Think**BIG**

How and why landscape-scale conservation benefits wildlife, people and the wider economy




ENGLAND BIODIVERSITY GROUP

Contents

Foreword

In June 2011 the Government published the *Natural Environment White Paper* which set out a new direction of travel for managing and valuing the natural environment in England. The White Paper supports moves towards a landscape-scale approach to conservation and the greater recognition and valuing of the wider benefits (termed ecosystem services) that the natural environment provides for us and which underpin our economy, society and individual health and well-being.

This ThinkBIG report was jointly written by representatives of the conservation, land owning and farming communities together with statutory agencies who collectively make up the England Biodiversity Group. It sets out why the England Biodiversity Group supports the White Paper's move towards landscape-scale conservation and the significance of linking this to an ecosystem approach. It also provides advice on how to implement the recommendations of the Making Space for Nature review, which calls for 'more, bigger, better and joined' places for nature. The report does not go into policy detail but rather summarises the case for such an approach, highlights examples of where a landscape-scale approach is already being implemented and some lessons learnt.

ThinkBIG is intended to provide background and supporting information to local authorities, land managers, farmers, communities and Government agencies to support their delivery of the White Paper's recommendations.

Introduction

As an economy, as businesses and as communities, our health, well-being, security, future prosperity and sense of identity are influenced by and heavily dependent upon the natural environment[1]. If our towns, cities and countryside were well managed to support wildlife it is likely we would be economically, socially and culturally better off as a society[2]. Unfortunately, and despite much good work by landowners, farmers, foresters and environmental organisations, we have not managed our environment this way.

Despite some recent improvements, our attempts to reverse decades of decline in our wildlife[3], and the habitats in which it lives – our biodiversity – have not succeeded[4]. This has consequences not just for our wildlife. It means our economy and society suffer too and our communities are at greater risk from the likely consequences of climate change[5]. A more sustainable approach that benefits wildlife and the economy is needed. To achieve this we need to re-think our approach to conservation and to the environment. We need, in particular, to do three things.

First, we need to be thinking and acting at a much larger scale. We can no longer focus our efforts only on preserving and maintaining individual wildlife sites, important as this is. We need to look beyond these sites at the wider environment in our towns, cities and countryside. A landscape scale approach involves considering the whole landscape, managing it appropriately to make it more ecologically coherent and integrating a range of different land uses in a way that is sympathetic to the environment, in order to benefit both wildlife and people.

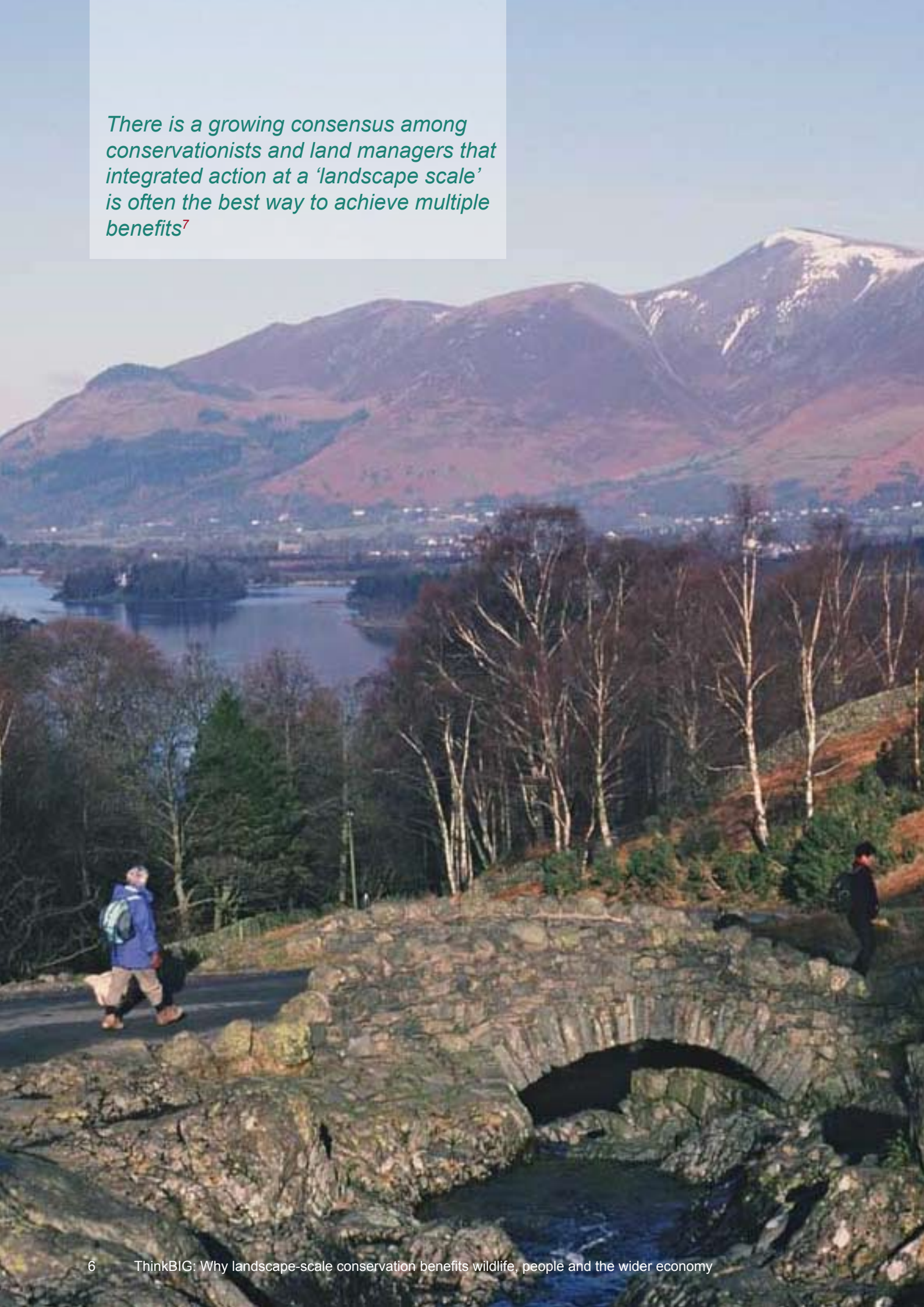
Second, we need to appreciate and value the wider benefits that wildlife and the natural environment can and do provide for people, the economy and society, in the form of ecosystem services. Only by recognising and valuing these can we hope to effect the change needed to help wildlife recover. Both of these principles, that of landscape-scale working and of valuing the natural environment and the ecosystem services it provides, lie at the heart of the *2011 Natural Environment White Paper*.

Third, we need to be better at ensuring that the way we manage our environment actually delivers for biodiversity, including for our rarest and most threatened wildlife[6]. We must make sure that their specific needs are incorporated into our approach to landscape scale delivery.

Landowners, farmers, foresters, wildlife charities, local authorities, business, Government and its agencies and communities have a crucial role to play in effecting these changes. Many are already doing good work (see section 6), but more is needed to support our wildlife and, in turn, deliver a more sustainable economy with healthy and resilient communities.

This report sets out why a move towards a landscape-scale approach is needed, provides examples of landscape-scale initiatives that are already underway in this country and abroad and suggests ways in which local authorities, communities, business, landowners, farmers, foresters, investors, Government and its agencies and environmental and wildlife charities and civil society organisations can help facilitate this.

There is a growing consensus among conservationists and land managers that integrated action at a 'landscape scale' is often the best way to achieve multiple benefits[7]



Landscape-scale: what is it and why is it needed?

What

'Landscape scale conservation is characterised by the pursuit of multiple benefits across a defined area (e.g. water quality, biodiversity, access). The best examples also make links to wider economic and social priorities, where enhancing nature can provide benefits to the local economy and quality of life'[8] **Natural Environment White Paper**

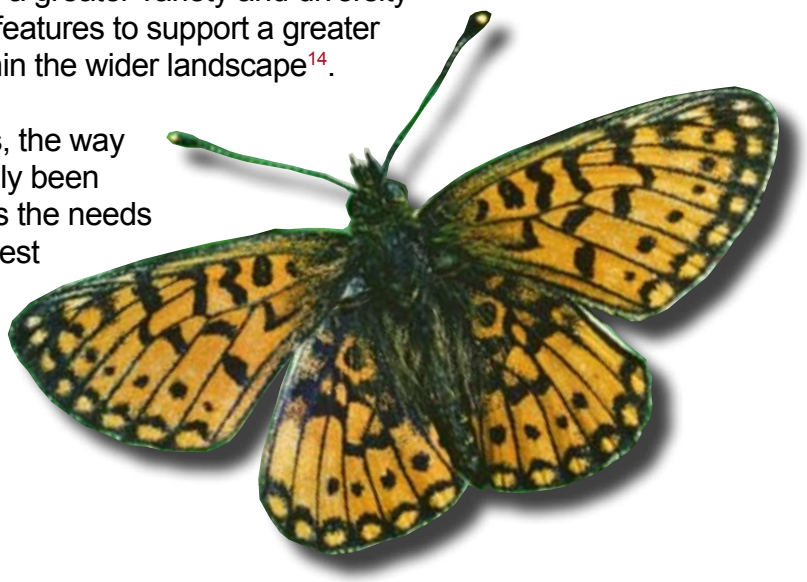
Why

'We need a step-change in our approach to wildlife conservation, from trying to hang on to what we have, to one of large-scale habitat restoration and recreation, under-pinned by the re-establishment of ecological processes and ecosystem services, for the benefits of both people and wildlife'[9] **Professor Sir John Lawton**

For wildlife

The continued loss and decline of wildlife in England, despite excellent work by landowners, farmers, foresters and conservation organisations, points to a wider problem. Many wildlife sites are now well managed[10] and England's important Sites of Special Scientific Interest (SSSIs) are improving after many years of neglect[11]. However, the wider landscape in which these sites sit continues to be of variable quality. This is important because wildlife depends as much on land that lies outside existing wildlife reserves as it does within them. Equally importantly, many of these reserves and protected sites are small (77% of SSSIs are less than 100 hectares in size – equivalent to 100 rugby pitches), fragmented and isolated havens[12] in a wider landscape containing limited places for wildlife to live. We need to re-establish linkages and stepping stones between these sites and the wider landscape to enable wildlife to move and re-colonise old territories[13] and we need to enhance the overall environmental quality of our rural and urban landscapes to enable such movement and re-colonisation to occur. We also need a greater variety and diversity – heterogeneity – of habitat types and features to support a greater number and wider range of wildlife within the wider landscape[14].

Even within our existing protected sites, the way that many of these sites have historically been managed sometimes misses or ignores the needs of some of our most endangered or rarest wildlife. Many individual species require particular habitat niches, or features where they live, in order to survive and reproduce.



For example, the presence of patches of bare ground is needed by certain insects and reptiles, while many birds, butterflies and plants need ponds or clearings within woodland. The Brecklands in Norfolk, home to some of England's rarest wildlife, provides an example of how important such niches can be can. Because the heathland here has been left undisturbed, the many plants and insects that need disturbed and bare ground are in decline[15]. In short, and as concluded by Professor Sir John Lawton's 2010 report *Making Space for Nature*[16], we need to make our sites work harder for wildlife now and in the future by ensuring they provide greater complexity and a mosaic or patchwork of habitat types and features within them if they are to benefit the greatest number of species.

In order for wildlife to prosper we need, as set out in *Making Space for Nature 'more, bigger, better and joined'* sites. That does not mean we need to turn vast swathes of land over exclusively to wildlife management. As a nation we still need an economy that deliversfood, jobs and housing. There are already pressures on the supply of all of these, pressures which are expected to increase[17]. But it does mean that we need to better integrate the needs of wildlife into land-use decisions and management, both in our countryside and in our towns and cities. In so doing, we are likely to benefit not just wildlife but our economy and society as a whole through the provision of ecosystem services (see below).

Such management is not without cost. In towns and cities the business case for providing green infrastructure that can benefit wildlife and deliver ecosystem services, such as improved health or surface water management has increasingly been made[18]. However, in the countryside challenges remain to provide the financial mechanisms needed to cover the costs, or make it profitable, for farmers and landowners to implement such change. The total cost to farmers of landscape management outside agri-environment schemes across England was estimated to be £412m per year in 2006[19]. More recently it has also been estimated that if farmers and land managers were to be paid through agri-environment schemes for the delivery of all biodiversity objectives in England this would cost in the region of £624.4m per annum[20]. Landowners, farmers and foresters own the solution to making real change in the countryside. If they agreed the collective environmental challenges within their local area and each adopted complementary management over property boundaries then a real increase in wildlife might be seen. However it needs to be acknowledged that such management is not without cost and financial mechanisms must be devised to offset these costs or make such management more profitable in order for it to be delivered.

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For people

Our economy and society relies upon a wide range of goods and services that we obtain from the natural environment. Known collectively as ecosystem services they encompass a wide range of benefits, from growing the food we eat, cleansing the water we drink, protecting of our homes and property from floods, providing raw materials for medicine, industry and commerce and as places to visit, enjoy and relax or exercise in. The full range of ecosystem services we receive from the natural environment are summarised in Table 1 below.

Table 1: Ecosystem services[21]

Category	Example of ecosystem service provided
Provisioning services	• Food • Fibre and fuel • Biochemicals, natural medicine and pharmaceuticals • Genetic resources • Ornamental resources • Fresh water
Regulating services	• Air-quality regulation • Climate regulation • Water regulation • Pest regulation • Disease regulation/health • Erosion control • Water purification/detoxification and waste treatment • Natural hazard protection • Pollination
Cultural services	• Spiritual and religious value • Inspiration for art, folklore, architecture etc • Social relations • Aesthetic values • Cultural heritage values • Recreation and tourism
Supporting services, necessary for the production of all other ecosystem services	• Soil formation and retention • Nutrient cycling • Primary production • Water cycling • Production of atmospheric oxygen • Provision of habitat

Biodiversity underpins ecosystem goods and services through the functional role it plays within ecosystems[22]

Ecosystem services are delivered by a healthy ecosystem. If people, the economy and society are to gain the maximum benefit we need to think about maintaining and repairing whole ecosystems and all the services they can provide[23]. Scale, therefore, is a consideration – we will often need to conserve and manage the environment over large areas in order to restore functioning ecosystems. As an example, to protect our homes and businesses from flooding we need to manage the entire river catchment (from its source to mouth and all the land that drains into the river) in a manner that reduces water run-off and increases the catchment's flood storage capacity. For too long we have taken a piecemeal approach, trying to manage or alleviate specific issues at a local level when we need to manage at a landscape-scale if we are to maximise the ecosystem services the natural environment can provide.

Biodiversity plays a key, albeit not yet fully understood, role in enhancing and/or stabilising many ecosystem services[24]. It forms the building blocks that help ensure these ecosystems deliver the services we need. Without the wildlife we risk getting second-rate services. Wildlife not only provides the building blocks, but the absence of species from landscapes we know can support them gives us an early warning that something is wrong. For example, the absence of certain insect species can indicate poor river water quality[25].

Across much of our towns and countryside the value of the ecosystem services we derive from the environment is huge. The National Ecosystem Assessment[26] estimates that our coastal wetlands provides us with £1.5 billion annually of 'free' coastal defence. In other words, this is a huge saving to taxpayers who, were it not for such natural coastal defences, would have to pay for additional work to protect coastal towns and communities from flooding. Equally, 84% of European crops and 80% of wildflowers rely on wild insect pollination. The value of pollination to UK agriculture is £440 million per year (13% of the total value of agriculture)[27]. All of these benefits would have had to be paid for were they not provided free by the natural environment.

If we and nature are to derive the maximum benefit, both in terms of ecosystem services and biodiversity, big is undoubtedly better[28]. Expanding out from the core of an existing well managed or protected site will increase the living space for wildlife and increase its chances of adapting to climate change. It will also help to reduce external pressures, such as pollution, on these sites and provide strengthened ecosystem services[29]. However, it can also be as much the sum of the parts that matters as the whole. Even the smallest area of land or building can contribute towards a landscape-scale approach provided they are connected or are acting as a stepping stone that enables wildlife to move across a wider landscape. All we need to do is to better join up these areas by working with our neighbours, friends, fellow landowners or businesses so that collectively we enhance a far, far bigger area. Landowners know that it is no good just one or two of them trying to control deer to prevent their woodlands from being damaged, it requires all of the landowners in the area to do the same or the problem just returns[30].

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Equally, in terms of ecosystem services the city business that installs a green roof to cool and shade their building from the summer heat would derive an even bigger benefit if all the other building owners in their town or city did the same. This is equally true for the insects, plants and birds that live or feed on the roof which would benefit from the greater area and 'connectivity' provided by a greater number of such roofs.

In short, with a clear vision and objectives we can all play our part, whether the areas of land we manage is a few square metres in size or a few hundred square kilometres. Be it built-up or rural, on the coast or inland, mountain or lowland, flat or manor, all can play their part. The vital thing is that we work collectively as individuals, communities, charities and businesses, national or local government, public or private sectors.

Landscape-scale in practice

In England and elsewhere examples can be found of landscape-scale initiatives that are delivering benefits for people and wildlife. They provide valuable insights into the benefits that such an approach can bring as well as illustrating some of the challenges that operating at a landscape-scale can present. All demonstrate that every sector of society and the economy can and should play a part. Equally, they highlight that there is no one size fits all solution.

Landscape-scale in practice – upland example:

Moors for the Future

An exciting moorland restoration project covering an area in excess of 30 square kilometres of The Peak District and South Pennines. The project is enhancing biodiversity (including rare blanket bog and heather habitat); water management, repairing access erosion, fire management, and the sinking and storage of carbon in peat. The project aim is to manage the moorland sustainably. More information can be found at: **http://www.moorsforthefuture.org.uk**

Ecosystem Services Enhanced	Climate regulation Water regulation Erosion regulation Recreation & tourism
Wildlife Gain Delivered	Peat moorland restoration Ground nesting bird protection

"We want the peatlands to be as healthy as possible so they can support their special wildlife, provide inspiration and enjoyment and function as an effective carbon store."

Jon Stewart, Natural England

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Landscape-scale in practice – lowland example:

Thames Gateway Partnership – Parklands Programme

The Thames Gateway Parklands Programme has already delivered 15 key projects across East London, North Kent and South Essex, including over 600 hectares of new green space, over 2000 hectares of enhanced green space, 7 kilometres of Thames Estuary Path and 110 hectares of SSSI improvements. The contribution that this large scale investment has already made to environmental quality across the Thames Gateway is evident. More natural greenspaces and places where people can enjoy nature have improved the sense of place, in turn providing a stimulus for new economic development. More information can be found at:

http://www.naturalengland.org.uk/regions/london/ourwork/integratedprojects.aspx

Ecosystem Services Enhanced (examples)	Recreation & tourism Natural hazard regulation Water regulation
Wildlife Gain Delivered	118 ha new and enhanced habitat 110 ha SSSI enhanced 10.3 km waterways and canals restored

"The Parklands programme has already made great strides in transforming perceptions of place on the ground as well as the quality of life. All over the estuary new high quality landscapes are being created. These will have a lasting impact on the estuary's potential as an engine room for growth in the Greater South East. Continuing support for Parklands is a critical part of maintaining London's status as a world city."

Sir Terry Farrell, 2010 –
internationally renowned architect

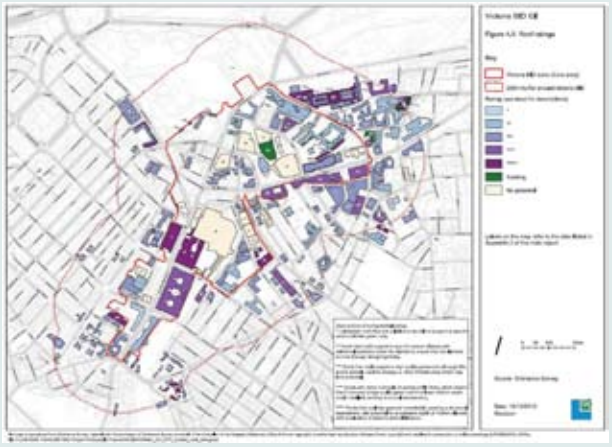
Landscape-scale in practice – private sector-led example:

Victoria Business Improvement District – Greening Victoria SW1

Private companies in Central London, such as Land Securities and the John Lewis Partnership, are part of a business-led partnership championing a sustainable green agenda for the SW1 area in London that will benefit wildlife, business and local communities. The BID intends to strengthen awareness amongst the business community by implementing measures that will secure and maintain SW1 as a leader in sustainable business environments. Initiatives range from retrofitting green infrastructure in order to reduce surface water flooding and support wildlife, monitoring and reducing the area's carbon dioxide emissions, to reducing signage clutter and promoting a cleaner, more efficient and accessible Victoria. A landmark audit commissioned by the BID identified that an area of new habitat equivalent in size to St James' Park could be retrofitted onto existing roof space in the BID area and help provide 'stepping stones' for wildlife across the heart of the capital. More information can be found at: **http://www.insw1.com/Clean-and-Green-5632.html**

Ecosystem Services Enhanced (examples) *	Water regulation Climate regulation Aesthetic value Tourism
Wildlife Gain Delivered (examples) *	Replacement of scarce brownfield habitat Thames terrace invertebrate habitat House sparrow habitat

* at the time of writing the project was just beginning to move into its delivery stage so these are anticipated beneficiaries.



Audit map of green roof opportunities within Victoria BID area.

"The BID is championing a sustainable green agenda for the SW1 area and is looking to become the leader in the development of sustainable business environments through retrofitting of GI. We are working closely with public and private sector partners to achieve a positive change in the physical landscape in and around Victoria. The increase in green infrastructure will not only benefit the environment but also the workers, residents and visitors that come into Victoria on a daily basis."

Ruth Duston, CEO Victoria BID

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Landscape-scale in practice – farmer-led example:

The West Cambridgeshire Hundreds Project

In 2005 private local landowners considered how they could work together to connect areas of Ancient Woodland. Initially they asked a land agent to identify all of the relevant landowners and land managers within the local area. They approached conservation organisations and received support from the Woodland Trust and the Wildlife Trust. The West Cambridgeshire Hundreds project now covers more than 10,000 hectares.

The landowners funded a Landscape and Conservation Masterplan to identify the priorities for action. They agreed that the goal of the partnership was to establish an exemplar of environmentally conscious landscape management in South West Cambridgeshire, primarily through connecting habitats with wildlife corridors. They also agreed a Terms of Reference for the project which recognised the importance of commercial agriculture and field sports within the project area. Unlike many landscape projects the landowners took the decision to have a 'fuzzy' project boundary in order that those with an interest and relevant landscape/biodiversity features could take part should they wish to. Alongside enhancing the environment, the project has created a forum for discussing such topics as deer management, machinery sharing and woodchip for fuel, potentially creating new business opportunities. The project has also involved local schools through tree planting. More information can be found at:

http://www.wildlifebcnp.org/LivingLandscapes6.htm

Ecosystem Services Enhanced (examples)	Wood production (wood chip for wood burners) Biomass production Landscape Recreation and tourism through permissive paths and field sports
Wildlife Gain Delivered (examples)	Ancient Woodland Sites enhanced and restored New bat habitats Wet grassland Grass headlands

Landscape-scale in practice – new development example:

Cambourne New Town

Built on former farmland Cambourne in Cambridgeshire was designed as a new town development that would have wildlife and greenspace at its heart. The development incorporated existing habitats, such as woodland, as well as creating new areas of habitat and accessible greenspace for local residents. The project involved close cooperation between the developers, local Wildlife Trusts, architects and the local authority. Care was taken to create new habitats typical of that area of Cambridgeshire, including increasingly threatened orchard habitats which in turn provide a resource for local residents. Following completion of the development the new town has attracted many surprising new residents, including the return of Wasp Spiders, previously extinct in Cambridgeshire but which have now found a home in Cambourne, More information about Cambourne New Town can be found at:

http://www.carltd.com/downloads/Cambourne.pdf

Ecosystem Services Enhanced (examples)	Recreation and tourism Health Water regulation Climate regulation
Wildlife Gain Delivered (examples)	45 ha new woodland 6 ha new lakes

"We were pleased to see that the master plan aimed to keep the best habitats – three blocks of old woodland, six farm ponds, a few stretches of hedgerow and patches of grassland – and then to link them together with wildlife corridors and an eco-park."

Brian Eversham, Chief Executive Beds, Cambs, Northants and Peterborough Wildlife Trust

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Landscape-scale in practice – urban example:

All London Green-Grid

Covering the entirety of Greater London this is an innovative initiative that works through the planning system to improve London's (initially East London but now extended across London) provision of open space and provide a range of formal and informal recreational uses and landscapes, promoting healthy living. The grid provides a spatial framework covering the whole Capital that identifies existing and potential 'greening' opportunities that are embedded in sub-area frameworks for subsequent delivery via planning or other mechanisms. It will help London adapt to climate change by reducing flood risk and enhancing surface water management. It will provide beautiful, diverse and managed green infrastructure to the highest standards for people and wildlife. It focuses in particular upon delivering enhancements through the planning process. More information can be found at:

http://www.designforlondon.gov.uk/what-we-do/all/all-london-green-grid/

Ecosystem Services Enhanced (examples)	Recreation and tourism Health Water regulation Climate regulation
Wildlife Gain Delivered (examples)	Floodplain grazing marsh creation and enhancement Street tree and urban woodland creation Urban river restoration

"The Beam Parklands project significantly enhances the local environment and gives the opportunity for thousands of people to have access to a quality public space as well as contributing to the wider landscape framework of the East London Green Grid."

Jon Crudas, MP for Dagenham and Rainham

Landscape-scale in practice – international example:

The Lower Columbia River Estuary Partnership – USA

The Lower Columbia River Estuary Partnership works to protect and restore the nationally significant lower Columbia River estuary with on-the-ground improvements and education and information programs. To augment existing efforts, the Estuary Partnership focuses on bringing together the whole picture; building the capacity of partners, levering resources and providing information; and removing barriers to better management of the lower Columbia River through collaboration, convening and coordination. More information can be found at: **http://www.lcrep.org/**

Ecosystem Services Enhanced (examples)	Recreation and tourism Health Water regulation Climate regulation
Wildlife Gain Delivered (examples)	520 acres floodplain restored 300 acres Salmonid rearing habitat created Bald eagle nests protected

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Landscape-scale in practice – new initiatives across England:

Pilot Integrated Biodiversity Delivery Areas in England

In 2010 the England Biodiversity Group established 8 pilot landscape-scale initiatives across England. Known as Integrated Biodiversity Delivery Areas (IBDAs) these pilot projects bring together a range of organisations, existing projects and sectors to enhance the wildlife value of large parts of England and deliver enhanced ecosystem services to local communities. More information can be found at:

http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/integratedbiodiversitydeliveryareas/default.aspx g.uk

Potential Ecosystem Services Enhanced (examples) *	Recreation and tourism Health Water regulation Climate regulation Flood protection
Potential Wildlife Gain Delivered (examples) *	Better integration of species into habitat management Strengthening the wildlife value of green infrastructure projects

* IBDAs are a new initiatives and at the time of writing were still in the process of developing their work areas and activities.

As can be seen from these examples a number of conservation and land management organisations also have a range of landscape-scale projects underway or planned. Further information about these projects can be found in Annex A.

At a fundamental level, all economies and businesses depend directly or indirectly on the conservation of biodiversity and the sustainable supply of ecosystem services[31]

Landscape-scale – keys to success and challenges

There is no one-size fits all solution to successfully establishing or implementing a landscape-scale project. All are different and need to reflect and meet local challenges and opportunities. However, the experience of past and present projects highlights that there are some general principles which can be applied and lessons learned. These are as follows:

Information – Knowing the current state of the environment within a landscape-scale area and having information about its potential (about both wildlife it can support and the ecosystem services it can provide and about other existing projects to link up with) is vital in order to be able to measure progress and identify and realise the environmental potential of an area. However, these data may be held by many disparate organisations and can be difficult to identify or obtain. Improving the collation, sharing and publication of data would certainly assist landscape-scale projects achieve their desired outcomes. Nationally the

Government has committed to making data held by public sector organisations more readily available, including environmental data in particular. In addition, both Natural England and the Environment Agency have developed approaches for making landscape-scale information more readily available as follows;

- **Natural England** – is developing National Character Area profiles which provide information on the current state of the environment and its potential for each of the 159 national character areas that together cover the entirety of England (see http://www.naturalengland.org.uk/ourwork/landscape/englands/character/areas/default.aspx).

- **The Environment Agency** – has produced individual catchment flood management plans for England's rivers which provides detailed information about future flood management issues and how these can be addressed (http://www.environment-agency.gov.uk/research/planning/33586.aspx).

- Both agencies are working closely together to ensure that environmental information is brought together at a large spatial level so that anyone interested can see what the opportunities and potential benefits are in any particular area and, thereby, work together to achieve these.

In addition to the above, biodiversity opportunity maps covering all of England have been produced by regional biodiversity partnerships and local record centres and the national biodiversity network (www.nbn.org.uk) hold a wealth of wildlife data.

Finally, many local authorities employ professional ecologists to provide advice and expertise. These can be an excellent source of information and advice and many can be contacted through the Association of Local Government Ecologists http://www.alge.org.uk.

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Partnership – our natural environment is owned, managed and regulated by a complex range of organisations and many more groups and communities have a direct interest in it, be they anglers, dog walkers or local businesses. The larger the area, the greater the number of stakeholder groups there are likely to be. Not all will want the same thing, but working collaboratively and in partnership is essential to securing success. Different organisations have diverse skills, knowledge and resources that they can bring into a partnership. Government and its agencies have access to information and expertise which needs to be made available. Farmers, foresters, landowners, wildlife and environmental organisations also have expertise but most crucially they have the skills and ability to make change happen on the ground. However, complexities of land tenure and ownership can, in some instances, work against bringing together those who work the land. Where landscape-scale working is being attempted, it is vital that all partners focus and utilise their resources collaboratively and overcome any such ownership or tenure issues to help meet the aims of the project. In addition, nature, and the ecosystem services it provides, is no respecter of institutional boundaries. Landscape-scale working requires collaboration between and across different organisational, political and administrative areas. The Government's new Localism Bill places a responsibility on local authorities to collaborate on issues of mutual concern and interest, such as the natural environment and the enhancement of ecosystem services[32]. Local government will have a key role to play in turning landscape-scale ambitions into reality. The All London Green Grid is one example of how this is being achieved[33].

Co-ordination – all organisations that have been involved in developing or implementing landscape-scale projects have highlighted a common requirement, namely the need for a project coordinator. Such a person could be an employee of one of the organisations involved in the project or a volunteer but the existence of such a person, with the relevant skills, is essential to the successful implementation of any complex, multi-partner initiative – as most landscape-scale projects are.

Carrots and Sticks – regulation has played a key role in ensuring the continued protection of England's most important wildlife sites and will continue to do so. Indeed, a number of successful landscape-scale initiatives were at least partly driven by the regulatory requirement to protect sites within them that were being adversely affected by factors influencing the surrounding area[34]. The polluter pays principle is also one which is well established in English law and has sought to ensure that organisations or individuals who harm the environment pay towards repairing the damage done. Until recently, however, many of the ecosystem services which biodiversity serves to underpin or provide went unaccounted for in economic terms. There existed no mechanism to reflect or show their true value. Economically speaking they were 'environmental externalities[35] '. As a consequence:

'Market prices and private production costs fail to reflect the full value of biodiversity and ecosystem services – economic incentives to provide biodiversity benefits are weak as are the incentives to avoid harm'. [36]

In recent decades, moves have begun to address this and reward those who provide environmental benefits by realising the value of their actions. Payments to farmers and landowners via Environmental Stewardship are one such example[37]. Farmers and landowners who agree to undertake work that will improve the environment or benefit wildlife on their farm can receive payments, via Environmental Stewardship, which contribute towards the cost of this environmental management for the wider public goods provided. In locations where greater gains can be secured (in terms of wildlife and ecosystem services) from bringing a larger area into Environmental Stewardship, farmers and landowners can enter into collaborative Higher Level Stewardship agreements. In addition to existing schemes, Government is also exploring the idea of extending the provider benefits principle more widely. Examples could include providing financial recognition to a landowner who allows their land to act as flood storage from the beneficiaries, who in this instance could be communities downstream who benefit from the management because their properties are less likely to flood.

Industry has already begun to develop such provider benefits initiatives, with United Utilities developing a Sustainable Catchment Management Programme (SCAMP) in association with the RSPB[38]. The project coordinates Environmental Stewardship payments and industry incentives to encourage changes in land management techniques in Bowland and the Peak District that benefit wildlife and biodiversity and which in turn improve water quality. The Government is also actively looking at ways to establish markets (for example, in the form of offsets) for biodiversity and also, potentially, the creation of markets for ecosystem services. Biodiversity offsets are well established in a number of countries, such as the United States, and provide a mechanism to provide funds for landscape-scale conservation via the sale of credits to developers[39]. Last year, PricewaterhouseCoopers identified biodiversity offsets and the establishment of ecosystem markets as one of a number of key developments that business needs to both prepare for, and which it could potentially benefit from, if the challenge of continued global biodiversity loss and ecosystem service degradation was to be addressed[40]. In short, there are emerging opportunities to establish novel or market-based incentives for landscape-scale working.

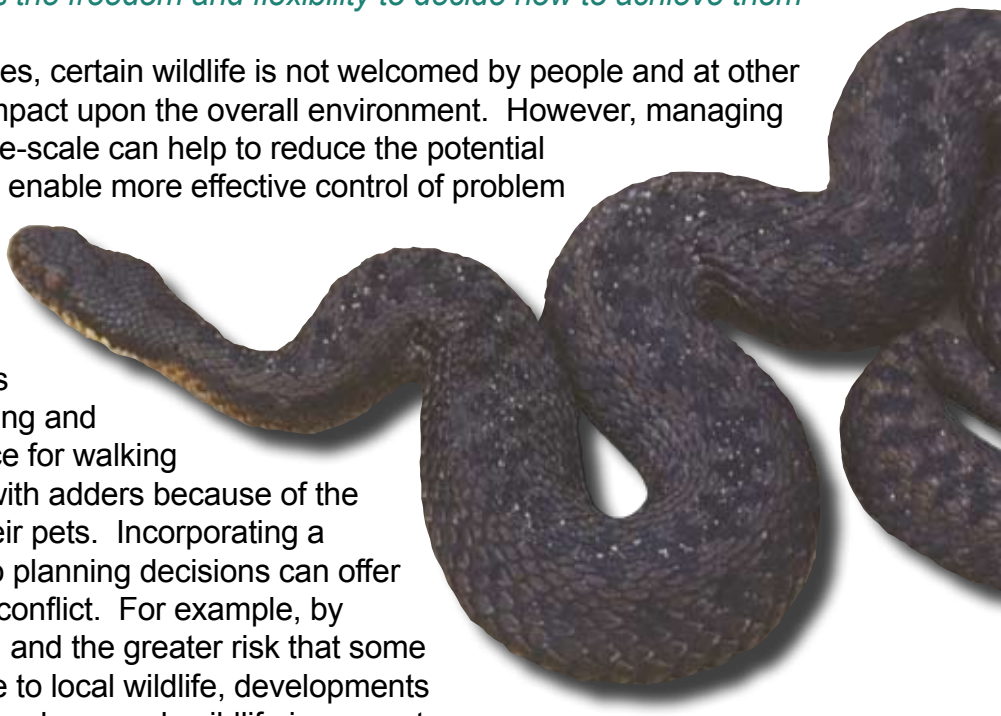
Managing for wildlife is not without cost, but it can also provide new economic opportunities. Mechanisms that can compensate those whose business is impacted by wildlife or which provide sustainable funding sources to support management practices that benefit wildlife should be supported. This can be achieved, in some instances, through the creation of new revenue streams, that can provide local communities, farmers, foresters or landowners with financial incentives to protect and accommodate such wildlife. One example of how this can be done successfully is through the establishment of a market for products or services associated with wildlife or the habitats in which they live. Woodlands and forests provide a good example of how this can be achieved. The sustainable management of woodland and forests for timber products or biomass fuel can not only provide a direct revenue stream for the woodland owner or forester, but the management itself can increase the importance of the woodland to wildlife[41]. Wildlife tourism also offers opportunities to provide a financial return to local communities and businesses, and can provide local jobs. Such an approach has been successfully adopted in parts of the developing world[42] and could be further developed in England. The RSPB estimates that £3.5m is already spent each year by visitors to Osprey-watching sites in the UK[43].

Strategic and local – one of the advantages of undertaking activities that will benefit wildlife is that (as is shown in the next section) irrespective of ability everyone can do something, whether as an individual, community, organisation or business, and everyone benefits. Across the country over 9 million people are members of wildlife organisations and 2.86 billion outdoor recreational visits were made in England during 2009/10[44]. But, in order for landscape-scale restoration to be effective there needs to be a strategy to help ensure informed local decisions. There exist examples of well-intentioned projects that have failed to deliver the wildlife or ecosystem service benefits envisaged because there was no strategic coordination. Examples include, trees planted on existing important grassland habitats and new habitats created that were too far apart or which had no plans in place for their longer-term management and so rapidly deteriorated.

Government, its agencies, local authorities, wildlife and environmental organisations all have a key role and responsibility to ensure that the enthusiasm that exists to help or enjoy the benefits of the natural environment, the local drive that gets things done and appreciated, is coordinated and achieved in a sustainable way that does not inadvertently replace something good with something less good. This strategic requirement is highlighted in the case studies cited in Section 4 and has been recognised by Government in the *Natural Environment White Paper* which calls for a 'Single Voice' between the Environment Agency, Forestry Commission and Natural England to:

'provide a unified and authoritative source of advice which sets clear objectives but allows partnerships and local councils the freedom and flexibility to decide how to achieve them' [45]

Managing conflict – sometimes, certain wildlife is not welcomed by people and at other times it can have a negative impact upon the overall environment. However, managing the environment at a landscape-scale can help to reduce the potential of such conflicts occurring and enable more effective control of problem wildlife to be undertaken. An example of the former is England's only venomous snake, the adder, which is legally protected because of its rarity. Pressure for new housing and a lack of alternative open space for walking can bring people into conflict with adders because of the perceived threat to them or their pets. Incorporating a landscape-scale approach into planning decisions can offer a solution that manages such conflict. For example, by recognising the perceived risk, and the greater risk that some people and their pets can pose to local wildlife, developments can be located away from sites where such wildlife is present. Planning can also be used to provide alternative open space for local people to use that reduces the chance of people, their pets and wildlife coming into conflict. One example of where planning policy has taken just such an approach can be found in Hampshire, where a landscape-scale approach is used to manage conflict between ground nesting birds, which can easily be disturbed by dog walking activities, and new developments[46] .

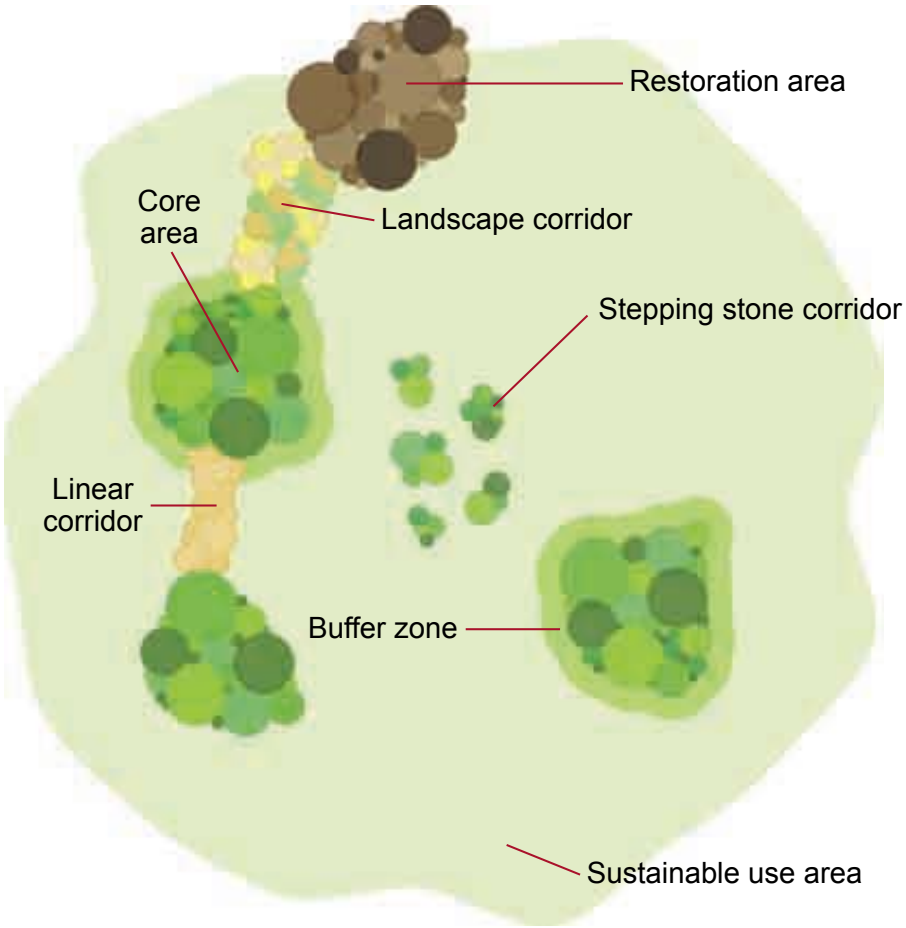


Some wildlife (such as the case of deer highlighted on page 10) can damage the environment if their populations are not managed, something that is only effective if undertaken at a landscape scale. Non-native wildlife can, in some circumstances, pose a particular threat to native wildlife and even harm the provision of ecosystem services. Management at a landscape scale is essential if such harmful wildlife is to be effectively managed.

In addition to the above general principles there are also some specific environmental principles which should underpin any landscape-scale restoration project in order to benefit wildlife. These are:

Protect – where a landscape-scale project includes existing protected and/or designated sites, such as SSSIs or county wildlife sites, these should continue to be cherished and protected. They are, or have the potential to become, the wildlife jewels in the crown and are already likely to be delivering a wide range of ecosystem services of benefit to people, business and society. Such sites should be treated as core areas within any landscape-scale restoration project and emphasis should be placed on ensuring they receive a high level of protection and the optimum management.

Buffer – all wildlife sites are impacted or affected by what is happening around them. This could be through human behaviour and activity, such as development, or natural processes, such as erosion. Wherever possible existing sites should be buffered, that is the land area around them should be managed in a way that is sympathetic to and helps protect the core area and its wildlife.



Components of an ecological network
(from Lawton, J. *Making Space for Nature*)

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Enhance – in order to help wildlife and to maximise the potential gain from enhancing ecosystem services all land (built or non-built, rural or urban) can and should be managed in a way that increases its environmental potential. In urban areas, green roofs/walls, street trees, rain gardens or pocket parks are just some examples of the features that not only benefit wildlife but also deliver ecosystem services by minimising surface water flooding, providing urban cooling or places to socialise and relax. In the countryside every field, farm, hamlet or estate can include features that will benefit wildlife and potentially provide enhanced ecosystem services of benefit to the landowner, local community or wider society. The range of potential urban and rural enhancements that can be undertaken is vast and ranges from the straightforward to the more complex.

Connect – much of our most endangered wildlife can be found hanging on in just a handful of individual sites within any given part of England. Populations of threatened species have become isolated and disconnected from any other suitable habitat. This puts them in great danger of being wiped out if a catastrophic event such as fire or pollution occurs at one of these sites, as they have nowhere else to go. Individuals from other populations are also less likely to be able to re-colonise the area afterwards. Isolation from other populations increases the chances of inbreeding and loss of genetic diversity, which again increases the risk of the population becoming extinct. In addition, as the climate continues to change it is likely that the ranges of some species will need to shift; a reduced ability to disperse across fragmented areas of suitable habitat increases the risk that species will not be able to 'keep up' with changing conditions. Where such isolated 'last posts' exist, efforts should be made to expand and connect them to allow these species to move and inter-breed. Enlarging and buffering existing wildlife sites is an important first step, as this can make existing populations larger and more resilient, thus increasing the number of individuals available to disperse to new areas. It will also increase the capacity of those areas to accommodate them. Enhancing 'connectivity' between sites must take into account differences between species. For many more mobile species, such as birds, butterflies and other insects, and even some plants, dispersal is possible by flying or being carried by the wind, so just creating new stepping-stone sites suitable to live in can be enough to improve their ability to move between existing sites. Land-based creatures, however, need to be able to physically move across the landscape to reach new sites. They do not necessarily need a physical corridor that can link them to an alternative home but barriers can prevent them from getting there[47]. In such instances, attention should also be paid to managing the intervening land more sympathetically, wherever this is feasible. All too often sites can become an effective prison for the wildlife found within, with no possibility for that wildlife to move out of or pass through the site even if there are good neighbouring 'stepping-stones' nearby. Where barriers preventing the movement of wildlife exist, attention should be paid to removing such barriers or devising solutions that enable wildlife to overcome them.

The longer-term solution must be landscape-scale, and centred around those who manage the landscape[48]

Biodiversity – the variety of life on earth – is at the heart of our aim for a more sustainable future[49]

Landscape-scale – what you can do

Every individual and organisation in the land, whether based in the countryside or a city can play their part in turning the ambition of working at a landscape-scale into reality. Some examples of what can be done are given below;

Individuals and communities – can:

- support the work of local wildlife and environmental organisations and charities. Most rely on volunteers and there are activities that can be done by people of all ages and abilities.
- work to make our gardens, allotment, estate, neighbourhood, school or workplace more wildlife-friendly. Your local council or wildlife charity can normally provide some practical examples of things that can be done, many at little or no cost at all.
- contact local councillors or your Member of Parliament to ask what is being done to develop landscape-scale wildlife projects in your area and demand action be taken if it is not already.
- record what wildlife you see and pass this onto your local records centre or wildlife charity. This information provides vital data to help understand how well wildlife is doing locally.

Farmers, foresters and land owners (including local authority land owners) – have a vital role to play. They have already delivered substantial gains for biodiversity and enhanced ecosystem services through their individual actions and participation in schemes such as Environmental Stewardship[50], the English Woodland Grant Scheme[51] or the Campaign for the Farmed Environment[52]. But more can be done to benefit biodiversity and ensure agricultural and woodland productivity is sustained through better functioning ecosystem services[53]. Farmers and landowners can;

- contact Natural England to find out how they can get paid to support wildlife on their farm and participate in a landscape-scale initiative and how they can work with Natural England and Defra to further improve the Environmental Stewardship scheme.
- work with neighbouring farmers and land owners to manage their land in a way that maximises ecosystem services (for example reducing nitrate use near water courses to improve water quality) and promotes wildlife (such as restoring farm ponds). Opportunities exist, via Environmental Stewardship, to receive funding, for such group applications which can maximise environmental benefits and potentially reduce paperwork and increase the financial return to the farmers/land owners.
- ask their commercial customers what they are doing to help farmers deliver even better ecosystem services.
- work collectively to establish their own landscape-scale initiative or participate in existing ones with support and guidance from Government, its agencies and wildlife and environmental organisations.

Woodland owners can:

- contact the Forestry Commission to see how they can get paid for woodland management and planting.
- look to plant or manage their woodland with native tree species wherever possible as these support a greater range and diversity of wildlife than non-native trees as well as providing ecosystem services such as carbon sequestration.
- manage their woodlands to diversify the woodland structure and let more light on to the forest floor. This will enhance the variety of wildlife it is able to support.
- speak to their local Forestry Commission representative or local authority officer about supplying wood fuel or biomass to help pay for their woodland management.
- where appropriate seek to introduce greater habitat complexity into woodland sites, such as areas of wet woodland, glades or areas of grassland and ensure that dead wood (which supports more species than living trees) is left in the woodland as this will increase the woodland's attractiveness for wildlife.
- liaise with local land managers and communities to identify opportunities to extend areas of existing woodland or identify nearby sites suitable for new woodland creation.
- collaborate with your neighbours to manage the impacts of deer grazing and browsing. Contact the Deer Initiative for help and advice.

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Local Authorities – have a legal responsibility to have regard to the conservation of biodiversity in the exercising of their duties[54]. In relation to landscape-scale initiatives, they have the potential to play a key role. Some examples of action which could be taken are:

- ensuring authority-owned /managed sites have a management plan which is being implemented and that up to date ecological data and expertise is made available and used locally to inform all planning and other authority decisions.
- ensuring that developments and strategic plans take into account ecosystem services and that the authority uses its powers to ensure these are actively enhanced in both rural and urban areas.
- help to facilitate new or actively participate in existing landscape-scale initiatives in their local area to ensure their communities derive maximum benefit, including through the provision of green infrastructure.
- work with neighbouring local authorities, Government agencies and wildlife and environmental organisations to provide a strategic framework in which landscape-scale projects can be initiated with their communities[55].
- work with their communities to make best use of the new designation to protect green areas of particular importance to local communities, once it is established[56] and consider how best these could be integrated into new or existing landscape-scale projects.

Environmental and wildlife charities and civil society organisations – have a fantastic track record in delivering biodiversity gains through site management, restoration and creation; engaging with communities and leveraging in money and resources. Many have led the way in developing landscape-scale initiatives[57]. Such organisations are central to translating the ambition of more landscape-scale restoration into reality. There exists a challenge though to ensure these organisations are able to combine their expertise, knowledge and enthusiasm to deliver beyond the boundaries of their own reserves and sites whilst ensuring they receive the long-term resource and support needed to manage their own sites. Environmental and wildlife charities and civil society organisations will need increased resources, especially if they are asked to take on additional land management on the public's behalf.

Business – drives the economy but our economic performance is being held-back by poorly functioning or broken ecosystem services. This, in turn, places our wildlife at greater risk. Many companies already recognise this and are actively working to support landscape-scale initiatives that deliver enhanced ecosystem services and boost their bottom line (for example the Co-Op[58], United Utilities[59] and Arup[60]). Business can:

- manage their own estate and work with their suppliers to support landscape-scale initiatives and deliver enhanced ecosystem services.
- encourage the development of sustainable enterprises and create markets and incentives for land management practices that can deliver ecosystem services (for example sustainable biomass that provides an economic return for woodland management or the creation of market mechanisms, such as offsets, for biodiversity and ecosystem services).
- incorporate reporting of their business impact on environmental externalities within their annual report[61] and work to minimise or eradicate these.

Investors – the investment community has the capacity to drive change and support initiatives with its financial muscle. Some investors already recognise the value of investing in practices that make a positive contribution back to society, so-called 'ethical investments'. However, all too often many ecosystem services are not traded in a market and so there is little way for an investor to realise a return. Investors can:

- work with and support existing landscape-scale initiatives, especially where land is owned by investors.
- utilise their flair and dynamism to support the establishment or creation of ecosystem service markets. In England no ecosystem service markets are known to exist, although this is not the case internationally. In the United States one of the established ecosystem markets is the North Carolina Ecosystem Enhancement Programme (NEEP) which covers North Carolina's 17 river basins[62]. The European Union Council of Ministers issued a communiqué in October 2010 which supported the development of markets for ecosystem services in member countries, stating that it supports;

  'work towards new and improved instruments for financing the conservation and sustainable use of biodiversity and the restoration of ecosystems, by encouraging the development of sustainable finance plans through the use of innovative financial mechanisms...[such as] payments for ecosystem services[63]'

- work with Government, regulators and industry to remove existing disincentives to adopting an ecosystem services approach, for example when existing industry regulations hinder business from incentivising changes in land management practice, such as has been the case in the water industry[64].

Government and its agencies – Government, including its supporting bodies, has a range of levers it can use to support and encourage landscape-scale initiatives that enhance ecosystem services and benefit wildlife. These include;

- ensuring a joined-up and coordinated approach between Government departments and their agencies and local Government incentivising communities, business and local Government to develop and/or support and participate in landscape-scale initiatives.
- providing supporting information, data and technical expertise to enable landscape-scale initiatives to establish robust baseline data, undertake effective monitoring and evaluation and secure additional technical support or assistance not available locally.
- providing the strategic context and framework within which informed local landscape-scale delivery can occur.
- working towards the establishment of markets for biodiversity offsets, ecosystem services or other market or financial mechanisms where these do not currently exist and work to remove existing disincentives.

As we have shown there are many ways in which all sectors of society and the economy can contribute towards a landscape-scale approach and deliver enhanced ecosystem services. However, to be effective we need to work in partnership with one another. Operating on a piecemeal basis can deliver some benefits but working collectively and in partnership together, pooling our expertise, our resources and our ability to implement change is more efficient, more cost-effective and more likely to result in positive and sustainable change. Local government and Government agencies are well-placed to play a key role in facilitating and supporting such partnership approaches. Local authorities know their communities, their aspirations and needs and provide a crucial planning framework whilst Government agencies can help bridge administrative and political boundaries and provide technical support and evidence. Business and investors too can play a crucial role; and land managers and owners, civil society organisations and local communities make things happen. We all have a part to play.

'Retaining areas of natural habitat is important to enable the protection of rare and at risk species of plants and animals.....In addition to its intrinsic value, Greenwich's biodiversity also has functional benefits. Retaining and enhancing biodiversity mitigates the risk of flooding. Vegetation helps to slow water run-off and allows water to permeate the ground better than paved areas, reducing the risk of flood from the Borough's rivers.'

LB Greenwich Draft Core Strategy

Conclusion

Our collective efforts to date to halt and reverse the decline in England's biodiversity have not been enough. This has consequences, not just for nature but for our society, our economy and our communities. We need to address the shortcomings of our historic approach to wildlife conservation to establish thriving species populations and restore, value and enhance our ecosystem services. Landscape-scale restoration of our rural and urban environments provides us with the potential to deliver both. To do so needs a partnership between communities, local government, farmers and landowners, business and wildlife and environmental organisations. We need to develop tools to incentivise change and make it happen whilst continuing to afford protection when appropriate. Additional and new forms of resourcing using market and other mechanisms need to be developed to pay for and incentivise change. Communities and organisations need to have the information to make informed decisions that benefit biodiversity and enhance ecosystem services.

The good news is that many of the building blocks are either already assembled, or are close to being in place, to enable this to happen. We have experience of landscape-scale restoration in England from past and existing projects. We increasingly understand what works and what doesn't. Our scientific knowledge increases daily and, though not perfect, is helping us to better understand the relationship between biodiversity and our health, wealth and security. More than ever we need to protect the biodiversity we have left but we also need to support, encourage and work with existing, new or planned landscape-scale initiatives. It is in our own, our communities and our national interest.

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Annex A

Additional information about some existing landscape-scale initiatives can be found at the following:

Butterfly Conservation landscape-scale projects
http://www.butterfly-conservation.org/text/2344/landscape_scale_approach.html

Campaign for the Farmed Environment's work
http://www.cfeonline.org.uk/

The Deer Initiative
http://www.thedeerinitiative.co.uk/

Defence Estates
http://www.mod.uk/DefenceInternet/MicroSite/DE/OurPublications/EstateAndSustainableDevelopment/Index.htm

England's Community Forests
http://www.communityforest.org.uk/

English National Parks Authorities
http://www.enpaa.org.uk/enpaa/whatsnew/national__parks_beacons_for_biodiversity.htm

The Forestry Commission landscape-scale working
http://www.forestry.gov.uk/fr/HCOU-4U4JG3

The National Trust landscape-scale approach
http://www.nationaltrust.org.uk/main/w-nature_conservation_strategy3.pdf

The Royal Society for the Protection of Birds Futurescapes
www.rspb.org.uk/futurescapes/

The Wildlife Trusts Living Landscapes
http://www.wildlifetrusts.org/?section=environment:livinglandscapes

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Annex B

England Biodiversity Group membership

The England Biodiversity Group is made up of representatives of the following organisations and working groups, the latter having been operational since 2002.

Organisations

- Association of Local Government Ecologists
- Country Land and Business Association
- Department for Environment, Food and Rural Affairs
- Environment Agency
- Forestry Commission
- Natural England
- National Farmers Union
- Ministry of Defence Estates
- Royal Society for the Protection of Birds
- The National Trust
- The Wildlife Trusts
- Wildlife and Countryside Link

Working Groups

- Agriculture
- Business
- Climate Change Adaptation
- Coastal
- Economics
- Education and Public Understanding
- Local and Regional
- Marine
- Towns, Cities and Development
- Water & Wetlands
- Woodlands and Forestry

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2. *UK National Ecosystem Assessment (2011). The UK National Ecosystem Assessment: Synthesis of the Key Findings.* UNEP-WCMC, Cambridge.
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4. The United Nations Convention on Biological Diversity established a global objective to significantly reduce the rate of decline in biodiversity by 2010, a target that the UK – along with all other signatories to the convention – failed to achieve.
5. *The Role of Ecosystem Management in Climate Change Adaptation and Disaster Risk Reduction*. UNEP Copenhagen Discussion Series Paper 2, June 2009.
6. Section 41 of the *Natural Environment and Rural Communities Act 2006* lists *Species of principal importance in England.* Further information about these species can be found at http://data.nbn.org.uk/directory/browseDesignation.jsp?designationKey=67
7. Natural Environment White Paper 2011, Chapter 1.
8. Natural Environment White Paper 2011, Chapter 1.
9. *Making Space for Nature: a review of England's wildlife sites and ecological network.* Lawton, J.H., Brotherton, P.N.M., Brown, V.K., Elphick, C., Fitter, A.H., Forshaw, J., Haddow, R.W., Hilborne, S., Leafe, R.N., Mace, G.M., Southgate, M.P., Sutherland, W.J., Tew, T.E., Varley, J., & Wynne, G.R. Report to Defra, 2010, p.10. http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf.
10. An unpublished review of National Indicator 197 (since disbanded) of local wildlife sites showed that 35% of such sites were under positive management in 2009.
11. 95% of these sites are were adjudged in 2010 to be in favourable or unfavourable recovering condition.
12. *Making Space for Nature*: p.8.
13. *Making Space for Nature*: p.14.
14. See for example http://www.rspb.org.uk/ourwork/projects/details/200101-effects-of-grazing-on-upland-birds. This RSPB research investigated the importance of heterogeneity for upland bird species. The Centre for Ecology & Hydrology and the Farmed Environment Company's BUZZ project found a similar relationship between heterogeneity in the farmed environment and wildlife diversity see http://www.ceh.ac.uk/sci_programmes/BUZZProject.html. For a discussion on the importance of garden heterogeneity in supporting urban wildlife see *No Nettles Required: The Wildlife Value of Urban Gardening*. Ken Thompson, 2006.
15. *Brecklands Biodiversity Audit,* 2010 study led by the University of East Anglia. See http://www.norfolkbiodiversity.org/news/PioneeringstudyBreckland.pdf
16. *Making Space for Nature* p.8.
17. *Foresight Land Use Futures: Making the most of land in the 21st century.* Foresight Land Use Futures, 2010.
18. See for example '*The Economic Value of Green Infrastructure'* North West Development Agency report. http://www.nwda.co.uk/PDF/EconomicValueofGreenInfrastructure.pdf and '*Grey to Green: How we shift funding and skills to green our cities'* Commission for Architecture and the Built Environment, 2009. http://webarchive.nationalarchives.gov.uk/20110118095356/http:/www.cabe.org.uk/files/grey-to-green.pdf.
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24. *Biodiversity and Ecosystem Service Sustainability*. Natural Environment Research Council. See http://www.nerc.ac.uk/research/programmes/bess/.
25. Natural Environment Research Council, Science Impacts Database. http://sid.nerc.ac.uk/details.aspx?id=296.
26. See http://uknea.unep-wcmc.org/.
27. Natural Environment White Paper, 2011.
28. *Making space for nature*, p.8.
29. *Conserving biodiversity in a changing climate: guidance on building capacity to adapt*. Published by Defra on behalf of the UK Biodiversity Partnership, 2007, p.16.
30. See http://www.thedeerinitiative.co.uk/.
31. *Business and Ecosystems: Markets for Ecosystem Services – New Challenges and Opportunities for Business and the Environment.* World Council for Business and Sustainable Development, 2007 p.2.
32. Localism Bill 2011, Part 5, Clause 90.
33. See http://www.designforlondon.gov.uk/what-we-do/all/all-london-green-grid/.
34. See for example the Great Fen project in Cambridgeshire http://www.greatfen.org.uk/.
35. See http://stats.oecd.org/glossary/detail.asp?ID=824. The Organisation for Economic Co-operation and Development defines such environmental externalities as 'environmental externalities refer to the economic concept of uncompensated environmental effects of production and consumption that affect consumer utility and enterprise cost outside the market mechanism.'
36. *The Economics of Ecosystems and Biodiversity: TEEB for business* draft chapter 2 p.13. See http://www.teebweb.org/LinkClick.aspx?fileticket=LR1FpODIuOw%3d&tabid=1021&language=en-US.
37. See http://www.naturalengland.org.uk/ourwork/farming/funding/es/default.aspx.
38. See http://www.unitedutilities.com/scamp.aspx.
39. See http://bbop.forest-trends.org/offsets.php and http://archive.defra.gov.uk/environment/biodiversity/offsetting/principles.htm.
40. http://www.ukmediacentre.pwc.com/News-Releases/Biodiversity-threat-will-eclipse-climate-change-economic-impacts-but-still-misses-CEO-and-valuations-radar-PwC-study-e9b.aspx
41. See for example research published by Forest Research on sustainable management http://www.forestry.gov.uk/fr/INFD-5SUK4R.
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49. *Working With The Grain Of Nature*. Defra, 2002. p.9.
50. 70% of available farmland is now covered by an agri-environment agreement.
51. See http://www.forestry.gov.uk/ewgs.
52. See http://www.cfeonline.org.uk/.
53. *UK National Ecosystem Assessment*.
54. See section 40 of the Natural Environment and Rural Communities (NERC) Act, 2006.

55. *Making space for nature* advocated the creation of ecological restoration zones and the creation of these has been supported by Defra. Local authorities have an opportunity to help identify and shape these, either with wholly or in-part with existing landscape-scale initiatives or new ones.
56. Localism Bill, 2011.
57. For example The Wildlife Trusts' *Living Landscapes* or the RSPB's *Futurescapes.*
58. See http://www.co-operative.coop/farms/responsible-farming/biodiversity/.
59. See http://corporateresponsibility2010.unitedutilities.com/futurePlans.aspx.
60. See http://www.arup.com/Services/Masterplanning.aspx.
61. See for example the work being undertaken by some businesses already in this field through reporting mechanisms and advice such as the Global Reporting Initiative http://www.globalreporting.org.
62. See http://www.ecosystemmarketplace.com/pages/dynamic/web.page.php?section=biodiversity_market&page_name=nceep_market.
63. C*ouncil Conclusions, 3036th ENVIRONMENT Council Meeting, Luxembourg*, 14th October 2010 http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/envir/117072.pdf.
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