The Croaker

Newsletter of the Tablelands Frog Club

August 2007

Tablelands Frog Club

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Tablelands Frog Club

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PUBLIC INFORMATION:

The Croaker is the Newsletter of the Tablelands Frog Club Incorporated. This Newsletter is produced by the voluntary efforts of members. We gratefully accept all contributions, however limited space may mean that contributions are not included immediately, and all are subject to editorial discretion. The TFC newsletter is published bimonthly (i.e. February, April, June, August, October, & December). Newsletter submissions are due on the 15th of the preceding month. Please direct all contributions to The Editor c/o Tablelands Frog Club, at the addresses listed above.

TFC meetings/nights and field trips/outings are held monthly. See schedule for dates, speakers and locations. Annual membership fees are:

$15.00 Adults
$15.00 Family
$ 5.00 Junior/Associate

The Croaker is now available as a PDF to members that have access to email. The PDF version of *The Croaker* is in full colour, and contains more information than mail-out photocopied versions. Email costs less to send out, and doesn't waste paper and other resources, making it good for the Tablelands Frog Club and the environment. To take advantage of this service, contact the Tablelands Frog Club with your email details. You will need Adobe Acrobat Reader to open PDF files. The latest version of Adobe Acrobat Reader is available as a free download from:

Adobe PDF http://www.adobe.com/downloads/

http://www.tablelandfrogclub.com

Editorial bullrush!

Hello everyone and welcome to the August 2007 edition of ***The Croaker***. This issue has been bumped up to 22 pages to cope with all the submissions… Thanks to all those members that sent something in, and a big apology to those that are not in this newsletter; we only have limited space available, but who knows, if this keeps up we could look at increasing the newsletter even more. Please don't forget our frog of the month, or should I say our frog in the spotlight. Unfortunately the section ***Kids Corner*** is seriously lacking content in this edition of ***The Croaker***. This was due to the simple fact that no one sent anything in; I managed to find something at the last minute before publishing. Please send us something to help encourage an interest in our younger members. If you have time, scan the internet, or write something yourself… before you croak it! Hop to it..

My regards to all...

Darren Green

Front Cover

Common Tree Frog by Michael Anthony. See Page 13 for this story.

Our Story

The Tablelands Frog Club was formed in January 1995 in Yungaburra by a group of people who were aware of diminishing numbers of frogs in all areas and who were keen to learn more about the species in general. From the outset guidance was available from experts in the field. Since that time public interest has been constant and the Club has grown rapidly. Frog enthusiasts have joined from as far afield as Adelaide in the south to Weipa in the north. The pooling of Club members' expertise in various related fields has helped the Club to become established and recognised within the community. Membership numbers reached 94 within the first year and are still increasing. On November 17, 1995, the Club became incorporated under the Queensland Associations Incorporation Act 1981. The Club now operates under appropriate rules.

What can I do as a member?

The Club needs all the support and enthusiasm you can provide to help us to achieve a better understanding of these much overlooked animals. Some of the rare species are facing extinction at this very moment. We need assistance to address the many problems which threaten the livelihood of these vulnerable creatures by improving our knowledge of their habits and habitat, by enhancing their environment and by educating our children and the public at large on these issues.

Education: The Club offers many opportunities for you to learn about frogs and in turn to educate others.

Research: Grant applications are made by the Club as an incorporated body and research is led by social scientists who provide you with the opportunity to participate in this work. The Club maintains an information database on frog distribution and invites your input.

Protection of frog environment and breeding: The Club provides guidance and knowledge on how to protect and create friendly frog environments and how to set up a breeding programme for common species in your garden.

Our Aims

To study frogs: The Club meets once a month with professional guest speakers and relevant videos. Members are encouraged to participate in general discussion and to introduce items of interest. A mobile library of scientific and general information on frogs is available at these meetings. Members recordings of frog distribution and animal husbandry are collated on a database for research purposes. The Club conducts workshops and field trips with professional guidance. The Croaker, the Club's newsletter, contains scientific information, contributions from both adult and junior members and general business matters of the Club.

To conserve and encourage the preservation of frogs: The Club has a Code of Conduct and abides by the Nature Conservation Act 1992, runs public awareness campaigns through the media, displays static educational material, encourages a `Frog Friendly' environment and guides members on breeding programmes of common species in gardens and urban parks.

To encourage children's interest in frogs: The Club holds workshops suitable for junior members, runs a section called `Kid's Comer' in the newsletter aimed at the younger group and conducts various competitions with appropriate educational prizes. The Club also guides children in frog breeding programmes and encourages them, under parental guidance, to participate in suitable field trips.

From the president's lilypad

Well it's already 4 months into the new frog club year! Just about everybody should have received the July newsletter, sorry we missed a couple and also we missed a few members names in the member list. Hopefully also everybody has had a chance to check out our website (www.tablelandfrogclub.com). Many thanks to Darren Green for the fantastic newsletter and Claudine Grandjean for the fantastic website. I urge you all to contribute and interact with the club to make all their hard work more rewarding. It can be very difficult to keep your interest and energy levels up when no-one appears to appreciate all your efforts. Many thanks to those who have contributed to our website and newsletter and sent in photos, hopefully this is the start of something big.

Of course not much has happened frog-wise of late, being the middle of the "dry" season. Most frog observations at this time of year are when frogs are found hiding in a moist spot to avoid the cold, dry conditions, whether it be around the home or out in the bush. Rainforest frogs are generally the exception, particularly some of the stream dwelling frogs which can be found active at almost any time of year. The ground hylid group eg rocket frogs may also be found active near permanent watercourses at this time of year - some of these actually bask in the sun! Occasional specimens of the Common Tree Frog also appear on the highway at night or along dry or nearly dry creek beds. In the dry savannah country most frogs remain dormant until the wet season starts, although Ornate Burrowing Frogs Limnodynastes ornatus can emerge after minor episodes of rain outside this time. The Bumpy Rocket Frog Litoria inermis is another frog which can be found active at night where there is some water remaining in near-dry rocky creek beds, even into the hottest, driest time of year in late October/ November.

From time to time the frog club holds exhibits to interact with the public. Most notably the Tablelands Garden Expo and the Frog Festival. Beryl Davidson, who normally organises the garden expo is unable to do so this year, so we are looking for a volunteer or three to organise this for the 22/23rd September. The frog festival, normally held at Yungaburra on the Sunday of the folk festival, is also looming (October) so we also need volunteers for this. If you are interested in getting involved in this side of the club, please contact the committee.

Everyone who attended our last meeting would have very much enjoyed the fantastic photos on show from our guest speaker, Michael Cermak. There were some amazing shots of some amazing amphibians and other wildlife from Borneo. This newsletter and our website will include some excerpts from Michael's presentation. He is also working on a book on north Queensland's frogs.

Happy Frogging!

Michael Anthony

http://www.tablelandfrogclub.com

June meeting...

BORNEO

The June 2007 Tablelands Frog Club meeting was held at the CWA Hall in Yungaburra. Attendance was good as first-class wildlife photographer Michael Cermak presented a slide show from his recent trip to Borneo. Michael took us through the districts of Brunei, Sarawak and Sabah. Compared with the 219 species from 5 families of Australian amphibians, Borneo has 142 species from 6 families. The Australian species are formed from Hylidae (x79), Microhylidae (x19). Myobatrachidae (119), Ranidae (x1), and the introduced Bufonidae (x1). Borneo consists of Bufonidae (x29), Rycophoridae (x34), Microhylidae (x20), Megaphoridae (x19), Ranidae (x39), and Bombinatoridae (x1).

Our evening's journey with Michael began with a long-boat trip at Temburong, in Brunei, to the Kuala Belalong Research Centre. After a visually stunning display of frogs, lizards and snakes, the journey continued to Bako, Sarawak. Here the tortured rock formation, mangroves, and rainforests yielded to all manner of primates, pigs, dragons and vipers. A closer look at the scrub showed a rainbow of epiphytes and nepenthes, a cup-like carnivorous plant. The red water of the tannin stained streams also revealed a number of interesting frogs. The boulder laden rainforest streams of Gudung Gading and Temburong, both in Sarawak, exposed many hidden jewels of the night. At Mt Kninabalu, in Sabah, the leaf litter came alive to uncover a wonderful array of leaf-litter frogs, while the Danum Valley Field Centre paraded a sample of Borneo's wildlife diversity. They say that a picture is worth a thousand words… Michael's presentation cannot be given full justice here. All I can say is that the slides were visually stunning, so here are few of the remarkable frogs of Borneo. Firstly, a big thank you must go to Michael Cermak for a wonderful evening, and allowing us to reproduce some of his photos for the newsletter.

Brunei

Rana hosii

Polypedates leucomystax

Staurois latopalmatus

Brunei

Kalophrynus pleurostigma

Rhacophorus sp.

Bufo juxtasper

Sarawak

Staurois guttatus

Limnonectes palavanensis

Rana signata

"Michael Cermak's frogs of Borneo"

TFC June meeting continued page 5...

June meeting cont...

Michael Cermak's frogs of Borneo

Sarawak

Rana picturata

Microhyla borneensis

Pelophryne signata

Sabah

Meristogenys kinabaluensis

Rhacophorus pardalis

Rhacophorus latopalmatus

Sabah

Polypedates otilophus

Megophrys nasuta

Limnonectes finchi

August meeting...

7:30pm Tuesday 14 August 2007

Guest speaker Michael Anthony is a naturalist that has had a lifelong interest in herpetology, the study of reptiles and amphibians. His main interest has been with reptiles, however he developed a keen interest in frogs over the last 10 years after the disappearances of many species of frog from Queensland's rainforests. Michael is the current president of the Tablelands Frog Group. In conjuction with the Far North Queensland Wildlife Rescue, Michael's presentation on the Frogs of North Queensland will include photographs and calls of north Queensland's diverse frog fauna including the familiar large green tree frogs, as well as endangered stream dwelling frogs, burrowing species and the tiny rainforest microhylids. A night not to be missed. Don't forget, after the meeting you will have the chance to meet and socialise with other like-minded members and guests, all this while enjoying a cuppa tea or coffee, and biscuit. Invite all your friends to come along and support our meetings. Hope to see you there.

Meeting held at Cominos House
Cnr Greenslopes & Little St
Edge Hill (Cairns)

Schedule of events...

Dates, times & localities will be confirmed in the newsletter prior to meetings and field trips.

Meetings...

Tuesday 14th August 2007
Michael Anthony with a presentation on the frogs of the Wet Tropics & Hinterland, Cominos House, Cairns (see Page 7 for details).

Friday 15th September 2007
Marion Anstis on North Queensland Frogs & Tadpoles, Cairns.**October 2007 TBA**
Laws relating to keeping of frogs & tadpoles.

Friday 16th November 2007
The Wilderness Society's Cape York Presentation, CWA Hall, Yungaburra.

January 2008 TBA
To be announced.

February 2008 TBA
To be announced.

March 2008 TBA
Annual General Meeting.

Events...

October TBA
Frog Festivalv

Field trips...

18th August 2007
Mt Baldy & Wongabel State Forest (Saturday night, short walks).

15th September 2007
Daintree (weekend).

October 2007 TBA
Koolmoon Creek (weekend, long hike but can do just part of trail).

17th November 2007
Mt Fisher (third highest peak in Queensland but start at altitude).

15th December 2007
Mt Carbine (Saturday, hopefully coincide with first major storms).

February 2008 TBA
Mareeba Wetlands (Saturday night, easy walking).

TFC Members...

Mandy Lindsay	Atherton
Bevan Pritchard	Atherton
Dr Stacey Gelis	Beerwah
Dr Amber Gillett	Beerwah
Dr Che Phillips	Beerwah
Dominic Chaplin	Bungalow
Val Bonner-Burrows	Oxley
Bonnie Arbon	Caboolture
Judy Catchpole	Chambers Flat
Keith Martin	Clifton Beach
Cindy Harkness	Edge Hill
Jo Loader	Glass House Mountains
Kia Bailey	Glass House Mountains
John Booy	Gordonvale
Grant Turner	Innisfail
Kent Jozefowski	Kallangur
Clarissa Morris	Landsborough
Sue Morris	Landsborough
Beryl Davidson	Malanda
Inga Lorenz	Malanda
Merv Robson	Malanda
J & M Sweetzer	Malanda
Marney Fichera	Mooroobool
Cheryl Lammeretz	Peachester
Tricia Schilling	Reesville
Murray Wellington	Speewah
Darren & Jo Green	Trinity Beach
Michael Anthony	Whitfield
Shaun Cook	Whitfield
Maria Destro	Whitfield
Eleanor Duignan	Whitfield
Alan Gillanders	Yungaburra
Murray Powdren	Yorkeys Knob
Margret Egger	Yungaburra
Neville Simpson	Yungaburra
Claudine Grandjean	Yungaburra
Chris Tsilemanis	Yungaburra

Amphibian news...

Water for review as frogs shift sex

AUSTRALIAN drinking water standards are under scrutiny after scientific research linking commonly used herbicides to gender bending in male frogs. The National Health and Medical Research Council is to reassess its drinking water guidelines after minuscule traces of the herbicides atrazine and simazine were found to turn the frogs into hermaphrodites — creatures with male and female sex organs.

Australian guidelines allow up to 40 parts per billion (ppb) of atrazine in drinking water before it is considered a health risk. But scientific studies have found that male frogs grow ovaries when exposed to the chemical at the minuscule level of .1ppb in water. "The current Australian Drinking Water Guidelines specify that atrazine should not be detected in drinking water and that if it is detected, then remedial action should be taken to stop contamination," NHMRC spokesman Nigel Harding said. "The guidelines state that if present in drinking water, atrazine would not be a health concern in humans unless the concentration exceeds 40ppb. "The guidelines are currently under review."

Atrazine, which was banned across the European Union in 2003, has been used for weed control in Australia for more than 25 years and is the nation's second most commonly used agricultural pesticide, being sprayed around canola fields, forestry plantations and sugar cane crops. There is no legal requirement for atrazine users to notify water authorities when the chemical is being sprayed. No traces have been found in Melbourne's drinking water since testing began in 2005, but Melbourne Water acknowledges it probably is used in the city's unprotected water catchments.

But while Melbourne Water tests twice yearly for atrazine to a level of .5ppb, it does not test for its close chemical relative simazine, which is used on Yarra Valley vineyards. The Yarra Valley is part of the catchment zone for the Sugarloaf reservoir, which supplies drinking water to the northern and western suburbs. "Melbourne Water understands that simazine is used infrequently in the Yarra Valley, and because of this infrequency of use and its degradation in the environment, testing is not conducted, consistent with our risk assessments," a Melbourne Water spokesman said.

At .5ppb, its atrazine tests are still five times higher than the level required to turn male frogs into hermaphrodites, according to US scientist Dr Tyrone Hayes, an associate professor of integrative biology at the University of California. "What struck us as unbelievable was that atrazine could cause such dramatic effects at such low levels," said Dr Hayes, an associate professor of integrative biology at the University of California, Berkeley, who led the frog study. "If you take five grains of salt, divide this weight by 5000, that is the amount of atrazine that causes these abnormalities."

Environmentalists say Melbourne Water's tests do not go far enough. "They now test for atrazine twice a year at each of their testing locations, that's two readings per year or one reading every 182 days," said Anthony Amis of Friends of the Earth, which partly sponsored a visit to Australia by Dr Hayes. "Their results only go as low as .5ppb, which means they probably won't detect atrazine at the level required."
AUTHOR: Carmel Egan, SOURCE: The Age July 15, 2007.

Cane Toads dying from unknown disease

A mystery disease is killing the North's cane toads before scientists have a chance to unleash their man-made virus upon them. Toad numbers are believed to have dropped throughout North Queensland, which has led one expert to believe a microbe may be responsible. Last week, CSIRO scientists told the Townsville Bulletin they had found the `holy grail' of cane toad control – an engineered amphibian virus, created from a disease found in Townsville, Bohle iridovirus (BIV).

Before the water-borne disease is released, the scientists will test the virus to be 100 per cent certain it does not kill native species. CSIRO hopes to have results by end of the year. The engineered BIV targets cane toads' genes, halting tadpoles from metamorphosing into toads and therefore preventing the toads from laying eggs.

Jensen resident John `Nipper' Ryan believed he had already seen a toad virus in action in his backyard. "We used to have heaps of the bastards here," Mr. Ryan said. "There'd be 20-30 when you turned on the porch light at the front of the house. "In the wet season, you look out and just think `holy hell'. "All of a sudden they started disappearing about 18 months ago."

The remaining toads Mr. Ryan found had a dark grey to black discoloration along their backs. The toads were also extremely lethargic. "They just sit there, doing nothing," Mr Ryan said. "Usually you lift something up and the toad hops away."

James Cook University toad expert Professor Ross Alford believed a disease was responsible for the blackened toads. "Frogs and toads do get a variety of diseases," Professor Alford said. He said the difference in toad populations could be in response to environmental factors, and probably influenced by diseases and parasites. "It is possible they are down right now," Professor Alford said. "I haven't been monitoring them closely. "They certainly could be down in the Jensen area."

However, Professor Alford said there was no chance the toads were becoming extinct in North Queensland. "We still don't have much trouble collecting fair numbers of them when we need to," he said. Mr. Ryan hoped authorities could soon fix the cane toad problem. "They've stuffed up the environment," he said. "The only thing that knows how to kill them are crows. They will flip them over and eat their insides out."
AUTHOR: Daniel Bateman
SOURCE: Townsville Bulletin (6/12/07).

Can Powerlines Help Frogs?

Scientists are trying to figure out if clearings created for powerlines through rainforests may be helping frogs survive a deadly disease. In laboratories, scientists have noticed the potentially fatal fungus chytrydiomycosis is not nearly so deadly at temperatures of about 37C. But once the temperature drops to about 25C, the fungus becomes more potent. The fungus had proved deadly to higher altitude species. Chytrydiomycosis is believed responsible for three species being wiped out but might be to blame for at least six extinctions. "The idea is to look at small-scale but intensive disturbance to the frogs habitat and monitor how it affects them," said Lin Schwarzkopf, of James Cook University's school of marine and tropical biology. There are no cases of population declines due to the disease in frogs that live in lowland rainforests. The project will examine why this could be. "Higher, more variable temperatures and light levels and lower humidity seem to protect frogs from the disease," Professor Alford said. "Small clearings being made for power line towers are likely to increase the exposure of frogs to such conditions, which could reduce their vulnerability to the disease. "Our monitoring of the frogs will determine if the areas disturbed by tower construction are used by frogs and how."
AUTHOR: Brian Williams
SOURCE: 12 July 2007, http://www.couriermail.com.au

Note from the Editor

The Croaker is your Newsletter. If you have any feedback, comments or additions, please forward them to the TFC (see page 2 for address). If you have anything interesting, perhaps good or sad news, then perhaps we could all learn from it. Don't let anything be forgotten, send it in for others to read. Remember, we all have different knowledge and experiences, let's share it so that we all may benefit.

Amphibian news...

Caribbean Frogs Raft

Science Daily — Nearly all of the 162 land-breeding frog species on Caribbean islands, including the coqui frogs of Puerto Rico, originated from a single frog species that rafted on a sea voyage from South America about 30-to-50-million years ago, according to DNA-sequence analyses led by a research group at Penn State, which will be published in the 12 June 2007 issue of the Proceedings of the National Academy of Sciences and posted in the journal's online early edition this week. Similarly, the scientists found that the Central American relatives of these Caribbean frogs also arose from a single species that arrived by raft from South America.

"This discovery is surprising because no previous theories of how the frogs arrived had predicted a single origin for Caribbean terrestrial frogs and because groups of close relatives rarely dominate the fauna of an entire continent or major geographic region," explained Penn State's Blair Hedges, the evolutionary biologist and professor of biology who directed the research. "Because land connections among continents have allowed land-dwelling animals to disperse freely over millions of years, the fauna of any one continent is usually a composite of many types of animals."

The field work for the study required nearly three decades to complete because many of the species are restricted to remote and isolated mountain tops or other inaccessible areas. Some species included in the study now are believed to be extinct because of habitat degradation and possibly other causes such as climate change. A recent global assessment of frogs found that the Caribbean Islands have the highest proportion of frog species threatened with extinction. Hedges and coauthor William Duellman, a professor emeritus of the University of Kansas, were involved in much of the field work. A third co-author of the study is Penn State graduate student Matthew Heinicke, who performed DNA sequencing and analyses. One prominent theory had proposed that frog species on the large islands of Cuba, Jamaica, Hispaniola, and Puerto Rico had walked there across land bridges that existed when those islands were connected in a geologic arc about 70-to-80-million years ago. A second major theory proposed that they arrived, instead, by rafting across the Caribbean Sea after the giant asteroid impact near Cuba 65-million years ago, which is widely believed to have exterminated the dinosaurs. "Both theories acknowledged that the frog faunas must have arrived by rafting over water to the smaller and younger islands, the Lesser Antilles, because they never were connected by land to South America, but neither theory proposed that all of the Caribbean island frog species had a single common ancestor," Hedges said.

The anatomy of Caribbean frogs previously had led the advocates of both theories to conclude that species in Cuba and other western-Caribbean islands were related to different mainland species than were the species on Puerto Rico and other eastern-Caribbean islands, regardless of how they got there. "Discovering a single origin for all of these species from throughout the Caribbean islands was completely unexpected," Hedges said. To make their discovery, the researchers sequenced the DNA of nearly 300 species of Caribbean, Central American, and South American frogs and used three mitochondrial genes and two nuclear genes in their study, building trees of relationships among the species and timing the divergences of the species with molecular-clock methods. "Molecular clocks work by counting the number of DNA-sequence mutations separating two species and then dividing that number by the rate of change, which is established with the help of fossils and geologic information," explained Hedges. The study's DNA research revealed that, while many ocean dispersals may have occurred over time, only two led to the current faunas: one for the Caribbean islands and another for Central America. The scientists speculate that it may not be coincidental that these ancient and successful dispersals happened after the asteroid collision rather than earlier. "The asteroid impact generated giant waves that devastated the islands, probably eliminating any existing fauna at that time," Hedges said.

The original frogs that successfully colonized the Caribbean islands likely hitched a ride on floating mats of vegetation called flotsam, which is the method typically used by land animals to travel across salt water. "Some rafts of flotsam, if they are washed out of rivers during storms and caught in ocean currents, can be more than a mile across and could include plants that trap fresh water and insect food for frogs," Hedges said. It is not likely that the frog species dispersed simply by swimming because frogs dry easily and are not very tolerant of salt water. In addition to the study's discoveries about Caribbean and Central American frogs, the research also revealed and defined an unusually large and unpredicted group of species in South America. "The South American group may have more than 400 species and is mostly associated with the large Andes mountains of South America," Hedges said.

"Until now, the entire group of these terrestrial, tropical frog species -- the eleutherodactylines -- have been considered a "black hole" in frog biology because of the poor understanding of their evolutionary history," explained Hedges. Scientists consider the knowledge of evolutionary relationships, also called "phylogeny," to be fundamental to many fields of biology, including medicine, anatomy, physiology, ecology, and conservation. This research was supported by the National Science Foundation's Biotic Surveys and Inventories Program, Systematic Biology Program, and Assembling the Tree of Life (AToL) Program. The latter program is an effort to understand the "tree of life," or the relationships among all organisms. The research also was supported by the National Aeronautics and Space Administration's Astrobiology Institute (NAI). A major goal of NASA's Astrobiology Roadmap is to understand how past life on Earth interacted with its changing planetary environment, such as asteroid impacts and connections of continents.
SOURCE: http://www.sciencedaily.com

Conservation of the Crapaud

In September 2004, I began a 3-year study, funded by the Jersey Ecology Fund, on the common European toad (Bufo bufo) in Jersey, British Channel Islands. The species has cultural associations with Jersey and its' islanders (both are known as crapauds!) and was once supposedly very common there. Declines have been recorded for several decades and the toad is now restricted to fewer than ten semi-natural breeding ponds in the wild in Jersey. A media appeal run in conjunction with the Durrell Wildlife Conservation Trust has, however, resulted in some 200 garden pond records from members of the Jersey public.

It is not usual for B.bufo to breed in small ornamental ponds of the type it uses in Jersey, though there is evidence of plasticity in breeding site choice in this species from areas where the geology does not favour large water bodies. A selection of garden-pond breeding sites is being visited and their population dynamics compared with the few remaining natural breeding ponds. Any differences in genetic diversity at garden and "wild" toad ponds are also being assessed and compared with sites in NW France and S England. Many garden sites have only one or two reproductive female toads each year and this has implications both for genetic fitness and the long-term viability of the population.

There is an abundance of small farm reservoirs in the agricultural areas of Jersey that are rarely, nowadays at least, utilized as toad breeding sites but that would seem to be suitable. An experimental examination of the affects of water quality variables, coupled with landscape-scale analysis of features associated with toad breeding ponds in Jersey, will hopefully elucidate the factors influencing toad distribution on the island and reveal elements important for their conservation. It is, for example, perhaps important that toads in Jersey often breed as early as January so their spawn and larvae may be especially susceptible to runoff containing the products of winter-crop fertilizer applications.

Jersey crapauds seem to be demonstrating remarkable adaptation to local conditions – those in nearby France seem inclined to act like more conventional toads – surviving in novel habitats and with an unusual reproductive ecology. This serves as a salient reminder to all of us engaged in amphibian decline research that there are always new things to be discovered about even well-known species and that decline phenomena often owe more to specific local conditions than to global pandemics or rampant urbanization. It is perfectly possible that, without the housing boom in Jersey due partly to the success of the offshore finance industry, there may be no toads now left on Jersey and an island would have lost a cultural icon.
AUTHOR: John W. Wilkinson (jwwws@kent.ac.uk),
SOURCE: Herpdigest (http://www.herpdigest.org).

Amphibian news...

New Zealand's Native Frogs

Ancient, Threatened & the Object of Intensive Conservation Effort

New Zealand has a tiny native amphibian fauna, containing a single genus (Leiopelma) consisting of four extant and three extinct species. Among the world's most ancient amphibians, they have remained largely unchanged for 160 to 200 million years. They appear to communicate by chemical means, with only a limited ability to make sounds or to hear them. Essentially terrestrial in their habits, they probably rarely need to swim; when made to do so, they kick their hindlegs alternately, not synchronously as most frogs do. They are remarkably calm and relaxed when handled.

They are highly restricted in their distribution, confined to isolated populations in small remaining areas of native forest on the North Island, and to a few offshore islands in Cook Strait. Known from 1861 as a single species, Hochstetters's frog (L.hochstetteri), new species have been described recently: Hamilton's frog (L.hamiltoni) in 1919, Archey's frog (L.archeyi) in 1942, and the Maud Island frog (L.pakeka) in 1998. Archey's frog is listed as Critically Endangered, Hamilton's frog as Endangered, the other two species as Vulnerable.

Like much of New Zealand's fauna, these frogs owe their precarious situation to a combination of habitat loss and degradation and the impact of a variety of introduced mammals. In addition, chytridiomycosis has had a severe impact on some populations, notably of Archey's frog in the Coromandel peninsula (Bell et al., 2004). However, sympatric populations of Hochstetter's frog seem not to have been so affected.

These remarkable frogs are now the subject of an intensive conservation effort, involving close cooperation between New Zealand academic and zoo communities. This involves raising public awareness about these obscure and secretive animals, the creation of reserves, habitat restoration and translocation. The news is not all bad; a new population of Hochstetter's frog has recently been found (Baber et al., 2006) and, as a result of habitat restoration efforts on Maud Island, the population of its native frog appears to be expanding quite rapidly (ongoing work by Jacqueline le Roux and Ben Bell, Victoria University of Wellington).

The New Zealand frog conservation programme provides a model for comparable initiatives elsewhere in the world, and shows the value of collaboration between science, zoos and local groups. For example, a translocation of Maud Island frogs has been used to develop and test a theoretical model of translocations, enabling critical assumptions about how translocated animals behave to be tested (Trewenack et al., in press).

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AUTHOR: Tim Halliday, SOURCE: Herpdigest (http://www.herpdigest.org).

Frog Molecule Drug Treatment

Science Daily — A synthetic version of a molecule found in the egg cells of the Northern Leopard frog (Rana pipiens) could provide the world with the first drug treatment for brain tumours. Known as Amphinase, the molecule recognises the sugary coating found on a tumour cell and binds to its surface before invading the cell and inactivating the RNA it contains, causing the tumour to die. In new research published in the Journal of Molecular Biology, scientists from the University of Bath (UK) and Alfacell Corporation (USA) describe the first complete analysis of the structural and chemical properties of the molecule. Although it could potentially be used as a treatment for many forms of cancer, Amphinase offers greatest hope in the treatment of brain tumours, for which complex surgery and chemotherapy are the only current treatments. "This is a very exciting molecule," said Professor Ravi Acharya, from the Department of Biology & Biochemistry at the University of Bath. "It is rather like Mother Nature's very own magic bullet for recognising and destroying cancer cells. "It is highly specific at hunting and destroying tumour cells, is easily synthesised in the laboratory and offers great hope as a therapeutic treatment of the future."

Amphinase is a version of a ribonuclease enzyme that has been isolated from the oocytes (egg cells) of the Northern Leopard frog. Ribonucleases are a common type of enzyme found in all organisms. They are responsible for tidying up free-floating strands of RNA cells by latching on to the molecule and cutting it into smaller sections. In areas of the cell where the RNA is needed for essential functions, ribonucleases are prevented from working by inhibitor molecules. But because Amphinase is an amphibian ribonuclease, it can evade the mammalian inhibitor molecules to attack the cancer cells. As a treatment, it is most likely to be injected into the area where it is needed. It will have no effect on other cells because it is only capable of recognising and binding to the sugar coating of tumour cells.

"Amphinase is in the very early stages of development, so it is likely to be several years and many trials before it could be developed into a treatment for patients," said Professor Acharya and his colleagues Drs Umesh Singh and Daniel Holloway. "Having said that, the early data is promising and through this study we have provided the kind of information needed if approval for use is requested in the future."

Amphinase is the second anti-tumour ribonuclease to be isolated by Alfacell Corporation from Rana pipiens oocytes. The other, ONCONASE(R) (ranpirnase), is currently in late-stage clinical trials as a treatment for unresectable malignant mesothelioma, a rare and fatal form of lung cancer, and in Phase I/II clinical trials in non-small cell lung cancer and other solid tumours. "We are pleased with the superb work performed by Professor Acharya and his talented team at the University of Bath," commented Kuslima Shogen, Alfacell's chairman and chief executive officer. "Their work is critical to the continued development and understanding of our family of novel ribonuclease based therapeutics with the potential to help patients suffering from cancer and other dismal diseases." The company is now working on pre-clinical trials of Amphinase with a view to beginning clinical trials in the future.
SOURCE: http://www.sciencedaily.com

Rare Golden Frog Tadpoles Hatched

Science Daily — Hundreds of golden frog tadpoles hatched at Hotel Campestre in El Valle earlier this month, product of the Golden Frog Project that started in 2001. The Project aims to serve as Noah's Ark until a solution to control a fungus is found. Principal investigator Edgardo Griffith, STRI visiting scientist from Southern Illinois University and research assistant Heidi Ross were surprised at the event "We didn't expect that the conditions for reproduction were already there."

The new facilities of Hotel Campestre include at least one 100 gal aquarium irrigated with tap water filtered with activated charcoal to insure purity. River stones with emerging algae, tropical plants and petri dishes containing tadpole food based on algae are also contained in the aquarium, providing a simple but effective ecosystem for the new golden frogs. These frogs are the survivors of many highland species in Panama, victims to a chitrid fungus Batrachochytrium dendrobatidis (Bd). Along with habitat loss, soils use change, and commercial overexploitation, Bd is responsible for the decimation of populations and extinction of many species of amphibians. No wild golden frogs are found in El Valle.

The new tadpoles are the offsprings of two resident couples of golden frogs of the Hotel. In normal conditions in the wild, without the fungus, maybe only 25% of the tadpoles would survive, but given the conditions provided by the project all 100% of tadpoles may reach adulthood. The efforts to conserve the golden frog and many other species of amphibians is shared by ANAM, the Houston Zoo, the World Association for Zoos and Aquaria, World of Conservation, Zoo Atlanta, etc.
SOURCE: http://www.sciencedaily.com

October "in the spotlight" focuses on the Waterfall Frog (Litoria nannotis) send us a story about this frog!

Amphibian news...

3D Anatomy Images Available Online

Science Daily — Frog biology is especially noteworthy because of the amphibians' sensitivity to pollution, which often flags previously unknown environmental problems. Science labs and classrooms around the world can now get inside frogs, slice them up, and rotate 3D images of their organs on MorphologyNet.org, a new online resource produced by a biologist and a computer scientist. The Web site also contains models of fish, reptiles, birds and mammals. Researchers will be able to share images across continents and limit the samples of endangered species that are destroyed in the research process.

ROLLA, Mo. -- Frogs are some of the oldest living creatures and they could provide the first clues on changes in our environment that could impact us. Today scientists are getting the inside facts from frogs. Frogs… They're the line of defense to tell us what happens when something is wrong in the environment. And according to biologist Anne Maglia, chemicals in the water may have something to do with the developmental problems that breed frogs with multiple limbs or facial deformities.

"It's really important to people because a lot of this water ends up being part of the drinking water supply," Maglia, from the University of Missouri-Rolla, tells DBIS. And that is the reason Maglia has dedicated her life to learning about frogs and now she is helping the world learn about them too. Joining forces with computer scientist Jennifer Leopold, Maglia created a Web site that lets students to get inside amphibians. The site also allows scientists to share their research with experts around the world. This high-tech tool could help scientists identify local environmental problems sooner. But there's nothing hi-tech to how the research starts. Maglia says, "We can take a frog, cut it into about 2,000 slices." Computer software then uses mathematics to piece the slices together like a puzzle, creating an animation. You can take the frog apart, highlight areas, shadow them, and even go inside them. "We're building now, essentially, a virtual museum of 3-D reconstructions of anatomy," Maglia says. The information can be dissected for generations to come, and through each frog, we'll find out a little bit more about ourselves. MorphologyNet.org is not just for frogs. You can also check out reptiles, fish, birds and mammals.

ADVANTAGES: Computerized 3D reconstructions are not new, but most either focus only on humans, show only bone structure, or don't allow the user to interact with the sample or customize it to his or her specific needs. MorphologyNet enables the user not just to study a 3D representation of a frog, for example, but also to remove each layer entirely, dissecting the image as he or she would a real frog in a biology laboratory. Users can slice the image into as many layers as they like, and even rotate it 360 degrees in any direction, using any form of Web browser. One day the site could allow researchers to determine the effects of pesticides on declining amphibian populations.

WHAT CAUSES DEFORMITIES IN FROGS: In a given population, if 5 percent or fewer of frogs have malformations, that is natural, but there are populations where 70 percent show deformities. Researchers are trying to understand what outside source is causing the frogs to develop abnormally, resulting in diminishing populations around the world. Among the factors that have been studied are climate changes, such as global warming and the thinning of the ozone layer, which can result in overexposure to ultraviolet radiation. Habitat destruction is also a factor, as is pollution: frogs absorb water directly through their skin, so they are vulnerable to water pollutants like pesticides and acid rain.

WHAT IS BIOINFORMATICS: Bioinformatics is the field of science in which biology, computer science and information technology merge into a single discipline. The major advances in molecular biology and genomics have resulted in an explosive growth in biological information. Bioinformatics was born of the need for computerized databases to store, organize, index, and analyze the data.

FROG OR TOAD: Technically speaking, frogs and toads the same. The name "toad" is generally given to those with dry, warty skin and short hind legs for walking instead of jumping. Those with smooth moist skin and strong webbed hind legs for swimming and jumping are typically described as "frogs." Frogs usually live in moist climates and lay their eggs in clusters, while toads live in drier climates and lay their eggs in long chains. But there's not a clear-cut distinction: many species fit equally well into both categories.
See the video at http://www.sciencedaily.com/videos/2005-07-09/

Lethal Amphibians Pesticides

Science Daily — The breakdown products (oxons) of the three most commonly used organophosphorus pesticides in California's agricultural Central Valley - chlorpyrifos, malathion and diazinon - are 10 - 100 times more toxic to amphibians than their parent compounds, which are already highly toxic to amphibians, according to experiments conducted by scientists of Southern Illinois University, Carbondale, and the U.S. Geological Survey (USGS) Western Ecological Research Center. "Since some of the parent pesticide compounds are already at concentrations sufficient to cause significant amphibian mortality in the Sierra Nevada, the higher toxicity of the breakdown products poses a serious problem," said Dr. Gary Fellers, coauthor of the study.

Dr. Donald Sparling, a research biologist and contaminants specialist at Southern Illinois University, and Fellers, a research biologist and amphibian specialist at the USGS Western Ecological Research Center in California, conducted laboratory tests to determine the acute toxicity - the lethal dosage causing death in 96 hours or less - of chlorpyrifos, malathion and diazinon, and their oxon derivatives on tadpoles of the foothill yellow-legged frog (Rana boylii).

Organophosphorus pesticides have been implicated in the declines of several amphibian species in the California Central Valley and in downwind montane areas, including the Cascades frog, California red-legged frog, mountain yellow-legged frog and the foothill yellow-legged frog, which inhabit foothill or montane regions east of the Central Valley. More than 6 million pounds of active ingredient organophosphorus pesticides were used in California during 2004, the most recent year for which data are available. Researchers estimate that this accounts for about 25 percent of organophosphorus pesticide use nationwide.

Organophosphorus pesticides suppress an enzyme called acetylcholinesterase, which is essential for the proper functioning of the nervous system. Reduced levels of acetylcholinesterase cause neurological synapses to fire repeatedly and uncontrollably, leading to death, usually by asphyxiation as the animal loses respiratory control. Most pesticides of this group reach their greatest potencies when metabolized internally and converted to an oxon form in the liver. However, oxons can also be found in the environment, formed by bacterial decay of the parent pesticide. For the laboratory experiments, tadpoles were raised from eggs collected from a stream in the California Coast Range, upwind of agricultural activities in the Central Valley and away from areas where significant quantities of pesticides are used. Test results indicated that chloroxon killed all tadpoles and was at least 100 times more toxic than the lowest concentration of the parent compound chlorpyrifos, which resulted in no mortality. Maloxon was nearly 100 times more toxic than malathion, and diazoxon was about 10 times more toxic than diazinon.

"Other data published in 2001 and new unpublished data show that these pesticides are widespread, even in pristine areas of the Sierra Nevada Mountains," Sparling said. "The combination of field and laboratory studies is revealing that organophosphorus pesticides are posing serious hazards to the welfare and survival of native amphibians in California." The authors noted that amphibians inhabiting ponds in the Central Valley of California could be simultaneously exposed to two or all three of these pesticides and their oxons. "Because of this," said Sparling, "the potential for interactive effects of these chemicals needs to be explored." Organophosphorus pesticides form the largest group of chemicals used in the control of pests, including invertebrates, vertebrates and, to a lesser extent, plants. Some 200 organophosphorus pesticides available in this class have been formulated into thousands of different products for use in agriculture, forests, gardens, homes and industrial sites. The results of the laboratory experiments on the toxicity of three breakdown products were just published in the journal Environmental Pollution. The title of the article is "Comparative toxicity of chlorpyrifos, diazinon, malathion and their oxon derivatives to larval Rana boylii."
SOURCE: http://www.sciencedaily.com

The Amphibians of Mount Gede Pangrango & Mount Salak, Indonesia

The Amphibians of Mount Gede Pangrango and Mount Salak, Indonesia Although there is good evidence that amphibian declines are a global problem, most reported amphibian declines have occured in developed countries or in countries that have a strong research culture. Almost no declines have been reported in Indonesia. However this may be due to a lack of research and long-term monitoring in this country (Iskandar & Erdelen, 2006). In 2003, we conducted amphibian surveys in two mountainous areas in West Java province: Mount Gede Pangrango National Park (highest peak 3,400 m above sea level) and Mount Salak (part of Mount Salak-Halimun National Park; with the highest level of 2211 m). Both mountains represent some of the few remaining pristine areas of the heavily populated West Java province. Liem (1971) described 19 species of amphibians in the Cibodas Trail of Mount Gede from 1961 to 1964. Unfortunately, there are no further available reports of Mount Gede amphibians after this time. There are no comprehensive surveys of the amphibian fauna of Mount Salak region either, and only a few reports on amphibian biodiversity in adjacent areas. Surveys by The Indonesian Insitute of Science (LIPI) in 1999-2001 in Mount Halimun region found 27 species of frogs (Mumpuni, 2002).

We conducted Visual Encounter Surveys (Heyer et al., 1994) in several locations inside the national park with different types of habitat encompassing the forest floor, water bodies and surrounding vegetation. The occurrence of a species was determined by finding adults as well as larvae and if possible by male vocalization. Surveys in Mount Gede were conducted from September 2004-February 2005, comprising nine locations ranging from 700-2740 m asl including locations reported by Liem (1971). A second series of monitoring surveys has been underway since November 2006. Surveys in Mount Salak were conducted in 7 locations, ranging from 700-340 m asl from December 2005-June 2006. Each location was visited once, for four days in a row.

In total we found 19 and 21 species from five families (Bufonidae, Megophrydae, Microhylidae, Ranidae and Rhacophoridae) for Mount Gede Pangrango NP and Mount Salak NP respectively. The number of species found in Mount Gede Pangrango NP were less than those found by Liem (1971) and species composition differed. Four species from Liem's result were not found in the first survey: Fejervarya cancrivora, Bufo bipocartus, Microhyla palmipes and Rana nicobariensis. Instead, we found additional species: Rana hosii, Leptophryne borbonica, and Limnonectes macrodon. During our second year monitoring in Mount Gede Pangrango NP (November 2006-February 2007) we found the missing M.palmipes. A particularly important finding was of a caecilian Ichthyophis hypocyaneus in Bodogol (700 mm asl). This is the first record of a caecilian in Mount Gede Pangrango NP. No mass mortalities were found on either mountain, however, an adult Limnonectes kuhlii was found dead, floating in a small puddle of water on the side of a walking trail in Chevron Geothermal Concessions in Mount Salak.

With additional data based on the work from Mumpuni (2002), we compiled a list of 26 frog species in the vicinity of Mount Gede Pangrango NP and Mount Halimun- Salak NP area which represent almost two-thirds of the total Java species (Iskandar, 1998). From this list, 12 species were not found in one or two locations. Based on the known biology and distribution of each of these species, we categorized three types of threat. "Red" represents species that are currently under threat, "yellow" represents species that might be vulnerable to threats and "green" represents species of least concern. Leptophryne cruentata is the only species that is currently under threat (IUCN Red List, Critically Endangered). This small bufonid is currently found in Curug Cibeureum (Mount Gede Pangrango NP). The number found during the first sampling was very low (three individuals). However, during the second sampling we found more individuals including an aggregation of about 15 frogs which were well hidden in a moss-covered rock crevice in a wall of one of the three waterfalls in Cibeureum. Kurniati (2003) found three individuals of L.cruentata in Cikeris (Mount Halimun), which suggest that the current distribution of this frog is not restricted to the Cibeureum area alone. We put three species of tree frogs (Nyxticalus margaritifer, Philautus vittiger and Philautus pallidipes) and a caecilian Ichthyophis hypocyaneus in the "yellow" category. All three tree frogs are endemic to Java with little or no bio-ecology information available. This entire species is rare, probably because of their cryptic nature (the genus Philautus are very small), although we can- not dismiss the possibility that populations may be in decline. Seven species were placed in the "green" category (Bufo bipocartus, Rana nicobariensis, Rana erythraea, Fejervarya cancrivora, Occidozyga sumatrana, Microhyla palmipes). Although only found in one or two locations, almost all of these species are found in human settlements and are widely distributed.

There are several potential threats for frogs in both areas. Anthropogenic threats in the form of habitat modification are relatively absent in Mount Gede Pangrango, but more apparent in Mount Salak. Other potential threats are due to human visitation in the national park which include trampling of bottom substrate and more importantly solid waste such as plastics and empty tin cans. Although chytridiomycosis has not yet been detected in Indonesia, locations in high elevations have suitable environmental conditions favourable to chytrid. For instance the temperature in Gede Pangrango NP and Halimun Salak NP in West Java ranges from from 13.5-28C in the morning to 9-21C at night. The humidity in all locations is high, ranging from 63- 100%. Using environmental variables, Ron (2005) developed a model to identify the geographic ranges of B.dendrobatidis. Although the primary focus of Ron's research is neotropical, his model also predicted the occurrence of B.dendrobatidis in the montane forests of Java and Sumatra.

Knowledge of the population dynamics, ecology and biology of the amphibians in this report is generally poor. Therefore, there is a need to do more research to ensure conservation of these species, and in particular, for determining the cause of decline of L.cruentata.

Acknowledgments

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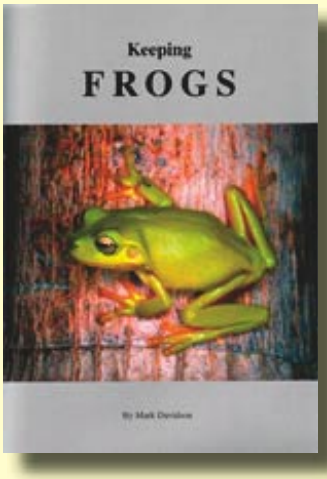
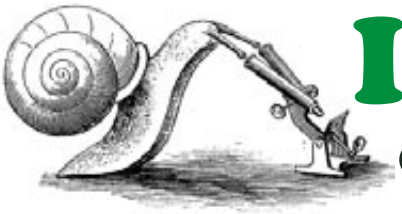
SOURCE: Herpdigest (http://www.herpdigest.org).

Keeping Frogs

This book is a must have aid for anyone interested in the captive care of Australian frogs. Keeping Frogs is an easy to follow guide for everyone from beginner to long-term amphibian enthusiasts. It helps guide the reader through those tricky stages of tadpole development and morphing. Contents include biology, basic rules, indoor & outdoor enclosures, substrates, water quality, lighting, heating, humidity, feeding & supplements, breeding, raising tadpoles, metamorphosis, health & disease, common questions & answers, and some vital reminders. It covers many of the most commonly kept species such as the Green Tree Frog (Litoria caerulea), White-lipped Tree Frog (Litoria infrafrenta), Red-eyed Tree Frog (Litoria chloris), Blue Mountains Tree Frog (Litoria citropa), Peron's Tree Frog (Litoria peronii), Dainty Tree Frog (Litoria gracilienta), Green & Golden Bell Frog (Litoria aurea), Dwarf Tree Frog (Litoria fallax), Southern Brown Tree Frog (Litoria ewingii), Growling Grass Frog (Litoria reniformis), Spotted Marsh Frog (Limnodynastes tasmaniensis), Striped Marsh Frog (Limnodynastes peronii), Painted Burrowing Frog (Neobatrachus sudelli), and Great Barred Frogs (Mixophyes species). Full colour, 40 pages, 25 photos.



AVAILABLE: http://www.reptilepublications.com.au



In the spotlight

Common Tree Frog (Litoria caerulea)

Details...

Family: Hylidae
Common name: Common Green Tree Frog
Scientific name: *Litoria caerulea*
Description: This frog has a dark olive to bright green back, which can change over a period of an hour. The sides often have white spots as does the back. There is usually a white streak or a number of white spots that run from the corner of the mouth to the base of the arm. The belly is white and granular. There is a skin fold that runs from the eye to the arm. The skin on the back is smooth and the iris of the eye is golden. The finger and toe pads are large. The fingers are one-third webbed and the toes are three-quarters webbed.
Size: 100 mm
Habitat: This frog lives in many habitats and is often found around human buildings such as shower blocks, water tanks and toilets.
Call: A low "crawk…crawk…crawk" sound.
Breeding: Males call after heavy summer rains from December to February. Breeding takes place in shallow water.
Eggs: Are large and laid in floating clumps that form a single layer on the surface of the water.
Tadpoles: Are fairly large and range from dusky brown, olive brown to translucent gold-brown in colour depending on the habitat. These tadpoles eat a variety of food and grow very fast.
Similar species: This frog can be distinguished from Litoria splendida by its distribution and it does not have a gland on the top of its head.
Other characteristics: Lots of people like to keep Green Tree Frogs as pets, because they are easy to look after and fascinating to watch.

Conservation Information...

Suspected threatening processes: Habitat modification (e.g. vegetation clearing, invasive weeds).
Population size: An estimate of the total number of adults present in the species entire range is >50000 individuals. Some factors affecting population size and distribution are known, but 1 or more major factors are unknown.
Population trend in Australia over the past 50 years: Population trend unknown; no information on habitat changes.
Knowledge of population trend in Australia: Not currently monitored.
Population concentration: Not known to concentrate or exist in discrete locations. (e.g. the number of sites in which individuals group together either seasonally, such as breeding sites, or they may occupy discrete habitat patches within the broader landscape, such as discrete water bodies or drainage units.)
Ongoing management activities in Australia: None directed primarily at the taxon.

Reproductive potential for recovery: The average number of eggs deposited per adult female per year is >1000 eggs/female/year. Minimum age at which females are known or suspected to first reproduce is 2-3 years.
Range size in Australia: The size of the geographic area over which the taxon is distributed: > 1,000,000 km.
Distribution trend: Area occupied has declined by < 25%. (This is an estimate of change in the portion of the total range that is occupied or utilised; it may not equal the change in total range.)
Knowledge of distribution in Australia: Broad range limits or habitat associations are known, but local occurrence cannot be predicted accurately.

Source...

Frogs Australia Network.

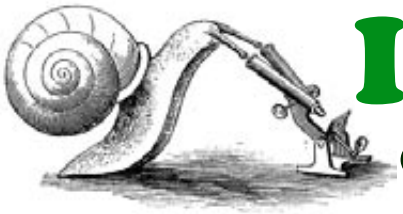
PHOTO: Common Tree Frog from Trinity Beach (Darren Green).

For more information of the August 2007 frog of the month, the Common Tree Frog, turn to page 13.

Do you have any stories to tell about our frog of the month? Do you have any observations from the field, or even captivity? Have you kept, bred or raised tadpoles of our frog of the month? Do you have any photos, sketches or paintings of our frog of the month? Do you have a scientific or anecdotal opinion about this frog? Do you know of any myths, fairy tales, dreamtime stories, or religious accounts regarding our frog of the month? If you have answered yes to any of these questions, then I would like you to send your information to the Editor, c/o- TFC at the address on Page 2. I would love to read about it in the next issue of *The Croaker.* For details about the next frog of the month, see the highlight below.

Frogs Australia NETWORK
http://frogsaustralia.net.au/

October "in the spotlight" focuses on the Waterfall Frog (Litoria nannotis) send us a story about this frog!



In the spotlight

Common Tree Frog (Litoria caerulea)

Not just a pretty face...

Probably Australia's best known frog, also known as the Green Tree Frog, this is the classic green frog. Found from wet coastal areas to desert country, this is the frog you will most likely have encountered. Its distribution encompasses northern Australia, extending south to about Sydney on the east coast. Australian's first encounter with a frog is often on a first visit to a country area (or at a very young age for those lucky enough to have been brought up in the country) and involves big green frogs appearing in the toilet bowl! This can be after flushing, but sometimes they are just floating around in the water, creating feelings of at least indecisiveness and at worst horror, depending on one's attitude to frogs. Mike Tyler once recorded 26 frogs from the cistern of one toilet.

The reasons for this frog inhabiting such a distasteful place is purely because of the presence of water, which in an open toilet bowl may be the only accessible water for frogs in dry areas. Otherwise Green Tree frogs must find another place to hide out during the dry times. This is usually somewhere that retains some water, or at least provides the frog with shelter that will not allow the frog to lose too much of the water it can retain in its body – rock crevices, tree hollows, beneath large rocks or logs in the wild. Around the house letterboxes, drainpipes, bathrooms, airconditioners, swimming pool pumps and the like can all provide sufficient moisture for this frog. Its presence may not be obvious, until perhaps a tree snake finds one and you can hear the calls of distress, often magnified by its location, from the frog as it becomes lunch. These positions may become very hot, letterboxes and some pipes around the house exposed to the sun can burn a human finger or hand.

When good rains come, these frogs find a body of water and males change colour slightly (their back becomes brownish) and begin to call to attract a mate. Serious calling is usually done from near the waters edge, on the ground or low rocks & vegetation. Frogs living in trees can sometimes be heard making short calls during the "build-up" to the wet season from high in the tree, but once sufficient rain has fallen the frogs will call continuously, a repetitive "crawk" until a female is serenaded sufficiently to approach a male frog and amplexus (mating position) takes place in the water. There are two types of amplexus position in Australian frogs. The first is known as inguinal, where the male frogs grasp the female around the waist or groin, or axillary where the male uses the armpits of the female to hold her. Green Tree Frogs use the latter method. In almost all Australian frogs the female is larger than the male; this is the case with Green Tree Frogs, although not to the degree seen in some other species.

The female lays up to 2000 eggs which are fertilised by the male as they are discharged into the water. In northern Australia, still water such as pools left on the surface after heavy rain are favoured. They also utilise small creeks which may be running while the frogs are calling after heavy rain, but soon stop flowing, or the side pools of such creeks. Areas such as borrow pits and other "holes" made by man are utilised by many species of frogs. The eggs are laid in clumps, which form a layer on the surface of the water then sink to the bottom. They take from one to three days to hatch into tadpoles and metamorphosis can occur from two to three weeks under good conditions, up to about 3 months. Egg and tadpole development is dependent upon temperature, the warmer the water the faster the process.

Green Tree Frogs are believed to reach sexual maturity in about two to three years and they reach a length of about 10 cm, living up to 16 years. There is a record of a frog living 23 years in captivity! They are popular exotic pets around the world, where they are known as dumpys, or White's Tree Frogs, to differentiate them from the American Green Tree Frog. Green Tree Frogs do very well in captivity, they are docile and hardy and eat just about anything that moves - insects, vertebrates, including prey longer than the frog itself. Large food items such as large grasshoppers are captured and forced down into the frogs stomach by using its hands and twisting its body; these frogs will eat snakes, even poisonous ones. Some frogs wait around entrances to caves, catching and eating bats as they fly in & out. Captive animals may become rather obese.

The Green Tree Frog was the first Australian frog to be described, in 1790, from a specimen which was recieved in England only two years after the arrival of the first fleet. This specimen was in preservative, which caused the skin to turn blue. The scientific name "caerulea" is latin for blue. Occasional live specimens may show a blue or yellow hue, and animals in breeding condition become more brownish. Some specimens have white spots.

The skin of the green tree frog produces many interesting compounds. One secretion is known to destroy the staph bacterium (antibiotic) and lower blood pressure. Other secretions contain fly and mosquito repellent substances, bird repellent, rodent repellent, painkillers, anti-viral and anti-fungal properties and a surgical glue has been developed! Even a treatment for schizophrenia! Not just a pretty face!

AUTHOR & PHOTOS: Michael Anthony.

Observations...

Species: Litoria rubella
Date: Oct 04,
Time: 10:00am
Location: 17o23'35.06" S 145o23'00.40" E
Habitat: domestic garden,
Weather: Fine
(once discovered about 6 individuals of this species sheltered together under a rock, and one individual in full sun in a small puddle of water on the top of a 44 gallon drum).

Species: Litoria gracilenta
Date: 30 Apr 05
Time: 2:30pm
Location: 17o23'34.56" S 145o23'01.32" E.
Habitat: Overgrown grass area on pile of rocks.
Weather: Slightly cloudy

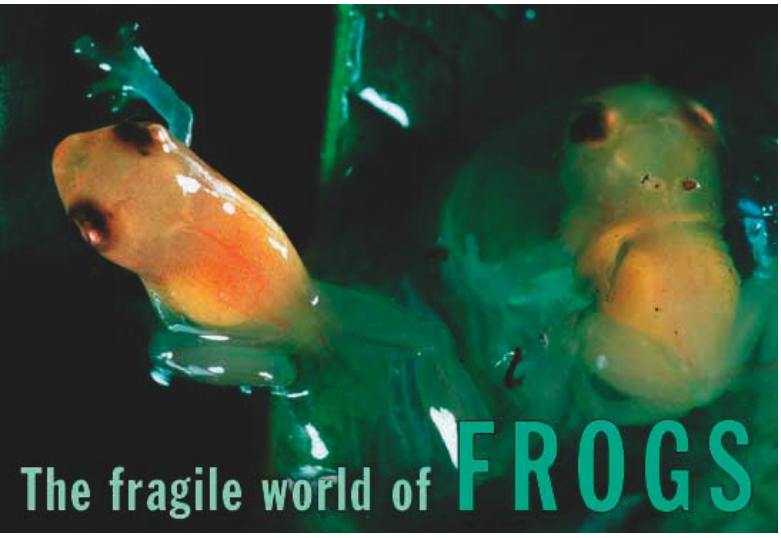
Species: Litoria inermis
Date: 19 Feb 05
Time: 11:30am
Location: 17o23'33.39" S 145o23'02.34" E
Habitat: Edge of seasonal dam/silt pond.
Weather: Fine

Species: Limnodynastes ornatus
Date: 13 Nov 04
Time: 10:30am
Location: 17o23'35.06" S 145o23'00.40" E
Habitat: Disturbed this individual in a pile of loose gravely soil
Weather: Fine

October "in the spotlight" focuses on the Waterfall Frog (Litoria nannotis) send us a story about this frog!

Species: Limnodynastes ornatus
Date: 13 Nov 04
Time: 10:30am
Location: 17o23'35.06" S 145o23'00.40" E
Habitat: Disturbed this individual in a pile of loose gravely soil
Weather: Fine

General description of the Property: Seven acres in Syme Road Herberton. The Wild River forms one boundary with a semi-permanent stream as another. The property also has a seasonal dam (actually an old silt pond from when tin was processed on the property), which is very popular with several species of frogs in the wet season.
OBSERVATIONS & PHOTOS BY: Murray Powdrell



In many frog species the males protect the eggs. In South America male Darwin's frogs slurp up the fertilized eggs and hold them in their vocal sacs until the froglets emerge. In other species females provide the parental care. The female Surinam toad (Pipa pipa), an aquatic species, converts her entire back to a nursery. She and the male swim end over end in their mating dance, transferring the fertilized eggs to pouches in her back. Her skin grows over the eggs, sealing them in until the froglets hatch.

As wonderful as these adaptations are, none is—or was—as remarkable as that of Australia's gastric-brooding frogs, Rheobatrachus. Researchers invariably mention the two species in this genus as the most astonishing example of what frogs can do. The females of this two-inch-long (five-centimeter-long) stream dweller swallowed their fertilized eggs or tadpoles, shut down their digestive systems, and hatched their young in their stomachs. About a month later the mother opened her mouth and regurgitated her tiny froglets. "It was almost unbelievable," says Keith McDonald, the chief ranger with the Queensland Parks and Wildlife Service. "You could see the little buggers pushing their tiny hands and feet inside their mum's swollen belly."

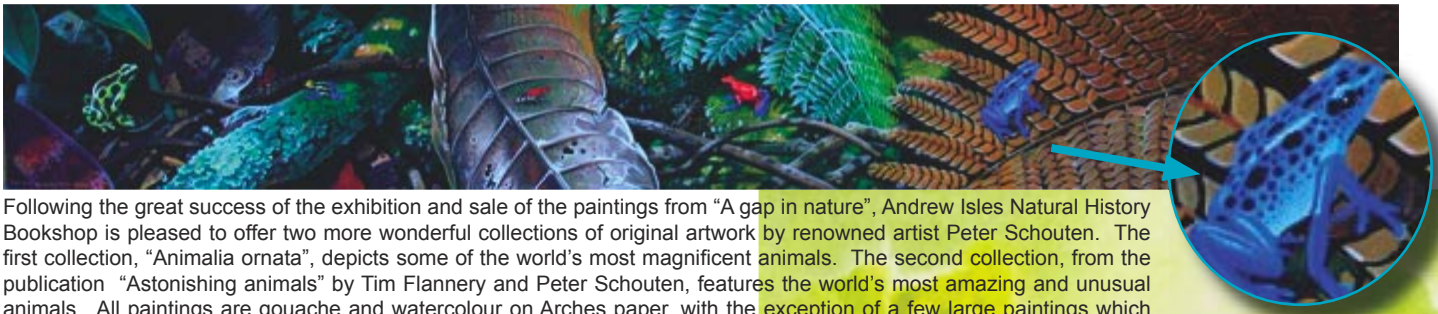
Stocky and pink-faced, with a twinkle in his blue eyes, McDonald had helped monitor the two known populations of gastric brooders shortly after they were first discovered about 25 years ago. "Then bang! They disappeared in the blink of an eye. Ahhh, how can I describe my feelings?" he says, his voice cracking and his eyes misting up. "I'd been watching this population; I went back three months later, and that's when it hit me in the guts." McDonald recalls walking frantically up and down the stream, turning over rocks, searching for frogs. None were to be found. No one has seen a gastric brooder in the wild since the 1980s, and none are in captivity; they are apparently extinct.

But the gastric brooders aren't the only species of frogs to have vanished or fallen on hard times. Since the 1970s more than a dozen Queensland frog species, especially the stream-dwelling types, have experienced sudden, massive die-offs. At the same time many frog populations in protected areas of Central and South America and the western United States also plummeted. In some cases, such as in these remote Queensland mountains, certain frog populations vanished in a few short months.

Other frog species in the U.S. West and Midwest began turning up with deformities, particularly misshapen or extra hind limbs, in disturbing numbers. Though no evidence suggested a link between the outbreak of deformities and the die-offs, this much was clear: Something in the environment was adversely affecting frogs, but no one was certain what it was or how many factors were to blame.
AUTHOR: Virginia Morell, PHOTOGRAPHS: George Grall, SOURCE: Extract from National Geographic magazine.

NATIONAL GEOGRAPHIC MAGAZINE

Frog art...



Following the great success of the exhibition and sale of the paintings from "A gap in nature", Andrew Isles Natural History Bookshop is pleased to offer two more wonderful collections of original artwork by renowned artist Peter Schouten. The first collection, "Animalia ornata", depicts some of the world's most magnificent animals. The second collection, from the publication "Astonishing animals" by Tim Flannery and Peter Schouten, features the world's most amazing and unusual animals. All paintings are gouache and watercolour on Arches paper, with the exception of a few large paintings which are acrylic on canvas. Thirty of the "Animalia ornata" collection are expertly framed and are part of an exhibition launched by Dr Tim Flannery last night at the Manning Regional Art Gallery. Please visit our website for full details of the exhibition. All the paintings can be viewed in the virtua l exhibition on our website http://www.AndrewIsles.com and select GALLERY.

Here you will find images and details of every painting. Many of the paintings are available to be viewed at our shop in Prahran, Melbourne. Pictured above is Poison Arrow Frogs Dendrobates spp. original artwork from Animalia ornate ($2,500. Stock ID: 26311). Watercolour and gouache on Arches paper, 95 x 670mm, framed, signed and dated by artist. Left to right: Golden poison frog Dendrobates auratus, Blue poison frog Dendrobates azureus, Lehmann's poison frog Dendrobates lehmanni, Dendrobates quinquevittatus, Dendrobates reticulatus. The vibrant colours of these living jewels is a warning to potential predators to stay away as all of these little frogs are highly toxic. Pictured Right is Tomato Frog Dyscophus antongili. Original artwork from Astonishing animals ($950. Stock ID: 26168). Madagascar is the strangest island on Earth, its extraordinary lemurs and baobab trees perhaps its best known indigenous life. Yet few know of its spectacular frogs. Madagascar has species that mimic the spectacular poison arrow frogs of central America, Australia's burrowing frogs and Europe's toads and tree frogs, though not one of these mimics is related.

Pond croakings

Like most fields of scientific endeavour, herpetology (the study of reptiles and amphibians) involves a certain amount of jargon. In this section I will attempt to explain the terms they use. I will provide other definitions as required in forthcoming newsletters. Over time you will be able to build up a dictionary of common terms.

HERPS
Usually refers to reptiles and amphibians, however it may also refer to the people who study of keep reptiles and amphibians (may be distinguished by a capital "H" in the word Herp).

HERPETOCULTURE
The husbandry or breeding of reptiles and amphibians.

HERPETOLOGY
The study of reptiles and amphibians.

ANTERIOR
Towards the front.

POSTERIOR
Tail end of the herp.

LATERAL
The sides of the herp.

DEXTRAL
Located on the right side of the body.

SINISTRAL
Located on the left side of the body.

CAUDAL
Tail section of the herp (from the anal scale to the terminal scale in reptiles and the tail in tadpoles). Caudal stripe relates to the stripe on the tail.

SUBCAUDAL
Under the tail.

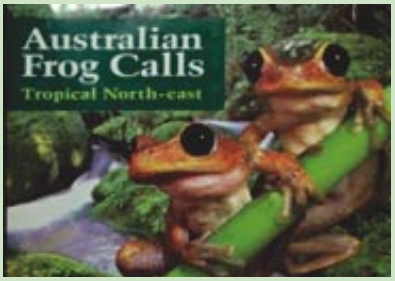
DORSAL
Top or upper surface of the herp, it's back.

VENTRAL
Refers to the underside or lower surface of the herp, it's belly.

CARAPACE
The upper or top half of the shell in turtles.

PLASTRON
The underside or lower half of the shell in turtles.

TFC Merchandise



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Address: _____

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Climate change, connectivity & biodiversity conservation

Conference paper (draft) presented at Protected Areas: Buffering nature against climate change. A symposium on building and managing the terrestrial protected area system to best enable Australia's biodiversity to adapt to climate change. WWF/IUCN WCPA. Mon 18 Jun 9:00 am Jaeger Room, Shine Dome, Canberra 18-19 June 2007.
Prof Brendan Mackey, Director, ANU WildCountry Research & Policy Hub The Fenner School of Environment & Society, The Australian National University Email: brendan.mackey@anu.edu.au

Introduction

The reality of human-forced rapid climate change presents an unprecedented challenge to the conservation of biodiversity. In this paper I review the interactions between natural climate change and biodiversity, the reason why species have persisted through past climate change, and the break down in natural adaptation processes now being experienced due to human impacts on habitat and key ecological processes. I then explain the role of connectivity conservation and protected areas in promoting the long term conservation of species and ecosystems in the face of climate change.

Is climate change a threatening process?

About the only things constant in the history of Earth is that occasionally asteroids hit, the lands shift, life evolves, and climate changes. Since Earth formed around 4.5 billions years ago the climate has changed continuously, experiencing periods of heating or cooling and wetting or drying. However, within this natural variability two mega-trends are apparent from the geological record. First, there has been an overall cooling of Earth's average planetary temperature, and notably since the early Eocene around 55 million years ago (Zachos et al. 2001). Second, since life first emerged on Earth some 3.5 billions years ago, the average planetary temperature has maintained a dynamic equilibrium ranging between 15-250C (Williams 2007). This range represents the ideal conditions for living organisms, suggesting that living organisms have helped generate and sustain the very conditions for its existence Gorshkov et al. (2000). Nonetheless, evidence exists that global climate change has been associated with increased speciation (Beninda-Emonds et al. 2007). Of course, extinction processes operate alongside those driving speciation, and rapid environmental change has also lead to the extirpation of species unable to tolerate or adapt to the new conditions.

Evidence from glacial ice cores has revealed the severe climatic oscillations that have occurred over the last 500,000 years (Petit et al. 1999). About every 120,000 years, average planetary conditions have oscillated between glacial periods with low levels of atmospheric CO2, low temperatures and dryness, and inter-glacial 'highs' that experienced high levels of atmospheric CO2, higher temperatures and wetness. We are currently in an inter-glacial 'high'. The ice core record also shows that the transition out of glacial troughs has been extremely rapid; as much as 5-100C warming in 20 years (Taylor 1999). It is very relevant therefore to consider whether these prior rapid climate change events caused the creation of new species or the extinction of existing species?

Analysis of molecular data has shown that Australia's plant and animal species are of ancient lineage (leaving aside relatively recent immigrants such as dingoes). The last great vertebrate animal speciation event was during the Pliocene (2-4 million years ago) (Norman et al. 2007), while most extant species have an origin spanning the mid to late Miocene (~20 million years ago) (Osborne and Christidis 2002). Our plant species are of similar ancient lineage, with the origin of many being traced back to when Australia was part of the super-continent Gondwanland (White 1998). We can conclude therefore that the often rapid climatic oscillations of the last 500,000 years (as revealed by the ice core records) precipitated neither major speciation nor extinction events. We can also conclude that all extant native species persisted through these oscillations, despite changes in average planetary temperatures of 5-100C and swings in wetness the equivalent of 'droughts to flooding rains'.

Given the natural climatic variability shown by the ice core record, and the ancient lineage of Australia's native species, why should we be concerned now about the impact of climate change on the conservation of biodiversity? Given that species have persisted through millions of years of dramatic climatic change, could we not reasonably assume that species are pre-conditioned to persist through the current regime of human-forced rapid climate change? In order to answer this question, we need to first consider how species and ecosystems are affected by and respond to climate change.

How does biodiversity respond to climate change?

Climate change has both direct and indirect effects on species and ecosystems. Direct effects on species include changes in the physiological niche conditions experienced by a species. All species are genetically programmed such that their physiological functioning operates within specific environmental conditions (defined by the concentrations of heat, light, water and nutrients), and optimally within a subset of these conditions. The primary inputs of water and energy into these primary environmental regimes are dictated by the climate. Indirect affects on species include changes in the availability of vegetation-based habitat resources for food, shelter, and nesting, not to mention the geographic ranges other animal and plant species on which they depend.

Climate, through the inputs of energy, water and nutrients, determines the rates of key ecosystem processes, especially photosynthesis and biological decomposition, and the rates of nutrient rec-cycling. Therefore, as climate changes so does ecosystem composition and structure. Rates of plant photosynthesis are also regulated by the concentration of atmospheric C02, with decreasing concentrations resulting in decreasing GPP (gross primary productivity) and subsequent biomass production (Berry & Roderick 2004).

Before the Anthropocene (Crutzen & Stoermer 2000), the ecosystem characteristics of land would simply change as a result of climatic impacts on biological, ecological, and associated ecosystem processes. Thus, forests would geographically expand or shrink with increasing/decreasing temperature, wetness and atmospheric C02 concentrations. When the climate became hotter and wetter (such as during the interglacial 'highs'), land that was shrubland, would become woodland, and woodland would grow into forest (all other factors being equal).

Given the above, it follows that in the past rapid climate change could have resulted in either local extirpations or global extinctions if: (1) the primary environmental regimes changed beyond a species physiological tolerance (niche) limits; or (2) ecosystem characteristics changed so that habitat resources (especially food) were no longer available. Conversely, species would have survived rapid climate change (if not in the same location, then elsewhere) through some combination of the following adaptation mechanisms: (1) evolution of new, fitter traits; (2) phenotypic plasticity in their physiology, behaviour or life history strategies; (3) dispersal to country that met their physiological niche and habitat resource requirements; and (4) by taking refuge in micro-habitats that retained the necessary niche and habitat requirements.

What is different now?

The current rapid climate change event is different from previous ones in a number of ways. First, it is human-forced as the result of a strengthening of the greenhouse affect caused by humans burning fossil fuel for energy and deforestation (IPCC 2007). Whereas, the glacial-interglacial oscillations revealed in the ice core record are considered to be driven by the Milankovitch Cycle; changes in the amount of solar energy reaching Earth due to long term 'wobbles' in Earth's orbit (Muller & MacDonland 1997). Though, the proximate cause is the same – a change in Earth's net energy budget; the direct driver of global climate change.

Second, and probably more importantly, the current rapid climate change coincides with the 6th mass species extinction event in the history of Earth. This extinction event is being driven by a combination of (a) habit loss, degradation and fragmentation, (b) over-harvesting of wildlife, (c) artificially introduced invasive species, and (d) changes to ecosystem

Climate change, connectivity & biodiversity conservation continued...

function through, among other things, humans diverting water resources and altering fire regimes (WRI 2005). It is the interaction between rapid climate change and these extant threatening processes that will cause problems for species and ecosystems in the coming decades and centuries.

In addition to the global extinction of species, we are also witnessing massive regional extirpations (Mackey et al. 2006), resulting in a potential loss of intra-species genetic diversity. This loss reduces prospects for many Australian species to persist in the face of rapid climate change through either natural selection and evolution or phenotypic plasticity (adaptation mechanisms 1 and 2 above). Habitat loss, degradation and fragmentation means species will find it more difficult to find suitable locations to which they can migrate or take refuge (adaptation mechanisms 3 and 4; see Soulé 1990). Across the Australian continent, modern land use activities, along with feral animals and weeds, are changing the composition, structure and functioning of terrestrial ecosystems. These activities and invasives are interfering with natural processes that would otherwise result in ecosystem processes optimally (sensu Odum 1995) re-organising to changing climatic and associated environmental conditions. As a result, the production and availability of wildlife habitat resources are being severely impaired, further limiting options for species in the face of rapid climate change.

Prior to the Anthropocene, ecosystem processes were intact and there was always a dynamic continuum of ecosystem types in existence for species to explore. Thus, in the past, the full compliment of natural adaptation mechanisms (1- 4 above) were potentially available to a species. This is no longer the case; and conservation planning and management is needed to help restore and facilitate the natural evolutionary (Darwinian) mechanisms that will enable species to persist, and ecosystems to develop, in the face of the rapid climate change we are now experiencing. Moreover, speciation of large animals is highly improbable in the foreseeable future, given the huge impact that human beings and their technologies are having on the planet; as such speciation requires extensive, undisturbed populations and landscapes (Soulé 1980; Frankel & Soulé 1981).

The role of connectivity conservation

The term 'connectivity' has been conventionally thought of as referring to retaining or constructing narrow corridors of native vegetation between two or more local habitat patches. Michael Soulé and colleagues helped redefine the scope of the term in conservation biology by considering the conservation requirements of top order predators (Soulé & Terborgh 1999). In North America, their long term viability demands consideration of movement and dispersal at continental scales and hence the development of continental scaled connectivity of protected area networks. In Australia, the need for a broad re-conceptualisation of connectivity conservation has been argued by Soulé et al. (2004) and Mackey et al. (2007). 'Connectivity' can be considered more broadly again as referring to the maintenance or restoration of key, large scale ecological phenomena, flows, and processes critical to the long term conservation of biodiversity. Of this set of connectivity processes, amongst the most important to consider for climate change are (1) dispersive fauna and (2) hydroecology.

Dispersive fauna

There are 535 vertebrate species in Australia (including 342 land and freshwater birds) that are recorded as 'dispersive', in that they are known to travel large distances to obtain the necessary habitat resources or to optimize physiological niche requirements (Gilmore et al. 2007). Such dispersive behaviour has presumably been a crucial life history strategy in the persistence of these species on a continent such as Australia which is characterized by extreme natural variability and comparatively little vertical relief. For many of these species, their long term survival depends on protecting geographically extensive networks of habitat patches, the ongoing productivity of source areas, or the maintenance of ecosystem types on which they are seasonally dependent (Woinarski et al. 1992). Many if not most of the habitat resources are not necessarily found in or do not persist reliably in protected areas, but are distributed across land tenures.

While the capacity of dispersive species for long distance travel will be advantageous in the face of rapid climate change, even their future is uncertain given the extent of land clearing in eastern and southern Australia, unsustainable pastoral practices in the rangelands, the abundance and diversity of invasive and feral species from other continents, the intensification of logging and land clearing in native forests and woodlands, and lack of systematic conservation planning and management in the extensive and relatively intact woodlands of Northern Australia, the W.A. Goldfields (the Great Western Woodlands), and the tall E. tetradonta woodlands of Cape York Peninsula (Mackey 2006).

Hydro-ecology

The distribution and availability of water is the principle environmental determinant of biology and ecology in Australia, where around 70% of the continent is climatically arid/semi-arid. Water availability determines rates of photosynthesis and biomass production, the 'fruits' of which propagate through the entire food chain (Berry et al. 2007). This "upward trickle" of energy and material is called a bottomup effect by ecologists. The vegetation cover in turn influences water infiltration, soil water storage, and catchment water budgets. Throughout Australia, but particularly in the rangelands and the seasonally dry tropical north, ground water resources are biologically critical, enabling deeply rooted perennial plants to flourish, and sustaining springs, water holes and streams during dry periods.

Hydro-ecological processes sustain biodiversity at scales ranging from catchment (e.g. the chain-of-ponds originally found along the valley floors of the southern tablelands in NSW; Starr 1999) through to the basin-wide seasonal flooding of the channel country from tropical monsoonal rains. Both surface water catchment boundaries and groundwater recharge/discharge zones transcend protected areas boundaries and demand a whole-of-landscape approach to their maintenance and for the persistence of the flora and fauna that they sustain over broad areas.

Connections: The role of protected area networks

Protected areas have a pivotal role to play in enabling species and ecosystems to persist in the face of rapid climate change. Protected areas can remove or control (depending on legal provisions) many of the threatening processes driving the current mass extinction crisis, in particular, habitat loss and fragmentation. If selected according to ecological criteria or obtained through good fortune, protected areas can protect source habitats that provide an ongoing supply of organisms for dispersal to locations suffering local extirpations. Many of our protected areas also contain refugia locations comprising micro-climatic conditions and associated habitat resources that persist despite global and regional shifts in climatic regimes (Mackey et al. 2002). Large or strategically placed protected areas can conserve critical hydro-ecological processes, including ecologically significant water discharge points, catchment headwaters, and groundwater re-charge zones.

Given the possible scale of the projected climate change Australia may experience in the coming decades (CSIRO 2007), perhaps the most important contribution of the protected area network will be to function as biological 'stepping stones' and 'stopover' points that span continental gradients; thereby facilitating the necessary migration of species (and their propagules) seeking physiological niche optima or essential habitat resources. However, the current network of protected areas is geographically unconnected, limiting its capacity to function in this way for many species that are less mobile than dispersive birds. Most protected areas, even large ones, remain islands in "oceans" of land cover and land uses unsympathetic to biodiversity conservation.

Landscape-wide planning and management is needed to better buffer and link existing protected areas through mechanisms such as conservation covenants on private land and changes to leasehold conditions. In this way, biological permeability can be enhanced at scales commensurate with the likely impacts of global warming. The NSW government's A2A (Alps-to-Atherton) connectivity conservation initiative is an exemplar of the kind of response needed in the coming decades. Similarly, the WildCountry initiative aims at whole-of-landscape approaches to conservation (Soulé et al. 2004). Protected areas are the core around which cross-tenure, connectivity conservation planning and management can be designed and implemented.

Climate change, connectivity & biodiversity conservation continued...

Conclusion

Ultimately, it is the natural adaptation mechanisms evident during past global climate change events that will enable species to persist in the face of the current humanforced, rapid climate change. However, these are being massively degraded and interrupted by the same destructive forces driving the biodiversity extinction crisis. Large scale conservation planning and management, as exemplified by the A2A and the WildCountry initiatives, is needed to protect and restore ecological connectivity and biological permeability at scales from patch to continental and beyond. The protected area network will remain the cornerstone of connectivity conservation programmes, and indeed of all our collective endeavours to ensure our rich biodiversity persists into the future.

Acknowledgements

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Kids corner...

Help frogs survive in the concrete jungle

Do you lead a double life? Frogs do! Frogs are amphibians. They live part of their life cycle underwater, breathing through gills, and part of their life cycle on land, breathing with lungs. 'Amphibian' comes from two Greek words - amphi meaning 'both', and bios meaning 'life'.

Frogs start their lives as eggs laid in water. After a week or so they hatch, as tadpoles, and swim around eating tiny animals, algae and other plant life in the water. Gradually they lose their tails and grow little legs and arms until finally they turn into fully formed frogs. Mature frogs live mostly on land, but love to visit nice and wet shady areas and shallow water.

Frogs need your help to survive!

By maintaining frog habitats in your backyard, you'll be rewarded with a frog symphony in the spring, summer and autumn months.
Frogs rely on camouflage for protection. Some can even change colour to blend into the background! While this sometimes works on natural predators, our pets - particularly cats - are not fooled so easily. So it's a good idea to keep your cats inside when you know there are frogs around.
Tadpoles, which eat some plant life and other things in water, can only live in unpolluted water. This means that we need to be extra careful about what kind of chemicals we wash into our waterways (particularly cleaning products, oils and pesticides). A tadpole's survival ultimately means a frog's survival!

Be a backyard buddy

We can make our neighbourhoods friendly for frogs. The Department of Environment and Conservation, local councils and other interest groups have established Backyard Buddies to get you started.
It's easy. All you have to do is care. And take a few simple steps. Step one is to find out what frogs like and don't like.

Frogs love:

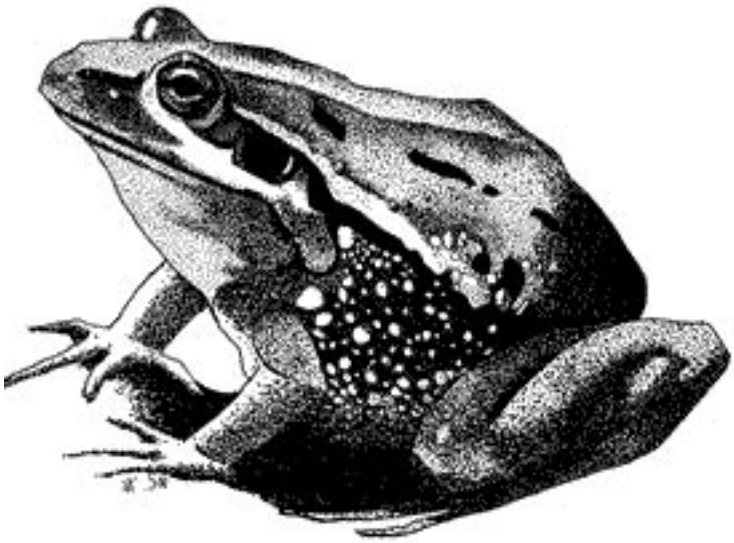
- Water - their eggs and tadpoles live in water, and as fully grown frogs they also like to sit in or near water.
- Cool, damp places - frogs don't have waterproof skin, because they absorb drinking water and oxygen through their skin. Many frogs need a cool, moist environment, so water does not evaporate from their skin.
- A place to hide from predators - under rocks, or among leaf litter, mulch, twigs, shrubs, trees, hollow branches and bark.
- Garden pests to eat, especially mosquitos, moths, caterpillars, cockroaches and flies.

But they don't like:

- Cats and dogs – household pets, especially cats, will prey on frogs when the opportunity arises.
- Garden chemicals, which can contaminate frog ponds and destroy the homes of frogs and tadpoles.
- Exotic fish - goldfish, gambusia and other exotic fish are known to eat frog eggs and attack tadpoles.
- Being handled and moved around – frogs are at risk from diseases caused by the frog chytrid fungus and other infections. A frog is more likely to become infected when under stress. The disease may also be spread when frogs or tadpoles are moved by people from place to place.

SOURCE: http://www.nationalparks.nsw.gov.au/npws.nsf/Content/backyard_buddies_frogs

Colour me in...



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The Croaker

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