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Project Scope

Community Science Urban Monitoring Framework

July 2023

The Authority is Natural England. The Authority's priorities are to secure a healthy natural environment; a sustainable, low-carbon economy; a thriving farming sector and a sustainable, healthy and secure food supply. Further information about the Authority can be found at: https://www.gov.uk/government/organisations/natural-england.

1. About Natural England

Natural England (NE) is the government's advisor on the natural environment. We provide practical advice, grounded in science, on how best to safeguard England's natural wealth for the benefit of everyone. Our remit is to ensure sustainable stewardship of the land and sea so that people and nature can thrive. It is our responsibility to see that England's rich natural environment can adapt and survive intact for future generations to enjoy.

2. Project Background

2.1 Natural Capital and Ecosystems Assessment

The Natural Capital and Ecosystems Assessment (NCEA) programme will transform and innovate the way our evidence-base is captured, analysed and brought together to ensure science meets the needs of policy/decision makers to embed a natural capital approach, allowing us to leave our environment in a better state than we found it.

The NCEA will provide a holistic, accurate and robust set of evidence and data for DEFRA, and other arm's length bodies, to make informed policy decisions about the state of our natural capital assets in high profile policy areas and lead to better outcomes for the environment. It will also identify innovative and transformative ways of collecting, analysing and distributing the data.

Better data and evidence are required so that government and society can:

- Understand our natural capital, how and why it is changing.
- Tackle pressures on the environment and the drivers of change.
- Take biodiversity and natural capital into account in decision making.
- Target action where it will be most effective.
- Evaluate policies and interventions to improve their effectiveness across DEFRA bodies

2.2 NCEA Community Science workstream

Community Science - often synonymous with the term Citizen Science but with more inclusive connotations - (CS) is one of the cross-cutting tools we have for collecting these data, alongside professional surveys, and earth observation. CS is already essential to environmental policy, forming the majority of current biodiversity monitoring in the UK. It complements and augments standard scientific approaches. Critically it has the potential to contribute even more significant amounts of useful data in places and of a richness that cannot be achieved by other means. The approach also provides an important means for members of the public to connect with nature and the environment, further developing and deepening their appreciation and understanding of its importance and benefit to us.

2.3 Community Science in the Urban Landscape

In the UK, the Office of National Statistics (ONS, 2005) classifies "urban" as contiguous areas with a population of 10,000 or more, but by urban we mean, 'anywhere where a community of people live'.

Urban areas represent an estimated 8% of the total UK land area, yet urban and residential spaces are not included in professional field surveys conducted by England Ecosystem Survey (Appendix 5). Community Science presents an opportunity to advance our approach to better study and understand the ecological and natural capital resources in urban and residential spaces.

Community Science naturally provides meaningful and practical opportunities for local consultation and co-design. Local residents may have their own interests and needs that can helpfully contribute to generating a meaningful evidence base, while simultaneously enhancing the long-term sustainability of the recording schemes. There are individual and societal benefits of engaging communities in the architecture of environmental decision-making too, increasing the likelihood that decisions are sustainable, representative and fair.

Extensive community science activities exist but have limitations: national recording schemes are less able to meet local information needs and opportunities are missed for local initiatives to contribute to the bigger picture.

2.4 Urban Frameworks

Frameworks can take many forms and research conducted by partners [1,2,3,4,5] suggests that in the biodiversity world, frameworks refer to a collection of indicators e.g., a key attribute for measuring changes in biodiversity at a range of scales [6]. McDonald et al [7] note that there are more than 22 frameworks specific to urban biodiversity applied internationally.

While a range of projects and initiatives operating at a range of scales have pioneered the use of CS in urban areas these have not coalesced around a single comprehensive narrative that serves the need for a holistic, multi-resolution understanding of urban environments and its long-term monitoring (Appendix 1).

2.5 Community Survey Frameworks

Defra group is exploring the creation of a suite of Community Survey Frameworks. These aim to bring together existing knowledge and research to create a single comprehensive narrative surrounding the use of community science in long-term environmental monitoring.

Frameworks in this context go beyond simply a set of survey methods and tools. They will describe a holistic approach to allow more comprehensive and structured study of nature & the environment across England. They will capture the bigger picture of the monitoring landscape describing: the inflows and outflows of survey methods, tools and data, the relationships and needs of stakeholders, what is currently available and what is missing. They will also capture the infrastructure needs to bring this all together and create a system that enables effective data mobilisation and partnership working to deliver a joined-up efficient means for generating the evidence to support nature's recovery and the delivery of natural capital needs.

3. Vision / Ambition

We know there is national interest and local interest in urban ecology and natural capital, both to understand them within certain conurbations, but also to better compare urban and rural locations, as well as contribute to a more complete national picture.

A Community Science Urban Monitoring Framework will form the foundation of a comprehensive monitoring strategy for urban environments. In addition to addressing emerging needs and current gaps (Appendix 2), a comprehensive Community Science Urban Monitoring Framework should support and enhance the work of stakeholders with existing compatible urban interests.

The process of devising this framework will also help to inform the creation of a suite of additional frameworks across the themes of Rural, Freshwater and Marine (Community Survey Frameworks).

More information about the proposed use of this contract is outlined in Appendix 3.

3.1 Drawing on current knowledge

A key element of this contract is to take the current knowledge and assessment of needs and translate this into a communicable framework, as well as suggesting approaches for implementing this framework so that pilots can be planned within the lifespan of the NCEA programme. This framework will gain insight from and build on existing experience of CS from within NCEA and beyond and will gain insight from, but not limited to:

- Internal reports on NCEA needs analysis and Natural Capital and Ecosystem Assessment Evidence Needs and Citizen Science Opportunities [1,4,5]
- A report conducted by CEH on Citizen Science and the Natural Capital and Ecosystem Assessment Pilot [2]
- Recent research conducted by JNCC on Urban Citizen Science Frameworks recommending framework approaches for monitoring in the urban citizen science space in England [3]
- Recent conversations within NCEA about the wider wireframe for the Environmental Community Science frameworks across Urban, Rural, Freshwater and Marine
- Liaise with contractors awarded the monitoring and evaluation of the NCEA 'Local Pilots' project at the stage after initial community consultation to understand what local needs there may be for such a framework

3.2 Project/Contract Aim

The contract will:

A. **Investigate and propose a Community Science Urban Monitoring Framework for areas where people live.**

B. **Deliver an initial framework which will facilitate an environment of collaborative sharing, development and ongoing adaptation of ideas, drawing together experience and lessons to establish the underlying structure for the community to understand and contribute to:**

Who is interested in the data (in order to deliver why), who provided the underlying structures to collect the data and who will be collecting the data. What are their motivations, needs and how can these best feed into, and be met through, the framework.

Why we (as NCEA and as communities) need/want to study nature and the environment

What variables we need to study in order to deliver the outcomes (and why)

How we can/should study variables in a scientific and effectively joined up way, what tools, resources, standards and infrastructure do we have and what do we still need (e.g., gaps that exist)

C. **Deliver an initial framework, suitable for piloting, to enable and guide more collaborative working to better coordinate our own efforts and engagements with people (active and potential community scientists) to study ecosystems and natural capital within urban areas and enable a more accurate understanding of the state of urban nature. The initial framework should include:**

What to study – a summary of natural capital and ecological features that could be studied within urban areas and an assessment of the relative value of doing so (resolving opportunity and need). We envisage a definitive narrative that describes a core common need for society to study and better understand the ecology and natural capital within our urban places and how this is changing.

Sampling strategy – how to structure and prioritise the features and resources there is a need to study and understand more closely, together with how to address dynamic land tenure and issues of access.

Protocol deployment – how to select and coordinate (possibly integrate) the deployment of existing survey protocols and tools available to study elements of ecosystems and natural capital. Where there are identified gaps, what may need to be adapted or developed.

Surveyors – a summary of who might carry out survey work, capitalising on the varied roles community scientists can play in addition to, or complemented by, employed surveyors (contractors) and automated techniques (survey stations).

Data Journey and Use – how should data be collected and processed efficiently to ensure it can be used timely, widely, and effectively. What are the core uses and who are the core user groups that should be addressed?

Feedback, Engagement & Action – particularly for community scientists and bringing elements of the overall framework together as a whole.

The framework will aim to address CS across different levels of engagement, scale of participation and different modes (Appendix 4) and contribute to meeting existing and future data needs, allow finer scale analysis, but consistency at greater scale, and where possible cross-compatibility with similar data from non-urban areas – e.g., Green and Blue Infrastructure, England Ecosystem Survey. The scope is however refined to CS conducted in the environmental CS domain (I.e., CS has relevance across many other disciplines e.g., medicine, astronomy and engineering etc), and for this contract, urban environments.

4. References

[1] Lusardi, J., Lord, A., Lear, R., Wilson, R., Hooper, T., Bayes, J., Burton, S., Young, M., Kibowski, F., Qadir, Z., Leake, A., Edwards, C., Jenkins, T., Trigg, D. (2022) Scoping a State of Natural Capital Report. Natural England

[2] Pocock, M., Roy, H., Mancini, F., Harrower, C. Roy, D. (2021) Citizen Science and the Natural Capital and Ecosystem Assessment Pilot, UK Centre for Ecology and Hydrology

[3] Recent research conducted by JNCC on Urban Citizen Science Frameworks recommending framework approaches for monitoring in the urban citizen science space in England

[4] Boardman, P. (2021) A Needs Analysis for Natural Capital Evidence Across Natural England

[5] Bohn, K., Williams, R. (2021) Natural Capital and Ecosystem Evidence Needs and Citizen Science Opportunities

[6] Lusardi, J., Rice, P. Waters, R.D. AND Craven, J. (2018) Natural Capital Indicators: for defining and measuring change in natural capital. Natural England Research Report, Number 076

[7] McDonald, R.I., Mansur, A.V., Ascensão, F. et al. (2020) Research gaps in knowledge of the impact of urban growth on biodiversity.

[8] Bonney, R., Ballard, H., Jordon, R., McCallie, E., Phillips, T., Shirk, J., and Wilderman, C. (2009) Public Participation in Scientific Research: Defining the Field and Assessing Its Potential for Informal Science Education. A CAISE Inquiry Group Report. Washington, D.C.

[9] Pocock MJO, Tweddle JC, Savage J, Robinson LD, Roy HE (2017) The diversity and evolution of ecological and environmental citizen science.