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Good news for newts' DNA

By Penny Bunting - 31 Mar 2014 6:00 GMT



The protected great crested newt is common in parts of Europe but severely restricted in urbanised Britain by the loss of many of its habitats. Tracing its distribution with the help of water eDNA samples will be a tremendous aid in the conservation effort to reverse, "a century of pond loss." - [Newt larva image](#). Credit: © Freshwater Habitats Trust

A pioneering new survey technique that analyses DNA traces in water is set to revolutionise the monitoring of great crested newts across the UK.

Research led by the Freshwater Habitats Trust together with Amphibian and Reptile Conservation, University of Kent and genetics company SpyGen shows that the new method allows researchers to determine quickly and easily whether newts are present in ponds and streams.

The Defra-funded research project has discovered that monitoring levels of environmental DNA (eDNA) in water makes it at least 10 times faster to detect species than was previously possible - and has wide implications for conservation of endangered and rare aquatic animals.

Great crested newts have suffered a major decline in the last century and although they have protection under UK and European law, their numbers continue to fall. A shortage of suitable breeding and resting places, and deterioration of existing habitats, is a major cause for this decline. 50% of the UK's ponds were lost during the 20th century, and of those that remain 80% are in a poor state.

The new research methods offer fresh hope to the great crested newt, allowing more sites to be checked for newts and providing essential information for effective conservation and land-use planning. As the testing process is simple and fast, volunteers need just basic training - meaning that anyone across the country can become involved and help to build up a comprehensive picture of the behaviour and distribution of these amphibians.

"Previously it has been impossible to determine whether the great crested newt population was going up or down because it was just too time-consuming and expensive to visit enough sites to get a reliable national or regional picture," says Dr Jeremy Biggs, project leader and Director of Freshwater Habitats Trust.

"Now that we've shown a single water sample can detect the newts with remarkable reliability, it makes large scale surveys practical - which will help enormously with future protection of Great Crested Newts."

Before the research could be conducted, a 'primer' - an artificial length of DNA that exactly matches the DNA of the great crested newt - was developed, and then tested to ensure that it only detected newts.

Water samples were then collected by volunteers from 250 ponds known to be inhabited by great crested newts. The samples were analysed for traces of eDNA - released from plants and animals from their skin, faeces, mucus, hair, eggs and sperm, or when they die. The eDNA techniques correctly detected newts in 91% of the ponds - a far more accurate and effective result than traditional methods, which include counting newts

Recent News



[Anti-poaching drones: the answer!](#)

How will we prevent the Chinese and other poaching gangs from continuing their greedy and bloodthirsty crimes? The use of military units has already proved useful and suitably adverse conditions for the cowardly crime. Now a semi-permanent eye in the sky will obviously enable more efficient use of rangers and prevent their deaths!



[Green turtles need help](#)

How to provide for indigenous and other peoples with a rare animal as a food source and sustain their diet? (As well as make sure we don't have another extinction on our hands). A scientific approach is required in the Caribbean, where little seems to be going well in some countries, while others conserve their fauna and flora to make large profits from tourism.



[Carbon destroys ocean life as well as our climate](#)

Air pollution is rarely linked to water pollution, but the strong links will soon be obvious, just as the surface air movement is influenced by the ocean currents and the temperatures of both. While scientific models can tell us what is going to happen as the earth warms, climate change will also be influenced by small so far neglected fluctuations in chemistry such as these pH changes in our oceans, affecting billions of creatures, and of course, us.

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by torchlight, bottle trapping and searching for eggs.

But it's not just newts that will benefit. There is potential for eDNA analysis to be used to gather vital information about other endangered aquatic species, including freshwater fish, amphibians and invertebrates.

Freshwater pearl mussels are one such species. Numbers of this remarkable mollusc have declined dramatically in the past 60 years - and they are even facing extinction in some parts of England and Wales. They can live for over 100 years, and are extremely sensitive to pollution - more so than any other freshwater animal - making them an important indicator of river water quality.

Freshwater and wetlands are amongst the most threatened habitats in the natural world. Groundbreaking research such as eDNA analysis and practical conservation work such as the Freshwater Habitats Trust's Million Ponds Project - which aims to create a network of new ponds across the UK, reversing a century of pond loss - are vital for protecting these fragile, vulnerable environments and the species they support.

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Current Environmental Issues



Natural Disasters

The question is whether global warming is leading to an increase in natural disasters. There are suggestions that in some instances this might be the case. Someone living in an area that is prone to one or other of these natural disasters will be well aware of the fact, so the most important factor is to be prepared. If you live in an area that is prone to earthquakes, you might not experience one for a number of years, but they can occur with very little warning.



Energy

In the developed world we take a limitless supply of energy for granted. But energy is precious - we can't manage without it but we need to learn how to manage it wisely.



Habitat Loss and Degradation

Thousands of the world's species are endangered as a result of habitat destruction caused by human intervention. Every living thing needs somewhere to live, find food and reproduce. This is known as its habitat. In order for a species to be viable its habitat must have sufficient territory, necessary food and water and a range of necessary physical features.



Rainforests

The progressive destruction of tropical rainforest could see their complete end within 40 years. This decline can only be stopped if governments and commercial interests can be persuaded to harvest resources in a sustainable way. Tropical rainforests have been called the "jewels of the Earth" and the "world's largest pharmacy"



Endangered Species

The world has an amazingly diverse number of different species of animal and plant life, but many are in danger of being lost for ever, often as a result of human action. An endangered species is a group of organisms which is at risk of becoming extinct.



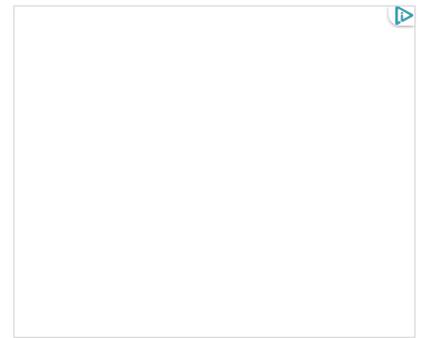
Food and Water Security

Food and Water Security are a basic need and a right for all people and those of us in the developed world have a responsibility to do everything in our power to speed its progress. How easy it is to take things for granted. From the comfort of the developed world it is hard to imagine what it must be like to be constantly hungry or thirsty, with an ever-present fear of starvation and to live in a world where a plentiful supply of fresh water is just a dream.



Waste

This disposal of ever-increasing amounts of waste can be a considerable problem and most is still simply dumped into landfill. Waste actually represents a considerable resource - much of it can be reused or recycled, or processed to extract its energy. In the 21st century



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[Masdar Sustainability Blogging Contest](#)

Masdar is launching its annual global sustainability debate at ADSW again. The blogging contest will appeal to a very wide range of people, focussing on cities and sustainable development.



[How to protect skin and use a deodorant](#)

The deodorant story progresses with a natural solution that has no aluminium or other "contaminant" to cause you any allergies or discomfort. Rubbing this in your skin could solve any BO problems!

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landfill is no longer a satisfactory option for its disposal.



Mass Extinction

A summary of the five great mass extinctions, each of which wiped out thousand of species of animal and plant life. Many scientists believe that we are now in the middle of the sixth great mass extinction.

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