the climate change issue...

- will amphibians & reptiles cope with a warming world?
- doing your bit to combat climate change

plus... latest news: frogalogue: toad talk: book offer
Dear all,

Well done to the beavers! Perhaps an odd thing to read in an amphibian and reptile newsletter, but all is explained in the feature on page 6. It seems that new ponds created by beavers in the US might be helping frogs cope with climate change. I am pleased that our edition on climate change is not all negative - as Barbara Dinham has highlighted in her column on page 8, there are positive steps that we can all take. Barbara quotes the Chinese wisdom 'every long journey starts with a single step', and it is through the steps we each take that we will hopefully offer our amphibian and reptile species a more secure future. Despite (and perhaps because of) the 'climategate' events covered in our book review (back page), we need to keep up our efforts. We are only just discovering the effects of climate change on amphibians and reptiles, but we do know that conservation and management actions are needed to ensure their future. Pond creation, whether by beavers, Froglife or readers at home, looks to be an important part of creating wildlife corridors and tackling drought. Our commitment to habitat creation, restoration and management, incorporating training and public engagement is certainly the most positive action that we can take.

We are thrilled to welcome Mike Dilger as Froglife’s new Patron to help us continue this action - Mike’s work as a broadcaster and naturalist brings conservation messages to thousands of viewers. So, thank you to Mike, the beavers and all of our friends and donors who continue to support our work. Your support is what makes us function and I am sure that the amphibian and reptiles would thank you too!

Kathy Wormald, CEO
01733 558844

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**NEWS SPECIAL: CLIMATE CHANGE HEADLINES**

Researchers at the University of Sydney have discovered that climate change may not be all bad news for reptiles, it was found that scincid lizards grow larger and smarter if their eggs are incubated at warmer temperatures [2].

A recent study by the University of Exeter, the University of Lefkfe (Turkey) and the North Cyprus Society for Protection of Turtles has revealed that sea turtles mating habits may protect them from the adverse effects of climate change [3].

Warmer temperatures whilst turtle eggs are incubating lead to a higher number of females hatching, up to 95% in some cases, and there was concern that such a large number of females would tend to inbreed with the comparatively few males. But the study, focusing on green turtles Chelonia mydas in Cyprus, suggests there are actually more males out there than expected and, combined with their ability to travel vast distances between mates, this should help buffer populations against any negative effects of climate change.

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**Ongoing research will help us identify what the future holds for many species of amphibian and reptile. A study is currently underway on the Kalakad Mundanthurai Tiger Reserve in Western Ghats, India to improve our understanding of the effect of climate change on amphibian and reptile populations [7]. Since frogs and toads respond to changes in atmospheric moisture and temperature, and specific frogs sing at specific times of the year, the team reasoned that an analysis of sound recordings, combined with readings from climate data loggers, could help improve understanding of the impacts of climate change.**

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**The Good News**

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**The Bad News**

It has been suggested that warmer, wetter weather, brought on by climate change, has contributed to a massive 70% decline in amphibians and reptiles in Costa Rica in the last 35 years [8]. The animals, mainly live in leaf litter on the forest floor and these types of weather conditions lead to less tree growth, meaning there is less leaf litter.

In 2010, a study by the University of California found that even though their habitats remained intact, the population of one group of lizards in Mexico has shrunk by 12% since 1975 due to climate change [5]. It was found that the reptiles are disappearing because they need to spend more time in the shade to avoid overheating, leaving them less time to forage.

The Houston toad Bufo houstonensis is an endangered amphibian endemic to southeast Texas; these unassuming brown/grey toads rely on woodland and wetland to survive. Climate change could be a huge problem for this species [6]; 2011 was the driest 12-month period on record for Texas and with climate change making drought conditions more and more likely the future is not bright for the Houston toad. September 2011 also saw wildfires so intense they could have wiped out the species completely and conservationists are currently working to rebuild the population.

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**Welcome Froglife’s new Patron: Mike Dilger!**

We are delighted to announce that naturalist and broadcaster Mike Dilger has become Froglife’s Patron! The ever enthusiastic nature presenter from The One Show on BBC1, Mike has a broad range of conservation experience and has been involved in our Tuppence a Toad campaign to develop his passion for all creatures amphibian and reptile. ‘I’m delighted to support Froglife,’ said Mike. ‘I really respect the work they do for the animals they conserve, as well as their commitment to helping more and more people become engaged in conservation. I look forward to being more involved!’ The whole Froglife team is thrilled to have Mike on board.

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**From the CEO**

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**More female green turtles are hatching but the future for this species is not as bad as first feared. Photo: Keenan Adams**

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**Cover photo: Developing amphibian embryo by Wicky Ogilvy**
WHAT TO DO WHEN THE WETLANDS ARE DRY

With the ongoing drought in East Anglia, the South East and other areas of the country, wildlife charities are offering advice to help protect the birds and other animals that could be affected.

“In the short term, some ponds drying out is not actually that much of a problem,” explains Dr Silviu Petrovan, Conservation Coordinator at Froglife. “Ponds naturally fluctuate, and dry spells can benefit some species as it decreases the chances of fish presence, meaning less predators for developing amphibians. It’s more of a worry that this might become part of a longer term trend due to climate change, and it highlights the need for networks of ponds of varying size and depth so that animals can have the choice to move to more suitable areas.”

Rob Shore, Head of Wetland Conservation at the Wildfowl & Wetlands Trust (WWT), is also concerned. “We’re struggling to keep our wetlands wet in winter which virtually unheard of. If this continues it could have serious impacts on a wide range of wetland wildlife, particularly those species that are less mobile or rely on small and increasingly isolated habitats”.


RESERVE NOTEBOOK

Hampton Nature Reserve hosts the biggest population of great crested newts in the world, with a whopping 30,000 breeding adults. It’s a big claim and we make it all the time, but is it true? And where did this figure come from?

Over 20 years ago, around 29,000 great crested newts were originally translocated from the neighbouring development site on to the current reserve. The first spring peak-count survey of the whole reserve, covering all 400 ponds, counted 3,327 adult great crested newts. Based on this figure, an estimate of 250 adults per hectare was established. Take in account the 120 hectares of terrestrial habitat and ponds and this gives the origins of the incredible figure of 30,000 newts.

But is it still true? These initial studies and surveys were carried out in the early 1990s and a lot has changed since then. In order to monitor the world important great crested newt population at this site, repeat surveys of the whole pond network are carried out once every five years. The most recent of these was in 2006, when 3,391 records were collected. Whilst there are methodological differences between these surveys, the results appear to show no significant change in newt population, indicating that the population is healthy and steady.

Now, the volunteer team has been very busy helping prepare the site for a repeat survey in 2012 to give us an up to date population status. I’ve been working closely with Assistant Warden Nick Peers all winter cutting scallops into all the heavily overgrown ponds to open up access points for surveying. Once cut, all these reeds need to be hauled up out of the water and heaped into piles where they’ll provide egg-laying habitat for grass snakes and hibernacula areas for other reptiles and toads over winter. This has been a huge project which absorbed the whole reserve team for the full winter management season, but it’s been worth it for the access it’s given us. Following a training session in March, volunteers will be helping survey every one of the 400 ponds throughout the spring - watch this space for the results of the survey in a future edition of Natterchat!

Paul Furnishoward, Conservation Officer: 07977 250048 or paul.furnishoward@froglife.org

HOT STUFF

Climate change is a hot topic and will no doubt have an affect on many species in various habitats. But how will our native amphibians cope with a changing climate? Anna Muir explains how she’s trying to find out.

Anna Muir is a final year PhD student at the University of Glasgow looking at population genetics of the Scottish common frog in a changing climate, supervised by Dr. Barbara Mable. Anna is chair of the Clyde Amphibian and Reptile Group and runs a website and blog dedicated to Scottish amphibians: www.scottishfrogs.co.uk

“This climate change has been identified as one of the contributing factors to the global decline in amphibians. As amphibians can’t regulate their body temperature, they are thought to be particularly sensitive to changes in the thermal environment. Within the UK, most amphibian species (excluding the common toad) have brought forward their time of spawning in response to earlier spring temperatures. Worldwide, a number of amphibian species have shifted their range northwards or higher up mountains to stay within a cooler climatic zone as the temperature warms. The mountains of Scotland offer an ideal opportunity to look at how populations have adapted to different temperature regimes. The common frog occurs from sea level to over 1000m at the top of the highest Munros. Here at the University of Glasgow we are using these environmental gradients to assess whether, and in what way, the common frog has adapted to local thermal conditions. Temperature differences between the base and summit of these mountains are within the range of climate warming expected in Scotland by 2050. This research is ongoing, but the results will facilitate the creation of knowledge-based conservation strategies. Many questions still remain surrounding the vulnerability of British amphibians to climate change and the best way to conserve them. In the meantime, maintaining large population numbers and creating habitat corridors for dispersal are likely to be the best way of trying to conserve our native amphibians in the face of a changing climate.”

Anna Muir
Climate change is one of the main threats to biodiversity, and much research has been done in the past decade on understanding the pros and cons of warmer world for amphibians worldwide. It is interesting that each species (not only amphibians) has a ‘climate space’, defined by some parameters such as mean temperature, total annual precipitation etc. Populations thrive within ‘climate space’ boundaries, which ultimately define the geographic distribution of that particular species. The good news is that because amphibians are cold-blooded, a warmer world will enable many of them to establish new populations and expand their ranges towards the poles. For example, North American wood frogs have been conquering new territory each year and are now reaching northern Alaska. The bad news is that in some places, like Spain and Portugal, a warmer climate will also be drier, which will threaten some amphibian species that are unable to move and find more suitable locations. Worryingly, we also know that climate change may have negative effects by facilitating the spread of diseases and invasive species, which in turn can affect the populations of native species. Diseases are already a major factor in amphibian declines worldwide with several species made extinct or brought to the brink of extinction as a result in the last decade alone.

However, all of these aside, amphibians would probably rather enjoy a warmer (and hopefully more humid) world, but as a general rule in nature, some exceptions occur. For example, take the peculiar case of the mink frog Lithobates septentrionalis…

How will a cold-adapted frog survive in a warmer world?

The mink frog is also known as the ‘Frog of the North’ and is one of the least studied amphibians in North America. It was exactly this latter name that made us think that this particular species might not conform to the ‘the warmer the better’ rule. The mink frog is a large, largely aquatic amphibian and has a southern range limit at the highest latitude of any North American anuran, with occurrence linked to cold, well-oxygenated wetland breeding sites (Hedeen 1986). Although widespread throughout Canada, on the southern edge of its range it exists only in isolated high-altitude areas such as the Adirondack Park in New York State. The mountainous Adirondack Park is a large protected area (the largest in the United States outside the National Park system, and about the size of Belgium) which is covered with pristine forests and is poorly inhabited. Similar to many places in the UK, this landscape was molded during the last glaciations by retreating ice caps, and their legacy is visible in the hundreds of lakes and extensive peatlands that speckle the entire region.

So, we set out to investigate if there is indeed a relation between the mink frog’s ‘climate space’ and its distribution in New York State, and how this distribution will look like in a warmer world (luckily, in northeastern United States the future is predicted to be more humid) (Popescu and Gibbs 2009). We also wanted to see if there are any other factors acting at a much finer landscape scale that were affecting its distribution and hopefully draw some management recommendations to help this species persist in the Adirondack Mountains. The mink frogs breed very late in the season (July-August), and their egg masses drop to the bottom of the breeding ponds, where presumably dissolved oxygen (needed for embryos to develop) is scarcer. Our hypothesis was that higher temperatures during the main breeding window (July) might lead to lower levels of dissolved oxygen in water, and high egg mortality. Thus, this climate parameter (mean temperature during July) can be used to characterise the ‘climate space’ of the mink frog.

After surveying about 50 ponds in the Adirondacks and surrounding regions, we found that the July temperatures negatively affected mink frogs: it was more likely for mink frogs to occur in ponds located in colder, higher elevation areas compared to warmer, lower elevations. Also, it seemed like a mean July temperature of 10°C was the tipping point, and mink frogs did not persist in areas above this threshold. Looking 50 years into the future, it was all bad news for Adirondack mink frogs. Their ‘climate space’ will be restricted to about 10% of their actual distribution, with no means for emigrating to other suitable locations because the Adirondacks are surrounded by agricultural lands or other impassable barriers, like highways and large rivers.

However, we uncovered a very interesting and somewhat unexpected result: a positive association between mink frog persistence and presence of beavers. Beavers are true ‘ecosystem engineers’ and are known as keystone species in the conservation world. Beavers are among the few wildlife species that can modify an ecosystem to suit their needs, mainly by impounding streams, creating ponds, and modifying riparian vegetation. Many studies have shown that these modifications offer new food and shelter resources to other animals, like wading birds, waterfowl, and fish; for amphibians, beavers create new breeding sites, allowing them to colonise areas that otherwise would have been inaccessible. In the Adirondack Mountains beavers are a common presence, despite being nearly extirpated 100 years ago. Thus, we found that beavers might dampen the negative effects of a warmer climate by allowing mink frog to access newly-created breeding sites, especially ones located in cold, oxygen-rich headwater streams. So, management of amphibians, which is notoriously hard to do, can be replaced by management of beavers, a process known as ‘beaver farming’. This finding has some important implications for European pond-breeding amphibians as well. The Eurasian beaver has been extirpated from most of Europe, but has been reintroduced in some countries, for example in Scotland; this is most likely good news for amphibians in these countries. Unlike the mink frogs, which live in pristine forested regions, most of Europe’s amphibians live in areas that are highly impacted by human activities (agriculture, urbanisation, dense transportation network). Even if a warmer climate would be beneficial for some amphibian species, these barriers might impede range shifts or expansions. The natural modification of ecosystems by beavers may facilitate these processes by offering dispersal corridors or ‘stepping stone’ habitats along streams and rivers that otherwise would not be suitable breeding sites. In drier areas of Europe, beaver ponds could provide much-needed breeding habitat vital for the persistence of amphibian populations.

In a nutshell, while there is much uncertainty surrounding the responses of amphibians to climate change, we know that conservation and management actions must be taken to ensure their persistence. Some successful species might not need our help to maintain or expand their range, but those threatened by climate and other human activities will likely require some type of intervention.

References
Words of Wisdom

Barbara Dinham, retired Director of Pesticide Action Network UK, looks at what needs to be done to win the war against climate change and how you can do your bit.

Like the legendary canary in a coal mine, frogs are indicators of a healthy environment. Natterchatter readers will be familiar with tragic declines in global amphibian populations and worried by estimates that say nearly one-third of over 6,800 species globally are extinct or under threat. Declining populations are linked to habitat changes driven by the same elements that bring about climate change: industrialisation, intensive agriculture, loss of wetlands and forests. Any activity that combats these forces, however small, helps to halt this destruction. What direct actions can individuals take in the face of these global forces?

A greener government?

Policy changes will remain critical to bring about major reductions in the emissions that lead to climate change. This means maintaining pressure to implement and increase political commitments to combat global warming. The 1997 Kyoto Protocol was a landmark achievement but fell short of imposing legal obligations. More constructive was the outcome of the Climate Change conference in Durban, South Africa, in December 2011, when governments committed themselves to write a comprehensive global agreement to reduce greenhouse gas emissions. But the world will have to wait until 2020 to see these come into force. Clearly, continued pressure is essential to get governments to meet, and go beyond, reduction targets.

Simple steps

But big policy changes require lifestyle transformations, particularly in rich countries. Embracing climate-friendly living cannot wait for global treaties to be enacted. Small actions are not futile, and many individuals, households and communities have already accepted the Chinese wisdom that ‘every long journey starts with a single step’. More and more people take simple measures to reduce their carbon footprint - recycling, using your car less, insulating your home, backing renewable energy sources - and now it is easier to measure your own carbon emissions as an incentive to go further.

And what about the potential to not only reduce, but also offset, emissions? Initiatives taken by Froglife and its partners and Friends to save and expand wetlands and amphibian habitats are a vital example of practical actions.

Working together

A combination of political and personal action is essential to roll back the tragedy of climate change. Both are vital to protect amphibians and to help stabilise and expand populations. Froglife is doing a crucial job of encouraging greater awareness of the critical role of frogs and other amphibians in demonstrating how the world is faring to combat climate change.

Find out more about building a pond or creating a frog-friendly allotment on the Froglife website: www.froglife.org/garden. If you've not got space there are plenty of other ways you can support our work: www.froglife.org/support

Grow Your Own

At an individual, household and community level, there is great potential for balancing carbon emissions by embracing the joys of growing your own food. Anyone with a garden - or even a balcony - can grow at home; alternatively you could consider joining a community garden or allotment.

Adopting organic growing principles is particularly effective in a small growing space and composting is great for the soil and reduces household waste.

Realistically, most small gardens will not produce enough to prevent trips to buy food or to reduce ‘food miles’. But the food tastes great and it’s hard to beat the pleasure of harvesting your own crop.
In March of this year, Froglife hosted a workshop in Peterborough to establish what needs to be done to tackle the issue of Toads on Roads at a European level. www.froglife.org/EUtoadsnonroads

What’s happening in Europe?

The Netherlands: Raymond Kreemers, Ravon
Ravon’s excellent web resources help the Dutch Amphibian and Reptile Groups record data and recruit volunteers. 150,000 amphibians are helped every year.

France: Claude Miaud, University of Savoie and the French Herpetological Society
Claude was unable to attend the workshop in person but supplied some information about the 200 tunnels currently installed in France.

Portugal: Catia Matos, University of Porto
Some wildlife passages have been installed in Portugal but they are not monitored. There is need for a national amphibian survey.

Spain: Neftali Sillero from the Spanish Herpetological Society
The society are managing a database of amphibian populations in order to monitor threats and help inform volunteer effort.

Switzerland: Benedict Schmidt, Karch
There are 958 amphibian crossings in Switzerland with volunteer patrols. A web-based system is used to gather records.

Germany: Tom Kirschev, NABU
NABU have a database of amphibian fences across Germany and have been involved in raising awareness.

Poland: Sylwia Szczutowska, Association Workshop for All Beings
The Workshop have been training and educating structural engineers and have produced Protecting of the Amphibians - A Guide.

Lithuania: Dalia Bastyte, Lithuanian Fund for Nature
A guidance document to help amphibians was adopted in Lithuania in 2010 but there is still very little fencing and other protection.

It’s not just toads, species like the fire salamander are also at risk.

The two-day EU Workshop on Amphibian Mortality on Roads was held at the Town Hall in Peterborough. After a welcome address by Froglife’s CEO Kathy Wormald and sponsors ACO Technologies Plc, each representative presented a short summary of the situation in their country. Following case studies, films, a visit to the toad tunnels on Hampton Nature Reserve and lots of discussion, the newly formed European Network for Toads on Roads (ENTOR) issued the statement below.

“Roads present one of the biggest threats to amphibian survival across Europe.
Habitat fragmentation by existing and developing road networks leads to mass amphibian mortalities, leading in turn to local population extinctions. Combined with other factors such as disease, habitat loss and climate change, we will lose billions of frogs, toads, newts and salamanders unless coordinated action is taken soon.

We need:
- to recruit and support the thousands of volunteers across Europe who are committed to helping amphibians survive.
- road construction across Europe to follow cost effective best practice for amphibian mitigation to avoid simple mistakes.
- improved construction on existing road networks to solve issues for amphibians.
- more data on the situation in each country to map existing and potential amphibian and road conflicts.
- to identify hot spots for amphibian mortalities to better implement conservation measures.
- shared resources in different languages to disseminate information and educate stakeholders.
- investment in amphibian conservation to protect these fascinating, precarious and protected animals.

With these actions, we can successfully protect a part of Europe’s threatened natural heritage for future generations to enjoy. Biodiversity loss affects everyone, action to prevent it should involve everyone, and everyone will benefit from the positive outcomes."

Sponsor a Species: Protect a toad
Donate to the Tuppence a Toad campaign on someone else’s behalf via this virtual gift. Your money helps toads by providing Toad Patrols with support and equipment.

Price: £4 (+ £0.50 p&p)
Code: C003

Other ‘sponsor a species’ gifts are available, please see www.froglife.org/shop/sponsor-a-species.htm for more information.
BOOK REVIEW & OFFER

The Hockey Stick and the Climate Wars: Dispatches from the Front Lines by Michael E. Mann puts the 'climategate' email hacking scandal of 2009 in a broader context. The book includes descriptions of ongoing attacks by vested interests trying to discredit climate change science, and aims to tackle the damage done to Mann's reputation and that of other climate scientists.

Mann explores how the 'hockey stick' graph from his research came to be used extensively to illustrate that recent increases in temperature in the Northern Hemisphere go far beyond what could be expected from natural fluctuations. He makes an impassioned case for the science behind climate change theory, explaining how the graph came into existence. The book focuses on his story of climate change for only one chapter; the rest discusses the background of climate change theory and how hypotheses were formed, as well as analysing different approaches used to deny anthropogenic climate change. Mann highlights that scientists are used to scepticism and arguing for their research, suggesting that it’s not that he cannot take criticism but that the criticism levelled at him is often biased and flawed, with an aggressive pro-fossil fuel agenda.

This is an interesting and readable combination of science and politics, going into the subtleties of the situation from Mann’s point of view. Anyone whose faith in climate change theory was shaken after climategate may find it restored after reading this book. Despite his shocking stories of attacks and misrepresentation, Mann ends on an optimistic note and will not be giving up the fight to tackle climate change.

Froglife has a copy this new book to giveaway, courtesy of Columbia University Press (RRP £19.95). To be entered in the draw to win the book, please email sam.taylor@froglife.org, call the office on 01733 558844, or send your name and address to 2a, Flag Business Exchange, Vicarage Farm Road, PE1 5TX by midnight on Sunday 13th May.

frogalogue

To order visit www.froglife.org/shop, call 01733 558844 or fill in and return an order form.

Photo and art prints

Price: £25 (+ £1.75 p&p)

Print dimensions: 42cm x 30cm (A3). Prints are packaged in acid-free tissue paper and posted in a sturdy cardboard tube.

Common toad (black and white photo) by Oliver Kratz  code: AP01
Common toad (colour photo) by Oliver Kratz  code: AP02

Collection of toads (colour photo) by Oliver Kratz  code: AP03
Frog in a pond (colour print) by Sam Taylor  code: AP04

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Lin Wenlock, Frank Clark, Roger Downie, Heather Jones, Rob Oldham, Desmond Quinn and Inez Smith; Ashlea Jarvis and all the other volunteers we couldn’t do without!