Strengthening our Capability and Leadership in Science and Evidence

Building capability

To deliver better outcomes for the natural environment, communities and the economy, we need to invest in staff skills and capabilities so we have the expertise and knowledge to adapt to future challenges. Our science capability is an essential part of this delivery. This capability is led by the Chief Scientist Directorate, but scientific expertise is present throughout our organisation, including both national and area teams where staff have a wealth of experience and expert knowledge. Our science capability exists for the benefit of all staff in Natural England, the agencies with whom we work, our partners and, ultimately, people, places and nature.

In the Chief Scientist Directorate, the Specialist Services and Programmes Team hosts our experts in natural sciences, social sciences and economics. The team's primary purpose is to bring together and apply this expertise to inform and support our delivery, practical action and advice. It was created in 2015 to provide a central hub for over 80 environmental specialist roles. A further 60 specialists are seconded to other Directorates in Natural England. The team supports day-to-day and forward-looking work across the business. Specialists face inwards to strategic and operational teams in Natural England, and outwards to the wider science and evidence community and other stakeholders.

Maintaining fundamental science skills

To maintain and develop our specialist skills, we have invested in a comprehensive training programme in essential underpinning skills, including analysis of evidence, knowledge exchange, horizon scanning, enabling others and scientific publishing. In addition, our specialists are members of over 40 different professional bodies which support their professional development and scientific reputation.

Science storytelling ... getting published

Publishing our scientific findings externally is an integral part of our science work. We publish popular scientific articles, scientific papers, books and conference proceedings. Examples include co-authoring papers on farmland birds in the international journal *Agriculture, Ecosystems & Environment*, a horizon scan of global conservation issues in the journal *Trends in Ecology and Evolution* and contributing a chapter in the book *Nature's Conscience: The life and legacy of Derek Ratcliffe*. Further examples of our published work can be seen in Annex 3.

Training in new topics in conservation science

Where we have a particular business need our specialists develop specific training packages. One recent example is training developed for Natural England and partners' staff to build capacity in using the ecosystem approach.

The ecosystem approach is an integrated approach to the sustainable management of land and sea for the benefit of people and wildlife. The training package developed by Natural England specialists included an advanced course for practitioners focused on case-studies and hands-on workshop examples, covering topics such as managing for multiple benefits and how to develop an integrated delivery plan for an area.

About to commence practitioner field training

So far over 300 staff have gone through this advanced training and partners from a number of organisations have also joined our practical training workshops. To provide ongoing support, we developed a range of ecosystem approach tools, some alongside key partners. These include an **Ecosystem Approach Handbook** and a series of **Quick Start Guides**.

Out and about: field skills training

Many of our specialists spend time out on site providing advice, demonstrations or participating in monitoring. Where we need scientific skills to support a particular conservation outcome we form specialist units such as the Dive team (see article in the monitoring section) or Natural England's Field Unit.

The Field Unit was created in 2014 to bring together specialists with expert ecological skills to help us deliver targets in the **Biodiversity 2020 Strategy**. The unit is made up of 11 ecological specialists who support a network of 14 specialists from our area teams. The aim of the unit is to build expertise across Natural England in surveying techniques for protected sites and conservation management.

Field Unit

Since its creation, the Field Unit has responded to over 250 requests for assistance from our area teams and delivered over 100 training courses.

Knowledge exchange: themed months

We have themed months as part of our internal communications with staff. In September 2015 we focused on **Green infrastructure**, a concept that delivers benefits across our towns, cities and countryside such as provision of habitats for wildlife, urban cooling, reduced flood risk, improved human health and local growth and investment. It is an important tool for Natural England, our partners and a wide range of private and public sector organisations.

To help equip our staff with the knowledge and confidence to champion green infrastructure, our themed month of evidence-sharing and knowledge exchange activities included a live panel debate, a series of themed walks from our offices, news items on our intranet site and talks on a variety of related subjects by Natural England experts and partners. The material generated during the month has been used as an internal training resource and shared externally with some local authorities. Feedback collected from the activities led to the development of an introduction to green infrastructure basic guide and training courses for our area teams.

Wildflower meadow in Whitley Bay, North Tyneside

Using secondments to build knowledge

Our staff are encouraged to develop their skills through outward secondments within the wider Defra group, elsewhere in the public sector or into the private or voluntary sectors. This helps us bring new knowledge into Natural England and to share our expertise with our partners.

Recent secondments for Natural England staff have been to a range of organisations including Defra, the UK Space Agency, the Soil Association and the Defence Infrastructure Organisation.

Defending the reptiles and amphibians

Outward secondments are an excellent way of ensuring effective use of skills and resources across organisations. Natural England's amphibian and reptile specialist was seconded to the Defence Infrastructure Organisation at Longmoor, Hampshire, in 2015. The site contains all four of England's reptile and amphibian European protected species.

A lack of information on the population status of some European protected species means Natural England often has to adopt an approach of protecting individual animals when determining licence applications for development purposes. The secondment involved developing an approach focusing on protecting populations rather than individual animals, which would conserve these species whilst avoiding unnecessary costs and delays to development. The emphasis of the project at Longmoor was on mapping the extent and quality of suitable habitat for these species. The results will include details of a simple and cost-effective method for mapping suitable habitat for the four reptile and amphibian species, as well as a standardised approach to carrying out rapid site checks.

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Demonstrating leadership

Drawing on the expertise of our staff, Natural England works with the wider scientific community to develop and share scientific knowledge that will deliver better outcomes for the natural environment. Our work in this area is broad ranging, reflecting both the breadth of Natural England's role and the many different areas of science in which we have strong expertise.

Advising on research priorities

Green corridor, Whitley Bay

Working at the interface between conservation science and policy/practice, Natural England has an important role in identifying the priority research questions that conservation science needs to answer.

We advise research councils and other organisations that fund research and development, to help them make the work they fund as relevant as possible to the needs of conservation on the ground. For example, in 2015 Natural England helped the Natural Environment Research Council (NERC) develop a funding call for green infrastructure projects on nature-based solutions to building resilience to climate change, with a focus on addressing spatially specific policy questions about how communities and people could better engage with the natural environment. This led to the funding of a series of exciting projects across the country.

High-level steering and advisory groups

Natural England is involved in a range of high-level groups that seek to promote knowledge exchange between researchers, policy-makers and practitioners. A good example of this is our work in the emerging field of natural capital – the approach of viewing the natural environment as a suite of assets that need maintenance and investment to ensure that benefits and services (often called ecosystem services) are provided for people, society and the economy. In 2015/16, our specialists continued to be actively involved in several important national groups in this field, including: the steering group for the Natural Capital Initiative (a forum that brings together decision-makers from academia, business, civil society and policy to discuss how to embed natural capital thinking in policy and practice, based on evidence from across the natural and social sciences); the stakeholder advisory group for the Ecosystems Knowledge Network, which links academic, policy and practitioner groups; the Advisory Group for the Valuing Nature Programme (a cross-Research Council research programme); and the Biodiversity and Ecosystem Services Sustainability (BESS) programme, which aims to explain the links between biodiversity and ecosystem services and provide appropriate tools and indicators to help conserve them.

On these groups we use our expertise as a bridge between research, decision making and practical action. We also encourage the collation of findings into formats that delivery bodies and practitioners can use.

Promoting discussion and knowledge exchange

We facilitate discussions to exchange knowledge and ideas among researchers, and between researchers and decision-makers. We are actively involved in interest groups in scientific societies, and we organise scientific symposia, workshops and conferences.

As an example of this type of work, at a major IUCN conference on nature conservation in Europe, held in Austria, we held a workshop to discuss new approaches to planning the optimal placement of new protected areas for conservation (see box opposite). We followed this with a workshop later in the year to discuss methods for identifying spatial conservation priorities in the UK. This meeting was co-organised with colleagues at the universities of York and Kingston, under the auspices of the conservation biology interest group of the British Ecological Society. It identified the priority questions to be answered in future research, data requirements and the practical application of systematic conservation planning techniques in UK conservation.

Optimising the value of protected areas

Ennerdale

In May 2015, the Europe section of the World Commission for Protected Areas, part of the International Union for the Conservation of Nature (IUCN), convened a conference in Hainburg, Austria on nature conservation in Europe. The conference was a European sequel to the World Parks Congress that had been held in Australia the year before, and attracted over 300 leading European conservation scientists and practitioners. At the conference, Natural England co-organised, with colleagues from the University of Kent and the University of Helsinki, a workshop to consider the questions: "how much conservation land does Europe need, of what type and where?"

The workshop concluded that the systematic conservation planning tools developed in recent years provide powerful frameworks that can be used at European, national and regional levels to ensure that the maximum variety of wildlife is conserved for the least cost, in terms of land. New analyses presented and discussed during the workshop showed how even a small increase in the current protected area network in Europe could result in a substantial increase in the protection of priority species, if properly targeted.

In our role as chair of the climate change interest group in the Network of Heads of European Conservation Agencies (ENCA), Natural England co-organised an international conference on climate change with the German Federal Agency for Nature Conservation and the Helmholtz Centre for Environmental Research /German Centre for Integrative Biodiversity Research. This was the third successful international conference we have organised with our partners in Germany in recent years. The 2015 conference, held in Bonn, focused on nature-based solutions to climate change in urban and surrounding areas. The conference had over 220 participants from 27 different countries, and produced a detailed series of recommendations for future research and on how research findings can be applied.

Natural England also led the establishment of a new interest group of the British Ecological Society on climate change ecology. This group has already held several well-attended events and will make an important contribution to facilitating discussions and sharing of knowledge on the possible effects of climate change on the natural environment and how to respond to them, and on ways of managing the natural environment to reduce greenhouse emissions and to protect people from the effects of climate change.

Another important conference in 2015 was the latest National Heathland Conference, jointly organised by the Surrey Wildlife Trust, Natural England, Footprint Ecology, the RSPB and the National Trust. This was attended by 180 delegates from all over the UK who came together to discuss the latest policies, management tools and approaches to the future conservation of heathlands and visit sites showcasing exemplary heathland management practices.

Greenham Common heathlands

The new knowledge and contacts gained through this event will translate into better managed heathlands around the country for years to come.

Publishing the latest evidence in conservation science

Linked to the work described earlier, we work actively to promote, and contribute to, the publication of the most important new scientific evidence relating to conservation. One particular highlight of this in 2015 was the publication of the second edition of the UK Climate Change Impacts Report Card for Biodiversity (see Sharing our Science section). A second was the continuation of a partnership between Natural England and the international journal, Proceedings of the Geologists' Association, an ongoing collaboration that is having a real impact in raising the profile of geoconservation in the geological literature. In addition, following an international conference in Iceland at which we presented our approach to conserving mines and quarries (500 of which are geological sites of special scientific interest in England), Natural England was invited to publish a paper sharing our experience as part of an international publication on geodiversity and its management.

Coordinating the development of expert advice

Natural England often has an important role in bringing together and distilling expert opinion to address a specific issue in conservation. One of our best examples of this is our work to help identify conservation actions for threatened species.

Charmouth, looking towards Golden Cap, part of the Jurassic coast World Heritage Site

Coordinating the science of species recovery

Torpid dormouse

Determining the most appropriate and important actions for the individual species most in need of help requires a coordinated effort. This is the task of the England-wide 'taxon groups' – expert groups that bring together the key individuals and organisations concerned with the conservation of a particular group of species. There are groups for birds, mammals, reptiles & amphibians, invertebrates, lichens, bryophytes, vascular plants, and most recently, marine mammals. Natural England's specialists lead or co-lead each of these groups as they weigh the information available on each species' distribution, numbers and productivity, the primary research evidence on their ecology and assessments of the effectiveness of management interventions.

In 2015, the Taxon Groups completed the identification of some 3,800 actions as integral to the recovery of priority species – those on section 41 of the Natural Environment and Rural Communities (NERC) Act or which are in imminent danger of disappearing from England. Each has an agreed priority for execution, an estimate of costs and associated information on potential timescales, delivery partners and progress. In order to aid users of this information, Natural England then led the codification of the information into eight major themes: survey & monitoring; research; ex-situ conservation; education and awareness raising; land management schemes; site protection and designation; policy, legislation and regulation and a 'geographical' theme. The latter theme has been subdivided into a series of 40 'big wins' each embracing practical actions for multiple species with a common geography. This information is being used to aid the identification and refinement of objectives for Natural England's area team focus areas and to inform the construction of detailed bids for external funding to enable the implementation of the actions identified.

As we look forward over the next five to ten years it is the skills, knowledge and expertise of all our staff that will determine what the best response will be to wider social, political and economic change in delivering outcomes for the natural environment and communities.

We are likely to need new competencies in commercial/business opportunities, monitoring technology, behaviour change and participatory working to support our strong core expertise of natural science and ensure we remain an effective advocate and protector of the natural environment.