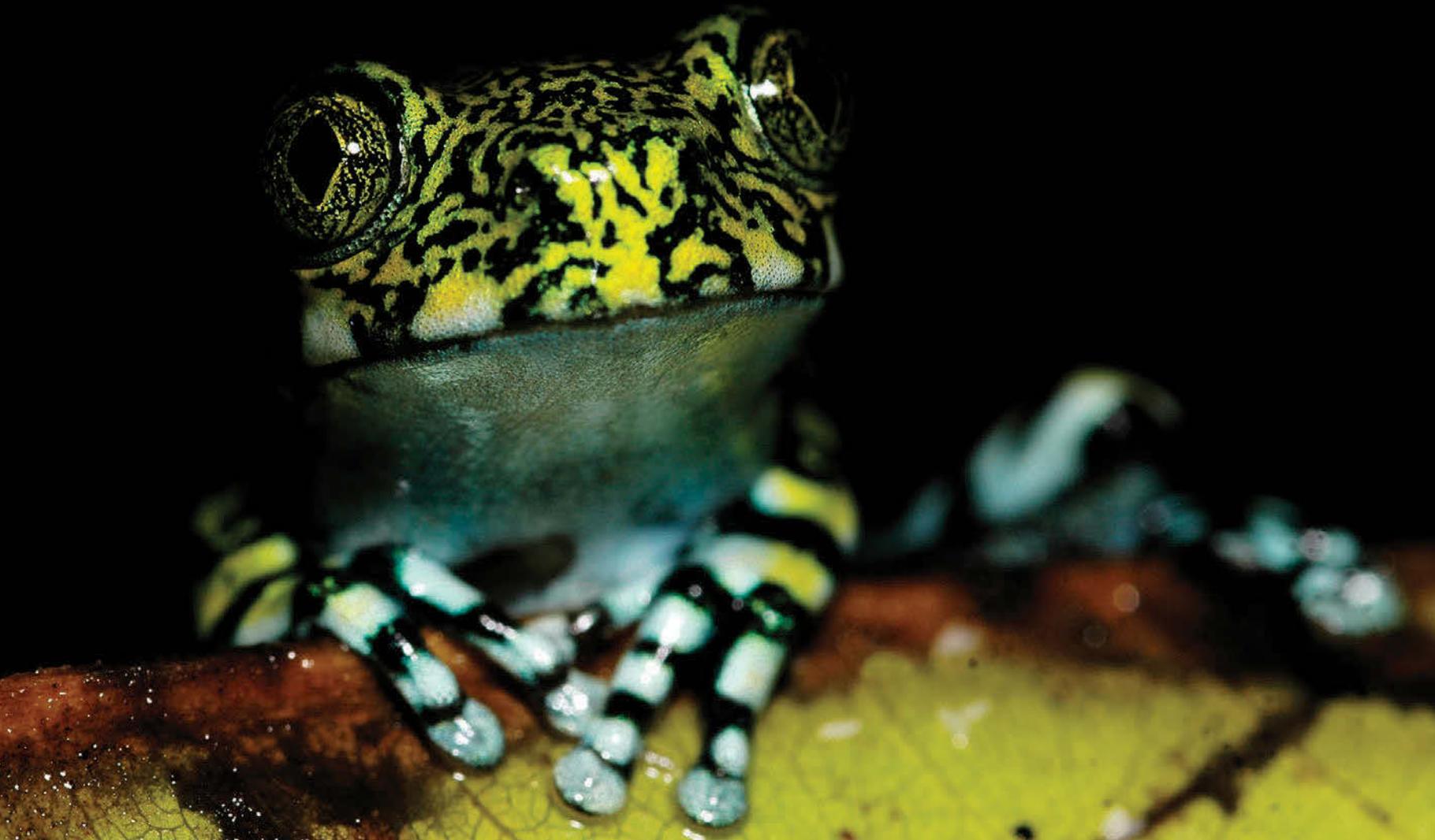


Globally Threatened Amphibian Species



ANURA

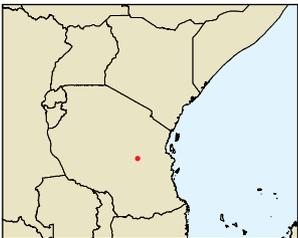
ARTHROLEPTIDAE

EN *Arthroleptis crusculum* Angel, 1950**Endangered B1ab(iii)****Order, Family:** Anura, Arthroleptidae**Country Distribution:** Guinea**Current Population Trend:** Decreasing

© Annika Hillers

**Geographic Range** This species is known only from Mount Nimba in Guinea; it presumably also occurs in the Liberian and Ivorian parts of Mount Nimba, but this has not yet been confirmed. It has been recorded from 500-1,650m asl.**Population** There is no recent information on the population status of this species, but it was formerly recorded as being very common.**Habitat and Ecology** It lives in high-altitude grassland, gallery forest, and on the edges of marshes. Like other members of the genus, it presumably breeds by direct development and is not dependent upon water.**Major Threats** The major threat to the species is habitat loss and degradation, since Mount Nimba is subject to slash-and-burn agricultural activities and extensive iron-ore mining operations.**Conservation Measures** The species occurs in the Mont Nimba Strict Nature Reserve, which was added to the list of World Heritage Sites in 1981 (the adjacent part in Cote D'Ivoire was added in 1982). However, strengthened and improved management of this site is needed, and further survey work is required to determine the current population status of the species.**Notes on taxonomy:** We follow Poynton (2003c) in retaining the genus *Schoutedenella* only for *Schoutedenella xenochirus*, and assign this species to its original genus, *Arthroleptis*. However, this species is very distinctive and should probably be transferred to the monotypic genus *Arthroleptulus* (R.C. Drewes pers. comm.).**Bibliography:** Angel, F. (1950), Perret, J.-L. (1991), Poynton, J.C. (2003c)**Data Providers:** Mark-Oliver Rödel, Robert Drewes**EN** *Arthroleptis francei* Loveridge, 1953**Endangered B1ab(iii)****Order, Family:** Anura, Arthroleptidae**Country Distribution:** Malawi**Current Population Trend:** Decreasing

© Colin Tilbury

**Geographic Range** This species is known only from Mount Mulanje in southern Malawi and possibly from the nearby Zomba Mountains. It is found as low as 700m asl in the Ruo Basin, but also occurs higher up on the mountain, including on the plateau, probably up to at least 2,500m asl.**Population** It is apparently common within its restricted range, but there have been no records over the last 30 years, probably due to a lack of fieldwork.**Habitat and Ecology** This species inhabits both lowland and montane forest, including high-altitude cedar forest. It is also found, but is probably much less common, in montane grassland and pine plantations. There is little information on its adaptability to secondary habitats, but it is believed to favour undisturbed habitats. It lives in leaf-litter in areas of very high rainfall. They sometimes climb trees up to at least 2m from the ground. It is presumed to breed by direct development, though the site of egg deposition is not known.**Major Threats** Although somewhat protected, the forest on Mount Mulanje continues to be lost in places as a result of small-scale farming and extraction of wood.**Conservation Measures** It occurs in the Mulanje Mountain Forest Reserve, and continued protection and management of this area is essential. Further survey work is required to determine the current population status of this species.**Bibliography:** Channing, A. (2001), Poynton, J.C. and Broadley, D.G. (1985a), Stevens, R.A. (1974), Stewart, M.M. (1967)**Data Providers:** Lovemore Mazibuko, John Poynton**EN** *Arthroleptis nikeae* Poynton, 2003**Endangered B1ab(iii)****Order, Family:** Anura, Arthroleptidae**Country Distribution:** Tanzania**Current Population Trend:** Decreasing

© Michele Menegon

**Geographic Range** This species is known only from the Mafwemiro Catchment Forest Reserve in the Rubeho Mountains in eastern Tanzania, at 1,900m asl. It presumably occurs more widely, at least within the northern part of the Rubeho Mountains.**Population** It is a recently discovered species known only from two specimens collected in 2001.**Habitat and Ecology** Both specimens were found on the floor of montane forest in a small valley, and one of them was collected close to a stream. Like other members of the genus, it presumably breeds by direct development, and is not dependent upon water.**Major Threats** It is probably adversely affected by forest loss for agriculture, collection of wood and human settlement.**Conservation Measures** It occurs in the Mafwemiro Catchment Forest Reserve, which affords some level of protection, but which is not managed for biodiversity conservation. Further survey work would be useful in determining the species' current population status.**Bibliography:** Poynton, J.C. (2003a)**Data Providers:** John Poynton, Kim Howell**VU** *Arthroleptis tanneri* Grandison, 1983**Vulnerable B1ab(iii)****Order, Family:** Anura, Arthroleptidae**Country Distribution:** Tanzania**Current Population Trend:** Decreasing

© Alan Channing

**Geographic Range** This species is known only from the East and West Usambara Mountains, the Nguru Mountains, and the Ukaguru Mountains in eastern and north-eastern Tanzania. It is a montane species, though its altitudinal range is not yet fully known; the type specimen was collected at 1,530m asl.**Population** It appears to be an uncommon species.**Habitat and Ecology** It lives in leaf-litter on the floor of montane forests, and is generally found in moister situations (sometimes even aggregating alongside water). It probably cannot cope well with habitat loss. Like other members of the genus, it presumably breeds by direct development.**Major Threats** This species is probably adversely affected by forest loss due to agriculture, wood extraction, and human settlement. Its habitat in the East Usambaras has recently come under serious threat as a result of the activities of illegal gold miners.**Conservation Measures** It occurs in the University of Dar es Salaam reserve at Mazumbai in the West Usambara Mountains.**Bibliography:** Grandison, A.G.C. (1983), Howell, K.M. (1993)**Data Providers:** Kim Howell, John Poynton

CR *Arthroleptis troglodytes* Poynton, 1963

Critically Endangered B1ab(v)+2ab(v)
Order, Family: Anura, Arthroleptidae
Country Distribution: Zimbabwe
Current Population Trend: Decreasing



Geographic Range This species is known only from the western Chimanimani Mountains in eastern Zimbabwe, where it occurs above 1,500m asl. It is likely to occur in the eastern Chimanimani Mountains across the border in Mozambique.

Population It is probably a rare species. There have been no records since this species was discovered in 1962 (when 16 specimens were collected), despite survey efforts.

Habitat and Ecology Most of the specimens were collected in sinkholes or caves, and a few were found in open montane grassland. It presumably breeds by direct development.

Major Threats There is very little direct information available for this poorly known species, and threats to the species are not well understood. As an isolated, montane species, it could be at risk from the effects of climate change.

Conservation Measures The area from which it has been recorded is protected, primarily in the Chimanimani National Park. Surveys are urgently needed to relocate this species.

Notes on taxonomy: We follow Poynton (2003c) in retaining the genus *Schoutedenella* only for *Schoutedenella xenochirus*, and therefore assign this species to its original genus, *Arthroleptis*. There are serious taxonomic problems with the genera *Arthroleptis* and *Schoutedenella* through much of Africa. In many cases, the available names can be referred only to museum specimens, not to animals in the field. This is because the identification of these species frequently depends more on their vocalizations than their morphology.

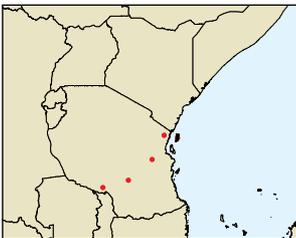
Bibliography: Channing, A. (2001), Lambiris, A.J.L. (1989b), Poynton, J.C. (1963), Poynton, J.C. (1964b), Poynton, J.C. (2003c), Poynton, J.C. and Broadley, D.G. (1985a)

Data Providers: John Poynton, Alan Channing

CAVE SQUEAKER

VU *Arthroleptis xenodactylus* Boulenger, 1909

Vulnerable B1ab(iii)
Order, Family: Anura, Arthroleptidae
Country Distribution: Tanzania
Current Population Trend: Decreasing



© Elizabeth Harper

Geographic Range This species is endemic to Tanzania, and occurs on the island of Pemba, and on the mainland in the East Usambara, Uluguru, and Udzungwa Mountains (Kihansi), and Mount Rungwe. It probably occurs more widely in the Eastern Arc Mountains than current records suggest. It ranges from near sea level up to at least 2,000m asl.

Population It is a reasonably common species.

Habitat and Ecology It occurs in both lowland and montane forest, living in leaf-litter, under logs, and in the axils of banana leaves. It is not known to what degree it can tolerate alteration of its natural habitat. It breeds by direct development, and the eggs are laid in leaf-litter.

Major Threats It is probably adversely affected by forest loss for agriculture, wood extraction, and human settlement. Its habitat in the East Usambara Mountains has recently come under serious threat as a result of the activities of illegal gold miners.

Conservation Measures It occurs in the Amani Nature Reserve, but has not yet been recorded from Udzungwa National Park (although it is likely to occur there).

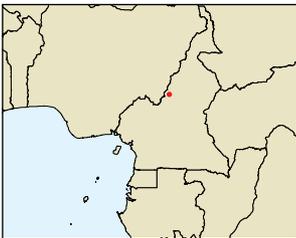
Notes on taxonomy: Following Poynton (2003c), the genus *Schoutedenella* is retained only for *Schoutedenella xenochirus*, therefore we assign this species to its original genus, *Arthroleptis*. There are major taxonomic problems with the genera *Arthroleptis* and *Schoutedenella* through much of Africa. In many cases, the available names can be referred only to museum specimens and not to animals in the field. This is because the identification of these species frequently depends more on their vocalizations than their morphology. It is likely that more than one species is covered by this name.

Bibliography: Harper, E. and Vonesh, J.R. (2003), Howell, K.M. (1993), Poynton, J.C. (2003b), Poynton, J.C. (2003c)

Data Providers: Kim Howell, John Poynton

CR *Cardioglossa alsco* Herrmann, Herrmann, Schmitz and Böhme, 2004

Critically Endangered B2ab(iii)
Order, Family: Anura, Arthroleptidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Andreas Schmitz

Geographic Range This recently described species is known only from the southern slopes of Mount Tchabal Mbabo at 1,700-2,100m asl on the Adamawa Plateau in western Cameroon. It is unlikely to occur on the northern slopes, at least not at the altitude of the type locality, because the forest habitat on the northern slopes at this altitude is very different from the gallery forest on the southern slopes.

Population There is little information, although it is likely to be common within its small range, since 73 specimens were collected close together, suggesting a high concentration of animals.

Habitat and Ecology It lives in montane gallery forest, and is associated with streams, in which it presumably breeds by larval development. Individuals have been found under large stones around shallow pools adjacent to a creek. They were calling at night during the dry season.

Major Threats The remaining forest habitat on Tchabal Mbabo is now confined to galleries and steep inaccessible slopes, as a result of the clearing of forest for pasture. However, much of the forested habitat that can be easily removed has now been cleared. The forest is also threatened by fire.

Conservation Measures This species is not known from any protected areas, though one has been recommended for Tchabal Mbabo.

Notes on taxonomy: Records of *Cardioglossa pulchra* from Tchabal Mbabo (Amiet 1972a) now refer to this species (Herrmann *et al.* 2004).

Bibliography: Amiet, J.-L. (1972a), Herrmann, H.-W. *et al.* (2004)

Data Providers: Hans-Werner Herrmann

EN *Cardioglossa aureoli* Schiøtz, 1964

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Arthroleptidae
Country Distribution: Sierra Leone
Current Population Trend: Decreasing



© Annika Hillers

Geographic Range This species is known only from the hilly parts of the Freetown Peninsula in Sierra Leone, although it possibly occurs a little more widely.

Population There has been no information on this species since it was last collected in 1963, but this is probably due to lack of field surveys in this area. It was described as "not rare" on the Freetown Peninsula at the time of its discovery.

Habitat and Ecology It has been found in forest, and in rural gardens near forest, living on rocks. It has been noted as calling away from water, and so it is possible that, unlike other members of the genus, it does not require water for breeding, although this has not been confirmed.

Major Threats There is likely to be extensive pressure on its forest habitat on the Freetown Peninsula primarily for firewood collection.

Conservation Measures It is likely to be present in the Western Area Peninsula Forest Reserve, although much more effective protection and management of this site is required. Additional survey work is urgently needed to determine the current population status of this species.

Bibliography: Schiøtz, A. (1964a)

Data Providers: Arne Schiøtz, Mark-Oliver Rödel

EN *Cardioglossa melanogaster* Amiet, 1972**Endangered B1ab(iii)****Order, Family:** Anura, Arthroleptidae**Country Distribution:** Cameroon, Nigeria**Current Population Trend:** Decreasing

© David C. Blackburn



Geographic Range This species is known from the mountains of eastern Nigeria and western Cameroon at 1,200-2,000m asl. In Nigeria, it has been recorded from the Obudu Plateau, and in Cameroon it is known from Mount Manenguba, the southern fringe of the Bamileke Plateau (at Foto and Mount Bana), Mount Nlonako, and the Bamenda Highlands (in the Bafut-Ngamba Forest Reserve). At Mwakoumel on Mount Manenguba, it co-exists with *Cardioglossa pulchra* and *C. venusta*.

Population It is common on Mount Manenguba at about 1,600-1,700m asl.

Habitat and Ecology It lives in submontane and montane areas in forest and in dense secondary growth. Males call from shady situations along streams. It is a stream-breeding species.

Major Threats It is at risk because of forest loss as a result of expanding human settlements, agricultural encroachment, and removal of wood.

Conservation Measures It does occur in the Bafut-Ngamba Forest Reserve, but additional habitat protection of the remaining highland forests in Cameroon, particularly Mount Manenguba, and in Nigeria, is needed.

Bibliography: Amiet, J.-L. (1972a), Amiet, J.-L. (1972c), Amiet, J.-L. (1973b), Amiet, J.-L. (1973c), Amiet, J.-L. (1975), Amiet, J.-L. (1981), Herrmann, H.-W. *et al.* (2005)

Data Providers: Jean-Louis Amiet, Arne Schiøtz

EN *Cardioglossa oreas* Amiet, 1972**Endangered B1ab(iii)****Order, Family:** Anura, Arthroleptidae**Country Distribution:** Cameroon**Current Population Trend:** Decreasing

© Václav Gvoždík



Geographic Range This species is endemic to the mountains of western Cameroon at 1,900-2,650m asl, occurring on Mount Manenguba, and on the Bamenda Highlands at the Bamboutos Mountains, the Bafut-Ngamba Forest Reserve, and Mount Oku.

Population It is common within its small range.

Habitat and Ecology It lives in montane forest, often in bamboo forest, and in degraded habitats with trees. They are associated with areas around fast-flowing streams, where they sit on leaves, or hide in holes or under stones and breed in streams.

Major Threats This species is seriously threatened by forest loss due to agricultural expansion and extraction of wood, as well as by overgrazing and expansion of human settlements.

Conservation Measures The species occurs in the Bafut-Ngamba Forest Reserve, but is largely unprotected elsewhere in its range. A conservation project has been conducted on Mount Oku for several years by BirdLife International, involving community management of the area by the local villages; this project needs to take into account the conservation needs of this species.

Bibliography: Amiet, J.-L. (1972a), Amiet, J.-L. (1972c), Gartshore, M.E. (1986)

Data Providers: Jean-Louis Amiet, Arne Schiøtz

EN *Cardioglossa pulchra* Schiøtz, 1963**Endangered B1ab(iii)****Order, Family:** Anura, Arthroleptidae**Country Distribution:** Cameroon, Nigeria**Current Population Trend:** Decreasing

© David C. Blackburn



Geographic Range This species is known from the mountains of eastern Nigeria and western Cameroon at 900-1,800m asl. In Nigeria, it has been recorded from the Obudu Plateau, and in Cameroon it is known from Mount Manenguba, Mount Ngokham, the Bafut-Ngamba Forest Reserve, Batie, and Fongo-Tongo. At Mwakoumel on Mount Manenguba, it co-exists with *C. melanogaster* and *C. venusta*.

Population It is known to be common in the breeding season.

Habitat and Ecology It lives in submontane and montane forest along fast-flowing streams and also at high elevations along forest edges. It can survive with some deforestation and it breeds in streams.

Major Threats It is probably threatened by ongoing forest loss caused by agricultural encroachment, extraction of wood, and expanding human settlements.

Conservation Measures It is found in the Bafut-Ngamba Forest Reserve in Cameroon and the Cross River National Park in Nigeria. Continued protection of these areas, and further habitat protection of the remaining highland forests in Cameroon, particularly Mount Manenguba, and in Nigeria, is needed.

Notes on taxonomy: Records of this species from Tchabal Mbabo refer to *Cardioglossa alsco*.

Bibliography: Amiet, J.-L. (1971b), Amiet, J.-L. (1972a), Amiet, J.-L. (1972c), Amiet, J.-L. (1973c), Amiet, J.-L. (1975), Schiøtz, A. (1963)

Data Providers: Arne Schiøtz, Jean-Louis Amiet

EN *Cardioglossa schiøtzi* Amiet, 1981**Endangered B1ab(iii)****Order, Family:** Anura, Arthroleptidae**Country Distribution:** Cameroon, Nigeria**Current Population Trend:** Decreasing

© Mary E. Gartshore



Geographic Range This species is endemic to the Oshie-Obudu Ridge in Cameroon and Nigeria. It is found from Acha Tugi on Mount Oshie in Cameroon and from the Obudu Plateau in Nigeria. Its altitudinal range is 1,640-1,800m asl.

Population There is no information available on its population status, and the species is generally poorly known.

Habitat and Ecology It lives in and around relict patches of montane forest, which are now fragmented, and also in secondary vegetation in which no trees remain. It has been found on steep slopes of scree, boulders and clay, overgrown with a dense cover of high grass and trees. It has also been found around streams, where it presumably breeds.

Major Threats It is threatened by habitat loss due to expanding agricultural activities and human settlements, and overgrazing.

Conservation Measures It occurs in the Cross River National Park in Nigeria, but further measures are urgently needed to protect the remaining patches of habitat in its very small range. Additional survey work would be useful to determine the current population status of this species.

Bibliography: Amiet, J.-L. (1981), Gartshore, M.E. (1986)

Data Providers: Jean-Louis Amiet, Arne Schiøtz

CR *Cardioglossa trifasciata* Amiet, 1972

Critically Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Arthroleptidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Jean-Louis Amiet



Geographic Range This species is known only from the southern slopes of Mount Manenguba at 1,750-1,800m asl in western Cameroon.

Population There is no information available on its current population status.

Habitat and Ecology It has been found in and around a small stream running through dense secondary bush and montane forest; it has not been recorded from primary forest, although it might well occur. The animals hide under large rocks and small stones, and presumably breed in streams.

Major Threats Although the habitat of this species is not especially threatened, it is at severe risk given its small range and vulnerability to agricultural encroachment, wood extraction, and expanding human settlements.

Conservation Measures The species is not known from any protected areas, and the remaining habitat in the area needs to be protected as a matter of urgency. There is a need for further survey work to determine the current population status of this species.

Bibliography: Amiet, J.-L. (1972a), Amiet, J.-L. (1972c), Amiet, J.-L. (1973c), Amiet, J.-L. (1975)

Data Providers: Jean-Louis Amiet, Arne Schiøtz

EN *Cardioglossa venusta* Amiet, 1972

Endangered B1ab(iii)
Order, Family: Anura, Arthroleptidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Andreas Schiøtz



Geographic Range This species is known only from a small area of the mountains of western Cameroon at 950-1,350m asl at Mount Manenguba, the Bamileke Plateau (at Fotabong, Fontem, and the Mbos Cliffs), Mount Nlonako, and the Rumpi Hills. At Mwakoumel on Mount Manenguba, it co-exists with *Cardioglossa pulchra* and *C. melanogaster*.

Population The species is largely unknown, and there is no information on its current population status.

Habitat and Ecology It lives in submontane forests near fast-flowing streams in hilly country with high rainfall. It can survive in degraded, secondary habitat close to more mature forest and it breeds in streams.

Major Threats It is at risk due to forest loss caused by agricultural encroachment, extraction of wood, and expanding human settlements.

Conservation Measures It may occur in the Rumpi Hills Forest Reserve, but this reserve is not well managed for biodiversity conservation; improved and expanded habitat protection is urgently needed to ensure the survival of this species.

Bibliography: Amiet, J.-L. (1972a), Amiet, J.-L. (1972c), Amiet, J.-L. (1973c), Amiet, J.-L. (1975), Herrmann, H.-W. *et al.* (2005)

Data Providers: Arne Schiøtz, Jean-Louis Amiet

ASTYLOSTERNIDAE

VU *Astylosternus diadematus* Werner, 1898

Vulnerable B1ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Mary E. Gartshore



Geographic Range This species is known only from western and south-western Cameroon, and possibly extreme eastern Nigeria, in hilly country and mountains, at 250-1,100m asl. There are records from Mount Cameroon, and other mountains in Cameroon south of the higher parts of the Bamenda Highlands. Records of *Astylosternus schioetzi* from the northern part of Korup National Park, east to Nguti, and north to Mount Nta Ali (Lawson 1993) are based on misidentifications and refer to this species (J.-L. Amiet pers. comm.).

Population It is abundant in suitable habitat.

Habitat and Ecology It lives in or near flowing water in lowland and submontane forest, and can survive in somewhat degraded habitats. It breeds in streams and in small marshes criss-crossed with tiny watercourses. The tadpoles live in clear, flowing water.

Major Threats The major threat to this species is habitat loss due to smallholder farming activities and logging.

Conservation Measures It occurs in the Korup National Park.

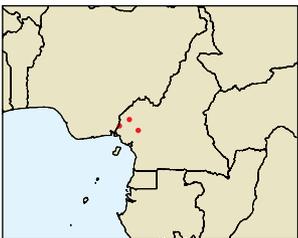
Notes on taxonomy: It is possible that animals resembling this species on Mount Manenguba and at Buea on Mount Cameroon belong to as yet undescribed forms (Amiet 1977).

Bibliography: Amiet, J.-L. (1971b), Amiet, J.-L. (1973c), Amiet, J.-L. (1977), Amiet, J.-L. (1983a), Amiet, J.-L. (1987), Amiet, J.-L. (1989), Herrmann, H.-W. *et al.* (2005), Lawson, D.P. (1993)

Data Providers: Jean-Louis Amiet

EN *Astylosternus fallax* Amiet, 1978 "1977"

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Jean-Louis Amiet



Geographic Range This species is known only from three small areas of western and south-western Cameroon: between Yabassi and Nkongsamba, at low elevations (apparently, it is absent to the west of Nkongsamba); Mount Yuhan in Korup National Park; and Mount Nta Ali in the Mamfe basin. It occurs mainly below 1,000m asl.

Population It is a common species, certainly more so than *Astylosternus laurenti*.

Habitat and Ecology It lives and breeds in and near rivers and slow-flowing streams in lowland and hilly closed-canopy forest. Males call from among dead leaves on the banks close to water.

Major Threats It is severely threatened by loss of habitat within its very small range, primarily due to human settlement and agricultural encroachment.

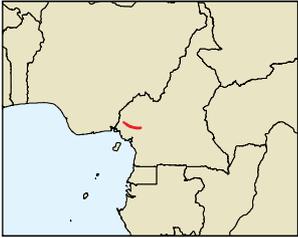
Conservation Measures It occurs in Korup National Park, but further protection of the remaining forest habitat is required.

Bibliography: Amiet, J.-L. (1977), Herrmann, H.-W. *et al.* (2005), Lawson, D.P. (1993)

Data Providers: Jean-Louis Amiet

EN *Astylosternus laurenti* Amiet, 1978 "1977"

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Mary E. Gartshore

Geographic Range This species is known only from a small part of south-western Cameroon at 400-850m asl, from the Ikenge Research Station in Korup National Park, to the south of the Rumpi Hills, Mount Manenguba and the Bamileke Plateau. There are records from Ikenge, Fopouanga, Ekomtolo and Mahole. It is probably a little more widespread than current records indicate.

Population It is a common species.

Habitat and Ecology It lives and breeds in and near slow-flowing rivers and streams in lowland and hilly forest in regions of high rainfall. It can live in dense secondary forest provided that there is a closed canopy. Males call from rocks in and around the water.

Major Threats This species is severely threatened by habitat loss and degradation, primarily due to human settlement and agricultural encroachment.

Conservation Measures It occurs in Korup National Park, but further protection of other unprotected forest habitat, such as Mount Manenguba, is required.

Bibliography: Amiet, J.-L. (1977), Lawson, D.P. (1993)

Data Providers: Jean-Louis Amiet

CR *Astylosternus nganhanus* Amiet, 1978 "1977"

Critically Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



Geographic Range This species is known only from Mount Nganha on the Adamawa Plateau, at 1,400-1,700m asl, in Cameroon, to which it is probably endemic.

Population It is known only from five specimens.

Habitat and Ecology This species is found along watercourses in a few narrow gallery forests, and in seepage areas in nearby grassland. Tadpoles, almost certainly of this species, have been found in rock pools in streams.

Major Threats This poorly known species is probably at severe risk from habitat loss due to smallholder farming activities and subsistence wood extraction.

Conservation Measures It is not known from any protected areas and protection of the remaining habitat in the range of the species is urgently needed. Further survey work is required to establish the current population status of the species.

Bibliography: Amiet, J.-L. (1977)

Data Providers: Jean-Louis Amiet

EN *Astylosternus perreti* Amiet, 1978 "1977"

Endangered B1ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



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Geographic Range This species is known only from western Cameroon on the southern slopes of Mount Manenguba and from Mount Bana and Mount Nlonako on the Bamileke Plateau at an altitude of 1,200-1,400m asl. It presumably occurs more widely in the Bamileke Plateau, and there is an unconfirmed record from the Rumpi Hills.

Population It is common on Mount Manenguba.

Habitat and Ecology It lives in or near flowing water in lower montane and submontane forest, often in very steep, precipitous areas close to torrents. It probably hides in holes during the day, and breeds in mountain streams.

Major Threats This species is experiencing severe habitat loss within its very small range. However, it is capable of adapting to a measure of forest degradation.

Conservation Measures The species is not known from any protected areas, and habitat protection of the remaining montane forests in western Cameroon is urgently needed.

Bibliography: Amiet, J.-L. (1977), Gartshore, M.E. (1986), Herrmann, H.-W. *et al.* (2005)

Data Providers: Jean-Louis Amiet

EN *Astylosternus ranoides* Amiet, 1978 "1977"

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Jean-Louis Amiet

Geographic Range This species is known only from high altitudes (2,000-2,600m asl) in western Cameroon; there are records from the Bamboutos Mountains, Lake Oku, and Mount Neshele in the Bafut-Ngamba Forest Reserve.

Population There is no information on its population status.

Habitat and Ecology It lives in grassy marshes, around lakes, and along streams and watercourses in montane forest, montane shrubland, and montane grassland. Its breeding habitat is not fully known, but it appears to be less tied to flowing water than other members of its genus.

Major Threats Overgrazing, forest clearance, and changes in water quality are probably the major threats to this species.

Conservation Measures It occurs in the Bafut-Ngamba Forest Reserve, but is largely unprotected elsewhere in its range. A conservation project has been conducted on Mount Oku for several years by BirdLife International, which involves community management of the area involving the local villages, but which needs to take into account the conservation needs of this species. Further survey work is needed to determine the species' current population status.

Bibliography: Amiet, J.-L. (1977), Amiet, J.-L. (1989), Gartshore, M.E. (1986)

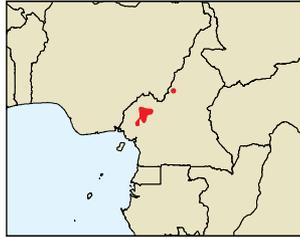
Data Providers: Jean-Louis Amiet

VU *Astylosternus rheophilus* Amiet, 1978 "1977"

Vulnerable B1ab(iii)+2ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Václav Gvozdík



Geographic Range This species is endemic to western Cameroon at altitudes of 1,300-2,450m asl. The nominate subspecies is recorded from Mount Manenguba, Mount Mbam, Santa, Mount Bana, Mount Ngokham, the Bamboutos Mountains, and the Bafut-Ngamba Forest Reserve, and is likely also to occur on Mount Oku. The subspecies *A. r. tchabelensis* is known only from the southern slopes of Tchabal Mbaba, at 1,700-1,900m asl, in Cameroon, and might occur on the Mambila Plateau in eastern Nigeria.

Population It is a very common species.

Habitat and Ecology It lives in both the submontane and montane zones, and is typically associated with small streams in forest where it breeds. However, at higher altitudes above 2,000m asl it can also be found along streams in montane grassland, sometimes bordered with trees. It seems able to tolerate minor disturbance of its habitat. The subspecies *A. r. tchabelensis* lives in relict gallery forests in a generally deforested area.

Major Threats Although it is likely that it can tolerate a degree of habitat alteration, this species is probably declining as a result of widespread habitat loss and degradation within its restricted range, mainly due to smallholder agricultural activities, subsistence wood extraction, and human settlement.

Conservation Measures It occurs in the Bafut-Ngamba Forest Reserve.

Bibliography: Amiet, J.-L. (1977), Amiet, J.-L. (1989)

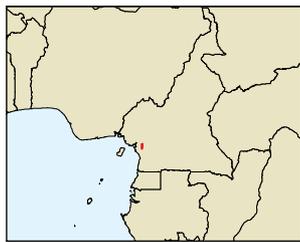
Data Providers: Jean-Louis Amiet

EN *Astylosternus schioetzi* Amiet, 1978 "1977"

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© David C. Blackburn



Geographic Range This species is known only from two general areas in south-western Cameroon: Apouh and Koupongo, near Edéa, in southern Cameroon (these two localities are 50km apart, and are separated by the Sanaga River). Records from the northern part of Korup National Park, east to Nguti, and north to Mount Nta Ali (Lawson 1993) are based on misidentifications and refer to *Astylosternus diadematus* (J.L. Amiet pers. comm.).

Population It appears to be a rare species occurring at low densities in the southern parts of its range.

Habitat and Ecology It lives in and near flowing water in lowland forest, and can survive in tall, secondary forest. It breeds in small streams and in marshy depressions with very small, superficial streams.

Major Threats The major threat to the species is habitat loss and degradation.

Conservation Measures It might occur in the Douala-Edéa Forest Reserve and Lac Ossa Wildlife Reserve. The remaining forest habitat in south-western Cameroon is urgently in need of improved protection.

Bibliography: Amiet, J.-L. (1977), Lawson, D.P. (1993)

Data Providers: Jean-Louis Amiet

VU *Leptodactylodon albiventris* (Boulenger, 1905)

Vulnerable B1ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Ignacio De La Riva



Geographic Range This species is known only from the western edge of the southern Cameroon plateau, though it might occur more widely than current records suggest. Its altitudinal range is 300-1,000m asl.

Population It is an uncommon species.

Habitat and Ecology This is a species of lowland rainforest in hilly country. It is not known to what extent it can adapt to forest disturbance. It breeds in streams, and the males call from rocky areas (under rocks or in cracks) close to small streams.

Major Threats The major threat to this species is habitat loss from smallholder farming activities and logging.

Conservation Measures It is not known from any protected areas, though it might occur in Campo-Ma'an National Park. There is a need for improved habitat protection at sites at where the species is known to occur.

Notes on taxonomy: Following Amiet and Dowsett-Lemaire (2000), *Leptodactylodon bueanus* is here considered a separate species from *L. albiventris* (as opposed to a subspecies of *L. albiventris* following Amiet (1987)). Rödel and Pauwels (2003) provisionally assigned records of *L. albiventris* from Equatorial Guinea (De la Riva 1994b) to *L. stevarti*.

Bibliography: Amiet, J.-L. (1980a), Amiet, J.-L. (1987), Amiet, J.-L. and Dowsett-Lemaire, F. (2000), Amiet, J.-L. and Schiøtz, A. (1972), De la Riva, I. (1994b), Frétey, T. and Blanc, C.P. (2000), Rödel, M.-O. and Pauwels, O.S.G. (2003)

Data Providers: Jean-Louis Amiet

EN *Leptodactylodon axillaris* Amiet, 1971

Endangered B1ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© David C. Blackburn



Geographic Range This species is known from the Bamboutos Mountains in the Bamenda Highlands of western Cameroon, at altitudes of 2,300-2,700m asl. It probably also occurs on Mount Oku in the Bamenda Highlands.

Population It is most common above 2,400-2,450m asl.

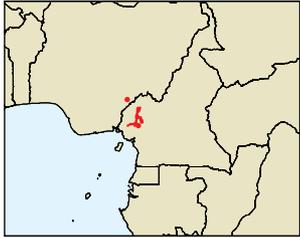
Habitat and Ecology It lives in bamboo forest and, in the rainy season, grazed montane grasslands where it hides under rocks in seepage areas. It lives in drier areas than other members of its genus. It has never been found at its breeding sites, but it is likely to breed in small streams in rocky areas.

Major Threats It is probably under severe threat from habitat loss and overgrazing. Like other high-altitude species, it also could be at risk from climate change.

Conservation Measures This species is not known from any protected areas, and habitat protection is urgently needed in the Bamboutos Mountains. In view of its tiny range and possible impacts of climate change, a captive-breeding programme should probably be established.

Bibliography: Amiet, J.-L. (1971a), Amiet, J.-L. (1980a)

Data Providers: Jean-Louis Amiet

VU *Leptodactylodon bicolor* Amiet, 1971**Vulnerable B1ab(iii)****Order, Family:** Anura, Astylosternidae**Country Distribution:** Cameroon, Nigeria**Current Population Trend:** Decreasing

© Mary E. Gartshore



Geographic Range This species occurs on the southern and western edge of the Cameroon mountain range (excluding Mount Cameroon), extending to the Obudu Plateau in eastern Nigeria. In Cameroon, it is known from Mount Manenguba, Mount Nlonako, the Mbos Cliffs, Fotabong, Petit Diboum, Mount Bana, Acha Tugi near Oshie, Bafut near Bamenda, and the Rumpi Hills. Its altitudinal range is 950-1,750m asl.

Population It is generally common in suitable habitat.

Habitat and Ecology An inhabitant of forest in the submontane zone, usually near rocky streams and springs, or on mossy talus slopes with fissures and caves. It avoids dry areas, living in places where there tends to be orographic mists during the dry season. It can survive in somewhat degraded habitats. Breeding takes place in streams in rocky areas.

Major Threats The major threat to this species is forest loss due to smallholder farming activities and subsistence wood extraction. The tadpoles are eaten locally by villagers in the Rumpi Hills.

Conservation Measures It occurs in the Cross River National Park in Nigeria. Further research is needed into the harvest level of tadpoles of this species from the wild.

Bibliography: Amiet, J.-L. (1971a), Amiet, J.-L. (1980a), Amiet, J.-L. (1983a), Amiet, J.-L. and Schiøtz, A. (1972), Gartshore, M.E. (1986)

Data Providers: Jean-Louis Amiet

VU *Leptodactylodon bouleengeri* Nieden, 1910**Vulnerable B1ab(iii)****Order, Family:** Anura, Astylosternidae**Country Distribution:** Cameroon**Current Population Trend:** Decreasing

© Mary E. Gartshore



Geographic Range This species is known from the mountains of western Cameroon. There are records from Banyo (near Batié), Petit Diboum, Mount Bana, Foto, Mbakang, Mount Nlonako and Bafut, with an isolated population to the east on Mount Ngorro. It probably also occurs in the western section of the Adamawa Plateau, and perhaps also in Nigeria. It ranges from 800-1,450m asl.

Population It is a common species.

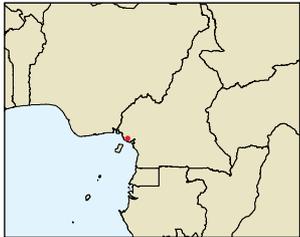
Habitat and Ecology It lives in degraded forest, dense bush and raffia palm verges along swamps bordering rocky streams. Breeding takes place in streams.

Major Threats Although it can tolerate some habitat disturbance, it is probably threatened by habitat loss and degradation due to smallholder farming activities and subsistence wood extraction throughout its range.

Conservation Measures It is not known to occur in any protected areas. There is a need for improved habitat protection at sites at which this species is known to occur.

Bibliography: Amiet, J.-L. (1971a), Amiet, J.-L. (1971b), Amiet, J.-L. (1973b), Amiet, J.-L. (1975), Amiet, J.-L. (1980a), Amiet, J.-L. and Schiøtz, A. (1972), Herrmann, H.-W. *et al.* (2005)

Data Providers: Jean-Louis Amiet

VU *Leptodactylodon bueanus* Amiet, 1981 "1980"**Vulnerable D2****Order, Family:** Anura, Astylosternidae**Country Distribution:** Cameroon**Current Population Trend:** Stable

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Geographic Range This species is known only from the eastern slopes of Mount Cameroon, and from Bimbia Hill east of Limbe, in western Cameroon. Its altitudinal range is 200-1,000m asl.

Population It is abundant at many localities on the eastern slopes of Mount Cameroon.

Habitat and Ecology It lives in and around streams and springs in forest, usually sheltering in rocky areas. Most of the known localities are in degraded forest, but it requires dense vegetation in order to survive. Its absence above 1,000m asl is probably related to the lack of streams, which it needs to breed, at high altitudes on Mount Cameroon.

Major Threats Despite its tolerance of secondary vegetation, populations are likely to be threatened by habitat loss due to smallholder farming activities, subsistence wood extraction, and human settlement.

Conservation Measures It is not known to occur in any protected areas. There is a need for improved habitat protection at sites where the species is known to occur.

Notes on taxonomy: Following Amiet and Dowsett-Lemaire (2000), *Leptodactylodon bueanus* is here treated as a separate species from *L. albiventris* (as opposed to a subspecies of *L. albiventris* following Amiet (1987)).

Bibliography: Amiet, J.-L. (1980a), Amiet, J.-L. (1987), Amiet, J.-L. and Dowsett-Lemaire, F. (2000)

Data Providers: Jean-Louis Amiet

CR *Leptodactylodon erythrogaster* Amiet, 1971**Critically Endangered B1ab(iii)****Order, Family:** Anura, Astylosternidae**Country Distribution:** Cameroon**Current Population Trend:** Decreasing

© Jean-Louis Amiet



Geographic Range This species is known only from the south-eastern slopes of Mount Manenguba at 1,550-1,800m asl in western Cameroon.

Population It is reported to be abundant within its tiny range, and is most common at altitudes of 1,700-1,800m asl.

Habitat and Ecology It is found in submontane and lower montane forest, around springs and streams, living in holes, humus, gravel, root masses and dense undergrowth. It can survive in open, disturbed forest. It presumably breeds in streams, and co-exists with *Leptodactylodon mertensi* around 1,700m asl.

Major Threats Habitat loss is taking place on Mount Manenguba due to smallholder farming activities and subsistence wood extraction, and while this species is tolerant of a degree of habitat disturbance, it is nonetheless at severe risk in view of its tiny range.

Conservation Measures It is not currently recorded from any protected areas. There is an urgent need for improved protection of remaining forest habitats on Mount Manenguba.

Bibliography: Amiet, J.-L. (1970a), Amiet, J.-L. (1971b), Amiet, J.-L. (1973b), Amiet, J.-L. (1975), Amiet, J.-L. (1980a), Amiet, J.-L. and Schiøtz, A. (1972)

Data Providers: Jean-Louis Amiet

EN *Leptodactylodon mertensi* Perret, 1959

Endangered B1ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Andreas Schmitz

Geographic Range This species is known only from the southern slopes of the Bamileke Plateau (at Mount Bana and Petit Diboum), Mount Nlonako and Mount Manenguba, western Cameroon. It occurs between 1,000 and 1,850m asl, though only up to 1,700m asl on Mount Manenguba, above which it is replaced by *Leptodactylodon erythrogaster*.

Population It is reported to be abundant on the southern and south-eastern slopes of Mount Manenguba.
Habitat and Ecology It lives in dense undergrowth in submontane and lower montane forest, and in the dense herbage of raffia palm beds along streams. It can also survive in dense secondary forest habitats. The males call near pools and riffles in small streams, or in waterlogged humus near springs. It avoids rocky areas and breeds in small streams.

Major Threats Although this species can tolerate a degree of habitat modification, it is probably threatened by forest clearance for smallholder farming.

Conservation Measures It is not known to occur in any protected areas, and protection of the remaining forest habitat at the sites where it occurs, particularly Mount Manenguba, is urgently needed.

Bibliography: Amiet, J.-L. (1970a), Amiet, J.-L. (1971b), Amiet, J.-L. (1980a), Amiet, J.-L. and Schiøtz, A. (1972), Herrmann, H.-W. et al. (2005)

Data Providers: Jean-Louis Amiet

EN *Leptodactylodon ornatus* Amiet, 1971

Endangered B1ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Andreas Schmitz

Geographic Range This species comprises two subspecies, both endemic to western Cameroon: the nominate subspecies occurs on Mount Manenguba, Mount Nlonako, Mount Kupe, the Bonandam Hills and the Ebonji Hills at 200-1,450m asl; *Leptodactylodon ornatus permaculatus* occurs on the southern and western slopes of the Bamileke Plateau at Fotabong, Foto, and the Mbos Cliffs, at 1,000-1,400m asl.

Population Generally, this species is somewhat uncommon, although *L. o. permaculatus* is not uncommon within its small range.

Habitat and Ecology This is not a true montane species, but occurs at low and medium altitudes in hilly areas, usually near mountains, in areas of high rainfall. It lives in wet lowland and submontane forest and also in partially degraded forest. It frequents rocky areas that are found less frequently at lower altitudes. It breeds in fast-flowing streams; the males call from fissures in rocks, or from under stones.

Major Threats Despite its tolerance of a degree of habitat modification, this species is probably threatened by forest clearance for smallholder farming.

Conservation Measures It is not known to occur in any protected areas, and protection of the remaining forest habitat at the sites where it occurs, particularly Mount Manenguba, is urgently needed.

Bibliography: Amiet, J.-L. (1970a), Amiet, J.-L. (1980a), Amiet, J.-L. and Schiøtz, A. (1972), Herrmann, H.-W. et al. (2005)

Data Providers: Jean-Louis Amiet

EN *Leptodactylodon perreti* Amiet, 1971

Endangered B2ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Wolfgang Böhm

Geographic Range This species is known only from the higher peaks of western Cameroon in the Bamenda Highlands, and further north-east to Tchabal Mbaba. In the Bamenda Highlands it is known from the Bamboutos Mountains, Mount Mbam, Mount Ngokham, Mount Lefo, Mount Oku, and the Bafut-Ngamba Forest Reserve. Its altitudinal range is 1,200-2,650m asl.

Population It is reported to be common within its restricted range.

Habitat and Ecology This is mainly a species of the montane zone, but it also occurs in smaller numbers in the submontane zone down to 1,200m asl. It is strictly confined to forest, and the males call from secluded sites and holes in humus close to streams. At higher altitudes, it breeds in shallow marshes in forest traversed by small, superficial streams. At lower altitudes it breeds in streams in rocky areas.

Major Threats It is seriously threatened by extensive forest loss, mainly from smallholder farming, throughout its range.

Conservation Measures It occurs in the Bafut-Ngamba Forest Reserve, but remains largely unprotected elsewhere in its range. BirdLife International has conducted a conservation project on Mount Oku for several years; this project involves community management of the area involving the local villages, but it also needs to take into account the conservation needs of this species.

Bibliography: Amiet, J.-L. (1971a), Amiet, J.-L. (1980a), Amiet, J.-L. (1983a), Amiet, J.-L. (1987), Amiet, J.-L. and Schiøtz, A. (1972)

VU *Leptodactylodon polyacanthus* Amiet, 1971

Vulnerable B1ab(iii)
Order, Family: Anura, Astylosternidae
Country Distribution: Cameroon, Nigeria
Current Population Trend: Decreasing



© Jean-Louis Amiet

Geographic Range This species occurs in the western Cameroonian highlands, excluding Mount Cameroon, Mount Kupe, Mount Nlonako, Mount Manenguba and the Rumpi Hills. It also occurs on the Obudu Plateau in eastern Nigeria. There are two subspecies: *L. p. polyacanthus* occurs in the northern parts of the species' range at 1,640-1,900m asl in the Bafut-Ngamba Forest Reserve, Acha Tugi on Mount Oshie, and the Obudu Plateau; and *L. p. punctiventris* occurs in the southern part of the range at 1,000-1,400m asl on the wet southern and western slopes of the Bamileke Plateau at Foto, Fotabong, Fongo-Tongo, the Mbos Cliffs, Petit Diboum and Mount Bana.

Population It is a common species.

Habitat and Ecology It lives in montane and submontane forest and degraded forest. During the breeding season males can be found on wet clay, in rock crevices, and small streams; the females hide under stones. Breeding takes place in streams and springs.

Major Threats Although it can tolerate degraded forest, it is likely to be threatened by ongoing forest loss due to smallholder farming activities and subsistence wood extraction.

Conservation Measures It occurs in the Bafut-Ngamba Forest Reserve.

Bibliography: Amiet, J.-L. (1970a), Amiet, J.-L. (1971a), Amiet, J.-L. (1971b), Amiet, J.-L. (1980a), Amiet, J.-L. and Schiøtz, A. (1972), Gartshore, M.E. (1986)

Data Providers: Jean-Louis Amiet

EN *Leptodactylodon stewarti* Rödel and Pauwels, 2003**Endangered B1ab(iii)****Order, Family:** Anura, Astylosternidae**Country Distribution:** Equatorial Guinea, Gabon**Current Population Trend:** Decreasing

Geographic Range This species was discovered in the Monts de Cristal in north-western Gabon at 460-550m asl. Specimens assigned to this species have also been found at Monte Alen in Equatorial Guinea, where it might occur up to 1,000m asl.

Population It has only recently been described, and only two specimens are known from Gabon. Its population status in Equatorial Guinea is difficult to assess, since it is hard to locate.

Habitat and Ecology It has been found only in primary forest under rocks along streams in deep, narrow valleys. It breeds in fast-flowing, rocky streams.

Major Threats It is at risk from habitat loss due to smallholder farming activities and logging.

Conservation Measures It occurs in the Monte Alen National Park in Equatorial Guinea and in the recently gazetted (2002) Monts de Cristal National Park in Gabon.

Notes on taxonomy: We follow Rödel and Pauwels (2003) in provisionally assigning records of *Leptodactylodon albiventris* from Equatorial Guinea (De la Riva 1994) to this newly described species.

Bibliography: De la Riva, I. (1994b), De la Riva, I., Bosch, J. and Marquez, R. (2003), Lasso, C.A. *et al.* (2002), Rödel, M.-O. and Pauwels, O.S.G. (2003)

Data Providers: Mark-Oliver Rödel

VU *Leptodactylodon ventrimarmoratus* (Boulenger, 1904)**Vulnerable B1ab(iii)****Order, Family:** Anura, Astylosternidae**Country Distribution:** Cameroon**Current Population Trend:** Decreasing

© Jean-Louis Amiet

Geographic Range This species occurs in the lowlands of south-western Cameroon, south of the Sanaga River, at 50-1,150m asl.

Population It is not uncommon in its favoured habitat, though it is less common on the coastal plain.

Habitat and Ecology It is strictly a forest species, not occurring in secondary habitats. Outside the breeding season it can be found among dead leaves on the forest floor. During the breeding season, males call from rocky areas by streams and springs in forest, especially in valley heads where there are boulders under which tiny currents of water flow. Breeding takes place in streams.

Major Threats The major threat to the species is habitat loss as a result of forest loss and fragmentation due to logging.

Conservation Measures It might occur in a few protected areas, though this is not confirmed. There is a need for improved habitat protection at sites where the species is known to occur.

Bibliography: Amiet, J.-L. (1970b), Amiet, J.-L. (1980a), Amiet, J.-L. (1987), Amiet, J.-L. and Perret, J.-L. (1969), Amiet, J.-L. and Schiøtz, A. (1972)

Data Providers: Jean-Louis Amiet

EN *Leptodactylodon wildi* Amiet and Dowsett-Lemaire, 2000**Endangered B1ab(iii)****Order, Family:** Anura, Astylosternidae**Country Distribution:** Cameroon**Current Population Trend:** Decreasing

© Chris Wild

Geographic Range This recently described species is known only from the vicinity of the villages of Kodmin and Edib in the Bakossi Mountains, 1,000-1,350m asl, in western Cameroon, although it might be a bit more widespread.

Population It is generally an uncommon species.

Habitat and Ecology It lives in montane forest, often close to small streams; there is no information on its ability to tolerate changes to its habitat. Breeding takes place in springs and rivulets.

Major Threats It is probably threatened by forest clearance for smallholder farming.

Conservation Measures It does not occur in any protected areas, and its remaining habitat in the Bakossi Mountains requires urgent protection.

Bibliography: Amiet, J.-L. and Dowsett-Lemaire, F. (2000)

Data Providers: Jean-Louis Amiet

BOMBINATORIDAE**VU** *Barbourula busuangensis* Taylor and Noble, 1924**Vulnerable B1ab(iii)****Order, Family:** Anura, Bombinatoridae**Country Distribution:** Philippines**Current Population Trend:** Decreasing

© Jaime Bosch

Geographic Range This species occurs on the islands of Busuanga, Culion, and Palawan, all in the western Philippines. It probably occurs more widely than current records suggest, especially in areas between known sites on Palawan. It is a lowland species occurring up to 300m asl, perhaps up to 500m asl.

PHILIPPINE FLAT-HEADED FROG

Population It commonly occurs in large numbers where known, though the overall distribution is patchy and fragmented.

Habitat and Ecology This aquatic species inhabits clear, unpolluted swift-flowing mountain streams and rivers in lowland rainforests, where it usually floats near the surface of the water unless disturbed, when it will hide under submerged rocks. The breeding strategy of this species remains unknown. Tadpoles have never been observed, and eggs collected from gravid females were large, unpigmented, and few in number (Inger 1954), suggesting that it could possibly reproduce by direct development (Brown and Alcalá 1983). However to date breeding habits have not yet been observed. It has not been found in open habitats outside forest.

Major Threats The lowland rainforest habitat of this species is generally protected on the island of Palawan. However, some populations are threatened by habitat conversion, shifting agriculture, quarrying, large-scale mining, and pollution of streams and rivers from agricultural effluents. The collection of frogs for the pet trade (including internationally) is also a possible threat.

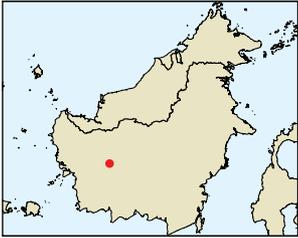
Conservation Measures There is a need for remaining intact lowland rainforest of Palawan to be designated as protected areas. Further research is needed to establish the levels of offtake of this species from the wild for the international pet trade; if proved to be a significant threat, then this species could also warrant listing by CITES.

Bibliography: Alcalá, A.C. and Brown, W.C. (1985), Brown, R.M., Diesmos, A.C. and Alcalá, A.C. (2001), Brown, W.C. and Alcalá, A.C. (1983), Frost, D.R. (1985), Infante, C.R. *et al.* (2002), Inger, R.F. (1954), Inger, R.F. (1999), Myers, G.S. (1943), Taylor, E.H. and Noble, G.K. (1924)

Data Providers: Arvin Diesmos, Angel Alcalá, Rafe Brown, Leticia Afuang, Genevieve Gee, Katie Hampson, Mae Leonida Diesmos, Aldrin Mallari, Perry Ong, Dondi Ubaldo, Baldwin Gutierrez

EN *Barbourula kalimantanensis* Iskandar, 1978

Endangered B2ab(iii)
Order, Family: Anura, Bombinatoridae
Country Distribution: Indonesia
Current Population Trend: Decreasing



© David Bickford



BORNEAN FLAT-HEADED FROG

Geographic Range This species is known only from West Kalimantan in Indonesian Borneo, where it is presently known only from two localities in the middle of the Kapuas River basin: Nanga Sayan (0° 44'S; 111° 40'E), 33km south of Nanga Pinoh; and Sungai Kelawit (0° 37'S; 111° 47'E), in the Melawi River basin, about 1km upstream from Nanga Pintas. It presumably ranges at least a little more widely, but it probably has a restricted distribution.

Population It is known only from two specimens collected 20 years apart. Directed surveys, in suitable habitat, close to the type locality have not recovered any further populations. This suggests that either the species has a very limited distribution or that it exists in very small numbers (R.F. Inger pers. comm.).

Habitat and Ecology Both known specimens were collected in clear rocky rivers, about 20-50m wide, under large rocks in midstream within tropical moist forest. The morphology of these frogs and the sites of collection indicate that this species is fully aquatic, and is probably dependent upon clear water with a high oxygen content. Breeding ecology is not known, but it possibly breeds by direct development. It has not been found in open areas outside forest.

Major Threats The area where this species occurs is now very highly disturbed due to illegal gold mining, and the rivers have become severely degraded as a result of siltation and also pollution with mercury waste (following its use for gold extraction). It is probably also affected by siltation of its aquatic habitat following deforestation of the surrounding land.

Conservation Measures It is not known from any protected areas, and effective conservation of large areas of remaining forest habitat is urgently required to help prevent the siltation of rivers.

Bibliography: Iskandar, D.T. (1978), Iskandar, D.T. (1995)

Data Providers: Robert Inger, Indraneil Das, Robert Stuebing, Maklarin Lakim, Paul Yambun

VU *Bombina fortinuptialis* Tian and Wu, 1978

Vulnerable B1ab(iii)+2ab(iii)
Order, Family: Anura, Bombinatoridae
Country Distribution: China
Current Population Trend: Decreasing



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LARGE-SPINED BELL TOAD

Geographic Range This species is known only from Dayaoshan, Pingnan and Longsheng in Guangxi province, China, from 1,200-1,640m asl.

Population It is very rare, with only a few specimens having been collected since it was described.

Habitat and Ecology This species inhabits forests, and has not been found outside forested areas. It breeds in pools and slow-flowing waters where the larvae also develop.

Major Threats The major threat is habitat destruction and degradation due to smallholder farming activities and logging.

Conservation Measures This species occurs in several nature reserves, including the Dayaoshan National Nature Reserve.

Bibliography: Fei, L. *et al.* (1999), MacKinnon, J. *et al.* (1996), Tian, W.S. and Wu, G.H. (1978)

Data Providers: Michael Wai Neng Lau, Yuan Zhigang

VU *Bombina lichuanensis* Ye and Fei, 1994

Vulnerable B1ab(iii)
Order, Family: Anura, Bombinatoridae
Country Distribution: China
Current Population Trend: Decreasing



© Fei, L., Ye, C.-Y., Huang, Y.-Z. and Liu, M.-Y. 1999



LICHUAN BELL TOAD

Geographic Range This species is known only from Beiyang, Lichuan in Hubei Province and Mabian County in Sichuan Province, China, at around 1,830m asl. It probably occurs more widely than current records suggest, especially in areas between the two known sites.

Population It is very rare.

Habitat and Ecology This species inhabits marshes in forested, mountainous areas. It breeds in pools where the larvae also develop.

Major Threats The major threat to this species is forest loss due to small-scale agriculture and human settlement.

Conservation Measures The population of this species in Hubei Province is probably within Lichuanxiaoheshuisha Nature Reserve.

Bibliography: Fei, L. *et al.* (1999), MacKinnon, J. *et al.* (1996), Ye, C.-Y. and Fei, L. (1994)

Data Providers: Fei Liang, Zhao Wenge

VU *Bombina microdeladigitora* Liu, Hu and Yang, 1960

Vulnerable B2ab(iii)
Order, Family: Anura, Bombinatoridae
Country Distribution: China, Viet Nam
Current Population Trend: Decreasing



© Nikolai L. Orlov



SMALL-WEBBED BELL TOAD

Hoang Lien Son mountain range near Sa Pa, Lao Cai Province, and from Ha Giang Province in the north. It has not been found in other surveys further south in the Hoang Lien Son mountain range in Viet Nam. It probably occurs more widely than current records suggest, especially in areas between the known sites in China and those in Viet Nam. It has been recorded from 1,830-2,200m asl.

Population Across much of its range, this species is uncommon and difficult to find.

Habitat and Ecology It inhabits marshes in forests, grassland, and the surrounding areas. Males call from tree holes, which is also where the eggs are laid (rather than in ponds); the water in these holes overflows during heavy rains and the tadpoles are washed into streams.

Major Threats The major threat to this species is habitat loss due to the collection of wood for subsistence use, and agricultural activities, including the planting of cardamom plantations (which are even found within Hoang Lien Son National Park). In Viet Nam, an additional threat is posed by touristic activities on the Hoang Lien Son Mountains.

Conservation Measures The range of this species overlaps with a few protected areas in China and Viet Nam, including Mount Tay Con Linh II and Hoang Lien Son National Park in Viet Nam.

Notes on taxonomy: In the past, populations of this species in northern Viet Nam were considered to belong to *Bombina maxima* (Ohler *et al.* 2000).

Bibliography: Bourret, R. (1942), Fei, L. *et al.* (1999), MacKinnon, J. *et al.* (1996), Ohler, A. *et al.* (2000), The Comprehensive Scientific Expedition to the Qinghai-Xizang Plateau (1997), Tran, K. *et al.* (1992), Yang, D.-T. (1991b)

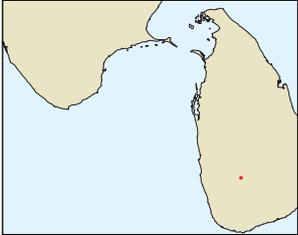
Data Providers: Peter Paul van Dijk, Steven Swan, Yang Datong, Annemarie Ohler

Geographic Range This species is known from China and Viet Nam. In China it is restricted to western Yunnan (Jingdong, Yongde and Xishuangbanna) and in Viet Nam it is known from two localities, from high altitudes in the

BUFONIDAE

CR *Adenomus dasi* Manamendra-Arachchi and Pethiyagoda, 1998

Critically Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Sri Lanka
Current Population Trend: Decreasing



© V.A.M.P.K. Samaravickrama



Geographic Range This species is restricted to a single locality "Moray Estate, Rajamally, near Mousakelle, alt. 1,370m asl" in the Peak Wilderness Sanctuary of the Adam's Peak area in Sri Lanka. It had previously been collected in the late 1890s at the town Nuwara Eliya (1,710m asl), but is now considered to be extinct at this location (K. Manamendra-Arachchi pers. comm.).

Population This is a rare species, now known only from the Moray Estate. There is no information on its current population status.

Habitat and Ecology It is associated with hill streams in tropical moist forest. Adults can be found on mossy wet rocks within streams, and in riparian leaf-litter. Breeding and larval development take place in streams.

Major Threats The extremely restricted distribution of this species makes it very susceptible to water pollution from adjacent tea plantations and the possible negative impacts of tourism within the area.

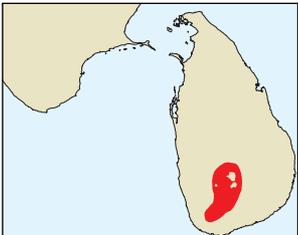
Conservation Measures The species is present in the 224-km² Peak Wilderness Sanctuary. Additional survey work is needed to determine the population status of the species.

Bibliography: Manamendra-Arachchi, K. and Pethiyagoda, R. (1998)

Data Providers: Kelum Manamendra-Arachchi, Anslém de Silva

EN *Adenomus kelaartii* (Günther, 1858)

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Sri Lanka
Current Population Trend: Decreasing



© Peter Janzen



Geographic Range This species is a Sri Lankan endemic, and is found over much of the south-west of the island. It has been recorded at elevations between 30 and 1,230m asl.

Population It is fairly common where it occurs.

Habitat and Ecology It is normally terrestrial, but also sometimes semi-arboreal, and is associated with hill streams in tropical wet forest. Adults have been observed in rock crevices, leaf-litter and decaying logs, and within tree holes. Larvae are found in permanent pools.

Major Threats The major threat to the species is habitat loss and degradation due to the clearance (clear cutting) of forested areas, agrochemical pollution, and expansion of cardamom plantations.

Conservation Measures The species has been recorded from several protected areas, including the Peak Wilderness Forest Reserve, Sinharaja World Heritage Site, Kanneliya Reserve Forest, Haycock Forest Reserve, Gilimale-Eratne Forest Reserve and Kitulgala Forest Reserve. Continued and improved management of these reserves is recommended.

Bibliography: Dutta, S.K. and Manamendra-Arachchi, K. (1996), Haas, W., Lehr, E. and Köhler, G. (1997), Manamendra-Arachchi, K. and Pethiyagoda, R. (1998)

Data Providers: Kelum Manamendra-Arachchi, Anslém de Silva, Deepthi Wickramasinghe

EN *Altiphrynoides malcolmi* (Grandison, 1978)

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Ethiopia
Current Population Trend: Decreasing
CITES: Appendix I



© Colin Tilbury



Geographic Range This species is endemic to the Bale Mountains at 3,200-4,000m asl, in Bale Province, Ethiopia.

Population During the period 1971-1986, it was found to be common at several sites within its very limited geographical range. The lack of recent records is due to the absence of survey work.

Habitat and Ecology This species spans the transition from *Schefflera-Hagenia-Hypericum* forest to Afro-alpine moorland. Egg strings are deposited amongst moist herbaceous vegetation where development proceeds to metamorphosis through a terrestrial larval stage.

Major Threats The main threat is probably timber extraction from high-altitude forest, and there is some evidence that this may already have occurred at the type locality.

Conservation Measures At least one of the sites where this toad remains common lies within the Bale Mountains National Park, although this protected area is not formally gazetted. Nonetheless, there is a long-running conservation programme in the Bale Mountains National Park (led by the Ethiopian Wolf Conservation Programme). The priority action for the species is the protection of remaining montane forest habitats from commercial and subsistence exploitation. It is listed in Appendix I of CITES, though it is not present in international trade.

Bibliography: Grandison, A.G.C. (1978), Lagen, M.J. (2001), Wake, M.H. (1980)

Data Providers: Malcolm Lagen

CR *Andinophryne colomai* Hoogmoed, 1985

Critically Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



© Luis A. Coloma



Geographic Range This species is known only from the type locality ("Cabacera del Rio Baboso, cerca a Lita", Carchi Province, Ecuador), and one other locality close by in the province of Carchi, in the north-western Andes of Ecuador. It has been recorded from 1,180-1,400m asl.

Population It is a very rare species, and there have been no records since September 1984. Subsequent visits to the type locality have failed to find any individuals.

Habitat and Ecology The holotype was collected on a branch some 50cm above the ground in the forest of a small creek at night (Hoogmoed 1985). A male was collected at night sitting on a tree trunk in a creek, while a female was collected in the afternoon on the forest floor near a creek (Hoogmoed 1989).

Major Threats The type locality has been severely impacted by habitat destruction as a result of agriculture and logging. In addition, spraying of herbicides in Colombia to control crops is polluting the species' habitat.

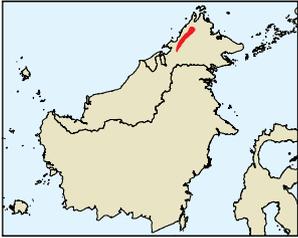
Conservation Measures It is not known to occur in any protected areas. Survey work is needed to determine the population status of this species.

Bibliography: Hoogmoed, M.S. (1985), Hoogmoed, M.S. (1989)

Data Providers: Luis A. Coloma, Santiago Ron, Mario Yáñez-Muñoz, Diego Cisneros-Heredia

EN *Ansonia anotis* Inger, Tan and Yambun, 2001

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Malaysia
Current Population Trend: Decreasing



© Paul Yambun

Geographic Range This species is known only from two localities, Sayap Station and Sungai Purulon, Sabah (Borneo), Malaysia. It presumably occurs elsewhere, in particular in areas between the confirmed localities. The altitudinal range of this species is 300-1,000m asl.

Population The species is rarely encountered, and good estimates of population size are lacking.

Habitat and Ecology It is a terrestrial species of lowland and submontane tropical moist forest, and the larvae inhabit clear forest streams. This species probably cannot adapt to modified habitats.

Major Threats The main threat to it is habitat loss and degradation as a result of the destruction of the forest through logging and clearance for rice cultivation, and the consequent siltation of streams.

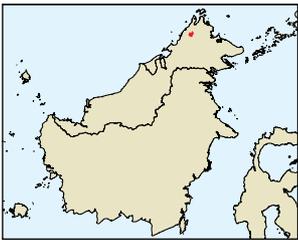
Conservation Measures The species has been recorded from Kinabalu National Park and the Crocker Range National Park. Improved management of these areas and expanded protection of other remaining tracts of lowland forest are essential.

Bibliography: Inger, R.F., Lian, T.-F. and Yambun, P. (2001), Inger, R.F., Tan, F.-L. and Yambun, P. (2001)

Data Providers: Robert Inger, Indraneil Das, Robert Stuebing, Maklarin Lakim, Paul Yambun

VU *Ansonia fuliginea* (Mocquard, 1890)

Vulnerable D2
Order, Family: Anura, Bufonidae
Country Distribution: Malaysia
Current Population Trend: Unknown



Geographic Range This Bornean endemic is known only from the montane forests of Kinabalu, Malaysia. Attempts to locate the species on Gunung Mulu in Sarawak have not been successful. The altitudinal range is 1,500-3,050m asl.

Population The current population status of this species is unknown. It is rarely encountered.

Habitat and Ecology Most records are from moist montane and sub-alpine forest above 2,500m asl. Adults are terrestrial, and breeding is presumed to take place in forest streams.

Major Threats The major threat to this species in the future is likely to be selective logging.

Conservation Measures It occurs in Kinabalu National Park, which is well protected. Surveys of potentially suitable areas of habitat in adjacent parts of Borneo are needed to determine whether or not this species might occur elsewhere, and also to help better understand its current population status.

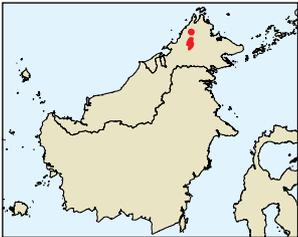
Notes on taxonomy: We follow Inger (1966) and Malkmus *et al.* (2002) in considering *Ansonia altitudinis* (Smith 1931) to be a synonym of *A. fuliginea*.

Bibliography: Inger, R.F. (1960a), Inger, R.F. (1966), Inger, R.F. and Stuebing, R.B. (1997), Malkmus, R. *et al.* (2002), Matsui, M., Hikida, T., and Namu, H. (1985)

Data Providers: Robert Inger, Indraneil Das, Robert Stuebing, Maklarin Lakim, Paul Yambun

EN *Ansonia gibeii* Inger, 1966

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Malaysia
Current Population Trend: Decreasing



© Indraneil Das

Geographic Range This species is endemic to a portion of montane north-western Sabah (northern Borneo). A large subpopulation exists at one corner of Kinabalu National Park between 1,600 and 2,000m asl. A small population has also been found on Mount Trus Madi at 1,300m asl. Attempts to locate the species on Gunung Mulu in Sarawak have not been successful. It has not been found at other montane sites south of Trus Madi.

Population It is sometimes locally very abundant, especially along streams.

Habitat and Ecology Adults disperse widely over the floor of montane and submontane forests. It breeds in small, clear, rocky-bottomed streams and larvae live in torrents, clinging to rocks and feeding on lithophytes. It appears to be unable to adapt to modified habitats.

Major Threats As Trus Madi is being actively logged, it is likely that the population there will be diminished, if not driven to extinction. Destruction of the forest at Trus Madi will probably lead to the siltation of streams in which the larvae develop. If the species occurs at other montane sites, these are likely to remain as insular isolates because of the extensive deforestation taking place at lower elevations.

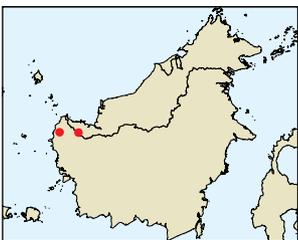
Conservation Measures The species occurs in Kinabalu National Park, which is well protected. However, the area where this species is particularly abundant is increasingly subject to the impact of tourist activities. There is a particular need to expand the existing protected area network (especially above 1,200m asl) south of Kinabalu National Park.

Bibliography: Inger, R.F. (1966), Inger, R.F. and Stuebing, R.B. (1997), Malkmus, R. (1994), Malkmus, R. *et al.* (2002), Malkmus, R., and Kosuch, J. (2000)

Data Providers: Robert Inger, Indraneil Das, Robert Stuebing, Maklarin Lakim, Paul Yambun

EN *Ansonia latidisca* Inger, 1966

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Indonesia, Malaysia
Current Population Trend: Decreasing



Geographic Range This species is known only from two locations in the western corner of Borneo: Mount Damus, near Sambas, in Kalimantan (Indonesia), and Mount Penrissen, in western Sarawak (Malaysia). It possibly occurs more widely than current records suggest, especially in areas between the two known sites.

Population There are no estimates of population size. Only two specimens are known and it was last collected over 50 years ago. There are no recent records, probably due to lack of herpetological work within its range.

Habitat and Ecology The known localities were primary, hilly rainforest at the time the frogs were collected. The adults are primarily terrestrial, and the larvae are found in forest streams. If it is similar to other members of its genus, it is unlikely to be able to adapt to modified habitats.

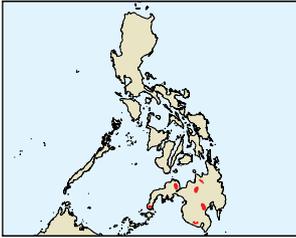
Major Threats The main threat to this species is habitat loss and degradation primarily as a result of logging. The remaining suitable

habitat within its range has been almost entirely converted for recreational use (one of the two known sites, Mount Penrissen, has recently been converted into a golf course), or converted to cultivated land. An additional threat is the resultant sedimentation of streams (following logging) which results in the deterioration of breeding habitat.

Conservation Measures Effective preservation of hilly rainforest in the regions of the two known localities is essential. In addition, further survey work in the hilly border area of Sarawak and Kalimantan is necessary to help provide a better indication of the species' current population status.

Bibliography: Inger, R.F. (1966)

Data Providers: Robert Inger, Indraneil Das, Robert Stuebing, Maklarin Lakim, Paul Yambun

VU *Ansonia mcgregori* (Taylor, 1922)**Vulnerable B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Philippines**Current Population Trend:** Decreasing

© Arvin C. Diesmos

Geographic Range This species is found in the mountains of central and western Mindanao Island in the Philippines. It probably occurs more widely than current records suggest.

Population It is fairly common.

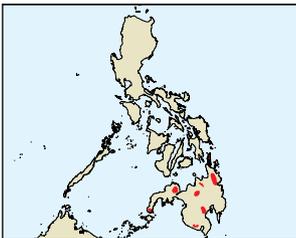
Habitat and Ecology It inhabits cool mountain streams and rivers in lower montane and lowland forests. It breeds in streams, which is where the larvae also develop.

Major Threats The major threats include habitat loss and deforestation, due to agriculture and logging, and water pollution.

Conservation Measures It is recorded from several protected areas on Mindanao, including Mount Malindang National Park and Mount Apo and Mount Kitanlad Range Natural Parks. Conservation measures should include the regulation and proper disposal of pesticides and herbicides, and the protection of the remaining rainforest, especially riverine habitats and gallery forest, on Mindanao.

Bibliography: Alcala, A.C. and Brown, W.C. (1985), Brown, R.M., Diesmos, A.C. and Alcala, A.C. (2001), Crombie, R.A. (n.d.), Frost, D.R. (1985), Inger, R.F. (1954), Inger, R.F. (1999), Taylor, E.H. (1923)

Data Providers: Arvin Diesmos, Angel Alcala, Rafe Brown, Leticia Afuang, Genevieve Gee, Katie Hampson, Mae Leonida Diesmos, Aldrin Mallari, Perry Ong, Dondi Ubaldo, Baldwin Gutierrez

VU *Ansonia muelleri* (Boulenger, 1887)**Vulnerable B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Philippines**Current Population Trend:** Decreasing

© Rafe Brown, 2006. Courtesy of HerpWatch Philippines

Geographic Range This species is found in the mountains of Mindanao and Dinagat Islands, in the Philippines.

Population It is fairly common where it occurs, but it has a patchy distribution.

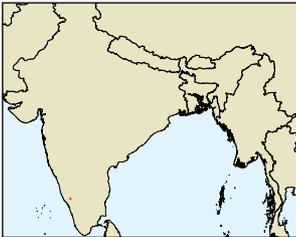
Habitat and Ecology It inhabits cool mountain streams and rivers in montane rainforest where it also breeds and the larvae develop.

Major Threats This species inhabits high-elevation forests, which are generally less threatened by habitat conversion, agriculture, and human encroachment, and the pollution of streams and rivers. Regardless, some populations of this species are subject to these threats.

Conservation Measures It is known from several protected areas, including Mount Malindang National Park. Conservation measures must include the regulation and proper disposal of pesticides and herbicides, and the protection of the remaining rainforest, especially high-elevation riverine habitats and gallery forests, on Mindanao. The taxonomic status of this species requires further study.

Bibliography: Alcala, A.C. and Brown, W.C. (1985), Brown, R.M., Diesmos, A.C. and Alcala, A.C. (2001), Crombie, R.A. (n.d.), Frost, D.R. (1985), Inger, R.F. (1954), Inger, R.F. (1999), Taylor, E.H. (1923)

Data Providers: Arvin Diesmos, Angel Alcala, Rafe Brown, Leticia Afuang, Genevieve Gee, Katie Hampson, Mae Leonida Diesmos, Aldrin Mallari, Perry Ong, Dondi Ubaldo, Baldwin Gutierrez

EN *Ansonia ornata* Günther, 1876**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** India**Current Population Trend:** Decreasing

© S.D. Biju

Geographic Range This species is known with certainty only from the type locality of "Brumagherries (Brahmagiri Hills)" and adjoining areas of Coorg, Karnataka, in the southern Western Ghats. There are also unpublished reports of this species from Kudremukh National Park (Karnataka), Silent Valley National Park and Wayanad Wildlife Sanctuary (Kerala) (Amphibian CAMP 2002). However, further survey work is needed to confirm that the species does occur at these sites (S.D. Biju pers. comm.) and these additional areas are currently not included in the map for this species. It has been recorded at an altitude of around 1,000m asl.

Population It is an uncommon species.

Habitat and Ecology It is presumably restricted to tropical evergreen forest. Its breeding is not known, but it presumably breeds by larval development in streams, like other members of its genus.

Major Threats The main threat to this species is continuing deforestation (mainly for the cultivation of coffee) in the Coorg area and surroundings.

Conservation Measures This species is currently not known with certainty from any protected areas, and strengthened and expanded protection of the remaining forest habitat in this region of the Western Ghats is necessary. It is included as part of ongoing field studies begun in 1998 (S.D. Biju pers. comm.).

Notes on taxonomy: There are taxonomic difficulties with this species, and it is possible that *Ansonia rubigina* is a synonym of it (S.D. Biju pers. comm.).

Bibliography: Biju, S.D. (2001), Chanda, S.K. and Deuti, K. (1997), Daniel, J.C. (1963), Daniels, R.J.R. (1991), Daniels, R.J.R. (1997), Dutta, S.K. (1997), Günther, A. (1876), Ravi Kumar, M.V. (2000), Reddy, A.H.M. *et al.* (2003)

Data Providers: S.D. Biju, Sushil Dutta, M.S. Ravichandran

VU *Ansonia penangensis* Stoliczka, 1870**Vulnerable D2****Order, Family:** Anura, Bufonidae**Country Distribution:** Malaysia**Current Population Trend:** Stable

Geographic Range This species is known only from Penang Island, Malaysia. Its altitudinal range is not known.

Population There is very little information. The collection of tadpoles on Penang Hill in 2004 represents the first records of the species in over 100 years; this absence of records might be a reflection of inadequate surveying effort.

Habitat and Ecology This is a stream-breeding species that inhabits rocky streams in rainforests.

Major Threats The forest habitat at the type locality is well protected; other potential threats are presently unknown.

Conservation Measures The hill forests on Penang Hill are currently protected as a catchment area for Georgetown, and the lower reaches are within the Penang Botanical Gardens. Nonetheless, the population status of this species requires careful monitoring, given that it is known only from a single location.

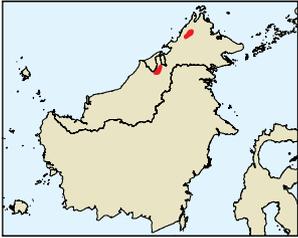
Notes on taxonomy: There is much confusion surrounding the status of this species relative to *Ansonia malayana*. Populations that have been assigned to this species on the Isthmus of Kra and from Fraser's Hill in Malaysia are considered here to refer to *A. malayana*. However, it is not clear that these two species are distinct from each other, and further taxonomic work is needed. Records of *A. penangensis* from Sumatra, Indonesia, are now assigned to *A. glandulosa*.

Bibliography: Dring, J.C.M. (1979), Leong, T.M. and Lim, K.K.P. (2003), Taylor, E.H. (1962)

Data Providers: Peter Paul van Dijk, Jeet Sukumaran, Indraneil Das, Norsham Yaakob, Leong Tzi Ming, Yodchaiy Chuaynern

EN *Ansonia platysoma* Inger, 1960

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Malaysia
Current Population Trend: Decreasing



© Indraneil Das

Geographic Range This Bornean endemic occurs at a number of sites within Kinabalu National Park and at other sites in the Crocker Range south of Kinabalu in Sabah (Malaysia); it is also known from Gunung Mulu National Park in Sarawak. The altitudinal range in Kinabalu is 600-950m asl (Malkmus *et al.* 2002), and its overall altitudinal range is 750-1,600m asl.

Population This species is abundant at most locations where it has been reported (such as the Crocker Range).

Habitat and Ecology Adults are found on the floor of montane forests and move to clear, rocky mountain creeks to breed. The larvae cling to rocks in torrents in these streams and presumably feed on lithophytes. It appears not to be able to survive in modified habitats.

Major Threats Logging in the submontane and montane forests could potentially lead to siltation of the streams needed for larval development and result in loss of the lithophytes.

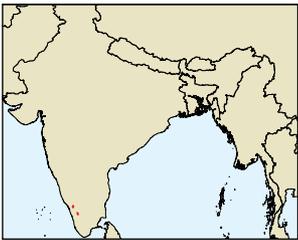
Conservation Measures The species is known to be present in the Kinabalu and Gunung Mulu National parks, both of which are reasonably well managed; however, further protection of the remaining forest habitats, and continued management of the existing protected areas, are needed. Additional surveys of potentially suitable sites in Kalimantan are required to establish whether this species occurs there.

Bibliography: Inger, R.F. (1960a), Inger, R.F. (1966), Inger, R.F. and Stuebing, R.B. (1997), Malkmus, R. *et al.* (2002)

Data Providers: Robert Inger, Indraneil Das, Robert Stuebing, Maklarin Lakim, Paul Yambun

VU *Ansonia rubigina* Pillai and Pattabiraman, 1981

Vulnerable D2
Order, Family: Anura, Bufonidae
Country Distribution: India
Current Population Trend: Stable



© S.D. Biju

Geographic Range This species is present only in the Silent Valley and Wayanad areas of Kerala State in the southern Western Ghats of India (Biju 2001) where it has been recorded at elevations between 1,000 and 1,200m asl.

Population It is a rare species, though populations are generally believed to be stable within the Silent Valley National Park.

Habitat and Ecology It is restricted to tropical evergreen forest, and is associated with torrential streams and the forest floor. Breeding presumably takes place by larval development in streams.

Major Threats There are currently no major threats to this species.

Conservation Measures It is currently considered to be adequately protected within the Silent Valley National Park. Nonetheless, the population status of this species requires careful monitoring, given that it is known only from two locations.

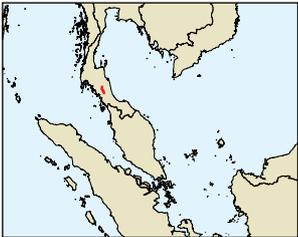
Notes on taxonomy: This species might be a synonym of *Ansonia ornata* (S.D. Biju pers. comm.).

Bibliography: Biju, S.D. (2001), Dutta, S.K. (1997), Pillai, R.S. and Pattabiraman, R. (1981)

Data Providers: S.D. Biju, Sushil Dutta, M.S. Ravichandran

VU *Ansonia siamensis* Kiew, 1984

Vulnerable D2
Order, Family: Anura, Bufonidae
Country Distribution: Thailand
Current Population Trend: Unknown



Geographic Range This species is known from a single locality in the Khao Chong Mountains of Peninsular Thailand. It presumably occurs more widely within these mountains, as has been mapped. The type locality is at an elevation of 300m asl.

Population It is apparently uncommon. A pair was collected in 1979, and a further five individuals have been collected since (Kiew 1984b, Matsui, Nabhitabhata and Panha 1998).

Habitat and Ecology It is restricted to lowland primary tropical moist forest. It is a stream-breeding species.

Major Threats The habitat of this species appears to be reasonably well protected at present, and there are currently no major threats. However, given its restricted range, it is potentially at risk from stochastic events and pollution from adjacent tourist sites.

Conservation Measures The known range is entirely within the Khao Chong Mountains protected area. The population status of this species requires careful monitoring, given that it is known only from a single location.

Bibliography: Kiew, B.H. (1984b), Matsui, M., Nabhitabhata, J. and Panha, S. (1998)

Data Providers: Peter Paul van Dijk, Jeet Sukumaran, Norsham Yaakob, Leong Tzi Ming, Yodchaiy Chuaynkern

VU *Ansonia tiomanica* Hendrickson, 1966

Vulnerable D2
Order, Family: Anura, Bufonidae
Country Distribution: Malaysia
Current Population Trend: Stable



© Jim McGuire

Geographic Range This species is known only from two localities on Tioman Island, Malaysia, at an altitude of 300-1,000m asl.

Population The population status of this species is unknown, but it is presumed to be stable at present.

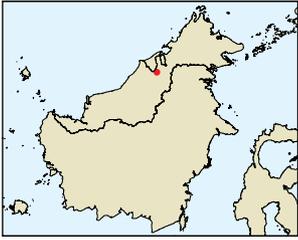
Habitat and Ecology It is associated with boulders and waterfalls in caves. Breeding is presumed to take place in streams.

Major Threats The species' habitat is not currently under immediate threat, but the potential clearance of habitat for tourism infrastructure is of concern for the future.

Conservation Measures Tioman Island has been designated as a protected area; continued enforcement of this protected status is required. Safeguarding caves and other high-altitude habitats on Tioman Island is needed. The population status of this species requires careful monitoring, given that it is known only from a single location.

Bibliography: Hendrickson, J.R. (1966)

Data Providers: Peter Paul van Dijk, Jeet Sukumaran, Norsham Yaakob, Leong Tzi Ming

VU *Ansonia torrentis* Dring, 1983**Vulnerable D2****Order, Family:** Anura, Bufonidae**Country Distribution:** Malaysia**Current Population Trend:** Stable

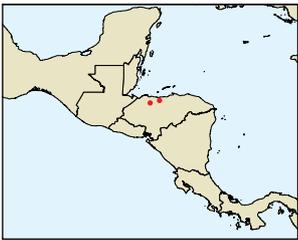
Geographic Range This species is known only from Gunung Mulu in northern Sarawak, Borneo, Malaysia, at 1,800m asl, though it is possible that it might occur in other montane forest blocks.

Population It is believed to be reasonably abundant.

Habitat and Ecology Specimens were observed calling beside a small, clear, mountain stream with a steep gradient. Breeding is presumed to take place in these forest streams.

Major Threats There are no current major threats to this species, but if Gunung Mulu is indeed the only locality at which this species occurs, then it might well be susceptible to stochastic threatening processes.

Conservation Measures The species has been recorded from Gunung Mulu National Park. Further survey work is needed to ascertain whether or not this species is indeed confined to Gunung Mulu. In any event, the population status of this species requires careful monitoring given that it is currently known from only a single location.

Bibliography: Dring, J.C.M. (1984b)**Data Providers:** Robert Inger, Indraneil Das, Robert Stuebing, Maklarin Lakim, Paul Yambun**EN** *Atelophryniscus chrysophorus* McCranie, Wilson and Williams, 1989**Endangered A2ac; B1ab(iii,v)****Order, Family:** Anura, Bufonidae**Country Distribution:** Honduras**Current Population Trend:** Decreasing

© James McCranie

Geographic Range This species occurs in the middle of the Cordillera Nombre de Dios along the Atlantic versant of north-central Honduras at 750-1,760m asl. It has been collected at only two sites, 60km apart.

Population It is uncommon, and the population has been decreasing over the last 15 years.

Habitat and Ecology It lives in premontane and lower montane wet forest, and is found breeding in clear water mountain streams.

Major Threats Major threats to this species include landslides in the upper reaches of streams (due to strong storms and human activities) and slash-and-burn agriculture. As a montane, stream-breeding species, declines could also be linked to chytridiomycosis.

Conservation Measures The upper elevations in the central Cordillera Nombre de Dios have been protected in Pico Bonito National Park since 1988 and also in Refugio de Vida Silvestre Texiguat. Research is urgently needed to determine whether or not this species has been affected by chytridiomycosis. If disease is shown to be a major threat, then a captive-breeding programme may need to be established.

Bibliography: Lavilla, E.O. and de Sá, R. (2001), McCranie, J.R. and Wilson, L.D. (2002b), McCranie, J.R., Wilson, L.D. and Williams, K.L. (1989), Wilson, L.D. and McCranie, J.R. (1998)

Data Providers: Gustavo Cruz, Larry David Wilson**CR** *Atelopus andinus* Rivero, 1968**Critically Endangered A3ce****Order, Family:** Anura, Bufonidae**Country Distribution:** Peru**Current Population Trend:** Decreasing

© Ted Kuhn

Geographic Range This species is restricted to the upper Río Biabo Valley (northern versant of the Cordillera Azul) (Departamento de San Martín), the Río Pisqui, (Departamento Loreto), and Río Cachiayacu (on the border of Departamentos San Martín and Loreto), Peru. Its recorded altitudinal range is 1,000-2,000m asl.

Population There is no information on its current population status, but it has been seen as recently as 2004 near Iquitos.

Habitat and Ecology It is a terrestrial species restricted to submontane tropical forest. Breeding is thought to take place in streams. This species is presumed to be susceptible to habitat change and is therefore not expected to occur in any modified or degraded habitats.

Major Threats There are no reports of chytridiomycosis impacting this *Atelopus* species, but it is presumed to be susceptible to this pathogen, which is now causing amphibian declines in northern Peru. It is possible that populations of this species at lower altitudes might be able to survive an outbreak of the disease.

Conservation Measures This species is present in the Parque Nacional Cordillera Azul. Given the susceptibility of this species to chytridiomycosis, successful conservation measures are likely to require some form of disease management programme and the maintenance of captive populations.

Bibliography: Alverson, W.S., Rodriguez, L.O. and Moskovits, D.K. (2001), Instituto Nacional de Recursos Naturales (INRENA) (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Lötters, S. *et al.* (2005), Lötters, S. and de la Riva, I. (1998), Pounds, J.A. *et al.* (2006), Rivero, J.A. (1968b), The Field Museum of Natural History (2002)

Data Providers: Stefan Lötters, Antonio Salas, Ariadne Angulo, Javier Icochea, Robert Reynolds, Enrique La Marca**CR** *Atelopus angelito* Ardila-Robayo and Ruiz-Carranza, 1998**Critically Endangered A3ce****Order, Family:** Anura, Bufonidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

Geographic Range This species is known only from Valencia, San Sebastián Municipality, in Cauca Department, Colombia, at elevations of 2,900-3,000m asl. It might occur more widely than current records suggest.

Population There is very little information available, but it was collected as recently as 2000.

Habitat and Ecology This species is found on vegetation along side streams in montane Andean forests and sub-páramo bush land. There is no information known about breeding habitats, or its ability to tolerate habitat disturbance.

Major Threats There have been serious declines of other high-elevation *Atelopus* species in the region suggesting that this species might also be at risk. The cause of the declines is still not fully understood, though chytridiomycosis is almost certainly involved, possibly in combination with the effects of climate change.

Conservation Measures The type locality is within Parque Na-

cional Natural Puracé, which might benefit in future from improved management. However, given the likely threat of chytridiomycosis, disease management and captive-breeding programmes might be required. Research into this species' population status and ecological requirements is needed, in particular to determine if it occurs outside the vicinity of the type locality.

Bibliography: Acosta-Galvis, A.R. (2000), Ardila-Robayo, M.C. and Ruiz-Carranza, P.M. (1998), La Marca, E. *et al.* (2005), Pounds, J.A. *et al.* (2006)

Data Providers: María Cristina Ardila-Robayo, Wilmar Bolívar, Jose Vicente Rueda, Andrés Acosta-Galvis, John Lynch

CR *Atelopus arsyecue* Rueda-Almonacid, 1994

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



© Juan Manuel Benjifo



Geographic Range This species is known only from the type locality: Parque Nacional Natural Sierra Nevada de Santa Marta in the department of Cesar, Colombia. It has been recorded between 2,000 and 3,500m asl. It might occur a little more widely on the Sierra Nevada de Santa Marta.

Population Only six specimens of this species are known, and there have been no records since 1991. It is not yet clear whether or not this reflects lack of survey effort, or a genuine rarity or decline.

Habitat and Ecology It occurs in sub-Andean and Andean forests, sub-páramo and páramo. Egg chains are placed in fast-flowing water, and the tadpoles develop in the water.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. Habitat loss caused by agricultural expansion and logging is also a major threat, as is pollution resulting from the fumigation of crops.

Conservation Measures Its range includes Parque Nacional Natural Sierra Nevada de Santa Marta. Further survey work is required to determine the population status of this species, especially in light of the recent drastic declines observed in other montane *Atelopus* species. Given the likely threat of chytridiomycosis, disease management and captive-breeding programmes might be required.

Bibliography: Acosta-Galvis, A.R. (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Rueda-Almonacid, J.V. (1994b), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Jose Vicente Rueda, Andrés Acosta-Galvis, Martha Patricia Ramirez Pinilla, Mariela Osorno-Muñoz, Adolfo Amézquita, María Cristina Ardila-Robayo

CR *Atelopus arthuri* Peters, 1973

Critically Endangered A2ace;
B1ab(iii,v)+2ab(iii,v)
Order, Family: Anura, Bufonidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



© Luis A. Coloma



Geographic Range This species is known from three localities on the Pacific versant of the Andes of Ecuador at an altitude of 2,200-3,000m asl. The type locality is 15km north of Pallatanga, in Chimborazo Province. The second and third localities are at Cashca Totoras and Las Guardias, respectively, in Bolívar Province.

Population This is an extremely rare species and it has not been recorded since 1988, despite searches, particularly at Cashca Totoras (Bustamante 2002). This suggests that a serious decline has taken place.

Habitat and Ecology It inhabits humid montane forest and sub-páramo. There is no specific information known about breeding habits, though it is likely to be similar to other *Atelopus* species, with breeding taking place in streams.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. The disease has been confirmed in *Gastrotheca pseustes* in the same area. Other major threats includes habitat loss due to agriculture, logging and infrastructure development for human settlement, and agricultural pollution.

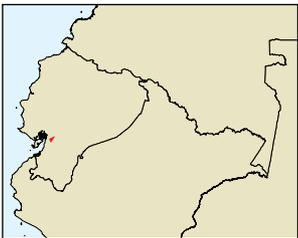
Conservation Measures The range of the species does not encompass any protected areas. However, it was protected in Bosque Protector Cashca Totoras (in Bolívar Province), where it disappeared. The species might be extinct, and it might be too late for measures such as captive breeding; additional survey work is required to confirm the continued persistence of this species in the wild.

Bibliography: Bustamante, M. R. (2002), La Marca, E. *et al.* (2005), Lötters, S. (1996), Merino-Viteri, A. (2001), Peters, J.A. (1973), Pounds, J.A. *et al.* (2006), Ron, S.R. and Merino, A. (2000)

Data Providers: Santiago Ron, Luis A. Coloma, Martín R. Bustamante, Diego Cisneros-Heredia, Mario Yáñez-Muñoz

CR *Atelopus balios* Peters, 1973

Critically Endangered A2ace
Order, Family: Anura, Bufonidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



© Luis A. Coloma



Geographic Range This species is known from only four localities in Azuay, Cañar, and Guayas Provinces in the Pacific lowlands of south-western Ecuador, from 200-460m asl.

Population This is now considered a very rare species. There have been no records since April 1995 despite repeated searches. It is no longer found at Río Patul (in Azuay province), where it used to be abundant (L. Coloma pers. comm.).

Habitat and Ecology It is an inhabitant of lowland rainforest, and has been found on riverbanks. There is no specific information known about breeding habits, though it is likely to be similar to other *Atelopus* species, with breeding taking place in streams.

Major Threats This species seems to have disappeared, as with many other *Atelopus* species, likely due to chytridiomycosis, although the altitude at which it occurs is low (the disease normally occurs at higher altitudes in the tropics). Habitat degradation and loss, due to agriculture (crops and livestock) and logging, and pollution, continue to be very serious threats.

Conservation Measures The range of the species does not include any protected areas. As the species might be extinct, it might be too late for conservation measures such as captive breeding; additional survey work is required to confirm the continued persistence of this species in the wild.

Bibliography: Coloma, L.A. and Lötters, S. (1996), La Marca, E. *et al.* (2005), Lötters, S. (1996), Parker III, T.A. and Carr, J.L. (1992), Peters, J.A. (1973), Pounds, J.A. *et al.* (2006)

Data Providers: Diego Cisneros-Heredia, Mario Yáñez-Muñoz, Luis A. Coloma, Santiago Ron

CR *Atelopus bomolochos* Peters, 1973

Critically Endangered A2ace
Order, Family: Anura, Bufonidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



© Luis A. Coloma



Geographic Range This species is found in the Cordillera Oriental in southern Ecuador, Azuay and Cañar Provinces, between 2,500 and 2,800m asl, where it has been recorded from at least 15 localities. There was one record from Parque Nacional Sangay. The specimens from the Departamento Piura, Peru, which referred to this species, are in fact specimens of an undescribed species (Coloma, Lötters and Salas 2000).

Population One individual was seen in 2002 in the Parque Nacional Sangay (D. Almeida pers. comm.), but otherwise this formerly abundant species has disappeared from its range.

Habitat and Ecology It lives in humid montane forest, sub-páramo, and páramo (Lötters 1996). Breeding takes place in streams.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. Dead and dying animals infected with the chytrid fungal pathogen have been collected in Ecuador (Ron *et al.* 2003), and it was the first species (in 1980) in Central or South America confirmed to have chytridiomycosis. It tolerates some habitat destruction, and can be found near streams in artificial grasslands. Introduced predators such as trout might threaten the species.

Conservation Measures The species has been recorded from Parque Nacional Sangay, which is a World Heritage Site. The population status of this species urgently needs to be assessed; given the threat of chytridiomycosis, successful conservation measures will probably need to include the maintenance of any surviving individuals in captivity.

Bibliography: Coloma, L.A., Lötters, S. and Salas, A.W. (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Merino-Viteri, A. (2001), Peters, J.A. (1973), Pounds, J.A. *et al.* (2006), Ron, S.R. *et al.* (2003), Ron, S.R. and Merino, A. (2000)

Data Providers: Luis A. Coloma, Santiago Ron, Stefan Lötters, Martín R. Bustamante, Andrés Merino-Viteri, Antonio Salas

CR *Atelopus boulengeri* Peracca, 1904

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



© Ted Kahn



Geographic Range This species is known from six localities in the provinces of Morona-Santiago and Loja, in the south-eastern versant of the Cordillera Oriental, the Cordillera de Cutucú, and the Cordillera del Cóndor, in eastern Ecuador. It has been recorded from 800-2,000m asl.

Population It is a rare species, and there have been no records since 1984, although some localities at which the species is known to occur have not been well surveyed. It is not known precisely whether or not populations have declined as observed in other *Atelopus* in the Ecuadorian Andes, though this seems likely.

Habitat and Ecology This species is an inhabitant of humid montane forest. There is no specific information known about breeding habits, though it is likely to be similar to other *Atelopus* species, with breeding taking place in streams.

Major Threats Agriculture, as well as mining and infrastructure development for human settlement, are major threats to the species' habitat, and much of the natural vegetation within its known distribution area has been cleared. Pollution of streams is also a threat. It is almost certainly at severe risk from chytridiomycosis.

Conservation Measures The distribution range of this species overlaps with Parque Nacional Sangay, which is a World Heritage Site. Surveys are urgently needed to determine whether or not this species still persists within its natural range. Given the threat of chytridiomycosis, successful conservation measures will probably need to include the maintenance of any surviving individuals in captivity.

Bibliography: Duellman, W.E. and Lynch, J.D. (1988), La Marca, E. *et al.* (2005), Lötters, S. (1996), Peracca, M.G. (1904), Peters, J.A. (1973), Pounds, J.A. *et al.* (2006)

Data Providers: Santiago Ron, Luis A. Coloma, Martín R. Bustamante, Diego Cisneros-Heredia, Ana Almandáriz, Manuel Morales

CR *Atelopus carauta* Ruiz-Carranza and Hernández-Camacho, 1978

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



Geographic Range This species is known from two localities: the type locality of Parque Nacional Natural Las Orquideas, and from Murri in La Blanquita, both in Antioquia Department, in north-western Colombia, between 1,300 and 2,000m asl.

Population It is uncommon. There do not appear to be any confirmed records since 1973, but it is not known if this is indicative of a decline, or simply a lack of survey effort.

Habitat and Ecology It occurs on vegetation alongside streams in sub-Andean forests. It has not been recorded outside forest. Its breeding habits are not known, though breeding is likely to take place in streams.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. Forest destruction for the creation of fruit plantations is occurring within the species' range.

Conservation Measures The type locality is within Parque Nacional

Natural Las Orquideas. More research into the species' distribution range, ecological requirements, and population status is needed, in particular to determine if it occurs outside the vicinity of the two known localities; given the threat of chytridiomycosis, successful conservation measures will probably need to include the maintenance of any surviving individuals in captivity.

Bibliography: Acosta-Galvis, A.R. (2000), Cannatella, D.C. (1981), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Ruiz-Carranza, P.M. and Hernández-Camacho, J.A. (1978), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Andrés Acosta-Galvis, Wilmar Bolívar, Fernando Castro, John Lynch

RIO CARAUTA STUBFOOT TOAD**CR** *Atelopus carbonerensis* Rivero, 1972

Critically Endangered A2ace; B2ab(v)
Order, Family: Anura, Bufonidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



© Pascual Soriani



Geographic Range This species is known from a single locality estimated to be less than 10km² in size (La Marca 1992) in the state of Mérida, in the Venezuelan Andes. In the past, it was most common at the Bosque de San Eusebio (La Carbonera). It has been recorded from 2,000-2,800m asl.

Population Populations of this frog seem to be restricted to the type locality, where it was formerly abundant, but is now extremely rare, and possibly even extinct. It was last recorded in 1998, despite intensive searches for the species. Observations of population declines were made by La Marca (1995b).

Habitat and Ecology This species is an inhabitant of cloud forest and it is found along streams. Surviving populations, if it is still extant, are restricted to an isolated patch of forest surrounded by pasturelands. It lays egg chains in streams, and the larvae develop in these streams.

Major Threats The first alert about the conservation status of the species was advanced by La Marca and Reinthaler (1991). As with other *Atelopus* species, the most likely cause of the dramatic decline is chytridiomycosis, which was confirmed in this species in 1988. Logging and agricultural expansion, both for crops and livestock, are major threats to the species' habitat. The recent introduction of *Rana catesbeiana* in places near the type locality poses the problem of a new predator. With higher insolation as a result of climate change, this species could be at increased risk due to its habit of basking in the sun. It has been recorded occasionally in the international pet trade although not at levels thought to pose a major threat to the species.

Conservation Measures This species occurs in Parque Nacional Sierra de La Culata and a few unprotected areas nearby (La Marca and Lötters 1997). Surveys to determine whether or not this species still survives are urgently needed. Given the threat of chytridiomycosis, surviving individuals might need to be maintained in captivity.

Notes on taxonomy: This species was elevated to species status by La Marca (1983).

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1983), La Marca, E. (1992), La Marca, E. (1995b), La Marca, E. *et al.* (2005), La Marca, E. and Lötters, S. (1997), La Marca, E. and Reinthaler, H.P. (1991), Lötters, S. (1996), Lötters, S., La Marca, E. and Vences, M. (2004), Pounds, J.A. *et al.* (2006), Rivero, J.A. (1972), Rodríguez, J.P. and Rojas-Suárez, F. (1995), Torres, D.A. and Barrio, C.L. (2001)

Data Providers: Enrique La Marca, Argelia Rodríguez, Juan Elias García-Pérez

VENEZUELAN YELLOW FROG**CR** *Atelopus carrikeri* Ruthven, 1916

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



© Juan Manuel Renjifo



Geographic Range This species is known from the páramos of the Sierra Nevada de Santa Marta, in the department of Magdalena, Colombia. It has been recorded between 2,350 and 4,800m asl.

Population The current population status of this species is unknown, but it was common in the past (1994). There has been no recent survey work due to security problems in the area.

Habitat and Ecology It occurs in sub-Andean and Andean forests, and páramo, and also the lower portion of snowy areas. It can adapt to some modification of its habitat. It lays egg chains in streams, where the tadpoles also develop.

Major Threats The most serious threat to this species is the risk of chytridiomycosis, which has had a devastating impact on other high-altitude *Atelopus* species. Climate change, habitat loss caused by agriculture, and crop fumigation, are all also major threats.

Conservation Measures Its range includes Parque Nacional Natural Sierra Nevada de Santa Marta. Surveys to determine the current population status of this species are urgently required. A captive-breeding programme might need to be established.

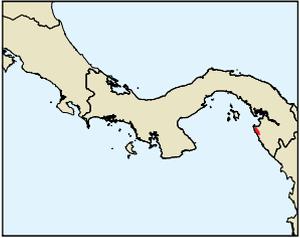
Notes on taxonomy: We follow Coloma (2002) in considering *Atelopus leoperezii* as a synonym of this species.

Bibliography: Acosta-Galvis, A.R. (2000), Ardila-Robayo, M.C. and Acosta-Galvis, A. (2000a), Coloma, L.A. (2002), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Rueda-Almonacid, J.V. (1994b), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Hernández-Camacho, J.A. (1994), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Andrés Acosta-Galvis, Martha Patricia Ramírez Pinilla, Mariela Osorno-Muñoz, Jose Vicente Rueda, Adolfo Amézquita, María Cristina Ardila-Robayo

EN *Atelopus certus* Barbour, 1923

Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Panama
Current Population Trend: Decreasing



© Andrew Crawford



Geographic Range This species is currently known only from the Cerro Sapo in south-western Darién Province, Panama. It is suspected that the species is more widely distributed, and may range through much of Parque Nacional Darién. It has been found at altitudes of 50-1,150m asl.

Population This species is locally common within its small range, and has been recorded as recently as 2003.
Habitat and Ecology This is a terrestrial species of tropical montane and submontane forest. Breeding and larval development takes place in forest streams.

Major Threats The main threats to the species are deforestation of habitat for agricultural use and general water pollution. Congeners are known to have virtually disappeared throughout much of Mesoamerica, probably due to chytridiomycosis, and this species might also be at risk from the disease, although it occurs at lower altitudes (the disease normally occurs at higher elevations in the tropics).

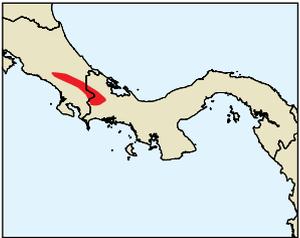
Conservation Measures It has been recorded from Parque Nacional Darién. Further survey work is needed to establish the limits of the species' range, and additional research is needed to establish whether chytridiomycosis might be a threat.

Bibliography: Ibáñez, R. *et al.* (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Savage, J.M. (1972a), Young, B. *et al.* (1999)

Data Providers: Frank Solís, Roberto Ibáñez, César Jaramillo, Querube Fuenmayor

CR *Atelopus chiriquiensis* Shreve, 1936

Critically Endangered A2ace
Order, Family: Anura, Bufonidae
Country Distribution: Panama, Costa Rica (Extinct)
Current Population Trend: Decreasing



© David M. Dennis



Rica since 1996 and the species is now considered to be extinct in that country; it might also have disappeared in Panama.

Population This species was once considered locally abundant along streams. In Costa Rica this species has disappeared from its entire range, and there have been no sightings since 1996 despite many searches in appropriate montane habitats. The population status in Panama shows evidence of a decline, with no records since the late 1990s.

Habitat and Ecology It is a diurnal, terrestrial species of stream margins in lower montane wet forest and rainforest. Males are territorial and use an advertisement call to maintain a breeding site. Breeding and larval development for this species takes place in forest streams (Savage 2002).

Major Threats Marked declines have been noticed in its extent of occurrence. In Costa Rica the decline and probable extinction of this species has been linked to chytridiomycosis (Lips 1998), which was confirmed in this species in 1993 and 1994. Introduction of predatory trout, and general habitat loss both outside, and within protected areas, are also threats to remaining populations. Climate change is considered to be a possible threat.

Conservation Measures The range of the species is within the protected areas of Parque Nacional Chirripó and Parque Internacional La Amistad. The threat of chytridiomycosis means that successful conservation measures will probably need to include the maintenance of any surviving individuals in captivity.

Bibliography: Ibáñez, R. *et al.* (2000), La Marca, E. *et al.* (2005), Lindquist, E.D. and Swihart, D.W. (1997), Lips, K.R. (1998), Lips, K.R. (1999), Lips, K.R., Green, D.E. and Papendick, R. (2003), Lips, K.R., Reeve, J.D. and Witters, L.R. (2003), Lötters, S. (1996), Pounds, J.A. (2006), Savage, J.M. (1972a), Savage, J.M. (2002), Young, B. *et al.* (1999)

Data Providers: Karen Lips, Roberto Ibáñez, Federico Bolaños, Gerardo Chaves, Frank Solís, Jay Savage, César Jaramillo, Querube Fuenmayor, A. Castillo

CR *Atelopus chocoensis* Lötters, 1992

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species is known from the type locality: Cerro del Ingles near San Jose del Palmor, close to Serranía de los Paraguas, in Choco department, between 1,900 and 2,200m asl. It is also known from Boqueron in the Municipality of El Cairo, Valle del Cauca department, in Colombia. It might occur a little more widely.

Population The current population status is unknown, and it is known from less than 10 specimens. The species was last collected in 1998, and the area has most likely not been surveyed since then.

Habitat and Ecology A terrestrial species, it occurs in montane forest on the forest floor and near the forest edge. It has not been recorded from anthropogenically disturbed habitats. Its breeding habits are not known, although breeding is likely to take place in streams.

Major Threats Like other *Atelopus* species, it is presumably at serious risk from chytridiomycosis. Habitat loss due to subsistence wood collection and clear-cutting, and forest clearance for the planting of illegal crops and cattle ranching, is also a major threat.

Conservation Measures The range of the species includes the Parque Nacional Natural Tatamá. More research into the species' range, ecological requirements, and population status is needed. The threat of chytridiomycosis means that successful conservation measures will probably need to include the maintenance of any surviving individuals in captivity.

Bibliography: Acosta-Galvis, A.R. (2000), La Marca, E. *et al.* (2005), Lötters, S. (1992a), Lötters, S. (1996), Pounds, J.A. *et al.* (2006)

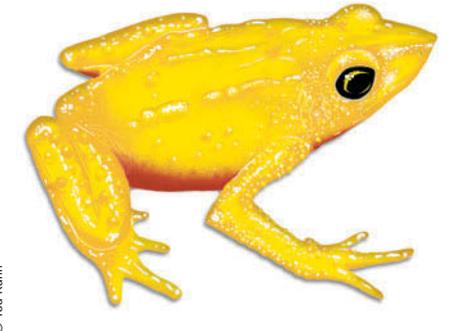
Data Providers: Fernando Castro, Stefan Lötters, Jose Vicente Rueda

CR *Atelopus chrysochlorus* La Marca, 1994

Critically Endangered A2ace; B1ab(iii,v)+2ab(iii,v)
Order, Family: Anura, Bufonidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



© Ted Kahn



Geographic Range This species is restricted to the type locality, near the village of Tostós in Trujillo State, in the Venezuelan Andes. Its known range is less than 100km². It has been recorded from 2,000-2,700m asl.

Population It is a rare species, and there have been no records since it was discovered in 1988. A subsequent survey failed to record this species again, suggesting a possible decline, as is the case with many other Venezuelan *Atelopus* species.

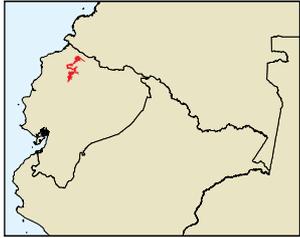
Habitat and Ecology It is a diurnal, photophilic species found on the floor of cloud forest. It lays egg chains in streams, where the tadpoles also develop.

Major Threats The most critical threat to this species is probably chytridiomycosis. However, the type locality lies within an unprotected forested area that has been altered at a fast rate, mainly due to subsistence wood collection, and conversion to crop lands and pasture lands. With higher insolation as a result of climate change, this species could be at increased risk due to its habit of basking in the sun. La Marca and Lötters (1997) indicated that severe floods might have affected populations of this species.

Conservation Measures Its range does not include any protected areas, and surveys are urgently needed to confirm the continued existence of this species. Given the threat of chytridiomycosis, successful conservation measures will probably need to include the maintenance of any surviving individuals in captivity.

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1994b), La Marca, E. *et al.* (2005), La Marca, E. and Lötters, S. (1997), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Rodríguez, J.P. and Rojas-Suárez, F. (1995)

Data Providers: Enrique La Marca, Juan Elias Garcia-Pérez

CR *Atelopus coynei* Miyata, 1980**Critically Endangered A2ace****Order, Family:** Anura, Bufonidae**Country Distribution:** Ecuador**Current Population Trend:** Decreasing

© Ted Kahn, based on a photograph by Ken Miyata

**Geographic Range** This species is known from the provinces of Pichincha, Imbabura, and Carchi on the Pacific versant of the Andes in north-western Ecuador. It has been recorded from 600-1,380m asl.**Population** It is a rare species and has not been recorded since September 1984. It has probably undergone a serious population decrease.**Habitat and Ecology** This species is an inhabitant of humid north-western Andean montane forest. It appears to be able to adapt to secondary forest. It lays its eggs in swift-flowing streams and rivers. It has typical *Atelopus* tadpoles, attached to rocks.**Major Threats** The most critical threat to this species is probably chytridiomycosis. Agriculture, both crops and livestock, as well as logging and infrastructure development for human settlement, are major threats to the species' habitat.**Conservation Measures** The range of this species includes the Reserva Ecológica Cotacachi-Cayapas. Surveys are needed to establish whether or not this species still survives in the wild. Given the threat of chytridiomycosis, successful conservation measures will probably need to include the maintenance of any surviving individuals in captivity.**Bibliography:** La Marca, E. *et al.* (2005), Lötters, S. (1996), Miyata, K. (1980), Pounds, J.A. *et al.* (2006)**Data Providers:** Santiago Ron, Luis A. Coloma, Martín R. Bustamante, Diego Cisneros-Heredia, Ana Almandáriz, Mario Yáñez-Muñoz**CR** *Atelopus cruciger* (Lichtenstein and Martens, 1856)**Critically Endangered A2ace****Order, Family:** Anura, Bufonidae**Country Distribution:** Venezuela**Current Population Trend:** Decreasing

© Francisco José López-López

**Geographic Range** This species is restricted to several localities in the northern and southern versants of the Cordillera de la Costa of Venezuela (Estados Aragua, Carabobo, Miranda, Vargas, Yaracuy and the Distrito Federal) and recently from the Cerro Azul (Estado Cojedes) (Rivas Fuenmayor 1998) which suggests that the species might be present throughout the entire mountainous area of the central coastal range (Lötters, La Marca and Vences 2004). It has been recorded from 30-2,200m asl.**Population** Although this species was once abundant, it has undergone an extreme decline, to the point that despite extensive surveys no specimens have been seen since 1986 and there are no museum records after 1988 (La Marca1995; La Marca and Lötters 1997; Manzanilla and La Marca 1999; Lötters, La Marca and Vences 2004). Recently (2004), a single small population of *A. cruciger* has been found just south of the town of Cata within the limits of the 107,000-ha Parque Nacional Henri Pittier, in cloud forest at 600m asl.**Habitat and Ecology** It is a diurnal species usually found on rocks of rivulets or the surroundings, where they can climb on to plants up to 1.5m above ground. The general habitat is humid forest in montane and lowland environments. It breeds along swift-flowing streams. The recently rediscovered population was found by a cascading mountain stream in cloud forest.**Major Threats** The major cause of the observed population decline of this species is chytridiomycosis, which was confirmed in 1986 (Bonaccorso *et al.* 2003). Pollution by acid rain could be another possible threat, given the vicinity of the species to the large concentration of industries generating polluting gases in the nearby area of Valencia-Maracay. Droughts and flash floods could be a further potential threat, as well as over collecting for scientific or pet trade purposes.**Conservation Measures** Many of the known localities are within the Parque Nacional Henri Pittier, Parque Nacional Rancho Grande, and Parque Nacional San Esteban. Monitoring of the populations, establishment of a captive-breeding population, and disease management are all urgently required.**Notes on taxonomy:** This species was recently redescribed by Lötters, La Marca and Vences (2004) following the discovery that the original type material represents *Atelopus varius* of Central America. The former junior synonym *A. vogli* is considered to be a distinct species following Lötters, La Marca and Vences (2004).**Bibliography:** Barrio Amorós, C.L. (2004), Bonaccorso, E. *et al.* (2003), Guayasamin, J.M. *et al.* (2002), La Marca, E. (1995b), La Marca, E. *et al.* (2005), La Marca, E. and Lötters, S. (1997), Lichtenstein, M.H.C. and Von Martens, E.C. (1856), Lötters, S. (1996), Lötters, S., La Marca, E. and Vences, M. (2004), Manzanilla, J. (2001), Manzanilla, J. *et al.* (1995), Manzanilla, J. and La Marca, E. (1999), Manzanilla, J. and La Marca, E. (2004), Pounds, J.A. *et al.* (2006), Rivas Fuenmayor, G. (1998), Rodríguez, J.P. and Rojas-Suárez, F. (1995), Solano de Chacín, H. (1968)**Data Providers:** Jesús Manzanilla, Enrique La Marca, Ronald Heyer, Ernesto Fernández-Badillo**RANCHO GRANDE HARLEQUIN FROG****EN** *Atelopus dimorphus* Lötters, 2003**Endangered A3e****Order, Family:** Anura, Bufonidae**Country Distribution:** Peru**Current Population Trend:** Decreasing

© Reiner Schulte

**Geographic Range** This species is known only from the western versant of the Cordillera Azul, Huánuco Department, Peru, where it has been observed between 1,650 and 1,800m asl.**Population** It is currently known only from museum specimens, and was last recorded in 1980.**Habitat and Ecology** The general habitat in the area of collection is humid mountain forest. It is presumed to be a stream-breeding species.**Major Threats** The threats to the species within its range on the Cordillera Azul have not been recorded. However, like other members of its genus, it is assumed to be at severe risk from chytridiomycosis.**Conservation Measures** It is not known to occur in any protected areas. In view of the likely threat of chytridiomycosis, it is a very high priority to conduct surveys to locate this species and determine its current population status; a captive-breeding programme may also need to be established.**Bibliography:** La Marca, E. *et al.* (2005), Lötters, S. (2003), Lötters, S. *et al.* (2005), Pounds, J.A. *et al.* (2006)**Data Providers:** Stefan Lötters**CR** *Atelopus ebenoides* Rivero, 1963**Critically Endangered A2ace+3ce****Order, Family:** Anura, Bufonidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

© Rocha, C. GESA - UPTC

**Geographic Range** This species occurs in the southern part of the Colombian Andes in Cauca and Huila Departments, with a separate northern population (*Atelopus ebenoides marinkellei*) at the Páramo de las Papas, in the Department of Boyacá, in the Cordillera Oriental of Colombia. Its altitudinal range is 2,500-4,700m asl.**Population** The northern population had not been recorded since 1995, until its remarkable rediscovery in early May of 2006 in the highlands of Boyacá. The southern populations were last recorded in 1992, though there have not been any recent surveys.**Habitat and Ecology** It occurs on vegetation, mosses and in leaf-litter along streams in Andean forests and páramos. It has not been recorded from disturbed habitat. The tadpoles develop in streams.**Major Threats** The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. Habitat loss caused by agricultural expansion (cattle ranching and the planting of illegal crops), as well as pollution from the fumigation of crops, and water source loss are all threats.**Conservation Measures** It occurs in the Parque Nacional Natural Puracé. Survey work has recently confirmed the persistence of the northern population, but additional surveys are needed to ascertain the population status of the southern population. Given the threat of chytridiomycosis, successful conservation measures will probably need to include the maintenance of any surviving individuals in captivity. Research is also needed to confirm the taxonomic status of the northern populations of the species.**Notes on taxonomy:** The northernmost population of this species is sometimes regarded as a separate species (*Atelopus marinkellei*).**Bibliography:** Ardila-Robayo, M.C. and Acosta-Galvis, A. (2000b), Cochran, D.M. and Goin, C.J. (1970), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)**Data Providers:** Alberto Cadena, Andrés Acosta-Galvis, Wilmar Bolívar, John Lynch

CR *Atelopus elegans* (Boulenger, 1882)**Critically Endangered A2ace****Order, Family:** Anura, Bufonidae**Country Distribution:** Colombia, Ecuador**Current Population Trend:** Decreasing

© Luis A. Coloma



Geographic Range This species occurs in north-western Ecuador in Esmeraldas, Imbabura, and Pichincha Provinces, at 300-1,140m asl, and on Gorgona Island, a small island 30km off the Colombian coast on the Pacific side, where it occurs close to sea level.

Population In Ecuador, it has declined very seriously and has disappeared in the last ten years, with no records since November 1994, apart from one record in November 2002 from Bogotá River in Esmeralda Province. For example, in a recent survey, it was not found 5km north-west of Alluriquín (in Pichincha Province), where it used to be abundant (L. Coloma pers. comm.). On Gorgona Island, the species is still very common.

Habitat and Ecology It lives in lowland and submontane humid rainforest, and has not been found in degraded habitats. It breeds in streams.

Major Threats The decline in Ecuador is unexplained, and is possibly due to chytridiomycosis, although its elevational range is rather low for this disease. It is also impacted by habitat destruction and degradation, due to agriculture, logging, and human settlement.

Conservation Measures In Ecuador, its range overlaps with the Reserva Ecológica Cotacachi-Cayapas. In Colombia it occurs in the Parque Nacional Natural Isla Gorgona. It is an urgent priority to locate the Ecuadorian population and to implement emergency *ex-situ* conservation measures. Close monitoring of the population on Gorgona Island is needed, since, as far as is known, chytrid has not yet been recorded from this population.

Notes on taxonomy: The population on Gorgona Island (i.e., *Atelopus gracilis*) should be removed from the synonymy of *Atelopus elegans* (S. Lötters pers. comm.), but is here provisionally retained in *A. elegans* pending revision.

Bibliography: Ardila-Robayo, M.C. and Acosta-Galvis, A. (2000b), Boulenger, G.A. (1882b), Cochran, D.M. and Goin, C.J. (1970), Coloma, L.A. and Ron, S.R. (2001), La Marca, E. *et al.* (2005), Lötters, S. (1996), Peters, J.A. (1973), Pounds, J.A. *et al.* (2006), Rivero, J.A. (1963b), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996), Urbina, J.N. and Londono, M.C. (2003)

Data Providers: Luis A. Coloma, Santiago Ron, Wilmar Bolívar, Diego Cisneros-Heredia, Stefan Lötters

CR *Atelopus erythropus* Boulenger, 1903**Critically Endangered A3ce****Order, Family:** Anura, Bufonidae**Country Distribution:** Peru**Current Population Trend:** Decreasing

© Alessandro Catenazzi



Geographic Range This species is known only from the vicinity of the type locality of Cordillera Carabaya on the Amazonian versant of Departamento Puno, Peru. Records of this species from Departamento Huanuco and Departamento Ucayali (Rodríguez, Cordova and Icochea 1993) require further investigation. It has an altitudinal range of 1,800-2,500m asl.

Population Its population is unknown, but it might be declining. It has been recorded as recently as 2003.

Habitat and Ecology This species' habitat is cloud forest on the Amazonian versant of the Peruvian Andes. The species is not expected to be tolerant of habitat degradation. Breeding is presumed to take place in streams.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. This disease has not yet been recorded in this species, but incidence of the disease is known to be spreading in northern Peru.

Conservation Measures This species is not present in any protected areas. If chytridiomycosis is indeed shown to be a threat to this species, then the maintenance of populations in captivity will be a needed conservation measure.

Bibliography: De la Riva, I. *et al.* (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Lötters, S. (2003), Lötters, S. and de la Riva, I. (1998), Pounds, J.A. *et al.* (2006), Rodríguez, L.O., Cordova, J.H. and Icochea, J. (1993)

Data Providers: Ariadne Angulo, Karl-Heinz Jungfer, Robert Reynolds, Javier Icochea, Stefan Lötters, Roberto Ibañez, Juan Carlos Chaparro-Auza, César Aguilar Puntriano

CR *Atelopus eusebianus* Rivero and Granados, 1993**Critically Endangered A3ce****Order, Family:** Anura, Bufonidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

© Francisco José López-López



Geographic Range This species is known from a few locations all within close proximity in the Cauca Department, on the western slope of the central Andes, Totoro-Malvasa, in Colombia, between 2,820 and 3,250m asl.

Population One recent survey found no individuals, although another survey in 2004 did record several individuals. It is not known to what extent the species is in overall decline.

Habitat and Ecology It occurs along streams on vegetation in páramo, and has not been recorded from disturbed habitat. Breeding and larval development takes place in streams.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*. Other, localized threats include habitat loss caused by agricultural expansion (cattle ranching and the planting of illegal crops), water extraction, and fumigation of illegal crops. Climate change might also be impacting the species.

Conservation Measures It occurs in the Parque Nacional Natural Puracé. More research into the species' range, ecological requirements, and population status is needed, and in particular surveys are needed to determine whether or not the species is currently in decline as has been evidenced in other high-elevation stream-dwelling *Atelopus* species in the region. A captive-breeding programme might need to be established for this species.

Bibliography: Acosta-Galvis, A.R. (2000), Ardila-Robayo, M.C. and Acosta-Galvis, A. (2000b), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Rivero, J.A. and Granados-Díaz, H.G. (1993), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Jose Vicente Rueda, Maria Isabel Herrera, Fernando Castro, Andrés Acosta-Galvis, Enrique La Marca, Wilmar Bolívar, John Lynch

CR *Atelopus exiguus* Boettger, 1892**Critically Endangered A3ce****Order, Family:** Anura, Bufonidae**Country Distribution:** Ecuador**Current Population Trend:** Decreasing

© Eduardo Toral



Geographic Range This species is known from the type locality, Laguna Llaviuco, in Azuay province, and from the nearby vicinity in the Cordillera Occidental of southern Ecuador. It is known from eight localities, and has been recorded from 3,150-3,850m asl.

Population This historically abundant species was recorded in May 1995, at a time when no decline was recorded (Coloma, Lötters and Salas 2000). Since then, there has been little survey work, but it is expected that the species has undergone a population decline across its range, although it is still known to survive in the wild (La Marca *et al.* 2005).

Habitat and Ecology It is an inhabitant of sub-páramo and páramo, but is also known to occur in pastureland around the Laguna Llaviuco. Breeding and larval development take place in streams.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*. Agriculture, both crops and livestock, as well as climate change and the construction of dams are major threats to the species' habitat. Invasive trout species might prey on tadpoles of this species.

Conservation Measures The range of this species includes Parque Nacional Cajas and Parque Nacional Mazán. The population status of this species urgently needs to be assessed and, given the threat of chytridiomycosis, the maintenance of individuals in captivity is a recommended conservation measure. It is also necessary to control trout populations within the protected areas.

Notes on taxonomy: This species was removed from the synonymy of *Atelopus ignescens* by McDiarmid (1971).

Bibliography: Boettger, O. (1892), Coloma, L.A., Lötters, S. and Salas, A.W. (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), McDiarmid, R. (1971), Merino-Viteri, A. (2001), Pounds, J.A. *et al.* (2006), Ron, S.R. and Merino, A. (2000)

Data Providers: Eduardo Toral, Manuel Morales, Diego Cisneros-Heredia, Luis A. Coloma, Santiago Ron, Martín R. Bustamante

CR *Atelopus famelicus* Rivero and Morales, 1995 "1992"

Critically Endangered A2ace
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



Geographic Range This species is known from two localities: the type locality (La Costa), and El Tambito, both localities on the western slope of the Cordillera Occidental of the Andes, in Cauca Department, Colombia, between 1,300 and 1,580m asl.

Population It is known from only a few specimens, and, despite survey work, has not been recorded since 1993.

Habitat and Ecology It is a terrestrial species found in montane forest, and which has not been recorded outside forest. Its breeding habits are not known, but presumably it breeds in streams like other species of the genus.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*. There is also a threat of pollution resulting from fumigation of the illegal crops grown in Parque Nacional Natural Munchique.

Conservation Measures The two localities are on the border of

Parque Nacional Natural Munchique, where it has been recorded from the private protected area of the El Tambito Proselva Foundation. Further survey work is required to determine the current population status of this species in the wild. Given the threat of chytridiomycosis, any surviving individuals might need to be maintained in captivity.

Notes on taxonomy: This species was previously confused with *Atelopus longirostris* and *Atelopus lynchi*, according to Rivero and Morales (1995).

Bibliography: Acosta-Galvis, A.R. (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Rivero, J.A. and Morales, V.R. (1995), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996), Ruiz-Carranza, P.M., Vélez and Ardila-Robayo, M.C. (1995)

Data Providers: Wilmar Bolívar, Andrés Acosta-Galvis, John Lynch, Stefan Lötters

CR *Atelopus farci* Lynch, 1993

Critically Endangered A2ace; B2ab(iii,v)
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



© Juan Manuel Renjifo



Geographic Range This species is known from only one site: Granjas del Padre Luna, Municipio de Alban, western slope of the Cordillera Oriental, in Cundinamarca Department, Colombia, at 2,090m asl.

Population This species was known to be abundant up until around 1995. Six subsequent visits and some 80 hours of searching during the course of 2002-2003 turned up only one tadpole, perhaps indicative of a serious decline.

Habitat and Ecology It occurs in streams in cloud forest. It also reproduces in rapid streams.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*. Habitat loss is also a major threat to this species, mainly caused by agricultural expansion and human settlement.

Conservation Measures This species is not known to occur in any protected area, and there is an urgent need for improved habitat protection at its only known locality. Further survey work is required to determine the current population status of this species. Given the probable threat of chytridiomycosis, disease management and captive-breeding programmes might be required.

Bibliography: La Marca, E. *et al.* (2005), Lötters, S. (1996), Lynch, J.D. (1993b), Pounds, J.A. *et al.* (2006), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Jose Vicente Rueda, Wilmar Bolívar, Andrés Acosta-Galvis

VU *Atelopus flavescens* Duméril and Bibron, 1841

Vulnerable A3ce
Order, Family: Anura, Bufonidae
Country Distribution: French Guiana
Current Population Trend: Stable



© Renaud Boistel



Geographic Range This species is known from north-eastern coastal and central French Guiana. It occurs from sea level up to 300m asl.

Population This is a common species, although it is not common in Mont Grand Matoury and Matoury region. It has been recorded as recently as 2000.

Habitat and Ecology This species is known from the proximity of fast-flowing small streams in lowland primary forest. It has not been recorded outside primary forest. Embryonic and larval development occurs in water.

Major Threats There are no present threats to this species, but future threats will most likely include shifting agriculture and clear-cutting of the forests. Although illegal, there is still some collection for the pet trade, but at present this is not a major threat to the species. This species probably occurs at elevations below the altitude at which chytridiomycosis seems prevalent, though this nonetheless remains a potential future threat.

Conservation Measures The range of this species includes Matoury Nature Reserve and Kaw Nature Reserve. Continued population monitoring is required, especially in light of the potential threat of chytridiomycosis.

Notes on taxonomy: *Atelopus spumarius barbotini* has been suggested to represent a junior synonym of this species (Kok 2000).

Bibliography: Boistel, R., Grosjean, S. and Lötters, S. (2005), Duméril, A.M.C. and Bibron, G. (1841), Kok, P.J.R. (2000), La Marca, E. *et al.* (2005), Lescure, J. (1974), Lescure, J. (1981a), Lescure, J. and Marty, C. (2000), Lötters, S. (1996), Lynch, J.D. (1993b), McDiarmid, R.W. (1973), Mudde, P. (1996), Pounds, J.A. *et al.* (2006), Schmidt, M. (1999), van den Nieuwenhuizen, A. (2003a), van den Nieuwenhuizen, A. (2003b)

Data Providers: Jean Lescure, Christian Marty, Renaud Boistel, Stefan Lötters, Enrique La Marca, Robert Reynolds, Marinus Hoogmoed, Ross MacCulloch, Philippe Gaucher, Stefan Lötters

VU *Atelopus franciscus* Lescure, 1974

Vulnerable A3ce
Order, Family: Anura, Bufonidae
Country Distribution: French Guiana
Current Population Trend: Stable



© Christian Marty



Geographic Range This species is known from central coastal French Guiana. It has been recorded from 5-200m asl.

Population It is a locally common species (Lescure and Marty 2001), and was recorded as recently as 2000.

Habitat and Ecology This species is found near fast-flowing small streams and creeks in lowland rainforest; it is not known from any disturbed habitats. Eggs are laid in the water and the tadpoles adhere to rocks.

Major Threats There are no current major threats. However, it is potentially at risk from chytridiomycosis, although it occurs at low altitudes (which might afford it a degree of protection from this disease). An illegal international pet trade exists for this species, but it is not a threat to the species as a whole.

Conservation Measures The range of the species includes several nature reserves. Continued population monitoring is required, especially in light of the potential threat of chytridiomycosis.

Bibliography: Boistel, R., Grosjean, S. and Lötters, S. (2005), La Marca, E. *et al.* (2005), Lescure, J. (1974), Lescure, J. and Marty, C. (2000), Lötters, S. (1996), Pounds, J.A. *et al.* (2006)

Data Providers: Jean Lescure, Christian Marty, Marga Born, Renaud Boistel, Robert Reynolds, Marinus Hoogmoed, Ross MacCulloch, Philippe Gaucher, Stefan Lötters

CR *Atelopus galactogaster* Rivero and Serna, 1993 "1991"

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Unknown



© César Landrázabal



Geographic Range This species is known from two localities within Parque Nacional Natural Paramillo, in Antioquia Department, on the northern slope of the western Andes, in Colombia, at 1,500m asl.

Population This species is known only from ten specimens; however, there has been no recent survey work within its range.

Habitat and Ecology Both of the known localities are within primary forest, but no other information is available on the species' habitat requirements or breeding habits.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*.

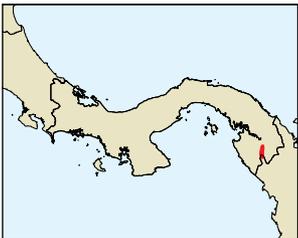
Conservation Measures Both known localities of the species are within Parque Nacional Natural Paramillo. Further research into the species' range, ecological requirements, and population status is needed, in particular to determine if it occurs outside its current known range. Given the likely threat of chytridiomycosis, disease management and captive-breeding programmes might be required.

Bibliography: Acosta-Galvis, A.R. (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Rivero, J.A. and Serna, M.A. (1993), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Jose Vicente Rueda, Stefan Lötters, John Lynch

CR *Atelopus glyphus* Dunn, 1931

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia, Panama
Current Population Trend: Decreasing



© Andrew Crawford



Geographic Range This species occurs in eastern Panama, in the Serranía de Pirre, and also the Chocó of Colombia, at 884-1,500m asl.

Population It is considered to be generally common within its known range. It was still common in September 2002 in the Serranía de Pirre, above Cana, in eastern Panama (R. Ibáñez pers. obs.).

Habitat and Ecology It is a terrestrial species of tropical montane forest, with breeding and larval development taking place in forest streams. There is no information on whether or not this species can survive in degraded habitats.

Major Threats The major threat is likely to be a future catastrophic decline, due to chytridiomycosis, as has occurred in many other species of *Atelopus*. Additional threats include habitat loss due to agricultural development (including the planting of illegal crops), logging, and human settlement, and pollution resulting from the spraying of illegal crops.

Conservation Measures The species has been recorded from two protected areas: Parque Nacional Darién (a World Heritage Site) in Panama and Parque Nacional Natural los Katíos in Colombia. In view of the severe risk of chytridiomycosis, the status of this species should be closely monitored, and *ex-situ* populations should be established.

Bibliography: Ibáñez, R. *et al.* (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996), Savage, J.M. (1972a), Young, B. *et al.* (1999)

Data Providers: Roberto Ibáñez, Frank Solís, César Jaramillo, Querube Fuenmayor, Stefan Lötters, Jose Vicente Rueda, Andrés Acosta-Galvis

CR *Atelopus guanujo* Coloma, 2002

Critically Endangered A2ace
Order, Family: Anura, Bufonidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



© Luis A. Coloma



Geographic Range This species is known only from the type locality and its immediate vicinity (Guaranda, Gallo Rumi) in the Chimbo Basin of the Cordillera Occidental of Ecuador, in the province of Bolívar. These localities are between 2,600 and 2,923m asl in the upper Río Chimbo Valley (Coloma 2002).

Population It is a rare species, and the most recent record dates from April 1988 (Coloma 2002). Since then, survey efforts have been unsuccessful in finding any individuals, suggesting a serious population decline and possible extinction.

Habitat and Ecology This species is an inhabitant of humid cloud forest. Frogs have also been collected in disturbed montane cloud forest areas (Coloma 2002). There is no specific information on breeding habits, but it is likely to be similar to other *Atelopus* species, with breeding and larval development taking place in streams.

Major Threats The most likely cause of the species' population decline is chytridiomycosis. Habitat loss is also a major threat, due to agriculture (crops, livestock, and wood plantations), logging, and infrastructure development for human settlement. Invasive species such as dogs, cats, and chickens also prey on this species.

Conservation Measures The known range of the species does not include any protected areas. Surveys are needed to establish whether or not this species still persists in the wild. In view of the severe threat of chytridiomycosis, any surviving populations should be maintained in captivity.

Bibliography: Coloma, L.A. (2002), La Marca, E. *et al.* (2005), Merino-Viteri, A. (2001), Pounds, J.A. *et al.* (2006), Ron, S.R. and Merino, A. (2000)

Data Providers: Luis A. Coloma, Santiago Ron, Martín R. Bustamante, Diego Cisneros-Heredia, Ana Almandáriz

CR *Atelopus guitarraensis* Osorno Muñoz, Ardila-Robayo and Ruíz-Carranza, 2001

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



Geographic Range This species is only known to occur in the Laguna de Guitara, Parque Nacional Natural Sumapaz, Meta Department, Colombia, at 3,400m asl.

Population It is rare, being recorded only from two expeditions conducted in 1975 and 1990. There has been no subsequent survey work for this species.

Habitat and Ecology It lives and reproduces in streams in páramo habitats.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*. Its habitat is threatened by fires caused by cattle ranchers.

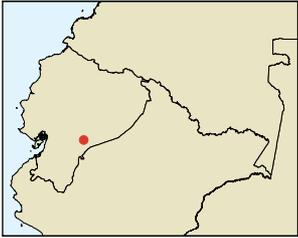
Conservation Measures This species occurs in the Parque Nacional Natural Sumapaz. Further work is required to determine the population status of this species; given the threat of chytridiomycosis, a captive-breeding programme might need to be established for this species.

Bibliography: La Marca, E. *et al.* (2005), Osorno Muñoz, M., Ardila-Robayo, M.C. and Ruiz-Carranza, P.M. (2001a), Osorno Muñoz, M., Ardila-Robayo, M.C. and Ruiz-Carranza, P.M. (2001b), Pounds, J.A. *et al.* (2006)

Data Providers: Mariela Osorno-Muñoz, María Cristina Ardila-Robayo, Andrés Acosta-Galvis

CR *Atelopus halihelos* Peters, 1973

Critically Endangered A2ace; B1ab(iii)+Zab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



© Ted Kahn



Geographic Range This species is known only from the Cordillera Cutucú, in Morona-Santiago Province, in southern Ecuador, around 1,975m asl.

Population Although sampling effort through the species' range is insufficient, it is likely that this species has undergone a population decline (as seen in other montane species of *Atelopus*). It was last recorded in 1984, and is perhaps no longer present at the type locality.

Habitat and Ecology This species is an inhabitant of humid montane forest. There is no specific information on their breeding habits, but these are likely to be similar to other *Atelopus* species, with breeding and larval development taking place in streams.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude *Atelopus* species. Agriculture, both crops and livestock, as well as logging and infrastructure development for human settlement are major threats to the species' habitat.

Conservation Measures It is not known to occur in any protected areas. Surveys to confirm the continued existence of this species are needed; given the threat of chytridiomycosis, surviving individuals should be maintained in captivity.

Bibliography: Duellman, W.E. and Lynch, J.D. (1988), La Marca, E. *et al.* (2005), Lötters, S. (1996), Peters, J.A. (1973), Pounds, J.A. *et al.* (2006)

Data Providers: Santiago Ron, Luis A. Coloma, Martín R. Bustamante

CR *Atelopus laetissimus* Ruíz-Carranza, Ardila-Robayo and Hernández-Camacho, 1994

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species is known from the slopes of south-east Cuchilla San Lorenzo, in the north-west sector of Parque Nacional Natural Sierra Nevada de Santa Marta (in the department of Magdalena), and the adjacent El Dorado Nature Reserve, in Colombia. It has been recorded from 1,900-2,880m asl.

Population This was a common species when last recorded in 1992. A population was rediscovered on 22 May 2006 when staff of the El Dorado Nature Reserve located two individuals in a small forested stream.

Habitat and Ecology This species is an inhabitant of sub-Andean forests. It can also adapt to some modification of its habitat. It lays egg chains in streams, where the tadpoles also develop.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude *Atelopus* species. Climate change, habitat loss due to agriculture, and pollution from the fumigation of illegal crops are also major threats.

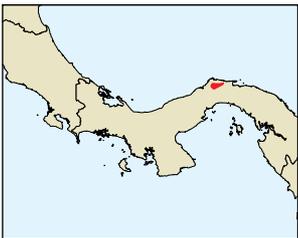
Conservation Measures Its range includes Parque Nacional Natural Sierra Nevada de Santa Marta, and the adjacent El Dorado Nature Reserve established in March 2006 to secure one of the last forested valleys for this and other threatened amphibian and bird species. Further surveys are needed to determine the current population status of this species. Disease management and captive-breeding programmes might be required, particularly if it is found that the species has suffered extensive declines due to chytridiomycosis.

Bibliography: Acosta-Galvis, A.R. (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Ruiz-Carranza, P.M. and Ardila-Robayo, M.C. (1991), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Martha Patricia Ramírez Pinilla, Mariela Osorno-Muñoz, Jose Vicente Rueda, Adolfo Amézquita, María Cristina Ardila-Robayo

EN *Atelopus limosus* Ibáñez, Jaramillo and Solís, 1995

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Panama
Current Population Trend: Decreasing



© Brian Kubicki



Geographic Range This species is endemic to the eastern Atlantic versant of central Panama, although it is believed to occur much more widely. It is a low-altitude species, occurring at 10-730m asl.

Population This species is reasonably common at a number of localities, and there is little evidence of a decline. However, at Filo de Santa Rita, Provincia de Colón, while relatively abundant in October 2000, only one individual was seen in December 2002 (R. Ibáñez pers. obs.).

Habitat and Ecology This is a terrestrial species of tropical lowland forest. Breeding and larval development takes place in forest streams.

Major Threats The deforestation of habitat for agricultural use and general infrastructure development, as well as water pollution and stream sedimentation, are the main threats to this species. A number of congeners have recently disappeared over much of their range due to the effects of chytrid, although this species probably occurs below the altitude at which chytridiomycosis is prevalent.

Conservation Measures The species has been recorded from Parque Nacional Chagres, but expanded habitat protection is recommended. Further survey work is needed to establish the limits of the species' range, and close monitoring of existing populations is necessary.

Bibliography: Ibáñez, R. *et al.* (2000), Ibanez-D.R., Jaramillo, C.A. and Solís, F.A. (1995), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Savage, J.M. (1972a), Young, B. *et al.* (1999)

Data Providers: Frank Solís, Roberto Ibáñez, César Jaramillo, Querube Fuenmayor

EN *Atelopus longibrachius* Rivero, 1963

Endangered A3ce; B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



Geographic Range This species is known only from the region of the type locality: El Tambo, near Guisito, at 800m asl, Cauca Department, Colombia. Lötters (1996) suggested that the elevation given for the type locality (300m asl) was a typographic error in the original publication.

Population There is no recent information on the population status of this species.

Habitat and Ecology It lives on the ground in tropical humid forests, and presumably breeds in streams.

Major Threats The major threat is likely to be chytridiomycosis, as has occurred in many other species of *Atelopus* (although its occurrence at lower altitudes might afford it some level of protection from the disease). Additional threats include deforestation for agricultural development, illegal crops, logging and human settlement, and pollution resulting from the spraying of illegal crops.

Conservation Measures It occurs in Parque Nacional Natural Munchique. In view of the severe risk of chytridiomycosis, it is a high priority to conduct surveys to determine the current population status of this species, as well as to initiate a captive-breeding programme.

Bibliography: Acosta-Galvis, A.R. (2000), Cannatella, D.C. (1981), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Andrés Acosta-Galvis, Wilmar Bolívar, Stefan Lötters

CR *Atelopus lozanoi* Osorno-Muñoz, Ardila-Robayo and Ruiz-Carranza, 2001

Critically Endangered A2ace; B2ab(v)
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species is known only from the type locality in the Páramo de Palacio, Cundinamarca, Colombia, at an altitude of 3,000-3,300m asl.

Population This species was once abundant, but it has not been seen since 1993, despite repeated visits to the site.

Habitat and Ecology It lives in páramo and does not tolerate habitat destruction. Breeding and larval development take place in fast-flowing streams.

Major Threats Although not proven, the most likely cause of the decline of this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*. It is also likely to be threatened by fires set by cattle ranchers. In addition, introduced trout prey upon tadpoles in streams.

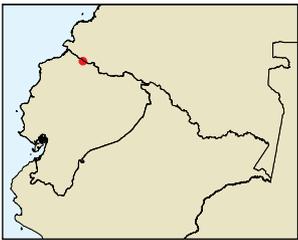
Conservation Measures Occurs in Parque Nacional Natural Chingaza. Survey work is needed to determine the population status of this species; given the threat of chytridiomycosis, successful conservation measures will probably need to include the maintenance of any surviving individuals in captivity. There is also a need to control populations of trout within the National Park.

Bibliography: La Marca, E. *et al.* (2005), Osorno Muñoz, M., Ardila-Robayo, M.C. and Ruiz-Carranza, P.M. (2001b), Pounds, J.A. *et al.* (2006)

Data Providers: Mariela Osorno-Muñoz, Adolfo Amézquita, Andrés Acosta-Galvis

CR *Atelopus lynchi* Cannatella, 1981

Critically Endangered A3ce; B1ab(iii,iv,v)
Order, Family: Anura, Bufonidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



© John D. Lynch



Geographic Range This species is endemic to the Pacific slopes of northern Ecuador (Maldonado in the Province of Carchi), between 800 and 1,410m asl. Records of this species from the western slope of the Cordillera Occidental, Valle del Cauca Department, in Colombia refer to an unidentified, probably un-named species.

Population This species has disappeared from Ecuador, and there have been no records from this country since 1984.

Habitat and Ecology It lives on the border between lowland tropical rainforests and montane forests. It is terrestrial, presumably breeding in streams.

Major Threats The major threat is likely to be chytridiomycosis, which has caused major declines in many other species of *Atelopus*. Additional threats include deforestation for agricultural development (including the planting of illegal crops), logging, and human settlement, and pollution resulting from the fumigation of illegal crops.

Conservation Measures This species is not known from any protected areas. Survey work is urgently required to determine whether or not this species still persists, and, in view of the severe risk of chytridiomycosis, any surviving populations should immediately form part of an *ex-situ* management programme.

Notes on taxonomy: Rivero and Serna (1993 "1991") doubted that specimens from Valle del Cauca, Colombia, were correctly assigned to this species.

Bibliography: Acosta-Galvis, A.R. (2000), Cannatella, D.C. (1981), La Marca, E. *et al.* (2005), Lötters, S. (1996), Merino-Viteri, A. (2001), Pounds, J.A. *et al.* (2006), Rivero, J.A. and Morales, V.R. (1995), Rivero, J.A. and Serna, M.A. (1993), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Santiago Ron, Luis A. Coloma, Martín R. Bustamante, Wilmar Bolívar, Stefan Lötters, Juan Manuel Renjifo, Jose Vicente Rueda

CR *Atelopus mandingues* Osorno-Muñoz, Ardila-Robayo and Ruiz-Carranza, 2001

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Unknown



Geographic Range This species is known only from the type locality: Reserva Biológica Carpanta, Cundinamarca, Colombia, at an altitude of 2,900-3,350m asl.

Population This species was uncommon until 1990. A single pair was recorded in 1992; however, due to guerrilla activity, no one has subsequently returned to the original locality to look for it.

Habitat and Ecology It lives in páramo and cloud forest, and does not tolerate habitat destruction. It reproduces in fast-flowing streams.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*.

Conservation Measures It occurs in the Reserva Biológica Carpanta, which borders Parque Nacional Natural Chingaza. Survey work is urgently needed to determine the population status of this species. In view of the severe risk of chytridiomycosis, *ex-situ* populations might need to be established.

Bibliography: La Marca, E. *et al.* (2005), Osorno Muñoz, M., Ardila-Robayo, M.C. and Ruiz-Carranza, P.M. (2001a), Pounds, J.A. *et al.* (2006)

Data Providers: Mariela Osorno-Muñoz, Adolfo Amézquita

CR *Atelopus mindoensis* Peters, 1973

Critically Endangered A2e
Order, Family: Anura, Bufonidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



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Geographic Range This species is known from Pichinca and Esmeraldas provinces, in the north-western versant of the Andes of Ecuador, between 700 and 2,200m asl. It is known from more than ten localities.

Population There is no current information on the population status of this species; it was last recorded in 1989, despite survey efforts, suggesting a serious population decrease.

Habitat and Ecology This species is an inhabitant of lowland rainforest and humid montane forest. Eggs are laid in strings in streams, and tadpoles attach themselves to rocks.

Major Threats The major threat is likely to be a catastrophic decline, due to chytridiomycosis, as has occurred in many other species of *Atelopus*. Agriculture, both crops and livestock, as well as logging, are also major threats to the species' habitat, and very little suitable habitat remains.

Conservation Measures The range of this species overlaps Reserva Ecológica Cotacachi-Cayapas and just reaches the northern limit of Reserva Ecológica Los Illinizas. Additional survey work is urgently needed to determine whether or not this species still persists. In view of the severe risk of chytridiomycosis, surviving individuals might need to form the basis for the establishment of an *ex-situ* population.

Bibliography: La Marca, E. *et al.* (2005), Lötters, S. (1996), Lötters, S. (2001), Miyata, K. (1980), Peters, J.A. (1973), Pounds, J.A. *et al.* (2006)

Data Providers: Luis A. Coloma, Santiago Ron, Martín R. Bustamante, Mario Yáñez-Muñoz, Diego Cisneros-Heredia, Ana Almandáriz

CR *Atelopus minutulus* Ruíz-Carranza, Hernandez-Camacho and Ardila-Robayo, 1988

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



© María Cristina Ardila



Geographic Range This species lives on the eastern slope of the eastern Andes, Meta Department, Villavicencio, Acacias, Vareda Portachuelo, via Manzanares, Colombia, at 1,370-1,560m asl.

Population This species was abundant in the early 1980s, but was last seen in 1985 (despite subsequent surveys in 1987). No one has returned to look for this species since.

Habitat and Ecology It is an inhabitant of cloud forest, with breeding and larval development taking place in streams. It tolerates natural disturbances such as landslides, but not significant opening up of its habitat.

Major Threats It occurs in a very restricted area that is severely threatened by habitat destruction, particularly due to cattle ranching. However, the most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude *Atelopus* species.

Conservation Measures This species is not known to occur in any protected areas. Surveys are urgently needed to determine the population status of the species. In view of the severe risk of chytridiomycosis, *ex-situ* populations might need to be established.

Bibliography: Acosta-Galvis, A.R. (2000), Cocroft, R.B. *et al.* (1990), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996), Ruiz-Carranza, P.M., Hernández-Camacho, J.A. and Ardila-Robayo, M.C. (1988)

Data Providers: Jose Vicente Rueda, María Cristina Ardila-Robayo, Andrés Acosta-Galvis, Mariela Osorno-Muñoz, Ruth Adriana Maldonado-Silva

CR *Atelopus monohernandezi* Ardila-Robayo, Osorno-Muñoz and Ruíz-Carranza, 2001

Critically Endangered A2e
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



Geographic Range This species is found in Santuario de Fauna y Flora Guanentá Alto Río Fonce, Río Cañaverales, Santander Department, Colombia, at 1,700-2,000m asl.

Population During the course of multiple visits undertaken in 1979-1982, this species was found to be common. There have been no subsequent surveys for the species, with the exception of one survey in 1992 when this species was not recorded, suggesting a serious decrease.

Habitat and Ecology It is an inhabitant of cloud forest, with breeding and larval development taking place in streams. It tolerates disturbed forest.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*.

Conservation Measures It occurs in the Santuario de Fauna y Flora Guanentá Alto Río Fonce. Further survey work is required to deter-

mine the biology and population status of this species. Given the threat of chytridiomycosis, successful conservation measures will probably need to include the maintenance of any surviving individuals in captivity.

Bibliography: Ardila-Robayo, M.C., Osorno-Muñoz, M. and Ruiz-Carranza, P.M. (2002), La Marca, E. *et al.* (2005), Pounds, J.A. *et al.* (2006)

Data Providers: María Cristina Ardila-Robayo, Mariela Osorno-Muñoz

CR *Atelopus mucubajensis* Rivero, 1972

Critically Endangered A2ace; B2ab(v)
Order, Family: Anura, Bufonidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



© Enrique La Marca



Geographic Range This species has a very restricted distribution of only a few square kilometres at the type locality, in the Páramo de Mucubaj, in the Sierra de Santo Domingo, in the Venezuelan Andes. It has an altitudinal range of 2,300-3,500m asl.

Population It is a very rare species. This is the only Venezuelan Andean amphibian for which an ongoing population monitoring programme exists. The population seems to have experienced a drastic decline in the last 15 years or so, to the point that no individuals of this species were recorded since 1993 (adults) or 1994 (larvae), until recent surveys confirmed that a few individuals (23 in total) continue to survive in the wild (Barrio-Amorós 2004).

Habitat and Ecology This species is an inhabitant of páramo and cloud forest, the highest environments in the Venezuelan Andes, resembling alpine tundra, but with daily temperature extremes. It is usually found within grasses and frailejones (*Espeletia* spp.), and along streams. It probably lives in the shrubs of the sub-páramo environment. It is photophilic and lays egg chains in streams, where the tadpoles also develop.

Major Threats The major threat is likely to be chytridiomycosis, which has resulted in catastrophic declines of many other species of *Atelopus*. Chytridiomycosis was confirmed in this species in 1988. Introduced trout, introduced conifers, fires caused by humans, over collection, and agriculture and infrastructure development for human settlement are all major threats. With higher insolation as a result of climate change, this species could be at increased risk due to its habit of basking in the sun.

Conservation Measures Most of the range of this species is within the Parque Nacional Sierra Nevada. A new monitoring project for this species has recently begun (www.andigena.org). In view of the threat of chytridiomycosis, an *ex-situ* population might need to be established.

Bibliography: Barrio Amorós, C.L. (2004), Barrio-Amorós, C.L. (2004), La Marca, E. (1995b), La Marca, E. *et al.* (2005), La Marca, E. and Lötters, S. (1997), La Marca, E. and Reinhaller, H.P. (1991), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Rivero, J.A. (1972), Rodríguez, J.P. and Rojas-Suárez, F. (1995)

Data Providers: Enrique La Marca, Suleima Santiago, Stefan Lötters, Juan Elías García-Pérez, César Luis Barrio Amorós

CR *Atelopus muisca* Rueda-Almonacid and Hoyos, 1992 "1991"

Critically Endangered A2ace; B2ab(v)
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



© Juan Manuel Benjifo



Geographic Range This species occurs in Parque Nacional Natural Chingaza, Colombia, between 2,900 and 3,350m asl.

Population This species was common up until 1996, but four expeditions in 1998 and 2003 failed to turn up a single individual at any of the previous known localities.

Habitat and Ecology It occurs in Andean cloud forests and páramos. Breeding and larval development take place in streams.

Major Threats The major threat is likely to be chytridiomycosis, which has resulted in catastrophic declines of many other species of *Atelopus*. Cattle grazing is also a threat to the habitat of this species, and introduced trout have a negative impact on reproductive success.

Conservation Measures This species occurs in the Parque Nacional Natural Chingaza. Further survey work is required to determine whether or not this species still persists in the wild. In view of the threat of chytridiomycosis, any surviving individuals might need to form the basis for the establishment of an *ex-situ* population.

Bibliography: Acosta-Galvis, A.R. (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Rueda-Almonacid, J.V. and Hoyos, J.M. (1991), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Jose Vicente Rueda, Wilmar Bolívar, Adolfo Amézquita, Andrés Acosta-Galvis

CR *Atelopus nahumae* Ruiz-Carranza, Ardila-Robayo and Hernández-Camacho, 1994

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Unknown



© Conservación Internacional Colombia



Geographic Range This species is known from the slopes of south-east Cuchilla San Lorenzo, in the north-west sector of Parque Nacional Natural Sierra Nevada de Santa Marta, and the adjacent El Dorado Nature Reserve, in the department of Magdalena, Colombia. It has been recorded between 1,900 and 2,800m asl.

Population This was a common species when it was last recorded in 1992. It was rediscovered in 2006, following survey work in the recently established El Dorado Nature Reserve.

Habitat and Ecology This species is an inhabitant of sub-Andean forests, and can also tolerate some degree of habitat disturbance. It lays egg chains in streams, where the tadpoles also develop.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*. Other major threats include climate change, habitat loss caused by agriculture (illegal crops) and logging, and pollution caused by the fumigation of illegal crops.

Conservation Measures The range of this species encompasses the Parque Nacional Natural Sierra Nevada de Santa Marta; the adjacent El Dorado Nature Reserve was established in March 2006 to secure one of the last forested valleys for this and other threatened amphibian and bird species. Surveys are needed to determine the current population status of this species and, given the threat of chytridiomycosis, a captive-breeding programme might be required.

Bibliography: Acosta-Galvis, A.R. (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Hernández-Camacho, J.A. (1994), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Martha Patricia Ramírez Pinilla, Mariela Osorno-Muñoz, Jose Vicente Rueda, Adolfo Amézquita, María Cristina Ardila-Robayo

CR *Atelopus nanay* Coloma, 2002

Critically Endangered A2ace; B2ab(v)
Order, Family: Anura, Bufonidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



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Geographic Range This species is known only from páramo habitats near Laguna Toreadora, in the Cordillera Occidental, in Azuay Province, Ecuador (Coloma 2002) at around 4,000m asl.

Population The current population status of this species is not known. It has not been recorded since July 1989, despite surveys within the range, suggesting a serious population decrease.

Habitat and Ecology This species is an inhabitant of herbaceous páramo. Some specimens have been found active close to streams and springs in an area of many interconnected pools, while others have been found on land under rocks (Coloma 2002). There is no specific information available on their breeding habits, but they are likely to be similar to other *Atelopus* species, with breeding and larval development taking place in streams.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline as has occurred in many other montane species of *Atelopus*. Agriculture (both crops and livestock), as well as logging and infrastructure development for human settlement, are major threats to the species' habitat. Invasive alien species are also a problem.

Conservation Measures The type locality of the species is within Parque Nacional Cajas. Further survey work is required to determine whether or not this species survives in the wild. Given the threat of chytridiomycosis, any surviving individuals might need to form the basis for the establishment of an *ex-situ* population.

Bibliography: Coloma, L.A. (2002), La Marca, E. *et al.* (2005), Merino-Viteri, A. (2001), Pounds, J.A. *et al.* (2006), Ron, S.R. *et al.* (2003)

Data Providers: Luis A. Coloma, Santiago Ron, Martín R. Bustamante, Stefan Lötters

CR *Atelopus nepiozomus* Peters, 1973

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Ecuador
Current Population Trend: Unknown



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Geographic Range This species is known from six localities, on the eastern flanks of the Andes in Morona-Santiago Province, Ecuador, at 2,000-3,450m asl.

Population The population status of this species is not known, but sampling effort through its range is insufficient. It was last recorded in September 1985.

Habitat and Ecology This species is an inhabitant of sub-páramo and páramo. There is no specific information available on breeding, but it is likely to be similar to other *Atelopus* species, with breeding and larval development taking place in streams.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude *Atelopus* species. Habitat loss and degradation as a result of mining and logging is a major threat.

Conservation Measures The range of this species slightly overlaps with Parque Nacional Podocarpus, although it has, to date, not been recorded from inside the park. Further survey work is required to determine the abundance of this species. In view of the severe risk of chytridiomycosis, *ex-situ* populations might need to be established.

Bibliography: La Marca, E. *et al.* (2005), Lötters, S. (1996), Merino-Viteri, A. (2001), Peters, J.A. (1973), Pounds, J.A. *et al.* (2006)

Data Providers: Luis A. Coloma, Santiago Ron, Martín R. Bustamante, Stefan Lötters, Diego Cisneros-Heredia

CR *Atelopus nicefori* Rivero, 1963

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Unknown



Geographic Range This species is known only from the type locality: Alto de Caicedo, in Antioquia Department, Colombia, between 1,800 and 2,670m asl.

Population The current population status of this species is unknown, but it was not uncommon when last collected. There has not been any recent survey work for this species.

Habitat and Ecology It occurs along forested streams in sub-Andean and Andean forests. It is restricted to forest habitats requiring canopy cover over the stream to maintain suitable conditions. Breeding and larval development take place in streams.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*. Forests within the range of the species are being cleared for the planting of fruit trees, as well as illegal crops.

Conservation Measures The known range of the species is close to Parque Nacional Natural Orquideas. Further survey work is needed

to determine the population status of this species, and to establish whether or not it occurs outside the vicinity of the type locality. In view of the threat of chytridiomycosis, *ex-situ* populations might need to be established.

Notes on taxonomy: Specimens discussed by Cochran and Goin (1970) were subsequently named as *Atelopus echeverrii*.

Bibliography: Acosta-Galvis, A.R. (2000), Cochran, D.M. and Goin, C.J. (1970), Cocroft, R.B. *et al.* (1990), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Rivero, J.A. (1963b), Rivero, J.A. and Serna, M.A. (1985), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Stefan Lötters, Jose Vicente Rueda, John Lynch

CR *Atelopus oxyrhynchus* Boulenger, 1903**Critically Endangered A2ace**

Order, Family: Anura, Bufonidae

Country Distribution: Venezuela

Current Population Trend: Decreasing



Geographic Range This species has a very restricted distribution, in cloud forests in the vicinities of the city of Mérida, in Mérida State, in the Cordillera de Mérida in the Venezuelan Andes. Its elevation ranges from 2,100-3,500m asl.

Population It is now an extremely rare species, and although found in good numbers in 1978 and 1985, it was last recorded in 1994. Subsequent survey attempts to locate this species have failed to find any individuals, suggesting a serious population decrease.

Habitat and Ecology This species is an inhabitant of montane cloud forests. It is photophilic and lays egg chains in streams, where the tadpoles also develop.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. Habitat loss and degradation is also a major threat, due to agriculture (crops, livestock, and plantations), logging (in the past), and mining.

Conservation Measures Some subpopulations occur within the Parque Nacional Sierra Nevada and Parque Nacional Sierra de la Culata. Surveys are needed to establish whether or not this species still persists in its natural range. In view of the threat of chytridiomycosis, surviving individuals might need to form the basis for the establishment of an *ex-situ* population.

Bibliography: Barrio Amorós, C.L. (2004), Boulenger, G.A. (1903), La Marca, E. (1992), La Marca, E. (1995b), La Marca, E. *et al.* (2005), La Marca, E. and Lötters, S. (1997), La Marca, E. and Reintaler, H.P. (1991), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Rodríguez, J.P. and Rojas-Suárez, F. (1995)

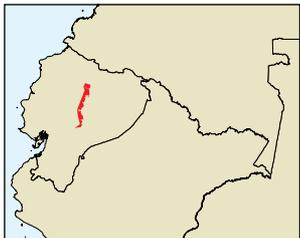
Data Providers: Enrique La Marca, Irwin García, Rubén Albornoz, Juan Elías García-Pérez

CR *Atelopus pachydermus* (Schmidt, 1857)**Critically Endangered A2ace**

Order, Family: Anura, Bufonidae

Country Distribution: Ecuador

Current Population Trend: Decreasing



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Geographic Range This species occurs on the eastern versant of the Andes of Ecuador in Napo Province. It was reported from humid montane forests in the Departamentos of Amazonas, Cajamarca and La Libertad, Peru, by Rodríguez, Cordova and Icochea (1993), but these specimens refer to an unnamed species (S. Lötters pers. comm.). It might be present in Colombia, because the type specimens were shipped from Buenaventura, Colombia. It occurs at around 2,755-3,300m asl.

Population This formerly abundant species has completely disappeared from its known range, and the last record is from 1996. Surveys at Papallacta undertaken since 1993 have failed to record this species.

Habitat and Ecology It occurs near streams in páramo and sub-páramo, and breeding takes place in streams.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*.

Conservation Measures The geographic range of this species in Ecuador overlaps Reserva Ecológica Cayambe-Coca, Reserva Ecológica Antisana, Parque Nacional Llanganates, and Parque Nacional Sangay. Survey work is needed to determine whether or not this species still persists. In view of the threat of chytridiomycosis, surviving individuals might need to form the basis for the establishment of an *ex-situ* population.

Notes on taxonomy: The species treated here (and by previous authors) as *A. pachydermus* is in fact unnamed. True *Atelopus pachydermus* are from an unknown locality, probably in the Peruvian Andes (S. Lötters pers. comm.).

Bibliography: Acosta-Galvis, A.R. (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Merino-Viteri, A. (2001), Peters, J.A. (1973), Pounds, J.A. *et al.* (2006), Rodríguez, L.O., Cordova, J.H. and Icochea, J. (1993), Ron, S.R. and Merino, A. (2000), Schmidt, O. (1857)

Data Providers: Wilmar Bolívar, Luis A. Coloma, Santiago Ron, Stefan Lötters, Enrique La Marca

CR *Atelopus pedimarmoratus* Rivero, 1963**Critically Endangered A3ce**

Order, Family: Anura, Bufonidae

Country Distribution: Colombia

Current Population Trend: Unknown



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Geographic Range This species is known only from the type locality: San Isidro, Municipio de Ubalá, Cundinamarca Department, Colombia, at 2,600-3,100m asl.

Population There have been no reports of this species since its original description in 1963, but there appear to have been no attempts to relocate it.

Habitat and Ecology It is an inhabitant of cloud forest, with breeding and larval development taking place in streams.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. Habitat destruction due to potato farming is also a threat to this species.

Conservation Measures The species has not been recorded from any protected area, although it might occur in the Reserva Forestal Protectora El Predio Río Sucio, in the Municipio de Gachalá. Survey work is necessary to determine the current population status of the species. In view of the threat of chytridiomycosis, surviving individuals might need to be taken into captivity.

Notes on taxonomy: Lötters (1996), suggested that the Cauca localities (by Cochran and Goin 1970) were doubtful on geographic grounds.

Bibliography: Acosta-Galvis, A.R. (2000), Cochran, D.M. and Goin, C.J. (1970), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Jose Vicente Rueda, María Cristina Ardila-Robayo, Mariela Osorno-Muñoz, Ruth Adriana Maldonado-Silva, Enrique La Marca

CR *Atelopus peruensis* Gray and Cannatella, 1985**Critically Endangered A2ace**

Order, Family: Anura, Bufonidae

Country Distribution: Peru

Current Population Trend: Unknown



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was) present at Charco (3,700m asl), Huari, Departamento Ancash, and also in the Departamento Piura. Its altitudinal range is from 2,800-4,200m asl.

Population This species was very abundant until 1992, but there appears to have been a decline since then, and several populations, one of them at Cajamarca-Celendín, are believed to have disappeared (R. Schulte pers. comm.).

Habitat and Ecology It inhabits puna and "sub-puna" (high altitude) habitats, with scattered tussock grass and *Baccharis* sp. They are sensitive to habitat degradation. Breeding takes place in streams, with larvae adhering to the undersides of large (30-50cm) rocks in swiftly flowing streams at a depth of approximately 30cm.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. The chytrid pathogen has yet to be found in this species, but the disease is known to be spreading in northern Peru, and the declines already reported are likely to be related to this disease. It has previously been reported in the pet trade, although this appears to have stopped. A population in Cajamarca was lost due to water contamination from activities at a nearby gold mine.

Conservation Measures This species occurs in Parque Nacional Huascarán, and might be present in Reserva Nacional Callipuy, and Santuario Nacional Callipuy. Disease management and captive-breeding programmes appear necessary given the threat of chytridiomycosis.

Bibliography: Gray, P. and Cannatella, D.C. (1985), INRENA (Instituto Nacional de Recursos Naturales, Peru) (2001), Instituto Nacional de Recursos Naturales (INRENA) (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Lötters, S. *et al.* (1990), Lötters, S. *et al.* (2005), Lötters, S. and Köhler, J. (1998), Mebs, D. *et al.* (1995), Pounds, J.A. *et al.* (2006), Rodríguez, L.O., Cordova, J.H. and Icochea, J. (1993)

Data Providers: Rainer Schulte, Antonio Salas, Ariadne Angulo, Stefan Lötters, Ulrich Sinsch, Alfonso Miranda Leiva

Geographic Range This species is known only from the northern Peruvian Andes near the surroundings of Celendín, Abra Comulica, San Miguel de Pallaques and Province of Hualgayoc, all in the Departamento Cajamarca; it is (or

CR *Atelopus petruizi* Ardila-Robayo, 1999

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Unknown



Geographic Range This species occurs in Parque Nacional Natural Los Picachos, Varedas la Esperanza y Andalucía, Caquetá Department, Colombia, between 1,750 and 2,500m asl. It might occur a little more widely.

Population It is only known from four specimens collected between 1994 and 1998; there has been no subsequent survey work for the species.

Habitat and Ecology It occurs and breeds in streams in premontane moist forest.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*. Habitat loss due to the planting of illegal crops is a threat to this species.

Conservation Measures It occurs in Parque Nacional Natural Los Picachos. Survey work is required to determine the current population status of the species. Given the threat of chytridiomycosis, surviving individuals might need to form the basis for an *ex-situ* population.

Bibliography: Acosta-Galvis, A.R. (2000), Ardila-Robayo, M.C. (1999), La Marca, E. *et al.* (2005), Pounds, J.A. *et al.* (2006)

Data Providers: María Cristina Ardila-Robayo, John Lynch

CR *Atelopus pictiventris* Kattan, 1986

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Unknown



© Gustavo Kattan

Geographic Range This species is known from Alto Pance (Corea), Municipality of Cali, in the Valle del Cauca Department on the eastern slope of the Cordillera Occidental, in Colombia, at 2,600m asl.

Population This species is known from only a few specimens, and was last recorded in 1996.

Habitat and Ecology It is a terrestrial and diurnal species, with all specimens having been found in artificially cleared forest. Its breeding habits are not known, but it presumably breeds in streams like other species in the genus.

Major Threats The most serious threat to this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*.

Conservation Measures The type locality is within the Parque Nacional Natural Farallones de Cali. Further survey work is required to determine the biology and current population status of this species. Considering that chytridiomycosis is the likely overwhelming threat, surviving individuals might need to form the basis for the establishment of an *ex-situ* population.

Bibliography: Acosta-Galvis, A.R. (2000), Kattan, G. (1986), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Stefan Lötters, John Lynch

CR *Atelopus pinangoi* Rivero "1980" (1984)

Critically Endangered A2ac; B1ab(iii,v)
Order, Family: Anura, Bufonidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



Geographic Range This species is only known from the type locality, "Piñango", at 2,920m asl, and from a second population a few kilometres away, in cloud forest near the village of Pinango, Mérida State, in the Andes of Venezuela. It has been recorded from 2,300-2,920m asl.

Population This is a rare species. The last recorded observation was in 1997, despite repeated searches, thus suggesting a serious population decrease.

Habitat and Ecology This species is an inhabitant of montane cloud forest. It is photophilic and lays egg chains in streams, where the tadpoles also develop.

Major Threats The major threat is likely to be chytridiomycosis, which has also caused major declines in many other montane species of *Atelopus*. Habitat loss due to logging and agriculture (cattle ranching, crops) -- the type locality was completely destroyed by the mid-1980s -- and introduced trout, are also major threats to the

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species. With increased insolation as a result of climate change this species could be at enhanced risk due to its sub-basking habits.

Conservation Measures The range of the species does not include any protected areas. Surveys are required to establish whether or not this species still survives. In view of the threat of chytridiomycosis, surviving individuals might need to form the basis for the establishment of an *ex-situ* population.

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1994d), La Marca, E. (1995b), La Marca, E. *et al.* (2005), La Marca, E. and Lötters, S. (1997), La Marca, E. and Reinthaler, H.P. (1991), Lötters, S. (1996), Péfaur, J.E. and Rivero, J.A. (2000), Pounds, J.A. *et al.* (2006), Rivero, J.A. (1984), Rodríguez, J.P. and Rojas-Suárez, F. (1995), Vial, J.L. and Saylor, L. (1993)

Data Providers: Enrique La Marca, Juan Elías García-Pérez

CR *Atelopus planispina* Jiménez de la Espada, 1875

Critically Endangered A2ace
Order, Family: Anura, Bufonidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



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Population The population of this species has declined dramatically. The last record was in July 1985 (an amplectant pair) despite repeated visits to known (El Reventador) or inferred localities (within its extent of occurrence) (Bustamante 2002).

Habitat and Ecology This species is an inhabitant of humid montane forest. There is no specific information known about breeding, but it is likely to be similar to other *Atelopus* species, with breeding and larval development taking place in streams.

Major Threats The major threat is likely to be chytridiomycosis, and which has also led to catastrophic population declines in many other montane species of *Atelopus*. Habitat loss due to agriculture (both crops and livestock), logging, mining, and infrastructure development for human settlement, as well as agricultural pollution, are also major threats.

Conservation Measures Its distribution range overlaps with Parque Nacional Sumaco Napo-Galeras, Parque Nacional Sangay, Reserva Ecológica Antisana, Parque Nacional Llanganates, and possibly Reserva Ecológica Cayambe-Coca. Surveys are needed to establish whether or not this species still survives. In view of the threat of chytridiomycosis, surviving individuals might need to form the basis for the establishment of an *ex-situ* population.

Notes on taxonomy: The taxonomic status of *A. planispina* and *A. palmatus* was discussed by Coloma (1997). Recent unpublished information suggests that *A. palmatus* might be a valid species known from the type locality (S. Lötters pers. comm.).

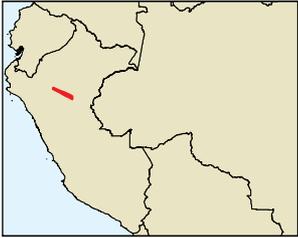
Bibliography: Bustamante, M. R. (2002), Coloma, L.A. (1997), Jiménez de la Espada, M. (1875), La Marca, E. *et al.* (2005), Lötters, S. (1996), Peters, J.A. (1973), Pounds, J.A. *et al.* (2006)

Data Providers: Santiago Ron, Luis A. Coloma, Martín R. Bustamante, Diego Cisneros-Heredia, Stefan Lötters, Enrique La Marca

Geographic Range This species is known from five localities in the eastern slopes of the Ecuadorian Andes, from Volcán Reventador to the south, to Cordillera de Cutucú. It has been recorded from 1,000-2,000m asl.

CR *Atelopus pulcher* (Boulenger, 1882)

Critically Endangered A2ace
Order, Family: Anura, Bufonidae
Country Distribution: Peru
Current Population Trend: Decreasing



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Geographic Range This species is distributed along the lower Andean versant in the upper Rio Huallaga drainage, Departamentos San Martín and Loreto, Peru. It is present at approximately 600-900m asl. There are populations resembling this species from the north-eastern versant of Peru and adjacent Ecuador, but these are not included in this account until their taxonomic status can be more conclusively verified.

Population The current population status of this species is not known, although it was recorded as recently as July 2004. It is now considered to be relatively rare, and has disappeared from many known localities.

Habitat and Ecology This is a diurnal and terrestrial species of lowland and premontane tropical forest. Breeding takes place in streams. It is not known how adaptable the species is to habitat modification.

Major Threats The threats to this species include the potentially devastating impacts of chytridiomycosis (the disease is already present in northern Peru) which was confirmed in this species in 2003. Other threats include localized habitat loss through conversion to agricultural land.

Conservation Measures The species occurs in Parque Nacional Cordillera Azul. A captive-breeding program for this species has been established, and there is ongoing research investigating the biology of a population of this species that apparently has chytridiomycosis.

Notes on taxonomy: This species was removed from the synonymy of *A. spumarius* by Lötters *et al.* (2002b).

Bibliography: La Marca, E. *et al.* (2005), Lötters, S. *et al.* (2002b), Lötters, S. *et al.* (2005), Pounds, J.A. *et al.* (2006)

Data Providers: Stefan Lötters

CR *Atelopus quimbaya* Ruíz-Carranza and Osorno-Muñoz, 1994

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Unknown



© Pedro Ruíz-Carranza

Geographic Range This species is known only from the vicinity of the type locality on the border of Risaralda and Quindío Departments, Colombia, between 2,200 and 2,900m asl. It might occur more widely than current records suggest.

Population This is a rare species, and was last recorded in 1992.

Habitat and Ecology It is found on vegetation along streams and away from streams in sub-Andean and Andean forests; it has not been recorded outside forest habitat. Breeding and larval development take place in streams.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude species of *Atelopus*.

Conservation Measures It might occur within a protected area (Parque Regional Natural Ucumari, in Risaralda Department). Further survey work is required to determine the population status of this species and whether or not it occurs outside the vicinity of the type locality. Given the threat of chytridiomycosis, recommended conservation measures will probably need to include the maintenance of any surviving individuals in captivity.

Bibliography: Acosta-Galvis, A.R. (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Ruíz-Carranza, P.M. and Osorno-Muñoz, M. (1994), Ruíz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Wilmar Bolívar, Andrés Acosta-Galvis, John Lynch

CR *Atelopus reticulatus* Lötters, Haas, Schick and Böhme, 2002

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Peru
Current Population Trend: Decreasing



© Rainer Schulte

Geographic Range This species is known only from the type locality on the eastern versant of the Cordillera Azul (Departamento Ucayali), ca. 3km by road after Divisoria on the Tingo María-Pucallpa road, Peru. It was collected at an elevation of 1,600m asl.

Population There is no information on the population of this species. It appears that the last record was in 1992, but the lack of subsequent observations might be due to lack of survey work.

Habitat and Ecology It is recorded from primary montane tropical forest; it is not known whether or not it occurs in modified habitats. Breeding is believed to take place in streams, like other species in the genus.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. The chytrid pathogen has yet to be found in this species, but the disease is known to be spreading in northern Peru. Its habitat might also be threatened by small-scale agriculture (e.g., cocoa and tea), but this requires further confirmation.

Conservation Measures The presence of this species in the Parque Nacional Cordillera Azul is possible, but is not confirmed. Further survey work is required to determine the current population status of this species. Given the threat of chytridiomycosis, recommended conservation measures will probably need to include the establishment of a captive-breeding programme.

Bibliography: La Marca, E. *et al.* (2005), Lötters, S. *et al.* (2002a), Lötters, S. *et al.* (2005), Pounds, J.A. *et al.* (2006)

Data Providers: Stefan Lötters, Jorge Luis Martínez, Rainer Schulte

CR *Atelopus seminiferus* Cope, 1874

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Peru
Current Population Trend: Decreasing



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Geographic Range This species is known only from the type locality and the immediate vicinity, from between Balsa Puerto and Moyobamba (San Martín), Peru. It occurs at 1,000-2,000m asl.

Population There is no information on population status or abundance, although it was recorded as recently as 2004.

Habitat and Ecology This is a terrestrial species of montane primary forests on the eastern slopes of the Andes. It is a stream-breeding species and not believed to be present in modified habitats.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*; however, the chytrid pathogen has not yet been positively confirmed in this species.

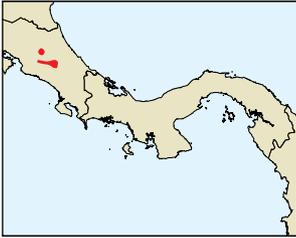
Conservation Measures This species is present in the Bosque de Protección Alto Mayo. Given the possible threat of chytridiomycosis, disease management and captive-breeding programmes might be required, as is further survey work to establish the population status of this species.

Bibliography: La Marca, E. *et al.* (2005), Lötters, S. (1996), Lötters, S. *et al.* (2005), Pounds, J.A. *et al.* (2006), Rodríguez, L.O., Cordova, J.H. and Icochea, J. (1993)

Data Providers: Rainer Schulte, Antonio Salas, Ariadne Angulo, Stefan Lötters

CR *Atelopus senex* Taylor, 1952

Critically Endangered A2ace
Order, Family: Anura, Bufonidae
Country Distribution: Costa Rica
Current Population Trend: Decreasing



© Wayne Van Devender



Geographic Range This species occurs in humid montane forest in central Costa Rica in the Cordilleras Central and Talamanca in Costa Rica from 1,100-2,200m asl.

Population This species was formerly abundant but has not been seen since 1986 despite repeated searches. It was formerly abundant on the slopes of Volcán Barva, but is now believed extinct there (Savage 2002).

Habitat and Ecology It occurs and reproduces in stream margins in premontane rainforest and lower montane rainforest. It is a diurnal, stream-breeding species, and used to be found in great concentrations during the reproductive period from July to August (Savage 2002).

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. Other threats to this species might include climate change, collecting for the pet trade, and possibly pollution.

Conservation Measures The range of this species is protected by both Parque Nacional Tapantí and Parque Nacional Braulio Carrillo (although it is now believed extinct in the latter area). Further survey work is required to determine whether or not this species still persists. Given the threat of chytridiomycosis, surviving individuals might need to form the basis for the establishment of an *ex-situ* population.

Bibliography: Barrantes, U. (1986), Cocroft, R.B. *et al.* (1990), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Savage, J.M. (2002)

Data Providers: Federico Bolaños, Gerardo Chaves, Uriel Barrantes

CR *Atelopus sernai* Ruíz-Carranza and Osorno-Muñoz, 1994

Critically Endangered A2ace
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species is known from the type locality, Serranía Las Baldías, and from one other locality, Belnira, Paramo Morron, both of which are in Antioquia Department, in Colombia, between 2,800 and 3,100m asl.

Population It is not a common species, and recent surveys have not found any specimens at the type locality; a decline has also been observed at the other known locality. The most recent record of the species was apparently in 2000.

Habitat and Ecology It occurs on vegetation along streams in natural forest edge in the high Andes, and has not been recorded from disturbed habitats. Breeding and larval development take place in streams.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. Other major threats include habitat loss, due to agricultural expansion (illegal crops), water pollution from agriculture, and possibly climate change.

Conservation Measures The range of the species is not within any protected areas. Further survey work is required to determine the population status of this species and the limits of its range. In view of the threat of chytridiomycosis, the status of this species should be closely monitored, and *ex-situ* populations should be established.

Bibliography: Ardila-Robayo, M.C. and Acosta-Galvis, A. (2000b), La Marca, E. *et al.* (2005), Pounds, J.A. *et al.* (2006), Ruíz-Carranza, P.M. and Osorno-Muñoz, M. (1994), Ruíz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Jose Vicente Rueda, Mariela Osorno-Muñoz, María Cristina Ardila-Robayo, Ruth Adriana Maldonado-Silva, Wilmar Bolívar, Fernando Castro, John Lynch

CR *Atelopus simulatus* Ruíz-Carranza and Osorno-Muñoz, 1994

Critically Endangered A2ace
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species is known from the central Andes of Colombia, from Cauca and Tolima Departments, between 2,500 and 3,000m asl.

Population Before 1999 this was a common species, but it has only been recorded once since then (2001) at a single locality despite numerous searches. A serious decline appears to have taken place.

Habitat and Ecology It occurs on the ground near streams and also in open areas; it has not been recorded from anthropogenically disturbed habitats. The tadpoles develop in streams.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. Habitat loss due to agricultural expansion (including the planting of illegal crops), as well as water pollution from agriculture, are major threats to the species. Climate change might also be a threat, but this needs to be investigated further.

Conservation Measures It is not known whether or not this species occurs in any protected areas. Further survey work is needed to determine whether or not this species still survives. Given the threat of chytridiomycosis, recommended conservation measures should include the establishment of a captive-breeding programme.

Bibliography: Ardila-Robayo, M.C. and Acosta-Galvis, A. (2000b), La Marca, E. *et al.* (2005), Pounds, J.A. *et al.* (2006), Ruíz-Carranza, P.M. and Osorno-Muñoz, M. (1994), Ruíz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Alonso Quededo Gil, Jose Vicente Rueda, Wilmar Bolívar

CR *Atelopus sonsonensis* Vélez-Rodríguez and Ruíz-Carranza, 1997

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Unknown



© John D. Lynch



Geographic Range This species is known only from the type locality: Mesopotamia, near Páramo de Sonsón, in the municipality of Sonsón, Vereda Caunzal, on the eastern side of the Cordillera Central, about 15km to the east of the municipality of Argelia, in Colombia. It was recorded at 1,500m asl, and might occur more widely.

Population The population status is unknown. This is a relatively newly described species, but it apparently has not been recorded since it was first discovered in 1996.

Habitat and Ecology It occurs on the ground in the under-storey of forest along streams; it has not been recorded from disturbed habitats. Breeding and larval development take place in streams.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. Habitat loss due to smallholder farming activities and the planting of illegal crops, and water pollution from agriculture, are major threats to the species.

Conservation Measures This species is not known from any protected areas. More research into the species' range and population status is needed, in particular to determine if it occurs outside the vicinity of the type locality. In view of the threat of chytridiomycosis, *ex-situ* populations might need to be established.

Bibliography: Acosta-Galvis, A.R. (2000), La Marca, E. *et al.* (2005), Pounds, J.A. *et al.* (2006), Vélez-Rodríguez and Ruíz-Carranza, P.M. (1997)

Data Providers: Wilmar Bolívar, Fernando Castro

CR *Atelopus sorianoi* La Marca, 1983

Critically Endangered A2ace; B2ab(iii,v)
Order, Family: Anura, Bufonidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



© Pascual Soriano



Geographic Range This species is known from a single stream in an isolated cloud forest, the Paramito de San Francisco, near the town of Guaraque, in Mérida State, Cordillera de Mérida, in Venezuela. It has the most restricted

geographic range of any Venezuelan *Atelopus* species, and lives at an altitude of 2,400-2,718m asl.

Population At the time of its discovery, this species was particularly abundant at the type locality. However, it is now extremely rare, or perhaps even extinct; the last record of the species was in 1990.

Habitat and Ecology It is an inhabitant of montane cloud forests. It is photophilic and lays egg chains in streams, where the tadpoles also develop.

Major Threats The major threat is likely to be chytridiomycosis (which was confirmed in this species in 1988), and which has led to a catastrophic population decline, as has been observed in many other montane *Atelopus* species. Clear cutting has greatly reduced the amount of available habitat for this species. Climate change might also be a threat. With higher insolation as a result of climate change, this species could be at increased risk due to its habit of basking in the sun.

Conservation Measures The small range of this species does not include any protected areas. Surveys are needed to establish whether or not this species still survives, and a project aimed at evaluating their population status and at assessing environmental and climate conditions of the cloud forests of Mérida State in the Venezuelan Andes (where populations of this toad might occur in remote ridges and valleys) has been initiated. *Ex-situ* conservation action might also be required.

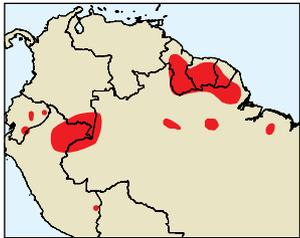
Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1983), La Marca, E. (1995b), La Marca, E. *et al.* (2005), La Marca, E. and Lötters, S. (1997), La Marca, E. and Reinhater, H.P. (1991), Pounds, J.A. *et al.* (2006), Rodríguez, J.P. and Rojas-Suárez, F. (1995), Vial, J.L. and Saylor, L. (1993)

Data Providers: Enrique La Marca, Argelia Rodríguez, Juan Elías García-Pérez

VU *Atelopus spumarius* Cope, 1871

Vulnerable A3ce

Order, Family: Anura, Bufonidae
Country Distribution: Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname
Current Population Trend: Decreasing



© Ron DeGiandro, courtesy of Atlanta Botanical Garden



Geographic Range This species occurs in the Amazonian lowlands of Colombia, Ecuador and eastern Peru, to Amazonas, Para, Amapa (Brazil), and the Guianas (Frost 1985; but see taxonomic notes). It ranges from sea level to 600m asl.

Population It is locally abundant. It is unlikely to be declining in most of its range, but in Ecuador it is thought to have declined significantly and there are no records since November 1994. It was formerly abundant at Madre de

Dios in Peru (A. Salas, in litt. to E. La Marca), but there is no recent information.

Habitat and Ecology It lives on the floor of terra firme tropical rainforest and in the leaf-litter near running streams. It appears to be restricted to undisturbed habitats. Breeding takes place in fast-flowing streams.

Major Threats Threats to this species include forest loss due to agriculture, and logging and clear cutting, especially in eastern Amazonia. It occurs below the altitude at which chytridiomycosis is normally a problem, but declines have nevertheless taken place in Ecuador and probably also Peru, and it is possible that animals from Iquitos in Peru succumbed to this disease (R. Schulte pers. comm. to E. La Marca).

Conservation Measures It occurs in many protected areas across its range. Further research is necessary to determine the degree of threat posed by chytridiomycosis. A captive-breeding program for this species has been initiated.

Notes on taxonomy: Cocroft *et al.* (1990) and Lötters *et al.* (2002b) suggested that *Atelopus spumarius* might be a complex of more than one species. Lescure and Marty (2001) recognize two subspecies: *A. s. barbotini* Lescure 1981; and *A. s. hoogmoedi* Lescure 1973 without arguments and in contrast to their earlier opinion. Lötters *et al.* (2002b) suggested that *A. spumarius* occurs in the upper Amazon Basin only (Peru, Colombia, Brazil); populations from southern Peru, Ecuador and central Brazil might refer to undescribed taxa within *A. spumarius sensu lato*. Populations from the Guianas and eastern Amazonia might be treated as *A. hoogmoedi* complex (maybe within *A. spumarius sensu lato*). *Atelopus spumarius hoogmoedi* is a synonym of *A. spumarius* under Lescure and Gasc (1986). This form is understood by Lescure and Gasc (1986) to be more or less *A. spumarius sensu lato*; however, *A. spumarius hoogmoedi* is not conspecific with *A. spumarius sensu stricto* (S. Lötters pers. comm.)

Bibliography: Boulenger, G.A. (1882a), Cocroft, R.B. *et al.* (1990), Coloma, L.A. and Ron, S.R. (2001), Cope, E.D. (1871), Frost, D.R. (1985), Gascon, C. (1989), La Marca, E. *et al.* (2005), Lescure, J. (1973), Lescure, J. (1981b), Lescure, J. and Gasc, J.P. (1986), Lescure, J. and Marty, C. (2000), Lötters, S. (1996), Lötters, S. *et al.* (2002b), Lötters, S. *et al.* (2005), Pounds, J.A. *et al.* (2006), Rivero, J.A. (1968b), Rodríguez, L.O. and Duellman, W.E. (1994), Ron, S.R. (2001), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Claudia Azevedo-Ramos, Santiago Ron, Luis A. Coloma, Martín R. Bustamante, Antonio Salas, Rainer Schulte, Stefan Lötters, Ariadne Angulo, Fernando Castro, Jean Lescure, Christian Marty, Enrique La Marca, Marinus Hoogmoed

VU *Atelopus spurrelli* Boulenger, 1914

Vulnerable A3ce

Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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**CR** *Atelopus subornatus* Werner, 1899

Critically Endangered A3ce

Order, Family: Anura, Bufonidae
Country Distribution: Colombia
Current Population Trend: Decreasing



© John D. Lynch



Geographic Range This species is known from two localities, some 20km apart, in the northern Colombian Andes: Alto San Miguel and Aguadita, Municipios de Sibaté, and Fusagasuga, Cundinamarca Department, between 2,000 and 2,800m asl.

Population This species was common until the time of the last record in 1999, although there have been no subsequent surveys for the species.

Habitat and Ecology It occurs in pristine and disturbed cloud forests. Breeding and larval development take place in streams.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. Habitat loss due to agricultural expansion, and water pollution caused by run-off from pig farms, are also serious threats faced by this species.

Conservation Measures It is not known to occur in any protected area. Survey work is needed to determine the population status of this species; in view of the threat of chytridiomycosis, *ex-situ* populations might need to be established.

Notes on taxonomy: This species was removed from the synonymy of *Atelopus ignescens* by Lynch (1986).

Bibliography: Acosta-Galvis, A.R. (2000), Ardila-Robayo, M.C. and Acosta-Galvis, A. (2000a), La Marca, E. *et al.* (2005), Lötters, S. (1996), Lynch, J.D. (1968), Lynch, J.D. (1986c), Pounds, J.A. *et al.* (2006), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: María Cristina Ardila-Robayo, Jose Vicente Rueda, Mariela Osorno-Muñoz, Ruth Adriana Maldonado-Silva

CR *Atelopus tamaense* La Marca, García-Pérez and Renjifo, 1989

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Colombia, Venezuela
Current Population Trend: Decreasing



Geographic Range This species is known from the Páramo de Tamá, on the Venezuelan-Colombian border, in Apure State, Venezuela. It has been heard in Colombia from Venezuela, along the stream that marks the border between the two countries. Its known altitudinal range is 2,950-3,200m asl.

Population This species has not been seen since 1987, but there have not been any surveys within its range since this time.

Habitat and Ecology It lives in high-elevation sphagnum bogs in páramo habitat. The tadpoles have been found in streams.

Major Threats The major threat is likely to be chytridiomycosis, leading to a catastrophic population decline, as has occurred in many other montane species of *Atelopus*. The only likely threat to its habitat is fire.

Conservation Measures It occurs in the Parque Nacional El Tamá in Venezuela, and Parque Nacional Natural Tamá in neighbouring Colombia. In view of the risk of infections with the chytrid fungus, it

is a very high priority to conduct surveys to relocate this species and determine its current population status, as well as to initiate a captive-breeding programme.

Notes on taxonomy: The correct name of this species is *Atelopus tamaense* (a noun in apposition, rather than an adjective) (E. La Marca pers. comm.)

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1992), La Marca, E. *et al.* (2005), La Marca, E. and Lötters, S. (1997), La Marca, E., García-Pérez, J.E. and Renjifo, J.M. (1990), Pounds, J.A. *et al.* (2006), Rodríguez, J.P. and Rojas-Suárez, F. (1995)

Data Providers: Enrique La Marca, Juan Elías García-Pérez

TAMÁ HARLEQUIN FROG

VU *Atelopus tricolor* Boulenger, 1902

Vulnerable A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Bolivia, Peru
Current Population Trend: Decreasing



© Jim Köhler

Geographic Range This species is found in the eastern Andes in Peru and Bolivia, at elevations of 600-2,500m asl. The type locality is the Marcapata Valley in Peru, in the Amazonian slopes of the eastern Andes (south-eastern Cuzco Department). Other Peruvian records are from areas close to the Puno Department, at 1,700-2,100m asl (Duellman 1979, Köhler 2000a). In Bolivia there are records from La Paz Department, in the Yungas region, and in the south of the Chapare's region, at Cochabamba Department, at the eastern slope of the Andes (Fugler 1984, De la Riva 1990, Reynolds and Foster 1992, Köhler 2000a). The larval description of *A. tricolor* comes from 12 samples of Pucartambo-Atalaya, 68km (by the road) north-east Union Bridge, at Tachila River at 1,700m asl, in Cuzco Department,

Peru; and five specimens from 40km north Caranavi, Buena Vista Hills, Nor Yungas Province, La Paz Department, Bolivia (Lavilla *et al.* 1997).

Population It is still common within its range, and the declines associated with other species of *Atelopus* have not yet been noted in this species. It has been recorded as recently as 2003.

Habitat and Ecology This species inhabits wet primary montane forest, corresponding to the Yungas Forest (De la Riva *et al.* 2000, Köhler 2000a). Breeding takes place in streams. Köhler (2000a) observed this species perching, at night, at 0.3-1.2m elevation, in vegetation in disturbed primary forest, and secondary growth along roadsides. Males call in small groups of 4-10 individuals.

Major Threats The major threats are habitat loss, due to smallholder farming activities (coffee, coca, chili peppers), and pollution, as a result of increased stream sedimentation. Chytridiomycosis has yet to be found in this species, but is a potential major threat in the future. Introduced predatory trout might be a threat in some areas.

Conservation Measures In Bolivia, it is present in the Parque Nacional Carrasco, Parque Nacional Madidi and Pilon Lajas. In Peru, it is present in Manu Biosphere Reserve. Continued population monitoring is required, especially in light of the potential threat of chytridiomycosis.

Notes on taxonomy: Reynolds and Foster (1992) indicated that *Atelopus rugulosus* is a synonym of *A. tricolor*. Subsequently, Lötters and De la Riva (1998) confirmed this and pointed out that in evaluating the types of *A. rugulosus* from south-east Peru, and *A. willimani* from Bolivia, both are synonyms of *A. tricolor*.

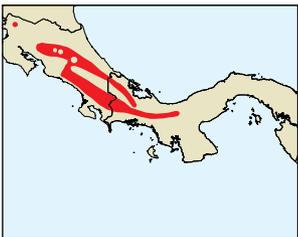
Bibliography: Boulenger, G.A. (1902), de la Riva, I. *et al.* (2000), Donoso-Barros, R. (1969), Duellman, W.E. (1979), Fugler, C.M. (1984), Instituto Nacional de Recursos Naturales (INRENA) (2000), Köhler, J. (2000a), La Marca, E. *et al.* (2005), Lavilla, E.O. and de Sá, R. (2001), Lavilla, E.O., de Sa, R.O. and de la Riva, I. (1997), Lötters, S. and de la Riva, I. (1998), Noble, G.K. (1921), Pounds, J.A. *et al.* (2006), Reynolds, R. and Foster, M. (1992)

Data Providers: Antonio Salas, Roberto Ibáñez, Alessandro Catenazzi, Juan Carlos Chaparro-Auza, Ariadne Angulo, Steffen Reichle, Jörn Köhler, Ignacio De la Riva, Stefan Lötters, Claudia Cortez, Wilfredo Arizabal

THREE-COLOURED HARLEQUIN TOAD

CR *Atelopus varius* (Lichtenstein and von Martens, 1856)

Critically Endangered A2ace
Order, Family: Anura, Bufonidae
Country Distribution: Costa Rica, Panama
Current Population Trend: Decreasing



© Brian Kubicki

Geographic Range This species is known from both Atlantic and Pacific versants of the cordilleras of Costa Rica and western Panama, up to 2,000m asl. It is also present on outlying ridges and hills down to 16m asl at a few lowland sites. The species is absent from the lowlands of the Pacific north-west (Savage 2002). Records from Colombia are in error. Recent declines have reduced the Costa Rican range to only one known locality, Fila Chonta, 10km north-west of the city of Quepos.

Population Over 100 populations of this species were known from Costa Rica where it was often quite common. Drastic declines began in Monteverde in 1988 and the species was thought to have been extirpated in Costa Rica by 1996. However, after nearly eight years during which the species was thought to be extinct, a remnant population was discovered near Quepos, on the Pacific coastal range, in 2003, and was surveyed again in 2005 when more

individuals were found. In Panama, some populations have declined, but others persist. For example, Lips (1999) reported a mass mortality in Fortuna, Provincia de Chiriquí, which affected this species in December 1996-January 1997. This site was visited again in February 1998, but the species was not found (Ibáñez 1999). It has been recorded in Panama as recently as November 2002, but it is believed to still be in serious decline.

Habitat and Ecology It is a terrestrial species of humid lowland and montane forest; specimens recorded at lowland rainforest localities were all found along high-gradient, rocky streams, in hilly areas (Savage 2002). It is associated with small fast-flowing streams and is often found along the banks and sitting out on rocks in streams; at night they sleep in crevices or low vegetation. They formerly occurred in large concentrations during the dry season, from December to May (Savage 2002). Eggs are laid in water and are probably attached to rocks.

Major Threats The major threat is likely to be chytridiomycosis, which has led to catastrophic population declines in many other montane species of *Atelopus*. Museum specimens of this species have been found to have chytrid fungi. One specimen collected in 2003 from the only known site at which the species survives in Costa Rica tested positive for chytrid infection, and the disease was also confirmed in individuals in 1986, 1990, 1992 and 1997. Other threats to the species include habitat loss due to the destruction of natural forests, and predation by introduced trout. The only known site in Costa Rica is under serious threat of a landslide that could potentially destroy the entire stream section where they are presently found. It was collected by the thousands in the 1970s and shipped to Germany as part of the international pet trade.

Conservation Measures The species is present in three protected areas in Panama, and was previously found in a number of Costa Rican protected areas. *Ex-situ* conservation measures are now needed to ensure the future survival of this species, and a captive-breeding program has been initiated.

Bibliography: Crump, M.L. (1986), Crump, M.L. and Pounds, J.A. (1989), Ibáñez, R. (1999), Ibáñez, R. *et al.* (2000), La Marca, E. *et al.* (2005), Lips, K.R. (1999), Lips, K.R., Green, D.E. and Papendick, R. (2003), Lips, K.R., Reeve, J.D. and Witters, L.R. (2003), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Pounds, J.A. and Crump, M.L. (1987), Pounds, J.A. and Crump, M.L. (1994), Pounds, J.A., Fogden, M.P.L. and Campbell, J.H. (1999), Savage, J.M. (1972a), Savage, J.M. (2002), Young, B. *et al.* (1999), Zippel, K. (2005)

Data Providers: Alan Pounds, Robert Puschendorf, Federico Bolaños, Gerardo Chaves, Martha Crump, Frank Solís, Roberto Ibáñez, Jay Savage, César Jaramillo, Querube Fuenmayor, Karen Lips

HARLEQUIN FROG

CR *Atelopus walkeri* Rivero, 1963**Critically Endangered A3ce****Order, Family:** Anura, Bufonidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

Geographic Range This species is known from the northern slope of the Parque Nacional Natural Sierra Nevada de Santa Marta in the Department of Magdalena, and from the Guatapuri river basin in the department of Cesar, in northern Colombia, between 1,500 and 2,900m asl.

Population This species was considered to be common when it was last recorded in 1992. There have been no further surveys within its range since then.

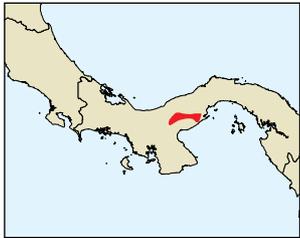
Habitat and Ecology It occurs in sub-Andean and Andean forests. It can also adapt to some modification of its habitat. It lays egg chains in streams, where the tadpoles also develop.

Major Threats The most serious risk to this species is chytridiomycosis, which has had a devastating impact on other high-altitude *Atelopus* species. Habitat fragmentation, primarily due to agriculture, and pollution, resulting from agricultural practices and the fumigation of crops, are also major threats.

Conservation Measures The range of the species includes Parque Nacional Natural Sierra Nevada de Santa Marta. Surveys are needed to determine the current population status of this species. Disease management and captive-breeding programmes are recommended.

Bibliography: Acosta-Galvis, A.R. (2000), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Martha Patricia Ramirez Pinilla, Mariela Osorno-Muñoz, Jose Vicente Rueda, Adolfo Amézquita, María Cristina Ardila-Robayo

CR *Atelopus zeteki* Dunn, 1933**Critically Endangered A2ace****Order, Family:** Anura, Bufonidae**Country Distribution:** Panama**Current Population Trend:** Decreasing**CITES:** Appendix I

© Paul Crump

Geographic Range This species is endemic to Panama, occurring east of the main Tabasará ridge in Provincias Coclé and Panamá at 335-1,315m asl.

Population This species was reasonably common at a number of localities, and has been recorded as recently as 2005, but it is apparently less abundant north of El Copé, in comparison with observations in 1980. It is very rare or extinct on Cerro Campana. It has been extinct in the El Valle de Antón for approximately 40 years. In recent years,

populations have been declining catastrophically due to chytridiomycosis, and the well-known El Copé population collapsed and disappeared over the course of a few months in late 2004 (K. Lips pers. comm.). The chytridiomycosis epidemic is spreading from west to east through Panama, and populations in the eastern part of its range are now at severe risk of disappearing.

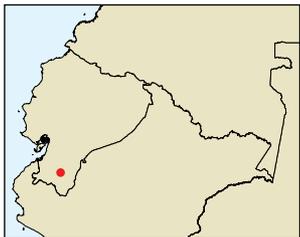
Habitat and Ecology It is a terrestrial species of tropical montane forest, with breeding and larval development taking place in forest streams.

Major Threats The major threat is likely to be chytridiomycosis, which has led to catastrophic population declines in many other species of montane *Atelopus*. The deforestation of habitat for both agriculture and general infrastructure development, water pollution, and over collection for the pet trade are also threats to this species. In 2003, a road from Sorá to El Valle was opened along the ridge of the Cordillera Central, resulting in heavy sedimentation of most streams on the Pacific and Caribbean slopes, which has negatively affected a significant portion of the habitat used by this species (R. Ibañez, in litt. to E. La Marca).

Conservation Measures This species is protected in Panama by national legislation (as *Atelopus varius zeteki*) decree No. 23 of January 30, 1967. It has been recorded from the protected areas of Parque Nacional Altos de Campana and Parque Nacional Omar Torrijos Herrera. A successful captive-breeding programme involving many zoos in North America is in place, although no re-introductions will be made until existing threats can be addressed. Steps are also under way to establishing a captive colony in Panama.

Bibliography: Cocroft, R.B. *et al.* (1990), Daly, J.W. *et al.* (1994), Ibañez, R. *et al.* (2000), La Marca, E. *et al.* (2005), Lindquist, E.D. (1995), Lindquist, E.D. and Hetherington, T.E. (1996), Lindquist, E.D. and Hetherington, T.E. (1998a), Lindquist, E.D. and Hetherington, T.E. (1998b), Lindquist, E.D., Hetherington, T.E. and Badgley, D.D. (1999), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Ramos, C.W., Pimental, N. and Martinez-Cortes, V. (2002), Young, B. *et al.* (1999), Zippel, K. (2002)

Data Providers: Karen Lips, Frank Solis, Roberto Ibañez, César Jaramillo, Querube Fuenmayor

PANAMANIAN GOLDEN FROG**CR** *Bufo amabilis* Pramuk and Kadivar, 2003**Critically Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Ecuador**Current Population Trend:** Decreasing

© John D. Lynch

Geographic Range This species is known only from elevations of 2,050-2,200m asl in the Loja Basin, an inter-Andean valley in Loja Province, Ecuador (Pramuk and Kadivar 2003). It is likely to have a restricted distribution, and recent surveys confirm this.

Population Past collections indicate that the species was fairly common at areas nearby creeks, even near plantations; however, surveys undertaken between 1989 and 2001 failed to find the species. It appears that it has not been collected since 1968, and a serious decrease might have taken place.

Habitat and Ecology The species has been collected in small pools and irrigation canals. Little is known of its habitat requirements or ecology, but breeding is presumed to take place in freshwater with larval development.

Major Threats The apparent declines of this species might in part be due to the modification of much of the Loja basin area for agriculture, urbanization, and other regional development. It appears that populations of this toad in the area surrounding Provincia Loja have been severely affected by human activities (Pramuk and Kadivar 2003). Disease might also be a factor but there is no evidence to confirm this.

Conservation Measures The species is not known to occur within a protected area. More exhaustive searches are needed to determine the population status of this species.

Bibliography: Pramuk, J.B. and Kadivar, F. (2003)

Data Providers: Luis A. Coloma

EN *Bufo amatolicus* Hewitt, 1925**Endangered B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)****Order, Family:** Anura, Bufonidae**Country Distribution:** South Africa**Current Population Trend:** Decreasing

© Richard Boycott

Geographic Range This species is known only from the Winterberg and Amatola Mountains, between Katberg and Keiskammahok, in Eastern Cape Province, South Africa, at 1,400-1,800m asl.

Population It is locally moderately common, and congregates in large numbers to breed.

Habitat and Ecology It breeds in shallow temporary pools and seepages in high-altitude moist grasslands, and is absent from forests and plantations.

Major Threats The main threats are deforestation, overgrazing, and fires; over the last 20 years, about 20% of its habitat has been lost to plantations.

Conservation Measures It occurs in the Hogsback Indigenous Forest and the Kubisi Indigenous Forest. Continued and strengthened protection of these areas, and expanded protection of other remaining forest habitat, are necessary.

Bibliography: Branch, W.R. (1988), Channing, A. (2001), Minter, L.R. *et al.* (2004), Passmore, N.J. and Carruthers, V.C. (1995), Tandy, M. and Keith, R. (1972), Wager, V.A. (1986)

Data Providers: Leslie Minter, James Harrison

AMATOLA TOAD

VU *Bufo aucoinae* O'Neill and Mendelson, 2004**Vulnerable B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Costa Rica, Panama**Current Population Trend:** Decreasing

© Ivan Leenders



Geographic Range This species is known from 25-500m asl in far north-western Panama and western Costa Rica, from the Golfo Dulce area, north to the Rio Baru near Dominical.

Population It is not abundant.

Habitat and Ecology A nocturnal and terrestrial species that belongs to a clade of frogs considered intolerant of habitat disturbance (J. Mendelson pers. comm.). Adults are restricted to primary forest, but can migrate across degraded habitat to large streams and rivers where they breed at the end of the wet season (Mid-December to January) (Savage 2002; O'Neill and Mendelson 2004). It has not been found in forest patches < 10ha in size, but they also do not occur in all large forest patches in the region. It is hypothesized that the secondary limiting factor is proximity of appropriate breeding streams to occupied forest patch. The breeding stream requirements appear to be a wide, low-gradient, rocky stream with small isolated pools with sun exposure.

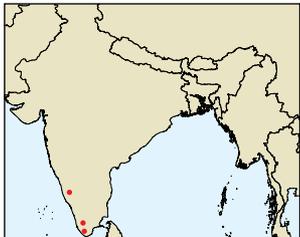
Major Threats Habitat loss and fragmentation is a significant threat in western Costa Rica, due in particular to cattle ranching and plantation forestry. Loss of access to breeding streams and poisoning of rivers for the harvest of freshwater shrimp are also problems (M. Ryan pers. comm.).

Conservation Measures The species is known from Corcovado, Braulio Carrillo, and Carara National Parks in Costa Rica.

Notes on taxonomy: This species has recently been separated from *Bufo melanochlorus* (O'Neill and Mendelson 2004).

Bibliography: O'Neill, E.M. and Mendelson, J.R. (2004), Savage, J.M. (2002)

Data Providers: Joseph Mendelson

EN *Bufo beddomii* Günther, 1875**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** India**Current Population Trend:** Decreasing

© S.U. Saravanakumar



Geographic Range This species is believed to be endemic to the southern Western Ghats of India, and has been recorded from Kudremukh, Ponnudi and Kalakad. Specimens collected in Maharashtra are misidentifications of *Bufo c.f. scaber* (S.D. Biju pers. comm.). It has an altitudinal range of 1,000-1,500m asl.

Population This is a rare species, and there are no estimates of population size or trends. Populations are fragmented, and the species is believed to be declining throughout much of its range.

Habitat and Ecology It is a terrestrial species primarily associated with montane tropical moist forest, and is presumed to breed in streams. Individuals have been recorded in abandoned eucalyptus plantations. It has not been recorded from agricultural areas.

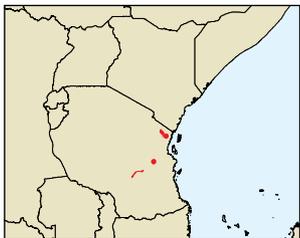
Major Threats The main threat is the conversion of areas of suitable habitat to intensive plantations (tea, eucalyptus and *Acacia*), and industrial development and urbanization around Ponnudi.

Conservation Measures It has been recorded from the Kalakad-Mundanthurai Tiger Reserve (Tamil Nadu) and Kudremukh National Park (Karnataka). The species has been the focus of recent studies (S.D. Biju 1998-2001).

Notes on taxonomy: Many museum specimens assigned to *Bufo beddomii* are misidentifications (Biju 2001).

Bibliography: Biju, S.D. (2001), Dutta, S.K. (1997), Krishnamurthy, S.V. and Hussain (2000), Ravichandran, M.S. (1996a), Ravichandran, M.S., and Pillai, R.S. (1990), Ravichandran, M.S., and Pillai, R.S. (1990), Vasudevan, K., Kumar, A. and Chellam, R. (2001)

Data Providers: S.D. Biju, Sushil Dutta, M.S. Ravichandran Karthikeyan Vasudevan, S.P. Vijayakumar, Chelmala Srinivasulu, Gajanan Dasaramji Bhuddhe

EN *Bufo brauni* Nieden, 1911**Endangered B1ab(iii,v)****Order, Family:** Anura, Bufonidae**Country Distribution:** Tanzania**Current Population Trend:** Decreasing

© Michele Menegon



Geographic Range This species occurs in the West and East Usambaras, the Ulugurus, and the Udzungwa Mountains in eastern Tanzania, from 750m asl (perhaps lower) to 1,800m asl.

Population It is not an uncommon species. However, there is evidence that it is becoming more scarce.

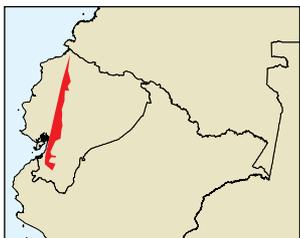
Habitat and Ecology It lives in submontane and montane forest zones, occurring in leaf-litter on the forest floor, and breeding in streams. It tolerates limited habitat disturbance, but is not found in open habitats, except when these are close to forest.

Major Threats It is probably adversely affected by forest loss for agriculture, collection of wood, and human settlement, and its habitat in the East Usambaras has recently come under serious threat as a result of the activities of illegal gold miners.

Conservation Measures It occurs in Amani Nature Reserve and Udzungwa National Park, but expanded and strengthened protection of these and other forest reserves in the Eastern Arc mountains is necessary. The species requires close population monitoring.

Bibliography: Harper, E. and Vonesh, J.R. (2003), Howell, K.M. (1993), Poynton, J.C. (1998), Poynton, J.C. (2003b), Tandy, M. and Keith, R. (1972)

Data Providers: Kim Howell, John Poynton, Mills Tandy

EN *Bufo caeruleostictus* Günther, 1859**Endangered A2c****Order, Family:** Anura, Bufonidae**Country Distribution:** Ecuador**Current Population Trend:** Decreasing

© Luis A. Coloma



Geographic Range This species is known from several localities in western Ecuador in the north-western Andean montane forest and western Ecuador moist forests. It has been recorded from 40-2,000m asl.

Population It is a rare species.

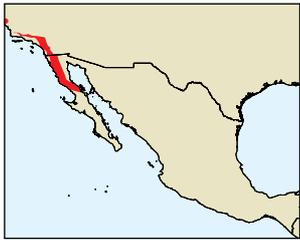
Habitat and Ecology It is found from the lower Pacific Andean slopes up to cloud forests. In Las Pampas, the habitat of this species was described as being close to rivers/creeks in low montane cloud forest (Hoogmoed 1989). There is no information about its breeding habitats although it is presumed to be a larval developer.

Major Threats The major threat to the species is habitat loss due to agricultural expansion, both for crops and livestock ranching, as well as logging and wood plantations. The invasive bullfrog (*Rana catesbeiana*) is probably also competing with this species.

Conservation Measures The species is likely to be present in several protected areas. Further research is needed into the breeding biology of this species, and the possible adverse effects of competition with the invasive bullfrog.

Bibliography: Günther, A.C.L.G. (1859), Hoogmoed, M.S. (1989)

Data Providers: Diego Cisneros-Heredia, Ana Almandáriz, Mario Yáñez-Muñoz, Luis A. Coloma, Santiago Ron

EN *Bufo californicus* Camp, 1915**Endangered A2ac****Order, Family:** Anura, Bufonidae**Country Distribution:** Mexico, United States of America**Current Population Trend:** Decreasing

© Andrew Borchert



Geographic Range This species formerly ranged from San Luis Obispo County, California, USA, south to north-western Baja California in Mexico; see Gergus, Sullivan and Malmos 1997 for southernmost record. It is now apparently extirpated in San Luis Obispo County; populations persist in headwater areas of streams in Santa Barbara, Ventura, Los Angeles, Riverside, and San Diego counties; recent sightings of scattered individuals have been reported from Orange, San Bernardino, and southern Imperial counties (USFWS 1994). The majority of the remaining populations in Santa Barbara and Ventura counties are in Los Padres National Forest (five viable populations); Sespe Creek in Ventura County has the largest known population. Other populations occur in the Sisquoc, Santa Ynez, and upper and lower Piru drainages (USFWS 1994). It also occurs in San Diego County along the Santa Margarita, Guejito, Sweetwater, Vallecito, San Luis Rey, Santa Ysabel, Witch, Cottonwood, Temescal, Agua Caliente, Santa Maria, Lusardi, Pine Valley, Noble, Kitchen, Long Potrero, Upper San Diego, San Vicente, and Morena drainages; populations in the Temescal, Agua Caliente, Pine Valley, and Cottonwood drainages may be considered viable (USFWS 1994). It was recently recorded in Whitewater Canyon in Riverside County (Patten and Myers, 1992, Herpetol. Rev. 23:122). Recent surveys

located very small populations in four creeks in south-western Riverside County (Temecula, Arroyo Seco, San Mateo, and Tenaja creeks) (USFWS 1994). The single recent record in San Bernardino County is from Deep Creek in the San Bernardino National Forest. It is also still extant in north-western Baja California.

Population The total estimated breeding population is less than 3,000 individuals (USFWS, Federal Register, 6 May 1998). Only six of the 22 extant populations south of Ventura are known to contain more than a dozen adults (USFWS 1994). It has been extirpated from an estimated 75% of its former range in the USA (Sweet, in USFWS 1993). Reproductive success has been poor in recent years (USFWS 1993). There is very little recent information on the trends in this species in Mexico. It occurs in at least a couple dozen sites, but viable populations may remain in only five drainages (USFWS 1993). It is known in California from 22 river basins in nine counties (USFWS 1999).

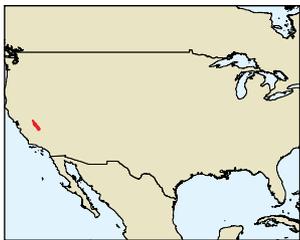
Habitat and Ecology This species inhabits washes, streams, and arroyos, and adjacent uplands (in desert and shrubland). It is also found on sandy banks in riparian woodlands (willow, cottonwood, sycamore, and/or coast live oak) in California. It is also found along rivers that have shallow gravelly pools adjacent to sandy terraces (USFWS 1993). Adults obtain shelter by burrowing into sandy soil. It lays eggs among gravel, leaves, or sticks, or on mud or clean sand, at the bottom of shallow quiet waters of streams or shallow ponds, in areas with little or no emergent vegetation. Newly metamorphosed individuals remain near pools for up to several weeks (until the pools dry up).

Major Threats Threats include habitat degradation (mainly through urbanization, dam construction and ill-timed water releases, agriculture, road construction, off-road vehicle use, overgrazing, and mining activities, and also via drought and wildfires), recreational use of habitat (which causes habitat degradation and direct mortality), predation by introduced fishes and bullfrogs (*Rana catesbeiana*), and small population sizes (see USFWS 1993 and 1994 for further details).

Conservation Measures USFWS (2001) designated as critical habitat approximately 182,360 acres in 22 units in Monterey, Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego counties. Critical habitat includes stream and river courses, riparian areas, and adjacent terrace and upland habitats. It does not include existing structures or other developed areas. See recovery plan (USFWS 1999). In Mexico this species is found within San Pedro Martir National Park.

Bibliography: Behler, J.L. and King, F.W. (1979), Blackburn, L., Nanjappa, P. and Lannoo, M.J. (2001), Collins, J.T. (1991), Gergus, E.W.A. (1998), Gergus, E.W.A., Grismer, L.L., and Beaman, K. (1997), Gergus, E.W.A., Sullivan, B.K. and Malmos, K.B. (1997), Price, A.H. and Sullivan, B.K. (1988), Stebbins, R.C. (1954), Stebbins, R.C. (1972), Stebbins, R.C. (1985b), Sullivan, B.K. (1992), U.S. Fish and Wildlife Service (1993), U.S. Fish and Wildlife Service (1994a), U.S. Fish and Wildlife Service (1999b), U.S. Fish and Wildlife Service (2000g), U.S. Fish and Wildlife Service (2001a)

Data Providers: Geoffrey Hammerson, Georgina Santos-Barrera

ARROYO TOAD**EN** *Bufo canorus* Camp, 1916**Endangered A2ae****Order, Family:** Anura, Bufonidae**Country Distribution:** United States of America**Current Population Trend:** Decreasing

© Andreas & Christel Nöllert



Geographic Range This species is endemic to the state of California, USA. It is found only in the high sierra from the Blue Lakes region north of Ebbetts Pass (Alpine County) south to Spanish Mountain area (Fresno County), and is found at elevations of 1,460-3,630m asl.

Population The total adult population size is unknown but is likely to be at least a few thousand. Declines, some in seemingly pristine environments, occurred in the eastern Sierra Nevada between the early 1970s and early 1990s (Kagarise Sherman and Morton 1993). Although still distributed over most of its original range, and many populations have active breeding and recruitment (Shaffer *et al.* 2000), the species has declined or disappeared from more than 50% of the sites from which it has been recorded (Jennings and Hayes 1994; Drost and Fellers 1996). USFWS (2000) reviewed additional evidence of declines in distribution and abundance.

Habitat and Ecology It inhabits wet mountain meadows and borders of forests, and obtains shelter in rodent burrows as well as in dense vegetation. This species breeds in shallow edges of snowmelt pools and ponds or along edges of lakes and slow-moving streams. Some breeding sites dry up before larvae metamorphose. Females may

breed every other year or once every three years. It persists in meadow habitats degraded by cattle as well as in lakes stocked with non-native trout.

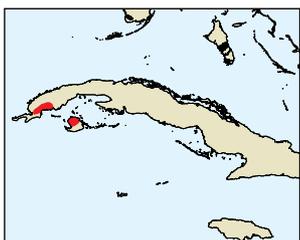
Major Threats Leading hypotheses for the declines are disease (chytridiomycosis), airborne contaminants, and livestock grazing. An examination of preserved specimens from a 1970 die-off found multiple pathogens, but no single pathogen was present in more than 25% of the specimens, suggesting that the animals suffered from suppressed immune systems (Green and Kagarise Sherman 2001). Davidson, Shaffer and Jennings (2002) found a weak pattern between declines at sites and amount of agricultural land upwind (suggesting that windborne agrochemicals may have contributed to declines). Livestock grazing may have detrimental impacts on Yosemite Toads through trampling, alteration of meadow habitat, and possible lowered water quality (D. Martin pers. comm.). Other factors that may have contributed to declines are the 1980s California drought, and predation by introduced trout. Ultraviolet radiation is not suspected to be a major contributor to declines based on fieldwork by Sadinski (pers. comm.).

Conservation Measures Most of the habitat of this species is confined within protected areas including: Yosemite National Park, Kings Canyon National Park, wilderness areas of Eldorado, Inyo, Stanislaus, and Sierra National Forest, with the highest number of populations recorded in Sierra National Forest followed by Stanislaus National Forest. Off-highway vehicle use, pack stock and cattle grazing still occur in National Forests, as well as protected wilderness areas; only pack stock use continues in Yosemite National Park and Kings Canyon National Park. Because declines have occurred in pristine areas in parks, no occurrences can be regarded as adequately protected. This species has been federally petitioned for listing under the Endangered Species Act in March 2000 by the Pacific Rivers Council and Centre for Biological Diversity. In December 2002 the US Fish and Wildlife Service published a decision in the Federal Register that placed the toad on the "warranted-but-precluded" list due to higher priority listings. Further taxonomic work is required to determine the status of this species relative to *B. exsul*.

Notes on taxonomy: Molecular data suggest that *Bufo exsul* is possibly conspecific with this species.

Bibliography: Behler, J.L. and King, F.W. (1979), Blackburn, L., Nanjappa, P. and Lannoo, M.J. (2001), Bradford, D.F., Swanson, C. and Gordon, M.S. (1992), Camp, C.L. (1916), Cunningham, J.D. (1963), Davidson, C., Shaffer, H.B. and Jennings, M.R. (2002), Drost, C.A. and Fellers, G.M. (1996), Frost, D.R. (1985), Green, D.E. and Kagarise Sherman, C. (2001), Grinnel, J. and Storer, T.I. (1924), Jennings, M.R. and Hayes, M.P. (1994), Kagarise Sherman, C. and Morton, M.L. (1993), Karlstrom, E.L. (1962), Karlstrom, E.L. (1973), Karlstrom, E.L. and Livezey, R.L. (1955), Martin, D.L. (1991), Mullally, D.P. (1953), Shaffer, H.B. *et al.* (2000), Sherman, C.K. (1980), Stebbins, R.C. (1972), Stebbins, R.C. (1985a), Stebbins, R.C. (2003), U.S. Fish and Wildlife Service (2000b)

Data Providers: Geoffrey Hammerson, Rob Grasso, Carlos Davidson

YOSEMITE TOAD**EN** *Bufo cataulaciceps* Schwartz, 1959**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Cuba**Current Population Trend:** Decreasing

Geographic Range This species has a restricted range in the lowlands of the Isla de Juventud and extreme western Cuba. It has been recorded from sea level up to 50m asl.

Population It can be very common at breeding aggregations, but is otherwise hard to find.

Habitat and Ecology It inhabits savannah habitat, with pinewood and palms, with sandy soils. Males call from temporary pools (rain puddles), flooded pastures, and other shallow still water (which is also where the eggs are laid). It is an explosive breeder that breeds after heavy rains.

Major Threats The main threats to this species are habitat loss and degradation due to intensive agriculture and the extraction of sand for the glass industry. The invasive *Dichrostachys cinerea* (Marabu), a thorny, fast-growing woody species native to Africa that was introduced to the Caribbean in the 19th century, also poses a threat to native habitat, and is difficult and expensive to control.

Conservation Measures The range of the species includes the Reserva Ecológica los Indios.

Bibliography: Díaz, L.M. (1998a), Hedges, S.B. (1993), Hedges, S.B. (1999), Hedges, S.B. (2001), Henderson, R.W. and Powell, R. (1999), Henderson, R.W. and Powell, R. (2001), Schwartz, A. (1959b), Schwartz, A. and Henderson, R.W. (1991)

Data Providers: Blair Hedges, Luis Díaz

CUBAN PINE TOAD

MOUNTAIN TOAD

EN *Bufo cavifrons* Firschein, 1950

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Mexico
Current Population Trend: Decreasing



Geographic Range This species occurs only in the Sierra de Los Tuxtlas and a few other localities near the Santa Marta volcano, in southern Veracruz, Mexico. It is known from 200-1,600m asl.

Population This is a naturally rare species.

Habitat and Ecology It inhabits tropical pine-oak forests with abundant leaf-litter. It is a stream-breeding amphibian.

Major Threats The major threat to this species is loss and degradation of its pine-oak forest habitat due to agricultural activities (crops and livestock), wood extraction, and infrastructure development.

Conservation Measures Although this species can be found in protected areas, the protection of these areas is not always guaranteed, and some are subject to human disturbance; improved management of these is urgently needed. This species is protected by Mexican law under the "Special Protection" category (Pr).

Bibliography: Mendelson III, J.R. (1997a), Mendelson III, J.R. (1998a), Porter, K. (1963)
Data Providers: Georgina Santos-Barrera, Oscar Flores-Villela

CR *Bufo chavin* Lehr, Kohler, Aguilar and Ponce, 2001

Critically Endangered B2ab(iii,v)
Order, Family: Anura, Bufonidae
Country Distribution: Peru
Current Population Trend: Decreasing



© Edgar Lehr

Geographic Range This species is only recorded from Palma Pampa and Cordillera de Carpish, Departamento Huánuco, Peru. It is believed to have a genuinely restricted distribution, with an altitudinal range of 2,600-3,072m asl.

Population This species is uncommon and probably declining.

Habitat and Ecology It is a species of primary cloud forest on the eastern Andean slopes of central Peru. It has also been found in disturbed areas at the forest edge. Its breeding habitat is not known, but it may breed in bromeliads, presumably by larval development.

Major Threats Deforestation for agriculture (potatoes) is a major threat. Agrochemical use has also contributed to the decline of this species at known sites.

Conservation Measures The species is not known to be present in protected areas, and its remaining habitat is in urgent need of protection. The current population status of this species also needs to be determined.

Bibliography: Lehr, E. (2002), Lehr, E. *et al.* (2001), Lehr, E., Rodriguez, D. and Cordova, J.H. (2002)

Data Providers: Ariadne Angulo, Edgar Lehr, César Aguilar Puntriano

EN *Bufo claviger* Peters, 1863

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Indonesia
Current Population Trend: Decreasing



Geographic Range This species is only known with certainty from northern Bengkulu Province, Sumatra, Indonesia, where it occurs at low altitudes. It has not been found in West Sumatra, despite attempts to locate it there. There is an old record from Nias Island but there are doubts that the locality of this specimen has been correctly recorded.

Population It is probably rare, since a number of expeditions have collected only a few specimens, and it probably occurs at low densities.

Habitat and Ecology It lives in lowland forest, but it is not known whether or not it can adapt to secondary habitats. It probably breeds by larval development in slow-flowing streams.

Major Threats The primary threat is likely to be habitat conversion due to smallholder farming and logging activities.

Conservation Measures Although it is known to occur in forest in a recreational area for tourists, expanded protection of lowland

forest habitats is clearly necessary.

Bibliography: Iskandar, D.T. and Colijn, E. (2000)

Data Providers: Djoko Iskandar, Mumpuni

VU *Bufo corynetes* Duellman and Ochoa, 1991

Vulnerable D2
Order, Family: Anura, Bufonidae
Country Distribution: Peru
Current Population Trend: Stable



© Natural History Museum and Biodiversity Research Center, University of Kansas

Geographic Range This species' appears to be restricted to a west-facing slope descending into the Amazonian lowlands of Abra Malaga and San Luis, Provincia Urubamba (Departamento Cuzco), Peru. Its altitudinal range is 2,000-3,200m asl.

Population It is a very rare species.

Habitat and Ecology This is a forest edge species specifically restricted to the zone of puna grassland directly adjacent to montane forest; it is not known whether or not it can occur in modified habitats. Its breeding habitat is not known, though breeding probably takes place in water.

Major Threats There are not believed to be any major threats to this species at present; however, it might be susceptible to habitat loss in the future.

Conservation Measures It is not known from any protected areas. There is a need for close monitoring of the population status of this species.

Bibliography: Cordova, J.H. (1999), Duellman, W.E. and Ochoa, O. (1991), Duellman, W.E. and Schulte, R. (1992), Instituto Nacional de Recursos Naturales (INRENA) (2000), Rodríguez, L.O., Cordova, J.H. and Icochea, J. (1993)

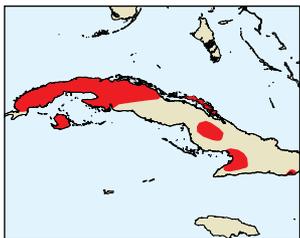
Data Providers: Ariadne Angulo, Wilfredo Arizabal, Jesús Córdova-Santa Gadea

CR *Bufo cristatus* Wiegmann, 1833**Critically Endangered B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)****Order, Family:** Anura, Bufonidae**Country Distribution:** Mexico**Current Population Trend:** Decreasing

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**Geographic Range** This species is found in the central Sierra Madre Oriental, Mexico, in the states of Puebla and Veracruz. However, it only survives in northern Puebla at Apulco, at 1,400m asl, and Barranca de Xocoyolo, at about 1,300m asl.**Population** This species was believed to be extinct and has only recently been rediscovered at Apulco and Barranca de Xocoyolo, where it is uncommon. There have been no recent records of the species at any of the previously known localities in Veracruz, and it is believed to be extinct in these sites.**Habitat and Ecology** It inhabits pristine cloud forests (dominated by oak) and breeding takes place in streams by larval development.**Major Threats** The disappearance and disturbance of the pine-oak forests, as well as the pollution and desiccation of streams, are the major threats to this species. The habitat has been completely destroyed in the localities where this species appears to have been extirpated.**Conservation Measures** Protection of the original pine-oak forest and measures to avoid the pollution of streams from anthropogenic activities are required to protect this species. This species is protected by Mexican law under the "Special Protection" category (Pr).**Bibliography:** Brandt, T. and Buschmann, H. (2004), Gleed-Owen, C. (1996), Mendelson III, J.R. (1997a), Mendelson III, J.R. (1998b), Mendelson III, J.R. and Canseco-Márquez, L. (1998)**Data Providers:** Georgina Santos-Barrera, Luis Canseco-Márquez**LARGE-CRESTED TOAD****VU** *Bufo cycladen* Lynch and Smith, 1966**Vulnerable A2a; B1ab(v)****Order, Family:** Anura, Bufonidae**Country Distribution:** Mexico**Current Population Trend:** Decreasing

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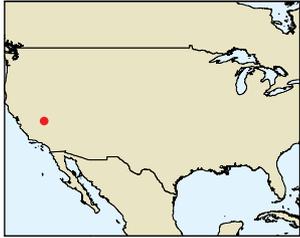
**Geographic Range** This species occurs in a relatively narrow altitudinal band around 750-1,000m asl on the Pacific slope of the Sierra Madre del Sur in Guerrero and Oaxaca states, Mexico. Most specimens have been collected around the private hacienda of Agua del Obispo, along the old highway between Tierra Colorada and Chilpancingo, Guerrero. One other series is known from Putla de Guerrero, about 150km east on the same slope of the Sierra Madre del Sur, Oaxaca. The distribution is presumed to be continuous between these two localities at mid elevations, and might well continue further east or west as this region is undersampled for amphibians.**Population** Field notes and collections by E.H. Taylor, H.M. Smith, and W.E. Duellman in the 1940s, 1950s and 1960s indicate that this species was common in the Agua del Obispo area. Approximately five weeks of fieldwork there during 2000 and 2003 resulted in the discovery of just a single individual, indicating a probable serious decline.**Habitat and Ecology** This species is known from the ecotone of scattered small pines and brush between lower altitude tropical deciduous forest and higher altitude pine-oak forest. The species is presumed to be a larval developer.**Major Threats** Although this species is believed to be tolerant of some degree of habitat alteration, such as selective logging, large-scale agricultural clearance and agrochemicals are likely to cause significant impacts. There is no direct evidence that chytridiomycosis is a threat to this species, but chytrid is known from this locality (Lips *et al.* 2004) and the drastic population decline is consistent with such an impact.**Conservation Measures** This species is not known from any protected areas, but might occur in the lower reaches of the Omilteme Reserve. There is a need for improved habitat protection at sites where this species is known to occur. Further research is required to investigate the potential threat posed by chytridiomycosis.**Notes on taxonomy:** This species was removed from the synonymy of *Bufo coccifer* by Mendelson *et al.* (2005).**Bibliography:** Lips, K.R. *et al.* (2004), Lynch, J.D. and Smith, H.M. (1966), Mendelson III, J.R. *et al.* (2005)**Data Providers:** Joseph Mendelson**EN** *Bufo djohongensis* Hulselmans, 1977**Endangered B2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Cameroon**Current Population Trend:** Decreasing**Geographic Range** This species is known only from the Adamawa Plateau in north-central Cameroon.**Population** There is very little information on its population status, and it has only been recorded on a few occasions.**Habitat and Ecology** It lives in gallery forests in a landscape of montane grassland and wooded savannah, and has been found breeding in streams.**Major Threats** It is probably suffering from continuing degradation of its montane habitats as a result of expanding agriculture, overgrazing by livestock, wood extraction, fire, and human settlement.**Conservation Measures** It has not been recorded from any protected areas, and some form of protection of the remaining habitat on the Adamawa Plateau is urgently needed. Further survey work is necessary to determine the current population status of this species.**Notes on taxonomy:** The taxonomic status of this species is uncertain. It was described as a subspecies of *Bufo funereus* (Hulselmans 1977), and was considered a distinct species by Joger (1982) and Böhme and Schneider (1987). J.-L. Amiet (pers. comm.) considers that it is a junior synonym of *Bufo villiersi*, an opinion not shared by U. Joger (pers. comm.).**Bibliography:** Böhme, W. and Schneider, B. (1987), Hulselmans, J.L.J. (1977), Joger, U. (1982)**Data Providers:** Ulrich Joger, Mills Tandy, Jean-Louis Amiet**VU** *Bufo empusus* (Cope, 1862)**Vulnerable B2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Cuba**Current Population Trend:** Decreasing**Geographic Range** This species has a wide but patchy distribution in lowland Cuba and the Isla de Juventud. It ranges from sea level up to 70m asl.**Population** It is abundant during breeding, but otherwise burrows underground and is rarely seen.**Habitat and Ecology** It inhabits xeric and mesic lowland forests and savannahs. The males call from flooded ditches and large temporary pools of rainwater, and the eggs are laid in still water. It is an explosive breeder, though outside the breeding season it remains in burrows below ground.**Major Threats** The major threats to this species are habitat loss and degradation, due to agriculture (it occurs in an area of intense agricultural production), and pollution from agricultural pesticides. The spread of the invasive plant species *Dichrostachys cinerea* is also threatening this species' native habitat.**Conservation Measures** It occurs in several protected areas. There is a need to control the spread of invasive species within these existing protected areas.**Bibliography:** Hedges, S.B. (1993), Hedges, S.B. (1999), Hedges, S.B. (2001), Henderson, R.W. and Powell, R. (1999), Henderson, R.W. and Powell, R. (2001), Schwartz, A. and Henderson, R.W. (1991)**Data Providers:** Blair Hedges, Luis Díaz**CUBAN SMALL-EARED TOAD**

VU *Bufo exsul* Myers, 1942**Vulnerable D2**

Order, Family: Anura, Bufonidae

Country Distribution: United States of America

Current Population Trend: Stable



© Kenny Wiley

Geographic Range This species' range includes several springs feeding Deep Springs Lake, in Deep Springs Valley, Inyo County, California, USA: Buckhorn Spring, Corral Spring and adjacent ponds, and Bog Mound Springs at about 1,520m; also Antelope Springs at about 1,710m (Murphy, Simandle and Becker 2003, Stebbins 2003). Apparently, this species was introduced to a flowing well in Saline Valley, Death Valley National Park, Inyo County, California (Murphy, Simandle and Becker 2003), and also introduced at Batchelder Spring, Westgard Pass, Inyo County, but is possibly extirpated there.

Population The population of this species was regarded as more or less stable in the early 1970s (Bury, Dodd and

Fellers 1980), and no significant change was reported in 1990 (California Department of Fish and Game 1990, Schuierer and Anderson 1990). The population at Antelope Springs (apparently introduced) was reported to have died out (Stebbins 1985b), but is still referred to by both Murphy, Simandle and Becker (2003) and Stebbins (2003). Historical population data is as follows: over 4,000 individuals (1971 survey), more than 80,000 individuals (1977 estimate). The population at Corral Spring(s) was reported in 1980 as more than 22,000 (Sherman 1980).

Habitat and Ecology Its primary habitat is watercourses/marshes (grass, sedge, dwarf bulrush, and watercress), formed by water flow from springs, and surrounded by desert with low bushes. Adults are more aquatic than other toad species in California. Adults prefer habitats with short plant cover and unobstructed access to still or slowly flowing water (Schuierer and Anderson 1990). It retreats to rodent burrows or other refuges in winter. It breeds in shallow marsh and pond waters (Schuierer and Anderson 1990).

Major Threats At present, there do not appear to be any major threats to this species. However, potential future threats include habitat destruction from irrigation schemes or other factors resulting in water table alteration, recreational vehicle use, cattle overgrazing, and predation by carp.

Conservation Measures The Department of Fish and Game has purchased 719 acres to protect the habitat at Deep Springs; Deep Spring College (owner of property at Buckhorn and Antelope springs) has fenced an area to exclude livestock and is manipulating irrigation water to minimize impacts on breeding toads, eggs, and larvae (California DF&G 1990). Other sites are on BLM land, but the level of protection is uncertain.

Notes on taxonomy: Molecular data suggest that this species might be conspecific with *Bufo canorus*, but this requires further investigation.

Bibliography: Behler, J.L. and King, F.W. (1979), Blackburn, L., Nanjappa, P. and Lannoo, M.J. (2001), Bury, R.B., Dodd, Jr., C.K. and Fellers, G.M. (1980), California Department of Fish and Game (CDF&G). (1990), Frost, D.R. (1985), Murphy, J.F., Simandle, E.T. and Becker, D.E. (2003), Myers, G.S. (1942c), Schuierer, F.W. (1962), Schuierer, F.W. (1963), Schuierer, F.W. (1972), Shaffer, H.B. *et al.* (2000), Sherman, C.K. (1980), Stebbins, R.C. (1985b), Stebbins, R.C. (2003)

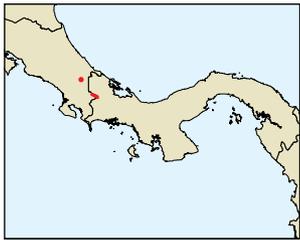
Data Providers: Geoffrey Hammerson

BLACK TOAD**CR** *Bufo fastidiosus* (Cope, 1875)**Critically Endangered A2ace**

Order, Family: Anura, Bufonidae

Country Distribution: Costa Rica, Panama

Current Population Trend: Decreasing



© Karen Lips

Geographic Range This species occurs on both slopes of the southern Cordillera de Talamanca of Costa Rica and the Atlantic slope of immediately adjacent Panama, from 760-2,100m asl (Savage 2002).

Population The species was once abundant in Costa Rica, but it has undergone marked declines since the 1980s. There is no information available on the population size or abundance of this species in Panama, but it is presumed to have declined.

Habitat and Ecology Its habitat is premontane and lower montane rainforest. It is a diurnal terrestrial species that is largely fossorial, and has been excavated from leaf-litter along stream banks in August. Juveniles have been found on rocky stream margins throughout the year. This species is an explosive breeder, with reproduction taking place in ephemeral pools after heavy rain in late April to May; eggs are laid in the shallow pools (Savage 2002).

Major Threats The main cause of the population decline is likely to be chytridiomycosis. In addition, there is general habitat loss across the range due to agriculture and timber extraction.

Conservation Measures The species is known to occur in Parque Internacional La Amistad, a transboundary protected area between Panama and Costa Rica. Given the threat of chytridiomycosis, the implementation of a disease management and captive-breeding programme is recommended.

Bibliography: Graybeal, A. and de Queiroz, K. (1992), Ibáñez, R. *et al.* (2000), Lips, K.R. (1998), Lips, K.R. and Krempels, D.M. (1995), Savage, J.M. (2002), Young, B. *et al.* (1999)

Data Providers: Federico Bolaños, Frank Solís, Roberto Ibáñez, Gerardo Chaves, Jay Savage, César Jaramillo, Querube Fuenmayor

CR *Bufo fluviaticus* Schwartz, 1972**Critically Endangered B2ab(iii)**

Order, Family: Anura, Bufonidae

Country Distribution: Dominican Republic

Current Population Trend: Decreasing



Geographic Range This species has a very restricted range (only two known localities) in north-western Dominican Republic. Its altitudinal range is 150-175m asl.

Population It is presumably very rare. It has not been encountered by any herpetologist in the three decades since it was discovered, including by herpetologists who have collected extensively on the island, as recently as 2003 (M. Hernandez pers. comm.).

Habitat and Ecology It is found in xeric habitats with broadleaf gallery forest, typically in close proximity to streams. Males call from shallow running water, and eggs are laid in still water. It is not known whether or not animals stay close to streams or spread out into xeric habitats.

Major Threats The species is threatened by habitat destruction from agriculture (crops and livestock) and subsistence wood collection.

HISPANIOLAN CRESTLESS TOAD

Conservation Measures It is not known to occur in any protected areas. Additional survey efforts are required to determine whether or not this species survives in the wild.

Bibliography: Hedges, S.B. (1993), Hedges, S.B. (1999), Hedges, S.B. (2001), Henderson, R.W. and Powell, R. (1999), Henderson, R.W. and Powell, R. (2001), Powell, R. *et al.* (2000), Powell, R. and Pregill, G.K. (1991), Schwartz, A. (1972), Schwartz, A. and Henderson, R.W. (1991)

Data Providers: Blair Hedges, Sixto Inchaustegui, Marcelino Hernandez, Robert Powell

EN *Bufo fractus* Schwartz, 1972**Endangered B1ab(iii)**

Order, Family: Anura, Bufonidae

Country Distribution: Dominican Republic

Current Population Trend: Decreasing



Geographic Range This species has a fragmented distribution in eastern Dominican Republic, and is known from six to eight locations very close together. The exact elevational range is not known but it is definitely known from only below 500m asl.

Population Although this species was formerly known to be abundant at a breeding aggregation near the town of Higuey in 1972, extensive surveys in the region in 2003 did not find any individuals (M. Hernandez pers. comm.).

Habitat and Ecology So far it has only been recorded from degraded forest; however, it is difficult to find outside the breeding season and so may just not have been recorded from primary forest yet. Eggs are laid in temporary pools, and the larvae develop in the pools.

Major Threats The main threat to the species is habitat loss and degradation largely due to intensive agriculture, but also due to human settlement and livestock grazing. The development of new tourism facilities nearby poses an additional threat to the existing habitat.

EASTERN CRESTED TOAD

Conservation Measures It is not known to occur in any protected areas, and protection of the existing habitat is urgently needed.

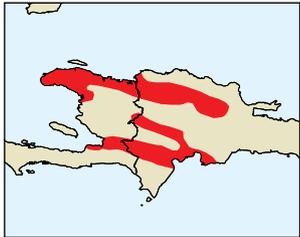
Notes on taxonomy: This species was elevated from subspecific status under *Bufo guentheri* by Powell (1993).

Bibliography: Hedges, S.B. (1993), Hedges, S.B. (1999), Hedges, S.B. (2001), Henderson, R.W. and Powell, R. (1999), Henderson, R.W. and Powell, R. (2001), Powell, R. (1992), Powell, R. (1993), Powell, R. *et al.* (2000), Schwartz, A. (1972), Schwartz, A. and Henderson, R.W. (1991)

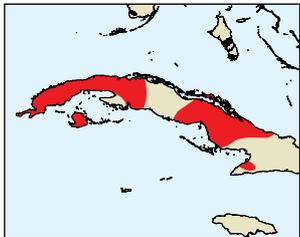
Data Providers: Blair Hedges, Sixto Inchaustegui, Marcelino Hernandez, Robert Powell

EN *Bufo gallardoi* Carrizo, 1992**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Argentina**Current Population Trend:** Decreasing

© Marcos Vaira

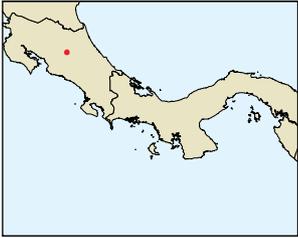
Geographic Range This species occurs in Jujuy, Ledesma and Calilegua in Argentina from 1,000-1,700m asl.**Population** It is a rare species, but it is nevertheless recorded on a regular basis.**Habitat and Ecology** It is restricted to montane forests (Yungas). It occurs on the ground and reproduces in slow-flowing streams where the larvae also develop. Its tolerance to habitat disturbance is not known.**Major Threats** The main threats include selective logging and clear cutting of primary forests, the introduction of predatory fish (trout), and the alteration of watersheds.**Conservation Measures** Some populations are protected in Parque Nacional Calilegua, which was created to preserve a representative part of the Yungas forest. Strengthened protection of this reserve, and expanded protection of other remaining habitat, is recommended.**Bibliography:** Cochran, D.M. (1955), Lavilla, E.O. *et al.* (2000), Lavilla, E.O. and Cei, J.M. (2001), Vaira, M. (2002)**Data Providers:** Esteban Lavilla**EN** *Bufo gemmifer* Taylor, 1940**Endangered B1ab(iii)+2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Mexico**Current Population Trend:** Decreasing**Geographic Range** This species is known only from central coastal Guerrero, Mexico, in north-western Acapulco city.**Population** It is thought to be rare.**Habitat and Ecology** The primary habitat is xeric and deciduous forest, and it has never been recorded out of the lowlands near Acapulco. It is a stream-breeding amphibian.**Major Threats** The main threat is habitat loss due to agricultural expansion, wood extraction, and the expansion of plantations.**Conservation Measures** Protection of the suburban and tropical dry areas around Acapulco represents the only chance for the survival of this species. It is protected by Mexican law under the "Special Protection" category (Pr).**Notes on taxonomy:** This species is currently under taxonomic review.**Bibliography:** Porter, K. (1963)**Data Providers:** Georgina Santos-Barrera, Oscar Flores-Villela**JEWEL TOAD****VU** *Bufo guentheri* Cochran, 1941**Vulnerable B2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Dominican Republic, Haiti**Current Population Trend:** Decreasing

© Alejandro Sanchez

Geographic Range This species is widely but patchily distributed in southern, central, and northern and north-western Hispaniola (both Haiti and Dominican Republic): Plaine du Nord-Valle de Cibao, Valle de San Juan, and Plaine du Cul de Sac-Valle de Neiba. The altitudinal range is from 40m below sea level up to 107m asl.**Population** In suitable habitats, this species can be found all year round. However, according to B. Hedges (pers. comm.) the species is infrequently encountered.**Habitat and Ecology** It occurs in dry lowland valleys, in both mesic and xeric areas, retreating under rocks and logs. Males call from rain-flooded areas, and eggs are laid in still water. The species breeds year round in some areas. It is occasionally found near water with heavy concentrations of sulphur.**Major Threats** The major threats to this lowland species are habitat loss, due to both livestock grazing and selective logging, and agricultural pollution.**Conservation Measures** It occurs in several protected areas.**Bibliography:** Hedges, S.B. (1993), Hedges, S.B. (1999), Hedges, S.B. (2001), Henderson, R.W. and Powell, R. (1999), Henderson, R.W. and Powell, R. (2001), Powell, R. (1992), Schwartz, A. (1972), Schwartz, A. and Henderson, R.W. (1991)**Data Providers:** Blair Hedges, Sixto Inchaustegui, Marcelino Hernandez, Robert Powell**VU** *Bufo gundlachi* Ruibal, 1959**Vulnerable B2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Cuba**Current Population Trend:** Decreasing**Geographic Range** This species is widespread but patchily distributed in Cuba, including the Isla de Juventud, at low elevations (sea level up to 70m asl).**Population** It is abundant during the breeding season, but otherwise is rarely seen since it burrows underground.**Habitat and Ecology** Mainly a forest species, but it also occurs in xeric and mesic grasslands, and diurnally retreats in burrows near rocks. Males call while floating in rain-flooded pools and the eggs are laid in still water. This species is an explosive breeder.**Major Threats** The major threat to this species is habitat loss and degradation, due to agriculture (it occurs in an area of intense agricultural production), and pollution from agricultural pesticides. The spread of the invasive plant species *Dichrostachys cinerea* is also a threat to the species' native habitat.**Conservation Measures** It occurs in several protected areas. There is a need to control the spread of invasive species within existing protected areas.**CUBAN HIGH-CRESTED TOAD****Bibliography:** Centro Nacional de Areas Protegidas (CNAP) (2002), Hedges, S.B. (1993), Hedges, S.B. (1999), Hedges, S.B. (2001), Henderson, R.W. and Powell, R. (1999), Henderson, R.W. and Powell, R. (2001), Schwartz, A. and Henderson, R.W. (1991)**Data Providers:** Blair Hedges, Luis Díaz

CR *Bufo holdridgei* Taylor, 1952

Critically Endangered A2ace; B1ab(v)
Order, Family: Anura, Bufonidae
Country Distribution: Costa Rica
Current Population Trend: Decreasing



© Wayne Van Daele



Geographic Range This species occurs on the Volcán Barva, Cordillera Central, Costa Rica, at 200-2,200m asl (Savage 2002).

Population It was formerly common in appropriate habitat and during the breeding season at the onset of the rainy season (2,765 males were seen visiting two pools in an eight-day period; Nowak and Robinson 1975). It has not been seen since 1986 despite repeated searching throughout its range, and it is possible that it is now extinct.

Habitat and Ecology It lives in lower montane rainforest. It is a fossorial species, and may be found under surface debris within the forest during periods of heavy rain, but otherwise concentrates on mossy stream banks during dry periods. It is an explosive breeder that lays its eggs in forest floor pools, as well as in man-made drainage ditches (Savage 2002).

Major Threats Although not proven, the main cause of the population decline is likely to be chytridiomycosis perhaps in synergy with the effects of climate change.

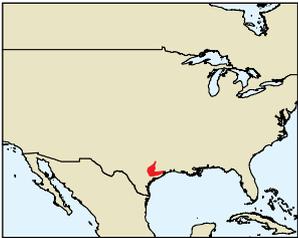
Conservation Measures The entire known range of this species is protected in Parque Nacional Braulio Carrillo, 20km north-east of the capital of San José. Surveys are urgently required to determine whether or not the species survives and, in view of the threat of chytridiomycosis, surviving individuals might need to form the basis for the establishment of an *ex-situ* population.

Bibliography: Novak, R.M. and Robinson, D.C. (1975), Savage, J.M. (2002)

Data Providers: Federico Bolaños, Gerardo Chaves

EN *Bufo houstonensis* Sanders, 1953

Endangered C2a(ii)
Order, Family: Anura, Bufonidae
Country Distribution: United States of America
Current Population Trend: Decreasing



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**HOUSTON TOAD**

habitat and favours the proliferation of other toad species, certain agricultural practices can be beneficial to Houston toads. These include maintaining low to moderate numbers of livestock to avoid overgrazing, protecting pond habitat from livestock and predatory fish, planting native bunchgrasses instead of sod-forming grasses such as Bermuda grass (which are difficult for the toads to move through), and conserving large blocks of woodlands. Certain forestry practices may benefit the Houston toad, while others, such as clear cutting, are harmful. Thinning and burning have been shown to benefit some species of amphibians and reptiles by opening up the forest canopy and allowing more sunlight to reach the forest floor. This practice encourages the growth of vegetation and, in turn, increases insect numbers. This may be beneficial to the Houston toad. Other threats that often appear in conjunction with the factors outlined above include prolonged drought and the presence of fire ants, an unwelcome species from Brazil. Fire ants have been observed preying on toadlets as they leave their breeding pond. Fire ants thrive in open, sunny areas where the soil has been disturbed and woody vegetation uprooted, as in agricultural fields and urban areas. Protecting large forested areas is one of the most effective deterrents to fire ants. Where fire ant control with pesticides is necessary, mounds should be treated individually, rather than broadcasting the chemicals, to avoid impacting other invertebrates that the Houston toad eats (see <http://ifw2es.fws.gov/HoustonToad>).

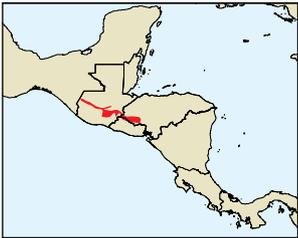
Conservation Measures The Houston toad was the first amphibian granted protection under the U.S. Endangered Species Act. A critical habitat was designated in 1978 in Bastrop and Burleson counties, in areas supporting the largest populations known at that time. However, the population within critical habitat in Burleson County has not been seen since 1983. In the 1970s, the state of Texas acquired land within designated critical habitat in Bastrop County adjacent to Buescher and Bastrop state parks to aid in conservation. Additionally, an effort was started in 1978 by the Houston Zoo to identify remaining Houston toad populations and supplement them or establish new populations in protected areas using wild-caught adults, naturally deposited eggs, or captive-reared juveniles and adults. However, new populations were not established in spite of introducing over 500,000 individuals (adults, juveniles, larvae) into sites at the Attwater Prairie Chicken National Wildlife Refuge. Research is urgently needed to determine the status of Houston toad populations outside Bastrop County and promote conservation efforts in these areas. Research is also critical to determine which management practices are most conducive to the Houston toad and the ecosystem on which it depends. The Houston Toad Recovery Plan was published by the U.S. Fish and Wildlife Service (USFWS) in 1984. The Texas Parks and Wildlife Department and the USFWS have jointly prepared a brochure for private landowners who wish to implement their agricultural practices in ways that are compatible with the needs of the Houston toad and the Texas Forest Service has formed a committee to develop management practices that protect the Houston toad and its habitat. Additionally, the USFWS is working with community leaders, private landowners, and conservation organizations to develop and implement a regional Habitat Conservation Plan for Bastrop County, which would provide for the issuance of endangered species permits that allow development to proceed while ensuring permanent habitat protection. The USFWS also has established a fund with the National Fish and Wildlife Foundation to assist in local habitat protection efforts for the Houston toad.

Bibliography: Bartlett, R.D. and Bartlett, P.P. (1999), Blackburn, L., Nanjappa, P. and Lannoo, M.J. (2001), Brown, L.E. (1971), Brown, L.E. (1973), Brown, L.E. *et al.* (1984), Bury, R.B., Dodd, Jr., C.K. and Fellers, G.M. (1980), Campbell, L. (1995), Conant, R. and Collins, J.T. (1991), Dixon, J.R. (2000), Dodd, Jr., C.K. and Seigel, R.A. (1991), Frost, D.R. (1985), Gaston, M.A., Forstner, M.R.J. and Dixon, J.R. (2001), Hillis, D.M., Hillis, A.M. and Martin, R.F. (1984), Jacobson, N.L. (1989), Kennedy, J.P. (1961), Matthews, J.R. and Moseley, C.J. (eds) (1990), Quinn, H.R. and Mengden, G. (1984), Seal, U.S. (1994), U.S. Fish and Wildlife Service, U.S. Fish and Wildlife Service (1980b), U.S. Fish and Wildlife Service (1990a)

Data Providers: Geoffrey Hammons, Donald Shepard

EN *Bufo ibarrai* Stuart, 1954

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Guatemala, Honduras
Current Population Trend: Decreasing



© Iwan Leenders



Geographic Range This species occurs at moderate and intermediate elevations of central and southern Guatemala and the Sierra de las Minas, eastern Guatemala, from 1,360-1,980m asl. Its range has also recently been extended into contiguous regions of Honduras in the western ranges of the Southern Cordillera Region in the departments of Intibucá, Lempirá and Ocotepeque, up to 2,020m asl (Mendelson *et al.* 2005). However, McCranie and Wilson (2002) refer all Honduran material to *Bufo coccifer*.

Population This species persists in small numbers in appropriate habitat. Nearly continuous field work throughout the range of this species in Guatemala between 1989 and 1998 produced less than 10 observations.

Habitat and Ecology It occurs in pine-oak or premontane or lower montane moist forest, and breeds in ponds, marshes and wet meadows. Males have been observed calling from the banks of ponds.

Major Threats Its range is severely fragmented due to habitat loss, primarily due to agricultural activities. Formerly robust populations in Guatemala are now extirpated following severe alteration of montane wetlands and cloud forests, and may well have succumbed to the effects of chytrid, which has been documented in other anuran species in the same area (Mendelson *et al.* 2004).

Conservation Measures A portion of the range previously occurred in the Reserva de la Biosfera Sierra de las Minas in Guatemala, but it has now been extirpated from this region. Protection of the remaining habitat of this species is urgently required. Given the threat of chytrid, this species requires close population monitoring.

Bibliography: Campbell, J.A. (2001), McCranie, J.R. and Wilson, L.D. (2002b), Mendelson III, J.R. (2001), Mendelson III, J.R. *et al.* (2004), Mendelson III, J.R. *et al.* (2005)

Data Providers: Manuel Acevedo, Bruce Young

EN *Bufo inyangae* Poynton, 1963**INYANGA TOAD****Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Zimbabwe**Current Population Trend:** Decreasing

© Richard Boycott



Geographic Range This species is known only from the Nyanga Mountains in eastern Zimbabwe. It presumably occurs in adjacent Mozambique, but there have been no records here, probably because of a lack of herpetological work in this area. It has been found at 2,400-2,560m asl, but probably also occurs at slightly lower elevations.

Population It is rather cryptic and hard to find, but it seems to be fairly common within its very limited range.

Habitat and Ecology It inhabits montane grassland with exposed bare granite. The animals hide under stones, in cracks in the granite, and in rodent burrows. It breeds in temporary pools, and larvae have been seen moving across wet granite faces.

Major Threats The high-altitude habitat of this species has remained relatively intact up until now, although it might be at increasing risk from wood plantations, overgrazing by livestock, and human settlement.

Conservation Measures It occurs in the Nyanga National Park; continued and strengthened management of this protected area is needed.

Bibliography: Channing, A. (2001), Lambiris, A.J.L. (1989b), Poynton, J.C. (1963), Poynton, J.C. (1964b), Poynton, J.C. and Broadley, D.G. (1988), Tandy, M. and Keith, R. (1972)

Data Providers: John Poynton, Mills Tandy

VU *Bufo justinianoi* Harvey and Smith, 1994**Vulnerable B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Bolivia**Current Population Trend:** Decreasing

© Jim Köhler



Geographic Range This species is found in the Bolivian Andes, in Cochabamba, Santa Cruz and La Paz Departments. It is known from the type locality, El Chape, in Florida Province, Santa Cruz Department, at an altitude of 2,050m asl, and from Campamento Fortaleza, in Carrasco Province, Cochabamba Department, from 1,875-2,220m asl, and from four localities in Nor Yungas Province, in La Paz Department, from 1,440-2,250m asl.

Population The population status of this species is not known.

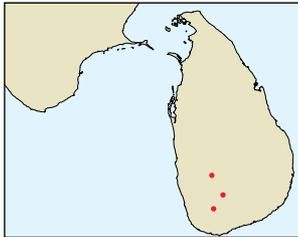
Habitat and Ecology It inhabits wet montane forest including cloud and Yungas forest. Köhler (2000a) suggests that it is probably restricted to primary forest. The larvae develop in streams.

Major Threats The major threat to this species is habitat destruction and degradation caused primarily by agriculture.

Conservation Measures Its range includes Parque Nacional Carrasco and Parque Nacional Amboro.

Bibliography: De la Riva, I. *et al.* (2000), Harvey, M. and Smith, E. (1994), Köhler, J. (2000a)

Data Providers: Claudia Cortez, Steffen Reichle, Ignacio De la Riva, Jörn Köhler

EN *Bufo kotagamai* Feonando and Dayawansa, 1994**Endangered B1ab(iii)+2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Sri Lanka**Current Population Trend:** Decreasing

© Madhava Meegaskumbura



Geographic Range This species is restricted to three sites in south-western Sri Lanka (Kitulgala Forest Reserve, Messana Forest Reserve and Sinharaja World Heritage Site). It ranges from 150-1,070m asl.

Population Little is known about the population status of this species, but it is not common.

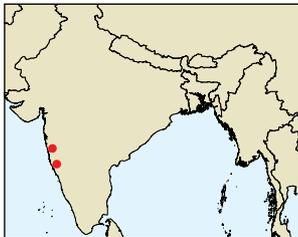
Habitat and Ecology A terrestrial species associated with wet leaf-litter, rocks and other ground cover, close to streams in tropical wet montane forest, its breeding biology has not been recorded, but it presumably takes place in water, probably in streams, by larval development.

Major Threats Habitat loss (small-scale agriculture) and human disturbance (local tourism) are the primary threats to this species.

Conservation Measures It has been recorded from several protected areas, including the Kitulgala Forest Reserve, Messana Forest Reserve and the Sinharaja World Heritage Site.

Bibliography: Dubois, A. and Ohler, A. (1999), Dutta, S.K. and Manamendra-Arachchi, K. (1996), Manamendra-Arachchi, K. and Pethiyagoda, R. (1998)

Data Providers: Kelum Manamendra-Arachchi, Ansem de Silva, Deepthi Wickramasinghe

EN *Bufo koynayensis* Soman, 1963**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** India**Current Population Trend:** Decreasing

© K. Jayaram



Geographic Range This species is known only from two localities (Koyna and Aboli) in the Western Ghats of Maharashtra, India. Specimens have been recorded at elevations between 900 and 1,200m asl.

Population It is a rare species, and is uncommon at the type locality.

Habitat and Ecology This is a terrestrial toad of moist to wet evergreen forest, and dry riparian grassland. Its breeding has not been recorded, but it presumably takes place in water, probably in streams, by larval development.

Major Threats The main threat to this species is habitat loss due to agriculture and clear cutting of forests.

Conservation Measures It has been recorded from the Konya Wild Life Sanctuary, but expanded protection of forest habitats in the species' range is needed. Further research is needed into the range and breeding biology of this species.

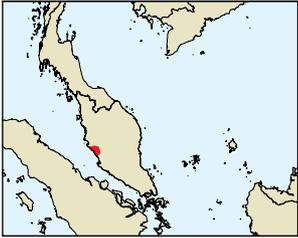
Notes on taxonomy: The taxonomy and relationships of this species need re-evaluation (Biju 2001).

Bibliography: Biju, S.D. (2001), Dutta, S.K. (1997), Giri, V. and Chaturvedi, N. (2001), Grandison, A.G.C. and Daniel, J.C. (1964), Soman, P.W. (1963)

Data Providers: S.D. Biju, Sushil Dutta, Robert Inger

EN *Bufo kumquat* Das and Lim, 2001

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Malaysia
Current Population Trend: Decreasing



© Jeet Sukumaran

Geographic Range This newly described species was found on the west coast of Peninsular Malaysia. It is known only from the type locality, Sabak Bernam, and from the North Selangor Peat Swamp, though it possibly occurs more widely.

Population It is locally abundant, but it is possibly hard to find when not breeding (which may be one explanation for its recent discovery).

Habitat and Ecology It is a peat swamp specialist. It is thought to be an explosive breeder, and presumably breeds by larval development.

Major Threats The major threat is drainage and reclamation of peat swamps for agricultural purposes, and part of its type locality has already been destroyed.

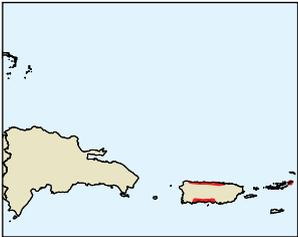
Conservation Measures This species has not been recorded from any protected areas, making habitat protection an urgent priority.

Bibliography: Das, I. and Lim, K.P.P. (2001)

Data Providers: Indraneil Das, Jeet Sukumaran, Norsham Yaakob

CR *Bufo lemur* (Cope, 1868)

Critically Endangered A2a; B1ab(v)+2ab(v); C2a(ii)
Order, Family: Anura, Bufonidae
Country Distribution: Virgin Islands (British), Puerto Rico
Current Population Trend: Decreasing



© Alejandro Sanchez

PUERTO RICAN CRESTED TOAD

Geographic Range This species has a very restricted range, and is known from only a handful of localities along the north and south coasts of Puerto Rico and Virgin Gorda Island. In recent years it has been recorded from only one location on the south coast of Puerto Rico. It has been recorded from sea level up to 50m asl.

Population The north coast population has not been recorded since 1992, and it is most likely extirpated in this area. It was last recorded on Virgin Gorda Island in 1964, and other surveys since then have not located any individuals. Since 1992, there has only been one known population remaining. In 1984, there were 900 mature individuals recorded in this population; subsequently, in 1998, there were only 215 mature individuals recorded (of which 34 were females), in 2002 only 100 mature individuals, and in 2003 only 80 mature individuals were recorded (R. Joglar pers. comm.).

Habitat and Ecology It is a terrestrial species found in semi-arid, rocky areas of seasonal evergreen forest. Eggs are laid in permanent or temporary pools of water, streams, or small dams for livestock.

Major Threats Infrastructure development for human settlement is a major threat, particularly on the north coast. In the south of its range some breeding pools were deliberately drained to clear parking space for visitors to the beach.

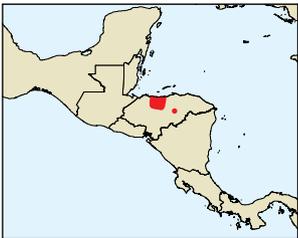
Conservation Measures The last known population occurs entirely within the Guanica National Forest, which is a well-managed area. Captive breeding has been successful, and after many years a re-introduction program in Puerto Rico seems to be showing some success, with re-introduced captive-bred animals now returning to the constructed ponds where they were first released (Zippel 2005).

Bibliography: Hedges, S.B. (1993), Henderson, R.W. and Powell, R. (1999), Henderson, R.W. and Powell, R. (2001), Joglar, R.L. (1999), Rivero, J.A. (1998), Rivero, J.A. and Seguí Crespo, D. (1992), Zippel, K. (2005)

Data Providers: Blair Hedges, Rafael Joglar, Richard Thomas, Luis J. Villanueva-Rivera, Neftalí Ríos-Lopez

EN *Bufo leucomyos* McCranie and Wilson, 2000

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Honduras
Current Population Trend: Decreasing



© Iwan Leenders

Geographic Range Disjunct populations of this species occur on the Atlantic slope of north-central Honduras at 0-1,600m asl.

Population The population is apparently stable in appropriate habitat and the species is recorded on a regular basis.

Habitat and Ecology It can be found in lowland moist, and premontane and lower montane wet, forest; all specimens have been collected from broadleaf forests. The larvae apparently develop in streams.

Major Threats A major threat to this species is the impact of landslides on upper clear water streams, as a result of strong storms and human activities taking place in the lower portions of the streams. Habitat loss due to slash-and-burn agriculture, smallholder farming, logging, and expanding human settlements is also a significant threat.

Conservation Measures Part of the range of this species is protected in La Muralla and Pico Bonito National Parks, the Lancetilla Botanical Garden, and the Reserva de Visda Silvestre Texiguat.

Bibliography: McCranie, J.R. and Wilson, L.D. (2000a), McCranie, J.R. and Wilson, L.D. (2002b)

Data Providers: Larry David Wilson, Gustavo Cruz

EN *Bufo longinasus* Stejneger, 1905

Endangered B2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Cuba
Current Population Trend: Decreasing



Geographic Range This species is only known from three very small distributional pockets (Pinar del Río Province, Sierra de Trinidad, and Sierra del Guaso) in Cuba, and each of these may turn out to be separate species. It has been recorded from 100-820m asl.

Population It is generally an uncommon species, although one population in the west is known to be very abundant. However, the eastern population has not been found again since it was first described in the early 1900s.

Habitat and Ecology It is found in upland pinewoods and mesic broadleaf forest, and is terrestrial by day but may be arboreal at night. It has not been recorded outside forest habitat, and is always found by streams. Males call while floating on the surface of water. Eggs are laid in streams, where the larvae also develop.

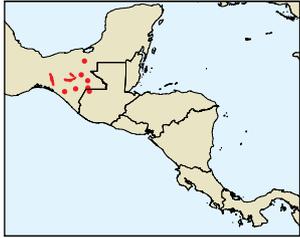
Major Threats There is ongoing habitat loss in the upland woodlands in which it occurs from clear-cutting and subsistence logging, charcoaling, fires, and agricultural expansion.

CUBAN LONG-NOSED TOAD

Conservation Measures Its range includes several protected areas, although these areas do not provide sufficient protection for the species. Improved management of these reserves, and strengthened protection of the remaining forest habitat, is required.

Bibliography: Centro Nacional de Areas Protegidas (CNAP) (2002), Hedges, S.B. (1993), Hedges, S.B. (1999), Hedges, S.B. (2001), Henderson, R.W. and Powell, R. (1999), Henderson, R.W. and Powell, R. (2001), Moreno, L.V. et al. (1999), Schwartz, A. and Henderson, R.W. (1991)

Data Providers: Blair Hedges, Luis Díaz

VU *Bufo macrocristatus* Firschein and Smith, 1957**Vulnerable B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Guatemala, Mexico**Current Population Trend:** Decreasing

Geographic Range This species' geographic range extends from Los Chimalapas region in south-central Oaxaca, Mexico, south and east along the Atlantic versant as far as the Sierra de los Cuchumatanes in Guatemala. It occurs at 1,000-1,600m asl.

Population It is rare across its range.

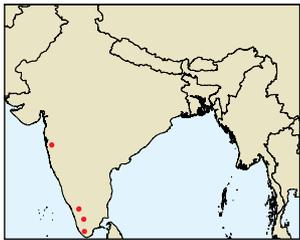
Habitat and Ecology This species is mainly associated with high humid areas in cloud forest and, in Mexico, pine-oak-Liquidambar forests. It breeds in streams.

Major Threats The major threats to this species are habitat loss, due to agriculture and human settlement, and water pollution.

Conservation Measures The conservation, expansion and management of cloud forest are key measures to preserve this species since it has not been recorded from any of the Biosphere reserves in Chiapas, Mexico. It also does not occur in any protected area in Guatemala.

Bibliography: Campbell, J.A. (2001), Mendelson III, J.R. (1997b)

Data Providers: Georgina Santos-Barrera, Manuel Acevedo

VU *Bufo microtypanum* Boulenger, 1882**Vulnerable B1ab(iii)+2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** India**Current Population Trend:** Decreasing

Geographic Range This is a poorly known species that is presumed to be endemic to the southern Western Ghats of India. A record from Maharashtra (Yazdani and Mahabal 1976) requires confirmation. Manamendra-Arachchi and Pethiyagoda (1998) clarified that it does not occur in Sri Lanka. The altitudinal range is from 1,400-2,100m asl.

Population It is a rare species.

Habitat and Ecology A terrestrial species associated with montane 'shola' (grassland-forest mosaic) and tropical moist forest habitat; it has not been recorded from modified habitats. It may be found in the vicinity of water bodies, but the breeding habitat is not known.

Major Threats The major threat to this species is habitat loss due to the conversion of forested areas to cultivated land (including timber and non-timber plantations), future dam development projects, road construction, and urbanization.

Conservation Measures It has been recorded from the Kalakkad Mundauthurai Tiger Reserve (Tamil Nadu) and Silent Valley National Park (Kerala).

Notes on taxonomy: Several specimens bearing this name, and which are deposited in different museums in India, do not belong to this species (Biju 2001).

Bibliography: Biju, S.D. (2001), Chanda, S.K. (2002), Dubois, A. and Ohler, A. (1999), Dutta, S.K. (1997), Manamendra-Arachchi, K. and Pethiyagoda, R. (1998), Vasudevan, K., Kumar, A. and Chellam, R. (2001), Yazdani, G.M. and Mahabal, A. (1976)

Data Providers: S.D. Biju, Sushil Dutta, Karthikeyan Vasudevan, S.P. Vijayakumar, Chelmal Srinivasulu, Gajanan Dasaramji Bhuddhe

EN *Bufo nelsoni* Stejneger, 1893**Endangered C2a(i)****Order, Family:** Anura, Bufonidae**Country Distribution:** United States of America**Current Population Trend:** Decreasing

© Kenny Wray

Geographic Range This species occurs in riparian habitats associated with the Amargosa River, tributary springs of the Amargosa River in Oasis Valley, and isolated spring systems near Beatty, Nye County, Nevada, USA (USFWS, Federal Register, 1 March 1996).

Population The total adult population size is uncertain but is likely to be at least several hundred. Thousands were reported in 1958; estimates of the size of the metamorphosed population at 10 sites in 1993 and 1994 ranged from 30-130, but some sites that were probably occupied have not been surveyed in recent years (USFWS, Federal Register,

1 March 1996). Surveys at 20 sites since 1990 yielded the following results: apparently extirpated from one spring, decreased abundance at four springs, fluctuating but relatively constant populations at 15 sites (USFWS, Federal Register, 1 March 1996; see also unpublished 1993 and 1994 reports by Hoff, prepared for the USFWS, Reno, Nevada). Over the past few decades, the species reportedly has declined greatly from its former range and abundance (Altig and Dodd 1987), but more recent surveys found that distribution and abundance were greater than previously known (USFWS, Federal Register, 1 March 1996).

Habitat and Ecology Usually found near water at desert springs and outflow. Vegetation bordering water consists of cottonwood trees, cattails, and sedges. May congregate at streetlights to feed on attracted insects (Burroughs 1999). Eggs and larvae develop in spring waters (open areas with little vegetation at LaFleur).

Major Threats Factors that may be adversely affecting the toad and its habitat include the effects of variable rainfall on small populations, livestock and feral burro grazing and trampling, off-road vehicle use, grading for flood control, activities related to commercial development, non-native predators (catfish, crayfish, bullfrog (*Rana catesbeiana*)), water pollution, and water diversion (Froglog, December 1994). Trampling of larvae by cattle may be negatively affecting the LaFleur population, which also may be threatened by road widening (of Route 95). Expansion of non-native salt cedar may degrade habitat (Burroughs 1999).

Conservation Measures The majority of available habitat is on private property. BLM has initiated protection (Area of Critical Environmental Concern) for all occupied sites under their jurisdiction. TNC purchased a 60-ha ranch near Beatty for experimental habitat management (Burroughs 1999). Nye County is a co-operator with state and federal agencies in a conservation agreement (Burroughs 1999).

Bibliography: Altig, R. and Dodd, C.K. Jr. (1987), Blackburn, L., Nanjappa, P. and Lannoo, M.J. (2001), Burroughs, M. (1999), Bury, R.B., Dodd, Jr., C.K. and Fellers, G.M. (1980), Feder, J.H. (1977), Stebbins, R.C. (1951), Stebbins, R.C. (1985b), U.S. Fish and Wildlife Service (1989a)

Data Providers: Geoffrey Hammerson

AMARGOSA TOAD**EN** *Bufo nesiotes* Duellman and Toft, 1979**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Peru**Current Population Trend:** Decreasing

Geographic Range This species is known only from the vicinity of the type locality of Laguna, west slope of Serrania de Sira, Departamento Huánuco, Peru. The type specimen was recorded at 1,280m asl, but the species may well occur from 600 to around 2,000m asl (as another specimen is believed to have been found at 600m asl). It presumably ranges much more widely than has been mapped, but it is nonetheless likely to be endemic to the Serrania de Sira.

Population There is no information on the population status of this species.

Habitat and Ecology Their habitat is premontane and montane forest on an isolated mountain ridge of the upper Amazon Basin. Nothing is known about their breeding strategy, although it has been suggested that this may be a species that breeds by direct development. It is not known to what degree they can withstand any anthropogenic disturbance.

Major Threats Although the restricted area that the species inhabits is relatively inaccessible, there is some disturbance due to farming activity and human settlements. In addition, the lower parts of the range are being selectively logged.

Conservation Measures This species is quite likely to occur in Reserva Comunal El Sira. Continued maintenance of this, and other remaining habitat in the Serrania de Sira, is necessary.

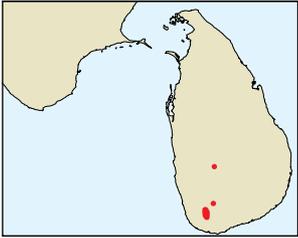
Notes on taxonomy: Duellman and Toft (1979) described this species from only one specimen (a female), and suggested this species could have direct development.

Bibliography: Duellman, W.E. and Toft, C.A. (1979), Rodríguez, L.O., Cordova, J.H. and Icochea, J. (1993)

Data Providers: Ariadne Angulo, Karl-Heinz Jungfer, Javier Icochea

EN *Bufo noellerti* Manamendra-Arachchi and Pethiyagoda, 1998

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Sri Lanka
Current Population Trend: Decreasing



© Madhava Meegaskumbura



Geographic Range This species has a restricted distribution in south-west Sri Lanka, and has been recorded at elevations of between 150 and 460m asl.

Population It is not a common species, and populations may be declining proportionately with a loss in forest habitat.

Habitat and Ecology It is a terrestrial species found in, and around, tropical lowland moist forest. Adults have been recorded from rubber plantations, tea estates, and domestic gardens close to the forest edge only. The breeding habitat is not known.

Major Threats The main threats to the species are habitat loss, due to selective logging, and agrochemical pollution.

Conservation Measures It has been recorded from the Kanneliya Forest Reserve, Gilimale-Eratne Forest Reserve and the Sinharaja World Heritage Site; the continued management of these for biodiversity conservation is important.

Bibliography: Dubois, A. and Ohler, A. (1999), Dutta, S.K. and Manamendra-Arachchi, K. (1996), Manamendra-Arachchi, K. and Pethiyagoda, R. (1998)

Data Providers: Kelum Manamendra-Arachchi, Ansem de Silva

VU *Bufo nyikae* Loveridge, 1953

Vulnerable D2
Order, Family: Anura, Bufonidae
Country Distribution: Malawi, Zambia
Current Population Trend: Stable



© David C. Blackburn



Geographic Range This species is known only from the Nyika Plateau in northern Malawi and north-eastern Zambia. It is a high-altitude species, although its precise altitudinal range is not known.

Population It is probably reasonably common within its small range.

Habitat and Ecology It is apparently associated mainly with montane forest, and with wet, boggy places in grassland, and is never far from trees. It breeds in small, shallow pools.

Major Threats Most, if not all, of the range of this species is in a protected area, and so it is probably not seriously threatened at present.

Conservation Measures It occurs in the Nyika National Park. This species requires close population monitoring given that it is known from only a single location.

Notes on taxonomy: This species was removed from the synonymy of *Bufo lonnbergi* by Poynton (1997), where it had been placed by Grandison (1972).

Bibliography: Broadley, D.G. (1971), Channing, A. (2001), Grandison, A.G.C. (1972b), Poynton, J.C. (1964a), Poynton, J.C. (1997), Poynton, J.C. and Broadley, D.G. (1988), Stewart, M.M. (1967), Stewart, M.M. and Wilson, V.J. (1966), Tandy, M. and Keith, R. (1972)

Data Providers: Mills Tandy, Lovemore Mazibuko, Alan Channing, John Poynton

EN *Bufo pantherinus* Smith, 1828

Endangered B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)
Order, Family: Anura, Bufonidae
Country Distribution: South Africa
Current Population Trend: Decreasing



© Andrew Turner



WESTERN LEOPARD TOAD

Geographic Range This species is known only from a very small area of the Western Cape Province in South Africa, ranging from the Cape Peninsula eastward to beyond Gansbaai in the Pearly Beach area. It occurs only at low elevations, within 10km of the sea.

Population It is a locally common species.

Habitat and Ecology It occurs in large wetlands, vleis, dams, and sluggish water in lowland fynbos heathland, as well as in altered habitats, such as farmland, suburban gardens, and urban open areas, although always in close proximity to freshwater habitats. It breeds in permanent waterbodies, and occasionally temporary waterbodies that retain water well into summer, and has a preference for deep water, with floating plants.

Major Threats Although it is tolerant of a degree of habitat alteration, it is probably being negatively impacted by increased urbanization and agricultural expansion. Road kills may also be an important factor.

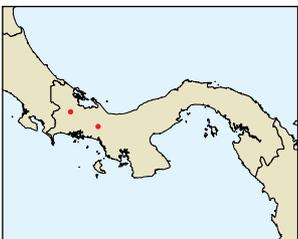
Conservation Measures It occurs in the Agulhas National Park and in the northern limits of Cape of Good Hope Nature Reserve, as well as in various local reserves. However, much of its habitat remains unprotected, such that improved protection of this habitat is necessary.

Bibliography: Channing, A. (2001), Cherry, M.I. (1992), Cunningham, M. and Cherry, M.I. (2000), Eick, B.N., Harley, E.H. and Cherry, M.I. (2001), Minter, L.R. *et al.* (2004), Passmore, N.I. and Carruthers, V.C. (1995), Poynton, J.C. and Lambiris, A.J.L. (1988), Tandy, M. and Keith, R. (1972)

Data Providers: Leslie Minter, James Harrison

CR *Bufo peripatetes* Savage, 1972

Critically Endangered A3ce
Order, Family: Anura, Bufonidae
Country Distribution: Panama
Current Population Trend: Decreasing



Geographic Range This species is known only from two sites: Parque Internacional La Amistad, a transboundary protected area between Costa Rica and Panama, and Cerro Bollo, in the western central cordillera of Panama. It has been recorded at 1,500-1,856m asl.

Population There is no information available on the population size or abundance of this species. It can still be found above Boquete on the trail to Almirante and Cerro Bollo on the border between Chiriquí and Bocas del Toro Provinces.

Habitat and Ecology This is a largely unknown terrestrial species of tropical montane forest. There is no information available on reproduction or breeding habitats, though it presumably takes place in water. Assuming that it is similar to *Bufo fastidiosus* and *B. holdridgei*, it is likely to emerge unpredictably to breed, and is probably very hard to find.

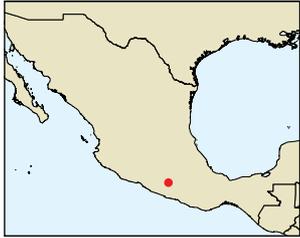
Major Threats The closely related species *Bufo fastidiosus* and *B. holdridgei* have both declined dramatically, probably due to chytrid-

iomycosis, and are now possibly extinct. This disease must be considered a very serious threat to *B. peripatetes* as well, and the disease has already passed through the range of this species. Destruction of available forest habitat (generally caused by the driving of cattle through La Amistad) is a threat to the species.

Conservation Measures There are no specific conservation measures currently in place, but further research is needed into the range, ecology, and population status of this species. In view of the threat of chytridiomycosis, the status of this species should be closely monitored, and an *ex-situ* population should be established.

Bibliography: Ibáñez, R. *et al.* (2000), Savage, J.M. (1972b), Savage, J.M. and Donnelly, M.A. (1992), Young, B. *et al.* (1999)

Data Providers: Frank Solís, Roberto Ibáñez, César Jaramillo, Querube Fuenmayor, Karen Lips

EN *Bufo perplexus* Taylor, 1943**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Mexico**Current Population Trend:** Decreasing

Geographic Range This species is found in the Tepalcatepec Basin and surrounding areas in south-western Michoacán, south of the Balsas River in Guerrero, Mexico. It probably occurs more widely than currently known.

Population This is a rare species.

Habitat and Ecology It inhabits the Pacific lowlands in areas of seasonal tropical forest, and lives under rocks and logs close to streams, breeding in pools.

Major Threats The main threats to this species are infrastructure development and agricultural expansion, coupled with changes in the management of agricultural habitat.

Conservation Measures It is not found within any protected area, and protection of the species' original forest habitat is urgently needed.

Bibliography: Blair, W.F. (1972), Duellman, W.E. (1961)

Data Providers: Georgina Santos-Barrera, Luis Canseco-Márquez

VU *Bufo perreti* Schiøtz, 1963**Vulnerable D2****Order, Family:** Anura, Bufonidae**Country Distribution:** Nigeria**Current Population Trend:** Unknown

© Arne Schiøtz

Geographic Range This species has been recorded only from the Idanre Hills, in Ondo Province, south-western Nigeria. It is very likely to occur in other similar habitats in south-western Nigeria. There have been no recent records of the species, presumably because of a lack of herpetological work within its range.

Population It is reported to be very common within its small known range, and tadpoles are abundant during the wet season.

Habitat and Ecology It is closely associated with gneiss domes or inselbergs in the forest zone, though is absent from similar inselbergs in the savannah belt. It lives terrestrially in patches of shrubby vegetation and forest on the gneiss domes. The eggs are probably laid on soil, and the tadpoles then disperse by crawling out on the wet, sloping (often almost vertical) rock.

Major Threats Its rocky habitat is largely inaccessible and useless to humans, so this species is probably not facing any serious threats at present. However, it is intrinsically at risk because of its restricted range.

Conservation Measures It is not known from any protected areas, and there is a need for improved protection of sites where this species is known to occur. There is also a need for population monitoring given that it is known from only a single location.

Bibliography: Schiøtz, A. (1963), Tandy, M. and Keith, R. (1972)

Data Providers: Arne Schiøtz, Mills Tandy

VU *Bufo quechua* Gallardo, 1961**Vulnerable B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Bolivia**Current Population Trend:** Decreasing

© Arturo Muñoz

Geographic Range This species is known from the eastern slopes of the Bolivian Andes, in Cochabamba and Santa Cruz Departments. It has also been recorded in Chapare Province, Cochabamba Department and Caballero Province, Santa Cruz Department in Bolivia (Köhler 2000a; Cortez 2001). It has been recorded from 1,900-2,300m asl.

Population The population status of this species is not known.

Habitat and Ecology A terrestrial species inhabiting wet montane forest including cloud and Yungas forest. The eggs are laid in lotic waters (Köhler 2000a).

Major Threats Major threats to this species' habitat include agriculture (mainly from smallholder farmers) and agricultural pollution. Köhler (2000a) points out that it is very common to find this species infected by parasites, with visible red pustules that, according to De la Riva (1997), are caused by the larvae of a trombidid mite. However, it is not known whether or not the infestations have a negative effect on the species.

Conservation Measures Its range includes Parque Nacional Carrasco and Parque Nacional Amboro.

Notes on taxonomy: Harvey and Smith (1993) pointed out that *Bufo echinodes*, described by Reynolds and Foster (1992), is a synonym of *B. quechua*. This species is possibly a complex of more than one species.

Bibliography: Cortez, C. (2000), De la Riva, I. (1997), De la Riva, I. *et al.* (2000), Gallardo, J.M. (1961b), Harvey, M. and Smith, E. (1993), Hoogmoed, M.S. (1990), Köhler, J. (2000a), Mercadal-de Barrio, I.T. and Barrio, A. (1978), Reynolds, R. and Foster, M. (1992)

Data Providers: Claudia Cortez, Steffen Reichle, Ignacio De la Riva, Jörn Köhler

VU *Bufo rubropunctatus* Guichenot, 1848**Vulnerable A2c****Order, Family:** Anura, Bufonidae**Country Distribution:** Argentina, Chile**Current Population Trend:** Decreasing

© Andrés Moya

Geographic Range This species is endemic to the temperate forests of Chile and Argentina. In Chile, the distribution extends from Lanalhue Lake (37° 55'S; 73° 19'W), Arauco Province, to Palena 43°S (approximately). In Argentina, the species is restricted to southern Río Negro Province and northern Chubut Province (including a single record from Parque Nacional Los Alerces). It has an altitudinal range of 200-800m asl.

Population The northernmost population in Chile is declining, while the Argentinean subpopulations seem to be stable, with successful reproduction with recruitment recently verified (Vidoz and Ubeda 2000). It is abundant during the breeding season when courtship aggregations are formed.

Habitat and Ecology It inhabits humid to xeric forests, as well as open environments, some of them with a certain degree of disturbance (Vidoz and Ubeda 2000). Breeding occurs in shallow temporary ponds adjacent to rivers, reservoirs and lakes. Adults live in small holes or under bushes during the day.

Major Threats The major threat is degradation and fragmentation of habitat, due to agriculture, afforestation with exotic species (pine), overgrazing by cattle, and human settlements. Tourism development also appears to be a threat to the habitat of this species.

Conservation Measures The species is protected by Parque Nacional Lago Puelo and Parque Nacional Los Alerces (a single record) in Argentina, and Parque Nacional Puyehue and Parque Nacional Vicente Pérez Rosales in Chile.

Bibliography: Cei, J.M. (1962), Cei, J.M. (1980), Formas, J.R. (1979), Formas, J.R. (1995), Formas, J.R. and Pugin, E. (1978), Gallardo, J.M. (1962a), Gallardo, J.M. (1965), Glade, A. (1993), Lavilla, E.O. *et al.* (2000), Servicio Agrícola Ganadero (1998), Veloso, A. and Navarro, J. (1988), Vidoz, F. and Ubeda, C.A. (2000)

Data Providers: Carmen Ubeda, Alberto Veloso, Herman Núñez, Néstor Basso

VU *Bufo rumbolli* Carrizo, 1992**Vulnerable B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Argentina**Current Population Trend:** Decreasing

© Arturo Muñoz

Geographic Range This species occurs in Calilegua, Ledesma Department, Jujuy Province and Arasayal, Orán Department, Salta Province, Argentina, from 700-1,700m asl. It is expected to occur more widely, and might be present in Bolivia.

Population Although it is a rare species, it is nonetheless collected regularly.

Habitat and Ecology It is a terrestrial species occurring in montane forests (Yungas). Its tolerance to habitat disturbance is not known. It reproduces in slow-flowing streams where the tadpoles also develop.

Major Threats Selective logging and clear-cutting of primary forests are the main threat to this species, although it is also being affected by the introduction of predatory fish (trout) and the alteration of watersheds.

Conservation Measures It is present in Parque Nacional Calilegua and Parque Nacional Baritú.

Bibliography: Carrizo, G.R. (1991), De la Riva, I. *et al.* (2000), Lavilla, E.O. *et al.* (2000), Lavilla, E.O. and Cej, J.M. (2001), Vaira, M. (2002)

Data Providers: Esteban Lavilla

EN *Bufo sclerocephalus* Mijares-Urrutia and Arends, 2001**Endangered B1ab(iii,v)****Order, Family:** Anura, Bufonidae**Country Distribution:** Venezuela**Current Population Trend:** Decreasing

Geographic Range This species is known from the Sierra de San Luis, in Falcón State, Venezuela, where it has been recorded from 1,150-1,500m asl.

Population The most recent specimens were collected in 1992, and no additional specimens have been found since then (although this may be due to a lack of fieldwork within its range).

Habitat and Ecology It occurs on vegetation in cloud forest. Some individual males have been observed calling in slow-moving water, and the larvae probably develop in water.

Major Threats The habitat of the species is under intense pressure from agriculture and livestock farming, even within Parque Nacional Juan Crisóstomo Falcón. The species is also used in local medicinal use for the preparation of treatments against dermal herpes.

Conservation Measures Although it occurs in Parque Nacional Juan Crisóstomo Falcón, this area is poorly managed for conservation and is in urgent need of more effective management. Education and

awareness of the local people regarding the use of this species is recommended. Further survey work is also needed to determine the current population status of the species.

Bibliography: Barrio Amorós, C.L. (2004), Mijares-Urrutia, A. and Arends, A. (2001)

Data Providers: Abraham Mijares, Enrique La Marca

VU *Bufo scortecii* Balletto and Cherchi, 1970**Vulnerable D2****Order, Family:** Anura, Bufonidae**Country Distribution:** Yemen**Current Population Trend:** Stable

Geographic Range This species is possibly restricted to Wadi al Khalili near Mafhaq (1,550m asl) on a high plateau in northern Yemen.

Population It is probably common within its restricted range.

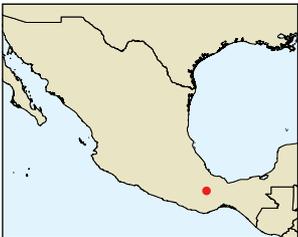
Habitat and Ecology It is found within the wadi, and shelters in the surrounding vegetation. Breeding takes place in pools.

Major Threats There are no current threats to this species, although its restricted range makes it vulnerable to stochastic events.

Conservation Measures It is not known whether or not this species occurs in protected areas, or whether or not it is protected by national legislation. It requires close population monitoring given that it is known from only one location.

Bibliography: Balletto, E., Cherchi, M.A. and Gasperetti, J. (1985)

Data Providers: Andrew Gardner, Theodore Papenfuss, Steven Anderson, Matthias Stöck, Sergius Kuzmin

EN *Bufo spiculatus* Mendelson, 1997**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Mexico**Current Population Trend:** Decreasing

Geographic Range This species is known from two localities in northern Oaxaca in the Sierra de Juárez in Mexico, and another allopatric population has been recorded in the Sierra Mixe, south-central Oaxaca, Mexico; additional survey work is likely to result in its discovery at additional locations. The type locality is at 1,570m asl.

Population There is no information available on the population status of this species.

Habitat and Ecology It appears that this species is confined to high elevations covered with primary cloud forests and lowland rainforest beneath the cloud forest. It breeds in permanent streams.

Major Threats The main threats are the fragmentation and disturbance of the cloud and rainforest habitat, which results in the disappearance of streams and a decrease in the humidity of the leaf-litter.

Conservation Measures The range of the species is not within any protected area, and only the preservation and restoration of

cloud forest patches in the Sierra de Juárez and the Sierra Mixe can guarantee the preservation of suitable conditions for the survival of this species. Further survey work is necessary to determine the current population status of this species.

Bibliography: Mendelson III, J.R. (1997a)

Data Providers: Georgina Santos-Barrera, Luis Canseco-Márquez

CR *Bufo sumatranus* Peters, 1871**Critically Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Indonesia**Current Population Trend:** Decreasing

Geographic Range This species is known only from a tiny area on the island of Sumatra, Indonesia. The type locality is unspecified. It is apparently confined to Lubuk Selasi, at the head of the Terusan River at about 1,000m asl, on the borders of three districts, Padang Pariaman, Solok and Pesisir Selatan. Despite searches, it has not been found above 1,260m, or below 800m asl. Surveys in several other parts of Sumatra have failed to find this species, and it is likely to have a very restricted distribution.

Population This species was rediscovered in 2001 after a gap of 141 years. At present, it is only known from one area, but is relatively abundant within its tiny range.

Habitat and Ecology It has been found along a small, clear stream with a width of 15m in secondary forest. No evidence of breeding has been found, but it presumably breeds by larval development in streams. It is not known whether or not the species is dependent on forest, though this is likely.

Major Threats Since its rediscovery, there has been extensive and very rapid habitat destruction for rice paddies in its only known locality, leading to the siltation of streams, which might affect its ability to breed.

Conservation Measures The species is not known from any protected area (it has not been recorded from a conservation forest about 10km from the only known locality). A community-based initiative involving local NGOs and communities is urgently needed to save the only known population of this species.

Bibliography: Dubois, A. and Ohler, A. (1999), Iskandar, D.T. and Colijn, E. (2000)

Data Providers: Djoko Iskandar, Mumpuni

EN *Bufo tacanensis* Smith, 1952**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Guatemala, Mexico**Current Population Trend:** Decreasing

© Sean M. Rovito

Geographic Range This species occurs at intermediate elevations along the Pacific versant of eastern Chiapas (Unión de Juárez), Mexico to western Guatemala, at elevations of 1,500-1,700m asl.

Population This is a rare species throughout its range, and there are no recent records of it in either Mexico or Guatemala, despite searches.

Habitat and Ecology This species has been recorded in foothills in premontane tropical forest. It is probably a stream breeder.

Major Threats The alteration of the original forested areas by local people has severely impacted the only known habitat for this species. Furthermore, as a montane stream-breeding bufonid, it is possible that the species may be at risk of chytridiomycosis.

Conservation Measures Conservation of the forested areas along the foothills of the Tacana volcano is necessary to ensure the preservation of this species. Fortunately, some programs of protection and restoration of the forests in the area have been implemented. In view of the severe risk of chytridiomycosis, the status of this species should be closely monitored, and ex-situ populations should be established if chytrid is shown to be a threat.

Bibliography: Smith, W.P. (1952)

Data Providers: Georgina Santos-Barrera, Oscar Flores-Villela, Manuel Acevedo, Antonio Muñoz Alonso

CR *Bufo taiensis* Rödel and Ernst, 2000**Critically Endangered B2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Côte d'Ivoire**Current Population Trend:** Decreasing

© Mark-Oliver Rödel

Geographic Range This species is known only from south-western Côte d'Ivoire. It possibly occurs in adjacent Liberia.

Population It is clearly a very rare species, and is known from only four specimens in an area that has been thoroughly surveyed.

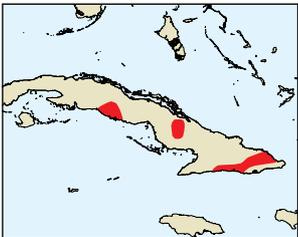
Habitat and Ecology It is known only from primary rainforest. There is no information on its breeding, but if like *B. tuberosus*, then breeding is likely to take place in small forest streams.

Major Threats There is ongoing forest loss in south-western Côte d'Ivoire, due to agriculture, timber extraction, and human settlement.

Conservation Measures This species has been recorded from Tai National Park. Further survey work is required to determine the biology and population status and trends of this species, as well as the limits of its distribution range.

Bibliography: Rödel, M.-O. (2000b), Rödel, M.-O. and Ernst, R. (2000), Tandy, M. and Perret, J.-L. (2000)

Data Providers: Mark-Oliver Rödel, Jean-Luc Perret, Mills Tandy

VU *Bufo taladai* Schwartz, 1960**Vulnerable B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Cuba**Current Population Trend:** Decreasing

© David Ortiz-Martinez

CUBAN SPOTTED TOAD

Geographic Range This species is found in central and eastern Cuba from sea level up to 560m asl.

Population It is very common in suitable habitat.

Habitat and Ecology It is found in lowland mesic broadleaf forests and cultivated fields (providing farming is not too intensive). Males call in streams and shallow creeks, and eggs are laid in permanent water.

Major Threats The major threat to this species is habitat loss due to intensive agriculture (livestock, sugarcane), charcoaling, and nickel mining. Pollution from agricultural pesticides is also a threat.

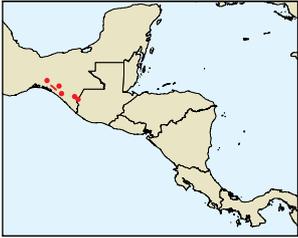
Conservation Measures This species occurs in many protected areas.

Bibliography: Centro Nacional de Areas Protegidas (CNAP) (2002), Hedges, S.B. (1993), Hedges, S.B. (1999), Hedges, S.B. (2001), Henderson, R.W. and Powell, R. (1999), Henderson, R.W. and Powell, R. (2001), Schwartz, A. (1960b), Schwartz, A. and Henderson, R.W. (1991)

Data Providers: Blair Hedges, Luis Díaz

EN *Bufo tutelarius* Mendelson, 1997

Endangered B1ab(iii,v)
Order, Family: Anura, Bufonidae
Country Distribution: Guatemala, Mexico
Current Population Trend: Decreasing



Geographic Range This species occurs on the Pacific versant of Mexico from the Chimalapas region in south-eastern Oaxaca south through Chiapas to extreme western Guatemala, at elevations of 1,000-2,000m asl.

Population It is uncommon but still present in one Oaxaca locality, with no evidence of a decline. In Chiapas, it has declined and is now rare, though it still persists. Apparently, it is rare in Guatemala, as recent expeditions within its range have not recorded this species, indicating a decline there also.

Habitat and Ecology This species is closely associated with streams, which provide breeding habitat, in cloud forest; it also occurs in pine-oak (broadleaf) forest, and does tolerate moderate forest disturbance.

Major Threats The major threat to this species has been the loss and fragmentation of suitable forest habitat as a result of livestock ranching and agricultural activities, and wood extraction. Since this

is a montane, stream-breeding bufonid, it is possible that it may be affected by chytridiomycosis.

Conservation Measures It occurs in Reserva de la Biósfera La Sepultura and Reserva de la Biósfera El Triunfo, but further protection of the remaining habitat in the range of this species is needed. In view of the severe risk of chytridiomycosis, the status of this species should be closely monitored and ex-situ populations should be established if chytrid is shown to be a threat.

Bibliography: Campbell, J.A. (2001), Mendelson III, J.R. (1997b), Mendelson III, J.R., Ustach, P.C. and Montes de-Oca, A.N. (1999)

Data Providers: Manuel Acevedo, Luis Canseco-Márquez, Antonio Muñoz Alonso

VU *Bufo uzunguensis* Loveridge, 1932

Vulnerable B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Tanzania
Current Population Trend: Decreasing



© Michele Menegon

Geographic Range This species occurs in the Udzungwa Mountains and Southern Highlands of Tanzania, from Dabaga south-west to Nyamwanga. It is found above 1,800m asl.

Population It appears to be locally abundant in suitable habitat.

Habitat and Ecology It is a species of swampy montane grassland. Its ability to adapt to habitat modification is unknown, though most records are from pristine grassland. It breeds in wet areas in the bottom of gentle valleys on high plateaus.

Major Threats The montane grasslands of southern Tanzania are being destroyed and fragmented as a result of afforestation, overgrazing, agricultural expansion, and human settlement, which is a major threat to this species.

Conservation Measures It has not been recorded in any protected areas, and there is a need for improved protection of sites where the species is known to occur. It might be present in the Udzungwa National Park, but it is not clear whether it ranges that far north.

Bibliography: Grandison, A.G.C. (1972b), Howell, K.M. (1993), Loveridge, A. (1932a), Poynton, J.C. (1998), Tandy, M. and Keith, R. (1972)

Data Providers: Kim Howell, John Poynton, Mills Tandy, Michele Menegon

EN *Bufo villiersi* Angel, 1940

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Jean-Louis Amiet

Geographic Range This species is known from the mountains of western Cameroon at 1,200-2,500m asl, where it occurs on Mount Manenguba, the Bamileke Plateau (at Djuttitsa, Batie and Bangwa), the Bamboutos Mountains, and Riboa (between the Adamawa and Mambilla Plateaus). It might occur more widely, and if *Bufo djohongensis* proves to be a synonym, then its range will extend to the east of the Adamawa Plateau.

Population It is not a well-known species, though it is probably moderately common in suitable habitats.

Habitat and Ecology It lives along fast-flowing streams in montane grassland, sometimes with forest strips, and hides in holes during the day. It breeds in slow-flowing streams bordered with trees.

Major Threats Although it can probably cope with some disruption to its habitat, it is probably suffering from continuing degradation of its montane habitats as a result of smallholder farming activities, livestock ranching, wood extraction, and human settlement.

Conservation Measures It is not known to occur in any protected areas. Protection of the remaining highland forests in Cameroon, particularly Mount Manenguba, is urgently needed.

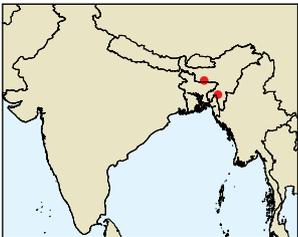
Notes on taxonomy: It is possible that *Bufo djohongensis* is a synonym of this species (J.-L. Amiet pers. comm.).

Bibliography: Amiet, J.-L. (1973b), Amiet, J.-L. (1976c), Perret, J.-L. (1971b), Tandy, M. and Keith, R. (1972)

Data Providers: Jean-Louis Amiet, Mills Tandy

EN *Bufoides meghalayanus* (Yazdani and Chanda, 1971)

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: India
Current Population Trend: Decreasing



Geographic Range This species is known only from two sites, the type locality "Mawblang, ca. 5km. southeast of Cherrapunji town (Khasi-Jaintia Hills District, Meghalaya), latitude 25° 15'N and longitude 91° 44'E, altitude above mean sea-level 4,369 ft. or ca. 1,330 meters", India, and a second, recently discovered site in Mizoram, Bangladesh. It probably occurs at least a little more widely than current records suggest, especially in areas between the two known sites.

Population Little is known about this species other than the original description, but it is considered to be rare.

Habitat and Ecology The habitat is primarily wet forest floor, although adjacent scrubland and grassland are also used. The adults are to some degree arboreal. Breeding occurs on both pandanas and the ground. Larvae are found in water holes, presumably in both trees and on the ground.

Major Threats The main threat is clear-cutting of the species' forest habitat.

Conservation Measures It has been reported from the Mizoram Wildlife Sanctuary, but additional habitat protection is necessary.

Bibliography: Chanda, S.K. (1994), Chanda, S.K. (2002), Dutta, S.K. (1997), Pillai, R.S. and Yazdani, G.M. (1973)

Data Providers: Sushil Dutta, Mohammed Firoz Ahmed

VU *Capensibufo rosei* Hewitt, 1926

Vulnerable B1ab(ii,iii,iv)+2ab(ii,iii,iv)
Order, Family: Anura, Bufonidae
Country Distribution: South Africa
Current Population Trend: Decreasing



© Andrew Turner



Geographic Range This species occurs only in south-western South Africa, where it is restricted to the Cape Peninsula and to the mountains south-west of the Breede River. Its altitudinal range is 60-1,600m asl, with more than 80% of localities being above 400m asl.

Population It is locally common at breeding sites, and large dense breeding aggregations can sometimes be found. However, it is absent from some apparently suitable sites.

Habitat and Ecology It is a species of mountain fynbos heathland, and does not survive in altered habitats. Breeding takes place in temporary rock pools in weathered sandstone.

Major Threats The main threat to this species is the loss of its fynbos habitat, mainly because of the spread of alien vegetation and frequent burning.

Conservation Measures Much of the range of this species is within protected areas, including the Cape Peninsula National Park and several State Forests.

Bibliography: Branch, W.R. (1988), Channing, A. (2001), De Villiers, A.L. (1997), Grandison, A.G.C. (1980), Minter, L.R. *et al.* (2004), Passmore, N.I. and Carruthers, V.C. (1995), Tandy, M. and Keith, R. (1972)

Data Providers: Leslie Minter, Alan Channing, James Harrison

CR *Churamiti maridadi* Channing and Stanley, 2002

Critically Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Tanzania
Current Population Trend: Decreasing



© William T. Stanley



Geographic Range This species is known only from the Ukaguru Mountains in eastern Tanzania. The only specimens were collected at 1,840m asl. It has not been found in other, better-surveyed parts of the Eastern Arc mountain chain.

Population Only two female specimens are known.

Habitat and Ecology The only specimens were collected in dry montane forest. The large toe pads suggest that it is arboreal. Its breeding is unknown, but the presence of large numbers of pigmented eggs in the only known specimens suggests that it is neither a live-bearer, nor a direct developer.

Major Threats The forests in the Ukaguru Mountains are poorly protected, and threatened by agricultural encroachment and human settlement.

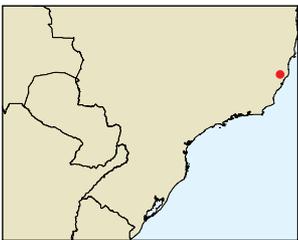
Conservation Measures This species occurs in the Mamiwa-Kisara Forest Reserve. Further survey work is required to determine the biology and population status and trends of this species and the limits of its range.

Bibliography: Channing, A. and Stanley, W.T. (2002)

Data Providers: Kim Howell, Alan Channing

EN *Dendrophryniscus carvalhoi* Izecksohn, 1994 "1993"

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Brazil
Current Population Trend: Decreasing



© Miguel Terefaut Rodrigues



Geographic Range This species is known from only two localities at around 800m asl in the state of Espírito Santo, southern Brazil: the type locality, Santa Tereza; and from nearby at Fundao. It almost certainly occurs a little more widely.

Population It appears to be a rare species.

Habitat and Ecology It lives in the leaf-litter of primary and secondary forests, but not in more degraded habitats, and is dependent upon bromeliads in which it lays its eggs and in which the larvae develop.

Major Threats The major threats are habitat loss due to agricultural expansion, livestock grazing, clear-cutting, the collection of bromeliads, and human settlement. The population at Fundao is threatened by coffee cultivation.

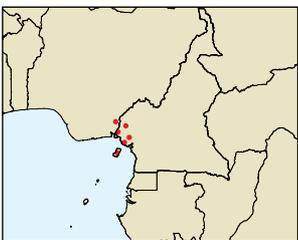
Conservation Measures It might occur in the Estacion Biológica Santa Lucia, and Reserva Biológica Augusto Ruschi, but this is not confirmed. It has been found in forest on private land, and bromeliads from this area have been introduced into nearby protected areas. Since it is quite possible that these bromeliads contained larvae of the species, it may have become inadvertently established in these protected areas.

Bibliography: Izecksohn, E. (1993)

Data Providers: Débora Silvano, Oswaldo Luiz Peixoto

EN *Didynamis sjostedti* Andersson, 1903

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Cameroon, Equatorial Guinea, Nigeria



© Mary E. Gartshore



Current Population Trend: Decreasing

Geographic Range This species is known from extreme south-western Cameroon in the general area of Mount Cameroon and surrounding forests, and from old specimens at 400-600m asl near Basile on Bioko Island, Equatorial Guinea. It has recently been discovered in the Oban Hills in Nigeria (M. Gartshore pers. comm.). In Cameroon there are records from Mount Cameroon (especially from the southern slopes) where it has been recorded at an altitude

of 200-1,250m asl, and also from the Kendong Forest Reserve to the north of Mount Cameroon, the Mokoko Forest Reserve north-west of Mount Cameroon close to the border with Nigeria, and from Baro just outside the north-western border of Korup National Park. Although it can be expected between the known localities in Cameroon, there has been extensive herpetological fieldwork in this area, which is perhaps indicative of a patchy distribution.

Population There have been very few records of this species, but it is common on the southern slopes of Mount Cameroon, and is especially numerous at around 1,000m asl. There is also a healthy population in the Makoko Forest Reserve, and it is locally extremely abundant in the Oban Hills. There is no recent information on its status on Bioko.

Habitat and Ecology It lives on forest edges and in clearings in moist forest from the lowlands to the submontane zone. They form aggregations of 5-40 individuals including males, females and juveniles. They are most often seen sitting on wet leaves of low herbaceous vegetation. It has also been found in selectively logged forest on the edge of small farms. Its breeding habits are not known, but it is suspected to have a viviparous mode of reproduction, since it is most closely related to the West African genus *Nimbaphrynoides*.

Major Threats The main threat to the species is habitat loss primarily due to agricultural expansion, wood extraction, and human settlement.

Conservation Measures It is recorded from the Makoko and Kendong Forest Reserves, and probably occurs in Korup National Park. It also has recently been found in the Cross River National Park in Nigeria.

Bibliography: Amiet, J.-L. (1976b), Gartshore, M.E. (1986), Gartshore, M.E. (1999), Grandison, A.G.C. (1981), Lawson, D.P. (1993), Mertens, R. (1965)

Data Providers: Mary Gartshore, Jean-Louis Amiet, Robert Drewes

CR *Leptophryne cruentata* (Tschudi, 1838)

Critically Endangered A2ac
Order, Family: Anura, Bufonidae
Country Distribution: Indonesia
Current Population Trend: Decreasing



© Djoko Iskandar

Geographic Range This species occurs only on Mount Pangrango, Mount Gedeh and Curug Luhur, Jawa Barat, Java, Indonesia, at altitudes between 1,000m and 2,000m asl.

Population In 1976, this species was abundant within its small range. In 1987, it was very rare following the eruption of Mount Galunggung. There were no records from the early 1990s until 2003, when one individual was sighted from the Cibereum Waterfall. It appears to have undergone a major decline.

Habitat and Ecology It lives in the boundary zone between moist lowland and montane forest. It breeds in very slow-moving, intermittent streams in forest where the larvae also develop.

Major Threats It appears to have declined drastically due to a volcanic eruption. However, its decline is also reminiscent of similar disappearances of montane stream-breeding amphibians in other parts of the moist tropics, and so chytridiomycosis cannot be ruled out (although this disease has not so far been recorded in this region).

Conservation Measures This species occurs in the Gunung Gede Pangrango National Park. Surveys are needed to locate this species and a captive-breeding programme might need to be established.

Bibliography: Iskandar, D.T. and Colijn, E. (2000)

Data Providers: Djoko Iskandar, Mumpuni

BLEEDING TOAD

EN *Melanophryniscus devincenzii* Klappenbach, 1968

Endangered B2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Argentina, Uruguay
Current Population Trend: Decreasing



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Geographic Range This species occurs in the southern part of Misiones Province, Argentina, and Rivera, Tacuarembó, and Cerro Largo Departments in Uruguay at elevations of 150-350m asl.

Population It is very rare in Misiones (Argentina) where males have been found (in 1998 and 2003) in amplexus with females of other species, possibly because of a lack of conspecifics. The population status of the species in Uruguay is unknown.

Habitat and Ecology It occurs in open areas with rocky outcrops, but also occurs in the ecotones between grasslands and forests of *Astronium balansae*. In Uruguay, it has been found in eucalyptus plantations. Nothing is known about its breeding habits, other than that males have been found in amplexus in temporary streams and the larvae presumably develop in streams.

Major Threats The pollution of soil and water due to agricultural practices is a known threat to this species. In Misiones, it is also threatened by the conversion of native habitat to pine plantations.

Conservation Measures It occurs in small provincial parks in Argentina, including Fachinal and the Campos San Juan private reserves. Broad-scale conservation actions are necessary to combat the effects of pollution on its breeding habitat.

Bibliography: Langone, J.A. (1994), Lavilla, E.O. *et al.* (2000), Lavilla, E.O. and Cei, J.M. (2001), Lavilla, E.O., Barriounevo, S. and Baldo, D. (2002), Maneyro, R. and Langone, J.A. (2001)

Data Providers: Esteban Lavilla, Diego Baldo, Jose Langone

VU *Melanophryniscus dorsalis* (Mertens, 1933)

Vulnerable B1ab(iii)+2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Brazil
Current Population Trend: Decreasing



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Geographic Range This species occurs along the coast of Brazil in Santa Catarina and Rio Grande de Sul states, from 0-20m asl.

Population It was previously collected rather extensively, but there have only been a few recent collections and the species is believed to have undergone declines in recent years.

Habitat and Ecology It occurs on sand dunes and nearby areas, and reproduces in temporal pools.

Major Threats The major threat to this species is habitat loss and degradation due to the conversion of habitat for beaches, urbanization, and off-road recreational vehicle use.

Conservation Measures It occurs in Guarita Municipal Park, but there is a need for improved protection of habitat at other sites at which this species is known to occur.

Bibliography: Garcia, P.C.A. and Vinciprova, G. (2003)

Data Providers: Paulo Garcia

VU *Melanophryniscus macrogranulosus* Braun, 1973

Vulnerable B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Brazil
Current Population Trend: Decreasing



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Geographic Range This species is known only from the type locality: Torres, Rio Grande do Sul State, Brazil. The type locality is listed as a municipality, which has since been divided into several municipalities.

Population It has not been recorded since 1960.

Habitat and Ecology There is no information about its ecology or biology in the literature. It presumably breeds in water.

Major Threats There is no information on threats to this species, although there has been extensive habitat loss in its range due to urbanization in the last 30 years and there is probably very little habitat remaining.

Conservation Measures There are no protected areas near where this species was collected. It is categorized as Vulnerable on the Brazil national list.

Bibliography: Braun, P.C. (1973), Braun, P.C. and Braun, C.A.S. (1980)

Data Providers: Débora Silvano, Paulo Garcia

VU *Melanophryniscus montevidensis* (Phillippi, 1902)

Vulnerable A2ac; B1ab(iii,iv,v)
Order, Family: Anura, Bufonidae
Country Distribution: Brazil, Uruguay
Current Population Trend: Decreasing



© Axel Kvet

Geographic Range This species is restricted to coastal Uruguay (Montevideo, Canelones, Maldonado, and Rocha Departments) and adjacent Brazil (one locality in Rio Grande do Sul state). It occurs at sea level.

Population This species is in decline in some areas and extirpated in others. Nevertheless, it is still common at several localities.

Habitat and Ecology It is a diurnal species inhabiting coastal sand dunes. It is an explosive breeder, and may be found in large numbers in temporary pools after heavy rains; the larvae develop in these pools. It is not tolerant of habitat disturbance.

Major Threats The major threat to this species is habitat loss due to human settlements, exotic tree plantations, and the drainage of wetlands.

Conservation Measures It does not occur in any protected areas, and there is a need for improved protection of sites at which this species is known to occur.

Notes on taxonomy: Elevated to full species status by Klappenbach and Langone (1992).

Bibliography: Klappenbach, M.A. and Langone, J.A. (1992), Langone, J.A. (1994), Maneyro, R. and Langone, J.A. (2001), Tedros, M., Kolenc, F. and Borteiro, C. (2001)

Data Providers: Jose Langone

VU *Melanophryniscus orejasmirandai* Prigioni and Langone, 1986

Vulnerable D2
Order, Family: Anura, Bufonidae
Country Distribution: Uruguay
Current Population Trend: Stable



Geographic Range The type locality of this species is Sierra de Animas, Maldonado Province, Uruguay, at an elevation of 350-500m asl. It occurs in an area of less than 10km².

Population It is common at its only known locality, and has not undergone any change in population size in 10 years of monitoring from 1990 to 2000.

Habitat and Ecology It occurs in grasslands and rocky outcrops, and reproduces in permanent small streams. Its tolerance to habitat disturbance is unknown.

Major Threats Although there are currently no major threats to the species, habitat loss and degradation due to wood plantations and touristic activities might result in declines in the future.

Conservation Measures It does not occur in any protected areas. This species requires continued close population monitoring particularly since it is known only from a single location.

Bibliography: Langone, J.A. (1994), Maneyro, R. and Langone, J.A. (2001), Prigioni, C.M. and Langone, J.A. (1986)

Data Providers: Esteban Lavilla, Jose Langone

VU *Metaphryniscus sosae* Señaris, Ayarzagüena and Gorzula, 1994

Vulnerable D2
Order, Family: Anura, Bufonidae
Country Distribution: Venezuela
Current Population Trend: Stable



Geographic Range This species is known only from the type locality, on top of Cerro Marahuaca, in Amazonas state (03° 40'N; 65° 27'W), at 2,600m asl, in Venezuela.

Population The population status of this species is not known.

Habitat and Ecology It inhabits high montane tepui habitat. It breeds by direct development, perhaps with internal fertilization.

Major Threats There are no current major threats, but its restricted range makes it susceptible to threatening processes such as wildfire.

Conservation Measures There is a population within Parque Nacional Duida-Marahuaca. There is a need for close population monitoring of this species, particularly since it is restricted to a single location.

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1997), Señaris, J.C., Ayarzagüena, J. and Gorzula, S. (1994)

Data Providers: Enrique La Marca, Celsa Señaris

CR *Nectophrynoides asperginis* Poynton, Howell, Clarke and Lovett, 1999 "1998"

Critically Endangered B1ab(ii,iii,v)+2ab(ii,iii,v)
Order, Family: Anura, Bufonidae
Country Distribution: Tanzania
Current Population Trend: Decreasing
CITES: Appendix I



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Geographic Range This species is only known from the Kihansi Falls, in the Kihansi Gorge, in the Udzungwa Mountains, eastern Tanzania, at 600-940m asl. Its global range covers a tiny area of just two hectares around the Kihansi Falls, and searches for it around other waterfalls on the escarpment of the Udzungwa Mountains have not located any additional populations.

Population It was formerly abundant in a tiny area, with a population of around 17,000 animals. Reports indicate that the species fluctuated naturally in its population size. The population appeared to be at a high in May 1999, at a low in 2001 and 2002 (when the population was estimated at 1,000 animals), and at a high again in June 2003, when perhaps as many as 20,000 individuals survived. However, subsequently the population went into steep decline, and

by mid-January 2004, only three individuals could be seen and just two males were heard calling. There were a few records of calling animals during the rest of 2004, and an unconfirmed report from January 2005, but there are no records of any individuals since, despite surveys, and the species might now be extinct in the wild.

Habitat and Ecology It lives only in soaked herbaceous vegetation in the spray zone of the Kihansi Falls. It breeds by internal fertilization, the females retaining the larvae internally in the oviduct until little toadlets are born.

Major Threats The serious decline of this species appears related to the Lower Kihansi Hydropower Project, involving the construction of a dam in 2000 upstream on the Kihansi River, which cut off 90% of the original water flow to the gorge, thereby hugely reducing the volume of spray, particularly in the dry season, as well as altering the vegetational composition. An artificial gravity-fed sprinkler system was set up to mimic the natural spray of the Kihansi ecosystem with the remaining water flow. Unfortunately, the sprinkler system was not ready by the time the water was cut off in 2000, and by the time the sprinklers came on nine months later the ecosystem had already dried up (see Krajick 2006). Later, during the dry season in 2003, the artificial sprinkler system failed for a while. Around this time, the fungal disease chytridiomycosis was confirmed in dead animals of this species, and this disease is probably responsible for the final population crash. It is possible that the drought caused by the failure of the sprinkler system resulted in stress to the animals that rendered them susceptible to the disease. There are also reports that the 2003 crash coincided with a brief opening of the dam's floodgates to flush sediments; tests showed that these contained pesticides used in maize farming operations upstream, in concentrations sufficient to kill the toads (Krajick 2006).

Conservation Measures It is not known from any protected areas. Sufficient minimum bypass flow from the dam is required to maintain the spray habitat. An artificial sprinkler system is in place, and this is especially important in the dry season. Captive breeding is ongoing in Toledo and New York Bronx Zoos. The captive population has fluctuated as husbandry problems have been encountered and addressed (animals were initially plagued with various infections and nutritional deficiencies), but currently stands at about 300 individuals. Investigations are urgently needed to determine whether or not any individuals survive in the wild, and whether or not chytridiomycosis is still present in any remaining individuals.

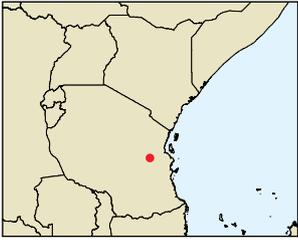
Bibliography: Krajick, K. (2006), Poynton, J.C. (1998), Poynton, J.C. (2003b), Poynton, J.C. *et al.* (1998), Quinn, C.H. *et al.* (2005), Zippel, K. (2005)

Data Providers: John Poynton, Kim Howell, Alan Channing, Simon Loader, Michele Menegon

KIHANSI SPRAY TOAD

EN *Nectophrynoides cryptus* Perret, 1971

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Tanzania
Current Population Trend: Decreasing
CITES: Appendix I



Geographic Range This species is known only from the northern part of the Uluguru Mountains in Tanzania where it has been recorded at 600-2,200m asl.

Population There have been no records of this species since the original collections of the species in 1926 and 1927. In view of the amount of herpetological work that has taken place in this area, it would appear to be a rare species.

Habitat and Ecology The type series was collected in forest, secondary forest, banana cultivation and bamboo. From this information, it seems that it can tolerate a degree of habitat disturbance, but probably not the complete opening of its habitat that has taken place in some parts of the Ulugurus. It is ovoviparous, with internal fertilization, the females retaining the larvae internally in the oviduct until the birth of the toadlets.

Major Threats The habitat of this species is probably being lost to agricultural encroachment, wood extraction, and expanding human settlements, especially at lower altitudes.

Conservation Measures It occurs in the Uluguru North Forest Reserve, but this area is not generally managed for biodiversity conservation. Improved management of this reserve, and the protection of other remaining forest habitat in the Ulugurus, is necessary.

Bibliography: Howell, K.M. (1993), Perret, J.-L. (1971a), Perret, J.-L. (1972), Poynton, J.C. (1998)

Data Providers: Simon Loader, John Poynton, Kim Howell

EN *Nectophrynoides minutus* Perret, 1972

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Tanzania
Current Population Trend: Decreasing
CITES: Appendix I



Geographic Range This species is known only from the Uluguru and Rubeho Mountains in eastern Tanzania, at 1,200-1,500m asl, and probably higher.

Population It appears to be a reasonably common species.

Habitat and Ecology It has been found only in undisturbed forest, and appears not to tolerate habitat alteration. It is ovoviparous, with internal fertilization and the females retaining the larvae internally in the oviduct until the toadlets are born.

Major Threats Its habitat is probably being lost, especially at lower altitudes, due to agricultural encroachment, wood extraction, and expanding human settlements.

Conservation Measures It occurs in the Uluguru North and Uluguru South Forest Reserves, and also in the Ukwiva Forest Reserve in the Rubeho Mountains. These forest reserves are in need of continued and strengthened management to ensure the maintenance of remaining forest habitat.

Bibliography: Howell, K.M. (1993), Perret, J.-L. (1971a), Perret, J.-L. (1972), Poynton, J.C. (1998)

Data Providers: Simon Loader, John Poynton, Kim Howell

CR *Nectophrynoides poyntoni* Menegon, Salvidio and Loader, 2004

Critically Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Tanzania
Current Population Trend: Decreasing
CITES: Appendix I



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Geographic Range This species is known only from the Mkalazi Valley at 1,200m in the Udzungwa Scarp Forest Reserve, Udzungwa Mountains, in eastern Tanzania. Surveys of other parts of the Udzungwa Forest Reserve have not located this species.

Population It is reasonably common within its tiny range, though much less numerous than the sympatric *Nectophrynoides tornieri*.

Habitat and Ecology All specimens were found in moist submontane rainforest, close to a stream. At night they can be found on leaves 60-160cm above the ground, and during the day they hide on the ground under fallen trees and coarse wood debris. Its breeding strategy is unknown, but it is assumed to be a live-bearer, like other member of its genus, with internal fertilisation, giving birth to tiny toadlets.

Major Threats Its habitat is probably being lost due to agricultural encroachment, wood extraction, and expanding human settlements.

Conservation Measures This species occurs in the Udzungwa Scarp Forest Reserve, but not in any well-protected areas. The population status and trends of this species require monitoring.

Bibliography: Menegon, M., Salvidio, S. and Loader, S.P. (2004)

Data Providers: Michele Menegon, Simon Loader

EN *Nectophrynoides pseudotornieri* Menegon, Salvidio and Loader, 2004

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Tanzania
Current Population Trend: Decreasing
CITES: Appendix I



Geographic Range This species is known only from the Uluguru North Forest Reserve on the eastern slopes of the northern part of the Uluguru Mountains, eastern Tanzania, at 1,080-1,345m asl. It appears to have a very restricted distribution.

Population There is no information on the population status of this species; it is known only from two specimens, collected in 1996 and 2000.

Habitat and Ecology This species is known only from tall, submontane rainforest. Its breeding biology is unknown, but it is assumed to be ovoviparous, like other member of its genus, with internal fertilization, giving birth to tiny toadlets.

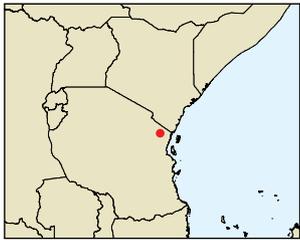
Major Threats The submontane forest on the eastern slopes of the Uluguru Mountains has been extensively cleared, mainly due to agricultural encroachment, wood extraction, and expanding human settlements.

Conservation Measures It occurs in the Uluguru North Forest Reserve, but this area is not generally managed for biodiversity

conservation and is in need of improved management. Further survey work is needed to determine the current population status of this species.

Bibliography: Menegon, M., Salvidio, S. and Loader, S.P. (2004)

Data Providers: Michele Menegon, Simon Loader

EN *Nectophrynoides vestergaardi* Menegon, Salvidio and Loader, 2004**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Tanzania**Current Population Trend:** Decreasing**CITES:** Appendix I

© Martin Vestergaard



Geographic Range This species is known only from the West Usambara Mountains in north-eastern Tanzania. There are records from the Shume-Magamba Forest Reserve, the Mazumbai Forest Reserve, and the Ambangulu Estate between 1,230 and 2,000m asl.

Population There is little information available on its population status. However, the fact that 23 specimens have been found widely over the West Usambara Mountains, despite limited survey effort, suggests that it is not uncommon in suitable habitat within its small range.

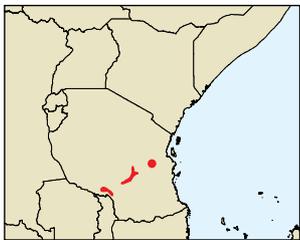
Habitat and Ecology All records have been from montane and submontane forest, including in the ecotone between forest and ericaceous vegetation. It is probably terrestrial, and some animals were found inside a rotten log. Its breeding is unknown, but it is assumed to be ovoviparous, like other members of its genus, with internal fertilization, giving birth to tiny toadlets.

Major Threats In some parts of the West Usambaras its habitat is probably being lost, especially due to agricultural encroachment, commercial logging, wood extraction, and expanding human settlements.

Conservation Measures It occurs in the University of Dar es Salaam's forest reserve at Mazumbai, but additional protection of the habitat in the West Usambara Mountains is needed.

Bibliography: Menegon, M., Salvidio, S. and Loader, S.P. (2004)

Data Providers: Michele Menegon, Simon Loader

VU *Nectophrynoides viviparus* (Tornier, 1905)**Vulnerable B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Tanzania**Current Population Trend:** Decreasing**CITES:** Appendix I

© David Meyer / Wildlife Conservation Society



Geographic Range This species occurs in the Uluguru and Udzungwa Mountains and in the Southern Highlands of eastern and southern Tanzania. It is a montane species, ranging from 1,350-2,800m asl.

Population It is relatively common.

Habitat and Ecology It is a terrestrial species living in forest, bamboo, and grasslands at the forest edge. It has been found in maize cultivation, but needs to be close to the forest edge, and probably cannot tolerate complete opening up of its habitat. It breeds by internal fertilization, the females retaining the larvae internally in the oviduct until little toadlets are born.

Major Threats The major threat to this species is habitat loss, especially at lower altitudes, due to agricultural encroachment, wood extraction and expanding human settlements.

Conservation Measures It occurs in several forest reserves, but has not been found in any well-protected area. It might occur in the Udzungwa National Park, but has thus far not been recorded.

Bibliography: Howell, K.M. (1993), Menegon, M. (2000), Perret, J.-L. (1971a), Perret, J.-L. (1972), Poynton, J.C. (1998), Poynton, J.C. (2003b)

Data Providers: Simon Loader, John Poynton, Kim Howell

CR *Nectophrynoides wendyae* Clarke, 1988**Critically Endangered B1ab(iii)+2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Tanzania**Current Population Trend:** Decreasing**CITES:** Appendix I

© Michele Menegon



Geographic Range This species is known from one tiny area, in the Udzungwa Scarp Forest Reserve, above Chita, on the escarpment of the Udzungwa Mountains, in eastern Tanzania. It is found from 1,500-1,650m asl. It has not been found at other localities in the Udzungwa Mountains.

Population The species is quite common in one tiny area, measuring roughly 300m x 300m.

Habitat and Ecology It is a species of montane moist forest, living on the ground. It is not known whether or not it can survive in anthropogenically disturbed habitats, since the only known site is in undisturbed forest. It breeds by internal fertilization, the females retaining the larvae internally in the oviduct until little toadlets are born.

Major Threats Its habitat is probably being lost due to agricultural encroachment, wood extraction, and expanding human settlements.

Conservation Measures This species occurs in the Udzungwa Scarp Forest Reserve, but not in any well-protected areas. The population status and trends of this species require monitoring.

Bibliography: Clarke, B.T. (1988), Howell, K.M. (1993), Poynton, J.C. (1998), Poynton, J.C. (2003b)

Data Providers: Michele Menegon, Simon Loader, John Poynton, Kim Howell

CR *Nimbaphrynoides liberiensis* Xavier, 1979 "1978"**Critically Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Liberia**Current Population Trend:** Decreasing**CITES:** Appendix I

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Geographic Range This species is known only from the Mount Nimba region in Liberia. It presumably also occurs in adjacent parts of Guinea and perhaps also in Côte d'Ivoire, but there have not yet been any records. It is a montane species, and the type locality is at 1,290m asl.

Population It is apparently extremely common in its small range, but there do not appear to have been any recent records, presumably due to a lack of fieldwork in the area.

Habitat and Ecology It is apparently a species of forest and forest edge close to savannah. It is a viviparous species, with the female nourishing the young internally prior to the birth of small toadlets.

Major Threats Habitat loss and degradation due to the mining of bauxite is the biggest threat to this species. There is probably also ongoing loss of forest due to wood extraction. The species is inherently at risk because of its small range.

Conservation Measures This species presumably occurs in the Mount Nimba Strict Nature Reserve, which is a World Heritage Site. Survey work is necessary to determine the current population status and trends of this species.

Bibliography: Grandison, A.G.C. (1981), Perret, J.-L. (1971a), Perret, J.-L. (1972), Xavier, F. (1978)

Data Providers: Mark-Oliver Rödel, Arne Schiøtz

CR *Nimbaphrynoides occidentalis* (Angel, 1943)

Critically Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Côte d'Ivoire, Guinea
Current Population Trend: Decreasing
CITES: Appendix I



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Geographic Range This species is known only from the Mount Nimba region in Guinea and Côte d'Ivoire. It presumably also occurs in Liberia, but there have not yet been any records. It is a montane species, occurring above 1,000m asl.

Population It is apparently an abundant species within its small range, and a survey in 2003 succeeded in locating several individuals, even during the cold season when they are supposed to be inactive.

Habitat and Ecology It is a species of montane grassland. It is a viviparous species, with the female nourishing the young internally prior to the birth of small toadlets.

Major Threats Habitat loss and degradation due to the mining of iron ore/bauxite is the biggest threat to this species, and new mining sites have been selected recently for mining in the Guinean part of Mount Nimba. There is a risk that mining could destroy the entire range of the species. Fires in the montane grassland might be a threat. The species is inherently at risk because of its small range.

Conservation Measures This species presumably occurs in the Mount Nimba Strict Nature Reserve, which is a World Heritage Site. Survey work is necessary to monitor the population status of this species.

Bibliography: Lamotte, M. (1959), Lamotte, M. and Sanchez-Lamotte, C. (1999), Perret, J.-L. (1971a), Perret, J.-L. (1972), Xavier, F. (1978), Xavier, F., Zuber-Vogeli, M. and Le Quang, Y. (1970)

Data Providers: Mark-Oliver Rödel, Arne Schiøtz

VU *Oreophrynella cryptica* Señaris, 1995 "1993"

Vulnerable D2
Order, Family: Anura, Bufonidae
Country Distribution: Venezuela
Current Population Trend: Stable



Geographic Range This species is restricted to the type locality: "Sector este, cima del Auyan-tepui, Estado Bolívar", in Venezuela (05° 53' 36"N; 62° 29' 12"W), at 1,750m asl.

Population It is a rare species.

Habitat and Ecology It is an inhabitant of high montane tepui habitat. Its breeding habitat is unknown, but it is presumed to breed by direct development.

Major Threats Although there are no current major threats, its restricted range makes it more susceptible to threatening processes, such as wildfire and disturbance of the habitat by tourists.

Conservation Measures The species' range is within Parque Nacional Canaima. There is a need for close population monitoring of this species given that it is restricted to a single location.

Bibliography: Barrio Amorós, C.L. (2004), Barrio, C. (1998), La Marca, E. (1997), Señaris, J.C. (1995)

Data Providers: Enrique La Marca, Celsa Señaris

VU *Oreophrynella huberi* Diego-Aransay and Gorzula, 1987

Vulnerable D2
Order, Family: Anura, Bufonidae
Country Distribution: Venezuela
Current Population Trend: Stable



Geographic Range This species is restricted to the type locality, Cerro El Sol, to the north-east of the Auyán-tepui (0.6km² at 06° 06' N; 62° 32' W), in Bolívar state, Venezuela, at an elevation of 1,700m asl.

Population It is a very rare species.

Habitat and Ecology It is a diurnal toad that is found in thick herbaceous vegetation on peat bogs of high montane tepui environments. It breeds by direct development.

Major Threats Although there are no current major threats, its restricted range makes it more susceptible to threatening processes.

Conservation Measures The type locality of this species is within Parque Nacional Canaima. There is a need for close population monitoring of this species given that it is restricted to a single location.

Bibliography: Barrio Amorós, C.L. (2004), Diego-Aransay, A. and Gorzula, S. (1987), La Marca, E. (1992), Péfaur, J.E. and Rivero, J.A. (2000), Señaris, J.C., Ayarsagüena, J. and Gorzula, S. (1994), Vial, J.L. and Saylor, L. (1993)

Data Providers: Enrique La Marca, Celsa Señaris

VU *Oreophrynella macconnelli* Boulenger, 1900

Vulnerable D2
Order, Family: Anura, Bufonidae
Country Distribution: Guyana, Venezuela
Current Population Trend: Stable



Geographic Range This species is known from the base of Mount Roraima on the border of Guyana and Venezuela, at an elevation of 1,060m asl. It is not absolutely certain which country the type specimen comes from, but it is presumed that the species is in fact present on both sides of the border.

Population The population status of this species is not known.

Habitat and Ecology It is an inhabitant of tropical moist submontane forest. Its breeding habitat is unknown, but it is presumed to breed by direct development.

Major Threats Threats to this species are unknown, although its range is in relatively pristine habitat at present.

Conservation Measures It is not known from any protected areas. A well-managed protected area would help to ensure the conservation of this range-restricted species. There is also a need for close population monitoring given that it is apparently restricted to a single location.

Bibliography: Barrio Amorós, C.L. (2004), Barrio, C. (1998), Frost, D.R. (1985), Gines, H. (1959), La Marca, E. (1992), La Marca, E. (1995b), La Marca, E. (1997), McDiarmid, R. (1971), McDiarmid, R. and Gorzula, S. (1989), Péfaur, J.E. and Rivero, J.A. (2000), Rivero, J.A. (1961), Señaris, J.C., Ayarsagüena, J. and Gorzula, S. (1994), Vial, J.L. and Saylor, L. (1993)

Data Providers: Marinus Hoogmoed, Celsa Señaris

VU *Oreophrynella nigra* Señaris, Ayarzagüena and Gorzula, 1994**Vulnerable D2**

Order, Family: Anura, Bufonidae
Country Distribution: Venezuela
Current Population Trend: Stable



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Geographic Range This species is known from Tepuis Kukenan and Yuruaní, in Bolívar State, Venezuela, at 2,300-2,700m asl.

Population It is a common species.

Habitat and Ecology This is a diurnal frog that can be found on rocks in montane tepui environments. It is a communally breeding species, with breeding taking place by direct development in galleries within peat bogs.

Major Threats Although there are no current major threats, its restricted range makes it more susceptible to threatening processes such as wildfire.

Conservation Measures It is recorded from Yuruaní National Monument. There is a need for close population monitoring of this species given that it is restricted to a single location.

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1997), McDiarmid, R. and Gorzula, S. (1989), Señaris, J.C., Ayarsagüena, J. and Gorzula, S. (1994), Solano, H. (1989)

Data Providers: Enrique La Marca, Celsa Señaris

VU *Oreophrynella quelchii* (Boulenger, 1895)**Vulnerable D2**

Order, Family: Anura, Bufonidae
Country Distribution: Brazil, Guyana, Venezuela
Current Population Trend: Stable



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Geographic Range This species is restricted to the summit of Mount Roraima in Venezuela, Guyana and Brazil, and from Wei-Assipo-Tepui in Guyana. It has been recorded from 2,300-2,800m asl.

Population It is common on the summit of Mount Roraima, and its population is probably stable.

Habitat and Ecology A diurnal toad usually found on open rock surfaces in high montane tepui environments. It breeds by direct development.

Major Threats Although there are no current major threats, the restricted range of this species makes it more vulnerable to threatening processes, such as disturbance by tourists (who frequently handle the animals).

Conservation Measures It is protected in Monumento Natural Los Tepuyes in Venezuela, and Parque Nacional Monte Roraima in Brazil. There is a need for increased education among tourists to make them aware of the importance of not handling these animals in the wild. Close population monitoring is also required, particularly since this species is known only from a single location.

Bibliography: Barrio Amorós, C.L. (2004), Frost, D.R. (1985), Gines, H. (1959), Gorzula, S. and Señaris, J.C. (1998), La Marca, E. (1992), La Marca, E. (1995b), La Marca, E. (1997), McDiarmid, R. (1971), McDiarmid, R. and Gorzula, S. (1989), Péfaur, J.E. and Rivero, J.A. (2000), Rivero, J.A. (1961), Señaris, J.C., Ayarsagüena, J. and Gorzula, S. (1994), Solano, H. (1989), Vial, J.L. and Saylor, L. (1993)

Data Providers: Marinus Hoogmoed, Celsa Señaris

VU *Oreophrynella vasquezii* Señaris, Ayarzagüena and Gorzula, 1994**Vulnerable D2**

Order, Family: Anura, Bufonidae
Country Distribution: Venezuela
Current Population Trend: Stable



Geographic Range This species is restricted to the summit of Ilú-tepui (05° 25'N; 60° 58'W), in Bolívar State, Venezuela, where it has been recorded from 2,450-2,650m asl.

Population The population status of this species is not known.

Habitat and Ecology A diurnal, high-montane toad found in tepui habitats. It breeds by direct development, and lays its eggs under rocks.

Major Threats Although there are no current major threats, the restricted range of this species makes it more vulnerable to threatening processes, such as wildfire.

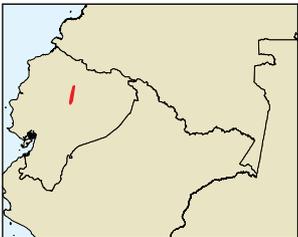
Conservation Measures It most likely occurs within Parque Nacional Canaima. Close population monitoring of this species is required, particularly since it is known only from a single location.

Bibliography: Barrio Amorós, C.L. (2004), Barrio, C. (1998), La Marca, E. (1997), Señaris, J.C., Ayarsagüena, J. and Gorzula, S. (1994)

Data Providers: Enrique La Marca, Celsa Señaris

EN *Osornophryne antisana* Hoogmoed, 1987**Endangered B1ab(iii,v)**

Order, Family: Anura, Bufonidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



© Mario Humberto Yáñez-Muñoz

Geographic Range This species is known only from the type locality, Antisana, Napo Province, Ecuador, and from the volcano of Quilindana. In total, it is known from only four localities. It has been recorded between 3,400 and 4,000m asl.

Population It appears to be a rare, and locally uncommon species; however, this may be an artefact of inappropriate survey techniques. For example, when digging into the soil under the páramo plants, dozens of specimens have been found (M. Yáñez and D.F. Cisneros-Heredia pers. comm.). The population of this species is thought to be declining.

Habitat and Ecology It is terrestrial, and both diurnal and nocturnal, inhabiting wet sub-páramo habitats. The holotype was collected in an area of meadows with isolated patches of forest. Creeks and swamps are the typical landscape on the upper limit of the *wet* altitudinal forest (Hoogmoed 1987). It breeds by direct development, and lays its eggs on soil under vegetation.

Major Threats The major threat to this species is habitat loss due to agricultural activities, both crops and livestock; climate change may also be impacting the species.

Conservation Measures This species occurs in the Reserva Ecológica Antisana, the Reserva Ecológica Cayambe-Coca, and Parque Nacional Llanganates.

Notes on taxonomy: The identity of the specimens from the northern part of Parque Nacional Llanganates requires confirmation.

Bibliography: Hoogmoed, M.S. (1987)

Data Providers: Luis A. Coloma, Santiago Ron, Diego Cisneros-Heredia, Mario Yáñez-Muñoz

EN *Osornophryne guacamayo* Hoogmoed, 1987**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Colombia, Ecuador**Current Population Trend:** Decreasing

© Luis A. Coloma



Geographic Range This species is known from the Cordillera de Guacamayos in north-eastern Ecuador (in Napo Province) and from the Valle del Sibunday in southern Colombia. It probably occurs more widely than current records suggest, especially in areas between known sites. Its altitudinal range is 2,100-3,500m asl.

Population It is locally uncommon.

Habitat and Ecology It lives in very wet tropical cloud forest, and is usually found on low vegetation and in leaf-litter; specimens have been collected along a roadside, on moss in rock crevices. It is found only in undisturbed habitats. Breeding is by direct development.

Major Threats The major threat is habitat loss as a result of deforestation for agricultural development, the planting of illegal crops, fire, logging activities, and human settlement. An additional threat is pollution resulting from the spraying of illegal crops.

Conservation Measures The range of this species in Ecuador overlaps several protected areas, including the Reserva Ecológica Cayambe-Coca, the Reserva Ecológica Antisana and Parque Nacional Sumaco in Ecuador. It has not been found in any protected areas in Colombia. Improved and expanded habitat protection is urgently needed to ensure the persistence of this species in its montane forest habitat.

Notes on taxonomy: The Colombian populations have different skin texture and some morphological differences compared to Ecuadorian populations. More research is needed to determine whether or not this is in fact two separate species (D.F. Cisneros-Heredia pers. comm.).

Bibliography: Gluesenkamp, A.G. and Acosta, N. (2001), Hoogmoed, M.S. (1987), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Luis A. Coloma, Santiago Ron, Diego Cisneros-Heredia, Ana Almandáriz, Wilmar Bolívar

GUACAMAYO PLUMP TOAD**EN** *Osornophryne percrassa* Ruiz-Carranza and Hernández-Camacho, 1976**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

© John D. Lynch



Geographic Range This species is known from the central páramos in Tolima, Caldas and Quindío Departments, on the eastern flank of the central Andes, in Colombia, between 2,700 and 3,700m asl.

Population It is not a common species.

Habitat and Ecology It occurs on leaf-litter and rocks on the ground in Andean forests and páramos, and has not been recorded from anthropogenic habitats. It is a direct developing species.

Major Threats The species is threatened by habitat loss and fragmentation, mainly due to the expansion of agriculture, and pollution from the fumigation of illegal crops. Climate change is also a potential threat to this high-elevation species.

Conservation Measures Its range includes several protected areas, but improved and expanded protection of the montane habitat of this species is necessary.

Bibliography: Acosta-Galvis, A.R. (2000), Ardila-Robayo, M.C. and Acosta-Galvis, A. (2000b), Gluesenkamp, A.G. (1995), Ruiz-Carranza, P.M. and Hernández-Camacho, J.A. (1976b)

Data Providers: Wilmar Bolívar, John Lynch

HERVEO PLUMP TOAD**VU** *Osornophryne sumacoensis* Gluesenkamp, 1995**Vulnerable D2****Order, Family:** Anura, Bufonidae**Country Distribution:** Ecuador**Current Population Trend:** Stable

Geographic Range This species is known only from around a small crater lake on the eastern slopes of Volcán Sumaco, in Napo Province, Ecuador, at 2,500m asl.

Population It is locally common.

Habitat and Ecology It is an inhabitant of the cloud forest surrounding the lake. This forest is made up of bamboo (*Chusquea* sp.), *Ficus* and other trees up to 20m tall. There is an abundance of epiphytes in the area. It is terrestrial, both diurnal and nocturnal, and specimens have been found under leaf-litter by day (Gluesenkamp 1995). It breeds by direct development, and lays its eggs on soil under vegetation.

Major Threats There are no current major threats to the species, although eruption of Volcán Sumaco poses a future potential threat to its only known site.

Conservation Measures It is present in Parque Nacional Sumaco. There is a need for close population monitoring of this species, particularly given its restriction to a single location.

Bibliography: Gluesenkamp, A.G. (1995)

Data Providers: Luis A. Coloma, Santiago Ron, Diego Cisneros-Heredia, Ana Almandáriz

EN *Osornophryne talipes* Cannatella, 1986**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Colombia, Ecuador**Current Population Trend:** Decreasing

© Mario Humberto Yáñez-Muñoz



Geographic Range This species ranges from the type locality in Imbabura Province, Ecuador, north to Narino and Cauca Departments in southern Colombia. It probably occurs a little more widely than current records suggest, especially in areas between known sites. The type locality is at 3,400m asl, and it occurs at similar altitudes in Colombia.

Population It appears to be a rare species; however, this may be an artefact of inappropriate survey techniques. For example, when digging into the soil under páramo plants, dozens of specimens have been found (M. Yáñez and D.F. Cisneros-Heredia pers. comm.).

Habitat and Ecology It has been found only in undisturbed habitats in dense upper montane forest, with trees reaching heights of as much as 10m, and in sub-páramo bushland. It breeds by direct development.

Major Threats The major threat is habitat loss as a result of deforestation for agricultural development, the planting of illegal crops, fire, logging, and human settlement. Pollution resulting from the spraying of illegal crops is an additional threat.

Conservation Measures It is not known from any protected areas in Ecuador, but it occurs in Parque Nacional Natural Purace in Colombia. It is recommended that the existing protected areas network be expanded to incorporate remaining patches of high-elevation montane forest.

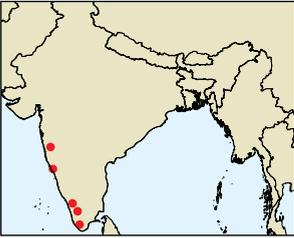
Bibliography: Cannatella, D.C. (1986), Lynch, J.D. (1981a), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Luis A. Coloma, Santiago Ron, Taran Grant, Diego Cisneros-Heredia, Ana Almandáriz

CANNATELLA'S PLUMP TOAD

EN *Pedostibes tuberculosus* Günther, 1875

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: India
Current Population Trend: Decreasing



© S.U. Saravakumar

Geographic Range This species is endemic to the Western Ghats of India, where it has a very fragmented range. It occurs at elevations of 300-1,800m asl.

Population There is no reliable information available on the population status of this species, although it is locally uncommon and believed to be declining.

Habitat and Ecology It is a semi-arboreal species generally associated with montane moist evergreen forest. Breeding takes place on the ground at stream banks, and the larvae develop in water.

Major Threats It is threatened by the conversion of its forest habitat to non-timber plantations (including coffee and tea), the collection of timber and wood for subsistence use by local people, and the construction of roads and dams.

Conservation Measures It has been recorded from several protected areas, including the Konya Wild Life Sanctuary (Maharashtra), Cotigao Wild Life Sanctuary (Goa), Indira Gandhi National Park and Kalakad-Mundanthurai Tiger Reserve (Tamil Nadu), Ponmudi Hills and Silent Valley National Park (Kerala). The species is the focus of ongoing studies from 1998 to the present (S. D. Biju pers. comm.).

Bibliography: Biju, S.D. (2001), Chanda, S.K. (2002), Das, I. and Whittaker, R. (1988), Das, I. and Whittaker, R. (1990), Dutta, S.K. (1997), Günther, A. (1876), Inger, R.F. *et al.* (1984), Pillai, R.S. (1986)

Data Providers: S.D. Biju, Sushil Dutta, Robert Inger, Vivek Ashok Gour-Broome

EN *Pelophryne albotaeniata* Barbour, 1938

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Philippines
Current Population Trend: Decreasing



Geographic Range This species is found only on Palawan Island, in the Philippines. The type locality was at an elevation of 1,500m asl.

Population It is apparently rare, and there have been no field observations of this species for more than 40 years, though this may be an artefact of limited survey work.

Habitat and Ecology It inhabits arboreal microhabitats in riverine habitat in montane and lowland forests. Its breeding biology is unrecorded, but it presumably takes place in water by larval development.

Major Threats The loss of lowland rainforest, mainly due to agricultural activities and selective logging, is a major threat to this species.

Conservation Measures Although the forests on Palawan are, in general, reasonably well protected in much of the island, more effective protection of the remaining rainforest on the island, espe-

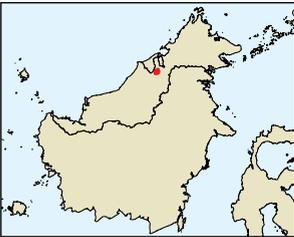
cially riverine habitats and gallery forests, is necessary. Further survey work is also needed to establish the current population status of this species.

Bibliography: Alcalá, A.C. and Brown, W.C. (1985), Brown, R.M., Diesmos, A.C. and Alcalá, A.C. (2001), Frost, D.R. (1985), Inger, R.F. (1954), Inger, R.F. (1960b), Inger, R.F. (1999), Taylor, E.H. (1923)

Data Providers: Arvin Diesmos, Angel Alcalá, Rafe Brown, Leticia Afuang, Genevieve Gee, Katie Hampson, Mae Leonida Diesmos, Aldrin Mallari, Perry Ong, Dondi Ubaldo, Baldwin Gutierrez

EN *Pelophryne api* Dring, 1984

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Malaysia
Current Population Trend: Decreasing



© Indraneil Das

Geographic Range This species is endemic to Borneo where it is known only from the type locality (Gunung Mulu National Park) in northern Sarawak, Malaysia; however, it might occur a little more widely. It has an altitudinal range of 65-1,200m asl.

Population The population status and abundance of the species is not known.

Habitat and Ecology All known specimens have been found in primary rainforest in limestone karst areas. The larvae are endotrophic and occur in small pools on the forest floor.

Major Threats It is not certain whether this species is entirely restricted to karst areas, but, if so, then its distribution is likely to be extremely patchy and localized, thereby exposing this species to the hazards of stochastic events.

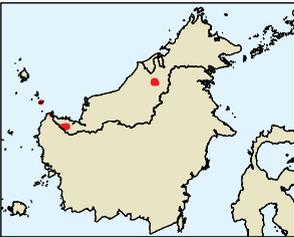
Conservation Measures The only known locality for the species is protected in Gunung Mulu National Park, a 52,000-ha park that is the most studied tropical karst area in the world. Further survey work is required to determine the current population status of the species at this locality, and whether it might be present in other karst areas of Borneo.

Bibliography: Dring, J.C.M. (1984b), Dring, J.C.M. (1984b), Inger, R.F. and Stuebing, R.B. (1997)

Data Providers: Robert Inger, Indraneil Das, Robert Stuebing, Maklarin Lakim, Paul Yambun

VU *Pelophryne guentheri* (Boulenger, 1882)

Vulnerable B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Indonesia, Malaysia
Current Population Trend: Decreasing



Geographic Range This species is known from south-western and north-eastern Sarawak (Malaysia) and Serasan (north-western Kalimantan, Indonesia), and might also occur in north-western Kalimantan (Indonesia) and south-western Sabah (Malaysia), in Borneo. It probably occurs more widely than current records suggest. It is a lowland species present at elevations below 200m asl.

Population There is no information on the population status of this species.

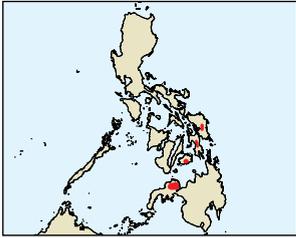
Habitat and Ecology It occurs in the leaf-litter of hilly lowland primary moist forest. The large eggs are probably deposited in very small rain pools.

Major Threats The major threat to this species is habitat loss due to logging. The northern part of the range now consists of disturbed habitat (largely deforested) and it is unclear whether or not the species still survives there.

Conservation Measures The species is present in Kubah National Park, although the southern section is facing increasing pressure from encroaching logging activities. There is a need for improved habitat protection of sites at which this species is known to occur.

Bibliography: Inger, R.F. (1966), Leong, T.M., Grismer, L. and Mumpuni (2002)

Data Providers: Robert Inger, Indraneil Das, Robert Stuebing, Maklarin Lakim, Paul Yambun

VU *Pelophryne lighti* (Taylor, 1920)**Vulnerable B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Philippines**Current Population Trend:** Decreasing

© Arvin C. Diesmos



Geographic Range This species is patchily distributed in Bohol, Samar, Leyte and Mindanao in the Philippines. It probably occurs a little more widely than current records suggest.

Population It is locally common.

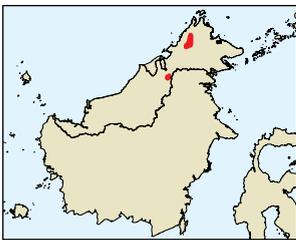
Habitat and Ecology It inhabits arboreal microhabitats in riverine areas in montane and lowland forests, and is able to survive in slightly disturbed habitats. It presumably breeds in water by larval development.

Major Threats The major threats to this species include the loss of lowland rainforest (as a result of agriculture and logging), and the pollution of mountain streams and rivers due to agricultural effluents and mine tailings.

Conservation Measures This species is present in several protected areas. Conservation measures must include the regulation and proper disposal of pesticides, herbicides, and mine tailings and the protection of the remaining rainforest, especially riverine habitats and gallery forests.

Bibliography: Alcalá, A.C. and Brown, W.C. (1985), Frost, D.R. (1985), Inger, R.F. (1960b), Inger, R.F. (1999), Taylor, E.H. (1921)

Data Providers: Arvin Diesmos, Angel Alcalá, Rafe Brown, Leticia Afuang, Genevieve Gee, Katie Hampson, Mae Leonida Diesmos, Aldrin Mallari, Perry Ong, Dondi Ubaldo, Baldwin Gutierrez

VU *Pelophryne misera* (Mocquard, 1890)**Vulnerable B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Malaysia**Current Population Trend:** Decreasing

© Andreas & Christel Nöllner



Geographic Range This species is known only from mountains in Sabah and north-eastern Sarawak, in northern Borneo, Malaysia. It might also occur in the mountains of northern Kalimantan, Indonesia, but has not yet been recorded from there. It probably occurs more widely than current records suggest. It is present in forests above 1,500m asl.

Population It is difficult to observe, but is considered locally abundant in montane forests (Malkmus *et al.* 2002).

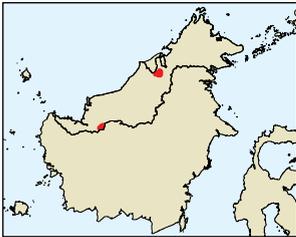
Habitat and Ecology All known observations were made in montane 'elfin' type forests. Adults are largely terrestrial and are found in leaf-litter, rock crevices, and holes in the ground. Breeding takes place in small, temporary pools on the forest floor, and tadpoles are endotrophic.

Major Threats Habitat loss is probably the most serious threat, due mainly to logging. Logging is occurring at Gunung Murud, but is below the altitudinal range of this species. The development of recreation and tourism facilities is a potential threat.

Conservation Measures The range of the species includes Kinabalu National Park. Other suitable montane forests, particularly those of Trus Madi, require more effective protection.

Bibliography: Inger, R.F. (1966), Inger, R.F. and Stuebing, R.B. (1997), Malkmus, R. *et al.* (2002)

Data Providers: Robert Inger, Indraneil Das, Robert Stuebing, Maklarin Lakim, Paul Yambun

VU *Pelophryne rhopophilus* Inger and Stuebing, 1996**Vulnerable B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Malaysia**Current Population Trend:** Decreasing

© Djoko Iskandar



Geographic Range This species is known only from south-western and north-eastern Sarawak (Malaysia), but probably also occurs in western Kalimantan (Indonesia), in Borneo. It probably occurs more widely than current records suggest. It is present at elevations around 800m asl.

Population It is moderately abundant within its restricted range.

Habitat and Ecology Males have been seen calling from low shrubs in submontane and montane mossy forest. Eggs are probably deposited in very small rain pools.

Major Threats The major threat to the species is ongoing habitat loss due to agriculture and logging.

Conservation Measures The species' range includes Gunung Mulu National Park and Lanjak Entimau Wildlife Sanctuary.

Bibliography: Inger, R.F. and Stuebing, R.B. (1996), Inger, R.F. and Stuebing, R.B. (1997)

Data Providers: Robert Inger, Indraneil Das, Robert Stuebing, Maklarin Lakim, Paul Yambun

EN *Pelophryne scalptus* (Liu and Hu, 1973)**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** China**Current Population Trend:** Decreasing

© Michael Wai Neng Lau / Kadonnie Farm & Botanic Garden



Geographic Range This species is restricted to the hilly areas in southern Hainan Province, China, from 350-1,400m asl.

Population There is no information available on its population status.

Habitat and Ecology It inhabits evergreen broadleaf forests. Males call near small streams, which are probably also the breeding sites.

Major Threats The species is particularly susceptible to habitat destruction and degradation that is taking place primarily due to smallholder farming activities and small-scale wood extraction from expanding human settlements.

Conservation Measures The range of this species includes several protected areas, but expanded and improved protection of the remaining forest habitat is necessary.

Bibliography: Fei, L. *et al.* (1999), MacKinnon, J. *et al.* (1996), Ye, C.-Y., Fei, L. and Hu, S.Q. (1993)

Data Providers: Michael Wai Neng Lau, Shi Haitao

EN *Rhizophryne macrorhina* Trueb, 1971**Endangered B1ab(iii)+2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

© Brian C. Beck, courtesy of Museo de Historia Natural de Antioquia



Geographic Range This species is known from the type locality: Santa Rita, in Antioquia Department, Colombia, between 1,890 and 1910m asl. It is also known from two other locations in Colombia: Guatapé (Mesopotamia) and Amalfi (Anorí) all in Antioquia Department, in the central Andes, between 1,800 and 1,900m asl. There is no suitable habitat available to the species between these known localities.

Population It is a common species.

Habitat and Ecology It occurs in the leaf-litter of sub-Andean and Andean forests, and is restricted to primary and good secondary forest. It most likely breeds by direct development like other species in the genus.

Major Threats Habitat fragmentation and loss, due to the expansion of agriculture, timber extraction, desiccation, and the fumigation of illegal crops, are all major threats to the species' habitat. Climate change may also be a threat, given that this species occurs at relatively high elevations.

Conservation Measures The range of the species includes the Reserva La Forzosa, but other tracts of montane forest remain in urgent need of formal protection.

Bibliography: Acosta-Galvis, A.R. (2000), Grant, T. (1998), Grant, T. (1999), Trueb, L. (1971)

Data Providers: Wilmar Bolívar, John Lynch

EN *Rhizophryne nicefori* (Cochran and Goin, 1970)**Endangered B1ab(iii)+2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

© Juan Camilo Arechondo, courtesy of Museo de Historia Natural de Antioquia



Geographic Range This species is known from the type locality, "El Chaquiro, [department of] Antioquia, Colombia" (amended to "Hacienda Palmas, El Chaquiro, Antioquia Department, Colombia, 2,670m elevation"), and from nearby locations.

Population It is a common species within its relatively small range.

Habitat and Ecology It occurs in high-altitude grassland, and has not been recorded from anthropogenic habitats. It breeds by direct development.

Major Threats The main threat is habitat loss due to expanding pastures for cattle grazing. Climate change may be a threat in the future.

Conservation Measures The range of this species does not include any protected areas, such that habitat protection remains the most urgent conservation action required. Further survey work is needed to determine whether it occurs outside the vicinity of the type locality.

Bibliography: Cochran, D.M. and Goin, C.J. (1970), Trueb, L. (1971)

Data Providers: Wilmar Bolívar, John Lynch

CR *Rhizophryne rostrata* (Noble, 1920)**Critically Endangered B1ab(iii)+2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

Geographic Range This species is known only from the type locality: "Santa Rita Creek, fourteen miles north of the village of Mesopotamia in the southern part of the Department of Antioquia, Colombia", at 2,472m asl. It is unlikely to range more widely.

Population This species is known from only two specimens collected in 1914. Searches of the type locality since then have not found it, and it is possible that it is now extinct.

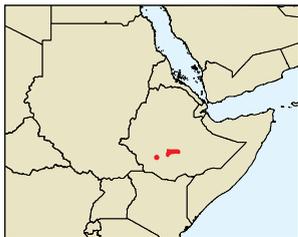
Habitat and Ecology The type locality was forest when the specimens were collected, but the exact habitat requirements of the species are still unknown. It presumably breeds by direct development like other species in the genus.

Major Threats At the type locality there has been significant logging in the past, and there is now high human population density in this area with accompanying increased infrastructure development for human settlement. Agriculture, including the planting of illegal crops, is also a threat in the area as well as fumigation of illegal crops.

Conservation Measures The type locality is not within a protected area. Further survey work is needed to establish whether or not the species still occurs at the type locality or in any location outside the type locality, as the species might already be extinct in view of the scale of habitat destruction in the general vicinity.

Bibliography: Acosta-Galvis, A.R. (2000), Cochran, D.M. and Goin, C.J. (1970), Grant, T. (1999), Graybeal, A. and Cannatella, D.C. (1995), Lynch, J.D. and Renjifo, J.M. (1990), Noble, G.K. (1920), Rivero, J.A. and Castañón, C. (1990), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996), Trueb, L. (1971)

Data Providers: Wilmar Bolívar, John Lynch

VU *Spinophrynoides osgoodi* (Loveridge, 1932)**Vulnerable B1ab(iii)+2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Ethiopia**Current Population Trend:** Decreasing**CITES:** Appendix I

© M.J. Largent



Geographic Range This species is endemic to the mountains of south-central Ethiopia (Arsi, Balé, Sidamo and Gamo Gofa Provinces) at 1,950-3,520m asl. With the exception of the population in the Gughe Mountains, all records are from east of the Rift Valley.

Population It is locally common within its limited range.

Habitat and Ecology It is essentially a species of montane forest, though perhaps extending marginally into open moorland. It has been observed breeding in a small, probably temporary, pool in a grassy glade surrounded by *Hypericum* woodland.

Major Threats It is threatened by environmental degradation resulting from human settlement, specifically the destruction of forests through both subsistence and commercial exploitation.

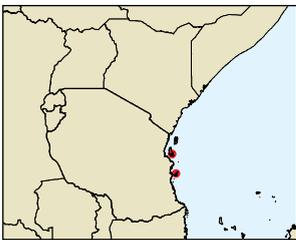
Conservation Measures The species is relatively common in the Bale Mountains National Park, but there is a need for improved protection of other sites at which this species has been recorded.

Bibliography: Grandison, A.G.C. (1978), Largent, M.J. (2001)

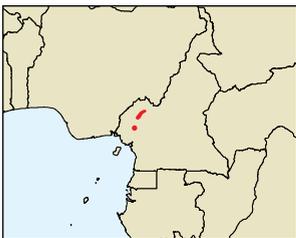
Data Providers: Malcolm Largent

EN *Stephopaedes anotis* (Boulenger, 1907)**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Mozambique, Zimbabwe**Current Population Trend:** Decreasing

© Richard Boycott

**Geographic Range** This species is known only from the Chirinda Forest in eastern Zimbabwe and the Dombe Forest in adjacent Mozambique. In the Chirinda Forest it occurs at approximately 900-1,300m asl.**Population** It is apparently common in its small range.**Habitat and Ecology** It lives in the leaf-litter of evergreen forest, often hiding inside or beneath rotten logs. The eggs are laid in pockets of water between the buttress roots of *Chrysophyllum gorungosanum* trees, or in water-filled grooves on the trunks of fallen trees. It is not found outside forest.**Major Threats** Its forest habitat is threatened by agriculture, wood extraction, and human settlement.**Conservation Measures** It occurs in the Gungunyana Forest Reserve in Zimbabwe. The Chirinda Forest is administered by the Forestry Commission and is one of the best researched forests in Zimbabwe, but the area remains in need of strengthened protection.**Bibliography:** Channing, A. (1978), Channing, A. (1993), Channing, A. (2001), Poynton, J.C. (1964b), Poynton, J.C. and Broadley, D.G. (1988), Poynton, J.C. and Clarke, B.T. (1999), Tandy, M. and Keith, R. (1972), Taylor, P. (1973)**Data Providers:** John Poynton, Alan Channing**CHIRINDA TOAD****EN** *Stephopaedes howelli* Poynton and Clarke, 1999**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Tanzania**Current Population Trend:** Decreasing

© Alan Channing

**Geographic Range** This species, which is endemic to Tanzania, is known only from the Mrora Forest on Mafia Island, and from the Jozani Forest on Zanzibar (and from an unmapped, unspecified locality on the east of Zanzibar). All records are from close to sea level.**Population** It is probably an uncommon species.**Habitat and Ecology** It is terrestrial, occurring in lowland coastal forest. Some of its remaining habitat is degraded, and it seems to display some adaptability to living in such habitats. Its breeding behaviour is unknown, but it might breed in puddles in tree roots like *Stephopaedes anotis*.**Major Threats** Its habitat is being degraded rapidly on Mafia for agriculture, wood extraction, and human settlements.**Conservation Measures** It possibly occurs in the Mafia Marine Park, but this remains to be confirmed, and improved protection of remaining suitable habitat on Mafia is a priority. On Zanzibar, the Jozani Forest, the largest tract of forest remaining on the main island, has recently had its protection status upgraded to that of a national park.**Bibliography:** Howell, K.M. (1993), Poynton, J.C. (1998), Poynton, J.C. (2003b), Poynton, J.C. and Clarke, B.T. (1999)**Data Providers:** John Poynton, Kim Howell**EN** *Stephopaedes usambarae* Poynton and Clarke, 1999**Endangered B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Tanzania**Current Population Trend:** Decreasing**Geographic Range** This species is known only from the foothills of the East Usambara Mountains in north-eastern Tanzania. All records have been from below 410m asl.**Population** It is not uncommon within its very small known range.**Habitat and Ecology** It is a terrestrial species of lowland forest, but also survives in mildly disturbed, selectively logged forest. Its breeding behaviour is unknown, but it might breed in puddles in tree roots (like *Stephopaedes anotis*).**Major Threats** There is ongoing loss of its habitat due to agricultural encroachment, wood extraction, and human settlement.**Conservation Measures** It occurs in the Kwangumi, Segoma and Mtai Forest Reserves, but these are not well protected and are in need of improved management.**Bibliography:** Harper, E. and Vonesh, J.R. (2003), Poynton, J.C. (1998), Poynton, J.C. and Clarke, B.T. (1999)**Data Providers:** John Poynton, Kim Howell**EN** *Werneria bambutensis* (Amiet, 1972)**Endangered B1ab(iii)+2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Cameroon**Current Population Trend:** Decreasing

© David C. Blackburn

**Geographic Range** This species is known only from the mountains of western Cameroon, where it occurs on Mount Manenguba and in the Bamenda Highlands in the Bamboutos Mountains and Mount Oku. It also occurs at Santa on Mount Neshele. Its altitudinal range is from 1,750-2,600m asl, but it rarely occurs below 2,100-2,200m asl.**Population** It is not a common species. In 1985, it was reported as possibly nearing extinction in the Bamboutos Mountains.**Habitat and Ecology** It is found on flat rocks in fast-flowing streams at high elevations, typically in montane forest patches. It breeds in streams, and it seems that after reproduction the adults disperse into forest patches, open bamboo glades, and montane grassland. The larvae live in fast, even torrential, water. During the dry season the adults may live in water, hiding under stones. It seems to occur at higher altitudes than other members of its genus, living at a higher altitude than both *Werneria tandyi* and *W. mertensiana* on Mount Manenguba.**Major Threats** It is probably threatened by forest clearance and degradation resulting from overgrazing, fires, and cultivation.**Conservation Measures** The species might occur in the Bafut-Ngamba Forest Reserve, but is largely unprotected elsewhere in its range; additional protection of the remaining highland forests in Cameroon, particularly Mount Manenguba, is needed. A conservation project has been conducted on Mount Oku for several years by BirdLife International, involving community management of the area involving the local villages. This project needs to take into account the conservation needs of this species.**Bibliography:** Amiet, J.-L. (1972b), Amiet, J.-L. (1976b), Amiet, J.-L. (1989), Gartshore, M.E. (1986), Rödel, M.-O. *et al.* (2004)**Data Providers:** Jean-Louis Amiet

CR *Werneria iboundji* Rödel, Schmitz, Pauwels and Böhme, 2004

Critically Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Gabon
Current Population Trend: Decreasing



Geographic Range This species is known only from two specimens from the type locality at 560m asl on the east flank of Mount Iboundji, Massif du Chaillu, Offoué-Onoy Department, Ogooué-Lolo Province, Gabon. Searches at a second waterfall on Mount Iboundji and at many other waterfalls in Gabon, revealed no further records of this species. However, it is possible that it occurs at other waterfalls, particularly in the Chaillu Massif, although it must be localized.

Population Unlike most congeners, which are often locally very abundant, this species appears to be very rare; only two individuals could be located in 20 person-hours of searching.

Habitat and Ecology This species is known only from among rocks at the edge of a plunge pool at the base of a large waterfall in lowland forest. It is presumed to be a larval developer.

Major Threats The main threat to the species is logging, which is ongoing, but has not yet reached the waterfall basin where the species occurs. Even if logging occurs nearby, it is likely to modify

temperature, humidity, and available food, and so have serious consequences for this species which, like its congeners, is dependent on high humidity.

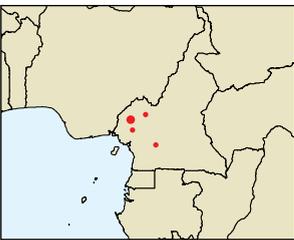
Conservation Measures Mount Iboundji has been proposed as a Biodiversity Sanctuary, due to its botanical and herpetological values, but no protection status has been granted to date.

Bibliography: Rödel, M.-O. *et al.* (2004)

Data Providers: Olivier Pauwels

EN *Werneria mertensiana* (Amiet, 1976)

Endangered B2ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Mary E. Gartshore

Geographic Range This species is known from Cameroon where it has been recorded from Mounts Manenguba, Nlonako, Kupe and Nta Ali, and at Fotabong in western Cameroon, and on the mountains around Yaoundé (Kala and Mbam-Minkoum) in southern Cameroon. There is also one specimen recorded from Equatorial Guinea on Monte Alén, although this may be another species and requires confirmation. Its altitudinal range is from 800-1,050m asl. It probably also occurs on the southern and western slopes of the Bamileke Plateau, and perhaps also on the Obudu Plateau in eastern Nigeria.

Population It has been found to be reasonably common in suitable habitat within its small range.

Habitat and Ecology It is associated with rocks in streams and waterfalls in forest and degraded secondary habitats at the lower limit of the submontane zone, although it has also been found in leaf-litter away from water. On Mount Manenguba it occurs at a lower altitude than *Werneria tandyi*, although their ranges might overlap slightly. It breeds in streams.

Major Threats This species is presumably affected by habitat loss due to agricultural encroachment and human settlement.

Conservation Measures In Cameroon, the species occurs in a few forest reserves, such as Nta Ali Forest Reserve; however, the higher elevation forest habitats in western Cameroon, particularly Mount Manenguba, are in urgent need of improved protection. The specimen recorded from Equatorial Guinea was found in Monte Alén National Park in Equatorial Guinea, although confirmation of the taxonomic identity of this population is needed.

Bibliography: Amiet, J.-L. (1972b), Amiet, J.-L. (1976b), De la Riva, I. (1994b), Gartshore, M.E. (1986), Herrmann, H.-W. *et al.* (2005), Lasso, C.A. *et al.* (2002), Lawson, D.P. (1993), Rödel, M.-O. *et al.* (2004)

Data Providers: Jean-Louis Amiet

EN *Werneria preussi* (Matschie, 1893)

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Cameroon, Togo
Current Population Trend: Decreasing



© Wolfgang Böhme

Geographic Range This species is known from the lower slopes of Mount Cameroon at 700-1,200m asl, from Mount Kupe around 900m asl, as well as a highly disjunct population from the highlands of west-central Togo ("Bismarckberg"), although this record may be in error. There have been no records from Togo for more than 100 years. It possibly has a wider range across the Cameroonian highlands than is currently known.

Population It is common, perhaps even abundant, in suitable habitat on Mount Cameroon. A survey in eastern Ghana in 2001 very close to the Togo highlands failed to recover this species.

Habitat and Ecology It is associated with rocky streams and waterfalls in submontane forest and degraded secondary habitats. The lack of permanent streams at high elevations on Mount Cameroon probably imposes an altitudinal limit on the species in this part of its range, since it breeds in streams and lives exclusively in and around water.

Major Threats It is presumably at risk from forest loss due to agricultural encroachment and human settlement.

Conservation Measures It does not occur in any protected areas, and protection of remaining forest habitat on Mount Cameroon and Mount Kupe is urgently needed. An ecotourism project has been established at Mount Kupe for some time, which aims to reduce hunting and agricultural expansion, and the area has been proposed as a Strict Nature Reserve (Réserve Écologique Intégrale). Further survey work is needed to confirm the existence and status of the population in Togo.

Notes on taxonomy: Studies are needed to determine whether or not specimens from Cameroon and Togo belong to the same species (M.-O. Rödel pers. comm.).

Bibliography: Amiet, J.-L. (1971b), Amiet, J.-L. (1972b), Amiet, J.-L. (1976b), Amiet, J.-L. (1987), Grandison, A.G.C. (1981), Rödel, M.-O. *et al.* (2004), Rödel, M.-O. and Agyei, A.C. (2003)

Data Providers: Jean-Louis Amiet, Mark-Oliver Rödel

EN *Werneria submontana* Rödel, Schmitz, Pauwels and Böhme, 2004

Endangered B1ab(iii)
Order, Family: Anura, Bufonidae
Country Distribution: Cameroon
Current Population Trend: Decreasing



© Andreas Schmitz

Geographic Range This species is known from Nyassoso on the south-west side of Mount Kupe at 910m asl, and from 800-1,200m asl in the Bakossi Mountains (including the Mwendelengo Mountains), Cameroon. A specimen collected in the vicinity of Nkongsamba (Maholé, 10km north-west of Tombel, Bakossi Forest Reserve, at 300-350m asl), may also belong to this species, as may specimens from Mofako in the Rumpi Hills. However, it is not believed likely to occur much more widely, given its specific habitat preferences and lack of habitat in the general area.

Population This species is often locally abundant.

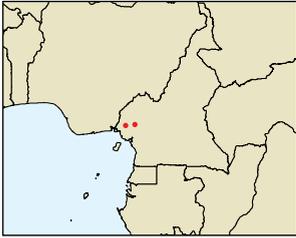
Habitat and Ecology On Mount Kupe, this species was found in a transition zone between good quality secondary forest and undisturbed primary forest. The species has been found during the day along a stream, under rocks in a partly dried-up river basin, and on stony ground between wet, very low vegetation in the spray zone of a small, artificial waterfall. It is presumed to be a larval developer.

Major Threats The habitat of this species is being steadily deforested for cultivation (particularly since human populations in the area are growing quickly) and several logging companies hope to start large-scale logging operations soon in the Bakossi/Mwendelengo Mountains. Even if deforestation does not eliminate the habitat of this species, it is likely to significantly alter temperature, humidity, and available food, and so have serious consequences for this species which, like its congeners, is dependent on high humidity. Near Nyassosso, the household use of detergents in rivers is also a potential threat.

Conservation Measures An ecotourism project has been established at Mount Kupe for some time, and aims to reduce hunting and agricultural expansion. In addition, a Strict Nature Reserve (Réserve Écologique Intégrale) has been proposed for the area. A management plan has been in preparation with the aim of designating most of the Bakossi Mountains as Protection Forest (55,000ha).

Bibliography: Rödel, M.-O. *et al.* (2004)

Data Providers: Mark-Oliver Rödel, Andreas Schmitz

EN *Werneria tandyi* (Amiet, 1972)**Endangered B2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Cameroon**Current Population Trend:** Decreasing

© David C. Blackburn



Geographic Range This species is known only from Mount Manenguba and the Rumpi Hills in western Cameroon, though its range is not well understood. Its altitudinal range on Mount Manenguba is from 1,300-1,750m asl, and the single specimen from the Rumpi Hills was collected at 1,000m asl.

Population It is common within its limited range.

Habitat and Ecology It lives on the verges of fast-flowing streams in submontane forest and degraded secondary habitats, where several individuals may cluster together on rocks in the splash zone. On Mount Manenguba it lives at a higher altitude than *Werneria merteniana*, but at lower elevations than *W. bambutensis*. It breeds in streams.

Major Threats It is presumably at risk from forest loss due to agricultural encroachment and human settlement.

Conservation Measures It may occur in the Rumpi Hills Forest Reserve, although this is not managed for biodiversity conservation; increased protection of the montane forest habitats in western Cameroon is rather urgently needed, particularly on Mount Manenguba.

Bibliography: Amiet, J.-L. (1972b), Amiet, J.-L. (1976b), Gartshore, M.E. (1986), Rödel, M.-O. *et al.* (2004)

Data Providers: Jean-Louis Amiet

CR *Wolterstorffina chirioi* Boistel and Amiet, 2001**Critically Endangered B1ab(iii)+2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Cameroon**Current Population Trend:** Decreasing

© David C. Blackburn



Geographic Range This recently described species is known only from the summit of Mount Oku at 3,000m asl in the Bamenda Highlands in western Cameroon. In view of the absence of suitable vegetation at other localities in Cameroon, this species is probably endemic to this area.

Population The population status of this species is unknown.

Habitat and Ecology It lives in Afro-Alpine vegetation and grassland at the summit of Mount Oku. Its breeding habits are unknown, but since it lives above the water limit on Mount Oku, it is presumably either a live-bearer or a direct-developer laying eggs on the ground.

Major Threats The habitat at the summit of Mount Oku is threatened by overgrazing and fire. Because it is a high-altitude species with a very limited range, it is potentially affected by climate change.

Conservation Measures A conservation project has been conducted on Mount Oku for several years by BirdLife International, involving community management of the area by the local villages. This project needs to take into account the conservation needs of this species. A captive-breeding programme should be considered in view of possible effects of climate change. Survey work is necessary to determine the current population status and breeding habits of this species.

Bibliography: Boistel, R. and Amiet, J.-L. (2001)

Data Providers: Jean-Louis Amiet

EN *Wolterstorffina mirei* (Perret, 1971)**Endangered B1ab(iii)+2ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Cameroon**Current Population Trend:** Decreasing

© David C. Blackburn



Geographic Range This species is known from western Cameroon on Mount Oku (at 2,500m asl) and Mount Meletan at 2,200-2,700m asl in the Bamboutos Mountains. Both localities are within the Bamenda Highlands. There is some doubt as to the validity of the record from Mount Oku (J.L. Amiet pers. comm.).

Population It was reported to be abundant on Mount Meletan.

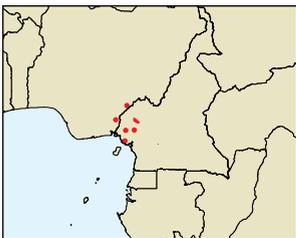
Habitat and Ecology This is a species of montane grassland that retreats to areas near streams and small watercourses in bamboo forest in the dry season. Its breeding habits are unknown, though it is likely to breed in streams.

Major Threats This species is almost certainly at risk from fire, overgrazing, and forest loss due to agriculture. Habitat damage is very severe in the Bamboutos Mountains.

Conservation Measures A conservation project has been conducted on Mount Oku for several years by BirdLife International, involving community management of the area by the local villages. This project needs to take into account the conservation needs of this species (assuming that it occurs there).

Bibliography: Boistel, R. and Amiet, J.-L. (2001), Perret, J.-L. (1971a), Perret, J.-L. (1972)

Data Providers: Jean-Louis Amiet

VU *Wolterstorffina parvipalmata* (Werner, 1898)**Vulnerable B1ab(iii)****Order, Family:** Anura, Bufonidae**Country Distribution:** Cameroon, Nigeria**Current Population Trend:** Decreasing

© Mary E. Gartshore



Geographic Range This species is known from eastern Nigeria on the Obudu Plateau and the higher parts of the Oban Hills, and from a number of montane localities in western Cameroon, including Mount Cameroon, the Rumpi Hills, Mount Kupe, Mount Manenguba, the Mbos Cliffs, and Foto. It is also known from Mount Kala and Mount Mbam-Minkoum near Yaoundé in southern Cameroon. Its altitudinal range is 800-2,000m asl.

Population It is generally uncommon.

Habitat and Ecology It is confined to montane forest near streams and small waterfalls, and requires forest with a closed canopy. It moves further from watercourses during the rainy season. It presumably normally breeds in streams, though tadpoles have been found in a water tank.

Major Threats The main threat is habitat loss, primarily due to smallholder farming activities, which is continuing over much of its range.

Conservation Measures It occurs in the Cross River National Park in Nigeria, but there is a need for improved protection of other sites at which the species is known to occur.

Bibliography: Amiet, J.-L. (1971b), Amiet, J.-L. (1987), Amiet, J.-L. and Perret, J.-L. (1969), Boistel, R. and Amiet, J.-L. (2001), Herrmann, H.-W. *et al.* (2005), Perret, J.-L. (1971a), Perret, J.-L. (1972)

Data Providers: Jean-Louis Amiet, Mary Gartshore

CENTROLENIDAE

EN *Centrolene audax* (Lynch and Duellman, 1973)

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



© Mario Humberto Yáñez-Muñoz



Geographic Range This species is known from four localities on the Amazonian slopes of the Andes in Río Salado and the Cascada de San Rafael, Napo Province, Ecuador, at altitudes of 1,300-1,700m asl.

Population It is known to be rare; it was last recorded in 1979 and searches in 1999-2001 failed to turn up any individuals (Bustamante 2002). However, the sampling effort throughout its range has probably been insufficient.

Habitat and Ecology It lives in cloud forest. The holotype was found in a bromeliad in the spray zone of a waterfall and on a cliff (Lynch and Duellman 1973). It lays its eggs on vegetation, and the larvae develop in water.

Major Threats Habitat destruction and degradation, as a result of agriculture and logging, are the main threats to this species. It is possible that chytridiomycosis may also have contributed to the decline.

Conservation Measures Its distribution may overlap marginally with the Reserva Ecológica Cayambe-Coca. Improved protection of the montane forest habitat in the range of this species is necessary. Given the possible threat of chytridiomycosis, surveys are needed to determine this species' current population status.

Bibliography: Bustamante, M. R. (2002), Lynch, J.D. and Duellman, W.E. (1973), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a)

Data Providers: Luis A. Coloma, Santiago Ron, Diego Cisneros-Heredia

EN *Centrolene azulae* (Flores and McDiarmid, 1989)

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Peru
Current Population Trend: Decreasing



Geographic Range This species is known only from Fundo Nuevo Mundo (at 1,500m asl), a cloud forest of the Cordillera Azul in Huanuco Department, central Peru. It probably occurs a little more widely than is currently known, but it is believed to have a restricted range.

Population It is rare and poorly known.

Habitat and Ecology It is associated with stream habitats in montane tropical forest, where the trees are generally widely spaced and separated by 2-3m tall shrubland. Within this there are also wet depressions and small ravines, with slightly taller (4-9m) elfin forest. Eggs are deposited on leaves above streams, and larvae develop in the streams.

Major Threats The principal threat to this species is habitat loss due to agricultural expansion from smallholder farming and human settlement.

Conservation Measures It may occur in Parque Nacional Cordillera

Azul. Further research into the distribution range and population status of this little-known species is needed, while the potential impacts of climate change and possible infection with the chytrid fungus require investigation.

Bibliography: Alverson, W.S., Rodriguez, L.O. and Moskovits, D.K. (2001), Duellman, W.E. and Schulte, R. (1993), Flores, G. and McDiarmid, R.W. (1989), Rodriguez, L.O., Cordova, J.H. and Icochea, J. (1993)

Data Providers: Lily Rodríguez, Jorge Luis Martínez, Daniel Neira, Wilfredo Arizabal, Edgar Lehr, César Aguilar Puntriano

CR *Centrolene ballux* (Duellman and Burrowes, 1989)

Critically Endangered A2ac; B2ab(iii,iv)
Order, Family: Anura, Centrolenidae
Country Distribution: Colombia, Ecuador
Current Population Trend: Decreasing



© Ignacio De La Riva



Geographic Range This species is known from three nearby localities in Saloya River Valley in Ecuador (Pichincha Province), at 1,700-2,010m asl, and from the Pacific versant of Colombia, in the Reserva Natural La Planada, 1,780m asl, Nariño Department.

Population In Ecuador, the most recent record is from 1989, and the species is no longer present in the Saloya Valley, and is apparently not in other nearby valleys. It has apparently declined seriously. In Colombia, many specimens were collected when it was first recorded, but there have been no recent surveys.

Habitat and Ecology It lives on vegetation next to streams in humid upper montane forest. It breeds in streams and is probably not tolerant of degraded habitats.

Major Threats The most likely cause of the severe decline of this species is the movement of the cloud layer up the mountain sides as a result of climate change, resulting in reduced humidity within the altitudinal range of the species (probably exacerbated by habitat fragmentation). Additional likely threats include: deforestation for agricultural development (including illegal crops), fire, logging, and human settlement; introduction of alien predatory fish species in streams; and pollution resulting from the spraying of illegal crops. Chytridiomycosis also cannot be ruled out.

Conservation Measures It occurs in the privately owned Reserva La Planada in Colombia, and could be in the binational reserve near Planada. Surveys are urgently needed to determine whether or not this species still survives, and, if necessary, an *ex-situ* captive population should be established.

Bibliography: Acosta-Galvis, A.R. (2000), Duellman, W.E. and Burrowes, P.A. (1989), Marquez, R., De la Riva, I. and Bosch, J. (1996), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Wilmar Bolívar, Luis A. Coloma, Santiago Ron, Diego Cisneros-Heredia, Erik Wild

EN *Centrolene fernandoi* Duellman and Schulte, 1993

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Peru
Current Population Trend: Decreasing



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Geographic Range This species is currently known only from the type locality on the west slopes of Abra Tangarana (1,080m asl) north-east of the San Juan de Pacaysapa, Departamento San Martín, in northern Peru. It is likely to occur more widely, but is believed to have a restricted distribution.

Population It is an uncommon species.

Habitat and Ecology The area in which this species occurs supports lower montane rainforest and cloud forest, whereas the intervening valleys are extensively cultivated. All individuals of this arboreal species were found on the upper surface of trees 1.5-2.0m above a small stream in a narrow ravine at night. Eggs are laid on leaves, and larvae develop in streams. This species needs the specific narrow microhabitat of flat damp areas with a constant source of water.

Major Threats The main threats to the species are unclear, but habitat loss, as a result of the expansion of agricultural activities, wood extraction, and human settlement, is likely to be the main threat.

Conservation Measures The species is not present in any protected areas, and some form of formal habitat protection is urgently needed along the west slopes of Abra Tangarana.

Bibliography: Duellman, W.E. and Schulte, R. (1993), Rodríguez, L.O., Cordova, J.H. and Icochea, J. (1993)

Data Providers: Lily Rodríguez, Jorge Luis Martínez, Javier Icochea, Ariadne Angulo, Edgar Lehr, Daniel Neira, César Aguilar Puntriano

VU *Centrolene geckoideum* Jiménez de la Espada, 1872**Vulnerable A3c; B1ab(iii)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Colombia, Ecuador**Current Population Trend:** Decreasing

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Geographic Range This species occurs in all three Cordilleras of Colombia from Antioquia, Caldas and Boyaca Departments, south to the north-western Andean slopes of Ecuador in Carchi and Pichincha Provinces. It has been recorded between 1,750 and 2,500m asl.

Population It is localized, but can be conspicuous in its microhabitat. In Ecuador, the population at Quebrada Zapadores (Pichincha Province) appears to have disappeared.

Habitat and Ecology This species inhabits cloud forest, where it can be found on vegetation next to running water or on rocks in streams and behind waterfalls. The eggs are placed on boulders in the splash zone of fast-flowing streams and waterfalls. It is a very territorial species, and the males guard the eggs. It is very susceptible to deforestation, and does not survive in degraded habitats.

Major Threats The major threat is habitat loss and deforestation, as a result of agricultural development (particularly the planting of illegal crops), logging, and human settlement. Other threats include the introduction of alien predatory fish in streams, and pollution resulting from the spraying of illegal crops. Like some other species in its family, it might also be affected by the movement of the cloud layer up the mountain sides as a result of climate change, resulting in reduced humidity within the altitudinal range of the species (probably exacerbated by habitat fragmentation). Chytridiomycosis also cannot be ruled out as a potential threat.

Conservation Measures It occurs in several protected areas in Colombia, but none in Ecuador. Further introductions of predatory alien fish should be prevented. The species is in need of close population monitoring given the potential threat of chytridiomycosis.

Notes on taxonomy: In spite of its Amazonian type locality, this species is in fact known only from the Andes.

Bibliography: Acosta-Galvis, A.R. (2000), Goin, C.J. (1964), Grant, T., Bolívar-G., W. and Castro, F. (1998), Jiménez de la Espada, M. (1872), Lynch, J.D., Ruiz-Carranza, P.M. and Rueda-Almonacid, J.V. (1983), Rueda-Almonacid, J.V. (1994a), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Wilmar Bolívar, Luis A. Coloma, Santiago Ron, Diego Cisneros-Heredia, Erik Wild, Mario Yáñez-Muñoz

CR *Centrolene gemmatum* (Flores, 1985)**Critically Endangered B2ab(iii)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Ecuador**Current Population Trend:** Decreasing

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Geographic Range This species is known only from the type locality: San Francisco de Las Pampas, Cotopaxi Province, Ecuador, at 1,800m asl.

Population It has not been found since it was first described in the early 1980s. Intensive searching at Bosque Integral Otonga (near the type locality) has not turned up any individuals. However, the type region is large, and the species might have been overlooked.

Habitat and Ecology It is found near streams in cloud forest. Reproduction is presumed to be via eggs laid on vegetation, with the tadpoles developing in water.

Major Threats Habitat destruction and degradation, due to small-scale agriculture and subsistence wood collection, is the primary threat to this species, but it might also have been impacted by chytridiomycosis.

Conservation Measures The species is not known to occur in any protected areas. Further survey work is required to determine whether or not this species still survives.

Bibliography: Flores, G. (1985a), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a)

Data Providers: Luis A. Coloma, Santiago Ron

CR *Centrolene heloderma* (Duellman, 1981)**Critically Endangered A2ac****Order, Family:** Anura, Centrolenidae**Country Distribution:** Colombia, Ecuador**Current Population Trend:** Decreasing

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Geographic Range This species occurs on the western versant of the Cordillera Occidental in Colombia in Cauca, Valle del Cauca and Risaralda Departments, south to the Tandayapa and Saloya Valleys, in Pichincha Province, Ecuador (where it has been recorded from four localities). Its altitudinal range is 1,900-2,400m asl.

Population It has disappeared from all known localities in Ecuador, the most recent record dating back to March 1979, although they might occur elsewhere in this country. In Colombia, it is very rare, and was last recorded in 1996. Overall, it appears to have undergone a serious decline.

Habitat and Ecology It inhabits the upper elevations of cloud forest, surviving only in mature forest. It breeds in streams, with the eggs laid on leaves overhanging the water.

Major Threats The most likely cause of the severe decline of this species is the movement of the cloud layer up the mountain sides as a result of climate change, resulting in reduced humidity within the altitudinal range of the species (probably exacerbated by habitat fragmentation). Additional likely threats include: deforestation for agricultural development (including illegal crops), fire, logging, and human settlement; introduction of alien predatory fish species in streams; and pollution resulting from the spraying of illegal crops. Chytridiomycosis also cannot be ruled out.

Conservation Measures This species probably has been recorded in several protected areas in Colombia, but is not recorded from any in Ecuador. Surveys are urgently needed to determine whether or not this species still survives, and, if necessary, an *ex-situ* captive population should be established.

Bibliography: Duellman, W.E. (1981), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Luis A. Coloma, Santiago Ron, Diego Cisneros-Heredia, Taran Grant, Wilmar Bolívar

VU *Centrolene hesperium* (Cadle and McDiarmid, 1990)**Vulnerable B1ab(iii)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Peru**Current Population Trend:** Decreasing

Geographic Range This species is known only from forested slopes at elevations of 1,500-1,800m asl on the Pacific versant of the Cordillera Central in the department of Cajamarca in northern Peru. Its range is incompletely known, and it presumably occurs much more widely, but nevertheless probably has a somewhat restricted distribution.

Population It is believed to be a common species; the type series is represented by 67 specimens.

Habitat and Ecology Associated with streams in montane forest. At night, individuals were perched on the upper surfaces of leaves over streams; others were observed during the day resting vertically on upper leaf surfaces over streams where breeding occurred. Eggs are deposited on leaves above permanent and temporary streams, and larvae develop in the streams. It is not known if the species can adapt to modified habitats.

Major Threats The threats to the species are not well known. It is

probably susceptible to localized habitat loss as a result of livestock farming and selective wood extraction. It might also be vulnerable to the effects of localized climate change and infection with the chytrid fungus.

Conservation Measures It is not known to occur in any protected areas, and there is clearly a need for improved habitat protection of sites at which this species is known to occur. Further research is needed to help better understand the threats to this species, and close monitoring of the population is recommended given the potential risk of chytridiomycosis.

Bibliography: Cadle, J.E. and McDiarmid, R.W. (1990), Rodríguez, L.O., Cordova, J.H. and Icochea, J. (1993)

Data Providers: Lily Rodríguez, Jorge Luis Martínez, César Aguilar Puntriano, Daniel Neira, Edgar Lehr

EN *Centrolene lynchi* (Duellman, 1980)**Endangered B2ab(iii,iv,v)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Colombia, Ecuador**Current Population Trend:** Decreasing

© Mario Humberto Yáñez-Muñoz



Geographic Range This species is known only from two general areas: on the western versant of the Cordillera Occidental in Risaralda Department, Colombia; and seven localities on the western versant of the Andes in Ecuador in Pichincha Province. It probably occurs between these areas, but it is a rare species and hard to detect. Its altitudinal

range is 1,100-1,600m asl.

Population It is known to have undergone declines in Ecuador, but has been seen as recently as August 2001. It appears to have disappeared entirely from some regions, such as the Río Faisanes area.

Habitat and Ecology It lives in cloud forest, including secondary forest, along streams, where it needs forest vegetation overhanging water, but it is not found in degraded habitats. It breeds in streams, with the eggs laid on leaves overhanging the water.

Major Threats The most likely cause of the severe decline of this species is the movement of the cloud layer up the mountain sides as a result of climate change, resulting in reduced humidity within the altitudinal range of the species (probably exacerbated by habitat fragmentation). Additional likely threats include: deforestation due to agricultural development, the planting of illegal crops, fire, logging, and human settlement; introduction of alien predatory fish species in streams; and pollution resulting from the spraying of illegal crops. Chytridiomycosis also cannot be ruled out.

Conservation Measures Its distribution overlaps with the Reserva Ecológica Los Illinizas in Ecuador, but it is not known from any protected areas in Colombia, and further protection of the cloud forest habitat of this species is necessary. Further research is needed to ascertain whether or not chytrid is a threat to this species; given the multitude of current threats, including the impact of predatory fish, a captive-breeding programme may need to be established.

Notes on taxonomy: This species and *Centrolene scirtetes* may be conspecific (D. Cisneros-Heredia pers. comm.).

Bibliography: Duellman, W.E. (1980), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Luis A. Coloma, Santiago Ron, Erik Wild, Diego Cisneros-Heredia

EN *Centrolene mariae* (Duellman and Toft, 1979)**Endangered B1ab(iii)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Peru**Current Population Trend:** Decreasing

Geographic Range This species is known only from the Serranía de Sira at 2,000m asl, extending north-north-west to south-east between two large northward flowing rivers, the Río Pachitea on the west and the Río Ucayali on the east, in Huanuco Department, Peru, at 1,550-2,000m asl. It presumably occurs more widely, but it nevertheless probably has a restricted distribution.

Population The population status of this species is not known (its description was based on a single specimen).

Habitat and Ecology The fauna of the Serranía de Sira area apparently represent isolated relicts from Andean relatives that spread across the lowlands during periods of climatic depression in the Pleistocene. The area is cloud forest, and characterized by the presence of many bromeliads and moss. Eggs are deposited on leaves, and larvae develop in streams.

Major Threats Although the area that the species inhabits is relatively inaccessible, there is some habitat disturbance due to farming

and human settlement. In addition, the lower parts of the Serranía de Sira are being selectively logged.

Conservation Measures It may occur in the Reserva Comunal El Sira. Further research is needed to determine the current population status of this little-known species.

Bibliography: Cannatella, D.C. and Duellman, W.E. (1982), Duellman, W.E. and Schülte, R. (1993), Duellman, W.E. and Toft, C.A. (1979), Rodríguez, L.O., Cordova, J.H. and Icochea, J. (1993)

Data Providers: Lily Rodríguez, Jorge Luis Martínez, Erik Wild, Wilfredo Arizabal, Edgar Lehr, César Aguilar Puntriano

VU *Centrolene peristictum* (Lynch and Duellman, 1973)**Vulnerable B1ab(iii,iv,v)+2ab(iii,iv,v)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Colombia, Ecuador**Current Population Trend:** Decreasing

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Geographic Range This species occurs on the Pacific slopes of the Andes in Ecuador (in Pichincha Province, where it is known from three localities), north to the northern extent of the western slope of the Cordillera Occidental in Colombia. Its recorded altitudinal range is 1,780-1,820m in Colombia, but has been found down to 1,350m in Ecuador. The Ecuadorian population appears to be isolated from that in Colombia.

Population In Ecuador, the species seems to have undergone a severe decline, and it has not been recorded in recent years. It remains uncommon in Colombia.

Habitat and Ecology It is a species of undisturbed cloud forest, and has not been found in secondary habitats. It breeds in streams, with the eggs laid on leaves overhanging the water.

Major Threats The most likely cause of the severe decline of this species is the movement of the cloud layer up the mountain sides as a result of climate change, resulting in reduced humidity within the altitudinal range of the species (probably exacerbated by habitat fragmentation). Additional likely threats include deforestation, due to agricultural development (including the planting of illegal crops), fire, logging, and human settlement; the introduction of alien predatory fish species in streams; and pollution resulting from the spraying of illegal crops. Chytridiomycosis also cannot be ruled out.

Conservation Measures It occurs in three Natural National Parks in Colombia: Farallones de Cali, Munchique, and Tatama. It is not known from any protected areas in Ecuador. There is a need for further survey work in Ecuador to establish the current population status of the species in the wild.

Bibliography: Lynch, J.D. and Duellman, W.E. (1973), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Luis A. Coloma, Santiago Ron, John Lynch, Diego Cisneros-Heredia, Erik Wild

EN *Centrolene petrophilum* Ruíz-Carranza and Lynch, 1991**Endangered B1ab(iii)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

Geographic Range This species occurs on the eastern flank of the northern portion of the Cordillera Oriental, Boyacá Department, Colombia, between 1,600 and 2,200m asl.

Population It is a common species.

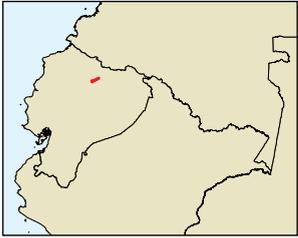
Habitat and Ecology It occurs on vegetation next to or above streams in cloud forest, and can also occur in secondary forest. It lays its eggs on rocks in streams, and the larvae develop in the water.

Major Threats Deforestation due to agricultural activities (livestock ranching, and the cultivation of crops) is the main threat to this species.

Conservation Measures It does not occur in any protected areas, and there is a need for the protection of existing cloud forest fragments, such as the site known as "Pajarito".

Bibliography: Acosta-Galvis, A.R. (2000), Ruíz-Carranza, P.M. and Lynch, J.D. (1991b)

Data Providers: María Cristina Ardila-Robayo, Jose Vicente Rueda

EN *Centrolene pipilatum* (Lynch and Duellman, 1973)**Endangered B1ab(iii,iv,v)+2ab(iii,iv,v)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Ecuador**Current Population Trend:** Decreasing

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**Geographic Range** This species occurs on the Amazonian slopes of the Andes in Río Salado, Río Azuelo and 16km from Santa Rosa in Napo and Sucumbíos Provinces, Ecuador, at 1,300-1,740m asl.**Population** First collected in 1971, this species was last recorded in 1977. Several trips to known localities where the species occurs have not turned up any individuals (e.g. Bustamante 2002); however, the area of available habitat in the vicinity of the type locality is large, and the sampling effort has probably been insufficient.**Habitat and Ecology** It is found near streams in cloud forest, and has been recorded over 3m above the ground. Eggs are presumably laid on vegetation, with the larvae developing in water.**Major Threats** The main threat to the species is habitat loss and degradation mainly due to smallholder farming and livestock ranching. It is possible that it may also have been affected by chytridiomycosis.**Conservation Measures** It probably occurs in the Reserva Ecológica Cayambe-Coca. Further survey work is needed to determine the current population status of this species.**Bibliography:** Bustamante, M. R. (2002), Lynch, J.D. and Duellman, W.E. (1973), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a)**Data Providers:** Luis A. Coloma, Santiago Ron, Diego Cisneros-Heredia**CR** *Centrolene puyoense* (Flores and McDiarmid, 1989)**Critically Endangered B1ab(iii)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Ecuador**Current Population Trend:** Decreasing**Geographic Range** This species is known only from the type locality: Puyo, Pastaza Province, Ecuador, at 1,000-1,050m asl. It is likely to occur in other nearby localities, but its distribution is probably very limited in extent.**Population** It has not been seen since the early 1980s, but there has not been any survey work for the species. However, there is no suitable habitat left at the type locality, so its continued survival depends upon undiscovered populations occurring nearby in suitable habitat.**Habitat and Ecology** It lives in lower montane forest. The holotype was collected in the evening, after it had rained the previous day and night (Flores and McDiarmid 1989). Reproduction is presumed to be via eggs laid on vegetation, with the tadpoles developing in water.**Major Threats** Habitat destruction and degradation due to agriculture and logging is the primary threat to this species. By 1996, the forest had been cleared at the type locality.**Conservation Measures** The species is not recorded from any protected area. Survey work is urgently required to determine the current population status of this species and the precise limits of its range.**Notes on taxonomy:** Duellman and Schulte (1993) transferred this species to the genus *Centrolene* from *Cochranella*.**Bibliography:** Duellman, W.E. and Schulte, R. (1993), Flores, G. and McDiarmid, R.W. (1989), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a)**Data Providers:** Luis A. Coloma, Santiago Ron**VU** *Centrolene quindianum* Ruiz-Carranza and Lynch, 1995**Vulnerable D2****Order, Family:** Anura, Centrolenidae**Country Distribution:** Colombia**Current Population Trend:** Stable

© John D. Lynch

**Geographic Range** This species is known from Filandia and Salinto in Quindío Department, and from Ucumari and Pereira in Risaralda Department, on the western flank of the Cordillera Central, between 1,900 and 2,050m asl, in Colombia.**Population** It is a very common species.**Habitat and Ecology** It occurs on vegetation next to streams in sub-Andean forests. Eggs are laid on leaves overhanging the water and when they hatch the tadpoles drop into the water below where they develop further. They require gallery forest to lay their eggs, hence they do not tolerate much habitat disturbance.**Major Threats** Although there are no major threats to the species overall at present, habitat loss and degradation due to the expansion of cattle raising, and water pollution, are potential future threats. The invasive *Rana catesbeiana* is also a threat, since it eats the tadpoles of this species.**Conservation Measures** Its range includes a few protected areas. There is a need for close monitoring of the population status of this species.**Bibliography:** Acosta-Galvis, A.R. (2000), Ruiz-Carranza, P.M. and Lynch, J.D. (1995b), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)**Data Providers:** Erik Wild, John Lynch**VU** *Centrolene robledoii* Ruiz-Carranza and Lynch, 1995**Vulnerable B1ab(iii)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

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**Geographic Range** This species occurs north of the Cordillera Central in the department of Antioquia, on the eastern flanks of the Cordillera Central in the department of Risaralda, and on the western flank of the Cordillera Central in the department of Caldas, in Colombia. It has been recorded from 800-2,800m asl.**Population** It is a common species.**Habitat and Ecology** It occurs on vegetation next to streams in cloud forest. It lays its eggs on leaves, and when hatched the tadpoles drop in to the water below. It has also been recorded from secondary forests near water.**Major Threats** The major threat is habitat loss and degradation due to the expansion of agriculture, coupled with water source loss, and pollution from the fumigation of crops.**Conservation Measures** Its range includes Reserva Regional Bosques de Florencia in the department of Caldas.**Bibliography:** Ardila-Robayo, M.C. and Acosta-Galvis, A. (2000b), Ruiz-Carranza, P.M. and Lynch, J.D. (1995b), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)**Data Providers:** Martha Patricia Ramírez Pinilla, Mariela Osorno-Muñoz, Jose Vicente Rueda, Adolfo Amézquita, María Cristina Ardila-Robayo

VU *Centrolene tayrona* Ruíz-Carranza and Lynch, 1991

Vulnerable B1ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species is known from the Sierra Nevada de Santa Marta, in Magdalena Department, Colombia. It has been recorded between 980 and 1,790m asl.

Population It is a common species.

Habitat and Ecology It occurs on vegetation next to water sources in sub-Andean forests and cloud forests. It lays its eggs on leaves, and when hatched the tadpoles fall in to the water below where they develop further.

Major Threats The major threat is habitat loss due to agriculture (both crops and livestock), as well as water pollution due to the fumigation of crops.

Conservation Measures Its range includes Parque Nacional Natural Sierra Nevada de Santa Marta.

Notes on taxonomy: This species was considered to be a synonym of *Hyalopsis platycephalus* Werner, 1894, by Lynch (1981b), but this was not accepted by McDiarmid and Savage (1984).

Bibliography: Acosta-Galvis, A.R. (2000), Lynch, J.D. (1981b), McDiarmid, R.W. and Savage, J.M. (1984), Ruiz-Carranza, P.M. and Lynch, J.D. (1991b), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: John Lynch, Martha Patricia Ramírez Pinilla, Mariela Osorno-Muñoz, Jose Vicente Rueda, Adolfo Amézquita, María Cristina Ardila-Robayo

VU *Cochranella adiazeta* Ruíz-Carranza and Lynch, 1991

Vulnerable B1ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species occurs on the eastern slope of the Cordillera Oriental in Cundinamarca, Santander and Tolima Departments, Colombia, between 1,130 and 2,060m asl.

Population It is common, with several recent records.

Habitat and Ecology It occurs on vegetation next to streams in premontane humid forest; it also occurs in secondary forest. It lays its eggs on vegetation, and the tadpoles develop in water.

Major Threats The major threat is habitat loss due to agricultural expansion (cattle ranching and crops).

Conservation Measures It occurs in the Santuario de Fauna y Flora Guanentá Alto Río Fonce.

Bibliography: Acosta-Galvis, A.R. (2000), Ruiz-Carranza, P.M. and Lynch, J.D. (1991d), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Jose Vicente Rueda, Martha Patricia Ramírez Pinilla

CR *Cochranella anomala* (Lynch and Duellman, 1973)

Critically Endangered B2ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



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Geographic Range This species is known only from the type locality: Río Azuela, Napo Province, in northern Ecuador, at 1,740m asl. It is likely to occur a little more widely, but surveys elsewhere have not recorded it, and so its distribution is unlikely to be extensive.

Population It has not been seen since its original discovery (one individual) in 1971. A few return visits to the type locality have not recorded it.

Habitat and Ecology It lives in cloud forest. The holotype was found on a mossy limb of a bush about 1.5m above a cascading rivulet at night (Lynch and Duellman 1973). Its breeding is unknown, but is likely to take place in streams.

Major Threats At the type locality, patches of forest have been cleared for agriculture and livestock farming.

Conservation Measures The distribution range of this species appears to overlap with Reserva Ecológica Cayambe-Coca. Survey work is required to determine the population status of this species and to ascertain the limits of its range.

Bibliography: Lynch, J.D. and Duellman, W.E. (1973), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a)

Data Providers: Luis A. Coloma, Santiago Ron

VU *Cochranella armata* Lynch and Ruíz-Carranza, 1996

Vulnerable D2
Order, Family: Anura, Centrolenidae
Country Distribution: Colombia
Current Population Trend: Stable



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Geographic Range This species is known only from near Boquerón at the base of Cerro Ingles, near Vereda La Amarillas, Municipio El Cairo, in Valle del Cauca Department, Colombia, at 2,160m asl. Even though every stream within 5km of the type locality has been sampled, the species has not been recorded, suggesting that it has a very restricted range.

Population It was reportedly a common species when collected.

Habitat and Ecology Specimens have been collected on vegetation next to an open stream in primary forest. Its breeding habits are not known, but it is likely to breed in streams.

Major Threats There are no major threats, but given its small range it is susceptible to stochastic threatening processes.

Conservation Measures The type locality is within a private reserve, which is part of a larger network of reserves. Maintenance of the habitat of this restricted-range species is essential to ensure its persistence, and it requires close population monitoring given its restriction to a single location.

Bibliography: Acosta-Galvis, A.R. (2000), Lynch, J.D. and Ruiz-Carranza, P.M. (1996a)

Data Providers: Erik Wild, John Lynch

VU *Cochranella balionota* (Duellman, 1981)

Vulnerable B2ab(iii,iv,v)
Order, Family: Anura, Centrolenidae
Country Distribution: Colombia, Ecuador
Current Population Trend: Decreasing



Geographic Range This species occurs between 400 and 800m along the western slope of the Cordillera Occidental of Colombia, from El Tambito in Cauca Department, south to Ecuador. In Ecuador, it is known only from the type locality: Mindo, in Pichincha Province, at 1,540m asl.

Population It is reasonably common in Colombia, but there are no recent records from Ecuador.

Habitat and Ecology It is an arboreal species, living on vegetation next to streams in humid lowland tropical forest and cloud forest. It seems to require closed forest. It breeds in streams, with the eggs laid on leaves overhanging water.

Major Threats The major threat is habitat loss as a result of deforestation for agricultural development (including the planting of illegal crops), logging, and human settlement. Other threats include the introduction of alien predatory fish, and pollution resulting from the spraying of illegal crops. Like some other centrolenids, this species

might also be affected by the movement of the cloud layer up the mountain sides as a result of climate change, resulting in reduced humidity within the altitudinal range of the species (probably exacerbated by habitat fragmentation).

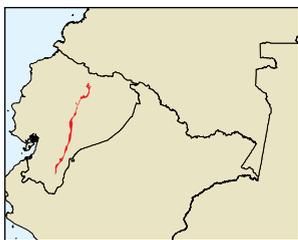
Conservation Measures Its presence has not been confirmed from any protected areas, though it might occur in Parque Nacional Natural Munchique in Colombia. There is clearly a need for improved habitat protection of sites at which this species is known to occur.

Bibliography: Acosta-Galvis, A.R. (2000), Duellman, W.E. (1981), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Wilmar Bolivar, Luis A. Coloma, Santiago Ron, Diego Cisneros-Heredia, John Lynch, Erik Wild

VU *Cochranella cochranae* (Goin, 1961)

Vulnerable B1ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



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Geographic Range This species is found on the lower Amazonian slopes of the Andes in northern and southern Ecuador (Sucumbios, Pastaza and Zamora Chinchipe Departments), at elevations of 1,100-1,600m asl. It might occur a little more widely.

Population This species is noted as being uncommon across most of its range.

Habitat and Ecology It lives in montane rainforest along streams with steep gradients (Lynch and Duellman 1973). Reproduction is presumed to occur via eggs laid on vegetation, with the tadpoles developing in the water.

Major Threats Habitat destruction and degradation is a threat to this species, mainly as a result of smallholder farming activities and clear-cutting of forests.

Conservation Measures Its distribution range overlaps with Parque Nacional Sumaco Napo-Galeras, Reserva Ecológica Antisana, Parque Nacional Podocarpus and Parque Nacional Llanganates.

Bibliography: Goin, C.J. (1961), Lynch, J.D. and Duellman, W.E. (1973), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a)

Data Providers: Luis A. Coloma, Santiago Ron, Diego Almeida

VU *Cochranella daidalea* Ruiz-Carranza and Lynch, 1991

Vulnerable B1ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Colombia
Current Population Trend: Decreasing



© Conservacion Internacional-Colombia

Geographic Range This species occurs on the western flank of the Cordillera Oriental in Cundinamarca and Santander Departments, Colombia, between 1,630 and 2,060m asl.

Population It is common, and has recently been collected.

Habitat and Ecology It occurs on vegetation near streams in premontane and cloud forest, and has been recorded from secondary forest. It lays its eggs on vegetation, and the tadpoles develop in the water.

Major Threats The main threat to this species is habitat fragmentation and loss due to agriculture (cattle raising and crops).

Conservation Measures It occurs in the Santuario de Fauna y Flora Guanentá Alto Río Fonce.

Bibliography: Acosta-Galvis, A.R. (2000), Ruiz-Carranza, P.M. and Lynch, J.D. (1991c), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: María Cristina Ardila-Robayo, Jose Vicente Rueda

VU *Cochranella garciae* Ruiz-Carranza and Lynch, 1995

Vulnerable B1ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Colombia
Current Population Trend: Decreasing



Geographic Range This species is known from Cauca, Huila and Tolima (Combeima) Departments, on the eastern slope of the Cordillera Central, in Colombia, between 1,900 and 3,030m asl.

Population It is a relatively common species.

Habitat and Ecology It occurs on vegetation alongside streams in sub-Andean and Andean forests. The eggs are laid on leaves overhanging water and when they hatch the tadpoles drop in to the water below where they develop further. They require gallery forest to lay their eggs and hence are very sensitive to disturbance of their forest habitat.

Major Threats The main threat to this species is habitat loss as a result of clear-cutting of forests and agricultural encroachment, due to the planting of illegal crops and cattle raising.

Conservation Measures The range of the species includes a few protected areas, such as Parque Nacional Natural Nevado del Huila.

Bibliography: Ruiz-Carranza, P.M. and Lynch, J.D. (1995b), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Alonso Quevedo Gil, John Lynch

VU *Cochranella griffithsi* (Goin, 1961)**Vulnerable B1ab(iii)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Colombia, Ecuador**Current Population Trend:** Decreasing

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Geographic Range This species occurs on the Pacific slopes of the Cordillera Occidental in Colombia, in Antioquia, Chocó, Cauca, Valle del Cauca, Nariño and Risaralda Departments, south to Cotopaxi Province in adjacent Ecuador. It is also known from the eastern slopes of the Cordillera Central in the Department of Caldas, Colombia. In Ecuador it has been recorded from only five sites covering a relatively small area. It has been recorded at 1,780-2,650m asl.

Population It is very common in Colombia, but uncommon in Ecuador where it appears to have disappeared from Quebrada Zapadores in Pichincha Province, where it once occurred.

Habitat and Ecology It occurs on vegetation next to streams in montane forests, and is perhaps a little more arboreal than some other related species. It is not found in degraded habitats, but does occur in selectively logged forest. It breeds in streams, with the eggs laid on leaves overhanging the water.

Major Threats The major threat is habitat loss as a result of deforestation for agricultural development (including the planting of illegal crops), logging, and human settlement. Other threats include the introduction of alien predatory fish, and pollution resulting from the spraying of illegal crops. Like some other centrolenids, this species might also be affected by the movement of the cloud layer up the mountain sides as a result of climate change, resulting in reduced humidity within the altitudinal range of the species (probably exacerbated by habitat fragmentation). Chytridiomycosis is a possible future threat.

Conservation Measures It occurs in several protected areas in Colombia, while in Ecuador its range overlaps with Reserva Ecológica Los Illinizas.

Bibliography: Acosta-Galvis, A.R. (2000), Goin, C.J. (1961), Morales, M. *et al.* (2002), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Wilmar Bolívar, Luis A. Coloma, Santiago Ron, Mario Yáñez-Muñoz, Taran Grant

EN *Cochranella luminosa* Ruiz-Carranza and Lynch, 1995**Endangered B1ab(iii)+2ab(iii)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

Geographic Range This species is known from three localities in Antioquia Department, on the western flank of the western Andes in Colombia, between 1,140 and 1,430m asl.

Population It is not a rare species but it is difficult to collect as it occurs high in the canopy.

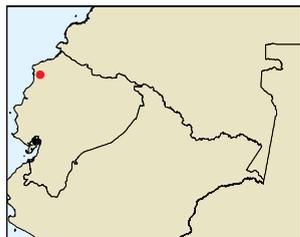
Habitat and Ecology It is restricted to primary forest, occurring next to streams. It lays its eggs on the top of leaves in the canopy and when hatched the larvae drop into the stream below where they develop further.

Major Threats The main threats are habitat loss and fragmentation caused by the expansion of livestock ranching activities, timber extraction for subsistence use, and the planting of illegal crops.

Conservation Measures The range of the species includes Parque Nacional Natural Orquideas. However, additional habitat protection is required for this species, given its reliance on intact primary forest.

Bibliography: Ruiz-Carranza, P.M. and Lynch, J.D. (1995a)

Data Providers: Erik Wild, John Lynch

EN *Cochranella mache* Guayasamin and Bonaccorso, 2004**Endangered B1ab(iii)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Ecuador**Current Population Trend:** Decreasing

© Juan Manuel Guayasamin



Geographic Range This species is known only from around 510m asl near Río Aguacatal in the Reserva Biológica Bilsa in the Montañas de Mache of Esmeraldas Province in the Chocó region of the north-western Ecuadorian lowlands. The species is likely to occur in other localities within the surrounding Mache Chindul Ecological Reserve, but may be restricted to the Mache-Chindul Mountains.

Population It appears to be rare, although this may be due to the fact that the species generally inhabits the forest canopy and may be hard to locate.

Habitat and Ecology It is known from evergreen foothill forest, and individuals have been found at night on vegetation 1-1.5m above the ground near streams. The species is presumed to be a larval developer.

Major Threats The Mache Chindul Ecological Reserve represents the last sizeable block of forest in the northern coastal hills of north-western Ecuador. Unfortunately, the area is under significant pressure from logging.

Conservation Measures The known range of this species is encompassed by the 2,500-ha Reserva Biológica Bilsa, managed by Fundación Jatun Sacha, which, in turn, is located within the Mache Chindul Ecological Reserve.

Bibliography: Guayasamin, J.M. and Bonaccorso, E. (2004)

Data Providers: Juan Guayasamin

EN *Cochranella megacheira* (Lynch and Duellman, 1973)**Endangered B1ab(iii,iv,v)+2ab(iii,iv,v)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Colombia, Ecuador**Current Population Trend:** Decreasing

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Geographic Range This species occurs on the Amazonian slopes of the Andes in Ecuador (at four locations in Napo Province: near Santa Rosa, Río Azuela, Río Salado, and Guacamayos), and also from the Amazonian slopes of the Cordillera Oriental, in Putumayo Department, Colombia. It has been recorded at 1,300-1,750m asl.

Population It was most recently seen in Ecuador in 2000, and it appears to be very rare, having apparently disappeared from Río Azuela. There is no recent information from Colombia.

Habitat and Ecology It inhabits mature, closed cloud forest, where it has been found on the leaves and stems of bushes and trees overhanging streams. It does not occur in degraded areas. It breeds in streams, with the eggs laid on leaves overhanging the water.

Major Threats The major threats include: deforestation for agricultural development, the planting of illegal crops, logging, and human settlement; introduction of alien predatory fish in streams; and pollution resulting from the spraying of illegal crops. Like some other centrolenids, this species might also be affected by the movement of the cloud layer up the mountain slopes as a result of climate change, resulting in reduced humidity within the altitudinal range of the species (probably exacerbated by habitat fragmentation). Chytridiomycosis may present a possible future threat.

Conservation Measures It has not been found in any protected areas, and protection of the cloud forest habitat of this species is urgently needed. Survey work is necessary to ascertain the current population status of this species; given the nature of some of the threats, an ex situ population may need to be established.

Bibliography: Lynch, J.D. and Duellman, W.E. (1973), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

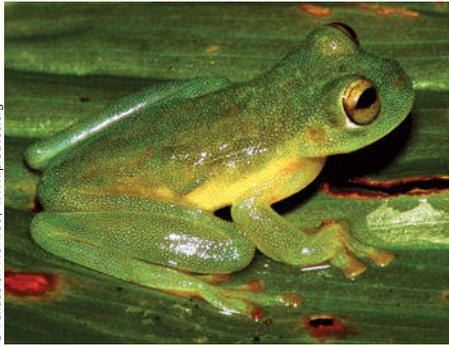
Data Providers: Wilmar Bolívar, Luis A. Coloma, Santiago Ron, Ana Almandáriz, Taran Grant

VU *Cochranella posadae* Ruiz-Carranza and Lynch, 1995

Vulnerable B1ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species is known from Caldas (Samaná), Cauca (Inza) and Huila (San Jose Isnos) Departments on the eastern flank of the Cordillera Central in Colombia, between 1,100 and 2,800m asl. It presumably occurs more widely, particularly at localities between the two currently known areas.

Population It is a common species.

Habitat and Ecology It occurs in sub-Andean and Andean forests, on vegetation alongside streams. Eggs are laid on leaves over-hanging water and when they hatch the tadpoles drop into the water below where they develop further. They require gallery forest to lay their eggs, and hence are sensitive to any disturbance of their forest habitat.

Major Threats Threats to this species include habitat fragmentation and loss, due to the expansion of agriculture (including the planting of illegal crops) and timber extraction, and water pollution.

Conservation Measures The range of the species does not include any protected areas, and there is a need for improved habitat protection of sites where this species is known to occur.

Bibliography: Acosta-Galvis, A.R. (2000), Ruiz-Carranza, P.M. and Lynch, J.D. (1995b), Ruiz-Carranza, P.M. and Lynch, J.D. (1997), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Erik Wild, John Lynch

VU *Cochranella prasina* (Duellman, 1981)

Vulnerable B1ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species is known from Valle del Cauca Department, northwards through Choco and Risaralda departments to Antioquia Department, on the western flank of the western Andes, in Colombia, between 900 and 1,450m asl. It probably occurs more widely.

Population It can be locally common in suitable habitat.

Habitat and Ecology It occurs in rainforests and sub-Andean forest, and is often found on vegetation along streams (being restricted to streams with canopy cover). It lays its eggs on the upper surface of leaves and when hatched the tadpoles drop into the stream below.

Major Threats The major threats are habitat fragmentation and loss, due to the expansion of agriculture (cattle raising and planting of illegal crops), and water pollution.

Conservation Measures The range of the species includes Parque Nacional Natural Orquideas.

Bibliography: Acosta-Galvis, A.R. (2000), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Fernando Castro, Taran Grant, Erik Wild

VU *Cochranella punctulata* Ruiz-Carranza and Lynch, 1995

Vulnerable B1ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species is known from Tolima, Antioquia and Caldas Departments on the eastern flank of the Central Cordillera, between 500 and 930m asl, in Colombia. It probably occurs more widely.

Population It is a very common species.

Habitat and Ecology It occurs in sub-Andean forests, on vegetation alongside streams. Eggs are laid on leaves over-hanging water and when they hatch the tadpoles drop in to the water below where they develop further. They require gallery forest to lay their eggs, and hence are very sensitive to habitat disturbance.

Major Threats The major threats are habitat fragmentation and loss, due to the expansion of agriculture (cattle raising and planting of illegal crops), and water pollution. A small white fly lays its eggs within the eggs of this species, resulting in egg mortality.

Conservation Measures The range of this species does not include any protected areas, hence there is a need for improved habitat protection at sites where it is known to occur.

Bibliography: Acosta-Galvis, A.R. (2000), Ruiz-Carranza, P.M. and Lynch, J.D. (1995b), Ruiz-Carranza, P.M. and Lynch, J.D. (1997), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Alonso Quevedo Gil, John Lynch

VU *Cochranella resplendens* (Lynch and Duellman, 1973)

Vulnerable B1ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Colombia, Ecuador
Current Population Trend: Decreasing



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Geographic Range This species is only known from the type locality in Ecuador (Santa Cecilia) and from one location in Colombia (south-western Putumayo), but might occur more widely than these records suggest. It occurs between 300 and 400m asl.

Population This is thought to be a rare species in Colombia, but there is no information on population status in Ecuador.

Habitat and Ecology It occurs in lowland tropical primary and secondary rainforests, and sub-Andean forests, on vegetation next to running water sources like streams. The holotype was found in primary rainforest (Lynch and Duellman 1973). It has not been recorded from anthropogenic habitats. The eggs are laid on leaves above the streams, and when hatched the tadpoles drop into the stream below.

Major Threats The species is threatened by habitat fragmentation and habitat loss, as a result of agricultural expansion (including the planting of illegal crops) and timber extraction, and water pollution.

Conservation Measures It is not known from any protected areas in Colombia or Ecuador, and there is a need for improved habitat protection at sites where this species is known to occur.

Bibliography: Acosta-Galvis, A.R. (2000), Guayasamin, J.M. and Bonaccorso, E. (2004), Lynch, J.D. and Duellman, W.E. (1973), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Fernando Castro, Jose Vicente Rueda, Wilmar Bolívar, Ruth Amanda Estupinan, Luis A. Coloma, Santiago Ron, Ana Almandáriz

VU *Cochranella riveroi* (Ayarzagüena, 1992)**Vulnerable D2**

Order, Family: Anura, Centrolenidae
Country Distribution: Venezuela
Current Population Trend: Stable



Geographic Range This species is endemic to Cerro Aracamuni, in Amazonas State, Venezuela, at an elevation of 1,600m asl.

Population It is a rare species.

Habitat and Ecology It lives and reproduces (by larval development) within terrestrial bromeliads in montane forest.

Major Threats There are no current major threats, but the restricted range of this species makes it vulnerable to threatening processes.

Conservation Measures The population occurs in a Natural Monument within the Parque Nacional Serranía de la Neblina. There is a need for close population monitoring of this species given that it is known only from a single location.

Bibliography: Ayarzagüena, J. (1992), Barrio Amorós, C.L. (2004), Barrio, C. (1998), Duellman, W.E. (1993), Duellman, W.E. (1999), Gorzula, S. and Señaris, J.C. (1998), La Marca, E. (1997), Lynch, J.D. and Ruiz-Carranza, P.M. (1996a), Myers, C.W. and Donnelly, M.A. (1997)

Data Providers: Enrique La Marca, Celsa Señaris

VU *Cochranella rosada* Ruíz-Carranza and Lynch, 1997**Vulnerable B1ab(iii)**

Order, Family: Anura, Centrolenidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species is known from Tolima (Falan near Mariquita), Antioquia (Anorí), and Caldas Departments, between 1,100 and 2,000m asl, in Colombia. It is believed to occur more widely.

Population It is a common species in Tolima, but is thought to be uncommon in Antioquia.

Habitat and Ecology It occurs in sub-Andean forests on vegetation alongside streams. Eggs are laid on leaves over-hanging water and when they hatch the tadpoles drop into the water below where they develop further. They require gallery forest to lay their eggs and hence are sensitive to any habitat disturbance.

Major Threats The major threats are habitat fragmentation and loss, due to agricultural expansion (including planting of illegal crops) and timber extraction, and water pollution.

Conservation Measures The range of the species does not include any protected areas, and there is a need for improved habitat protection at the sites where it is known to occur.

Bibliography: Acosta-Galvis, A.R. (2000), Ruiz-Carranza, P.M. and Lynch, J.D. (1997)

Data Providers: Alonso Quevedo Gil, John Lynch

VU *Cochranella ruizi* Lynch, 1993**Vulnerable B1ab(iii)**

Order, Family: Anura, Centrolenidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species is known from both slopes of the western Andes, between Cauca and Risaralda Departments, and on the western slope of the central Andes, in Colombia, between 2,100 and 2,470m asl.

Population It is not a particularly common species.

Habitat and Ecology It occurs on vegetation next to streams in sub-Andean forests. It lays its eggs on leaves above the water and when hatched the tadpoles drop into the stream below where they develop further. It is restricted to gallery forest due to its requirement for overhanging branches for breeding habitat.

Major Threats The major threats are habitat loss, due to agricultural development (including the planting of illegal crops), logging, and human settlement, and pollution resulting from the spraying of illegal crops.

Conservation Measures The range of the species includes a few protected areas, such as the Parque Nacional Natural Tatamá.

Bibliography: Lynch, J.D. (1993a), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Fernando Castro, John Lynch, Erik Wild

VU *Cochranella savagei* Ruíz-Carranza and Lynch, 1991**Vulnerable B1ab(iii)**

Order, Family: Anura, Centrolenidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species occurs on the western slope of the Cordillera Central in the departments of Quindío and Risaralda, on the eastern slope of the Cordillera Central in the department of Caldas, and on the western slope of the Cordillera Occidental, in the department of Valle del Cauca, in Colombia. It has been recorded from 1,400-2,410m asl.

Population It is a common species.

Habitat and Ecology It occurs in sub-Andean forests on vegetation next to running water such as streams. The eggs are laid on leaves, and when hatched the tadpoles fall into the water below where they develop further. It is also recorded from secondary forests.

Major Threats The major threat is forest loss due to agriculture, both crops and livestock, and pollution (as a result of the fumigation of crops).

Conservation Measures Its range includes the Reserva Regional Bosques de Florencia and the Parque Nacional Natural Farallones de Cali.

Bibliography: Acosta-Galvis, A.R. (2000), Ruiz-Carranza, P.M. and Lynch, J.D. (1991b), Ruiz-Carranza, P.M. and Lynch, J.D. (1991c), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Wilmar Bolívar, Martha Patricia Ramírez Pinilla, Mariela Osorno-Muñoz, Jose Vicente Rueda, Adolfo Amézquita, María Cristina Ardila-Robayo

EN *Cochranella saxiscandens* Duellman and Schulte, 1993**Endangered B1ab(iii)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Peru**Current Population Trend:** Decreasing

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Geographic Range This species is known only from one locality (two sites in close proximity to each other) at 800m asl on the south slope of the north-west-south-east range of the mountains immediately to the north of Tarapoto Province, San Martín Department, in northern Peru. It probably occurs more widely, but it is still likely to have a restricted distribution.

Population It is a common species at the type locality, and was described from a series of 31 adult males.

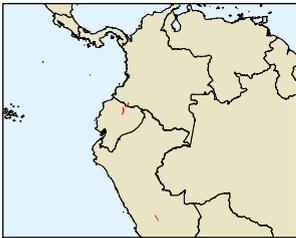
Habitat and Ecology The type locality is a rocky gorge into which two streams plunge. The sides of the gorge are nearly vertical rocky walls, and the floor of the gorge is littered with huge boulders. The species was found perched on ferns on boulders, but most were on the boulders within 10cm of the waterline at night. They breed in streams, with eggs laid on leaves above water.

Major Threats The main threat to this species is habitat loss due to agriculture, wood extraction, and human settlement, as well as the impacts of tourism. The potential impacts of localized climate change and possible infection with the chytrid fungus require further investigation.

Conservation Measures It is not known to occur in any protected areas, but the type locality at least is in need of some formal protection or management.

Bibliography: Duellman, W.E. and Schulte, R. (1993), Rodríguez, L.O., Cordova, J.H. and Icochea, J. (1993)

Data Providers: Lily Rodríguez, Jorge Luis Martínez, Ariadne Angulo, Karl-Heinz Jungfer, Wilfredo Arizabal

VU *Cochranella siren* (Lynch and Duellman, 1973)**Vulnerable B1ab(ii,iii,iv,v)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Colombia, Ecuador, Peru**Current Population Trend:** Decreasing

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Geographic Range This species occurs on the Amazonian slopes of the eastern Andes in Napo Province, Ecuador (at elevations of 1,310-1,700m asl); in Putumayo Department, Colombia; and in Ayacucho Province, southern Peru. The Peruvian specimens might refer to a distinct species (Duellman and Schulte 1993).

Population In Ecuador, it has disappeared from the type locality (Rio Salado) and several other localities, but one specimen was seen in Azuela in 1998.

Habitat and Ecology It lives near streams in pre-montane forest (Lynch and Duellman 1973; QCAZ database). It lays its eggs on vegetation, and the tadpoles develop in the water.

Major Threats Habitat destruction and degradation is a threat to this species, due mainly to the activities of smallholder farmers and as a result of logging. Given its narrow altitudinal range, its decline in Ecuador might be related to the impacts of climate change.

Conservation Measures It occurs in the Reserva Ecológica Cayambe-Coca in Ecuador.

Bibliography: Duellman, W.E. and Schulte, R. (1993), Lynch, J.D. and Duellman, W.E. (1973), Rodríguez, L.O., Cordova, J.H. and Icochea, J. (1993), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a)

Data Providers: Luis A. Coloma, Santiago Ron, Diego Cisneros-Heredia

VU *Cochranella susatamai* Ruiz-Carranza and Lynch, 1995**Vulnerable B1ab(iii)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

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Geographic Range This species is known from the departments of Tolima, Caldas and Antioquia, on the eastern flank of the Cordillera Central, in Colombia, between 400 and 1,650m asl. It is likely to occur a little more widely than these records suggest.

Population It is a common species.

Habitat and Ecology It occurs in sub-Andean forests on vegetation along streams. Eggs are laid on leaves overhanging water and when they hatch the tadpoles drop into the water below where they develop further. They require gallery forest to lay their eggs, and hence are sensitive to any habitat disturbance.

Major Threats The major threats are habitat fragmentation and loss, due to agricultural expansion (including planting of illegal crops) and timber extraction, and water pollution.

Conservation Measures The range of the species does not include any protected areas, and there is a need for improved habitat protection at sites where it is known to occur.

Bibliography: Acosta-Galvis, A.R. (2000), Ruiz-Carranza, P.M. and Lynch, J.D. (1995b), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Erik Wild, John Lynch

VU *Cochranella xanthocheridia* Ruiz-Carranza and Lynch, 1995**Vulnerable B1ab(iii)****Order, Family:** Anura, Centrolenidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

Geographic Range This species is known from the departments of Risaralda and Antioquia on the western flank of the Cordillera Occidental, in Colombia, between 800 and 2,060m asl.

Population It is a common species.

Habitat and Ecology It occurs on vegetation next to streams in sub-Andean forests. It lays its eggs on the top of leaves and when hatched the tadpoles drop into the water below where they develop further. It has not been recorded outside forest habitat.

Major Threats The major threats are habitat fragmentation and loss, due to agricultural expansion (including planting of illegal crops) and timber extraction, and water pollution.

Conservation Measures The range of the species includes Parque Nacional Natural Orquideas.

Bibliography: Acosta-Galvis, A.R. (2000), Ruiz-Carranza, P.M. and Lynch, J.D. (1995a)

Data Providers: Fernando Castro, John Lynch

VU *Hyalinobatrachium antisthenesi* (Goin, 1963)**Vulnerable B1ab(iii)**

Order, Family: Anura, Centrolenidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



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Geographic Range This species is known from the northern versants of the Venezuelan Coastal Range, in the central region, and from the Cerro Azul, in Cojedes State, in the Serranía del interior. It has an altitudinal range between 220 and 1,200m asl.

Population The current population status of this species is not known.

Habitat and Ecology It occurs in cloud forests and gallery forests. It lays its eggs on either side of leaves overhanging streams, and when hatched the larvae fall into the stream below where they develop further.

Major Threats Threats to this species are unknown, but the main threat is likely to be habitat loss due to smallholder farming activities, logging, burning, and human settlements. The Venezuelan Coastal Range is a highly modified habitat.

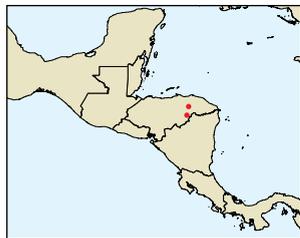
Conservation Measures Some populations are within the Parque Nacional Henri Pittier and Rancho Grande in Aragua State. Further survey work is needed to determine the population status of this species.

Bibliography: Barrio Amorós, C.L. (2004), Goin, C.J. (1963), La Marca, E. (1992), La Marca, E. (1997), Rivero, J.A. (1968a), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a)

Data Providers: Enrique La Marca, Jesús Manzanilla, Celsa Señaris

EN *Hyalinobatrachium cardiocalyptum* McCranie and Wilson, 1997**Endangered B1ab(iii,v)+2ab(iii,v)**

Order, Family: Anura, Centrolenidae
Country Distribution: Honduras
Current Population Trend: Decreasing



Geographic Range This species is found in west-central Honduras along the middle portion of the Río Patuca, western Olancho and Quebrada Las Marias near La Colonia, north-western Olancho, at elevations of 100-700m asl.

Population It is moderately common but the population is decreasing.

Habitat and Ecology It occurs and breeds along streams in lowland moist forest and premontane wet forest.

Major Threats The main threats to the species are deforestation, forest fires, and water pollution. In addition, much of its range is threatened by the development of the Patuca 2 hydroelectric project.

Conservation Measures It occurs in Parque Nacional Río Patuca, and it has been collected at the edge of the Río Platano and the Asang Launa Tawahka Biosphere Reserves.

Notes on taxonomy: This species was reported from the Reserva de la Biosfera Río Platano as *Centrolenella fleischmanni* by Cruz (1978).

Bibliography: Cruz Diaz, G.A. (1978), McCranie, J.R. and Wilson, L.D. (1997b), McCranie, J.R. and Wilson, L.D. (2002b)

Data Providers: Gustavo Cruz, Larry David Wilson

CR *Hyalinobatrachium crybetes* McCranie and Wilson, 1997**Critically Endangered B1ab(iii)+2ab(iii)**

Order, Family: Anura, Centrolenidae
Country Distribution: Honduras
Current Population Trend: Decreasing



Geographic Range This species is known only from the vicinity of Catacamas, Olancho department, east-central Honduras, at an elevation of 500-680m asl.

Population It is rare and is known only from a small section of a disturbed stream margin. It has not been seen since the first specimen was collected in 1967. McCranie and Wilson (1997b), collecting at the same locality, did not find this species.

Habitat and Ecology It was collected in vegetation along a small stream, in lowland moist forest. It presumably lays eggs in vegetation overhanging streams.

Major Threats Habitat loss due to agriculture, logging, and human settlement is the major threat to this species.

Conservation Measures It is not known to occur in any protected areas. Further survey work is required to determine whether or not this species is still extant in the wild.

Bibliography: McCranie, J.R. and Wilson, L.D. (1997b), McCranie, J.R. and Wilson, L.D. (2002b)

Data Providers: Gustavo Cruz, Larry David Wilson

EN *Hyalinobatrachium esmeralda* Ruiz-Carranza and Lynch, 1998**Endangered B1ab(iii)**

Order, Family: Anura, Centrolenidae
Country Distribution: Colombia
Current Population Trend: Decreasing



Geographic Range This species is known from two sites 50km apart, in Municipio Pajarito and Municipio Garagoa, in Boyacá Department, on the Cordillera Oriental of the Colombian Andes, between 1,600 and 1,750m asl, though it might occur more widely.

Population It is a common species.

Habitat and Ecology It occurs on vegetation near streams in cloud forest; the eggs are laid on the vegetation, and the larvae develop in the water. It also occurs in secondary forest.

Major Threats The main threat to this species is habitat loss caused by the expansion of cattle ranching and the planting of illegal crops. Pollution, resulting from the fumigation of illegal crops, is also a threat.

Conservation Measures It does not occur in any protected areas, making habitat protection a much-needed conservation action for this species.

Bibliography: Barrera-Rodriguez, M. (2000), Ruiz-Carranza, P.M. and Lynch, J.D. (1998)

Data Providers: Jose Vicente Rueda, Andrés Acosta-Galvis

VU *Hyalinobatrachium fragile* (Rivero, 1985)

Vulnerable B1ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



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Geographic Range This species is known from several localities in the Cordillera de la Costa, including La Sierra in Cojedes State, and Sierra de Aroa in Yaracuy State, in Venezuela. It has been recorded from 100-700m asl.

Population It is probably an uncommon species.

Habitat and Ecology It inhabits montane forest environments, where it occurs along streams. It lays its eggs on the under side of leaves overhanging streams, and when hatched the larvae fall into the stream below where they develop further.

Major Threats The major threat to this species is habitat loss due to agriculture (both crops and livestock), as well as logging. Avalanches are a potential threat along the coast, especially during heavy rainfall periods.

Conservation Measures It is present in several protected areas, including Parque Nacional Henri Pittier and Rancho Grande.

Notes on taxonomy: In the past, some specimens of this species were considered to be *Hyalinobatrachium fleishmanni*.

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1992), La Marca, E. (1997), Myers, C.W. and Donnelly, M.A. (1997), Rivero, J.A. (1985), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a)

Data Providers: Enrique La Marca, Celsa Señaris

EN *Hyalinobatrachium guairarepanensis* Señaris, 2001

Endangered B1ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



Geographic Range This species is known from the central part of the Venezuelan coastal mountain range on the Cordillera de la Costa, at elevations between 720 and 1,000m asl.

Population The population of this species is in decline, even in pristine habitats. It is associated with *Atelopus cruciger*, which has disappeared from almost all of its range, probably because of chytridiomycosis.

Habitat and Ecology It occurs along streams in seasonal (semi-caducifolious) forests. It lays its eggs on leaves overhanging streams, and when hatched the larvae fall into the stream below where they develop further.

Major Threats Agriculture, logging, water pollution, and infrastructure development for human settlement are all major threats to the species' habitat. However, it is declining even in pristine habitats, suggesting that chytridiomycosis, or some other disease, may be playing a role in the observed declines.

Conservation Measures Its range includes Parque Nacional El Avila and Parque Nacional Macarao. Further research is required to determine the reasons for its decline in pristine habitat. If disease is shown to be a major threat, then surviving individuals may need to form the basis for the establishment of an ex-situ population.

Bibliography: Barrio Amorós, C.L. (2004), Rivero, J.A. (1961), Rivero, J.A. (1968a), Señaris, J.C. (2001)

Data Providers: Enrique La Marca, Celsa Señaris

VU *Hyalinobatrachium ibama* Ruiz-Carranza and Lynch, 1998

Vulnerable B1ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species occurs on the western slopes of the Cordillera Oriental in Norte de Santander and Santander Departments, Colombia, between 1,600 and 2,050m asl. It probably occurs a little more widely than current records suggest.

Population It is common, and there are many recent records.

Habitat and Ecology It occurs in riparian habitats in old-growth forests. It lays its eggs on vegetation, and the tadpoles develop in streams.

Major Threats Habitat loss caused by agricultural expansion (cattle ranching, planting of illegal crops, and especially onion farming) is the main threat to this species. Pollution, resulting from the fumigation of illegal crops, is also a threat.

Conservation Measures It occurs in Santuario de Fauna y Flora Guanentá, Alto Río Fonce and Area Natural Unica Los Estoraques.

Bibliography: Ruiz-Carranza, P.M. and Lynch, J.D. (1991b), Ruiz-Carranza, P.M. and Lynch, J.D. (1998)

Data Providers: Jose Vicente Rueda, Mariela Osorno-Muñoz

VU *Hyalinobatrachium orientale* (Rivero, 1968)

Vulnerable B1ab(iii)
Order, Family: Anura, Centrolenidae
Country Distribution: Trinidad and Tobago, Venezuela
Current Population Trend: Decreasing



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Geographic Range The nominate subspecies is known only from the eastern sector of the Venezuelan Coastal Range, with records from Serranía del Interior, Macizo de Turimiquire, and Serranía de Paria in the states of Monagas and Sucre, at elevations of 190-1,200m asl. The subspecies *H. o. tobagoensis* is recorded from north-eastern Tobago in Trinidad and Tobago. Reports from Colombia are incorrect.

Population It is a common species across its range.

Habitat and Ecology A nocturnal species that lives on *Heliconia* vegetation overhanging cascading streams about 2-6m above the water in tropical rainforest. The eggs are laid on the underside of leaves, and the larvae develop in the water. It has been found only in mature, closed-canopy forest.

Major Threats In Venezuela, although some of its habitat is within protected areas, other areas are being lost due to human settlement and agricultural expansion. There are no known threats to the species in Tobago.

Conservation Measures It occurs in the Parque Nacional Peninsula de Paria in Venezuela. The rainforest in which this species occurs in Tobago is protected in the Little Tobago Wildlife Sanctuary. Taxonomic work is required to investigate whether or not populations of this species from Tobago represent a distinct species.

Notes on taxonomy: It is possible that two species might be included in *Hyalinobatrachium orientale* in Venezuela, one being the species from the type locality, and the other an undescribed form from Macizo del Turimiquire. Animals on Tobago might also belong to a different species.

Bibliography: Barrio Amorós, C.L. (2004), Cannatella, D.C. and Lamar, W.W. (1986), Duellman, W.E. (1977), Hardy, Jr, J.D. (1982), Hardy, Jr, J.D. (1984), La Marca, E. (1992), La Marca, E. (1995b), La Marca, E. (1997), Murphy, J.C. (1997), Myers, C.W. and Donnelly, M.A. (1997), Rivero, J.A. (1968a), Rivero, J.A. (1985), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Celsa Señaris, Enrique La Marca, Jerry Hardy

EN *Hyalinobatrachium pallidum* (Rivero, 1985)**Endangered B1ab(iii)**

Order, Family: Anura, Centrolenidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



Geographic Range This species is known from Guacharaquita, in the state of Táchira, in the Venezuelan Andes at 1,768m asl, and from Mundo Nuevo, in the state of Cojedes, at 396m asl.

Population It is not a common species.

Habitat and Ecology It occurs in evergreen dry forest in the Andes, and humid forests in the southern central part of the Venezuelan coastal mountain range. Eggs are laid on the underside of leaves in humid forest near streams, into which the larvae then fall to complete their development.

Major Threats The habitat of the Andean populations has suffered from intensive exploitation and degradation in the past, and these populations are now almost extirpated.

Conservation Measures The range of this species does not include any protected areas. Surveys are needed to determine the current population status of the Andean population.

Bibliography: Barrio Amorós, C.L. (2004), Duellman, W.E. (1999), La Marca,

E. (1992), La Marca, E. (1997), Mijares-Urrutia, A. (1990), Myers, C.W. and Donnelly, M.A. (1997), Rivero, J.A. (1985), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a)

Data Providers: Enrique La Marca, Jesús Manzanilla

EN *Hyalinobatrachium pellucidum* (Lynch and Duellman, 1973)**Endangered B1ab(iii)+2ab(iii)**

Order, Family: Anura, Centrolenidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



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Geographic Range This species is known from three localities: Río Azuela, Río Reventador and Río Salado, all in Napo Province on the Amazonian slopes of the Ecuadorian Andes, at 1,740m asl.

Population It was last recorded in 1979, when five specimens were collected from one site. The Río Azuela site has been revisited several times without locating any individuals.

Habitat and Ecology It lives in cloud forest. The holotype was found on the leaf of a herb over a small stream at night (Lynch and Duellman 1973). Reproduction is presumed to occur via eggs laid on vegetation, with the larvae developing in streams.

Major Threats Habitat destruction and degradation is the main threat to this species, primarily due to smallholder farming and logging. At this stage it is not clear whether or not this species might have declined within pristine habitats.

Conservation Measures It is not known to occur in any protected areas, and protection of remaining cloud forest habitats is sorely needed. Further survey work is necessary to determine the current population status of this species.

Bibliography: Lynch, J.D. and Duellman, W.E. (1973), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a)

Data Providers: Luis A. Coloma, Santiago Ron, Diego Cisneros-Heredia

VU *Hyalinobatrachium revocatum* (Rivero, 1985)**Vulnerable B1ab(iii)**

Order, Family: Anura, Centrolenidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



Geographic Range This species is known from the southern slopes of the central part of Cordillera de la Costa, and Serranía del Interior, in the Venezuelan coastal range, at elevations between 1,200 and 1,800m asl.

Population It is a common frog in undisturbed habitats.

Habitat and Ecology It occurs along streams, and is usually found on overhanging vegetation up to 2m above the stream. The eggs are laid on the upper and under sides of leaves, and when hatched the larvae fall into the stream below where they develop further.

Major Threats The major threat is habitat loss, due to agriculture (both crops and livestock), logging, and infrastructure development for human settlement. Agricultural pollution is also having an impact on populations.

Conservation Measures Some populations lie within the El Avila, Macarao and Henri Pittier and Rancho Grande National Parks.

Bibliography: Barrio Amorós, C.L. (2004), Duellman, W.E. (1993), La Marca, E. (1997), Rivero, J.A. (1961), Rivero, J.A. (1968a), Rivero, J.A. (1985), Ruiz-Carranza, P.M. and Lynch, J.D. (1991a)

Data Providers: Enrique La Marca, Celsa Señaris

DENDROBATIDAE**CR** *Aromobates nocturnus* Myers, Paolillo and Daly, 1991**Critically Endangered A2a; B2ab(v)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



Geographic Range This species is known only from the type locality: about 2km ESE by air from Agua de Obispo, in the state of Trujillo, Venezuela, at 2,250m asl (9.42°N, 70.05°W).

Population It is a very rare species that appears to have declined. Several attempts to find it in recent years have failed, and it is still known only from the time it was first described.

Habitat and Ecology It occurs in small cold-water streams in cloud forest. The eggs are laid on land and the male protects the eggs. When hatched the male carries the larvae on his back to water where they develop further.

Major Threats Habitat loss and degradation due to agriculture (both crops and livestock) and road construction, is the major threat to the species. The locality is near the headwaters of a stream and thus could have been affected by a drought in the past. The species could also potentially be affected by disease, such as chytridiomycosis.

Conservation Measures There is a population within the Parque

Nacional Dinira. Surveys are urgently needed to determine the population status of this species.

Bibliography: Barrio Amorós, C.L. (2001), Barrio Amorós, C.L. (2004), La Marca, E. (1992), La Marca, E. (1996b), Myers, C.W., Paolillo, A. and Daly, J.W. (1991)

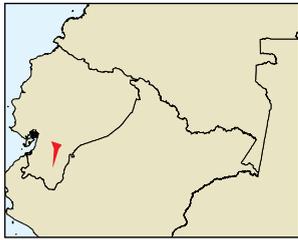
Data Providers: Enrique La Marca, Juan Elías García-Pérez

SKUNK FROG

CR *Colostethus anthracinus* Edwards, 1971

Critically Endangered A2ac

Order, Family: Anura, Dendrobatidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



Geographic Range This species occurs in a narrow altitudinal zone (2,710-3,500m asl) on the Cordillera Oriental (Cordillera Real or Central), and the Mazán River in southern Ecuador. There are records from six localities.

Population The most recent record of this species is from December 1991. An extensive search in Mazán in 1995 (where the species was abundant in 1986) turned up no individuals. It appears to have undergone a serious decline.

Habitat and Ecology It lives in páramo, very humid montane forest, and lower humid montane forest (Coloma 1995). Reproduction probably occurs by the females laying eggs on the ground, and the males bringing the tadpoles to streams for development.

Major Threats The primary threat to this species is habitat loss and degradation due to agriculture, and logging. The possible disappearance of the species could be related to chytridiomycosis.

Conservation Measures The range of this species overlaps Parque Nacional Cajas and its southern limit is adjacent to the northern limit of Parque Nacional Podocarpus. Surveys are urgently needed to establish the population status of this species.

Bibliography: Coloma, L.A. (1995), Edwards, S.R. (1971)

Data Providers: Luis A. Coloma, Santiago Ron, Taran Grant, Manuel Morales

VU *Colostethus awa* Coloma, 1995

Vulnerable B1ab(iii)

Order, Family: Anura, Dendrobatidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



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Geographic Range This species is known from the western Andean slopes and in the western Pacific lowlands of north-western Ecuador. It occurs from 265-1,220m asl.

Population It is not uncommon.

Habitat and Ecology It inhabits humid sub-montane tropical forest, and lays its eggs outside water on leaf-litter or low vegetation. The adults then carry the tadpoles on their back to nearby streams where they develop further.

Major Threats The major threats are habitat loss due to agriculture (both crops and livestock) and logging, and agricultural pollution.

Conservation Measures Its range overlaps Reserva Ecológica Cotacachi-Cayapas, and slightly overlaps Reserva Ecológica Mache-Chindul and Reserva Ecológica Los Illinizas.

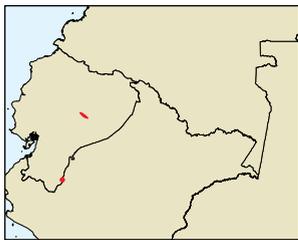
Bibliography: Coloma, L.A. (1995), Morales, M. *et al.* (2002), Parker III, T.A. and Carr, J.L. (1992)

Data Providers: Luis A. Coloma, Santiago Ron, Mario Yáñez-Muñoz, Diego Cisneros-Heredia, Ana Almandáriz

EN *Colostethus cevallosi* Rivero, 1991

Endangered B1ab(iii)

Order, Family: Anura, Dendrobatidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



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Geographic Range This species is known from the eastern side of the Andes, in Ecuador, in two general areas: four localities between 480 and 970m asl in Pastaza Province in central Ecuador, and Centro Shuar Yawi, at 920-1,040m asl, in Zamora Chinchipe Province in south-eastern Ecuador. Records from Peru require confirmation.

Population It was discovered in Zamora Chinchipe Province in 2003. However, surveys in Pastaza Province have not turned up any additional records of this species since it was first discovered.

Habitat and Ecology It occurs in eastern Cordillera Real montane forests and napo moist forests. The distribution lies mainly within very humid premontane forest and pluvial premontane forest. As with other members of the genus, it probably breeds on the ground, under rocks or in leaf-litter, and the larvae are carried by the parent to streams. Most members of this genus do not adapt well to anthropogenic disturbance.

Major Threats The main threat to the species is habitat loss and degradation due to agriculture, involving both crops and livestock, as well as logging and infrastructure development for human settlement.

Conservation Measures It is not known to occur in any protected areas, and some form of formal habitat protection is urgently needed. Further survey work is necessary to determine the status of the subpopulation in Pastaza Province.

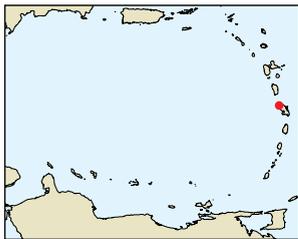
Bibliography: Almandariz, A. (1991), Coloma, L.A. (1995), Rivero, J.A. (1991)

Data Providers: Luis A. Coloma, Diego Almeida, Fernando Nogales, Ana Almandáriz, Diego Cisneros-Heredia, Karl-Heinz Jungfer, Santiago Ron

VU *Colostethus chalcopis* Kaiser, Coloma and Gray, 1994

Vulnerable D2

Order, Family: Anura, Dendrobatidae
Country Distribution: Martinique
Current Population Trend: Stable



Geographic Range This species is found on the south-eastern slope of Montagne Pelee, Martinique, at 500m asl.

Population It is relatively common in its tiny range.

Habitat and Ecology It lives in grassy areas on lava flows. Eggs are laid on the ground in a nest under leaves and guarded by the adults, and presumably the adults transport the larvae to water, as with other members of the genus.

Major Threats Although there are no current major threats to the species, its small range render it at severe risk of stochastic events, especially from volcanic eruptions.

Conservation Measures It does not occur in any protected areas, and there is a need for improved protection of the Montagne Pelee. The species requires close population monitoring, given that it is restricted to a single location.

Notes on taxonomy: It has been suggested that this species is not native to Martinique, but is synonymous with another species from South America (M. Breuil pers. comm.).

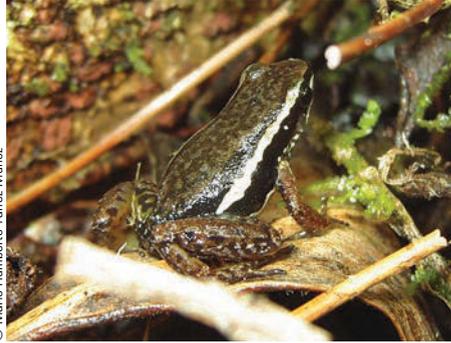
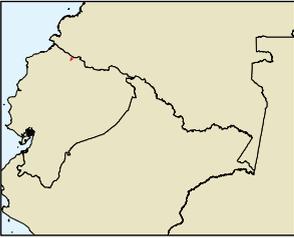
Bibliography: Breuil, M. (2004), Hedges, S.B. (1999), Hedges, S.B. (2001), Henderson, R.W. and Powell, R. (1999), Henderson, R.W. and Powell, R. (2001), Kaiser, H. and Altig, R. (1994), Kaiser, H. and Henderson, R.W. (1994), Kaiser, H., Coloma, L.A. and Gray, H.M. (1994), Schwartz, A. and Henderson, R.W. (1991)

Data Providers: Blair Hedges, Beatrice Ibéné, Michel Breuil, Robert Powell

MARTINIQUE VOLCANO FROG

CR *Colostethus delatorreae* Coloma, 1995

Critically Endangered B2ab(iii,iv,v) C2a(ii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



© Mario Humberto Yáñez-Muñoz

Geographic Range This species is known only from three nearby localities at elevations of 2,340-2,700m on the western slopes of the Andes in Carchi Province, in extreme north-western Ecuador.

Population It is locally uncommon. Fifty calling males were recorded in 2003 in Moran, Carchi Province. However, it appears to have disappeared at all other localities.

Habitat and Ecology It occurs in wetlands and bogs, and in areas of cattle ranching surrounded by forest remnants. It lays its eggs on the ground, and the males carry the tadpoles to water where they develop further.

Major Threats Habitat destruction and degradation is a significant threat to this species, due mainly to agriculture (including livestock ranching) and logging. It is possible that this species has been impacted by chytridiomycosis, which has been confirmed in other frog species within its range.

Conservation Measures The species is not known to occur in any protected areas, and there is a need for urgent habitat protection at sites at which it is known to survive.

Bibliography: Coloma, L.A. (1995)

Data Providers: Luis A. Coloma, Santiago Ron, Mario Yáñez-Muñoz

CR *Colostethus dunni* (Rivero, 1961)

Critically Endangered A2ace
Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



Geographic Range This species is known from the central part of the Venezuelan Coastal Range, in the vicinity of Caracas, from around 800 to at least 1,520m asl. Its presence has been suggested, but not confirmed, in Quebrada de Caurimare, Miranda State, also in the vicinity of Caracas.

Population This species was once considered one of the more common species of the Caracas Valley; however, comprehensive surveys in 1992-1993 and, more recently, in 2004 have failed to find any populations in these areas. It is not known when exactly the decline began, but the decline of *Atelopus cruciger*, another formerly common frog from the same region, has been documented. It is possible that *Colostethus dunni* has experienced a similar decline. There are no known extant populations in the wild at present, even in suitable habitat.

Habitat and Ecology It inhabits seasonal montane forests. Its breeding habits are unknown, although the larvae are likely to

develop in water, like other species of the genus.

Major Threats The major threats to the species include habitat loss due to urban development and fires, and pollution. The cause(s) of the recent dramatic decline have not been established, but it is characteristic of declines seen in other species impacted by chytridiomycosis.

Conservation Measures Some populations might be protected in Parque Nacional El Ávila, near Caracas. Research into the cause(s) of the population decline is urgently needed, as are surveys to determine the current status of populations.

Bibliography: Barrio Amorós, C.L. (2004), Barrio, C. (1998), La Marca, E. (1992), La Marca, E. (1997), La Marca, E. (2004), Rivero, J.A. (1961)

Data Providers: Enrique La Marca, Jesús Manzanilla, Celsa Señaris

CR *Colostethus edwardsi* Lynch, 1982

Critically Endangered A2ac; B1ab(iii,iv,v)+2ab(iii,iv,v)
Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species is known from two localities in the Cordillera Oriental, La Cueva de las Moyas and the Páramo de Cruz Verde, Cundinamarca Department, Colombia, between 3,030 and 3,300m asl.

Population It was last seen in 1996. Three visits to the type locality have failed to turn up this species, and it is likely that it has declined severely due to complete habitat alteration.

Habitat and Ecology It occurs in streams within caves and crevices. Breeding and larval development takes place in streams.

Major Threats It is threatened by habitat loss due to conversion to timber forestry and water pollution caused by urban runoff.

Conservation Measures The species is not known to occur in any protected areas. Surveys are needed to determine the current population status of the species.

Bibliography: Lynch, J.D. (1982b), Rivero, J.A. (1988), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Jose Vicente Rueda

EN *Colostethus elachyhistus* Edwards, 1971

Endangered A2ac; B2ab(iii,iv,v)
Order, Family: Anura, Dendrobatidae
Country Distribution: Ecuador, Peru
Current Population Trend: Decreasing



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Geographic Range This species occurs on the western slopes of the Andes in southern Ecuador, at elevations of 850-2,760m asl. It also occurs on the Pacific and Amazonian slopes of the Andes in the Huancabamba depression, Piura Department, northern Peru, at 600-1,800m asl.

Population It is an uncommon species. In Ecuador, populations from Loja and nearby localities at the higher altitudes of its range seem to be extinct, but lowland populations are still extant with records as recently as 2003.

Habitat and Ecology It lives in dry and humid lowland and premontane forest, and occurs near streams, especially in dry forests. The larvae presumably develop in streams.

Major Threats The cause of the declines at high elevations, which have taken place even in suitable habitat, could be due to chytridiomycosis. Habitat destruction and degradation, in particular due to agricultural activities, is also a threat to this species, and the species may also be impacted by invasive alien species and pollution.

Conservation Measures It does not occur in any protected areas, and some form of formal habitat protection is urgently needed. Further survey work is needed to determine whether any animals survive around Loja and other nearby localities.

Bibliography: Coloma, L.A. (1995), Duellman, W.E. and Wild, E.R. (1993), Edwards, S.R. (1971), Rodríguez, L.O., Cordova, J.H. and Icochea, J. (1993)

Data Providers: Javier Icochea, Luis A. Coloma, Santiago Ron

VU *Colostethus humilis* Rivero, 1978**Vulnerable D2**

Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Stable



Geographic Range This species is known from the type locality, in the vicinity of the town of Boconó, in Trujillo State, Venezuela, at an altitude of 1,470m asl, and from a recently discovered population found inside the Parque Nacional Guaramacal, also close to Boconó. It is also now known from the states of Barinas and Portuguesa. It has been recorded from 600-1,800m asl.

Population It is locally common.

Habitat and Ecology It occurs in seasonal montane forest, and cloud forests. It is associated with temporary ponds, where the larvae presumably develop, but exact reproductive habits are unknown. It is probably able to tolerate minor habitat disturbance.

Major Threats Human settlement, and associated infrastructure development, is a threat to some populations. The lagoon at the type locality has already disappeared. It might also be affected by drought.

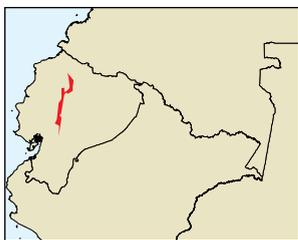
Conservation Measures One population is within Parque Nacional Guaramacal (at the limit of the range).

Bibliography: Barrio Amorós, C.L. (2004), Barrio-Amorós, C.L. and García-Porta, J. (2003), García-Pérez, J.E. (1999), La Marca, E. (1992), La Marca, E., Vences, M. and Lötters, S. (2002), Péfaur, J.E. and Rivero, J.A. (2000), Rivero, J.A. (1978), Vial, J.L. and Saylor, L. (1993)

Data Providers: Enrique La Marca, Juan Elías García-Pérez, César Luis Barrio Amorós

CR *Colostethus jacobuspetersi* Rivero, 1991**Critically Endangered B2ab(i,ii,iii,iv,v)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



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Geographic Range This species was known from the inter-Andean valleys of Guayllabamba, Toachi, Chimbo, and Cañar, and on the western slopes of the Andes in northern and central Ecuador, where it occupied areas between 1,500 and 3,800m and was known from more than ten localities.

Population There are no records of this species since the 1960s. Bustamante (2002) provides data of its absence at Bosque Protector Cashca Totoras (Provincia Bolívar), where it used to be a common frog. It is possible that undetected relict populations might still survive.

Habitat and Ecology It lives in mid- to high-elevation humid montane forest (Coloma 1995). It lays its eggs on the ground, and males carry the eggs to small streams for development.

Major Threats The primary threat to this species is habitat destruction and degradation due to agriculture, clear cutting, and human settlement; virtually no habitat remains where this species used to occur. Invasive alien species are also a threat.

Conservation Measures The distribution range of the species overlaps Reserva Ecológica Los Illinizas, Reserva Geobotánica Pululahua, and Reserva de Producción Faunística Chimborazo. Surveys are urgently required to determine the population status and continued persistence of this species.

Bibliography: Bustamante, M. R. (2002), Coloma, L.A. (1995), Rivero, J.A. (1991)

Data Providers: Luis A. Coloma, Santiago Ron

CR *Colostethus juanii* Morales, 1994**Critically Endangered B2ab(i,iii)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia
Current Population Trend: Decreasing



© John D. Lynch



Geographic Range This species is known only from the area of the type locality, Villavicencio, in the foothills of the Orinoco region, Meta Department, Colombia, at 580m asl, where it occurs in a single botanical garden surrounded by a substantial urban area.

Population It is scarcely distributed in its tiny area of occupancy. There are few specimens known, and it was last seen in 2002. Searches in outlying areas have not turned up any individuals.

Habitat and Ecology It is known from small patches of forest and from a botanical garden; it has not been found in larger tracts of forest in nearby areas. It is a terrestrial and diurnal species, and it lays its eggs in the leaf-litter. The males probably take care of the eggs and then move the larvae to small streams for development.

Major Threats Habitat fragmentation and destruction caused by the expansion of human settlement, and water pollution, are the primary threats to this species.

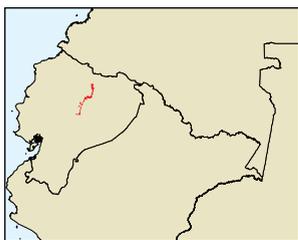
Conservation Measures This species is not recorded from any protected areas, and there is an urgent need for protection of its remaining habitat. Further survey work is needed to determine the current population status of this species.

Bibliography: Morales, V.R. (1994)

Data Providers: Andrés Acosta-Galvis, Jose Vicente Rueda

EN *Colostethus kingsburyi* (Boulenger, 1918)**Endangered B1ab(iii)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



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Geographic Range This species is known from a narrow altitudinal zone (1,140-1,300m asl) on the eastern slopes of the Andes in the vicinity of Volcán Reventador and in the Río Pastaza trench, in Napo, Orellana and Pastaza Provinces, Ecuador.

Population It was formally abundant, at least judging by the large numbers of specimens in museums, but there is little recent information.

Habitat and Ecology It occurs in premontane forest, where the annual mean precipitation is 2,000-4,000mm and the annual mean temperature is 18-24°C. Reproduction probably occurs by the females laying the eggs on the ground, with the males taking the larvae to streams for their development.

Major Threats Habitat destruction and degradation, mainly due to agricultural expansion (involving crops, plantations and livestock) and logging, is the main threat to this species. Its narrow altitudinal range might leave it vulnerable to the effects of climate change.

Conservation Measures Its distribution range overlaps with several protected areas, including Parque Nacional Sumaco Napo-Galeras, Parque Nacional Llanganatis, the Reserva Ecológica Antisana, and the Reserva Ecológica Cayambe-Coca. This species is in need of close population monitoring.

Notes on taxonomy: Molecular data suggest that *Colostethus kingsburyi* is a species complex (L.A. Coloma pers. comm.).

Bibliography: Andersson, L.G. (1945), Boulenger, G.A. (1918), Coloma, L.A. (1995), Edwards, S.R. (1974b), Edwards, S.R. (1985)

Data Providers: Luis A. Coloma, Santiago Ron, Manuel Morales

CR *Colostethus leopardalis* Rivero, 1978**Critically Endangered A2ace; B2ab(v)****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Venezuela**Current Population Trend:** Decreasing

Geographic Range This species is known only from a very restricted area near Páramo de Mucubají, Sierra de Santo Domingo, in estado Mérida, in the Venezuelan Andes, from 2,435-3,300m asl.

Population It has not been seen in at least a decade, and its range is very much reduced.

Habitat and Ecology It inhabits páramo grassland and sub-páramo shrubland environments and cloud forest, the highest environments in the Venezuelan Andes, resembling alpine tundra, but with daily temperature extremes. It is usually found within grasses and frailejones (*Espeletia* spp.), usually along and within streams.

Major Threats Introduced trout and possibly disease might be threatening this species. This species shares its habitat with *Atelopus mucubajiensis*, a páramo frog well known for having experienced a dramatic population decline (La Marca and Reinhaller 1994; Lotters 1996; La Marca and Lotters 1997) probably due to chytridiomycosis, and so this disease must also be suspected in *C. leopardalis*.

Conservation Measures There is a population within Parque Nacional Sierra Nevada (Mérida State), in the Venezuelan Andes. Surveys are required to determine the population status of this species. Given the potential risk of disease, there might be a need for the establishment of a captive-breeding programme.

Notes on taxonomy: We follow La Marca (1994a) in assigning this species to the genus *Colostethus*, not *Nephelobates*.

Bibliography: Barrio Amorós, C.L. (2001), Barrio Amorós, C.L. (2004), La Marca, E. (1994a), La Marca, E. and Lötters, S. (1997), La Marca, E. and Reinhaller, H.P. (1991), Lötters, S. (1996), Mijares-Urrutia, A. (1991), Péfaur, J.E. and Rivero, J.A. (2000), Rivero, J.A. (1976), Vial, J.L. and Saylor, L. (1993)

Data Providers: Enrique La Marca, Juan Elías García-Pérez

EN *Colostethus mandelorum* (Schmidt, 1932)**Endangered B1ab(iii)****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Venezuela**Current Population Trend:** Decreasing

Geographic Range This species is restricted to the Cerro Turimiquire, a mountainous region shared between Monagas, Sucre, and Anzoátegui States, in eastern Venezuela. It has been recorded from 1,900-2,630m asl.

Population It is a common species.

Habitat and Ecology It inhabits cloud forest and sub-páramo shrubland. The eggs are laid on land and when hatched the male carries the larvae on his back to water, where they develop further.

Major Threats The main threat is habitat loss due to agriculture, involving both crops and livestock, as well as road construction for telecommunications installations.

Conservation Measures Its range includes a protected area for a dam project (Zona Protectora Macizo Turimiquire), but the habitat of this species is in need of much better protection.

Bibliography: Barrio Amorós, C.L. (2004), Hardy, J.D. (1984), La Marca, E. (1993), La Marca, E. (1997), Péfaur, J.E. and Rivero, J.A. (2000), Rivero, J.A. (1961), Rivero, J.A. (1982b), Vial, J.L. and Saylor, L. (1993)

Data Providers: Enrique La Marca, Jesús Manzanilla

EN *Colostethus mertensi* (Cochran and Goin, 1964)**Endangered B1ab(iii)****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing

Geographic Range This species is known from Cerro Munchique, and Quintana (near Popayan in Cauca Department), between 2,100 and 2,350m asl, in Colombia.

Population It is a common species.

Habitat and Ecology It occurs on the ground next to streams in cloud forests. It lays its eggs on the ground, which (when hatched), are transported on the backs of the male to temporary ponds where they develop further. It has not been recorded outside forest habitat.

Major Threats The major threats are deforestation for agricultural development, the planting of illegal crops, logging, and human settlement.

Conservation Measures The range of the species includes Parque Nacional Natural Munchique.

Bibliography: Cochran, D.M. and Goin, C.J. (1964), Cochran, D.M. and Goin, C.J. (1970), Rivero, J.A. (1988), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: John Lynch, Fernando Castro

VU *Colostethus murisipanensis* La Marca, 1997**Vulnerable D2****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Venezuela**Current Population Trend:** Stable

Geographic Range This species is known only from the type locality, stated to be "Murisipan-Tepui (05 53N, 62 04W)", in the state of Bolívar, Venezuela, at 2,350m asl.

Population It is known from only one specimen.

Habitat and Ecology The single specimen was collected under a rock in tropical montane forest. Breeding habits are unknown, although the larvae probably develop in streams.

Major Threats There are no current major threats, but fires, caused by lightning, are a potential threat.

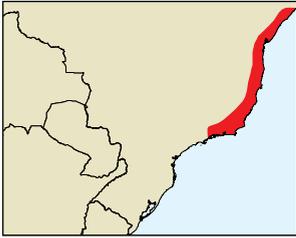
Conservation Measures Its range does not include any protected areas. There is a need for further survey work to determine the current population status of this species, and to monitor its status, given that it is known only from one site.

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1996b), La Marca, E. (1997)

Data Providers: Enrique La Marca, Celsa Señaris

VU *Colostethus offersioides* (A. Lutz, 1925)**Vulnerable A2ac**

Order, Family: Anura, Dendrobatidae
Country Distribution: Brazil
Current Population Trend: Decreasing



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Geographic Range This species is known from Rio de Janeiro State, northwards along the coast to Alagoas State, in south-eastern Brazil. It occurs up to about 400m asl.

Population It used to be a very common species, but it has recently declined and is now absent from several localities at which it was previously common.

Habitat and Ecology This diurnal species occurs in the leaf-litter of primary and secondary forest. It can also tolerate significant habitat disturbance and is found in gardens and plantations. They lay their eggs in temporary pools, and after they hatch they are carried on the backs of the adults to streams where they complete their development.

Major Threats Habitat loss, due to deforestation and agricultural development, is ongoing, but probably has not been severe enough to cause the declines that have been observed. Chytridiomycosis could be implicated, although the species occurs well below the elevation at which conditions are normally suitable for chytrid.

Conservation Measures It is known to occur in several protected areas, such as Parque Nacional da Serra da Bocaina. Research to determine the causes of the current decline is urgently needed.

Notes on taxonomy: *Colostethus carioca*, *C. capixaba* and *C. alagoanus* are probably synonyms of this species (V. Verdade pers. comm.).

Bibliography: Cochran, D.M. and Goin, C.J. (1970), Eterovick, P.C. *et al.* (2005), Izecksohn, E. and Carvalho-e-Silva, S.P. (2001), Lutz, B. (1954), Rivero, J.A. (1988), Verdade, V.K. (2001)

Data Providers: Sergio Potsch de Carvalho-e-Silva, Vanessa Verdade

VU *Colostethus pulchellus* (Jiménez de la Espada, 1871)**Vulnerable A2ace; B1ab(i,ii,iii, iv,v)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia, Ecuador
Current Population Trend: Decreasing



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Geographic Range This species occurs in the inter-Andean páramos of southern Colombia (in Nariño and Cauca Departments) and northern Ecuador (south to Cotapaxi Province), and on the eastern slopes of the Andes from southern Colombia south to the headwaters of the Río Pastaza in Ecuador. Its altitudinal range is 1,590-2,970m asl.

Population It has disappeared from sites where it used to be abundant in Ecuador, but is still common at Cosanga in Napo Province. It remains common in Colombia.

Habitat and Ecology An inhabitant of both dry and humid montane forests. It is a terrestrial species, and breeding takes place in streams. It can be found in secondary growth near streams, but not in open areas.

Major Threats The major threat to this species is habitat loss as a result of agricultural development (including the planting of illegal crops), logging, and human settlement; introduction of alien predatory fish in streams, and pollution resulting from the spraying of illegal crops, are additional threats. There is heavy deforestation as a result of wood extraction at Cosanga, where the species survives in Ecuador. The cause of declines observed in Ecuador is not clear, but could be due to habitat loss, climate change, and/or chytridiomycosis.

Conservation Measures In Ecuador, its geographic range overlaps with the Parque Nacional Sumaco Napo-Galeras, Reserva Ecológica Antisana, Parque Nacional Llanganates, and the Reserva Ecológica Cayambe-Coca. It occurs in several protected areas in Colombia. The species requires close population monitoring, especially in view of the potential risk of chytridiomycosis.

Notes on taxonomy: The populations from the Carchi basin might represent a distinct species (Coloma 1995).

Bibliography: Coloma, L.A. (1995), Jiménez de la Espada, M. (1875), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Wilmar Bolívar, Luis A. Coloma, Santiago Ron

EN *Colostethus ranoides* (Boulenger, 1918)**Endangered B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia
Current Population Trend: Decreasing



Geographic Range This species occurs north of Villavicencio, in the eastern foothills of the Andes, Meta Department, Colombia, at 450-800m asl.

Population It is rare, and was last seen in 2001, despite recent survey work in its range.

Habitat and Ecology It is a terrestrial, diurnal species that occurs in foothill forest and lays its eggs in leaf-litter. The males probably take care of the eggs, and then move the larvae to small streams for their continued development.

Major Threats Habitat loss caused by agricultural expansion is the main threat to this species, and oil extraction may pose a future threat. It is also threatened by the introduced bullfrog, *Rana catesbeiana*.

Conservation Measures Although it occurs in several small private reserves, ex situ populations should be established because the entire range of this species is nearly entirely deforested and

introduced bullfrogs could eliminate the species from remaining forest fragments. Further research and survey work is required to better understand its current population status and in order to advance appropriate conservation measures for this species.

Notes on taxonomy: This species was removed from the synonymy of *Colostethus brunneus* by Silverstone (1971).

Bibliography: Rivero, J.A. (1988), Rivero, J.A. and Serna, M.A. (1988), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996), Silverstone, P.A. (1971)

Data Providers: Andrés Acosta-Galvis, Jose Vicente Rueda, Fernando Castro

CR *Colostethus ruizi* Lynch, 1982**Critically Endangered B1ab(iii,v)+2ab(iii,v)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia
Current Population Trend: Decreasing



Geographic Range This species is known from Fusagasuga, between Alto de San Miguel and Aguadita, on the western flank of the eastern Andes, Cundinamarca Department, Colombia, between 2,410 and 2,469m asl.

Population It is rare, and is known from only six individuals. Its range has been completely deforested, except for one private tract of land 11ha in size. Four expeditions since 1995 have failed to turn up any individuals of this species.

Habitat and Ecology It lives on the forest floor and along streams in cloud forest; it is not found outside old-growth forest. Its breeding habits are not documented, but it is assumed that breeding and larval development take place in streams.

Major Threats Deforestation for the planting of crops and cattle grazing is the primary threat to this species.

Conservation Measures The species is not known to occur in any protected areas. Surveys are urgently needed to determine whether or not this species still persists in the wild.

Bibliography: Lynch, J.D. (1982b), Rivero, J.A. (1988), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Wilmar Bolívar, Jose Vicente Rueda

EN *Colostethus ruthveni* Kaplan, 1997**Endangered B1ab(iii)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia
Current Population Trend: Decreasing



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Geographic Range This species is known from the lower slopes of the north-western portion of the Sierra Nevada de Santa Marta, in Magdalena Department, Colombia. It occurs between 680 and 1,540m asl.

Population It is a common species.

Habitat and Ecology It occurs along streams in cloud forest and dry tropical forests near the Caribbean coast. The eggs are laid in bromeliads, and the larvae are then carried on the back of the adults to water where they develop further.

Major Threats The major threat is habitat loss and degradation due to agriculture, involving both crops and livestock, as well as logging, agricultural pollution, and infrastructure development.

Conservation Measures The species occurs in Parque Nacional Natural Sierra Nevada de Santa Marta and in the adjacent, recently established El Dorado Nature Reserve.

Bibliography: Kaplan, M. (1997)

Data Providers: John Lynch, Martha Patricia Ramírez Pinilla, Mariela Osorno-Muñoz, Jose Vicente Rueda, Adolfo Amézquita, María Cristina Ardila-Robayo

EN *Colostethus saltuensis* Rivero, 1978**Endangered B1ab(iii)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



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Geographic Range Until recently, this species was only known from the type locality at 830m asl, on the road from La Fria to Michelena, in Táchira State, Venezuela. However, another population was found close by at a slightly higher elevation (about 1,500m asl).

Population It is not a common species; some populations are still found along the Andean piedmont facing Lake Maracaibo.

Habitat and Ecology It occurs in humid lower montane Andean forests. The eggs are laid on land and the male protects the eggs until they hatch when he carries the larvae on his back to water, where they develop further.

Major Threats The main threat is habitat loss and degradation due to agriculture, involving both crops and livestock, as well as logging, water pollution, and infrastructure development for human settlement.

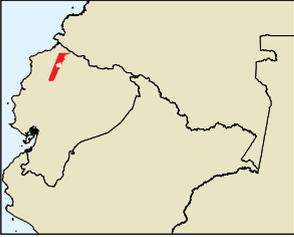
Conservation Measures It does not occur in any protected areas, and some form of formal protection is urgently required to conserve the habitat of this species.

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1992), La Marca, E. (1997), Rivero, J.A. (1978)

Data Providers: Enrique La Marca, Juan Elias García-Pérez

EN *Colostethus toachi* Coloma, 1995**Endangered B1ab(iii)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



© Mario Humberto Yáñez-Muñoz

Geographic Range This species is known from nine localities in north-western Ecuador, from elevations of 200-1,410m asl.

Population It is a locally common species.

Habitat and Ecology It occurs in humid tropical forest and very humid premontane forest (Coloma 1995), as well as lowland grasslands. It lays its eggs on land in leaf-litter or under rocks, and the larvae are then carried to water by the adults, where they develop further.

Major Threats The major threat is habitat loss and degradation due to agriculture, for both crops and livestock, as well as logging and agricultural pollution.

Conservation Measures Its range overlaps with the Reserva Ecológica Cotacachi-Cayapas.

Bibliography: Coloma, L.A. (1995), Morales, M. *et al.* (2002)

Data Providers: Diego Cisneros-Heredia, Ana Almandáriz, Mario Yáñez-Muñoz, Luis A. Coloma, Santiago Ron

VU *Colostethus vergeli* (Hellmich, 1940)**Vulnerable D2**

Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia
Current Population Trend: Stable



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Geographic Range This species occurs on the western flank of the Cordillera Oriental, in Fusagasuga, Cundinamarca Department, and Icononso, Tolima Department, Colombia, at 1,500-1,800m asl.

Population It is known to be an abundant species, although no one has looked for it since 1994.

Habitat and Ecology It occurs near streams in cloud forest, and seems able to tolerate some minor habitat disturbance. The eggs are laid on land, and the males carry the tadpoles to streams where they develop further.

Major Threats There are no current known threats to this species, and it is somewhat resilient to habitat disturbance. Nonetheless, its small range renders it susceptible to stochastic threatening processes.

Conservation Measures It does not occur in any protected areas. The species requires close population monitoring given its very restricted range.

Notes on taxonomy: This species was considered a synonym of *Colostethus fuliginosus* by Edwards (1974b).

Bibliography: Edwards, S.R. (1971), Edwards, S.R. (1974a), Rivero, J.A. and Serna, M.A. (1988), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Adolfo Amézquita, Jose Vicente Rueda

CR *Colostethus vertebralis* (Boulenger, 1899)**Critically Endangered A2ace****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Ecuador**Current Population Trend:** Decreasing

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Geographic Range This species occurs in the inter-Andean valleys and on the western slopes of the Andes in southern Ecuador, at elevations of 1,770-3,500m asl.

Population The most recent record of this species is from 1997 (QCAZ database). It was abundant in the Bosque Protector Mazán in 1986, but one year of searching in 1995 yielded only a single specimen. It was also abundant in Laguna Busa in 1987. Recent expeditions to the range have turned up no specimens, and no surviving populations are known.

Habitat and Ecology It occurs in cloud forest, in ponds in open areas and in streams. Eggs are placed on the ground, and the males carry the tadpoles to streams where they develop further.

Major Threats The primary threat to this species is habitat destruction and degradation, due to agriculture and clear cutting, but this does not account for the observed decline, and chytridiomycosis is implicated as the likely cause of its apparent disappearance.

Conservation Measures The range of this species overlaps Parque Nacional Cajas and slightly overlaps Parque Nacional Sangay. Survey work is urgently needed to determine whether or not this species survives in its natural range.

Bibliography: Boulenger, G.A. (1899), Coloma, L.A. (1995)

Data Providers: Luis A. Coloma, Santiago Ron, Manuel Morales, Ana Almandáriz

VU *Colostethus wayuu* Acosta, Cuentas and Coloma, 1999**Vulnerable D2****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Colombia**Current Population Trend:** Unknown

Geographic Range This species is known only from the Parque Nacional Natural de Macuira, on the Sierranía of Macuira, in the Department of Guajira, Colombia. It has an altitudinal range of 210-780m asl. It occurs in an isolated area of forest habitat in an otherwise arid region, so it is very unlikely to occur anywhere else.

Population It is abundant in the rainy season.

Habitat and Ecology It lives in tropical forest with dry vegetation, and can be found in secondary forest. The eggs are deposited on the forest floor and the male carries the hatched tadpoles to streams and ponds to complete their development.

Major Threats There are no current major threats to the species, and its only known population is within a national park. However, its restricted range renders it susceptible to threatening processes.

Conservation Measures It has been recorded from the Parque Nacional Natural de Macuira, Colombia. The population of this species requires close monitoring, particularly given that it is known only from a single location.

Bibliography: Acosta, A.R., Cuentas, D.A. and Coloma, L.A. (1999)

Data Providers: Andrés Acosta-Galvis, Taran Grant

EN *Cryptophyllobates azureiventris* (Kneller and Henle, 1985)**Endangered B1ab(iii)****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Peru**Current Population Trend:** Decreasing

© Karl-Heinz Jungfer

Geographic Range This species is known only from the vicinity of the type locality of Tarapoto-Yurimaguas Road, 700m asl (San Martín Department), Peru. It is presumed to have a restricted distribution.

Population It is not very common.

Habitat and Ecology Its habitat is lowland primary tropical rainforest, and eggs are laid under leaf-litter and the larvae are transported to small streams. Nothing is known about its adaptability to modified habitats.

Major Threats The major threat to the species is general habitat loss resulting from various human activities; local people use the area for recreation and there are lots of settlements, with agricultural development, in lower areas. The species has been recorded in trade. Specimens presumably originated from illegal collection by tourists, although they may have been captive bred. However, the species has not been seen in the commercial trade over the last fifteen years.

Conservation Measures It is not present in any protected areas, and there is an urgent need to both encourage the protection of remaining lowland habitat as well as establish a conservation management plan that includes some form of legislation concerning trade.

Bibliography: Kneller, M. and Henle, K. (1985), Lötters, S., Jungfer, K.-H. and Widmer, A. (2000)

Data Providers: Javier Icochea, Ariadne Angulo, Karl-Heinz Jungfer, Stefan Lötters, Wilfredo Arizabal, Jorge Luis Martinez

CR *Dendrobates abditus* (Myers and Daly, 1976)**Critically Endangered A2ac; B1ab(iii)****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Ecuador**Current Population Trend:** Decreasing**CITES:** Appendix II

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Geographic Range This species is only known from the eastern base of Volcán Reventador, south-west of the Río Azuela bridge on the Quito-Lago Agrio road, in Napo Province, at 1,700m asl, on the Amazonian versant of the Andes in Ecuador.

Population It no longer survives at its only known locality, but there is a small chance that it survives elsewhere in localities that have not yet been surveyed.

Habitat and Ecology The type locality is a forested ridge, which has a relatively low canopy and is exceedingly dense in most places. This forest is cool and very damp, with a conspicuous moss layer and many epiphytes on the tree trunks. Specimens have been found by day, on or close to the ground, in the forest and in adjacent new clearings. The eggs are laid on the ground, and the tadpoles are carried on the back of the adults one by one to bromeliads, where they develop.

Major Threats Patches of forest at the type locality have been cleared for agriculture and livestock farming. The species also could have been affected by the synergistic effects of chytridiomycosis and climate change.

Conservation Measures The distribution range of the species might overlap with Reserva Ecológica Cayambe-Coca, but its presence there has not been confirmed. There is an urgent need for further survey work to determine whether or not this species might survive at other sites near the type locality.

Bibliography: Myers, C.W. (1987), Myers, C.W. and Daly, J.W. (1976a)

Data Providers: Luis A. Coloma, Santiago Ron

VU *Dendrobates altobueyensis* (Silverstone, 1975)**Vulnerable D2**

Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia
Current Population Trend: Stable
CITES: Appendix II



Geographic Range This species has a very restricted range around Alto del Buey, on the Serranía Baudo, in Choco Department, Colombia, between 980 and 1,070m asl.

Population There is little information on its population status.

Habitat and Ecology It lives on the ground and in bromeliads in very humid pre-montane forests in the Pacific region of Colombia. There is no information on breeding, but it is probable that the eggs are laid in leaf-litter, and that the tadpoles are carried by the adults to bromeliads. There is no information on its adaptability to secondary habitats.

Major Threats There is very little information on threats to this species, though it is likely that some populations are threatened by habitat loss due mainly to smallholder agricultural activities, logging, and human settlement. It might also be collected for the pet trade.

Conservation Measures It occurs in the Parque Nacional Natural Utria. Management practices that could allow a commercial, sustainable harvest of this species should be investigated. Decree

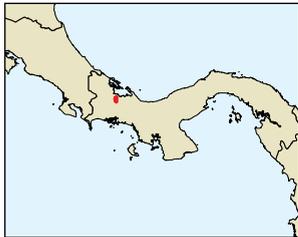
INDERENA No. 39 of 9 July, 1985, forbids the collection of *Dendrobates* spp. from the wild for breeding (or other) purposes.

Bibliography: Myers, C.W. (1987), Rueda-Almonacid, J.V. (1999), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996), Silverstone, P.A. (1975)

Data Providers: Wilmar Bolívar, Taran Grant

EN *Dendrobates arboreus* Myers, Daly and Martínez, 1984**Endangered B1ab(iii)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Panama
Current Population Trend: Decreasing
CITES: Appendix II



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Geographic Range This species is endemic to the western cordilleras and Atlantic lowlands of Panama. It occurs up to at least 1,120m asl.

Population There is no information available on the population status of this species.

Habitat and Ecology This is a phytotelmic canopy species of humid lowland and montane forest, with breeding taking place in bromeliads.

Major Threats The main threat is habitat loss due to logging, livestock ranching and human settlement. The level of trade in this species is not known. It is potentially at risk from chytridiomycosis.

Conservation Measures It has been recorded from the protected areas of Parque Internacional La Amistad and Bosque Protector Palo Seco. Further research and survey work is needed to ascertain the possible negative impacts of trade and chytrid.

Bibliography: Ibáñez, R. *et al.* (2000), Myers, C.W., Daly, J.W. and Martínez, V. (1984), Young, B. *et al.* (1999)

Data Providers: Frank Solís, Roberto Ibáñez, César Jaramillo, Querube Fuenmayor

POLKADOT POISON FROG**VU** *Dendrobates azureus* Hoogmoed, 1969**Vulnerable D2**

Order, Family: Anura, Dendrobatidae
Country Distribution: Suriname
Current Population Trend: Stable
CITES: Appendix II



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Geographic Range This species is known only from the vicinity of the type locality: "Sipaliwini, forest-island on western slope Vier Gebroeders Mountain, 2°N; 55° 58'W, Surinam." The type locality is at around 350m asl.

Population It is a common species.

Habitat and Ecology It is usually seen on rocks along streams in naturally occurring primary forest fragments (forest/savannah mosaic). Males call from leaves on trees or from the ground. A clutch of 2-6 eggs are laid in leaf-litter and attended to by the male, but also sometimes by the female. Males carry the tadpoles on their back to streams where they develop further.

Major Threats It is not significantly threatened in its tiny range, but fire probably has an impact on its forest habitat (though rumours from European dart frog collectors that a fire had rendered the wild populations extinct in 1992 were proved to be unfounded). Illegal collection of the species for the international pet trade probably is no longer a significant threat, since the species is extensively bred in captivity.

Conservation Measures The range of the species is wholly within Sipaliwini Protected Area. In 1997 the National Aquarium in Baltimore, in the USA, initiated a captive-breeding program, which has been very successful and now involves more than 20 other institutions.

Bibliography: Hoogmoed, M.S. (1969), Zippel, K. (2005)

Data Providers: Robert Reynolds, Marinus Hoogmoed, Ross MacCulloch, Philippe Gaucher

BLUE POISON FROG**EN** *Dendrobates bombetes* (Myers and Daly, 1980)**Endangered B1ab(iii)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia
Current Population Trend: Decreasing
CITES: Appendix II



© Juan Manuel Renjifo

Geographic Range This species is known from both flanks of the western Andes, in the department of Valle del Cauca, and from the western flank of the central Andes, in the departments of Quindío and Risaralda, in Colombia, between 1,580 and 2,100m asl.

Population It is a common species, but it is believed to be declining.

Habitat and Ecology It occurs on the lowest stratum and on bromeliads in cloud forests and very dry forests. Eggs are laid in the leaf-litter, and the larvae develop in bromeliads.

Major Threats Habitat loss and degradation caused by agricultural expansion, timber extraction, crop fumigation, and the removal of bromeliads is a major threat. This species is also collected illegally for the pet trade.

Conservation Measures It is not known to occur in any protected areas, and habitat protection is urgently needed. Decree INDERENA No. 39 of 9 July, 1985, forbids the collection of *Dendrobates* spp. from the wild for breeding (or other) purposes. It is also necessary to review international legislation regarding the illegal trade of this species.

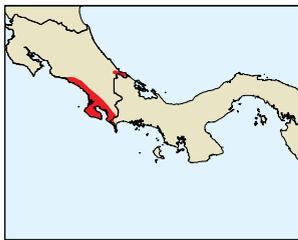
Bibliography: Myers, C.W. (1987), Myers, C.W. and Daly, J.W. (1980), Rueda-Almonacid, J.V. (1999), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Martha Patricia Ramírez Pinilla, Mariela Osomo-Muñoz, Jose Vicente Rueda, Adolfo Amézquita, María Cristina Ardila-Robayo

CAUCA POISON FROG

VU *Dendrobates granuliferus* Taylor, 1958

Vulnerable B1ab(iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Costa Rica, Panama
Current Population Trend: Decreasing
CITES: Appendix II



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GRANULAR POISON FROG

Geographic Range This species occurs in the lowlands of south-western Costa Rica, adjacent south-western Panama, and possibly in south-eastern Costa Rica, from 20-100m asl.

Population It is common in Costa Rica.

Habitat and Ecology A diurnal, terrestrial species most often found in relatively undisturbed humid lowland forest, but also recorded from secondary forest and plantations. Eggs are deposited on the forest floor and the female transports the tadpoles to bromeliads to complete metamorphosis.

Major Threats The major threat is habitat loss due to agriculture, selective logging, and human settlement. The current level of offtake of specimens for the international trade is unknown.

Conservation Measures It is present in several protected areas, including Parque Nacional Corcovado.

Bibliography: Ibáñez, R. *et al.* (2000), Meyer, E. (1992), Meyer, E. (1993), Meyer, E. (1996), Savage, J.M. (2002), Silverstone, P.A. (1975), Young, B. *et al.* (1999)

Data Providers: Frank Solís, Roberto Ibáñez, Gerardo Chaves, Jay Savage, César Jaramillo, Querube Fuenmayor

CR *Dendrobates lehmanni* Myers and Daly, 1976

Critically Endangered B2ab(iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia
Current Population Trend: Decreasing
CITES: Appendix II



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LEHMANN'S POISON FROG

Geographic Range This species is known with certainty only from two localities in Colombia on the western slopes of the Cordillera Occidental: west of Dagua at 850-1,200m on the south-facing versant of the upper Río Anchicayá drainage, Department of Valle del Cauca; and from Alto del Oso near San José del Palmar in the Department of Chocó. Its overall altitudinal range is between 600 and 1,200m asl. Records from the Serranía de Baudo in the Department of Chocó (not mapped) require confirmation.

Population It is a locally common species in its tiny range.

Habitat and Ecology It lives mostly on the ground in submontane tropical rainforests, but it can also be found perching on leaves up to 60cm above ground. It is not found in heavily degraded areas, but does occur in mature secondary forest. The eggs are laid on the ground, and the tadpoles are carried on the backs of the females to bromeliads, where they develop. The females feed the tadpoles on unfertilized eggs.

Major Threats The major threats are habitat loss and degradation, as a result of agricultural development (illegal crops), logging, and human settlement, and pollution, resulting from the spraying of illegal crops. It occasionally appears in the illegal pet trade.

Conservation Measures The species occurs in the Parque Nacional Natural Farallones de Cali. Management practices that could allow a commercial, sustainable harvest of this species should be investigated. Decree INDERENA No. 39 of 9 July, 1985, forbids the collection of *Dendrobates* spp. from the wild for breeding (or other) purposes.

Notes on taxonomy: Lötters (1992b) doubted the distinction of this species from *Dendrobates histrionicus*.

Bibliography: Bauer, L. (1979), Bechter, R. (1978), Fenolio, D. (1994), Garraffo, H.M. *et al.* (2001), Lötters, S. (1992b), Lötters, S. (1996), Lötters, S. *et al.* (1999), Lötters, S. and Widmer, A. (1997), Myers, C.W. and Daly, J.W. (1976b), Myers, C.W., Daly, J.W. and Martínez, V. (1984), Rueda-Almonacid, J.V. (1999), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996), Schoop, E. (2002), van Dijk, W. (2001), Zimmermann, H. and Zimmermann, E. (1980), Zimmermann, H. and Zimmermann, E. (1981)

Data Providers: Wilmar Bolívar, Fernando Castro, Stefan Lötters

EN *Dendrobates mysteriosus* Myers, 1982

Endangered B1ab(iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Peru
Current Population Trend: Decreasing
CITES: Appendix II



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MARAÑÓN POISON FROG

Geographic Range This species is currently known with certainty only from a single location in the vicinity of the town of Santa Rosa at the foothills of the Cordillera del Cóndor (Cajamarca Department), north-eastern Peru, at around 1,000m asl.

Population The population status of this species is not known. Much of the area is deforested and populations are only known from forest remnants that remain on some steep cliffs and slopes.

Habitat and Ecology It has only been recorded from primary premontane forest, with breeding taking place in bromeliads.

Major Threats The main threat is habitat clearance for agricultural use (including pastureland and coffee cultivation). Recently, a few specimens have also been reported in international trade.

Conservation Measures Reportedly present in the Cordillera del Cóndor Reserve, this species is also protected by national legislation. Further research into the distribution and population status of the species is necessary, and there is a need to monitor its presence in international trade.

Bibliography: Myers, C.W. (1982), Rodríguez, L.O., Cordova, J.H. and Icochea, J. (1993), Schmidt, O. (1857), Schmidt, O. (1858), Schulte, R. (1990), Schulte, R. (1999)

Data Providers: Javier Icochea, Karl-Heinz Jungfer, Stefan Lötters, Wilfredo Arizabal, Jorge Luis Martínez

VU *Dendrobates opisthomelas* Boulenger, 1899

Vulnerable B1ab(iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia
Current Population Trend: Decreasing
CITES: Appendix II



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ANDEAN POISON FROG

Geographic Range This species occurs from the central and western Andes, in Antioquia Department, to the eastern slope of the central Andes, in Caldas Department, Colombia. It has been recorded between 1,160 and 2,200m asl. It might occur a little more widely than current records suggest.

Population It is a common species.

Habitat and Ecology It occurs on the ground in leaf-litter in montane forest, although it may also climb on vegetation in the interior of primary forest. It lays its eggs in leaf-litter and the tadpoles develop in bromeliads.

Major Threats The major threats to this species are habitat loss/degradation, due to agriculture, logging and fire, and pollution as a result of the fumigation of crops. It is also harvested illegally for the international pet trade.

Conservation Measures It is not known to occur in any protected areas, and there is clearly a need for improved habitat protection at sites where this species is known to occur. Measures need to be put in place to ensure levels of offtake of this species from the wild are sustainable. Decree INDERENA No. 39 of 9 July, 1985, forbids the collection of *Dendrobates* spp. from the wild for breeding (or other) purposes.

Bibliography: Myers, C.W. (1987), Rueda-Almonacid, J.V. (1999), Ruiz-Carranza, P.M. and Ramírez Pinilla, M. (1992), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996), Silverstone, P.A. (1975)

Data Providers: Martha Patricia Ramírez Pinilla, Mariela Osorno-Muñoz, Jose Vicente Rueda, Adolfo Amézquita, María Cristina Ardila-Robayo

EN *Dendrobates sirensis* Aichinger, 1991**Endangered B1ab(iii)****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Peru**Current Population Trend:** Decreasing**CITES:** Appendix II

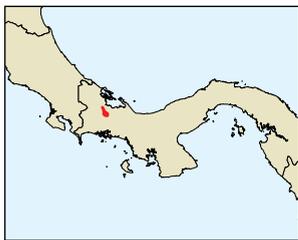
Geographic Range This species is known only from the Cordillera El Sira (in the departments of Huanuco, Pasco, Ucayali), Peru, at an altitude of 750-1,000m asl. This is a single isolated mountain, so the species is probably restricted to this area.

Population Nothing is known of its population status, although it is likely to be rare.

Habitat and Ecology It is a diurnal species of primary montane cloud forest, and is presumed to use phytotelms for breeding. It is not known if it can occur in secondary or modified habitats.

Major Threats Although the restricted area that the species inhabits is relatively inaccessible, there is some disturbance due to farming and human settlement. In addition, the lower parts of the range are subject to selective logging.

Conservation Measures It is present in the Reserva Comunal El Sira, an indigenous people's reserve. Strengthened management may be necessary to ensure the maintenance of this species' habitat.

Bibliography: Aichinger, M. (1991)**Data Providers:** Javier Icochea, Karl-Heinz Jungfer, Ariadne Angulo**EN** *Dendrobates speciosus* O. Schmidt, 1857**Endangered B1ab(iii)****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Panama**Current Population Trend:** Decreasing**CITES:** Appendix II

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Geographic Range This species is a Panamanian endemic of the western Cordillera Central adjacent to Costa Rica. It is present at around 1,370m asl.

Population The species was formerly considered to be common, but its current population status is not known.

Habitat and Ecology It is a terrestrial species of humid lowland and montane forest, with breeding taking place in plants.

Major Threats The major threat is habitat loss due to logging and human settlement. It is also subject to collection for the pet trade.

Conservation Measures The species has been recorded from the protected areas of Bosque Protector Palo Seco and Parque Internacional La Amistad. Further research is needed into the current population status of the species, and some form of management or legislation needs to be put in place in order to control the level of offtake for the pet trade.

Bibliography: Edwards, M.W., Daly, J.W. and Myers, C.W. (1988), Ibáñez, R. *et al.* (2000), Jungfer, K.H. (1995), Myers, C.W., Daly, J.W. and Martínez, V. (1984), Oostveen, H. (1981), Savage, J.M. (1968b), Silverstone, P.A. (1975), Young, B. *et al.* (1999)

Data Providers: Frank Solís, Roberto Ibáñez, César Jaramillo, Querube Fuenmayor**SPLENDID POISON FROG****CR** *Dendrobates steyermarki* Rivero, 1971**Critically Endangered B2ab(iii)****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Venezuela**Current Population Trend:** Decreasing**CITES:** Appendix II

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Geographic Range This species is restricted to Cerro Yapacana, at elevations from 600-1,300m asl, in Amazonas state, Venezuela.

Population According to Gorzula and Señaris (1999) this frog is exceedingly common in bromeliads on the summit, and it is possible to collect hundreds in just a few hours. It is still found in great numbers.

Habitat and Ecology It occurs in terrestrial bromeliads in montane tepui forest. Breeding probably takes place in bromeliads.

Major Threats Intensive open gold mining in the area is a major threat to the species' habitat. Barrio and Fuentes (1999) reported the illegal collection and exportation of some 150 specimens to Germany, and other collections for scientific purposes. Wildfires might also be a threat to the species' habitat.

Conservation Measures Cerro Yapacana is a Venezuelan natural monument, like most other tepuis in the region. Surveys are necessary to monitor the population trends of this species. Measures are also required to combat illegal trade of this species, and to regulate the mining activities so that the survival of the species is not jeopardised.

Bibliography: Barrio Amorós, C.L. (2001), Barrio Amorós, C.L. (2004), Barrio, C.L. and Fuentes, O. (1999), Frost, D.R. (1985), Gorzula, S. (1988), Gorzula, S. and Cerda, J. (1979), Gorzula, S. and Señaris, J.C. (1998), La Marca, E. (1992), La Marca, E. (1995b), La Marca, E. (1997), Myers, C.W. (1987), Rivero, J.A. (1971), Rodríguez, J.P. and Rojas-Suárez, F. (1995), Silverstone, P.A. (1975), Walls, J.G. (1994)

Data Providers: Enrique La Marca, Celsa Señaris**VU** *Dendrobates viridis* (Myers and Daly, 1976)**Vulnerable B1ab(iii)****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Colombia**Current Population Trend:** Decreasing**CITES:** Appendix II

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Geographic Range This species occurs on the western slopes of the Cordillera Occidental of Colombia, from Río Anchicaya in Valle del Cauca Department, to Río Saija in Cauca Department, between 100 and 1,200m asl.

Population It is very common.

Habitat and Ecology It lives on the ground and in bromeliads in primary and good secondary, lowland and sub-montane forests. The tadpoles presumably are deposited in bromeliads.

Major Threats The major threats are deforestation due to agricultural development (including planting of illegal crops), logging, and human settlement, and pollution resulting from the spraying of crops. Unlike other species of the genus, it has not been recorded in international trade.

Conservation Measures It occurs in the Parque Nacional Natural Farallones. Decree INDERENA No. 39 of 9 July, 1985, forbids the collection of *Dendrobates* spp. from the wild for breeding (or other) purposes.

Bibliography: Myers, C.W. (1987), Myers, C.W. and Daly, J.W. (1976b), Rueda-Almonacid, J.V. (1999), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Wilmar Bolívar, Fernando Castro**GREEN POISON FROG**

EN *Dendrobates virolinensis* (Ruíz-Carranza and Ramírez-Pinilla, 1992)**Endangered B1ab(iii)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia
Current Population Trend: Decreasing
CITES: Appendix II



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Geographic Range This species occurs in the Santuario de Fauna y Flora Guanentá, Alto Río Fonce, Río Cañaverales and El Reloj; and also in Municipio de Socorro, Santander Department, Colombia, at 1,700-2,000m asl.

Population It is common, with many recent records.

Habitat and Ecology It lives on the floor of cloud forest, and only occurs in secondary forest if there is a lot of leaf-litter and bromeliads (since it lays its eggs in leaf-litter and the males bring the larvae to the bromeliads).

Major Threats Habitat fragmentation and loss is the main threat, and is taking place primarily due to agricultural expansion. This species is also found in the pet trade.

Conservation Measures Although it occurs in the Santuario de Fauna y Flora Guanentá, improved habitat protection is required, and there is a need to monitor and regulate the offtake of this species for international trade. Decree INDERENA No. 39 of 9 July, 1985, forbids the collection of *Dendrobates* spp. from the wild for breeding (or other) purposes.

Bibliography: Amezcuita, A. (1995), Perez, G., Ruiz-Carranza, P.M. and Ramirez-Pinilla, M.P. (1992), Rueda-Almonacid, J.V. (1999), Ruiz-Carranza, P.M. and Ramirez Pinilla, M. (1992), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996), Vences, M. *et al.* (2000b)

Data Providers: Adolfo Amézquita, Jose Vicente Rueda

VU *Epipedobates cainarachi* Schulte, 1989**Vulnerable B1ab(iii)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Peru
Current Population Trend: Decreasing
CITES: Appendix II



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**CAINARACHI POISON FROG**

Geographic Range This species is known only from the type locality and adjacent areas including the Tarapoto-Yurimagas road (San Martín Department) in Peru. It probably occurs more widely than is currently known. It has been recorded up to 600m asl.

Population There is nothing known about the population status of this species.

Habitat and Ecology It inhabits lowland tropical moist forest and "rolling hills", and can be found in primary and possibly slightly degraded habitats. The breeding habitat is not known, although the larvae are presumably deposited in water.

Major Threats The major threat is the loss of forest habitat through agriculture (coffee), livestock production, and subsistence wood collection. The species has not been recorded from international trade.

Conservation Measures It is not recorded from any protected areas. Improved habitat protection is required at sites where this species is known to occur.

Bibliography: Jungfer, K.-H. (1989), Rodriguez, L. and Myers, C.W. (1993), Schulte, R. (1989)

Data Providers: Javier Icochea, Karl-Heinz Jungfer

CR *Epipedobates ingeri* (Cochran and Goin, 1970)**Critically Endangered B1ab(iii)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia
Current Population Trend: Decreasing
CITES: Appendix II



Geographic Range This species is known only from the type locality: Asarrio, on the Pescado River in the Amazonian lowlands, Caqueta Department, Colombia, at 200m asl. It has not been found elsewhere, and probably has a very small range.

Population It is known from a single specimen, which was described in 1970. Recent work in the region has not turned up any new specimens. Given the level of habitat destruction that has taken place within its range, it could be extinct.

Habitat and Ecology The area where it was collected was lowland forest. It is probably a terrestrial and diurnal species, laying its eggs in leaf-litter. The males probably take care of the eggs and then move the larvae to pools of water in epiphytes for development.

Major Threats The entire region where the type specimen was collected has been deforested for cattle farming since 1978.

Conservation Measures There are no protected areas near the type locality. A search for any remaining populations is urgently needed before the species is declared extinct.

Notes on taxonomy: Jungfer, Lötters and Jörgens (2000) suggest this species should revert to the genus *Dendrobates*.

Bibliography: Jungfer, K.-H., Lötters, S. and Jörgens, D. (2000), Rueda-Almonacid, J.V. (1999), Silverstone, P.A. (1976)

Data Providers: Andrés Acosta-Galvis, Jose Vicente Rueda

CR *Epipedobates planipaleae* Morales and Velazco, 1998**Critically Endangered B1ab(iii)**

Order, Family: Anura, Dendrobatidae
Country Distribution: Peru
Current Population Trend: Decreasing
CITES: Appendix II



Geographic Range This recently described species is known only from the type locality of Llamaquíz stream, close to Oxapampa town, at 2,010m asl (Departamento: Pasco), Peru. It is thought to have a genuinely restricted distribution.

Population It is a very rare species, and is known only from the type series.

Habitat and Ecology It is recorded from montane tropical rainforest. Its breeding habitat is not known.

Major Threats The major threat to this species is habitat loss due to expanding agricultural activities.

Conservation Measures Although Parque Nacional Yanachaga-Chemillén is very near to the type locality, populations of the species have not been reported from this protected area; there might be a need to extend the boundaries of this park to include the known type locality. The species is protected by national legislation in Peru. Further surveys are needed to determine the current population status of the species, and captive-breeding programmes might be required to ensure its persistence.

Bibliography: Morales, V.R. and Velazco, P.M. (1998)

Data Providers: Javier Icochea, Edgar Lehr, Karl-Heinz Jungfer, Stefan Lötters

OXAPAMPA POISON FROG

EN *Epipedobates tricolor* (Boulenger, 1899)**Endangered B1ab(iii,v)****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Ecuador**Current Population Trend:** Decreasing**CITES:** Appendix II

© Wouter Beukema



Geographic Range This species is known only from seven localities on the Andean slopes of the Bolívar Province in central Ecuador, where it occurs at elevations of approximately 1,000-1,769m asl.

Population It appears to have been declining in the northern portion of its range in Ecuador, where some populations have disappeared.

Habitat and Ecology It lives in montane forest near streams. Eggs are laid in the leaf-litter, and the males carry the larvae to running and standing water for development. It is not known if this species can adapt to habitat modification.

Major Threats The major threat is agrochemical pollution of waterways, and habitat loss due to smallholder farming activities. It is also collected for medicinal use in Ecuador. Some of the declines appear to have taken place in suitable habitat, so chytridiomycosis cannot be ruled out as a possible threat.

Conservation Measures It is not known with certainty if this species occurs in any protected areas, and expanded protection of the remaining montane forest within the range of the species' is recommended. The possible impact of overharvesting for medicinal use, and commercial trade in wild specimens, requires further investigation.

Notes on taxonomy: This species and *Epipedobates anthonyi* were recently separated by Schulte (1999). We follow Graham *et al.* (2004) in restricting the distribution of *E. tricolor* to central Ecuador.

Bibliography: Boulenger, G.A. (1899), Graham, C.H. *et al.* (2004), Schulte, R. (1999), Silverstone, P.A. (1976)

Data Providers: Luis A. Coloma

CR *Mannophryne caquetio* Mijares-Urrutia and Arends, 1999**Critically Endangered B1ab(iii,v)+2ab(iii,v)****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Venezuela**Current Population Trend:** Decreasing

Geographic Range This species is known from the type locality, stated to be "toma de agua de Maparari" in the municipality of Federación, in Sierra de Churuguara, in the state of Falcón, Venezuela (approx. 10.47N, 69.25W), where it has been recorded around 800m asl. An additional population in Parque Nacional Cueva de la Quebrada del Toro was found in May 2002 (J. Manzanilla pers. comm.).

Population There has been an observed decline in the population of this species. However, in May 2002, specimens were collected at the type locality and a new population was also found in Parque Nacional Cueva de la Quebrada del Toro.

Habitat and Ecology It is a terrestrial, diurnal frog found in deciduous lower montane tropophilous forests. The larvae are presumably carried on the backs of the males to streams, as with other members of the genus.

Major Threats Habitat loss and degradation, due primarily to agriculture (crops and livestock), and general disturbance by humans, is

the main threat. Water extraction is a threat at the type locality. Pollution and/or parasites might be causing what appear to be problems in the development or incomplete development of the limbs. It is potentially at risk from chytridiomycosis.

Conservation Measures It occurs in the Parque Nacional Cueva de la Quebrada del Toro. Survey work is necessary to determine the population status and trends of this species. Captive breeding might be required if the risk of chytridiomycosis proves real.

Bibliography: Barrio Amorós, C.L. (2004), Manzanilla, J., García-París, M. and La Marca, E. (2002), Manzanilla, J., La Marca, E. and García-París, M. (2003), Mijares-Urrutia, A. and Arends, A. (1999b)

Data Providers: Enrique La Marca, Jesús Manzanilla, Abraham Mijares

EN *Mannophryne collaris* (Boulenger, 1912)**Endangered B1ab(iii,v)+2ab(iii,v)****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Venezuela**Current Population Trend:** Decreasing

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Geographic Range This species is known from the Andes in the state of Mérida, in Venezuela. It occurs from 200-1,800m asl.

Population It is a locally abundant species, but appears to be in decline in some parts of its range. La Marca (1995a) noted population declines in this species in several localities in the Andes of Venezuela.

Habitat and Ecology It inhabits seasonal (semi-deciduous) montane forests. The eggs are laid on land and the male protects the eggs. When hatched the male carries the larvae on his back to water where they develop further.

Major Threats The main threat to the species is habitat destruction and alteration, due primarily to agriculture (for both crops and livestock), infrastructure development for human settlement in the vicinity of the city of Merida, and tourism development. In addition, pollution may also be contributing to the observed declines.

Conservation Measures Its range does not include any protected areas, and expanded protection of the remaining montane forest within the range of the species is recommended.

Bibliography: Barrio Amorós, C.L. (2001), Barrio Amorós, C.L. (2004), Barrio, C.L. and Fuentes, O. (1999), Dole, J. (1974), Durant, P. and Dole, J. (1975), Frost, D.R. (1985), Gines, H. (1959), Gottberg, C., Ramoni, P. and Praderio, M.J. (2002), La Marca, E. (1992), La Marca, E. (1994e), La Marca, E. (1995a), La Marca, E. (1995b), La Marca, E. (1997), Lutz, A. (1927), Manzanilla, J., García-París, M. and La Marca, E. (2002), Manzanilla, J., La Marca, E. and García-París, M. (2003), Péfaur, J.E. and Rivero, J.A. (2000), Rivero, J.A. (1961), Vial, J.L. and Saylor, L. (1993)

Data Providers: Enrique La Marca, Juan Elías García-Pérez, Jesús Manzanilla

VU *Mannophryne cordilleriana* La Marca, 1994**Vulnerable D2****Order, Family:** Anura, Dendrobatidae**Country Distribution:** Venezuela**Current Population Trend:** Stable

Geographic Range This species is known from a few localities in the vicinity of Santo Domingo, in the state of Mérida, in the Venezuelan Andes. It has been recorded from 1,300-1,950m asl.

Population It is a common species.

Habitat and Ecology It inhabits montane humid forest. The eggs are laid on land and the male protects the eggs. When the eggs are hatched, the male carries the larvae on his back to the streams where they develop further. It seems to be quite tolerant of habitat disturbance, and is sometimes found in very polluted streams (but see Major Threats).

Major Threats Its habitat is impacted by agriculture, wood collection, and human settlement, although this does not seem to be having an immediate impact on the species. It is potentially at risk from chytridiomycosis (since the species has been proven to carry this fungus, though it does not appear to show any symptoms of the disease). In May 2004, some specimens with malformations

(polymelia, amelia) were found at the type locality (J. Manzanilla and E. La Marca pers. comm.) where significant pollution of the stream was also observed.

Conservation Measures Its range does not include any protected areas. Improved habitat protection is required at sites where this species is known to occur. There is also a need for close population monitoring, particularly given its small range and the potential risk of chytridiomycosis.

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1994e), La Marca, E. (1995a), La Marca, E. (1995b), La Marca, E. (1997), Manzanilla, J., García-París, M. and La Marca, E. (2002), Manzanilla, J., La Marca, E. and García-París, M. (2003)

Data Providers: Enrique La Marca, Juan Elías García-Pérez, Jesús Manzanilla

CR *Mannophryne lamarcai* Mijares-Urrutia, 1999

Critically Endangered B1ab(iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



Geographic Range This species is restricted to the Cerro Socopó in the municipality of Mauroa, in the state of Falcón, Venezuela, at 600-1,250m asl. It might occur more widely than is currently known.

Population It is a rare species that is probably declining rapidly because of habitat loss. It was last collected in 2004.

Habitat and Ecology It is a diurnal species that has been found living among grasses in a small marsh along an unpaved road, and in calm parts of a small stream. Males have been observed calling from river margins. The larvae are presumably carried on the backs of the males to streams where they develop further, as with other members of the genus.

Major Threats The area around the site of its description was formerly cloud forest, but the forest was cleared to establish pasturelands for cattle farming. Climate change, acid rain, and pollution are also threats. It is potentially at risk from chytridiomycosis.

Conservation Measures The range of this species does not include

any protected areas, and its remaining habitat is in urgent need of protection. This species requires close monitoring, particularly given the potential threat of chytridiomycosis.

Notes on taxonomy: This frog was tentatively assigned to *Mannophryne herminae*, but its taxonomic status needs further research (La Marca 1999).

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1994e), Manzanilla, J., García-París, M. and La Marca, E. (2002), Manzanilla, J., La Marca, E. and García-París, M. (2003), Mijares-Urrutia, A. and Arends, A. (1999a), Mijares-Urrutia, A. and Arends, A. (1999b)

Data Providers: Abraham Mijares, Enrique La Marca, Jesús Manzanilla

CR *Mannophryne neblina* (Test, 1956)

Critically Endangered B1ab(v)+2ab(v)
Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



Geographic Range This species is known only from the type locality and the nearby vicinity, at elevations between 900 and 1,100m asl, in Paso Portachuelo, near Estación Biológica de Rancho Grande, Parque Nacional Henri Pittier, Aragua State, Venezuela.

Population It has not been recorded since its discovery 50 years ago, and so it might have declined and possibly even disappeared. In the last 10 years, searches for the species have been unsuccessful. This is one of the largest species of the genus, occurring in one of the best-studied places in Venezuela, and so it is of great concern that no further populations or specimens of this frog have been discovered.

Habitat and Ecology It inhabits cloud forest. Breeding habits are unknown, although it probably lays eggs on the forest floor and adults carry tadpoles to the stream where they develop further, like other species of the genus.

Major Threats Threats to this species are unknown, but chytridio-

mycosis cannot be ruled out as a threat.

Conservation Measures The range of this species includes Parque Nacional Henri Pittier. Additional surveys are required to establish whether or not this species is still extant, particularly since there is still suitable habitat in its natural range.

Bibliography: Barrio Amorós, C.L. (2004), Edwards, S.R. (1974b), Gines, H. (1959), La Marca, E. (1992), La Marca, E. (1994e), La Marca, E. (1995a), La Marca, E. and Lötters, S. (1997), Manzanilla, J. et al. (1995), Myers, C.W., Paolillo, A. and Daly, J.W. (1991), Rivero, J.A. (1961), Test, F.H. (1956), Test, F.H., Sexton, O.J. and Heatwole, H. (1966)

Data Providers: Enrique La Marca, Jesús Manzanilla

CR *Mannophryne olmonae* (Hardy, 1983)

Critically Endangered A2ae; B1ab(v)
Order, Family: Anura, Dendrobatidae
Country Distribution: Trinidad and Tobago
Current Population Trend: Decreasing



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Geographic Range This species is restricted to the upland areas of north-eastern Tobago Island and Little Tobago Island, Trinidad and Tobago. It is found at elevations of between 120 and 360m asl.

Population Populations of this species have declined significantly over the last 10 years, prior to which it was thought to be relatively abundant.

Habitat and Ecology This is a tropical forest species. Males of this species call from rocks in streams during the daytime. The eggs are laid on land; hatching tadpoles (11-19 in number) are carried to streams by the male where they complete their development. It is not thought to occur in degraded habitat.

Major Threats The causes of the current decline in this species are unknown. Areas of suitable habitat remain and there are no known human impacts on the species. It is possible that the species might have been impacted by chytridiomycosis, though this has not been proven.

Conservation Measures The rainforest in which this species occurs in Tobago is protected in Little Tobago Wildlife Sanctuary. Survey work is required to monitor the population status and trends of this species, and research into the causes of the decline of this species is needed; a captive breeding programme might need to be established if the threat of chytridiomycosis proves real.

Bibliography: Hardy, Jr, J.D. (1982), Hardy, Jr, J.D. (1983), Manzanilla, J., García-París, M. and La Marca, E. (2002), Manzanilla, J., La Marca, E. and García-París, M. (2003), Mertens, R. (1970a), Mertens, R. (1972), Murphy, J.C. (1997)

Data Providers: Jerry Hardy

BLOODY BAY POISON FROG

EN *Mannophryne riveroi* (Donoso-Barros, 1964)

Endangered B1ab(iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



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Geographic Range This species is known from Cerro Azul, Macuro, and Cerro El Humo, 10km north of Macuro, in Península de Paría, Sucre State, Venezuela. It has been recorded from 400-1,000m asl.

Population The population status of this species is not known, although specimens were collected in Parque Nacional Península de Paría as recently as May 2004.

Habitat and Ecology It lives along streams in lowland humid forest up to cloud forest habitat. A clutch of eggs is deposited in the leaf-litter of the forest floor, and then after hatching the larvae are carried to water where they develop further.

Major Threats The major threat is habitat loss due to selective logging and small-scale agriculture. Chytridiomycosis represents a potential future threat.

Conservation Measures Although most of the range of this species is within a protected area (Parque Nacional Península de Paría), this reserve is under pressure of deforestation (by the local people). Strengthened management and protection of this site is necessary to safeguard this species.

Bibliography: Ayarzagüena, J. and Señaris, J.C. (1993), Barrio Amorós, C.L. (2004), Donoso-Barros, R. (1964), Edwards, S.R. (1974b), Frost, D.R. (1985), La Marca, E. (1992), La Marca, E. (1994e), La Marca, E. (1995a), La Marca, E. (1995b), Manzanilla, J., García-París, M. and La Marca, E. (2002), Manzanilla, J., La Marca, E. and García-París, M. (2003), Myers, C.W., Paolillo, A. and Daly, J.W. (1991), Rivero, J.A. (1988)

Data Providers: Enrique La Marca, Jesús Manzanilla

VU *Mannophryne trinitatis* (Garman, 1887)

Vulnerable B1ab(iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Trinidad and Tobago, Venezuela
Current Population Trend: Decreasing



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Geographic Range This species is present in the Northern and Central Ranges of the island of Trinidad, in Trinidad and Tobago. In Venezuela, populations are present in Península de Paria (Sucre state), Serranía del Turimiquire (Sucre-Monagas states), and Serranía del interior, Miranda, Guarico, and Anzoatigui states. In Venezuela the species occurs between 40 and 1,525m asl, and on Trinidad it can be found from montane areas down to sea level.

Population In Venezuela, it is considered to be common, while on Trinidad it is considered to be very common with generally stable populations.

Habitat and Ecology Adults are found along densely shaded, narrow, shallow, slow-flowing, clear water streams in undisturbed montane and moist forests, where they engage in elaborate courtship and defensive behaviours. A terrestrial species, it lays its eggs in leaf-litter and on rocks near streams and the adults carry the tadpoles on their backs to the deeper stream pools. The populations in Tamana caves in central Trinidad are known to use the cave ponds for their tadpoles. Tadpoles in other populations have also been found in still temporary pools far from streams. The exact deposition site appears to be dependent on the presence of predators, with adults migrating significant distances in search of predator free pools. These animals depend on the insects that eat bat guano for food.

Major Threats In Venezuela, the species is threatened by habitat degradation and destruction resulting from small-scale agriculture. On Trinidad, it is locally threatened by domestic, agricultural, and some industrial water pollution. On the southern slopes of the Northern Range in Trinidad, deforestation has resulted in fragmentation of the species' habitat.

Conservation Measures A number of protected areas are present within the range of this species. In Venezuela, it is known to occur in the Parque Nacional Península de Paria and Parque Nacional el Guacharo.

Notes on taxonomy: This form is probably a complex of more than one species. The populations in Venezuela almost certainly belong to a different, undescribed, species (J. Manzanilla pers. comm.).

Bibliography: Alemán, C. (1952), Barrio Amorós, C.L. (2004), Edwards, S.R. (1974b), Frost, D.R. (1985), Jowers, M.J. and Downie, J.R. (2004), Kenny, J.S. (1969), La Marca, E. (1992), La Marca, E. (1994e), La Marca, E. (1995a), La Marca, E. (1997), Manzanilla, J., García-Paris, M. and La Marca, E. (2002), Manzanilla, J., La Marca, E. and García-Paris, M. (2003), Mole, R.R. and Ulrich, F.W. (1894), Murphy, J.C. (1997), Parker, H.W. (1933a)

Data Providers: Enrique La Marca, Jesús Manzanilla, Jerry Hardy

EN *Mannophryne yustizi* (La Marca, 1989)

Endangered B1ab(iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



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Geographic Range This species is known mainly from Yacambú and Terepaima National Parks in Lara State, Venezuela. It has been recorded from 1,200-1,800m asl.

Population It is a common species and there is currently no evidence of any decline. Healthy populations were found in April 2003 in Parque Nacional Yacambú.

Habitat and Ecology It occurs along streams and on the forest floor of montane moist and cloud forests. The eggs are laid on land and the male protects the eggs. When they hatch, the male carries the larvae on his back to water where they develop further.

Major Threats In some parts of the range, populations are affected by the extensive clearing of land for coffee plantations (and specifically by the agro-chemicals associated with the plantations).

Conservation Measures Although it is protected in two Venezuelan Andean national parks (Yacambú and Terepaima National Parks), some populations (in Cubiro and Guarico) live outside protected areas. Expanded protection of the montane forest within the species' range is recommended.

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1989), La Marca, E. (1992), La Marca, E. (1994e), La Marca, E. (1995a), La Marca, E. (1995b), La Marca, E. (1997), Manzanilla, J., García-Paris, M. and La Marca, E. (2002), Manzanilla, J., La Marca, E. and García-Paris, M. (2003), Myers, C.W., Paolillo, A. and Daly, J.W. (1991), Yustiz, E. (1996)

Data Providers: Enrique La Marca, Juan Elias García-Pérez, Jesús Manzanilla

EN *Nephelobates alboguttatus* (Boulenger, 1903)

Endangered B1ab(iii,v)+2ab(iii,v)
Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



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Geographic Range This species is known from the Andes of Mérida State, Venezuela, from 1,600-3,090m asl.

Population It is a rare species and has been in decline in recent years.

Habitat and Ecology It occurs in clear, fast-flowing streams in Andean cloud forests. The eggs are laid on land and the male protects the eggs. When they are hatched, the male carries the larvae on his back to water where they develop further.

Major Threats Some of the original environments occupied by this frog in the vicinities of the city of Mérida, in the Cordillera de Mérida, have been drastically changed by human activities, particularly due to agricultural expansion, for both crops and livestock. Much of the remaining habitat is severely fragmented. Introduced trout prey on the larvae of this species. However, this species is also declining in undisturbed habitats, which suggests an additional threat, possibly disease (such as chytridiomycosis).

Conservation Measures Some populations are protected within national parks (Sierra Nevada and Sierra de la Culata). However, the existing protected areas network requires expansion to ensure the protection of suitable cloud forest habitats for this species. Further research is required to establish the reasons for the species' decline in apparently suitable habitat, and to determine whether chytrid poses a threat.

Notes on taxonomy: *Colostethus inflexus* was synonymized with this species by Frost (1985), but was revived in Myers, Paolillo and Daly (1991) and La Marca (1997). Although officially still in the synonymy of *Nephelobates alboguttatus*, *C. inflexus* might prove to be a distinct species.

Bibliography: Barrio Amorós, C.L. (2004), Frost, D.R. (1985), La Marca, E. (1984), La Marca, E. (1985b), La Marca, E. (1992), La Marca, E. (1994a), La Marca, E. (1995b), La Marca, E. (1997), Lutz, A. (1927), Myers, C.W., Paolillo, A. and Daly, J.W. (1991), Péfaur, J.E. and Rivero, J.A. (2000), Piñero, J. and Durant, P. (1993), Piñero, J. and La Marca, E. (1996), Rivero, J.A. (1961), Vial, J.L. and Saylor, L. (1993)

Data Providers: Enrique La Marca, Juan Elias García-Pérez

EN *Nephelobates durantii* (Péfaur, 1985)

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



Geographic Range This species is only known from the type locality and the vicinity: Páramo de la Culata, in the district of Libertador, in the state of Mérida, Venezuela, at 2,600-3,000m asl.

Population It is an uncommon species.

Habitat and Ecology It inhabits clear, fast-flowing streams in Andean cloud forests and sub-páramo shrubland. The eggs are laid on land and the male protects the eggs. When they are hatched, the male carries the larvae on his back to water where they develop further.

Major Threats Livestock farming is a major threat to the species' habitat, which is now severely fragmented. Introduced trout also prey on the larvae of this species.

Conservation Measures A population probably occurs within Parque Nacional Sierra de la Culata. Continued and strengthened management of this area, and expansion of the existing protected areas network to include other tracts of montane forest habitat, are necessary.

Bibliography: Barrio Amorós, C.L. (2004), Diaz, A., Péfaur, J. and Durant, P. (1997), Frost, D.R. (1985), La Marca, E. (1992), La Marca, E. (1994a), La Marca, E. (1995b), La Marca, E. (1997), Mijares-Urrutia, A. and La Marca, E. (1997b), Péfaur, J.E. (1985), Rivero, J.A. (1988), Vial, J.L. and Saylor, L. (1993)

Data Providers: Enrique La Marca, Juan Elias García-Pérez

EN *Nephelobates haydeae* (Rivero, 1976)

Endangered B1ab(iii,v)+2ab(iii,v)
Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



Geographic Range This species is known from the Venezuelan Andean states of western Mérida and eastern Táchira. It has been recorded between 1,825 and 2,670m asl.

Population It is an uncommon species and is in decline.

Habitat and Ecology It occurs in clear, fast-flowing streams in Andean cloud forests, and in the puddles alongside the streams, and is sometimes hidden inside introduced "kikuyo" pasture grasses (*Pennisetum clandestinum*). The eggs are laid on land and the male protects the eggs. When they are hatched, the male carries the larvae on his back to water where they develop further.

Major Threats Most of the species' original habitat has now been lost to agricultural activities (involving livestock and crops), and the remaining habitat is severely fragmented.

Conservation Measures The species' range may be partially within Parque Nacional Los Paramos. Continued and strengthened management of this area, and expansion of the existing protected

areas network to include other tracts of montane forest habitat in the Venezuelan Andes, are necessary.

Bibliography: Barrio Amorós, C.L. (2004), Frost, D.R. (1985), La Marca, E. (1992), La Marca, E. (1994a), La Marca, E. (1995b), La Marca, E. (1997), Mijares-Urrutia, A. and La Marca, E. (1997b), Myers, C.W., Paolillo, A. and Daly, J.W. (1991), Péfaur, J.E. and Rivero, J.A. (2000), Rivero, J.A. (1976), Rivero, J.A. (1988), Vial, J.L. and Saylor, L. (1993)

Data Providers: Enrique La Marca, Juan Elias García-Pérez

EN *Nephelobates mayorgai* (Rivero, 1978)

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



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Geographic Range This species is known from several localities within Mérida State, on the road from Mérida to La Azulita, in Venezuela, at elevations of 1,700-2,400m asl.

Population It is a locally common species.

Habitat and Ecology It is found along mountain streams in cloud forests. The eggs are laid on land and the male protects the eggs. When they are hatched, the male carries the larvae on his back to water where they develop further.

Major Threats The main threats are agriculture, involving both crops and livestock, as well as agricultural water pollution. The introduced bullfrog (*Rana catesbeiana*) also poses a threat.

Conservation Measures The range of this species does not include any protected areas; protection of remaining tracts of forest habitat in the Venezuelan Andes is necessary.

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1992), La Marca, E. (1994a), La Marca, E. (1995b), La Marca, E. (1997), Mijares-Urrutia, A. and La Marca, E. (1997a), Myers, C.W., Paolillo, A. and Daly, J.W. (1991), Péfaur, J.E. and Rivero, J.A. (2000), Rivero, J.A. (1978), Rivero, J.A. (1988), Vial, J.L. and Saylor, L. (1993)

Data Providers: Enrique La Marca, Juan Elias García-Pérez

CR *Nephelobates meridensis* (Dole and Durant, 1972)

Critically Endangered B2ab(iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



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Geographic Range This species is known from the type locality, Chorotal, 15km south-east of la Azulita, and the nearby vicinity, in Mérida State, Venezuela, between 1,880 and 2,400m asl.

Population It is an uncommon species.

Habitat and Ecology It inhabits streams in cloud forest. The eggs are laid on land and the male protects the eggs; when they hatch, the male carries the larvae on his back to the water where they develop further.

Major Threats The primary threats to this species are habitat loss due to agriculture (crops and livestock) and agricultural pollution. The invasive bullfrog *Rana catesbeiana* is also a threat.

Conservation Measures The range of this species does not include any protected areas, and there is an urgent need to ensure that the remaining habitat at the type locality is maintained.

Bibliography: Barrio Amorós, C.L. (2004), Dole, J. and Durant, P. (1972), Frost, D.R. (1985), La Marca, E. (1992), La Marca, E. (1994a), La Marca, E. (1995b), La Marca, E. (1997), Mijares-Urrutia, A. and La Marca, E. (1997a), Myers, C.W., Paolillo, A. and Daly, J.W. (1991), Péfaur, J.E. and Rivero, J.A. (2000), Rivero, J.A. (1988), Vial, J.L. and Saylor, L. (1993)

Data Providers: Enrique La Marca, Juan Elias García-Pérez

EN *Nephelobates molinarii* (La Marca, 1985)

Endangered B1ab(ii,iii)+2ab(ii,iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



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Geographic Range This species is only known from a single zone near Bailadores, in Mérida State, Venezuela, at an altitude of 1,800-2,600m asl.

Population It is an uncommon species.

Habitat and Ecology It inhabits dry evergreen montane forest, where it lives along slow-flowing streams. The eggs are laid on land and the male protects the eggs. When they are hatched, the male carries the larvae on his back to water where they develop further.

Major Threats Habitat destruction and degradation, caused primarily by intensive agriculture, has reduced the area of occupancy of this species to less than 10km².

Conservation Measures Its range does not include any protected areas, although it is possible that it might occur in Parque Nacional Paramos El Batallon y La Negra. Continued and strengthened management of this area, and expansion of the existing protected areas network to include other montane forest habitat in the Venezuelan Andes, are necessary.

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1985a), La Marca, E. (1985b), La Marca, E. (1992), La Marca, E. (1994a), La Marca, E. (1997), Myers, C.W., Paolillo, A. and Daly, J.W. (1991), Péfaur, J.E. and Rivero, J.A. (2000), Rivero, J.A. (1988)

Data Providers: Enrique La Marca, Juan Elias García-Pérez

EN *Nephelobates orostoma* (Rivero, 1976)

Endangered B1ab(ii,iii)+2ab(ii,iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



Geographic Range This species is known with certainty only from the type locality in Táchira State, Venezuela (Boca del Monte, Camino del Pregonero), from 2,300-2,800m asl. Other Táchira localities listed in Barrio (1999) are unconfirmed.

Population It is an uncommon species.

Habitat and Ecology It inhabits mountain streams in cloud forest. The eggs are laid on land and the male protects the eggs. When they are hatched, the male carries the larvae on his back to water where they develop further.

Major Threats The major threats are agriculture, involving both crops and livestock, and agricultural pollution, and the area of occupancy of this species is now less than 20km².

Conservation Measures It is not known to occur in any protected areas, and protection of remaining tracts of forest habitat in the Venezuelan Andes is necessary.

Bibliography: Barrio Amorós, C.L. (2004), Frost, D.R. (1985), La Marca, E.

(1992), La Marca, E. (1994a), La Marca, E. (1995b), La Marca, E. (1997), Mijares-Urrutia, A. and La Marca, E. (1997a), Péfaur, J.E. (1985), Rivero, J.A. (1976), Rivero, J.A. (1988)

Data Providers: Enrique La Marca, Juan Elias Garcia-Pérez

EN *Nephelobates serranus* (Pefaur, 1985)

Endangered B1ab(ii,iii)+2ab(ii,iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



Geographic Range This species is only known from the type locality, Via El Morro, in the district of Libertador, in the state of Mérida, Venezuela, from 1,800-2,300m asl.

Population It is an uncommon species.

Habitat and Ecology It inhabits mountain streams in cloud forest. The eggs are laid on land and the male protects the eggs. When they are hatched, the male carries the larvae on his back to water where they develop further.

Major Threats The major threats are agriculture, involving both crops and livestock, and predation on larvae by invasive trout; the area of occupancy of this species is now less than 20km².

Conservation Measures A population may be protected within Parque Nacional Sierra Nevada. Continued and strengthened management of this area, and expansion of the existing protected areas network to include other montane forest habitat in the Venezuelan Andes, are necessary.

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. (1992), La Marca, E. (1994a), La Marca, E. (1995b), La Marca, E. (1997), Mijares-Urrutia, A. and La Marca, E. (1997a), Myers, C.W., Paolillo, A. and Daly, J.W. (1991), Péfaur, J.E. (1985), Rivero, J.A. (1988)

Data Providers: Enrique La Marca, Juan Elias Garcia-Pérez

EN *Phyllobates terribilis* Myers, Daly and Malkin, 1978

Endangered B1ab(iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Colombia
Current Population Trend: Decreasing
CITES: Appendix II



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Geographic Range This species is known only from tiny areas on the Pacific coast of Colombia on the Rio Saija drainage, in Cauca Department, occurring up to 200m asl.

Population It is extremely common in its tiny range.

Habitat and Ecology It lives on the ground in humid forests, and is only known from primary forest. It is not known whether or not it can adapt to secondary habitats. The eggs are laid on the ground and the males transport the larvae to permanent pools.

Major Threats The major threats are deforestation for agricultural development, the planting of illegal crops, logging, and human settlement, and pollution resulting from the spraying of illegal crops. It is very occasionally reported in international trade in small numbers.

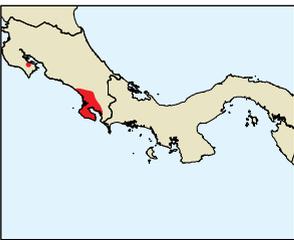
Conservation Measures It does not occur in any protected areas, and the protection of part of this species' lowland forest habitat is recommended. Management practices that could allow a commercial, sustainable harvest of this species should be investigated. Decree INDERENA No. 39 of 9 July, 1985, forbids the collection of *Phyllobates* spp. from the wild in Colombia for breeding (or other) purposes.

Bibliography: Lötters, S. *et al.* (1997), Myers, C.W., Daly, J.W. and Malkin, B. (1978), Rueda-Almonacid, J.V. (1999), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Wilmar Bolívar, Stefan Lötters

GOLDEN POISON FROG**EN** *Phyllobates vittatus* (Cope, 1893)

Endangered B1ab(iii)
Order, Family: Anura, Dendrobatidae
Country Distribution: Costa Rica
Current Population Trend: Stable
CITES: Appendix II



© Tobias Eisenberg

Geographic Range This species is known from the lowlands of the Golfo Dulce region of south-western Costa Rica, from 20-550m asl (Savage 2002), and has also recently been recorded from Dominical in the Provincia de Puntarenas of Costa Rica (Ryan 2002). It is expected to occur in parts of immediately adjacent south-western Panama.

Population This species is moderately common and regularly recorded (although extremely rare in Dominical).

Habitat and Ecology This is a diurnal, terrestrial species associated with streams in primary lowland moist and wet forests. Eggs are usually deposited on leaves above the ground; the male carries hatching larvae to small pools to complete their development (Savage 2002).

Major Threats This species is threatened by forest clearance for agricultural land and tree plantations. Water pollution caused by contamination from gold mining activities is also a threat, as is potential over-collection of adults for the pet trade.

Conservation Measures Most of the species' range is in three protected areas in Costa Rica, including Parque Nacional Corcovado. There is a need for strengthened management of these sites, and expanded protection to include other remnant forest patches in Costa Rica. Management practices that could allow a commercial, sustainable harvest of this species for the pet trade should be investigated.

Bibliography: Ryan, M. (2002), Savage, J.M. (1968b), Savage, J.M. (1976), Savage, J.M. (2002), Silverstone, P.A. (1976), Weygoldt, P. (1987), Zimmermann, H. (1982)

Data Providers: Frank Solís, Roberto Ibáñez, Gerardo Chaves, Jay Savage, César Jaramillo, Querube Fuenmayor, Federico Bolaños

GOLFODULCEAN POISON FROG

DISCOGLOSSIDAE

VU *Alytes dickhilleni* Arntzen and García-París, 1995

Vulnerable B2ab(iii,iv)
Order, Family: Anura, Discoglossidae
Country Distribution: Spain
Current Population Trend: Decreasing



Geographic Range This species is restricted to the mountains of south-eastern Spain. It occurs at altitudes of 700-2,140m asl (Sierra Nevada, Almería).

BETIC MIDWIFE TOAD

Population Populations of this species are very fragmented, many of them confined to isolated mountains and valleys. It is relatively common in the Alcaraz, Segura, and Cazorla mountains, but it is rare in drier mountains (Filabres, Baza, Gádor), where it is associated with springs. Populations in drier areas can consist of only a few adults.

Habitat and Ecology The species is present in pine and oak forests, most often on calciferous substrate, in open, very rocky landscapes. Adults occur in rock fissures and on stones next to water sources. Reproduction and larval development takes place in permanent mountain streams, man-made reservoirs and cattle troughs, and the larvae may take a long time to mature. Almost all known breeding habitats are human-modified water bodies.

Major Threats The species is threatened by loss of suitable breeding habitat as a result of excessive water withdrawal, droughts, and modernization of agricultural practices leading to the abandonment of cattle troughs and other man-made water sources. A potential future threat is the fungal disease chytridiomycosis, which has already impacted the related *Alytes obstetricans* in Spain.

Conservation Measures This species is listed on Appendix III of the Berne Convention. It is listed in regional Red Data Books and is present in the protected areas of Parque Nacional Sierra Morena, Parque Nacional de Sierra Nevada, and the Natural Park of Cazorla, Segura y las Villas. Protection measures in Castilla-La Mancha, Andalusia, such as restoration and construction of new breeding habitats, are under way.

Bibliography: Arnold, E.N. (2003), Arntzen, J.W. and García-París, M. (1995), Benavides, J. *et al.* (2000), Fromhage, L., Vences, M. and Veith, M. (2004), García-Cardenete, L. *et al.* (2003), Gasc, J.-P. *et al.* (eds.) (1997), Márquez, R. and Bosch, J. (1996), Martínez-Solano, I. *et al.* (2003), Martínez-Solano, I. *et al.* (2004), Pleguezuelos, J.M. (1997), Pleguezuelos, J.M., Márquez, R. and Lizana, M. (2002)

Data Providers: Jaime Bosch, Miguel Tejedo, Miguel Lizana, Iñigo Martínez-Solano, Alfredo Salvador, Mario García-París, Ernesto Recuero Gil, Jan Willem Arntzen, Rafael Marquez, Carmen Diaz Paniagua

VU *Alytes muletensis* (Sanchiz and Adrover, 1979 "1977")

Vulnerable D2
Order, Family: Anura, Discoglossidae
Country Distribution: Spain (Native and Reintroduced)
Current Population Trend: Increasing



Geographic Range This species is restricted to the Sierra Tramuntana of northern Mallorca, Balearic Islands, Spain. The present altitudinal range is from 10-850m asl. Its area of occupancy is less than 10km², but slowly increasing as a result of intensive conservation action.

Population The population is approximately 500-1,500 adult pairs (Gasc *et al.* 1997; Arnold 2003). There are approximately 25, mostly isolated, populations. The total population is slowly increasing following coordinated recovery efforts, following a long period of decline and near extinction. The current increase, which probably started around the time that the first re-introductions were made in 1989, has been maintained even during years of drought, notably in 1999-2000. The population trend in this species is monitored through annual tadpole counts, the counts for 2004 (over 30,000 tadpoles) being the highest on record. The increase in numbers in established populations is not dependent upon continued re-introductions. However, it is unlikely that new populations would be established without re-introductions.

MALLORCAN MIDWIFE TOAD

Habitat and Ecology It is currently found only in small streams deeply carved into limestone mountains. The presence of the species is positively associated with steep slopes. Breeding takes place in the small streams that persist as pools in summer. A few populations occur by man-made water sources (cattle troughs, containers, rain tanks etc.) in open mountainous country; these are within the river basins of nearby canyon-living populations. Animals are generally found in rock crevices and under stones. This species does not tolerate serious habitat degradation. The distribution of predators on the species is negatively associated with elevation, and reproductive success is positively associated with elevation.

Major Threats The major threats are predation by the introduced Viperine Snake (*Natrix maura*), and competition for space with Perez's Frog (*Rana perezi*). Development of tourism and human settlements, specifically the increased need for water resources (including damming and canalization of streams), is an additional threat. The threats are not likely to decrease, and so the current recovery programme needs to be continued more or less indefinitely. One isolated re-introduced population was impacted by an unidentified non-fungal disease in 2002 which killed some tadpoles. This disease did not recur in 2003 and 2004.

Conservation Measures The species is protected by sub-national and national legislation. It is listed on Appendix II of the Berne Convention, on Annexes II and IV of the EU Natural Habitats Directive, and on the national and sub-national Red Data Books. It is present in the protected areas of the Tramuntana mountains. The Balearic Government and Jersey Wildlife Preservation Trust have undertaken captive-breeding, re-introduction and other conservation initiatives. At least 10 populations have been successfully reintroduced. Re-introductions of animals from the Jersey Wildlife Preservation Trust stopped in 2002, but a new captive-breeding facility now exists on Mallorca, and re-introductions are expected to resume. However, as a result of the recent discovery of disease, a recommendation was made in 2004 to the Balearic Government to halt the re-introduction programme. A new recovery programme for the species is now being developed. A systematic programme is in place to remove *Natrix maura* from the range of the species.

Bibliography: Alcover, J.A. *et al.* (1984), Arnold, E.N. (2003), Arntzen, J.W. and García-París, M. (1995), Bush, S. (1996), Fromhage, L., Vences, M. and Veith, M. (2004), Gasc, J.-P. *et al.* (eds.) (1997), Halliday, T. (1992), Lea, J., Dyson, M. and Halliday, T. (2002), Martínez-Solano, I. *et al.* (2004), Mejías, R. and Amengual, J. (2000), Moore, R.D., Griffiths, R.A. and Román, A. (2004), Pleguezuelos, J.M. (1997), Pleguezuelos, J.M., Márquez, R. and Lizana, M. (2002), Roca, V. *et al.* (1998), Román, A. and Mayol, J. (1997), Schley, L., Griffiths, R.A. and Román, A. (1998)

Data Providers: Joan Mayol Serra, Richard Griffiths, Jaime Bosch, Trevor Beebee, Benedikt Schmidt, Miguel Tejedo, Miguel Lizana, Iñigo Martínez-Solano, Alfredo Salvador, Mario García-París, Ernesto Recuero Gil, Jan Willem Arntzen

HELEOPHYRIDAE

CR *Heleophryne hewitti* Boycott, 1988

Critically Endangered B2ab(ii,iii,iv,v)
Order, Family: Anura, Heleophrynidae
Country Distribution: South Africa
Current Population Trend: Decreasing



Geographic Range This species appears to be restricted to four perennial rivers (Geelhoutboom, Martin's, Klein and Diepkloof) with their headwaters in the Elandsberg mountains, in the Eastern Cape province, South Africa. Its altitudinal range is 400-550m asl.

Population It is an uncommon and declining species.

Habitat and Ecology It is a species of fynbos heathland and grassy fynbos. Only very small remnants of fynbos survive within its range, so very little non-breeding habitat survives. It breeds in fast-flowing perennial rivers and streams with rocky beds in the upper reaches of the Elandsberg. Adults and tadpoles are found beneath submerged and partly submerged rocks in these streams, and occasionally at the edge of small waterfalls and cascades. The tadpoles take two years to develop.

Major Threats The main threats are loss of suitable non-breeding and breeding habitat as a result of afforestation with exotic pine plantations, fires, erosion, siltation of streams, dams, and road building. Introduced predatory fish are probably also a threat.

Conservation Measures The species is not known to occur in any protected areas, and the maintenance of its remaining breeding and non-breeding habitat is essential. There is also a need for continued monitoring of known populations and survey work for other populations.

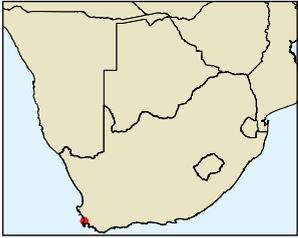
Bibliography: Boycott, R.C. (1988), Branch, W.R. (1988), Channing, A. (2001), Minter, L.R. *et al.* (2004), Passmore, N.I. and Carruthers, V.C. (1995)

Data Providers: Leslie Minter, Alan Channing, James Harrison

HEWITT'S GHOST FROG

CR *Heleophryne rosei* Hewitt, 1925

Critically Endangered B1ab(ii,iii,v)+2ab(ii,iii,v)
Order, Family: Anura, Heleophrynidae
Country Distribution: South Africa
Current Population Trend: Decreasing



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Geographic Range This species is endemic to the southern, eastern, and marginally western (and historically northern), slopes of Table Mountain, in the Western Cape province, extreme south-western South Africa. It occurs at 240-1,060m asl. Detailed information on the localities from which it has been recorded on Table Mountain are provided by Minter *et al.* (2004).

Population It is a rare and elusive species that appears to be declining and survives in low population densities; for example, it is estimated that the number of tadpoles in the Skeleton Gorge has decreased by 50% since 1980 (Minter *et al.* 2004).

Habitat and Ecology It lives in forest and fynbos heathland, breeding in clear perennial streams in forested gorges, valleys and ravines on Table Mountain. Non-breeding adults have been found in damp, sheltered habitat well away from streams, including in caves. The tadpoles require longer than 12 months to complete metamorphosis, and so it is important that there is perennial water to allow the larvae to develop.

Major Threats The main threats are the spread of alien vegetation, frequent fires, and construction of water storage reservoirs on the mountain affecting the consistency of stream-flow. Intensive eco-tourism is also a potential threat.

Conservation Measures The whole of this species' range is incorporated in the Table Mountain National Park, part of the Cape Floristic Region World Heritage Site. A monitoring programme by Western Cape Nature Conservation is in place.

Bibliography: Baard, E.H.W. (1989), Boycott, R.C. and de Villiers, A.L. (1986), Branch, W.R. (1988), Channing, A. (2001), De Villiers, A.L. (1997), McLachlan, A. (1978), Minter, L.R. *et al.* (2004), Passmore, N.I. and Carruthers, V.C. (1995)

Data Providers: Leslie Minter, Alan Channing, James Harrison

TABLE MOUNTAIN GHOST FROG**HEMISOTIDAE****VU** *Hemisus guttatus* (Rapp, 1842)

Vulnerable B2ab(ii,iii,iv)
Order, Family: Anura, Hemisotidae
Country Distribution: South Africa
Current Population Trend: Decreasing



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Geographic Range This species, which is known only from South Africa, occurs in southern Mpumalanga, and central and eastern KwaZulu-Natal, south to Durban on the coast. The northernmost coastal record is from Hluhluwe. It ranges from sea level up to over 1,000m on the summit of the Lebombo Mountains. It has not been recorded from Swaziland, but it presumably occurs in this country.

Population It is a rare species.

Habitat and Ecology It inhabits grassland and savannah. It breeds in seasonal pans, swampy areas, and in pools near rivers. It nests in burrows in wet soil by temporary water, and tadpoles move to water to develop.

Major Threats The main threats include: habitat loss due to afforestation, sugar cane cultivation, and urbanization; alien fish introductions; and invasive alien plants lowering the water table.

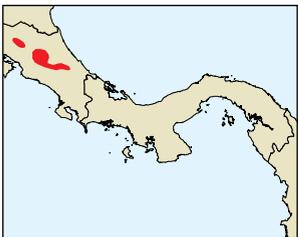
Conservation Measures It occurs in the Great St Lucia Wetlands Park, the Hluhluwe-Umfolozo Game Park, and other protected areas.

Bibliography: Alexander, G.J. (1990), Channing, A. (2001), Lambiris, A.J.L. (1989a), Laurent, R.F. (1972), Minter, L.R. *et al.* (2004), Passmore, N.I. and Carruthers, V.C. (1995), Wager, V.A. (1986)

Data Providers: Leslie Minter, Alan Channing, James Harrison

SPOTTED SNOUT-BURROWER**HYLIDAE****EN** *Agalychnis annae* Duellman, 1963

Endangered A2ab
Order, Family: Anura, Hylidae
Country Distribution: Costa Rica
Current Population Trend: Decreasing



© Iwan Leenders



Population Since the late 1980s, it has disappeared from pristine areas, including in protected areas such as Parque Nacional Tapanti and the Reserva Biológica Monteverde, where it was once common. It remains common only in highly altered habitats in metropolitan San José.

Habitat and Ecology This is a nocturnal species that lives in premontane moist and wet forests and rainforest, and tolerates disturbance to its habitat. It remains the most abundant species in San José and suburbs near heavily polluted streams, especially in shade-grown coffee plantations and gardens. It breeds in streams.

Major Threats Despite the apparent adaptability of this species, it is nonetheless subject to unconfirmed factors that have caused amphibian faunas to decline in certain locations in Central America, in particular the fungal disease, chytridiomycosis. It is possible that this species survives only in polluted areas because the chytrid fungus is more susceptible to pollution than the frog. The few, known remaining populations of this species are threatened by an introduced fish (*Xiphophorus hellerii*) that preys on the larvae. This species is also found in the international pet trade.

Conservation Measures Research is needed to determine whether or not this species can survive only in polluted areas, because of the ineffectiveness of the chytrid fungus in such environments. If this proves to be the case, then well-meaning conservation measures to abate water pollution could unintentionally lead to the extinction of this species. Given the nature of the threats, it may be worth considering the establishment of a captive-breeding programme for this species.

Bibliography: Duellman, W.E. (2001), Pounds, J.A. *et al.* (1997), Proy, C. (1993), Proy, C. (2000), Savage, J.M. (2002), Villa, J. and Townsend, D.S. (1983)

Data Providers: Alan Pounds, Federico Bolaños, Gerardo Chaves

BLUE-SIDED TREEFROG

Geographic Range This species occurs in the northern Cordillera de Talamanca, Cordillera de Tilarán and Cordillera Central, Costa Rica, at 780-1,650m. However, it has disappeared from most parts of its range, surviving mainly around San José only.

VU *Agalychnis litodryas* (Duellman and Trueb, 1967)

Vulnerable B1ab(iii)
Order, Family: Anura, Hylidae
Country Distribution: Ecuador, Panama
Current Population Trend: Decreasing



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Geographic Range This species is known from the single locality of Río Tuirá at Río Mono in Darién Province, Panama. It has been recorded from five localities in Ecuador and is presumed to occur in Colombia, although it has not yet been recorded. It ranges from 100-1,000m asl.

Population The species is known only from a single record in Panama. It is considered to be rare in Ecuador.

Habitat and Ecology An arboreal species of humid lowland forest. The single specimen in Panama was collected on a bush in a swamp. The holotype was found at night perched about one and a half meters above the ground in a bush at the edge of a swamp (Duellman and Trueb 1967). A gliding species, the Ecuadorian specimens have been heard calling from bushes overhanging a shallow pond in a banana grove at night (Duellman 2001). It deposits its eggs on the leaves floating on ponds, and larvae jump into the pond and develop in the water. Since it depends on the forest canopy, it is not very adaptable to disturbance.

Major Threats Habitat loss and degradation is a major threat in Ecuador, due to agriculture, timber, and human settlement.

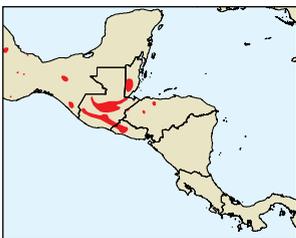
Conservation Measures The species occurs in Parque Nacional Darién in Panama, and Reserva Ecológica Cotacachi-Cayapas in Ecuador. Further survey work is needed to determine whether or not this species occurs in Colombia, as is predicted.

Bibliography: Duellman, W.E. (2001), Duellman, W.E. and Trueb, L. (1967), Ibañez, R. *et al.* (2000), Young, B. *et al.* (1999)

Data Providers: Luis A. Coloma, Santiago Ron, Karl-Heinz Jungfer, Diego Cisneros-Heredia, Ana Almandáriz, Frank Solís, Roberto Ibañez, César Jaramillo, Querube Fuenmayor

PINK-SIDED TREEFROG**CR** *Agalychnis moreletii* (Duméril, 1853)

Critically Endangered A3e
Order, Family: Anura, Hylidae
Country Distribution: Belize, El Salvador, Guatemala, Honduras, Mexico
Current Population Trend: Decreasing



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Geographic Range This species occurs from north-eastern Puebla state and south-central Veracruz state, Mexico, to north-western Honduras on the Atlantic versant; and from south-central Guerrero state, Mexico, to central El Salvador on the Pacific versant, at elevations of 300-1,500m asl.

Population It was formerly locally abundant in some locations in Chiapas state, Mexico, El Salvador and Guatemala. However, recent surveys in Guerrero, Oaxaca and Chiapas, Mexico, indicate that it has disappeared from all the sites surveyed. It is uncommon, but occasionally found in breeding aggregations in Belize and Honduras. In Guatemala and Honduras, the population is declining due to habitat destruction.

Habitat and Ecology It lives in lowland to montane moist forests on mountain slopes. It occurs in both pristine and disturbed habitats. Breeding takes place in small intermittent or permanent waterbodies.

Major Threats Chytridiomycosis is probably the main cause of the disappearance of populations in Mexico, and the species is now probably seriously at risk from this disease. Habitat destruction due to subsistence and smallholder agriculture is also a threat to this species, which also was formerly common in the pet trade.

Conservation Measures This species occurs in a number of protected areas throughout its range. Continued survey work is needed to monitor the population status of this species, and particularly to determine whether or not the reason for the apparent decline is due to chytridiomycosis. A captive-breeding programme might need to be established.

Bibliography: Duellman, W.E. (2001), Lee, J.C. (1996), Lips, K.R. *et al.* (2004), McCranie, J.R. and Wilson, L.D. (2002b)

Data Providers: Georgina Santos-Barrera, Julian Lee, Manuel Acevedo, Larry David Wilson

MORELET'S TREEFROG**EN** *Argenteohyla siemersi* (Mertens, 1937)

Endangered B2ab(iii)
Order, Family: Anura, Hylidae
Country Distribution: Argentina, Uruguay
Current Population Trend: Decreasing



© Jorge Abel Céspedes

Geographic Range This species occurs in Argentina in north-west Corrientes Province (*A. s. pedersenii*) and Entre Rios and Buenos Aires Provinces (*A. s. siemersi*). In Uruguay, it occurs in two localities in San Jose and Rocha states (*A. s. siemersi*). It occurs at elevations of 0-70m asl.

Population The nominate subspecies was known to be uncommon, and the last record is from 1982. All populations have disappeared from Argentina and Uruguay, the reason for which is not well understood. However, in 1983, the Paraná had the largest flood of the century and the population here subsequently disappeared and has not been found since, despite many attempts to relocate it. The subspecies *A. s. pedersenii* is rare but was recorded in 2002 and 2003, and this population at least appears to be stable.

Habitat and Ecology *A. s. pedersenii* occurs in leaf axils of terrestrial *Aechmae* bromeliads in gallery forests along main river systems. It reproduces in temporary pools close to the bromeliads. The nominate subspecies occurs and reproduces in wetlands and river deltas (Río Paraná), and tolerates moderate habitat disturbance.

Major Threats The main threat to this species is habitat destruction caused by fires used to expand or maintain pastures and pine forestry plantations. Some populations are also likely to be threatened by the "Hidrovia Paraná-Paraguay" project (the transformation of the Paraguay-Paraná-Uruguay-La Plata river system into a 3,400-km long shipping canal). In Uruguay, this species is threatened by draining of wetlands for agricultural expansion.

Conservation Measures Some populations of *A. s. pedersenii* occur in the 17,600-ha Parque Nacional Mburucuyá. The existing protected areas network requires expansion to ensure the protection of lowland riverine and wetland habitats. Further survey work is necessary to determine the status of populations of the nominate subspecies.

Notes on taxonomy: There are two subspecies: *Argenteohyla siemersi siemersi* and *A. s. pedersenii*.

Bibliography: Alvarez, B.B. *et al.* (2002), Alvarez, B.B. *et al.* (2003), Céspedes, J.A. (2000), Langone, J.A. (1994), Lavilla, E.O. *et al.* (2000), Lavilla, E.O. and Ceí, J.M. (2001), Maneyro, R. and Langone, J.A. (2001)

Data Providers: Esteban Lavilla, Jorge Céspedes, Diego Baldo, Boris Blotto, Jose Langone

CR *Bokermannohyla izecksohni* (Jim and Caramaschi, 1979)

Critically Endangered B1ab(iii,v)+2ab(iii,v)
Order, Family: Anura, Hylidae
Country Distribution: Brazil
Current Population Trend: Decreasing



© Ivan Sazima

Geographic Range This species is known only from Rubião Júnior, Botucatu, in the state of São Paulo, Brazil.

Population Surveys to locate this species in recent years have not found any individuals.

Habitat and Ecology It was originally found on vegetation or on forest leaf-litter near streams. The type specimen was found in a temporary pond, which has subsequently disappeared. It breeds in temporary ponds.

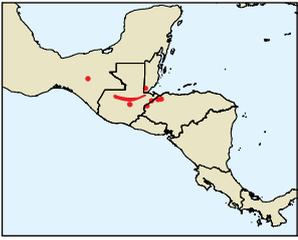
Major Threats The type locality of the species has been destroyed by agriculture and human settlement.

Conservation Measures The current known range of the species is not within any protected area. Further survey work is needed to determine if it occurs outside the vicinity of the type locality, and if it even still persists at the type locality.

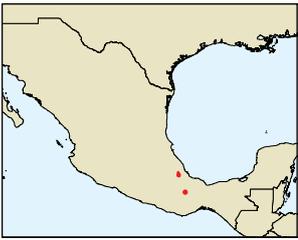
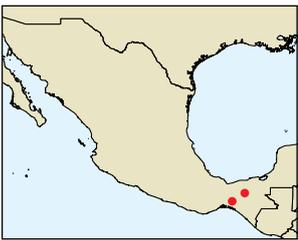
Notes on taxonomy: This species was previously included in the genus *Hyla* but has recently been moved to the genus *Bokermannohyla* (Faivovich *et al.* 2005).

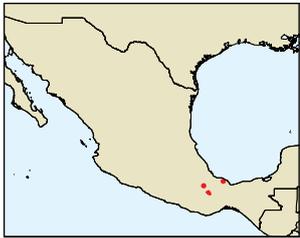
Bibliography: Faivovich, J. *et al.* (2005), Jim, J. and Caramaschi, U. (1979)

Data Providers: Miguel Trefaut Rodrigues, Carlos Alberto Gonçalves da Cruz

EN *Bromeliohyla bromeliacia* (K. Schmidt, 1933)**Endangered A2ace****Order, Family:** Anura, Hylidae**Country Distribution:** Belize, Guatemala, Honduras, Mexico**Current Population Trend:** Decreasing

© Silvina Petrovan

**Geographic Range** This species occurs on the Atlantic versant of north-western Chiapas State, Mexico; central and eastern Guatemala; the Maya Mountains of Belize; and north-western Honduras, at 350-1,790m asl.**Population** It is known from single specimens in Belize and Mexico. It is uncommon in Guatemala, but it continues to occur in suitable habitat, although some populations are in serious decline. In fact, some higher elevation populations in Guatemala, where most of the range occurs, appear to have declined sharply although the species has not disappeared; populations at lower elevations appear stable. It is relatively common in Honduras.**Habitat and Ecology** It is found in bromeliads in premontane and lower montane wet forest. It breeds by larval development. It is also found in leaf sheaths on banana trees, and tolerates some level of habitat disturbance.**Major Threats** The main threat is deforestation, due to agriculture (both crops and livestock), and water pollution which is taking place at higher elevations. The declines observed at high elevations, which have taken place even in suitable habitat, could be due to chytridiomycosis.**Conservation Measures** It is found in Parque Nacional Montaña de Cusuco and Parque Nacional Cerro Azul in Honduras, and in the Reserva de la Biósfera Sierra de la Minas and Biotop del Quetzal in Guatemala. Further research is necessary to ascertain whether chytrid is a threat to this species.**Notes on taxonomy:** This species was previously included in the genus *Hyla* but has recently been moved to the new genus *Bromeliohyla* (Faivovich *et al.* 2005).**Bibliography:** Campbell, J.A. (1998), Duellman, W.E. (2001), Faivovich, J. *et al.* (2005), Martínez-Coronel, M., Ramírez-Bautista, A. and Vidal-Lopez, R. (1995), McCranie, J.R. and Wilson, L.D. (2002b), Schmidt, K.P. (1933)**Data Providers:** Gustavo Cruz, Manuel Acevedo, Julian Lee**CR** *Bromeliohyla dendrocarta* (Taylor, 1940)**Critically Endangered A2ace****Order, Family:** Anura, Hylidae**Country Distribution:** Mexico**Current Population Trend:** Decreasing© Herpetological Society of Middle America, 2001
Society for the Study of Amphibians and Reptiles**Geographic Range** This species is found on the Atlantic slopes of the Sierra Madre Oriental and associated ranges in Mexico. It is also found in central Veracruz and northern Oaxaca in Mexico. It occurs from 450-1,900m asl.**Population** This has always been an uncommon species, but it appears to have gone into serious decline, and has not been recorded since 1974. Recent surveys to locate it have been unsuccessful, and it might now be extinct.**Habitat and Ecology** This species inhabits cloud forest habitats. It breeds and takes refuge in bromeliads.**Major Threats** This species has disappeared in suitable habitat, probably due to chytridiomycosis. Deforestation and alteration of the cloud forest are probably also major threats, as it requires bromeliads in mature trees to survive.**Conservation Measures** The range of this species does not include any protected area. Additional survey work is urgently needed to determine whether or not this species is still extant in its natural range. It is protected by Mexican law under the "Special Protection" category (Pr).**Notes on taxonomy:** This species was previously included in the genus *Hyla* but has recently been moved to the new genus *Bromeliohyla* (Faivovich *et al.* 2005).**Bibliography:** Duellman, W.E. (2001), Faivovich, J. *et al.* (2005), Lips, K.R. *et al.* (2004)**Data Providers:** Georgina Santos-Barrera, Luis Canseco-Márquez**CR** *Charadrahyla altipotens* (Duellman, 1968)**Critically Endangered A2ace****Order, Family:** Anura, Hylidae**Country Distribution:** Mexico**Current Population Trend:** Decreasing© Herpetological Society of Middle America, 2001
Society for the Study of Amphibians and Reptiles**Geographic Range** This species is known from the Pacific slopes of the Sierra Madre del Sur de Oaxaca, and north to the towns of San Gabriel and San Sebastián, in south-western Oaxaca, Mexico. It might occur a little more widely than current records suggest.**Population** This has always been a rare species, but it appears to have gone into serious decline, and has not been recorded since the 1960s. Recent surveys to locate it have been unsuccessful, and it might now be extinct.**Habitat and Ecology** This species occurs in pine-oak and cloud forests, and prefers rocky streams with abundant vegetation as microhabitat. It presumably breeds in streams.**Major Threats** This species has disappeared in suitable habitat, probably due to chytridiomycosis. The disappearance of the fragments of cloud forest in Oaxaca, the most fragile habitat in Mexico, is also threatening this species. At present this area is under extreme pressure from human population growth.**Conservation Measures** The range of this species does not include any protected areas. While additional survey work is urgently needed to determine whether or not this species is still extant in its natural range, protection of the remaining cloud forest fragments is important to preserve the humid habitats for this species as well as other amphibians. It is listed by the Mexican government in the category "Special Protection" (Pr).**Notes on taxonomy:** This species was previously included in the genus *Hyla* but has recently been moved to the new genus *Charadrahyla* (Faivovich *et al.* 2005).**Bibliography:** Duellman, W.E. (2001), Faivovich, J. *et al.* (2005), Lips, K.R. *et al.* (2004)**Data Providers:** Georgina Santos-Barrera, Luis Canseco-Márquez**EN** *Charadrahyla chaneque* (Duellman, 1961)**Endangered B1ab(iii)****Order, Family:** Anura, Hylidae**Country Distribution:** Mexico**Current Population Trend:** Decreasing© Herpetological Society of Middle America, 2001
Society for the Study of Amphibians and Reptiles**Geographic Range** This species is known from only three localities east of the Isthmus of Tehuantepec in northern Chiapas and eastern Oaxaca, Mexico. The type locality is at 1,690m asl.**Population** This is a common species within its restricted range.**Habitat and Ecology** It only inhabits high-elevation cloud forests with cascading mountain streams. It presumably breeds in streams.**Major Threats** Habitat loss due to logging represents the main threat to this species.**Conservation Measures** Its range includes the Reserva de la Biósfera Sierra del los Tuxtles, but expanded protection of cloud forest habitat in this region is needed. This species is protected by Mexican law under the "Special Protection" category (Pr).**Notes on taxonomy:** This species was previously included in the genus *Hyla* but has recently been moved to the new genus *Charadrahyla* (Faivovich *et al.* 2005).**Bibliography:** Duellman, W.E. (2001), Faivovich, J. *et al.* (2005), Mendelson III, J.R. and Campbell, J.A. (1999), Perez-Higareda, G. (1981b)**Data Providers:** Antonio Muñoz Alonso, Luis Canseco-Márquez

VU *Charadrahyla nephila* (Mendelson and Campbell, 1999)**Vulnerable B1ab(iii)****Order, Family:** Anura, Hylidae**Country Distribution:** Mexico**Current Population Trend:** Decreasing

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Geographic Range This species is known from Sierra de Juárez and Sierra Mixe, north-central Oaxaca, Mexico. A specimen has also been collected from Los Tuxtlas, Veracruz, Mexico, but this record is in doubt. It probably occurs more widely than records suggest. It occurs at elevations of 680-2,256m asl.

Population This is a common species.

Habitat and Ecology It inhabits mesic cloud forest, and is commonly found in or near streams and low vegetation, and presumably breeds in streams.

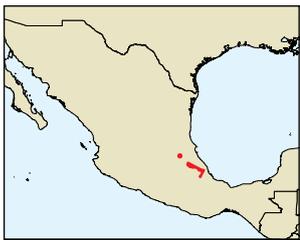
Major Threats The high rate of disturbance of the cloud forest is the main threat to this species. Tadpoles have been found in southern Mexico with loss of keratinised mouthparts, suggesting that chytridiomycosis might be involved.

Conservation Measures The range of this species does not include any protected areas, and urgent protection of the forests along the Sierra de Juárez and Sierra Mixe is required. The species is in need of close population monitoring, particularly if chytrid is shown to be a genuine threat.

Notes on taxonomy: This species was previously included in the genus *Hyla*, but has recently been moved to the new genus *Charadrahyla* (Faivovich *et al.* 2005).

Bibliography: Duellman, W.E. (2001), Faivovich, J. *et al.* (2005), Lips, K.R. *et al.* (2004), Mendelson III, J.R. and Campbell, J.A. (1999)

Data Providers: Georgina Santos-Barrera, Luis Canseco-Márquez

VU *Charadrahyla taeniopus* (Günther, 1901)**Vulnerable B1ab(iii)****Order, Family:** Anura, Hylidae**Country Distribution:** Mexico**Current Population Trend:** Decreasing

Reptiles and Amphibians of Middle America, 2001
Society for the Study of Amphibians and Reptiles



Geographic Range This species occurs in north-eastern Hidalgo, southward through northern Puebla to central Veracruz, Mexico. It probably occurs more widely than current records suggest, especially in areas between known sites. It occurs at intermediate elevations.

Population This is a common species. Several surveys conducted in the last few years in the Hidalgo-Veracruz region report healthy populations along its range.

Habitat and Ecology This species inhabits cloud forests characterized by moderate to low temperatures and high humidity. It is always associated with streams and epiphytic plants. It presumably breeds in streams.

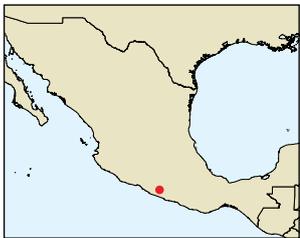
Major Threats Transformation of the forest into cultivated areas affects the presence of trees and epiphytic plants, the preferred habitat of this species. In some towns in Veracruz, this species is consumed as a traditional cooked dish; however, there is no information on the level of offtake.

Conservation Measures The range of this species does not include any protected areas, and there is clearly a need for protection of the remaining cloud forest remnants in this area. It is listed as "Threatened" (Amenazada) by the Mexican government. Further research is needed to determine the levels of offtake of this species from the wild.

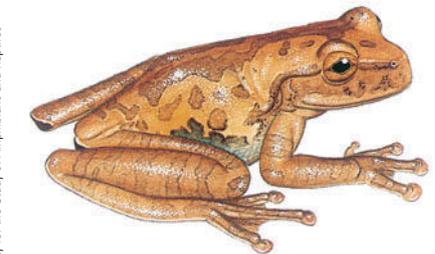
Notes on taxonomy: This species was previously included in the genus *Hyla* but has recently been moved to the new genus *Charadrahyla* (Faivovich *et al.* 2005).

Bibliography: Duellman, W.E. (2001), Faivovich, J. *et al.* (2005)

Data Providers: Georgina Santos-Barrera, Luis Canseco-Márquez

CR *Charadrahyla trux* (Adler and Dennis, 1972)**Critically Endangered B1ab(iii,v)+2ab(iii,v)****Order, Family:** Anura, Hylidae**Country Distribution:** Mexico**Current Population Trend:** Decreasing

Reptiles and Amphibians of Middle America, 2001
Society for the Study of Amphibians and Reptiles



Geographic Range This species is found on only on the slopes of Cerro Teótepec, in the Sierra Madre del Sur, in Guerrero, Mexico, at 1,760-2,415m asl.

Population This is a rare species. Recent attempts to locate it have been unsuccessful, suggesting a population decline, and it might even be extinct.

Habitat and Ecology This species inhabits pine-oak and bamboo-tree fern forests. It is commonly found associated with cascading mountain streams where it breeds.

Major Threats It has possibly been impacted by chytridiomycosis. In addition, the transformation of the forests along the transect between Filo de Caballo and Atoyac to open agricultural lands and farmlands is having a detrimental impact on the remaining habitat of this species.

Conservation Measures The range of this species does not include any protected areas. While additional survey work is urgently needed to determine whether or not this species is still extant in its natural range, a program to protect the forest areas surrounding the Cerro Teótepec is also recommended. This species is listed as "Threatened" (Amenazada) by the Mexican government.

Notes on taxonomy: This species was previously included in the genus *Hyla* but has recently been moved to the new genus *Charadrahyla* (Faivovich *et al.* 2005).

Bibliography: Duellman, W.E. (2001), Faivovich, J. *et al.* (2005), Lips, K.R. *et al.* (2004)

Data Providers: Georgina Santos-Barrera, Luis Canseco-Márquez

CR *Dendropsophus amicornum* (Mijares-Urrutia, 1998)**Critically Endangered B1ab(iii)****Order, Family:** Anura, Hylidae**Country Distribution:** Venezuela**Current Population Trend:** Decreasing

Geographic Range This species is known from a single specimen taken at Cerro Socopó, 84km north-west of Carora, in Falcón state, Venezuela (10.28N, 70.48W), at 1,250m asl. It is assumed to be restricted to the Cerro Socopó.

Population The population status of this species is not known.

Habitat and Ecology The Cerro Socopó is a relict of cloud forest surrounded by semi-arid vegetation. It presumably breeds by larval development, but the site of egg deposition is not known.

Major Threats All of the area of Cerro Socopó has been severely affected by forest destruction for agriculture (crops and livestock), as well as by agricultural pollution.

Conservation Measures The range of this species does not include any protected areas, and the species' habitat is in urgent need of protection. Additional survey work is needed to determine the biology and population status and trends of this species.

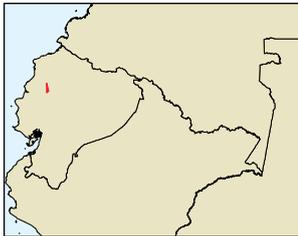
Notes on taxonomy: This species was previously included in the genus *Hyla* but has recently been moved to the resurrected genus *Dendropsophus* (Faivovich *et al.* 2005).

Bibliography: Barrio Amorós, C.L. (2004), Faivovich, J. *et al.* (2005), Mijares-Urrutia, A. (1998)

Data Providers: Enrique La Marca, Abraham Mijares

EN *Dendropsophus gryllatus* (Duellman, 1973)

Endangered B1ab(iii)
Order, Family: Anura, Hylidae
Country Distribution: Ecuador
Current Population Trend: Decreasing



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Geographic Range This species is known from the Pacific lowlands of north-western Ecuador, from 200-500m asl. It is known from three localities, but with further sampling is likely to occur more widely.

Population It is a rare species.

Habitat and Ecology This is originally a lowland forest species. However, specimens have been collected at a large duckweed-covered pond in a banana plantation outside forest; a few individuals were calling from bushes at the edge of the water, while others were found on grasses overhanging shallow muddy pools (Duellman 1973). It breeds in ponds, and probably deposits its eggs in the water.

Major Threats The main threat to this species is habitat loss, and much of the natural vegetation within its range has been cleared. While its occurrence in banana plantations may suggest that the species can survive in altered habitats, farming practices have changed radically over the last 20 years, especially with the use of pesticides, and cultivation that is more intensive. The soil is very fertile, and banana plantations do very well; however, these plantations are increasingly intensively managed and the use of pesticides poses an increasing threat.

Conservation Measures It is not known to occur in any protected areas. There is an urgent need for protection of remaining lowland forest habitat in this part of Ecuador.

Notes on taxonomy: This species was previously included in the genus *Hyla* but has recently been moved to the resurrected genus *Dendropsophus* (Faivovich *et al.* 2005).

Bibliography: Duellman, W.E. (1973), Faivovich, J. *et al.* (2005)

Data Providers: Luis A. Coloma, Santiago Ron, Diego Cisneros-Heredia, Ana Almandáriz

EN *Dendropsophus meridensis* (Rivero, 1961)

Endangered B1ab(iii,v)
Order, Family: Anura, Hylidae
Country Distribution: Venezuela
Current Population Trend: Decreasing



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Geographic Range This species is known from the Andes of Mérida State, in Venezuela. It has been recorded from 1,200-2,400m asl. Records from the Sierra del Turimiquire, in Sucre and Monagas States, are misidentifications.

Population This is an uncommon species that is estimated to have undergone a significant decline over the past ten years.

Habitat and Ecology It is an inhabitant of small ponds in cloud forests. It lays its eggs directly in water, where the larvae also develop.

Major Threats The main threats are agriculture, involving both crops and livestock, as well as agricultural pollution. The recent introduction of *Rana catesbeiana* has probably been at least partly responsible for the decline in populations of this frog.

Conservation Measures Although most of the species' range is outside protected areas, it may occur in Parque Nacional La Culata and/or Parque Nacional Sierra Nevada. Remaining cloud forest habitats in the Venezuelan Andes are in urgent need of protection.

Notes on taxonomy: This species was previously included in the genus *Hyla* but has recently been moved to the resurrected genus *Dendropsophus* (Faivovich *et al.* 2005).

Bibliography: Barrio Amorós, C.L. (2004), Duellman, W.E. (1977), Duellman, W.E. (1989b), Faivovich, J. *et al.* (2005), La Marca, E. (1992), La Marca, E. (1995b), La Marca, E. (1997), Péfaur, J.E. and Rivero, J.A. (2000), Rivero, J.A. (1961), Vial, J.L. and Saylor, L. (1993)

Data Providers: Enrique La Marca

VU *Dendropsophus stingi* (Kaplan, 1994)

Vulnerable D2
Order, Family: Anura, Hylidae
Country Distribution: Colombia
Current Population Trend: Increasing



Geographic Range This species is found on the eastern slope of the Cordillera Oriental in Boyacá Department, Colombia, at elevations of 2,000-2,020m asl.

Population This species is abundant and there are many recent records. Some populations even appear to be increasing.

Habitat and Ecology It occurs and reproduces in shrubs in flooded pastures, marshes, and temporary pools.

Major Threats There are no current major threats; however, its small range renders it susceptible to stochastic threatening processes.

Conservation Measures It does not occur in any protected areas. There is a need for close population monitoring of this species considering its small range.

Notes on taxonomy: This species was previously included in the genus *Hyla* but has recently been moved to the resurrected genus *Dendropsophus* (Faivovich *et al.* 2005).

Bibliography: Faivovich, J. *et al.* (2005), Kaplan, M. (1994)

Data Providers: María Cristina Ardila-Robayo, Jose Vicente Rueda

EN *Duellmanohyla chamulae* (Duellman, 1961)

Endangered B1ab(iii)
Order, Family: Anura, Hylidae
Country Distribution: Mexico
Current Population Trend: Decreasing



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Geographic Range This species occurs above 1,600m asl on the northern slopes of the central highlands of Chiapas, Mexico, from Jitotol to Soluschiapa.

Population This is not a rare species.

Habitat and Ecology It inhabits and breeds in cascading mountain streams in cloud forest areas.

Major Threats The main threat is deforestation and the disturbance of cloud forest remnants (at present, mountainous cloud forests are the most impacted habitats in Mexico). Chytridiomycosis may also pose a potential threat to this species.

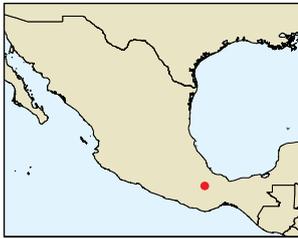
Conservation Measures The range of this species does not include any protected areas, and the protection and restoration of forested highland areas of northern Chiapas, Mexico, is needed. Further research is required to determine whether chytrid might pose a threat to this species. It is protected by Mexican law under the "Special Protection" category (Pr).

Bibliography: Campbell, J.A. and Smith, E.N. (1992), Duellman, W.E. (2001)

Data Providers: Georgina Santos-Barrera, Antonio Muñoz Alonso

EN *Duellmanohyla ignicolor* (Duellman, 1961)

Endangered B1ab(iii)+2ab(iii)
Order, Family: Anura, Hylidae
Country Distribution: Mexico
Current Population Trend: Decreasing



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 Society for the Study of Amphibians and Reptiles



Geographic Range This species is known from the Sierra de Juárez, northern Oaxaca, Mexico, at elevations of 680-1,850m asl.

Population This species is relatively uncommon and is known only from a few localities.

Habitat and Ecology It is a stream-breeding amphibian that requires the presence of streams and humid microhabitats.

Major Threats The main threat to this species is the disturbance and desiccation of streams in cloud forest. In addition, larvae with keratinized mouthparts have been found in southern Mexico, which suggests infection with chytridiomycosis.

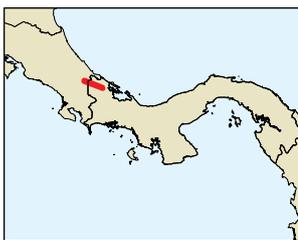
Conservation Measures Urgent protection of the Sierra de Juárez area is suggested since there are no existing protected areas in the region. In view of what appears to be a genuine risk of chytridiomycosis, the status of this species should be closely monitored, and ex-situ populations may need to be established. This species is protected by Mexican law under the "Special Protection" category (Pr).

Bibliography: Campbell, J.A. and Smith, E.N. (1992), Duellman, W.E. (2001), Lips, K.R. *et al.* (2004)

Data Providers: Georgina Santos-Barrera, Antonio Muñoz Alonso, Luis Canseco-Márquez

EN *Duellmanohyla lythrodes* (Savage, 1968)

Endangered B1ab(iii)
Order, Family: Anura, Hylidae
Country Distribution: Costa Rica, Panama
Current Population Trend: Decreasing



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 Society for the Study of Amphibians and Reptiles



Geographic Range This species is known from the humid lowlands of the Atlantic versant in southern Costa Rica and adjacent north-western Panama, from 170-440m asl (Savage 2002).

Population It is a rare species known only from three specimens.

Habitat and Ecology The few known specimens have been collected on low vegetation (approximately 3m above ground) within humid lowland forest. The species may be associated with headwater streams (Savage 2002). Larval development is presumed to take place in these streams.

Major Threats The major threat to the species is general habitat loss due to deforestation for smallholder farming activities, logging, and human settlement. Chytridiomycosis is also a potential threat to this species.

Conservation Measures It has not been recorded from any protected areas, and the lowland forest habitat of this species is in urgent need of protection. Further research is needed to determine the current population status of this species, and whether it is at risk of infection with chytrid.

Bibliography: Campbell, J.A. and Smith, E.N. (1992), Duellman, W.E. (1970), Duellman, W.E. (2001), Ibáñez, R. *et al.* (2000), Savage, J.M. (1968a), Savage, J.M. (2002), Young, B. *et al.* (1999)

Data Providers: Frank Solís, Roberto Ibáñez, Gerardo Chaves, Jay Savage, César Jaramillo, Querube Fuenmayor

VU *Duellmanohyla rufoculis* (Taylor, 1952)

Vulnerable B1ab(iii)
Order, Family: Anura, Hylidae
Country Distribution: Costa Rica
Current Population Trend: Decreasing



© Brian Kubicki



Geographic Range This species occurs on the Caribbean and Pacific slopes of the mountains of Costa Rica, at elevations of 775-1,580m asl.

Population It is regularly encountered in suitable habitat throughout its range.

Habitat and Ecology It lives in premontane wet forest and rainforest. A nocturnal stream breeder, males call throughout the year but are most active from August to December. The species sometimes aggregates around small, shallow streams or seeps draining into streams. Tadpoles are found in quiet pools.

Major Threats Major threats include deforestation, stream alteration, and pollution. Chytridiomycosis is also a potential threat.

Conservation Measures Its range includes several national parks, such as Braulio Carrillo, and other protected areas. The species is in need of close population monitoring, particularly if chytrid is shown to represent a genuine threat.

Bibliography: Campbell, J.A. and Smith, E.N. (1992), Pounds, J.A. *et al.* (1997), Savage, J.M. (2002)

Data Providers: Federico Bolaños, Gerardo Chaves

CR *Duellmanohyla salvavida* (McCranie and Wilson, 1986)

Critically Endangered B2ab(iii,v)
Order, Family: Anura, Hylidae
Country Distribution: Honduras
Current Population Trend: Decreasing



© James McCranie



Geographic Range This species occurs in Sierra de Nombre de Dios and Montana Macuzal, Atlantica and Yoro departments, north-central Honduras, at elevations of 90-1,400m asl.

Population It is uncommon and all populations are believed to be declining.

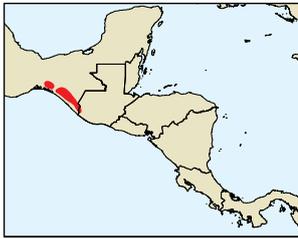
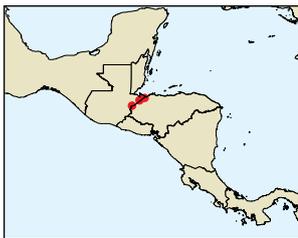
Habitat and Ecology It lives in lowland moist forest and premontane wet forest. It has been collected along shallow, slow-moving streams. It lays eggs in vegetation over streams.

Major Threats Habitat loss and degradation due to subsistence and smallholder agriculture, and logging, is the main threat to this species. Landslides on the upper clear water streams (caused by strong storms and human activities in the lower portions of the streams), water pollution, and fires are also threats. Chytridiomycosis presents a potential threat to this species.

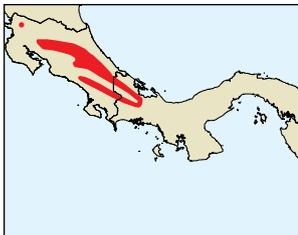
Conservation Measures It occurs within the Parque Nacional Pico Bonito and the Refugio de Vida Silvestre Texiguat. There is a need for close monitoring of the population status of this species, particularly given the threat of chytridiomycosis.

Bibliography: Campbell, J.A. and Smith, E.N. (1992), McCranie, J.R. and Wilson, L.D. (1986), McCranie, J.R. and Wilson, L.D. (1990), McCranie, J.R. and Wilson, L.D. (2002b), Wilson, L.D. and McCranie, J.R. (1998)

Data Providers: Gustavo Cruz, Larry David Wilson

VU *Duellmanohyla schmidtorum* (Stuart, 1954)**Vulnerable B1ab(iii)+2ab(iii)****Order, Family:** Anura, Hylidae**Country Distribution:** Guatemala, Mexico**Current Population Trend:** Decreasing© Herpetological Society of Middle America, 2001
Society for the Study of Amphibians and Reptiles**Geographic Range** This species is known from extreme eastern Oaxaca (Chimalapas) and extreme south-western Chiapas, Mexico, and adjacent Guatemala.**Population** It is not very common.**Habitat and Ecology** This species only inhabits montane cloud forest from moderate to high elevations in almost pristine environments. It is presumed to breed in streams.**Major Threats** The major threat is habitat loss due to deforestation and infrastructure development. However, chytridiomycosis is also a potential threat.**Conservation Measures** The range of this species includes Reserva de la Biósfera El Triunfo. There is a need for close population monitoring, particularly if chytrid is shown to represent a genuine threat. This species is protected by Mexican law under the "Special Protection" category (Pr).**Bibliography:** Campbell, J.A. (2001), Campbell, J.A. and Smith, E.N. (1992), Duellman, W.E. (2001)**Data Providers:** Georgina Santos-Barrera, Antonio Muñoz Alonso**CR** *Duellmanohyla soralia* (Wilson and McCranie, 1985)**Critically Endangered B2ab(iii,v)****Order, Family:** Anura, Hylidae**Country Distribution:** Guatemala, Honduras**Current Population Trend:** Decreasing

© Franklin E. Castañeda

**Geographic Range** This species occurs in Sierra de Omoa and Espiritu Santo in north-western Honduras and north-eastern Guatemala, between 40 and 1,570m asl.**Population** Formerly, it was moderately common in appropriate habitat. Currently, though, the population is declining throughout its range.**Habitat and Ecology** It is found on low vegetation along streams in lowland moist forest, and premontane and lower montane wet forest. Breeding and larval development take place in streams.**Major Threats** The main threats to the species are habitat loss due to agriculture (for uses such as pasture) and wood extraction, and water pollution. Chytridiomycosis is also a potential threat.**Conservation Measures** In Honduras, it is known to occur in Parque Nacional Cusuco and in the Parque Nacional Cerro Azul, both formally protected since 1987. Surveys are required to monitor the population status and trends of this species, particularly given the potential threat of chytridiomycosis.**Bibliography:** Campbell, J.A. and Smith, E.N. (1992), McCranie, J.R. and Wilson, L.D. (2002b), Wilson, L.D. and McCranie, J.R. (1985)**Data Providers:** Gustavo Cruz, Manuel Acevedo, Larry David Wilson**CR** *Duellmanohyla uranochroa* (Cope, 1875)**Critically Endangered A2ace****Order, Family:** Anura, Hylidae**Country Distribution:** Costa Rica, Panama**Current Population Trend:** Decreasing

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**Geographic Range** This species is known from the cordilleras of Costa Rica and western Panama (300-1,450m asl). In Costa Rica, the species occurs on the Atlantic versant at 656-1,740m asl and on the Pacific slope at 880-1,600m asl (Savage 2002).**Population** It was formerly common but has disappeared from its entire Costa Rican range except for a remnant population at Monteverde where it has declined substantially since the late 1980s. It is now infrequently seen in Costa Rica, and it is presumed to have declined in Panama.**Habitat and Ecology** It inhabits humid lowland and montane forest. Adults are usually found in the proximity of streams. During the day, individuals hide in vegetation, especially in leaf axils of epiphytes and terrestrial aroids. At night, moderately dense congregations have been found along small, fast-flowing streams. Males call from dense vegetation several metres away from the streams, from 0.5-3.0m above ground. Larvae develop in quiet pools, but sometimes adhere to large rocks in the stream bottom when the streams rise following heavy rains (Savage 2002).**Major Threats** Museum specimens have been found to be infected with chytrid fungi, and although it requires confirmation, it is likely that infection with this pathogen, perhaps in combination with climate change, is responsible for the current population decline. Habitat loss due to smallholder farming activities is also a threat to this species.**Conservation Measures** Although there are no specific conservation measures in place, this species has been recorded from at least three protected areas in Panama, and more than three protected areas in Costa Rica. Further survey work is required to monitor the population status and trends of this species, and to ascertain clearly whether or not chytrid poses a threat or not. A captive-breeding programme might need to be established.**Bibliography:** Duellman, W.E. (2001), Ibáñez, R. et al. (2000), Savage, J.M. (1968a), Savage, J.M. (2002), Young, B. et al. (1999)**Data Providers:** Alan Pounds, Gerardo Chaves, Frank Solís, Roberto Ibáñez, Jay Savage, César Jaramillo, Querube Fuenmayor**CR** *Ecnomiohyla echinata* (Duellman, 1962)**Critically Endangered A2ace****Order, Family:** Anura, Hylidae**Country Distribution:** Mexico**Current Population Trend:** Decreasing**Geographic Range** This species is known only from the type locality at around 2,000m asl on the northern slopes of the Sierra de Juárez, in the vicinity of Vista Hermosa town, north-central Oaxaca, Mexico.**Population** This has always been a rare species, but it appears to have gone into serious decline, and has not been recorded since 1962. Recent surveys to locate it have been unsuccessful, and it might now be extinct.**Habitat and Ecology** This species is restricted to cloud forest, and is highly dependent on humid habitats and in particular, the vegetation along low streams as well as epiphytic plants that serve as a refuge. It is a stream-breeding species.**Major Threats** This species has disappeared in suitable habitat, probably due to chytridiomycosis. The disappearance or disturbance of the unique cloud forest environment, primarily through selective logging, at Sierra de Juárez is also a serious threat to the survival of this species as well as many other amphibians, especially those associated with humid habitats.**Conservation Measures** This species is not known to occur in any protected areas, and urgent protection of the cloud forest areas in Sierra de Juárez is recommended. A survey to determine whether or not this species is still extant in the wild is also required. It is protected by Mexican law under the "Special Protection" category (Pr).**Notes on taxonomy:** This species was previously included in the genus *Hyla* but has recently been moved to the new genus *Ecnomiohyla* (Faivovich et al. 2005).**Bibliography:** Duellman, W.E. (2001), Faivovich, J. et al. (2005), Lips, K.R. et al. (2004)**Data Providers:** Georgina Santos-Barrera, Luis Canseco-Márquez