*Ambystoma californiense*

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# FROGLOG

Newsletter of the Declining Amphibian Populations Task Force

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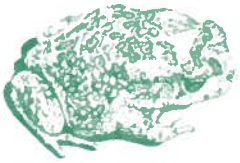
## Changes in a Common Toad Population Over 10 Years



**By Jan Clemons**

In view of the declining amphibian populations debate it is vital that long-term studies of amphibian populations are carried out. This article outlines how a simple study of a common toad population, using volunteers over a ten year period can generate some interesting data. The study can also be viewed as an educational tool in terms of getting people interested in amphibians and enabling them to extend their newly acquired expertise to further survey ponds in the county.

The study site, Dunchurch College, is situated in extensive landscaped gardens on the outskirts of the town of Rugby, Warwickshire, UK. In 1990, a large toad population was found in and around a large fish pond in the college grounds. A second heavily shaded pond within 50m was found to contain no vertebrate life. No amphibian data for this site had been recorded previously and a decision was made to survey the toad population every year as part of a long-term study.

The college gardens were designed and laid out in 1908 by the famous landscape gardener, Thomas Mawson for a new house formally called Dunchurch Lodge. The large pond was created as an ornamental feature to aid drainage on a wet slope down to the pond and was stocked with fish. The second pond appears to be a natural feature and is shown on Ordnance Survey maps dating back to 1882.

Over the past ten years the Dunchurch toad survey has involved over two hundred volunteers from the local community using the same simple methodology to ensure consistency from year to year. In England, common toads undertake spring migrations to return to their breeding ponds and, each year, as soon as the toads arrived at the pond, nightly 2 hour visits were made until toad numbers peaked and started to fall. Using torches, all the toads present in and approaching the pond were counted and their sex determined. Simple abiotic data was also collected.

**Figure 1. Total number of toads counted during peak count**

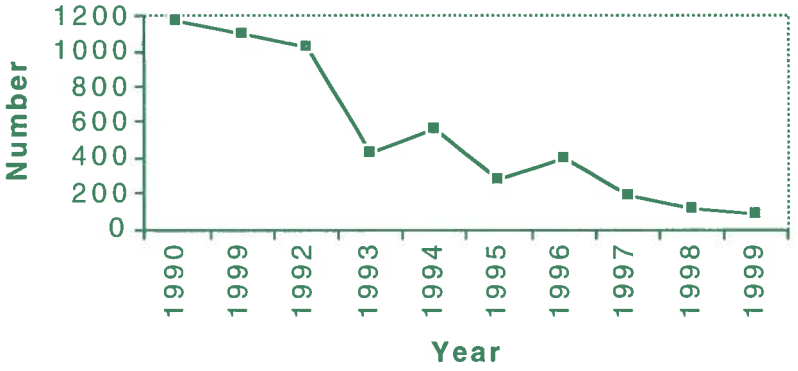



Figure 1 shows how this toad population has declined over the ten year study period. Since 1997 the population has remained very small and only further study will reveal whether or not the population will recover.

The ratio of male to female toads over the study period has remained fairly stable (at between 1.3:1 & 4:1), but there was a sudden decrease in females in 1995 (only 14 females were found) altering the ratio for that year to 12.5:1. The reasons for this phenomenon remain unknown as the ratio recovered the following year.

Over the last decade, the start of the migration period has ranged over 26 days, the earliest time being 17 March and the latest 11 April. However, the days needed to reach the peak count varied. In 1990, the peak count was reached in only three days whereas in 1997 it took 8 days. This year air temperature was only 8 degrees Celcius and such an unseasonal cold spell may have extended the migration period.

What factors could be responsible for this decline? There is certainly no lack of recruitment as different age cohorts make up the population. The groundsmen have reported masses of toad metamorphs on the lawns around the pond in summer and young toadlets shelter in the estate's various greenhouses and potting sheds. The college grounds are meticulously managed under a conservation policy. Use of agrochemicals is minimal and the pond water pH has remained closely around neutral.

Last year, whilst trying to come up with reasons for the decline, a conversation with the new estate manager shed light on the possible cause. A sewage outflow pipe from a local farm running parallel to the pond had got blocked and it was thought that effluent had leaked into the pond. This also correlated with the larger presence of algal growth over the past three years. The drain was subsequently unblocked and repaired, but may have been leaking for some years. An electronic oxygen probe registered an oxygen concentration of only 40% which is low compared to a nearby, similar sized pond which registered 110%.

Sewage leakage may well account for the decline over the past three years but it may be that the decline seen since the beginning of the study is a natural population fluctuation, exacerbated by organic pollution. We have now delegated future monitoring to the estate staff but will continue to monitor pond water oxygen concentration and look for any correlations. Ten years may be too short a time to reach any firm conclusions but it is vital that the study continues.

*Acknowledgements*
Staff at Dunchurch Management College for permission to study the site and for their support in positively managing the pond and surrounding environment for amphibians.
Members of Warwickshire Amphibian and Reptile Team (WART)
Past and present pupils of Rugby High School.

*For more information contact:* Jan Clemons, Rugby High School, Longrood Road, Rugby, Warwickshire CV22 7RE, UK.

## Are Direct-Developing Frogs 'Immune' to the Amphibian Decline Syndrome?

**By Rohan Pethiyagoda & Kelum Manamendra-Arachchi**

In 1993, we commenced a project to explore the diversity of amphibian species in Sri Lanka. At that time, the island's frog fauna was thought to comprise only 38 species (1). However, the island had never before been subjected to systematic exploration. Between 1993 and 1998 we sampled amphibians at some 354 mainly rain-forest habitats. Last year we published (2) the preliminary results of our survey, having previously reviewed the already described fauna (3): we have discovered upwards of 200 additional species of frogs, all of them in the 750 km$^2$ of natural rainforest that survives in Sri Lanka. This puts Sri Lanka (with 3.9 species/ 1,000 km2) ahead of Costa Rica (2.8 species/ 1,000 km2) as World No. 1 amphibian species hotspot. We are presently engaged in a wide-ranging multi-disciplinary investigation of this fauna, including taxonomic review (4).

We have now also examined almost all 19th-century collections of Sri Lankan frogs in museums world-wide. We find that well over half the species collected prior to 1900 are no longer known from extant populations. However, we have at present no evidence that the declining amphibian population syndrome has been responsible for these extinctions, which probably occurred as a result of habitat loss during the past century: only 750 of a former 16,000 km$^2$ of 'rain forest' now survives in Sri Lanka. More than 90% of Sri Lanka's ca. 250 amphibian species are restricted to rainforest habitats.

Over 80% of Sri Lanka's ca. 250 species of frogs belong to the Rhacophoridae. Of these, almost all deposit direct-developing eggs on terrestrial leaf litter in closed-canopy forest, including tropical montane cloud forest (0-2400 m a.s.l.). While no population data exist as yet (studies are in progress), we observed no obvious signs of widespread mortality and morbidity in our 5-year survey; neither have we failed to relocate populations of species in previously-surveyed transects. Happily, this suggests that the remaining Sri Lankan frog fauna has not yet been affected by declining amphibian syndrome. Nevertheless, we, together with the Sri Lanka DAPTF Chair Anslem de Silva, are proceeding with monitoring activity which we hope will provide an early-warning of trouble if it does occur.

We wonder whether direct-developing frogs with terrestrial eggs (e.g. genera of Leptodactylidae, Microhylidae) elsewhere too, appear 'immune' to the declining amphibian syndrome. We would like to get in touch with workers with data on such groups with a view to sharing information and possible collaboration.

*Contact:* Rohan Pethiyagoda
**rohan@wht.org**
**http://www.wht.org**

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***Editor's note:*** Declines in some other amphibians which have direct-developing eggs (for example of the genus *Eleutherodactylus* in Puerto Rico and elsewhere) have been documented, but what biological differences exist between these groups of frogs with (apparently) very similar reproductive modes which has caused only some of them to decline? Is it, in this case, simply a question of geography? I would invite readers with thoughts on this to contact Rohan on the e-mail address given and, of course, to use *Froglog* as a vehicle for discussion. *J.W.W.*

## Call for Information on Urodeles and Caecilians

To the general public, and to the media, 'amphibians' means 'frogs'. There is a danger that this bias will also be reflected in the data that we are collecting for the declining amphibian database (dad), as announced by John Wilkinson in *Froglog* 34. I make a special plea to those who work on caecilians and urodeles to do all they can to insure that we receive data on the status of populations of species in these groups, to help us insure that we gather as comprehensive and as balanced a dataset as possible. Note that data on populations that have *not* declined are just as informative in helping us to find the causes of amphibian declines as data on populations that have declined.

What we are after are data that have already been published. If you, or someone you know is sitting on population data that they did not think was interesting enough to publish, now is the time to do it.

*Tim Halliday, International Director.*

## The Maya Forest Anuran Monitoring Project: A Cooperative Tri-National Effort

**By John R. Meyer, Coordinator**

The Maya Forest Anuran Monitoring Project (MAYAMON) evolved as a result of two activities. The project was first conceived by the Belize Working Group of the Declining Amphibian Populations Task Force, and initial survey activities, under the name BELDAP Anuran Survey Project were undertaken in Belize in 1997 by six volunteer biologists. A report on the activities and goals of this group was presented by Working Group Chair, John R. (Jack) Meyer, at the Maya Forest Biodiversity Monitoring Workshop in Flores, Guatemala, September 28 - October 3, 1997. At this meeting, interest was expressed

in expanding this project into the Peten region of Guatemala, and the adjacent Mexican states of Chiapas, and Quintina Roo. Consequently, the name 'MAYAMON' was chosen to reflect this expanded geographic coverage and the regional cooperation involved.

The MAYAMON monitoring project is based upon vocalization estimates, categorized as 1-5 individuals calling (Category 1), 6-20 individuals calling (Category 2), 21-50 individuals calling (Category 3), and > 50 individuals calling (Category 4). Surveys are nocturnal at standardized sites, which are monitored following substantial rains during the months of June through November each year. Results are forwarded to the Coordinator by electronic mail and entered into a database, with complete project results made available to all participants at the end of each season. In addition, a website is now operational with descriptions and photographs of project sites and a link to photographs of each species being monitored, as well as summaries of results on an annual basis. During the current year (1999), there are 12 participants monitoring 30 sites in Belize, Guatemala, and the Mexican states of Chiapas and Quintana Roo. The point that must be stressed is that this has been a voluntary effort, meaning that until recently there was no project funding to carry out surveys. Hence, participants needed to be certain that they had the time and means to regularly monitor the sites they selected. For this reason, only those persons living at or near the sites chosen have been encouraged to participate. The purpose of the initial study is to derive baseline populational data for common species, generally those that can be encountered at accessible sites. Participants have to be reasonably certain that they will be able to carry out the surveys for the initial monitoring period of five years, or be committed to training a successor if this proves impossible. It was necessary for participants to become familiar with the anuran species likely to be encountered at their respective sites, and this has been accomplished by utilizing training materials provided to each participant by the Coordinator and Scientific Advisor, Julian Lee, of the University of Miami.

Recently, the project was awarded a grant by the Wildlife Conservation Society to expand monitoring at sites in southern Belize in an attempt to explore survey techniques to include terrestrially-oriented anurans, such as members of the genus *Eleutherodactylus*, and salamanders, which are all terrestrial or arboreal in the region. In addition, this expanded project will provide initial training of local Maya villagers in an attempt to extend the project into those areas inhabited by indigenous peoples who have an interest in monitoring the ecological health of their surroundings.

Although the MAYAMON project is in its infancy, it currently represents the only one of its kind in existence in a region of amphibian diversity and human developmental pressures. In addition to the initial goal of establishing baseline populational data for amphibian species, the project represents a unique effort at international cooperation, one which has been an unqualified success to date. In November of 1999, the Coordinator will assist The Nature Conservancy in presenting training workshops in Chetumal, Mexico and Panama City, Panama in an attempt to expand standardized amphibian monitoring efforts throughout the Mesoamerican region.

*For more information contact:*
John R. Meyer, P.O. Box 669, Gallup, New Mexico 87305, U.S.A.
**jraymeyer@hotmail.com**

**MAYAMON Website:**
**http://fwie.fw.vt.edu/mayamon/maya_home.html**

## Frog Declines in New Zealand: Abstract

*From:* Bell, B.D. (1999) Recent population declines of Archey's frog *(Leiopelma archeyi)* in the Coromandel Range. Proceedings of the Society for Research on Amphibians and Reptiles in New Zealand, Abstracts. *New Zealand Journal of Zoology* **26:** 255.

At a time of international concern regarding global declines of amphibians, it is important that New Zealand frog populations - both endemic and introduced species - are monitored closely to allow early identification of adverse trends should these be occurring. Already there are reports of local declines in the three Australian *Litoria* species introduced to New Zealand.

Amongst the endemic *Leiopelma* species, systematic field surveys carried out since the 1970s indicate that a marked decline of Archey's frog (*L. archeyi*) occurred in the central Coromandel Range over 1996-98. On Tapu Ridge *L. archeyi* was formerly abundant but had become scarce by December 1996. At Tokatea Saddle, 30 km north, an equivalent decline was not apparent in February 1997, but *L. archeyi* was very scarce by November 1998, and 29 dead specimens were collected there in January 1995 during a drought. Surviving *L. archeyi* tended to be larger individuals. No corresponding decline was evident among *L. hochstetteri* at Tapu, nor along ridges at Tokatea.

There are no reports of equivalent declines of *L. archeyi.* elsewhere in New Zealand, nor of other *Leiopelma* species, although further surveys are needed to better assess the situation.

Possible causes for these *L. archeyi* declines include: climate change; amphibian disease, such as a chytrid fungus reported as a frog pathogen overseas; research disturbance of sites; illegal collection of frogs; impact of biocides; impact of introduced predators; other factors not yet identified. Climatic change and/or amphibian disease cannot be eliminated as major factors at this stage, but most of the other factors probably can.

The current IUCN Red List status of *L. archeyi* as Low Risk (Near Threatened) needs review since the species is now more threatened. Given this "red alert" on a native frog, plus anecdotal reports of declines in introduced frogs, there is an urgent need to identify the causes and extent of frog declines in New Zealand, and the susceptibilities of different species. Contingencies for future conservation management need development to maximise chances of long term survival of *Leiopelma* species, while *Litoria* species also need study. The possibility that declines are the result of a contagious pathogen, such as chytrid fungus, requires the adoption of more stringent hygiene protocols, since herpetologists and others could unwittingly spread disease to new areas and to new frog populations.

*For further information, contact:*
Dr Ben D. Bell, School of Biological Sciences, Victoria University of Wellington, PO Box 600, Wellington, NEW ZEALAND.
**Ben.Bell@vuw.ac.nz**

## Webfrog

Pesticide linked to deformed frogs:
**http://www.onwis.comVwi/10069/wi--deformedfrogs10069.asp**

Amphibian diseases homepage:
**http://www.jcu.edu.au/school/phtm/PHTM/frogs/ampdis.htm**

Cuban amphibians:
**http://netdial.caribe.net/~aestrada/index.html**

## Donations

The Geraldine R. Dodge Foundation has supported the Task Force through annual awards starting in September 1996. I am pleased to share my excitement that when I opened the award letter in late September, we were once again provided with an annual award of $25,000. In addition, the Dodge Foundation (unexpectedly) gave us a two-year award, the next $25,000 award dependent only on our submitting an annual report. It is gratifying to realize that organizations such as the Geraldine R. Dodge Foundation recognize the importance of the Task Force operations. The award from the Geraldine R. Dodge Foundation is particularly important to the Task Force as it supports our basic operations (salary support for the International Coordinator). Such support is rarely available from funding foundations and is thus especially appreciated from the Dodge Foundation.

*Ron Heyer, DAPTF Chair.*

**Other Donations** We gratefully acknowledge receipt of the following donations from 1 July through 30 September 1999.

**Organizations:** Brookfield Zoo Library, Earth Images (Nancy Cannon), Portal Publications Ltd., Tiano's Water Lilies and Fish.

**Individuals:** Susan Benner & John Meeks, Dinorah Echeverría, Benjamin C. Hammett, Jane Hey, Moira Hope, Jerry & Linda Lowe, Sarah Mijer, Hidetoshi Ota, Andrew Price, Hobart Smith, David M. Virshup, Richard Wassersug, Hilary Wilson. Some of the preceding donations were given in honor of the marriage of Breck and Dayna Bartholomew.

## Publications of Interest


Andreone, F. & Sindaco, R. (Eds.) (1998) *Erpetologia del Piemonte e della Valle d'Aosta.* Museo Regionale di Scienze Naturali Torino.

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Driscoll, D.A. (1999) Genetic neighbourhood and effective population size for two endangered frogs. *Biol. Conservation* **88:** 221-229.

Gardiner, D.M. & Hoppe, D.M. (1999) Environmentally induced limb malformations in mink frogs (*Rana septentrionalis*). *J. Exp. Zool.* **284:** 207-216.

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Holmes, B. (1999) Heads in the clouds. *New Scientist* **8 May:** 32-36. *(Article about Monteverde)*

Lemckert, F. (1999) Impacts of selective logging on frogs in a forested area of northern New South Wales. *Biol. Conservation* **89:** 321-328.

Leonard, W.P., McAllister, K.R. & Friesz, R,C. (1999) Survey and assessment of northern leopard frog (*Rana pipiens*) populations in Washington State. *Northwestern Naturalist* **80:** 51-60.

Leong, T.M. & Chou, L.M. (1999) Larval diversity and development in the Singapore Anura (Amphibia). *The Raffles Bulletin of Zoology* **47(1):** 81-137. *(Contains a larval identification key and good photographs, as well as descriptions.)*

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Monello, R.J. & Wright. R.G. (1999) Amphibian habitat preferences among artificial ponds in the Palouse region of northern Idaho. *J. Herpetol.* **33:** 298-303.

Ranjit Daniels, R.J. (1999) An action plan for amphibian research and conservation in India. *Cobra* **35 & 36:** 13-17.

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Ranjit Daniels, R.J. (1999) Status of amphibian diversity in India. *Cobra* **35 & 36:** 25-28.

Sharma, I.K. (1999) Distribution, adaptations, survival and conservation of frogs and taods of the Thar Desert, western Rajasthan. *Cobra* **35 & 36:** 34.

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FROGLOG is the bi-monthy newsletter of the Declining Amphibian Populations Task Force.

*Edited by:* John W. Wilkinson, Department of Biological Sciences, The Open University, Walton Hall, Milton Keynes, MK7 6AA, U.K.

Tel: +44 (0) 1908 - 652274.
Fax: +44 (0) 1908 - 654167
E-mail: **daptf@open.ac.uk**