

# Apps take science out of the lab and into your lap

In April 2014, *Science Needs You!* at the Edinburgh International Science Festival set out to inspire a new generation of scientists.



Dave Kilbey



Crowd-sourced data gathering, also known as citizen science, is increasingly recognised as a valuable means for environmental organisations such as SEPA to collect a huge variety of data. At *Science Needs You!* groups of local citizen scientists – as well as some professional ones – shared their experiences of data gathering, and demonstrated how easy it is to join in.

The interactive highlight of the event was a hands-on session by Dave Kilbey, Project Manager of the Nature Locator project at the University of Bristol. His team has devised a number of mobile apps which allow members of the public to record and upload examples of species of interest to national and international databases. The apps take advantage of the sophisticated technologies included as standard on smart-phones – such as hi-resolution cameras, geolocation and wireless connectivity – allowing accurate, detailed and highly relevant data to be captured, verified and logged.

The Nature Locator team has created six data-gathering apps so far, including *SeaLife Tracker* and *AqualInvaders*, both also supported by SEPA and launched in 2013.

"The apps are designed to appeal to as wide a range of people as possible," Dave said. "So far we've had almost 17,000 downloads of *PlantTracker* since it was created in 2011, and from those we have around 7000 verified records."

Dave and his team attribute part of the success of the apps to their combination of easy functionality and attractive design. But another, vital factor in their success is the real-world relevance of the data that is collected by the citizen scientists.

Information uploaded via each app is verified by national experts working behind the scenes, checking all the records and making sure they're valid. As a trained ecologist with significant botanical and ornithological expertise, Dave does a lot of the verification for *PlantTracker* records himself.

"With every app we devise, we work hard early in development to get the right people on board. For example, we have the Marine Biological

Association doing record verification for us with records uploaded via *SeaLife Tracker*."

It means that there is a very well established process for data submission – once a record is verified, it eventually becomes available nationally and internationally. We make sure that our apps adhere to that process, so the data is available to researchers, public consultants – whoever needs the data can access it.

You can find these and many other recommended mobile apps on the Scotland's Environment website: [www.environment.scotland.gov.uk](http://www.environment.scotland.gov.uk)



## Citizen Science: Filling in the gaps

By Rhona Kiernan, Stirling

As part of the Edinburgh International Science Festival, SEPA sponsored an event on 12 April 2014, titled *Science Needs You!* The presentation focussed on two main parts: first, on the importance of having citizen volunteers to help measure air quality; and, second, on the availability of mobile apps which have been designed to help volunteers identify and record invasive non-native species of plants and animals.

In December 2013, the European Commission released an in-depth report on Environmental Citizen Science which focused on three key questions. I used these questions, in part, to shape my comments on how the speakers explored the subject.

### How can new technologies help citizen science?

The public have more opportunity than ever before to participate in environmental projects, and one such project concerns the issue of air pollution. This is measured by large, monitoring stations located in towns and cities but these are too expensive to have everywhere, which means that scientists do not have a complete picture. The picture of air pollution in Scotland is added to by having smaller monitoring stations in schools, but scientists are encouraging citizen scientists to carry portable measuring devices, which will provide more detailed information about air quality and levels of pollution.

The speakers demonstrated how easy it was to use the technology, which was reinforced when the next speakers explained that there is a variety of apps available for smartphone or tablet. These apps are focused on the identification and recording of various species, ranging from recording the numbers and locations of bats and butterflies, to tracking the invasion of non-native species of plant and marine life, for example *AqualInvaders*. The audience were inspired by this innovative use of mobile devices, and were

encouraged by the fact that all of the submissions are double-checked by scientists.

### Is data produced by citizen scientists as accurate as data produced by professional scientists?

Data collected by citizen scientists is generally not as accurate as that collected by the professionals – but the citizen scientists collect data from a far wider area, so the large sample sizes can cancel out individual error. The most important issue is to involve more citizen scientists, because greater coverage improves accuracy. Also, more public involvement might lead to greater investment in the technology used.

### What are the benefits of citizen science?

Each citizen science project may have a different aim: scientific, educational, or policy-focused. Although none of the speakers discussed the topic of policy-making, there was a suggestion that if more people were involved then there would be better opportunities for influence.

The volunteer conservationists stressed that it was good for everyone to participate, because not only do people learn skills but it could benefit their health, and it would be fun! It is difficult to find any negatives in a project which increases the sum of knowledge and has immediate benefits for individuals when they participate.

Citizen science is an exciting opportunity. We need more people to be involved, collecting data and filling in those gaps. It is our responsibility to take care of the environment for the future and, with citizen science offering easy, technologically-agile methods, there is no reason why we should hesitate. Let's fill in the gaps!

## New ways to get young people inspired to help the environment

On Saturday 12 April, I attended SEPA's *Science Needs You!* presentation, which sought new ways to get the public involved in protecting Scotland's natural ecosystems and environment. The presentation focused on two aspects: getting school students to find out the air quality in the local area, and three new mobile apps which allow the public and volunteer groups to identify species of animals which may be harming the natural ecosystem.

Air pollution is a big problem in many parts of the world. The main factors of air pollution are natural disasters, such as volcanic eruptions and the burning of fossil fuels. One way of measuring levels of pollution in communities is to have monitoring stations in local schools, which can be used by students. This not only sends information about how polluted the air is, it also lets the students get hand on experience with the equipment and develop an understanding of how to help the current situation. Attaching mobile instruments to bikes, or carrying them around on your body whilst you are having a leisurely stroll, is useful in that they measure how much pollution there is in certain areas of the city, such as busy junctions.

Protecting the environment has now been made a lot easier with the introduction of mobile phones. The University of Bristol has produced several different apps for smart phones. *AqualInvaders* allows you to photograph different species of aqua marine life which are not native to Scotland – a new way of measuring the numbers of species on the coastline. *PlantTracker* and *SeaLife Tracker* are similar, in that they allow you to take photographs of different species of plants and sea life, respectively.

A day after downloading the *PlantTracker* app, I can say that this is a unique and interesting way of getting the younger generation's attention. Indeed, I have become more interested in nature walks now, keeping a look out for any new plants I haven't yet recorded.

With the fast pace of technological development, there are some moments when you think that the environment is the last thing on the manufacturers mind. With these citizen science ideas, and even more under development, hopefully people will start paying attention to what is around them.

By Joe LeFevre, Edinburgh

### About Young Reporters for the Environment

Young Reporters for the Environment (YRE) is an international sustainable development education initiative for young people aged from 11-21 which empowers and encourages young people to investigate and report on environmental concerns and issues of sustainable development. YRE supports Learning for Sustainability by promoting advocacy and media skills around Global Citizenship, Outdoor Learning and Climate Justice.

Find out more at [www.keepsScotlandBeautiful.org/youngreporters](http://www.keepsScotlandBeautiful.org/youngreporters)

