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Natural England's Science, Evidence and Evaluation Strategy (2020-2025)

Our ambition

Natural England is respected and trusted for its use of evidence, its expertise and the provision of evidence-based advice on the natural environment locally and nationally, based on robust scientific method.

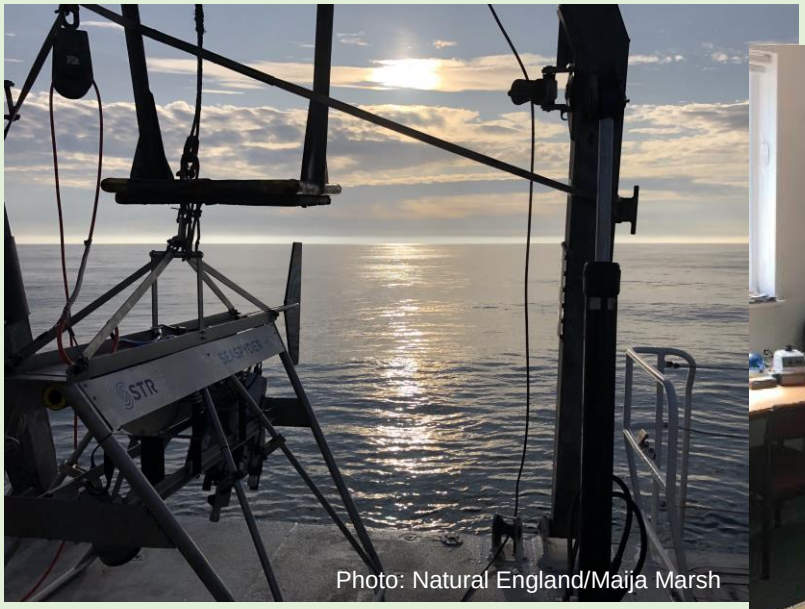


Photo: Natural England/Maija Marsh


Photo: Natural England/ Andy Nisbet


Photo: Natural England


Photo: Natural England/Alexandra Kilcoyne


Photo: Natural England/ Alex Prendergast

New technology and science including the use of marine drop-down video, eDNA analysis building up our evidence base, a survey in progress at Braunton Burrows, Devon, a drone survey of an area of Cannock Chase and moth trap used by a member of our Field Unit.

Purpose

The purpose of Natural England's Science, Evidence and Evaluation Strategy is to set out how we will move from being an evidence-based organisation to being an evidence-led organisation. The quality of our advice and actions, and the legality of our decisions, fundamentally depend upon our use and understanding of the evidence base, from understanding how and why the natural world is changing, to identifying and enhancing areas of high environmental value, to advising on the design of agri-environment schemes, and on creating opportunities for people and for nature to thrive. Science and evidence are vital to the delivery of environmental outcomes. Fostering a culture where the use of high quality science and evidence is celebrated and is at the heart of what we do and how we do it is key to the delivery of Natural England's vision.

Embedding this strategy requires us to change our culture and the way we routinely make our decisions.

By saying that we are an evidence-led organisation it means we will:

- Use science and evidence to identify strategic opportunities, priorities, and innovation, and act on them;
- Ensure that the best available evidence is central to all our decision making, delivery, advice and risk assessment;
- Be a learning organisation that evaluates the outcomes of our actions; and
- Be an organisation that invests in science, evidence and evaluation capability

These four aims are at the heart of our Science, Evidence and Evaluation Strategy, providing a framework for the way in which we all need to work. The Strategy is about changing our culture as well as practice so that using the best available evidence and making it prominent in our decision making and communications becomes a matter of routine. Achieving this is essential to realising the transformational changes necessary to the success of Natural England's Vision and Mission:

- To achieve *thriving nature*, Natural England needs to use science and evidence to identify opportunities and priorities, and to ensure that the best available evidence underpins all our decisions, delivery and advice.
- To *build partnerships for nature's recovery*, Natural England needs to be recognised, respected and trusted for its expertise and the provision of objective evidence-based advice.

The changing culture associated with being evidence-led is enabling and empowering and does not mean waiting for perfect information before we act or provide advice. Rather, Natural England is respected for our inter-disciplinary application of science in uncertain real-world settings: applying expert judgement, using the best available evidence, evaluating outcomes, and sharing knowledge.

Natural England strives to be a leader in applied environmental sciences. Our ability to integrate across our broad remit - biodiversity, geodiversity, landscape, soil, economics and understanding how people access, use and value the natural environment whether on land, sea or freshwater – makes Natural England unique. This does not, however, mean going it alone. Rather we aim to build purposeful partnerships with experts and practitioners across government, business and non-governmental organisations, as well as with researchers in academia and research-based organisations and Natural England's Scientific Advisory Committee (NESAC), an advisory committee to the Natural England Board and which has an important role providing independent advice, challenge and review. We do this to develop and apply the evidence base ensuring the best possible decisions to deliver thriving nature for people and planet.

What we mean by science and evidence

Natural England's science and evidence work involves assembling and commissioning information and using it to underpin our advice, decisions and actions. Science comprises a series of methods to produce reliable information about the world around us. In Natural England our remit covers the natural environment, both land and sea; its interactions with and sustainable use by people. As such, our evidence spans – and where necessary integrates – the natural sciences (biology, geology, geomorphology, chemistry etc.) and the social sciences (geography, economics, psychology, sociology etc.) Our science includes tactical and strategic research to inform both day-to-day operations and longer-term strategy.

The scientific methods and technologies we use are based on established good practise in data collection using repeatable observations, testing hypotheses, analysing results, explaining observations and drawing inferences regarding meanings and importance. The range of evidence we use comes from a variety of sources, including from scientific studies, from interaction with the scientific community, from practitioners working in the field (including our own staff) and from the public engaged through citizen science.

We are at our most effective when our operational delivery, science and evidence and advice to government are all mutually reinforcing, integrated and informing each other

Our priorities as an evidence-led organisation

To deliver the aims of this strategy, we need to change our culture and practice by improving the way we access, generate, use and communicate evidence across Natural England and beyond. The strategy will be delivered by the whole organisation. At an organisational level, our priorities are to:

1. Use science and evidence to identify strategic opportunities, priorities and innovation and act on them.

   To achieve nature's recovery we need to ensure that we understand the changes that are happening in the natural world, as well as the social and economic drivers of change, by drawing on the and generating the best available evidence. This requires us to:

   - review and understand the evidence base, including its limitations;
   - integrate evidence from across disciplines and take account of different forms of evidence, integrated data and evidence systems;
   - take a whole-systems multi-disciplinary approach to ensure we can succeed at large scales (e.g. across whole landscapes); and
   - make greater use of appropriate new and innovative scientific technologies and applications, including data science and social innovation.

2. Ensure that the best available evidence is central to all our decision making, delivery, advice and risk assessment.

   Our Evidence Standard[1] describes the approach that national and area-based staff should take to ensure that their advice and decisions are underpinned by the best available evidence and that the evidence we use and generate is of appropriate quality. This strategy will further embed and promote the Evidence Standard within Natural England and requires us to:

   - use appropriate robust scientific method to test hypotheses, gather data, and synthesize evidence;
   - demonstrate integrity in the ways we use and develop our evidence base. This involves being ethical, transparent, recording the reasoning behind our decisions and making our evidence available;
   - ensure effective, inclusive and accessible knowledge exchange and integration of science into practise through effective engagement, allowing our own staff and others to make evidence based decisions with ease and confidence ; and to communicate our science and evidence effectively internally and externally.

3. Be a learning organisation that evaluates the outcomes of our actions

   To achieve nature's recovery we need to ensure that resources are targeted and used to implement actions that are most likely to work. This requires us to:

   - evaluate our interventions as a matter of routine to understand what 'good' looks like, what works, unintended consequences, and ensure lessons learned are applied.

[1] http://neintranet/aboutus/howwework/standards/Documents/evidence_ststnd-internal.pdf

- embed evaluation from the start of programmes and projects, thereby improving their focus and likelihood of success.

What is evaluation?

Evaluation helps us to understand how a project, programme or policy was implemented, what effect it had, for whom, how and why. It's about understanding what is working, and what isn't working. It can help us to understand what difference a project or programme makes to the environment, the economy and people. It can also help us to think about how to do things differently or better so that we can achieve more in the long run.

It involves multi-disciplinary approaches to collecting and analysing information about a program's activities, characteristics, and outcomes

4. Be an organisation that invests in science, evidence and evaluation capability

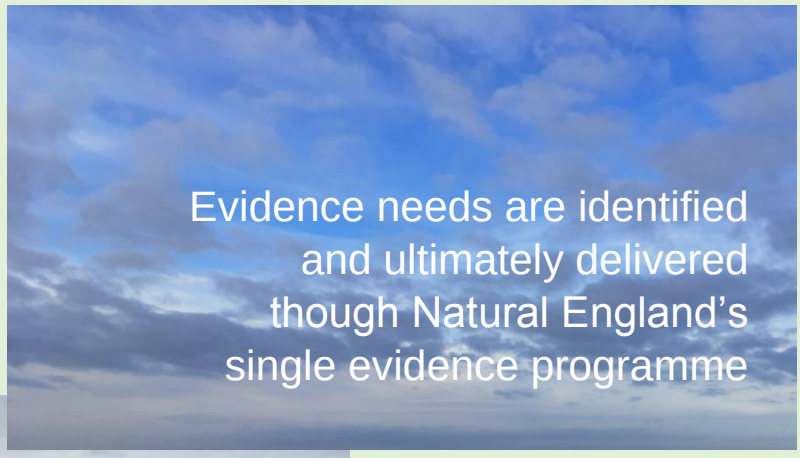
Natural England's reputation depends upon us being trusted and recognised for our expertise and trusted for the quality of our advice and decisions. We need to continually build our expertise and work to improve the evidence base upon which we depend. We will:

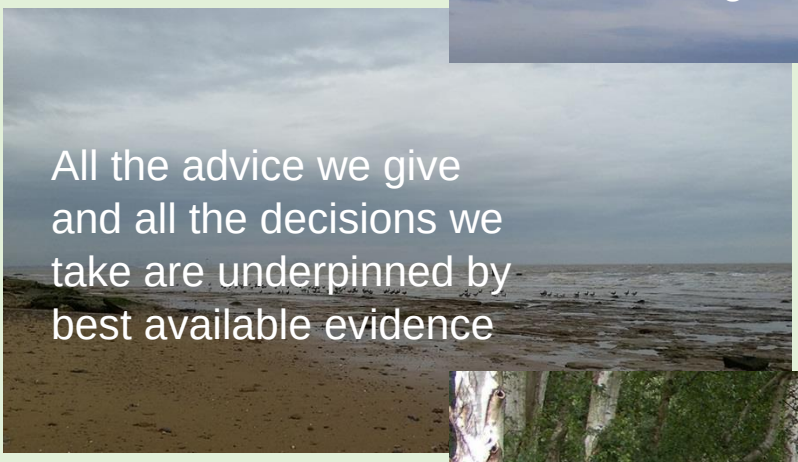
- invest in developing our expertise and capability throughout Natural England to ensure we have the skills we need today and for the future;
- continually improve the evidence base upon which we depend, through targeted collaborations with academia, research and partner organisations and by making best use of our data and assets, notably our National Nature Reserves; and
- use experimentation and demonstration including well-designed pilot projects to advance the evidence base, test novel approaches and share knowledge and understanding.

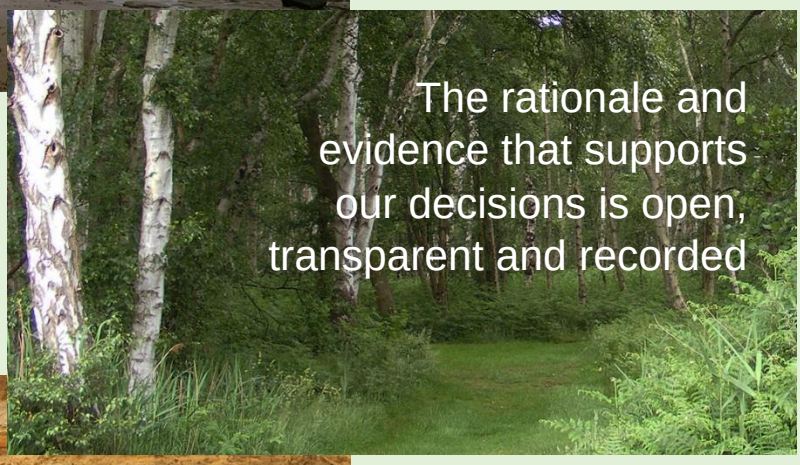
Investing in our expertise: Landscape training next to Grayson Perry's *A House for Essex*
Photo: Natural England/Naomi Stevenson

Our Evidence Standard

Natural England depends on sound quality-assured evidence on the natural environment to meet its needs as an environmental delivery organisation and as a statutory adviser to Government and others. Our Evidence Standard describes the approach all staff should take to ensure that:







Natural England: How we all work as an evidence-led organisation

Using science and evidence to identify strategic opportunities, priorities and innovation, and acting on them.

The long-term challenges facing nature will not be met by just tackling our short-term research or monitoring needs. Natural England will undertake long-term monitoring and strategic cross-cutting research to inform solutions to longer-term problems and challenges. We will invest in technologies such as Earth Observation, environmental DNA techniques, field-based science and in data science techniques to find better ways of collecting and using data. We will lead and support decommissioning and the adoption of new approaches when benefits have been identified. We will also employ horizon scanning to help us identify emerging challenges (including high risk cases) and potential solutions. Natural England aims to be a partner of choice for others conducting environmental conservation research. Natural England also needs to maintain a science and evidence infrastructure that is cross-cutting and accessible – for example providing data services across all programmes – and capable of supporting forward looking investigations and experimentation.

Kat Walsh, Mammal Senior Specialist, conducting field surveys with sniffer dogs
Photo: Kat Walsh

To deliver this Chief Scientist Directorate will:

- Lead on the identification and maintain the currency of the organisation's 5 year science and evidence priorities and our top research challenges. These will frame our engagement with science and evidence stakeholders and the wider evidence community and determine our strategic research and development bids (through SR20, other funding routes and collaborations);
- Deliver national evidence reporting requirements (including 25 year plan metrics, national state of environment reporting and assessments of condition and status, and cross-cutting monitoring activity);
- Undertake cross-cutting analysis and synthesis of evidence that are made readily available across the organisation;
- Undertake periodic scientific horizon scanning including assessment of new technologies and techniques and investigation of emerging pressures, environmental trends and the science and evidence of potential solutions;
- Provide the national and international context of our environmental systems e.g. climatic change;
- Build strong, purposeful relationships with researchers in academia and research-based organisations to develop and apply the evidence base to ensure we make the best possible decisions; and
- Enable and empower others, through effective leadership and passion, to use science and evidence well in their work.

Earth Observation: A drone survey
Photo: Natural England/Robert Ashington

Programmes will:

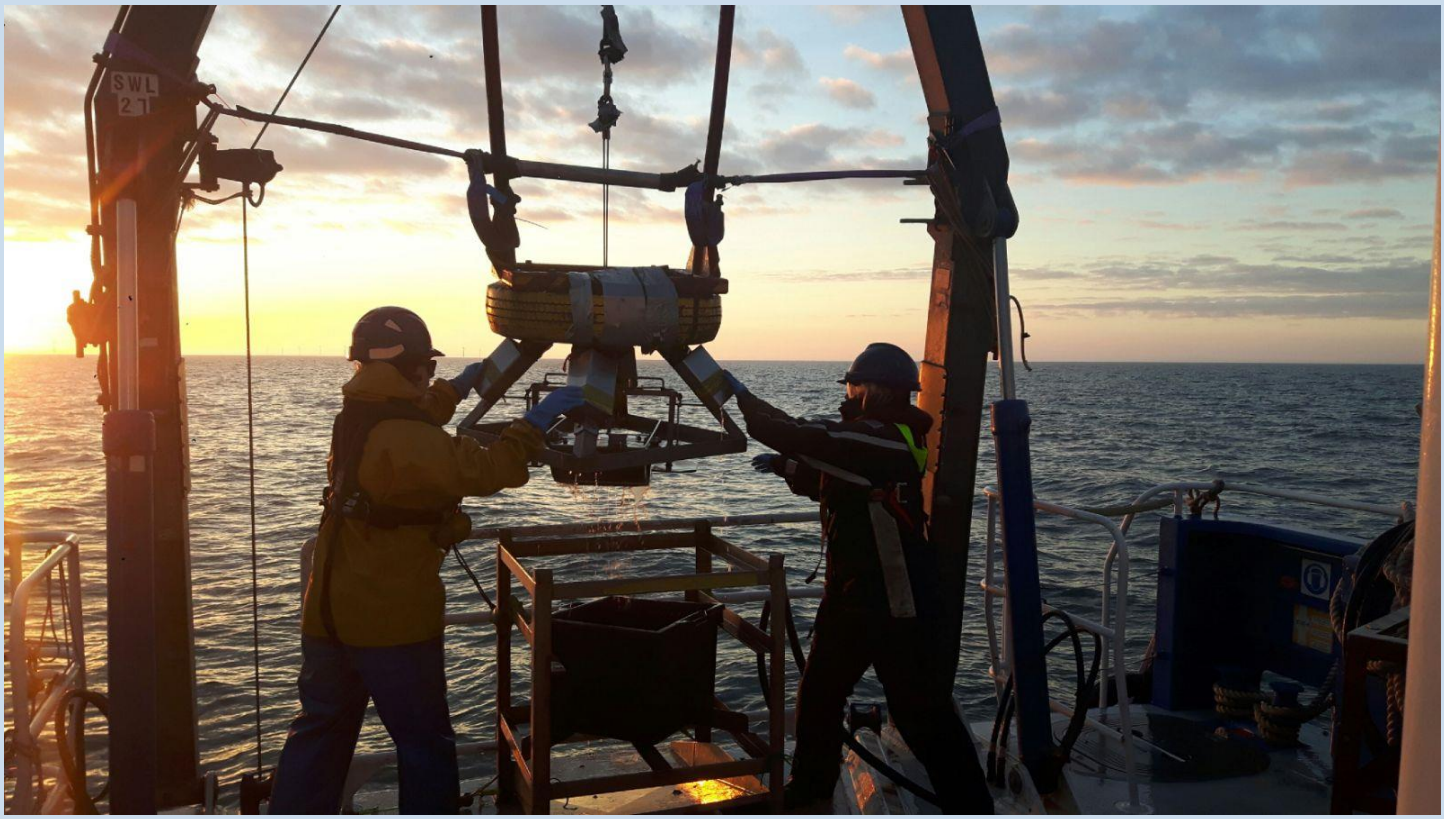
- Identify novel, new or emerging areas of policy and practice where evidence synthesis is needed to inform decision-making;
- Collaborate with Chief Scientist Directorate in identifying science and evidence priorities.

Operations and Area Teams will:

- Build purposeful local relationships with researchers to develop and apply the evidence base to address local challenges to ensure we make the best possible decisions; and
- Ensure Operational and Area Teams contribute to the organisational evidence base.

Strategy and Government Advice will:

- Identify novel, new or emerging areas of policy and practice where evidence synthesis is needed to inform decision-making;
- Collaborate with Chief Scientist Directorate in identifying science and evidence priorities.



Contributing to our evidence base: Operating a grab.
Photo: Natural England/Maija Marsh

Ensuring that the best available evidence is central to all our decision making, delivery, advice and risk assessment

We will use science and evidence to help set programme objectives and priorities and inform the direction of each programme. Within the resources we have available, we will carry out research, monitoring and analysis to address immediate evidence priorities of our four programmes. Programme delivery will be supported by specialist environmental and technical advice.

Programmes will:

- Set priorities based on a good understanding of the evidence base regarding need and what works;
- Take an inter-disciplinary approach, with all relevant disciplines contributing to maximise our chances of success;
- Have SMART objectives with uncertainties stated;
- Be underpinned by an Evidence Statement. This will describe the key evidence relevant to the programme, including the gaps in the evidence base; and
- Take steps to address key evidence gaps; commission science and evidence projects and specialist advice from and through Chief Scientist Directorate.

Operations and Area Teams will:

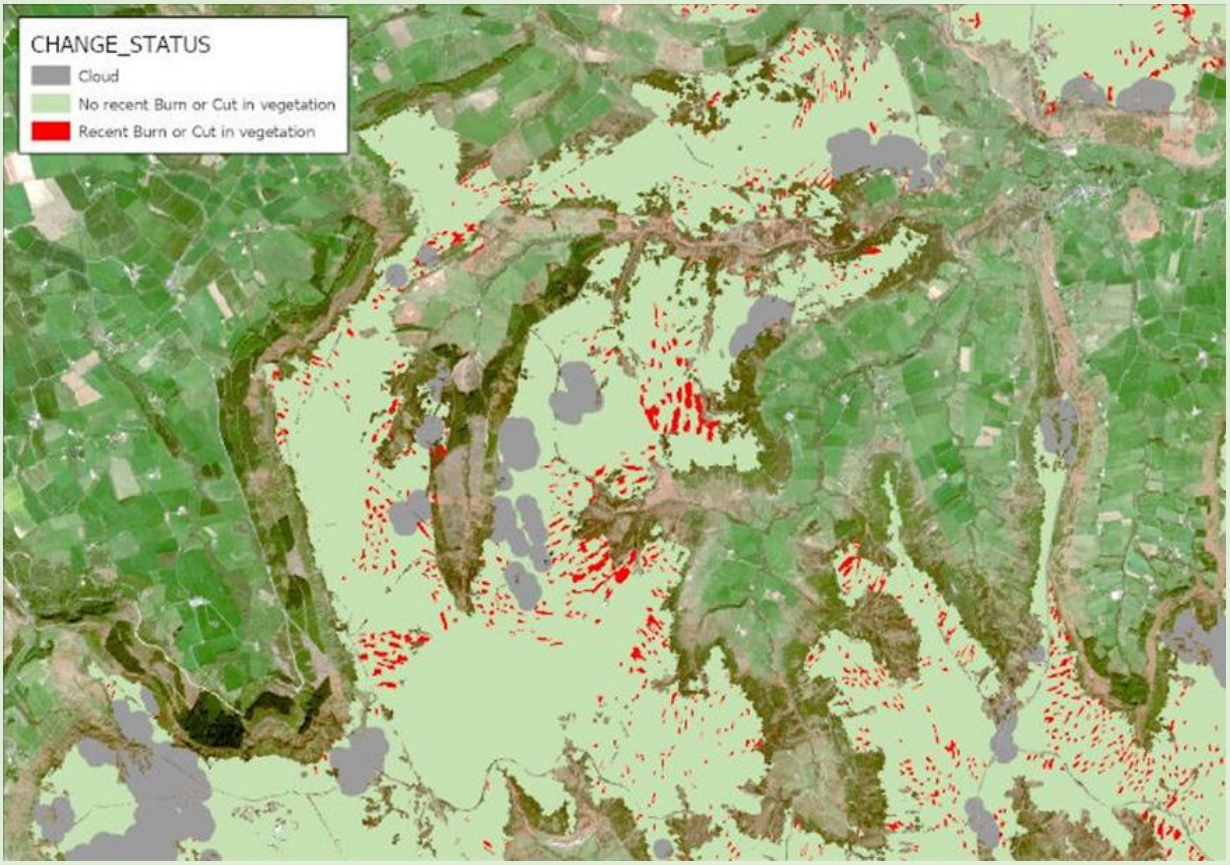
- Contribute local learning and consolidated practitioner experience to the organisations evidence base;
- Ensure advice is informed by integrated evidence and fulfils Evidence Standard requirements; and
- Commission science and evidence projects and specialist advice from Chief Scientist Directorate.

Strategy and Government Advice will:

- Ensure advice to government on the development of its environmental policy is based on the best available evidence; and
- Ensure developing internal standards and guidance are evidence based.

Chief Scientist Directorate will:

- Provide scientific challenge, discovery and support to shape Natural England programmes, Operations and Strategy;
- Undertake a commissioned programme of science and evidence activities to address gaps and better understand threats and opportunities;
- Actively provide science and evidence quality assurance through ensuring compliance with the evidence standard, data and ethical research requirements;
- Provide science and evidence services to support Natural England programmes and delivery at national and local level. Specifically, Chief Scientist Directorate will ensure the provision of expert specialist skills and access to technology to meet the needs of Natural England when addressing high risk, novel or technically challenging cases;
- Manage all science and evidence commissioned work within a single Evidence Programme that is itself integrated and co-ordinated with similar programmes across the Defra Group. This includes programme-specific monitoring and evaluation projects, survey and data analysis;
- Maintain, develop, and drive the use of integrated databases and evidence systems to meet Natural England's data needs across all programmes; and
- Provide peer-review and quality assurance of commissioned and internal science and evidence work, and as appropriate subject our work to independent peer-review an integral part of the publication and dissemination of our scientific findings



An example of our evidence: Output from the Moorland Change Map from the 2018/19 burn season

Be a learning organisation that evaluates the outcomes of our actions

Evaluation is about learning what works, in what circumstances and for whom. Evaluation is a critical part of being an evidence-led organisation – by helping us to focus resources where we know we will make biggest impact, by learning from our delivery and helping us to manage the risk of operating in new and innovative ways. It isn't an optional extra but a critical tool in establishing an evidence-led culture.

Programmes will:

- Have evaluation built in from the start and ensure sufficient investment in evaluation throughout the lifetime of the project; and
- Modify programme objectives and delivery to reflect evaluation results.

Operations and Area Teams will:

- Have evaluation built in from the start and ensure sufficient investment in evaluation throughout the lifetime of innovative projects; and
- Modify objectives and delivery to reflect evaluation results.

Strategy and Government Advice will:

- Have evaluation built in from the start and ensure sufficient investment in evaluation throughout the lifetime of developing and delivering new programmes and pilots for the government; and
- Modify programme objectives and delivery to reflect evaluation results.

Chief Scientist Directorate will:

- Support proportionate evaluation of programme objectives, through advice, training and analysis;
- Further embed evaluation within organisational strategy and procedures, including addressing questions of complexity within our work and the identification of risk;
- Ensure appropriate evaluation across programmes is carried out; and
- Create and maintain an integrated technical and specialist capability hub available to provide input as required to all programme delivery locally and nationally.

Be an organisation that invests in science, evidence and evaluation capability

We will invest in, and develop a diverse and resilient specialist and technical expert cohort to ensure Natural England can draw on in-house expertise across its remit, upskilling all our staff to ensure they have the skills they need to adapt to future challenges. Central to this is the value of developing our science and evidence leaders to inspire and motivate others to use science and evidence well in their work, leading by example with enthusiasm, passion and credibility. We will build our analytical capabilities and in-house use of emerging technologies and tools alongside existing science, evidence and evaluation skill-sets; sharing expertise and building joint capability across the Defra Group and with our partners. Our refreshed skills framework will support managers across Natural England to use the tool to identify skills gaps, and manage individual, team and organisational capability, succession and resilience.

Looking to the future, there will be a greater need for more multi-disciplinary training which will require new skills, changed work practices and changed cultures. We will develop foundational courses and career pathways to ensure that our staff acquire a range of skills that span across different disciplines including underpinning skills.

Programmes will:

- Understand and address capacity and capability needs and gaps for whole of Natural England.

Operations and Area Teams will:

- Maintain currency of Area Team staff through engagement with networks of expertise and developing capability; and
- Ensure staff have appropriate science and evidence objectives in Personal Development Plans and are supported to achieve them.

Strategy and Government Advice will:

- Maintain currency of Area Team staff through engagement with networks of expertise and developing capability; and
- Ensure staff have appropriate science and evidence objectives in Personal Development Plans and are supported to achieve them.

Chief Scientist Directorate will:

- Create and maintain an integrated technical and specialist capability hub available to provide input as required to all programme delivery locally and nationally;
- Develop expertise and analytical capability (and tools) to meet emerging requirements and exploit scientific developments; and
- Support capability development of staff across Natural England, including through providing expert training, running networks and professional memberships.

Annex 1: Strategic science and evidence priorities – our top challenges (2020 -)

How, where and why is the natural environment changing and what are the likely drivers of future change?

What are the natural environment and socio-economic attributes and indicators of resilience that support the conservation of terrestrial and marine biodiversity, landscapes and geodiversity?

How might changes in the natural environment affect people's health and wellbeing? What interventions can enhance the benefits and mitigate any negative impacts?

What are the fundamental ecological requirements of Priority Species in order that we can better identify and trial potential recovery solutions

Where and how should we develop resilient ecological networks, ensuring that we restore natural processes and secure benefits to people?

What do people and communities across England want and need from the environment? How can we integrate evidence about people's behaviour, their values to influence local partnerships and enable effective decision making to realise the benefits provided by the environment into economic, social and spatial planning?

How can we most effectively implement nature-based solutions to address climate change and support progress to net zero carbon emission?

How can we further develop sustainable agriculture and fisheries to secure environmental outcomes, including new approaches to deliver the niche requirements of species that are more compatible with modern agriculture than the current approach of mimicking traditional practices?

How can we best construct attributes, indicators and metrics to monitor the state of the natural environment, including natural capital assets?

How might opportunities from emerging science and innovation help shape our understanding and enhance the measurement of ecosystem structure, processes and function?

What is the potential of Big Data analyses and modelling to improve our handling of current complexities and uncertainties associated with environmental outcome delivery?

Front cover: Natural England Field Unit collecting by a pond. Photo: Natural England/Corrie Bruemmer

Natural England is here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

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