

UK National Ecosystem Assessment

Understanding nature's value to society

Progress and Steps Towards Delivery

February 2010



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What is the UK NEA?

The UK National Ecosystem Assessment (UK NEA) is the first analysis of the UK's natural environment in terms of the benefits it provides to society and our continuing prosperity. Part of the Living With Environmental Change (LWEC) initiative, the assessment began in mid-2009 and will be reporting its findings in early 2011. It is an inclusive process involving individuals and institutions with a wide range of perspectives, in government, academia, NGOs and the private sector.

From global change to local action

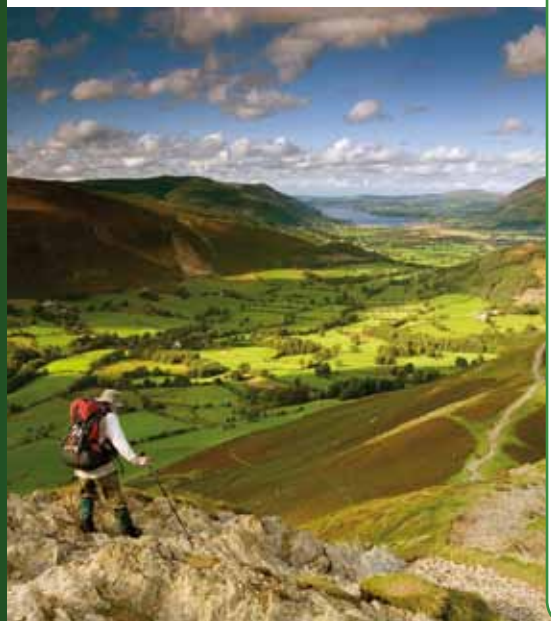
We have a growing understanding of the importance of the natural environment, not just for its own existence but also for **contributions that ecosystems** (see **Box 1. Key Definitions**) **make to sustain life, to society and to economic prosperity**. This was highlighted at the global scale in the Millennium Ecosystem Assessment (MA) and has been further elaborated upon in "*Securing a healthy natural environment*" (Defra's Action Plan for embedding an ecosystems approach 2007). The *Action Plan* recognises the natural environment as a precious resource that underpins the UK's health, well-being and prosperity as well as providing the essentials of life such as air, food and water. Our understanding of ecosystems and their contributions to human well-being is increasing.

Box 1. Key Definitions

Ecosystem: a natural unit of living things (animals, including humans; plants; and micro-organisms) and their physical environment (Defra Action Plan 2007).

Ecosystem services: the benefits provided by ecosystems that contribute to making human life both possible and worth living (MA 2005).

Ecosystems approach: a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way (Convention on Biological Diversity 1993).



Globally, ecosystems and biodiversity are under threat. The MA sent a strong message that human activity is placing such pressures on the natural environment that the world's ecosystems are losing the ability to sustain future generations (see **Box 2. Four Main Findings of the Millennium Ecosystem Assessment**). Along with a rapidly growing human population, demands for the provision of food, fresh water, energy and materials are increasing markedly and causing degradation of ecosystems and the biological processes upon which we all ultimately depend. While the degradation of ecosystem services disproportionately affects the poor, wealthy populations cannot assume they are fully insulated from effects of ecosystem and ecosystem service degradation (UNEP 2006).

Natural England reported in 2008 that England has less natural diversity than 50 years ago and is still under constant pressure from threats such as climate change (Natural England 2008), and similar patterns of loss have been seen across the UK.

Therefore there is a real need to ensure that in the UK our ecosystems are healthy and resilient, so that the natural environment can continue to support our communities and economy. Defra, the devolved administrations and partners are working towards implementing an ecosystem approach to conserving, managing and enhancing the natural environment of the UK. This will be achieved by focusing decision-making away from sector specific or habitat specific approaches and towards an integrated approach based on whole ecosystems and ensuring the value of ecosystem services is fully reflected in decisions (Defra Action Plan 2007).

Box 2. Four Main Findings of the Millennium Ecosystem Assessment

1. Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fibre and fuel. This has resulted in a substantial and largely irreversible loss in the diversity of life on Earth.
2. The changes that have been made to ecosystems have contributed to substantial net gains in human well-being and economic development, but these gains have been achieved at growing costs in the form of the degradation of many ecosystem services, increased risks of non-linear changes, and the exacerbation of poverty for some groups of people. These problems, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems.
3. The degradation of ecosystem services could grow significantly worse during the first half of this century and is a barrier to achieving the Millennium Development Goals.
4. The challenge of reversing the degradation of ecosystems while meeting increasing demands for their services can be partially met under some scenarios that the MA has considered, but these involve significant changes in policies, institutions and practices that are not currently under way. Many options exist to conserve or enhance specific ecosystem services in ways that reduce negative trade-offs or that provide positive synergies with other ecosystem services.

MA (2005)



The need for a UK National Ecosystem Assessment

The findings of the MA not only demonstrated the importance of ecosystem services to human well-being, but also showed that at global scales, many key services are being degraded and lost. As a result, in 2007 the House of Commons Environmental Audit recommended that the Government should conduct a full MA-type assessment for the UK to enable the identification and development of effective policy responses to ecosystem service degradation (House of Commons Environmental Audit 2007).

The UK NEA will help people to make better decisions that impact on the UK's ecosystems to ensure the long-term sustainable delivery of ecosystem services for the benefit of current and future populations in the UK, thereby addressing the needs set out in Defra's current *Action Plan (2007)* for embedding an ecosystems approach.

The UK NEA will also support global and regional obligations such as the Convention on Biological Diversity's call on countries to conduct such assessments and the European Union Water Framework Directive, which encourages the management of ecosystem services.



Objectives of the UK NEA

The UK NEA will provide new information on the changing natural environment in terms of ecosystems and the range of services that they provide to people. It has three objectives:

1. Produce an independent and peer-reviewed National Ecosystem Assessment for the whole of the UK.
2. Raise awareness of the importance of the natural environment to human well-being and economic prosperity.
3. Ensure full stakeholder participation and encourage different stakeholders and communities to interact and, in particular, to foster better inter-disciplinary co-operation between natural and social scientists, as well as economists.

Using an Ecosystem Assessment process the UK NEA will:

- assess the status and trends of the UK's ecosystems and the services they provide at multiple spatial scales from country to catchment levels;
- describe the key factors (drivers of change) affecting the UK's ecosystems, including changes in land-use, infrastructure development, pollution and climate change;
- include plausible futures (scenarios) for the UK's ecosystems and the services they provide;
- outline societal response options to secure continued delivery of the UK's ecosystem services, for all of society; and
- value the contribution of ecosystem services to human well-being through economic and non-economic analyses.

Outcomes of the UK NEA

The UK NEA, through its reports, website and key messages, will build on previous studies such as the Countryside Survey of 2007 by:

- creating a compelling and easily understood explanation of the state and value of the UK's natural environment and ecosystem services;
- providing a unique synthesis of what is currently known, by collating existing information on ecosystems and ecosystem services and exploring the interlinkages between habitats, ecosystem services and biodiversity;
- placing ecosystem services in the spotlight and focusing attention on how our natural ecosystems support their provision;
- identifying knowledge gaps for habitats and ecosystem services that will inform future research; and
- assisting in further embedding the concepts of ecosystem services and the ecosystem approach and strengthening decision-making at all scales from landowners to local government to companies to national administrations.

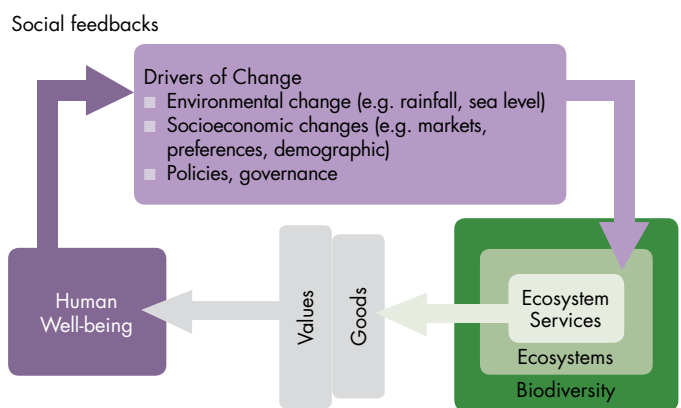
Progress to date of the methods behind the UK NEA

During the initial stages of the UK NEA, questions that the assessment would address were developed to identify key information to assist decision-makers in managing ecosystems and the services they provide for human well-being. This led to the development of a conceptual framework and an approach to tackle the challenges posed by the valuation of ecosystem goods and services.

A vision for the UK NEA – developing a conceptual framework of the links between nature and society

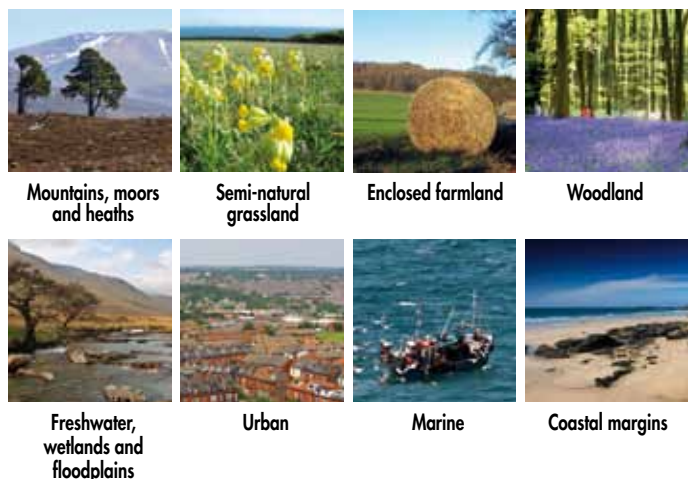
The UK NEA conceptual framework (see **Figure 1. UK NEA conceptual framework**) summarises the cycle that links human

Figure 1. UK NEA conceptual framework



Box 3. Ecosystems

The UK NEA will cover eight UK terrestrial, freshwater and marine ecosystems, e.g. Enclosed farmland, (consisting of arable, horticultural land and improved grassland) and Woodland (covering broadleaved, coniferous and mixed woodland). These are comprised of "broad habitats", which is an established habitat classification and reporting system. "Broad habitats" were used in the Countryside Survey of 2007, which has generated a wealth of information on the UK's countryside. This approach is also the basis for many conservation initiatives, such as the UK Biodiversity Action Plan, which identifies priority habitats within broad habitat types.



Box 4. Ecosystem Services

The UK NEA classifies services into four types:

Provisioning services: the products we obtain from ecosystems such as food, fibre and fresh water.

Regulating services: the benefits we obtain from the regulation of ecosystem processes such as regulation of pollination, the climate, noise and water.

Cultural services: the non-material benefits we obtain from ecosystems, for example through spiritual or religious enrichment, cultural heritage, recreation and tourism or aesthetic experience.

Supporting services: ecosystem functions that are necessary for the production of all other ecosystem services such as soil formation and the cycling of nutrients and water.

Provisioning



Provision of timber

Regulating



Regulation of climate

Cultural



Recreation and tourism

Supporting



Cycling of nutrients

societies and their well-being with the environment, building on the framework used by the MA. The conceptual framework emphasises the role of ecosystems (see **Box 3. Ecosystems**) in providing services that benefit people. **Ecosystem services** (see **Box 4. Ecosystem Services**) are the outputs of ecosystems from which people derive benefits including goods and services (e.g. food and water purification, which can be valued economically) and other values (e.g. spiritual experiences, which have a non-economic value). The combination of these goods, services and values provide our overall human well-being (expressed in society as health, wealth and happiness). The values that people receive from ecosystems may alter the way that they choose to use and manage the environment. This in turn leads to further changes in the environment (see **Box 5. The UK's changing environment**). The UK NEA will examine how this cycle

has played out in the past and will use plausible scenarios to explore how the cycle may change in the future.

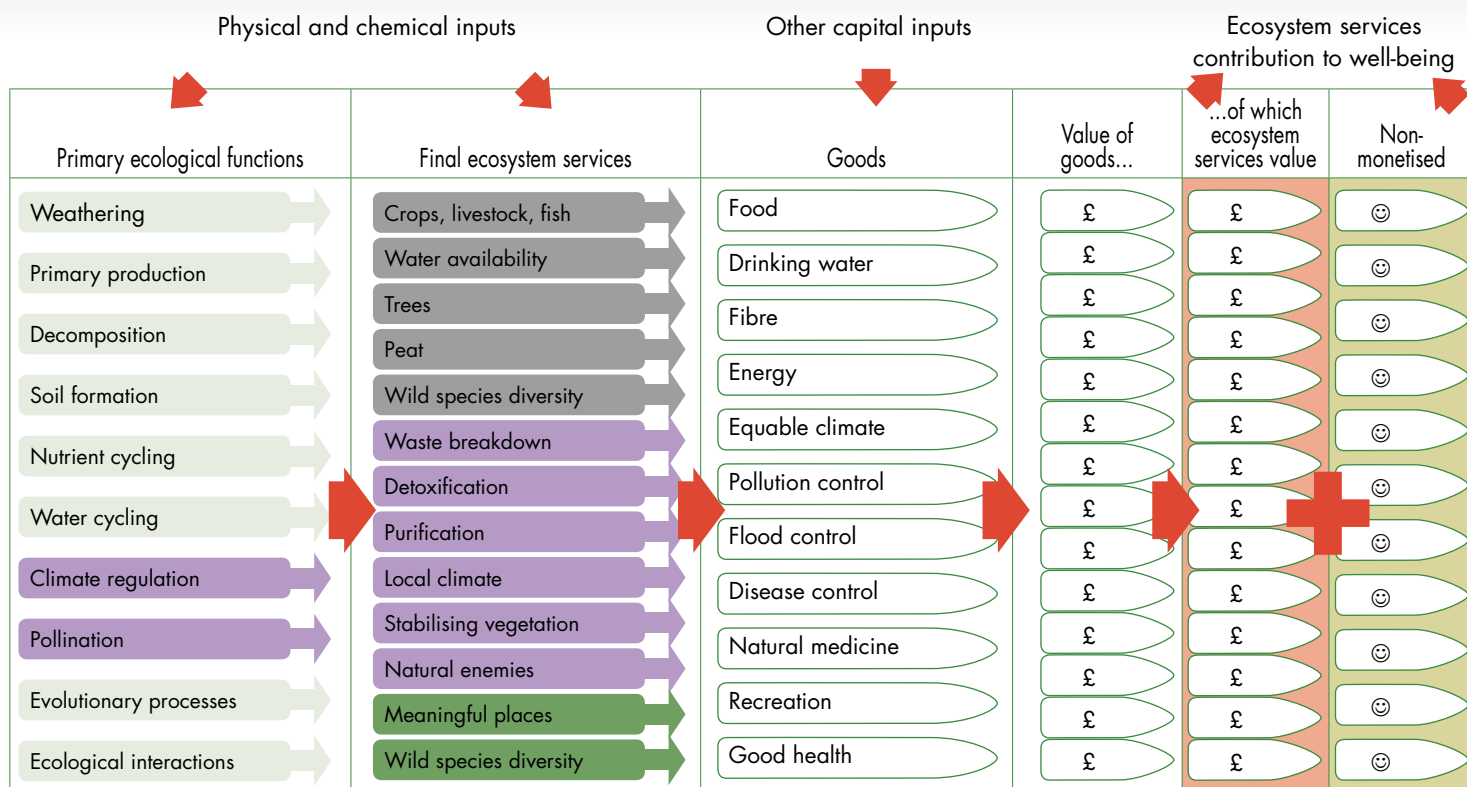
Biodiversity plays an important role in the natural environment and the UK NEA will consider the role biodiversity plays throughout the assessment (see **Box 6: Biodiversity and the UK NEA**).

Valuing the UK's ecosystem services

The UK NEA will attempt to move forward thinking around the valuation of ecosystem services. The economic analysis for the UK NEA divides ecosystem services into those primary ecological functions which support all of life, and those ecosystem services which directly contribute goods and values to human well-being, often referred to as final ecosystem services (see **Figure 2. Structure for the valuation of ecosystem goods and services**). This division is merely intended to avoid

a 'double counting' problem which might arise if the value of fundamental supporting services such as soil formation were added to final ecosystem services such as the growth of crops. These latter services are often (although not always) combined with manufactured and other human inputs to produce the goods which help generate welfare. The economic analysis then assesses the value of those goods and determines how much of that value is attributable to ecosystem services as opposed to manufactured or other influences.

The economic analysis will not be able to capture all aspects of the influence of ecosystems upon human well-being and will be augmented by an assessment of non-economic values (e.g. inspirational and spiritual experiences). Some benefits such as health changes will be assessed using both monetary and non-monetary measures.



Adapted from Fisher *et al.* 2008

Box 5. The UK's changing environment

As the UK population has grown and prospered over time our environment has changed around us. Recent environmental changes include:

- the improvements in air pollution levels since the 1960s due to implementation of pollution control legislation, or
- the significant increases in agricultural production capacity driven by the uptake of technological advances (such as mechanisation, fertiliser development and crop breeding) and strong encouragement by agricultural policies.

The UK NEA will analyse a range of these individual causes that drive changes in our environment and assess how they have impacted on the full range of ecosystems services and their potential to continue to support further improvements in our well-being.

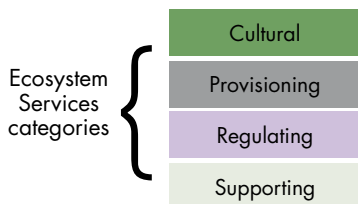


Figure 2. The structure for the valuation of ecosystem goods and services within the UK NEA

The combination of the **monetary value of an ecosystem service** plus the **non-monetary value** (the outputs of the valuation exercise) is the total contribution to human well-being made by ecosystem services.

Box 6. Biodiversity and the UK NEA

As defined in the Convention on Biological Diversity, biodiversity is 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*”. The UK NEA considers biodiversity in three different ways:

- Ecosystem processes** – biodiversity may play a role in the dynamics of ecosystem services, for example, in nutrient cycling or rates of decomposition.
- Genes and species** – some species and genetic variability within them contribute directly to goods and benefits. For example, the diversity of wild crop and livestock relatives is important for the improvement of crops and livestock, and resistance to disease increases with genetic diversity. Therefore wild species diversity is considered an ecosystem service in the UK NEA.
- Valued by people** – the appreciation of wildlife and scenic places and the spiritual, educational, religious and recreational values are direct benefits that result from biodiversity.

Progress of the UK NEA

Over the past nine months an evidence base has been collated, bringing together data sets from many institutions that had not previously been brought together. This evidence base has been used in developing chapters focusing on the changes in the UK's ecosystems and ecosystem services from around the middle of the last century to the present date.

As this preliminary phase is coming to an end, drafts of the **status and trends chapters** are being compiled. An initial internal review of the draft chapters, by an academic Expert Panel, a User Group of stakeholders, businesses and governmental departments, as well as the funders (the Client Group) (see

page 10), has provided valuable input into the writing process. Identifying the interlinkages between habitats and ecosystem services will be a priority as the draft chapters develop further. These chapters will include key messages that will summarise the main findings including the causes of change and the implications of these changes on human well-being. Later in 2010 these chapters will be available for wider consultation and input (see **Figure 3. Major milestones and key future dates**).

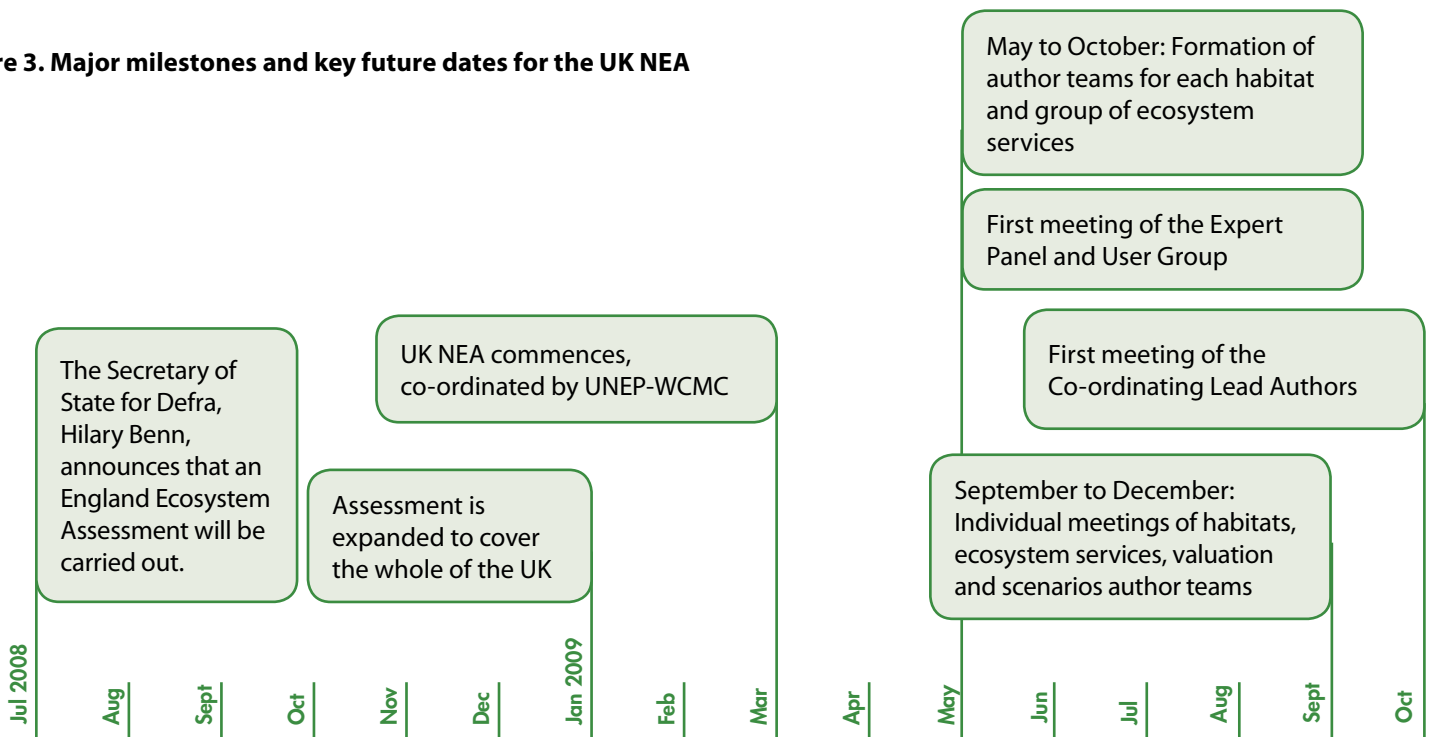
Next steps – Valuation and Scenarios

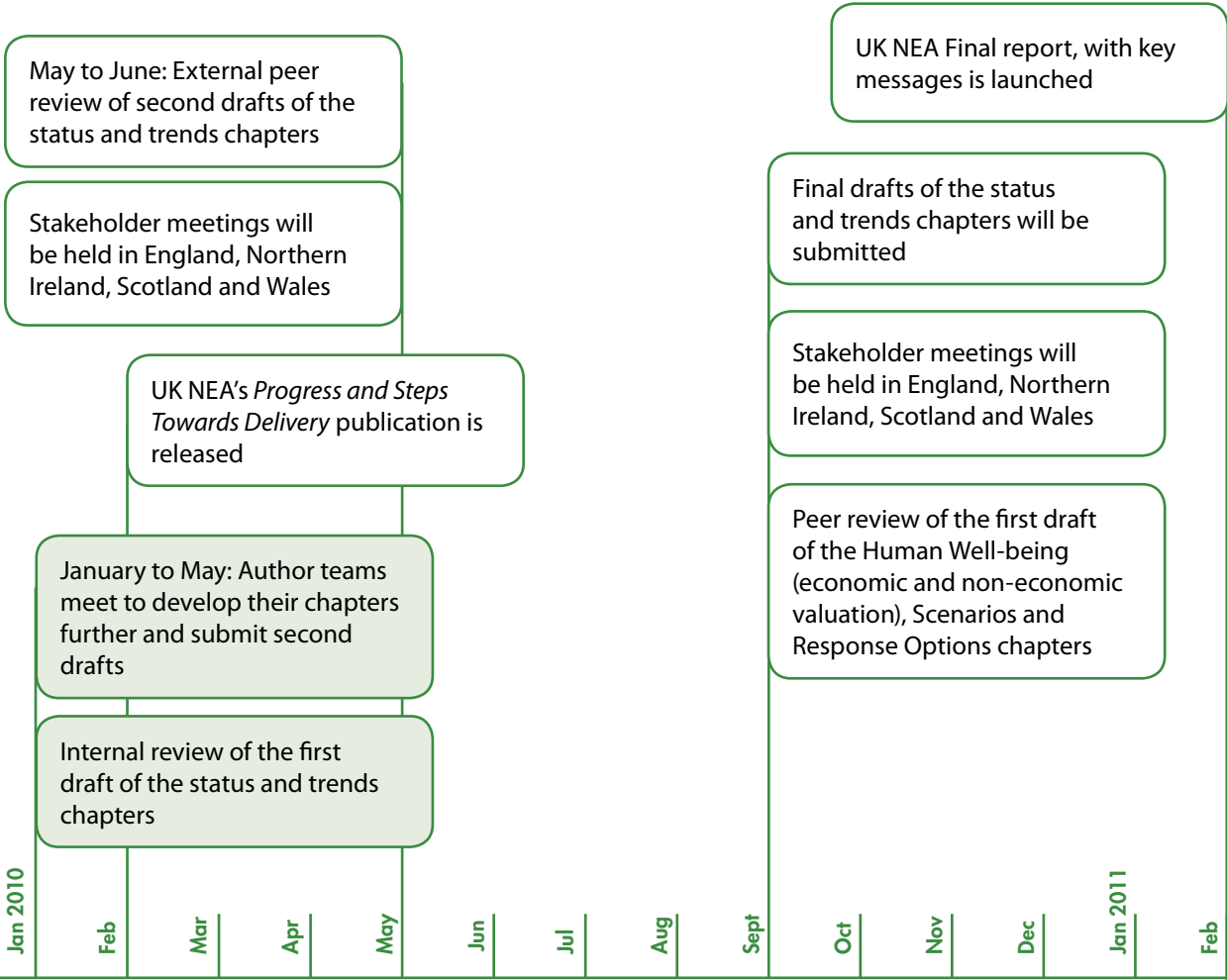
The **monetary valuation of goods** provided by the UK's ecosystem services

has commenced with input from an internationally renowned team of economists. This will be completed towards the end of 2010.

The second phase of the UK NEA will address how ecosystems and their services might change in the future under **plausible scenarios** and identify policy options to secure continued delivery of the UK's ecosystem services, for all of society. The working group for future scenarios has begun work on this section of the UK NEA. The UK NEA will also identify the key ecosystem services, upon which the UK depends, which are delivered by other countries, as well as the ecosystem services that the UK supplies to other countries.

Figure 3. Major milestones and key future dates for the UK NEA





Those involved in the UK NEA

A key feature of the two-year long UK NEA is that it is an inclusive process involving many government, academic, NGO and private sector institutions. Each institution or individual can offer valuable information and knowledge from a range of perspectives:

- **Co-Chairs** of the Expert Panel, *Professor Robert Watson* (Chief Scientific Adviser, Defra and Strategic Director, Tyndall Centre, University of East Anglia) and *Professor Steve Albon* (Macaulay Institute) are leading the assessment. *Professor Watson* brings his invaluable experience from Co-Chairing the MA and the Intergovernmental Panel on Climate Change (IPCC) to the UK NEA process.
- A diverse group of academics – consisting of natural scientists, economists and social scientists – form the 27-member **Expert Panel**. They provide expertise in all focus areas and advise on the assessment process.
- Consultations with and involvement of a wide range of public, private and third sector decision-makers and

stakeholders through a **User Group** help to shape the assessment process and ensure that the outputs will be relevant for different audiences.

- The 200 authors involved, managed by a group of **Co-ordinating Lead Authors** (largely natural scientists but including both economists and social scientists) are drawn from more than 50 academic institutions, together with representatives from seven government agencies and five NGOs.
- The organisations that commissioned the UK NEA – Defra (England), the devolved administrations of Northern Ireland, Scotland and Wales, together with some of the research councils (Natural Environment Research Council and Economic and Social Research Council) – are providing guidance and oversight via the **Client Group**.
- Co-ordinating all the different assessment activities is an independent **Secretariat**, provided by the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC).



How to get involved in the UK NEA

There are a number of opportunities for organisations and individuals to be involved in the UK NEA:

- Suggest case studies of particular initiatives, regions, sites or landowners that illustrate the supply of, or demand for, ecosystem services or the synergies and trade-offs that occur in managing ecosystems to maximise their services.
- Participate in one of several stakeholder workshops that will be taking place throughout the UK in 2010.
- Review the draft outputs; draft chapters of the final report will be available to download from the UK NEA website (<http://uknea.unep-wcmc.org>) in May 2010.
- In the final stages of the assessment the Secretariat will be looking for organisations to communicate the results of the UK NEA to a range of different user groups.

Please contact the Secretariat at nea@unep-wcmc.org to express your interest in becoming involved with any of the above.

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Contact details

The UK National Ecosystem Assessment Secretariat is based at UNEP World Conservation Monitoring Centre in Cambridge.

More information on the UK NEA can be found at <http://uknea.unep-wcmc.org>.

If you have any questions about the UK NEA please email nea@unep-wcmc.org.

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