Department for Environment Food & Rural Affairs

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Biodiversity and Ecosystems Evidence Plan

Policy portfolio: Sustainable Land Management and Livestock Farming

Policy area within portfolio: EU and UK Biodiversity Policy Delivery and International Biodiversity, Ecosystems and Evidence

Timeframe covered by Evidence Plan: 2013/14-2017/2018

Date of Evidence Plan: March 2013

This evidence plan was correct at the time of publication (March 2013). However, Defra is currently undertaking a review of its policy priorities and in some areas the policy, and therefore evidence needs, will continue to develop and may change quite rapidly. If you have any queries about the evidence priorities covered in this plan, please contact StrategicEvidence@defra.gsi.gov.uk.

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1. Policy context

What are the key policy outcomes for the policy programme/area?

Biodiversity is the variety of all life on Earth. It includes all species of animals and plants, their genetic diversity and their habitats – everything that is alive on our planet[1]. Ecosystems are a dynamic complex of plants, animals and micro-organisms and their non-living environment interacting as a functional unit[2]. `Biodiversity is essential for the fundamental ecosystem processes that provide a broad range of "ecosystem services" (such as food production, protection from floods, climate regulation or opportunities for recreation) that are critical to our wellbeing and prosperity. Biodiversity is therefore important not just because people value it for its own sake, and the enjoyment or inspiration it provides, but because human survival also depends upon it. The importance of the benefits we derive from nature was the key message of the groundbreaking UK National Ecosystem Assessment (NEA).

However the natural environment faces significant challenges:

- The NEA showed that nature is consistently undervalued in decision-making and that many of the services we get from nature are in decline. Over 40% of priority habitats, 30% of priority species and 30% of ecosystem services were declining in the most recent analysis.
- Internationally biodiversity is also in decline because of human activity, with 10-30% of animals threatened with extinction. Furthermore 10% of all species are thought to be at increasing risk for every 1°C rise in global mean temperature due to climate change.

The government is committed to tackle these challenges. Specifically:

- The set of strategic goals and targets know as "Aichi Targets" signed at Nagoya (2010) commit the UK along with over 190 countries to take urgent and effective action towards halting the alarming global declines in biodiversity;
- The European Commission's EU Biodiversity Strategy **(**2011) provides a framework for Member States, along with the global Aichi Targets, to inform their own national plans;
- The Natural Environment White Paper (2011) set out the Government's proposals for valuing nature and taking an integrated landscape scale approach to secure the most benefits for nature, people and our ecosystems;

[1] The Convention on Biological Diversity defines biodiversity as the: 'variability among living organisms from all sources including, *inter alia,* terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems'.

[2] Based on the definition used in the Millennium Ecosystem Assessment, 2005.

- *Biodiversity 2020:* the strategy for wildlife and ecosystem services in England builds on the Natural Environment White Paper, provides a comprehensive picture of what we are aiming to achieve and how we are implementing our international and EU commitments; and,
- The UK Biodiversity Framework provides an overarching framework for co-ordination with the Devolved Administrations at the UK level.

The headline aim of Defra's biodiversity activities set out in *Biodiversity 2020* is to halt overall biodiversity loss by 2020. Specific policy outcomes under this headline objective are:

- More, bigger and less fragmented areas for wildlife, conserved through integrated and joined up approaches;
- An overall improvement in the status of our wildlife and prevention of further human induced extinctions of known threatened species, including through the management of the impacts of climate change;
- Significantly more people engaged in biodiversity, aware of its value, and taking positive action;
- Reducing environmental pressures: protection and management of biodiversity is an integral part of wider policy and decision making;
- Improved implementation of the Habitat and Wild Bird Directives for the benefit of both the economy and the environment; and,
- UK effectively influences international and intergovernmental processes to conserve and enhance biodiversity around the world, including Overseas Territories.

In terms of ecosystems activities, the overarching objective is to deliver the broad "natural value" agenda set out in the White Paper. Specific policy outcomes include:

- Supporting sustainable economic growth through the creation of new markets for green goods and services and greening existing markets, expanding the opportunities for UK business;
- Developing ways to capture the value of nature in the way we value our wealth as a nation, in order to put natural capital at the heart of economic thinking;
- Developing and embedding tools, and building the evidence base, to help decision-makers take account of the value of nature and secure the most benefits for nature, people and the economy from our ecosystems; and,
- Ensuring that the Natural Environment White Paper is effectively implemented in partnership with others, including, civil society, businesses and local communities.

This is clearly a broad and challenging policy agenda which needs to be underpinned by robust and wide-ranging evidence and analysis, and integrated approaches - including more joined-up evidence on biodiversity and ecosystems. Evidence and analysis will be key to:

- Understanding how to optimise biodiversity and economic growth objectives, facilitating and directing nationally significant infrastructure projects and helping

develop new flexible policy instruments (such as Nature Improvement Areas or Biodiversity Offsets);

- Addressing biodiversity issues in an integrated way through an improved understanding of the underpinning role and value of biodiversity and its economic contribution;
- Helping to understand and resolve human/wildlife conflicts such as bats in churches and historic buildings, raptors and game birds and fish-eating birds and developing strategic solutions, such as fertility control;
- Informing policy responses to biosecurity issues relating to wildlife and biodiversity, including informing negotiations and impact assessments for the EU Invasive Alien Species Directive proposals;
- Increasing the number of people engaged in biodiversity and natural environment issues and taking positive action, and ensuring any interventions are carefully targeted and cost effective;
- Continuing to provide leadership on international biodiversity reflecting well focused research and a strong evidence base, including support for the recently established Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES);
- Ensuring effective use of natural capital[3] stimulating and maintaining economic growth and wellbeing, including by supporting the evidence needs of the Natural Capital Committee in assessing the state of the UK's natural assets, their sustainable use and priorities for protecting and enhancing our natural capital;
- Providing a robust evidence base on the opportunities for investment in the natural environment (green infrastructure) to deliver cost effective business solutions alongside wider environmental benefits; and,
- Embedding approaches to value and measure natural capital into decision-making, including by achieving a better understanding of ecosystems and the goods and services that they provide to society and by supporting the Office of National Statistics work to include natural capital in the UK environmental accounts.

The evidence objectives and priorities presented in Sections 2 and 3 below have been developed in consultation with Defra's Biodiversity Programme Board which includes Natural England, the Forestry Commission, the Environment Agency and the Joint Nature Conservation Committee.

[3] "Natural capital can be defined as the stock of our physical natural assets (such as soil, forests, water and biodiversity) which provide flows of services that benefit people (such as pollinating crops, natural hazard protection, climate regulation or the mental health benefits of a walk in the park). Natural capital is valuable to our economy. Some marketable products such as timber have a financial value that has been known for centuries. In other cases (e.g. the role of bees in pollinating crops), we are only just beginning to understand their financial value." Natural Environment White Paper.

2. Current and near-term evidence objectives

What are the current and near-term objectives for evidence and how do they align to policy outcomes?

Current and near-term evidence objectives of the programme are defined here has existing commitments, ongoing areas of work and planned investments in the next 1-3 years. These objectives are matched to policy outcomes in the table below, but many are cross-cutting and contribute to several policy outcomes. The evidence objectives include in-house analytical work and evidence provided by external partners, including the Non-Departmental Public Bodies (NDPBs) in the wider Defra-family: Natural England, Environment Agency, Forestry Commission and the Joint Nature Conservation Committee.

The current and near-term evidence objectives are categorised as 'ongoing' or 'time limited'. Time limited objectives are current priorities that are expected to be completed within 1-3 years. Ongoing objectives address needs that are expected to continue throughout the plan period to 2018. They are denoted as high or medium priority. The overall trajectory of spend in each policy area is summarised in bold italics at the end of each section.

Policy outcomes	Current and near-term evidence objectives
1. Habitats and sites: more, bigger, and less fragmented areas for wildlife.	Collaborate with partners to test, monitor and evaluate new policy instruments including **Nature Improvement Areas and Biodiversity Offsets** and improve understanding of policy, institutional, social and economic barriers to more integrated approaches, including access to data (time limited). Work with partners, and strategic evidence funds, to develop cost-effective methods to measure and map, and project future changes in, **habitat extent and condition**, ecosystem services, ecosystem resilience and ecological connectivity, and to understand the role of protected sites in those processes (time limited). Assess options for, or alternatives to **Countryside Survey,** and develop a collaborative approach with relevant Defra evidence programmes, the Devolved Administrations, NDPBs and the Natural Environment Research Council for the next Countryside Survey with a focus on essential needs for biodiversity and ecosystems policy development (ongoing – high priority). Establish priorities and programme for assessment of trends in condition of **protected sites**, extent and condition of habitats, and provision of ecosystem services - working closely with Natural England (ongoing – high priority). Quality assurance of scientific evidence underpinning policy development and decisions on statutory designations and wildlife

	licensing (ongoing – high priority). ***Maintain spending, and create capacity to support a future Countryside Survey, if needed.***
2. Species: overall improvement in the status of our wildlife	Establish priorities and strategy for monitoring trends in **species populations** and improve the coverage, quality and accessibility and use of data on species for biodiversity and ecosystem assessment, targeting conservation action and better national and local decision making - working closely with JNCC, Natural England and other members of the wider National Biodiversity Network (ongoing – high priority). Improve understanding of the reasons for declines in wildlife and impacts on ecosystem services (e.g. pollination) so that actions to halt loss can be more effective, including analytical work with other government departments to ensure biodiversity concerns are taken into account into their policies (ongoing – high priority). Identify critical gaps in monitoring species and develop cost-effective survey methods to address requirements of the **Habitats Directive** (e.g. Great Crested Newts) (time limited). ***Achieve savings through greater prioritisation and enhanced collaboration.***
3. People: significantly more people engaged in biodiversity, aware of its value and taking positive action	Collaborate with partners to monitor and evaluate **people's engagement** with the natural environment and understand what motivates different social groups, institutions, businesses and volunteers, and their attitudes, values and behaviours and develop tools to ensure any interventions are carefully targeted and cost effective (ongoing – high priority). Demonstrate the **economic value and social benefit**s of biodiversity and ecosystem services (ongoing – high priority). ***Maintain spending, and enhance synergy with ecosystems evidence.***
4. Reducing environmental pressures: protection and management of biodiversity is integrated in wider policy and decision making	**4.1 Wildlife management:** Develop methods to resolve conflicts between wildlife and human interests where this is clearly in the public interest and with appropriate co-funding (e.g. fertility control of urban badgers, alternatives to anticoagulant rodenticides, and techniques to reduce predation of pheasants) (ongoing – high priority). ***Increase spending to address Ministerial priorities***
	4.2 Non-native species: Improve understanding of the risks, costs, impacts (on biodiversity, ecosystems and our economy and well-being) and effectiveness of policies and regulation to control invasive non-native species (NNS) and provide analytical support in relation to EU

	Directive on Invasive Species (ongoing – high priority). Collaborate with partners to develop cost-effective methods and strategies for control of NNS, including surveillance and rapid response. (ongoing – high priority). ***Maintain spending, with flexibility to respond to emergencies.***
	4.3 Plant and animal disease, climate change and other pressures Collaborate with NDPBs to improve understanding impacts, mitigation and adaptation, of ongoing and emerging pressures on biodiversity and ecosystem services including: plant and animal disease (e.g. *Chalara fraxinae, Phytophthera spp*); air pollution; and new technologies (ongoing – high priority). Improve understanding of climate change impacts on biodiversity and ecosystem services and develop approaches to adaptation (ongoing – medium priority). Review evidence to improve compliance with the Zoos Licensing Act, particularly elephant welfare (time limited). ***Increase spending on understanding and adapting to impacts of climate change and plant and animal diseases.***
5. Improved implementation of the Habitats and Birds Directives for the benefit of economic growth and the environment	Determine what evidence on biodiversity and ecosystem services is needed to facilitate and direct nationally significant **infrastructure projects**, including through appropriate mitigation compensation and offsets (time limited). Improve understanding of how different human pressures impact on favourable condition of **European Protected Species** and the methods, effectiveness and costs of mitigating these impacts (time limited). See also surveillance objectives listed under policy outcome (2) - species. ***Achieve savings as specific requirements of the Review of Implementation of the Habitats Directive are completed and evidence needs are integrated with other policy outcomes/ evidence objectives.***
6. Supporting sustainable economic growth through the creation of new markets for green goods and services and greening existing markets, expanding the	Evidence and analysis to support advice to Government on opportunities for UK business to develop green markets, goods and services e.g. through **the Ecosystems Markets Task Force** (time limited). Evidence and analysis to enable and facilitate the development of **biodiversity offsets and payments for ecosystem services** that deliver investments in the natural environment (green infrastructure)

opportunities for UK business.	(ongoing – high priority). Improve understanding of how to optimise biodiversity and **economic growth objectives**, identify ways to reduce barriers to growth and promote sustainable growth opportunities alongside the conservation and restoration of biodiversity (time limited). Understand opportunities for UK business of implementing the **Nagoya Protocol** on Access and Benefit Sharing arising from the use of genetic resources (time limited). ***Increase spending on identifying opportunities for economic growth.***
7. Developing ways to capture the value of nature in the way we value our wealth as a nation, in order to put natural capital at the heart of economic thinking.	Additional evidence work on **ecosystems accounting** supporting the Office for National Statistics Roadmap work and additional support on this subject for the Natural Capital Committee, including development of two or three priority ecosystem accounts by 2014-15, and contribution to development of international guidance and the roadmap to 2020 (ongoing – high priority). ***Increase support for Natural Capital Committee.***
8. Developing and embedding tools, and building the evidence base, to help decision-makers take account of the value of biodiversity and ecosystem services and secure the most benefits for biodiversity**, people and the economy from our ecosystems.**	Building on **the UK National Ecosystem Assessment (NEA)** and other key studies break new ground in ecosystems valuation and tools for decision-makers, including (time limited): o the Natural Capital Asset Check and other evidence to inform the Natural Capital Committee; o Macro-economic implications of ecosystem service change and management; o Economic and non-economic valuation of ecosystem services including cultural ecosystem services and human well-being; o Development and evaluation of the NEA scenarios for future ecosystem service provision under different drivers of change; o Understanding and influencing cultures and behaviours to maintain and enhance the delivery of ecosystem services; o Engagement with end users and development of a framework to prioritise tool development; and, development and enhancement of tools and resources for the findings/methods of the NEA. Addressing data deficiencies e.g. for economic and social data to underpin **impact assessments** and decision-making e.g. data for valuing soil quality and undeveloped land (time limited). Investigating the interactions and linkages between different ecosystems, scale effects, and options for the dissemination of **mapping and other spatial data** on ecosystem services (time limited). Collaborate with the Natural Environment Research Council and other

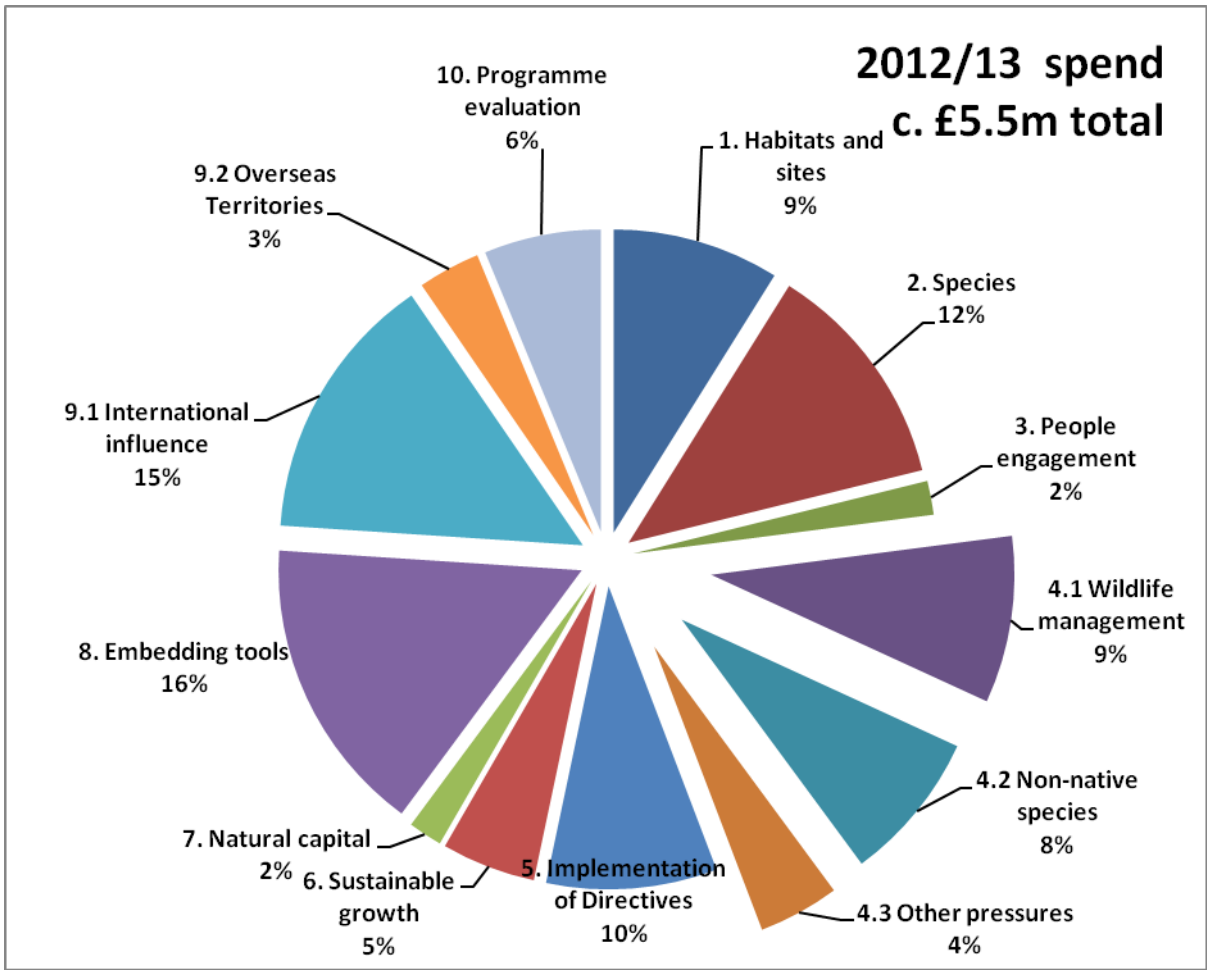
	partners to integrate long-term monitoring data to support an ecosystems approach e.g. through the **Environmental Change Network** (ongoing – medium priority). Enabling knowledge sharing between local scale projects that are applying an ecosystem approach through the **Ecosystems Knowledge Exchange Network** (ongoing – medium priority). ***Achieve savings through development of tools and completion of NEA follow-on.***
9. UK effectively influences international and intergovernmental processes to conserve and enhance biodiversity around the world.	9.1 Enable the **Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)** to be fully operational leading towards a future global assessment of biodiversity and ecosystem services, and coordinate with the EU Monitoring and Assessment of Ecosystem Services (MAES) initiative (ongoing – high priority). Support UK objectives in the **Convention on Biological Diversity (CBD) and Convention on International Trade in Endangered Species** through the application of an improved and influential evidence base, including understanding economic benefits and costs of meeting the Aichi targets, global impacts of UK consumption, potential impacts of synthetic biology, and capacity building in developing countries[4] (ongoing – high priority). Support our commitments to the CBD, promote sustainable development and seek to maintain resilient supply chains by developing policy tools (e.g. valuation methods) and capacity to support mainstreaming of biodiversity in Developing Countries (time limited). Develop techniques to support regulation of trade in endangered species, including reliable and cost-effective methods for identification of specimens (time limited). Improved methods for monitoring and access to global data on biodiversity and ecosystem services, including subscription to the **Global Biodiversity Information Facility** (ongoing – medium priority). Develop methods for prioritising UK investments in international conservation programmes (time limited). ***Achieve savings as current commitments are completed, achieve greater leverage through collaboration, and maintain funding for IPBES and GBIF.***

[4] Defra and the Department for International Development (DfID) also support the Darwin Initiative which provides funding for capacity building in countries rich in biodiversity but poor in financial resources.

	9.2 Improve the evidence base in **UK Overseas Territories** to assist in meeting international commitments, in particular the control and management of invasive species (ongoing – medium priority). ***Maintain spending.***
10. Implementing, monitoring and reporting**:** Tracking the effective implementation of the Natural Environment White Paper (NEWP) in partnership with others, including, civil society, businesses and local communities. Including Programme Management, budget monitoring, communications and international reporting.	Evaluation of **progress against NEWP commitments**, including development and use of an evaluation framework and reporting against indicators (ongoing – high priority). Evaluation **of progress towards *Biodiversity 2020* outcomes**, strategy actions and publication of annual indicator updates (ongoing – high priority). Reporting on UK Biodiversity Framework actions and support international reporting commitments including the 5th and 6th National Reports to the Convention on Biological Diversity and requirements under EU Directives (ongoing – high priority). Develop and establish long-term evaluation methods to measure the impact of **Local Nature Partnerships** and assess outcomes (ongoing – high priority). **External review** of the biodiversity and ecosystems evidence programmes by 2015 (time limited). ***Increase spending on policy and programme evaluation.***

The distribution of spend by Defra on evidence for each of the policy outcomes for the year 2012/13 is illustrated in Fig1. Additional funding for evidence relating to these policy outcomes is provided by the wider Defra family Non-Departmental Public Bodies (NDPBs). Adjustment of Defra funding on evidence in 2013/14 and future years is anticipated. Evidence spend on policy outcomes (2) species, (5) Habitats Directive review, (8) National Ecosystem Assessment Follow-On and (9.1) international biodiversity is forecast to decrease. Spend on (4.3) climate change, plant and animal health and other pressures, (6) opportunities for economic growth, (7) support for the Natural Capital Committee and (10) programme evaluation is forecast to increase.

Fig 1. Defra evidence spend by policy outcome, 2012/13.



3. Future evidence needs

What are the longer-term evidence needs for the policy area/ programme?

Many current and near-term evidence objectives from Section 2 are ongoing and there is more potential to join up the biodiversity and ecosystem elements reflecting policy development. Additional longer-term evidence needs will build on and respond to the outcomes of current projects and evaluation of policy interventions. Within available budgets the focus will be on identifying and addressing critical evidence gaps to inform and facilitate policy development, influencing the research commissioned by other evidence programmes and funders, and tackling cross-cutting evidence needs by joining up with others.

Policy outcomes	Longer-term evidence needs
1. Habitats and sites: more, bigger, and less fragmented areas for wildlife.	See ongoing needs in Section 2.

2. Species: overall improvement in the status of our wildlife.	See ongoing needs in Section 2.
3. People: significantly more people engaged in biodiversity, aware of its value and taking positive action.	Determine what measures, tools, delivery mechanisms and information products/systems are effective at increasing motivation, **encouraging engagement and changing behaviour** and evaluate pilot studies (high priority). Develop and improve cost-effective techniques for measuring public engagement, social and economic benefits and valuation (medium priority).
4. Reducing environmental pressures: protection and management of biodiversity is integrated in wider policy and decision making.	Improve understanding of **public attitudes to wildlife management** and develop approaches to conflict management (medium priority) Develop a strategic risk-based framework for identifying emerging wildlife management problems (high priority). Understand interactions between invasive non native species and other non native species and our native biodiversity (medium priority). Develop understanding of the nature and extent of societal change needed to meet biodiversity and ecosystems policy outcomes, including barriers and opportunities to facilitate change (high priority). Improve understanding of the scale of current and future, and cumulative, impacts on biodiversity and ecosystem services of other policy objectives and **develop methods for integrated approaches** to the management of natural resources, including policies on sustainable food, flood management, greenhouse gas emissions, low carbon energy, water quality and economic growth (high priority).
5. Improved implementation of the Habitats and Birds Directives for the benefit of economic growth and the environment.	Longer term needs integrated in other policy outcomes and evidence needs.
6. Supporting sustainable economic growth through the creation of new markets for green goods and services and greening existing markets, expanding the opportunities for UK	Understanding the links between housing development pressures, biodiversity and ecosystem goods and services (e.g. green space) in terms of evidence to support **Biodiversity Offsets** (high priority). Evidence to improve understanding of the relationship between key **drivers of growth** (e.g. infrastructure, energy) and the natural environment and to stimulate investment in green infrastructure (high priority).

business.	
7. Developing ways to capture the value of nature in the way we value our wealth as a nation, in order to put natural capital at the heart of economic thinking.	Respond to evidence needs identified by the **Natural Capital Committee** in their state of natural capital reports, – ensuring links with the National Ecosystem Assessment Follow-on project and to provide data for "state of nature" reporting, including the potential contribution of a future Countryside Survey (high priority).
8. Developing and embedding tools, and building the evidence base, to help decision-makers take account of the value of biodiversity and ecosystem services and secure the most benefits for nature, people and the economy from our ecosystems.	Refining our understanding of ecosystem structure, function and valuation and developing practical tools to enable decision makers to secure the most benefits for biodiversity, people and the economy from our ecosystems. This will be achieved primarily by engaging with and influencing other evidence providers to join-up the evidence base, facilitating cross-cutting research, working with end-users and ensuring critical evidence gaps are addressed to **enable operational tools for applying an ecosystems approach** to be developed (high priority). Critical evidence needs for tool development and decision-making include: o evidence on resilience of ecosystems and ability to recover from disturbance, including thresholds and "tipping points"; o evidence on relationships between ecosystem services, biodiversity and function; o evidence on mechanisms that underpin supporting services and how these services respond to current and future drivers like climate change, land use and nitrogen deposition – developing sustainable management options for end-users; o developing guidance on methods, standards and criteria for measurement, mapping and monitoring of biodiversity and ecosystem services – including data interoperability, management and indicators; o addressing gaps on valuation (both monetary and non monetary) by taking forward new primary valuation studies and working with end-users to develop new valuation tools in different policy contexts; o developing approaches and techniques that enable a full range of social and cultural meanings and values to be integrated in biodiversity and ecosystems decision-making at a variety of spatial scales; o developing accessible tools and methods for end-users to design coherent ecological networks and resilient ecosystems and to guide adaptation to climate change and determine the most cost-effective methods of ecosystem restoration.
9. UK effectively influences international and intergovernmental	Improved understanding of relationships between biodiversity, ecosystem services and human well-being and implications for policies on conservation, poverty alleviation and economic growth:

processes to conserve and enhance biodiversity around the world.	**regional and global assessments** of biodiversity and ecosystem services, and capacity building to be undertaken by the Intergovernmental Platform on Biodiversity and Ecosystem Services (high priority). Identifying where bilateral investments can add most value and have greatest impact and developing methods to evaluate outcomes (high priority).
10. Tracking the effective implementation of the Natural Environment White Paper (NEWP) and Biodiversity 2020 Strategy in partnership with others, including, civil society, businesses and local communities; International reporting.	Policy evaluation, including overall **evaluation of Biodiversity 2020** linking interventions with outcomes and impacts, in order to identify which elements of the strategy are working well and which may need additional policy or implementation support (high priority). Policy evaluation, including overall **evaluation of progress with NEWP** commitments and Local Nature Partnerships - linking interventions with outcomes and impacts, in order to identify which elements are working well and which may need additional evidence to support new directions for policy or implementation support (high priority).

4. Meeting evidence needs

What approach(es) will be taken to meeting evidence needs?

The newly established Biodiversity and Ecosystems Evidence Hub comprises a multi-disciplinary team of around 12 (full time equivalent) evidence specialists and analysts including: natural scientists, economists, a social scientist, statisticians and procurement specialists. Members of the hub are also embedded in policy and project teams in the Biodiversity and Natural Value Programmes and other cross-cutting projects.

Natural science specialists in the team have a focus on the the ecology and management of biodiversity and ecosystems and the factors impacting upon them, including interactions with other sectors of the economy, climate change and plant and animal disease. The statisticians work closely with the Office of National Statistics, drawing on expertise in ecosystems accounting and familiarity with a wide range of relevant data sources. Statisticians also contribute to the monitoring and evaluation activity to support NEWP, including taking a lead role in the development of indicators. The economists and social scientist are able to draw on expertise in both monetary and non monetary valuation approaches, evaluation techniques and understanding of application of policy instruments including regulation, market based instruments and behavioural incentives to the natural environment. Specialists are very well connected to external networks in the UK and

internationally, leading and influencing the wider interface between evidence and policy development. Specialists are also skilled in project management and procurement.

Evidence needs are met from a variety of sources and the evidence landscape to support biodiversity and ecosystem policy outcomes is complex, involving in-house analysts and statisticians, collaboration with other programmes within Defra, across the Defra network and external to the Department, as well as commissioning external research contracts. The in-house team applies evidence and analysis to policy development, regulatory impact assessments, decision-making and evaluation, including sourcing and quality assurance of external evidence. The in-house team also contributes to international programmes and supports international negotiations.

The biodiversity and ecosystems evidence budget for external commissions is small compared to UK investment in ecosystems research and so collaboration with the major funders in this area is essential for addressing our evidence objectives. Key evidence providers and partners that we work with are:

- Other Defra evidence programmes e.g. Sustainable and Competitive Farming Strategy, Sustainable Land and Soils, Rural Development Programme, Rural Communities Policy Unit, Green Economy and Resource Efficiency, Climate Change, Atmosphere and Local Environment, Floods, Water Quality, Marine and Plant and Animal Health;

- Defra-family partners in the Biodiversity Programme (see Table 1) – Environment Agency, Forestry Commission, Natural England, Joint Nature Conservation Committee;

Table 1. Biodiversity-related evidence programmes managed by Defra-family partners in the Biodiversity Programme

Agency	Evidence programmes
Natural England	Research (including PhDs & subscriptions) Monitoring & surveillance: Species & habitats, SSSI and other protected sites monitoring, data management, ecosystem services and climate change
Forestry Commission	Habitat management, protected species, biodiversity and genetic conservation. Vertebrate management (grey squirrel research and limited horizon scanning for non-native species) Land use and ecosystem services - impact of land-use choices (woodland creation, woodland conversion, and restoration of open habitats) on the provision and flow of ecosystem services
Environment Agency	Biological and fish monitoring (England and Wales)

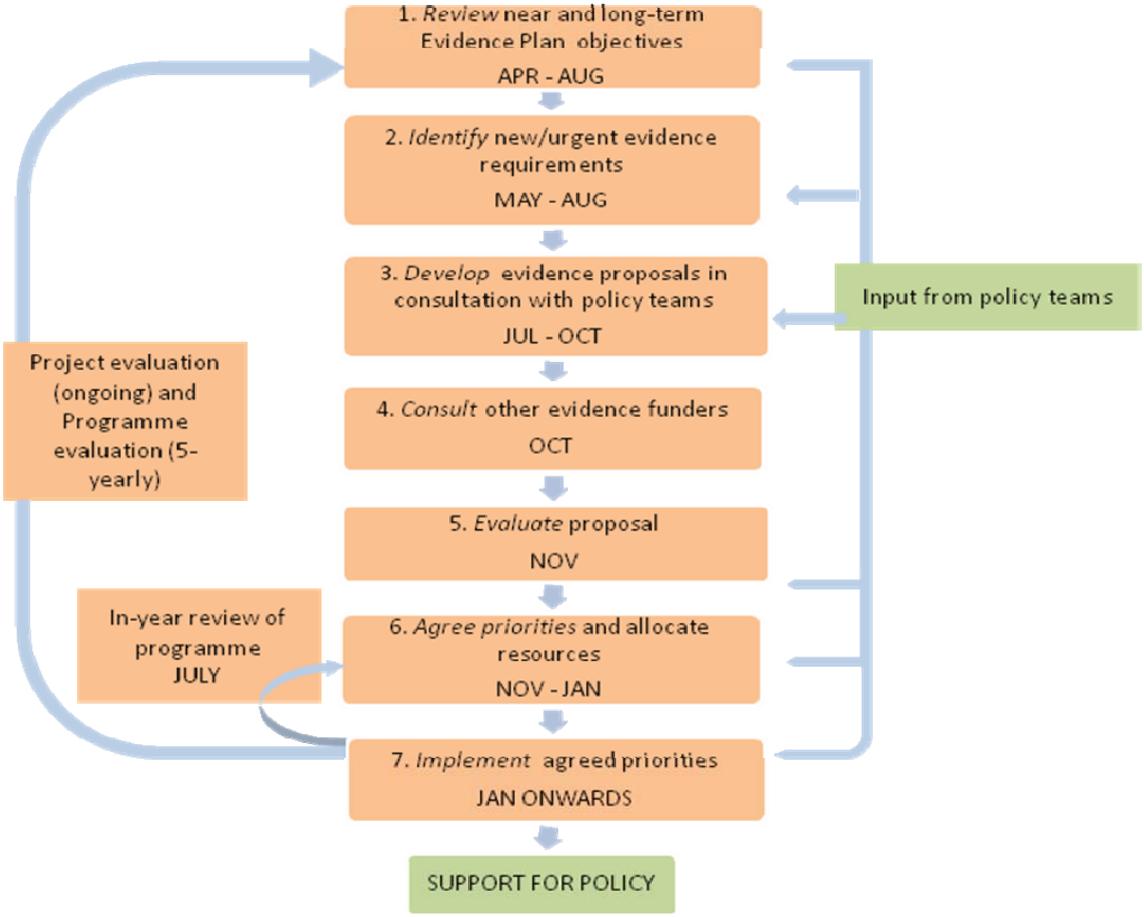
JNCC	Evidence projects to underpin global, European and sustainability advice Overseas Territories & Crown Dependencies advice Surveillance and monitoring (terrestrial) and access to information

- Other Defra Arms Length Bodies: Royal Botanic Gardens Kew, Food and Environment Research Agency and the Centre for Fisheries and Aquatic Science;
- Other Government Departments, Agencies and Local Authorities e.g. Business, Innovation and Science (BIS), Communities and Local Government (CLG), Department for Energy and Climate Change (DECC), Department for International Development (DfID), Office for National Statistics (ONS);
- The Devolved Administrations;
- UK Research Councils (NERC, BBSRC, ESRC, AHRC) – some of which have their own programmes on ecosystem services (e.g. NERC's Biodiversity and Ecosystem Service Sustainability programme and the Valuing Nature Network) and also through the Living with Environmental Change Programme (LWEC);
- EU Framework Programmes, institutions and projects (e.g. European Environment Agency and Joint Research Centre), European Platform for Biodiversity Research Strategy, Biodiversity ERA-Net (Biodiversa), PEER Research on EcoSystem Services (PRESS), and Global Monitoring for Environment and Security (GMES);
- Third and private sector e.g. UK-based and international NGOs; and,
- Other governments, intergovernmental organisations and secretariats of multi-lateral environmental agreements (e.g. Convention on Biological Diversity, Convention on International Trade in Endangered Species, UN Environment Programme, Intergovernmental Platform on Biodiversity and Ecosystem Services, Organisation for Cooperation in Economic Development - OECD).

New project topics and proposals are identified from various sources on an annual cycle (see Fig 2). These include periodic external programme reviews, thematic reviews of evidence and policy (e.g. National Ecosystem Assessment), external think-tanks (e.g. UK Biodiversity Research Advisory Group), policy teams and NDPB partners. Urgent policy needs are considered alongside longer term strategic evidence objectives. Resources are allocated to specific evidence projects at an annual meeting of the Evidence Priorities Group. An in-year review allows for adjustment of priorities, fine tuning of spending plans and inclusion of additional needs that emerge within year. Priorities are determined with reference to the criteria listed in Section 5.1.1 below and in consultation with NDPB partners and the Devolved Administrations.

The Evidence Plan covers priorities for Defra's evidence investments relating to England, England and Wales, Great Britain and the UK, or internationally, as applicable to specific issues. Collaborative funding arrangements are normally established with the Devolved Administrations where there are shared interests. The Plan does not address evidence priorities that are of exclusive interest to the Devolved Administrations.

Fig 2. Annual cycle for management and evaluation of evidence projects



5. Evaluating value for money and impact

What approach(es) will be taken to maximise and evaluate value for money and impact from evidence?

Evaluation of value for money and impact are addressed at three levels: (1) individual evidence projects; (2) the evidence programmes; and, (3) evaluation of policy outcomes.

5.1 Evaluating value for money and impact of projects

Individual evidence projects are evaluated at inception, during procurement and on completion.

5.1.1 Evaluation and selection of project proposals

As part of the annual evidence programme management cycle, evidence proposals are evaluated by a “Science Assessment Panel” using the following criteria, which incorporate factors contributing to value for money. Proposals are prioritised and budget allocations made by the Evidence Priorities Group on the basis of this evaluation.

- **Extent to which Defra Biodiversity and Ecosystems Evidence is best placed to undertake the evidence activity.** Whether other sources of funding (e.g. from other Defra research programmes, agencies, research councils, other government departments) are more appropriate or other options for delivering the outcome exist.

- **Policy imperative.** Whether the project is essential and required urgently to meet public commitments by Ministers or support other policy commitments.

- **Fit to Defra’s Biodiversity and Ecosystems priorities.** Whether the project closely aligns with evidence objectives set out in the Evidence Plan.

- **Likelihood of achieving benefits.** Whether the proposal is of sufficient quality such that that the project will result in the benefits identified;

- **Project collaboration**. Wherever possible projects and evidence needs are developed in a cross-cutting collaborative way, drawing in a range of disciplines, linking with other projects and programmes within the Department, and considering each project and programme in the context of the wider issues that Defra is addressing. Proposals are assessed in terms of the value that has been added to the project through the establishment of co-funding or in-kind contributions, and also from wider expertise or scope that collaboration brings to the proposal.

5.1.2 Evidence Procurement

Defra evidence procurement procedures are followed during tendering, management and evaluation of evidence projects to ensure quality of evidence, value for money and to minimise contractual and delivery risks. This includes independent peer review of project specifications and tenders for high value or sensitive projects; following appropriate codes of practice for commissioning external evidence projects and ensuring that contactors sign up to the Joint Code of Practice for Research; ensuring clear deliverables are agreed with contractors; and, encouraging publication of evidence outputs in the peer-reviewed literature.

5.1.3 Evaluating Impact

Following the framework that the UK Higher Education Funding Bodies are developing for assessing the impact of their funded research on society and the economy, we will evaluate the impact of our commissioned evidence through post-project review of the outputs. Impact can be measured in terms of **Reach** - the extent and breadth of the beneficiaries of the impact and **Significance** - the degree to which the impact has

enabled, enriched, influenced, informed or changed the products, services, performance, practices, policies or understanding of governments, communities or individuals, commerce, industry or other organisations.

Contractors are asked, as one of the project deliverables, to provide evidence of the impact/s of their project and the evidence team will evaluate the reach and significance of the identified impacts.

5.2 Evaluating value for money and impact of evidence programme

External Evidence Programme Reviews

Following Defra's best practice guidance the Biodiversity and Ecosystems Evidence Programme is subject to external expert review periodically (typically every 5 years). This is to provide assurance that the projects commissioned over that period have cumulatively delivered value for money and provided high quality outputs that contributed to meeting policy needs. This provides external expert challenge to the long-term output and direction of the evidence programme, and helps to determine future priorities and opportunities. The biodiversity element of the plan was reviewed in 2009, wildlife management was reviewed in 2011 and the ecosystem element has not been reviewed. It is intended to review all elements of the plan by 2015.

5.3 Evaluating value for money and impact of biodiversity and ecosystems policy

Policy evaluation

The evidence team contributes evidence, supports the use of policy tools and undertakes quality assurance of evidence used in policy advice and in Regulatory Impact Assessments. The evidence team participates in evaluation of policy pilot studies and reviews of policy, and manages external monitoring and evaluation projects on behalf of policy teams, where appropriate.

Wider policy evaluation will be undertaken according to policy commitments, including overall evaluation of NEWP and *Biodiversity 2020*, as indicated in Section 3. Policy evaluation will follow guidance set out in the Magenta Book[5].

[5] HM Treasury (2011). The Magenta Book: guidance for evaluation. HM Treasury, London. http://www.hm-treasury.gov.uk/magentabook