

## **Background and progress of the UK National Ecosystem Assessment**

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For many years there have been attempts to develop an approach to the environment that goes beyond a philosophy of protecting the environment for its own sake and instead takes a full account of the value of the environment for human well-being. The Millennium Ecosystem Assessment (MA 2005), which ran from 2001 to 2005 assessed the consequences of ecosystem change for human well-being, and prior Scoping the potential benefits of undertaking an ecosystem assessment for England provided a state of the art scientific appraisal of the condition and trends in the world's ecosystems and the ecosystem services they provide. The Department for Environment Food and Rural Affairs (Defra) has been working for a number of years to develop an ecosystems approach for England. It published an Ecosystem Approach Action Plan in December 2007 (Defra, 2007). This recognised that the natural environment provides a wide range of goods and services – 'ecosystem services' – that underpin human health, wellbeing and prosperity, and that there was a need to develop a more strategic approach and a more integrated framework for policy-making and delivery. A key part of the action plan was to develop the evidence base to better guide and support the changes which might be needed in policy. A wide range of evidence projects have been funded, much of which was summarised in a Defra report entitled "Towards a deeper understanding of the value of nature" (Defra, 2010).

A key part of this evidence programme was a scoping study to assess the potential benefits of conducting an ecosystem assessment for England (Defra, 2008). This concluded that it would be feasible to conduct a national ecosystem assessment for England over an 18 month period for a cost of about £500k. In the event, agreement was reached between the Devolved Administrations and the Natural Environment Research Council (NERC) that an assessment would be conducted with a scope covering the whole of the United Kingdom, and funding was provided by Defra, NERC, ESRC (the Economic and Social Research Council), Scottish Government, Welsh Government and Northern Ireland Assembly to jointly fund the UK National Ecosystem Assessment. This agreement to collaborate was brokered by the Living With Environmental Change Partnership (LWEC), and the UKNEA was accredited as an LWEC project. LWEC is a partnership between 21 UK Government Departments, agencies and Research Councils to ensure that decision makers in government, business and society have the knowledge, foresight and tools to mitigate, adapt to and benefit from environmental change. The UKNEA is expected to be completed within about 2 years, and to cost around £1.5 million. The costs were greater than the original estimate partly because of the wider geographical scope (UK rather than just England), but also because there were significant additional modules funded (particularly the environmental economics module). The

UKNEA involved over 500 scientists and economists, many of whom provided many more hours of work than they were contractually obliged to provide.

### **Governance Arrangements**

All the funding parties acknowledged at the outset that it would be important for the assessment to be conducted independently of Government, and the project's governance arrangements were designed accordingly. The different elements of the governance arrangements were as follows:

**Client Group:** This was a small group with representatives from each of the funding bodies. Its role was to oversee the financial and contractual arrangements of the assessment, and to provide policy guidance.

**Expert Panel:** This was a group of 27 independent experts (natural and social scientists and economists), whose role was to provide intellectual leadership for the project, to sign-off each of the Chapters after they had been through external peer review, and to define the key messages emerging from the assessment.

**Two Expert Panel Co-Chairs:** The Co-Chairs chaired the meetings of the Expert Panel and provided a continuing executive leadership of the assessment on behalf of the Expert Panel. They were Professor Bob Watson (Chief Scientific Adviser for Defra and Strategic Director of the Tyndall Centre, University of East Anglia), and Professor Steve Albon (James Hutton Institute).

**User Group:** A group with members representing a wide range of public sector, private sector and third sector interests, who helped shape the assessment process and provided advice on the most appropriate format of the outputs for different audiences.

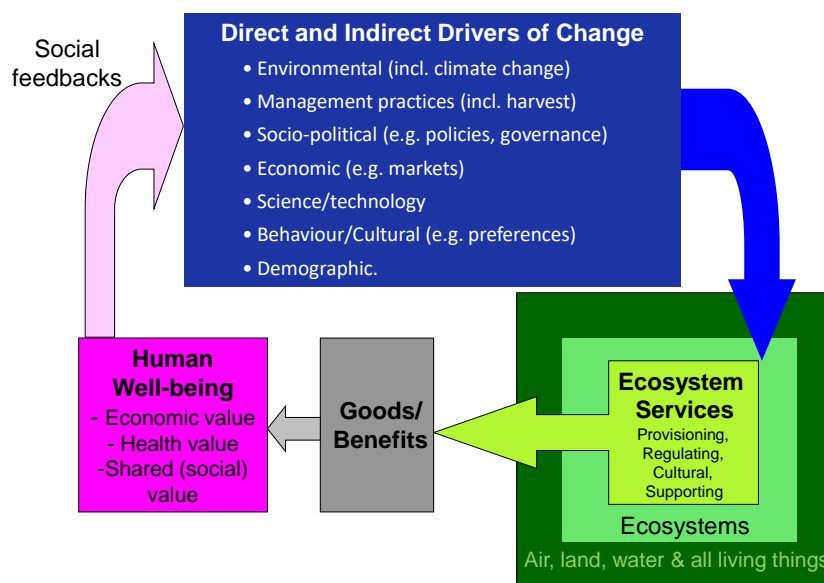
**Co-ordinating Lead Authors:** These were the lead authors for each of the 26 Chapters. Each was responsible for producing the final text for their chapter with the help of a small team of collaborating authors. In total more than 300 experts were involved in drafting the chapters.

**Independent peer reviewers:** Each chapter was reviewed by a number of peer reviewers, then revised by the Co-ordinating Lead Author before being reassessed by the Expert Panel and approved for publication.

**Secretariat:** The secretariat was provided by the United Nations Environment Programme Wildlife Conservation and Monitoring Centre (UNEP-WCMC). This organisation was contracted by Defra and the other funders to manage the delivery of the whole project, to issue and manage subcontracts with the other delivery partners, and to co-ordinate the different aspects of the assessment.

### **Technical background**

The Conceptual Framework of the UKNEA (Figure 1), is based on that of the Millennium Assessment which links human societies and their wellbeing with the environment and the ecosystem services it provides. Society influences the drivers of change, which in turn influence the ecosystems and the ecosystem services they produce. These services flow through to human society and affect human well-being, and these benefits can be valued in terms of economic value, health or shared social values. As with the Millennium Assessment, the ecosystem services are categorised as Supporting Service, Regulating Services, Provisioning Services or Cultural Services. The overall plan of the UKNEA was to look back at the status and trends of the UK's ecosystems and ecosystem services over the last 60 years and to predict what changes there might be over the next 50 years. This relied on a geographical framework to divide the UK into different ecosystems, a set of ecosystem services which would be assessed, a valuation framework which would attempt to calculate the value of different services, a set of scenarios which would explore possible futures, and an assessment which would examine historical trends and assess the potential impact of future changes. The final part of the assessment has been to explore different **Response options** which different sectors could take in response to the findings from the assessment.



**Figure 1 Conceptual Framework of the UKNEA showing the links between ecosystems, ecosystem services and human well-being.**

The **geographical framework** used by the Assessment is based on the Broad Habitats which have been mapped by the UK Countryside Survey (Carey et al, 2008), with the addition of a Marine Habitat (which is not included in Countryside Survey). The eight habitats considered are then:

Mountains, Moorlands & Heaths

Semi-natural grasslands

Enclosed farmland

Woodlands

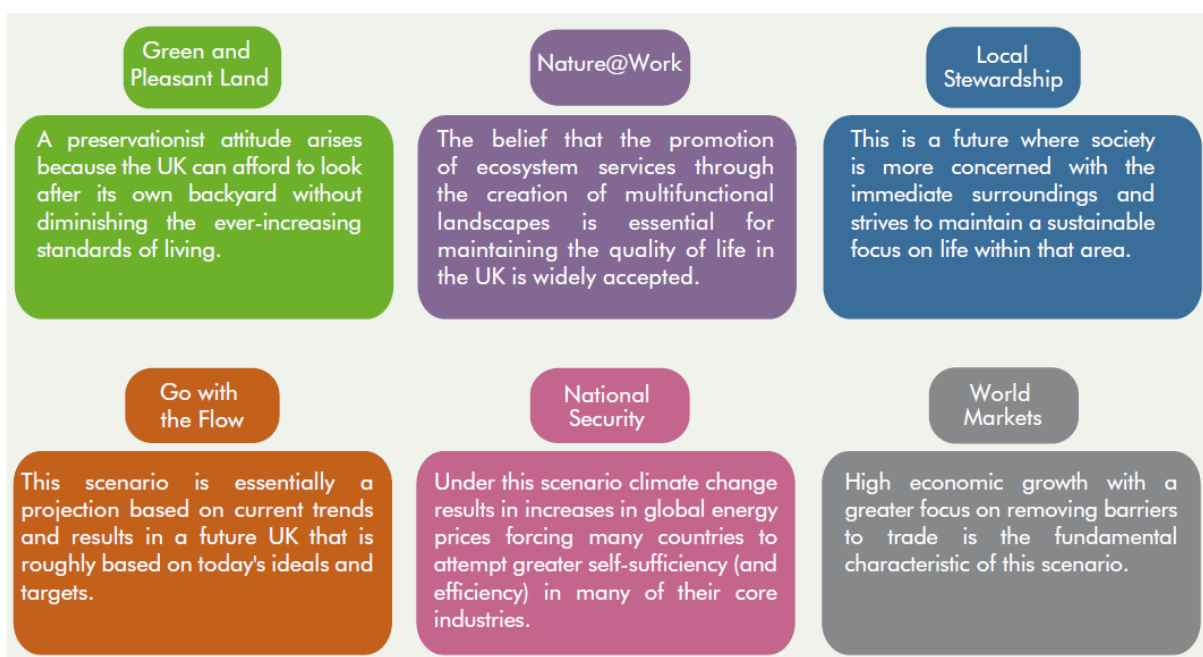
Freshwaters – Openwaters, wetlands & floodplains

Urban

Coastal margins

Marine

The **six scenarios** which have been developed are shown in Figure 2. These are not predictions of the future but indicate possible futures. The assessment will make predictions of what would happen to ecosystems and ecosystem services under each of these 6 scenarios.



**Figure 2: The six scenarios developed within the UK National Ecosystem Assessment**

**Assessment of the Value.** A significant part of the assessment has been to improve our understanding of how to value ecosystem services through the contribution they make to human well-being. The work on economic valuation has been led by Professor Ian Bateman of the University of East Anglia. The framework for valuation is shown in Figure 3 which demonstrates how ecosystem process such as weathering or soil formation lead into final ecosystem services such as crops or water supply. These in turn lead to goods and benefits for people, often only when combined with other inputs, such as capital infrastructure. The value of these benefits can then be calculated, either in monetary terms or in non-monetary terms such as improved health or social value.

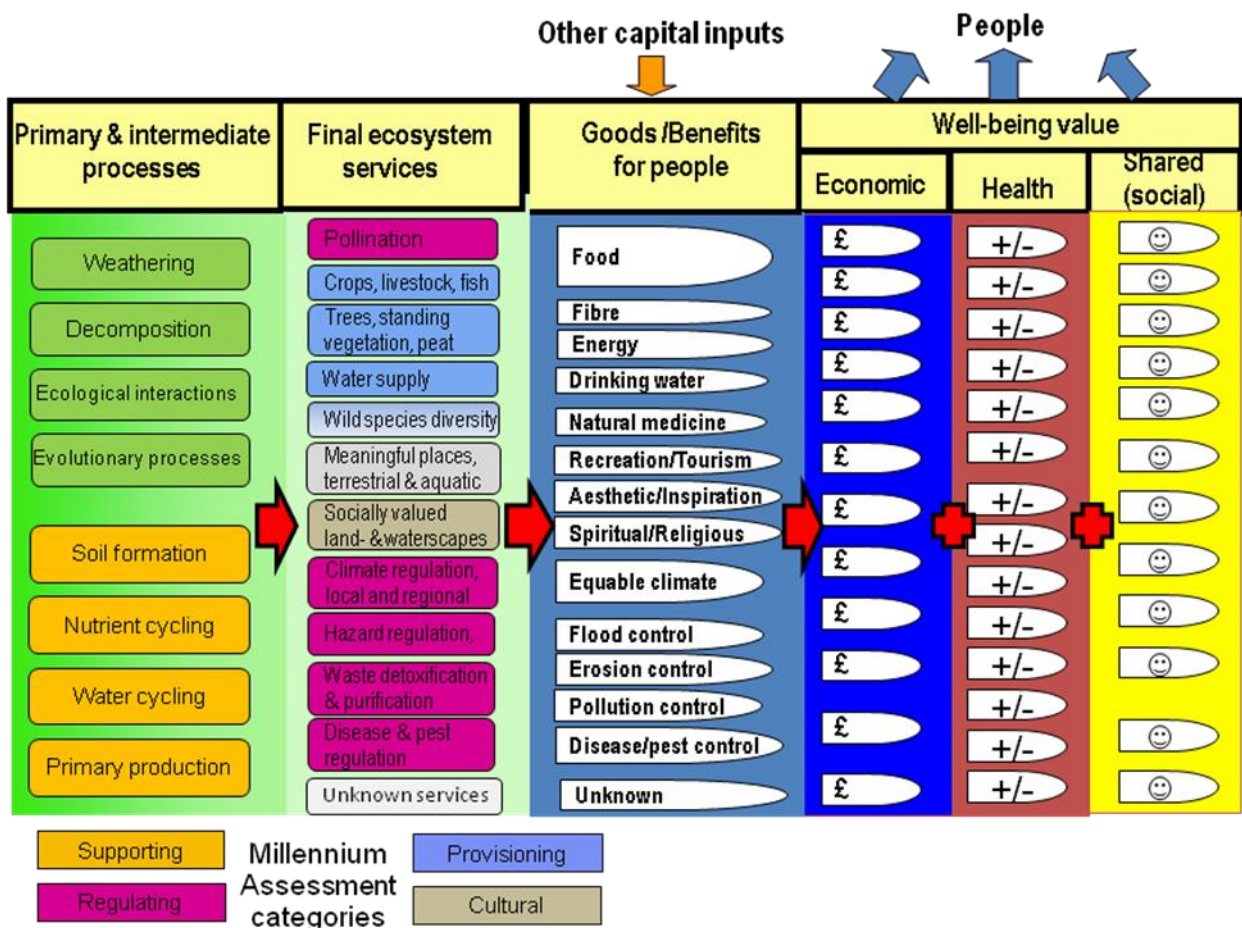


Figure 3 Diagram showing the framework for calculating the value of the benefits derived from UK ecosystems.

At the time of the Sibthorp Workshop, the results of the NEA were beginning to form, but had not at that stage been finalised by the Expert Panel. Since the Workshop, the full results have been published (UKNEA, 2011a and b), and in this published version it is appropriate to summarise the published results. There were six key messages identified by the Expert Panel from the UK National Ecosystem Assessment. These were:

- **The natural world, its biodiversity and its constituent ecosystems are critically important to our well-being and economic prosperity, but are consistently undervalued in conventional economic analyses and decision making.** Ecosystems and the services they deliver underpin our very existence. We depend on them to produce our food, regulate water supplies and climate, and breakdown waste products. We also value them in less obvious ways: contact with nature gives pleasure, provides recreation and is known to have a positive impact on long-term health and happiness.
- **Ecosystems and ecosystem services, and the ways people benefit from them, have changed markedly in the past 60 years, driven by changes in society.** During the second half of the 20th Century, the UK's population grew by roughly a quarter to nearly 62 million, living standards greatly increased and technological developments and globalisation had major effects on behaviour and consumption patterns. The production of food from agriculture increased dramatically, but many other ecosystem services, particularly those related to air, water and soil quality, declined.
- **The UK's ecosystems are currently delivering some services well, but others are still in long-term decline.** Of the range of services delivered in the UK by eight broad aquatic and terrestrial habitat types and their constituent biodiversity, about 30% have been assessed as currently declining. Many others are in a reduced or degraded state, including marine fisheries, wild species diversity and some of the services provided by soils. Reductions in ecosystem services are associated with declines in habitat extent or condition and changes in biodiversity, although the exact relationship between biodiversity and the ecosystem services it underpins is still incompletely understood.
- **The UK population will continue to grow, and its demands and expectations continue to evolve.** This is likely to increase pressures on ecosystem services in a future where climate change will have an accelerating impact both here and in the world at large. The UK's population is predicted to grow by nearly 10 million in the next 20 years. Climate change is expected to lead to more frequent severe weather events and alter rainfall patterns, with implications for agriculture, flood control and many other services. One major challenge is sustainable intensification of agriculture: increasing food production while decreasing the environmental footprint.
- **Actions taken and decisions made now will have consequences far into the future for ecosystems, ecosystem services and human well-being. It is important that these are understood, so that we can make the best possible choices, not just for society now but also for future generations.** Contemporary economic and participatory techniques allow us to estimate values for a wide range of ecosystem services. Applying these to scenarios of plausible futures shows that allowing decisions to be guided by market prices alone forgoes opportunities for major enhancements in ecosystem services, with negative consequences for social well-being. Recognising the value of ecosystem services more fully would allow the UK to

move towards a more sustainable future, in which the benefits of ecosystem services are better realised and more equitably distributed.

- **A move to sustainable development will require an appropriate mixture of regulations, technology, financial investment and education, as well as changes in individual and societal behaviour and adoption of a more integrated, rather than conventional sectoral, approach to ecosystem management.** This will need the involvement of a range of different actors – government, the private sector, voluntary organisations and civil society at large – in processes that are open and transparent enough to facilitate dialogue and collaboration and allow necessary trade-offs to be understood and agreed on when making decisions.

## Conclusions

The UKNEA has been a world-leading initiative to better understand the interaction between humans and our ecosystems. It has involved an active collaboration between the research community and the policy community. In many ways this has been assisted by the existence of a strong evidence base about the UK environment. The team involved has collated and analysed a huge volume of such existing data, and has added to it with further analysis providing a greatly improved understanding of the ways that ecosystems lead to societal benefits and how best to value those benefits.

A key further aspect of the UKNEA has been the tremendous collaborative nature of the project at the personal level. It has involved over 500 scientists and economists working over a very tight timescale to deliver an exciting and innovative project. The authors have been funded, but it is clear that many of the researchers have given far more of their time than has actually been funded, which must be attributable to the excitement and potential that this project has generated.

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