

Biodiversity in the New Forest



Edited by Adrian C. Newton



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Centre for Conservation Ecology and Environmental Change,
School of Conservation Sciences,
Bournemouth University,
Poole,
Dorset,
United Kingdom



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*Dedicated to the memory of
Muriel Eliza Newton (1929–2009),
who loved the New Forest,
especially the donkeys.*

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Back cover: Wood Crates (Adrian Newton)

The maps in this book are for illustrative purposes only, and do not represent the legal definition of National Park boundaries or any other feature

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Contributors

Keith Alexander, 59 Sweetbrier Lane, Heavitree, Exeter, Devon EX1 3AQ.

Patrick D. Armitage, Freshwater Biological Association, Moor House, Field Station, Garrigill, Alston, Cumberland DL12 0HQ.

Andrew J. Barker, 13 Ashdown Close, Chandler's Ford, Eastleigh, Hampshire SO53 5QF.

Ian Barker, New Forest National Park Authority, South Efford House, Milford Road, Everton, Lymington, Hampshire SO41 0JD.

Samantha Broadmeadow, Forest Research, Alice Holt Lodge, Farnham, Surrey GU10 4LH.

Libby Burke, Forestry Commission, The Queen's House, Lyndhurst, Hampshire SO43 7NH.

Elena Cantarello, Centre for Conservation Ecology and Environmental Change, School of Conservation Sciences, Bournemouth University, Poole, Dorset BH12 5BB.

Clive Chatters, c/o Hampshire and Isle of Wight Wildlife Trust, Beechcroft, Vicarage Lane, Curdridge, Hampshire SO32 2DP.

Greg Conway, British Trust for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU.

John Davy-Bowker, Centre for Ecology and Hydrology, c/o Freshwater Biological Association, East Stoke, Wareham, Dorset BH20 6BB.

Sarah Douglas, Centre for Conservation Ecology and Environmental Change, School of Conservation Sciences, Bournemouth University, Poole, Dorset BH12 5BB.

Maxine Elliott, Environment Agency, Solent and South Downs Office, Colvedene Court, Colden Common, Hampshire SO21 1WP.

Naomi C. Ewald, Department of Biology and Environmental Science, School of Life Sciences, University of Sussex, Falmer, Brighton, Sussex BN1 9QG.

David Green, Butterfly Conservation, The Cottage, West Blagdon, Cranborne, Dorset BH21 5RY.

Rachel Green, Natural England, 1 Southampton Road, Lyndhurst, Hampshire SO43 7BU.

Sue E. Hartley, Department of Biology and Environmental Science, School of Life Sciences, University of Sussex, Falmer, Brighton, Sussex BN1 9QG.

Timothy Holzer, Environment Agency, Solent and South Downs Office, Colvedene Court, Colden Common, Hampshire SO21 1WP.

John G. Jones, Centre for Environmental Sciences, School of Civil Engineering and the Environment, University of Southampton, Highfield, Southampton, Hampshire SO17 1BJ.

Terry Langford, Centre for Environmental Sciences, School of Civil Engineering and the Environment, University of Southampton, Highfield, Southampton, Hampshire SO17 1BJ.

Colleen Mainstone, Hampshire Bat Group, 42 Saxon Way, Halterworth, Romsey, Hampshire SO51 5QY.

Gillian Myers, Centre for Conservation Ecology and Environmental Change, School of Conservation Sciences, Bournemouth University, Poole, Dorset BH12 5BB.

Adrian C. Newton, Centre for Conservation Ecology and Environmental Change, School of Conservation Sciences, Bournemouth University, Poole, Dorset BH12 5BB.

Martin Noble, New Forest Ecological Consultants, Keepers Cottage, Holmsley, Burley, Ringwood, Hampshire BH24 4HY.

Andrew Page, Forestry Commission, The Queen's House, Lyndhurst, Hampshire SO43 7NH.

Bryan J. Pinchen, 7 Brookland Close, Pennington, Lymington, Hampshire SO41 8JE.

Rory Putman, Keil House, Ardgour by Fort William, Inverness-shire PH33 7AH.

Martin Rand, South Hampshire Vice-county Recorder, Botanical Society of the British Isles, email: vc11recorder@hantsplants.org.uk.

Neil A. Sanderson, Botanical Survey and Assessment, 3 Green Close, Woodlands, Southampton, Hampshire SO40 7HU.

Peter Shaw, Centre for Environmental Sciences, School of Civil Engineering and the Environment, University of Southampton, Highfield, Southampton, Hampshire SO17 1BJ.

Jane Smith, Forestry Commission, The Queen's House, Lyndhurst, Hampshire SO43 7NH.

Rod Stern, British Bryological Society, 15 Selham Close, Chichester, West Sussex PO19 5BZ.

Alan J. A. Stewart, Department of Biology & Environmental Science, School of Life Sciences, University of Sussex, Falmer, Brighton, Sussex BN1 9QG.

Natalia Tejedor, Centre for Conservation Ecology and Environmental Change, School of Conservation Sciences, Bournemouth University, Poole, Dorset BH12 5BB.

David J. Thompson, School of Biological Sciences, University of Liverpool, Crown Street, Liverpool, Lancashire L69 7ZB.

Stephen Trotter, New Forest National Park Authority, South Efford House, Milford Road, Everton, Lymington, Hampshire SO41 0JD.

Lena K. Ward, 53 Miles Avenue, Sandford, Wareham, Dorset BH20 7AS.

Phillip C. Watts, School of Biological Sciences, University of Liverpool, Crown Street, Liverpool, Lancashire L69 7ZB.

Diana Westerhoff, Natural England, 1 Southampton Road, Lyndhurst, Hampshire SO43 7BU.

Simon Wotton, Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire SG19 2DL

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Stephen Trotter and Ian Barker

Introduction

This chapter outlines the role of the recently established National Park, and reflects on some of the key strategic issues for wildlife conservation in the New Forest from a National Park perspective.

The previous chapters in this book provide a wealth of evidence demonstrating the significance of the wildlife interest in the New Forest. Within a small land area of only around 55,000 ha, the New Forest can justifiably lay claim to being one of the UK's key hotspots for wildlife on the basis of its richness of wild species and habitats (see also Chatters 2006, 2007). These contributions have also highlighted how little we know of our wildlife, despite the high profile of the area amongst naturalists and ecologists. Major gaps exist in survey coverage and our understanding of whether land management practices are maximising the quality and quantity of biodiversity that remains.

Table 48
The special qualities of the New Forest (New Forest National Park Authority 2008).

The New Forest National Park's landscape is unique; it is a 'living' and working remnant of medieval England with an overwhelming sense of continuity, tradition, and history. It is the survival of not just one special quality but a whole range of features that brings a sense of completeness and integrity.

These features include:

- the New Forest's outstanding natural beauty: the sights, sounds and smells of ancient woodland with veteran trees, heathland, bog, autumn colour and an unspoilt coastline with views of the Solent and Isle of Wight
 - an extraordinary diversity of plants and animals of international importance
 - a unique historic, cultural and archaeological heritage from royal hunting ground to shipbuilding, salt-making and 500 years of military coastal defence
 - a historic commoning system that maintains so much of what people know and love as 'the New Forest' forming the heart of a working landscape based on farming and forestry
 - the iconic New Forest pony together with donkeys, pigs and cattle roaming free
 - tranquillity in the midst of the busy, built-up south of England
 - wonderful opportunities for quiet recreation, learning and discovery in one of the last extensive, gentle landscapes in the south including unmatched open access on foot and horseback
 - a healthy environment: fresh air, clean water, local produce and a sense of 'wildness'
 - strong and distinctive local communities with real pride in and sense of identity with their local area.
-

It is also important to remember that the New Forest is significant for a range of other special qualities in addition to its wildlife interest. The relatively unspoilt natural beauty, tranquillity and landscape character of the area are seen as being particularly important. A summary of the National Park's special qualities has recently been compiled by the National Park Authority following consultation with the public (see Table 48). A key point is that many of these attributes are related and frequently have interdependent relationships; individual elements should not be considered in isolation for management and conservation purposes, including the wildlife interest. The list has been produced as a tool to help focus conservation efforts on some of the key issues.

The New Forest has been highly valued, cherished and loved by many people for generations. Consequently, and as a result of a number of perceived and real threats to its special qualities over the years, the modern conservation movement has been prominent in 'defending' the New Forest since at least 1865 (Briscoe Eyre 1870, New Forest Association 2004).

For many years the administrative arrangements within the Forest seemed to be adequate to tackle the challenges facing the New Forest. These mostly related to internal land management issues and the balance between commoning interests and those of the Crown. However, more recently it had become apparent that these arrangements would not be sufficient to protect and conserve the Forest from a range of new pressures. In particular, those pressures arising from both social and economic change had the potential to cause serious impacts and potential damage to the special qualities of the Forest. Critically, the challenges were not only internal but also came from external threats. No single organisation had a holistic perspective or the powers to address these strategic planning issues across the whole of the New Forest (and not just the central core). Additionally, even though the Forest is a relatively intact landscape (at least compared to the rest of lowland England), its small size meant that it could not isolate itself from developments in the outside world and, as well as concentrating on the internal details of land and species management, the New Forest must look beyond its boundaries.

These considerations led, in 2005, to the designation of the New Forest National Park and the creation of a new National Park Authority, specifically to address the wider issues. This was despite the view held by some in the Forest that this might be an additional layer of bureaucracy in an already congested administrative landscape.

National Park designation in the New Forest

National Park designation provides the highest level of protection for landscape in UK legislation. The National Park Authority's role is to ensure that the two purposes of national park designation are achieved, in other words to act as the National Park's guardian.

These purposes, common to all national parks, are:

- to conserve and enhance the natural beauty, wildlife and cultural heritage of the Park; and
- to promote opportunities for the understanding and enjoyment of the Park's special qualities by the public.

In doing this, the Authority also has a duty to seek to foster the social and economic wellbeing of local communities within the National Park.

The National Park Authority was formally established on 1 April 2005 and took on its full statutory powers and responsibilities on 1 April 2006, as the:

- local planning authority, responsible for spatial planning, minerals and waste planning, development control and enforcement and other related regulatory functions within the National Park;
- access authority and relevant authority for the National Park under the Countryside and Rights of Way Act 2000, dealing, for example, with applications for restrictions and closures. The Authority has also taken on joint responsibility for the New Forest Access Forum, in partnership with Hampshire County Council.

It is required to:

- produce a Management Plan for the National Park; and
- administer a Sustainable Development Fund.

Apart from these statutory functions, the National Park Authority also has wide powers to take forward the twin purposes of the National Park.

As a relative newcomer in the history of the New Forest, the organisation of the Authority and the way it works differs slightly from that of other national park authorities. It has relatively few staff because its role will focus on developing the strategic and policy framework for the National Park and advising on and facilitating the work of existing organisations, such as the Forestry Commission, to deliver national park purposes. Project work and action on the ground aims to support the work of partners who contribute to delivering national park purposes, to fill gaps in the coverage of existing providers and in so doing to avoid duplication.

The Authority's funding comes from central government (Defra) rather than local taxpayers. This reflects the fact that unlike local councils, its responsibilities extend well beyond its boundaries, as it is working with others to look after the National Park for the whole nation.

A key mechanism for achieving the Park's purposes will be the National Park Management Plan. Initial

versions of this plan brought together several strategic planning and development control documents (i.e. combining the Local Development Framework Core Strategy and revised Development Control policies). As it continues to be developed, the National Park Plan will be for the National Park as a whole and for all those with a stake in it, not just for the National Park Authority. It is intended to provide the long-term strategic policy framework for the National Park and to guide the work of the Authority and all the other organisations, partners and stakeholders that can contribute to the delivery of the national park purposes.

The Government also sets out its expectations of National Parks, in consultation with Natural England and the National Park Authorities. These highlight the areas on which the Government particularly expects progress to be made in the period to 2012. They include the statutory duties and Defra's current *Strategic Priorities*, often enshrined in Public Service Agreements (PSAs), and *Departmental Strategic Objectives* such as:

- putting in place climate change mitigation and adaptation measures;
- contributing to the delivery of the Natural Environment PSA, retaining local landscape character, promoting landscape restoration and sustainable tourism, supporting implementation of the Water Framework Directive, delivery of agri-environment scheme outcomes, and biodiversity outcomes (including contributing to Defra's targets of bringing 95% of Sites of Special Scientific Interest into favourable condition by 2010, and reversing the decline of farmland birds);
- promoting the principles of sustainable development.

The National Park's approach to conservation

Conservation is a value-driven activity that is about people and their relationship with a place; it involves making choices about what we feel it is important to conserve. The Authority has a clear approach to 'conservation' in the New Forest. This accepts and embraces change as an inevitable process and recognises that the key to conserving and enhancing the special qualities is to manage, as far as possible, the direction and rate of change. By managing the process of change, we aim to transfer from the present to the future those significant features, characteristics and attributes that make the New Forest special and distinctive.

The important first step is to define exactly what is significant so that we can be clear about our priorities and work. This is the reason for attempting to define the special qualities (see Table 48) and refine our understanding of them. Further work is underway to define the detail beneath this headline list, including the development of a Biodiversity Action Plan. It is also about recognising that we aim to take a balanced and holistic approach across the wide range of

qualities. That said, owing to the recognition in legislation of its international significance, nature conservation must be the clear priority for the National Park as, arguably, it is the most significant and foremost attribute of the New Forest.

What sustains the richness of the natural environment?

It is important to try to understand the factors that have created the New Forest's high value for nature conservation – and indeed what sustains this – if we are to devise strategies and policies to conserve the biota effectively.

A number of authors (e.g. Tubbs 1986, 2001; Chatters 1996, 2006, 2007; Vera 2000; Rose 1996) have identified some key drivers that are associated with and help to sustain the richness of the 'core' Open Forest. These include:

- The location, climate, geology and biogeography of the area (Tubbs 1986).
- The long and continuous history of extensive pastoral management that to some degree mimics the perception of what a natural system might look like (Vera 2000; see Chapter 13). Grazing, as a result of active commoning and the presence of four species of deer, acts as a proxy for the role of herbivores that are no longer present in modern-day ecosystems in the UK.
- Many of the fundamental drivers of keystone ecological processes that have often been lost elsewhere in the lowlands still appear to operate (albeit in a modified form) in the New Forest. Many are related to the actions of a mixture of large free-roaming herbivores, for example processes such as the creation of mud and bare ground, temporary water bodies and ponds, shifting dynamic habitat mosaics (although also strongly anthropogenically controlled in some places) of scrub, heath and woodland and so on.
- Long-established and sustained land management practices (e.g. heath burning and cutting) that seem to promote structural habitat diversity and maintain the open habitats (Tubbs 1986, 2001; Chatters 1996, 2006, 2007).
- The integrity of many habitat systems in which the ecological stress of low nutrient levels and low productivity is combined with grazing and ecological disturbance (Chatters 1996, 2006, 2007).
- The extensive nature of relatively unimproved and protected habitats at a landscape scale, and the comparatively low levels of internal fragmentation (including the minimal amount of fine-scale nature reserve manipulation as a land management tool, because of the scale of the landscape and relatively functional state of natural processes) (Chatters 1996, 2006, 2007).
- An apparent resilience to short-term incidents of disturbance and change, possibly owing to the inherent stability of species-rich communities. Even when change is dramatic, observers often

report that the Forest seems to bounce back with new features of value and interest for conservation (Tubbs 1986, 2001, Chatters 2007).

- Low levels of disturbance and pollution (Tubbs 2001, Rose 1996).

Challenges and issues for the National Park

As noted by other chapters in this book, despite the general survival of these factors, there is evidence of an ongoing deterioration in the quantity and quality of the wildlife species present in recent decades. This probably reflects the wider changes in the UK countryside, driven to a considerable extent by the subsidy regime of the Common Agricultural Policy. However, the impacts of intensive farming practices have not been anywhere near as pronounced or damaging in the Forest as in many other lowland areas. Recent losses appear to have been the result of some subtle and not-so-subtle changes in the 'drivers' and management pressures on the New Forest. Some of the following changes, amongst others, may have had an impact on the biota of the New Forest:

- Drainage (and 'cultivation') for 'improving' the productivity of forestry and grazing (Tubbs 2001, Wright and Westerhoff 2001).
- Coniferisation and internal fragmentation of habitat blocks (Tubbs 1986, 2001; Sanderson 2007).
- Changes in the types of machinery and technology employed.
- Invasive 'problem' species (as addressed during the LIFE II and III projects; see Chapter 17).
- Changes in grazing intensity (Tubbs 1986, Oates 1996), and potentially changes in grazing type, for example in the ratios between cattle, ponies and deer.
- Recreational disturbance and associated impacts (Sharp *et al.* 2008).
- Increased diffuse pollution (e.g. atmospheric pollution from vehicles, sewage, nitrification, pesticides, veterinary products, light, noise, etc.).
- Ongoing shrinkage of the grazed area and loss of active management of peripheral commons (Cox and Reeves 2000).

However, these impacts have not obliterated or irreversibly damaged the interest across the whole Forest. Even areas of the Forest that were ploughed for food production during the Second World War have reverted to relatively diverse communities when given the chance (presumably because of the minimal use of inorganic fertilisers?). Some of these drivers continue to act on the Forest in combination with several external pressures.

External drivers

A number of critical external drivers are likely to affect the conservation of wildlife in the New Forest. Few, if any, of the new threats are likely to bring

enhancements unless there is concerted and determined action by a range of partners and organisations to manage the impact of the changes. Some impacts may be completely preventable, if we anticipate them early enough; for others we may not be able to prevent them and we will have to concentrate on minimising their impact on the New Forest and help species to adapt as best they can.

Socio-economic change

Commoning, and the many related activities that have given rise to the special qualities of the area, are generally a function and product of the poverty and deprivation that the area has traditionally suffered, until recent decades. There are still pockets of relative rural deprivation but this is now, predominantly, an affluent area with major shifts in the socio-economic composition of local communities. The rural population involved in land management is now a minor proportion of the total population. For example, the population of the National Park is around 34,000 (New Forest National Park 2008), and there are in the region of 550 registered Commoners (Verderers 2008), with probably no more than 1500–2000 people involved in active commoning. The rural economy is also small and marginal in comparison to the mainstream economy. The trend towards a more urban-based population is likely to continue.

The financial returns from keeping livestock have similarly been under pressure. A recent study has shown how Commoners are losing money on their animals despite the efforts of Forest Friendly Farming initiatives and agri-environment scheme income (Ivey 2007). Increasingly, commoning is becoming as much a lifestyle choice as it is an economic necessity formed from the need to supplement an individual's income. Land and house prices are a significant barrier to new young Commoners becoming active and independent of their parents.

The National Park needs a strategy to sustain the land management processes that have caused the New Forest to develop and maintain its interest – principally commoning and pastoralism, but also other land management such as the work undertaken by the Forestry Commission and other landowners. Importantly we must design systems and processes to ensure that local people and land managers continue to have a stake in sustaining the wildlife of the New Forest. A Commoning Review (New Forest Commoning Review Group 2007), led by the Commoners themselves, has made some recommendations that should help to provide a sustainable future for active commoning (see Table 49).

If the fragile links that maintain the local social networks and structures start to fail, we could see the collapse of pastoralism in the medium to long term,

Table 49
Summary of the New Forest Commoning Review Recommendations (New Forest Commoning Review Group 2007).

Open Forest grazing needs and conservation, financial returns and young people	
2.1	Support the continuation of current schemes which provide direct support to Commoners for grazing their stock on the Open Forest, ensuring any benefits are available to young Commoners.
2.2	Support the continuation of locally tailored farm advisory support services to ensure that Commoners can utilise agri-environment and farm support schemes.
2.3	Support the continuation of existing schemes where these can demonstrate added value and business efficiencies to commoning enterprises i.e. New Forest Pony Publicity Group, Forest Friendly Farming Business Grant Scheme, Forest Friendly Farming Training Grant Scheme, New Forest Marque and New Forest Farmers and Producers Markets.
2.4	Explore opportunities to review the Defra Single Payment Scheme.
2.5	Consult with major landowners to investigate and develop opportunities for the use of land for back-up grazing and affordable homes for Commoners.
2.6	Provide financial and technical resources to support regular campaigns to reduce the speed of motorists travelling on the Forest.
2.7	Reduce collection costs of fallen stock on Forest roads.
2.8	Encourage Defra to consider a special derogation for the New Forest for the identification of horses.
2.9	Support the continuation of the Stallion Scheme, including raising awareness of the scheme with the general public.
2.10	Encourage Commoners to breed and register full-bred New Forest ponies.
2.11	Support the continuation of the current level of the Forestry Commission annual burning programme, providing resources if necessary to complete within the required time period.
2.12	Provide further assistance to investigate and develop markets for the bi-products of bracken cutting.
2.13	Work with the Forestry Commission to implement a programme for the reinstatement of lost forest lawns.
2.14	Assist in the defence of encroachments on the Open Forest, including raising awareness of the problem with local landowners and developers.
2.15	Assist with the upkeep of forest fencing used in the rounding up of Forest stock.
2.16	Assist with the further development of Beaulieu Road Sale Yard to meet modern standards.
2.17	Support the setting up and continued support of a young Commoners' group.

Table 49 ... continued

Planning, housing and back-up land	
3.1	Review the current Commoners' Dwellings Scheme with respect to: <ul style="list-style-type: none">• Faster application process with improved transparency.• Greater flexibility within selection criteria, whilst keeping firm principles.• Further research and definition of the needs of Commoners both in terms of domestic living and commoning activity.• Affordability in terms of land and construction costs.• Post application guidance – e.g. guidance with ratable value, IHT issues.
3.2	Support the acquisition of land and holdings which can be tied to commoning through a range of schemes.
3.3	Develop a range of full/part ownership and rental schemes between Commoners and local estates, landowners and relevant authorities with land holdings.
3.4	Develop partnerships between authorities to make the best use of sites for commoning.
3.5	Support the development of schemes to allow freehold properties to be entered into trust for future commoning generations.
3.6	Investigate whether there are opportunities to bracket Commoners' holdings with farms in terms of inheritance tax.
3.7	Review current planning policies to ensure that they: <ul style="list-style-type: none">• Support the upgrading of existing facilities to ensure that Commoners holdings can remain viable.• Support the provision of agriculturally orientated buildings used in connection with commoning activity.• Recognise the relationship between ancillary rural trades and the viability of commoning enterprises.
3.8	Commission further research to identify the amount, use and nature of back-up land and to ensure planning policy wherever possible, protects land used regularly for back-up land from other uses.
Education and awareness raising including conflicts between recreation, commoning and conservation	
4.1	Employ a clear set of guidelines to educate and inform the public about commoning.
4.2	Identify a range of audiences who need to be approached e.g. <ul style="list-style-type: none">• Visitors and tourists.• Residents of the New Forest area.• Local businesses that operate in the New Forest area and need to have regard for the different conditions that apply to it (e.g. driving schools, delivery companies, estate agents).• Local businesses that provide services to the area's visitors (e.g. camp sites, hotels, restaurants).• Local school and college students, as well as those engaged in life-long learning.• People who drive within or across the Open Forest.• Young Commoners who need to be encouraged about the importance of what they do.• Management and conservation organisations with a remit in the New Forest.
4.3	Focus the messages on a range of subject areas appropriate to the audience being addressed, e.g. <ul style="list-style-type: none">• How to behave in the New Forest (as in general countryside advice, and things that are specific to the New Forest).• How to deal when in contact with Commoners' stock.• The rights and responsibilities of Commoners and those who come in contact with them.• How to drive in the New Forest.• The rights and responsibilities of people whose land abuts the Open Forest.

with a knock-on impact for nature conservation and the environment. This is essentially what happened to the most of the lowland commons in the UK; many heaths and woodlands were enclosed and cleared, but in others the social systems that supported commoning broke down and disintegrated. It is no accident that the quality of the New Forest is high and that the commoning systems survives – the two go hand in-hand. Even though there may sometimes be differences and heated discussion on points of detail, strategically the interests of nature conservation and Commoners are very closely aligned.

A major priority for the National Park is to provide a framework within which commoning can survive and thrive and to create the conditions for a living landscape, where a sustainable core of people in local communities have a stake in the environment and a role in delivering biodiversity.

Different chapters of this book have made a case for the application of management regimes to meet

the needs of particular groups of species. Any management comes at a cost and somebody has to fund it. The existing contribution from central government is probably inadequate and under constant pressure from other calls on government expenditure. We will need to ensure that land managers have the resources to deliver agreed and balanced management for the Forest in a sustainable way. Alternative funding streams to support land management will be required in future. Visitors and tourism currently bring in around £100 million per annum to the New Forest, supporting in the region of 2,500 jobs (NFDC / NF Visitor Survey 2005). Only a small percentage of this income supports land management directly, despite the tourism industry being largely dependent on the special environmental qualities of the National Park. One of the important challenges will be to develop better mechanisms for visitor income to help fund land management.

Climate change

The impacts of climate change as currently forecast are likely to have major and fundamental impacts on the landscape of the National Park and its wildlife. These are summarised in Table 50.

It seems probable that because of the likely speed and severity of change, many of our most precious and rare species near the southern limits of their distribution may not be able to adapt and are likely to become extinct locally as their viable 'climate space' moves north and westwards. Theoretical modelling suggests that other species, such as the wild gladiolus or Bechstein's bat, near the northern limit of their

range, may do well and expand their range into newly favourable 'climate space' if suitable habitat exists (Monarch Project 2006).

Some non-indigenous species are already colonising the South coast and more new arrivals are likely. Consequently there are likely to be winners and losers as the climate changes, and we will probably observe significant changes in the composition of communities and habitats across the New Forest. At present the level of scientific knowledge about how species will respond has a high degree of uncertainty. It is difficult (and probably risky) to predict how species interactions will be affected or what the outcomes

Table 50

A summary of likely climate change in the New Forest and south-east England in the coming decades. (Sources: South East Climate Change Partnership 2004, Hossell and Rowe 2006).

All figures are derived from the UKCIP02 scenarios (Hulme *et al.* 2002). Where a range is given this relates to the low emissions (assuming large cuts in present emissions) and high emissions ('business as usual') scenarios, but also reflects geographical variation within the south-east.

Winter represents the average for December, January and February; summer represents the average for June, July and August.

The climate changes projected to the 2020s are similar across all scenarios. This is because we are already committed to some climate change as a result of past greenhouse gas emissions. Climate changes beyond the next few decades depend on future emissions, but even the low emissions scenario represents an acceleration of climate change when compared to the 20th century.

Relative to the baseline period of 1961 to 1990, the main climate changes projected for the South East by the 2050s are:

- Increase in winter temperatures of 1.0–2.0°C.
- Increase in summer temperatures of 1.5–3.5°C.
- Increase in winter precipitation by 0–20%.
- Decrease in summer precipitation by 10–40%.

Under the high emissions scenario, by the 2080s, summer temperatures may be more than 4.5°C higher on average, with many more very hot days. Summer precipitation may be less than half that of the baseline period. Winters will become more reliably warm. Winter precipitation will increase, but become more variable, with some winters being particularly wet. Winter rainfall intensities will increase. Summer will become more reliably dry, although temperatures may vary more widely from year to year. Cloud cover and relative humidity are likely to reduce, particularly in summer. Soils will become drier, especially in summer and autumn. Wind speeds may increase in winter, but this is only predicted with low confidence.

In terms of extreme events, by the 2050s, under the medium-high emissions scenario, for England and Wales:

- A dry summer, similar to 1995, will occur on average one year in three.
- A warm dry year, similar to 1999 (37% drier than average), will occur on average three years in four.

Winter	On average winters are predicted to become wetter and milder with less frost / ice / snow cover leading to increased flood risk. Greater night-time than day-time warming in winter. This could result in: <ul style="list-style-type: none"> • Longer growing seasons. • Increased flood risk. • Increased soil erosion and pollutant leaching.
Summer	On average, summers will be much hotter and longer but with lower rainfall. Greater warming in summer and autumn than in winter and spring. Greater day-time than night-time warming in summer. This could result in: <ul style="list-style-type: none"> • Increased tourism and leisure. • Enhanced yields of crops / new crops being viable. • Changes in species and habitats. • Increased risk of drought and increase in heathland / grassland / woodland fire risk. • Increase in low river flows and water quality problems. • Reduction in soil moisture. • Increased tree stress and loss.
Sea level	Sea level is predicted to rise by around 841 mm by 2115, leading to increased risk of coastal erosion and flooding and loss of important coastal habitats. Increased risk to coastal power stations and industry.
Wind speed	Possible higher wind speeds leading to more frequent risk of damage to essential infrastructure and an increased likelihood of large insurance claims. Winter depressions become more frequent including deepest ones.
Rainfall	Extreme rain events may happen twice as often by the 2080s leading to an increase in flood risk and risk of damage to essential infrastructure / increased likelihood of large insurance claims. By the 2020s: <ul style="list-style-type: none"> • Winters could be 5–15% wetter (winters 10–30% wetter by the 2080s). • Summers could be 15–30% drier (summers 25–55% drier by the 2080s). • Heavy rainfall episodes in winter become more common. • Summers as dry as 1995 (37% drier than average) become more common. • Snowfall totals decrease significantly.

Table 51

Potential climate change impacts on biodiversity in the New Forest National Park. After Hossell and Rowe (2006).

	Threats?	Opportunities?
Biodiversity	<ul style="list-style-type: none"> • Uncertainty over how individual species will respond but those at the edge of their range are at risk – changes may be subtle at first and affect habitat composition. • There will be winners and losers. • Species may be lost more quickly in adverse conditions than others colonise. • Species may be unable to migrate due to barriers of roads, development / unsuitable habitat, resulting in local extinction. • Changes and greater variation in hydrology e.g. lower water tables in summer. • Biodiversity is strongly influenced by land-use; changes in land-use management driven by climate e.g. in agriculture, tourism and forestry may impact nature conservation. • Loss or erosion of some habitats e.g. valley bogs, wet heathland. • Effect on stream temperatures and invertebrates / fish ecology. • Increase in drought stress to trees and bogs and other vulnerable species. • Increase in damage to trees in extreme events and early frosts. • Fish migration and spawning impeded by low flows. • Increased erosion risk to soft coastal habitats and coastal squeeze. • Risk to species requiring sub-zero period to break seed dormancy. • Risk of expansion of invasive species (e.g. bracken). • Increased visitor pressure on natural environment. • Increased incidence of fire in hot dry summers. • Reduction in extent and location of wet heath and some mires. • Timing and phenology may be upset and inter-related species may be out of synchrony. 	<ul style="list-style-type: none"> • Flora and fauna with pronounced southern distribution become more widespread – some species will gain and others will lose. • Expansion of some habitats and development of new community types. • Spread of species new to the UK. • To use agri-environment mechanisms to integrate land management to aid nature conservation. • To develop ecological networks and green infrastructure to enable species to migrate and use spatial planning for integrating nature conservation with other land uses. • To ensure that existing habitats are managed in better condition and hence more resilient to changing climate.
Coast	<ul style="list-style-type: none"> • Rising sea levels and possible increased storminess will increase coastal erosion and damage coastal infrastructure. • Natural assets such as beaches, wetlands, mudflats, salt marshes and dunes may be lost and their flora and fauna will be affected – silting of estuaries? • Deterioration in water quality and increase in algal blooms. • Increased run-off and leaching from land? • Protecting or relocating coastal assets may be too costly, therefore in some cases managed retreat may be the best option • Retreating from coastal areas in some locations, may not be viable, and protecting them will be very expensive. • Properties in high risk areas will lose value, and may become uninsurable or unsaleable, resulting in losses for individuals and lending institutions. • Replacement of existing sea defences (e.g. Lymington–Keyhaven sea wall has a limited life of approx. 50 years at current rate of sea-level rise) unlikely to be affordable. 	<ul style="list-style-type: none"> • Increased tourism on the coast may boost local economy. • Increased marine activity, water sports, surfing, etc., but pressures could arise from increased tourism and activity in the coastal fringe.
Agriculture and commoning	<ul style="list-style-type: none"> • Higher carbon dioxide concentrations and a longer growing season will enhance growth of some crops and offer the potential for growing new crops if practices adapt to changes in timing of seasons – may also result in pressure to intensify agriculture. • Potential increase in pests and diseases, including species new to the region. • Increased need for irrigation and on-farm storage, owing to reduced summer rainfall and higher temperatures. • Potential loss of competitive advantage for some sectors of south-east agriculture, e.g. current livestock management may become less viable than areas further north due to drought and impact on grass growth and increased heat stress; changes in needs for buildings and their design; need for more shade in fields. • Intense rainfall in winter may increase direct and indirect damage to crops and soils, causing soil erosion, accessibility problems, blocked drains and damage to rural roads. • Decreased soil quality and increased erosion owing to increased run-off from winter rainfall. • Possible increase in wind, heat and storm damage during severe events. • Lack of winter chilling. • Other issues as important in decision making e.g. CAP reform, economics etc and it is difficult to predict how farmers will respond. • Some loss of land on coast. 	<ul style="list-style-type: none"> • Longer and earlier growing season. • Increased growth rates and yields (but not quality?). • Potential for new crops. • Reduced frost damage should increase productivity. • Potential increased growth rate (e.g. for forest trees). • Increased visitor numbers to the region in warmer weather means a larger market, particularly for local specialities. • Changes to food and drink consumption patterns, including ice creams, cold drinks and salads in summertime.

Table 51 ... continued

	Threats?	Opportunities?
Landscapes	<ul style="list-style-type: none"> Increasingly arid landscape that may change in character, and the typical New Forest landscapes may be degraded in some aspects (the outcome of the balance between increasing wetness in winter and summer drought is not clear). The small-scale intricate pattern of traditional pastures may not be conducive to the extended grazing systems that would be best suited to taking advantage of a longer grass-growing season. Flow rates in streams and rivers will reduce in summer and increase in winter – major temperature, erosion and ecological issues in summer and winter. 	<ul style="list-style-type: none"> With the dynamic nature of the New Forest new landscapes will evolve of equal beauty?
Forestry	<ul style="list-style-type: none"> Plantations and woodlands could be affected by soil moisture deficits. There may be greater susceptibility to fungal diseases particularly for conifers. Changes to natural structure and species composition of woods. 	<ul style="list-style-type: none"> Higher carbon dioxide concentrations could increase growth rates and productivity.

might be. We should, however, be prepared to see massive changes in the wildlife populations of the New Forest over the next 100 years (see Table 51). Beyond the 2050s–2080s, there would seem to be critical and currently unanswered questions about the survival and sustainability of several New Forest specialities such as:

- low-lying coastal habitats and their associated species, as sea levels rise and retreat squeezes up against the coastal defences at places such as the Keyhaven–Lymington Marshes;

- wetland areas, valley bogs and peat;
- heathland flora and fauna;
- ancient trees and woodland and their associated species.

What should the strategic response be to these changes? Some potential questions and actions (after Hossell *et al.* 2000, Hossell and Rowe 2006, Walmsley 2006, Hopkins 2007) to help biodiversity adapt to climate change are outlined in Table 52 below.

Table 52
Some strategic issues and potential responses to climate change.

1	Management should aim to maintain New Forest habitats, natural processes and species populations in as 'favourable condition' as possible – to promote resilience and give existing species and habitats the best chance of survival.
2	Reverse the anthropogenic degradation of recent decades by restoring processes and management of damaged areas.
3	Maximise and expand the area available to semi-natural habitats and species and adopt a landscape-scale approach to 'growing the Forest'.
4	Move the focus away from the conservation of individual species towards enabling landscape scale processes to function. (In the coming years we can expect an increasing demand for projects and resources to 'save' the most desirable and threatened species which will be hard to resist. However, the conditions which led to the presence of current species have changed, and preventing change will probably be unsustainable no matter how much funding is invested. Is a change in our thinking required?).
5	We need to be much more open and look forward to the emergence of new assemblages of species, new communities and new landscapes (which we have not yet seen or enjoyed) – but which could be of equivalent significance and value. Do we need to review our concepts of what constitutes an appropriate species, and indeed whether the label of 'native' species has any meaning in future? We need to be prepared to accept the new arrivals.
6	Do we need to recognise that what really makes the New Forest special is the functioning and operation of relatively natural processes. Is it really 'naturalness' and an element of 'wildness' that we value? If so, we need to make a leap of faith and manage the landscape in such a way that natural or semi natural processes can operate and function. That probably requires a semi-natural style of management with minimal intervention (i.e. free-ranging extensive grazing). Can we then accept, enjoy and value the species that arrive within this regime?
7	Provide opportunities for species to move northwards – by reversing the fragmentation of the countryside north and west of the New Forest. Identifying opportunities for habitat creation in the agricultural landscape and promoting management that makes those landscapes more permeable to species movement and dispersal. Ideally this would involve the 'growing the Forest' approach – should we be encouraging opportunities for a network of land grazed animals? Can we explore mechanisms to do this such as encouraging part time / hobby commoning in other areas using the New Forest system as an exemplar? This will also require biodiversity needs to be genuinely integrated with development (i.e. a serious investment in green infrastructure).
8	This provides the exciting opportunity for the New Forest to act as a reservoir of species from which other areas might be re-populated with species.
9	This will help some species but others are likely to lose out. One of the interesting problems may well be what can we do to help the heathland and bog species move northward – if this is deemed desirable. We really do not understand enough about these issues and we may need to develop new techniques and mechanisms to assist natural dispersion processes to operate.

Development and further fragmentation

Some 1.7 million people live around the National Park and 34,000 people live within it. The South East and South West Plans have identified the need for an additional 80,000 houses in South Hampshire and 30,000 in Dorset by 2026. The direct impacts of new housing or industrial growth are likely to be minimal within the National Park, owing to the planning controls in this newly protected landscape and a considerable amount of growth has already taken place in the New Forest during the post-war period. Beyond the boundaries, development pressure may reduce the opportunities for connecting and 'de-fragmenting' the countryside, unless appropriate natural 'greenspace' is designed and integrated into development.

However, the proposed growth beyond the Park boundary is likely to have a number of direct and indirect impacts on the National Park situated, as it is, between the two expanding conurbations of South Hampshire and Bournemouth. Apart from traffic and direct pollution impacts, the most significant effects on wildlife in the New Forest are probably those arising from recreation and visitor pressure. These have not yet been fully quantified in the New Forest but research on other areas of lowland heath (see Haskins 2000 and Underhill-Day 2005) has highlighted the following impacts:

- trampling of vegetation and soil compaction;
- nutrient enrichment;
- increased frequency of arson and wildfire;
- disturbance of ground nesting birds and other species, especially by dogs.

A recent study by Sharp, Lowen and Liley of Footprint Ecology (2008) on behalf of the National Park, Natural

England and New Forest District Council has analysed the patterns of visitor use in the National Park and estimates that the number of visitor days could rise by an additional 1.2 million or 12% if the predicted housing growth takes place. A recreational management strategy is in preparation for the National Park to identify, resolve and address some of the issues for the New Forest.

What does the National Park want to do?

The key conclusion is that continued pastoralism would seem to offer the optimal mix for biodiversity conservation and the maintenance of physical and ecological processes in the New Forest. Whilst current management may not be perfect and may not provide the ideal structure for each and every species, it certainly does appear to deliver the requirements for the survival of a broad suite of special plants, animals and fungi. The effective conservation of this special and precious place is inextricably linked to the mixture of herbivores and especially the Commoners' animals. Nature conservationists may, from time to time, have issues with some of the detailed practices of modern day commoning, but taken overall, the two groups share virtually identical interests for the future. That is why the National Park has placed the support and promotion of commoning activity as one of its top priorities in the first years of its existence.

Table 53 summarises some of the activities that the National Park would like to facilitate and implement. These focus on using the key mechanisms at our disposal, encouraging and coordinating all those with

Table 53
A summary of potential actions.

1	Develop and implement more appropriate conservation and protection through spatial plans and planning policies for the National Park <ul style="list-style-type: none">• A new Park Plan by 2009.
2	Support the key ecological drivers e.g. grazing and commoning / appropriate forestry activity. <ul style="list-style-type: none">• Improve our understanding of the Forest through surveying the areas that have not been adequately investigated and how natural processes operate.• Invest resources in rural businesses via a new Leader scheme.• Secure a better share of subsidy payments for the New Forest.• Undertake and implement the Commoner-led commoning review.• Work to improve the targeting of Stewardship.• Work to improve the supply of affordable housing to Commoners and other key workers.• Investigate a partnership approach to land purchase /management for adaptation to climate change to meet strategic aims?• Influence policy makers and plans beyond our boundaries.• Reduce the number of animal accidents.
3	Work to expand the core New Forest. <ul style="list-style-type: none">• Explore opportunities for expanding the commons and exporting the New Forest system?• Follow natural processes – get away from focusing too much on species.• Find mechanisms to assist species to move northwards.• Raise the profile of coastal issues.
4	Build on the tremendous success of LIFE II and LIFE III + Pathfinder projects (see http://www.newforestlife.org.uk/). Continue to identify new funding and resources for sustaining and improving land management and implementation of the SAC management plan, to deliver favourable condition to 95% of the protected habitats.
5	Produce a Biodiversity Action Plan, with partners, which aims to influence policy makers and plans beyond our boundaries, seek to promote better public understanding and involvement by reconnecting the public with nature.

a role to help advance the cause of nature conservation, secure additional funding and resources for more survey and action and to use the planning tools at our disposal to promote sustainable and appropriate development.

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