# Changing patterns of visitor numbers within the New Forest National Park, with particular reference to the New Forest SPA



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## Summary

The cumulative impact of development is now increasingly recognised as a problem for a number of sites important for nature conservation. In particular, there is strong evidence to show that high numbers of housing in the vicinity of European Protected heathland sites leads to particular pressures, such as disturbance to breeding birds. In areas such as the Dorset Heaths and Thames Basin Heaths, various measures have been put in place to ensure that there will be no adverse effects on the European Sites as a result of new housing, these measures include development control, access management measures on the sites themselves and the creation of alternative green space sites. These solutions are appropriate where the recreational pressure comes from local people, visiting regularly for activities such as dog walking and exercise.

The New Forest is a unique area of enormous conservation importance. It also attracts people from a wide geographic area. In this document we consider current visitor levels within the New Forest National Park and address the impact of future housing development surrounding the National Park. We attempt to identify the impact of future housing on the levels of recreational activity inside the park. This is intended to inform future planning policy (emerging core strategies for the National Park Authority and adjacent local authorities) and the Appropriate Assessment of those plans.

Our approach has been to combine existing data for the National Park area, including bird data, visitor survey data and geographical data such as the distribution of current housing and camp sites. We focus on the three Annex I breeding bird species associated with heathland (nightjar, woodlark and Dartford warbler) as studies in other areas have shown impacts to these species from housing and disturbance. We draw comparisons with other areas, such as the Dorset Heaths and Thames Basin Heaths, as in these areas detailed ecological studies of key bird species have been conducted – showing impacts of housing and disturbance and the levels of disturbance at which these occur.

Forty percent (40 %) of New Forest visitors are staying tourists, a further 25 % are day-trippers, coming from beyond 5miles, and locals (living within 5miles) account for 35% of visitors. As a consequence of this range of visitor types, the New Forest receives a high total volume of visitors (current estimates are over 13 million visitor days per year). Most of these people tend to visit infrequently, in larger groups and, compared with other areas, they are less likely to be visiting to walk their dog. Visitor numbers peak in the summer and the tourists tend to be attracted to particular honey-pot sites, whereas local visitors tend to chose locations away from the tourist hot spots. Such a pattern provides a contrast to other heathland locations (we compare with Dorset and the Thames Basin Heaths, where there is concern about access levels and Annex I birds). In these areas visitors are local residents, there is much less seasonal variation and the main reason for visiting is dog-walking.

In day visitors alone, the New Forest receives roughly double the number of the Thames Basin Heaths, and considerably more when staying tourists (absent in the Thames Basin Heaths) are factored in. However, the New Forest covers a very large area, and the overall density of visitors is actually well below that of the Thames Basin Heaths, and also below that of the Dorset

Heaths. Visitor densities within the New Forest are more evenly distributed and of course there are relatively fewer dog walkers.

Current housing densities in the areas surrounding the New Forest are high to the east of the National Park (Southampton) and to the west (Bournemouth and Poole), with a notable peak around 8km. Densities are lower to the north (Salisbury). Taking current estimates of future housing, the greatest percentage change will be to the north of the National Park, but the largest actual numbers of new housing will be to both the east and the west.

Using existing visitor survey data (c.3800 interviews giving home postcodes of people visiting the National Park) it is clear that the likelihood that someone living outside the National Park will visit the park declines with distance – i.e. people living further away are less likely to visit. Most day visitors and a large proportion of the total number of visitors come from within 20 km of the National Park boundary. We use these data to attempt to predict visitor numbers to the New Forest in the future. We do this by taking housing allocations for the area surrounding the National Park (to 50km) and assuming that the distribution of new housing will be in proportion to the existing housing distribution. We assume new housing will result in an increase in population size and use a standard occupancy rate for all new housing. We also assume that the proportion of residents (at a given distance from the National Park boundary) that visit the National Park will remain the same.

We estimate that housing development in the period 2006-2026 within 50 km of the New Forest will result in an additional 1.05 million person visits per annum. Much of these additional visits will be as a result of development relatively close to the National Park boundary, with an estimated 764,000 of this total coming from within 10 km of the boundary. Development at a distance of 10-20 km from the National Park boundary will account for 168,000 visitor days per annum. Regular visitors (i.e. those who visit at least weekly) tend to be mainly dog walkers and most come from within 7 km of the National Park boundary. Approximately 226,000 of the additional visits made to the National Park coming from within 50 km will be regular dog walkers.

We also estimate the number of additional visits likely to occur as a result of new housing within the National Park. Residents within the National Park boundary are frequent visitors, making approximately 890,000 person visits per year, 6.7% of the total visits made within the park, which equates to 55 person visits per household per year. Of those visits, 64.7% are made by people who are frequent (at least weekly) dog walkers. Taking an estimated increase of 200 houses within the National Park boundary within the period 2006-20026, we therefore predict a further 11,000 person visits per year as a result of new housing within the National Park.

The increase in visitor pressure is therefore likely to be from people living outside the National Park, but reasonably close (within 20 km). Such visitors are likely to have some knowledge of the National Park and will probably avoid the tourist areas. In order to manage and mitigate the impacts of any such change, any mitigation measures will therefore need to be targeted at these visitors.

Visitor survey data shows that people tend to visit the part of the National Park that corresponds with their direction of travel – i.e. those visiting from the east tend to visit the eastern parts of the National Park etc.

The three heathland Annex I bird species (nightjar, woodlark and Dartford warbler) are notable in that densities within the New Forest National Park are particularly low when compared with other heathland areas (Dorset and Thames Basin Heaths). Although there are some potential caveats with the approach used, there is some evidence (particularly for woodlarks), that areas of high visitor pressure are avoided. Further work is needed to understand the generally low densities and the range of factors that may determine why densities are comparatively low within the New Forest. Without such an understanding it is difficult to determine the extent to which disturbance may have consequences for the bird populations of interest.

Further work on the breeding bird species is therefore warranted, and recommendations are made within the report. We also suggest measures which may reduce any potential impacts of future development.

# Contents

# Acknowledgements

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The various data we have used have come from a number of sources. The bird data (national survey data for nightjar, woodlarks and Dartford warblers) were provided by Allan Drewitt (Natural England); we acknowledge the work of the four partners (RSPB, BTO, Natural England, FC) in these surveys and the collection of the original data. Andrew Bell (New Forest National Park) and Saira Evans (New Forest National Park Authority) provided GIS data such as boundary files and car-park data. The habitat data were provided by Hampshire Biological Information Centre and we are grateful to Julia Verity (Hampshire County Council) for collating this for us. Access to the PROGRESS data, various visitor survey data and other FC data sets were provided by the Forestry Commission, and we are grateful to Bruce Rothnie, Simon Smith and Peter Thaxter for collating these data for us.

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# 1 Introduction

The New Forest National Park is one of the UK's most important areas for biodiversity conservation. Accordingly, it is covered by an array of European and national landscape and nature conservation designations. The large areas of relatively intact natural vegetation, scenic landscapes and varied wildlife also make the National Park a magnet for human recreational activity – by local residents, day visitors from nearby areas and tourists from further afield alike. This high level of visitors makes a substantial contribution to the local economy.

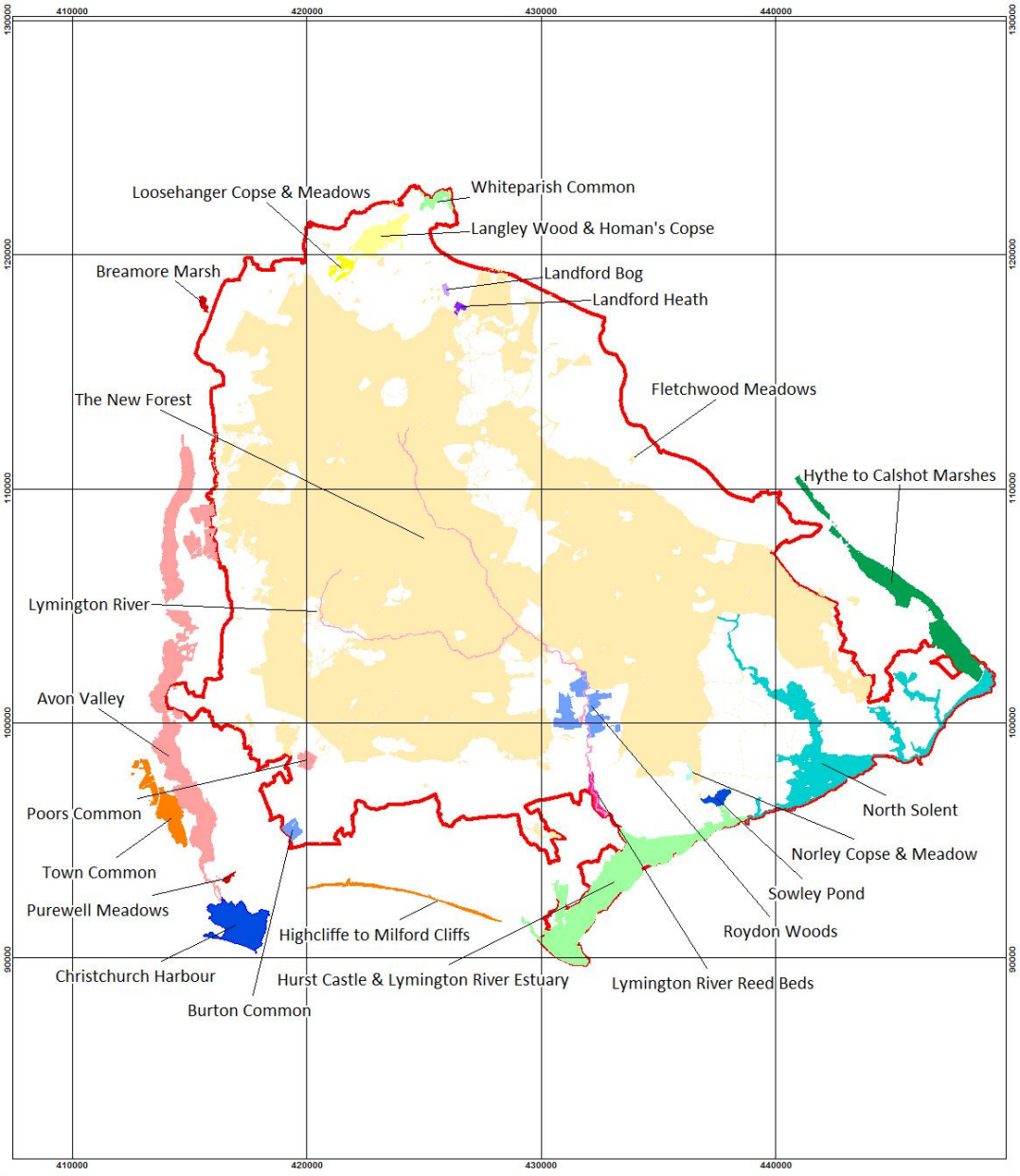
There is growing concern about the cumulative impacts of housing development on key sites for nature conservation in southern England. This is especially the case with lowland heathland, which often exists close to large human populations. Various studies have highlighted the impacts (see Underhill-Day, 2005; Woodfield & Langston, 2004a for reviews) which include disturbance, increased fire incidence and predation from pets. There are clear links between housing, access levels and nature conservation impacts (e.g. Liley *et al.*, 2006a; Liley *et al.*, 2006b). Where sites are internationally important for nature conservation, changes in access levels have the potential to result in adverse effects to the interest features.

This report explores whether the numbers of people visiting the New Forest are currently having a detrimental effect on species and habitats of European importance. The study is based on an assessment of recreational impacts on selected bird species, on the basis that they are indicators of the general health of the National Park's protected habitats and because work on other areas of southern England has shown these species to be impacted by human disturbance. This assessment looks at the present day, but also casts its eye forward, aware that new housing developments planned for southern England will have an impact on recreational patterns, and thus, potentially, on the Park's biodiversity.

## *1.1 New Forest National Park, designations and conservation importance*

The New Forest is of high significance for the conservation of biodiversity in Britain and Europe (Sanderson, 1998; Tubbs, 1986; Tubbs, 2001). It contains internationally important, extensive areas of lowland heath, ancient woodland, valley mires, river valleys and coastal marshes. In turn, these contain a very high number of nationally rare (and some internationally rare) species, particularly invertebrates.

A majority of the National Park is contained within the Natura 2000 network of European Sites, either as a Special Area of Conservation (SAC) under the Habitats Directive or a Special Protection Area (SPA) under the Wild Birds Directive, or both. Both classifications are protected under UK legislation by the Conservation (Natural Habitats &c) Regulations 1994. A large area is also designated as Ramsar sites (wetlands of international importance), under the terms of the Ramsar Convention. All areas contained in one of the above three designations are also protected under UK legislation as Sites of Special Scientific Interest (SSSIs) under the Wildlife and Countryside Act 1981, or as National Nature Reserves under the National Parks and Access to the Countryside Act 1949. Details of these are given below and are summarised in Maps 1 and 2.




**Map 1: SSSI within and in the vicinity of the New Forest National Park**

Changing patterns of visitor numbers within the New Forest National Park

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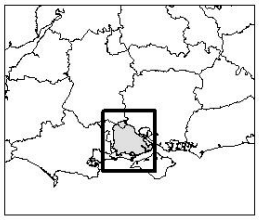
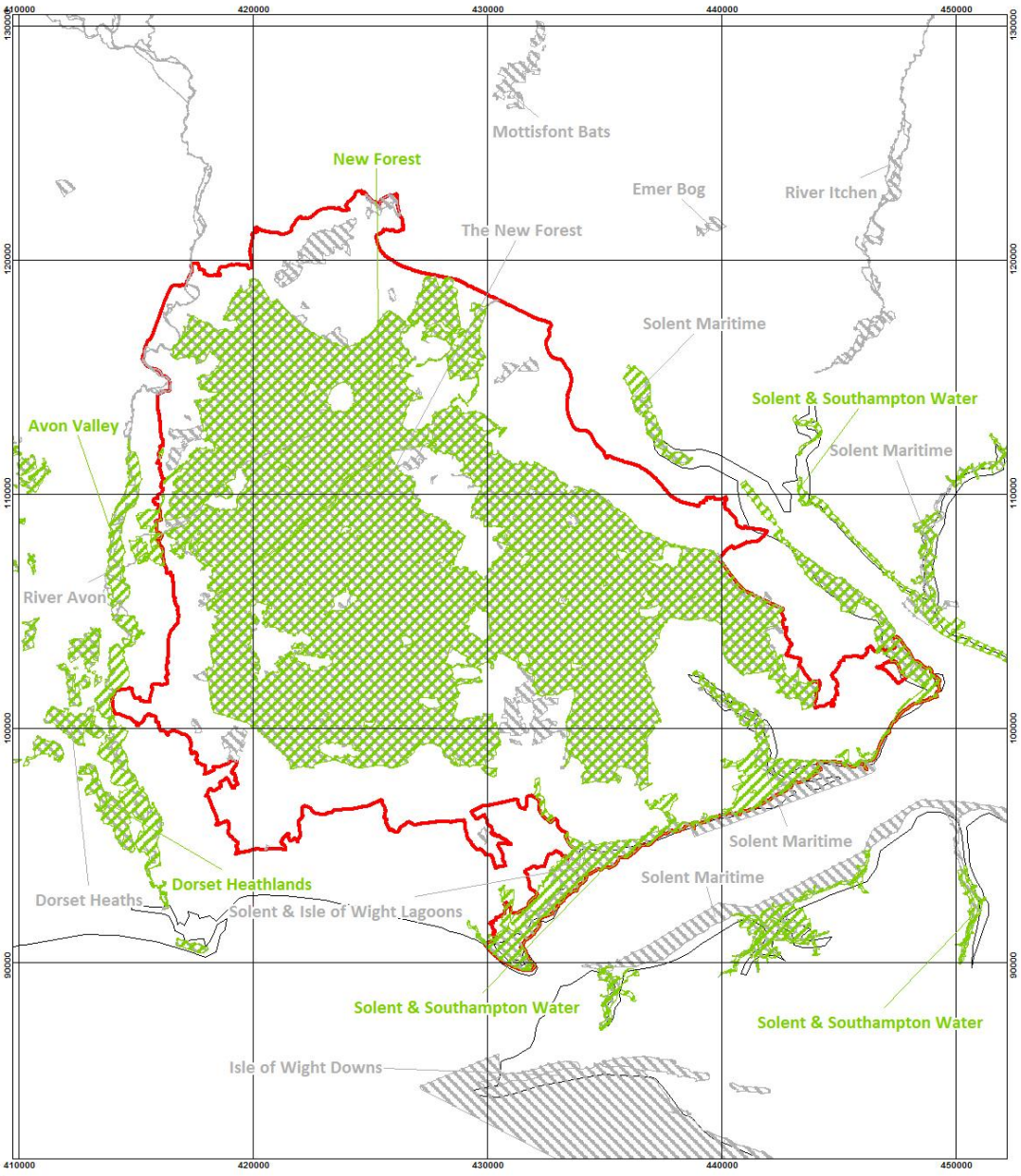
16 May 2008

Scale 1:203148








**Map 2: SAC and SPA within and in the vicinity of the New Forest National Park**

Changing patterns of visitor numbers within the New Forest National Park

footprint ECOLOGY

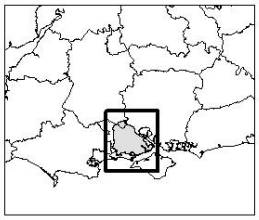
16 May 2008

Scale 1:186932

SPA

SAC





### 1.1.1 New Forest SPA

The New Forest was classified as a Special Protection Area in September 1999 under Regulation 11 of the Conservation (Natural Habitats &c) Regulations 1994, pursuant to Article 43 (1) of the Wild Birds Directive (Council Directive 79/409/EEC). This is a composite site of 28000.81 ha.

Ninety nine per cent of the SPA lies in the county of Hampshire, with the remaining 1% in Wiltshire.

The SPA contains a variety of habitats, particularly broad-leaved deciduous woodland (28.9%), heathland (27.3%), dry grassland (17.6%) and coniferous woodland (17.3%). Among less well-represented habitat types are bogs and marshes (5.9%).

The SPA was qualified for designation under Article 4.1 of the Birds Directive as it is used regularly by 1% or more of the Great Britain population of the species shown in Table 1. For some species such as Dartford warbler, woodlark, nightjar and honey buzzard, the proportion of the GB population supported by the New Forest far exceeds this threshold.

**Table 1 Estimated populations of Annex I species used for SPA designation**

| *Annex I species* | *Est. Pop* | *%GB* | *Survey Date* |
|---|---|---|---|
| Dartford warbler *Sylvia undata* | 538 pairs | 33.6 | 1996 |
| Nightjar *Caprimulgus europeaus* | 300 pairs | 8.8 | 1991 |
| Woodlark *Lullula arborea* | 184 pairs | 12.4 | 1997 |
| Hen harrier *Circus cyaneus* | 15, wintering | 2 | n/a |
| Honey buzzard *Pernis apivorus* | 2 pairs | 10 | n/a |

In addition, the SPA qualifies for designation under Article 4.2 f the Birds Directive, as it supports more than 350 pairs of breeding wood warbler *Phylloscopus sibilatrix* (2% of the GB population) and 25 pairs of hobby *Falco subbuteo* (5% of the GB population).

### 1.1.2 The New Forest SAC

Some 29,262.36 ha of the New Forest were also designated as a Special Area of Conservation in April 2005 under EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (“the Habitats Directive”). It lies 99% in Hampshire and 1% in Wiltshire.

The Annex I habitats and Annex II species which were the primary reason for this designation are shown in Table 2:

**Table 2 Annex I habitats and Annex II species that are a primary reason for the designation of The New Forest SAC**

| *Annex* | *Habitat/Species* | *% of SAC* | *Details* |
|---|---|---|---|
| I | Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) | 1 | Hatchet Pond is an important southern example of this lake type where northern species, more common in UK uplands, co-exist with southern species. |
| I | Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea* | 1 | occurs on the edge of large temporary ponds, shallow ephemeral pools and poached damp hollows in grassland; include two nationally scarce species coral-necklace *Illecebrum verticillatum* and yellow centaury *Cicendia filiformis*, |
| I | Northern Atlantic wet heaths with *Erica tetralix* | 7 | the most extensive stands of this habitat in southern England, mainly of the M16 *Erica tetralix – Sphagnum compactum* type, important for rare plants and dragonflies |
| I | European dry heaths | 26 | the largest area of lowland heathland in the UK. Comprises H2 *Calluna vulgaris – Ulex minor* heath type, with H3 *Ulex minor – Agrostis curtisii* heath in damper areas. |
| I | *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) | 2.8 | supports a large area of the heathy form of M24 *Molinia caerulea – Cirsium dissectum* fen-meadow. Unusual in the UK in terms of their species composition, management and landscape position. |
| I | Depressions on peat substrates of the *Rhynchosporion* | 1 | Holds the largest area of this habitat type in England, in complex habitat mosaics associated primarily with the extensive valley bogs of this site. |
| I | Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrub layer (*Quercion robori-petraeae* or *Ilici-Fagenion*) | 6.8 | the largest area of mature, semi-natural beech *Fagus sylvatica* woodland in Britain with unique and varied assemblages of epiphytic lichens and saproxylic invertebrates. |
| I | *Asperulo-Fagetum* beech forests | 1.4 | the largest area of mature, semi-natural beech *Fagus sylvatica* woodland in Britain with unique and varied assemblages of epiphytic lichens and saproxylic invertebrates. |
| I | Old acidophilous oak woods with *Quercus robur* on sandy plains | 1 | the most extensive area of active wood-pasture with old oak *Quercus* spp. and beech *Fagus sylvatica* in north-west Europe and has outstanding saproxylic invertebrate and lichen populations. |
| I | Bog woodland | 1 | Priority feature. Underlying *Sphagnum* bog-moss communities and rich epiphytic lichen communities. |
| I | Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) | 1 | Priority feature. Contains many streams and some small rivers that are less affected by drainage and canalisation than those in any other comparable area in the lowlands of England |
| II | Southern damselfly *Coenagrion mercuriale* | N/a | an outstanding locality, with several population centres and strong populations estimated to be in the hundreds or thousands of individuals |
| II | Stag beetle *Lucanus cervus* | N/a | a major stronghold for the species in the UK – due to presence of rotting wood |

In addition, there are two Annex I habitats (Transition mires and quaking bogs and Alkaline fens) and a few Annex II species (Great crested newt *Triturus cristatus,* brook lamprey *Lampetra planeri,* bullhead *Cottus gobio,* barbastelle bat *Barbastella barbastellus,* Bechstein's bat *Myotis*

*bechsteini,* and Eurasian Otter *Lutra lutra)* that comprise qualifying features but not a primary reason for selection.

### 1.1.3 The New Forest Ramsar Site

In addition to the SPA and SAC designations, 28,002.81 ha of the New Forest were designated a Ramsar site in September 1993, under criteria 1, 2 and 3 of the guidelines adopted under resolution VII.II of the Ramsar Convention. Details follow:

**Under Ramsar Criterion 1**
Valley mires and wet heaths found throughout the site are of outstanding scientific interest. The largest concentration of intact valley mires of their type in GB.

**Under Ramsar Criterion 2**
Supports a diverse assemblage of wetland plants and animals including (at the time of designation at least) 29 nationally important plant species occur, including small fleabane *Pulicaria vulgaris,* slender cottongrass *Eriophorum gracile* and pennyroyal *Mentha pulegium*. Invertebrates include two species with internationally important populations (southern damselfly *Coenagrion mercuriale* and stag beetle *Lucanus cervus*) and 180 species of invertebrates (ranging from butterflies such as the high brown fritillary *Argynnis adippe* to ground bugs such as *Nysius helveticus*, freshwater invertebrates such as the tadpole shrimp *Triops canriformis* and insects such as the New Forest cicada *Cicaette montana*, the latter two species only known from the New Forest in the UK). Other important species occurring include one amphibian (great crested newt *Triturus cristatus*) and two fish (brook lamprey *Lapetra planeri* and bullhead *Cottus gobio*)

**Under Ramsar Criterion 3**
The mire habitats are of high ecological quality and diversity. Invertebrate fauna are important due to the concentration of rare and scarce wetland species. The whole site complex is essential to the genetic and ecological diversity of southern England.

### 1.1.4 Solent and Southampton Water SPA

The Solent and Southampton Water SPA site comprises a series of estuaries and adjacent coastal habitats important for breeding gulls and terns and wintering waterfowl.

The site qualifies under article 4.1 of the Birds Directive (79/409/EEC) as it is used regularly by 1 % or more of the Great Britain population of five species listed in Annex 1 (Table 3.)

**Table 3: Annex I species associated with the Solent and Southampton Water SPA (count data from JNCC Seabird Colony Register)**

| *Species* | *5 year peak mean* | *% of GB population* | *Count Years* |
|---|---|---|---|
| Mediterranean Gull *Larus melanocephalus* | 2 pairs | 8.2-13.9 | 1994-1998 |
| Sandwich tern *Sterna sandvicensis* | 231 pairs | 1.7% | 1993-1997 |
| Common tern *Sterna hirundo* | 267 pairs | 2.2 | 1993-1997 |
| Little tern *Sterna albifrons* | 49 pairs | 2 | 1993-1997 |
| Roseate tern *Sterrna dougalli* | 2 pairs | 3.1 | 1993-1997 |

The site also qualifies under article 4.2 of the Birds Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographic population of the following regularly occurring migratory species: Dark-bellied brent goose *Branta bernicla bernicla,* Teal *Anas crecca,* Ringed plover *Charadrius hiaticula* and Black-tailed godwit *Limosa limosa.*

The area also qualifies under article 4.2 in that it holds more than 20,000 waterfowl

### 1.1.5 Solent Maritime SAC

The Solent Maritime SAC is primarily designated for three Annex I habitats: estuaries, Spartina swards (*Spartinion maritimae*) and Atlantic salt-meadows (Glauco-Puccinellietalia maritimae).

The estuary feature encompasses a major estuarine system on the south coast of England with four coastal plain estuaries (Yar, Medina, King's Quay Shore, and Hamble) and four bar-built estuaries (Newtown Harbour, Beaulieu, Langstone Harbour, Chichester Harbour). The Solent is unique for its regime of four tides each day, and for the complexity of the marine and estuarine habitats present within the area. The designation for Spartina swards reflects the fact that Solent Maritime is the only site for smooth cord-grass *Spartina alterniflora* in the UK and is one of only two sites where significant amounts of small cord-grass *S. maritima* are found. It is also one of the few remaining sites for Townsend's cord-grass *S. x townsendii*. The salt meadows are notable as being representative of the ungrazed type and support a range of communities dominated by sea-purslane *Atriplex portulacoides*, common sea-lavender *Limonium vulgare* and thrift *Armeria maritima*.

In addition the SAC contains a number of other Annex I habitats that are not a primary reason for designation: Sandbanks which are slightly covered by sea water all the time; Mudflats and sandflats not covered by seawater at low tide; Coastal lagoons; Annual vegetation of drift lines; Perennial vegetation of stony banks; Salicornia and other annuals colonising mud and sand; and Shifting dunes along the shoreline with Ammophila arenaria (`white dunes`). Desmoulin`s whorl snail *Vertigo moulinsiana* (Annex II) is also present as a qualifying feature, but is not a primary reason for the selection of the SAC.

### 1.1.6 Solent and Southampton Water Ramsar

The Solent and Southampton Water Ramsar site comprises a series of estuaries and adjacent coastal habitats including intertidal mud and sandflats saline lagoons, vegetated shingle, saltmarsh, reedbeds, damp woodland, and grazing marsh. It is designated under the following criteria

**Ramsar criterion 1**

The site is one of the few major sheltered channels between a substantial island and mainland in European waters, exhibiting an unusual strong double tidal flow and has long periods of slack water at high and low tide. It includes many wetland habitats characteristic of the biogeographic region: saline lagoons, saltmarshes, estuaries, intertidal flats, shallow coastal waters, grazing marshes, reedbeds, coastal woodland and rocky boulder reefs.

**Ramsar criterion 2**
The site supports an important assemblage of rare plants and invertebrates. At least 33 British Red Data Book invertebrates and at least eight British Red Data Book plants are represented on site.

**Ramsar criterion 5**
The waterfowl assemblage is of international importance with peak mean counts of 51,343 waterfowl (5 year peak mean 1998/99-2002/2003)

**Ramsar criterion 6**
The following species/populations occur at levels of international importance:
ringed plover Charadrius *hiaticula*,
dark-bellied brent goose *Branta bernicla bernicla*,
Eurasian teal *Anas crecca*,
black-tailed godwit *Limosa limosa islandica*.

### 1.1.7 River Avon SAC

The River Avon SAC encompasses the main water courses of the river, running from Upavon in the north to the coast. One arm of the designation extends well into the New Forest National Park, reaching nearly as far east as Fritham. The SAC is primarily designated for one Annex I habitat: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation.

There are 5 Annex II species that are a primary reason for the SAC's selection:
Desmoulin`s whorl snail *Vertigo moulinsiana*
Sea lamprey *Petromyzon marinus*
Brook lamprey *Lampetra planeri*
Atlantic salmon *Salmo salar*
Bullhead *Cottus gobio*

### 1.1.8 SSSIs and National Nature Reserves

The New Forest Special Site of Scientific Interest (SSSI) was designated under the Wildlife and Countryside Act 1981, covers 28,924.5 hectares and comprises 584 individual units. The SSSI overlaps almost entirely the SAC and/or SPA, with two key differences: additional land along valleys in the south-east of the Park and in the WSW of the Park (specifically Poors, Burton and Town Commons, Norley Copse and Meadow, Fletchwood Meadow and Dibden Bay); and exclusion of the westernmost element of coastline in the south of the Park.

The principal reason for designating the SSSI is that the New Forest contains the largest area of semi-natural vegetation in lowland England, and includes large areas of habitat formations formerly common but now fragmented and rare in lowland Western Europe. It is considered that the juxtaposition and large extent covered by the mosaic of lowland heath, valley and seepage step mire, and ancient pasture woodland, is unique. The SSSI is noted for its important populations of a long list of vertebrates and invertebrates. The vast majority of these species

overlap with those identified under the SAC, SPA and/or Ramsar designations and are not repeated here.

Besides the New Forest SSSI there are a number of other SSSIs that are within, or partly within, the New Forest National Park (Map 1). These include coastal and freshwater habitats.

Three sites are designated as National Nature Reserves under the National Parks and Access to the Countryside Act 1949: Kingston Great Common, North Solent and Langley Wood. All lie within the boundaries of European Sites subsequently designated.

### 1.1.9 National Park

The National Park designation was confirmed in 2005, with the new National Park Authority became fully operational in 2006. The Authority is a free-standing organisation operating within the local government framework. It is responsible for conserving and enhancing the natural beauty, wildlife and cultural heritage of the Park; and promoting opportunities for the understanding and enjoyment of the Park's special qualities by the public. In pursuing these purposes, the Authority must seek to foster the social and economic well-being of local communities within the Park.

## *1.2 Overview of visitor studies and recreational activity in the New Forest*

In this report, we have drawn extensively on the two main sources of visitor and recreational information for the New Forest.

The University of Portsmouth was commissioned the early 1990s to produce a *New Forest Sport and Recreation Study*, providing a data set describing current and expected patterns of recreational use and provision. This study reported in 1996 (University of Portsmouth, 1996).

In 2004-2005, Tourism South East carried out an extensive survey of visitor patterns in the New Forest (Tourism South East Research Services & Geoff Broom Associates, 2005), on behalf of the Countryside Agency and as part of the tri-nation PROGRESS project (Gallagher, Graham & Colas, 2007). The objectives of the research were: to identify the profile of visitors to the then proposed New Forest National Park; to explore the characteristics of visits to the area; to identify the main reasons for visits; to gather data on visitor destinations and activities; and to produce reliable estimates of visitor volumes and resultant economic impact. Tourism South East reported in 2006 and its findings provide the basis of our comparison with the Thames Basin Heaths and Dorset Heaths in section 2.2. In this report, we refer to this work, and the other components of the project as “the PROGRESS data” or simply “PROGRESS”.

We also mention, in passing, studies on the New Forest by Ecotec (1992) and on other National Parks by Defra (2002).

These various studies highlight the high levels or recreational use currently taking place within the New Forest. Total visitor volumes within the New Forest are estimated at over 13 million visitor days (PROGRESS). This total includes holidaymakers staying within the park (12% of

visitor days), day trips from home by New Forest residents (14% of visitor days) and people living outside the park and visiting for the day from home (64% of day visits).

## *1.3 Impacts of Development*

New Forest District Council, in their Habitat Regulations Assessment of the draft New Forest District Council Core Strategy, identified recreational pressure as a potential issue for European habitats in the New Forest National Park, particularly in-combination effects with development outside of the District. Changes in the levels of recreational pressure are likely to result from new development, changing the number of people living in the vicinity of the park and the spatial distribution of housing. This section gives an overview of the impacts of recreational activity and impacts that may arise as a result of future development. The most popular New Forest activities—walking, dog-walking, cycling, horse-riding and picnicking—are generally not limited by habitat type, thus they and their associated impacts potentially occur over a very large part of the New Forest.

### 1.3.1 Disturbance to birds: an overview

Human disturbance of birds has become a key issue for both conservationists and researchers in recent years. Disturbance can be defined as any human activity that influences a bird's behaviour or survival. There are a wide variety of studies which describe disturbance effects (for reviews see Hill *et al.*, 1997 ; Nisbet, 2000; Woodfield *et al.*, 2004a).

Most studies of disturbance demonstrate behavioural effects, such as birds changing their feeding behaviour (e.g. Burger, 1991; Fitzpatrick & Bouchez, 1998; Thomas, Kvitek & Bretz, 2003; Verhulst, Oosterbeek & Ens, 2001) or taking flight (e.g. Blumstein, 2003; Blumstein *et al.*, 2003 ; e.g. Burger, 1998; Fernandez-Juricic, Jimenez & Lucas, 2001; Fernandez-Juricic *et al.*, 2005; Stalmaster & Kaiser, 1997; Webb & Blumstein, 2005). Other studies have focused on physiological impacts, such as demonstrating changes in the levels of stress hormones (Remage-Healey & Romero, 2000; Tempel & Gutierrez, 2003; Walker, Dee Boersma & Wingfield) or monitoring changes in heart rate (Nimon, Schroter & Oxenham, 1996; Weimerskirch *et al.*, 2002). While behavioural and physiological studies show an impact of disturbance, it is usually difficult to understand whether the disturbance does actually have an impact on the population size of the species in question. For example, the fact that a bird takes flight when a person approaches is to be expected and a short flight in unlikely to have a major impact on the individual in question, let alone the population as a whole.

Certain impacts of disturbance are perhaps more likely to have a population impact. Direct mortality resulting from disturbance has been shown in a few circumstances (Liley, 1999; Yasue & Dearden, 2006) and many (but not all) studies have shown a reduction in breeding success where disturbance is greater (e.g. Arroyo & Razin, 2006; Bolduc & Guillemette, 2003; Murison, 2002; Ruhlen *et al.*, 2003). There are also many examples of otherwise suitable habitat being unused as a result of disturbance (Gill, 1996; Kaiser *et al.*, 2006; Liley *et al.*, 2006a; Liley & Sutherland, 2007). Very few studies have actually placed disturbance impacts in a population context, showing the actual impact of disturbance on population size (but see Liley *et al.*, 2007; Mallord *et al.*, 2007; Stillman *et al.*, 2007; West *et al.*, 2002).

### 1.3.2 Disturbance to birds: evidence for the New Forest Annex I species

The New Forest SPA is designated in part due to its breeding populations of three Annex I birds: nightjar *Caprimulgus europaeus*, woodlark *Lullula lullula* and Dartford warbler *Sylvia undata* (see section 1.1.2). Various research has been conducted on the impacts of human disturbance on these species, the essence of which is summarised below. While none of this research has taken place within the New Forest, the locations where much of the work has taken place (for example the Dorset Heaths and the Thames Basin Heaths) are in close geographical proximity to the National Park. There is therefore likely to be much cross-over with the New Forest.

Little work on disturbance has been conducted for the two raptor species.

***Nightjar.*** A negative relationship has been shown with the number of houses surrounding a heathland site and the number of nightjar present on that site (Liley & Clarke, 2003; Liley *et al.*, 2006a). These studies have looked across urban gradients that do not occur within the New Forest. Intensive field studies (Murison, 2002) found that nests failed more frequently on urban heaths, and nests closer to footpaths were more likely to fail from predation. Given that adult nightjar are camouflaged, but eggs in an unoccupied nest clearly visible, Murison suggested that disturbance from people, and perhaps dogs in particular, flushes incubating adults from the nest, exposing the eggs to predators such as crows. Subsequent work suggested that high levels of recreational access, in particular dogs, may reduce nightjar breeding success (Langston *et al.*, 2007b; Woodfield & Langston, 2004b).

***Woodlark.*** Mallord (2006d; 2005) spent four years studying the impact of disturbance to woodlarks on 16 heathland sites in Dorset. These sites all had historical records of breeding woodlarks, and together encompassed a range of visitor access levels. Mallord found that the density of woodlarks within a site was negatively correlated to disturbance levels, with lower densities where disturbance levels were higher. In addition, within sites, the probability that a territory would be occupied declined with increasing levels of disturbance. However, there was no effect of disturbance on nest survival, and the number of chicks raised per pair actually increased at higher levels of disturbance. This was because birds in areas of high disturbance were nesting at lower densities, and at these low densities chicks seemed less likely to starve and more fledged. Overall, Mallord estimated that if there was no disturbance on any of the sites, 34% more woodlark chicks would be raised.

Using a similar approach to that used by Liley & Clarke (2003) for nightjar, Mallord (2005) also looked at the numbers of woodlarks on sites in relation to the amount of urban development surrounding each site. As with nightjars much of this work has been conducted across a range of sites including heaths with very high levels of development directly adjacent to their boundaries, a situation not found within the New Forest. Mallord found that the number of woodlarks on a site was determined by the amount of suitable habitat within the site, and the extent of adjacent urban development. He suggested that urban development could be operating in three distinct ways; firstly, by increasing site isolation and thus reducing the probability of colonisation; secondly, by reducing the amount of foraging habitat available to birds off-site; and thirdly, as a surrogate for recreational disturbance, to which it is strongly related.

***Dartford warbler.*** In Dorset, disturbance only appeared to have a significant impact on breeding productivity in territories in heather dominated territories (as oppose to those dominated by gorse *Ulex* sp.), delaying breeding by up to six weeks and thereby decreasing both the number of broods raised and chicks fledged per brood (Murison *et al.*, 2007). Within the New Forest concern has been raised that grazing may reduce gorse regeneration and therefore impact the quality of Dartford warbler territories (Bibby, 1979). In Murison's study, nests sited close to territory edges, with high numbers of disturbance events, were more likely to fail outright. Murison's work suggests that disturbance levels of 13-16 people passing through a heather-dominated territory each hour would prevent pairs raising multiple broods.

***Raptors.*** The New Forest is designated as an SPA in part due to the presence of two raptor species, breeding honey buzzard and wintering hen harriers. There are no relevant studies on these species and disturbance. Honey buzzards are a very scarce breeding species in the UK and have always been considered vulnerable to disturbance, this may not necessarily be the case (Roberts, Lewis & Williams, 1999). Wintering hen harriers tend to roam over large areas and are unlikely to be affected by disturbance, apart from possibly at the communal roost sites (for example Haskins, 2000).

### 1.3.3 Other impacts of urban development and associated human activity

Disturbance effects are not the only impacts of visitor pressure. Others include: deliberate and accidental fires, litter, predation from people and pets, eutrophication, flytipping, trampling, traffic-induced air pollution and site management problems. These impacts are summarised by various authors (see Liley *et al.*, 2006b; Underhill-Day, 2005) and these provide the basis for the following overviews of specific impacts. It should be noted that these impacts often operate synergistically. For example, fire removes vegetation, which may then make reptiles more susceptible to predation by cats. This means that it is difficult to isolate a single effect in explaining the rarity or absence of an interest feature at a particular site.

***Wild fires.*** Controlled fires are a beneficial part of heathland management, but unmanaged 'wild' fires are quite different – not being targeted at specific stages in the heathland cycle, restricted to a pre-determined size or a specific season. Fire has a serious impact on ecological integrity, destroying heathland vegetation that, depending on substrate and fire characteristics, can take 4-20 years to regenerate (Underhill-Day, 2005). Invertebrates with restricted niches (e.g. living in litter or heather canopy) take 10 years to recolonise. Large fires remove nesting cover and foraging habitat for insectivorous birds such as Dartford warblers. Reptiles suffer direct mortality in summer fires; those that survive are susceptible to predation afterwards. On the Dorset Heaths, fires peak in April-August, the season of greatest visitor pressure and highest susceptibility to damage of local fauna and flora (Kirby & Tantrum, 1999). There was a clear linkage between wild fires and proximity of urban areas, and a majority were found to be due to arson (Kirby *et al.*, 1999). More recent analysis has shown that fire incidence in Dorset varies markedly between years, depending on weather (Rose & Clarke, 2005).

***Cats and other urban predators.*** Cats are prolific predators, each catching roughly 29 prey items per year. Evidence suggests that cats roam up to 1,500 m from their home, so sites near urban areas are within territory ranges (Underhill-Day, 2005). Research on the Dorset heaths has revealed high levels of predation of Dartford warbler chicks by cats (Murison pers. comm.).

On heaths with human activity, there is evidence of higher densities of avian predators such as crows *Corvus* spp. and magpies *Pica pica* (Marzluff & Neatherlin, 2006; Taylor, 2002).

***Trampling, compaction and erosion.*** Ecological effects of trampling include: soil compaction, changes to soil hydrology or chemistry, changes to soil invertebrate communities (and an overall reduction in total populations), changes in plant communities and, with heavy use, soil erosion and the creation of bare ground. With particular reference to the habitats present in the New Forest, the following points are of note:

- The degree of damage depends on soil type, slope, drainage and hydrology, vegetation composition, and scale, frequency and seasonality of wear (Bayfield, 1979; Gallet & Rose, 2001; Harrison, 1981; Kuss, 1983; Toullec *et al.*, 1999a; Toullec *et al.*, 1999b);
- Nutrient-poor, coarse-textured, inorganic soils (e.g. heathland sands) are most vulnerable to compaction, particularly when wet (Gallet *et al.*, 2001);
- Wet communities are more vulnerable than dry communities, particularly in dry conditions, although they may recover more quickly. Bogs or lichens/mosses are particularly intolerant (Bayfield, 1979);
- Repeated trampling, for example from large groups, causes more damage than a series of single trampling events (Gallet & Roze, 2002; Kuss, 1983);
- Recovery from winter trampling is greater on wet heaths than dry (Gallet *et al.*, 2002);
- Horse trampling has been found to directly damage populations of Hymenoptera and Diptera on bare ground (Miles, 2003).

Soil compaction may be by horses, cycles, motorcycles or human/dog feet – which encompasses all key New Forest activities highlighted in the PROGRESS report. The effects of dog-walking and walking are typically greatest at access points (e.g. near car parks), as people tend to spread out thereafter and dog fouling tends to occur at the start of walks (Taylor *et al.*, 2005).

***Air pollution/traffic.*** Air pollution has been identified as a potential impact to the New Forest National Park (New Forest District Council, 2007). Air pollution from vehicles, industrial uses and fires has a negative impact on vegetation communities (Bobbink & Heil, 1993; Bobbink, Hornung & Roelofs, 1998; Power *et al.*, 1998). Vehicular traffic is the most likely problem in the New Forest, particularly when congestion occurs – as is frequently the case on certain New Forest roads in summer. The PROGRESS work has revealed that 85% of visitors already arrive by private motor vehicle. Absolute numbers of vehicles are likely to rise due to increasing affluence and smaller household sizes meaning increased car ownership.

***Management problems.*** High numbers of visitors can impact on the management of sites, for example dogs can worry livestock, gates can be left open, livestock can linger around car-parks waiting to be fed (and therefore not be grazing in the desired areas) and litter collection, emptying of dog-bins and other general maintenance issues require funding and staff resources. We are not aware that these issues have been researched or the impacts clearly defined in the New Forest area. Mitigation has been attempted in the New Forest through, for example, the PROGRESS leaflet for visitors 'out and about', which stresses the importance of shutting gates.

***Other impacts.*** Roads exacerbate habitat fragmentation (already a problem in many areas, but probably less so in the New Forest), as they pose barriers to arthropod and other invertebrate mobility (Mader, Schell & Kornacker, 1990) and traffic can cause disturbance (Reijnen, Foppen &

Veenbaas, 1997). Road traffic can also result in direct road kills – of birds, mammals, reptiles and invertebrates (Erritzoe, 2002; Erritzoe, Mazgajski & Rejt, 2003; Putman, 1997).

## *1.4 Current Condition of the key sites within the National Park*

There are fifteen SSSIs within the New Forest National Park (see Map 1). The principal SSSI in terms of area is The New Forest SSSI, of which 16 % (of nearly 29,000 ha) is currently classified as unfavourable no change or unfavourable declining[1]. Recreational pressure or disturbance is cited as a reason for unfavourable condition for 4 units (unit numbers 54, 249, 496 and 571, totalling some 98ha). Details for these units describe problems that include exotics (such as terrapins and lilies) in a pond adjacent to a car-park, problems with parking on verges and bare ground.

Of the other fourteen SSSIs, only the North Solent SSSI has part of its area in unfavourable condition due to recreational pressure. Here 2 units are classified as unfavourable due to disturbance to breeding birds (ringed plover and oystercatcher) and from bait digging.

At Solway Pond the larger unit is now classified as unfavourable recovering, with the notes for the unit stating that the problems with increasing recreational pressure have now been resolved.

On the basis of the latest SSSI condition assessments, and the details made public, it would therefore appear that a relatively small part of the National Park is negatively affected by public access. Those parts of the National Park where the condition assessments do identify access impacts are relatively limited in extent and some of the problems, such as introduced terrapins are quite specific.

## *1.5 Future changes in the New Forest: relevant planning policies and strategic documents*

Future planning is now governed by Regional Spatial Strategies. The New Forest National Park lies wholly in the area covered by the South East Regional Spatial Strategy. However, the catchment area for day visitors to the New Forest also includes areas covered by the South West Plan. The proposals and policies set out in both regional Plans are therefore relevant.

### 1.5.1 South East Regional Spatial Strategy

The submitted South East Plan envisages provision of an annual average of 28,900 dwellings from 2006-2026 over the region as a whole. For the South Hampshire sub-region, over the entire period, the Plan requests 80,000 new dwellings. Of these, 4,138 are to be the New Forest region; the remainder will lie in the National Park catchment area for what the PROGRESS report

[1] Details taken from the Natural England website, http://www.english-nature.org.uk/Special/sssi/search.cfm

terms 'other day-visitors'. The accumulation of new dwellings is evenly spread in each five year period[1] . The Report of the Panel (August 2007) supports these figures so they are likely to become reality.

### 1.5.2 Hampshire Structure Plan

In the period before the South East Plan is finalised, the Secretary of State has provided that Housing Policies H1-4 of the Hampshire Structure Plan 1996-2011 remain in force, guiding current development. These require provision of 94,290 dwellings between 1996 and 2011, including 14,000 as reserve housing[2].

### 1.5.3 New Forest District Core Strategy

The New Forest District Council Core Strategy, published October 2007, provides local consideration of up to 4,990 new dwellings allocated to the New Forest region. It identifies 'preferred options' for a strategic approach to locating these (and for many other issues).

### 1.5.4 The South West Plan

The South West Plan notes that the South East Dorset conurbation is the second largest urban area in the South West region, with a population of over 400,000[3]. Strategic planning authorities have identified the potential for 25,000 new dwellings by 2026, focused on Bournemouth (55%), Poole (35%) and Christchurch (10%)[4]. Housing growth is most likely to be more rapid in the first ten (and particularly first five) years than in the second half of the period. Bournemouth Borough Council, Dorset County Council and the Borough of Poole have jointly proposed providing for the development of up to 40,400 dwellings between 2001 and 2026 (note that the start date is retrospective)[5].

Recent forecasts suggest that the South West region's population could grow by over 750,000 people from 2006-2026, although we have not been able to locate figures solely for South East Dorset. The South West as a whole has an older than average population profile compared with other English regions: 24% are aged 60 or over, compared with 21% nationally. The former figure is predicted to increase to 30% by 2026. We have no reason to suspect that the South East Dorset figure will differ significantly. This is likely to have a significant impact on visitor pressure on the New Forest National Park, given that between 36-51% of current visitors are aged 55 or over, i.e. the higher numbers of older people are likely to mean higher Park visitor numbers.

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[1] Policy SH12, p246, South East Plan
[2] Hampshire Structure Plan 1996-2011, policies H1-H4
[3] section 4.3.2, South West Plan
[4] Section 4.3.10, South West Plan
[5] Bournemouth Borough Council, Dorset County Council and Borough of Poole (2005) South east Dorset sub-regional study: final first detailed proposals. http://www.bournemouth.gov.uk/Library/PDF/Living/Planning/Miscellaneous/SE%20DORSET%20JSA%20SUBMISSION.pdf

### 1.5.5 PUSH

The emerging Partnership for Urban South Hampshire (PUSH) Green Infrastructure Strategy also provides context. Green infrastructure describes the physical spaces that intersperse and connect our cities, towns and villages. An assessment of potential environmental impacts on green infrastructure assets in the South Hampshire sub-region is underway. It seeks to ensure that pressures from additional growth are minimised, mitigation packages identified and opportunities to enhance green assets maximised.

The underlying aim is to maximise the potential of local green space – by providing new local green assets and making more effective use of existing assets - to help absorb pressure from new development and reduce the impact on the protected and environmentally sensitive landscapes within South Hampshire and surrounding areas such as the New Forest. The resulting Strategy is needed to help deliver PUSH's environmental policy objectives and its vision to improve South Hampshire's quality of life. The 11 PUSH partner local authorities will take account of the Strategy in preparing local development documents. The Strategy is currently in development, with the process being led by TEP, a consultancy.

## *1.6 Aims and Objectives of this work*

Levels of recreational use within the New Forest are already high. Development pressure outside the National Park will change the spatial distribution of people living in the vicinity of the park and recreational use may therefore change in the future. For other heathland areas in the UK, such as the Dorset Heaths and the Thames Basin Heaths, concern about the impacts of development on the European interest features of the heathland sites has led to a series of mitigation work and planning control measures.

The aim of this report is to determine the extent to which current visitor levels are impacting on the European Interest Features of the New Forest, and to look to the future to determine the extent to which the pressures may change, and in particular access levels may change as a result of new housing outside the National Park. We use the existing visitor data, bird data and other information to look at visitor numbers from a housing perspective, in order to assess where new housing is likely to result in changes in visitor pressures, and the types of visitors likely to be involved.

Our principal aims, which form the structure of the report, are:

1. To determine how current visitor levels in the New Forest, and types of visitor, compare with other sites. Here we focus on the Dorset and Thames Basin Heaths where existing visitor pressure is thought to be high and where various mitigation measures have been implemented.
2. To explore the extent to which visitor numbers relate to the current distribution of housing. Here we will determine the scale of new development outside the New Forest within a 50km radius and explore where and to what extent such development will result in a change in visitor pressure.
3. To map the spatial distribution of visitors and determine, using existing data, whether there is any evidence that the distribution and abundance of key bird species is affected by visitor pressure.

We use the above to make recommendations for further research, where relevant and for measures that would be needed to ensure that development pressure in the period 2006-2026 outside the National Park will no adverse effects on the European Interest Features within the Park.

# 2 Recreational Use of the New Forest

## *2.1 Overview and Summary*

This section sets context for future chapters, summarising existing visitor data and using these visitor surveys to determine the types of visitor and how they access the New Forest. We also make direct comparisons with other heathland areas where high visitor levels are a cause for concern. We focus on the Dorset Heaths and Thames Basin Heaths, where the bulk of the work on access and disturbance to heathland birds has been conducted. Well-informed and considered comparisons between the New Forest and these areas should provide an indication of whether there are likely to be impacts to the key species. Such comparisons are also important in identifying whether the planning control measures, provision of new sites and access management measures proposed in these areas might be effective in the New Forest.

Visitor data from the New Forest is drawn largely from the work conducted as part of the PROGRESS Project. The New Forest has a far larger catchment area than the Thames Basin and Dorset Heaths and, accordingly, attracts a far higher proportion of tourists (40%). New Forest tourists tend to visit in peak season (when they form 50% of all visitors) and shoulder period (45%) rather than the off-peak period (when they form 20% of all visitors). Local visitors tend to avoid sites with comparatively high tourist pressure. While staying visitor/tourists visit almost all sites surveyed, they tend to be concentrated at a dozen or so 'honeypot' sites, particularly the six urban centres

Children form under a fifth of visitors in all three areas; New Forest proportions are similar to Thames Basin Heaths, but roughly double those of the Dorset Heaths. A large proportion (at least one third and possibly a half) of New Forest visitors are aged over 55, and a small majority are women. Compared to the Thames Basin and Dorset Heaths, the New Forest mean visitor group size (i.e. the average number of people per group) is considerably higher, the proportion of single person groups much lower, and the proportion of larger groups much higher.

Visitors to the New Forest come less frequently than to the Thames Basin Heaths – probably due to the influx of staying visitors/tourists who visit only infrequently. In terms of local day-visitors, visit frequency is similar. In contrast to the Thames Basin and Dorset Heaths, where there appears little seasonal variation in visitor numbers, the New Forest exhibits a clear peak during summer. This peak is due in large part due to the arrival of holidaymakers. Visitor pressure is thus greatest during the most ecologically vulnerable period of the year (i.e. during the vertebrate and invertebrate breeding season).

New Forest visitors spend more time and travel further on site than other visitors to the Thames Basin and Dorset Heaths. Dog-walking is a far less important activity and walking far more important an activity in the New Forest than in either the Dorset or Thames Basin Heaths. Local day visitors to the New Forest are more likely to walk dogs than non-locals, but the proportion is still comparatively low. We estimate that tourists account for roughly 179,000 dog-walks pa. Crude estimates suggest that the number of dog-walks carried out per year is higher in the Thames Basin Heaths than in the New Forest and Thames Basin Heaths –despite the latter being considerably larger.

Visitors are attracted to the New Forest, rather than alternative areas, by dint of its scenery, peace and quiet, ease of accessibility, suitability for walking, and wildlife. Such appeal factors would need to be taken into consideration when identifying principles for suitable alternative green spaces (or equivalents) to alleviate visitor pressure.

The New Forest appears to be the third most frequently visited National Park in England. In day visitors alone, the New Forest receives roughly double the number of the Thames Basin Heaths, and considerably more if staying tourists are included. However, the large size of the New Forest means that visitor densities are much lower than Thames Basin Heaths and roughly equivalent to the Dorset Heaths. Local day visitors spend shorter periods at sites but visit more frequently than either non-local day visitors or staying tourists.

The majority of visitors arrive at sites in the three areas by car or van; in the case of the Thames Basin Heaths and New Forest, this majority is very large. Visitor distribution within the New Forest may be largely governed by the distribution of car parks.

## *2.1 Origins and destinations of visitors to the New Forest*

### 2.1.1 Origins: who comes from where?

Southern England's extensive motorway and trunk road system puts more than 15 million people within 90 minutes drive. Good rail links further improve ease of accessibility. This, coupled with the unique mosaic of extensive, high quality habitats, is probably the main reason for the appeal of the New Forest as a tourist destination.

It is this high proportion of *staying tourists*, i.e. those spending the night away from home (40% according to the PROGRESS research, 43% according to the University of Portsmouth study), that primarily sets the New Forest apart from other large areas of open space near urban areas in southern England (such as the Thames Basin Heaths and Dorset Heaths, which form the main comparators in section 2.2). Ninety-eight per cent of visitors and 94% of staying tourists are domestic (i.e. living in the UK), with 2% visiting from overseas (the key countries being France, Australia, USA, Germany and Netherlands). The main sources of tourist supply are relatively evenly spread across southern England, with the primary contributors being Kent (11% of staying tourists), Hampshire (9%, surprisingly given that visitors could easily day trip the National Park), West Sussex (8%), Surrey (7%), Greater London (6%) and East Sussex (6%).

In addition to staying tourists, the New Forest attracts large numbers of day-visitors from areas more than five miles from the National Park. PROGRESS estimate that such "other day-visitors" account for 25% of the visitor total (35% in the University of Portsmouth work).

The majority (52%) come from Hampshire, specifically Southampton, Eastleigh and Chandlers Ford (28%), Winchester (9%), Portsmouth, Fareham, Gosport and Havant (8%) and North Hampshire (3%). Dorset forms the next largest visitor origin, contributing 29% of the 'other day-visitor' total, specifically from Bournemouth (11%), Poole (5%) and Ferndown, West Moors and

Verwood (5%). Other counties (as far north as Cambridgeshire) contribute far smaller proportions of day visitors, with only Wiltshire (7%) being notable. [Table 21]

The University of Portsmouth study suggests that there is particularly strong day-visitor pressure from the east of the New Forest, with 23% of other day-visitors coming from Southampton and Eastleigh, with a further 10% from the Test Valley, Winchester and East Hampshire.

The New Forest also attracts large numbers of local day-visitors, i.e. those living within the National Park or within about five miles of its boundary. PROGRESS estimate that such local day-visitors account for 35% of the visitor total (22% in the University of Portsmouth work).

Unsurprisingly, the key sources of local day-visitors are the major urban population centres in and around the National Park. PROGRESS found that one fifth of local day-visitors come from Waterside-Marchwood, Dibden, Hythe and Fawley. Other key sources are: Milford-on-sea, New Milton, Hordle and Sway (15%), Ringwood, Poluner, Crow, Burley and Bransgore (12%) and Totton, Cadnam, Calmore, Bartley and Ower (10%). The University of Portsmouth *Recreation Site Survey* suggests that the key sources of local day-visitors are Totton and Waterside (31%) and Lymington and New Milton (21%).

There is a high proportion of the population who fall into the wealthier socio-economic categories (ABC1) in and around the New Forest; these categories form the most frequent visitors to the countryside. In particular, the New Forest District has more than twice the national average of professional class residents who are most likely to visit the countryside for recreation (University of Portsmouth, 1996).

Hampshire and the New Forest have higher than average car ownership levels. At present, only 16% of households in the New Forest District do not have a car (NFDC Core Strategy, paragraph 6.94). Increasing affluence and smaller household sizes is likely to result in further increases (University of Portsmouth, 1996). Given that PROGRESS reveals that 85% of visitors to the New Forest National Park arrive by car, these trends are likely to result in an increasing number of motor vehicles in the park, causing increasing pressure on car parking spaces.

### 2.1.2 Destinations: who goes where?

The PROGRESS research provides a rough ranking of the most frequently visited sites among its 62 interview locations. Although the report does not define its classifications, it identifies three “very high use” sites (Dibden Inclosure, Bolderwood and Wilverley Plain) and four “High use” sites (Queens, Longslade Bottom, Blackwater and Keyhaven). It identifies a further 24 sites as “medium use”; these include one locality (Roundhill) considered to be a tourist “honeypot” site by the University of Portsmouth survey (see below). [Table 10]

There are considerable differences in the sites frequented by staying visitors (tourists) and day-visitors, particularly those living locally. Day visitors (wherever they live) tend not to visit urban centres. Local day-visitors tend to avoid sites with comparatively high tourist pressure (e.g. Bolderwood). While staying visitor/tourists visit almost all sites surveyed, they tend to be concentrated at a dozen or so ‘honeypot’ sites, particularly the six urban centres, but also Bolderwood, Queens, Blackwater, Ober Corner, Whitfield Moor, Wooton Bridge and Roundhill

Campsite. The heavily used Dibden Inclosure is almost entirely used by local day visitors (and is thus likely to be a key site for dog-walkers).

The PROGRESS household interviews suggest slightly different results, with the different visitor groups all claiming to visit urban centres most regularly. Day-visitors living in the National Park claim that they most regularly visit twons / villages within the National Park (particularly Lyndhurst, Brockenhurst, Beaulieu, Burley and Fritham). Remarkably, Dibden Inclosure—which PROGRESS interview data reveals as being a "very high use" site almost exclusively visited by locals—does not even muster 1% of responses. Visitors living adjacent to the National Park follow a similar pattern, reporting that they most regularly visit urban centres (particularly Lymington, Burley, Brockenhurst, Beaulieu and Lymington). Visitors from major urban catchment towns (e.g. Southampton, Bournemouth, and Poole) similarly report visiting the major New Forest urban centres most frequently (particularly Lyndhurst, Brockenhurst, Burley, Beaulieu and Lymington).

Some clearer insight into where visitors to each site have come from can be derived from data published by the University of Portsmouth study. The key results corroborate the PROGRESS finding that there are distinct user profiles for certain sites in the New Forest. Tourists appeared to congregate at a low number of 'honeypot sites' such as Rufus Stone (where 72% of visitors live 'elsewhere in the UK'), Rhinefield (63%), Bolderwood (62%) and Roundhill (61%). Day visitors from outside the National Park also frequented these sites in large numbers, but local day-visitors shunned them: only 4% of visitors to Bolderwood lived in the National Park and the pattern was similar at Rufus Stone (8%), Roundhill (10%), Rhinefield (12%), and Lepe (15%).

Local day-visitors tended to avoid 'tourist traps' and to stay close to home. For example, at Half Moon Common, 70% of visitors were locals, with 46% at Deerleap-Matley (three-quarters of whom live in the nearby settlements of Totton or Waterside). Similarly, Hampton Ridge received most of its visitors from the nearby towns of Ringwood and Fordingbridge. In general, local day-visitors appeared to favour sites around Lyndhurst, Brockenhurst, Godshill and Burley to those in other areas of the National Park (specifically, around Beaulieu, Wilverley, Exbury, Dibden, Cadnam and Nomansland). Intensity of local resident use decreased towards the north and increases towards the south of the National Park.

The destinations of 'other day-visitors' appeared to depend in considerable part on where they lived, i.e. ease of accessibility appears to be a major factoring site selection. People from the west (i.e. Bournemouth, Christchurch and Poole) concentrated on sites in the centre and south of the National Park (e.g. Rhinefield attracted a third of all visitors from these towns, and Bolderwood 16%) whereas visitors from the east (Southampton) focussed on Deerleap, Fritham and Lepe. A third of the visitors from the Test Valley, Winchester and East Hants went to Half Moon Common, while a fifth went to Lepe – suggesting that the coast is a key visitor resource for those without easy access to it nearby (e.g. as at Bournemouth, Christchurch and Poole, only 6% of whose visitors travelled to Lepe).

## *2.2 Comparison of visitor levels and attributes with other areas*

We compare the New Forest visitor survey data with survey data from two other heathland areas, the Dorset Heaths and the Thames Basin Heaths. In these areas concern about the impacts of cumulative development on the European Protected sites has led to development control and other measures to be put in place, with mitigation funded through developer contribution. There are existing visitor survey data for these areas.

We draw our comparisons from visitor surveys conducted for each SPA (Clarke *et al.*, 2006; Liley, Jackson & Underhill-Day, 2006c). These two surveys conducted interviews and counted visitors at a sample of access points onto the heaths. Counts / interviews were conducted for standard time periods on a week day and a weekend day. In Dorset 20 access points were sampled and a total of 632 interviews conducted. In the Thames Basin Heaths 1144 interviews were conducted, across 26 different access points. These two surveys were relatively simple, snapshot surveys. They are less comprehensive that the PROGRESS work, 3838 (unless otherwise stated) interviews were conducted across 62 varied sites. However, there are elements of the three surveys that can be compared, and the comparison provides a useful means of understanding visitor pressure on the New Forest in context with other areas.

Key elements of the three surveys are summarised in Table 4 and Table 5.

**Table 4 Area characteristics of the Dorset Heaths, Thames Basin Heaths and New Forest National Park**

| | *Dorset Heaths* | *Thames Basin Heaths* | *New Forest National Park* |
|---|---|---|---|
| Size (ha)[1] | 8,169 | 8,294 | 57,100 (New Forest SPA is 27,924) |
| Area (ha) with public access | 5,113 | 7,033 | 30,000[2] |
| Relevant protected area designations | SPA, SAC, Ramsar, SSSIs, AONB, NNR | SPA, SAC, SSSIs, NNR | SPA, SAC, SSSIs, National Park, Ramsar, NNR |
| Number of SSSIs contained | 40 | 13 | 15 |
| Number of counties involved | 1 | 3 | 2 |
| Number of planning authorities involved | 5 | 13 | 1 |

**Table 5 A comparison of various characteristics of recreational use of the Dorset Heaths, Thames Basin Heaths and New Forest. "?" is used to indicate where the information is not known. Dorset Heaths and Thames Basin Heaths data are taken largely from the respective visitor surveys (Clarke *et al.*, 2006; Liley *et al.*, 2006c).**

| | *Dorset Heaths* | *Thames Basin Heaths* | *New Forest* |
|---|---|---|---|
| Mean group size | 1.5 | 1.8 | 2.6 |
| % of single person groups | 64 | 52 | 22 (13)[3] |
| % of groups with 3+ people | 8 | 18 | 30 |
| % of visitors that are children | 9 | 16 | 18 |
| % of visitor groups visiting daily | ? | 52 | 17 |
| % visitors whose main purpose is dog-walking | 80 | 59 | 24(50)[3] |
| % visitors whose main purpose is walking | 10 | 32 | 30(20)[3] |
| % of local day visitors | ? | ? | 35 |
| % of non-local/other day visitors | ? | ? | 25 |
| % of staying holidaymakers/tourists | ? | ? | 40 |
| Estimated total annual visitor numbers[4] | 5 million | 7.5 million | 13.3 million |
| Estimated total annual dog-walks[5] | 4 million | 4.4 million | 3.185 million |
| Estimated visitor density (per ha pa)[6] | 680 | 842 | 443 |
| % visitors arriving at site by car/van | 59 | 83 | 85(78)[3] |
| % visitors arriving at site by foot | 36 | 13 | 8(16)[3] |
| Mean distance travelled on site (km) | 2.4 | 2.6 | ? |
| Mean distance travelled by dog-walkers on site (km) | 2.2 | 2.5 | ? |
| Mean penetration distance (m)[7] | 818 | 785 | ? |
| % dog-walkers penetrating less than 1 km onto heath | 83 | 78 | ? |
| Mean dwell time on site for all visitors (hrs) | n/a | n/a | 1.9 |
| Mean dwell time on site for dog-walkers (hrs) | n/a | n/a | 1.1 |

[1]These areas are the total area designated – the Dorset Heaths SPA, the Thames Basin Heaths SPA and the New Forest National Park.

[2]For Dorset and the Thames Basin Heaths these figures are taken from Liley *et al* (2006a), for the New Forest the figure is from http://www.newforestnpa.gov.uk/index/lookingafter/la-access/countryside_access.htm

[3] Main figure from visitor interviews. Figure in parentheses from households survey.

[4] For Dorset and the Thames Basin Heaths, these figures are derived from the spatial models (see Liley *et al.*, 2006a). We have rounded the estimates and taken the mid value between the different models. These estimates are for the SPA / SAC and associated access land outside the European sites – a total area of 7348ha for Dorset and 8906ha for the Thames Basin Heaths.

[5] These figures calculated by applying the percentage of visitors whose main purpose is dog walking to the annual total visitor numbers. New Forest figure calculated from the proportion of dogs with each category of visitor – tourists, day visitors etc.

[6] Estimated visitor density is the estimated total annual visitor numbers divided by the area figure (see point 4 above).

[7] Penetration distance is the linear distance from the start of an interviewee's route to the midpoint.

### 2.2.1 Distances travelled to each site and visitor type

The Thames Basin Heaths and Dorset Heaths visitor surveys both used postcode data to determine the straight line distance from a visitor's house to the access point where interviewed. These data show that the majority of people interviewed in both surveys were relatively local for example 70% of people at the Thames Basin Heaths gave home postcodes within 5km of the access point. The Dorset survey found visitors travelled a mean of 400 m to sites without parking and 3.75 km to sites with parking facilities. In the Thames Basin Heaths survey the median distance travelled by visitors arriving by car/van was 3.1 km. The equivalent figure for visitors arriving on foot was 1.5 km.

By contrast in the New Forest, the Progress visitor survey found approximately one third (35%) of visitors are local day-visitors, living within the National Park or within approximately five miles (roughly 8km) of its boundary. A quarter are other day visitors from further afield. Over half of these (52%) come from Hampshire, 29% from Dorset and 7% from Wiltshire. Forty per cent of total visitors are staying holidaymakers – who come from further afield. In total, 98% of visitors are from the UK, and 2% from overseas. The proportion of tourists is, unsurprisingly, greater in the peak and shoulder periods (50% and 45% respectively of all visitors) than in the off-peak period (19%). The figures for the three categories are very similar to those produced during the University of Portsmouth surveys: 22% local residents, 35% leisure day visitors (equivalent to the 'other day visitors' of the PROGRESS report), and 43% staying visitors/tourists. Of the leisure day visitors, 23% came from Southampton and Eastleigh with 10% from the Test Valley, Winchester and East Hampshire.

Given the high proportion of staying holidaymakers/tourists in the New Forest relative to the other two areas, it is worth giving an overview of any important differences in the sites they visit, compared to local day visitors and non-local day visitors. This is inevitably rough, as the data presented by PROGRESS are not directly comparable.

Using the baseline figures for winter and summer visitor proportions, we can identify differences in visiting destinations of the different visitor groups. We have restricted the analysis in Table 6 to sites of medium use or higher plus interview-only sites in villages/towns.

**Table 6 Variation in the proportion of visitor types across sites in the New Forest**

| | Summer % of visitor type (Apr-Oct) | | | Winter % of visitor type (Oct-Mar) | | |
|---|---|---|---|---|---|---|
| **Visitor type** | Local | Other day | Staying | Local | Other day | Staying |
| **Baseline** | 29 | 23 | 48 | 50 | 31 | 19 |
| **Site** | | | | | | |
| *(a) Very high use* | | | | | | |
| Dibden Inclosure | 85 | 7 | 7 | 95 | 5 | 0 |
| Bolderwood | 16 | 33 | 51 | 5 | 50 | 46 |
| Wilverley Plain | 49 | 19 | 32 | 66 | 17 | 17 |
| *(b) High use* | | | | | | |
| Queens | 20 | 26 | 55 | | N/a | |
| Longslade Bottom | Mostly locals and day visitors | | | 54 | 14 | 31 |
| Blackwater | 13 | 29 | 58 | 20 | 41 | 39 |
| Keyhaven | 53 | 15 | 32 | 73 | 5 | 23 |
| *(c) Medium use* | | | | | | |
| Linford Bottom | 62 | 28 | 11 | Locals and day visitors | | |
| Deerleap | 41 | 49 | 10 | Mostly locals and day visitors | | |
| Godshill Cricket | 55 | 18 | 26 | Mixture of locals, day and staying | | |
| Ober Corner | 16 | 16 | 69 | Mostly staying visitors | | |
| Whitefield Moor | 17 | 29 | 54 | 47 | 24 | 29 |
| Turf Hill | 70 | 20 | 10 | 56 | 29 | 6 |
| Longslade Heath | 61 | 11 | 28 | Mostly locals & day visitors | | |
| Hollands Wood Campsite | 5 | 95 | 0 | Seasonal closure | | |
| Fritham | 26 | 48 | 26 | 33 | 51 | 17 |
| Abbots Well/Hampton Ridge | 33 | 30 | 37 | 40 | 45 | 15 |
| Burley | 20 | 44 | 37 | | mixed | |
| Rockford Common | 47 | 41 | 12 | Locals & day visitors | | |
| Beaulieu Heath | 43 | 25 | 32 | Locals & day visitors | | |
| Godshill | 64 | 18 | 18 | 63 | 25 | 13 |
| Moonhills | 58 | 23 | 19 | | N/a | |
| Wooton Bridge | Mostly staying visitors & some locals | | | Mostly locals & day visitors | | |
| Burbush Hill | Mostly locals & day visitors | | | Mostly locals & day visitors | | |
| Ashley Walk | 30 | 33 | 37 | | Mixed | |
| Cadnam Cricket | | mixed | | Mostly locals & day visitors | | |
| Testwood Lakes | Locals & day visitors | | | Locals & day visitors | | |
| Standing Hat | 39 | 21 | 41 | | N/a | |
| Smugglers Road | 50 | 13 | 38 | Mostly locals & day visitors | | |
| Roundhill Campsite | 4 | 0 | 96 | | N/a | |
| Yew Tree Heath | Mostly locals & day visitors | | | 47 | 37 | 16 |
| *(d) Other (interviewing only)* | | | | | | |
| Lyndhurst | 8 | 21 | 71 | | | |
| Lymington | 11 | 20 | 69 | | | |
| Ringwood | 15 | 21 | 64 | | N/a | |
| Burley (village) | 7 | 26 | 67 | | | |
| Brockenhurst | 10 | 14 | 77 | | | |
| Sandy Balls | 7 | 10 | 84 | 0 | 0 | 100 |

From this dataset, it can be seen that:

(a) In summer, staying holidaymakers/tourists are disproportionately highly represented at:
- the six areas where interviews took place (Lymington, Lyndhurst, Ringwood, Burley village, Brockenhurst and Sandy Balls);
- two high use sites (Queens and Blackwater); and

- four medium use sites (Ober Corner, Whitefield Moor, Wooton Bridge and Roundhill Campsite).

(b) In winter, staying holidaymakers are disproportionately highly represented at:
- one very high use site (Bolderwood);
- two high use sites (Longslade Bottom and Blackwater); and
- one medium use site (Whitefield Moor)

(c) In summer, staying holidaymakers are disproportionately poorly represented at:
- one very high use site (Dibden Inclosure);
- seven medium use sites (Linford Bottom, Deerleap, Godshill Cricket, Turf Hill, Rockford Common, Godshill and Moonhills).

(d) Local day visitors are disproportionately highly represented at:
- two very high use sites all year round (Dibden Inclosure and Wilverley Plain, the former being clearly a major destination for local residents);
- one high use site all year round (Keyhaven); and
- over half the medium use sites in summer (particularly Linford Bottom, Godshill Cricket, Turf Hill, Longslade Heath, Rockford Common, Godshill, Moonhills and Smugglers Road).

(e) Local day visitors are disproportionately poorly represented at:
- one very high use site all year round (Bolderwood); and
- one high use site in summer (Blackwater);
- two medium use campsites in summer (Holland Wood and Roundhill); and
- all six urban centres were only interviews were conducted in summer (Lyndhurst, Lymington, Ringwood, Burley village, Brockenhurst and Sandy Balls).

(f) Other day visitors are disproportionately highly represented at:
- one very high use site all year round (Bolderwood).
- at least six medium use sites in summer (Deerleap, Fritham, Hollands Wood campsite, Ashley Walk, Burley and Rockford Common);
- one high use site in winter (Blackwater); and
- two medium use sites in winter (Fritham and Abbots Well/Hampton Ridge).

(g) Other day visitors are disproportionately poorly represented at:
- one very high use sites (Dibden Inclosure) all year round;
- one very high use site in winter (Wilverley Plain);
- two high use sites (Longsdale Bottom and Keyhaven) in winter; and
- two medium use sites in summer (Longslade Heath and Smugglers Road).

Twenty-one per cent of visitors comprise tourists staying in the National Park. Of these, over half (56%) stay on campsites, whether in caravans or tents. The Recreation Site Survey conducted by the University of Portsmouth suggested that staying tourists and other day visitors tended to favour popular 'honeypot' sites, such as Bolderwood, Rhinefield, Lepe and the Rufus Stone. Local day-visitors tended to avoid such sites and instead favour sites nearest to their home.

While the PROGRESS report does not give any indication of where visitors from particular areas tend to concentrate, the University of Portsmouth report does offer an insight. Accessibility appears to be a major factor in site selection for non-local day-visitors, with inhabitants of Bournemouth, Christchurch and Poole favouring sites in the centre and south of the forest (e.g. Rhinefield accounting for 33% and Bolderwood for 16%), while visitors from Southampton are concentrated around the coastal areas of Deerleap, Fritham and Lepe. In contrast, few people

(just 6%) from Bournemouth, Christchurch and Poole travel to the coast at Lepe, presumably because they have adequate coastal access closer to home.

The New Forest has a far larger catchment area than the Thames Basin or Dorset Heaths. This is primarily due to the far higher proportion of visitors formed by tourists that it attracts; in the Thames Basin and Dorset Heaths, tourists are the exception rather than the rule. Staying tourists create potential issues: over half of those who stay in the National Park do so in touring accommodation (i.e. on campsites), many of which are close to fragile habitats vulnerable to such high visitor pressure.

Even if one strips out staying holidaymakers (who constituted 40% of groups interviewed, people still travel further to get to the New Forest than to sites in the Dorset and Thames Basin Heaths. Sixty-five percent of visitors to the New Forest are non-local (i.e. living further than 8km away from the National Park boundary).
In terms of sites chosen by different visitor types, several conclusions can be drawn.

- There is considerable inter-site difference between the proportions of actual numbers of visitors in different categories and those that might be predicted from the average proportions in each visitor category;
- There are considerable differences in the sites frequented by staying visitors (tourists) and day-visitors, particularly those living locally;
- Day visitors (whether local or from further afield) tend not to visit the urban centres;
- Local visitors tend to avoid sites with comparatively high tourist pressure.
- While staying visitor/tourists visit almost all sites surveyed, they tend to be concentrated at a dozen or so 'honeypot' sites, particularly the six urban centres, but also Bolderwood, Queens, Blackwater, Ober Corner, Whitfield Moor, Wooton Bridge and Roundhill Campsite.
- The heavily used Dibden Inclosure is almost entirely used by local day visitors (and is thus likely to be a key site for dog-walkers); and
- Another very high use site, Bolderwood, is relatively poorly visited by locals, but heavily frequented by other day visitors and staying visitors.

### 2.2.2 Size of visitor group

Group sizes in the Dorset and Thames Basin Heaths were typically small (mean group size in the respective surveys was 1.5 and 1.8). Most 'groups' interviewed were people visiting on their own (64% of interviewees in Dorset and 52% in the Thames Basin Heaths). In the New Forest the Progress visitor survey recorded a mean group size of 2.6 people, substantially higher than the Dorset Heaths and Thames Basin heaths.

The larger mean group size is likely due to the higher proportion of non-local day visitors and holidaymakers than in the Dorset and Thames Basin. Local day visitors to the New Forest were more likely to be visiting alone, forming 44% of total visitors in that category and 69% of all single person groups. Only 15% of local day visitors came in groups of three or more. In contrast, nearly half of non-local day visitors came in pairs and over one third (34%) of this visitor category came in groups of three or more. This pattern was even more marked in staying visitors/holidaymakers, of whom just 7% visited alone, slightly more than half (53%) did so in pairs, and 40% did so in groups of three or more.

The 1882 households interviewed were asked whether they usually visited the New Forest alone (i.e. group size of one), with a spouse or partner (i.e. group size of two) or with family or friends (i.e. group size of two or more). On average, 13% of respondents said that they normally visited alone – lower than the 22% of single-person groups recorded during on-site interviews. Surprisingly, the proportion of local day visitors (i.e. those living either in or bordering the National Park) who claimed to usually visit alone (14%) was substantially lower than evidence gathered during on-site interviews (where the figure was 44%).

### 2.2.3 Frequency of visit

In the Dorset Heaths survey, people were not asked about their frequency of visit. In the Thames Basin Heaths, over half of groups interviewed (52%) visited daily, accounting for 41% of all visitors. In the New Forest, the Progress report shows that less than a fifth of groups (17%) interviewed visited on a daily basis, with the same proportion visiting weekly or bi-weekly. Frequency varied between the different visitor groups; the closer the visitor lived, the more likely s/he was to visit frequently. Nearly half (46%) of local day-visitors visited daily, with an additional 34% visiting weekly or bi-weekly. Just 4% of other day-visitors visited daily, with an additional 17% visiting weekly or bi-weekly. As might be expected for holidaymakers, just 1% of staying visitors visited weekly with around three quarters visiting at most one or two times per year.

The 'Local Towns survey' element of the University of Portsmouth report produced not dissimilar results. Sixty-four per cent of local residents use the New Forest for recreation at least weekly; there is little seasonal variation, with 70% visiting weekly in summer and 59% in winter. Daily use, however, was recorded less frequently than in the PROGRESS survey (16% compared to 46%). Some 85% of local dog-walkers use the Forest at least once per week, and 36% do so daily.

### 2.2.4 Seasonality of visitor numbers

The Dorset Heaths visitor surveys were limited to 10 Aug – 9 Oct (which comprises roughly one month each of 'peak season' and 'shoulder season' as defined by PROGRESS), but 92% of interviewees said they visited "all year-round". Accordingly, seasonality was not analysed further. Year-round visiting is likely due to high proportion of local day visitors and few holidaymaking tourists. Indeed, given that most visitors are local residents and August is peak holiday season, it is possible that net visitor numbers during the survey period could be *lower* than at other times of the year. Similarly in the Thames Basin Heaths work surveys were limited to 1-31 August, which falls entirely into 'peak season' as defined by PROGRESS for New Forest work. However, three quarters of interviewees said they visited at least weekly, suggesting that seasonality is not a significant issue.

In the New Forest, assuming that the numbers of people interviewed across the seasons in the Progress survey can be taken as a proxy for visitor numbers (i.e. which itself assumes that interviewing effort was evenly balanced), 43% of visits were in peak period (July – mid-September), 30% in the shoulder period (April-June & mid-Sep to mid Oct), and 27% in the off-peak period (mid-October to end March). Excluding the sites where interviews were conducted

only in summer, in the six months of the year that include spring and summer (April-October), there were two-thirds more interviews than during the winter period (October – March); assuming that interviewing effort was evenly spread, this implies a clear summer peak in visitors.

Variations in the usage of the New Forest at different times of the year by different types of visitors were found. The high numbers during the peak period appear to mainly be due to the summer influx of tourists (i.e. not day visitors), who formed 50% of interviewees during the peak period and a similar proportion (45%) during the shoulder period, but only 19% off-peak. Day visitors generally exhibited less variation in their use of the New Forest than staying visitors/holidaymakers. For example, non-local (i.e. 'other') day visitors (i.e. those living further than 5 miles from the National Park boundary) accounted for roughly similar proportions of visitor groups throughout the year (20% during peak season, 27% during shoulder period and 31% off-peak).

### 2.2.5 Reasons for visiting

The proportion of visitors undertaking different activities in the Dorset Heaths, Thames Basin and New Forest are summarised in Table 7.

**Table 7 Main purposes of leisure visits to the Dorset Heaths and New Forest National Park and top two stated purposes of visits to Thames Basin Heaths**

| *Purpose* | *Dorset Heaths (%)* | *Thames Basin Heaths (%)*[1] | *New Forest (%)*[2] |
|---|---|---|---|
| Dog walking | 80 | 59 | 24(20) |
| Walking | 10 | 32 | 30(50) |
| Jogging | 2 | 4 | (0) |
| Cycling | 2 | 6 | 6(3) |
| Horse-riding | 1 | 2 | 1(3) |
| Other | 5 | 10 | 39(24) |

[1] The figure combines answers for the top two stated purposes (i.e. rather than main purpose as for the other two areas)
[2] The first figure given is derived from visitor interviews, the second (in parentheses) from household interviews.

In the Dorset and Thames Basin Heaths surveys, interviewees were asked for their main and secondary reasons for visiting the heath. In Dorset a resounding 80% were mainly visiting the heath to walk their dog(s). Ten per cent came to mainly walk, with 1-2% each to mainly jog, cycle or ride a horse. The importance of the heaths for dog-walking was underlined by 73% of dog-walkers saying that this was the sole purpose of their visit (i.e. they had no secondary reason). In the Thames Basin Heaths survey, over half of people (59%) visited to walk their dog(s) and just under a third (32%) came to walk. Smaller proportions (2-6%) came to jog, cycle, ride a horse or picnic. As dogs need walking on a daily basis, whatever the season, it is conjectured that dog-walkers form a higher proportion of visitors during the off-peak seasons.

Combining the estimates for total annual visitor numbers (7.5 million p.a.) in the Thames Basin Heaths (Table 5) and the figures for the proportions of visitor groups interviewed who identified dog-walking as the main purpose of their visit (59%), we can give a rough estimate of the total numbers of dog-walking visits on the Thames Basin Heaths: 4.425 million pa.

Data on reasons for visiting the New Forest were gathered both as part of the Progress work by direct interviews with visitors and telephone interviews with householders. These two formats produced notably different results. The same two main reasons were given by both visitor interviewees and household interviewees – walking and dog-walking - although the proportions differed between the two methods. Thirty per cent of visitor interviewees gave walking as their main purpose, and 24% gave dog-walking; the equivalent figures for household interviewees were 50% and 20%. Walking the dog was not a particularly common secondary reason for the visit: just 6% of households and 9% of visitors interviewed listed this as one of their purposes.

After walking and dog-walking, other 'main' purposes given were sightseeing (6% for household interviewees, 3% for visitor interviewees), relaxing/picnicking (4% for household interviewees, but 13% for visitor interviewees), visiting a town/village (7% of visitor interviewees), cycling (5% for visitor interviewees) and horse riding (3% for household interviewees).

There is relatively little seasonal variation in main purpose, with the ranking remaining unchanged and proportions broadly so. Of note, however, is proportionately slightly less dog-walking in the peak summer period (20%) and spring/autumn shoulder period (17%) compared to the annual mean of 24%, and considerably more dog-walking in the off-peak winter period (38%).

The most common secondary reasons for visiting were relaxing/picnicking (16% of household interviewees, 35% of visitor interviewees), watching wildlife/ponies (29% visitor interviewees), visiting a pub, café or tea room (81% of household interviewees, 18% of visitor interviewees) or a town/village (53% of household interviewees and 12% of visitor interviewees).

Among household interviewees, the proportion of dog-walkers was slightly higher (26%) for local day-visitors and considerably lower for day visitors from major urban catchments (9%). There was little variation (19-23%) in the proportion of dog-walkers between the various occupational/socio-economic grades. Among visitor interviewees, the proportion of local dog-walkers was more than double the average (49%) for local day visitors (i.e. those living inside the park). Unsurprisingly, the proportion was particularly low for holidaymakers (6%, whether staying inside or outside the park). The University of Portsmouth survey produced similar results: 47% for local day-visitors, 20% for other day-visitors and 14% for staying tourists/holidaymakers.

We can use the PROGRESS data to calculate a rough estimate of the annual numbers of New Forest day visitors whose main purpose is dog-walking - to give an indication of dog pressure. Total annual day visitor numbers in the New Forest are estimated to be 10,369,200. The proportions of day-visiting households and day visitors interviewed who identified dog-walking as the main purpose of their visit are 20% of 1883 and 36% of 2299 respectively. Thus 29% of all day-visiting interviewees are primarily dog-walkers, resulting in roughly 3.007 million dog-walks per year. To this we can add the 6% of staying visitors (i.e. holidaymakers) whose stated main

purpose is dog-walking, and combine with the estimate of annual holidaymakers (2,976,200) to give an estimate of 178,572 dog-walks by tourists. Thus a rough estimate of the number of New Forest dog-walkers would be 3.185 million p.a., a total lower than that estimated for the Thames Basin Heaths.

The PROGRESS and University of Portsmouth reports also offer an interesting insight into why visitors come to the New Forest – rather than any other site – to conduct their particular activity. This helps us identify the 'appeal factors' which together comprise the 'uniqueness' of the New Forest. In turn, this gives us hints as to the principles of selection of potential alternative sites to offset visitor pressure. Forty-three per cent of Portsmouth respondents listed 'scenery' as their principal reason, followed by ease of accessibility (37%), 'peace and quiet' (30%), 'to see the animals' (20%) and 'because it's the New Forest' (18%). [section 4.4.7] The PROGRESS report produced similar findings: scenery was top (51%), followed by 'peace and quiet' (42%), 'good for walking' (32%), ease of accessibility (29%) and wildlife (29%). [Table 44]

People interviewed as part of the Portsmouth 'Recreation Site Survey' were asked where they might have gone had they not visited their chosen site that day. Over one third (38%) suggested that they would simply have gone elsewhere in the New Forest, 12% would have gone to the coast, while 19% would have stayed at home. Neither country parks nor tourist attractions featured as significant alternatives. The report authors suggest that this "provides fairly conclusive evidence that there is no substitute for the New Forest".

### 2.2.6 Extrapolations about total visitor pressure

Predictions developed by Liley *et al.* (2006b) suggest total visitor pressure of roughly 4.8-5.4 million visitors pa to the Dorset Heaths SPA as a whole. Further, most Dorset Heaths patches have lower visitor levels than Thames Basin Heaths, but that some sites (e.g. urban heaths in Poole and Bournemouth) have very high visitor numbers. Similar predictions for the Thames Basin Heaths ranged from 4.9 to 10.3 million, depending on the modelling approach used.

The Progress work results in an estimate that total visitor days spent in the New Forest each year to be 13,345,400, of which 10,369,200 are day-visitors (i.e. non-staying tourists). Previous estimates include 7 million visitors pa in 1992 (Ecotec 1992, cited in University of Portsmouth, 1996) and (a surprisingly high) 18 million visits pa by local residents alone (University of Portsmouth, 1996).

For comparison, visitor estimates for English National Parks are given in Table 8. The New Forest appears to be the third most frequently visited National Park in England – although its visitor numbers are roughly half those of the Peak District and Lake District.

**Table 8 Visitor numbers to English National Parks (from Defra 2002)**

| *National Park* | *Total visit (millions of people p.a.)* |
|---|---|
| Lake District | 22 |
| Peak District | 19 |
| Yorkshire Dales | 9 |
| North York Moors | 8 |
| Broads | 5.4 |
| Dartmoor | 3.8 |
| Exmoor | 1.4 |
| Northumberland | 1.5 |

### 2.2.7 Mode of transport to access point and dependence on/use of parking facilities

The Dorset Heaths visitor survey found a relatively high proportion of visitors (36%) arrived on foot at the sites where the interviews took place. There was, however, much inter-site variation. Where a car park was available, 85% came by car/van, whereas over 70% walk to access points without parking facilities. Where no parking facilities were provided (but informal parking on roadsides etc was available nearby), only 23% came by car/van with the large majority (71%) arriving on foot. While the proportion of dog-walkers was higher at sites with parking facilities (85%) than those without (74%), this difference was not statistically significant due to the substantial variation between sites.

In the Thames Basin Heaths a very large majority of people (83%) arrived by car or van, with just 13% arriving on foot. There was, however, much inter-site variation (0-100% car users; 1-88% foot visitors). Across all sites, visitor numbers correlated significantly with the number of car-parking spaces. As an indication, there were 7.4 visitors per hour arriving by car at sites with more than 20 car parking spaces, but just 0.9 visitors per hour arriving by car at sites with very limited parking.

In the New Forest, the Progress survey obtained data sets on transport mode from both visitors and households. A very large majority (85% of visitors interviewed, 78% of households interviewed) travelled or usually travelled to their chosen site by car/van. (These are slightly lower than the 95% recorded by the University of Portsmouth in 1995.) The next most common travel method was walking (8% of visitors, 16% of households). These figures are, respectively, substantially higher and substantially lower than the equivalents for the Dorset Heaths.

Of visitor categories, holidaymakers staying within the New Forest were least likely to arrive by car (although 67% still did so) and the most likely to walk (20%) or cycle (11%). (This said, 95% of holidaymakers still travelled from home to overnight accommodation by car.)

On the basis of visitor interviews, the figures for local day visitors (i.e. those living within the National Park) and non-local day visitors (living outside the park) were broadly similar, although unsurprisingly given the shorter distance they had to travel, slightly fewer locals drove (88% compared to 94% of non-locals) and slightly more walked (8% compared to 1%). [Table 30]

Household interviews suggested a slightly different pattern, with rather fewer local households claiming to usually drive to the site (64%) and rather more suggesting that they would usually walk (28%).

### 2.2.8 Distances travelled at each site/dwell time at each site

In the New Forest the mean time spent by visitors on site (from survey base of 3596) was 1.9 hours. Visits were slightly longer during peak and shoulder periods (2.0 hrs) than off-peak periods (1.6 hrs). Local day visitors spent shorter durations (mean of 1.3 hrs) than other day visitors (2.3 hrs) or staying holidaymakers (2.2 hrs). Dog-walkers stayed the shortest time of any main purpose (mean of 1.1 hrs) with the longest being cycling on roads and long walks (both 2.8 hrs). The 'Recreation Site Survey' carried out by the University of Portsmouth suggests that visitors tended to spend slightly longer on site: 21% spent a full day, 40% half a day, and 33% less than two hours. However, it also found that local day visitors make shorter visits than other categories of visitor.

It is likely that, on average, New Forest visitors spend more time and travel further on site than visitors to the Thames Basin and Dorset Heaths. In the Dorset and Thames Basin Heaths surveys the distance walked, rather than time spent, at each site was recorded. The mean distance walked was in the region of 2.5km (2.4km on the Dorset Heaths and 2.6km in the Thames Basin), equating to well under an hour, assuming an average walking pace of 4km per hour. Such short visits would be typical of a regular dog walk rather than the day-trips more frequent in the New Forest.

## *2.3 The different types of visitors to the New Forest and how they differ*

As the previous sections demonstrate, there are a range of different visitors to the New Forest. In particular the New Forest attracts a high volume of tourists who will behave differently to other visitors. In terms of understanding the potential impacts of new housing near the Park, it is necessary to understand how visitor use is related to the types of visitor. We therefore summarise the PROGRESS data in such a way as to highlight the differences between those local visitors and tourists (Figure 1).

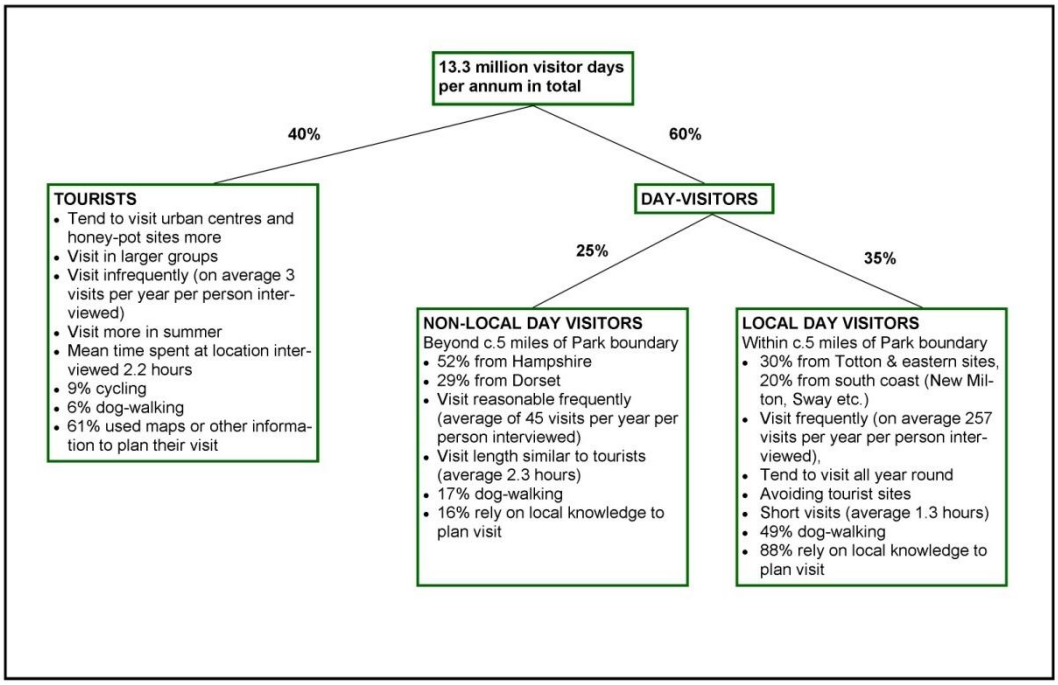



**Figure 1: Summary of behaviour of different visitor types. Categories and all figures and percentages taken from the PROGRESS report. Percentages outside the boxes refer to the overall total (i.e. 13.3 million), while percentages within boxes refer solely to that category of visitors.**

# 3 Current Distribution of Housing, Likely Change and Consequences for Visitor Patterns to the New Forest

## *3.1 Overview and Summary*

In this section we address the current distribution of housing and the extent to which the distribution is likely to change in the future. We use existing visitor data to explore the proportion of people that visit from different distances from outside the National Park boundary, and we then use this approach to estimate the change in numbers that may occur in the future.

Currently the highest population densities are to the east (Southampton and the northern shore of the Solent) and also to the west, within the Poole / Bournemouth conurbation. The population density to the north is relatively low.

We predict that visitor numbers will increase as result of new development proposed over the period 2006 – 2026. For example, as a result of new development within 50km of the National Park boundary we estimate approximately one million additional person visits per annum, an increase of 7.8%, with approximately 226,000 of these being undertaken by regular (at least weekly) dog walkers.

## *3.2 Methods*

### *3.2.1 Predicted Changes in Housing*

To quantify the current distribution of housing around the New Forest National Park the park boundary[1] was mapped using MapInfo (Version 9) and then buffers were drawn around the boundary at 1 km intervals for 50 km. The sections which were found not to be on land were subsequently removed. The National Park boundary was used (rather than the SPA boundary) as this provided a simpler boundary and allowed us to separate visitors originating within the Park (i.e. isolating those visitors coming from other planning authority areas).

Current postcode data[2], with the number of residential delivery points per postcode, was used to describe the current number and spatial distribution of housing. The number of residential delivery points within each 1 km wide band around the park boundary was calculated. These values were then multiplied by the average house occupancy for England and Wales, determined to be 2.36 in the 2001 census (National Statistics, 2001), to give an estimate of the population found within each band. To calculate population density, these values were then combined with the land area covered by each band to give an estimate of population density. Throughout all analyses addressing the spatial distribution of housing both now and in the

[1] The existing New Forest National Park boundary was used in these analyses and does not consider any changes that are planned.

[2] Dated July 2007, each individual postcode is mapped.

future, population density and visitor data, the Isle of Wight is considered separately due to the unique nature of the its location and access to the mainland.

As can be seen in map 3, the number and density of delivery points north of the park boundary, especially within Salisbury district is far lower than that found within Poole, Bournemouth, Southampton and Portsmouth unitary authorities. This therefore causes the population density within some regions of the first 10 to 15 km outside of the park boundary to be underestimated. To rectify this each of the mainland bands was divided along district/unitary authority boundaries into three segments within the 50 km buffer, as described in Table 9.

**Table 9 Districts and unitary authorities within each segment.**

| *West* | *North* | *East* |
|---|---|---|
| Bournemouth | Basingstoke and Deane | Arun |
| Christchurch | Hart | Chichester |
| East Dorset | Kennet | East Hampshire |
| New Forest (west) | Mendip | Eastleigh |
| North Dorset | North Wiltshire | Fareham |
| Poole | Salisbury | Gosport |
| Purbeck | Test Valley | Havant |
| South Somerset | West Berkshire | New Forest (east) |
| West Dorset | West Wiltshire | Portsmouth |
| Weymouth and Portland | | Southampton |
| | | Waverley |
| | | Winchester |

To estimate future housing within the first 50 km outside the New Forest National Park boundary, the future housing allocations from 2006 to 2026 for each district or unitary authority were extracted from the submitted regional spatial strategies for the south east and south west of England (Table 10). These values were then used to calculate the proposed future percentage increase in housing across the whole district or unitary authority. Given that the spatial strategies for most districts and unitary authorities are yet to be published and the significant difficulty in predicting the specific locations where new housing will come forward, the housing allocation was simply spread throughout each district or unitary authority according to the current distribution of housing. To do this the number of delivery points within each district or unitary authority within each section of each 1 km band was increased by the percentage increase in Table 10. The estimated number of houses in 2026 in each section of each 1 km band was therefore the sum of the estimated future housing within each district or unitary authority within each section within each band[1].

[1] It is assumed that none of the housing allocation for the New Forest District Authority will be built within the New Forest National Park. A separate estimate of current housing and possible increase in housing within the National Park is shown in Table 10.

**Table 10 Estimated current housing and proposed future housing in districts and unitary authorities within 50km of the New Forest National Park. Data are from the Submission draft Regional Spatial Strategies for the South East and South West.**

| *District / Unitary Authority* | *Current Housing*[1] | *Annual Increase in Housing*[2] | *Total Increase in housing 2006 - 2026* | *% increase* |
|---|---|---|---|---|
| Arun District | 36,768 | 465 | 9,300 | 25.29 |
| Basingstoke and Deane | 66,316 | 825 | 16,500 | 24.88 |
| Bournemouth | 78,270 | 780 | 15,600 | 19.93 |
| Chichester | 48,706 | 430 | 8,600 | 17.66 |
| Christchurch | 22,727 | 180 | 3,600 | 15.84 |
| East Dorset | 38,438 | 270 | 5,400 | 14.05 |
| East Hampshire | 47,040 | 260 | 5,200 | 11.05 |
| Eastleigh | 54,129 | 354 | 7,080 | 13.08 |
| Fareham | 46,723 | 686 | 13,720 | 29.36 |
| Gosport | 35,609 | 125 | 2,500 | 7.02 |
| Hart | 36,137 | 200 | 4,000 | 11.07 |
| Havant | 51,840 | 315 | 6,300 | 12.15 |
| Isle of Wight | 62,063 | 520 | 10,400 | 16.76 |
| Kennet | 33,743 | 250 | 5,000 | 14.82 |
| Mendip | 46,529 | 360 | 7,200 | 15.47 |
| New Forest | 79,491 | 207 | 4,140 | 5.21 |
| North Dorset | 29,304 | 255 | 5,100 | 17.40 |
| North Wiltshire | 56,153 | 500 | 10,000 | 17.81 |
| Poole | 66,195 | 500 | 10,000 | 15.11 |
| Portsmouth | 81,815 | 735 | 14,700 | 17.97 |
| Purbeck | 21,289 | 105 | 2,100 | 9.86 |
| Sailsbury | 49,606 | 460 | 9,200 | 18.55 |
| South Somerset | 69,684 | 680 | 13,600 | 19.52 |
| Southampton | 94,933 | 815 | 16,300 | 17.17 |
| Test Valley | 48,357 | 446 | 8,920 | 18.45 |
| Waverley | 41,099 | 230 | 4,600 | 11.19 |
| West Berkshire | 62,634 | 525 | 10,500 | 16.76 |
| West Dorset | 54,039 | 410 | 8,200 | 15.17 |
| West Wiltshire | 55,108 | 525 | 10,500 | 19.05 |
| Weymouth and Portland | 28,987 | 280 | 5,600 | 19.32 |
| Winchester | 48,313 | 522 | 10,440 | 21.61 |
| *Within New Forest National Park*[3] | *16,264* | *20* | *200* | *1.23* |

[1] Derived from the number of residential postal delivery points within each district or unitary authority (July 2007 postcode data).

[2] From the published Submission draft Regional Spatial Strategies for both south east and south west England.

[3] Barker pers. comm.

### *3.2.2 Consequences of New Housing on Visitor Levels*

To address the usage of the New Forest National Park by the population within the first 50 km of the park boundary, the survey data collected as part of the PROGRESS study (Gallagher *et al.*, 2007) was mapped spatially according to the postcode given by the respondents. Of the 3,838 questionnaires completed, only 2,864 could be mapped to a UK postcode. This is due in part to visitors from overseas and in part to the postcodes in the PROGRESS data being either a partial postcode, incorrect or missing. Using MapInfo, the number of respondents living within each 1 km band, as constructed in section 3.2.1 but not subdivided into sections, from the National Park boundary was counted. This data was then scaled up to provide estimates of actual visitor numbers using a multiplication factor of 1,767, the number of actual visitors represented by each person interviewed (Box 1). In this instance the PROGRESS survey data was used as a representative sample of the total number of visits per year, estimated to be 13.3 million (Gallagher *et al.*, 2007). It must be noted that the PROGRESS data is not a true representative sample and shows significant bias, therefore all values given are an estimate and should be treated as such.

**Box 1: Scaling up the PROGRESS interview data**

The New Forest National Park receives approximately 13.3 million visits per annum, as estimated in the PROGRESS report. As part of PROGRESS, 3,838 interviews were conducted and they represented 9,839 visitors. Of those 9,839 visitors interviewed, 9,528 were domestic visitors while 311 (3.16%) were from overseas. In the case of country of origin, if the PROGRESS interview data is taken to be a representative sample of all people visiting the New Forest National Park, this would equate to 420,280 visitors coming from overseas (13,300,000*0.0316), while 12,879,720 visitors would come from the UK (13,300,000-420,280) and therefore have UK postcodes, the method by which the home location of visitors was determined. Of the 3,743 interviews obtained with UK visitors, only 76.5% of the UK postcodes provided by the interviewees could be matched to current UK postcodes, equating to 7,289 domestic visitors (9,528*0.765) interviewed. If the mismatch of postcodes is assumed to be random throughout the interview sample; the visitors represented by an interview all come from the same postcode and the PROGRESS data is a representative sample of visitors; then the number of actual domestic visitors to the New Forest National Park represented by each person interviewed is 1,767 (12,879,720/7,289). This is therefore the multiplication factor by which the PROGRESS interview data is scaled up.

Additional queries were also asked of the PROGRESS interview dataset using MapInfo, where only day visitors, staying visitors, at least weekly visitors, less than weekly visitors, dog walkers and non-dog walkers were selected.

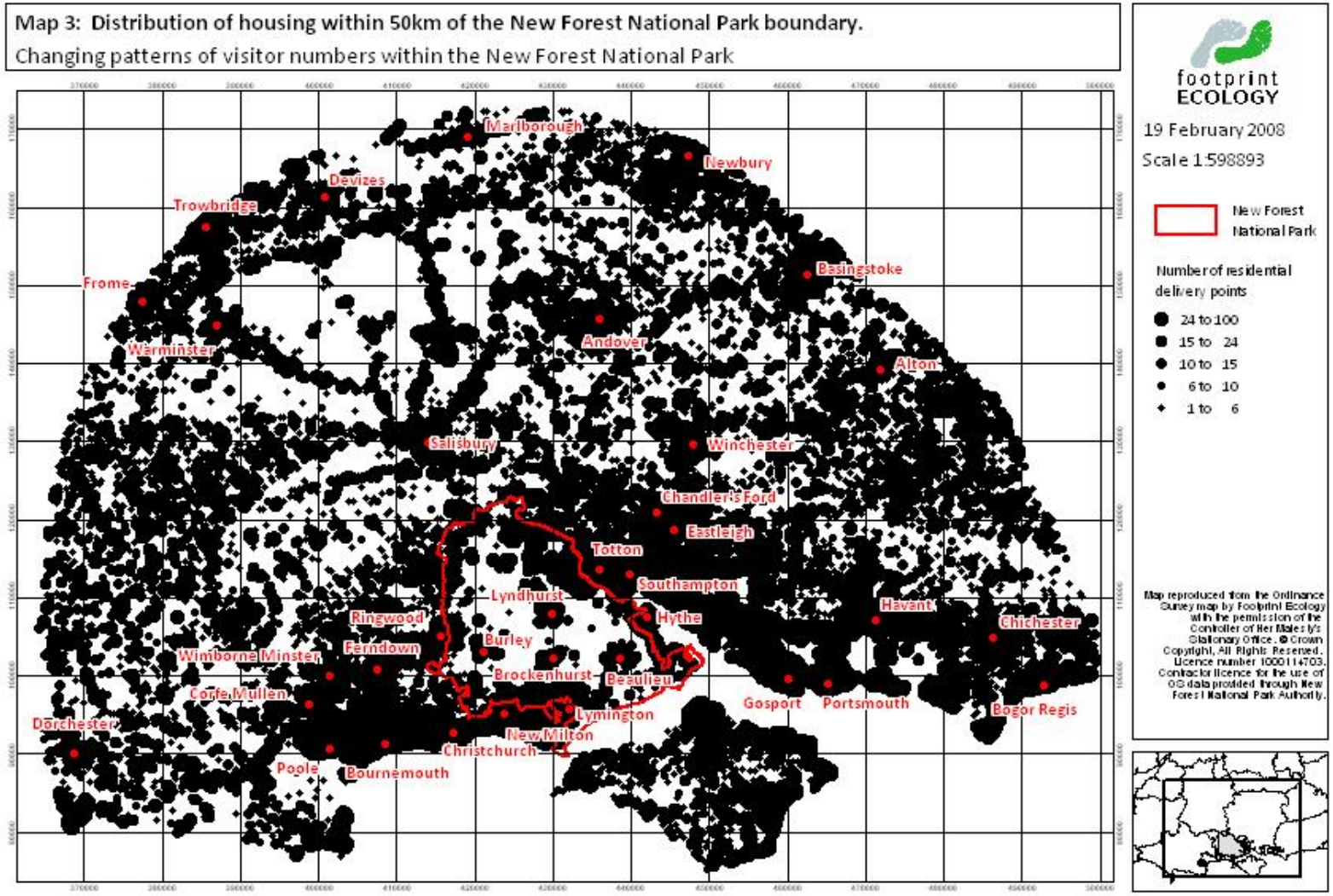
To estimate the number of visits made in 2026 by people originating from within 50 km outside the National Park boundary, the current number of visits derived above for each 1 km band was increased by the percentage increase in housing for that 1 km band, as calculated in section 3.2.1. This method assumes that the average house occupancy will remain unchanged.

A similar method was applied to the visitors originating from within the New Forest National Park and the impact that the change in housing may have. However, results are displayed separately in Table 12.

## *3.3 Predicted Changes in Housing*

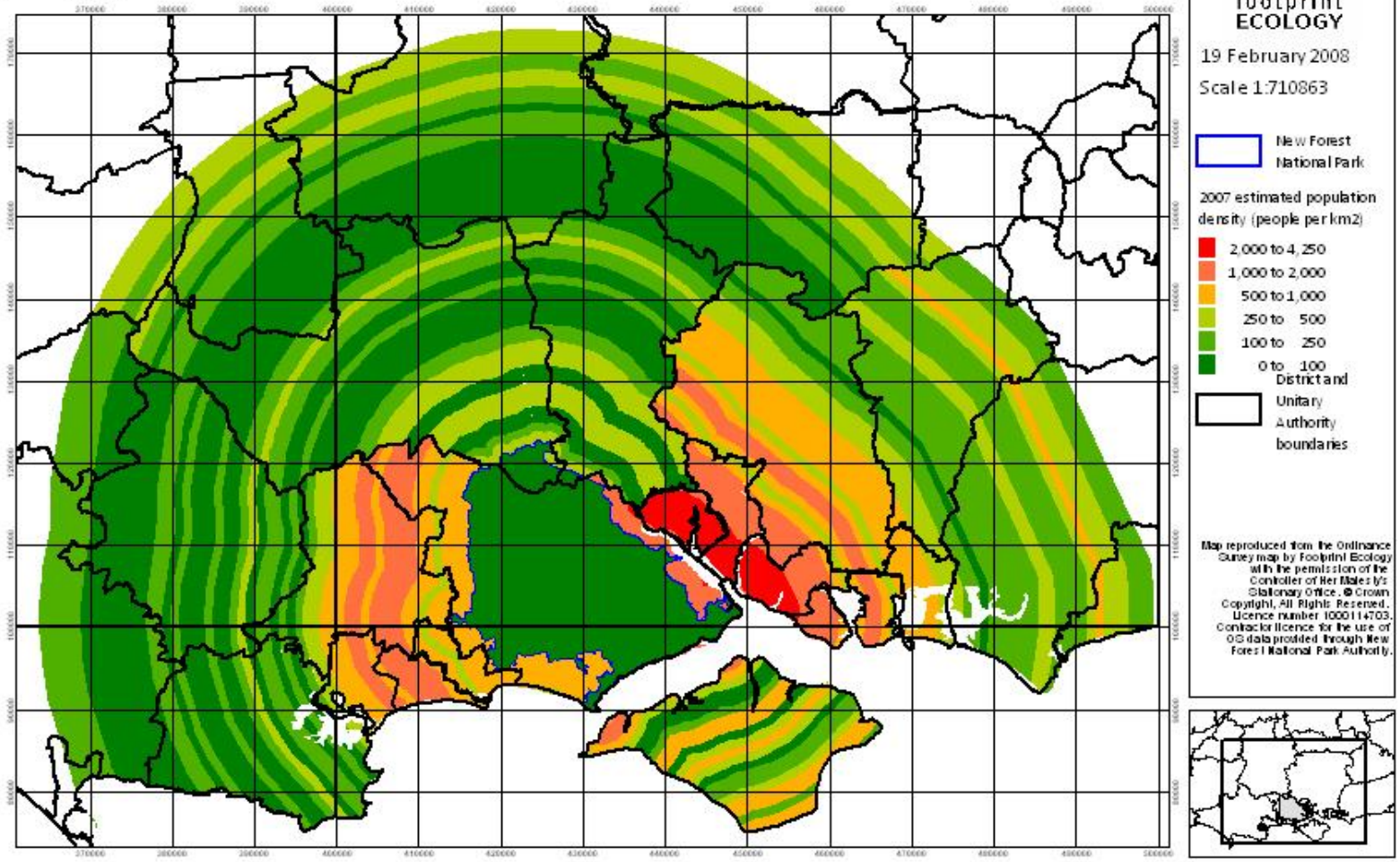
Map 3 shows the current spatial distribution of housing within the first 50 km from the New Forest National Park boundary. It shows that there are large, dense centres of housing within and around the large town and cities of Poole, Bournemouth, Southampton and Portsmouth. This therefore has resulted in high housing density along the coast, especially to the east of the park and the first 25 km nearest the boundary to the west. Moving inland, the density of housing decreases, with areas of Salisbury district having areas of very little housing.

When the above is then translated into population density and broken down into three segments (the methods and justification for which are described in the above section) the results are shown in map 4. It demonstrates the high population density in the first 25 km to the east of the National Park boundary, with an area approximately 100 $km^2$ exceeding 2,000 people per $km^2$, peaking at over 3,600 people per $km^2$. After that density still remains relatively high and only once falls below 100 people per $km^2$. The map also shows that the population density in the first 2 km from the easterly boundary exceeds 1,000 people per $km^2$. The high density of people living to the west of the National Park is also demonstrated by map 4. However, unlike the segment to the east of the New Forest, in the westerly segment there is a boundary of 6 km before the population density exceeds 1,000 people per $km^2$. After that the population density rises above that threshold, peaking at approximately 1,300 people per $km^2$ and then declines and then rarely exceeds 250 people per $km^2$. To the north of the National Park boundary, as commented above, the population density remains low, especially compared to the easterly and westerly segments, never exceeding 500 people per $km^2$ and only occasionally exceeding 250 people per $km^2$. Nevertheless, when looking at the distribution within the band itself, some of the greater population densities are found within the first 15 km of the boundary. Map 4 therefore clearly shows that the greatest population density, as described in 1 km bands surrounding the New Forest National Park boundary is found to the east. To the west the population density is lower than in the east but is greater than that in the north.


Map 3: Distribution of housing within 50km of the New Forest National Park boundary.
Changing patterns of visitor numbers within the New Forest National Park
Marlborough
Newbury
Devizes
Trowbridge
Basingstoke
Frome
Andover
Warminster
Alton
Salisbury
Winchester
Chandler's Ford
Eastleigh
Totton
Southampton
Lyndhurst
Ringwood
Hythe
Havant
Chichester
Burley
Ferndown
Wimborne Minster
Brockenhurst
Beaulieu
Corfe Mullen
Gosport
Portsmouth
Bognor Regis
Lymington
Dorchester
New Milton
Christchurch
Poole
Bournemouth
footprint ECOLOGY
19 February 2008
Scale 1:598893
New Forest National Park
Number of residential delivery points
24 to 100
15 to 24
10 to 15
6 to 10
1 to 6
Map reproduced from the Ordnance Survey map by Footprint Ecology with the permission of the Controller of Her Majesty's Stationary Office. © Crown Copyright. All Rights Reserved. Licence number 100011703. Contractor licence for the use of OS data provided through New Forest National Park Authority.

**Map 4: Estimate of 2007 population density by 1km bands within 50km of the New Forest National Park boundary.**

Changing patterns of visitor numbers within the New Forest National Park

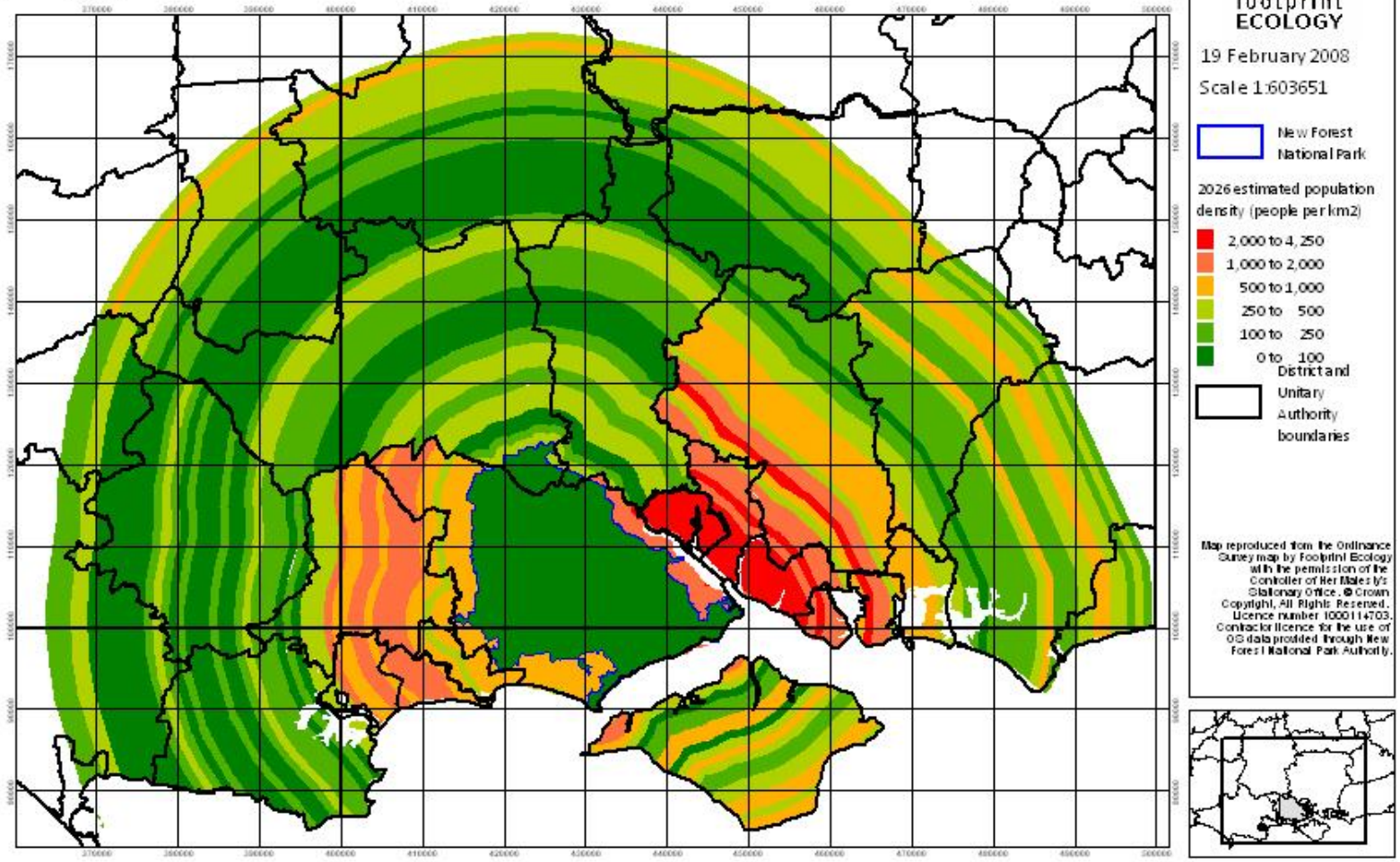


Map 5 shows the same area as shown in map 4, however indicates the estimated population density in 2026. These estimates are based on the regional spatial strategies for the south east and south west of England and the current distribution of housing within the first 50 km around the New Forest National Park boundary. It indicates an expansion in the high population density in the first 25 km to the east of the National Park boundary, with an area over 150km$^2$ exceeding 2,000 people per km$^2$, peaking at over 4,250 people per km$^2$. After that the population density remains similar, however there is a greater area where the population density exceeds 500 people per km$^2$. To the west of the National Park the spatial distribution of population remains similar with a greater area having more than 1,000 people per km$^2$ compared to 2007. The segment to the north of the National Park boundary appears to show widespread increases in housing densities, however due to the relatively low initial population density, these are far lower than those estimated for the easterly and westerly segments.

Map 6 shows the estimated change in housing density as a percentage of 2007 housing density. It shows that the greatest increase in housing density and therefore population density, assuming little change in the mean level of house occupancy, are in the northerly segment of the 50 km outside the boundary. It shows that in this north segment the predominant percentage increase is between 18 and 20 %, including the first five kilometres immediately adjacent to the National Park boundary. However, the relatively high increase in housing to the north of the National Park may be a reflection of the low existing population density within this segment (see map 3) and therefore the capacity for future housing. The estimated change in the 1km bands of the segment to the east of the National Park shows regions with a relatively high increase in housing (i.e. >18 %) and regions with relatively low increase in housing (i.e. <14 %). In the first two bands adjacent to the boundary within this segment the increase in housing is approximately 6 %. After that the percentage rapidly rises to 20 % at 6 km and then again to 24 % at 14 km. Compared to the easterly segment the percentage increase in housing to the west of the National Park is less varied with few bands exceeding an increase of 18 %. In the first two kilometres adjacent to the park boundary the increase does not exceed 9 %, after that the percentage increase steadily rises to approximately 19 % at 10 km then declines.

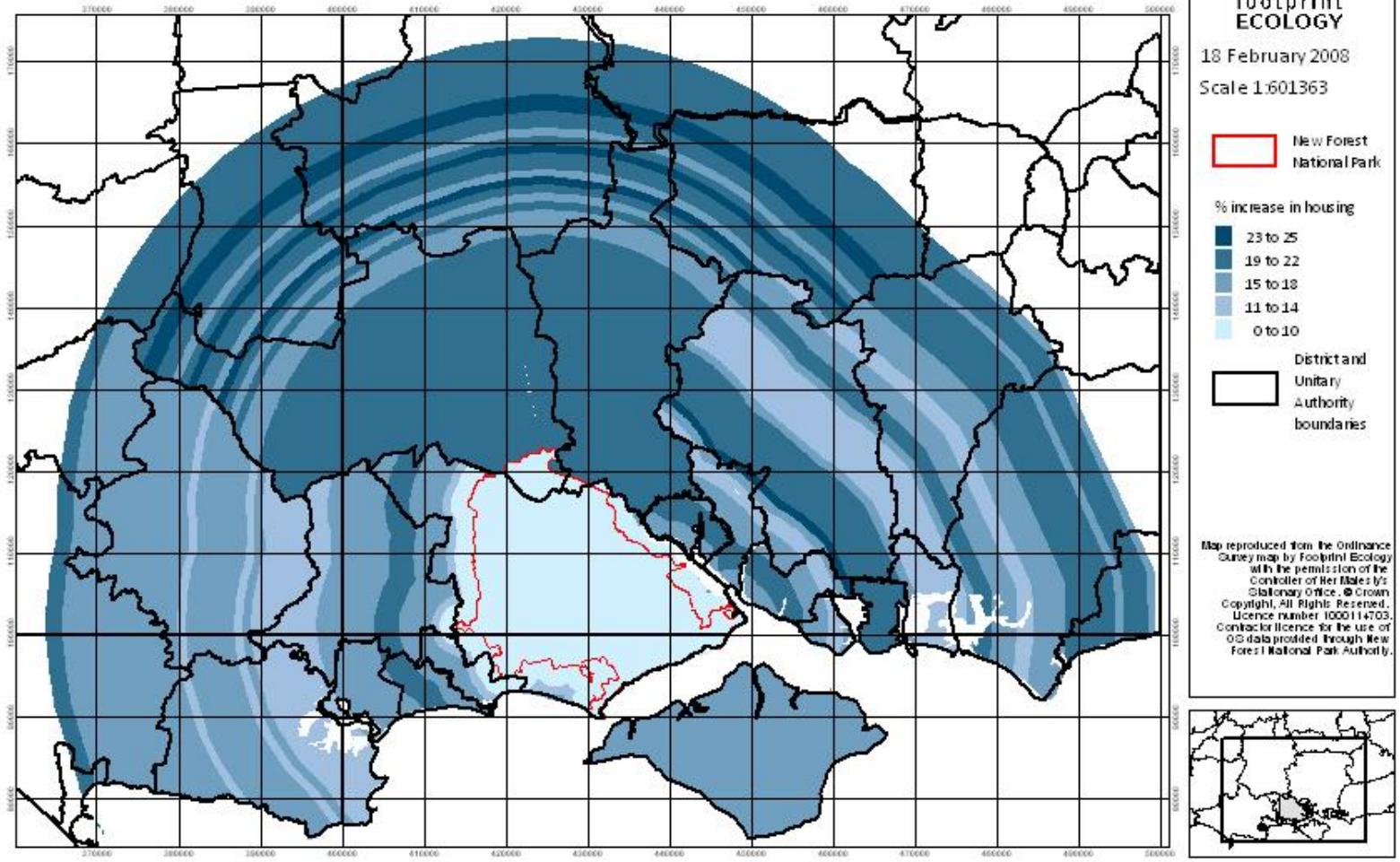
**Map 5: Estimate of 2026 population density by 1km bands within 50km of the New Forest National Park boundary.**

Changing patterns of visitor numbers within the New Forest National Park



**Map 6: Estimated % increase in housing between 2007 and 2026 within 50km of the New Forest National Park.**

Changing patterns of visitor numbers within the New Forest National Park



## *3.4 Consequences of New Housing on Visitor Levels*

As described above, the data from the PROGRESS work (Gallagher *et al.*, 2007) was used to address the home location of the visitors to the New Forest National Park. With 39.7 % of all visitors and 76.1 % of at least (or more often than) weekly visitors surveyed being people residing within the first 50 km outside the National Park boundary they are one of the primary demographics in terms of visitor pressure within the National Park. Figure 2 shows the estimated number of visits made by those residents in the first 50 km outside the National Park boundary. It indicates that people living in the first 1 km band currently make approximately 1.75 million visits to the New Forest per year. This value then falls sharply to around 500,000 visits per 1 km band per year as the distance from the boundary increases to 2 to 8 km then declines gradually to a base level of 2,000 to 3,000 visits per 1 km band per year after 20 km. Figure 2 also shows the estimated number of future visits based upon estimates of future housing, and therefore population, described in section 3.3. It estimates that visits per year from people residing within the first 1km outside the boundary may increase to approximately 1.9 million. As the distance from the boundary increases the estimated number of future visits falls in a similar relationship to that described for the estimated number of current visits. The difference between estimated current visits and estimated future visits is shown in Figure 3.

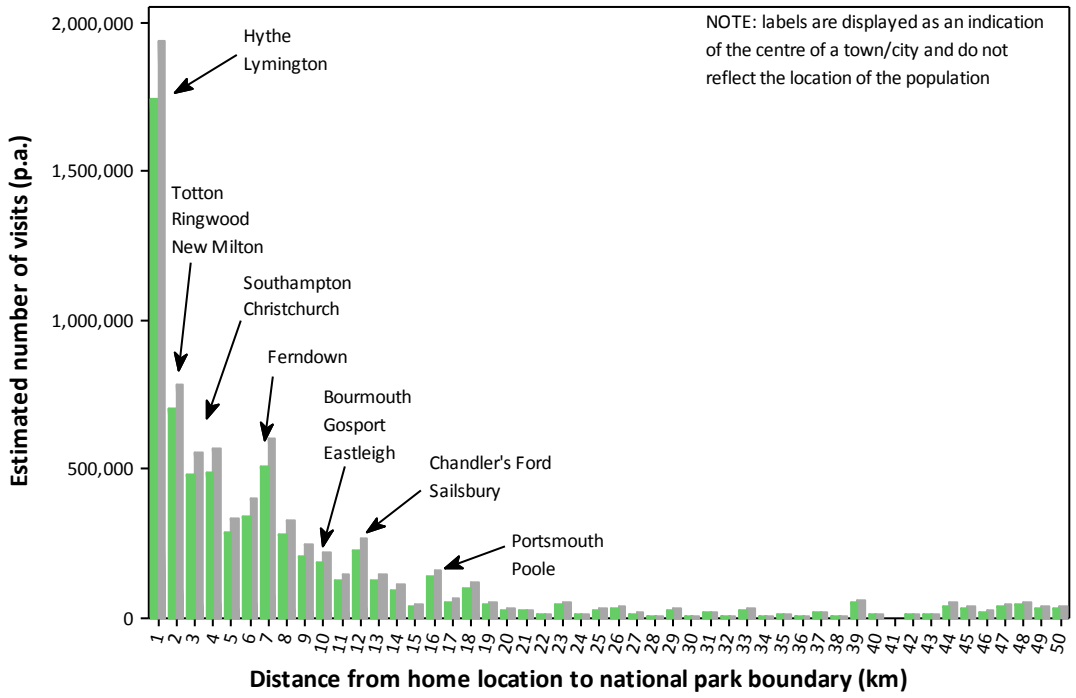



**Figure 2 Estimated number of visits per annum made currently and in 2026 by people residing within the first 50 km outside the New Forest National Park boundary.**

Figure 3 shows an estimated increase of approximately 190,000 visits from people resident within 1 km outside the park boundary. This value then declines to between 50,000 and 95,000 estimated additional visits per 1 km band from residents originating from between 2 and 7 km, and to between 10,000 and 50,000 from between 8 and 18 km. After that the estimated

increase in the number of visits from people residing over 20 km from the park boundary remains at approximately 4,000 per 1 km band per year. Should the housing allocations planned in the regional spatial strategies take place, in the spatial distribution estimated above, by 2026 the New Forest National Park may receive approximately 764,000 additional visits per year from people living within the first 10 km outside the park boundary. This value increases to nearly 931,000 visits when the distance is increased to 20 km.

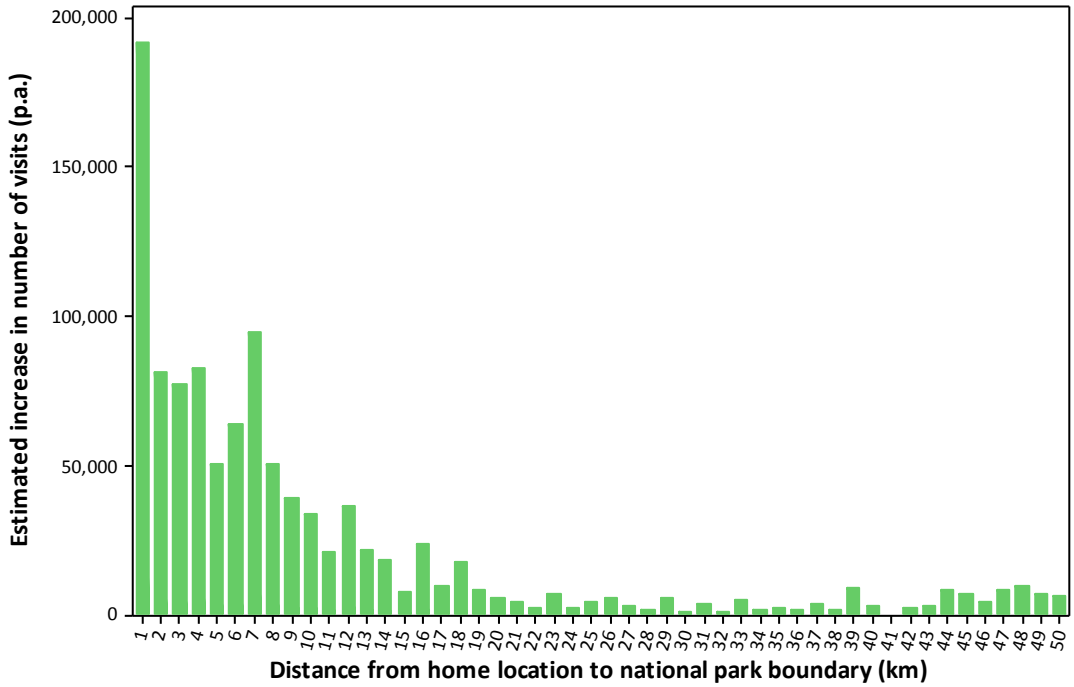



**Figure 3 Estimated increase in the number of visits per annum made by people residing within the first 50 km outside the New Forest National Park boundary.**

To address the frequency and activity of visitors originating from within 50 km of the National Park and to gauge their impact within the park, a series of queries were completed as described above. Figure 4 shows the estimated number of visits completed as either day visitors or staying visitors. Unsurprisingly very few visitors living within the first 50 km of the New Forest were staying away from home when visiting. Nevertheless there is a baseline of approximately 10,000 visits per 1 km band per year, which increases to around 40,000 at the further distances made by visitors staying away from home. The importance of these result are highlighted by the PROGRESS report (Gallagher *et al.*, 2007), which showed day visitors predominantly visit non-urban areas and visit a greater number and range of sites than staying visitors, who tend to stay within or near urban areas. As a result, the impact they have and pressure they apply upon the facilities and habitats in the natural areas will be greater those visitors staying away from home. These results therefore suggest that visitors that live within the first 50km outside the National Park boundary are far more like to be day visitors and therefore it is reasonable to expect that the impact that the consequent increase in the number of day visitors brought about by the proposed housing allocations is likely to be greater in the areas away from urban settlements with the New Forest National Park.

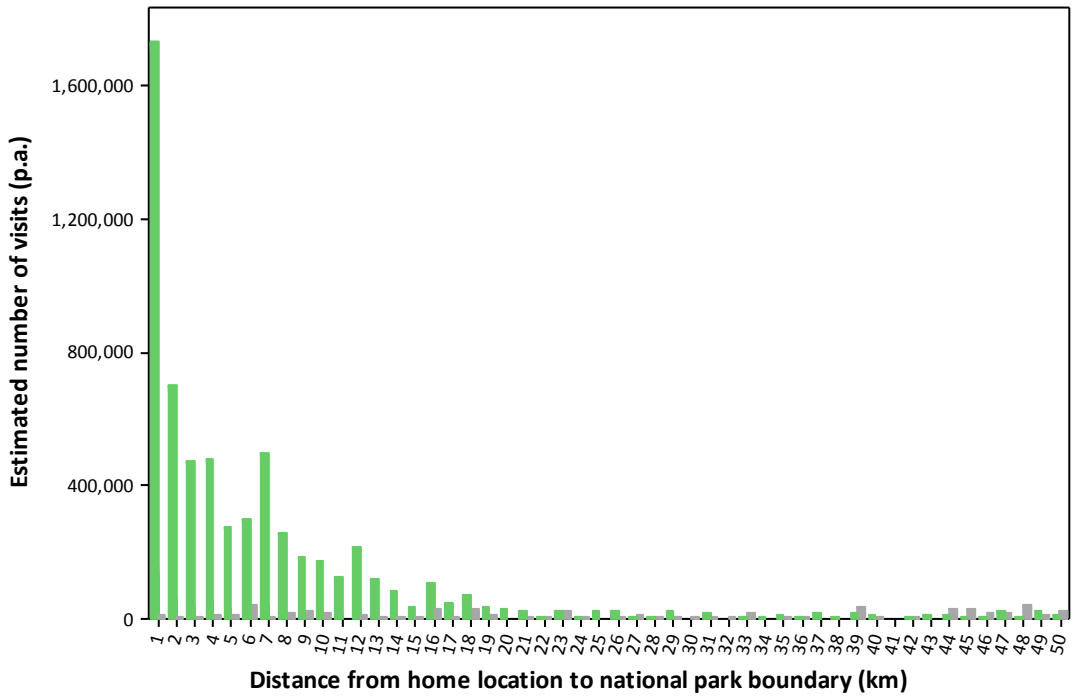



**Figure 4 Estimated number of both day visits (green) and staying visits (grey) per annum made by people residing within the first 50 km outside the New Forest National Park boundary.**

Figure 5 shows the estimated frequency of day visits to the New Forest National Park made by people living within the first 50 km outside the boundary. It shows that people who visit at least weekly predominantly live in the first 10 km outside the boundary, with few visitors living further visiting that frequently. The number of visitors originating from less than 4 km from the park boundary and visit less than weekly is lower than those who visit more often, however after 4 km they consistently exceed them. Figure 5 also shows that the number of at least weekly visitors only exceeds the baseline of 0 to 3,000 visits per year when they live within 10 km of the boundary; while for less than weekly visitors the same is true for those living with 20 km of the boundary. This therefore suggests that an increase in housing, and therefore population, within 10 km of the park boundary is likely to cause an increase day visits by visitors who both visit at least once a week and less often, while an increase in housing between 10 km and 20 km is more likely to have an impact on those day visitors who visit less than weekly.

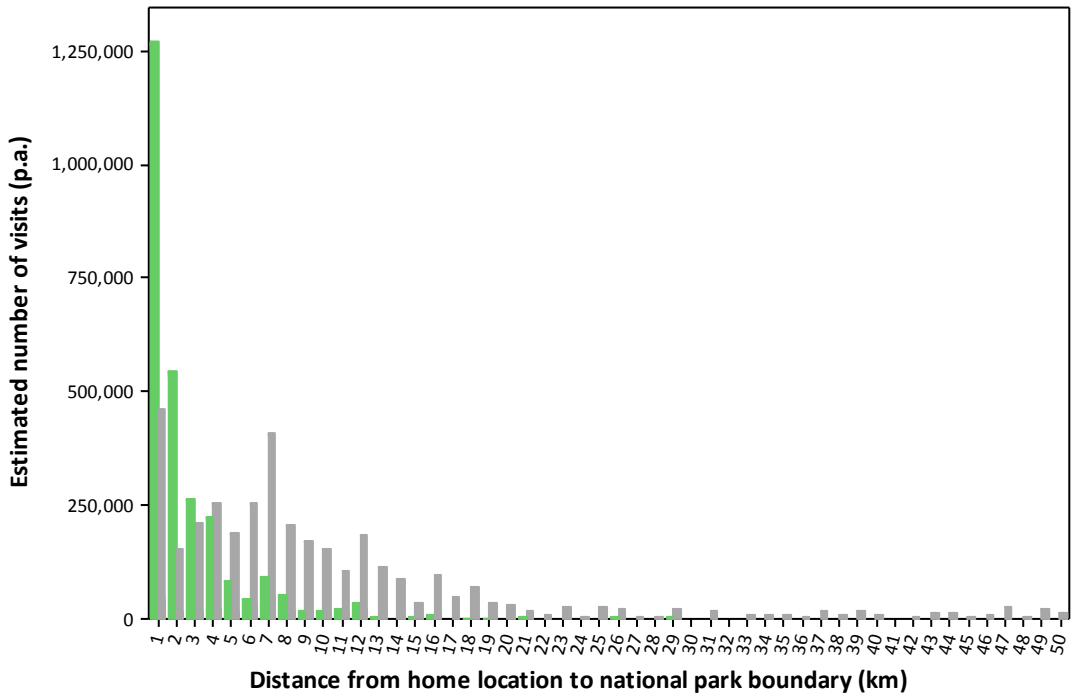



**Figure 5 Estimated number of day visits per annum made by people residing within the first 50 km outside the New Forest National Park boundary and visiting at least (or more often than) weekly (green) and less than weekly (grey).**

Figure 6 shows the estimated number of visits made by visitors who visit at least weekly both with and without a dog. It shows that there are many more people visiting with a dog from within a kilometre of the Park boundary.

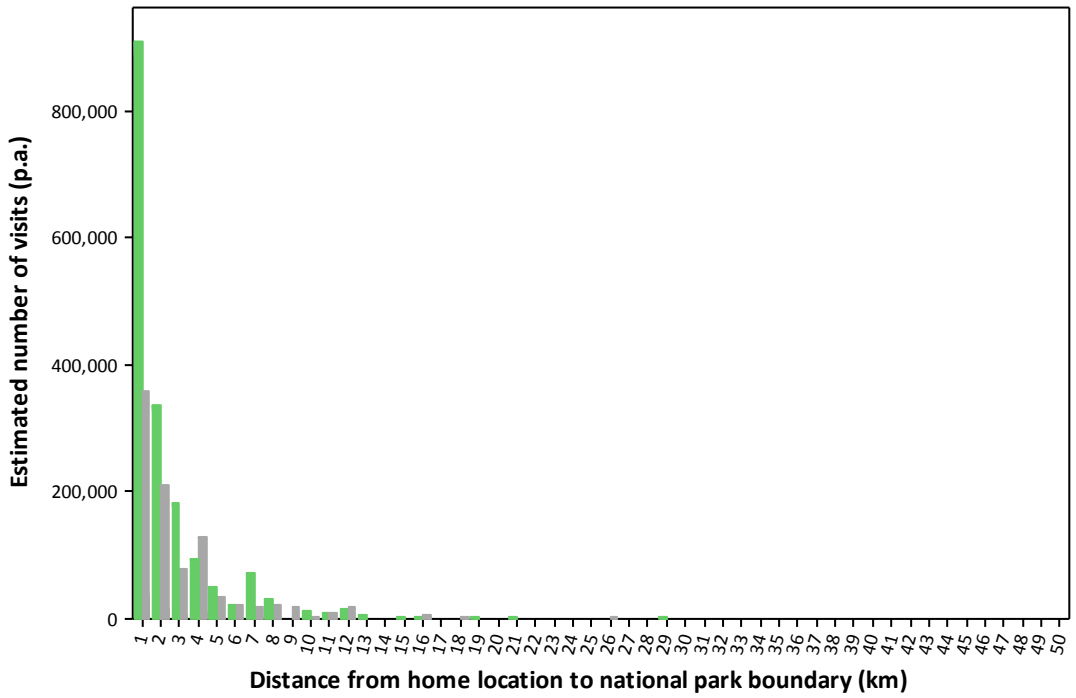



**Figure 6 Estimated number of day visits per annum made currently by people residing within the first 50 km outside the New Forest National Park boundary, visiting at least (or more often than) weekly, with (green) or without (grey) their dog.**

The series of figures above highlight that the housing allocations, planned in the regional spatial strategies, but especially those within the first 20 km outside the New Forest National Park boundary, are likely to result in an increase in the number of visits made to the park. This increase is likely to be in due to an increase in day visitors, who visit at least once per week and are likely to have a dog.

In summary it can be seen that development will increase visitor numbers. Development levels within 50km of the National Park boundary, to 2026 will result in an increase of 15.2% in visitors from within 50 km of the National Park boundary and of 7.9% in total visitor numbers (Table 11). The most marked increases will be in day visitors, regular day and dog walkers visiting at least weekly.

**Table 11: Change in number of person visits per annum as a result of new housing (proposed 2006 – 2026) within different distances (maximum distance from home location) from the National Park boundary.**

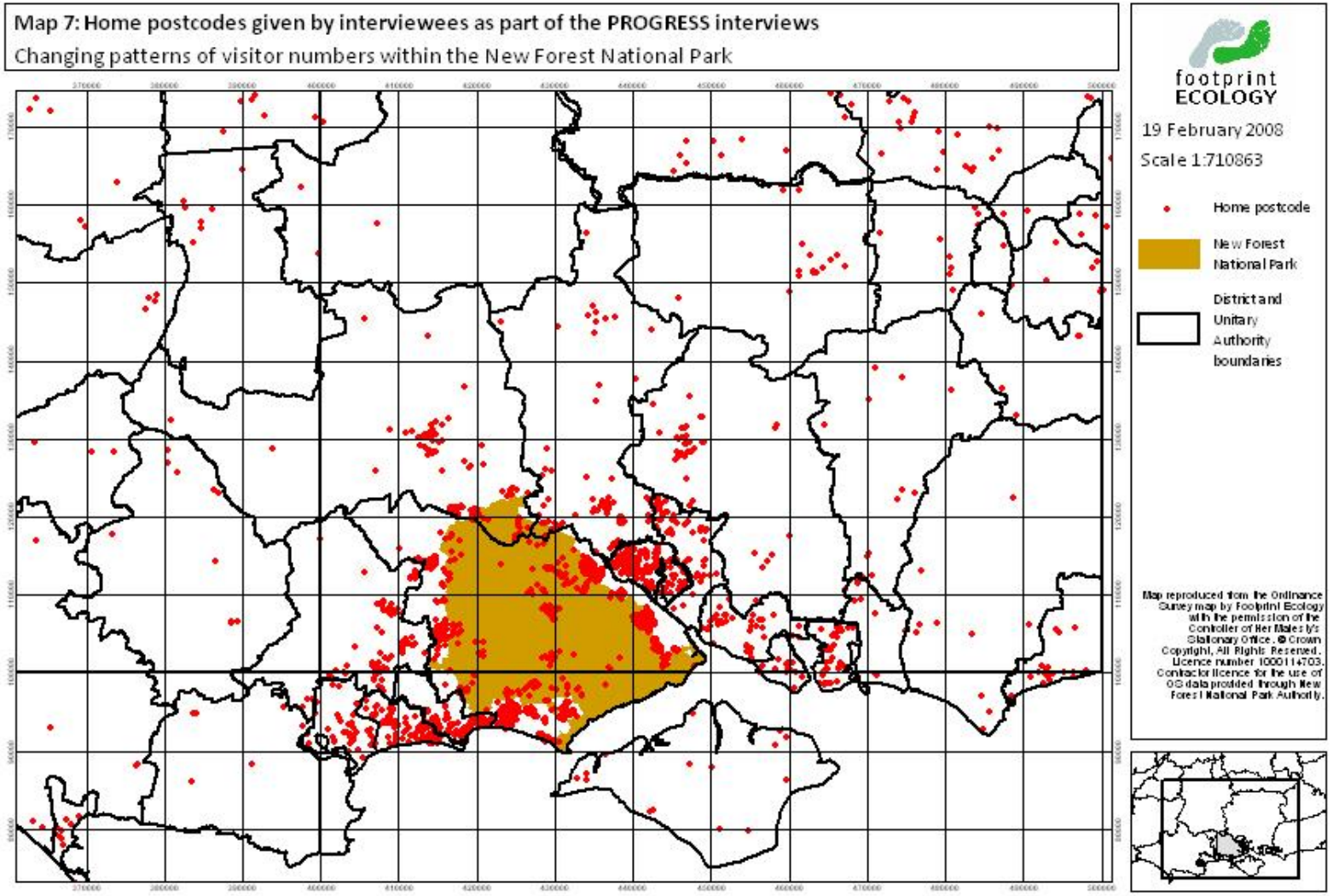
| | *Current* | | *2026* | | *Difference* | |
|---|---|---|---|---|---|---|
| | *20km* | *50km* | *20km* | *50km* | *20km* | *50km* |
| All visitors | 6,235,829 | 6,898,474 | 7,167,244 | 7,943,720 | 931,405 | 1,045,246 |
| Staying visitors | 263,287 | 576,051 | 308,577 | 676,218 | 45,290 | 100,167 |
| Day visitors | 5,972,552 | 6,322,423 | 6,858,667 | 7,267,502 | 886,115 | 945,079 |
| Day visitors at least weekly | 2,694,717 | 2,705,319 | 3,046,028 | 3,058,344 | 351,311 | 353,025 |
| Day visitors at least weekly with a dog | 1,756,425 | 1,763,493 | 1,981,549 | 1,989,800 | 225,124 | 226,307 |

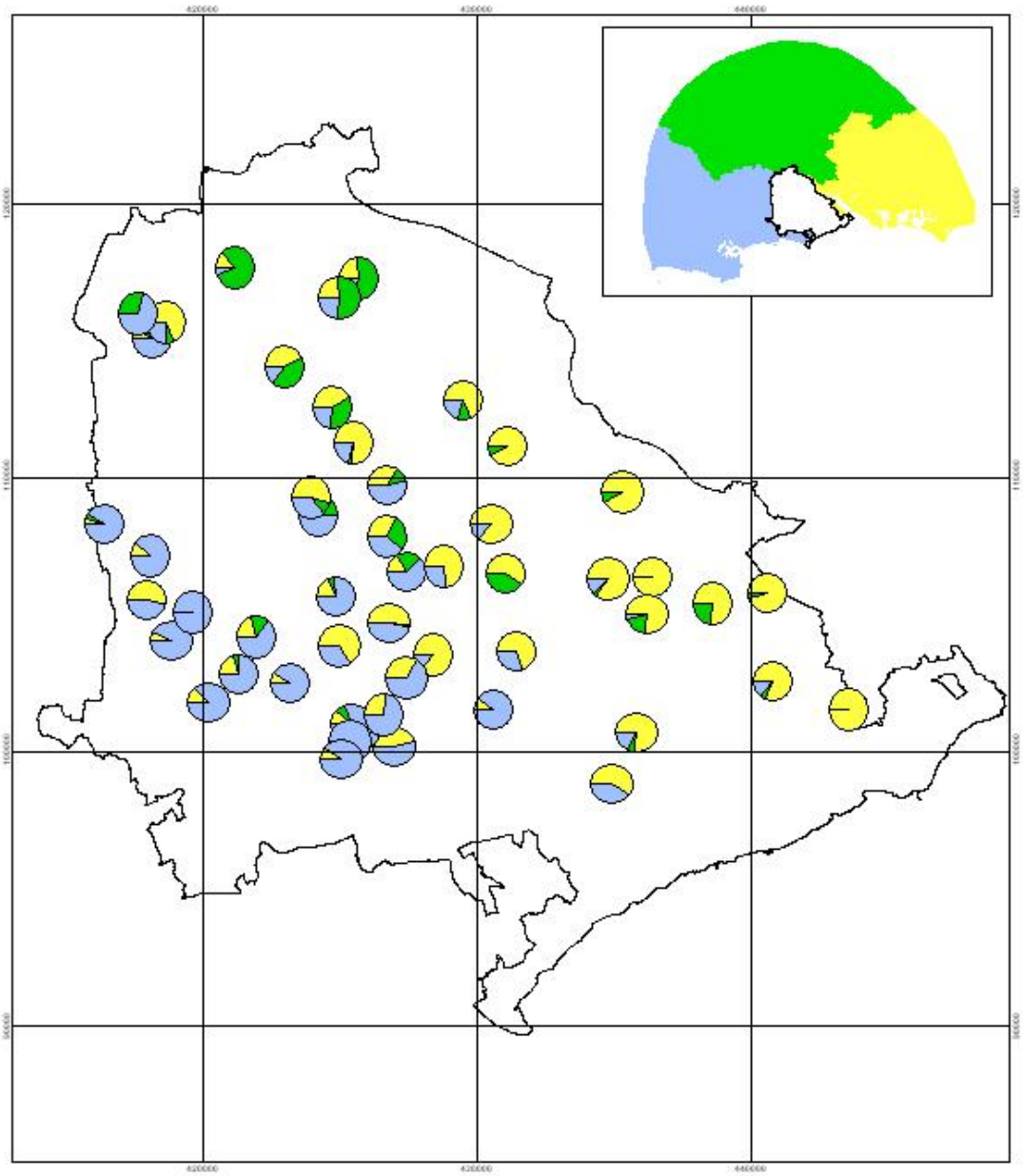
Table 12 shows the current number of visits made by residents within the National Park and the impact that estimated new housing within the National Park may have on visitor numbers. Unsurprisingly, it shows that residents are frequent visitors, making approximately 890,000 person visits per year, 6.7% of the total visits made within the park, which equates to 55 person visits per household per year. Of those visits, 64.7% are made by people who are frequent (at least weekly) dog walkers. It also shows that an estimated increase of 200 new houses within the park may result in an additional 11,000 visits per year.

**Table 12: Change in number of person visits per annum as a result of new housing (proposed 2006 – 2026) within the National Park boundary.**

| | *Current* | *2026* | *Difference* |
|---|---|---|---|
| All visitors | 890,582 | 901,536 | 10,954 |
| Day visitors at least weekly | 805,764 | 815,675 | 9,911 |
| Day visitors at least weekly with a dog | 576,051 | 583,136 | 7,085 |

The actual postcodes of visitors are shown in Map 7. This provides an additional perspective on the raw data, and allows particular clusters of postcodes to be identified. In order to gain an understanding of the destination of visitors to the National Park from the surrounding 50 km, map 8 was produced. Unsurprisingly it shows that visitors originating from the east of the National Park tend to visit sites on the easterly side on the park, and the same for the west. Sites to the north tend to receive a mix of visitors. It would therefore be reasonable to assume, for example, that an increase in housing and population in the segment to the east of the National Park will result in increased visitor impacts and pressure on sites in the east of the National Park.


Map 7: Home postcodes given by interviewees as part of the PROGRESS interviews
Changing patterns of visitor numbers within the New Forest National Park
footprint ECOLOGY
19 February 2008
Scale 1:710863
Home postcode
New Forest National Park
District and Unitary Authority boundaries
Map reproduced from the Ordinance Survey map by Footprint Ecology with the permission of the Controller of Her Majesty's Stationary Office. © Crown Copyright. All Rights Reserved. Licence number 100011703. Contractor licence for the use of OS data provided through New Forest National Park Authority.



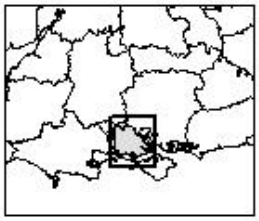
Map 8: **Home location of visitors from the first 50km outside the national park boundary.**
Changing patterns of visitor numbers within the New Forest National Park

footprint ECOLOGY
19 February 2008
Scale 1:190473

Proportion of visitors interviewed from each section at each interview location

East
North
West





## *3.4 Implications for Strategic Planning*

With respect to the New Forest District Council's emerging core strategy, five key issues are relevant. These issues are likely to be similar for other local authorities too:

- Housing needs: *how can the Core Strategy best provide for housing needs … where opportunities for new development are severely limited by environmental constraints*?
- Impact on the National Park: *How can the Core Strategy ensure that its proposals avoid significant harmful impacts on the New Forest National Park?*
- Biodiversity: h*ow can the Core Strategy ensure that biodiversity in the Plan Area and in adjoining areas is protected and enhanced?*
- Leisure and recreation: *how can the Core Strategy ensure adequate provision for leisure and recreation (including open space) in locations that will avoid damage to sensitive environments?*
- Tourism and visitors: *how can the Core Strategy encourage sustainable tourism that will benefit the local economy without harming the special qualities of the area?*

Among the nine strategic objectives for the Core Strategy, the interplay between four stands out as being particularly relevant to this study:

- Housing: *To provide for additional housing within the Plan area to meet at least the requirements of the submitted South East Plan for New Forest District and National Park…*
- Travel: *To reduce the need to travel, particularly using the private car… and improve the accessibility and attractiveness of alternative transport modes.*
- Biodiversity and landscape: *to promote and safeguard biodiversity, protection and enhancement of wildlife, and landscape quality in the Plan Area and to avoid significant harmful impacts on the adjoining National Park…*
- Leisure and recreation: *to … facilitate enjoyment of the area's other special qualities by visitors as well as local communities. To manage recreational pressures within areas subject to environmental designations, to minimise human impacts while maintaining appropriate opportunities to enjoy and experience the special qualities of the area.*

Breaking down the South East Plan requirement of 4,138 new dwellings into 1,538 in Totton and Waterside and 2,600 in the remainder of the District, the Core Strategy:

- Notes that a provisional figure of 268 dwellings (48 already with permission or allocated for development, 220 as part of the small site allowance) has been agreed with the National Park Authority for construction within the National Park; and
- Suggests that all but 232 of the 4,138 dwellings can be constructed without any new green field allocations of land

The Core Strategy identifies four potential Spatial Options for this new development:

- Option 1: concentrate development in built-up areas;
- Option 2: development in built-up areas that retains their character;
- Option 3: Development in built-up areas that retains their character, plus dispersed new green field sites; and
- Option 4: As Option 3 but with new green field sites in just two strategic locations.

Policy Outline CS1 relates to sustainable development, seeking to ensure that new development is located "so as to minimise risk of damage to areas of high nature conservation and/or landscape value". The Habitat Regulations Assessment conducted for the Core Strategy (New Forest District Council, 2007) considers that, for each of the four options above, some potential for harmful impact cannot be ruled out, but considers it likely that sufficient mitigation could be provided to ensure that these impacts are not significant. The Assessment prefers Options 2 and 3 as these minimise traffic impacts on the European designated sites. The NDFC subsequently indicated its preference for Option 3, amended to involve less development and to avoid any commitment to development that is not necessary for either specific local needs or to meet South East Plan requirements.

As a consequence of the likely development over the period 2006 – 2026 there will be increases in visitor levels as described. The increases will be most marked as a result of development within 20km, and particularly 7km of the National Park boundary, for example there will be nearly 17,000 additional visits per annum involving regular dog walkers. The scale of the impacts needs to be considered in relation to the existing levels of visitor pressure and scale of current impacts, which we consider in section 4. Mitigation may be needed, as a precaution to ensure no significant effect. Such mitigation will need to be aimed at absorbing the additional pressure set out in Table 11. Potential measures are considered in more detail in section 5.

# 4 Evidence for existing disturbance impacts to breeding Annex I bird species in the New Forest

## *4.1 Overview and Summary*

In this section we use existing visitor data and bird data to determine whether there is any indication that disturbance resulting from recreational activities are currently having an impact on the Annex I bird species associated with the New Forest. We focus on nightjar, woodlark and Dartford warbler as good information exists on the spatial distribution of these species and other studies of these species (mainly conducted in Dorset) have found impacts of visitor pressure.

We use existing data on visitor numbers at car-parks etc and then, with some assumptions of how far people may walk, we have produced a map showing the spatial distribution of people within the National Park. While quite simple, these maps provide an intuitive visual assessment of the visitor distribution, which can be mapped with bird data.

Bird densities, even when accounting for habitat, are clearly lower than other areas – we make comparisons with the Dorset Heaths and the Thames Basin Heaths. All three species are present at markedly lower densities within the New Forest and the reasons for this are not clear. The maps show that all three species do occur in areas of high visitor pressure, but there does seem to be some avoidance of the more highly disturbed areas by all three species. This avoidance is not enough to account for the reduced densities.

We suggest further work is necessary to understand the lower densities.

## *4.2 Methods*

### 4.1.1 Distribution of key species within the New Forest

Bird data were taken from the national surveys conducted in 2004 for nightjar (Conway *et al.*, 2007) and 2006 for both woodlark and Dartford warbler. The data show approximate territory centres, mapped as point data. Then in combination with mapped habitat data, supplied by HBIC, the density of each bird species within each habitat type was calculated. The habitat data was also used to examine the spatial relationship between habitat suitable for each bird species and distribution of those species.

### 4.1.2 Distribution of key species in relation to visitor levels

To estimate visitor levels across the whole National Park, count data supplied by the Forestry Commission which was collected in 2004 and 2005 for a wide selection of sites, was used to estimate visitor rates. The average number of people visiting a particular site within the standard five hour observation period was scaled up to that for a 16 hour period. For those sites where visitor counts were not recorded, the number of car-park spaces at each site was used as a predictor of visitor numbers (Figure 7).

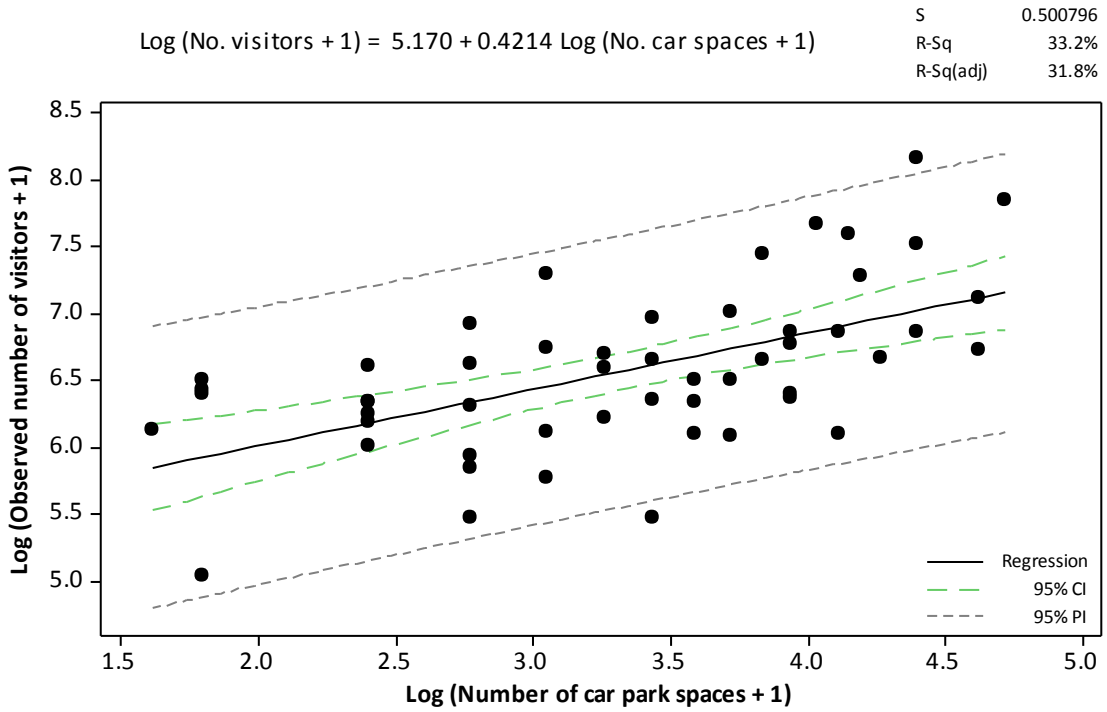



**Figure 7 Linear regression relationship between the logarithm (to base e) of the observed number of visitors ($\log_e(y+1)$) and the logarithm of the number of car parking spaces at each site ($\log_e(x+1)$).**

Having calculated the number of visitors using a particular site, either through scaling up of existing data or through its relationship with car park size, the next step was to derive estimates of the spatial distribution of visitors. An existing method, previously used on the Dorset heaths SPA for modelling visitor pressure, was used to plot the spatial distribution of visitors within the New Forest (Liley *et al.*, 2006b).

Firstly a grid of 50m x 50m squares was drawn to cover the land area of the New Forest National Park, where any grid squares with their centroid not within the National Park boundary were deleted. Each column on the grid was then identified with a letter and each row with a number, allowing each cell ("pixel") within the grid to have a unique identifier. Pixels covering areas where visitors obviously do not walk (e.g. valley mires, rivers, sea, refuse tip, surface mines) were identified and excluded ("exclusion pixels") from the statistical prediction of the spatial distribution of visitor pressure within the patches.

In the Forestry Commission study there was no data collected on the precise distance that the observed people had gone from the car park. However, previous studies have recorded the route of paths on heath that visitors have claimed they had followed (Clarke *et al.*, 2006; Liley *et al.*, 2006c). After inputting all of visitors' routes into a GIS, the authors determined the distance from the access point to the mid-point of a route was taken as the penetration distance. The frequency distribution of distances that visitors travelled on the Dorset and Thames Basin heaths were later shown to be generally similar and the data from the two visitor surveys were combined to give a single overall probability distribution of penetration distances (Liley *et al.*,

2006b). This probability distribution of penetration distances was used in this study as a relatively simple means of estimating the dispersal of people from car parks and is shown in Figure 8.

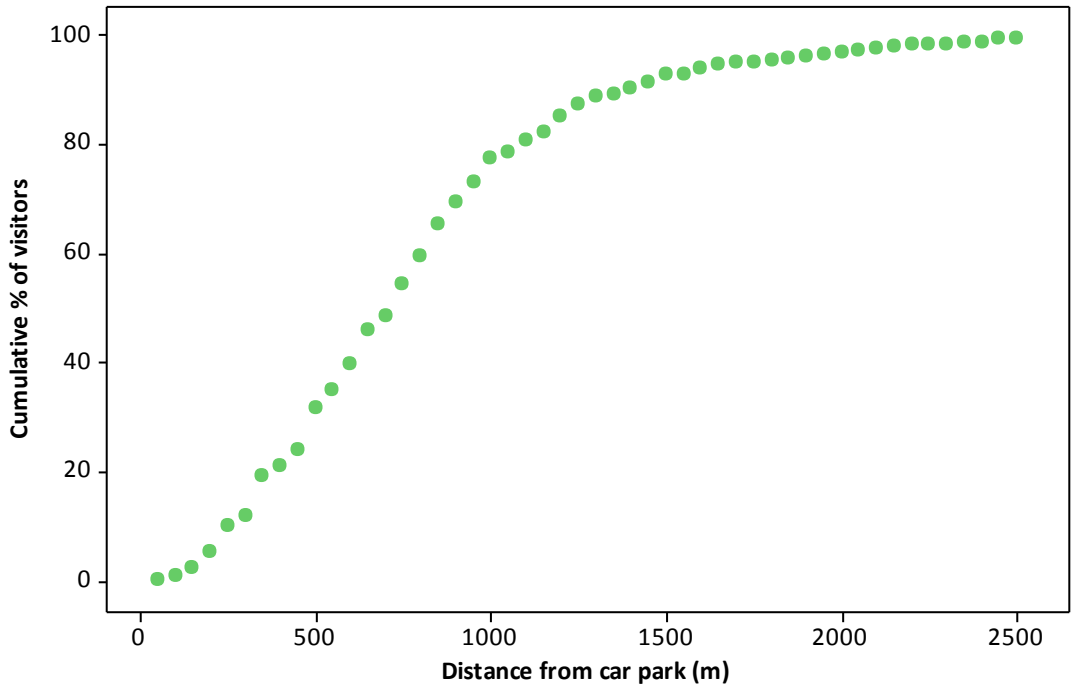



**Figure 8 Cumulative frequency distribution of the penetration distance onto heaths by visitors (Liley *et al.*, 2006b).**

Again, a similar method was used to that on the Dorset and Thames Basin heaths to estimate the visitor pressure in each pixel (Liley *et al.*, 2006b). Given the predicted number of visitors ($V_i$) visiting site *i*, the penetration distribution was used to estimate the proportion ($P_{id}$) of visitors who travel at least *d* metres away from the site car park. In terms of mapping visitor pressure in this study, it is assumed that all pixels can potentially be reached and/or impacted by visitors, apart from those already identified and excluded. (Obviously this is not strictly true as, for example, stands of dense scrub are much less easily accessed.)

Each visitor who penetrated a distance *d* from the car park is assumed to travel over *K* pixels at each of the 50 m distance classes up to a distance *d* from the access point, and *K* is estimated to be equal to 2. For each site car park *i* the number of pixels ($M_{id}$) within each distance class *d* from the car park was determined. Then the estimated number of people $N_{id}$ travelling from a particular car park *i* across a particular pixel at a distance class *d* is estimated by:

$$N_{id} = V_i * Pi_d * K / M_{id}$$

The total number of people visiting a particular pixel from all car parks is estimated by summing the estimates of the number of visitors to the cell from the individual car parks.

In addition to car parks, campsites were also included in the model. According to the PROGRESS report (Gallagher *et al.*, 2007) there are 4,476 pitches over 39 campsites within the New Forest National Park boundary. This equates to an average of 114 pitches per campsite. In summer the campsites have a 60 % occupancy rate, and assuming an average of 3 people per pitch, this equates to 207 guests per 16 hour period at the campsite. From the PROGRESS report it has been shown that 31% of staying guests go out into the park in the area immediately surrounding their campsite on either foot or by bicycle. It can therefore be estimated that 64 people go out from each campsite and were treated as if they were additional car parks in the analyses.

Approximate territories of the three bird species were then produced by creating circular buffers around each data point. While bird territories are not usually exactly circular in shape, the area which they covered was in line with those previously published. For nightjar we used a radius of 150m, equating to a territory of 7ha. This falls within the range suggested by other authors (for example Berry, 1979; Morris *et al.*, 1994), and has been used in other studies (Liley *et al.*, 2006a). For Dartford warbler and woodlark we use a radius of 100m, reflecting an area of approximately 3 to 3.5 ha (Mallord, 2005; Murison, 2007). Then in combination with the habitat/land use data, supplied by HBIC, the area of each habitat within each of the bird species' territories was determined.

The resulting above data allowed subsequent analyses of habitat usage in relation to visitor pressure.

## *4.2 Distribution of key species within the New Forest*

The most recent national survey data for the three species, for the New Forest, are summarised in Table 13. The New Forest holds a large proportion of the UK population of each species.

**Table 13 Summary of most recent national survey data for nightjar, woodlark and Dartford warbler in the New Forest**

| | *Nightjar(2004 & 2005)* | *Woodlark (2006)* | *Dartford warbler (2006)* |
|---|---|---|---|
| New Forest population | 697 | 392 | 149 |
| UK population | 4606 | 2461 | 1640 |
| % of UK population found in New Forest | 15.1 | 15.9 | 9.1 |

All three bird species are found throughout the whole National Park and show similar patterns of distribution, corresponding to regions of heathland habitat (see map 8, 9 and 10). More specifically all species are found widely in the western half of the park, where there is an extensive large scale mosaic of heathland and woodland. While in the eastern half of the park they show a patchier distribution, with populations associating with the smaller areas of heathland between Lyndhurst and north Beaulieu, and to the west of Beaulieu. Apart from a few isolated records, there are few sighting of any of the three key species within 2.5 km of the coast, and near the larger urban areas of Lyndhurst and Brockenhurst.

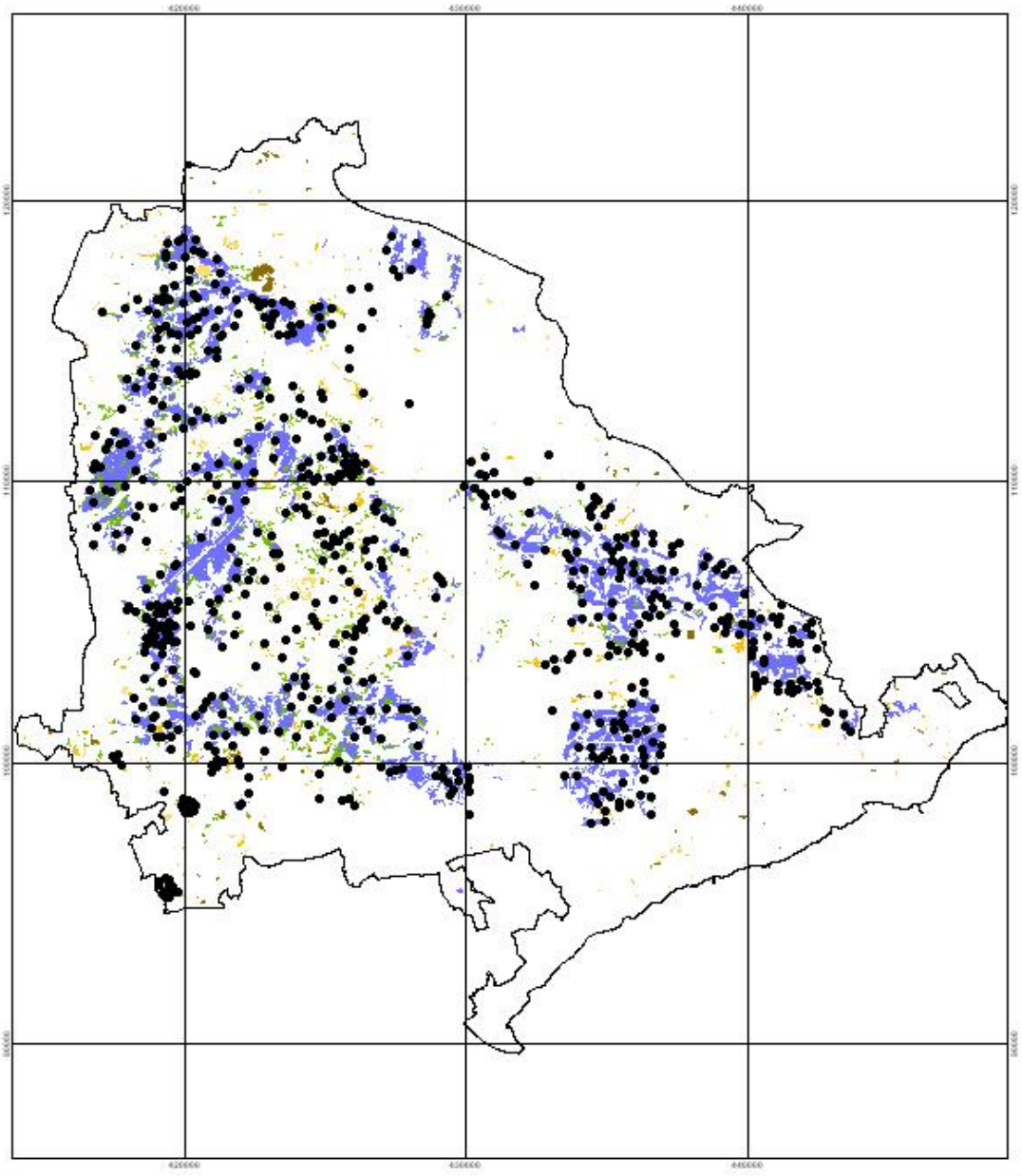
### 4.2.1 Nightjar

Nightjar territories within the National Park are aggregated in the western half of the park, with few recorded in the far north and in the patches of heathland in the east (see map 9). They are absent from the areas surrounding Lyndhurst and Brockenhurst, and the corridor between the two towns. Their distribution correlates well with that of heathland and woodland edge habitats. Table 14 shows that scrub, clearfell, dry heath and wet heath are the most commonly utilised habitat. While the New Forest clearly holds high numbers of nightjars, it is clear from Table 14 that densities are comparatively low. The density of nightjar both in total and across all habitats within the New Forest is approximately half that on the Dorset and Thames Basin heaths.

The reasons for the lower densities are unclear and the low densities do not seem to have been highlighted by other authors (for example Bright, Langston & Bierman, 2007; Brown & Grice, 2005; Conway *et al.*, 2007; Langston *et al.*, 2007b; Sharkey, 2005; Tubbs, 1968). Given that the numbers of visitors, particularly dog walkers (Langston *et al.*, 2007a; Murison, 2002) are comparatively low, it may be that other issues, for example grazing, habitat management (such as heather burning), and invertebrate densities may account for the low densities, potentially even a combination of these. In the absence of detailed field studies this is only speculation, further work is clearly warranted.

**Table 14 Area of different habitats within the New Forest National Park, and the number and density of nightjar within those habitats.**

| | *Area (ha)* | | | *Nightjar* | | | *Nightjar Density (per ha)* | | |
|---|---|---|---|---|---|---|---|---|---|
| *Habitat* | *New Forest* | *Dorset* | *TBH* | *New Forest* | *Dorset* | *TBH* | *New Forest* | *Dorset* | *TBH* |
| Clearfell | 263 | 585 | 430 | 11 | 59 | 30 | 0.042 | 0.101 | 0.070 |
| Conifer | 5268 | 3271 | 4166 | 79 | 118 | 68 | 0.015 | 0.036 | 0.016 |
| Deciduous | 13240 | 446 | 17 | 77 | 10 | 1 | 0.006 | 0.022 | 0.059 |
| Dry Heath | 7178 | 2379 | 2191 | 251 | 181 | 151 | 0.035 | 0.076 | 0.069 |
| Farmland | 4586 | 2 | 17 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 |
| Grassland | 14885 | 452 | 115 | 119 | 6 | 1 | 0.008 | 0.013 | 0.009 |
| Other | 5418 | 166 | 135 | 2 | 1 | 2 | <0.001 | 0.006 | 0.015 |
| Scrub | 1334 | 11 | 0 | 58 | 0 | 0 | 0.043 | 0.000 | 0.000 |
| Wet Heath | 3538 | 1608 | 171 | 97 | 76 | 15 | 0.027 | 0.047 | 0.088 |
| Young Conifer | 225 | 136 | 143 | 4 | 14 | 7 | 0.018 | 0.103 | 0.049 |
| TOTAL | 55935 | 9056 | 7385 | 697 | 465 | 275 | 0.195 | 0.405 | 0.374 |




**Map 9: Distribution of nightjar and nightjar suitable habitat within the New Forest**
Changing patterns of visitor numbers within the New Forest National Park

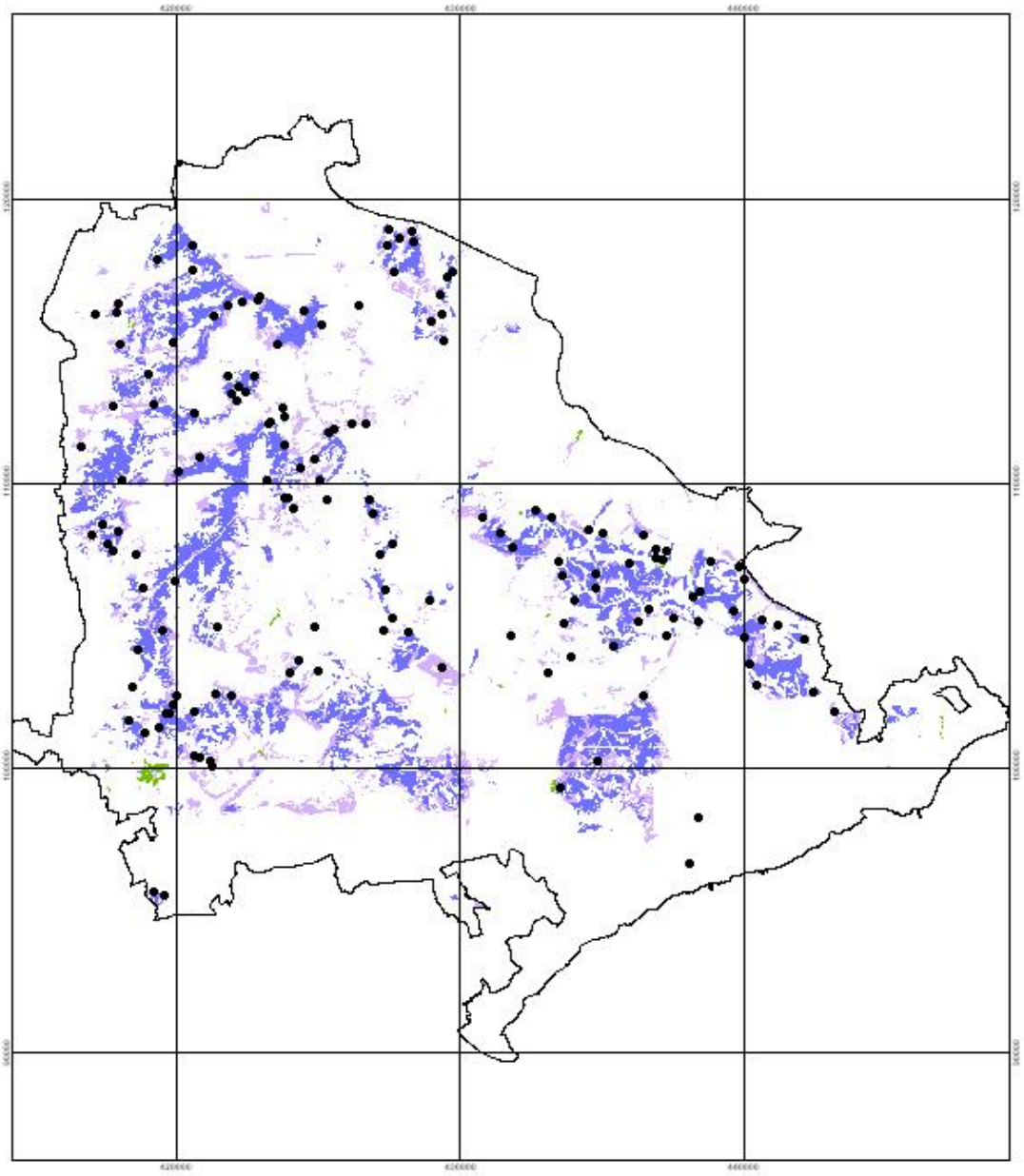
### 4.2.2 Woodlark

Woodlark are loosely aggregated around both heathland and dry acid grassland/heathland mosaic within the National Park, however show very low numbers in the region south of Brockenhurst, including the heath to the south west of Beaulieu. Again this reflects the spatial distribution of their preferred habitats within the park (map 10). Table 15 indicates that dry and wet heath is the main habitat utilised by woodlark. As with nightjar, the density of woodlark in the New Forest, both in total and across all habitats, is a fraction of that observed on the Dorset and Thames Basin heaths. This is clearly seen when considering clearfell, where the density of Woodlark in the New Forest within this habitat is a tenth of that on the Thames Basin heaths.

As with nightjars, these comparatively low densities of woodlarks in the New Forest have not been highlighted by other authors (for example Brown *et al.*, 2005; Langston *et al.*, 2007b; Sitters *et al.*, 1996; Wotton & Gillings, 2000). It is possible to speculate that factors such as prey density, habitat structure and grazing levels may influence density, but without detailed fieldwork it is impossible to determine the underlying causes.

**Table 15 Area of different habitats within the New Forest National Park, and the number and density of woodlark within those habitats.**

| | *Area (ha)* | | | *Woodlark* | | | *Woodlark Density (per ha)* | | |
|---|---|---|---|---|---|---|---|---|---|
| *Habitat* | *New Forest* | *Dorset* | *TBH* | *New Forest* | *Dorset* | *TBH* | *New Forest* | *Dorset* | *TBH* |
| Clearfell | 263 | 585 | 430 | 1 | 8 | 17 | 0.004 | 0.014 | 0.040 |
| Conifer | 5268 | 3271 | 4166 | 17 | 12 | 36 | 0.003 | 0.004 | 0.009 |
| Deciduous | 13240 | 446 | 17 | 12 | 0 | 0 | 0.001 | 0.000 | 0.000 |
| Dry Heath | 7178 | 2379 | 2191 | 55 | 18 | 84 | 0.008 | 0.008 | 0.038 |
| Farmland | 4586 | 2 | 17 | 2 | 0 | 0 | <0.001 | 0.000 | 0.000 |
| Grassland | 14885 | 452 | 115 | 35 | 4 | 4 | 0.002 | 0.009 | 0.035 |
| Other | 5418 | 166 | 135 | 0 | 0 | 6 | 0.000 | 0.000 | 0.044 |
| Scrub | 1334 | 11 | 0 | 11 | 0 | 0 | 0.008 | 0.000 | 0.000 |
| Wet Heath | 3538 | 1608 | 171 | 15 | 11 | 5 | 0.004 | 0.007 | 0.029 |
| Young Conifer | 225 | 136 | 143 | 0 | 3 | 4 | 0.000 | 0.022 | 0.028 |
| TOTAL | 55935 | 9056 | 7385 | 148 | 56 | 156 | 0.031 | 0.402 | 0.223 |




**Map 10: Distribution of Woodlark and suitable habitat within the New Forest**

Changing patterns of visitor numbers within the New Forest National Park

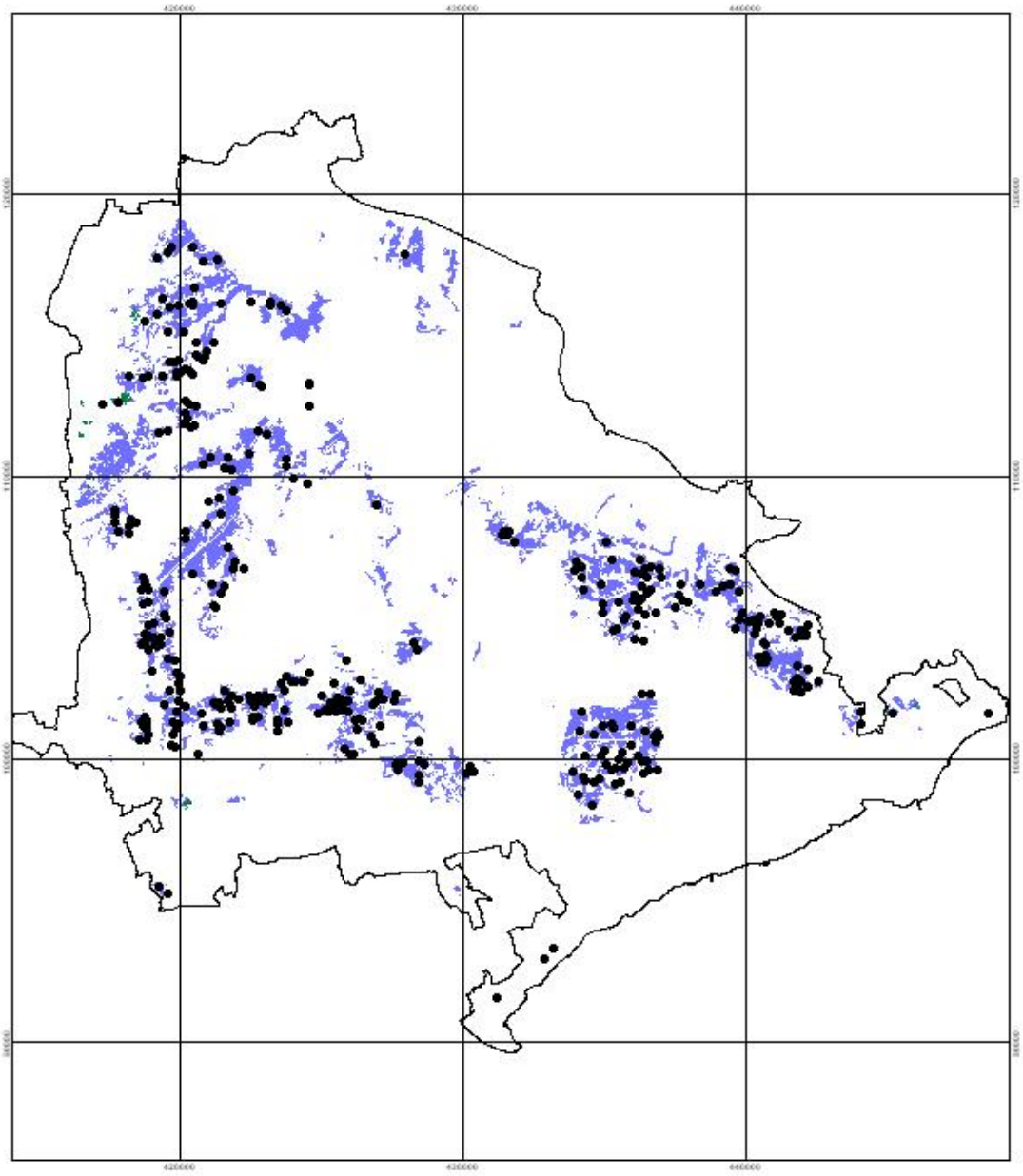
### 4.2.3 Dartford Warbler

Dartford warblers show a highly aggregated distribution within the park, with populations following very closely the regions of dry heathland (see map 11). They are therefore largely absent from non-heathland or heathland associated habitats, such as dense scrub and bracken (Table 16). They are also absent from the area of heathland between Hyde and Linwood. Again, the density of Dartford warbler in the New Forest is comparatively low, both in total and across all habitats, with densities approximately a quarter of that observed on the Dorset and Thames Basin heaths.

The Dartford warbler population in the New Forest has been relatively intensively studied (Bibby & Tubbs, 1975; Tubbs, 1963; Westerhoff & Tubbs, 1991), yet reasons for comparatively low densities are unclear. Detailed fieldwork is warranted.

**Table 16 Area of different habitats within the New Forest National Park, and the number and density of Dartford warbler within those habitats.**

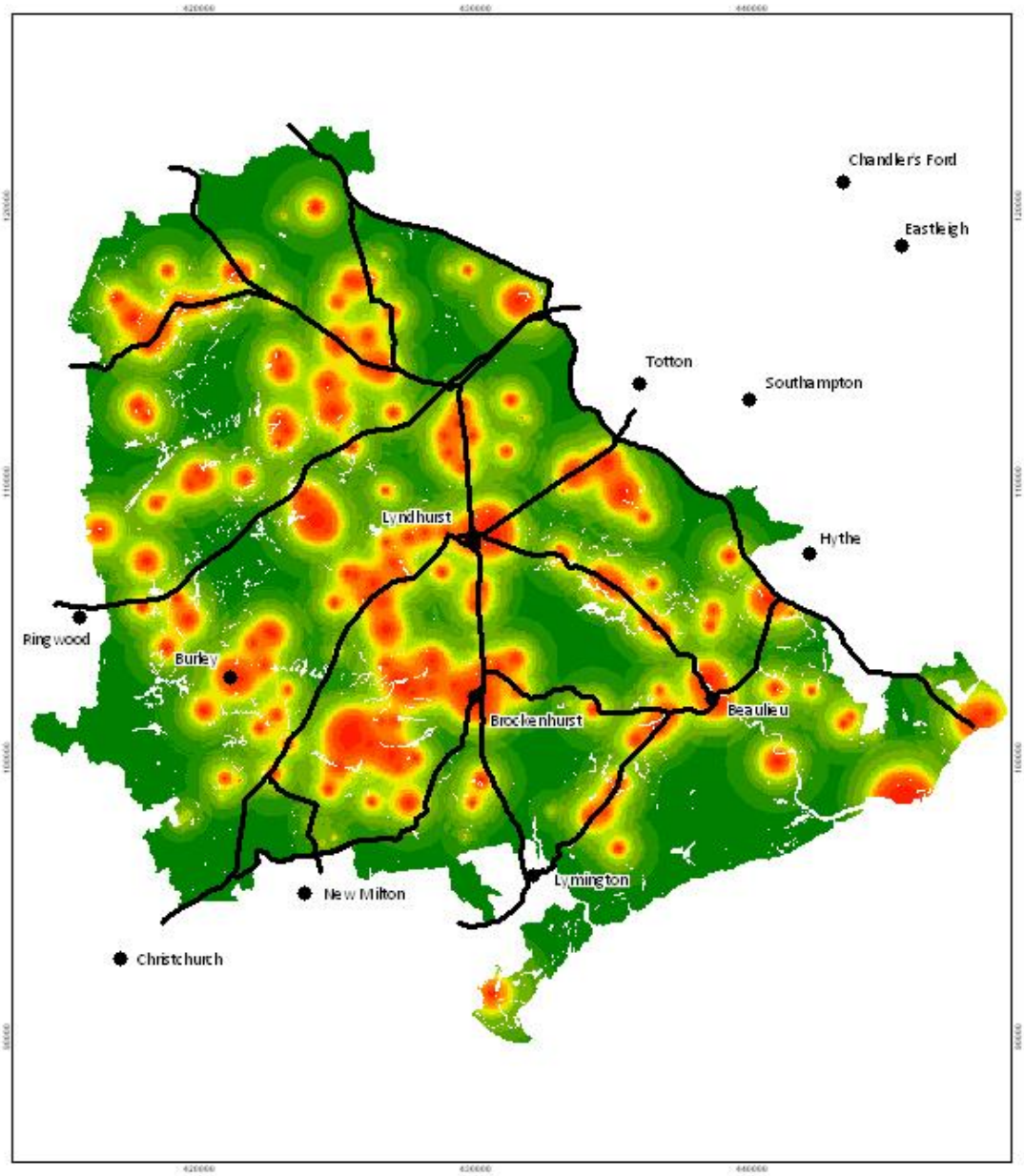
| | *Area (ha)* | | | *Dartford warbler* | | | *Dartford Warbler Density (per ha)* | | |
|---|---|---|---|---|---|---|---|---|---|
| *Habitat* | *New Forest* | *Dorset* | *TBH* | *New Forest* | *Dorset* | *TBH* | *New Forest* | *Dorset* | *TBH* |
| Clearfell | 263 | 585 | 430 | 1 | 18 | 3 | 0.004 | 0.031 | 0.007 |
| Conifer | 5268 | 3271 | 4166 | 10 | 68 | 51 | 0.002 | 0.021 | 0.012 |
| Deciduous | 13240 | 446 | 17 | 12 | 14 | 0 | 0.001 | 0.031 | 0.000 |
| Dry Heath | 7178 | 2379 | 2191 | 213 | 266 | 223 | 0.030 | 0.112 | 0.102 |
| Farmland | 4586 | 2 | 17 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 |
| Grassland | 14885 | 452 | 115 | 72 | 7 | 0 | 0.005 | 0.015 | 0.000 |
| Other | 5418 | 166 | 135 | 5 | 8 | 5 | 0.001 | 0.048 | 0.037 |
| Scrub | 1334 | 11 | 0 | 22 | 0 | 0 | 0.016 | 0.000 | 0.000 |
| Wet Heath | 3538 | 1608 | 171 | 57 | 160 | 28 | 0.016 | 0.100 | 0.164 |
| Young Conifer | 225 | 136 | 143 | 0 | 6 | 1 | 0.000 | 0.044 | 0.007 |
| TOTAL | 55935 | 9056 | 7385 | 392 | 547 | 311 | 0.075 | 0.402 | 0.329 |




**Map 11:Distribution of Dartford warbler and suitable habitat within the New Forest**
Changing patterns of visitor numbers within the New Forest National Park

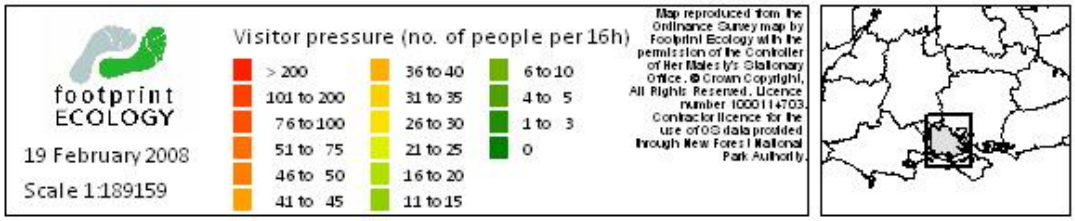
## *4.3 Distribution of key species in relation to visitor levels*

To assess the distribution of these key bird species within the National Park in relation to visitor levels, a model was built, as described above, to map the spatial distribution of visitor pressure (Map 12).




**Map 12: Visitor pressure, major roads and towns in the New Forest National Park**

Changing patterns of visitor numbers within the New Forest National Park



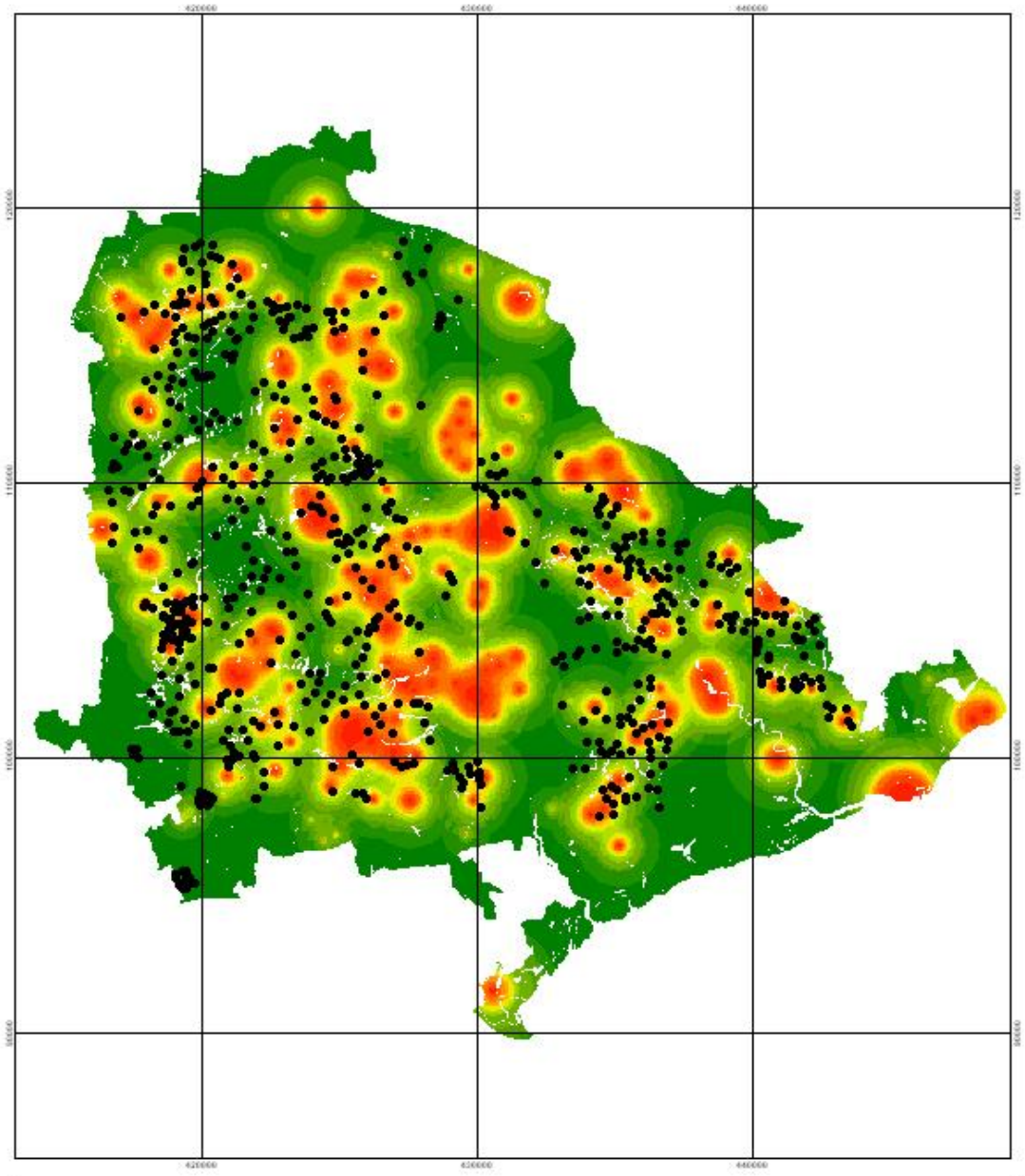
### 4.3.1 Nightjar

The spatial relationship between visitor pressure, defined as the estimated number of visitors entering a 50m by 50m pixel within a 16 hour period, and nightjar is shown in map 13. From the map it is clear that there are some territories in the areas where visitor numbers are predicted to be high. There is no significant difference in predicted visitor pressure between the areas where nightjars are present and those where nightjars are absent (Mann-Whitney test, adjusted for ties, $p = 0.2859$). However, as Figure 9 highlights, there are a few areas where visitor numbers are very high, and these areas support no nightjars. Nightjars tend to avoid areas where visitor pressure is predicted to exceed 200 people per 16 hour period.

Figure 10 shows the proportion of nightjar suitable habitat that is within nightjar territories in relation to visitor pressure. This figure therefore gives an indication of the extent to which suitable habitat within the New Forest is used by nightjar and the impact that visitor pressure may have on that use. It shows that above approximately 60 visitors per 16 hour period there is a weak negative trend, where habitat utilisation by nightjar decreases as visitor pressure increases. Above 400 visitors per 16 hour period there are no nightjar present. Where visitor pressure is low there is wide variation in nightjar densities, possibly reflecting other factors, such as habitat quality.

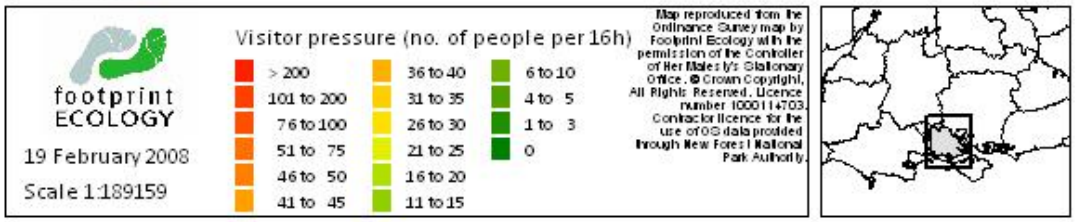
Figure 11 shows the area that nightjar territories, habitat and total area cover at different levels of predicted visitor pressure. It shows that the total area of land decreases as visitor pressures increase. There is greater area of the New Forest National Park where visitor numbers are predicted to be low than areas with predicted high visitor numbers (i.e. visitor distribution is very clumped, with a few areas with very high visitor numbers). It also shows that the curve indicating nightjar territories closely follows that of nightjar habitat. This suggests that as predicted visitor numbers increases there is little change in the proportional difference between nightjar habitat and territory indicating low impact of visitor pressure.

These result therefore indicate that while nightjar within the New Forest are not being significantly impacted by visitor pressure, there is some evidence that there is some avoidance of suitable habitat where estimated predicted visitor numbers are high.



**Map 13: Visitor pressure and the distribution of nightjar within the New Forest**

Changing patterns of visitor numbers within the New Forest National Park



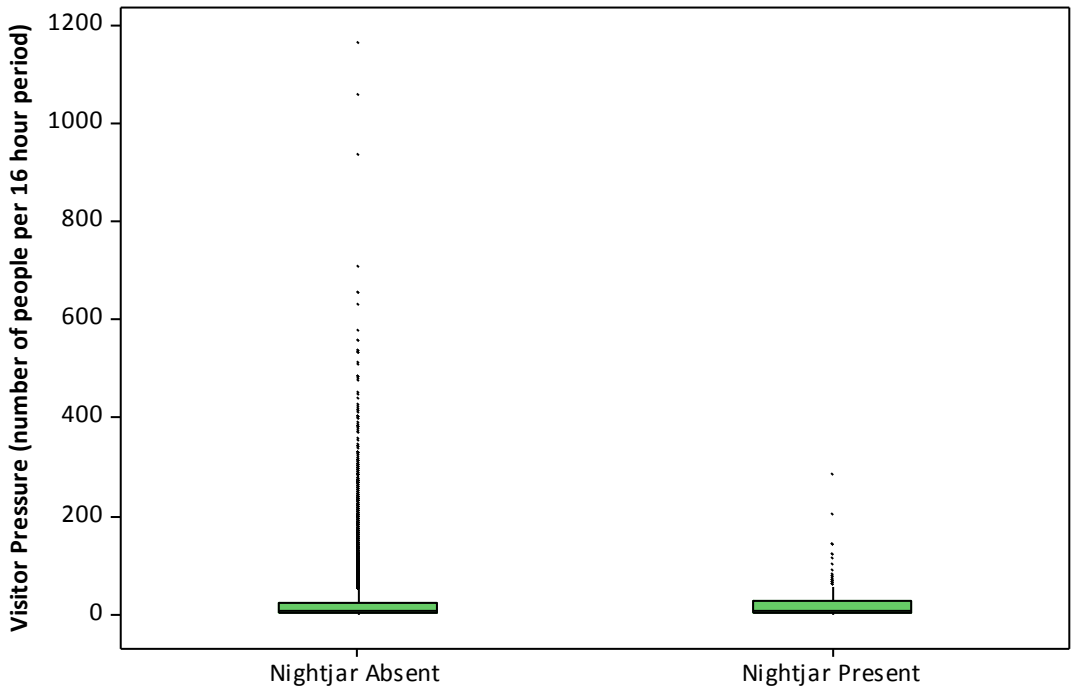



**Figure 9 Predicted numbers of visitors in cells of suitable habitat (GL8, HL1, W9, W10 & W12) where nightjar territories are absent compared to those where they are present.**

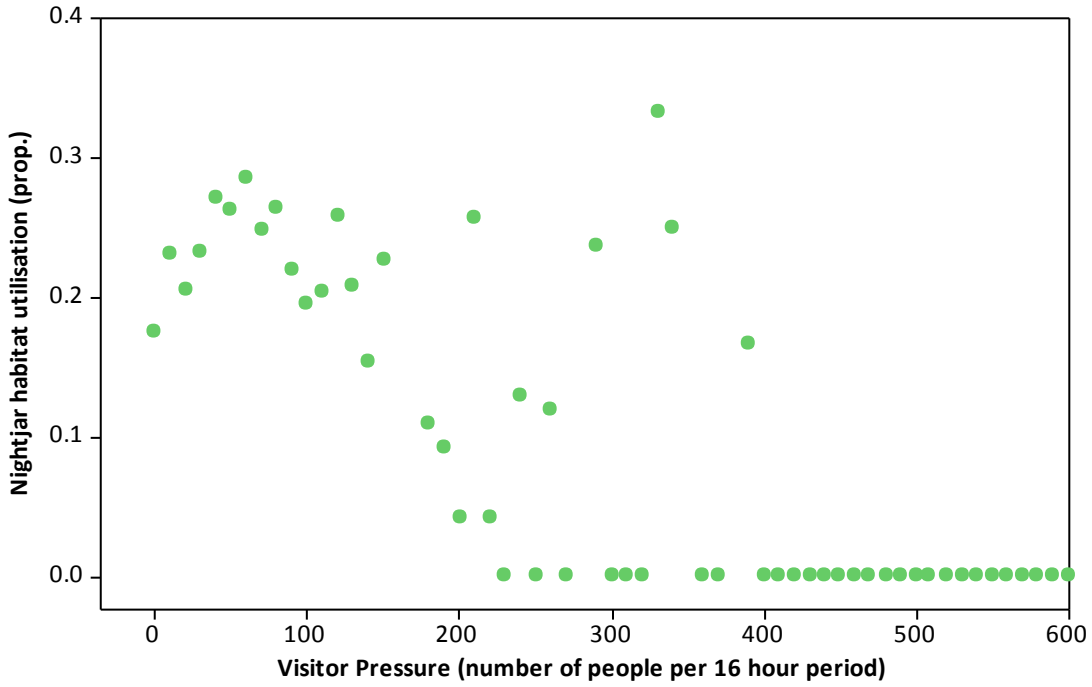



**Figure 10 Nightjar habitat utilisation, as a proportion of nightjar suitable habitat within nightjar territories, in relation to the predicted numbers of visitors. NB above visitor numbers of 600 people per 16 hour period, all values are zero.**

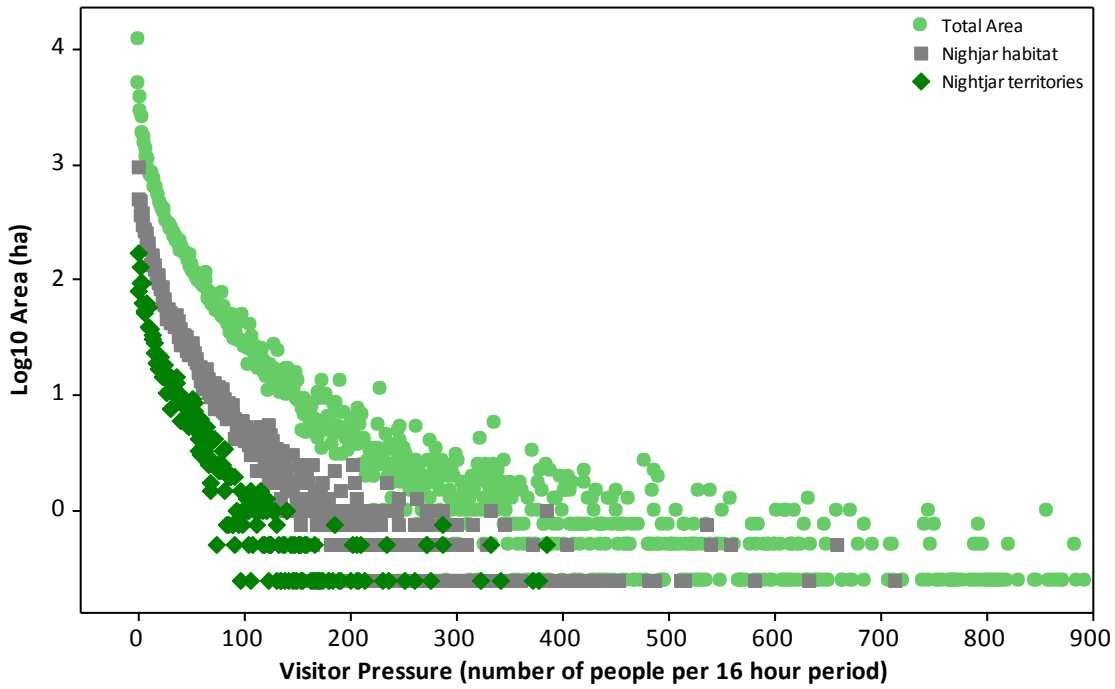



**Figure 11 $Log_{10}$ area (ha) of nightjar habitat, territories and total land area in relation to predicted numbers of visitors, (number of people per 16 hour period). NB above 900 there are no further nightjar habitat or territories and total land area is less than one hectare.**

### 4.3.2 Woodlark

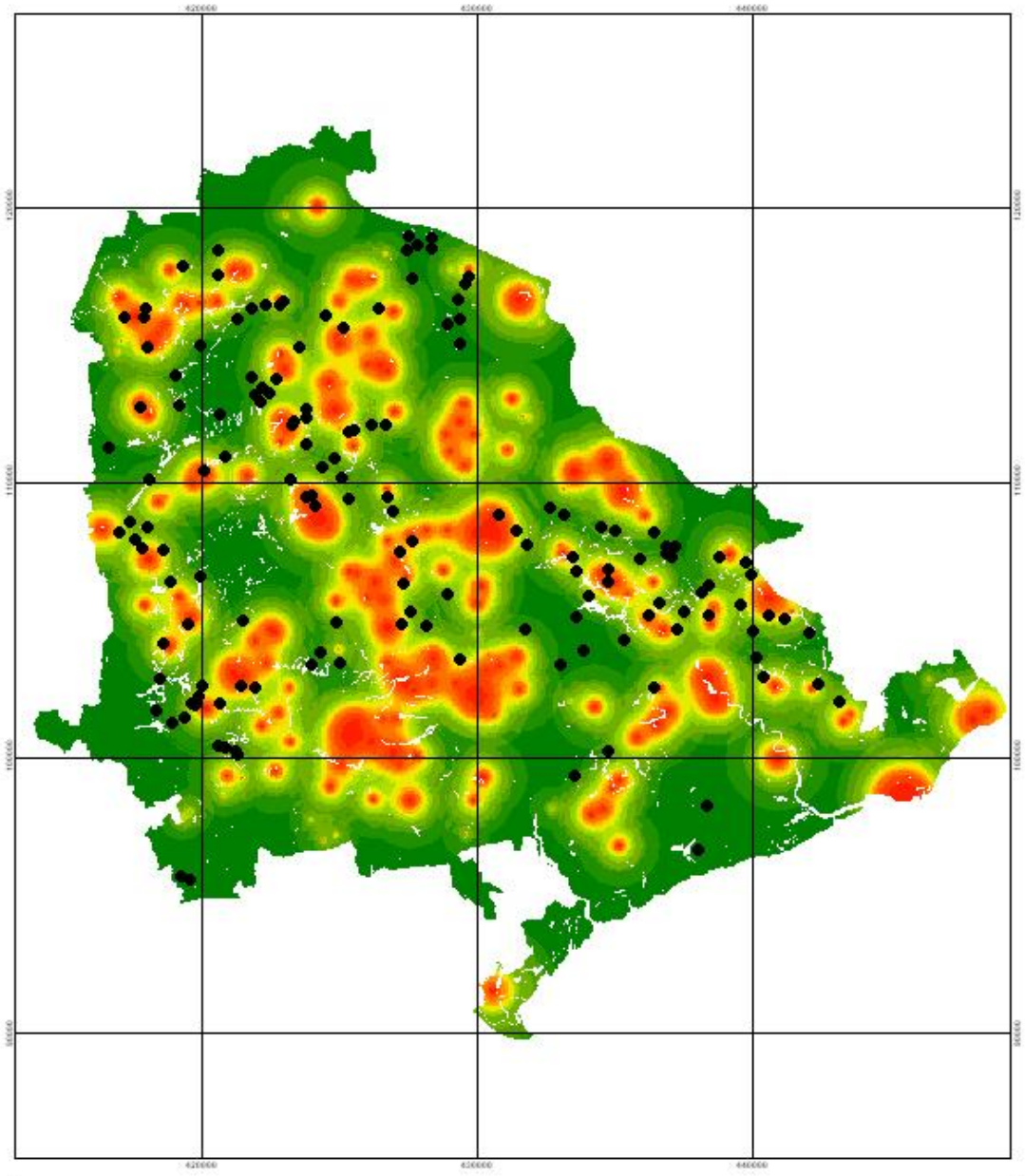
The spatial relationship between predicted visitor numbers and woodlark is shown in map 14.

When comparing predicted visitor numbers in woodlark suitable habitat there is no significant difference between pixels where woodlark territories are both present or absent (Figure 12, Mann-Whitney test, adjusted for ties, p = 0.8170). However, woodlarks tend not to nest where predicted visitor numbers are above 150 people per 16 hour period.

Figure 13 shows the utilisation of woodlark suitable habitat by woodlark over the range of predicted visitor numbers. It shows that below 200 visitors per 16 hour period there appears to be no effect on increasing predicted visitor numbers, and as with nightjars, woodlark densities vary widely. Above 200 visitors per 16 hour period there are no woodlarks using the suitable habitat.

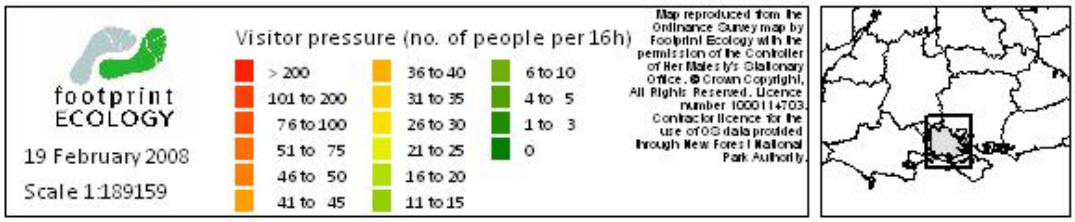
Figure 14 shows the area that woodlark territories, habitat and total area cover at different levels of predicted visitor numbers. It shows that the curve indicating territories does not closely follow that of woodlark habitat. This suggests that as visitor pressure increases there is an increase in the proportional difference between woodlark habitat and territory indicating an impact of visitor pressure. Proportionally less suitable habitat is used where our predictions of visitor numbers are higher.

These results indicate that visitor pressure is having an impact upon woodlark distribution and habitat utilisation, however this is not currently statistically significant.



**Map 14: Visitor pressure and the distribution of woodlark within the New Forest**

Changing patterns of visitor numbers within the New Forest National Park



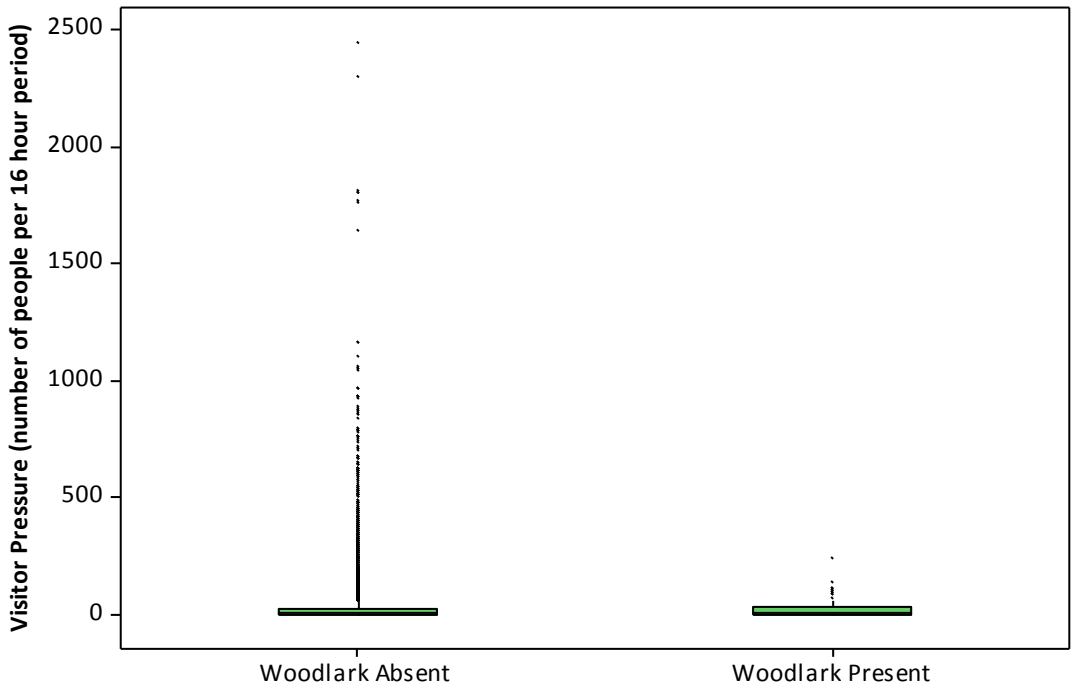



**Figure 12 Predicted numbers of visitors in cells of suitable habitat (GL11, HL1 & HL3) where woodlark territories are absent compared to those where they are present.**

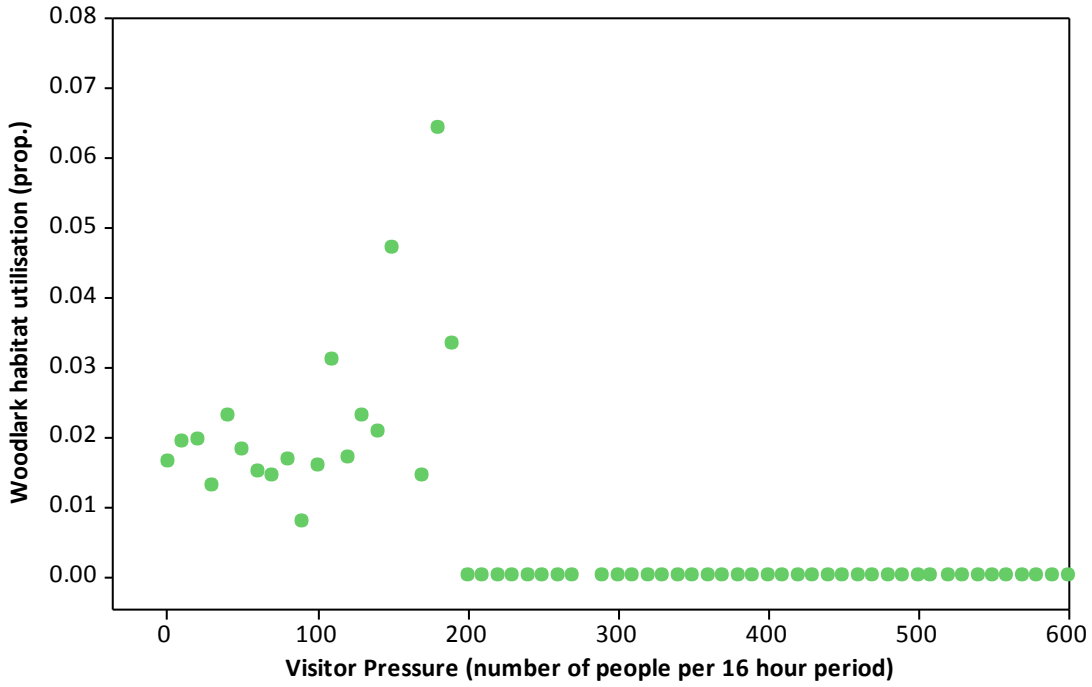



**Figure 13 Woodlark habitat utilisation, as a proportion of woodlark suitable habitat within nightjar territories, in relation to predicted numbers of visitors. NB above visitor numbers of 600 people per 16 hour period, all values are zero.**

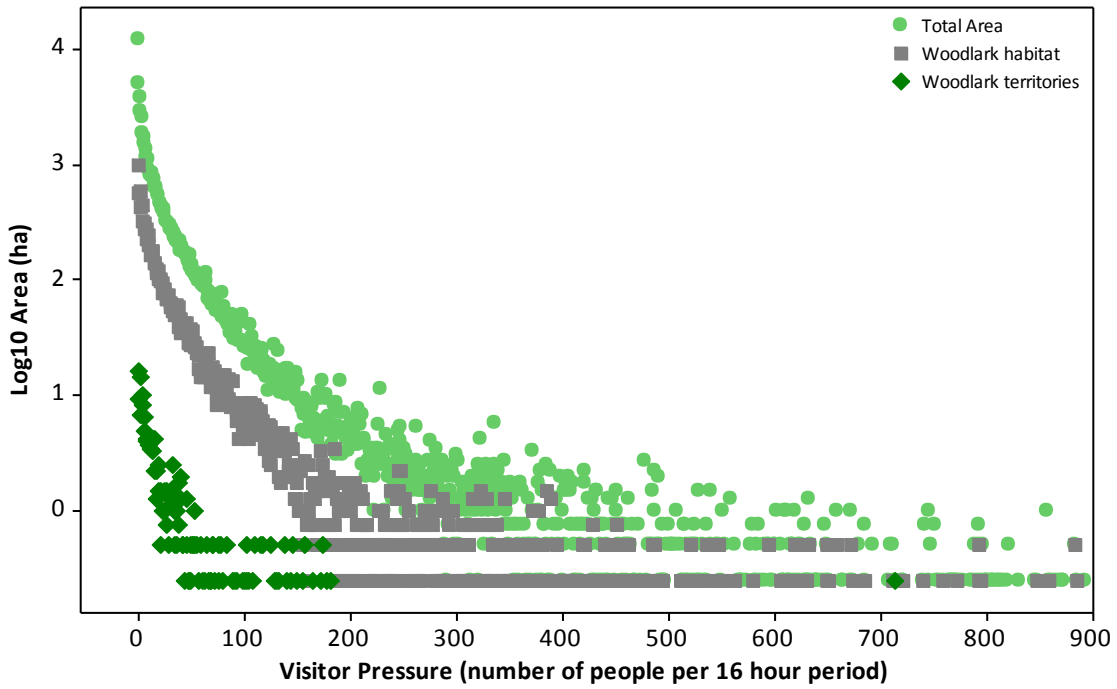


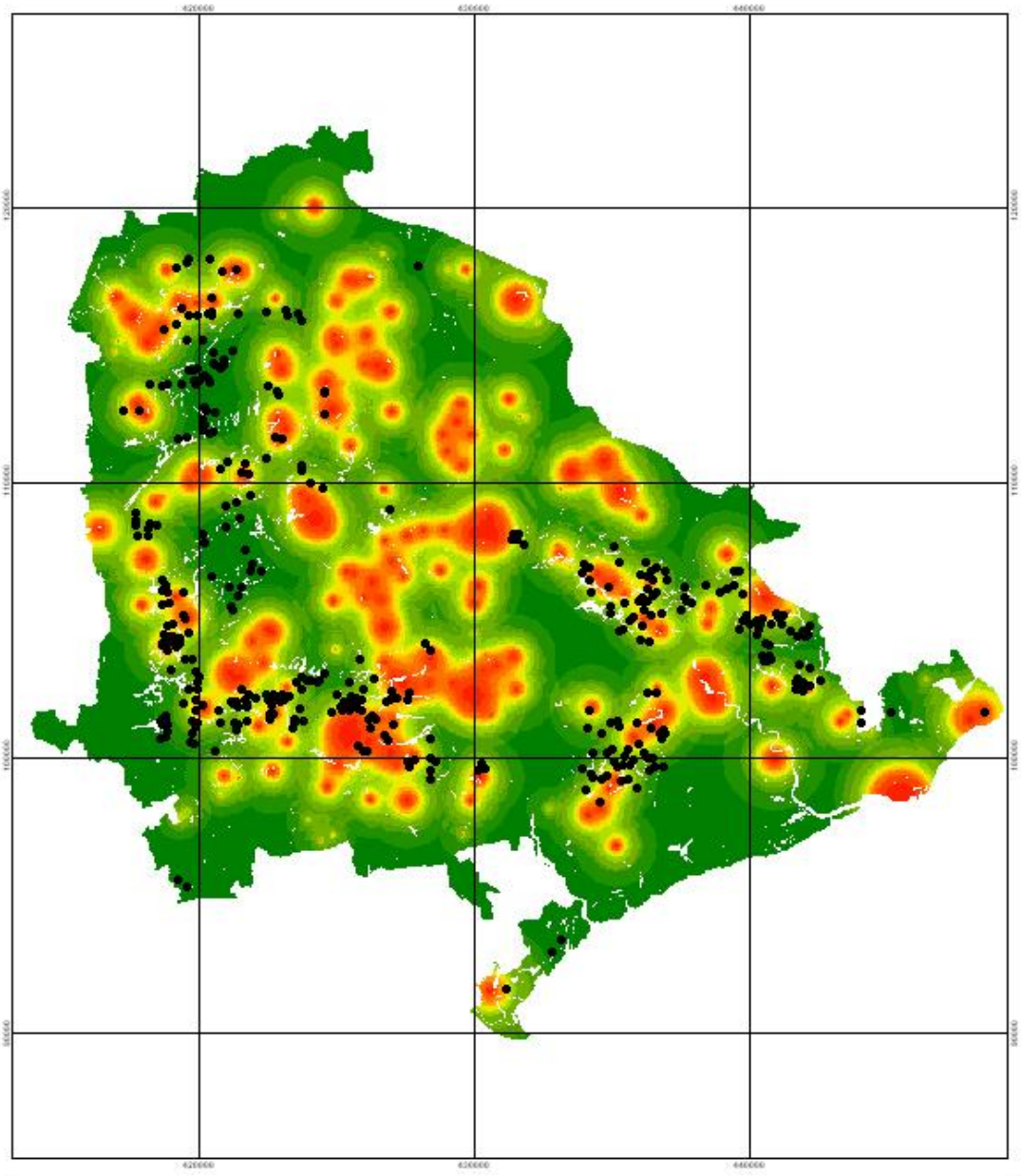

**Figure 14 $Log_{10}$ area (ha) of woodlark habitat, territories and total land area in relation to predicted numbers of visitors, (number of people per 16 hour period). NB above 900 there are no further woodlark habitat or territories and total land area is less than one hectare.**

### 4.3.3 Dartford warbler

Our predictions of visitor density, defined as the estimated number of visitors entering a 50m by 50m pixel within a 16 hour period, and the distribution of Dartford warbler territories are shown in Map 15. Dartford warblers appear to not completely avoid areas where the numbers of visitors is predicted to be high.

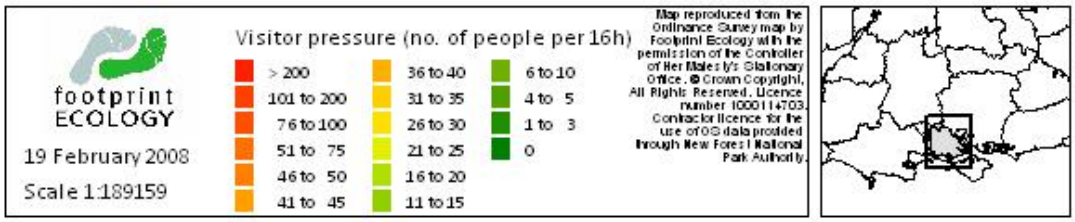
Figure 15 compares visitor pressure in Dartford warbler suitable habitat where their territories are present or absent. It shows that the predicted numbers of visitors is not significantly different when Dartford warbler are present or absent (Mann-Whitney test, adjusted for ties, p = 0.1179). However, Dartford warbler tend not to occur where the predicted visitor density exceeds 150 people per 16 hour period. This contrasts to work in Dorset that has shown no avoidance of highly disturbed areas (Liley & Clarke, 2002; Murison *et al.*, 2007).

Figure 16 shows the proportion of Dartford warbler suitable habitat that is within Dartford warbler territories in relation to predicted visitor density. This gives an indication of the extent to which suitable habitat within the New Forest is used by Dartford warbler. It shows that below 250 visitors per 16 hour period there appears to be no effect on increasing visitor pressure. Above 250 visitors per 16 hour period there are no Dartford warbler using suitable habitat.



**Map 15: Visitor pressure and the distribution of Dartford warbler within the New Forest**

Changing patterns of visitor numbers within the New Forest National Park



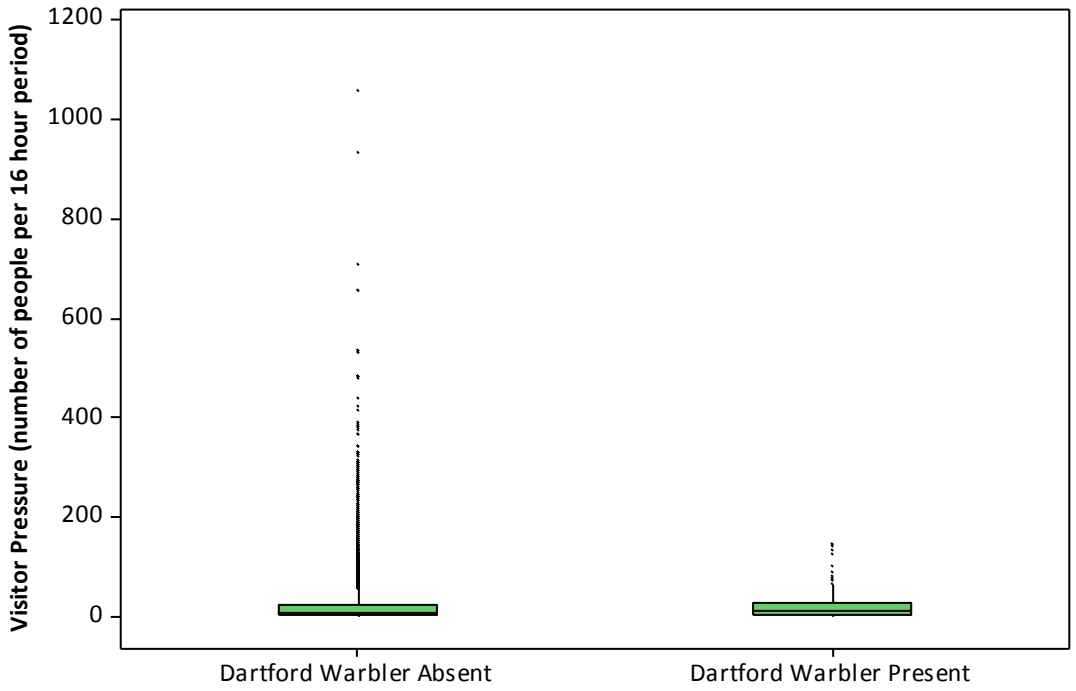



**Figure 15 Predicted numbers of visitors in cells of suitable habitat (HL1 & ST11) where Dartford warbler territories are absent compared to those where they are present.**

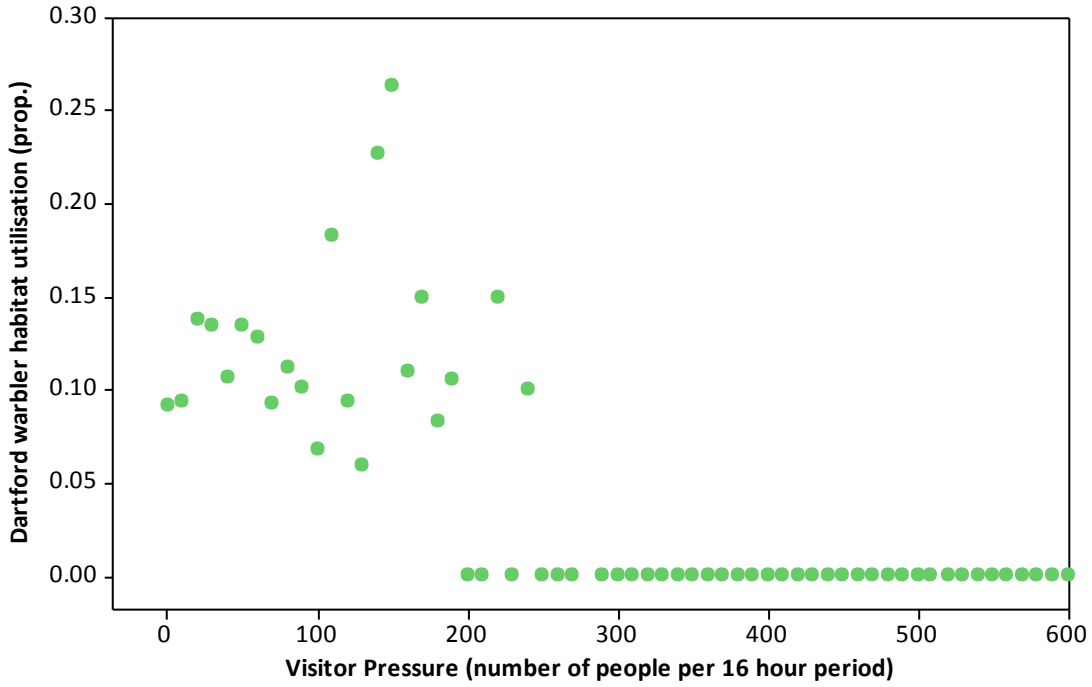



**Figure 16 Dartford warbler habitat utilisation, as a proportion of Dartford warbler suitable habitat within nightjar territories, in relation to predicted numbers of visitors. NB above visitor numbers of 600 people per 16 hour period, all values are zero.**

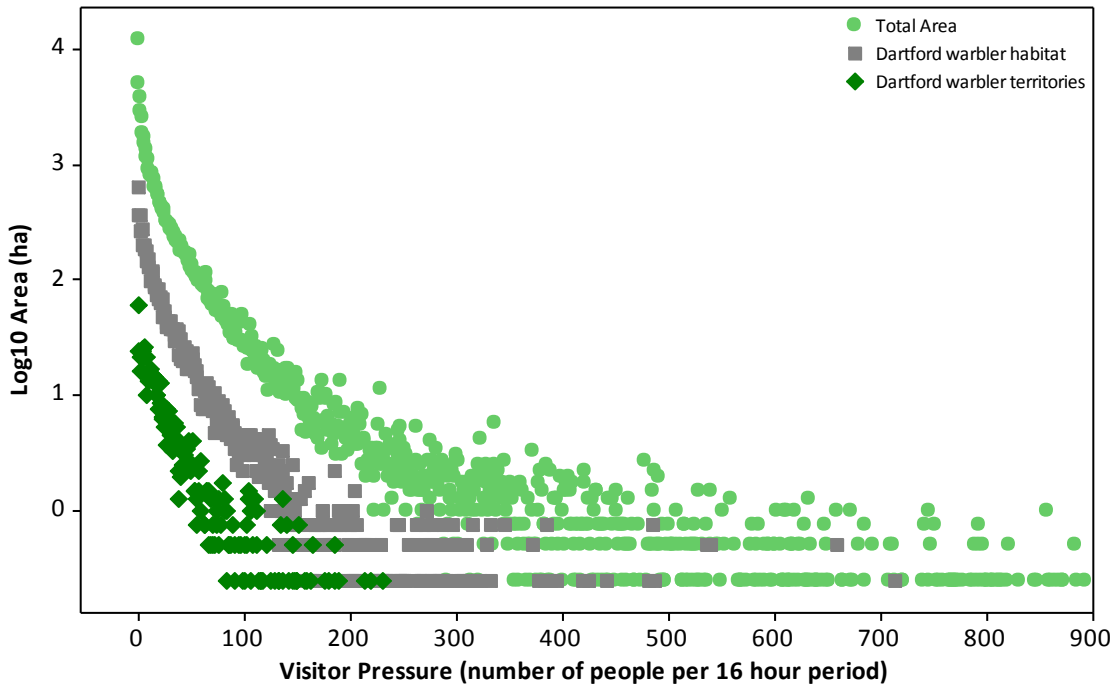



**Figure 17 $Log_{10}$ area (ha) of Dartford warbler habitat, territories and total land area in relation to predicted numbers of visitors, (number of people per 16 hour period). NB above 900 there are no further Dartford warbler habitat or territories and total land area is less than one hectare.**

Figure 17 shows the area that Dartford warbler territories, habitat and total area cover at different levels of predicted visitor density. It shows that the curve indicating Dartford warbler territories closely follows that of Dartford warbler habitat. This suggests that as visitor pressure increases there is little change in the proportional difference between Dartford warbler habitat and territory indicating a low impact of visitor pressure.

These result therefore indicate that Dartford warbler within the New Forest are not being significantly impacted by visitor pressure, but there is some evidence that suitable habitat is being avoided where estimated visitor pressure is very high Figure 15. There may therefore be concern if the number of people visiting the National Park in the future substantially increases.

# 5 Discussion

## *5.1 Overview*

This section provides a critical look at the approach taken within this report. We use the section to highlight particular issues or points not made elsewhere in the report.

## *5.2 Accuracy of Predictions on Visitor Numbers*

In order to derive the predictions of future visitor numbers, we have evenly distributed new development according to the spatial distribution of existing development and according to local authority boundaries and housing allocations within the draft regional plans.

In reality housing may be clumped in some particular locations. Furthermore, housing allocations may actually increase. Our approach therefore produces guideline estimates that indicate the scale of likely change. Effects such as climate change may well further influence visitor numbers in ways we cannot predict.

Although the number of dwellings is set to increase between the present and 2026, the New Forest District Core Strategy estimates that the actual population will fall from roughly 141,000 to 133,000 due to the ongoing reduction in household size [Core Strategy, paragraph 2.5 and Figure 3]. This has important implications for the modelling for future visitor numbers as we assume that the number of residents per dwelling will remain constant with time. We have adopted this approach because it is simple and because there is no evidence as to how occupancy rates will change in the long term; they may of course not continue to fall. Occupancy rates may also vary spatially. For example, in his report on the Thames Basin Heaths SPA to the panel for the draft south east plan examination in public, Burley (2007) highlights how some local authorities within the south-east have occupancy rates that are higher than average, with examples given of authorities where the rate exceeds an average of 2.5 people per household. While household size does appear to be declining as a whole across the south-east, there are some areas where occupancy rates remain particularly high. Given such spatial and temporal variation, and also the difficulty in making long term predictions of occupancy, we simply assume current occupancy rates, an approach used in other studies used to underpin planning policy in relation to European Sites (Liley *et al.*, 2006b). The predictions of visitor numbers are estimates and it is important to recognise the context and how they have been calculated.

The situation is also more complex than it would seem, however. It would be incorrect to deduce that the decline in population will be reflected by a proportionate decrease in local day-visitor numbers. The population profile is likely to age considerably by 2026 - with 33% of the population aged 65 or over, compared with 25% now. This is important given that this age group accounted for 25% of local day-visitors interviewed by PROGRESS. It is not impossible that a 6% population decline will be offset, in terms of National Park visitor numbers, by the 8% increase in local residents aged 65 or over.

## *5.3 Accuracy of visitor model*

We have produced a map that estimates the spatial distribution of people within the National Park. This allows us to examine the spatial distribution of people and birds. In order to construct the maps we have assumed that people move away from car-parks to the same extent as the Dorset and Thames Basin Heaths (following Liley *et al.*, 2006a; Liley *et al.*, 2006b). There is likely to be some error here as people in the New Forest clearly use the New Forest in a different way and visit for different reasons. People visit the New Forest for longer and are likely to penetrate further from car-parks. The model spreads people evenly in all directions. In reality particular tracks and routes will funnel people in particular directions. We also assume people will distribute evenly across different habitats, this is of course also unlikely to always be the case.

With more detailed data on penetration distances, extracted from actual route data from the New Forest, it would be possible to generate separate maps for different user groups (such as dog walkers). Refined models could factor in routes and different habitats.

## *5.4 Accuracy of the bird data*

We use the national survey data for nightjar, woodlark and Dartford warbler. These impressive datasets are aimed at determining the UK population of these key species and use a standard methodology and recording protocol. Data are checked centrally and standard criteria used (such as minimum distances between different territories) to check for over-recording. It should therefore be appropriate to make comparisons between different parts of the UK, and other authors have done so (Bright *et al.*, 2007; Conway *et al.*, 2007; Wotton *et al.*, 2000).

The New Forest is however unique, and the sheer size of the potential survey area does pose particular problems not encountered on other sites. The year in which the woodlark and Dartford warbler surveys were conducted (2006) was particularly wet during the early spring. It is perhaps not inconceivable that such weather may have suppressed territorial behaviour, making recording more challenging. On small, fragmented sites, it is perhaps more likely that surveyors will pick up birds that are not necessarily in full song. The difference in density between the New Forest and other areas is very marked, and under recording is unlikely to fully account for such differences. There is clearly scope for more detailed work.

## *5.5 Focus on key bird species*

We have focused on just three species, nightjar, woodlark and Dartford warbler. These species were selected because there are good datasets on their distribution, there are known impacts from recreational disturbance (they therefore would seem a good choice of indicator species) and they are also primary interest features of the SPA that dominates the National Park.

There are a variety of different bird species that would also warrant further work. We highlight the following:

- Waders associated with valley mires (Goater, Houghton & Temple, 2004)
- Breeding waders such as ringed plovers on the Solent shoreline
- Winter waterfowl within the Solent

There are likely to be some non-avian interest features and key sites that would also warrant detailed assessment, for example:

- Road verges (likely to be damaged by drivers straying off the road and informal parking),
- Ponds close to car-parks
- Mires close to areas with high visitor pressure.

## *5.6 Coastal sites*

As section 6.3 highlights, in addressing current impacts we have very much focused on the designated interest features of the heathland SPA. This SPA covers a large proportion of the National Park and represents some of the iconic landscapes and habitats with the National Park. The Solent shoreline is also internationally important and the SPA is designated for both breeding and wintering birds.

There is much information on the impacts of access to coastal and estuarine habitats. Coastal habitats often represent a linear strip of habitat that can attract high numbers of people, particularly in high summer (Liley *et al.*, 2007; Tratalos *et al.*, 2005). There are a wide range of different activities that take place and that may have impacts. Coastal areas can be popular with walkers and dog walkers (e.g. Liley, 1999), while other activities such as bait digging (Dyrynda & Lewis, 1994; Jackson & James, 1979; Morrisson, 2006), and boating activities (Bright *et al.*, 2003; Bright, Waas & Innes, 2004; Burger, 1998, , 2003; Mikola *et al.*, 1994) are particular to the habitat and have their own particular issues associated with them.

In our maps showing the predicted spatial distribution of visitors within the National Park we have included the coastal areas. The distance walked by people in these locations is likely to be different to the terrestrial habitats, and therefore the distribution of people that we predict may be less reliable in the coastal strip. However the maps do serve to highlight particular locations with higher visitor pressure. There is a need to consider the impacts of access to these locations in more detail and relate levels of access to the coast to housing levels. Such a piece of work would need to consider the full spectrum of activities taking place in the area, such as boat traffic.

## *5.7 The unique nature of the New Forest SPA*

Our approach in this report is to collate information (on visitors and birds) for the New Forest SPA and compare these to the New Forest and Dorset. In Dorset and the Thames Basin Heaths concern over access levels and the impacts of new housing have led to strategic solutions to access management, green space provision and habitat management. The New Forest is unique in many ways. The SPA is not in the form of a series of discrete patches, isolated and often surrounded by development. The total area of heathland habitats is on a totally different scale. Management practices, such as burning and grazing occur, can occur at a scale to match. The New Forest has a continuous history of grazing, the lack of which some authors believe has accounted for the local extinction of some plant species in other areas (Byfield & Pearman, 1994).

Our predictions of the spatial distribution of visitor numbers show visitors spreading out from various different locations – car-parks, campsites etc. Similar maps for the Dorset and Thames Basin Heaths tend to show a pattern dictated by the shape of the sites and their small size, with concentric rings around the edge of the sites showing that predicted visitor densities decline towards the centre of sites. On the really small sites, visitors tend to walk around the entire site and therefore the entire area has a uniform density.

It is clear that bird densities in the New Forest are comparatively low. It is crucial to understand why this might be, and further research is required here. It is possible that the lower densities are to do with the unique nature of the New Forest. Other studies have found that nightjar densities tend to decline on larger sites (Bright *et al.*, 2007; Liley *et al.*, 2003), however it is not clear why. The distribution of nightjar territories is typically related to forest edge habitats and the edges of sites (Lake, 2004), and tall, dense vegetation (such as deep mature heather) is typically used for nesting (Cresswell, 1996). It may be therefore be that high densities are associated with particular aspects of habitat structure that is less frequent within the New Forest. For woodlarks the levels of grazing may impact habitat suitability. The combination of burning and grazing can reduce the suitability of habitats for Dartford warblers, essentially inhibiting gorse regeneration (Bibby, 1979).

In order to ensure that there are no adverse effects to the European Interest features, any series of measures clearly need to be carefully tailored to suit the New Forest. It is clear that the package of measures used in Dorset or the Thames Basin Heaths cannot simply be transferred to the New Forest National Park.

# 6 Recommendations

In the Habitat Regulations Assessment for New Forest District's Core Strategy (New Forest District Council, 2007) all bar seven policies (CS2-7, 16) are thought to have no (negative) effect. For policies CS 2-7, they consider that there is "some potential for limited increases in recreational pressures, and in traffic leading to some potential increases in air pollution". For CS16, they consider that there is "limited potential for very minor increases in recreational pressures and water pollution for sewage disposal". To mitigate these potential negative effects, New Forest District Council's report authors make four recommendations, the adoption of which they believe will offset adverse impacts [Table 3.2]:

- Formulation and delivery of Green Infrastructure Strategy to provide alterative recreational opportunities;
- Provision for adequate open spaces in design of new development;
- Measures to support appropriate management of designated sites to ensure resilience and enhance integrity; and
- Mitigate transport-derived pollution through delivery of transport strategies and measures to ensure modal shift to alternative means.

The Habitats Regulations Assessment also notes that the NFDC Core Strategy should not be considered in a vacuum, but in conjunction with likely impacts from the draft South West Plan, South East Plan and Hampshire Minerals Plan. They envisage that substantial growth in South Hampshire and South East Dorset is likely to entail recreational pressures on the New Forest and air pollution relating to traffic growth. They thus recommend that mitigation measures need to look outside the NFDC area, and that the NFDC needs to work with partners to deliver these. This report considers the cumulative impacts of visitor numbers and recreational pressure. New housing is predicted to result in an increase in visitor numbers and there is some evidence of existing impacts of access. It would therefore seem necessary that a package of mitigation measures is implemented to ensure no adverse effects.

The nature of the New Forest means that the package of measures will need to be unique and tailored to the National Park. The large area of land, coupled with an existing expertise in access management, and an infrastructure already geared to cope with large numbers of visitors means there is already a strong starting point. The particular issues to focus on will be the need to cope potentially with an increase in visitors that already know the Park and are making visits from relatively close proximity, rather than tourists staying within the National Park.

Given the lack of understanding for the causes of the relatively low bird densities, we do urge caution with respect to the impacts of visitor numbers on the Annex I bird species. Further research on these species is necessary. Monitoring of visitor levels and key bird species is required in the future.

## *6.1 A Monitoring Strategy*

At present, strategic direction to management of the National Park remains that presented in the *Strategy for the New Forest*[1]. A key chapter with relevance to this study is *5.2 Managing Recreation*. It identifies the need for a strategy for recreation across the whole forest, clarifying pressures on particular sites and taking into account recreation potential offered by other areas inside and outside the Park. The Strategy recommends improved co-ordination of the various organisations that manage recreation within the Forest. It identifies potential measures to encourage walking and cycling. Monitoring it is important to record the success of such measures, providing confidence that any future increases in visitor pressure can be recorded and mitigation successfully implemented.

A focused monitoring strategy would set the context for monitoring future visitor impacts, visitor levels and the success of any access management / green space provision. The need for the strategy lies in the need to dovetail visitor data and biological information and consider these with respect to planning and policy issues. The strategy would consider established / on-going monitoring, existing data sets (and the potential to repeat certain aspects) and would bring together the necessary expertise, ensuring that there will be the potential to look at the different strands of information (such as data on people and birds). Such a strategy has been produced for the Dorset Heaths (Liley, 2007). Elements necessary within such a strategy are highlighted in box 2.

Reliable monitoring will also provide confidence for the National Park Authority and others to be able to respond appropriately should conditions change. Climate change may result in changes in visitor patterns, with possibly more people visiting in spring, autumn and winter if milder weather prevails at these times. Concern over the carbon implications of flights may cause more people to wish to holiday in the UK, and the New Forest may well therefore become more popular with tourists. It is hard to quantify such changes at the present time.

**Box 2: Elements of Future Monitoring**

1) Detailed **field-based work** is necessary to understand the low densities of **nightjar, woodlark and Dartford warbler**. We suggest a series of sample areas, with varying levels of recreational activity and different management, are monitored annually. Within these sample areas, detailed habitat recording and recording of management work should be conducted. Visitor counts should also be conducted. Bird territories should be carefully mapped over a series of visits. In some areas it would be ideal to conduct nest monitoring and record productivity. It may be necessary to conduct similar work within other areas for comparison.

2) Other **key species** and **sites** should be monitored regularly, where there are concerns about visitor impacts / recreational pressure. Key species would include waders. Sites would be those where ponds (such as the Eyeworth Pond in Unit 54 of New Forest SSSI) or other sensitive features are adjacent to car-parks or other areas with high visitor pressure, or locations that are particularly important for very rare species. Monitoring of such sites could be along the lines of SSSI condition assessment / favourable condition monitoring, but repeated more frequently and targeted to the areas of concern, rather than entire units.

[1] http://www.newforestnpa.gov.uk/new_forest_strategy

3) **Visitor levels** should be **monitored** annually, to determine the extent to which visitor numbers do increase in the future. Such monitoring could be achieved in a variety of ways, such as through car-park counts, automated counters, actual counts / observation or through questionnaires, conducted either by face-to-face interviews or sent through the post. Monitoring should include the coast, and ensure that the wide range of coastal activities – boating, fishing, swimming, walking etc are included.

4) There is little **evidence** to demonstrate the **success of access management measures**, and there is a clear need to be confident of the success of such measures before, rather than after, new housing is built. Any management measures such as car-park closure, limiting of car-park spaces, promotion of sites, new routes, new green space should be carefully documented and visitor monitoring conducted before and after.

## *6.2 Refinement of visitor models*

The maps of current visitor pressure produced for this report are based on some fairly basic assumptions, and are intended to help explore bird densities in relation to visitor numbers. Such maps could provide a useful tool to strategic management of visitors, highlighting pinch points and guiding where problems may occur. They also provide the means to relate ecological information, such as bird numbers and distribution, to visitor pressure. Maps provide an easy and intuitive way to display complex information and are a good way of portraying particular issues to a wider audience.

The maps would warrant further refinement, accounting for the spatial distribution of paths and points of interest that may attract people. Incorporating actual route data from the New Forest would also be important (see discussion).

There would be merit in exploring the spatial distribution of other species (besides the three Annex 1 bird species that are the focus of section 4 of this report) to predicted visitor pressure. Breeding waders certainly merit further focus, as studies of ground nesting waders have shown clear effects of disturbance on population size (e.g. Liley *et al.*, 2007). The waders are, however, not designated interest features of the SPA.

## *6.3 Visitor Management*

### 6.3.1 Car-parking

The high proportion of visitors arriving by private motor vehicle (78-85%, according to PROGRESS) offers opportunities as well as threats. Closing car-parks will often result in public opposition and conflict, but more subtle measures, such as promoting particular features / car-parks / locations to particular people may influence the numbers of visitors using car-parks where they then go within the National Park. Car-park closures have already been trialled within the New Forest.

Given the high proportion of visitors that arrive by car, there is a mechanism for controlling visitor numbers at particular locations. Using maps of visitor pressure (see 5.2) it is possible to relate visitor numbers and biological data such as species distributions, and it should then be possible to redistribute people where problems might be likely.

The PROGRESS report revealed that staying visitors/tourists used information sources to plan their visit far more than other visitors: 56% compared to 12% of locals and 27% of other day visitors. Of those staying visitors that used information, a majority used maps of various descriptions (notably Ordnance Survey maps) and small proportions used road signs (9%) and tourist leaflets or books (7-11%). In theory then, altering publicity material (in particular) and sign-posting to raise the profile of sites that can safely cope with large numbers of visitors, and decreasing the prominence of more vulnerable sites, could be a way to divert tourist visitor pressure towards more suitable sites. Such measures are likely to be less successful in diverting day-visitors and regular visitors who are likely to avoid the 'honey pot sites'.

### 6.3.2 Access Management Measures

Management measures aimed at reducing the impacts of any increase in visitor numbers will need to be particularly aimed at people who visit from within a 20km radius. Such people are likely to have some knowledge of the National Park, they may visit regularly, and may well avoid the tourist / honey-pot sites. They may visit outside the peak season. Access points that provide convenient parking away from tourist locations are likely to be utilised, and therefore control of parking on road verges etc may be effective in ensuring car-parks are used. Interpretation and path works may help in directing visitor flows in particular directions.

Promotion of sites and areas will need to be aimed not at tourists and will require a focus away from the tourist honeypots. Promotion of sites or issues (such as dogs on leads) may well be effective through local media sources and through word of mouth. Face-to-face contact with site managers and wardens may be effective.

### 6.3.3 Alternative Green Space Sites

The provision of alternative green space is a measure being promoted in some other areas of the UK as a means of reducing visitor pressure on sites of nature conservation importance. We are not aware of any long term visitor monitoring of such sites to test the extent to which they can serve to attract people away from other sites. The likely success of any new provision, or modification to existing sites, will lie very much in the location and experience offered by the site. People interviewed as part of the Portsmouth 'Recreation Site Survey' were asked where they might have gone had they not visited their chosen site that day. Over one third (38%) suggested that they would simply have gone elsewhere in the New Forest, 12% would have gone to the coast, while 19% would have stayed at home. Neither country parks nor tourist attractions featured as significant alternatives. The report authors suggest that this "provides fairly conclusive evidence that there is no substitute for the New Forest". In order to compete with the New Forest, or attract people that would otherwise visit the National Park, any space must be very carefully considered.

Intuitively, it should be less difficult to provide alternative destinations for visitors from outside the National Park (i.e. those living outside the New Forest National Park and its environs), and in particular those that visit for the day or for less – i.e. not tourists who stay within the park. This would require the NFDC to work with neighbouring authorities to identify and establish suitable sites. The aim would be to attract day-visitors or those that visit for even shorter periods – such as dog walkers.

From the analysis presented in this report it is clear that development close to the park will have the greatest impacts on visitor pressure, with a high proportion of the increase being generated by development within 7km of the National Park boundary, and relatively little impact beyond 20km (Figure 3). In particular it is development to the west within Bournemouth, Poole, Boscombe, Winton, Kinson, Ferndown, Wimbourne or Verwood, to the north in Romsey, or to the east in Totton, Hythe, Southampton, Rownhams, Eastleigh or Hedge End that may give greatest cause for concern. Alternative sites would therefore need to be between these areas and the National Park. There is clear cross-over here with on-going work in Dorset to provide green space sites to reduce pressure on the Dorset Heaths.

In order to identify potential sites it will be necessary to audit potential locations and search suitable areas. In particular it may be worth focusing search effort on parts of the National Park that currently have no public access.

In order to attract dog-walkers, safe off-road parking and a range of routes and features will be necessary (for further details see Liley *et al.*, 2006d). Perhaps crucially, locations where the perceived enjoyment of the dog is maximised, with elements such as other dog walkers (but not lots of non-dog walkers) likely to be particularly successful (Edwards & Knight, 2006). Measures aimed at proactively attracting dog walkers should also be combined with measures (such as keeping dogs on leads and clearing up mess) which push dog walkers off the sites of importance for nature conservation.

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