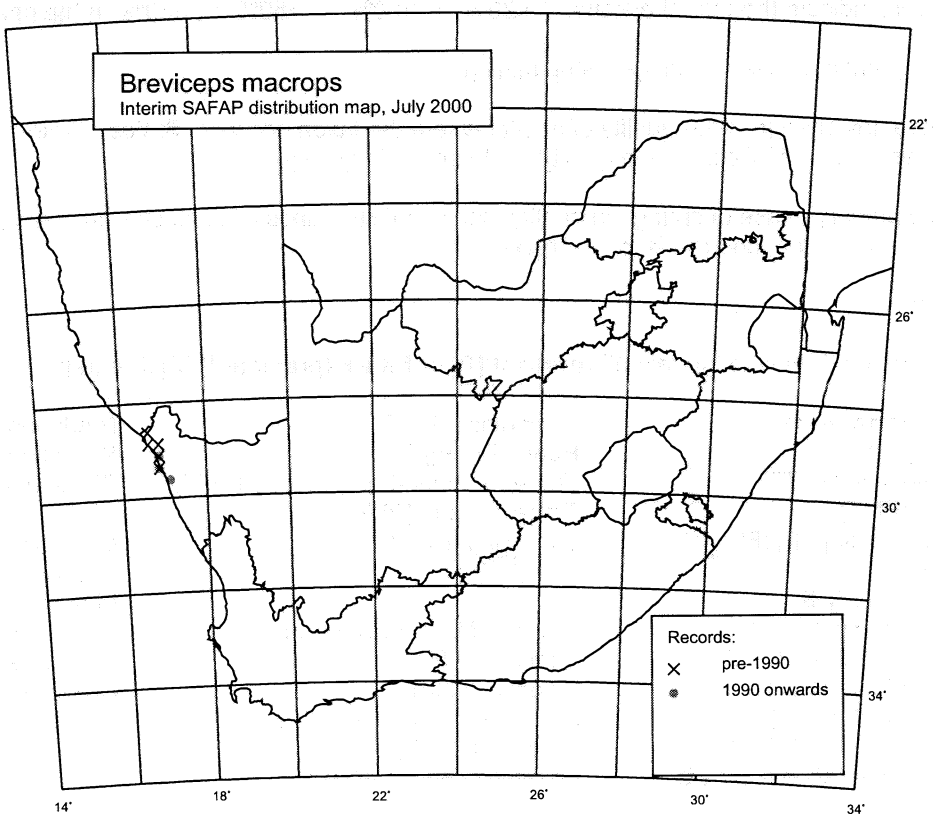
PART ONE

1. Scientific name: *Breviceps macrops* Boulenger 1907

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Microhylidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Desert Rain Frog, Melkpadda (Afrikaans).
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Succulent Karoo Biome.
2C. Habitat specificity (niche, elevation, etc.): Strandveld Succulent Karoo, scrub-covered coastal sand-dunes, and similar habitats up to 20 km inland fringing on the Lowland Succulent Karoo.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa, Namibia
2E. Current distribution (listed by country): South Africa, Namibia
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Northern Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 ■ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'):

□ <10 km^2 □ 11 – 500 km^2 ■ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

At least two subpopulations: north and south of the Orange River.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

Strip mining activity may have caused further habitat fragmentation in the southern subpopulation.

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ Decrease in area □ Increase in area?

6C. If decreasing, what has been the decrease in area (approximately, in percent) in the last ? years?
□ <20% ■ >20% □ >50% □ >80% in the last 50 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years

6E. State primary cause of change: Strip mining.

6F Is there any change in the quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ Decrease in quality □ Increase in quality?

6G. State primary cause of change in quality: Human disturbance associated with mining, such as coastal township development and roads; over-grazing.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing **[P]** ■ **[F]** ■
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation [P] **[F]** ■
Powerlines [P] [F]
Road kills [P][F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]

Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants [P] [F]
Overexploitation [P] [F]
Pesticides [P] [F]
Poisoning [P] [F]
Pollution [P] [F]
Other threats:

Genetic problems [P] [F]
Hybridization [P] [F]
Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No If yes, indicate which threats are resulting or may result in population decline: Strip mining and urbanisation.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it: □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Hair
□ Meat
□ Whole plants
Others

□ Skin
□ Horn
□ Taxidermy models
□ Flowers

□ Bones
□ Organs
□ Live animal
□ Seeds

□ Fur
□ Glands
□ Products
□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown
9B. Subpopulations (no. of individuals in each): Unknown
9C. Number of mature individuals in population: □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown

10. Population trends:

10A. Is the population size/ numbers of the taxon:
Declining □ Increasing □ Stable ■ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
<20% □ >20% □ >50% □ >80% in the last years/ generations

10C. If stable or unknown, do you predict a future decline in the population? ■ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
<20% □ >20% ■ >50% □ >80% in the next 30 years: strip mining activity is present throughout almost the entire recorded range of distribution, and there is increasing utilization of the land for grazing.

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study ■ Informal field sighting □ Literature
□ Indirect information, e.g. from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
A.C. Channing	Port Nolloth	1997	survey

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): VU A2c
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Restricted
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: None. (The Orange River mouth at Alexander Bay is in the process of being proclaimed as a protected area.)
13H. National or regionally endorsed protection plan: None.

Assigned status:

13I. Assigned IUCN Red List Category: Near Threatened
13J. IUCN Criteria based on: Small extent of occurrence and area of occupancy, and current threats are believed to have the potential to threaten the species in the future.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey	□ Genetic research	□ Taxonomic research	■ Life history studies
■ Limiting factor research		□ Epidemiology	□ Trade
□ Others (taxon specific)			

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management	□ Wild population management	■ Monitoring	□ Translocation
□ Sustainable utilization	■ Public education	□ Genome Resource Banking	
■ Limiting factor management	□ Captive breeding	□ Work in local communities	
□ Others			

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery	□ Education	□ Reintroduction	□ Benign introduction
□ Research	□ Husbandry	□ Preservation of live genome	

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon
□ Some techniques known for taxon or similar taxa
■ Techniques not known at all
□ Information not available in this group of compilers

20. Other comments:

Because of the extensive mining concessions, there is a need to establish whether worked dune areas are being re-colonized. Grazing pressure is likely to increase; future land uses are uncertain.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Channing A.C. 1988. Opportunistic seasonal breeding by frogs in Namaqualand. J. Herp. Assoc. Africa 35: 19-24.
De Villiers A.L. 1988. Desert Rain Frog species account. In: W.R. Branch (Ed.) South African Red Data Book – reptiles and amphibians. S. Afr. Nat. Sci. Prog. Rep. No. 151, CSIR, Pretoria.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs. Southern Book Publishers and Witwatersrand University Press, Johannesburg.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals Natal Museum 17: 1-334.

22. Compilers (members of the working group):

Mike Bates, Harold Braack, Clayton Cook, Louis du Preez, Niels Jacobsen, Les Minter, Ché Weldon.

23. Reviewers:

Les Minter.

Conservation Assessment Management Plan Taxon Data Sheet for *Breviceps sylvestris*
Status: Near Threatened

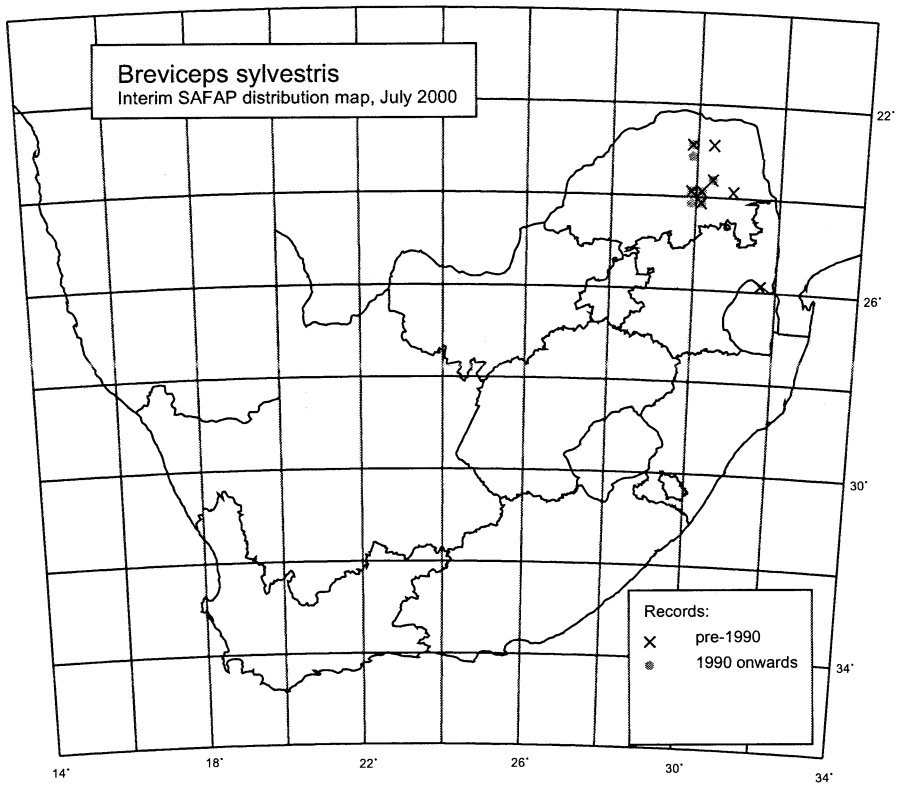
PART ONE

1. Scientific name: *Breviceps sylvestris* FitzSimons 1930

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Microhylidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Northern Province Rain Frog, Transvaal Forest Rain Frog, Woodbush Rain Frog, Soutpansberg Rain Frog, Woodbush-blaasop (Afrikaans), Soutpansberg-blaasop (Afrikaans).
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Forest Biome, Afromontane Forest.
2C. Habitat specificity (niche, elevation, etc.): Forest and forest fringe in mountainous areas above 1200 m.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Northern Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 ■ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'):

□ <10 km^2 □ 11 – 500 km^2 ■ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Two subpopulations: Soutpansberg; Transvaal Drakensberg escarpment from Haenertsburg south to Lekgalameetse Nature Reserve.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ Decrease in area □ Increase in area?

6C. If decreasing, what has been the decrease in area (approximately, in percent) in the last ? years?
□ <20% ■ >20% □ >50% □ >80% in the last 50 years

6D. If stable or not known, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years

6E. State primary cause of change: Afforestation and other agricultural activities.

6F Is there any change in the quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ Decrease in quality □ Increase in quality?

6G. State primary cause of change: Surrounding alien plantations reduce the availability of water; roads; fragmentation of previously continuous areas of suitable habitat.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Habitat loss: exotic animals [P] [F]
Powerlines [P] [F]
Road kills **[P]** ■ **[F]** ■
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]

Habitat loss: exotic plants [P] [F]
Overexploitation [P] [F]
Pesticides [P] [F]
Poisoning [P] [F]
Pollution [P] [F]
Other threats:

Hybridization [P] [F]
Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline? ■ Yes □ No If yes, indicate which threats are resulting or may result in population decline: Replacement of the remaining forest patches and surrounding grassland by exotic plantations or other agricultural crops; development of roads which cut through areas of suitable breeding habitat.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it: □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Hair
□ Meat
□ Whole plants
Others:

□ Skin
□ Horn
□ Taxidermy models
□ Flowers

□ Bones
□ Organs
□ Live animal
□ Seeds

□ Fur
□ Glands
□ Products
□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown
9B. Subpopulations (no. of individuals in each): Unknown
9C. Number of mature individuals in population: □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown

10. Population trends:

10A. Is the population size/ numbers of the taxon:
□ Declining □ Increasing □ Stable ■ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% □ >80% in the last ? years/ generations

10C. If stable or unknown, do you predict a future decline in the population? ■ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% ■ >20% □ >50% □ >80% in the next 30 years, due to habitat loss and fragmentation and change in quality of remaining habitat.

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study ■ Informal field sighting □ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
L.R. Minter	Entire range	1986-1999	reproductive biology

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: Northern Province Dept. Environmental Affairs and Tourism, Nature Conservation Ordinance 12 of 1973; National Forests Act 19408 of 1998, Section 7.
13G. Known presence in protected areas: Entabeni Nature Reserve, Lekgalameetse Nature Reserve, State Forests in the Soutpansberg and along the eastern escarpment between Woodbush and Lekgalameetse.
13H. National or regionally endorsed protection plan: None.

Assigned status:

13I. Assigned IUCN Red List Category: Near Threatened
13J. IUCN Criteria based on: Small extent of occurrence and area of occupancy, and current threats are believed to have the potential to threaten the species in the future.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey	■ Genetic research	■ Taxonomic research	□ Life history studies
■ Limiting factor research		□ Epidemiology	□ Trade
□ Others (taxon specific)			

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management	□ Wild population management	■ Monitoring	□ Translocation
□ Sustainable utilization	□ Public education	□ Genome Resource Banking	
■ Limiting factor management	□ Captive breeding	□ Work in local communities	
□ Others			

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery	□ Education	□ Reintroduction	□ Benign introduction
□ Research	□ Husbandry	□ Preservation of live genome	

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon
□ Some techniques known for taxon or similar taxa
■ Techniques not known at all
□ Information not available with this group of compilers

20. Other comments:

Although two subspecies are recognized, our evaluation was made at the species level.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
FitzSimons V. 1930. Descriptions of new South African Reptiles and Batrachia, with distribution records of allied species in the Transvaal Museum collection. Ann. Transv. Mus.14: 20-48.
Jacobsen N.H.G. Newberry, R.E., Petersen, W.L. 1986. A checklist of the herpetofauna of the Transvaal Provincial Nature Reserves. Transvaal Nature Conservation Division.
Jacobsen N.H.G. 1989. A herpetological survey of the Transvaal. Unpublished PhD Thesis, University of Natal, South Africa.
Minter L.R. 1998. Aspects of the reproductive biology of Breviceps. Unpublished PhD Thesis, University of the Witwatersrand, South Africa.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs. Southern Book Publishers and Witwatersrand University Press, Johannesburg.
Poynton J.C. 1964. The Amphibia of Southern Africa: a faunal study. Ann. Natal Mus. 17: 1-334.
Wager V.A. 1965. The frogs of South Africa: their fascinating life stories. Cape Town, Purnell.

22. Compilers (members of the working group):

Mike Bates, Harold Braack, Clayton Cook, Louis du Preez, Niels Jacobsen, Les Minter, Ché Weldon.

23. Reviewers:

Les Minter.

Conservation Assessment Management Plan Taxon Data Sheet for *Bufo amatolicus*
Status: Near Threatened

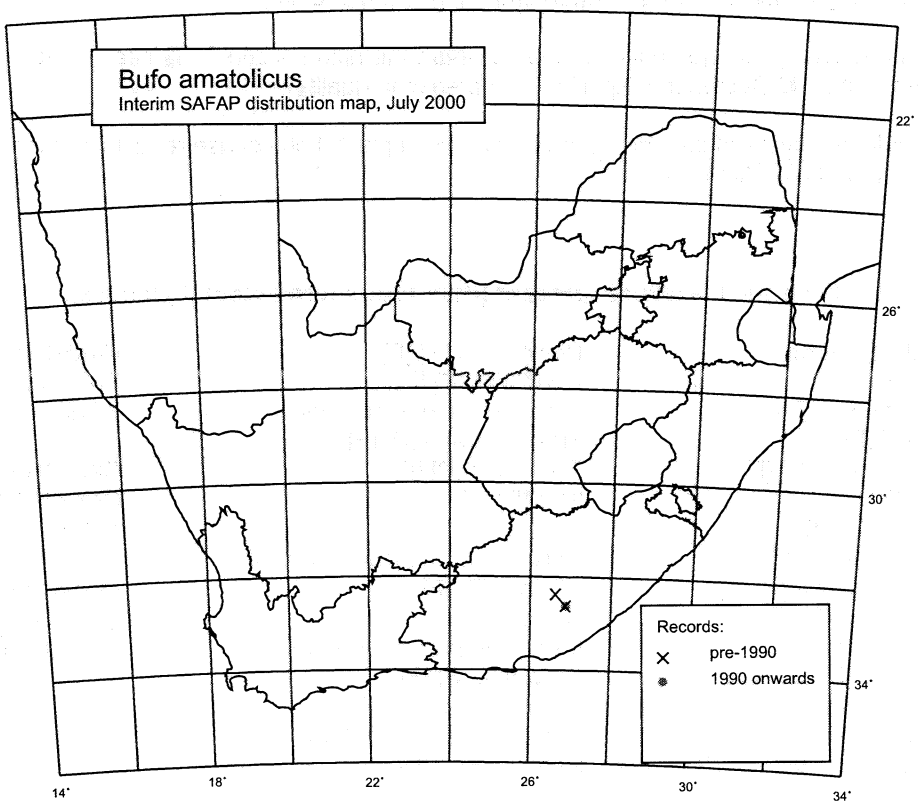
PART ONE

1. Scientific name: *Bufo amatolicus* Hewitt 1925

1A. Synonyms: *Bufo angusticeps amatolica* Hewitt 1925
1B. Scientific nomenclature:
$1B_1$. Family: Bufonidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Amatola Toad
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Grassland Biome: Moist Upland Grassland.
2C. Habitat specificity (niche, elevation, etc.): Rolling grassland and grassland-forest ecotone; elevation between 1400 and 1800 m a.s.l.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Eastern Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 ■ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'):

□ <10 km^2 □ 11 – 500 km^2 ■ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Three subpopulations on the Katberg, Gaika's Kop, and Hogsback mountains.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ Decrease in area □ Increase in area?

6C. If decreasing, what has been the decrease in area (approximately, in percent) in the last ? years?
■ <20% □ >20% □ >50% □ >80% in the last 30 years.

6D. If stable or not known, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years

6E. State primary cause of change: Afforestation, grazing and fire.

6F Is there any change in the quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ Decrease in quality □ Increase in quality?

6G. State primary cause of change: Surrounding alien plantations cause reduction in the availability of surface water, and alter fire regimes.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing **[P]** ■ **[F]** ■
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants **[P]** ■ **[F]** ■
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Hybridization [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]

Overexploitation [P] [F]
Pesticides [P] [F]
Poisoning [P] [F]
Pollution [P] [F]
Other threats:

Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No If yes, indicate which threats are resulting or may result in population decline: Replacement of grassland by alien vegetation, increased grazing pressure, altered fire regimes and afforestation, will result in population decline.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Skin □ Bones □ Fur
□ Hair □ Horn □ Organs □ Glands
□ Meat □ Taxidermy models □ Live animal □ Products
□ Whole plants □ Flowers □ Seeds □ Roots
Others

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown
9B. Subpopulations (no. of individuals in each): Unknown
9C. Number of mature individuals in population: □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown

10. Population trends:

10A. Is the population size/ numbers of the taxon:
□ Declining □ Increasing □ Stable ■ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% □ >80% in the last ? years/ generations

10C. If stable or unknown, do you predict a future decline in the population? ■ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% ■ >20% □ >50% □ >80% in the next 30 years, due to loss and/or change in quality of habitat and habitat fragmentation.

11. Data quality:

The above estimates are based on:
□ Census or monitoring □ General field study ■ Informal field sighting ■ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Cunningham M.	Hogsback	1998	atlas survey

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): VU A2c,e.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Restricted
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces); National Forests Act 19408 of 1998, Section 7.
13G. Known presence in protected areas: State forests between Keiskammahoek and Hogsback; SAFCOL Forestry areas: Kubusi Indigenous Forest, Hogsback Indigenous Forest.
13H. National or regionally endorsed protection plan: None.

Assigned status:

13I. Assigned IUCN Red List Category: Near Threatened
13J. IUCN Criteria based on: Small extent of occurrence and area of occupancy, and current threats are believed to have the potential to threaten the species in the future.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey ■ Genetic research ■ Taxonomic research ■ Life history studies
■ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? ■ Yes □ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization ■ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon
■ Some techniques known for taxon or similar taxa
□ Techniques not known at all
□ Information not available with this group of compilers

20. Other comments:

1) Although a number of protected areas are listed (13G), None. of those are nature reserves in the strict sense. We recommend that a particular subpopulation be given specific protection within a formal provincial nature reserve.
2) The taxonomic/genetic status of a small *Bufo* sp. on the Kammanassie Mountains needs to be investigated.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Boycott R.C. 1988. Amatola toad species account. In: W.R. Branch (Ed.) South African Red Data Book – reptiles and amphibians. S. Afr. Nat. Sci. Prog. Rep. No. 151, CSIR, Pretoria.
Branch W.R. 1990. The herpetofauna of the Cape Province, South Africa: new distribution records and zoogeography. Journal of the Herpetological Association of Africa 37: 17-44.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs. Southern Book Publishers and Witwatersrand University Press, Johannesburg.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals Natal Museum 17: 1-334.

22. Compilers (members of the working group):

Mike Bates, Harold Braack, Clayton Cook, Louis du Preez, Niels Jacobsen, Les Minter, Ché Weldon.

23. Reviewers:

Les Minter.

Conservation Assessment Management Plan Taxon Data Sheet for *Hemisus guttatus*
Status: Near Threatened

PART ONE

1. Scientific name: *Hemisus guttatus* (Rapp 1842)

1A. Synonyms: *Engystoma guttatum* Rapp 1842
Hemisus guttatum Günther 1858

1B. Scientific nomenclature:
$1B_1$. Family: Hemisotidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia

1C. Common name(s): Spotted Shovel-nosed Frog, Spotted Snout-burrower, Spotted Burrowing Frog, Eastern Sharp-snouted Frog.

1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form

1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a

2B. Habitat of the taxon (ecosystem level): Savannah and Grassland biomes.

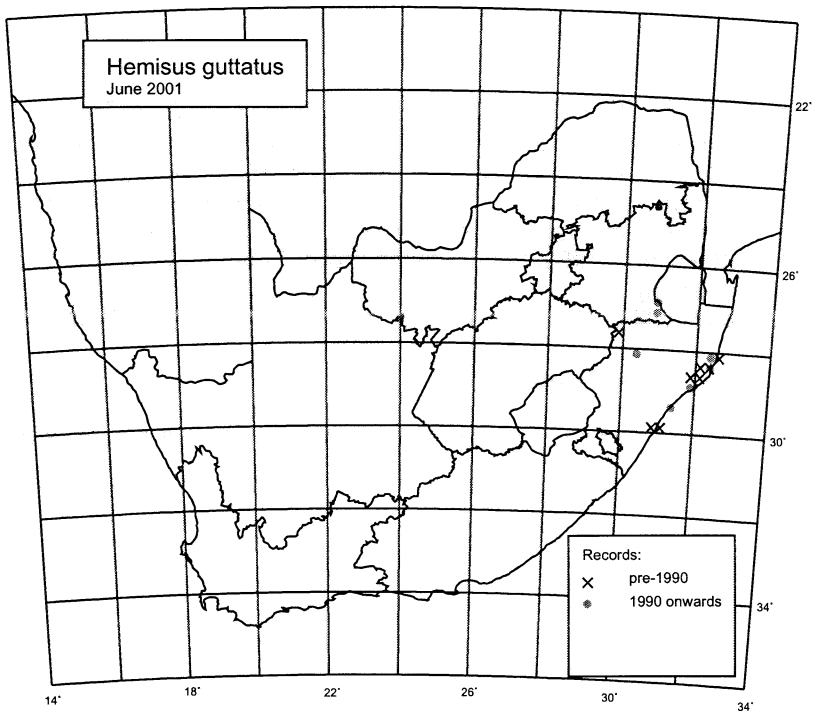
2C. Habitat specificity (niche, elevation, etc.): Pans in Coastal Bushveld/Grassland, Natal Central Bushveld and North-eastern Mountain Grassland.

2D. Historical distribution (Global -- in past 100 years described by country): South Africa

2E. Current distribution (listed by country): South Africa

2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Provinces of KwaZulu-Natal and Mpumalanga.

2G. Concentrated migration sites (using political units): n/a



3. Approxproximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 ■ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 □ 11 – 500 km^2 ■ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Two or more subpopulations (e.g., the coastal and inland subpopulations), each being also fragmented.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
□ <20% ■ >20% □ >50% □ >80% in the last 50 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Destruction of pan habitat by ploughing and plantations of sugarcane and alien trees, as well as urbanization.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Changes in soil moisture resulting from agriculture and silviculture.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Habitat loss: exotic animals [P] [F]
Pollution [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes **[P]** ■ **[F]** ■
Interspecific competition: livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

Habitat loss: exotic plants **[P]** ■ **[F]** ■ Genetic problems [P] [F]
Overexploitation [P] [F] Hybridization [P] [F]
Pesticides [P] [F] Interspecific competition [P] [F]
Poisoning [P] [F] Interspecific competition from exotics [P] [F]
Other threats: Changes to water regime.

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: Habitat loss owing to agriculture, alien trees and urbanization; drying and hardening of soil as result of reduced availability of ground water.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Hair □ Skin □ Bones □ Fur
□ Meat □ Horn □ Organs □ Glands
□ Whole plants □ Taxidermy models □ Live animal □ Products
□ Other □ Flowers □ Seeds □ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown, but >2,500.
9B. Subpopulations (no. of individuals in each): See 5; sizes unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% □ >80% in the last ? years/ generations ■ Unknown

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study ■ Informal field sighting ■ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
H. Braack	Piet Retief	2000	atlas survey

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: KwaZulu-Natal Nature Conservation Ordinance, No. 15 of 1974, as amended.
13G. Known presence in protected areas: Greater St Lucia Wetland Park (World Heritage Site), Umlalazi Nature Reserve, Bluff Nat. Res., Hluhluwe-Umfolozi Park, Bonamanzi Private Nat. Res.
13H. National or regionally endorsed protection plan: None.

Assigned status:

13I. Assigned IUCN Red List Category: Near Threatened
13J. IUCN Criteria based on: Small area of occupancy but, although the species is believed to have lost much of its original habitat and therefore have suffered a major population decline in the past, there is insufficient information on current trends to classify it as threatened at present. It is a poorly known and infrequently observed fossorial species, and Data Deficient could be an alternative classification.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey □ Genetic research □ Taxonomic research ■ Life history studies
■ Limiting factor research □ Epidemiology □ Trade
■ Others (taxon specific): Confirm conspecificity of subpopulations.

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization □ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,

17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

☐ A. Ongoing captive program intensified or increased
☐ B. Ongoing captive program decreased
☐ C. Initiate captive program within 3 years
☐ D. Initiate captive program in 3 years
☐ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

☐ Techniques known for this taxon or similar taxon
☐ Some techniques known for taxon or similar taxa
■ Techniques not known at all
☐ Information not available in this group of compilers

20. Other comments:

This species is extremely hard to find and even its call is problematic because it resembles that of an insect. The distributional information is therefore certainly incomplete and especially the inland populations are largely unknown. The species has unusual breeding habits which probably restrict it to specific habitats, details of which need to be described as a prerequisite for limiting factor management.

PART FOUR

21. Sources of data:

Alexander G.J. 1990. Reptiles and amphibians of Durban. Durban Museum Novitates 15: 1-41.
Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Johnson P.A. & Raw L.R.G. 1988. The herpetofauna of sugarcane fields and their environs on the north coast of Natal. Proceedings of the first HAA Conference, Stellenbosch, April 1987. J. Herpetological Assoc. of Africa 36:11-18.
Lambiris A.J.L. 1989. A review of the amphibians of Natal. Lammergeyer 39: 1-210.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Museum 17: 1-334.
Wager V.A. 1958. The Spotted Burrowing Frog (*Hemisus guttatum*). African Wildlife 12(3): 201-205.
Wager V.A. 1986. Frogs of South Africa: their fascinating life stories. Delta Books, Johannesburg.

22. Compilers (members of the working group):

Phil Bishop, Bill Branch, Marius Burger, Mike Coke, James Harrison, Andrew Turner.

23. Reviewers:

Phil Bishop, Marius Burger, James Harrison.

Conservation Assessment Management Plan Taxon Data Sheet for *Poyntonia paludicola* Status: Near Threatened

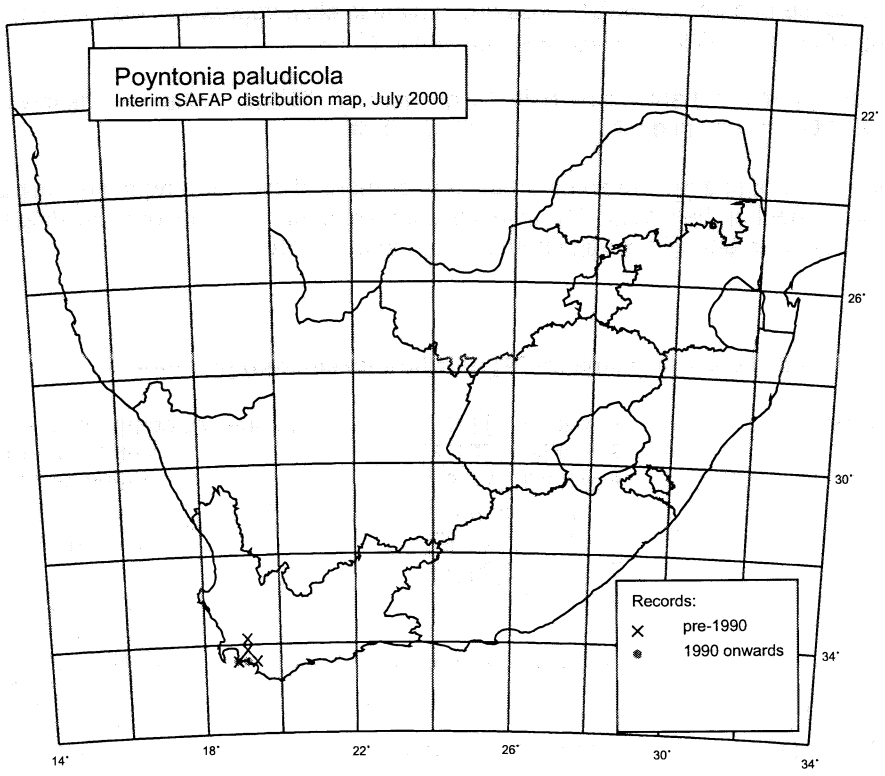
PART ONE

1. Scientific name: *Poyntonia paludicola* Channing and Boycott 1989

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Petropedetidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Montane Marsh Frog
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Fynbos Biome in Mountain Fynbos vegetation.
2C. Habitat specificity (niche, elevation, etc.): Montane seepage areas, mainly high altitude (500-1500 m a.s.l.), as well as at lower altitudes (20 m). Occurs both on slopes and flatter areas.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Western Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 ■ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Two subpopulations: Hottentots Holland/Kogelberg mountain complex, and Klein River Mountains.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
■ <20% □ >20% □ >50% □ >80% in the last 60 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Habitat loss due mainly to alien vegetation, plantations, and at least one locality through damming. Also building development in places.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in quality □ increase in quality?

6G. State primary cause of change: In some areas, one or more of the following factors are believed to have had an adverse effect on habitat quality: invasive alien vegetation, plantations, building developments (e.g. roads and dams), alteration of drainage patterns, too frequent fires.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming **[P]** ■ **[F]** ■
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Pollution [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire **[P]** ■ **[F]** ■
Hurricane [P] [F]
Landslide [P] [F]

Habitat fragmentation **[P] ■ [F] ■**
Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants **[P] ■ [F] ■**
Overexploitation [P] [F]
Pesticides [P] [F]
Poisoning [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Hybridization [P] [F]
Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Tsunami [P] [F]
Volcano [P] [F]
Other threats:

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: All of the above.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Hair
□ Meat
□ Whole plants
□ Other
□ Skin
□ Horn
□ Taxidermy models
□ Flowers
□ Bones
□ Organs
□ Live animal
□ Seeds
□ Fur
□ Glands
□ Products
□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown, but believed to be reasonably common in places.
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
■ <20% □ >20% □ >50% □ >80% in the last 60 years

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study ■ Informal field sighting ■ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Cape Nature Conservation	species' range	1990-present	field surveys

PART TWO

13. Conservation status:

Current status:
13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: Kogelberg Biosphere Reserve, Kogelberg Nature Reserve, Hottentots Holland Nature Reserve, Maanschynkop Nature Reserve, Vogelgat Nature Reserve.
13H. National or regionally endorsed protection plan: None.

Assigned status:
13I. Assigned IUCN Red List Category: Near Threatened
13J. IUCN Criteria based on: Extent of occurrence <5000 km^2 and area of occupancy estimated as <500 km^2, but there is no inferred or projected decline of either, and there is no severe fragmentation.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it
■ Survey □ Genetic research □ Taxonomic research ■ Life history studies
□ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization □ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon?

□ Techniques known for this taxon or similar taxon
□ Some techniques known for taxon or similar taxa
■Techniques not known at all
□ Information not available in this group of compilers

20. Other comments:

Due to its occurrence in generally rugged and inaccessible mountainous terrain, it is not considered to be under immediate threat, but appropriate conservation management practices are called for.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux A. & Mouton P. le F.N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Conservation, Stellenbosch.
Boycott R.C. 1990. A new frog from the south-Western Cape Province. Afr. Wildl. 44(6): 343-346.
Channing A. & Boycott R.C. 1989. A new frog genus and species from the mountains of the Southwestern Cape, South Africa (Anura: Ranidae). Copeia 1989(2): 467-471.
De Villiers A.L. 1997. Monitoring the distribution and conservation status of threatened amphibians in the southwestern Cape. Proceedings of the Third Herpetological Association of Africa Symposium, 1993, Pretoria. pp. 142-148.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Atherton de Villiers, Ernst Baard.

Conservation Assessment Management Plan Taxon Data Sheet for *Pyxicephalus adspersus* Status: Near Threatened

PART ONE

1. Scientific name: *Pyxicephalus adspersus* Tschudi 1838

1A. Synonyms: *Tomopterna adspersa* Duméril & Bibron 1841
Rana adspersa Boulenger 1882
Pyxicephalus adspersus adspersus Parry 1982

1B. Scientific nomenclature:
$1B_1$. Family: Ranidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia

1C. Common name(s): Giant Bullfrog, Bullfrog, African Bullfrog, Highveld Bullfrog, Groot Brulpadda (Afrikaans), Brulpadda (Afrikaans), Letlametlu (Pedi, Shangaan), Marokolo (Sesotho), Lentsoeta (Sesotho)

1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form

1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a

2B. Habitat of the taxon (ecosystem level): Grassland, Savanna, Nama Karoo and Thicket Biomes

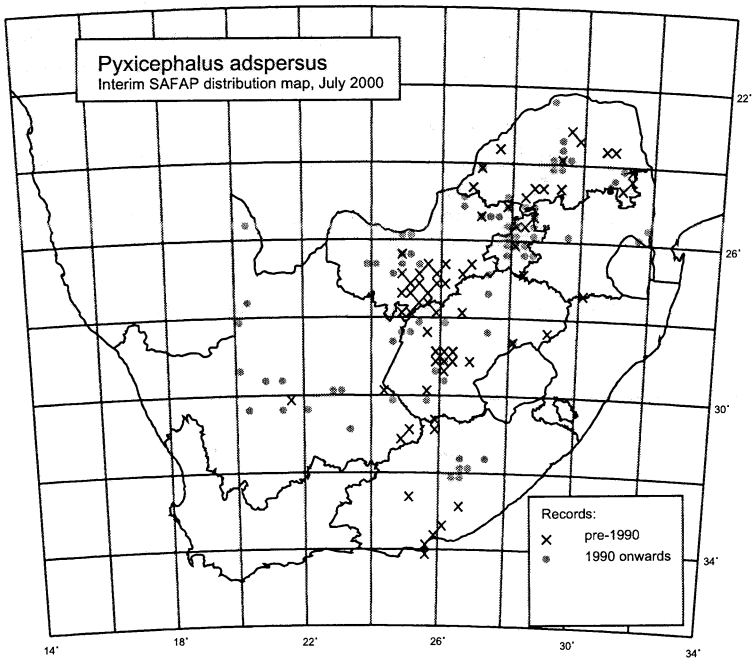
2C. Habitat specificity (niche, elevation, etc.): Breeds in seasonal pans in a variety of vegetation types, usually in flat, open habitats.

2D. Historical distribution (Global -- in past 100 years described by country): South Africa, Namibia, Botswana, Zimbabwe, Malawi, Tanzania, Kenya.

2E. Current distribution (listed by country): South Africa, Namibia, Botswana, Zimbabwe, Malawi, Tanzania, Kenya.

2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): South Africa, i.e., a sub-regional as opposed to a global assessment.

2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 ■ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 □ 11 – 500 km^2 □ 501 – 2,000 km^2 ■ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Unknown. Original distribution fragmented by crop agriculture, probably resulting in numerous, isolated subpopulations.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ Decrease in area □ Increase in area?

6C. If decreasing, what has been the decrease in area (approximately, in percent) in the last ? years?
□ <20% □ >20% ■ >50% □ >80% in the last 100 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next 30 years

6E. State primary cause of change: Agriculture, urban development.

6F Is there any change in the quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ Decrease in quality □ Increase in quality?

6G. State primary cause of change: Factors associated with agriculture, urban and industrial development in surrounding areas, such as roads, water pollution, pesticides, creation of artificial impoundments and the erection of mesh fences and walls.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming **[P]** ■ **[F]** ■
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food **[P]** ■ **[F]** ■
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Powerlines [P] [F]
Road kills **[P]** ■ **[F]** ■
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]

Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants [P] [F]
Overexploitation [P] [F]
Pesticides **[P] ■ [F] ■**
Poisoning [P] [F]
Pollution **[P] ■ [F] ■**
Other threats:

Genetic problems [P] [F]
Hybridization [P] [F]
Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline? ■ Yes □ No If yes, indicate which threats are resulting or may result in population decline: Habitat loss is the primary cause; roads.

8. Trade:

8A. Is the taxon in trade? ■ Yes □ No
If yes, is it ■ Local □ Domestic □ Commercial ■ International?

8B. Parts in trade:

□ Hair	□ Skin	□ Bones	□ Fur
■ Meat	□ Horn	□ Organs	□ Glands
□ Whole plants	□ Taxidermy models	■ Live animal	□ Products
Others	□ Flowers	□ Seeds	□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline?: Local trade.

9. Population numbers:

9A. Global population: Unknown; estimated to be in the region of tens of thousands.
9B. Subpopulations (no. of individuals in each): Unknown
9C. Number of mature individuals in population: □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown

10. Population trends:

10A. Is the population size/ numbers of the taxon:
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ 20% □ >20% ■ >50% □ >80% in the last 100 years, particularly in regions where crop agriculture predominates, or where there has been extensive urban and industrial development, such as Gauteng, Free State and North West Province.

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:
■ Census or monitoring ■ General field study ■ Informal field sighting □ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
C. Cook	Gauteng	1991-2000	breeding biology, ecology
L. du Preez	Bloemfontein	1996	breeding behaviour

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces); Transvaal Provincial Ordinance 12 of 1983; Mpumalanga Nature Conservation Act 10 of 1998.
13G. Known presence in protected areas: Small populations in Karoo National Park, Kalahari Gemsbok N.P., Vaalbos N.P., Karoo Nature Reserve, Sandveld N.R., Soetdoring N.R., Willem Pretorius N.R., Koppiesdam N.R., Borokolalo N.R., S.A. Lombaard N.R., Oviston N.R.
13H. National or regionally endorsed protection plan: None.

Assigned status:

13I. Assigned IUCN Red List Category: Near Threatened
13J. IUCN Criteria based on: Although the species is threatened and has declined severely in parts of its range, it is widespread and long lived, and overall the situation is not considered to warrant threatened status. However, this species requires monitoring, on at least a provincial basis.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey	□ Genetic research	□ Taxonomic research	■ Life history studies
■ Limiting factor research		□ Epidemiology	■ Trade
□ Others (taxon specific)			

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management	□ Wild population management	■ Monitoring	■ Translocation
■ Sustainable utilization	■ Public education	□Genome Resource Banking	
■ Limiting factor management	□ Captive breeding	■ Work in local communities	

■ Others: Translocation should only be attempted on a local scale to neighbouring localities.

16. If captive breeding/cultivation is recommended, is it for:

☐ Species recovery ☐ Education ☐ Reintroduction ☐ Benign introduction
☐ Research ☐ Husbandry ☐ Preservation of live genome

17. Do captive stocks already exist?

■ Yes ☐ No If yes,
17A. Names of facilities: Details of captive stocks in USA and Republic of China were not available.
17B. Number in captivity: Male Female Unsexed Total ☐ Not known
17C. Does a coordinated **Species Management Program** exist for this species: ☐ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
☐ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

☐ A. Ongoing captive program intensified or increased ☐ B. Ongoing captive program decreased
☐ C. Initiate captive program within 3 years ☐ D. Initiate captive program in 3 years
☐ E. Pending recommendation from a PHVA workshop ■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

■ Techniques known for this taxon or similar taxon ☐ Some techniques known for taxon or similar taxa
☐ Techniques not known at all ☐ Information not available in this group of compilers

20.Other comments:

Note that, as this widespread species is not endemic to South Africa, this is a *sub-regional,* not global, assessment of status. Rapid decline has been observed in parts of Gauteng: estimated >80% decline over the last 20 years due to habitat loss (survey and personal observation, C. Cook & N.H.G. Jacobsen), parts of Northern Province and North West Province (personal observation, C. Cook & L.R. Minter). Monitoring at a provincial level is strongly recommended.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Carruthers V. 1983. Bullfrog behaviour. Fauna & Flora. 40: 5-7.
Cook C. 1996. Aspects of the breeding biology and ecology of the Giant Bullfrog, *Pyxicephalus adspersus.* Unpublished M.Sc. Thesis.
Du Preez L.H. 1996. Field guide and key to the frogs and toads of the Free State. Univ. of the O.F.S., Bloemfontein.
Grobler J.H. 1972. Observations on the Amphibian *Pyxicephalus adspersus* Tschudi in Rhodesia. Arnoldia 3(6): 1-4.
Jacobsen N.H.G. 1989. A herpetological survey of the Transvaal. Unpublished PhD Thesis, University of Natal, South Africa.
Kok D., Du Preez L.H. & Channing A.C. 1989. Channel construction by the African bullfrog: another anuran parental care strategy. J. Herpetol. 23: 435-437.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals Natal Museum 17: 1-334.

22. Compilers (members of the working group):

Mike Bates, Harold Braack, Clayton Cook, Louis du Preez, Niels Jacobsen, Les Minter, Ché Weldon.

23. Reviewers:

Marius Burger, Atherton de Villiers, James Harrison, Les Minter.

Conservation Assessment Management Plan Taxon Data Sheet for *Strongylopus wageri* Status: Near Threatened

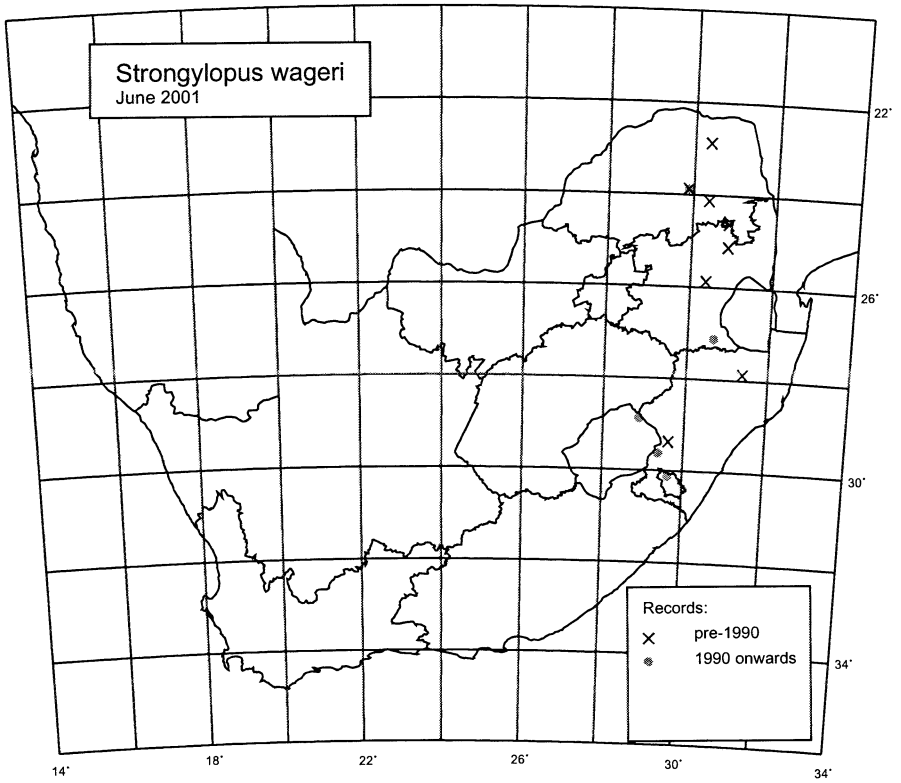
PART ONE

1. Scientific name: *Strongylopus wageri* (Wager 1961)

1A. Synonyms: *Rana wageri* Wager 1961
1B. Scientific nomenclature:
$1B_1$. Family: Ranidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Plain Stream Frog, Wager's Stream Frog, Natal Uplands Frog.
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa, Lesotho

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Forest Biome (Afromontane Forest), Grassland Biome (Afromontane Grassland and Moist Upland Grassland).
2C. Habitat specificity (niche, elevation, etc.): Pools in perennial upland streams in grassland and forest.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa and Lesotho.
2E. Current distribution (listed by country): South Africa and Lesotho.
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Provinces of KwaZulu-Natal, Free State, Eastern Cape and Mpumalanga, and Lesotho.
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 ■ 5,001 – 20,000 km □ >20,001 km^2

Note: We consider the Mpumalanga records, although they are few and far between, to be true indicators of the species' presence along the escarpment in that province. We also note that, despite extensive searches, the species has not been recorded on the escarpment in Swaziland.

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 □ 11 – 500 km^2 ■ 501 – 2,000 km^2 □ >2,001 km^2

5. Number of subpopulations in which the taxon is distributed:

Should presently be considered as two major subpopulations, one in the Drakensberg of KwaZulu-Natal and Lesotho, and the other on the escarpment in Mpumalanga. Both of these subpopulations are fragmented and several of these fragments may constitute distinct subpopulations.

6. Habitat status:

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
□ <20% ■ >20% □ >50% □ >80% in the last 50 years.

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Habitat destruction and changed water regimes resulting from afforestation and encroachment of alien trees.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Afforestation, exotic plant encroachment, and chemical pollution associated with silviculture; introduction of trout into streams.

7. Threats:

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Pollution **[P]** ■ **[F]** ■
Powerlines [P] [F]
Road kills [P] [F]
Trade: market or medicine [P][F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation: exotics **[P]■[F]■**
Siltation [P] [F]

Catastrophes
Drought [P] [F]

Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P] ■ [F] ■**
Habitat fragmentation [P] [F]
Habitat loss: exotic animals [P][F]
Habitat loss: exotic plants **[P] ■ [F] ■**
Overexploitation [P] [F]
Pesticides [P] [F]
Poisoning [P] [F]
Other threats:

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Hybridization [P] [F]
Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]

El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline? ■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: All of those factors indicated in 7A.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Hair
□ Meat
□ Whole plants
□ Other
□ Skin
□ Horn
□ Taxidermy models
□ Flowers
□ Bones
□ Organs
□ Live animal
□ Seeds
□ Fur
□ Glands
□ Products
□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown, but the species is believed to be common in the prime habitat of the streams in the KZN/Lesotho Drakenberg (Wager 1986).
9B. Subpopulations (no. of individuals in each): See 5. The KZN/Lesotho subpopulation is believed to contain a larger number of individuals. Distinct subpopulations are likely to be restricted to particular catchments and watercourses, but their numerical sizes are unknown; see 13G.
9C. Number of mature individuals (in all subpopulations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% ■ >20% □ >50% □ >80% in the last 50 years.

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study ■ Informal field sighting □ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
H. Braack & J. Theron	Mpumalanga	Nov. 2000	atlas survey
M. Burger	East Griqualand	Nov. 1997	atlas survey

PART TWO

13. Conservation status:

Current status:
13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: KwaZulu-Natal Nature Conservation Ordinance, No. 15 of 1974, as amended.
13G. Known presence in protected areas: Giant's Castle Game Reserve, Ntsikeni Nature reserve, Cathkin Peak State Forest, Drakensberg Gardens Nature Reserve, Entumeni Nature Reserve, Loteni Game Reserve, Qudeni State Forest, Royal Natal National Park, Weza State Forest.
13H. National or regionally endorsed protection plan: None.

Assigned status:
13I. Assigned IUCN Red List Category: Near Threatened
13J. IUCN Criteria based on: Small extent of occurrence and area of occupancy, together with a decline in extent and quality of habitat in a large part of the species' range. Further declines in habitat and locations in the same area are projected. Nevertheless, the southern parts of the range are considered to be secure.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it
■ Survey □ Genetic research □ Taxonomic research □ Life history studies
■ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization □ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased □ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years □ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop ■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon ■ Some techniques known for taxon or similar taxa
□ Techniques not known at all □ Information not available in this group of compilers

20. Other comments:

Strictly speaking, this taxon could be classified Vulnerable (B2a,b(ii,iii)), but, because of its secure protected status in the protected areas of the KwaZulu-Natal Drakensberg, it is not under high risk of extinction in the wild, and therefore classified as Near Threatened. It should be noted that the species' continued security is dependent on these protected areas in KZN, and that its threatened status in Mpumalanga contrasts sharply with that in KZN.

PART FOUR

21. Sources of data:

Allan D.G., Harrison J.A., Navarro R.A., Van Wilgen B.W. & Thompson M.W. 1997. The impact of commercial afforestation on bird populations in Mpumalanga Province, South Africa – insights from bird-atlas data. Biological Conservation 79(2-3): 173-186.
Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Lambiris A.J.L. 1989. A review of the amphibians of Natal. Lammergeyer 39: 1-210.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Museum 17: 1-334.
Wager V.A. 1961. The Plain Rana. African Wildlife 15: 151-156.
Wager V.A. 1986. Frogs of South Africa: their fascinating life stories. Delta Books, Johannesburg.

22. Compilers (members of the working group):

Phil Bishop, Bill Branch, Marius Burger, Mike Coke, James Harrison, Andrew Turner.

23. Reviewers:

Phil Bishop, Marius Burger, James Harrison.

Conservation Assessment Management Plan Taxon Data Sheet for *Afrana vandijki*
Status: Data Deficient

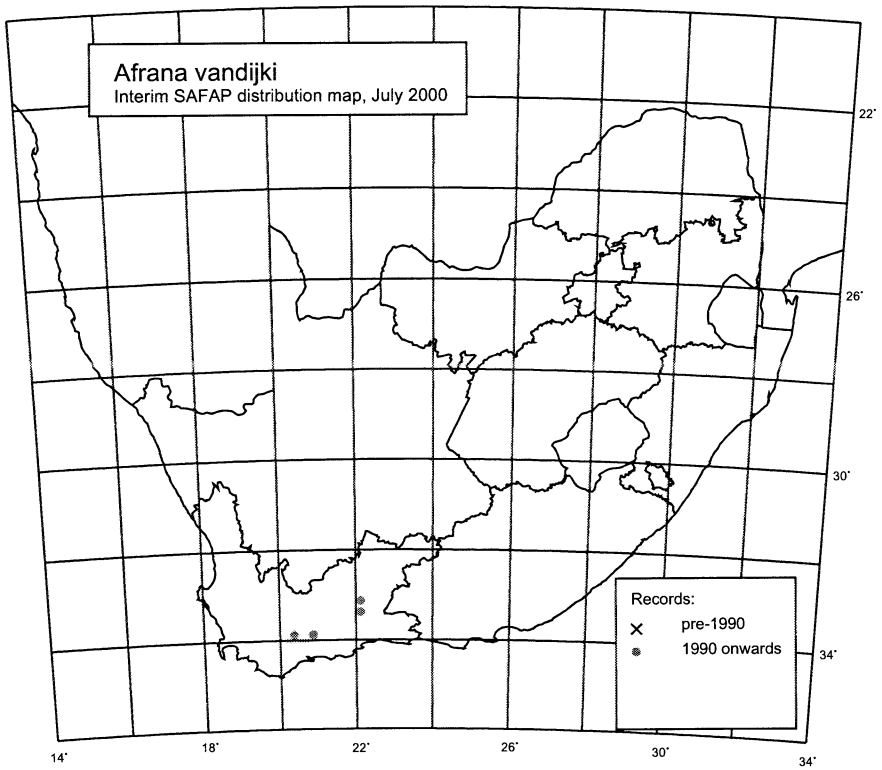
PART ONE

1. Scientific name: *Afrana vandijki* Visser & Channing 1997

1A. Synonyms: *Rana vandijki* (Visser & Channing 1997)
1B. Scientific nomenclature:
$1B_1$. Family: Ranidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Van Dijk's River Frog
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Fynbos Biome in Mountain Fynbos vegetation.
2C. Habitat specificity (niche, elevation, etc.): Permanent water in mountain streams, at medium to high altitude, including streams in forested gorges.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Western Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 ■ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 □ 11 – 500 km^2 ■ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Two subpopulations: Swartberg and Langeberg mountain ranges.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat ■ Contiguous □ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
■ <20% □ >20% □ >50% □ >80% in the last 60 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: See 6G.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in quality □ increase in quality?

6G. State primary cause of change: In some areas, one or more of the following factors are believed to have had an adverse affect on habitat quality: invasive alien vegetation, plantations, building developments (e.g., roads and dams), alteration of drainage patterns, and too frequent fires.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming **[P]** ■ **[F]** ■

Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Pollution [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Predation by exotics[P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]

Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire **[P]** ■ **[F]** ■
Hurricane [P] [F]
Landslide [P] [F]

Habitat fragmentation [P] [F]
Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants [P] **[F]** ■
Overexploitation [P] [F]
Pesticides [P] [F]
Poisoning [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Hybridization [P] [F]
Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

Other threats: Hydrological regime changes as a result of alien invasive plants, especially in the Langeberg Mountains, could negatively impact this species.

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline? ■Yes □ No; If yes, indicate which threats are resulting or may result in population decline: All of the above.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Skin
□ Bones
□ Fur
□ Hair
□ Horn
□ Organs
□ Glands
□ Meat
□ Taxidermy models
□ Live animal
□ Products
□ Whole plants
□ Flowers
□ Seeds
□ Roots
□ Other

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown, but believed to be reasonably common within their area of occupancy.
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
□ Declining □ Increasing □ Stable ■ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% □ >80% in the last ? years/ generations

10C. If stable or unknown, do you predict a future decline in the population? □ Yes ■ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study □ Informal field sighting ■ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
J.D. Visser & A.C. Channing	Swartberg & Tradouw's Pass	1995	collecting trip
A. de Villiers	Langeberg	1999, 2000	atlas survey
M. Burger	Langeberg	1999	atlas survey
L. Minter	Tradouw Pass	1999	atlas survey

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): Not listed
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: Grootvadersbos Nature Reserve, Boosmansbos Wilderness Area, Swartberg Nature Reserve, Garcia State Forest.
13H. National or regionally endorsed protection plan: None.

Assigned status:

13I. Assigned IUCN Red List Category: Data Deficient
13J. IUCN Criteria based on: Very little is known about this recently described species, and most of the points above are based on educated guesses which require confirmation.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey ■ Genetic research □ Taxonomic research ■ Life history studies
□ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management □ Monitoring □ Translocation
□ Sustainable utilization □ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon
■ Some techniques known for taxon or similar taxa
□ Techniques not known at all
□ Information not available in this group of compilers

20. Other comments:

More survey work is needed to establish the exact extent of occurrence and area of occupancy of this species. It is also relevant to establish whether the two subpopulations are genetically distinct.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux A. & Mouton P. le F.N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Conservation, Stellenbosch.
Visser J. & Channing A. 1997 A new species of river frog from the Swartberg, South Africa (Ranidae: Afrana). J. Afr. Zool. 111(3): 191-198.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Ernst Baard, Marius Burger, Atherton de Villiers, James Harrison, Les Minter.

Conservation Assessment Management Plan Taxon Data Sheet for *Afrixalus knysnae* Status: Data Deficient

PART ONE

1. Scientific name: *Afrixalus knysnae* (Loveridge 1954)

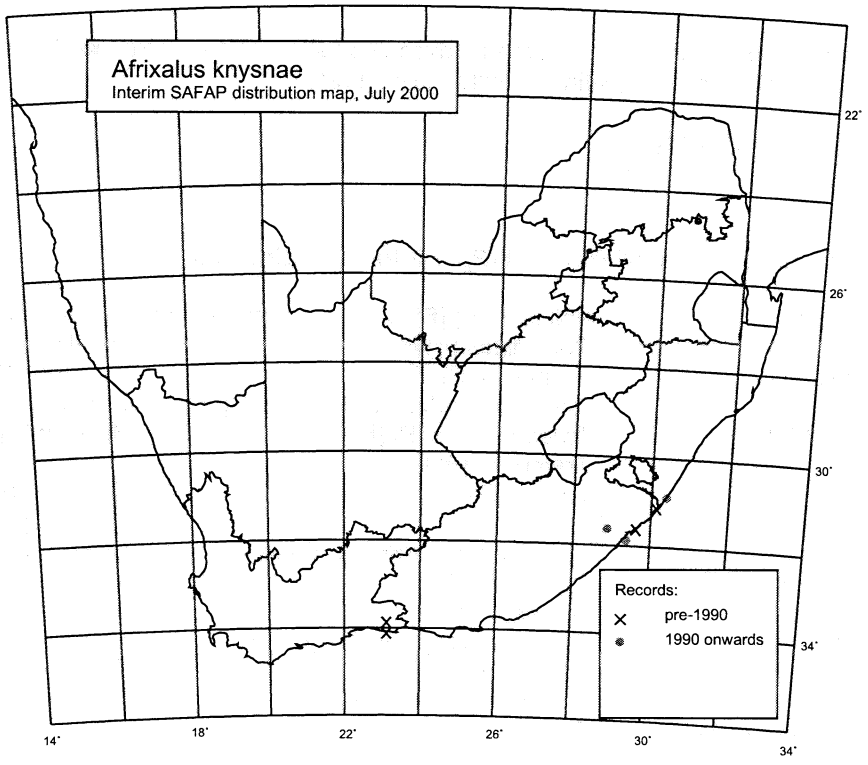
1A. Synonyms: *Hyperolius knysnae* Loveridge 1954
Afrixalus brachycnemis Boulenger 1896

1B. Scientific nomenclature:
- $1B_1$. Family: Hyperoliidae
- $1B_2$. Order: Anura
- $1B_3$. Class: Amphibia

1C. Common name(s): Knysna Leaf-folding Frog, Knysna Spiny Reed Frog, Knysna Banana Frog.
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Fynbos, Thicket and Savannah biomes; Mountain Fynbos, Dune Thicket, Coastal Bushveld/grassland.
2C. Habitat specificity (niche, elevation, etc.): Small pans and marshes with emergent vegetation.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Provinces of Eastern Cape, Western Cape and KwaZulu-Natal.
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 ■ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Two or three fragmented subpopulations (Knysna, Tsitisikamma, northern Eastern Cape areas).

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? □ Yes □ No ■ Unknown
If yes, is it a □ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
□ <20% □ >20% □ <50% □ >80% in the last ? years

6D. If stable or unknown, do you predict a decline in habitat? ■ Yes □ No
If yes, indicate the rate of decline: □ <20% ■ >20% □ >50% □ >80% in the next 30 years.

6E. State primary cause of change: Ongoing urban development concentrated along the south and east coasts.

6F. Is there change in quality of habitat where the taxon occurs? □ Yes □ No ■ Unknown
If yes, is it a: □ decrease in quality □ increase in quality?

6G. State primary cause of change:

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat [P] **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants [P][F]
Pollution [P] **[F]** ■
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man-induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Interspecific competition-livestock [P][F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

Overexploitation [P] [F]
Pesticides [P] [F]
Poisoning [P] [F]
Hybridization [P] [F]
Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Other threats:

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: See 7A.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International

8B. Parts in trade:
□ Skin □ Bones □ Fur
□ Hair □ Horn □ Organs □ Glands
□ Meat □ Taxidermy models □ Live animal □ Products
□ Whole plants □ Flowers □ Seeds □ Roots
□ Other

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown.
9B. Subpopulations (no. of individuals in each): Probably three distinct subpopulations, but their sizes are unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 □ >2,500 ■ Unknown
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
□ Declining □ Increasing □ Stable ■ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% □ >80% in the last ? years/ generations

10C. If stable or unknown, do you predict a future decline in the population? ■ Yes □ No
If yes, specify rate and factors, e.g. habitat loss, threats, trade, etc.:
□ <20% ■ >20% □ >50% □ >80% in the next 30 years, owing to habitat loss and pollution.

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study □ Informal field sighting □ Literature
■ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
M. Burger	Transkei	1997	atlas survey
M. Cunningham	Transkei	1999	atlas survey

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: Tsitsikamma National Park; Hluleka Nature Reserve; Diepwalle Forest.
13H. National or regionally endorsed protection plan: None.

Assigned status:

13I. Assigned IUCN Red List Category: Data Deficient
13J. IUCN Criteria based on: The extent of occurrence of this species is still poorly known and needs to be clarified by a systematic survey of the relevant areas along the east coast. It may well be shown that the species is threatened by ongoing coastal developments.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey	□ Genetic research	■ Taxonomic research	■ Life history studies
■ Limiting factor research		□ Epidemiology	□ Trade
□ Others (taxon specific)			

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

□ Habitat management	□ Wild population management	■ Monitoring	□ Translocation
□ Sustainable utilization	□ Public education	□ Genome Resource Banking	
□ Limiting factor management	□ Captive breeding	□ Work in local communities	
□ Others			

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery	□ Education	□ Reintroduction	□ Benign introduction
□ Research	□ Husbandry	□ Preservation of live genome	

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon?

□ Techniques known for this taxon or similar taxon
■ Some techniques known for taxon or similar taxa
□ Techniques not known at all
□ Information not available in this group of compilers

20. Other comments:

Very little is known about this taxon, and its status as distinct from *A. spinifrons* needs clarification. Its putative range should be thoroughly surveyed for populations and the contact area between it and *A. spinifrons* defined.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Branch W.R. & Hanekom N. 1987. The herpetofauna of the Tsitsikamma Coastal and Forest National Parks. Koedoe 30: 49-60.
Carruthers V.C. & Robinson G.A. 1977. Notes on amphibia in the Tsitsikamma National Parks. Koedoe 20: 115-123.
Lambiris A.J.L. 1989. A review of the amphibians of Natal. Lammergeyer 39: 1-210.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Pickersgill M. 1984. Three new *Afrixalus* (Anura: Hyperoliidae) from south-eastern Africa. Durban Museum Novitates 13:203-220.
Pickersgill M. 1996. A new subspecies of *Afrixalus* (Anura: Hyperoliidae) from Kwazulu-Natal, South Africa, and comments on its superspecies affinities. Durban Museum Novitates 21: 49-59.
Power H.J. 1935. A contribution to the herpetology of Pondoland. Proc. Zool. Soc. Lond. 1935: 333-346.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Mus. 17: 1-334.

22. Compilers (members of the working group):

Phil Bishop, Bill Branch, Marius Burger, Mike Coke, James Harrison, Andrew Turner.

23. Reviewers:

Phil Bishop, Marius Burger, James Harrison.

Conservation Assessment Management Plan Taxon Data Sheet for *Bufo robinsoni* Status: Data Deficient

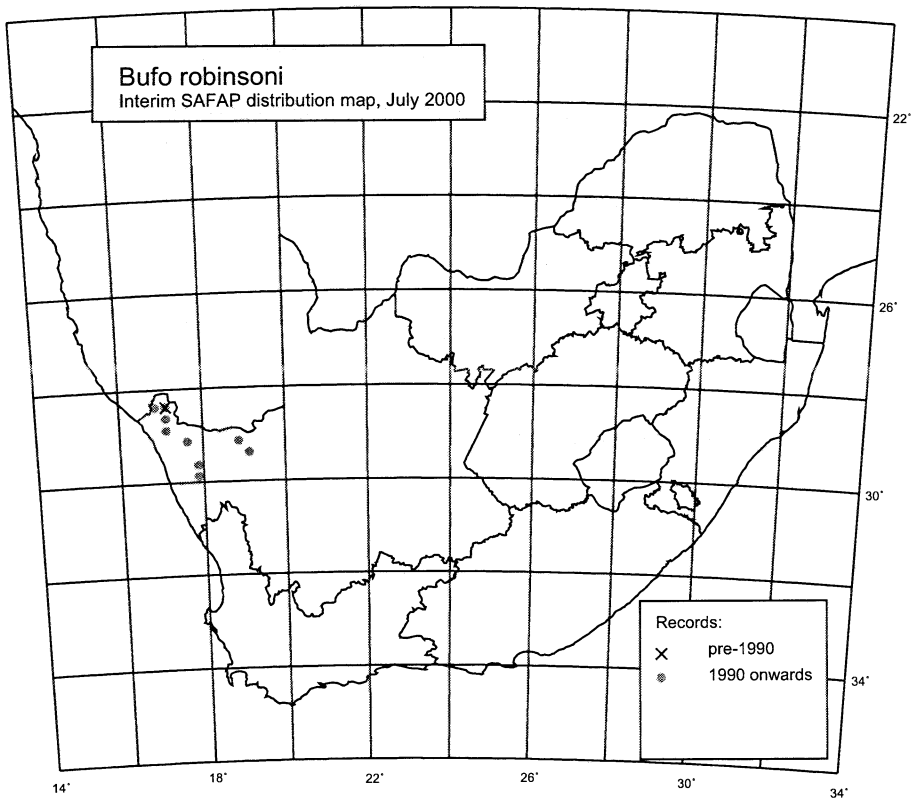
PART ONE

1. Scientific name: *Bufo robinsoni* Branch & Braack 1995

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Bufonidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Paradise Toad, Paradys Skurwepadda (Afrikaans)
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Succulent Karoo and Nama Karoo Biomes.
2C. Habitat specificity (niche, elevation, etc.): Associated with perernnial springs and streams in the Upland Succulent Karoo and Orange River Nama Karoo vegetation types.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Northern Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 ■ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'):

□ <10 km^2 □ 11 – 500 km^2 ■ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Approximately five subpopulations, including Vandersterberg, Ghaamsberg, Springbok.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? □ Yes □ No ■ Unknown
If yes, is it a □ Decrease in area □ Increase in area?

6C. If decreasing, what has been the decrease in area (approximately, in percent) in the last ? years?
□ <20% □ >20% □ >50% □ >80% in the last 50 years

6D. If stable or unknown, do you predict a decline in habitat? ■ Yes □ No
If yes, indicate the rate of decline: ■ <20% □ >20% □ >50% □ >80% in the next 30 years

6E. State primary cause of change: Predicted loss of breeding habitat due to overgrazing and mining activity.

6F Is there any change in the quality of habitat where the taxon occurs? □ Yes □ No ■ Unknown
If yes, is it a: □ Decrease in quality □ Increase in quality?

6G. State primary cause of change:

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat [P] **[F]** ■
Habitat fragmentation [P] [F]
Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants [P][F]
Powerlines [P] [F]
Road kills [P][F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Hybridization [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]

Overexploitation [P] [F]
Pesticides [P] [F]
Poisoning [P] [F]
Pollution [P] [F]
Other threats:

Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline? ■ Yes □ No If yes, indicate which threats are resulting or may result in population decline: Loss of breeding habitat.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it: □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Skin □ Bones □ Fur
□ Hair □ Horn □ Organs □ Glands
□ Meat □ Taxidermy models □ Live animal □ Products
□ Whole plants □ Flowers □ Seeds □ Roots
Others

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown
9B. Subpopulations (no. of individuals in each): Unknown
9C. Number of mature individuals in population: □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown

10. Population trends:

10A. Is the population size/ numbers of the taxon:
Declining □ Increasing □ Stable ■ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% □ >80% in the last ? years/ generations

10C. If stable or unknown, do you predict a future decline in the population? ■ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
■ <20% □ >20% □ >50% □ >80% in the next 30 years due to loss in breeding habitat.

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study ■ Informal field sighting ■ Literature
□ Indirect information, e.g. from trade, etc. □ Museum/herbarium studies/records □ Hearsay/popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
L.R. Minter	Namaqualand	1999	Survey
H. Braack & C. Weldon	Richtersveld & Namaqualand	2000	Survey
E.H.W. Baard	Ghaamsberg	2000	Impact study

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces); South African National Parks Acts 1996; Northern Cape Provincial Ordinance 2000.
13G. Known presence in protected areas: Richtersveld National Park, Goegap Nature Reserve.
13H. National or regionally endorsed protection plan: None.

Assigned status:

13I. Assigned IUCN Red List Category: Data Deficient
13J. IUCN Criteria based on: This species was described relatively recently and has not been studied in detail. Its extent of occurrence and areas of occupancy require clarification.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey ■ Genetic research ■ Taxonomic research ■ Life history studies
□ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

□ Habitat management □ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization □ Public education □ Genome Resource Banking
□ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

☐ A. Ongoing captive program intensified or increased
☐ B. Ongoing captive program decreased
☐ C. Initiate captive program within 3 years
☐ D. Initiate captive program in 3 years
☐ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

☐ Techniques known for this taxon or similar taxon
■ Some techniques known for taxon or similar taxa
☐ Techniques not known at all
☐ Information not available in this group of compilers

20. Other comments:

Difficulties may be experienced in distinguishing *Bufo robinsoni* from *B. gariepensis* in areas where these two species are sympatric (Namaqualand north of Kammieskroon). Calls and genetic analysis may assist identification.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W. 2000. The potential ecological impact of proposed zinc mining activities on the reptiles and amphibians of the Gamsberg, Northern Cape Province. Unpublished specialist report to Anglo American: Gamsberg Zinc Project.
Branch W.R. & Braack H.H. 1995. A new toad from Paradise. Madoqua, 19(1): 15-23.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs. Southern Book Publishers and Witwatersrand University Press, Johannesburg.

22. Compilers (members of the working group):

Mike Bates, Harold Braack, Clayton Cook, Louis du Preez, Niels Jacobsen, Les Minter, Ché Weldon.

23. Reviewers:

Les Minter.

Conservation Assessment Management Plan Taxon Data Sheet for *Cacosternum striatum* Status: Data Deficient

PART ONE

1. **Scientific name**: *Cacosternum striatum* FitzSimons 1947

1A. Synonyms: *Cacosternum striatus* FitzSimons 1947
1B. Scientific nomenclature:
$1B_1$. Family: Ranidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Striped Caco, Striped Dainty Frog.
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. **Distribution of the taxon**:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Grassland Biome, probably mainly in Moist Upland Grassland, Short Mistbelt Grassland and Coastal Grassland.
2C. Habitat specificity (niche, elevation, etc.): Inundated grasslands from coastal to high altitudes.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa and Lesotho.
2E. Current distribution (listed by country): South Africa and Lesotho.
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): KwaZulu-Natal Province and Lesotho highlands.
2G. Concentrated migration sites (using political units): n/a

3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 ■ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

Unknown, but appears to be thinly and discontinuously distributed, therefore several subpopulations are likely.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
□ <20% ■ >20% □ >50% □ >80% in the last 50 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Agriculture and afforestation in the KwaZulu-Natal midlands have had a severe impact on moist grasslands.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Altered drainage patterns, too frequent fires and invasive alien wattles have impacted the quality of habitat.

7. Threats:

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat [P] ■ [F] ■
Habitat fragmentation [P] ■ [F] ■
Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants [P] ■ [F] ■
Overexploitation [P] [F]
Pesticides [P] [F]
Poisoning [P] [F]
Pollution [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Hybridization [P] [F]
Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] ■ [F] ■
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

Other threats:

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: All the above.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Skin □ Bones □ Fur
□ Hair □ Horn □ Organs □ Glands
□ Meat □ Taxidermy models □ Live animal □ Products
□ Whole plants □ Flowers □ Seeds □ Roots
□ Other

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown.
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
□ Declining □ Increasing □ Stable ■ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% □ >80% in the last ? years/ generations

10C. If stable or unknown, do you predict a future decline in the population? ■ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years ■ Unknown rate, but believed to be happening as a result of habitat loss and degradation.

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study ■ Informal field sighting ■ Literature
□ Indirect information such as from trade, etc. ■ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
M. Burger	Cobham Nature Reserve	1999	atlas survey

PART TWO

13. Conservation status:

Current status:
13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: None.
13G. Known presence in protected areas: Cobham Nature Reserve, Sehlabathebe National Park (Lesotho).
13H. National or regionally endorsed protection plan: None.

Assigned status:
13I. Assigned IUCN Red List Category: Data Deficient
13J. IUCN Criteria based on: This species is known from only a handfull of specimens and its taxonomic status awaits confirmation. Clarification of its extent of occurrence and area of occupancy requires a systematic survey. Because of its occurrence in grassland, a threatened biome, its conservation status gives cause for concern.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it
■ Survey ■ Genetic research ■ Taxonomic research ■ Life history studies
■ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management ■ Monitoring □ Translocation
□ Sustainable utilization □ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased □ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years □ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop ■ F. No captive program recommended

19. Are techniques established to propagate the taxon?

□ Techniques known for this taxon or similar taxon □ Some techniques known for taxon or similar taxa
□ Techniques not known at all ■ Information not available in this group of compilers

20. Other comments:

As this taxon is very poorly known, its taxonomic and conservation status should be the subjects of further study. Its distribution and habitat requirements need to be much more fully investigated and described.

PART FOUR

21. Sources of data:

FitzSimons V.F.M. 1947. Descriptions of new species and subspecies of reptiles and amphibians from Natal, together with notes on some other little known species. Annals Transvaal Museum 11: 111-137.
Lambiris A.J.L. 1989. A review of the amphibians of Natal. Lammergeyer 39: 1-210.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Mus. 17: 1-334.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Marius Burger, James Harrison.

Conservation Assessment Management Plan Taxon Data Sheet for *Strongylopus springbokensis*
Status: Data Deficient

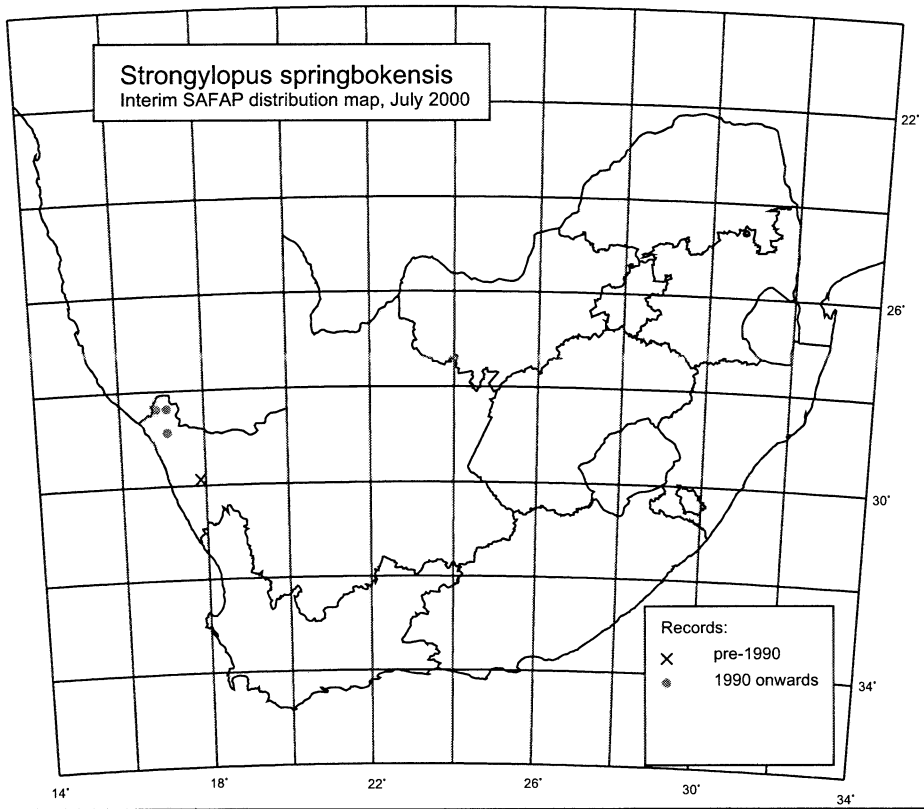
PART ONE

1. Scientific name: *Strongylopus springbokensis* Channing 1986

1A. Synonyms: *Rana (Strongylopus) springbokensis* Dubois 1992
1B. Scientific nomenclature:
$1B_1$. Family: Ranidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Namaqua Stream Frog, Namakwa Stroompadda (Afrikaans)
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Succulent Karoo Biome.
2C. Habitat specificity (niche, elevation, etc.): Associated with perennial streams and pools in the Upland Succulent Karoo vegetation type.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e.province, state, country, etc.): Northern Cape Province
2G. Concentrated migration sites (using political units): n/a



3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 ■ 5,001 – 20,000 km^2 □ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 ■ 11 – 500 km^2 □ 501 – 2,000 km^2 □ >2,001 km^2

5. **Number of subpopulations in which the taxon is distributed:**

At least three subpopulations: Springbok, Richtersveld, Ghaamsberg.

6. **Habitat status:**

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? □ Yes ■ No □ Unknown
If yes, is it a: Decrease in area Increase in area?

6C. If decreasing, what has been the decrease in area (approximately, in percent) in the last ? years?
□ <20% □ >20% □ >50% □ >80% in the last 50 years

6D. If stable or unknown, do you predict a decline in habitat? ■ Yes □ No
If yes, indicate the rate of decline: ■ <20% >20% □ >50% □ >80% in the next 30 years

6E. State primary cause of change: Change in land use.

6F. Is there any change in the quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ Decrease in quality □ Increase in quality?

6G. State primary cause of change in quality: An increase in grazing pressure leading to siltation of streams.

7. **Threats:**

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing **[P]** ■ **[F]** ■
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation [P] [F]
Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants [P] [F]
Powerlines [P] [F]
Road kills [P] [F]
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Hybridization [P] [F]
Predation [P] [F]
Predation: exotics [P] [F]
Siltation **[P]** ■ **[F]** ■

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]

Overexploitation [P] [F]
Pesticides [P] [F]
Poisoning [P] [F]
Pollution [P] [F]
Other threats:

Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No If yes, indicate which threats are resulting or may result in population decline: Siltation due to overgrazing, resulting in loss of breeding habitat.

8. Trade:

8A. Is the taxon in trade?: □ Yes ■ No
If yes, is it: □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Hair
□ Meat
□ Whole plants
Others

□ Skin
□ Horn
□ Taxidermy models
□ Flowers

□ Bones
□ Organs
□ Live animal
□ Seeds

□ Fur
□ Glands
□ Products
□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown.
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals in population: □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon:
□ Declining □ Increasing □ Stable ■ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% □ >50% □ >80% in the last ? years/ generations

10C. If stable or unknown, do you predict a future decline in the population? ■ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
■ <20% □ >20% □ >50% □ >80% in the next 30 years, due to habitat degradation.

11. Data quality:

The above estimates are based on:
□ Census or monitoring □ General field study ■ Informal field sighting □ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Braack H.H. & Weldon C.	Namaqualand, Richtersveld	2000	atlas survey
Baard E.H.W.	Ghaamsberg, Bushmanland	2000	impact study

PART TWO

13. Conservation status:

Current status:

13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces); SA National Parks Act of 1976.
13G. Known presence in protected areas: Richtersveld National Park.
13H. National or regionally endorsed protection plan: None.

Assigned status:

13I. Assigned IUCN Red List Category: Data Deficient
13J. IUCN Criteria based on: This species is known from relatively few localities; its extent of occurrence and areas of occupancy require clarification.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey	□ Genetic research	□ Taxonomic research	■ Life history studies
■ Limiting factor research		□ Epidemiology	□ Trade
□ Others (taxon specific)			

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management	□ Wild population management	■ Monitoring	□ Translocation
□ Sustainable utilization	□ Public education	□ Genome Resource Banking	
■ Limiting factor management	□ Captive breeding	□ Work in local communities	
□ Others:			

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery	□ Education	□ Reintroduction	□ Benign introduction
□ Research	□ Husbandry	□ Preservation of live genome	

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased
□ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years
□ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop
■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon
□ Some techniques known for taxon or similar taxa
■ Techniques not known at all
□ Information not available in this group of compilers

20. Other comments:

A comprehensive survey of this species' geographical distribution is needed urgently so that its status can be properly assessed.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Channing A. 1986. A new species of the genus *Strongylopus* Tschudi from Namaqualand, Cape Province, South Africa (Anura: Ranidae) Ann. Cape Prov. Mus. (Nat. Hist.) 16: 127-135.
Baard E.H.W. 2000. The potential ecological impact of proposed zinc mining activities on the reptiles and amphibians of the Gamsberg, Northern Cape Province. Unpublished specialist report to Anglo American: Gamsberg Zinc Project.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs. Southern Book Publishers and Witwatersrand University Press, Johannesburg.

22. Compilers (members of the working group):

Mike Bates, Harold Braack, Clayton Cook, Louis du Preez, Niels Jacobsen, Les Minter, Ché Weldon.

23. Reviewers:

Les Minter.

Conservation Assessment Management Plan Taxon Data Sheet for *Bufo angusticeps* Status: Least Concern

PART ONE

1. Scientific name: *Bufo angusticeps* Smith 1848

1A. Synonyms: None.
1B. Scientific nomenclature:
$1B_1$. Family: Bufonidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Sand Toad, Yellow-footed Toad
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Fynbos Biome
2C. Habitat specificity (niche, elevation, etc.): Sandy soils at low to medium altitudes; breeds in ephemeral pools.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Western Cape Province
2G. Concentrated migration sites (using political units): n/a

3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 ■ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 □ 11 – 500 km^2 □ 501 – 2,000 km^2 ■ >2,001 km^2

5. Number of subpopulations in which the taxon is distributed:

Unknown. The species is widely but unevenly distributed, hence there may be distinct subpopulations.

6. Habitat status:

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
□ <20% □ >20% ■ >50% □ >80% in the last 100 years

6D. If stable or unknown, do you predict a decline in habitat? ☐ Yes ☐ No
If yes, indicate the rate of decline: ☐ <20% ☐ >20% ☐ >50% ☐ >80% in the next ? years.

6E. State primary cause of change: Habitat loss and degradation due to urbanization and agriculture.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes ☐ No ☐ Unknown
If yes, is it a ■ decrease in quality ☐ increase in quality?

6G. State primary cause of change: Greater density of urban development and intensive agriculture, and further fragmentation of habitat.

7. Threats:

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P]** ■ **[F]** ■
Habitat fragmentation **[P]** ■ **[F]** ■
Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants [P][F]
Overexploitation [P] [F]
Pesticides **[P]** ■ **[F]** ■
Poisoning [P] [F]
Pollution [P] [F]
Powerlines [P] [F]
Road kills **[P]** ■ **[F]** ■
Trade for market or medicine [P] [F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Hybridization [P] [F]
Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Interspecific competition -livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation by exotics [P] [F]
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]

Other threats: Lowering of water table and drainage of seasonal breeding habitats.

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline? ■ Yes ☐ No; If yes, indicate which threats are resulting or may result in population decline: All of the above.

8. Trade:

8A. Is the taxon in trade? ☐ Yes ■ No
If yes, is it ☐ Local ☐ Domestic ☐ Commercial ☐ International?

8B. Parts in trade:
☐ Skin ☐ Bones ☐ Fur
☐ Hair ☐ Horn ☐ Organs ☐ Glands
☐ Meat ☐ Taxidermy models ☐ Live animal ☐ Products
☐ Whole plants ☐ Flowers ☐ Seeds ☐ Roots
☐ Other

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown, but the species is reasonably common in some areas.
9B. Subpopulations (no. of individuals in each): Unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
□ <20% □ >20% ■ >50% □ >80% in the last 100 years
10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study ■ Informal field sighting □ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
Cape Nature Conservation	Western Cape Province	1990-present	field surveys

PART TWO

13. Conservation status:

Current status:
13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: De Hoop Nature Reserve, Cape Peninsula National Park, Kogelberg Biosphere Reserve and various smaller statutory and private reserves.
13H. National or regionally endorsed protection plan: None.

Assigned status:
13I. Assigned IUCN Red List Category: Least Concern
13J. IUCN Criteria based on: Although locally threatened on the Cape Peninsula and Cape Flats, it has a relatively wide distribution and is not generally threatened.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey ■ Genetic research ■ Taxonomic research □ Life history studies
■ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management □ Monitoring □ Translocation
□ Sustainable utilization □ Public education □ Genome Resource Banking
■ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased □ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years □ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop ■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon ■ Some techniques known for taxon or similar taxa
□ Techniques not known at all □ Information not available in this group of compilers

20. Other comments:

Locally threatened on Cape Peninsula and Cape Flats. Genetic and taxonomic research is recommended to establish the species' relationship to *B. gariepensis*, and to identify any genetically distinct subpopulations. The findings could influence the current conservation status of the species.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Baard E.H.W., Branch W.R., Channing A.C., De Villiers A.L., Le Roux A. & Mouton P. le F.N. 1999. A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest. Unpublished Report, Cape Nature Conservation, Stellenbosch.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Mus. 17: 1-334.

22. Compilers (members of the working group):

Ernst Baard, Richard Boycott, Alan Channing, Mike Cherry, Atherton de Villiers, Liz Scott.

23. Reviewers:

Atherton de Villiers, Ernst Baard.

Conservation Assessment Management Plan Taxon Data Sheet for *Bufo pardalis* Status: Least Concern

PART ONE

1. Scientific name: *Bufo pardalis* Hewitt 1935

1A. Synonyms: *Bufo regularis pardalis* Hewitt 1935
1B. Scientific nomenclature:
$1B_1$. Family: Bufonidae
$1B_2$. Order: Anura
$1B_3$. Class: Amphibia
1C. Common name(s): Eastern Leopard Toad, Leopard Toad, Gleniffer Toad, Igogode (Xhosa).
1D. Taxonomic level of assessment: ■ Species □ Subspecies □ Variety □ Form
1E. Country: South Africa

2. Distribution of the taxon:

2A. Habit or life form (only plants): n/a
2B. Habitat of the taxon (ecosystem level): Thicket, Grassland biomes.
2C. Habitat specificity (niche, elevation, etc.): Parks and gardens, moist lowlands, large permanent waterbodies for breeding (primarily). Appears to prefer ecotonal habitat with moist cover.
2D. Historical distribution (Global -- in past 100 years described by country): South Africa
2E. Current distribution (listed by country): South Africa
2F. Current geographic extent of taxon's distribution being assessed in this workshop (i.e. county, province, state, country, etc.): Eastern Cape province and possibly southern KwaZulu-Natal.
2G. Concentrated migration sites (using political units): n/a

3. Approximate **EXTENT OF OCCURRENCE** of the taxon in and around the area of study/ sighting/ collection (Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary encompassing all known, inferred or projected sites of present occurrence of the taxon, but may exclude obvious discontinuities, e.g., large tracts which contain no suitable habitat.):

□ <100 km^2 □ 101 – 5,000 km^2 □ 5,001 – 20,000 km^2 ■ >20,001 km^2

4. Approximate **AREA OF OCCUPANCY** of the taxon in and around the area of study/ sighting/ collection (Area of occupancy is defined as the area occupied by the taxon within the 'extent of occurrence'.):

□ <10 km^2 □ 11 – 500 km^2 □ 501 – 2,000 km^2 ■ >2,001 km^2

5. Number of subpopulations in which the taxon is distributed:

There may be isolated subpopulations in the Transkei and KwaZulu-Natal. The major subpopulation in the south is fragmented.

6. Habitat status:

6A. Within the ranges of the subpopulations, is the habitat □ Contiguous ■ Fragmented □ Not known?
Fragmentation is particularly prevalent in the northern parts of the range.

6B. Is there any change in the habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a ■ decrease in area □ increase in area?

6C. If decreasing, what has been the decrease (approximately, in percent) in the last ? years?
■ <20% □ >20% □ >50% □ >80% in the last 50 years

6D. If stable or unknown, do you predict a decline in habitat? □ Yes □ No
If yes, indicate the rate of decline: □ <20% □ >20% □ >50% □ >80% in the next ? years.

6E. State primary cause of change: Intensification of agricultural practice with replacement of thicket with pasture, and development of roads and residential areas.

6F. Is there change in quality of habitat where the taxon occurs? ■ Yes □ No □ Unknown
If yes, is it a: ■ decrease in quality □ increase in quality?

6G. State primary cause of change: Introduction of exotic fish in waterbodies used for breeding.

7. Threats:

7A. What are the threats to the taxon? (**present [P]** or **future (predicted) [F]** threats):

Human interference
Aircraft [P] [F]
Artificial lighting [P] [F]
Damming [P] [F]
Destructive fishing [P] [F]
Fishing [P] [F]
Grazing [P] [F]
Harvest/ Hunting [P] [F]
Harvest for medicine [P] [F]
Harvest for food [P] [F]
Harvest for timber [P] [F]
Loss of habitat **[P] ■ [F] ■**
Habitat fragmentation **[P] ■ [F] ■**
Habitat loss: exotic animals [P] [F]
Habitat loss: exotic plants [P][F]
Overexploitation [P] [F]
Pesticides **[P] ■ [F] ■**
Poisoning [P] [F]
Other threats:
Pollution [P] [F]
Powerlines [P] [F]
Road kills **[P] ■ [F] ■**
Trade for market or medicine [P][F]
Trade of parts [P] [F]
Trampling [P] [F]
War [P] [F]

Natural/ Man induced threats
Climate [P] [F]
Disease [P] [F]
Decline in prey species [P] [F]
Drowning [P] [F]
Edaphic changes [P] [F]
Genetic problems [P] [F]
Hybridization [P] [F]
Interspecific competition [P] [F]
Interspecific competition from exotics [P] [F]
Interspecific competition: livestock [P] [F]
Nutritional disorders [P] [F]
Predation [P] [F]
Predation: exotics**[P]■[F]■**
Siltation [P] [F]

Catastrophes
Drought [P] [F]
El Nino [P] [F]
Fire [P] [F]
Hurricane [P] [F]
Landslide [P] [F]
Tsunami [P] [F]
Volcano [P] [F]

7B. Are these threats resulting in (perceived or inferred) or may result in (predicted) population decline?
■ Yes □ No; If yes, indicate which threats are resulting or may result in population decline: See 7A.
Habitat fragmentation and loss of terrestrial habitat; degree of degradation of breeding habitat is unknown.

8. Trade:

8A. Is the taxon in trade? □ Yes ■ No
If yes, is it □ Local □ Domestic □ Commercial □ International?

8B. Parts in trade:
□ Hair
□ Meat
□ Whole plants
□ Other
□ Skin
□ Horn
□ Taxidermy models
□ Flowers
□ Bones
□ Organs
□ Live animal
□ Seeds
□ Fur
□ Glands
□ Products
□ Roots

8C. Which form of trade (specified form) is resulting in a perceived or inferred population decline? n/a

9. Population numbers:

9A. Global population: Unknown.
9B. Subpopulations (no. of individuals in each): See 5. Sizes of subpopulations unknown.
9C. Number of mature individuals (in all populations): □ <50 □ <250 □ <2,500 ■ >2,500
9D. Average age of parents in population: Unknown.

10. Population trends:

10A. Is the population size/ numbers of the taxon
■ Declining □ Increasing □ Stable □ Unknown?

10B. If declining, what has been the rate of population decline perceived or inferred?
■ <20% □ >20% □ >50% □ >80% in the last 50 years

10C. If stable or unknown, do you predict a future decline in the population? □ Yes □ No
If yes, specify rate and factors e.g. habitat loss, threats, trade, etc.
□ <20% □ >20% □ >50% □ >80% in the next ? years/ generations

11. Data quality:

The above estimates are based on:
□ Census or monitoring ■ General field study ■ Informal field sighting ■ Literature
□ Indirect information such as from trade, etc. □ Museum/herbarium studies/records
□ Hearsay/ popular belief

12. Recent field studies (in the last 10 years):

Researcher names	Location	Dates	Topics
M. Burger	Thomas Baines Nat. Res.	1990	vertebrate survey

PART TWO

13. Conservation status:

Current status:
13A. Current IUCN Red List Category (2000 Red List): Not listed.
13B. CITES: Not listed.
13C. National Wildlife Legislation: Not listed.
13D. National Red Data Book (1988): Not listed.
13E. International Red Data Book: Not listed.
13F. Other legislation: A protected species in terms of the Cape Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974) for the Cape (inclusive of Western, Northern and Eastern Cape provinces).
13G. Known presence in protected areas: Addo Elephant National Park, Thomas Baines Nature Reserve, Woody Cape Nature Reserve, and others.
13H. National or regionally endorsed protection plan: None.

Assigned status:
13I. Assigned IUCN Red List Category: Least Concern
13J. IUCN Criteria based on: This species was recently separated from *Bufo pantherinus* which is classified Endangered. *B. pardalis* is more widespread and not considered to be threatened as a whole, although certain localities have been impacted by urban and agricultural development.

PART THREE

14. Supporting research recommended for the taxon?

■ Yes □ No If yes, is it

■ Survey □ Genetic research ■ Taxonomic research ■ Life history studies
□ Limiting factor research □ Epidemiology □ Trade
□ Others (taxon specific)

14A. Is Population and Habitat Viability Assessment recommended? □ Yes ■ No □ Pending

15. Management recommendations for the taxon:

■ Habitat management □ Wild population management □ Monitoring □ Translocation
□ Sustainable utilization □ Public education □ Genome Resource Banking
□ Limiting factor management □ Captive breeding □ Work in local communities
□ Others

16. If captive breeding/cultivation is recommended, is it for:

□ Species recovery □ Education □ Reintroduction □ Benign introduction
□ Research □ Husbandry □ Preservation of live genome

17. Do captive stocks already exist?

□ Yes ■ No If yes,
17A. Names of facilities:
17B. Number in captivity: Male Female Unsexed Total □ Not known
17C. Does a coordinated **Species Management Program** exist for this species: □ Yes ■ No
If yes, which countries (if country, which institutions):
17D. Is a coordinated **Species Management Program** recommended for the range country(ies)?
□ Yes ■ No (specify countries)

18. Level of captive breeding/cultivation recommended:

□ A. Ongoing captive program intensified or increased □ B. Ongoing captive program decreased
□ C. Initiate captive program within 3 years □ D. Initiate captive program in 3 years
□ E. Pending recommendation from a PHVA workshop ■ F. No captive program recommended

19. Are techniques established to propagate the taxon:

□ Techniques known for this taxon or similar taxon ■ Some techniques known for taxon or similar taxa
□ Techniques not known at all □ Information not available in this group of compilers

20. Other comments:

The validity of records from the Transkei and KwaZulu-Natal needs to be confirmed and, if so, the extent of those populations should be determined.

PART FOUR

21. Sources of data:

Anon 2000. SAFAP interim distribution maps. Avian Demography Unit, Cape Town.
Branch W.R. 1980. Tricks of the trade (herpetological collecting techniques). J. Herpetol. Assoc. Afr. 22: 14-20.
Cherry M.I. & Francillion Vieillot H. 1992. Body size, age and reproduction in the leopard toad, *Bufo pardalis*. Journal of Zoology (London) 228: 41-52.
Eick B.N., Harley E.H. & Cherry M.I. 2001. Molecular analysis supports specific status for *Bufo pardalis* and *Bufo pantherinus*. J. Herpetology 35(1): 113-114.
Lambiris A.J.L. 1976. New locality record for *Bufo pardalis* Hewitt (Amphibia: Bufonidae). Arnoldia (Rhodesia) 7(40): 1-3.
Lambiris A.J.L. 1989. A review of the amphibians of Natal. Lammergeyer 39: 1-210.
Passmore N.I. & Carruthers V.C. 1995. South African Frogs: a complete guide. Southern Book Publishers and Wits University Press.
Poynton J.C. 1964. The Amphibia of southern Africa: a faunal study. Annals of the Natal Mus. 17: 1-334.
Poynton J.C. & Lambiris A.J.L. 1998. On *Bufo pantherinus* A. Smith, 1828 (Anura: Bufonidae), the leopard toad of the southwestern Cape, South Africa, with the description of the neotype. African Journal of Herpetology 47(1): 3-12.

22. Compilers (members of the working group):

Phil Bishop, Bill Branch, Marius Burger, Mike Coke, James Harrison, Andrew Turner.

23. Reviewers:

Phil Bishop, Marius Burger, James Harrison.

Section 3
Appendices

Conservation Assessment and Management Plan

for Southern African Frogs

FINAL REPORT

Cape Town, South Africa
24-27 July 2000

APPENDIX I.

LIST OF PARTICIPANTS IN THE SOUTHERN AFRICAN FROG CAMP WORKSHOP

Ernst Baard
Cape Nature Conservation
Private Bag X5014
Stellenbosch 7599
SOUTH AFRICA
Tel 27-021-889-1560
Fax 27-021-889-1523
baarde@cncjnk.wcape.gov.za

Mike Bates
Dept. of Herpetology
National Museum
PO Box 266
Bloemfontein 9300
Tel 27-447-9609
herp@nasmus.co.za

Phillip Bishop
University of Otago
Dept. of Zoology
PO Box 56
Dunedin,
NEW ZEALAND
Tel 64-3-479-7990
Fax 64-3-479-7584
phil.bishop@stonebow.otago.ac.nz

Richard Boycott
S.D. Nature Trust Commission
PO Box 1797
Mbabane
SWAZILAND
Tel 27-09268-442-4241 (w)
27-09268-442-4408
richjude@realnet.co.sz

Harold Braack
146 Dorado Street
Waterkloot Ridge 0181
SOUTH AFRICA
Tel 27-082-723-9387
Bill Branch
Port Elizabeth Museum
PO Bodx 13147
Humewood 6013
Tel 27-041-586-1051
pemwrba@zoo.upe.ac.za

Marius Burger
Avian Demography Unit
University of Cape Town
Rondebosch 7701
SOUTH AFRICA
Tel 27-021-650-2564
marius@maths.uct.ac.za

Alan Channing
University of the Western Cape
Private Bag X17
Bellville 7535
SOUTH AFRICA
Tel 27-021-959-2261
Fax 27-021-959-2312
achanning@uwc.ac.za

Michael Cherry
University of Stellenbosch
Private Bag X1
Matieland 7602
SOUTH AFRICA
Tel 27-021-808-3233 (w)
Fax 27-021-808-2405
mic@maties.sun.ac.za

Mike Coke
Kwazulu Natal Nature Conservation Service
PO Box 13053
Cascades 3202
SOUTH AFRICA
Tel 27-033-845-1436
mcoke@kznncs.org.za
Clayton Cook
PO Box 106
Haenerksburg 0730
SOUTH AFRICA
Tel 27-002-688-9585
vlokw@unin.unorth.ac.za

Jeff Cowan
Dept. of Environmental Affairs
And Tourism
Private Bag X447
Pretoria 0001
SOUTH AFRICA
Tel 27-12-310-3701
gcowan@ozone.pwv.gov.za

John Dini
Dept. of Environmental Affairs and Tourism
Private Bag X447
Pretoria 0001
SOUTH AFRICA
Tel 27-012-310-3789
Fax 27-012-320-7026
jdini@ozone.pwv.gov.za

Susie Ellis
CBSG/SSC/IUCN
138 Strasburg Reservoir Road
Strasburg VA 22657
USA
Tel/fax 1-540-465-9589
s.ellis@conservation.org

James Harrison
Avian Demography Unit
University of Cape Town
Rondebosch 7701
SOUTH AFRICA
Tel 27-021-650-2564
batlas@maths.uct.ac.za

Neils Jacobsen
PO Box 671
Wilderness 6560
SOUTH AFRICA
Tel/fax 27-044-877-0309

Les Minter
Dept. of Medical Science
University of the North
Private Bag X1106
Sovenga 0727
SOUTH AFRICA
Tel/fax 27-15-268-2275 (work)
Tel 27-15-293-6002 (home)
minter@unin.unorth.ac.za

Elizabeth Scott
University of the Western Cape
Private Bag X17
Bellville 7535
SOUTH AFRICA
Tel 27-21-959-2261
escott@botzoo.uct.ac.za or
s9840801@itsunix.uwc.ac.za

Andrew Turner
Western Cape Nature Conservation Board
Private Bag X5014
Stellenbosch 7599
SOUTH AFRICA
Tel 27-012-889-1560
aaturner@cncjnk.wcape.gov.za

Atherton De Villiers
Cape Nature Conservation
Private Bag X5014
Stellenbosch 7599
SOUTH AFRICA
Tel 27-021-889-1560
atherton@cncjnk.wcape.gov.za

Ché Weldon
School of Env. Sciences & Development
Potchefstroom University for CHE
Private Bag X6001
Potchefstroom 2520
SOUTH AFRICA
Tel: XX27 18 299 2372
Fax: XX27 18 299 2370
drklhdp@puknet.puk.ac.za

Louis du Preez
School of Env. Sciences & Development
Potchefstroom University for CHE
Private Bag X6001
Potchefstroom 2520
SOUTH AFRICA
Tel: XX27 18 299 2372
Fax: XX27 18 299 2370
drklhdp@puknet.puk.ac.za

APPENDIX II.

IUCN RED LIST CATEGORIES

Prepared by the

IUCN Species Survival Commission

As approved by the
IUCN Council
Gland, Switzerland

February 2000

IUCN RED LIST CATEGORIES

I. INTRODUCTION

1. The IUCN Red List Categories have been developed as an easily and widely understood system for classifying species at high risk of global extinction. The general aim of the system is to provide an explicit, objective framework for the classification of the broadest range of species according to their extinction risk. However, while the Red List may focus attention on those taxa at the highest risk it is not the sole means of setting priorities for conservation measures for their protection.

Extensive consultation and testing in the development of the system strongly suggests that it is robust across most organisms. However, it should be noted that although the system places species into the threatened categories with a high degree of consistency, the criteria cannot take into account the life histories of every species. Hence, in certain individual cases, the risk of extinction may be under- or over-estimated.

2. Before 1994 the more subjective threatened species categories used in Red Data Books and Red Lists had been in place, with some modification, for almost 30 years. Although the need to revise the categories had long been recognised (Fitter & Fitter 1987), the current phase of development only began in 1989 following a request from the IUCN Species Survival Commission (SSC) Steering Committee to develop a more objective approach. IUCN Council adopted the new Red List system in 1994.

The new IUCN Red List Categories and Criteria have several specific aims:

- to provide a system that can be applied consistently by different people;
- to improve objectivity by providing users with clear guidance on how to evaluate different factors which affect risk of extinction;
- to provide a system which will facilitate comparisons across widely different taxa;
- to give people using threatened species lists a better understanding of how individual species were classified.

3. Since their adoption by IUCN Council in 1994, the IUCN Red List Categories have become widely recognised internationally and they are now used in a whole range of publications and listings produced by IUCN as well as by numerous governmental and non-governmental organisations. Such broad and extensive use revealed the need for a number of improvements and SSC was mandated by the 1996 World Conservation Congress (WCC Res. 1.4) to conduct a review of the system. This document presents the revisions recommended by the SSC Criteria Review Working Group.

The proposals presented in this document result from a continuing process of drafting, consultation and validation. It was clear that the production of a large number of draft proposals led to some confusion, especially as each draft has been used for classifying some set of species for conservation purposes. To clarify matters, and to open the way for modifications as and when they became necessary, a system for version numbering is as follows:

Version 1.0: Mace & Lande (1991)
The first paper discussing a new basis for the categories, and presenting numerical criteria especially relevant for large vertebrates.

Version 2.0: Mace *et al*. (1992)
A major revision of Version 1.0, including numerical criteria appropriate to all organisms and introducing the non-threatened categories.

Version 2.1: IUCN (1993)
Following an extensive consultation process within SSC, a number of changes were made to the details of the criteria, and fuller explanation of basic principles was included. A more explicit structure clarified the significance of the non-threatened categories.

Version 2.2: Mace & Stuart (1994)
Following further comments received and additional validation exercises, some minor changes to the criteria were made. In addition, the Susceptible category present in Versions 2.0 and 2.1 was subsumed into the Vulnerable category. A precautionary application of the system was emphasised.

Version 2.3: IUCN (1994)
IUCN Council adopted this version, which incorporates changes as a result of comments from IUCN members, in December 1994. The initial version of this document was published without the necessary bibliographic details such as date of publication and ISBN number, but these were included in the subsequent reprints in 1998 and 1999. This version was used for the *1996 IUCN Red List of Threatened Animals* (Baillie and Groombridge 1996) and *The World List of Threatened Trees* (Oldfield *et al* 1998)**.**

Version 3.0: IUCN/SSC Criteria Review Working Group (1999)
Following comments received, a series of workshops were convened to look at the Red List Criteria following which, changes were proposed.

Version 3.1:
The IUCN Council adopted this latest document, which incorporates changes as a result of comments from the IUCN and SSC memberships and from a final meeting of the Criteria Review Working Group, in February 2000.

All new assessments should use the latest adopted version and cite the version number.

2. In the rest of this document the proposed system is outlined in several sections. Section II, the Preamble, presents basic information about the context and structure of the system, and the procedures that are to be followed in applying the criteria to species. Section III provides definitions of key terms used. In Section IV, the categories are presented, while Section V presents the quantitative criteria used for classification within the threatened categories. Section VI is the bibliography. Annex I provides guidance on how to deal with uncertainty, Annex II suggests a standard format for citing the Red List Categories and Criteria, and Annex III outlines the documentation requirements for taxa to be included on IUCN's global Red Lists. It is important for the effective functioning of the system that all sections are read and understood to ensure that the definitions and rules are followed (Note: Annexes I, II and III are not part of the approved rules and will be updated on a regular basis).

II. PREAMBLE

The following information presents important information on the use and interpretation of the categories (= Critically Endangered, Endangered, etc.), criteria (= A to E), and sub-criteria (= 1, 2, etc.; a, b, etc.; i, ii, etc.):

1. Taxonomic level and scope of the categorisation process

The criteria can be applied to any taxonomic unit at or below the species level. The term 'taxon' in the following information, definitions and criteria is used for convenience, and may represent species or lower taxonomic levels, including forms that are not yet formally described. There is sufficient range among the different criteria to enable the appropriate listing of taxa from the complete taxonomic spectrum, with the exception of micro-organisms. The criteria may also be applied within any specified geographical or political area although in such cases special notice should be taken of point 14 below. In presenting the results of applying the criteria, the taxonomic unit and area under consideration should be made explicit in accordance with the documentation guidelines. The categorisation process should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions (defined in the IUCN Guidelines for Re-introductions (IUCN 1998) as "...an attempt to establish a species, for the purpose of conservation, outside its recorded distribution, but within an appropriate habitat and eco-geographical area. This is a feasible conservation tool only when there is no remaining area left within a species' historic range").

2. Nature of the categories

Extinction is a chance process. Thus, a listing in a higher extinction risk category implies a higher expectation of extinction, and over the time-frames specified, more taxa listed in a higher category are expected to go extinct than in a lower one (without effective conservation action). However, the persistence of some taxa in high-risk categories does not necessarily mean their initial assessment was inaccurate.

All taxa listed as Critically Endangered qualify for Vulnerable and Endangered, and all listed as Endangered qualify for Vulnerable. Together these categories are described as 'threatened'. The threatened categories form a part of the overall scheme. It will be possible to place all taxa into one of the categories (see Figure 1).

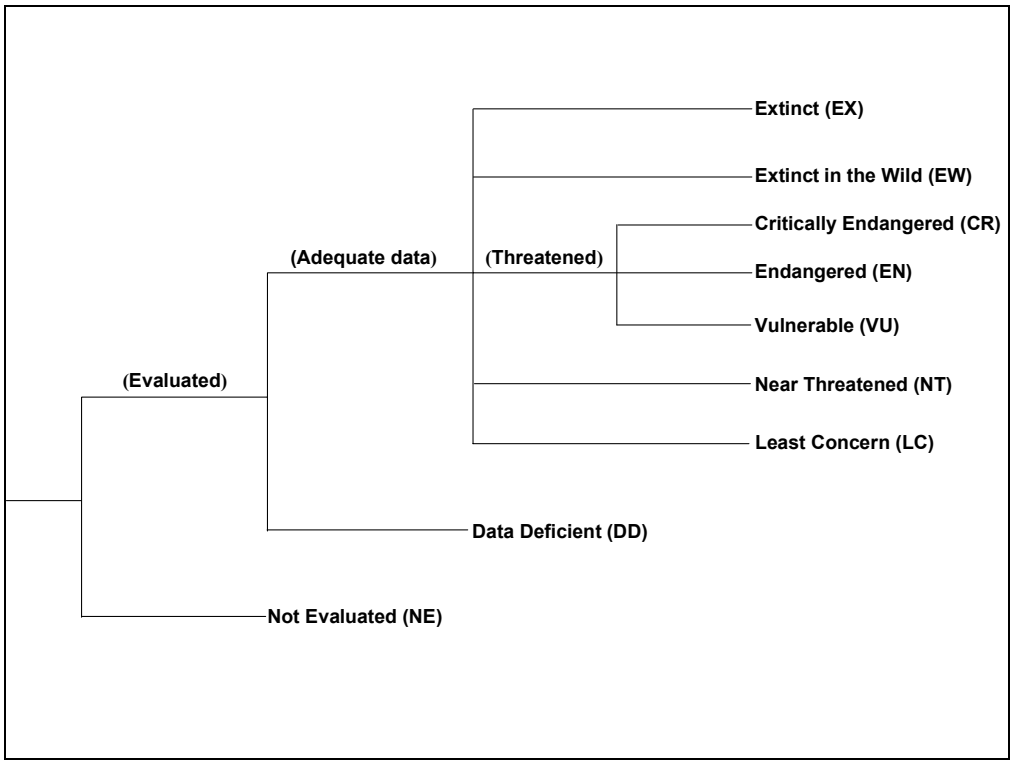


Figure 1. Structure of the categories.

3. Role of the different criteria

For listing as Critically Endangered, Endangered or Vulnerable there is a range of quantitative criteria; meeting any one of these criteria qualifies a taxon for listing at that level of threat. Each taxon should be evaluated against all the criteria. Even though some criteria will be inappropriate for certain taxa (some taxa will never qualify under these however close to extinction they come), there should be criteria appropriate for assessing threat levels for any taxon. The relevant factor is whether any one criterion is met, not whether all are appropriate or all are met. Because it will never be clear which criteria are appropriate for a particular taxon in advance, each taxon should be evaluated against all the criteria, and any criterion met should be listed.

4. Derivation of quantitative criteria

The different criteria (A-E) are derived from a wide review aimed at detecting risk factors across the broad range of organisms and the diverse life histories they exhibit. The quantitative values presented in the various criteria associated with threatened categories were developed through wide consultation and they are set at what are generally judged to be appropriate levels, even if no formal justification for these values

exists. The levels for different criteria within categories were set independently but against a common standard. Some broad consistency between them was sought.

5. Conservation actions in the listing process

The criteria for the threatened categories are to be applied to a taxon whatever the level of conservation action affecting it. It is important to emphasise here that a taxon may require conservation action even if it is not listed as threatened. Conservation actions which may benefit the taxon are included as part of the documentation requirements (see Annex 3).

6. Data quality and the importance of inference and projection

The criteria are clearly quantitative in nature. However, the absence of high quality data should not deter attempts at applying the criteria, as methods involving estimation, inference and projection are emphasised to be acceptable throughout. Inference and projection may be based on extrapolation of current or potential threats into the future (including their rate of change), or of factors related to population abundance or distribution (including dependence on other taxa), so long as these can reasonably be supported. Suspected or inferred patterns in either the recent past, present or near future can be based on any of a series of related factors, and these factors should be specified as part of the documentation.

Taxa at risk from threats posed by future events of low probability but with severe consequences (catastrophes) should be identified by the criteria (e.g. small distributions, few locations). Some threats need to be identified particularly early, and appropriate actions taken, because their effects are irreversible, or nearly so (pathogens, invasive organisms, hybridisation).

7. Problems of scale

Classification based on the sizes of geographic ranges or the patterns of habitat occupancy is complicated by problems of spatial scale. The finer the scale at which the distributions or habitats of taxa are mapped, the smaller the area will be that they are found to occupy, and the less likely it will be that range estimates exceed the thresholds specified in the criteria. Mapping at finer scales reveals more areas in which the taxon is unrecorded. Conversely, coarse-scale mapping reveals less of the unoccupied area causing larger range estimates that are more likely to exceed the thresholds for threatened categories. The choice of scale at which range is estimated may thus, itself, influence the outcome of Red List assessments and could be a source of inconsistency and bias. It is impossible to provide any strict but general rules for mapping taxa or habitats; the most appropriate scale will depend on the taxa in question, and the origin and comprehensiveness of the distribution data.

8. Uncertainty

The data used to evaluate taxa against the criteria are often estimated with considerable uncertainty. Such uncertainty can arise from any one or all of natural variation, vagueness in the terms and definitions used, and measurement error. The way in which this uncertainty is handled can have a strong influence on the results from an evaluation. Details of methods recommended for handling uncertainty are included in Annex 1 and assessors are encouraged to read and follow these principles.

In general, when this uncertainty leads to wide variation in the results of assessments the range of possible outcomes should be made explicit. A single category must be chosen and the basis for the decision should be documented, and should be both precautionary and credible.

When data are very uncertain, the category of 'Data Deficient' may be assigned. However, in this case it is important to document that this category indicates that this category has been assigned because data are inadequate to determine a threat category, rather than the taxon is poorly known. In cases where there are evident threats to a taxon, through, for example, deterioration of its only known habitat it is important to attempt threatened listing, even though there may be little direct information on the biological status of the taxon itself.

9. Implications of listing

Listing in the categories of Not Evaluated and Data Deficient indicates that no assessment of extinction risk has been made, though for different reasons. Until such time as an assessment is made, taxa listed in these categories should not be treated as if they were non-threatened. It may be appropriate (especially for Data Deficient forms) to give them the same degree of protection as threatened taxa, at least until their status can be assessed.

10. Documentation

All assessments should be documented. Threatened classifications should state the criteria and sub-criteria that were met. No listing can be accepted as valid unless at least one criterion is given. If more than one criterion or sub-criterion was met, then each should be listed. Therefore, if a re-evaluation indicates that the documented criterion is no longer met, this should not result in automatic down listing. Instead, the taxon should be re-evaluated with respect to all criteria to indicate its status. The factors responsible for triggering the criteria, especially where inference and projection are used, should be documented (see Annexes 2 and 3). The documentation requirements for other categories are also specified in Annex 3.

11. Threats and priorities

The category of threat is not necessarily sufficient to determine priorities for conservation action. The category of threat simply provides an assessment of the extinction risk under current circumstances, whereas a system for assessing priorities for action will include numerous other factors concerning conservation action such as costs, logistics, chances of success, and even perhaps the taxonomic distinctiveness of the subject.

12. Re-evaluation

Evaluation of taxa against the criteria should be carried out at appropriate intervals. This is especially important for taxa listed under Near Threatened, Data Deficient and for threatened taxa whose status is known or suspected to be deteriorating.

13. Transfer between categories

There are rules to govern the movement of taxa between categories which are as follows: (A) A taxon may be moved from a category of higher threat to a category of lower threat if none of the criteria of the higher category has been met for five years or more. (B) If the original classification is found to have been erroneous, the taxon may be transferred to the appropriate category or removed from the threatened categories altogether, without delay (but see Section 9). (C) Transfer from categories of lower to higher risk should be made without delay.

14. Use at regional level

The IUCN Red List Categories and Criteria were designed for global taxon assessments. However, many people are interested in applying them to subsets of global data, especially at regional, national or local levels. To do this, refer to guidelines prepared by the IUCN/SSC Regional Applications Working Group (Gärdenfors *et al*. 1999). When applied at national or regional levels it must be recognised that a global category may not be the same as a national or regional category for a particular taxon. For example, taxa classified as Least Concern globally might be Critically Endangered within a particular region where numbers are very small or declining, perhaps only because they are at the margins of their global range. Conversely, taxa classified as Vulnerable on the basis of their global declines in numbers or range might be Least Concern within a particular region where their populations are stable.

III. DEFINITIONS

1. Population and Population Size (Criteria A, C and D)

The term population is used in a specific sense in the Red List Criteria that is different to its common biological usage. Population is here defined as the total number of individuals of the taxon. For functional reasons, primarily owing to differences between life forms, population size is measured as numbers of mature individuals only. In the case of taxa obligately dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used.

2. Subpopulations (Criteria B and C)
Subpopulations are defined as geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less).

3. Mature individuals (Criteria A, B, C and D)
The number of mature individuals is the number of individuals known, estimated or inferred to be capable of reproduction. When estimating this quantity the following points should be borne in mind:

- Mature individuals that will never produce new recruits should not be counted (e.g. densities are too low for fertilisation).
- In the case of populations with biased adult or breeding sex ratios it is appropriate to use lower estimates for the number of mature individuals which take this into account (e.g. the estimated effective population size).
- Where the population size fluctuates use a lower estimate. In most cases this will be much less than the mean.
- Reproducing units within a clone should be counted as individuals, except where such units are unable to survive alone (e.g. corals).
- In the case of taxa that naturally lose all or a subset of mature individuals at some point in their life cycle, the estimate should be made at the appropriate time, when mature individuals are available for breeding.
- Re-introduced individuals must have produced viable offspring before they are counted as mature individuals.

4. Generation (Criteria A, C and E)
Generation length is the average age of parents of the current cohort (i.e. newborn individuals in the population). Generation length therefore reflects the turnover rate of breeding individuals in a population. Generation length is greater than the age at first breeding and less than the age of the oldest breeding individual, except in taxa that breed only once. Where generation length varies under threat, the more natural, i.e. pre-disturbance, generation length should be used.

5. Reduction (Criterion A)
A reduction is a decline in the number of mature individuals of at least the amount (%) stated over the time period (years) specified, although the decline need not still be continuing. A reduction should not be interpreted as part of a fluctuation unless there is good evidence for this. The downward part of a fluctuation will not normally count as a reduction.

6. Continuing decline (Criteria B and C)
A continuing decline is a recent, current or projected future decline (which may be smooth, irregular or sporadic) which is liable to continue unless remedial measures are taken. Fluctuations will not normally count as continuing declines, but an observed decline should not be considered as a fluctuation unless there is evidence for this.

7. Extreme fluctuations (Criteria B and C)
Extreme fluctuations occur in a number of taxa where population size or distribution area varies widely, rapidly and frequently, typically with a variation greater than one order of magnitude (i.e., a tenfold increase or decrease).

8. Severely fragmented (Criterion B)
Severely fragmented refers to the situation where increased extinction risks to the taxon result from the fact that most individuals within a taxon are found in small and relatively isolated subpopulations (in certain circumstances this may be inferred from habitat information). These small subpopulations may go extinct, with a reduced probability of recolonisation.

9. Extent of occurrence (Criteria A and B)
Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy (see Figure 2). This measure may exclude discontinuities or disjunctions within

the overall distributions of taxa (e.g. large areas of obviously unsuitable habitat) (but see 'area of occupancy'). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

10. Area of occupancy (Criteria A, B and D)

Area of occupancy is defined as the area within its 'extent of occurrence' (see definition) which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may contain unsuitable or unoccupied habitats. In some cases (e.g. colonial nesting sites, feeding sites for migratory taxa) the area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon. The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon, the nature of threats and the available data (see '6. Problems of scale' in the Preamble). To avoid inconsistencies and bias in assessments caused by estimating area of occupancy at different scales, it may be necessary to standardise estimates by applying a scale-correction factor. It is difficult to give strict guidance on how standardisation should be done because different types of taxa have different scale-area relationships.

11. Location (Criteria B and D)

Location defines a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations. Where a taxon is affected by more than one threatening event, location should be defined by considering the most serious plausible threat.

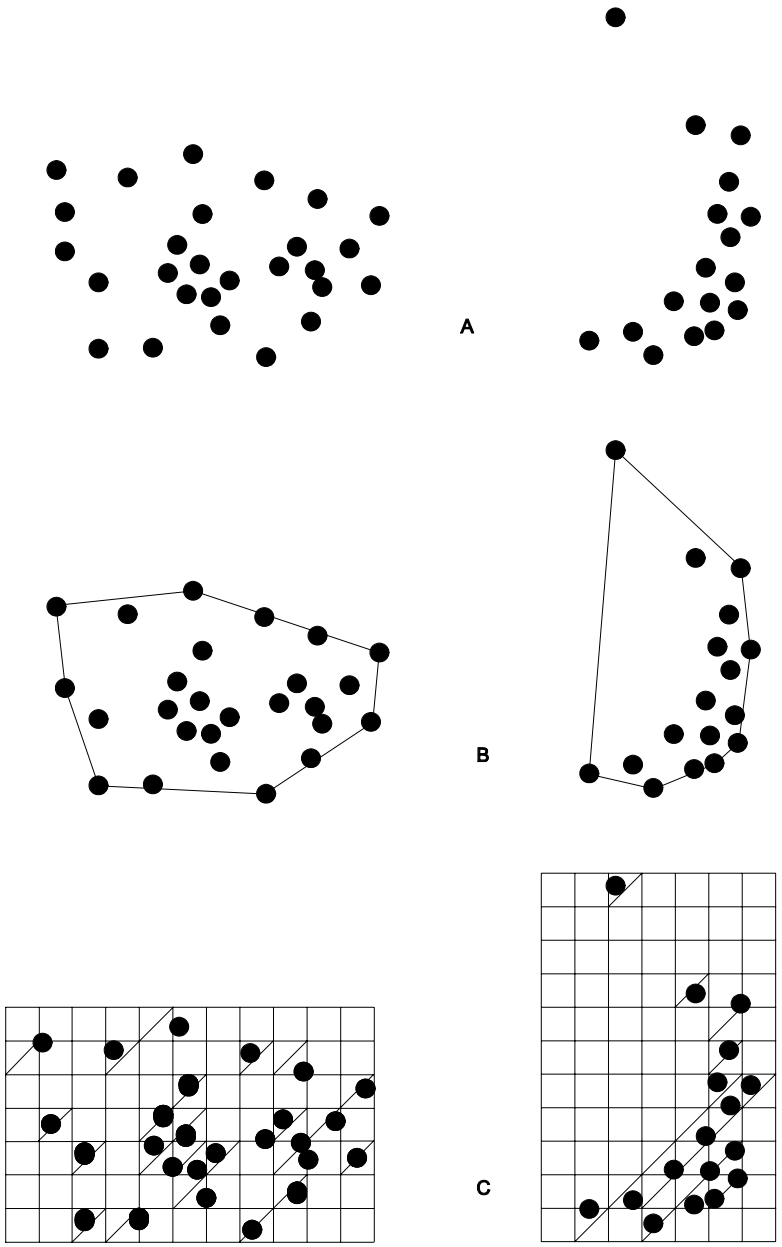


Figure 2. Two examples of the distinction between extent of occurrence and area of occupancy. (a) is the spatial distribution of known, inferred or projected sites of occurrence. (b) shows one possible boundary to the extent of occurrence, which is the measured area within this boundary. (c) shows one measure of area of occupancy which can be measured by the sum of the occupied grid squares.

12. Quantitative analysis (Criterion E)

A quantitative analysis is defined here as any form of analysis which estimates the extinction probability of a taxon based on known life history, habitat requirements, threats and any specified management options. Population viability analysis (PVA) is one such technique. Quantitative analyses should make full use of all relevant available data. In a situation in which there is limited information, such data as are available can be used to provide an estimate of extinction risk (for instance, estimating the impact of stochastic events on habitat). In presenting the results of quantitative analyses, the assumptions (which must be appropriate and defensible), the data used and uncertainty in the data or quantitative model must be documented.

IV. THE CATEGORIES [1]

A representation of the relationships between the categories is shown in Figure 1.

EXTINCT (EX)
A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

EXTINCT IN THE WILD (EW)
A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR)
A taxon is Critically Endangered when the best available evidence indicates that it meets any of the Criteria A to E on pages 213 to 214, and it is therefore considered to be facing an extremely high risk of extinction in the wild.

ENDANGERED (EN)
A taxon is Endangered when the best available evidence indicates that it meets any of the Criteria A to E on pages 214 to 216, and it is therefore considered to be facing a very high risk of extinction in the wild.

VULNERABLE (VU)
A taxon is Vulnerable when the best available evidence indicates that it meets any of the Criteria A to E on pages 216 to 217, and it is therefore considered to be facing a high risk of extinction in the wild.

NEAR THREATENED (NT)
A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)
A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT (DD)
A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified**.**

[1] *Note: As in previous IUCN categories, the abbreviation of each category (in parenthesis) follows the English denominations when translated into other languages (see Annex II).*

NOT EVALUATED (NE)
A taxon is Not Evaluated when it is has not yet been evaluated against the criteria.

V. THE CRITERIA FOR CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE

CRITICALLY ENDANGERED (CR)
A taxon is Critically Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing an extremely high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of ≥90% over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:

   (a) direct observation
   (b) an index of abundance appropriate for the taxon
   (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
   (d) actual or potential levels of exploitation
   (e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of ≥80% over the last 10 years or three generations, whichever is the longer**,** where the reduction or its causes may not have ceased OR be understood OR be reversible**,** based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of ≥80%, projected or suspected to be met within the next ten years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of ≥80% over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years), where the time period includes both the past and the future, and where the reduction or its causes have not ceased, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 100 km^2, and estimates indicating at least two of a-c:

   a. Severely fragmented or known to exist at only a single location.
   b. Continuing decline, observed, inferred or projected, in any of the following:
      (i) extent of occurrence
      (ii) area of occupancy
      (iii) area, extent and/or quality of habitat
      (iv) number of locations or subpopulations
      (v) number of mature individuals.

   c. Extreme fluctuations in any of the following:
      (i) extent of occurrence

(ii) area of occupancy
(iii) number of locations or subpopulations
(iv) number of mature individuals.

2. Area of occupancy estimated to be less than 10 km^2, and estimates indicating at least two of a-c:

a. Severely fragmented or known to exist at only a single location.
b. Continuing decline, observed, inferred or projected, in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) area, extent and/or quality of habitat
(iv) number of locations or subpopulations
(v) number of mature individuals.

c. Extreme fluctuations in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) number of locations or subpopulations
(iv) number of mature individuals.

C. Population size estimated to number less than 250 mature individuals and either:

1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, OR

2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):

(a) Population structure in the form of one of the following:
(i) no subpopulation estimated to contain more than 50 mature individuals, OR
(ii) at least 90% of mature individuals are in one subpopulation.

(b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number less than 50 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer (up to a maximum of 100 years).

ENDANGERED (EN)
A taxon is Endangered when best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a very high risk of extinction:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of ≥70% over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:

(a) direct observation
(b) an index of abundance appropriate for the taxon
(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of ≥50% over the last 10 years or three generations, whichever is the longer**,** where the reduction or its causes may not have ceased OR be understood OR be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of ≥50%, projected or suspected to be met within the next ten years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of ≥50% over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years), where the time period includes both the past and the future, AND where the reduction or its causes may not have ceased, based on (and specifying) any of the (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 5000 km^2, and estimates indicating at least two of a-c:

   a. Severely fragmented or known to exist at no more than five locations.
   b. Continuing decline, observed, inferred or projected, in any of the following:
      (i) extent of occurrence
      (ii) area of occupancy
      (iii) area, extent and/or quality of habitat
      (iv) number of locations or subpopulations
      (v) number of mature individuals.

   c. Extreme fluctuations in any of the following:
      (i) extent of occurrence
      (ii) area of occupancy
      (iii) number of locations or subpopulations
      (iv) number of mature individuals.

2. Area of occupancy estimated to be less than 500 km^2, and estimates indicating at least two of a-c:

   a. Severely fragmented or known to exist at no more than five locations.

   b. Continuing decline, observed, inferred or projected, in any of the following:
      (i) extent of occurrence
      (ii) area of occupancy
      (iii) area, extent and/or quality of habitat
      (iv) number of locations or subpopulations
      (v) number of mature individuals.

   c. Extreme fluctuations in any of the following:
      (i) extent of occurrence
      (ii) area of occupancy
      (iii) number of locations or subpopulations
      (iv) number of mature individuals.

C. Population size estimated to number less than 2500 mature individuals and either:

1. An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, OR

2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):

   (a) Population structure in the form of one of the following:
   (i) no subpopulation estimated to contain more than 250 mature individuals, OR
   (ii) at least 95% of mature individuals are in one subpopulation.

   (b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number less than 250 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years).

VULNERABLE (VU)
A taxon is Vulnerable when best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of ≥50% over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are: clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
   (a) direct observation
   (b) an index of abundance appropriate for the taxon
   (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
   (d) actual or potential levels of exploitation
   (e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of ≥30% over the last 10 years or three generations, whichever is the longer**,** where the reduction or its causes may not have ceased OR be understood OR be reversible**,** based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of ≥30%, projected or suspected to be met within the next ten years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of ≥30% over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years), where the time period includes both the past and the future, AND where the reduction or its causes may not have ceased, based on (and specifying) any of the (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
   1. Extent of occurrence estimated to be less than 20,000 km^2, and estimates indicating at least two of a-c:

a. Severely fragmented or known to exist at no more than ten locations.

b. Continuing decline, observed, inferred or projected, in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) area, extent and/or quality of habitat
(iv) number of locations or subpopulations
(v) number of mature individuals.

c. Extreme fluctuations in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) number of locations or subpopulations
(iv) number of mature individuals.

2. Area of occupancy estimated to be less than 2000 km^2, and estimates indicating at least two of a-c:

a. Severely fragmented or known to exist at no more than ten locations.

b. Continuing decline, observed, inferred or projected, in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) area, extent and/or quality of habitat
(iv) number of locations or subpopulations
(v) number of mature individuals.

c. Extreme fluctuations in any of the following:
(i) extent of occurrence
(ii) area of occupancy
(iii) number of locations or subpopulations
(iv) number of mature individuals.

C. Population size estimated to number less than 10,000 mature individuals and either:

1. An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, OR

2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):

(a) Population structure in the form of one of the following:
(i) no subpopulation estimated to contain more than 1000 mature individuals, OR
(ii) all mature individuals are in one subpopulation.

(b) Extreme fluctuations in number of mature individuals.

D. Population very small or restricted in the form of either of the following:

1. Population size estimated to number less than 1000 mature individuals.

2. Population with a very restricted area of occupancy (typically less than 20km^2) or number of locations (typically 5 or less) such that it is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period.

E. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

VI. Bibliography

Baillie, J. and Groombridge, B. (eds). 1996. *1996 IUCN Red List of Threatened Animals*. IUCN, Gland, Switzerland.

Fitter, R. and Fitter, M. (eds). 1987. *The Road to Extinction*. IUCN, Gland, Switzerland.

Gärdenfors, U., Rodríguez, J.P., Hilton-Taylor, C., Hyslop, C., Mace, G., Molur, S. and Poss, S. 1999. Draft Guidelines for the Application of IUCN Red List Criteria at National and Regional Levels. *Species* 31-32: 58-70.

IUCN. 1993. *Draft IUCN Red List Categories*. IUCN, Gland, Switzerland.

IUCN. 1994. *IUCN Red List Categories*. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland.

IUCN. 1996. Resolution 1.4. Species Survival Commission. *Resolutions and Recommendations*, pp. 7-8. World Conservation Congress, 13-23 October 1996, Montreal, Canada. IUCN, Gland, Switzerland.

IUCN. 1998. *Guidelines for Re-introductions*. Prepared by the IUCN/SSC Re-introduction Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK.

IUCN/SSC Criteria Review Working Group. 1999. IUCN Red List Criteria review provisional report: draft of the proposed changes and recommendations. *Species* 31-32: 43-57.

Mace, G.M., Collar, N., Cooke, J., Gaston, K.J., Ginsberg, J.R., Leader-Williams, N., Maunder, M. and Milner-Gulland, E.J. 1992. The development of new criteria for listing species on the IUCN Red List. *Species* 19: 16-22.

Mace, G.M. and Lande, R. 1991. Assessing extinction threats: toward a re-evaluation of IUCN threatened species categories. *Conservation Biology* 5: 148-157.

Mace, G.M. and Stuart, S.N. 1994. Draft IUCN Red List Categories, Version 2.2. *Species* 21-22: 13-24.

Oldfield, S., Lusty, C. and MacKinven, A. 1998. *The World List of Threatened Trees*. World Conservation Press, Cambridge.

Annex 1: Uncertainty

The Red List Criteria should be applied to a taxon based on the available evidence concerning its numbers, trend and distribution. In cases where there are evident threats to a taxon through, for example, deterioration of its only known habitat, a threatened listing may be justified, even though there may be little direct information on the biological status of the taxon itself. In all these instances there are uncertainties associated with the available information and how it was obtained. These uncertainties may be categorised as natural variability, semantic uncertainty and measurement error (Akçakaya *et al*. 2000). This section provides guidance on how to recognise and deal with these uncertainties when using the criteria.

Natural variability results from the fact that species' life histories and the environments in which they live are changing over time. The effect of this variation on the criteria is limited, because each parameter refers to a specific time or spatial scale. Semantic uncertainty arises from vagueness in the definition of terms or a lack of consistency in different assessors' usage of them. Despite attempts to make the definitions of the terms used in the criteria exact, in some cases this is not possible without the loss of generality. Measurement error is often the largest source of uncertainty; it arises from the lack of precise information about the parameters used in the criteria. This may be due to inaccuracies in estimating the values or a lack of knowledge. Measurement error may be reduced or eliminated by acquiring additional data. For further details, see Akçakaya *et al*. (2000) and Burgman *et al*. (1999).

One of the simplest ways to represent uncertainty is to specify a best estimate and a range of plausible values. The best estimate itself might be a range, but in any case the best estimate should always be included in the range of plausible values. When data are very uncertain, the range for the best estimate might be the range of plausible values. There are various methods that can be used to establish the plausible range. It may be based on confidence intervals, the opinion of a single expert, or the consensus opinion of a group of experts. Whichever method is used should be justified in the documentation.

When interpreting and using uncertain data, preferences and attitudes toward risk and uncertainty may play an important role. Attitudes have two components. First, assessors need to consider whether they will include the full range of plausible values in assessments, or whether they will exclude extreme values from consideration (known as dispute tolerance). An assessor with a low dispute tolerance would include all values, thereby increasing the uncertainty, whereas an assessor with a high dispute tolerance would exclude extremes, reducing the uncertainty. Second, assessors need to consider whether they have a precautionary or evidentiary attitude to risk (known as risk tolerance). A precautionary attitude will classify a taxon as threatened unless we are certain that it is not threatened, whereas an evidentiary attitude will classify a taxon as threatened only when there is strong evidence to support a threatened classification. Assessors should resist an evidentiary attitude and adopt a precautionary but realistic attitude to uncertainty when applying the criteria, for example, by using plausible lower bounds, rather than best estimates, in determining population size, especially if it is fluctuating. All preferences and attitudes should be explicitly documented.

The assessment using a point estimate will lead to a single Red List Category. However, when a plausible range for each parameter is used to evaluate the criteria, a range of categories may be obtained reflecting the uncertainties in the data. A single category, based on a specific attitude to uncertainty, should always be listed along with the criteria met while the range of plausible categories should be indicated in the documentation (see Annex 3).

Where data are so uncertain that any category is plausible, the category of 'Data Deficient' should be assigned. However, it is important to recognise that this category indicates that the data are inadequate to determine the degree of threat faced by a taxon, not necessarily that the taxon is poorly known. Although Data Deficient is not a threatened category, it indicates a need to obtain more information on a taxon to determine the appropriate listing; moreover it requires documentation with whatever available information there is.

References:

Akçakaya, H.R., Ferson, S., Burgman, M.A., Keith, D.A., Mace, G.M. and Todd, C.R. 2000. Making consistent IUCN classifications under uncertainty. *Conservation Biology* [in press].

Burgman, M.A., Keith, D.A. and Walshe, T.V. 1999. Uncertainty in comparative risk analysis of threatened Australian plant species. *Risk Analysis* 19: 585-598.

Annex 2: Citation of the IUCN Red List Categories and Criteria

In order to promote the use of a standard format for citing the Red List Categories and Criteria the following forms of citation are recommended:

1). The Red List Category may be written out in full or abbreviated as follows (when translated into other languages, the abbreviations should follow the English denominations):

Extinct or EX
Extinct in the Wild or EW
Critically Endangered or CR
Endangered or EN
Vulnerable or VU
Near Threatened or NT
Least Concern or LC
Data Deficient or DD
Not Evaluated or NE

2). Under Section V on the criteria for Critically Endangered, Endangered and Vulnerable there is a hierarchical alpha-numeric numbering system of criteria and sub-criteria. These criteria and sub-criteria (all four levels) form an integral part of the Red List assessment and all those that result in the assignment of a threatened category must be specified after the Category. The first level in the hierarchy consists of the five Criteria (A-E). Where more than one criterion is met, they should be separated by semi-colons. The second level of the hierarchy is indicated by the use of numbers (1-4) and if more than one is met they are separated by means of the '+' symbol. The third level is indicated by the use of the lower case alphabet characters (a-e). These are listed without any punctuation. The fourth level of the hierarchy under Criteria B and C involves the use of lower case roman numerals (i-v). These are placed in parentheses (with no space between the preceeding alphabet character and start of the parenthesis) and separated by the use of commas if more than one is listed. The following are examples of such usage:

EX
CR A1cd
VU A2c+3c
EN B1ac(i, ii, iii)
EN A2c; D
VU D1+2
CR A2c+3c; B1ab(iii)
CR D
VU D2
EN B2ab(i, ii, iii)
VU C2a(ii)
EN A1c; B1ab(iii); C2a(i)
EN B2b(iii)c(ii)
EN B1ab(i, ii, v)c(iii, iv); B2b(i)c(ii, v)
VU B1ab(iii)+2ab(iii)
EN A2abc+3bc+4abc; B1b(iii, iv, v)c(ii, iii, iv)+2b(iii, iv, v)c(ii, iii, iv)

Annex 3: Documentation Requirements for Taxa Included on the IUCN Red List

A major weakness of the *1996 IUCN Red List of Threatened Animals* and to a lesser extent *The World List of Threatened Trees* published in 1998, is that they are poorly documented and as a result, the listings in them are unsubstantiated. To rectify this weakness, a new system of minimum documentation requirements is being developed. It is important to note that the requirements outlined here are NOT part of the approved 'rule-set' for assigning a Red List status to any taxon and the requirements will be updated on a regular basis. All taxa added to the IUCN Red List, or any listings that are changed must be documented following the requirements outlined below. Taxa already on the Red List will also be documented in due course with help from the appointed Red List Authorities (see below). These documentation requirements are drafted as guides and deviations from them are acceptable provided they are fully substantiated. The documentation will bring greater credibility and transparency to listings on the Red List and will facilitate better analysis of the findings. It will also provide a basis on which listings can be contested.

Each listing should be documented as follows:

1. Name of taxon, authority, date of publication, and higher level taxonomic classification (phylum, class and order). IUCN/SSC has adopted a number of global taxonomic standards and these should be followed wherever possible. These standards are not listed here as they are constantly being updated (see http://www.iucn.org/themes/ssc/siteindx for details).
2. Red List Category and Criteria (including sub-criteria) met following the rules in this booklet; and see point 3 of 'notes' for exceptions.
3. Common name/s in English if available or in other languages if widely used.
4. An overview of range, including ALL range states (current and historical since AD 1600). For all non-marine taxa, the range states should be indicated using the standard names or two letter codes under the United Nations standard ISO 3166-1 (ISO 1997). A standard system of country subdivision codes (ISO 3166-2) is being developed (ISO 1998), until such time that this is ready, Red List Authorities are encouraged to use the geographical recording system devised by the Taxonomic Databases Working Group (TDWG) (see Hollis & Brummitt 1992). Old range state names should be updated following ISO 3166-3 (ISO 1999). For marine taxa occurring in coastal regions, the range state systems outlined above should be used provided the occurrence is within the countries defined economic exclusion zone or territorial waters. However, it may be more ecologically useful if the marine ecosystems e.g. Sherman (1994) or the WWF's marine ecoregions, (see http://www.worldwildlife.org/ for further details), are recorded. For deep-sea taxa, there is no single widely accepted system for recording geographic range, possibilities include the FAO Fisheries areas or the WCPA Marine Regions (Kehler *et al*. 1995), and although neither of these is entirely satisfactory the latter should be used. In the absence of any suitable system it is suggested that assessors be as informative as possible when describing the ranges of deep-sea taxa, so that this information can easily be translated to any system which may be adopted as a standard in the future. Against each range state or geographic region additional information may, if so desired, be included as codes to indicate: national status (only if obtained by following the *Guidelines on Regional Application*), breeding (B), non-breeding (N), passage (P), Regionally Extinct (RE), re-introduced (IN) taxa and uncertainty about occurrence in the particular area (?). The complete range must be specified for global assessments to be valid.
5. A brief rationale for the listing of the taxon, referring to the relevant factors from the narrative under point 6. Any assumptions and inferences concerning the information used to match particular criteria must be recorded. Similarly, details on how projections were done must be provided.
6. A short narrative specifying (if available):
   - Generation length;
   - If a plant, its usual growth form (see point 1 under 'notes');
   - Population trends (past, present, future, and fluctuations);
   - Extent of occurrence and/or area of occupancy (past, present and future);
   - Degree of fragmentation;
   - Information on main habitats (see point 2 under 'notes') including altitudinal range where known;
   - Population size and density;
   - Number and size of subpopulations;

- Nature, extent and severity of threats (see point 3 under 'notes');
- Number of locations;
- Any conservation measures taken which benefit the taxon, including protected areas that support particularly important populations;
- What future actions are required (e.g. field surveys, specific research or conservation actions);
- If a quantitative analysis is used (Criterion E) the assumptions, structural equations and data used should be documented; and
- For Extinct or Extinct in the Wild taxa, extra documentation is required indicating the effective date of extinction, causes of extinction and the details of surveys which have been conducted to search for the taxon.
- For taxa listed as Near Threatened, the documentation should include a discussion of the criteria that are nearly met.
- The documentation for taxa listed as Data Deficient should be a summary of the information available for each taxon.

7. A summary of current population trends should be indicated using the following notation:
   ↑ = improving, ↓ = deteriorating, → = stable and **?** = uncertain or don't know
8. All changes in status must be recorded in the documentation.
9. The key sources of data used must be cited in full, including any personal communications.
10. A general description of the consultation and peer review process followed (see details below). This should include:
    - The name/s and contact details of the assessor/s and date of assessment.
    - The names and contact details of at least two evaluators and date of evaluation.
    - In cases where the mandates of taxonomic, regional or thematic Red List Authorities overlap, the names of the other Red List Authorities consulted should be given.
    - Any disputes or petitions about a listing should also be recorded in the documentation, including how the dispute was resolved. The outcome of petitions referred to the Red List Standards Working Group will be documented by the IUCN/SSC Red List Programme Officer.

The improved objectivity of the 1994 IUCN Red List Categories and Criteria revealed that the *ad hoc* process of listing a taxon needed to be improved. To rectify this, a system of appointed **Red List Authorities** (RLAs) has been established. These RLAs are responsible for the assessment and evaluation of all taxa included on the IUCN Red List. In most cases, the Red List Authority is the SSC Specialist Group responsible for a species, group of species or specific geographic area, but in the case of birds, BirdLife International is designated as the RLA for birds. In cases where the SSC and its partner networks do not cover a particular taxonomic group or geographic region, the Red List Programme Subcommittee will recommend the appointment of other appropriate organisations or networks to act as RLAs for these. Under this new system, global Red List assessments may still be done by anyone (the assessors). However, for a new global assessment to be included on the IUCN Red List the listing (including documentation) must be evaluated and accepted by at least two members of the relevant Red List Authority and/or by the Red List Standards Working Group (the evaluators). There will be some overlap in the jurisdictions of RLAs, especially where regional groups consider taxa under the ambit of a taxon group and vice versa. In such cases, no RLA has precedence over another and both need to collaborate in assessing or evaluating the status of the taxon concerned.

Notes:

1). Growth Forms
The growth form (or habit) of each plant taxon should be described using the following terms:

annual
perennial herb
shrub (small if < 0.5 m, medium if > 0.5 m and large if > 1 m)
tree (small is > 2 m and large if > 5 m)
succulent (leaf and/or stem) [used in conjunction with the terms annual, shrub or tree]

geophyte (any bulbous taxon)
graminoid (grass or sedge-like plants) [can be used in conjunction with annual]
hydrophyte
epiphyte or lithophyte
parasite (can be used in conjunction with herb or shrub)
liane (vines, creepers and climbers)

Some taxa may fit one or more of these categories and the most usual one should be indicated and the others may be included if so desired.

2). Habitat Types
There is no globally accepted standard for describing habitat types. However, in order to facilitate analysis of the data, assessors are urged to use the following general descriptive terms based on the World Land Cover Types, rather than any country or region-specific habitat classification system:

Urban
Coniferous Forest
Temperate Broadleaf Forest
Temperate Mixed Forest (coniferous and broadleaf)
Lowland Tropical Rainforest
Montane Tropical Rainforest
Tropical Degraded Forest
Tropical Monsoon and Dry Forest
Temperate Forest and Fields Mosaics
Bamboo
Eucalyptus
Grassland
Grasses and Shrubs Mosaics
Tropical Savanna Woodland (with understorey dominated by grass
Shrublands
Mediterranean Scrub
Succulent and Thorn Scrub
Heath Scrub (cool)
Desert
Semi-Desert
Polar and Alpine Bare Soils
Tundra
Wooded Tundra
Rocks
Glacier Ice
Salt Pans and Playas
Beaches and Dunes
Coastal Rocky Cliffs and Slopes
Compound Coastlines (beaches and rocky cliffs mixed)
Coastline lagoons and estuaries
Mangroves
Crops and Urban
Crop and Water Mixtures (including irrigated cropland)
Arable Agriculture, excluding Cereals
Arable Agriculture - Cereals
Crop, Grass and Shrub Mixture
Freshwater Lakes, Ponds and Dams
Saline Lakes, Ponds and Dams
Rivers and Streams
Swamps, Marshes and Bogs
Deep Sea, Oceanic

Seagrass Beds
Coral Reefs
Continental Shelf Waters

Terms like 'lowland', 'montane' and 'alpine' may need to be combined with some of the above. In many cases one or more habitat may have too be given, especially in cases like anadromous and diadromous species which spend part of their life-time in freshwater rivers and lakes, and the other part in marine environments. Similarly, migratory and highly mobile species will occur in many different habitats. In all instances the major habitats upon which the species is dependent for its survival should be listed.

3). Threats
The nature of threats varies considerably, but where possible assessors are asked to use the following major categories of threat (more than one can be indicated), with additional notes if necessary:

Human-Induced Habitat Loss
Habitat replaced by waste-ground
Habitat replaced by arable agriculture
Habitat replaced by livestock farming
Habitat replaced by human settlements, industry, roads, etc.
Habitat replaced by forestry plantations
Mining activities
Groundwater extraction
Dams
Other
Unknown

Decline in Habitat Quality
Grazing
Commercial logging (selective removal of wood)
Firewood collection (selective removal of wood)
Other types of selective removal of wood, including for charcoal production
Loss of prey base/pollinators, etc
Shifting agriculture
Groundwater extraction
Selective removal of non-woody vegetation
Fire
Erosion
Habitat changes caused by invasives
Fragmentation
Other
Unknown

Pollution
Agricultural pollution/pesticides
Industrial pollution
Oil slicks
Other
Unknown

Use of Taxon in Question
Legal commercial use
Illegal commercial use
Recreational use
Subsistence/traditional use
Other
Unknown

Invasives
Predators
Competitors
Hybridisers
Pathogens
Other
Unknown

Intrinsic Factors
Poor dispersal/pollination
Poor regeneration/recruitment/reproduction
High juvenile mortality
Restricted range
Other
Unknown

Other
Increased predation
Disturbance
Disease
Intentional poisoning
Persecution
Accidental mortality
Bycatch
Tourism
Climate change
Drought
Storms
Volcanoes
Floods
Other

Not known

4). RAMAS® Red List Software

RAMAS® Red List is a software package (Akçakaya & Ferson 1999) developed by Applied Biomathematics (a New York based software company) to assign taxa to Red List Categories according to the rules of the IUCN Red List Criteria. A particular advantage of this package is that it includes an algorithm for dealing with uncertain data. Before using the software it must be stressed that all users must have a thorough knowledge of the IUCN Red List Categories and Criteria, especially the definitions. The software has been modified to produce all of the information required to meet the documentation standards above, but in certain instances the information will be reported differently, because of the way the software operates. The following points should be noted in addition to the documentation standards outline above:

- If RAMAS® Red List is used to obtain a listing, this should be stated.
- Uncertain values should be entered as a best estimate and a plausible range, or as an interval. See the section on specifying uncertain data in the RAMAS Red List manual or the program help file.
- The settings for attitude towards risk and uncertainty (i.e. dispute tolerance, risk tolerance and burden of proof) are all pre-set at a mid-point. If any of these settings are changed this should be documented and fully justified, especially if a less precautionary position is adopted.
- Depending on the uncertainties, the resulting classification can be a single category and/or a range of plausible categories. In such instances the following approach should be adopted (the program will usually indicate this automatically in the Results window):

- If the range of plausible categories extends from Critically Endangered to Least Concern and no preferred category is indicated a listing of 'Data Deficient' should be used.
- If the range of plausible categories extends across two or more of the threatened categories (e.g. Critically Endangered to Vulnerable) and no preferred category is indicated the precautionary approach is to take the highest category met i.e. CR in the above example. In such cases, the range of plausible categories met should be documented and the fact that a precautionary approach was followed must be indicated to distinguish it from the next case. The following notation has been suggested e.g. CR (CR-VU)*.
- If a range of plausible categories is given and a preferred category is indicated, the documentation should indicate the range of plausible categories met e.g. EN (CR-VU).

- The program gives the criteria that contributed to the listing (see Status window). However, when data are uncertain, the listing criteria are approximate, and in some cases may not be determined at all. In such cases, the assessors or evaluators should use the results to determine or verify the criteria and sub-criteria met. Listing criteria derived in this way must be clearly indicated in the 'Comments' field.
- If the preferred category is indicated as Least Concern, but the plausible range extends into the threatened categories, a listing of 'Near Threatened' (NT) should be used. The criteria, which triggered the extension into the threatened range, should be documented.
- Any assessments done using RAMAS® Red List may be submitted as text files (preferably MS-WORD) to the IUCN/SSC Red List Programme Officer. But these assessments must be submitted together with the RAMAS Red List input files (i.e. as *.RED files).

References:

Akçakaya, H.R and Ferson, S. 1999. *RAMAS Red List: Threatened Species Classifications under Uncertainty*. Version 1.0. Applied Biomathematics, New York. (For more information see http://www.ramas.com).

Hollis, S. and Brummitt, R.K. 1992. *World Geographical Scheme for Recording Plant Distributions*. Version 1.0. Plant Taxonomic Database Standards No. 2. Published for the International Working Group on Taxonomic Databases for Plant Sciences (TDWG). Hunt Institute for Botanical Documentation Carnegie Mellon University, Pittsburgh. (For an electronic version see http://www.bgbm.fu-berlin.de/TDWG/geo/default.).

ISO. 1997. ISO-3166-1. *Codes for the representation of names of countries and their subdivisions - Part 1: Country Codes*. ISO 3166 Maintenance Agency at DIN, Berlin. (See http://www.din.de/gremien/nas/nabd/iso3166ma/index.html for the updated two letter codes, also available at gopher://muse.bio.cornell.edu:70/00/standards/iso/iso-3166).

ISO. 1998. ISO 3166-2. *Codes for the representation of names of countries and their subdivisions - Part 2: Country Subdivision Codes*. ISO 3166 Maintenance Agency at DIN, Berlin. (See http://www.din.de/gremien/nas/nabd/iso3166ma/index.html for the updated two letter codes).

ISO. 1999. ISO 3166-3. *Codes for the representation of names of countries and their subdivisions - Part 3: Codes. For Formerly Used names of Countries*. ISO 3166 Maintenance Agency at DIN, Berlin. (See http://www.din.de/gremien/nas/nabd/iso3166ma/index.html for the updated two letter codes).

Kehler, G., Bleakley, C. and Wells, S. (eds). 1995. *A Global Representative System of Marine Protected Areas. Vol. III. Central Indian Ocean, Arabian Seas, East Africa and East Asian Seas*. The World Bank, Washington DC.

Sherman, K. 1994. Sustainability, biomass yields, and health of coastal ecosystems: an ecological perspective. *Marine Ecology in Progress Series* 112: 277-301. (See http://www.edc.uri/lme/default.htm for an updated version of the map and http://www.edc.uri/lme/brochure/page1.htm for further information).

APPENDIX III.
ADDITIONAL REFERENCES

Acocks, J.P.H. 1988. Veld types of South Africa. Memoirs of the Botanical Survey of South Africa 57: 1-146.

Baard, E.H.W., Branch, W.R., Channing, A.C., De Villiers, A.L., Le Roux, A. & Mouton, P. le F.N. 1999. *A review of the amphibians and reptiles of the Cape Floristic Region as indicators of centres of biodiversity, sensitive habitats and sites of special interest*. Unpublish Report of Cape Nature Conservation.

Bates, M.F. 1991. New distribution records for amphibians and reptiles from the Cape Province, South Africa. *J. Herp. Assoc. Afr.* **39**: 14-18.

Bates, M.F. 1995. Distribution and diversity of amphibians in the Free State, South Africa. *Madoqua* **19**(1): 3-14.

Bates, M.F. 1995. Atlas of frog distribution in the Free State, South Africa. *Afr. Herp. News* **23**: 15-31.

Bates, M.F. 1997. Herpetofauna of the nature reserves and national parks of the Free State province of South Africa. *Afr. J. Herpetol.* **46**(1): 13-29).

Boycott, R.C. 1982. On the taxonomic status of *Heleophryne regis* Hewitt, 1909 (Anura: Leptodactylidae). *Ann. Cape Prov. Mus.* **14**(3): 89-108.

Boycott, R.C. 1988. Description of a new species of *Heleophryne* Sclater, 1899 from the Cape Province, South Africa (Anura: Heleophrynidae). *Ann. Cape Prov. Mus.* **16**(11): 309-319.

Boycott, R.C. 1988. *Heleophryne hewitti*: species account. P 33-35. In: *South African Red Data Book - Reptiles and Amphibians*. Branch, W.R. (ed.), *S. Afr. Nat. Sci. Prog. Rpt.* **151**.

Boycott, R.C. & de Villiers, A.L. 1986. The status of *Heleophryne rosei* Hewitt (Anura: Leptodactylidae) on Table Mountain and recommendations for its conservation. *S. Afr. J. Wildl. Res.* **16**: 129-134.

Branch, W.R. (ed.) 1988. *South African Red Data Book - Reptiles and Amphibians*. *S. Afr. Nat. Sci. Prog. Rpt.* **151,** *iv*, 109pp.

Branch, W.R. 1988. Terrestrial reptiles and amphibians. p 251-264. In: *A Field Guide to the Eastern Cape Coast*. Lubke, R.A., Gess, F.W. & Bruton, M.N. Wildlife Soc. S. Afr. (Grahamstown centre), 520pp.

Branch, W.R. 1990. The Herpetofauna of the Cape Province, South Africa: New distribution records and zoogeography. *J. Herpetol. Assoc. Afr.* **37**: 17-44.

Branch, W.R. & Bauer, A.M. 1995. Herpetofauna of the Little Karoo, Western Cape, South Africa with notes on life history and taxonomy. *Herpetol. Nat. Hist.* **3**(1): 47-89.

Branch, W.R. & Braack, H.H. 1987. Reptiles and amphibians of the Addo Elephant National Park. *Koedoe* **30**: 61-111.

Branch, W.R. & Braack, H.H. 1989. Reptiles and amphibians of the Karoo National Park: A surprising diversity. In: Proceeding of the first HAA Conference, Stellenbosch, W.R. Branch (ed.) *J. Herpetol. Assoc. Afr.* **36**: 26-35.

Branch, W.R. & Hanekom, N. 1987. The Herpetofauna of the Tsitsikamma Coastal and Forest National Parks. *Koedoe* **30**: 49-60.

Burger, M. 1997. The current status of amphibians and reptiles in the Eastern Cape. *The Naturalist* **41**(3): 31-34.

Carruthers, V.C. & Robinson, G.A. 1977. Notes on amphibia in the Tsitsikamma National Parks. *Koedoe* **20**: 115-123.

Channing, A. 1998. Tadpoles as bio-indicators of stream quality: A baseline study. *WRC Report* **718/1/98**, 78 pp.

Channing, A. & Bogart, J.P. 1996. Description of a tetraploid *Tomopterna* (Anura: Ranidae) from South Africa. *S. Afr. J. Zool.* **31**(2): 80-85.

Channing, A., Boycott, R.C. & van Hensbergen, H.J. 1988. Morphological variation of *Heleophryne* tadpoles from the Cape Province, South Africa (Anura: Heleophrynedae). *J. Zool., Lond.* **215**: 205-216.

De Villiers, A.L. 1988. *Microbatrachella capensis*: species account. P 29-32. In: *South African Red Data Book - Reptiles and Amphibians*. Branch, W.R. (ed.), *S. Afr. Nat. Sci. Prog. Rpt.* **151**.

De Villiers, A.L. 1988. *Breviceps gibbosus*: species account. P 46-48. In: *South African Red Data Book - Reptiles and Amphibians*. Branch, W.R. (ed.), *S. Afr. Nat. Sci. Prog. Rpt.* **151**.

De Villiers, A.L. 1988. *Cacosternum capense*: species account. P 123-125. In: *South African Red Data Book - Reptiles and Amphibians*. Branch, W.R. (ed.), *S. Afr. Nat. Sci. Prog. Rpt.* **151**.

De Villiers, A.L. 1997. Monitoring the distribution and conservation status of threatened amphibians in the southwestern Cape. P 142-148 in: *Proceedings of the Third H.A.A. Symposium*. Van Wyk, J.H. (Ed.), RotaPress, Cape Town.

Drinkrow, D.R. & Cherry, M.I. 1995. Anuran distribution, diversity and conservation in South Africa, Lesotho and Swaziland. *S. Afr. J. Zool.* **30**(3): 82-90.

Dubois, A. 1992. Notes sur la classification des Ranidae (Amphibiens Anoures). *Bull. Mens. Soc. Linn. Lyon.* **61**: 305-352.

Greig, J.C., Boycott, R.C. & De Villiers, A.L. 1979. Notes on the elevation of *Rana fasciata montana* FitzSimons, 1946 to specific rank, and on the identity of *Rana fasciata sensu* Burchell, 1824 (Anura: Ranidae). *Ann*. *Cape Prov*. *Mus*. **13**(1): 1-29.

Greig, J.C. 1981. The reptiles, amphibians and fish of the coastal lowlands of the Western Cape. P 27-29. In: *Proceedings of a Symposium on Coastal Lowlands of the Western Cape.* Moll, E. (ed.), Univ. Western Cape.

Hewitt, J. 1937. *A Guide to the Vertebrate Fauna of the Eastern Cape Province. Part II. Reptiles, Amphibians and Freaswater Fishes.* Albany Mus., Grahamstown, *v*, 1419, *xxxiv* pls, a-h.

Jacobsen, N.H.G. 1989. *A herpetological survey of the Transvaal*. Unpublished Ph.D. thesis, University on Natal, Durban.

Kok, D.J. & Seaman, M.T. 1991. Aspects of the biology, habitat requirements and conservation status of *Natalobatrachus bonebergi* (Anura: Ranidae). *Lammergeyer* **40**: 10-17.

Lambiris, A.J.L. 1990. A review of the Amphibians of Natal. *Lammergeyer* **39**: 1-210.

Low, A.B. & Rebelo, A.G. 1996. Vegetation of South Africa, Lesotho and Swaziland. Dept. of Environmental Affairs & Tourism, Pretoria.

Passmore, N.I. & Carruthers, V.C. 1995. *South African Frogs - A complete guide* (Revised Edition). Southern Book Publishers, Halfway House, and Witwatersrand University Press, Johannesburg, 322 pp.

Picker, M.D. 1985. Hybridization and habitat selection in *Xenopus gilli* and *Xenopus laevis* in the south-western Cape Province. *Copeia* **1985**(3): 574-580.

Picker, M.D. & De Villiers, A.L. 1988. *Xenopus gilli*: species account. P 25-28. In: *South African Red Data Book - Reptiles and Amphibians*. Branch, W.R. (ed.), *S. Afr. Nat. Sci. Prog. Rpt.* **151**.

Poynton, J.C. 1964. The Amphibia of southern Africa: A faunal study. *Ann*. *Natal Mus*. **17**: 1-334.

Poynton, J.C. 1990. Composition and subtraction margins of the East African lowland amphibian fauna. Pp. 285-296. In G. Peters and R. Hutterer (Eds), Vertebrates in the Tropics. Alexander Koenig Research Institute and Zoological Museum, Bonn.

Poynton, J.C. 1992. Amphibian diversity and species turnover in southern Africa: investigation by means of a Bloemfontein-Durban transect. J. Herpetol. Assoc. Afr. 40:2-8.

Poynton, J.C. 1999. Distribution of amphibians in sub-Saharan Africa, Madagascar and Seychelles. Pp. 483-539. In W.E. Duellman (Ed.), Patterns of distribution of amphibians: a global perspective. Johns Hopkins Univ. Press, Baltimore & London.

Poynton, J.C. 2000. Evidence for an Afrotempreate amphibian fauna. Afr. J. of Herpetology 49: 33-41.

Poynton, J.C. & Broadley D.G. 1978. The herpetofauna. Pp. 927-948. In M.J.A. Werger (Ed.), Biogeography and ecology of southern Africa. W. Junk, The Hague.

Poynton, J.C. & Broadley D.G. 1985. Amphibia Zambesiaca 1: Scolecomorphidae, Pipidae, Microhylidae, Hemisidae, Arthroleptidae. Ann. Natal Mus. 26: 503-553.

Poynton, J.C. & Broadley D.G. 1991. Amphibia Zambesiaca 5: Zoogeography. Ann. Natal Mus. 32: 221-277.

Poynton, J.C. & Lambiris, A.J.L. 1998. On *Bufo pantherinus* A. Smith, 1828 (Anura: Bufonidae), the leopard toad of the southwestern Cape, South Africa, with the description of the neotype. *Afr. J. Herpetol*. **47**(1): 3-12.

Rose, W. 1962. *The Reptiles and Amphibians of Southern Africa.* Rev. ed. Maskew Miller, Cape Town, *xxix*, 424pp.

Rutherford, M.C. & Westfall, R.H. 1986. Biomes of southern Africa – an objective categorization. Memoirs of the Botanical Survey of South Africa 54: 1-98.

Siegfried, W.R. 1989. Preservation of species in southern African nature reserves. In: Huntley, B.J. (Ed.) Biotic diversity in southern Africa: concepts and conservation. Oxford University Press, Cape Town.

Visser, J.D. & Channing, A. 1997. A new species of river frog from the Swartberg, South Africa (Ranidae: *Afrana*). *J. African Zool.* **111**(3): 191-198.

White, F. 1983. The vegetation of Africa: a descriptive memoir to accompany the UNESCO/AETFAT/UNISO vegetation map of Africa. Natural Resources Research 20. UNESCO, Paris.