

Extinct and Extinct in the Wild Amphibian Species



EX *Adenomus kandianus* (Günther, 1872)

Order, Family: Anura, Bufonidae
Country Distribution: Sri Lanka (Extinct)

Geographic Range This species was endemic to Sri Lanka, and is known only from the general type locality of "Ceylon" (= Sri Lanka). The scientific name suggests that it might have been collected in the vicinity of the city of Kandy, central Sri Lanka. As the site of collection is unclear, the species has not been mapped.

Population It is known only from the type specimen. There have been no sightings since the original description and the species is now believed to be extinct (Manamendra-Arachchi and Pethiyagoda 1998). The general area of Kandy, where this frog is presumed to have occurred, has been well surveyed.

Habitat and Ecology While there is nothing known with certainty about the habitat and ecology of this species, it presumably bred by larval development in water as do other members of *Adenomus*.

Major Threats Although the causes of the species extinction not known, if the original collection locality was truly in the vicinity of Kandy, then it is quite likely that extensive urban development has destroyed any suitable habitat (Manamendra-Arachchi and Pethiyagoda 1998).

Conservation Measures It was not recorded from any protected areas.

Bibliography: Günther, A. (1872), Manamendra-Arachchi, K. and Pethiyagoda, R. (1998)

Data Providers: Kelum Manamendra-Arachchi, Ansem de Silva

EX *Atelopus ignescens* (Cornalia, 1849)

Order, Family: Anura, Bufonidae
Country Distribution: Ecuador (Extinct)



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Geographic Range This species ranged from Imbabura to Chimborazo and Bolívar Provinces, in the Inter-Andean valleys and higher parts of the major Andean Cordilleras of Ecuador, at elevations of 2,800-4,200m asl.

Population There have been no records of this species in Ecuador since 1988, despite extensive searches. It was formerly abundant along streams, but now appears to be extinct.

Habitat and Ecology An inhabitant of humid montane forest, humid sub-páramo (high-altitude bushland), and páramo (high-altitude grassland). This was a stream breeding species. Animals were recorded from disturbed habitats, including modified grasslands, in the Inter-Andean valleys and residential areas close to Quito.

Major Threats It probably disappeared due to the synergistic effects of the disease chytridiomycosis-confirmed in this species-and climatic change (local warming and droughts). Habitat loss and the introduction of predatory non-native trout might also have contributed to some population declines, however these threats are unlikely to have caused the substantial decline of the species throughout its range.

Conservation Measures The known range of this species overlapped with several protected areas, including: Reserva Ecológica Cayambe-Coca; Reserva Ecológica Antisana; Parque Nacional Cotopaxi; Área Nacional de Recreación el Boliche; Reserva Ecológica Los Illinizas; Parque Nacional Llanganates; and Reserva de Producción Faunística Chimborazo in Ecuador.

Notes on taxonomy: Coloma, Lötters and Salas (2000) redefined, *Atelopus ignescens*, and restricted the species to the north-central Andes of Ecuador. Populations in northern Ecuador (in Cachi Province), and adjacent southern Colombia (Nariño Department), previously assigned to *Atelopus ignescens* are now considered to belong to an undescribed species.

Bibliography: Coloma, L.A. (2002), Coloma, L.A., Lötters, S. and Salas, A.W. (2000), Cornalia, E. (1849), Gray, P. (1983), La Marca, E. *et al.* (2005), Lötters, S. (1996), Pounds, J.A. *et al.* (2006), Ron, S.R. *et al.* (2003)

Data Providers: Santiago Ron, Luis A. Coloma, Stefan Lötters, William Duellman, Martín R. Bustamante, Wilmar Bolívar, Enrique La Marca

EX *Atelopus longirostris* Cope, 1868

Order, Family: Anura, Bufonidae
Country Distribution: Ecuador (Extinct)



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Geographic Range This species was recorded from the Provinces of Esmeraldas, Imbabura, Cotopaxi, and Pichincha, on the north-western versant of the Ecuadorian Andes, at elevations of 200-2,500m asl. Records from the western

slope of the Cordillera Occidental, Valle del Cauca Department, in Colombia, refer to an unidentified, probably un-named species.

Population The species appears to be extinct, with no records in Ecuador since 1989, despite extensive surveys in suitable habitat.

Habitat and Ecology This was a terrestrial species of lowland and montane tropical rainforests. It was a stream breeding species.

Major Threats The decline in Ecuador is unexplained, and is possibly due to the disease chytridiomycosis, although this seems unusual given that the species was also found at lower elevations where chytridiomycosis is often not considered to be a threat. Other possible factors contributing to the extinction of this species include general climate change, pollution and habitat loss.

Conservation Measures The range of this species overlapped with the Reserva Ecológica Cotacachi-Cayapas and possibly reached the northern limit of the Reserva Ecológica Los Illinizas.

Notes on taxonomy: Lötters (1996) discussed controversy over the identity of frogs from Colombia assigned to this species by other authors.

Bibliography: Acosta-Galvis, A.R. (2000), Cannatella, D.C. (1981), Cope, E.D. (1868), La Marca, E. *et al.* (2005), Lötters, S. (1996), Merino-Viteri, A. (2001), Pounds, J.A. *et al.* (2006), Ruiz-Carranza, P.M., Ardila-Robayo, M.C. and Lynch, J.D. (1996)

Data Providers: Martín R. Bustamante, Wilmar Bolívar, Luis A. Coloma, Santiago Ron, Diego Cisneros-Heredia, Fernando Castro, Jose Vicente Rueda, Stefan Lötters, Andrés Acosta-Galvis

EX *Atelopus vogli* Müller, 1934

Order, Family: Anura, Bufonidae
Country Distribution: Venezuela (Extinct)



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Geographic Range This species is known only from the type locality of "Schluch Las Peñas (600m), unweit von Maracay". This area is now believed to be Pozo del Diablo en las cabeceras del Río Güey, on the southern versant of the Cordillera de la Costa, State of Aragua, Venezuela at 700m asl.

Population This species is known only from the type series collected by C. Vogel in 1933. Extensive searches in recent years have failed to find any animals, and the species is now believed to be extinct.

Habitat and Ecology The original habitat at the type locality, semi-deciduous humid forest, has been drastically modified by repeated clearing and burning, and only a savannah-like environment remains. Details from the collection series suggest that the species congregated for breeding in small streams.

Major Threats The species is believed to have become extinct following the extensive conversion of its habitat to agricultural use.

Conservation Measures This species has not been recorded from any protected areas.

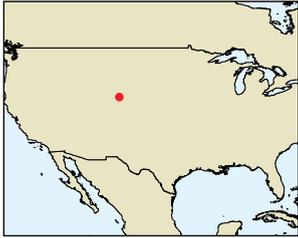
Notes on taxonomy: This species was recently recognized as distinct from *Atelopus cruciger* by Lötters, La Marca and Vences (2004).

Bibliography: Barrio Amorós, C.L. (2004), La Marca, E. *et al.* (2005), Lötters, S. (1996), Lötters, S., La Marca, E. and Vences, M. (2004), Pounds, J.A. *et al.* (2006)

Data Providers: Stefan Lötters, Enrique La Marca, Miguel Vences

EW *Bufo baxteri* Porter, 1964

Order, Family: Anura, Bufonidae
Country Distribution: United States of America (Extinct in the Wild)
Current Population Trend: Decreasing



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Geographic Range This species is restricted to the Laramie Basin, Wyoming, USA. The historical range extent was approximately 2,330km² (USFWS data). As of 2002, it was extant only at Mortenson Lake National Wildlife Refuge, which encompasses four impoundments: Mortenson, Garber, Gibbs, and Soda lakes; the refuge is closed to the public (USFWS 2002e). The extant occurrence probably would be extirpated without recent annual releases of captive-reared toadlets. Populations at former re-introduction sites (Lake George on the Hutton Lake National Wildlife Refuge, and Rush Lake) have been lost due to drought (USFWS 2002e).

Population This species was common in the 1950s, but underwent a large decline in the 1960s and 1970s; it was thought to be extinct in the wild in the mid-1980s, but was found again at Mortenson Lake in 1987 and captive propagation began in the mid-1990s using toads from Mortenson Lake (USFWS 2002e). At Mortenson Lake, there has been no natural reproduction by wild toads since 1991; the population is maintained through release of captive-reared young (Parker, Anderson and Lindzey 2000). In June 2002, a survey at Mortenson Lake NWR yielded 124 yearlings and

4 adults (USFWS 2002e). Limited natural reproduction and recruitment of a few metamorphosed juveniles occurred in 2002 (USFWS 2002e). Despite releases of captive-reared individuals, the population at Mortenson Lake NWR appears to be declining (USFWS 2002e).

Habitat and Ecology Historically, it is associated with floodplain ponds along the Big and Little Laramie Rivers; use of lakes might have been limited due to saline conditions; irrigation might have flushed out the lakes and made them more suitable for toads (G. Baxter pers. comm.). Currently, it occurs in the vicinity of lakes and adjacent meadows. It uses rodent burrows for shelter. Eggs and larvae develop in shallow water.

Major Threats Mortenson Lake, site of the only known extant population, is infected with the amphibian chytrid fungus (USFWS 2002e). This fungus has been implicated in declines and extinctions of amphibian species worldwide. Retrospective analysis shows that the fungus has been present at Mortenson Lake since at least 1989. In addition, chytridiomycosis is the most commonly seen disease in the captive population. Predation, pesticide use, irrigation practices, and lack of genetic diversity might also limit the abundance of Wyoming Toads in the Laramie Basin. The cause of the original decline remains unknown but might be associated with the invasion of chytrid into the area (USFWS 2002e). Mortenson Lake recently has become more saline (and less suitable for toads) as a result of drought-related increases in evaporation (USFWS 2002e). Salt-cedar was found (and removed) at Hutton Lake NWR in 2002. This plant has the potential to reduce habitat suitability (USFWS 2002e). For the past several years, beginning in late summer, adults with bacterial and fungal infections have been found moribund or dead (Taylor *et al.* 1999). Predators, probably mustelids, killed several radio-tagged individuals in 1998 (Parker, Anderson and Lindzey 2000).

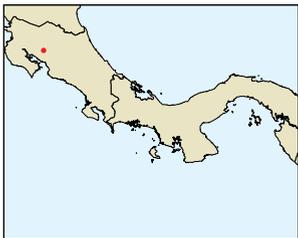
Conservation Measures It occurs in Mortenson Lake National Wildlife Refuge, where a recovery programme, using captive-bred animals and re-introductions, is being implemented. TNC recently acquired a 1,800-acre tract at Mortenson Lake and has arranged a conservation easement with an adjacent landowner. Lake George also is a toad refuge. The success of the recovery programme probably depends on finding some way to combat chytridiomycosis in the wild.

Bibliography: Baxter, G.T. and Stone, M.D. (1980), Blackburn, L., Nanjappa, P. and Lannoo, M.J. (2001), Collins, J.T. (1991), Dickerson, K. (1999), Dowling, H.G. (1993), Green, D.M. (1983), Lewis, D.L. *et al.* (1985), Matthews, J.R. and Moseley, C.J. (eds) (1990), Parker, J., Anderson, S.H. and Lindzey, F.J. (2000), Smith, H.M. *et al.* (1998), Spencer, B. (1999), Stebbins, R.C. (1985b), Taylor, S.K. *et al.* (1999), U.S. Fish and Wildlife Service (1990a), U.S. Fish and Wildlife Service (2002e)

Data Providers: Geoffrey Hammerson

WYOMING TOAD**EX** *Bufo periglenes* Savage, 1967

Order, Family: Anura, Bufonidae
Country Distribution: Costa Rica (Extinct)
CITES: Appendix I



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Geographic Range This species was known only from the Reserva Biológica Monteverde, Costa Rica, at elevations of 1,500-1,620m asl.

Population Formerly a common species, no specimen has been seen since 1989. It last bred in normal numbers in 1987, and its breeding sites were well known. In 1988, only eight males and two females could be located. In 1989, a single male was found, and was the last record of the species. Extensive searches since this time have failed to produce any more records.

Habitat and Ecology It lived in cloud and elfin forest, and bred in temporary pools at the beginning of the rainy season.

Major Threats Its restricted range, global warming, chytridiomycosis and airborne pollution probably contributed to this species' extinction.

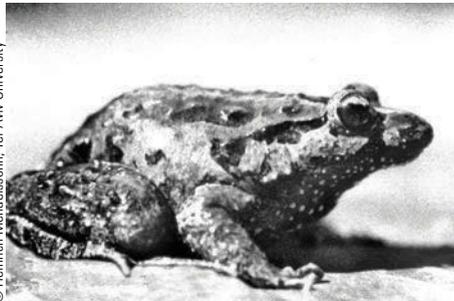
Conservation Measures Its entire range was protected by the Reserva Biológica Monteverde.

Bibliography: Crump, M.L. (1989), Crump, M.L., Hensley, F.R. and Clark, K.L. (1992), Jacobson, S.K. and Vandenberg, J.J. (1991), Pounds, J.A. *et al.* (1997), Pounds, J.A. and Crump, M.L. (1994), Pounds, J.A., Fogden, M.P.L. and Campbell, J.H. (1999), Savage, J.M. (1966), Savage, J.M. (2002)

Data Providers: Alan Pounds, Jay Savage

GOLDEN TOAD**EX** *Discoglossus nigriventer* Mendelssohn and Steinitz, 1943

Order, Family: Anura, Discoglossidae
Country Distribution: Israel (Extinct)



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Geographic Range This species was recorded from only two localities on the eastern shore of Lake Huleh, Israel. It seems possible that it could once also be found in adjacent parts of Syrian Arab Republic. The map indicates the possible former range.

Population It is known only from a few specimens and is now believed to be extinct. The single adult collected in 1955 represents the last confirmed record of this species.

Habitat and Ecology The species was reported to occur in marginal freshwater habitats within the Lake Huleh wetlands of Israel. It was presumably a larval developing species.

Major Threats The Huleh marshes were drained in the 1950s in an attempt to both eradicate malaria and to make the land suitable for agricultural use. Of the original 6,000ha of marshland, only 300ha remained after drainage. While this remaining wetland was set aside as a nature reserve in 1964 (at a considerable distance from the recorded localities of *Discoglossus nigriventer*) it seems that this action was too late to save the species.

Conservation Measures The species remains protected by national legislation in Israel. Surveys of potentially suitable habitat in the Aammiq marsh of nearby south-east Lebanon in April 2004 and April 2005 failed to locate any animals (Tron 2005). The Aammiq marsh is the only remaining wetland fragment of the Bekaa valley, which was once a major wetland of the Middle East but has been drastically reduced by conversion to agricultural use and urban development.

Bibliography: Fromhage, L., Vences, M. and Veith, M. (2004), Honegger, R.E. (1981), Honegger, R.E. (compiler) (1979), Mendelssohn, H. and Steinitz, H. (1943), Steinitz, H. (1955), Tron, F. (2005)

Data Providers: Theodore Papenfuss, Ahmad Disi, Steven Anderson, Sergius Kuzmin, Avital Gasith, Riyad A. Sadek, Yehudah Werner

HULA PAINTED FROG**EX** *Phrynomedusa fimbriata* Miranda-Ribeiro, 1923

Order, Family: Anura, Hylidae
Country Distribution: Brazil (Extinct)



Geographic Range This species has only been recorded from "Alto da Serra", Paranapiacaba, Santo Andre, in the State of Sao Paulo, south-eastern Brazil. It was collected at an elevation of around 1,000m asl.

Population It remains known from the holotype only, with no additional records for more than 80 years, despite repeated searches. It is now believed to be extinct.

Habitat and Ecology Although there is no information available on the biology or ecology of this species, it is possible that it was a high-altitude stream-breeder.

Major Threats No explanation is currently available for the disappearance of this species.

Conservation Measures There are no protected areas near the type locality of this species.

Bibliography: Cruz, C.A.G. (1982), Cruz, C.A.G. (1985), Cruz, C.A.G. (1990), Cruz, C.A.G. (1991)

Data Providers: Carlos Alberto Gonçalves da Cruz, Bruno Pimenta

EX *Craugastor chrysozetetes* (McCranie, Savage and Wilson, 1989)

Order, Family: Anura, Leptodactylidae
Country Distribution: Honduras (Extinct)



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Geographic Range This species was known only from Quebrada de Oro in the Río Viejo, south-east of La Ceiba, Department of Atlantida, northern Honduras, at 880-1,130m asl.

Population It was always extremely rare, and is now believed to be extinct. Several visits to the only known site in recent years have failed to locate the species.

Habitat and Ecology Animals were recorded along streams in premontane wet forest. It was presumably a direct developing species.

Major Threats The species is believed to have disappeared through a combination of threats including deforestation resulting from agricultural encroachment, human settlement of the region, logging, fires and landslides. The area from which this species was recorded is subject to extensive landslides; these often severely impact the species habitat. It should be additionally noted that all streamside *Craugastor* above 900m asl have disappeared in Honduras in a manner that is consistent with the disease chytridiomycosis.

Conservation Measures Although the species has not been recorded from a protected area, the Quebrada de Oro is at the edge of Parque Nacional Pico Bonito.

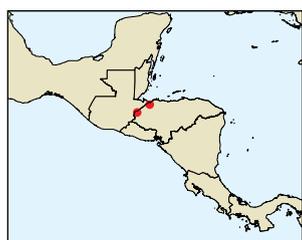
Notes on taxonomy: This species was previously included in the genus *Eleutherodactylus* (Crawford and Smith 2005).

Bibliography: Crawford, A.J. and Smith, E.N. (2005), McCranie, J.R. and Wilson, L.D. (2002b), McCranie, J.R., Savage, J.M. and Wilson, L.D. (1989)

Data Providers: Gustavo Cruz, Larry David Wilson, Randy McCranie

EX *Craugastor milesi* (K. Schmidt, 1933)

Order, Family: Anura, Leptodactylidae
Country Distribution: Honduras (Extinct)



© James McCranie

Geographic Range This species was known from west and north-west Honduras. It was recorded from the Cerro Azul in Copan Departamento, and from Montana del Cusuco (National Park) and Montana del Merendon (west of San Pedro Sula) in the Departamento de Cortes, within the Sierras de Espiritu Santo and Omoa. Animals were reported from elevations of 1,050-1,720m asl.

Population It was formerly relatively common, but underwent a precipitous decline. Repeated attempts to relocate this frog in appropriate habitat and weather conditions in Parque Nacional Cusuco between 1992 and 1996 were unsuccessful. It is now considered to be extinct.

Habitat and Ecology This was a leaf-litter species found along streams in premontane and lower montane wet forest. The species bred by direct development.

Major Threats While the species was clearly threatened habitat loss and degradation (largely resulting from the conversion of forest to subsistence agricultural use), this does not explain the sudden disappearance of populations from areas of pristine forest. It seems probable that factors related to declines in other montane frog species, such as disease chytridiomycosis, also contributed to the species demise.

Conservation Measures This species has been recorded within the Parque Nacional Cusuco and Parque Nacional Cerro Azul.

Notes on taxonomy: This species was previously included in the genus *Eleutherodactylus* (Crawford and Smith 2005).

Bibliography: Campbell, J.A. (1994b), Crawford, A.J. and Smith, E.N. (2005), McCranie, J.R. and Wilson, L.D. (1997a), McCranie, J.R. and Wilson, L.D. (2002b), McCranie, J.R., Savage, J.M. and Wilson, L.D. (1989), Savage, J.M. (2000), Schmidt, K.P. (1933)

Data Providers: Gustavo Cruz, Larry David Wilson

EX *Taudactylus diurnus* Straughan and Lee, 1966

Order, Family: Anura, Myobatrachidae
Country Distribution: Australia (Extinct)



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Geographic Range This species, an Australian endemic, occurred in disjunctive populations in three sub-coastal mountain ranges (Blackall, Conondale, and D'Aguilar Ranges) in the south-east Queensland region from Coonoon Gibber Creek in the north to Mount Glorious in the south (Czechura and Ingram 1990; Hines, Mahony and McDonald 1999). The extent of occurrence of the species was about 1,400km² (map in Hines, Mahony and McDonald 1999). *Taudactylus diurnus* occurred over a relatively narrow altitudinal range of 350-800m asl with most records falling between 500-800m asl (Czechura and Ingram 1990).

Population In the early 1970s it was considered to be relatively common (McEvoy, McDonald and Searle 1979), but it has not been sighted in the wild since 1979 despite continued efforts to relocate the species (Hines, Mahony and McDonald 1999). The disappearance of the species occurred over a period of three to four years, disappearing from the D'Aguilar Range in late 1975, then from the Blackall Range in late 1978, and finally from the Conondale Range in early 1979 (Czechura and Ingram 1990). There is no information on population size, structure, genetics or dynamics (Hines, Mahony and McDonald 1999). This species is now believed to be extinct.

MOUNT GLORIOUS TORRENT FROG

Habitat and Ecology *Taudactylus diurnus* was associated with permanent and temporary watercourses in montane rainforests, tall open forest, notophyll vine forest and sclerophyll fern forest (Czechura and Ingram 1990). In addition, animals were also found along watercourses in pure stands of the palm *Archontophoenix cunningghamii*, in exposed areas, in gorges, in dense non-forest riparian vegetation (*Lomandra longifolia*, *Carex neuroclamys*, *Elastostema reticulatum* and *Blechnum nudum*) and where the riparian vegetation had been slightly infested with *Lantana camara* (Czechura and Ingram 1990). Permanent streams with rocky substrates were favoured, but this species also occurred in permanent and ephemeral streams on gravel, clay, sand and soil substrates (Czechura and Ingram 1990). Active frogs have been observed all year round, although less frequently during winter months (Czechura and Ingram 1990). Breeding occurred in warm weather after or during heavy rain from late October to May, with a January to March peak (Czechura and Ingram 1990; Meyer, Hines and Hero 2001d). Gravid females have been reported between November and May (Straughan and Lee 1966). Amplexus is inguinal and 24-36 eggs (2.2mm diameter) are deposited in gelatinous clumps under rocks or branches in the water (Liem and Hosmer 1973; Watson and Martin 1973; Czechura and Ingram 1990; Meyer, Hines and Hero 2001d). Tadpoles, illustrated by Liem and Hosmer (1973) and Watson and Martin (1973), were found throughout the year.

Major Threats The reason(s) for the disappearance of this species remains unknown. Like *Rheobatrachus silus*, logging has occurred in catchments occupied by the species (Hines, Mahony and McDonald 1999); however, the effect of timber harvesting on the species has not been investigated. The species' habitat is currently threatened by feral pigs, invasion of weed species (especially mist flower) and altered stream flow and water quality due to upstream disturbances (Hines, Mahony and McDonald 1999). *Taudactylus diurnus* was not found in areas along watercourses that were heavily infested with *Lantana camara* or where the weeds *Baccharis halimifolia* and *Agertina riparia* (mist flower) occurred (Czechura and Ingram 1990). The frogs were also absent from streams with very muddy water associated with the activities of feral pigs (Czechura and Ingram 1990). From what is known from similar declines and disappearance elsewhere in the world, the disease chytridiomycosis also must be suspected as a cause for the decline.

Conservation Measures The species' habitat is fully protected within a National Park.

Bibliography: Czechura, G.V. and Ingram, G. (1990), Hines, H., Mahony, M. and McDonald, K. (1999), Ingram, G.J. (1980), Liem, D.S. and Hosmer, W. (1973), McEvoy, J.S., McDonald, K.R. and Searle, A.K. (1979), Meyer, E., Hines, H. and Hero, J.-M. (2001d), Straughan, I.R. and Lee, A.K. (1966), Tyler, M.J. (1997), Watson, G.F. and Martin, A.A. (1973)

Data Providers: Jean-Marc Hero, Sarah May, David Newell, Harry Hines, John Clarke, Ed Meyer

EX *Nannophrys guentheri* Boulenger, 1882

Order, Family: Anura, Ranidae
Country Distribution: Sri Lanka (Extinct)

Geographic Range This species is known only from the general type locality of "Ceylon" (= Sri Lanka). It is not possible to produce a meaningful distribution map for the species.

Population Known only from the type series collected more than a 100 years ago. It has not been recorded since it was originally described. Recent and extensive field surveys of the amphibian fauna of Sri Lanka have been unable to relocate this frog, and it is now believed to be extinct.

Habitat and Ecology There is no information on the habitat requirements of this species. It presumably bred on wet rock surfaces near streams, like other members of the genus.

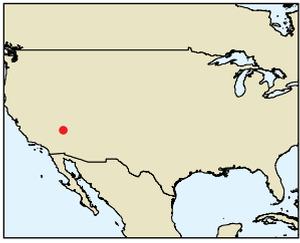
Major Threats The reasons for the extinction of this species are not known.

Conservation Measures It has not been recorded from any protected areas.

Notes on taxonomy: The five available museum specimens require further comparison with specimens of *Nannophrys ceylonensis*.

Bibliography: Clarke, B.T. (1983), Dutta, S.K. (1997), Dutta, S.K. and Manamendra-Arachchi, K. (1996)

Data Providers: Kelum Manamendra-Arachchi, Anselm de Silva

EX *Rana fisheri* Stejneger, 1893**Order, Family:** Anura, Ranidae**Country Distribution:** United States of America (Extinct)

Geographic Range This species was known from a small number of localities, elevation ca. 600m asl, in the northern portions of Las Vegas Valley, Clark County, Nevada, USA (Jennings, Riddle and Bradford 1995).

Population It was last seen in 1942 (Wright and Wright 1949) and is now believed to be extinct (Jennings, Riddle and Bradford 1995).

Habitat and Ecology This frog was restricted to freshwater streams, springs, seeps, and adjacent riparian habitat associated with the Upper Las Vegas Valley (Wright and Wright 1949). Egg masses are not known, but metamorphic individuals were collected in the same habitats as those used by adults (Wright and Wright 1949).

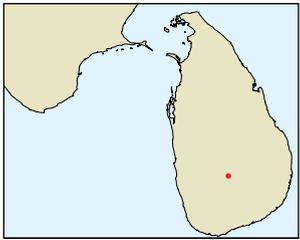
Major Threats It is extinct evidently due to habitat loss resulting from spring capture and ground water pumping by the growing city of Las Vegas (URS 1977), and exacerbated by the introduction of the Bullfrog *Rana catesbeiana*. Although some suitable habitat persists within or near the former range of this species, only *R. catesbeiana* can be found.

Conservation Measures No conservation measures are needed; this species is extinct.

Notes on taxonomy: Since its description, *Rana fisheri* (Stejneger 1893) has been considered a distinct species (Linsdale 1940; Jennings, Riddle and Bradford 1995), a subspecies of *R. pipiens* (Stebbins 1959) or a synonym of *R. onca* (Jennings 1988; Stebbins 2003). Morphological analyses support the view that *R. fisheri* represents a separate species (Jennings, Riddle and Bradford 1995).

Bibliography: Behler, J.L. and King, F.W. (1979), Blackburn, L., Nanjappa, P. and Lannoo, M.J. (2001), Frost, D.R. (1985), Jennings, M.R. (1988), Jennings, R.D., Riddle, B.R. and Bradford, D. (1995), Linsdale, J.M. (1940), Stebbins, R.C. (1954), Stebbins, R.C. (1959), Stebbins, R.C. (1985b), Stebbins, R.C. (2003), Stejneger, L. (1893), Wright, A.H. and Wright, A.A. (1949)

Data Providers: Randy Jennings, Geoffrey Hammerson

LAS VEGAS LEOPARD FROG**EX** *Philautus adspersus* (Günther, 1872)**Order, Family:** Anura, Rhacophoridae**Country Distribution:** Sri Lanka (Extinct)

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Geographic Range This extinct Sri Lankan species is known only from the non-specific type locality of "Ceylon" (not "Peradeniya" as sometimes stated) and from Nuwara Eliya, a resort town among mountains at 1,700-2,500m asl (Manamendra-Arachchi and Pethiyagoda 2005). Only the site of Nuwara Eliya has been mapped here. Reports of this frog occurring in India (Krishnamurthy and Sakunthala 1993) are believed to be erroneous (S.K. Dutta pers. comm. 2002).

Population It is known only from two specimens, and was last collected around 1886. It is now thought to be extinct since recent extensive field surveys of the amphibian fauna of Sri Lanka have failed to rediscover this frog.

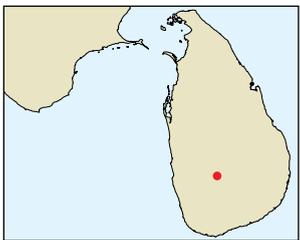
Habitat and Ecology The habitat requirements of this species are not known. It presumably bred by direct development.

Major Threats The threats that led to the extinction of this species are not known, though habitat loss through conversion of land to agricultural use seems the most likely cause.

Conservation Measures It is not known to have occurred in any protected areas.

Bibliography: Bossuyt, F. and Dubois, A. (2001), Krishnamurthy, S.V. and Sakunthala, K. (1993), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Sushil Dutta

EX *Philautus dimbullae* (Shreve, 1940)**Order, Family:** Anura, Rhacophoridae**Country Distribution:** Sri Lanka (Extinct)

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Geographic Range This species is a Sri Lankan endemic, known only from the type locality of "Queenwood Estate, Dimbulla, Ceylon", at 1,500m, where it was collected in 1933 (Manamendra-Arachchi and Pethiyagoda 2005).

Population It is known only from the holotype. There have been no records since its original collection and the species is now believed to be extinct because recent, extensive field surveys of the amphibian fauna of Sri Lanka, including at the type locality, have not rediscovered this frog.

Habitat and Ecology The habitat requirements of this species are not known. It presumably bred by direct development.

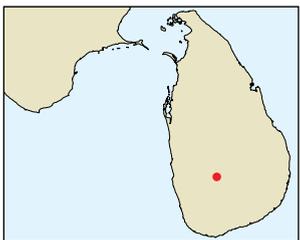
Major Threats The threats that resulted in the extinction of this species are not known, although presumably habitat loss was a contributing factor.

Conservation Measures It has not been recorded from any protected areas.

Notes on taxonomy: This species is considered distinct from *Philautus microtympnum*, following Manamendra-Arachchi and Pethiyagoda (2005).

Bibliography: Bossuyt, F. and Dubois, A. (2001), Dutta, S.K. and Manamendra-Arachchi, K. (1996), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Ansem de Silva

EX *Philautus eximius* Shreve, 1940**Order, Family:** Anura, Rhacophoridae**Country Distribution:** Sri Lanka (Extinct)

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Geographic Range This species is endemic to Sri Lanka, and is known only from the type locality of "Queenwood Estate, Dimbulla, Ceylon", at 1,500m asl, where it was collected in 1933 (Manamendra-Arachchi and Pethiyagoda 2005).

Population This species is known only from the holotype. There have been no sightings since 1933 and the species is believed to now be extinct, because recent, extensive field surveys of the amphibian fauna of Sri Lanka, including at the type locality, have not rediscovered this frog.

Habitat and Ecology The habitat requirements of this species are not known. It presumably bred by direct development.

Major Threats The threats that resulted in the extinction of the species are not known, although presumably habitat loss was a contributing factor.

Conservation Measures It has not been recorded from any protected areas.

Bibliography: Bossuyt, F. and Dubois, A. (2001), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Ansem de Silva

EX *Philautus extirpo* Manamendra-Arachchi and Pethiyagoda, 2005**Order, Family:** Anura, Rhacophoridae**Country Distribution:** Sri Lanka (Extinct)

Geographic Range This recently described species was originally collected in 1882 from an unspecified locality on Sri Lanka (Manamendra-Arachchi and Pethiyagoda 2005). It is not possible to produce a meaningful distribution map for this species.

Population There have been no records since 1882, and it is presumed to be extinct, because extensive searches have failed to rediscover this species.

Habitat and Ecology There is no information about the habitat requirements of this species. It presumably bred by direct development.

Major Threats The threats that led to the extinction of this species are not known, though habitat loss seems the most likely cause.

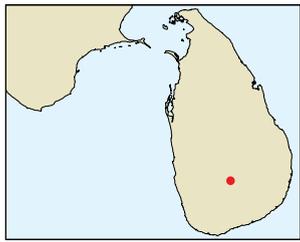
Conservation Measures It has not been recorded from any protected areas.

Bibliography: Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Rohan Pethiyagoda

EX *Philautus halyi* Boulenger, 1904

Order, Family: Anura, Rhacophoridae
Country Distribution: Sri Lanka (Extinct)



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Geographic Range This species is endemic to Sri Lanka, and is known only from the type locality of "Pattipola, Ceylon [= Sri Lanka]", where it was collected in 1899 (Manamendra-Arachchi and Pethiyagoda 2005).

Population It is known only from the holotype, and there have been no sightings since 1899. The species is believed to now be extinct, because recent extensive field surveys of the amphibian fauna of Sri Lanka have not rediscovered this frog.

Habitat and Ecology The habitat requirements of the species are not known. It presumably bred by direct development.

Major Threats The causes of the extinction are not known, but presumably habitat loss was a contributing factor.

Conservation Measures It has not been recorded from any protected areas.

Notes on taxonomy: This species is considered distinct from *Philautus leucorhinus* following Manamendra-Arachchi and Pethiyagoda (2005).

Bibliography: Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Ansem de Silva

EX *Philautus hypomelas* (Günther, 1876)

Order, Family: Anura, Rhacophoridae
Country Distribution: Sri Lanka (Extinct)

Geographic Range This species is endemic to Sri Lanka, and is known only from the imprecise type locality of "Ceylon [=Sri Lanka]" (Manamendra-Arachchi and Pethiyagoda 2005). It is not possible to map this species because the exact type locality is not known.

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Population It is known only from the type series. There have been no sightings of the species since it was described in 1876, and it is now believed to be extinct, because recent, extensive field surveys of the amphibian fauna of Sri Lanka have not rediscovered this frog.

Habitat and Ecology The habitat requirements of the species are not known. It presumably bred by direct development.

Major Threats The causes of the species' extinction are not known, but presumably habitat loss was a contributing factor.

Conservation Measures It has not been recorded from any protected areas.

Bibliography: Bossuyt, F. and Dubois, A. (2001), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Ansem de Silva

EX *Philautus leucorhinus* (Lichtenstein and Martens, 1856)

Order, Family: Anura, Rhacophoridae
Country Distribution: Sri Lanka (Extinct)

Geographic Range This species is known only from the type locality "Ceylon" (= Sri Lanka) (Dutta and Manamendra-Arachchi 1996). The type locality is too general to allow the production of a meaningful map for this species.

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Population It is known only from the type specimen (collected before description in 1856), and it is now believed to be extinct, because recent, extensive field surveys of the amphibian fauna of Sri Lanka have failed to rediscover this frog.

Habitat and Ecology The habitat requirements of this species are not known. It presumably bred by direct development.

Major Threats The causes of the species' extinction are not known, but presumably habitat loss was a contributing factor.

Conservation Measures It has not been recorded from any protected areas.

Notes on taxonomy: Specimens recorded as *Philautus temporalis* and *P. leucorhinus* from the Western Ghats of India are now considered to be *P. Wynnaedensis*. *P. temporalis* and *P. leucorhinus* are endemic species of Sri Lanka (S.D. Biju and K. Manamendra-Arachchi pers. comm.; Bossuyt and Dubois 2001).

Bibliography: Bossuyt, F. and Dubois, A. (2001), Dutta, S.K. (1997), Dutta, S.K. and Manamendra-Arachchi, K. (1996), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, S.D. Biju, Ansem de Silva

EX *Philautus malcolmsmithi* (Ahl, 1927)

Order, Family: Anura, Rhacophoridae
Country Distribution: Sri Lanka (Extinct)

Geographic Range This species is an extinct Sri Lankan endemic, known only from the type locality of "Ceylon" (Manamendra-Arachchi and Pethiyagoda 2005). It is not possible to produce a distribution map for this species because the type locality is too imprecise.

Population The species is known only from the holotype specimen. There have been no sightings for over 70 years and the species is now believed to be extinct. Recent, extensive field surveys of the amphibian fauna of Sri Lanka have not rediscovered this frog.

Habitat and Ecology The habitat requirements of this species are not known. It presumably bred by direct development.

Major Threats The cause of the species' extinction is not known, but presumably habitat loss was a contributing factor to its demise.

Conservation Measures It has not been recorded from any protected areas.

Notes on taxonomy: We consider this species to be distinct from *Philautus leucorhinus* following Manamendra-Arachchi and Pethiyagoda (2005).

Bibliography: Ahl, E. (1927), Bossuyt, F. and Dubois, A. (2001), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Ansem de Silva

EX *Philautus nanus* (Günther, 1869)

Order, Family: Anura, Rhacophoridae
Country Distribution: Sri Lanka (Extinct)

Geographic Range This species is an extinct Sri Lankan endemic, known only from the type locality of "southern Ceylon [=Sri Lanka]" (Manamendra-Arachchi and Pethiyagoda 2005). It is not possible to produce a distribution map for this species because the exact location of the type locality is not known.

Population It is known only from the lectotype. There have been no records since the species was described in 1869, and it

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is now believed to be extinct. Recent, extensive field surveys of the amphibian fauna of Sri Lanka have failed to rediscover this frog.

Habitat and Ecology The habitat requirements of this species are not known. It presumably bred by direct development.

Major Threats The reason for the species' extinction is not known, but presumably habitat loss was a contributing factor.

Conservation Measures It has not been recorded from any protected areas.

Notes on taxonomy: This species was resurrected from the synonymy of *Philautus microtympalum* by Dutta and Manamendra-Arachchi (1996).

Bibliography: Bossuyt, F. and Dubois, A. (2001), Dutta, S.K. and Manamendra-Arachchi, K. (1996), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Ansem de Silva

EX *Philautus nasutus* (Günther, 1868)

Order, Family: Anura, Rhacophoridae
Country Distribution: Sri Lanka (Extinct)

Geographic Range This species is an extinct Sri Lankan endemic, known only from the general type locality of "Ceylon [=Sri Lanka]" (Manamendra-Arachchi and Pethiyagoda 2005). It is not possible to produce a distribution map for this species because the exact location of the type locality is not known. Specimens previously attributed to this species from India (Krishnamurthi and Shakunthala 1993) are now believed to be a separate taxon (Biju 2001), and



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specimens reported by Karunaratne (1998) are believed to belong to a different species (K. Manamendra-Arachchi pers. comm.).

Population It is known only from the holotype. There have been no records since the species was described in 1869, and it is now believed to be extinct. Recent, extensive field surveys of the amphibian fauna of Sri Lanka have not rediscovered this frog.

Habitat and Ecology The habitat requirements of this species are not known. It presumably bred by direct development.

Major Threats The cause for the species' extinction is not known, but presumably habitat loss was a contributing factor.

Conservation Measures It has not been recorded from any protected areas.

Bibliography: Biju, S.D. (2001), Bossuyt, F. and Dubois, A. (2001), Dutta, S.K. (1997), Dutta, S.K. and Manamendra-Arachchi, K. (1996), Karunaratne, S. (1998), Krishnamurthy, S.V. and Sakunthala, K. (1993), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Ansem de Silva

EX *Philautus oxyrhynchus* (Günther, 1872)

Order, Family: Anura, Rhacophoridae
Country Distribution: Sri Lanka (Extinct)

Geographic Range This species is an extinct Sri Lankan endemic, known only from the type locality of "Ceylon" (Manamendra-Arachchi and Pethiyagoda 2005). Peradeniya is not the correct type locality (K. Manamendra-Arachchi pers. comm.). It is not possible to produce a meaningful distribution map for this species.



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Population The species is known only from the lectotype. There have been no sightings since the species was described in 1872, and it is now believed to be extinct. Recent, extensive field surveys of the amphibian fauna of Sri Lanka have not rediscovered this frog.

Habitat and Ecology The habitat requirements of this species are not known. It presumably bred by direct development.

Major Threats The reason for the species' extinction is not known, but presumably habitat loss was a contributing factor.

Conservation Measures It has not been recorded from any protected areas.

Notes on taxonomy: This species is considered distinct from *Philautus leucorhinus* following Manamendra-Arachchi and Pethiyagoda (2005).

Bibliography: Bossuyt, F. and Dubois, A. (2001), Dutta, S.K. (1997), Dutta, S.K. and Manamendra-Arachchi, K. (1996), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Ansem de Silva

EX *Philautus rugatus* (Ahl, 1927)

Order, Family: Anura, Rhacophoridae
Country Distribution: Sri Lanka (Extinct)

Geographic Range This species is endemic to Sri Lanka, and is known only from the non-specific type locality of "Ceylon (Farmlands)" or "Taralanda" (Manamendra-Arachchi and Pethiyagoda 2005). It is not possible to produce a distribution map for this species because the exact location of the type locality is not known.

Population It is known only from the holotype specimen. There have been no sightings since the species was described in 1927, and it is now believed to be extinct. Recent, extensive field surveys of the amphibian fauna of Sri Lanka have not rediscovered this frog.

Habitat and Ecology The habitat requirements of this species are not known. It presumably bred by direct development.

Major Threats The causes of the species' extinction are not known, but presumably habitat loss was a contributing factor.

Conservation Measures It has not been recorded from any protected areas.

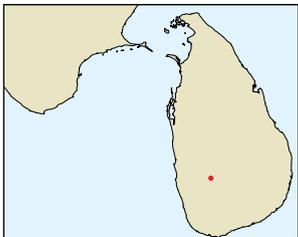
Notes on taxonomy: This species is considered distinct from *Philautus leucorhinus* (Günther, 1858) following Manamendra-Arachchi and Pethiyagoda (2005).

Bibliography: Ahl, E. (1927), Bossuyt, F. and Dubois, A. (2001), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Ansem de Silva

EX *Philautus stellatus* (Kelaart, 1853)

Order, Family: Anura, Rhacophoridae
Country Distribution: Sri Lanka (Extinct)



Geographic Range This species is known only from the type locality of Nuwara Eliya (06° 57' N, 80° 47' E) [Newera-Ellia], in Sri Lanka (Manamendra-Arachchi and Pethiyagoda 2005).

Population It is known only from the lost holotype. There have been no records since the species was described in 1853, and it is now believed to be extinct. Recent, extensive field surveys of the amphibian fauna of Sri Lanka, including at the type locality, have failed to rediscover this frog.

Habitat and Ecology The habitat requirements of this species are not known. It presumably bred by direct development.

Major Threats The threats that resulted in the extinction of this species are not known, although presumably habitat loss was a major factor.

Conservation Measures It has not been recorded from any protected areas.

Notes on taxonomy: This species is known only from the now lost holotype.

Bibliography: Bossuyt, F. and Dubois, A. (2001), Kelaart, E.F. (1853), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Rohan Pethiyagoda, Sushil Dutta, Ansem de Silva

EX *Philautus temporalis* (Günther, 1864)

Order, Family: Anura, Rhacophoridae
Country Distribution: Sri Lanka (Extinct)

Geographic Range This species is endemic to Sri Lanka, where it is known only from the non-specific type locality of "Ceylon" (Manamendra-Arachchi and Pethiyagoda 2005). It is not possible to produce a distribution map for this species because the exact location of the type locality is not known.



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Population It is known only from the lectotype and type series, and has not been recorded since the original description in 1864. Recent, extensive field surveys of the amphibian fauna of Sri Lanka have failed to rediscover this frog and it is now considered to be extinct.

Habitat and Ecology The habitat requirements of this species are not known. It presumably bred by direct development.

Major Threats The causes of the species' extinction are not known, but presumably habitat loss was a contributing factor.

Conservation Measures It has not been recorded from any protected areas.

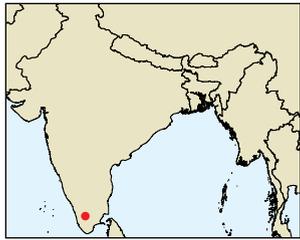
Notes on taxonomy: Specimens formerly attributed to *Philautus temporalis* and *P. leucorhinus* from the Western Ghats are now correctly assigned to *P. wynaadensis*. *P. temporalis* and *P. leucorhinus* are now considered to be endemic species of Sri Lanka (S.D. Biju and K. Manamendra-Arachchi pers. comm.).

Bibliography: Biju, S.D. (2001), Bossuyt, F. and Dubois, A. (2001), Dutta, S.K. (1997), Inger, R.F. et al. (1984), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: S.D. Biju, Kelum Manamendra-Arachchi

EX *Philautus travancoricus* (Boulenger, 1891)

Order, Family: Anura, Rhacophoridae
Country Distribution: India (Extinct)



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Geographic Range This species is known only from the type locality of "Bodanaikanur, Travancore, at the foot of the hills on the eastern side" in the Western Ghats of India. The altitudinal range is reported to be up to 400m asl.

Population It is known only from the holotype specimen, and was described in 1891. Extensive recent field surveys of the area, and surrounding suitable habitat, have not relocated this species, and it is now considered to be extinct.

Habitat and Ecology It is believed to have been an arboreal species of tropical moist evergreen forest. It is presumed to have been a direct developing species, like other species of the genus.

Major Threats The extinction of the species was caused by deforestation through conversion of land to agricultural use and urban development.

Conservation Measures It has not been recorded from any protected area.

Bibliography: Biju, S.D. (2001), Boulenger, G.A. (1891), Dutta, S.K. (1997)

Data Providers: S.D. Biju

At the time of going to press we received reports of the rediscovery of this species in the Western Ghats of India (S.D. Biju pers. comm.).

EX *Philautus variabilis* (Günther, 1858)

Order, Family: Anura, Rhacophoridae
Country Distribution: Sri Lanka (Extinct)

Geographic Range This species is known only from the general type locality of "Ceylon" (= Sri Lanka). It is not possible to produce a distribution map for this species because the exact location of the type collection is not known (Manamendra-Arachchi and Pethiyagoda 2005).

Population This species is known only from the lectotype. Recent, extensive field surveys of the amphibian fauna of Sri Lanka have not relocated this species and it is now believed to be extinct.



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Habitat and Ecology The habitat requirements of this frog are not known. It presumably bred by direct development.

Major Threats The cause of the species' extinction is not known, but habitat loss seems likely to have been a contributing factor.

Conservation Measures It has not been recorded from any protected areas.

Notes on taxonomy: Specimens formerly attributed to *Philautus variabilis* from the Western Ghats of India are misidentified *P. wynaedensis*. *P. variabilis* is endemic to Sri Lanka, where it is now considered to be extinct (K. Manamendra-Arachchi and S.D. Biju pers. comm.).

Bibliography: Biju, S.D. (2001), Bossuyt, F. and Dubois, A. (2001), Dutta, S.K. (1997), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005), Ravichandran, M.S. (1996a), Ravishankar, D. et al. (2001), Vasudevan, K., Kumar, A. and Chellam, R. (2001)

Data Providers: S.D. Biju, Kelum Manamendra-Arachchi, Anslém de Silva, Sushil Dutta

EX *Philautus zal* Manamendra-Arachchi and Pethiyagoda, 2005

Order, Family: Anura, Rhacophoridae
Country Distribution: Sri Lanka (Extinct)

Geographic Range This recently described species is a Sri Lankan endemic, known only from the general type locality of "Ceylon" (Manamendra-Arachchi and Pethiyagoda 2005). It is not possible to produce a distribution map for this species because the exact location of the type collection is not known.

Population It is known only from the holotype and two paratypes. There have been no records since the type collection (sometime before 1947) and the species is now believed to be extinct, because recent, extensive field surveys of the amphibian fauna of Sri Lanka have failed to rediscover this frog.

Habitat and Ecology The habitat requirements of this species are not known. It presumably bred by direct development.

Major Threats The reason for the species' extinction is not known, but presumably habitat loss was a contributing factor.

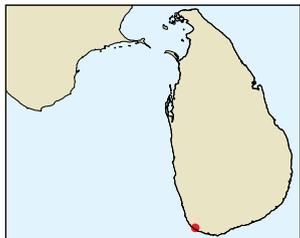
Conservation Measures It has not been recorded from any protected areas.

Bibliography: Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Anslém de Silva

EX *Philautus zimmeri* (Ahl, 1927)

Order, Family: Anura, Rhacophoridae
Country Distribution: Sri Lanka (Extinct)



Geographic Range This is an extinct Sri Lankan endemic, known only from the type locality of "Point de Galle, Ceylon".

Population It is known only from the holotype specimen described in 1927. There have been no records since this time and the species is now believed to be extinct. Recent, extensive field surveys of the amphibian fauna of Sri Lanka, including at the type locality, have not rediscovered this frog.

Habitat and Ecology The habitat requirements of this species are not known. It presumably bred by direct development.

Major Threats The reason for the species' extinction is not known, but presumably habitat loss contributed to its demise as the town of Galle is heavily urbanized.

Conservation Measures It has not been recorded from any protected areas.

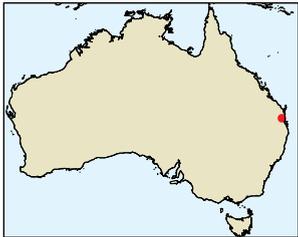
Notes on taxonomy: This species is considered distinct from *Philautus microtypanum* following Manamendra-Arachchi and Pethiyagoda (2005).

Bibliography: Ahl, E. (1927), Bossuyt, F. and Dubois, A. (2001), Manamendra-Arachchi, K. and Pethiyagoda, R. (2005)

Data Providers: Kelum Manamendra-Arachchi, Anslém de Silva

EX *Rheobatrachus silus* Liem, 1973

Order, Family: Anura, Rheobatrachidae
Country Distribution: Australia (Extinct)
CITES: Appendix II



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Geographic Range This species, an Australian endemic, was restricted to elevations between 350 and 800m asl in the Blackall and Conondale Ranges in south-east Queensland (Hines, Mahony and McDonald 1999). The geographic distribution of the species was less than 1,400km² (map in Hines, Mahony and McDonald 1999). *Rheobatrachus silus* inhabited streams in the catchments of the Mary, Stanley and Mooloolah River (Ingram 1983). It was thought to have been first found in 1972 (Liem 1973), but Ingram (1991) reported a specimen collected in 1914 from the Blackall Range.

Population The species declined rapidly and disappeared at about the same time as a sympatric species *Taudactylus diurnus* (Czechura and Ingram 1990). Czechura and Ingram (1990) and Ingram (1990) state that the last frog was seen in the wild in 1979 on the Conondale Range. However, Richards, McDonald and Alford (1993) reported the existence of a specimen taken from the Blackall Range in 1981. Despite intensive searching, the species has not been located since (Ingram and McDonald 1993; Hines, Mahony and McDonald 1999). In the laboratory, the last known individual died in 1983 (Tyler and Davies 1985b). Ingram (1983) studied a population of the species in the headwaters of Booloumba Creek, Conondale Range, and estimated that approximately 78 were present in 1976. No other estimates of population size are available for the species. This species is now believed to be extinct.

Habitat and Ecology *Rheobatrachus silus* lived in rainforest, wet sclerophyll forest and riverine gallery open forest at 350m asl and was closely associated with watercourses and adjacent rock pools and soaks (Czechura 1991; Meyer, Hines and Hero 2001e). These streams are mostly perennial, but in extremely dry years they may cease to flow (Ingram 1983). The vegetation along the stream banks is usually closed forest or tall closed forest with emergent eucalypts, although there are some sites in open forest with grassy ground cover (Ingram 1983). In spring and summer individuals were usually found in or at the edge of rock pools, either amongst leaf-litter, under and between stones

or in crevices around the edge (Ingram 1983). The species was also found under rock in shallow water in backwaters and also the main flow of permanent watercourses (Ingram 1983; Czechura 1991). Searches of popular sites in winter only recovered two frogs and it is assumed that the species hibernates in deep crevices in rocks or spaces between rocks underwater during the colder months (Ingram 1983). Adult males tend to prefer deeper pools, whereas females and juveniles may move to newly created pools after rain as long as these pools contained stones and/or leaf-litter (Ingram 1983). The prerequisite for the use of pools by this species seems to be that the pool must be deep enough for the frog to be able to sit with its head out of the water and be able to safely submerge (Ingram 1983). Individuals will only sit fully exposed on the rocks during light rain (Ingram 1983). *Rheobatrachus silus* has never been recorded from cleared riparian habitat. Breeding activity occurs between October and December (Ingram 1983). Males call from rock crevices above pools (Ingram 1983). Females brood young within the stomach and give birth through the mouth (Tyler and Carter 1982). Fertilized eggs or early stage larvae are presumably swallowed by the female and complete their development in the stomach (Tyler and Carter 1982). The number of eggs in gravid females (approximately 40) exceeds the number of juveniles found to occur in the stomach (21-26) (Tyler 1989). It is not known whether or not the excess eggs are digested by the female or whether or not they are simply not swallowed (Tyler 1989). The production of hydrochloric acid in the stomach of the female ceases during brooding (Tyler *et al.* 1983). Tadpoles develop in a manner similar to the aquatic tadpoles of other species though, as they feed off egg yolk, the labial teeth are absent and the intestines form at a later stage of development (Tyler 1989). After 6-7 weeks the females give birth to up to 25 young (Tyler and Davies 1983a). Young emerge from the female's mouth as fully formed frogs and after four days the digestive tract returns to normal and the female recommences feeding (Tyler and Davies 1983b). Ingram (1983) reported minimum brooding periods from two individuals of 36 and 43 days and suggested that the duration was such that females were unlikely to breed twice in one season.

Major Threats The reason(s) for the disappearance of this species remains unknown (Tyler and Davies 1985b). Populations were present in logged catchments between 1972 and 1979. Although the species persisted in the streams during these activities, the effects of timber harvesting on this aquatic species were never investigated. Its habitat is currently threatened by feral pigs, invasion of weeds (especially mistflower *Ageratina riparia*), and altered flow and water quality due to upstream disturbances. The habitat of the species is currently threatened by feral pigs and the invasion of weeds (especially mistflower) (Hines, Mahony and McDonald 1999). However, from what is known from similar declines and disappearances elsewhere in the world, the disease chytridiomycosis must be suspected.

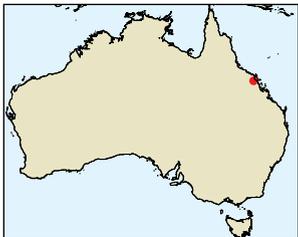
Conservation Measures The historical range of the species included several protected areas. Further research into the cause of the decline of this species is needed.

Bibliography: Czechura, G.V. (1991), Czechura, G.V. and Ingram, G. (1990), Hines, H., Mahony, M. and McDonald, K. (1999), Ingram, G.J. (1983), Ingram, G.J. (1990), Ingram, G.J. (1991), Ingram, G.J. and McDonald, K.R. (1993), Liem, D.S. (1973), Meyer, E., Hines, H. and Hero, J.-M. (2001e), Richards, S.J., McDonald, K.R. and Alford, R.A. (1993), Tyler, M.J. (1989), Tyler, M.J. *et al.* (1983), Tyler, M.J. and Carter, D.B. (1982), Tyler, M.J. and Davies, M. (1983a), Tyler, M.J. and Davies, M. (1983b), Tyler, M.J. and Davies, M. (1985b)

Data Providers: Ed Meyer, David Newell, Harry Hines, Sarah May, Jean-Marc Hero, John Clarke, Frank Lemckert

SOUTHERN GASTRIC BROODING FROG**EX** *Rheobatrachus vitellinus* Mahony, Tyler and Davies, 1984

Order, Family: Anura, Rheobatrachidae
Country Distribution: Australia (Extinct)
CITES: Appendix II



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Geographic Range This species, an Australian endemic, was discovered in January 1984 (Mahony *et al.* 1984) and was found exclusively in undisturbed rainforest in Eungella National Park, mid-eastern Queensland at altitudes of 400-1,000m asl (Covacevich and McDonald 1993). The extent of occurrence of the species was less than 500km² (map in McDonald 1990).

Population The species was considered common across its range until January 1985 when the first signs of decline (reported by Winter and McDonald 1986) were observed at lower altitudes (i.e., about 400m asl) (McDonald 1990). At higher altitudes the frogs remained common until March 1985 but were absent in June of that year (McDonald 1990). Despite continued efforts to locate the species, *Rheobatrachus vitellinus* has not been recorded again within Eungella National Park or any other locations (Ingram and McDonald 1993; McDonald and Alford 1999). This species is now considered to be extinct.

Habitat and Ecology It is an aquatic species largely restricted to the shallow section of fast-flowing creeks and streams in rainforest. It is one of only two known species to brood its offspring within its stomach. Females deposited

their eggs, and then swallowed them. While in the stomach, tadpoles excreted some form of enzyme that inhibited the female's gastric digestion, and then proceeded to develop into fully formed froglets. The froglets were then regurgitated through the female's mouth.

Major Threats The cause(s) of the population decline remain unknown. McDonald (1990) found no obvious evidence that seasonal rarity, over-collecting, predation, drought, floods, habitat destruction, disease, heavy parasite loads or stress due to handling for data collection were responsible for the population declines. Threats to the Eungella National Park include fires that might sweep up the slopes of the mountain during harvesting of the sugar cane in the fields below (Winter and McDonald 1986). Successive fires extend deeper into the rainforest leaving grassy ridges that are devoid of trees (Winter and McDonald 1986). The rainforest is extremely narrow in places and continual fire might eventually erode away entire sections of the forest or fragment the forest (Winter and McDonald 1986). Weeds that encroach on the edges of the forest pose a similar threat (Winter and McDonald 1986). It was thought that it might have been possible that the decline that was observed in 1984-1985 was a natural population fluctuation and that residual individuals had retreated to hidden refuges (Winter and McDonald 1986; McDonald 1990). The extent of such population fluctuations is unknown, but there is evidence of large swings in numbers of other Australian frogs (McDonald 1990). However, despite continued efforts to locate the species, it has not been recorded within Eungella National Park or any other locations since March 1985 (Ingram and McDonald 1993; Richards, McDonald and Alford 1993; Hero *et al.* 1998, 2002; McDonald and Alford 1999). Eungella National Park is subject to weed invasion on the edges of the reserve (Winter and McDonald 1986). From what is known from similar declines and disappearance elsewhere in the world, chytridiomycosis (present in at least some rainforest streams at Eungella) must be suspected and a major cause of the extinction of this species.

Conservation Measures Its known range is within a protected area. A recovery plan for the species has been prepared.

Bibliography: Cogger, H.G. (2000), Covacevich, J.A. and McDonald, K.R. (1993), Hero, J.-M. *et al.* (1998), Hero, J.-M. *et al.* (2002), Ingram, G.J. and McDonald, K.R. (1993), Mahony, M., Tyler, M.J. and Davies, M. (1984), McDonald, K. and Alford, R. (1999), McDonald, K.R. (1990), McDonald, K.R. and Tyler, M.J. (1984), Richards, S.J., McDonald, K.R. and Alford, R.A. (1993), Tyler, M.J. (1989), Tyler, M.J. (1997), Winter, J. and McDonald, K. (1986)

Data Providers: Jean-Marc Hero, Keith McDonald, Ross Alford, Michael Cunningham, Richard Retallick

NORTHERN GASTRIC-BROODING FROG

EX *Plethodon ainsworthi* Lazell, 1998**AINSWORTH'S SALAMANDER**

Order, Family: Caudata, Plethodontidae
Country Distribution: United States of America (Extinct)



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Geographic Range This species is known only from two specimens that were collected on 12 June 1964, two miles south of Bay Springs, Jasper County, Mississippi, USA (Lazell 1998).

Population No animals have been found in recent years despite survey work, and this species is considered to be extinct.

Habitat and Ecology The specimens were collected in springhead litter (Lazell 1998). It was presumably a terrestrial breeder with a direct development breeding strategy.

Major Threats Although the threats are not well known, it seems possible that habitat loss through deforestation might have caused the species' extinction.

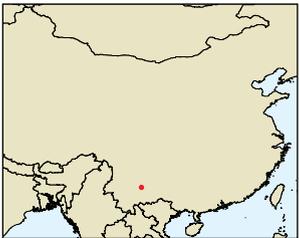
Conservation Measures There are no conservation measures needed; this species is extinct.

Bibliography: Blackburn, L., Nanjappa, P. and Lannoo, M.J. (2001), Lazell, J. (1998)

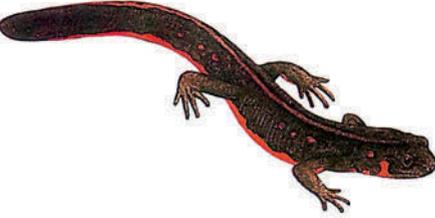
Data Providers: Geoffrey Hammerson

EX *Cynops wolterstorffi* (Boulenger, 1905)**YUNNAN LAKE NEWT**

Order, Family: Caudata, Salamandridae
Country Distribution: China (Extinct)



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



Geographic Range This species was restricted to Kunming Lake and the surrounding areas in Yunnan, China.

Population No animals can now be found and this species is considered to be extinct.

Habitat and Ecology The species formerly inhabited shallow lake waters and the adjacent irrigation channels, ponds and marshes. Breeding and larval development took place in these aquatic habitats.

Major Threats The extinction of this species was related to habitat destruction and degradation resulting from general pollution, land reclamation, domestic duck farming and the introduction of exotic fish and frog species.

Conservation Measures There are no conservation measures needed; this species is extinct.

Bibliography: He, X.R. (1998), Yang, D.-T. (1991b), Zhao, E.-M. (1998)

Data Providers: Yang Datong, Michael Wai Neng Lau