

Air Quality Citizen Science Advisory Group

Presentations and Workshop Findings

Thursday 12th February, SEPA Edinburgh Office

Introduction and Purpose

The Air Quality Citizen Science Advisory Group was setup in August 2013 to discuss and recommend Urban Air Quality Citizen Science projects. In the initial meeting the group considered engaging participants, methodology, stakeholders and outcomes, benefits and challenges, timescales and estimated costs. Following this initial meeting a draft programme of projects was produced. The overview of findings can be found here:

<http://www.environment.scotland.gov.uk/media/68224/Urban-air-quality-citizen-science-Project-Report.pdf>

The Advisory Group was reconvened in February 2015 to present on the projects that the members have since undertaken and discuss the lessons learnt, how we get more people engaged, the priorities and how monitoring leads to action. This note presents the findings of this workshop.

Attendees

Stefan Reis, CEH

Jackie Hyland, NHS Tayside / St Andrews University

Stuart McGrath, Education Scotland

Tom Burr, Vehicle Emission Partnership

Shauna Clarke, City of Edinburgh Council

Kerry Riddell, The Conservation Volunteers

Hilary Cowie, IOM

Janet Khan-Marnie, SEPA

Sheila Beck, NHS Health Scotland

Cecilia Oram, Sustrans Scotland

Alan Cameron, SNH

Paul Griffiths, SEPA/SEWeb

Mark Smith, Vehicle Emission Partnership

Christopher Ellis, Royal Botanic Garden Edinburgh

Joanne Dempster, Open Air Laboratories – Glasgow Science Centre

Francis Stoakley, The Conservation Volunteers / Royal Botanic Garden Edinburgh

David J Roy, SPOKES

Iain McLellan, Environmental Protection Scotland

Matt Keyse, Open Air Laboratories – FSC Scotland

Colin Gillespie, SEPA

Emilia Hanna, Friends of the Earth Scotland

Ben Jackson, SEPA

Presentations

Using 'Scotland's Environment' website to promote action on air quality in Scotland – Paul Griffiths

Lessons from Community Based Monitoring in North America – Kerry Riddell, The Conservation Volunteers

Have you heard about iSPEX? - Janet Khan, SEPA

Supporting Scottish schools: the Open Air Laboratories (OPAL) network – Matt Keyse, OPAL

Monitoring in Glasgow: A Particular Matter of Synchronisation – Emilia Hanna, Friends of the Earth Scotland

CEH Citizen Science – from practical guides to applied personal exposure monitoring – Stefan Reis, NERC Centre for Ecology and Hydrology

CITI-SENSE and HEALS – citizen involvement in air quality assessment - Hilary Cowie, IOM

Air Quality Teaching Package for Schools – Ben Jackson, SEPA

What lessons have we learnt so far from citizen science projects?

- The message about the health impacts of poor air quality in Scotland needs to be broadcast; increasing the public's awareness and understanding the health and environmental impacts in Scotland.
- Citizen science projects must be fun and interesting for participants! Projects must be relevant to the public to be successful and must feedback findings to the participants to keep them engaged.
- There is a wide range of techniques available for citizen science ranging from bio-indicators to sensor technologies. There are strengths and weaknesses to all these techniques. However a key issue is to ensure data quality/validity, in terms of the technology used (in particular low cost sensors) and the methodology followed. Both technology and methodology should be designed to maximise data quality. More static air quality monitoring stations containing reference monitors may be required to improve the validity of citizen science measurements, especially when there is concern over data quality.
- The public are competent at using the collected data, however there needs to be trust between Local Authorities, SEPA and the public. By giving people equipment to monitor the source of local air pollution this could lead to better engagement and understanding of air quality issues. However, the public's expectations may need to be managed regarding the impact of monitoring.
- The UK can learn from the US approach to citizen science (as presented by Kerry Riddell, TCV). The US Government Agencies appear willing to integrate data and to cluster reports of concerns. This compares to UK concerns about data validity potentially stopping sharing of raw data with the public. Examples from the United States show that the most successful outcomes occur when a strategic approach is taken involving community groups working with the Government Agencies.
- The legal complexities in terms of data collection, storage and permissions should not be underestimated. This is particularly important if personal information is used and when working with sensitive groups such as school children.
- The use and availability of apps on smartphones needs to be improved with, for example, the development of automatic downloads. Data should be identified and coalesced into a central resource such as SEWeb. Experiences and issues from citizen science projects should also be stored alongside the data.

How do we get more people engaged?

- When people care about an issue they are more likely to take action. We need to consider these 'emotional' values when designing citizen science projects.
- Clear examples of the benefits of citizen science need to be published. Case studies should be provided showing how projects have improved engagement, increased understanding of issues and lead to action.
- We need to identify people and groups already out there who can monitor while they are going about their daily business, e.g. cyclists, walking groups, dog owners, traffic wardens/beat police, pensioners and groups in the community (not necessarily with an environmental focus). Activities could be setup in city parks or national parks, encouraging people who are going for a walk to carry out observations, for example monitoring lichen.
- Schools should be engaged by using teaching packages or activities in out-of-school groups such as Duke of Edinburgh. If monitoring is conducted around schools this may engage parents and influence their driving behaviour during the school run. Educational events showcasing citizen science projects could be organised, such as through Science Festivals for both pupils and their parents.
- Within schools the link needs to be made between citizen science and STEM (Science, Technology, Engineering and Mathematics). The Curriculum for Excellence promotes STEM careers and we should be encouraging STEM careers by visiting schools. More females should be encouraged into STEM careers and citizen science is one way of achieving this.
- Students at universities and further education establishments should be encouraged to both design and participate in projects.
- To highlight the impact that poor air quality has on health, a patient group could be engaged to monitor personal exposure and this could be linked to health indicators.
- Buses, taxis and trams could be used as mobile monitors, feeding back information to passengers while also monitoring the driver's exposure. Driver exposure may be a health and safety issue for employers and they should be made aware of this.
- Technologies need to be made more user-friendly. Mobile phone apps could be improved to ease and facilitate participation.
- Typically children and retired people are involved in citizen science and there is possibly a gap where young adults are not engaged. This gap needs to be addressed.

What are the priorities for citizen science and how does monitoring lead to action?

- Traditionally Local Authorities/SEPA/Scottish Government have used low density high quality data as evidence to base policy decisions on, i.e. from 92 static monitoring stations across Scotland. The culture may need to be changed to accept citizen science generated data and use it to create solutions. The benefits of 'good enough' quality monitoring should be considered to complement high quality data from static monitors. Furthermore, as more citizen science data is collected, the amalgamation of this data will lead to high density data which has its own strengths. There is a perceived defensiveness of the public sector in not using this 'good enough' data which needs to be addressed, but this may change as projects gather more data.
- Citizen Science can also help the LA/SEPA/Scottish Government's understanding of air quality issues. Currently, the understanding of Scotland's air quality is based on limited static monitoring stations and modelling to fill in the gaps. Citizen Science data could be used to complement and field truth the modelling outputs which also have inherent uncertainty.
- To provide evidence for policy decisions, it is likely that significant data will be required and hence more people will be involved in collecting it. Projects can however still be very beneficial as engagement tools when fewer people are involved.
- Collected data and wider findings need to be useful to both those undertaking the study and the policy makers making decisions on it. Effective project design is essential in providing good quality data. Spatial and temporal resolved data is useful for building up the understanding of the issue. Good practice and training from successful projects should be shared with others to learn from, especially during the design stages.
- During the design and roll out of a project the key objectives / purposes are needed, e.g. is it for engagement, education, data collection or all. A common set of messages is required for all those involved.