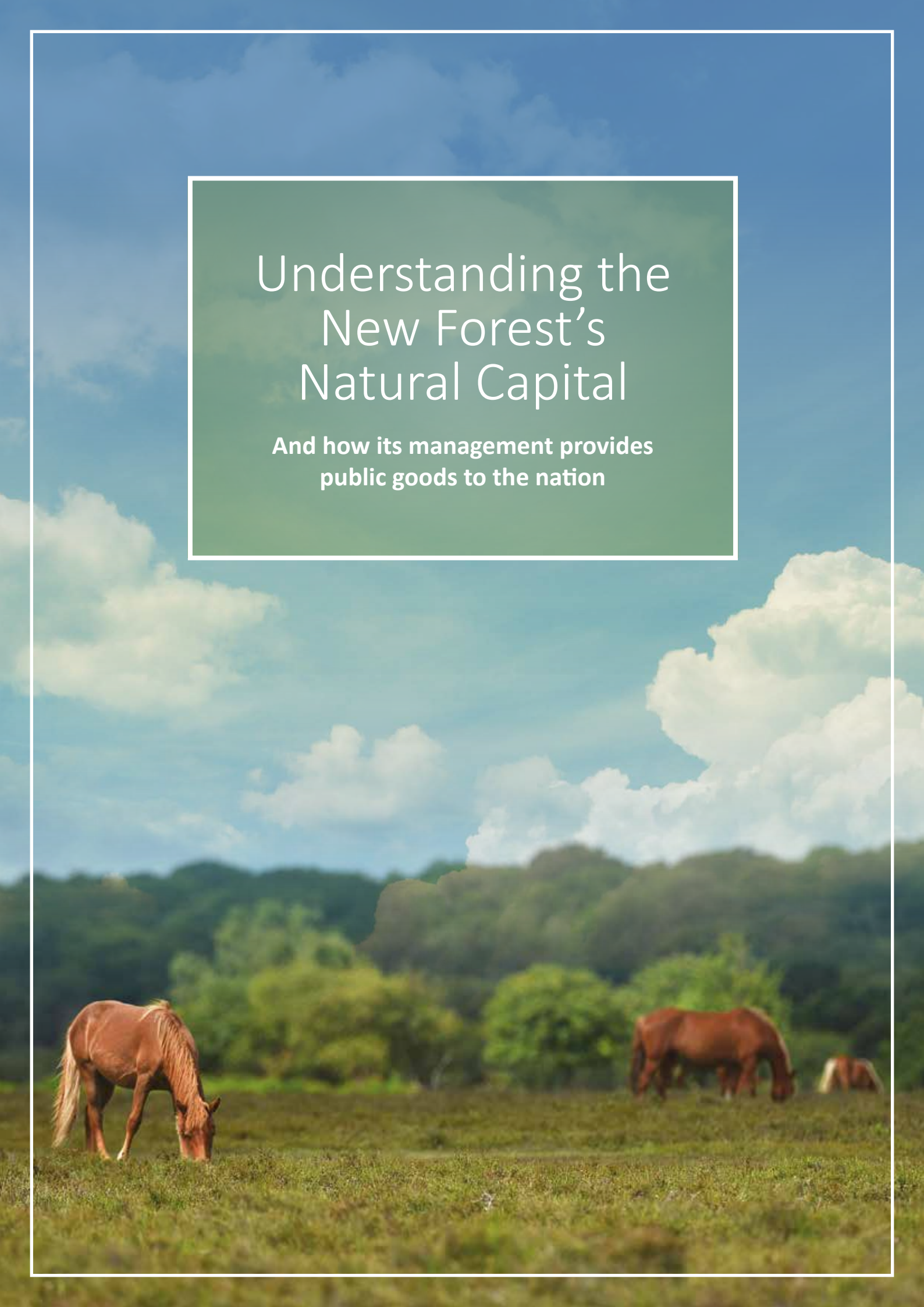
Understanding the New Forest's Natural Capital

And how its management provides public goods to the nation



RuralFocus

Final report to the Forest Farming Group
July 2019

Foreword

This document is the work of the Forest Farming Group, which was formed shortly after the Referendum in 2016 in order to help prepare the Forest's farming businesses for the post Brexit world. The sands have shifted much since then, however one thing has become clear, and that is the Government's desire to replace the current EU system of financial support for agriculture with one that is based on the core principle of 'public money for public goods', which is placed at the heart of its 25 Year Environment Plan. We believe we can be an exemplar of that principle by putting natural capital at the core of our plans and decisions.

The Group has set out in this report how the New Forest, as a highly protected landscape and much treasured national asset, provides a multitude of public goods for the benefit of society. It gives an invaluable evidence base from which to start the work of creating a replacement for the current system, that will be specially suited to the New Forest area.

Using this report, the Group will now begin that work.

Oliver Crosthwaite-Eyre
Chairman
Forest Farming Group

Verderers of the New Forest 1877 · Forestry England · New Forest National Park · Natural England · NFU · The Commoners Defence Association · National Trust

Understanding the New Forest's Natural Capital

And how its management provides public goods to the nation

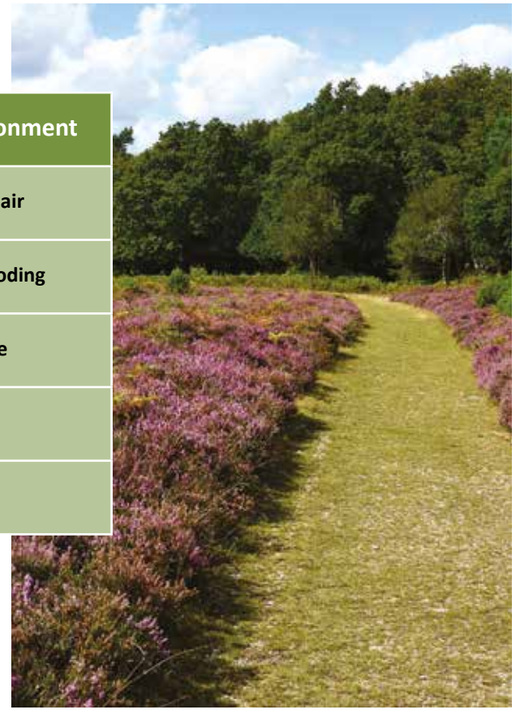
Executive summary

The New Forest is uniquely special, representing the remarkable survival of an unenclosed lowland landscape. It hosts wild species and traditional management practices at a scale that has long disappeared from the rest of western Europe. This gives the area global significance for its biodiversity, cultural continuity, public appreciation, and yet, the vocational system of commoning by around 700 local people and the associated traditional management is fragile and depends on direct support and specially-developed agri-environment agreements. Mindful that the largest of these agreements is due to end in 2020 and the Basic Payments Scheme is to be phased out, the Forest Farming Group, representing the statutory and voluntary bodies that own, rely on and care for this area, have prepared this document to help shape future schemes to conserve and enhance the public goods provided here.

The Government has made clear that future support for farming and environmental land management in the UK will be based on the principle of 'public money for public goods' and that the concept of natural capital will be used to support and incentivise the provision of public goods from the countryside. This report demonstrates how this concept may be applied to the Crown Lands and other commons in the New Forest, providing evidence and a structure from which new programmes to sustain and enhance public goods can be developed.

1. The public goods provided by the New Forest

Special Qualities	Healthy Environment
Commoning and cultural heritage	Clean water and air
Scenic beauty and tranquillity	Mitigation of flooding
Thriving plants and wildlife	Habitable climate
Access and recreation	Healthy soils
Public engagement and education	Animal health



Public goods from the New Forest

There is strong consensus from members of the Forest Farming Group about the public goods provided (Figure 1, left). These distinguish between public goods that are particularly characteristic of the New Forest "special qualities" and those that apply more universally but which are found in abundance in the New Forest "healthy environment".

The New Forest's natural capital assets

Natural capital is defined as 'the parts of the natural environment that produce value to people' (UK Natural Capital Committee). They are a combination of both natural and human resources.

There is an agreed methodology for determining the stock of natural capital assets, from which economists can estimate the value of the services provided. This involves measuring their extent (how much and where it is) and condition (what state it is in) as well as how both extent and condition are changing over time. Figure 2 shows the classification used for natural capital assets in this study.

The location of these natural capital assets is not restricted to the Open Forest (for instance back-up grazing for commoners' livestock is located in the surrounding enclosed countryside). Furthermore, there is huge potential for enhancing public goods on the Open Forest by improving the condition of this more widely dispersed natural capital.

2. Classification of natural capital used in this study

Natural Resources		Human Resources	
Land Cover	Features	Access & Built	Cultural
Heathland and acid grassland mosaic, lawns, wood pasture, scrub, miles, statutory inclosures, enclosed (back-up) pasture	Rare and atypically abundant wildlife species, iconic species and breeds, grazing livestock, water bodies, soils	Boundaries, livestock handling facilities, Open access land and routes, visitor infrastructure, commoners' housing	Governance, skills and knowledge, heritage and landscape features, sensory elements and perceptions, volunteering

Conclusions

We believe this to be one of the first local studies of natural capital to follow the policy direction set out in the Government's 25 Year Environment Plan. It shows how the established methodology can be used at a fine landscape scale to categorise and describe natural capital in a way that recognises local characteristics and management systems. If this can be done in a protected landscape as unique, complex and special as the New Forest, it should be applicable in all other English landscapes.

The study has found it essential to include an assessment of both natural and human resources in order to properly describe how the New Forest's natural capital assets deliver public goods.

The study has found that the extent and condition of most natural capital assets in the New Forest is good and either static or improving (see Figure 3 opposite). Key reasons for these successes include support for commoning from the Basic Payments Scheme and Environmental Stewardship scheme. These have made this vocational practice sustainable, promoting both quality and quantity of grazing livestock. The agri-environment schemes have supported the restoration of commercial forestry inclosures to grazed heath and previously deepened or realigned watercourses to a more naturally functioning state.

Factors responsible for declining extent or condition include the changing climate, intrusion and disturbance from human activities and economic pressures.

We believe that this work shows the great value of public goods already provided by the survival of the New Forest landscape and joint working to enhance it. It provides an important baseline for exciting work that would be an exemplar of the principle of 'public money for public goods'.

3. Matrix linking the New Forest's natural capital assets to the public goods it provides to the nation

Key to symbols

Colour of circles indicate current condition of asset:

- Good
- Weak
- Poor

Direction of arrows indicate change of extent or condition

- → No siginifcant change in recent years
- ↗ Increase in recent years
- ↘ Decline in recent years

Squares indicate role of natural capital in delivering public goods

- ■ Asset has a significant role in delivering public goods
- □ Asset may have a significant role, depending on condition and location. This may include the mitigation of negative impacts that would occur if the asset was not present in its current extent and condition.

Natural capital assets			Stock		Commoning & cultural heritage	Scenic beauty & tranquility	Thriving plants & mammals	Public access & recreation	Public engagement & eductaion	Clean air & water	Mitigation of flooding	Habitable climate	Healthy soils	Animal health
			Extent	Condition										
Natural resources	Land cover	Heathland & acid grassland mosaic	14,875 ha →	○ ↗	■	■	■	■	□	□	□	□	□	□
		Lawns	2,800 ha →	○ ↗	■	■	□	■	□		□		□	■
		Wood pasture, (A&O woodland)	6,817 ha ↗	○ ↗	■	■	■	■	■	■	■	■	■	□
		Scrub	350 ha →	○ →		□	■		□	□	□	□	□	
		Valley mires	1,904 ha →	○ ↗	■	■	■		■	■	■	■	■	■
		Statutory inclosures	8,494 ha ↘	○ →	■	□	■	■	■	■	■	■	□	
		Enclosed (back up) grassland	5,000 ha ↘	○ →	■	■	■		□	□	□	□	□	□
	Features	Rare and atypically abundant wildlife species	Various ↘	● ↘	□	■	■		□					
		Iconic species and breeds	Various →	○ →	■	■	■		■					
		Grazing lifestock	Various →	○ ↗	■	□	■		■					■
		Water bodies	1,000 ponds →	○ →	□	■	■	□	■	■	■			■
		Soils	Various →	○ →	■	□	■		■	■	■	■	■	□
Human resources	Access & built	Boundaries	345 km →	○ →	■			□						■
		Livestock handling facilities	Various →	○ ↗	■				□					■
		Open access land and routes	17,724 ha →	○ →	□	□	□	■	■	□				
		Visitor infrastructure	Various →	○ →				■	■					
		Commoners' housing	N.A. ↘	● ↘	■									□
	Cultural	Governance and regulation	N.A. ↗	○ ↗	■	■	■	■	■	■	□			■
		Skills and knowledge	N.A. →	○ ↗	■	■	■	□	■	□	□	□	□	■
		Heritage and landscape features	Various ↗	○ →	■	□		□	■					
		Traditional customs and events	N.A. →	○ ↗	■	□		□	■					■
		Sensory elements and perceptions	N.A. →	○ ↘	□	■	□	■	■					
		Volunteering	N.A. ↗	○ ↗	□	□	□	□	■	□				

1. Introduction

The New Forest is uniquely special. It preserves an assemblage of wild species and traditional management practices that is of global significance. The New Forest's survival as an intact cultural landscape, with a system of common grazing that harks back to the very origins of settled farming in the British Isles, is truly remarkable and reflects its location, geology, ownership by the Crown, historic rights of use and the independent spirit of its people.

This system of management, involving a close partnership of interests representing the Crown, commoners, Government agencies and local communities, has ensured that the New Forest maintains a complex mosaic of habitats which is found at this scale nowhere else in western Europe.

The New Forest provides one of the largest areas of open access countryside in southern England and is one of the UK's premier visitor destinations with more than 15 million visitor days a year.

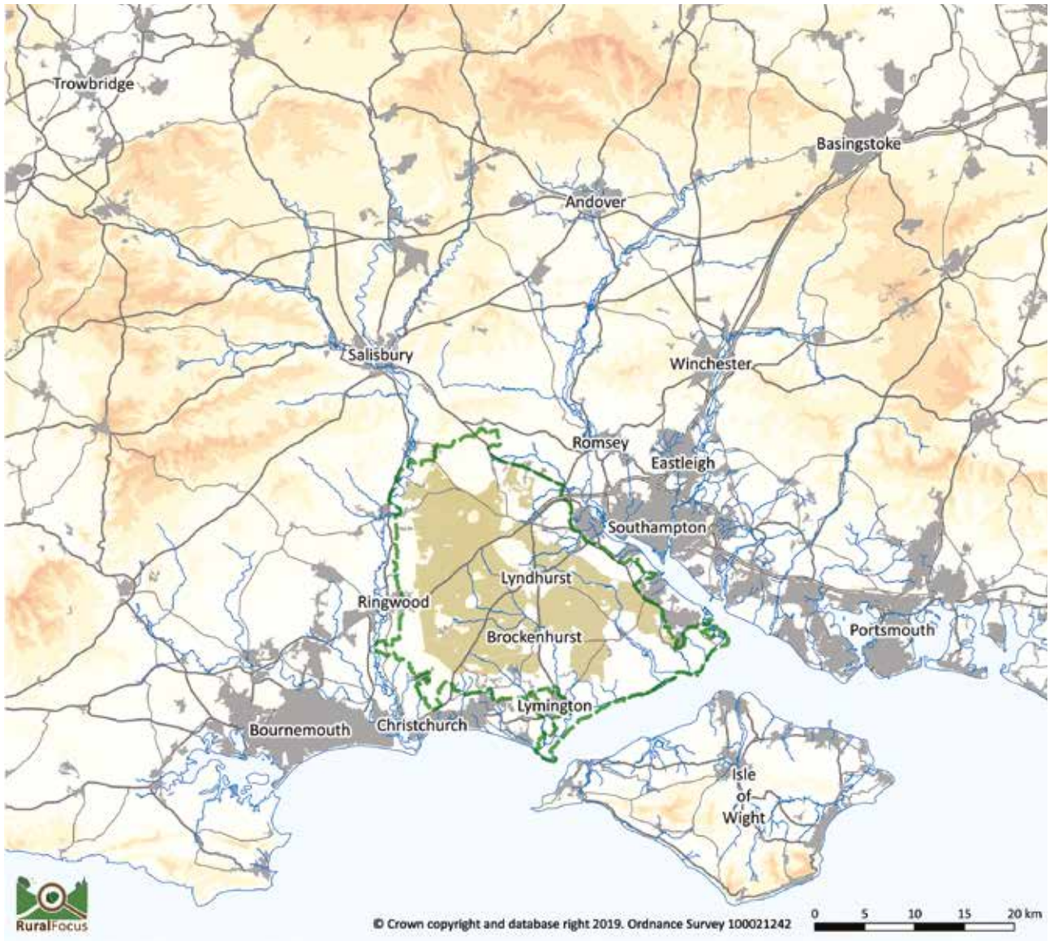
During the next few years, the New Forest faces fundamental decisions which will determine its ability to sustain and enhance its many benefits to society:

- in 2020, the Environmental Stewardship agreement that has been specially created for the Crown Lands is due to end
- following Brexit, the Government plans to phase out the Basic Payment Scheme that underpins the Forest's agricultural economy from 2024, replacing this entirely by 2027 with a new Environmental Land Management scheme which is currently under development
- the policies that determine how visitors are welcomed and how their impacts on the landscape are managed are under review (the New Forest Recreation Management Strategy)
- the statutory Management Plan for the National Park will be revised to enable a new Partnership Plan to be published in 2020
- at a national level, the New Forest together with other designated landscapes in England, is the subject of a review for Defra being led by Julian Glover.

A key consideration in all these reviews and decisions will be the way that the New Forest provides public goods to society. The Government has made clear that financial support in the countryside after Brexit will be based on 'public money for public goods'[1] . The concept of natural capital, which underpins the Government's 25 Year Environment Plan published in January 2018, defines how these public goods are provided and ensures that their value is properly taken into account in decision making.

1 This is set out in the Command Paper 'Health and Harmony: the future for food, farming and the environment in a Green Brexit' (February 2018, Cm 9577) and in the Explanatory Text to the Agriculture Bill (September 2018).

MAP 1 Orientation



This document examines how this ‘public goods from natural capital’ approach can be applied most effectively to the New Forest’s core – the Crown Lands and other commons (Map 2) – thus providing an up-to-date evidence base to inform debate and policy development. Notwithstanding its focus on this core of common land, the initiative is not restricted to a tight physical boundary. It acknowledges that natural capital located in the surrounding countryside plays a vital role in delivering the public goods that come from the common land. Furthermore, it recognises that there is huge potential for enhancing these public goods by improving the condition of this more widely dispersed natural capital. The back-up land used by commoners is a prime example of this more widely distributed resource.

This document has been produced by a group representing the organisations that own, manage or regulate the Open Forest, including those who exercise the common rights over the landscape. It demonstrates the consensus between them on the public goods they seek to provide and the natural capital they look after.

The rest of this report starts by defining the public goods that the New Forest provides (section 2). Section 3 explores the concept of natural capital and section 4 defines and describes the key natural capital assets present in the New Forest. Section 5 draws conclusions on how a better understanding of the New Forest’s natural capital can be used to enhance the public benefits it provides. A bibliography of key sources of evidence is provided in section 6.

2. The public goods produced by the New Forest

A thorough understanding of the New Forest’s public goods helps to identify both the area’s natural capital and the ways that public money and policy measures can support them. These public goods can be defined from two perspectives.

Firstly, Defra’s proposals for the new **Environmental Land Management** (ELM) scheme that will be introduced in England in 2024 include a list of public goods which apply across the whole country. They are:

- thriving plants and wildlife
- enhanced beauty, heritage and engagement (including recreation)
- clean and plentiful water
- clean air
- habitable climate
- mitigation of and protection from hazards.

Secondly, **the special qualities** of the National Park, as prepared for the Partnership Plan and State of the Park Report, describe the specific characteristics that are found in the New Forest and which the National Park designation is designed to conserve and enhance (Table 1, p12).

The term ‘public goods’ comes from economics and defines resources that are both accessible to everyone and do not diminish through their consumption, in contrast to ‘private goods’ where this is not the case. The term can be applied to social goods (such as information and public order) and environmental goods (such as fresh air and healthy soils).

The use of the term in relation to the Government’s environmental policy is relatively new and builds on the concept of ecosystem services. These are ‘the benefits provided by ecosystems that contribute to making human life both possible and worth living’ (UK NEA, 2011).

4. Summary of the special qualities of the New Forest National Park

- Outstanding natural beauty
- The extraordinary diversity of plants and animals
- A unique historic, cultural and archaeological heritage
- An historic commoning system
- Tranquillity
- Opportunities for quiet recreation, learning and discovery
- The iconic New Forest pony
- Strong and distinctive local communities
- A healthy environment.

Discussions with the organisations that own, manage or advise on the New Forest's commons and farmland have demonstrated a strong degree of consensus about the New Forest's public goods. A list prepared by the Commoners' Defence Association captured the full range of distinctive public goods produced from the commoning system. There was agreement that 'cultural' goods such as scenic beauty, access to nature and our shared human heritage are powerful public benefits which should be set alongside the 'provisioning and regulating' goods such as water and air quality, genetic diversity and climate change mitigation. The National Trust, among others, emphasised the benefits provided by volunteering and public education to build future public support for the natural environment.

From this discussion and taking account of Defra's proposals for the ELM scheme and the special qualities of the National Park, the list of public goods shown in Table 2 was agreed. This distinguishes between public goods that are particularly characteristic of the New Forest, helping to define its environmental and cultural identity ('special qualities') and those that apply more universally but which are found in abundance in the New Forest (here termed 'healthy environment').

5. The public goods provided by the New Forest

Special Qualities	Healthy Environment
Commoning and cultural heritage	**Clean water and air**
Scenic beauty and tranquillity	**Mitigation of flooding**
Thriving plants and wildlife	**Habitable climate**
Access and recreation	**Healthy soils**
Public engagement and education	**Animal health**

The following section describes these components of the New Forest. Taken collectively, these descriptions form a **statement of significance** of the public goods that the area provides to society.

Special qualities

Commoning and cultural heritage

The New Forest's system of commoning and smallholding stretches back into antiquity, with its origins in the pastoralism on open lands that preceded enclosed agriculture. It is one of the few remaining extensive systems of common rights operating in lowland Europe. The long continuity of commoning grazing is the primary reason for the survival of the Forest's outstanding landscapes, biodiversity and archaeological record.

The Forest reveals an incredible 'time depth' of archaeological preservation, including 340 Bronze Age barrows, fine Iron Age hillforts, evidence of Roman potteries and military infrastructure from both World Wars. The 214 scheduled monuments in the National Park are 10% of all those in south east England, but they represent the tip of an iceberg, with a huge number of archaeological sites in the Forest waiting to be assessed.

Scenic beauty and tranquillity

The New Forest's National Park designation is a recognition of its outstanding natural beauty[2]. The Open Forest landscapes of grazed woodland, heathland, mires and grass lawns, interspersed with large wooded Inclosures, cover half of the National Park area, the large majority being owned by the Crown and managed by Forestry England. Around the Open Forest lie ancient forest farmlands and smallholdings kept by commoners.

The New Forest contains the largest undeveloped coastal area in the south east of England and, compared with the busy urban and rural areas that surround it, offers high levels of tranquillity free from sensory intrusions.

2 The National Park is recognised internationally as a 'Category V' Protected Landscape 'where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value' by the International Union for the Conservation of Nature (IUCN).

Thriving plants and wildlife

Large areas of the New Forest are designated as a Special Area of Conservation under the EU Habitats Directive. The citation of its protected features includes a wide range of habitats, including wet and dry heaths, aquatic habitats and beech and oak woods, and species such as the southern damselfly and stag beetle.

Much of the New Forest's diverse ecosystem, including the dwarf shrub heath, acid grassland and valley mire habitats have survived due to the patterns of extensive livestock grazing provided by the commoning system. The life cycle of many of the nationally rare, atypically abundant or iconic species relies on these patterns of grazing and the activities of commoners' livestock.

Access and recreation

Relative to its size, the New Forest is probably one of the most visited National Parks in the world. At 15 million visitor days a year, it has the third highest number of annual visitors of any of the UK's National Parks, despite being one its smallest.

Most people come for the day, from urban areas such as Southampton, Bournemouth, London, Bristol and the West Midlands to enjoy the landscape and wildlife of the heathland, woodland and coast; to eat and shop in the towns and villages or to take part in coastal activities. The tourism economy (which generates nearly £400 million annually) is heavily reliant on many of the public goods provided by the New Forest.

Public engagement and education

The New Forest's ecosystems and cultural landscapes provide an important area for academic study and research, some of it involving international institutions. At a national and regional level, it also provides opportunities for volunteering and skills training to the general public.

In addition to the recreational experiences and knowledge that visitors gain, the New Forest contributes more broadly to public understanding of its environment and history through television and radio documentaries, magazines, books, art works and crafts, including to people who do not physically visit the National Park. Residents and visitors also have the opportunity to engage directly in conserving the New Forest through volunteer activities that give them a personal stake in its future.

Healthy environment

Clean water and air

The ponds, mires, streams and rivers of the New Forest are amongst the cleanest in lowland England, free from sources of pollution and supporting a rich aquatic life.

In the context of the relatively high levels of industrial air pollution occurring on the Solent to the east of the New Forest, the clean south-westerly airflow from the New Forest provides an important source of clean air to the residents of Southampton.

Mitigation of flooding

The storage of rainfall and attenuation of peak river flows that takes place in wet heaths, valley mires and riparian woodland of the New Forest reduces the risk of flooding in downstream settlements such as Brockenhurst.

Habitable climate

Carbon that is held in the peat/humic soils and timber of the New Forest is a regionally significant store, taking carbon dioxide out of the atmosphere. Losses of other greenhouse gases from land use (nitrous oxide and methane) are likely to be much less in the New Forest than in areas of more intensively managed farmland.

Healthy soils[3]

The undisturbed soils of the Open Forest nurture the diverse habitats and help produce the source of clean water in ponds and streams. Organic carbon stored in the peat and humic soils sequester atmospheric carbon.

Animal health

High standards of animal health, to prevent the spread of disease between commoners' livestock and maintain high standards of welfare, are an essential part of the commoning system.

3 There has been recent debate about whether the UK's soils are a public or private good. In the New Forest, their public ownership and shared use undeniably makes them a 'common good' (non-excludable and partly rivalrous, in the jargon).

The New Forest's national and international designations

The New Forest National Park covers 56,658 hectares (220 square miles) and, with the exception of the Broads, is the smallest National Park in the UK.

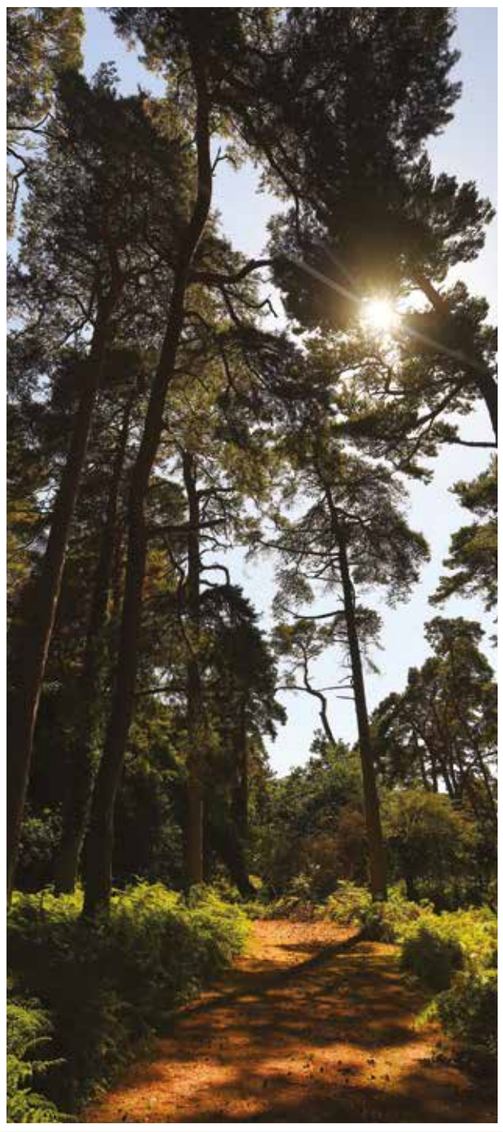
Half of the National Park is common land, over which commoners have legal rights to graze livestock and gather fuel. The majority of the common land is owned by the Crown under the management of Forestry England (the Crown Lands) and most of the remainder is owned by the National Trust (the Northern Commons).

With the exception of a few outlying commons, these areas lie within the 'perambulation' of the Forest which was defined in the 1964 New Forest Act and marks the historic boundary of the royal hunting forest.

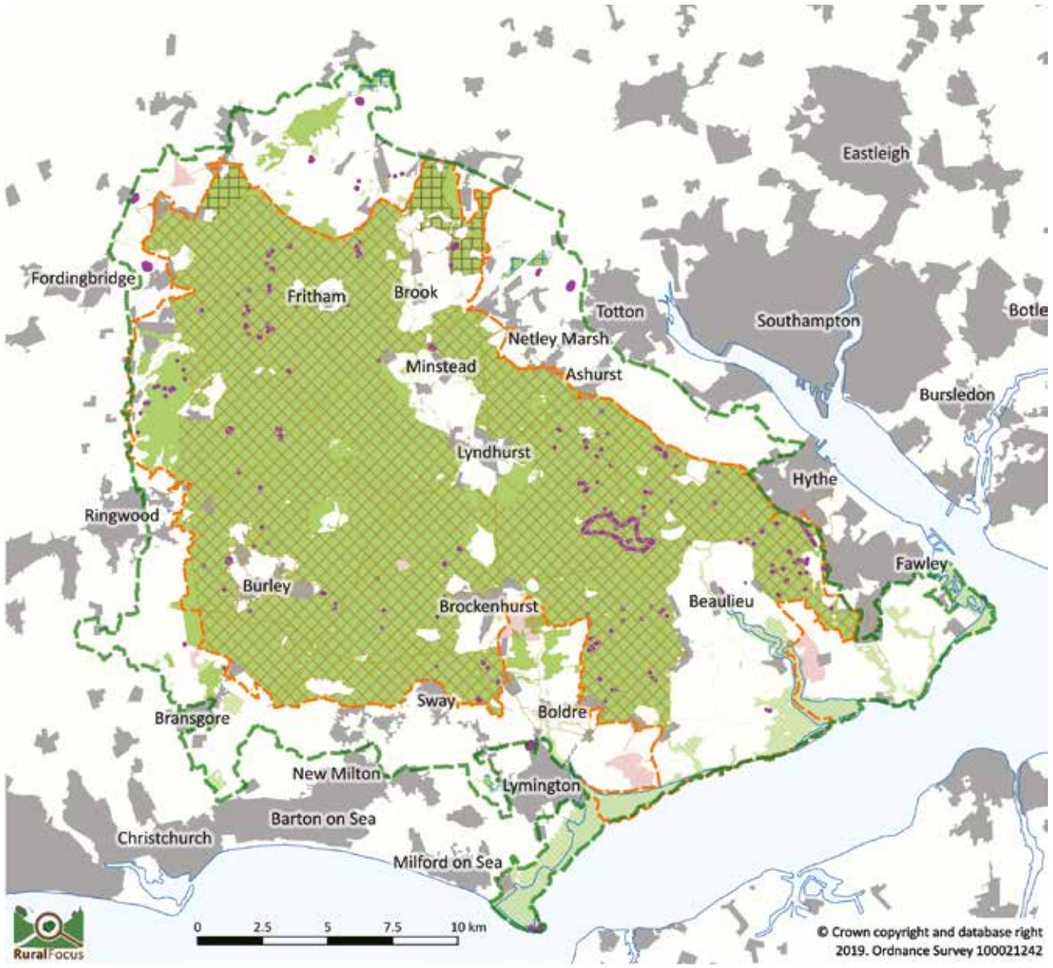
All of the Crown Lands and Northern Commons are part of the New Forest Special Area of Conservation, designated under the EU Habitats Directive and are also UK Sites of Special Scientific Interest (SSSI).

The National Park contains a higher concentration of priority habitats and SSSIs than any other National Park in England.

There are 183 scheduled monuments in the National Park, almost all found in the undisturbed soils of the common lands. These designated scheduled monuments represent a small proportion of the many historical sites which preserve a wealth of evidence of the area's long history.



MAP 2 Designations in the National Park

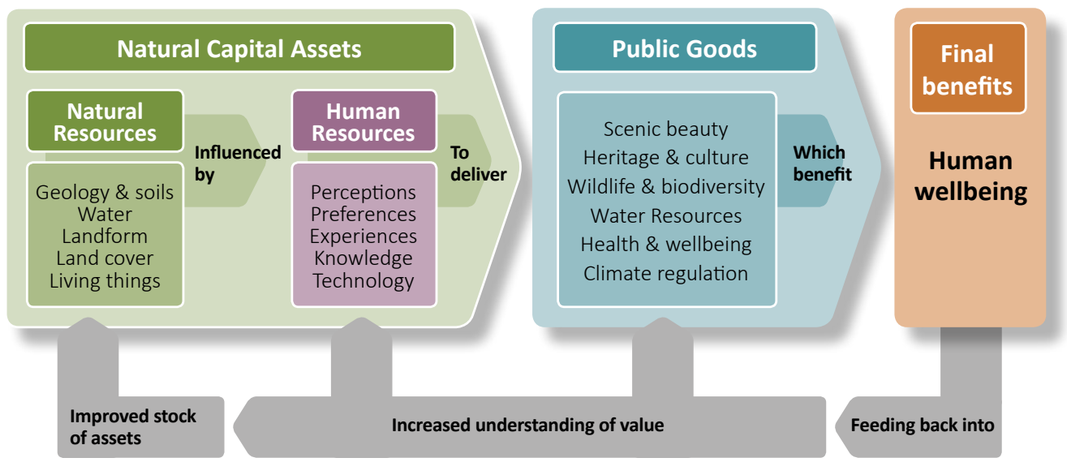


New Forest National Park
The perambulation
The Crown lands
Northern Commons
Other common land
New Forest SAC
Other SSSIs in National Park
Registered Historic Parks and Gardens
Scheduled Monuments
Built-up areas

3. The concept of natural capital

Natural capital is defined as 'the parts of the natural environment that produce value to people' (UK Natural Capital Committee). The natural capital assets that we value are a combination of both natural and human resources (the latter being essential to provide natural resources with their use and significance to society). In the jargon, the **stock** of natural capital assets provides a **flow** of goods and services that give **value** to people. This pathway, which includes an important positive feedback is shown in Figure 6.

6. The stock of natural capital assets, producing the flow of services that benefit people



Adapted by Rural Focus from ONS (2017). Principles of Natural Capital Accounting

There is an agreed methodology for determining the stock of natural capital assets, from which economists can estimate the value of the services provided. This involves measuring their extent (how much and where it is) and condition (what state it is in). It is also often helpful to record how these things are changing over time. These measures are shown in figure 7 (below) and form the basis for much of the analysis in this paper.

This study has not attempted to assign an economic value to the public goods provided by the New Forest's natural capital. Although there are well-established methodologies available to monetise public goods (or ecosystem services) from defined areas such as the New Forest[4], this document is more concerned with understanding how the stocks of natural capital and the public goods they provide can be enhanced through public policy and the actions of those who own, manage and regulate them.

7. Information needed to measure the stock of natural capital

	Measure	Information recorded	Type of information
Stock of assets	**Extent and spatial configuration**	**How much and where?**	**GIS data or text description**
	Condition	**What state is it in?**	**Categories e.g. good, fair, poor, bad**
	Change over time	**Is it improving or declining?**	**Categories e.g. same, more or less**

4 See White et al. (2015) which estimated the value of a range of ecosystem services delivered from the New Forest.

4. Defining the New Forest's natural capital assets

As noted earlier (Figure 1), the natural capital approach relies on being able to match up the stock of individual assets with the public goods they provide. Clear definitions of the different types of natural capital assets are needed, avoiding duplication between the language of different disciplines and recognising where gaps in current knowledge exist. There is no recommended classification from the Natural Capital Committee and none that is widely adopted, but an approach developed in a recently completed study in another National Park may be helpful[5].

The process of working through each of the public goods (figure 5), identifying the assets that are needed to deliver them, has produced the typology of natural capital for the New Forest that is shown in figure 8 (p22). This differentiates between natural and human resources (Figure 1) and splits both of these into two sub-types. Natural resources are split between areas of land cover and point or linear features. Human resources are split between those that are built or manufactured and those that are cultural. The natural and built resources tend to be tangible assets (seen and touched), whereas many of the cultural resources are intangible. If the New Forest's vital public goods are to be maintained and improved, the stock (extent and condition) of both types of assets needs to be supported.

5 Deane & Walker (2018).

8. Classification of natural capital assets for the Forest

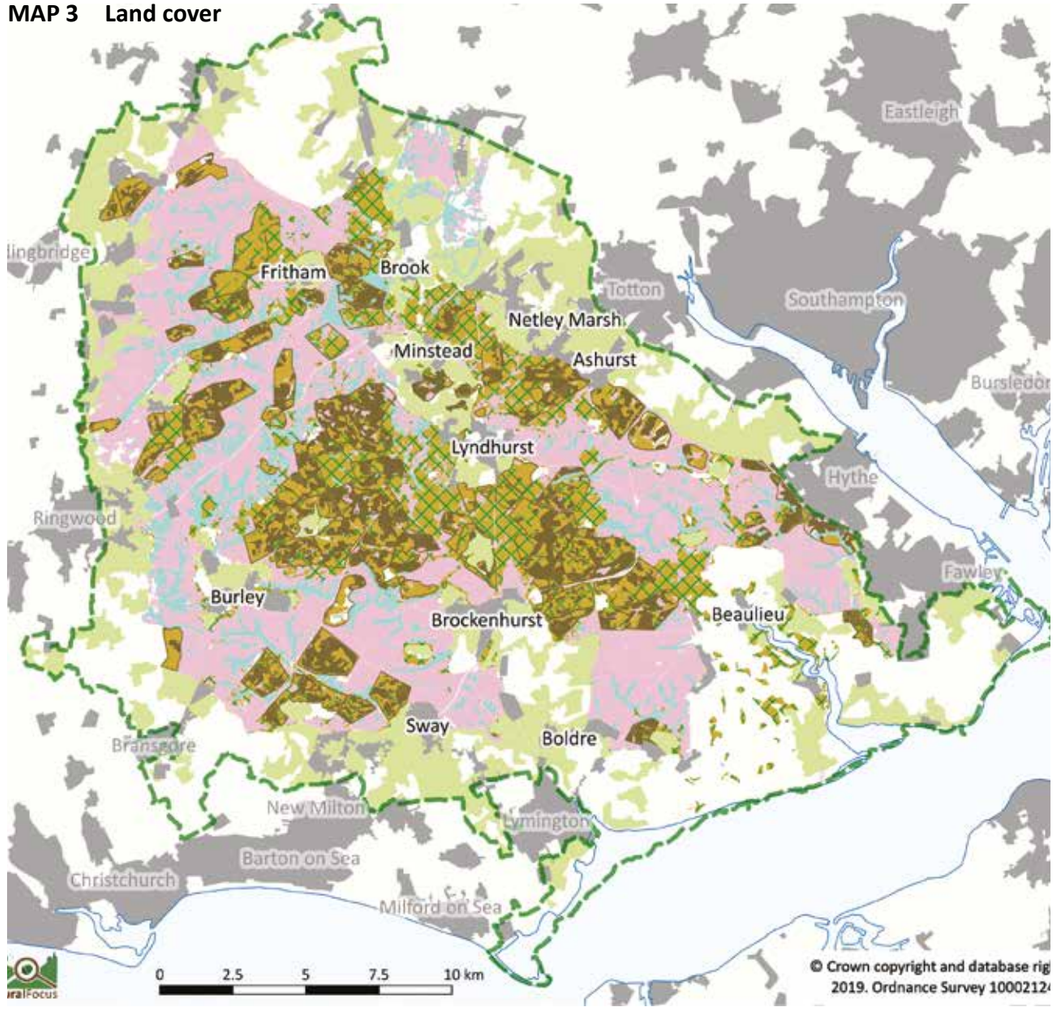
Types		Natural capital assets	Sub-categories
Natural resources	Land cover	Heathland and acid grassland mosaic	Dry; humid; wet
		Lawns	Improved; unimproved
		Wood pasture, including A&O woodland	Ancient; secondary
		Scrub	Gorse; thorn; holly, bramble etc
		Mires	Valley mires; bogs
		Statutory inclosures	Broadleaved; conifer; mixed
		Enclosed (back up) grassland	Improved; unimproved
	Features	Rare and atypically abundant wildlife species	Plants; animals; fungi
		Iconic species and breeds	
		Grazing lifestock	Cattle; ponies; pigs; sheep
		Water bodies	Ponds; main river; other watercourses
		Soils	Carbon-rich; mineral
Human resources	Built	Boundaries	Banks; hedgerows; tree lines; fences
		Livestock handling facilities	Pounds; transport vehicles
		Open access land and routes	Public rights of way; permissive routes
		Visitor infrastructure	Car parks; signage; toilets; vehicle barriers
		Commoners' housing	
	Cultural	Governance and regulation	Acts of Parliament; local bylaws
		Skills and knowledge	
		Heritage and landscape features	Archaeology; historic landscapes
		Traditional customs and events	
		Sensory elements and perceptions	Views; sounds; smells
		Volunteering	

In the rest of this section, each of these natural capital assets is described in turn. A table indicates the public goods provided by the asset (with dark green shading showing it has a particularly significant role to play and light green shading showing a lesser role) and a second table summarises its extent and condition.

Natural resources: land cover

The land cover of different types of vegetation is the main building block of natural capital. Map 3 shows the main categories of land cover in the New Forest from which public goods are provided. Blank areas on this map within the National Park are mostly covered by arable farming or commercial forestry.

MAP 3 Land cover



Heathland and acid grassland mosaic

The Crown Lands and surrounding commons of the New Forest contain the largest contiguous area of this internationally important habitat in western Europe. Made up from different plant communities of humid, wet and dry heath, dry acid grassland, including areas dominated by bracken, the open heathland is a key characteristic of the landscape that supports a wide range of characteristic species. The Forest heaths maintain their quality because of ongoing grazing and traditional management.

Public goods provided

Heritage	**Beauty**	**Wildlife**	**Access**	Education
Water and air	**Flood mitigation**	**Climate**	**Soils**	**Animal health**

Extent	**14,875 hectares in the perambulation, of which, roughly: dry heath 55%, wet heath 16%, acid grassland 29%.**
Condition	**Natural England's condition assessment for these habitats in the New Forest SSSI is 87% favourable and 10% unfavourable recovering.**
Change	**Increase in area over recent decades as a result of heathland restoration from forestry inclosure. Atmospheric deposition of nitrogen, leading to soil enrichment, is probably a cause of the spread of bracken.**

Lawns

On areas where livestock gather and feed frequently, short-cropped grassland has developed. These 'lawns' include plant communities of dry acid, wet and agriculturally improved grassland. Close grazing favours nationally rare plants such as chamomile and, in wetter poached soils, small fleabane. As with lowland heathland, they have developed as a result of common grazing and were this to decline significantly, natural succession from shrubs and trees would take place relatively quickly.

Public goods provided

Heritage	**Beauty**	Wildlife	**Access**	Education
Water and air	**Flood mitigation**	Climate	**Soils**	**Animal health**

Extent	**Thought to be around 2,800 hectares in the perambulation, often on the edge of Forest villages, including village greens, on the verges of roads and beside streams.**
Condition	**Condition good as a source of grazing for commoners' livestock, access to the public and a habitat for rare annual plants. Improvements due to wetland restoration.**
Change	**Small increase in recent decades from forestry inclosure restorations. Increasing recreational pressure in some areas may be having an effect on condition.**

Wood pasture

The ancient beech and oak woods of the New Forest are the largest area of active wood pasture in north-west Europe, containing many internationally rare species including bats, invertebrates, fungi and lichens. This exceptional habitat is influenced by the browsing and foraging actions of commoners' livestock (ponies and cattle and, in the autumn, pigs). Over many centuries, this activity has given rise to the relatively open structure of the woodland with a sparse ground flora and shrub layer, helping to support the rich lichen flora.

Public goods provided

Heritage	**Beauty**	**Wildlife**	**Access**	**Education**
Water and air	**Flood mitigation**	**Climate**	**Soils**	**Animal health**

Extent	**6,817 hectares in the Perambulation of which 3,490 ha are classified as Ancient and Ornamental Woodland.**
Condition	**Natural England's condition assessment for woodland (including enclosed woodland) in the New Forest SSSI is 33% favourable and 63% unfavourable recovering.**
Change	**Wood pasture area is gradually increasing as some inclosures are restored to grazing.**

Scrub

Across much of the heathland areas, against woodland or on steeper slopes, there are areas of scrub, typically of common gorse with areas of hawthorn, holly, rowan and bramble. The gorse scrub provides a valuable source of year-round browsing for ponies and exists in balance with the intensity of livestock grazing. The diversity of scrub, in structure and species, supports high numbers of invertebrates and rare species such as the Dartford warbler.

Public goods provided

Heritage	**Beauty**	**Wildlife**	Access	**Education**
Water and air	**Flood mitigation**	**Climate**	**Soils**	**Animal health**

Extent	**Thought to be around 350 ha, widely dispersed across the Crown Lands and commons and fluctuating as some areas are cleared and others allowed to develop.**
Condition	**The character of scrub varies considerably. Overall balance of condition is good.**
Change	**Scrub is dynamic and transitional, leading to a variety of age classes.**

Valley mires

The New Forest contains about 75% of the remaining areas of valley mire habitat in north-west Europe and by far the largest area in the UK. These mires occur in the valleys and valley sides of the Forest's rivers and streams, where the rain-fed ground water table comes to the surface. Most of the mires are highly biodiverse and are particularly rich in dragonflies and damselflies, with the New Forest supporting breeding populations of 29 of the 39 dragonflies in Britain and other rare invertebrates such as the Large Marsh Grass-hopper and Black Bog Ant. The mires provide valuable grazing for commoners' livestock in the early spring and during periods of drought on the open heath.

Public goods provided

Heritage	**Beauty**	**Wildlife**	Access	**Education**
Water and air	**Flood mitigation**	**Climate**	**Soils**	**Animal health**

Extent	**1,904 hectares in the National Park.**
Condition	**Natural England's condition assessment for this habitat in the New Forest SSSI is 41% favourable and 54% unfavourable recovering. Threats to condition include past land drainage, channel re-alignment and increasing frequency of summer drought. Recovery will depend on continuation of restoration projects.**
Change	**Overall area is probably stable. Recent restoration projects have improved condition in some areas. Unrestored areas will continue to decline.**

Statutory inclosures

Since the beginning of the 18th Century, the Forestry England and its predecessors as agents of the Crown have created forestry plantations in fenced inclosures within parts of the Crown Lands. Opposed by commoners because it deprived them of their grazing rights, many of these silvicultural inclosures have now been 'thrown open' to restore grazing to natural habitats. There is now a broad range of habitats in the inclosures, including native broadleaved (some of it former ancient wood pasture), conifer and mixed woodland, wood pasture and open habitats. Forestry England's management objectives are to increase native woodland cover, connecting old growth woodland, and to restore open habitats, while continuing to produce quality timber.

Public goods provided

Heritage	Beauty	**Wildlife**	**Access**	**Education**
Water and air	**Flood mitigation**	**Climate**	Soils	Animal health

Extent	**8,494 hectares, of which roughly 40% is conifer, 40% is broadleaved, 10% is mixed and the 10% is open habitats.**
Condition	**Improving. As noted earlier for wood pasture, Natural England's condition assessment for woodland in the New Forest SSSI is 33% favourable and 63% unfavourable recovering.**
Change	**As noted above, Forestry England plans to increase native woodland cover and to restore open habitats.**

Enclosed (back-up) pasture

The commoning system relies on commoners having access to enclosed grazing land close to the Open Forest, where ponies and cattle can be fed during the winter or brought back for calving. These areas of 'back-up land' may be owned, tenanted, or rented on a short-term basis by commoners. The land makes up a high proportion of the small pasture fields, surrounded by hedges or woodland, in the farmland surrounding the Crown lands. Most of the back-up land is extensively managed as permanent pasture, with large mixed hedges and often containing small ponds. It can be biodiverse in comparison to the improved grassland and arable fields on more intensively managed farmland. Ensuring a sufficient and affordable supply of this land is a pre-requisite for the continuation of a viable and active commoning system.

Public goods provided

Heritage	**Beauty**	**Wildlife**	Access	**Education**
Water and air	**Flood mitigation**	**Climate**	**Soils**	**Animal health**

Extent	**Nearly 5,000 hectares of pasture is used as back-up land (J. Ivey, 2011), 40% located in the central area of the Forest and almost all the rest around the edge within the National Park. A large proportion is rented, and distributions vary annually.**
Condition	**Can be biodiverse, including ponds, large hedges and unimproved pasture but can become heavily poached in winter.**
Change	**Competition for land, including for equestrian paddocks and (outside the National Park) housing, is reducing the area affordable by commoners. The cost and limited availability of back up land is a major constraint for young (new) commoners.**

Natural resources: features

Rare and atypically abundant wildlife

The large and contiguous area and historical continuity of habitats in the New Forest, as well as their location on the southern edge of Britain mean that they host many rare and unusual species. The Forest provides a stronghold for species which are now uncommon elsewhere in England's lowlands (i.e. atypically abundant in the New Forest). Bats, reptiles, dragonflies, damselflies, lichens and fungi are all well represented. Species of particular note include the wild gladioli, smooth snake, tadpole shrimp, small fleabane, noble chafer and Dartford warbler (pictured).

Public goods provided

Heritage	**Beauty**	**Wildlife**	Access	**Education**
Water and air	Flood mitigation	Climate	Soils	Animal health

Extent	**Records of species distributions are held by the Hampshire Biodiversity Information Centre (HBIC).**
Condition	**There is wide variation. Many of the species present in small populations on the edge of their natural range are highly endangered (such as the New Forest cicada which may now be extinct in the UK). The populations of others, such as the Dartford warbler and wild gladioli, are healthier as a result of suitable habitat management and favourable climatic conditions.**
Change	**Overall, the trend for rare and atypically abundant species in the Forest is likely to be downward, mainly as the result of external pressures on their habitats such as climate change, atmospheric deposition of nitrogen, disturbance, and intensive use of land surrounding the Forest.**

Iconic species and breeds

This study makes a distinction between the rare wildlife described above, and other plants and animals which may not be particularly rare but are popularly associated with the Forest as indicative of its special character and part of its folklore. They remind residents and visitors why the New Forest is special to them. Examples include the New Forest pony, which has rare breed status; the populations of deer; veteran trees such as the Knightwood Oak; the fungi that fruit in the woodlands in the autumn; goshawks and adder (pictured).

Public goods provided

Heritage	**Beauty**	**Wildlife**	Access	**Education**
Water and air	Flood mitigation	Climate	Soils	Animal health

Extent	**As above, records of species distributions are held by the HBIC. The New Forest pony stud book is maintained by the New Forest Pony Breeding and Cattle Society.**
Condition	**There is wide variation. The comments above, for rare species, apply here.**
Change	**Change in the populations of iconic species and breeds varies. As noted, pony numbers are overseen by the Breed Society and deer numbers are monitored by Forestry England and other landowners. Notwithstanding the pressures on biodiversity generally, some popular species such as the goshawk have benefited from a reduction in specific pressures and positive management programmes.**

Livestock

As already mentioned, commoners' ponies, cattle and sheep, and pigs in the pannage season, are an essential part of the New Forest ecosystem, maintaining the heathland and wood pasture landscapes and biodiversity. The New Forest pony is globally renowned and is classified as a rare breed by the Rare Breeds Survival Trust. Most of the cattle are reared locally from cross-bred suckler cows. The grazing of livestock on the Open Forest is overseen by the agisters employed by the New Forest Verderers according to Forest bylaws.
A high priority is given to maintaining healthy animals for welfare reasons and to minimise the risk of disease spreading between herds.

Public goods provided

Heritage	**Beauty**	**Wildlife**	Access	**Education**
Water and air	Flood mitigation	Climate	Soils	**Animal health**

Extent	**Unlike 'ordinary' commons in England, there is no quantified register for common rights held in the New Forest. Practising commoners must pay a 'marking fee' to the Verderers to be able to put stock out, and this information is held confidentially by them.**
Condition	**A number of locally developed schemes have successfully enhanced the quality, health and wellbeing of livestock. These include the Stallion, Mare Grading and Futurity Schemes and the TB control plan. A biannual 'Welfare Tour' organised by the Verderers for the RSPCA, Horse Trust and British Horse Society has shown that the condition of livestock is good.**
Change	**Numbers of ponies kept on the Forest are relatively stable. Numbers of cattle and pigs have increased in the last decade following very low numbers in the early 2000s following controls imposed during the national 2001 Foot and Mouth Disease epidemic.**

Water bodies

The New Forest is one of the most important sites for freshwater biodiversity in the UK. There are an estimated 1,000 ponds in the New Forest, ranging from ephemeral pools on the edges of trackways, to larger bodies of permanent water such as Hatchet Pond. The New Forest lies between the Avon and Test valleys but most of the Forest drains through small river systems which originate in the north of the National Park such as the Lymington and Beaulieu rivers, the Linford brook, Latchmore brook and Bartley Water. The Forest has many examples of natural river channels and systems, ponds and bog pools that are extremely rare elsewhere in lowland England. Ephemeral water bodies host a number of nationally rare species such as the Fairy and Tadpole shrimps. Some sites are popular visitor destinations. Commoners' animals rely on these for drinking and their action, in turn, creates diverse habitats (for instance light poaching of river side ground and browsing of vegetation) which increases their biodiversity.

Public goods provided

Heritage	Beauty	Wildlife	Access	Education
Water and air	Flood mitigation	Climate	Soils	Animal health

Extent	**The New Forest lies between the Avon and Test catchments (each accounting for around 20% of the National Park's area), with the majority 60% draining directly south to the coast through the Forest's own small rivers. As noted above there are an estimated 1,000 ponds, of which around half hold water year-round.**
Condition	**The Freshwater Habitats Trust has undertaken extensive surveying of water quality in the Forest using volunteers as part of its national Clean Waters for Wildlife Survey. Its data show that the New Forest's ponds and rivers are 'unrivalled [in the UK] in terms of their quality and quantity'. Three quarters of sites surveyed in 2016 were classified as pristine with low nutrient levels and no pollutants, benefiting from the negligible use of agrochemicals on the Open Forest.**
Change	**There would appear to be no change to the outstanding water quality in waterbodies draining the Open Forest.**

Soils

Geologically, the New Forest is in the Hampshire Basin on a bedrock of soft sedimentary clays and sands, overlain with gravel terraces formed by ancient rivers. These have produced soils that vary from nutrient-poor acid sands and gravels, to richer clays and loams. Peat and humic soils occur where the water table comes to the surface.

The distribution of these soils and the historical land use by people determines the current vegetation, with the heathland/acid grassland mosaic on the nutrient-poor sands and gravels in the north of the New Forest giving way to pasture farmland and woodland in the richer clays and loams towards the south.

The undisturbed nature of many of the waterlogged soils in bogs and mires has left a nationally significant record of ancient pollen samples in peat soils, enabling changes in the New Forest's vegetation to be traced, in some places, back the end of the last Ice Age.

Public goods provided

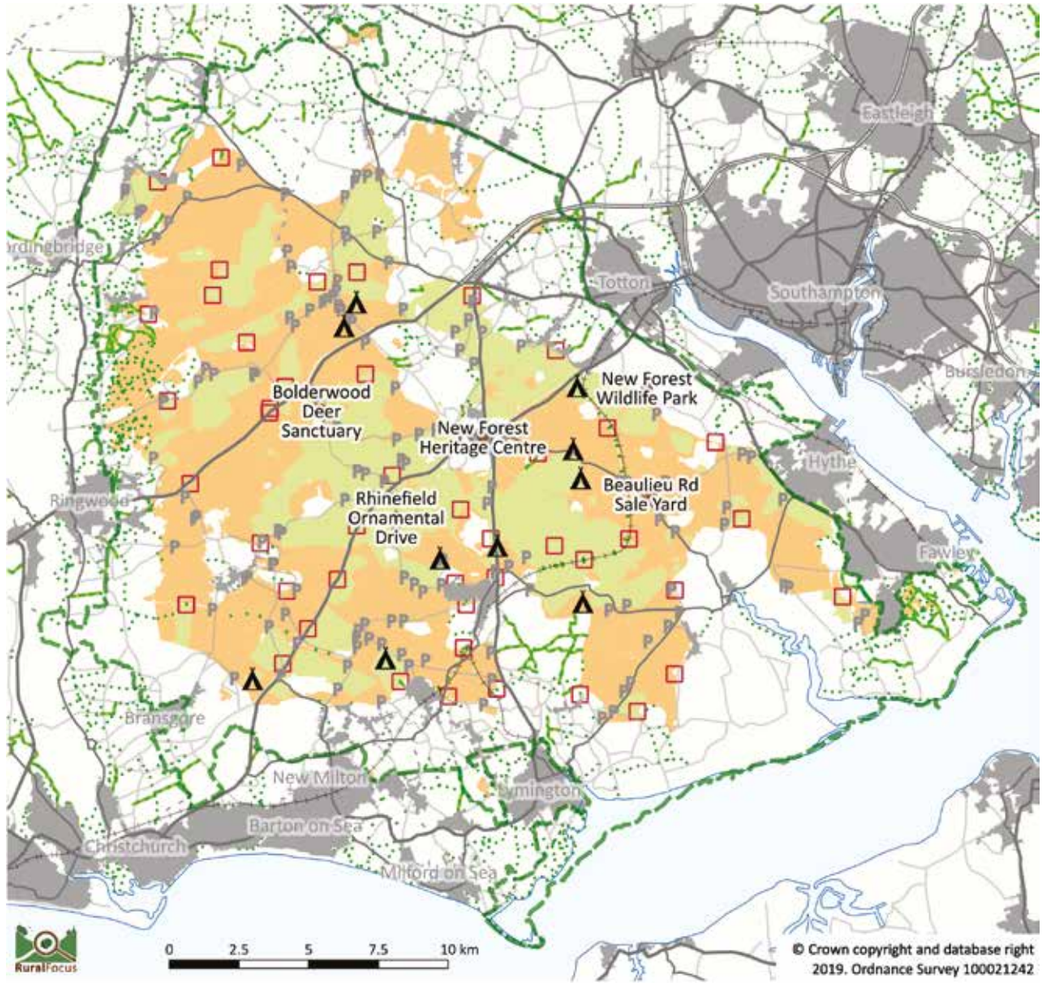
Heritage	Beauty	Wildlife	Access	Education
Water and air	Flood mitigation	Climate	Soils	Animal health

Extent	**The large majority of the Open Forest is underlain by slightly acid but base-rich loamy and clayey soils, which are slowly permeable, becoming seasonally or permanently waterlogged in the valleys.**
Condition	**The condition of soils in the Open Forest is generally very good. Rare exceptions occur in erosion scars where vehicles or other disturbance have broken through the surface vegetation.**
Change	**The distribution and condition of soils are stable. The absence of cultivation has provided continuity over many thousands of years.**

Human resources: access and built elements

A range of resources created and maintained by people in the New Forest are essential components of its natural capital. Map 4 illustrates the location of the different types of built elements, without which many of the public goods provided by the area could not be provided.

MAP 4 Access and built elements



Boundary features

The Open Forest is, by definition, unenclosed, but there are a variety of boundary features such as fences, banks, hedges and lines of trees around its edges. Many of these are maintained to prevent livestock entering farmland or woodland Inclosures, while others are artefacts from previous Inclosures and are now historical features. Fenced boundaries, such as against woodland Inclosures, are used to aid the gathering of animals. Beside the Forest roads, car-free ditching and padlocked barriers are used to prevent public vehicle access onto the Open Forest.

Public goods provided

Heritage	Beauty	Wildlife	**Access**	Education
Water and air	Flood mitigation	Climate	Soils	**Animal health**

Extent	**The Inclosure woodlands have a fenced perimeter of some 345 km against the adjacent grazed land.**
Condition	**The condition of boundary features varies. Stock-proof boundaries are generally kept intact although there have been instances where livestock access to woodland Inclosures has been disputed and fences have been cut.**
Change	**Encroachments, where neighbouring landowners take land to create driveways, car parking or gardens, remains a threat to the integrity of the Open Forest.**

Livestock handling facilities

Commoners' management of their livestock requires a dispersed network of physical infrastructure to enable efficient and humane handling, treatment and selection. This includes the Beaulieu Road sale yard where the annual pony sale is organised by the New Forest Livestock Society; pounds on the edges of commons to aid the gathering and treatment of animals; haulage lorries for moving animals; and livestock housing on commoners' own land. These facilities provide part of the socio-economic infrastructure that allows commoning to take place.

Public goods provided

Heritage	Beauty	Wildlife	Access	**Education**
Water and air	Flood mitigation	Climate	Soils	**Animal health**

Extent	**In addition to the sale yard next to the Beaulieu Road station south of Lyndhurst, there are around 45 livestock pounds beside roads across the Open Forest (Map 4). The pounds are typically 25m² – 60m² in size and consisting of timber fenced corrals with 'wing fences' to create a race.**
Condition	**Over the last 10 years, significant resources have been allocated through the Verderers' Grazing Scheme (VGS) to maintaining the pounds and other livestock infrastructure. As a result their condition is generally good.**
Change	**The investments made through the VGS have resulted in an improvement in the stock and condition of livestock handling facilities in the last 10 years.**

Open access land and linear routes

The public have rights of access on foot and horse for quiet recreation over all the Crown Lands and surrounding commons. Cycling is permitted on certain tracks. Rights of access on the Crown Lands are administered by Forestry England in accordance with national legislation and local bylaws. Although access on foot on the Open Forest is not restricted to specific linear routes, in practice people tend to favour paths and tracks through vegetation which often follow 'desire lines' (from one place to another). The grass verges of the unfenced forest roads, kept short by grazing livestock, provide easy routes for walkers and riders.

Public goods provided

Heritage	Beauty	Wildlife	**Access**	**Education**
Water and air	Flood mitigation	Climate	Soils	Animal health

Extent	**The public has rights of access over more than 30,000 ha of land in the National Park, including all of the Crown Lands and surrounding commons. In addition, there is a network of 325km of public rights of way, many leading onto and across the common land. Dog walking by people living locally is the main recreational activity (28% of visitor days to the National Park), followed by people taking a short walk (25% of visitor days).**
Condition	**The condition of rights of way is monitored by the landowners and/or local authorities. The impact of recreation on wildlife, particularly where dogs are involved, is hotly debated in the New Forest. The Recreation Management Strategy for the National Park is currently being updated.**
Change	**The most recent visitors' survey (2017) shows a 12.4% increase in visitor days since 2004, with the pattern of types of activity within this growing number staying broadly the same.**

Visitor infrastructure and destinations

Forestry England and other land owners provide facilities to help visitors enjoy the New Forest, and to manage their impacts. This includes car parks, interpretation boards and direction signs, benches, toilets and litter bins.

Campsites are licensed at certain sites such as Hollands Wood, Denny Wood and Matley Wood. Popular visitor destinations within the Open Forest include the Rhinefield Ornamental Drive and Bolderwood Deer Sanctuary and viewing platform. Places where the public can learn about the New Forest include the New Forest Heritage Centre in Lyndhurst and the New Forest Wildlife Park near Ashurst. Popular sites that offer good visitor experiences away from the Open Forest, reducing their impacts, include Foxbury, Lepe Country Park, Moors Valley, Ringwood Forest and Roydon Woods.

Public goods provided

Heritage	Beauty	Wildlife	**Access**	**Education**
Water and air	Flood mitigation	Climate	Soils	Animal health

Extent	**The location of key visitor destinations and facilities is shown on Map 4.**
Condition	**The condition of visitor facilities is generally good, with regular investment by the owners to keep pace with rising visitor numbers.**
Change	**As already noted, visitor numbers to the National Park are increasing, up by 12.4% since 2004.**

Commoners' housing

Commoners must live close enough to be able to check their animals on the commons on a regular basis. Although not essential, it is also desirable that commoners live on smallholdings which have land and buildings to keep their animals. The large majority of the most active commoners ('active' in terms of the number of animals depastured on the commons) live in the villages that surround the Crown Lands. The very high cost of open market housing rents relative to local earnings is a significant issue that may affect the future of the commoning system, particularly for the next generation of commoners.

Public goods provided

Heritage	Beauty	Wildlife	Access	Education
Water and air	Flood mitigation	Climate	Soils	**Animal health**

Extent	**The extent of existing commoners housing is not known. However, data provided by the Verderers, based on applications for marking fees in 2017, suggests that around 400 of the 700 applicants lived within the National Park and the large majority of the remaining 300 lived within 10km of the National Park.**
Condition	**The most recent survey of commoners (J. Ivey, 2011) showed that lack of affordable housing was amongst the greatest concerns of young commoners. The National Park Authority's Commoners Dwelling Scheme is a helpful measure but with limited impact given the scale of the issue.**
Change	**As noted above, rising house prices and rents are exacerbating the crisis in commoners' housing. There has been recent concern about the rising rent charged for the 65 keeper's cottages that are set aside for commoners by Forestry England.**

Human resources: cultural components

Governance and regulation

A complex framework of parliamentary Acts, local bylaws, regulations and policies have developed over many centuries and now govern the rights and responsibilities of landowners, commoners, statutory undertakers and the public in the New Forest. These include the various New Forest Acts (1697, 1877, 1964, etc), the bylaws of the Forestry England, Verderers and National Trust and the New Forest National Park Authority Local Plan. Specific directives from government over the regulation of the New Forest include the Minister's Mandate to the Forestry England (1971 and subsequently) and the Illingworth Report (1991).

International and national legislation including the EU Birds and Habitats Directive, the Wildlife and Countryside Act 1981 and the Countryside and Rights of Way Act 2000 are particularly relevant to the National Park. Decisions by government, including the Minister Mandate to the Forestry England and the Illingworth Report as core policies for the Crown Lands, documents such as the Forest Design Plan, Crown Lands Management Plan and Special Area of Conservation (SAC) Plan guide the way that large parts of the National Park are managed. All these influence the way public goods are provided in the New Forest and can be considered as a type of cultural capital.

Public goods provided

Heritage	**Beauty**	**Wildlife**	**Access**	**Education**
Water and air	**Flood mitigation**	Climate	Soils	**Animal health**

Extent	**'Extent' does not easily apply to laws and regulations.**
Condition	**The current structure of laws and regulations provides a tried-and-tested basis for managing the Forest. However, the Government has signalled its intention, through the 25 Year Environment Plan, to enhance the national framework through which public goods provided by natural capital are recognised and rewarded – and this highlights a weakness of the current situation.**
Change	**The regulatory framework affecting the New Forest has been relatively stable over the last decade, with the designation of the National Park in 2005 probably being the most recent major change. Looking to the future, the impact of Brexit, particularly in relation to agricultural and environmental policy, is likely to bring significant change. The future funding arrangements of Forestry England will also be an important factor.**

Skills and knowledge

The centuries of practice in the New Forest have produced a unique and irreplaceable reservoir of knowledge of land management and care for the environment. Successful commoning requires an understanding of the patterns of movement and grazing by livestock, signs of ill health and distress, and stock selection for breeding to suit the Forest environment. Retaining this knowledge and passing it on to future generations will be essential for the commoning system to continue to provide public goods and services.

Public goods provided

Heritage	**Beauty**	**Wildlife**	**Access**	**Education**
Water and air	**Flood mitigation**	**Climate**	**Soils**	**Animal health**

Extent	**The concept of 'extent' is difficult to apply to skills and knowledge. However, the range of topics covered by the New Forest Rural Skills Project indicates its breadth. Topics include cattle and TB, livestock transport, hedgelaying, coppicing, pig breeding, equine management and first aid.**
Condition	**The success of the New Forest Rural Skills Project and the Commoners' Mentoring Scheme (operated by the New Forest Land Advice Service and the Commoners Defence Association) are examples of current good provision of skills and knowledge.**
Change	**The end of current funding for the two initiatives described above (part of the 'Our Past Our Future' National Lottery Heritage Fund scheme) could lead to a reduction in the passing on of skills and knowledge.**

Volunteering

The voluntary commitment of time and skills by large numbers of people makes an essential contribution to the conservation of the Forest through organisations such as the Commoners Defence Association, New Forest Trust, New Forest Association and the Pony Breed Society.

Volunteering by the wider public is also of growing importance. Forestry England, the National Trust, New Forest Land Advice Service, Hampshire and Isle of Wight Wildlife Trust and New Forest Area Conservation Volunteers run successful volunteering schemes, drawing on people in nearby villages and towns as well as visitors from further afield. The Freshwater Habitats Trust's 'Clean Water for Wildlife' project and the New Forest 'Our Past Our Future' project use 'citizen science' projects to improve knowledge and understanding of the New Forest.

Public goods provided

Heritage	**Beauty**	**Wildlife**	**Access**	**Education**
Water and air	Flood mitigation	Climate	Soils	Animal health

Extent	**The level of volunteering activity in the Forest has not been collated but is likely to be in the order of tens of thousands of volunteer days a year.**
Condition	**The range of organisations offering volunteering, and the positive impacts that volunteers have, shows that it is in good condition.**
Change	**Opportunities to volunteer in the New Forest have been increasing and are likely to continue to be an important part of the conservation landscape.**

Heritage and landscape features

The undisturbed soils and landscapes of the New Forest preserve a long and remarkably rich heritage of human activity. Recent aerial surveys have shown that the Forest is rich in features that are still to be investigated. Amongst the most significant heritage features currently known about are the records of past land use held in peat soils (pollen and carbon) at sites such as Cranesmoor, and the Bronze Age barrows often found on prominent ridges and Romano-British pottery kilns excavated in the north eastern part of the New Forest.

The long legacies of commoning and management of the Crown Lands, in the form of historic settlement patterns and vernacular building design, the breed lines and brands of New Forest ponies, and the knowledge and skills held in commoning families, are all important cultural assets.

Public goods provided

Heritage	**Beauty**	Wildlife	**Access**	**Education**
Water and air	Flood mitigation	Climate	Soils	Animal health

Extent	**This can be assessed through the number of scheduled monuments (214 in the National Park, which is 10% of all those in SE England) and in the size of the Historic Environment Record maintained by Hampshire County Council. However, recent surveys to ground truth LiDAR data suggest that these underestimate the scale of archaeology by a factor of 20.**
Condition	**The lack of soil disturbance and preservation of landscape features means that the condition of upstanding and buried archaeology is generally good.**
Change	**The availability of new data showing the greater extent of archaeological features is increasing our understanding of the Forest's heritage.**

Traditional customs and events

The New Forest's cultural identity and sense of place lies in the many events and traditions that take place throughout the year, many of which are associated with commoning and smallholding. They include the drifts, when ponies are rounded-up from the Forest for branding and selection (pictured), the point-to-point races across the Forest, the pony sales at the Beaulieu Road Yard and the New Forest Show at the end of July each year. The monthly Verderers' Court, which has a more formal status than these other social events, is also important for upholding the historic governance of the Forest. These are all important forms of 'social capital' that reinforce the sense of community amongst commoners, with other residents and also potentially with visitors.

Public goods provided

Heritage	**Beauty**	Wildlife	**Access**	**Education**
Water and air	Flood mitigation	Climate	Soils	**Animal health**

Extent	**The concept of 'extent', in a quantified sense, is difficult to apply to traditional customs and events. However, attendance levels, such as the 95,000 people who typically go to the New Forest Show each year, is one way of measuring this.**
Condition	**The state of social capital in the New Forest, as measured through engagement with traditional customs and events, can be considered to be good. Compared to other areas of the south east of England, they are helping to maintain the New Forest's strong sense of identity.**
Change	**The number of events is being maintained, with good ongoing local support for them. Knowledge is being passed on to young people through initiatives such as the Commoners Defence Association's Young Commoners Group and Apprenticeship scheme, organised with the Land Advice Service.**

Sensory experiences and perceptions

The way that people appreciate 'intrinsic' public goods like nature beauty, cultural heritage and wildlife is strongly influenced by their sensory experiences (sights, sounds and smells) and perceptions (knowledge and values). It is these that generate the feelings of peace, wildness, wonder or exhilaration that people may feel in natural greenspaces, contributing to their wellbeing.

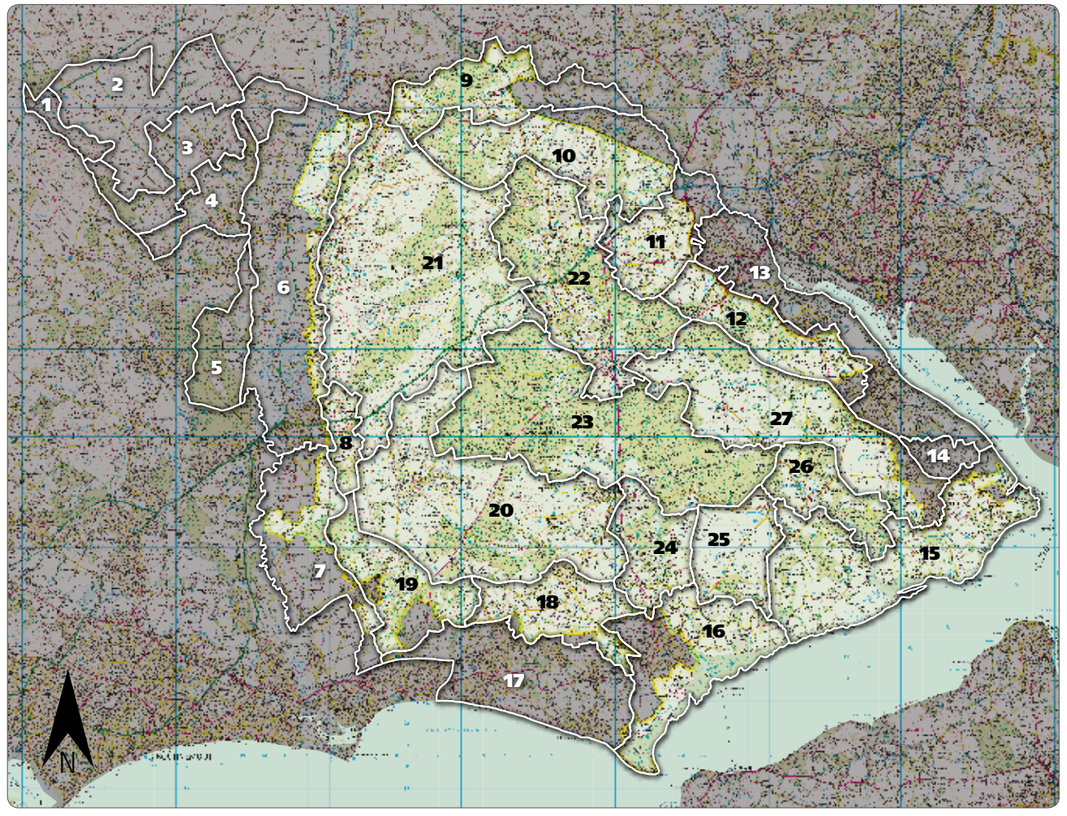
The Landscape Character Assessment (LCA) of the New Forest seeks to capture these qualities and show how they vary across the National Park. The LCA describes 18 distinct character areas, made up of 13 character types. The large scale of the Open Forest means that most of it is encompassed by five character areas and three character types.

Public goods provided

Heritage	**Beauty**	**Wildlife**	**Access**	**Education**
Water and air	Flood mitigation	Climate	Soils	Animal health

Extent	**The easiest way to describe the 'extent' of these experiences is through the map of landscape character types (Map 5).**
Condition	**It is likely that the New Forest is maintaining most of the sensory qualities that people value. The CPRE tranquillity map and dark night skies map (Map 6) demonstrates the relative lack of visual and sensory intrusions in the National Park, compared to surrounding areas.**
Change	**Increasing visitor numbers (noted previously) ensure that more people are able to experience what the New Forest has to offer, but also present threats to experiences such as the natural beauty of the New Forest.**

MAP 5 Landscape Character Areas of the New Foreset

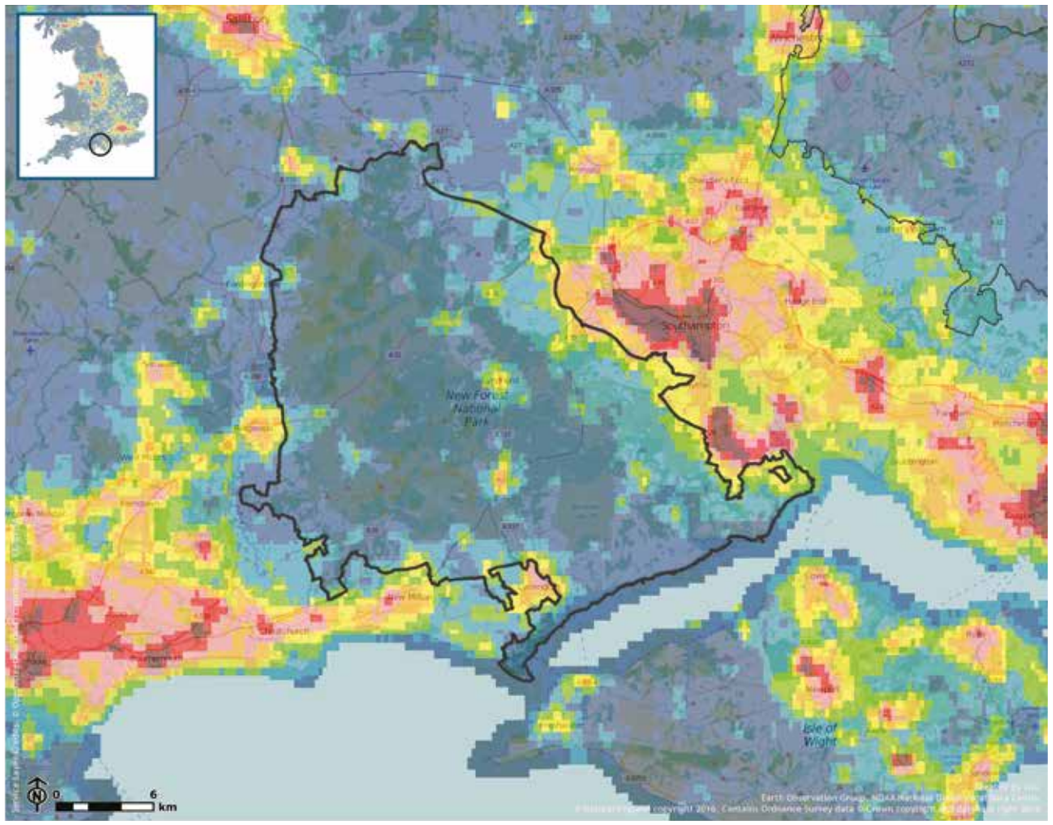


Key

1. Martin and Tidpit Down
2. Martin and Whitsbury Open Farmland
3. Damerham and Rockbourne Valley
4. Wooded Sandleheath Farmland
5. Ringwood Forest
6. Upper Avon Valley
7. Lower Avon Valley
8. Poulner Woods and Pastures
9. Landford Forest Farmlands
10. West Wellow Heaths and Commons
11. Copythorne Forest Farmlands
12. Hythe and Ashurst Forest Farmlands
13. Waterside Parishes
14. Fawley Refinery Complex
15. North West Solent Estates
16. Lymington and Pennington Coastal Plain
17. Barton And Milford Coastal Plain
18. Sway Pasture and Residential Settlements
19. Bransgore Woods And Pastures
20. Southern Heath and Forest
21. Northern Heath and Forest
22. Furzey Woodland and Villages
23. New Forest Central Woodlands
24. Lymington River LCA
25. Beaulieu Heath
26. Beaulieu River LCA
27. Eastern Forest Heaths

Landscape Character Areas 1,2,3,4,5,13,14, and 17 fall outside the National Park Boundary and are described in the New Forest District Council's Landscape Character Assessment.

MAP 6 The dark night skies in the National Park compared with neighbouring urban areas

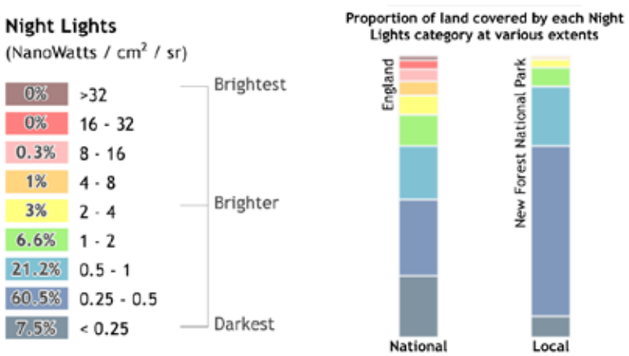


CPRE and LUC figures

Key

New Forest National Park

Each pixel shows the level of radiance (night light) shining up into the night sky. These have been categorised into colour bands to distinguish between different light levels. The percentage of pixels that fall within each band is shown as a % in the chart above.



5. Conclusions

This report has applied the concepts and methodology of the natural capital approach to one of the UK's most special and valued landscapes, the New Forest National Park. It is one of the first such assessments, as recommended by the Government's 25 Year Environment Plan, and takes place at a crucial time. This final section draws out the main findings from the report and the process of preparing it.

1. Applying the concepts of public goods and natural capital to the New Forest

- **Stakeholder support.** There was strong support and broad census from the organisations involved in this study that the concepts of public goods and natural capital are helpful and can be readily applied to the New Forest. It proved relatively easy to agree a list of key public goods which reflect the definitions being used by Defra for the ELM and which also draw on the special qualities of the National Park.
- **National guidance.** There is little guidance from bodies such as Defra, Natural England or the Natural Capital Committee on how natural capital can be applied at a relatively fine landscape scale to an area like the New Forest. Given that Defra wishes the new ELM to be based on the natural capital approach, new guidance and case study examples would be helpful.
- **Defining natural capital assets**. This study has found it essential to include an assessment of both natural and human resources in order to properly describe the New Forest's natural capital assets. This is because the maintenance of natural capital relies on systems of management (e.g. commoning) that combine natural and human resources to provide the natural capital assets that society values, and which deliver public goods. Again, this is not adequately covered in national guidance and if natural capital is to underpin the ELM, an agreed approach will be essential.

2. Analysis of the stock of natural capital

- **The methodology.** This study applied the methodology used in natural capital valuation of measuring the extent and condition of each natural capital asset. It also sought to describe changes in stock which, though not strictly required in natural capital valuation, is an important consideration in policy development.
- **Extent.** There is already good spatial (GIS) data for the New Forest to describe the amount and location of most natural resources. The same may not apply outside National Parks and other high-value landscapes where environmental data is often more patchy or dispersed amongst organisations. The concept of 'extent' is less clear when applied to human resources, although text descriptions of what constitutes each type of resource may be sufficient for the purpose.
- **Condition.** The concept of the condition of natural capital was readily understood by people participating in the study, but obtaining robust evidence was more challenging, usually because of a lack of recent and sufficiently fine-grained survey data. Nevertheless, assessments of condition can be made and justified more-or-less objectively, based on expert judgements. This study considers the current condition of most of the New Forest's natural capital to be generally good. This should be seen in comparison with the landscapes surrounding the New Forest where most natural capital is in a poorer condition. It is a reflection of the large scale and intactness of the Forest and its habitats.
- **Change.** As with condition, the study has found that there is patchy evidence on recent changes to natural capital. Of greater relevance is the likelihood of future change, which requires subjective judgement. An important conclusion, which may not be sufficiently clear from the main body of this report, is that the generally good condition of most of the Forest's natural capital is heavily dependent on current policies and support schemes and would be extremely fragile if these policies or schemes were withdrawn. This applies particularly to commoning which has been supported both by the Basic Payment Scheme and the Verderer's Grazing Scheme (and HLS schemes on surrounding commons), which are ending soon. This threat does not emerge sufficiently strongly by simply following the 'stock of natural capital' methodology.
- **Tensions between public goods.** On its own, the methodology for describing natural capital does not draw out the tensions between different public goods (for instance the impacts of high levels of recreation on biodiversity and tranquillity). However, the assessment of condition, and the reasons for poor condition, provide a way into this analysis.
- **Providing an overall assessment that highlights priorities.** A visual summary of the relationship between public goods and natural capital in the New Forest, and the key measures of this natural capital, is provided in Figure 7. This aims to make it easier to draw out the significance of different natural capital assets to each of the public goods, and to identify where there are opportunities to increase the condition or extent of individual assets. However, it is, by necessity, a simplification of a more complicated picture – particularly in terms of the summary judgements on condition and change which might be open to challenge and interpretation.

3. Using the natural capital approach to develop more effective schemes in the Forest

- **Context.** As already noted, the main driver for this study has been the completion of the Higher Level Scheme agreements on the Open Forest (and subsequently the Basic Payment Scheme) and the desire by organisations in the New Forest to help Defra develop a suitable successor, through its Environmental Land Management scheme.
- **Application at a landscape scale.** One of Defra's core principles for the new scheme is that it should be based on the natural capital approach. Current guidance and most existing studies categorise natural capital in a very simple way (based on high level habitat types). This study has shown how the approach can be used at a finer level to categorise and describe natural capital in a way that recognises local characteristics and management systems. If this can be done in a protected landscape as unique and special as the New Forest, it should be applicable in all other English landscapes.
- **Limitations of the approach so far.** This study has shown how natural capital can be used to produce a consistent 'Asset Register' of the difference elements that are needed to deliver public goods. This is essentially an extension of the 'Farm Environment Plans' that underpinned agreements under the Higher Level Scheme. It would be disappointing if the natural capital approach could not be developed further, beyond the assessment of existing stock, to deliver more effective and ambitious agreements.
- **Opportunities for enhancement.** As noted above, the approach tested out in this report has not been particularly effective at drawing attention to future opportunities and constraints. However, the scale of change to the Government's agri-environmental policy that is anticipated as a result of Brexit, and the increased ambition in the 25 Year Environment Plan, mean that the new scheme will need to address both of these. A natural capital approach could help to do this by identifying what natural capital is at risk and also how public goods can be enhanced by supporting more and better-quality natural capital. This would require a deliberative process of discussion with stakeholders, prioritising which policy interventions are needed to address impending threats and the considerable opportunities that exist to broaden and enhance public goods from the New Forest's natural capital.

4. Overall summary linking the New Forest's natural capital to its public goods

The overall findings of this study, in terms of the way that a full range of natural capital assets deliver public goods on the New Forest's commons, can be summarised in a matrix (figure 9). This seeks to simplify the information provided in section 2 of the report. It should be emphasised that the 'scoring' of condition and change is, for the most part, based on expert judgements and has not been subject to extensive consultation. Nevertheless, it may provide a helpful visual tool to identify overall patterns and priorities.

9. Matrix linking the New Forest's natural capital assets to the public goods it provides to the nation

					Special qualities					Healthy environment				
Natural capital assets			Stock		Commoning & cultural heritage	Scenic beauty & tranquillity	Thriving plants & mammals	Public access & recreation	Public engagement & eductaion	Clean air & water	Mitigation of flooding	Habitable climate	Healthy soils	Animal health
			Extent	Condition										
Natural resources	Land cover	Heathland & acid grassland mosaic	14,875 ha →	○ ↗	■	■	■	■	□	□	□	□	□	□
		Lawns	2,800 ha →	○ ↗	■	■	□	■	□		□		□	■
		Wood pasture, (A&O woodland)	6,817 ha ↗	○ ↗	■	■	■	■	■	■	■	■	■	□
		Scrub	350 ha →	○ →		□	■		□	□	□	□	□	
		Valley mires	1,904 ha →	○ ↗	■	■	■		■	■	■	■	■	■
		Statutory inclosures	8,494 ha ↘	○ →	■	□	■	■	■	■	■	■	□	
		Enclosed (back up) grassland	5,000 ha ↘	○ →	■	■	■		□	□	□	□	□	□
	Features	Rare and atypically abundunt wildlife species	Various ↘	● ↘	□	■	■		□					
		Iconic species and breeds	Various →	○ →	■	■	■		■					
		Grazing lifestock	Various →	○ ↗	■	□	■		■					■
		Water bodies	1,000 ponds →	○ →	□	■	■	□	■	■	■			■
		Soils	Various →	○ →	■	□	■		■	■	■	■	■	□
Human resources	Access & built	Boundaries	345 km →	○ →	■			□						■
		Livestock handling facilities	Various →	○ ↗	■				□					■
		Open access land and routes	17,724 ha →	○ →	□	□	□	■	■	□				
		Visitor infrastructure	Various →	○ →				■	■					
		Commoners' housing	N.A. ↘	● ↘	■									□
	Cultural	Governance and regulation	N.A. ↗	○ ↗	■	■	■	■	■	■	□			■
		Skills and knowledge	N.A. →	○ ↗	■	■	■	□	■	□	□	□	□	■
		Heritage and landscape features	Various ↗	○ →	■	□		□	■					
		Traditional customs and events	N.A. →	○ ↗	■	□		□	■					■
		Sensory elements and perceptions	N.A. →	○ ↘	□	■	□	■	■					
		Volunteering	N.A. ↗	○ ↗	□	□	□	□	■	□				

Key to symbols

Colour of circles indicate current condition of asset:

- ○ Good
- ○ Weak
- ● Poor

Direction of arrows indicate change of extent or condition

- → No significant change in recent years
- ↗ Increase in recent years
- ↘ Decline in recent year

Squares indicate role of natural capital in delivering public goods

- ■ Asset has a significant role in delivering public goods
- □ Asset may have a significant role, depending on condition and location. This may include the mitigation of negative impacts that would occur if the asset was not present in its current extent and condition.

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