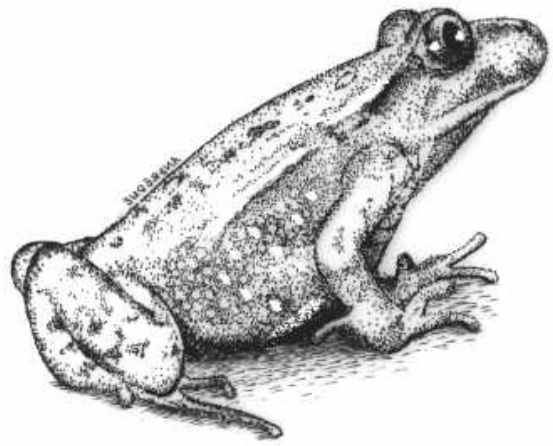
Pelodytes punctatus by Franco Andreone

ISSN 1026-0269



FROGLOG

Newsletter of the Declining Amphibian Populations Task Force

October 2004, Number 65: ***Focus on Australia.***

DAPTF SEED GRANTS 2005

We are pleased to announce a new round of Seed Grants for 2005. These are intended as one-time awards of between $500 and $2000 for the support or initiation of research that furthers the DAPTF's mission to determine the nature, extent and causes of amphibian population declines. There are three categories in this year's round, thanks to generous support from the US Department of the Interior's Amphibian Research and Monitoring Initiative (ARMI), and from the North of England Zoological Society-Chester Zoo in the UK. We will accept applications in Spanish, Portugese and French, as well as in English.

ARMI AWARDS. The criterion for these awards is that the proposed work should be done on species or issues of concern in the USA. ARMI is particularly interested in funding research on potential stressors of amphibian populations. For more information about ARMI, go to: **http://bbs-pwrc.er.usgs.gov/armi/index.cfm**

CHESTER ZOO AWARDS. Grants are available to support specific amphibian conservation action for new or existing initiatives. This action may be captive breeding, local community initiatives, habitat protection or population monitoring. Preference will be given to applicants from Asia, Africa and Central and South America.

UNRESTRICTED AWARDS. The DAPTF welcomes applications that address any aspect of amphibian declines, but favours joint applications that involve a partnership between herpetologists in developed and developing countries. We are also prioritising research that investigates synergistic effects between two or more factors that have been identified as actual or potential causes of amphibian population declines.

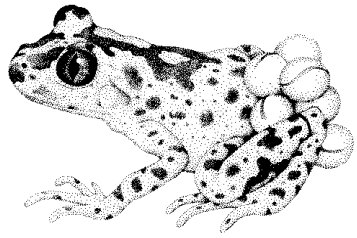
Applicants should indicate which of the above categories they have in mind, but we will consider applications in the ARMI and Chester Zoo categories also in the Unrestricted category. Do not hesitate to contact Tim Halliday if you need clarification or advice.

Proposals of no more than 4 pages should be addressed to: Tim Halliday, DAPTF International Director, at the address on the back of *Froglog*, or by e-mail to **t.r.halliday@open.ac.uk**

Proposals should contain: (1) Name, affiliation and contact information of proposer(s), (2) Project title, (3) Description of the intended work, including localities and species involved, (4) Start date and schedule of the project, (5) Explanation of how the project will further the DAPTF's mission, (6) Budget breakdown, including details of additional funding obtained or sought from elsewhere (note that we do not provide funds to support salaries), (7) References, if appropriate, and (8) Any other pertinent information.

All information acquired with the support of the DAPTF remains the intellectual property of the grant recipient, but must be freely available to the DAPTF and for the DAPTF's use in furthering its mission.

The closing date for applications is 13th December, 2004.



The Impact of Habitat Modification on the Striped Marsh Frog *Limnodynastes peronii*

By Amy Gye - A report on work carried out with support from a DAPTF Seed Grant

Habitat modification is one of the most significant factors involved in the extinction of species today. In Australia, modification by fire is one of the most common causes of substantial habitat change by its repeated use in control burns and as an ecological management tool. The aim of this study was to determine the response of frogs to abiotic and biotic parameters that may be altered as a result of habitat modification due to fire. Amphibians are particularly susceptible to habitat modification because their moist and permeable skin makes them sensitive to changes in temperature, humidity and light levels. Thus frogs are excellent environmental indicators of the impact of habitat modification and can facilitate understanding of entire fauna assemblages and their response to disturbance.

The species chosen for study was *Limnodynastes peronii*, a highly successful, ground-dwelling species usually associated with permanent water but often encountered in forests and open woodlands. There were three main objectives of the study: 1) to determine the effect of fire on habitat characteristics important for *L. peronii*, 2) to investigate the impact of habitat modification on water loss, body temperature and activity of *L. peronii*, and 3) to determine habitat preferences of *L. peronii* for thermoregulation and movement. I

addressed these aims through a series of descriptive and manipulative experiments in the field. At two paired, burnt (less than one year since last control burn) and un-burnt (approximately 10 years since last control burn) sites in Ku-ring-gai Chase National Park, NSW, I measured vegetation cover, leaf litter volume and soil water potential. Agar models of *L. peronii* were used to determine differences in desiccation rates and temperature between burnt and un-burnt sites and between different shelter types. A series of manipulative experiments in outdoor enclosures were conducted to determine rates of water loss of agar models and water loss and activity of *L. peronii* at different levels of soil moisture, leaf litter volume, shelter suitability and shelter availability. In the field, spool tracking and radio-telemetry were used to investigate movement and microhabitat preferences of *L. peronii*, and the importance of suitable microhabitat for thermoregulation. The movements of 14 *L. peronii* were tracked by attaching spools of nylon thread to elastic cotton gauze that was tied around the waist of each frog. This enabled distance and types of microhabitats traversed at night by each frog to be recorded. To determine whether frogs were behaviourally thermoregulating by selecting suitable retreat sites, I recorded the body temperature of 6 adult *L. peronii* (using temperature-sensitive radio-transmitters) and the temperature of agar models placed in shelter sites and randomly distributed throughout the study area.

As expected, the results indicated that fire significantly reduces vegetation cover and leaf litter. This could be detrimental to amphibians that depend on these habitat characteristics for survival. Fire reduced the abundance of large (>5 mm) invertebrates that are more calorically profitable and important for sit-and-wait predators that rely on vision to detect prey. Agar models indicated that frogs are subject to higher rates of water loss in burnt sites and that shelter sites are important in protecting against desiccation and high temperatures. Experimental manipulation of soil moisture in outdoor enclosures showed that dry soil significantly increases water loss and reduces activity levels of frogs. Different rates of water loss between frogs and models suggest that, in response to stressful thermal and hydric conditions, amphibians alter their behaviour to reduce water loss. A reduction in activity and changes in behaviour may interfere with foraging and other activities such as reproduction, which will ultimately affect a frog's fitness. Comparisons between frog body temperature and the temperature of the models in the field show that suitable microhabitat is crucial in allowing amphibians to maintain appropriate body temperatures by behavioural thermoregulation; hence reduction of suitable microhabitat may influence key physiological processes (e.g. locomotion, digestion, growth rates etc.). Crucially, movement patterns of *L. peronii* determined by spool tracking indicate that migration to more suitable habitat areas may be difficult because of the tendency of the frogs to move relatively short distances, particularly in dry conditions.

The study's results have implications for conservation efforts aimed at protecting habitat of amphibians and other sedentary, specialised animals. Efforts should be made to limit control burning to asset protection zones. Otherwise, burns in natural areas should be specifically based on ecological outcomes by maintaining a mosaic of habitats that include areas of undisturbed forest within disturbed areas particularly for species with low dispersal ranges. Because of the limited range traversed by *L. peronii*, shrubs and ground vegetation should be maintained in closely spaced clumps to provide shelter; retention of logs and other debris will promote a stable, moist microhabitat for a variety of amphibians and other ground-dwelling species.

For further information contact:
amygye@hotmail.com

Conservation Status of Australian Frogs.

By Jean-Marc Hero, Clare Morrison, Graeme Gillespie, Dale Roberts, Paul Horner, David Newell, Ed Meyer, Keith McDonald, Frank Lemckert, Michael Mahony, Michael Tyler, Will Osborne, Harry Hines, Steve Richards, Conrad Hoskin, Naomi Doak and Luke Shoo

The initial Global Amphibian Assessment for Australian frogs is now complete. Fifty of 216 frog species (23 %) from Australia are now recognised as threatened. Most demonstrate declines in abundance since the 1970's. Eight species can no longer be found in the wild (*Rheobatrachus silus, R. vitellinus, Taudactylus diurnus, T. acutirostris, Litoria castanea, L. lorica, L. nyakalensis* & *L. piperata*), an additional 3 species have almost entirely disappeared (*T. rheophilus, L. booroolongensis* and *Pseudophryne corroboree*), and at least 8 species have disappeared from most upland areas of their former range (*L. nannotis, L. rheocola, L. spenceri, L. verreauxi alpina, Nyctimystes dayi, P. pengilleyi, Philoria frosti* and *T. eungellensis*).

Timing of Declines

In southeastern Australia, substantial declines were first recorded in populations of *L. spenceri* in the 1970's and early 1980's. Monitoring confirmed that this species is now extremely restricted in distribution and populations at the few remaining sites are small. Similarly *L. castanea* disappeared throughout its former range in NSW. It was last seen in 1976 and is likely to be extinct (Sister species *L. aurea* and *L. raniformis* also declined in parts of their former range). Major declines were also reported for *L. booroolongensis, P. corroboree, P. pengilleyi, P. frosti, Mixophyes balbus* and *L. verreauxi alpina* in the mid 1980's throughout most of their range. Populations have not recovered and these species are now found in a severely reduced number of sites.

In subtropical east Australia, dramatic declines and the subsequent disappearance of the Southern Day Frog (*T. diurnus*) and the Southern Gastric Brooding Frog (*R. silus*) were first recorded in the late 1970s. Neither of these frogs has been seen in the wild since 1979 and 1981 respectively. The last Northern Gastric-Brooding Frog (*R. vitellinus*) was seen at Eungella in March 1985. Declines of the Eungella Day Frog (*T. eungellensis*) were also reported in the mid-1980's, and numbers remain critically low. The disappearances of the Mountain Mist Frog (*L. nyakalensis*), the Armoured Mist Frog (*L. lorica*) and the Sharp-snouted Day Frog (*T. acutirostris*) were reported from the Wet Tropics of north Queensland in the early 1990's. The Northern Tinker-Frog (*T. rheophilus*) also declined in abundance and only a few individuals of the last known wild population of this species have been found in the last 10 years. The dramatic decline and disappearance of upland populations of *L. nannotis, L. rheocola* and *N. dayi* were also reported from north Queensland in the

early 1990's. There has been limited 'recovery' at elevations between 400 and 650m but not throughout the range.

Broad scale catastrophic amphibian declines have been reported throughout eastern Australia since the 1970's. While no new catastrophic declines have been reported from Australia since 1994, few species or populations have recovered to previous distributions or densities suggesting the causal agent may continue to influence amphibian populations.

Geographic, Ecological and Phylogenetic Correlates

Threatened species are concentrated in upland areas along the eastern seaboard (> 300m asl, 41% of upland species and only 8% of lowland species are threatened). Of 50 threatened species, 37 (74%) primarily occur in upland areas while only 34 of 148 (23%) species of least concern occur in upland areas. Twelve montane endemics (*Cophixalus* and *Philoria* species) are listed, principally due to restricted geographic ranges (all < 2,000 km^2). The sub-tropical region contains proportionally more threatened species (34%) than either the tropical (19%) or temperate regions (21%).

Stream-breeding species appear to be most affected by dramatic declines (including species from alpine meadows). Associations with low fecundity and habitat specialization have been reported; however these variables are also correlated with restricted geographic range.

Phylogenetic associations include frogs of the myobatrachid genera: *Taudactylus* where 5 of the 6 species are threatened, *Rheobatrachus* where both species are considered extinct, *Philoria* where all species are threatened, and *Mixophyes* where 3 of 5 species are threatened. Within the microhylid genus *Cophixalus,* 7 of the 14 species are threatened, and in the hylid genus *Litoria,* where the *L. aurea* and *L. nannotis* species groups have suffered widespread declines (only in eastern Australia).

Known Threats

For many species known threats do not adequately explain the extent of decline. Habitat modification is an important threatening process, associated with declines in at least 23 of the 50 (46%) threatened species, including 11 of 13 (85%) threatened lowland species. Chytrid fungus is notably associated with declines for 5 species and is a potential contributor for an additional 13 species (36% of threatened species); however the chytrid has also been detected in an additional 33 non-threatened species (19%). Additional threats associated with threatened species include fire and introduced species (particularly salmonid fish and G*ambusia* / mosquito fish). Global climate change is a potential threat to species in upland areas, particularly *Cophixalus, Pseudophryne* and *Philoria* species that are restricted to montane habitats.

A distinction should be made with regards to the timing of threatening processes and recent amphibian declines. Continuing historical threats include habitat modification (clearing for agriculture, urban development and associated hydrological change) and changing fire regimes have potentially had a major impact on frog habitats over the past 200 years. Similarly, native amphibians have been exposed to introduced fish and amphibian species for over 70 years. In contrast, global climate change and the emerging infectious disease (chytridiomycosis) are relatively new threats (post 1970's). Recent declines and extinctions of frogs in Australia (1970's – present) are a "new" phenomenon that demand urgent attention.

Acknowledgements

We thank Craig Hilton Taylor, Simon Stuart, Janice Chanson and participants of the Australian GAA (Hal Cogger, Peter Robertson, David Hunter, Ken Aplin, Richard Retallick, Michael Cunningham, Ross Alford, Liz Dovey, Sarah May, Sylvana Mass, Margaret Considine, Stan Orchard, John Clark, Ross Goldingay, Peter Brown, Roy Swain and Murray Littlejohn).

For further information contact: **m.hero@griffith.edu.au**

New Funds available from the DAPTF

The DAPTF, in partnership with the Global Amphibian Specialist Group (GASG), has been awarded a substantial grant by the Critical Ecosystem Partnership Fund (CEPF) to fund projects in eight 'biodiversity hotspots': Mesoamerica, West Africa, Atlantic Forest of Brazil, Chocó of Colombia and Ecuador, Mountains of SW China, Eastern Arc Mountains and Coastal Forests of eastern Africa, Caucasus, Succulent Karoo.

This project will run over three years and will support projects directed at the conservation of amphibians. Grants will be available up to $10K. Further details about this scheme, in particular the identity of the regions that we will target for 2005, and application procedures will be published in Froglog 66 and at the DAPTF web site. In the meantime, Tim Halliday (**t.r.halliday@open.ac.uk**) and Don Church (**d.church@conservation.org**) will answer any queries.

Details of these and other biodiversity hotspots can be found under 'where we work' at the CEPF web site (**www.cepf.net/xp/cepf**).

Tim Halliday

Alaska Conference Summary

The First Statewide Conference on Alaska's Amphibians was held in Juneau, Alaska, from March 30 to April 1, 2004. Biologists gathered during an early spring snowstorm to discuss distribution and ecology of amphibians and reptiles in Alaska. Identification of information gaps was a common theme for presentations.

An overview of *The Amphibians and Reptiles of Alaska: a Field Handbook* by Stephen MacDonald (**www.alaskaherps.info**) and discussions of current taxonomic frameworks set the tone for the meeting. Because known herpetofauna in Alaska consists of three salamander species, a toad, two native and two non-native frogs and four marine turtles in two families, the task of compiling species records is not overly daunting. (Garter snake reports in Alaska remain unsubstantiated.) Evidence from mammalian taxa suggests that some islands in Southeast Alaska were Pleistocene refugia, which could have been occupied by amphibians. If that were the case, populations found on these islands today may have diverged, but the genetic analysis needed to explore this hypothesis has yet to be undertaken.

Michael Adams (USGS) introduced the "proportion of area occupied" (PAO) estimator adopted by the Amphibian Research and Monitoring Initiative (ARMI) **(http://edc2.usgs.gov/armi)**. ARMI has found this estimator to be optimal for large-area monitoring programs that seek to identify areas where amphibian species may be in decline. This, and a review of survey methods used in the Yukon and British Columbia (Brian Slough), provided perspectives on how Alaska amphibian monitoring could be standardized. The Yukon's amphibian brochure, part of which is available at **http://www.environmentyukon.gov.yk.ca/fishwild/amphibians.shtml**, has been an extremely successful tool for reaching the public.

Species survey and monitoring data from around the state were presented by biologists from state, federal, and non-governmental groups. Notably, a three year Alaska National Park inventory documented 1600 individuals at 65 sites in 10 parks, extended known geographic ranges of several species and added two species (Blain Anderson NPS). Detailed maps flanked the room providing opportunities for conference participants to record previously unreported species occurrences. Numerous previously

unreported observations were added for wood frogs (*Rana sylvatica*) and western toads (*Bufo boreas*). These reports will be collated and observations ranked by their level of documentation. Because there had not been a central repository for amphibian records in Alaska, these data will eventually be added to a state amphibian data base.

Presentations on habitat data for western toads in Southeast Alaska (Richard Carstensen) and abnormal wood frogs on Alaska National Wildlife Refuges (Kim Trust, USFWS) led to discussion on species declines, potential problems with disease, parasites and contaminants and need for additional focus in these areas.

In the Juneau area, of 42 randomly selected ponds with characteristics that would appear acceptable for toad breeding, only three were found to contain tadpoles during the 2003 breeding season. Review of anecdotal data dating back to the 1950's suggests that this low occupancy represents a dramatic decline from past toad populations. Investigation of potential breeding sites farther afield on the Taku River and at St. James Bay found an abundance of toads in 2003. Discussion centered on the change of snowfall patterns in Juneau and the depth of ground freezing in winter as a possible factor in toad decline. Taku River and St. James Bay, in contrast, are areas known to hold winter snow.

Amphibian abnormality surveys were initiated in Alaska in 2000. The Kenai NWR had an average prevalence of over 8% over a three year period and Tetlin NWR had a 7% abnormality incidence for 2003. Other Refuges surveyed, such as the Yukon Delta and the Arctic, had an overall abnormality rate of less than 3% in the 2-3 years they were monitored. The expected background incidence of abnormalities in a natural population is 0 – 2%. Work is continuing on the Kenai and Tetlin Refuges.

Presentation of the new Amphibian Curriculum for Juneau schools (Anne Post, ADF&G) energized the meeting, giving rise to discussion of potential methods for collaboration with educators. In particular, the need for amphibian awareness, problems from collection, release of non-natives and captive individuals and the resulting potential disease introduction into wild populations are perceived as real problems in Alaska due to small populations and limited distribution of some amphibian species, making them more vulnerable to catastrophic events.

The last day of the conference included a fieldwork and identification workshop and database demonstration (Discovery Southeast). Participants later assembled into a variety of focus groups to provide input to a statewide amphibian conservation plan coordinated by the Alaska Department of Fish and Game. Topics included plan objectives; species threats; inventory, monitoring and conservation actions; and education and outreach. Compilation of focus groups' discussions will be available in late 2004.

This conference was instrumental in bringing together a variety of biologists interested in Alaska's herpetofauna and setting direction for future efforts with these not-so-common species in this state. Conference proceedings will be published at **http://www.stikine.org/akherps2004**. New research in Alaska on amphibian genetics (Sandra Talbot), abnormalities (Kim Trust), and continuing work on distribution is underway, and organizers plan to make the Alaska Amphibian Conference an annual early spring event.

Acknowledgements
The conference was artfully arranged and then rearrranged due to snow complications by Helen Clough. Sponsorship was provided by USFWS, NPS, ADF&G, Alaska Natural Heritage Program and USFS.

Contact: Deborah D. Rudis, US Fish & Wildlife Service, 3000 Vintage Blvd #201, Juneau, AK 99801, USA.
Deborah_Rudis@fws.gov

Froglog Shorts

Changing Faces in the DAPTF Office John Wilkinson, who has been the DAPTF's International Coordinator for eight years, is leaving at the end of September to do a PhD on declining toad populations. We are enormously grateful to John for all the hard work he has done for the DAPTF, primarily as Editor of *Froglog*, but also for coordinating the efforts of all our working groups. We wish him well for the future.

John will be replaced by Jeanne McKay, who comes to us from the Durrell Instititute of Conservation and Ecology at The University of Kent, Canterbury, UK, where she has worked on a number of amphibian conservation projects, including work on Mallorcan midwife toads and axolotls in Mexico. *Tim Halliday*

The 31st Annual Meeting of the Kansas Herpetological Society will be held 6-7 November 2004 at Kansas State University in Manhattan. Registration is $10.00 at the meeting. Featured this year will be Alicia Mathis of Southwest Missouri State University, whose topic is "Sex, Safety, and Survival: Social Behavior and Conservation Biology of Salamanders." Individuals wishing to present a paper at this year's meeting should send their title and abstract (be sure to include institutional affiliation) via email asap to: **jcollins@ku.edu**

Reports on DAPTF Seed Grants Recipients of DAPTF Seed Grants are generally expected to publish the results of their projects in refereed journals, or as articles in *Froglog*. They are also required to send us reports, so that their results can be made available to DAPTF members. Below is a list of reports that we have received recently. Anyone wanting a copy of a report should contact the author in the first instance; we can supply copies if you cannot reach the author.

Luca Luiselli & Godfrey C. Akani (2000/1) The amphibian fauna diversity and its conservation status in some swamp-rainforests of the Niger Delta, Nigeria.
lucamlu@tin.it

Yet another threat to frogs? To the long list of anthropogenic insults that threaten the survival of amphibians, it looks as though we should add another: noise. In a recent study of frogs in Thailand (Sun & Narins 2005), it is reported that the sound of aircraft, and of motorcycles, causes males of three species to reduce their call rate; males of a fourth species, however, increased their calling.

Sun, J.W.C. & Narins, P. M. (2005) Anthropogenic sounds differentially affect amphibian call rate. *Biol. Conservation* **121:** 419-427. *Tim Halliday*

Eurycea Data Needed Robert D. Davic (Ohio Environmental Protection Agency) is interested in a specific life history aspect of larvae from the Two-lined Salamander complex (*Eurycea bislineata, E. cirrigera, E. wilderae*). He would like to talk to any herpetologist that has observed the larvae of these species outside flowing water habitat, either in nature or in captivity. He also has an interest in knowing if anyone has conducted experiments on burrowing activity for these larvae. He is aware that some salamander larvae have been observed in nature away from water (e.g., *Desmognathus fuscus*), but is not aware of any similar observations for Two-lined Salamander larvae. If you can contribute to Dr. Davic's research, please contact him at: **robert.davic@epa.state.oh.us**

The DAPTF at WCH5 We have strong links with the World Congress of Herpetology and we are planning to have a high profile at WCH5, to be held in Stellenbosch, South Africa from June 20 to 25, 2005. We are organising a symposium on amphibian declines and conservation and a social event, and we will be holding our annual Board meeting during the Congress. We look forward to meeting as many people involved in DAPTF activities as possible. **http://www.wits.ac.za/haa/5wch.htm**
Tim Halliday

RANA and the US National Science Foundation grant DEB-0130273 helped support the publication of this issue.

FROGLOG is the bi-monthly newsletter of the Declining Amphibian Populations Task Force. *Articles on any subject relevant to the understanding of amphibian declines should be sent to:* Jeanne McKay, Editor, 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**
This edition edited by John Wilkinson and Jeanne McKay.

Funding for FROGLOG is underwritten by the Detroit Zoological Institute, P.O. Box 39, Royal Oak, MI 48068-0039, USA