

## Response to a Consultation on 'Creating the Future: A 2020 Vision for Science and Research'

### The British Ecological Society

*"advancing ecology and making it count"*

July 2014

### About the British Ecological Society

The British Ecological Society (BES) is the UK's academic learned society for ecological science and the oldest institution of its kind in the world, established in 1913. The BES has nearly 6,000 members, representing the full scope of ecological research and practice and breadth of ecological careers, from undergraduate students to established professionals.

For further information about the Society and our work visit the BES's website:

<http://www.britishecologicalsociety.org>

The Society welcomes the opportunity to respond to the UK Government's calls for the research community to inform priorities for long-term capital investment in science and research. We have focused our individual response on the UK's priorities for investments in the national interest (consultation question two) but have provided input to the response from the Society of Biology, of which we are a member, covering the remaining questions in the consultation document.

### Comments

*KEY QUESTION 2: What should be the UK's priorities for large scale capital investments in the national interest, including where appropriate collaborating in international projects? (1,000 words maximum)*

#### **A. Long-term ecological research (948 words)**

The consultation highlights the value of longitudinal studies to the social and health sciences but fails to prioritise longitudinal studies in environmental science and ecology. The wealth of long-term data collected in this country has contributed to the UK's preeminence in environmental science, a position recognised by the consultation (p64).

One example is the Countryside Survey (CS) run by the Centre for Ecology and Hydrology.<sup>1</sup> Updated regularly since 1978, the CS is a unique, world-leading study of countryside changes. The findings of the CS are used to examine how the UK's natural assets respond to changes in land-use, climate change and policy. Likewise, data from long-term ecological monitoring, such as the Breeding Birds Survey and UK Butterfly Monitoring Scheme, contribute to Government reporting of biodiversity

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<sup>1</sup> Countryside Survey. Available at: <http://www.countrysidesurvey.org.uk/> [Accessed 03 July 2014].

under EU and international obligations. The results can be used to assess whether the Government will meet its stated commitment “to be the first generation to leave the natural environment of England in a better state than it inherited”.<sup>2</sup>

Many other world-leading long-term ecological experiments exist in the UK; experimental manipulations over lengthy time scales to track the impact of climate, pollutants or land management practices, for example, on ecological systems. The eight longest running continuous agronomic experiments in the world are found at Rothamsted Research, including the ‘Classical Experiments’: these are over 170 years old.

The consultation recognises the value of Rothamsted, proposing a £50m investment in a ‘research and innovation’ campus. There is no mention of this capital being used to secure the future of the Classical Experiments and other long-term studies: these are national capability, deserving long-term support. There is currently no scope for the replication of one of the experiments, Park Grass, or capacity to expand this for future research, for example.

- *Why are long-term ecological experiments important?*

Long-term ecological experiments are a significant resource, allowing identification and understanding of changes in ecosystems. In March 2014, the Natural Capital Committee (NCC), called for a 25-year plan from Government to restore and maintain natural assets across England<sup>3</sup>. Long-term experiments, tracking the efficacy of different forms of land management and methods for restoring ecosystems, will make a vital contribution.

Long-term ecological experiments also have a latent value in their potential for unforeseen research and application. The Park Grass experiment at Rothamsted has generated over 200 research papers, from studies on nitrogen storage in soils to the relationship between soil fertility, productivity and plant diversity.<sup>4</sup> Historic datasets from Newcastle University’s Palace Leas experiment are currently being used to model how hay yield may respond to climate change, with varying fertility of the soil.

Long-term ecological climate change experiments, such as those at the Buxton Climate Change Impacts Laboratory (BCCIL), the oldest ecological climate change experiment in Europe, can help us understand how land management can adapt to and mitigate the impacts of climate change.

Research from long-term ecological experiments informs codes of practice for national and international agreements. Results from long-term climate change experiments at Clocaenog and Peaknaze were widely cited within the Intergovernmental Panel on Climate Change (IPCC)’s fourth assessment report. At a local level, long-term research into the impact of nutrient addition to ecosystems has been instrumental in determining the critical loads of nitrogen underpinning UK Environmental Stewardship Agreements, and Glastir in Wales.

- *What is the status of long-term ecological experiments in the UK?*

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<sup>2</sup> HM Government, 2011. *The Natural Choice: securing the value of nature*. Available at: <http://sd.defra.gov.uk/2011/06/the-natural-choice-securing-the-value-of-nature/> [Accessed 03 July 2014].

<sup>3</sup> Natural Capital Committee, 2014. *The State of Natural Capital: Towards a framework for measurement and valuation*. Available at: <https://www.naturalcapitalcommittee.org/> [Accessed 03 July 2014].

<sup>4</sup> Ecological Continuity Trust, 2014. *The State of the UK’s Long-Term Experiments* (draft report).

Since 2008, 62% of the UK's active long-term ecological experiments have been lost.<sup>5</sup> Of the 26 remaining projects, five are at immediate risk (potential loss within one to two years), including all three of the UK's long-term climate change experiments. Eight further priority sites are considered by the Ecological Continuity Trust (ECT) to be at risk in the medium term (two to five years).

The loss of diversity of long-term experiments reduces the potential to make comparisons across sites and across habitats. It becomes more difficult to draw habitat-wide, rather than site-specific conclusions about the impact of experimental interventions.

As the ECT draft report states:<sup>4</sup>

*"[The loss of active LTEs] amounts to a cumulative total of 192 years of research, and capital and maintenance costs running into tens of millions of pounds. Assuming all the experiments that had been lost were re-established concurrently, these facilities would take a minimum of 20 years to replace."*

- *Cost of long-term capital investment in long-term ecological experiments*

Steady capital investment in long-term ecological experiments in the UK could establish a strategic network of the most valuable across a range of habitats. The total estimated cost of establishing a network of 20 active and high priority long-term experiments in the UK is £0.85 million – £1.25 million per annum.<sup>6</sup>

The estimated cost, over the life of the proposed Science Capital Roadmap (to 2020/21), to safeguard the most valuable existing long-term ecological experiments in perpetuity is £10 million, including support for new experiments initiated to fill significant existing research gaps.<sup>7</sup>

## **B. Big data and e-infrastructure**

The investment proposed in 'e-infrastructure' to support data sharing and analysis has the potential to benefit the exploitation of data collected through long-term ecological studies. We support this as a priority: data sets must be accessible to all researchers to give maximum benefits to the scientific community.

**Q: Are there high priority projects that have not been identified within the document?**

### **Research Council Campus Development**

The consultation refers to (p90, 6.1) 'proposed NERC campuses to be based around a proposed UK soil management innovation centre; and a proposed water security and innovation centre'. Sections 6.4 and 6.5 then discuss the centres. We are pleased that the importance of good management of soils and water has been recognised, however insufficient detail is provided to allow us to judge these proposals accurately.

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<sup>5</sup> In 2014, the Ecological Continuity Trust identified 26 long-term active ecological experiments in the UK, based at 19 separate sites. Treatments have ceased at 14 sites and three experiments have been lost in their entirety since a previous survey in 2008. Ten of the sites at which experiments have since ceased were considered to be those with the highest research value by the ECT in 2008.

<sup>6</sup> J. Tallowin (personal communication, 12 June 2014).

<sup>7</sup> J. Tallowin (personal communication, 12 June 2014).

We are concerned however that the Centre for Ecology and Hydrology (CEH) is not mentioned with respect to the proposed innovation centres or elsewhere in the consultation. As the 'UK's Centre of Excellence for integrated research in terrestrial and freshwater ecosystems and their relationship with the atmosphere', CEH should be at the heart of any programme of investment by Government to better understand how to manage our natural capital to deliver the ecosystem services on which we depend.

CEH is a provider of unique and invaluable long-term data, from ecological studies that are undertaken over the course of decades or even centuries, the importance of which we have already outlined. CEH maintains, for instance, the Predatory Bird Monitoring Scheme, which has been running for over 40 years and the National Riverflow Archive, with entries dating back to 1841. The ability for CEH to gather the resources needed for large-scale national projects such as the Countryside Survey should also be valued.

We would be concerned if a new 'Water Security and Innovation' and 'Soil Management Innovation Centre' were developed independently of CEH, without recourse to CEH expertise and with potential implications for the future of the organisation. The consultation states that ensuring programmes are affordable' may involve moving resources from 'old in-use facilities to the new facilities'. It is vital that CEH is supported in capitalising on recent investment by NERC in new facilities at Wallingford and Lancaster, providing stability for its activities after a period of change.

#### **Further information**

The BES is happy for our response to be made available publicly. If you have any questions about the content of this response or about the work of the BES, please contact Ceri Margerison, Policy Manager ([policy@britishecologicalsociety.org](mailto:policy@britishecologicalsociety.org)).