NATURAL HISTORY MUSEUM

Citizen science and natural history

Graham Higley & John Tweddle

Citizen science can play a key role in generating new knowledge and creating a scientifically literate society

Citizen science projects are collaborative initiatives in which members of the public are invited to engage in the process of scientific research and investigation: asking questions, collecting data, and/or interpreting results

When done well, citizen science initiatives can:

- Break down barriers to engagement in science
- Increase scientific knowledge
- Increase scientific literacy
- Inspire, motivate and enhance lives

It is a rapidly growing field, particularly within the natural sciences, with over 700 peer-reviewed papers published to date.

There is growing evidence that people want to get actively involved in such contributory science

NATURAL HISTORY MUSEUM

Natural history and citizen science: a perfect partnership

- Scientists can’t operate in isolation
- Many critical biodiversity questions require large observational datasets:
  - mapping species responses to climate change
  - tracking the spread of non-native taxa
  - monitoring population dynamics across large geographic areas
- Humans are very good at observing nature
- We enjoy observing and identifying wildlife and related aspects of the wider environment
- Data accuracy can generally be quantified
- There is a willingness to get involved

Supporting policy implementation

- As well as the scientific angle, there is also a convergence of biology and politics:
  - Explicit recognition that public buy-in is critical if we are to meet the 2020 Global Biodiversity Targets and related European Biodiversity Strategy objectives
  - Understanding of the quantifiable health benefits that engagement with nature can provide
- Set against a growing awareness that an increasing proportion of the population is living within urban areas, and that this can lead to a disconnect with nature
- ***Citizen science can help address these issues***

The Natural History Museum, London

- 250 years of history
- Global biodiversity research institute:
  - worlds most comprehensive Natural History Collection
  - 350 scientists
  - 700 peer-reviewed papers/yr
  - £95M in 5 years in external grants
- 5 million visitors per year
- 16 million hits on website per year
- 250,000+ school children per year
- Leading role in sector: UK, Europe, global

NATURAL HISTORY MUSEUM

Why is the NHM so well suited to citizen science?

- Science infrastructure & peer network
- Public engagement expertise
- Audience reach - well known and trusted
- Experience of managing ambitious projects and large external grants

The Angela Marmont Centre for UK Biodiversity

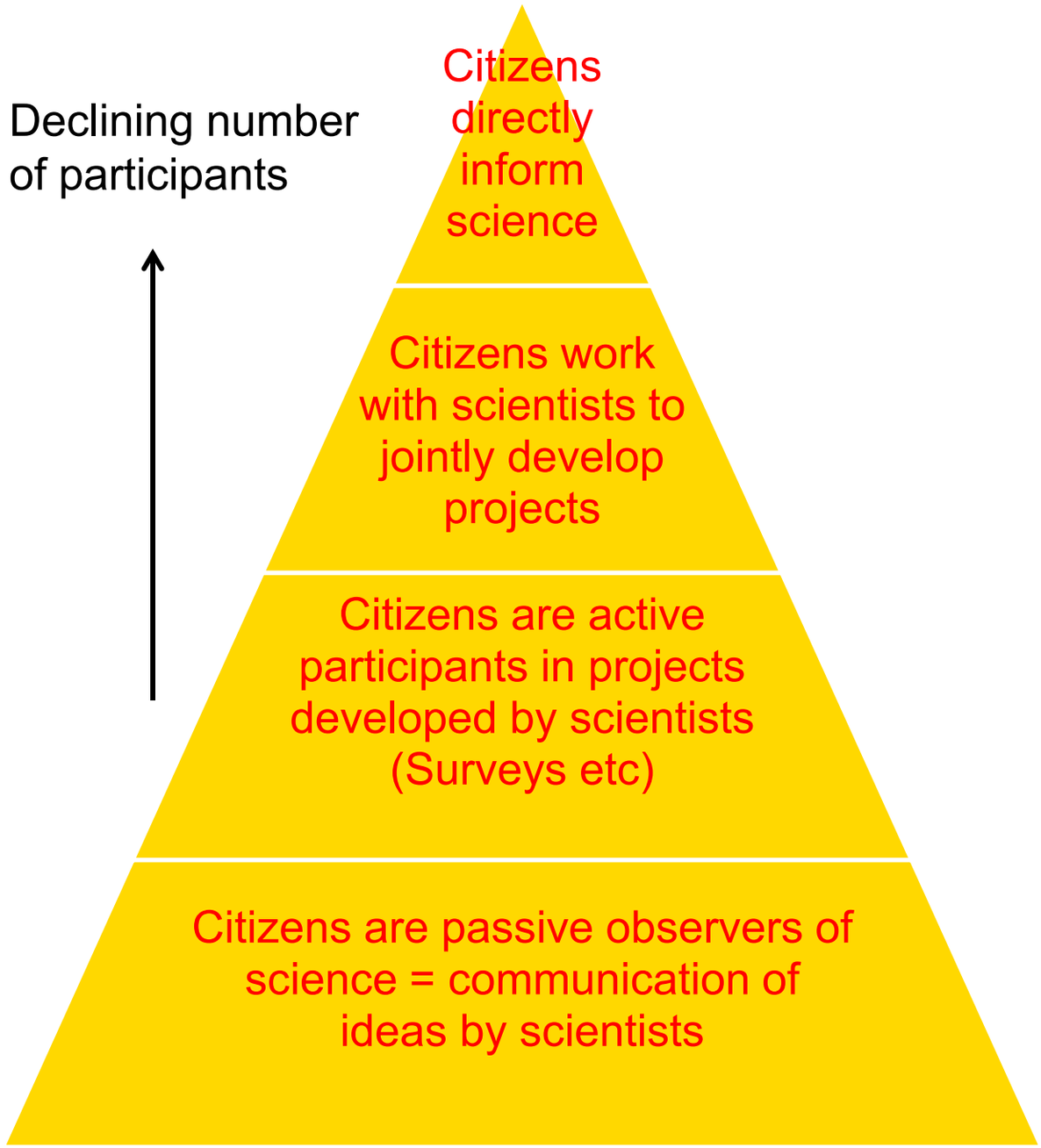
Mission: to promote the appreciation and study of UK biodiversity & nurture inspire & develop existing an future naturalists

- UK biodiversity research
- Outreach and engagement
- Support for existing naturalists
- Training for new naturalists
- Citizen science

NATURAL HISTORY MUSEUM

Citizen science at the NHM

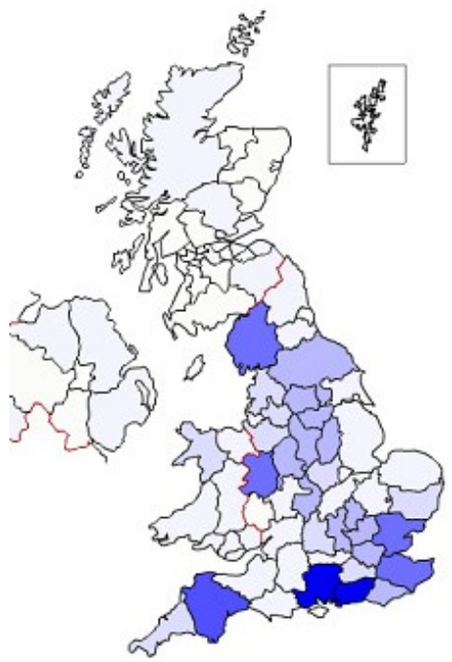
- >10 years formative experience
- Ambitious strategy set for 2010-2020: mainstreaming citizen science
- Led by NHM scientists in partnership with wide range of external groups
- Recognises that people are prepared to interact with science in different ways - pyramid
- ***Our aim is to provide opportunities to interact and move up the pyramid to suit personal interest/skills***



Pyramid of engagement

Scientist-led: the Bluebells Project

- Are flowering times responding to climate change?
- Is native bluebell under threat from non-native taxa?
- What is the nature of the threat?
- How do we manage the situation?



NATURAL HISTORY MUSEUM

Citizen-led: the River flies Project

- 2 million fishermen in UK
- 80,000 fly fishermen – who care about ‘their’ rivers
- Learning new skills in a familiar setting
- Ongoing monitoring by this volunteer network
- Providing data on river ecology and water quality

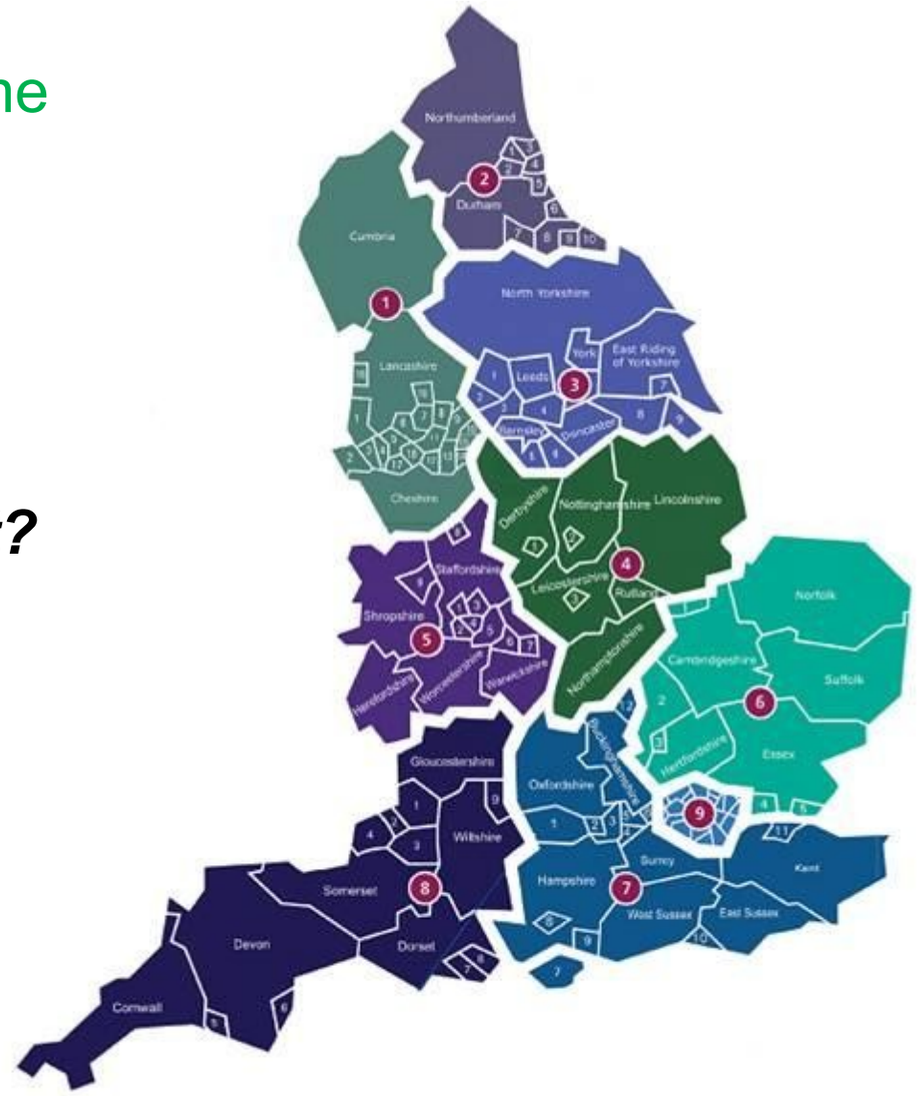
The Riverfly Partnership

NATURAL HISTORY MUSEUM

Crowd-sourcing environmental understanding

OPAL (Open Air Laboratories network) *www.opalexplorenature.org*

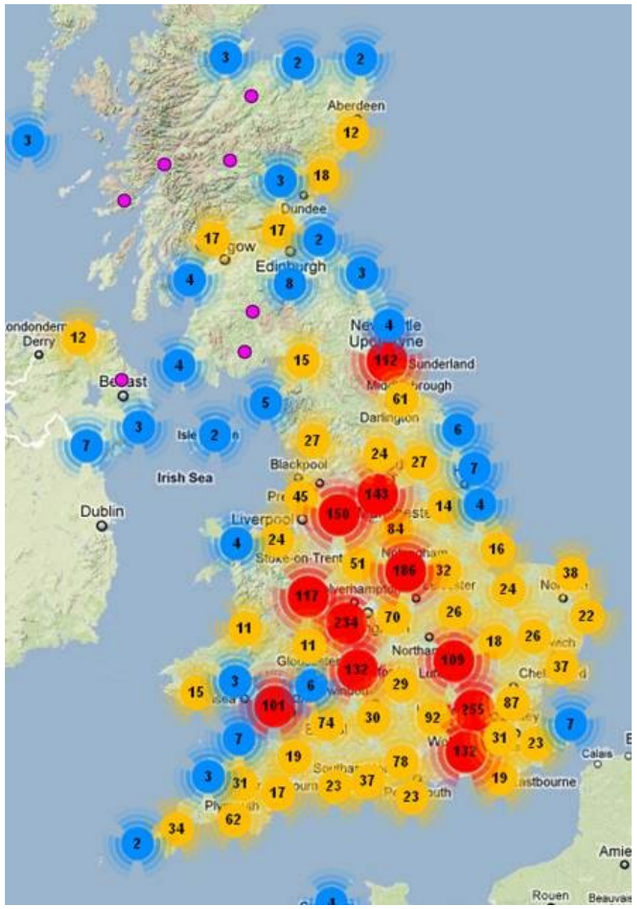
- UK's most ambitious citizen science programme
- 2007-2013, £14M UK Lottery funded
- 15 academic partners
- ***What is the state of England's environment?***
- Citizen science projects – biodiversity and environmental
- Reconnecting the public with nature
- NHM = public face OPAL

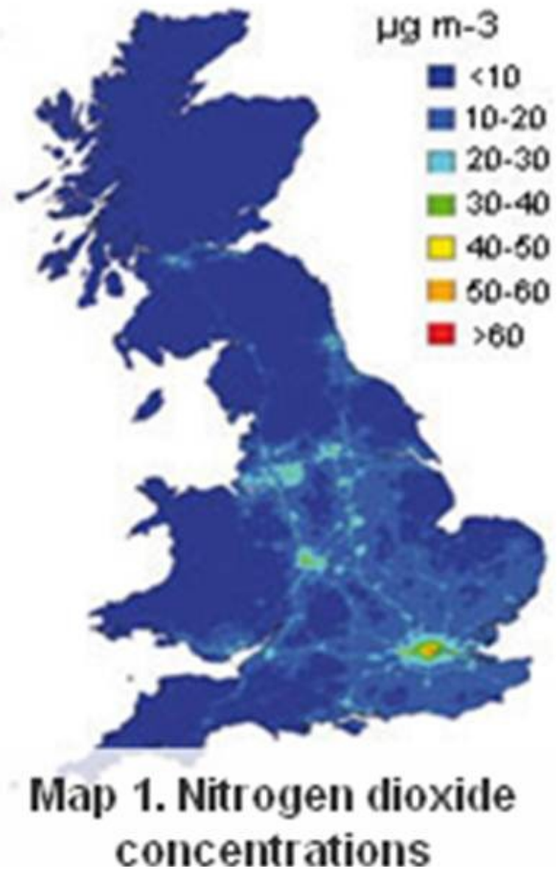


NATURAL HISTORY MUSEUM

OPAL – delivering mass engagement

- 500,000 members of the public have participated (all ages and backgrounds)
- Science data generated exceeds 1 million environmental/biodiversity records
- >20 peer-reviewed papers to date





Map 1. Nitrogen dioxide concentrations

NATURAL HISTORY MUSEUM

OPAL 1: Bugs Count survey

A national wildlife survey to:

1. Investigate how urbanisation affects biodiversity

2. Study habitat and resource availability in urban areas

3. Better understand the impacts of climate change, non-native species and habitat availability on invertebrates

It is also:

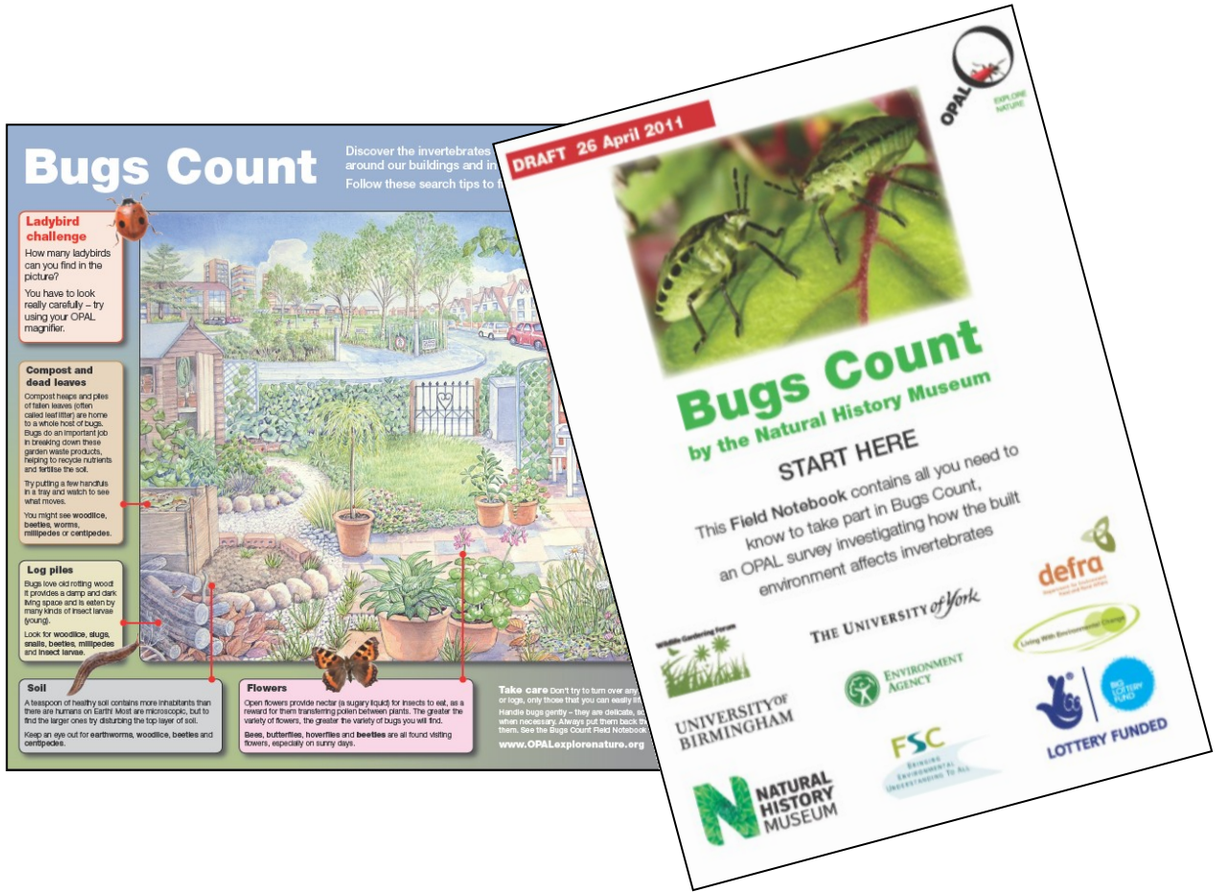
1. Raising awareness of the value of invertebrates

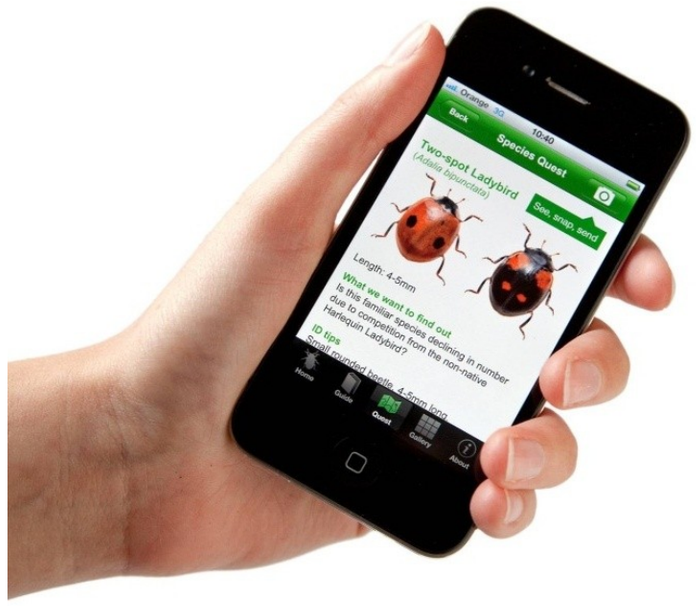
2. Encouraging ownership of the local environment

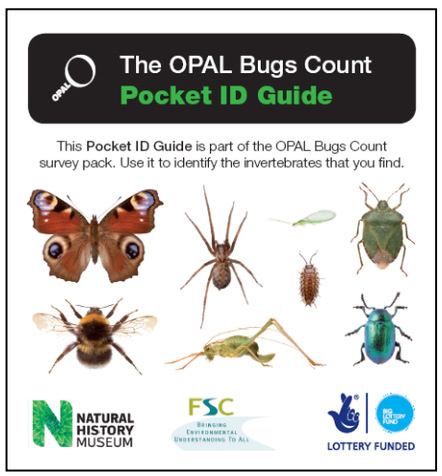
3. Involving people in long-term knowledge generation

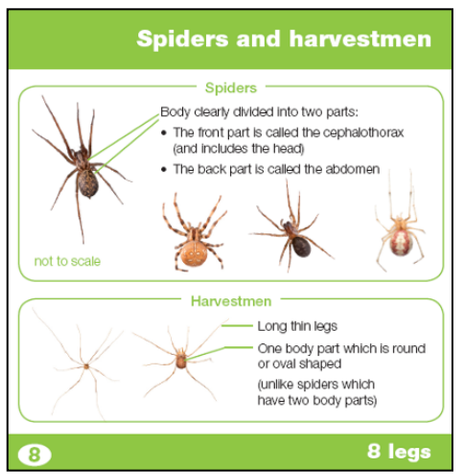
NATURAL HISTORY MUSEUM

Free printed/downloadable resources









- Research data on the move!
- ID guide and biological recording App
- Uses inbuilt camera and GPS capability
- Automatic upload to database and website
- Can quantify data accuracy

NATURAL HISTORY MUSEUM

Bugs Count: top-level statistics

- 655,000 observations of invertebrates
- >30,000 downloads of resources
- At least 19,000 participants
- 40 % participants hadn’t taken part in any science-based activity before
- 80 % participants learnt new science skills

- ***Research quality dataset***
- Improving scientific understanding

NATURAL HISTORY MUSEUM

OPAL 2: Bioblitz! A crowd-sourced biodiversity assessment

- How many species can we find in 24 hrs?
- Direct contacts between scientists/amateur naturalists and local people in their environment
- ***Mass appeal to press and public***
- Conduct for science research, communication and training
- Intergenerational sharing of knowledge
- ***Genuine science data***

e.g. **Alexandra Park, London.**
One park, 8,000 people, 700 species.
One species new to science.

NATURAL HISTORY MUSEUM

What are the benefits of this investment?

- Core part of an on-going programme to engage us (as scientists) with the public and the public with our science. It's actively breaking down barriers.
- Profiling our research with peers, media and public alike - leadership
- A large volume of science observational data, much of high quality
- Providing us with new perspectives and types of data
- UK leadership – becoming advisors to UK government statutory bodies (how to involve volunteers in biodiversity and environmental monitoring)

And for participants:

- Involvement in genuine research and the knowledge that we can all play a part
- Local understanding of global issues
- **Fun!**

NATURAL HISTORY MUSEUM

Questions?