

Biodiversity in the New Forest



Edited by Adrian C. Newton



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Dorset,
United Kingdom



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

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Back cover: Wood Crates (Adrian Newton)

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

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1 Birds

Introduction

It is widely recognised that the New Forest supports a rich bird fauna with a wide variety of species, at least 36 of which are considered to be particularly notable in conservation terms (Table 1). The international importance of the New Forest as a habitat for birds was recognised by the designation of the Crown lands and surrounding common land as a Special Protection Area (SPA) in 1993, in accordance with the EC Directive on the Conservation of Wild Birds 1979, and as a Wetland of International Importance under the Ramsar Convention (Tubbs 2001). The SPA designation reflects the occurrence of breeding populations of species considered threatened at the European scale, including honey buzzard, nightjar, kingfisher, woodlark, Dartford warbler and wintering hen harrier, and requires that the Forest be managed in ways that maintain and enhance its ornithological importance (Tubbs 2001).

Within the New Forest, important bird communities are associated with woodland and heathland vegetation, and wetland habitats such as valley mires and wet heath (Table 1). The abundance of large, old trees in wood pasture provides extensive habitat for species associated with crevices and rot holes, including woodpeckers (great spotted, lesser spotted and green), tree creeper, nuthatch, tits (blue, coal and marsh), spotted flycatcher, tawny owl and redstart (Wright and Westerhoff 2001). Species associated with the woodland understorey include woodcock, willow warbler and wood warbler. In situations where the shrub layer is sufficiently well developed, large numbers of relatively common species occur, including chaffinch, wren, robin, blackbird, song thrush, bullfinch, dunnoek, chiffchaff, blackcap, garden warbler, greenfinch, goldfinch and linnet (Wright and Westerhoff 2001).

Tubbs (2001) noted that the bird communities of broadleaved plantations have been relatively little studied, but available evidence suggests that the species composition of the avifauna is similar to that of the pasture woods, although the number of bird territories is significantly smaller. The establishment of conifer plantations since the early 19th century has encouraged the development of a bird community with boreal affinities, including crossbill, siskin, redpoll, coal tit and goldcrest, as well as firecrest. Conifers are also important in providing nesting sites for birds of prey (Tubbs 2001). Raptors breeding in woodland include buzzard, honey buzzard, kestrel, sparrowhawk, and occasionally goshawk (see Section B, below). According to Tubbs (2001), raptor population densities appear to be limited by the relative scarcity of prey items such as small mammals and heathland birds.

Heathland habitats support species for which the New Forest is designated as an SPA, namely Dartford warbler, nightjar and woodlark. However, the abundance and diversity of birds associated with heathland is

relatively low, partly as a result of the relatively uniform vegetation structure and the lack of a year-round food supply (Wright and Westerhoff 2001). Those species that overwinter on heathland (such as wren, stonechat, meadow pipit and Dartford warbler) are highly dependent upon gorse to provide an invertebrate food supply. Skylark are common and wheatear breed very occasionally on grassland sites, whereas other passerines (such as linnet, willow warbler, chiffchaff, dunnoek, robin, blackbird and green woodpecker) tend to be more reliant on woodland edge/ scrub habitats than directly upon heathland (Wright and Westerhoff 2001). It should be noted that yellowhammer, grasshopper warbler, whitethroat and whinchat have all but been lost as breeding heathland species in the last 15 years and that redpoll is now a very scarce breeding bird. Raptors associated with heathland include hen harrier and merlin, which overwinter, and hobby and Montagu's harrier, which are summer visitors (see Section B below).

Wetland sites (mires, bogs, pools, wet heathland and wet grassland) provide valuable habitat for inland breeding waders, including redshank, snipe, curlew and lapwing, breeding mallard and teal, and occasionally shelduck (Wright and Westerhoff 2001). Kingfisher and grey wagtail are associated with the rivers and larger streams. Tubbs (2001) notes that there were 7–10 breeding pairs of kingfisher within the Forest in the 1980s and 1990s, with 48–65 pairs of grey wagtail recorded in the early 1980s.

At least three bird species are known to have been lost from the New Forest during the past century. The red-backed shrike had a population of around 100 pairs in the New Forest in the late 1950s, but was last known to have bred in the Forest in 1978 (Tubbs 2001). The wryneck, which is now nearly extinct as a breeding species in Britain, was known from New Forest woods in the early 20th century, but is thought to have been extirpated by 1940 (Tubbs 2001). Black grouse is believed to have been absent from the New Forest since the 1930s (Table 1). The factors responsible for the loss of these species are not known with precision; red-backed shrike and wryneck are members of a group of insectivorous migratory birds that have declined throughout north-west Europe during the 20th century. Both are now nearly extinct as breeding species in the UK. Habitat loss and possibly also climate change (e.g. cooler, wetter springs) reducing insect prey are thought to have been influential in their decline (Tubbs 2001, Wright and Westerhoff 2001).

This chapter provides an overview of recent monitoring activities, which provide insights into the current status and trends of bird species in the New Forest, focusing on those species of particular conservation importance. The chapter is divided into two sections: the first (Section A) focuses on a range of species that are currently the focus of monitoring efforts, and the second (Section B) focuses explicitly on raptors.

Table 1

Selected bird species of conservation concern (BoCC; Gregory *et al.* 2002), known from the New Forest, and their current status in the New Forest. Updated from Wright and Westerhoff (2001) by Page and Westerhoff (2010). Status follows Eaton *et al.* (2009).

Species	Habitat	Distribution / breeding status	Protection status
Shelduck <i>Tadorna tadorna</i>	Valley mires / permanent ponds	Uncommon, occasional breeder	BoCC Amber List
Teal <i>Anas crecca</i>	Valley mires / permanent ponds	Uncommon, occasional breeder	BoCC Amber List
Montagu's harrier <i>Circus pygargus</i>	Dry heath (breeding)	Rare, occasional breeder	W&C Act Schedule 1, BoCC Amber List
Hen harrier <i>Circus cyaneus</i>	Dry heath (roost), feeds over heathland, farmland	15 wintering birds in 1980s, latterly reduced. Scarce, currently up to 8 individuals	W&C Act Schedule 1, BoCC Red List
Honey buzzard <i>Pernis apivorus</i>	Woodland	Rare, 2–5 breeding pairs, 12.5% of UK population	W&C Act Schedule 1, BoCC Amber List
Kestrel <i>Falco tinnunculus</i>	Woodland edge / heathland	Moderately common, regular breeder	BoCC Amber List
Merlin <i>Falco columbarius</i>	Heathland	Scarce, overwinters	W&C Schedule 1, BoCC Amber List
Black grouse <i>Tetrao tetrix</i>	Heathland	Extinct in the Forest since 1930s	BoCC Red List
Ringed plover <i>Charadrius hiaticula</i>	Dry grassland / bare stony ground	Uncommon, scarce breeder	BoCC Amber List
Lapwing <i>Vanellus vanellus</i>	Valley mires/ wet grassland / permanent and temporary ponds	Common, regular breeder	BoCC Red List
Curlew <i>Numenius arquata</i>	Valley mires / wet grassland / permanent and temporary ponds	Moderately common, regular breeder	BoCC Amber List
Redshank <i>Tringa totanus</i>	Valley mires / wet grassland / permanent and temporary ponds	Uncommon, scarce breeder	BoCC Amber List
Snipe <i>Gallinago gallinago</i>	Valley mires / wet grassland / permanent and temporary ponds	Moderately common, regular breeder	BoCC Amber List
Nightjar <i>Caprimulgus europaeus</i>	Heathland mosaic	647 churring males, 15.7% of UK population	BoCC Red List
Kingfisher <i>Alcedo atthis</i>	Rivers and streams	Uncommon, up to 10 pairs	BoCC Amber List
Wryneck <i>Jynx torquilla</i>	Woodland	Extinct, last seen in the 1940s	W&C Act Schedule 1, BoCC Red List
Green woodpecker <i>Picus viridis</i>	Woodland / grassland mosaic	Common, regular breeder	BoCC Amber List
Dunnock <i>Prunella modularis</i>	Woodland edge / scrub	Common, regular breeder	BoCC Amber List
Skylark <i>Alauda arvensis</i>	Heathland / grassland	Moderately common, regular breeder	BoCC Red List
Woodlark <i>Lullula arborea</i>	Dry heath / dry grassland	Moderately common, 163 pairs in 2006, 9.3% of UK population	W&C Schedule 1, BoCC Amber List
Nightingale <i>Luscinia megarhynchos</i>	Woodland edge / dense scrub	Very scarce, no recent records of breeding in the Forest	BoCC Amber List
Redstart <i>Phoenicurus phoenicurus</i>	Woodland	Common, regular breeder	BoCC Amber List
Stonechat <i>Saxicola torquata</i>	Dry heath	Common, regular breeder	BoCC Green List
Song thrush <i>Turdus philomelos</i>	Grassland	Common, regular breeder	BoCC Red List
Grasshopper warbler <i>Locustella naevia</i>	Heathland	Very scarce, no recent records of breeding in the Forest	BoCC Red List
Dartford warbler <i>Sylvia undata</i>	Dry heath	420 pairs in 2006, 16% of UK population	W&C Act Schedule 1, BoCC Amber List
Firecrest <i>Regulus ignicapilla</i>	Woodland	Moderately common, regular breeder	W&C Act Schedule 1, BoCC Amber List
Marsh tit <i>Poecile palustris</i>	Woodland	Common, regular breeder	BoCC Red List
Willow tit <i>Poecile montanus</i>	Woodland	Very scarce, no confirmed records of breeding	BoCC Red List
Starling <i>Sturnus vulgaris</i>	Woodland / grassland	Common but much declined, regular breeder	BoCC Red List
Red-backed shrike <i>Lanius collurio</i>	Woodland edge	Extinct as breeder in the Forest since 1978	W&C Act Schedule 1, BoCC Red List
Hawfinch <i>Coccothraustes coccothraustes</i>	Woodland	Local but regular breeder	BoCC Red List
Bullfinch <i>Pyrrhula pyrrhula</i>	Woodland	Moderately common, regular breeder	BoCC Amber List
Goldfinch <i>Carduelis carduelis</i>	Woodland / grassland	Common, regular breeder	BoCC Green List
Linnet <i>Carduelis cannabina</i>	Heathland	Common, regular breeder	BoCC Red List
Crossbill <i>Loxia curvirostra</i>	Pine woodland	Local but moderately common, regular breeder	W&C Act Schedule 1, BoCC Amber List

A Bird monitoring in the New Forest: a review of current and ongoing schemes

Greg Conway, Simon Wotton and Adrian C. Newton

The Breeding Bird Survey (BBS)

The BBS provides information on population trends for a range of common and widespread bird species in the UK. The scheme is coordinated by the British Trust for Ornithology (BTO), and jointly funded by the BTO, the Joint Nature Conservation Committee (JNCC) and the Royal Society for the Protection of Birds (RSPB). The project is undertaken at the national scale, with some 3,200 sites now being surveyed across the UK by more than 3,000 participants. Survey sites are randomly selected 1-km squares of the Ordnance Survey (OS) National Grid, and are visited by volunteers who record habitat characteristics and the bird species encountered while walking a survey route (two 1-km line transects).

To date (as of 2006), the survey has provided data for 11 1-km squares in the New Forest (Figure 3), in which 98 species have been recorded since 1994. Forty-nine of these species have been found to occur within more than half of the squares. At present, insufficient squares have been surveyed to permit calculation of reliable data on trends in abundance; for this purpose, more than 30 squares would be needed. However, even this limited annual monitoring data do set a baseline against which future changes in species' abundance and occurrence can be measured. This survey therefore provides an example of an ongoing monitoring programme that is likely to be of increasing value as it continues to develop. Its future value for documenting species trends in the New Forest will depend upon the participation of volunteers, which will inevitably determine the scope of the survey.

Figure 3
Results obtained by the Breeding Bird Survey for the New Forest (up to and including 2006). Figures show duration of coverage in years.



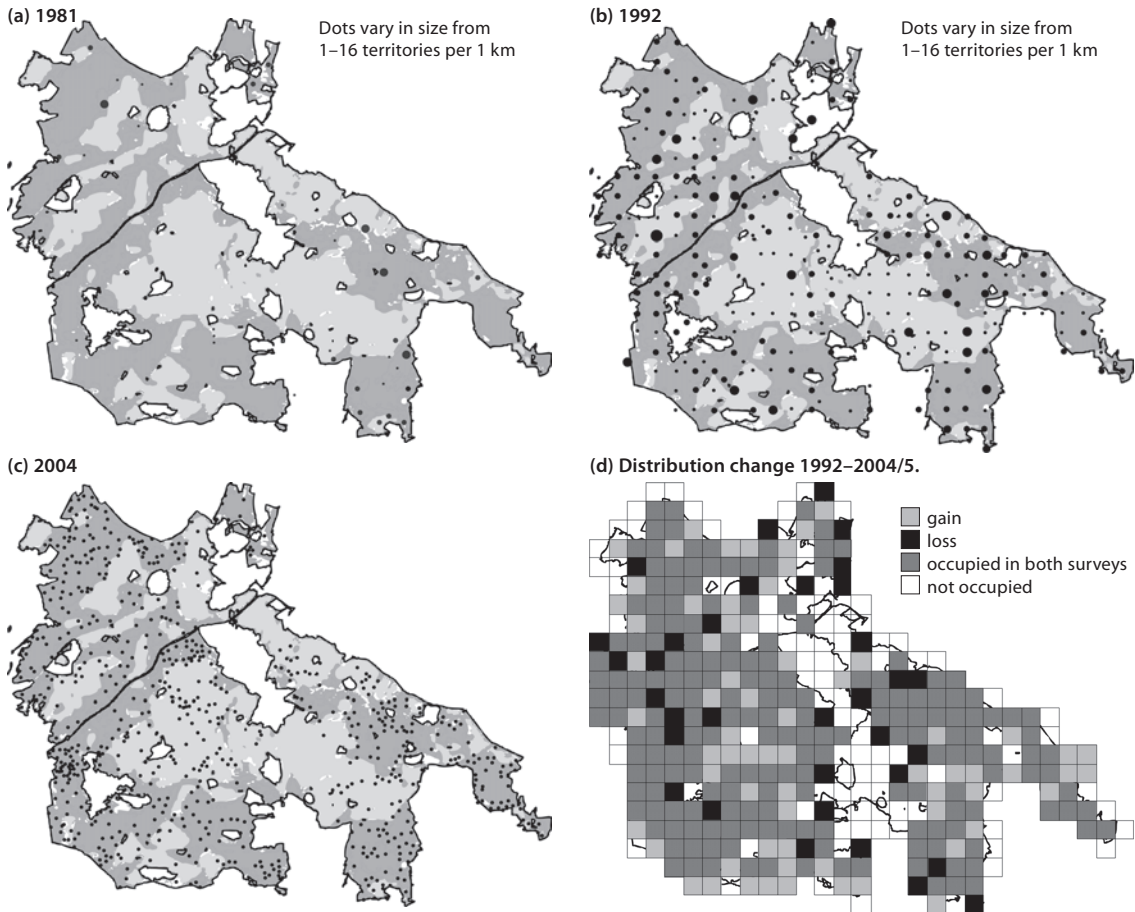
National Nightjar Survey

The Eurasian nightjar is currently declining in many European countries (Burfield and Van Bommel 2004). In Britain, the species is considered to be of high conservation concern, being classified as a Red Listed species with a breeding range decline in excess of 50% between 1972 and 1992 (Gregory *et al.* 2002). Since the 1950s, the geographic range of the species has contracted and it has undergone a marked decline in abundance, as a result of widespread losses of heathland to agriculture, urban development and afforestation. In the UK, the breeding range of nightjars declined from 562 10-km squares in 1968–72 to 241 in 1981, but increased slightly to 268 10-km squares by 1992, still substantially fewer than its former range (Conway *et al.* 2007). The New Forest is still one of the main centres of occupancy of the species, together with other heathland in southern England and the Brecklands and Sandlings of East Anglia. The partial recovery of nightjars in southern and eastern England in the late 1980s can be attributed to an increase in large-scale harvesting of conifer plantations, which increased the availability of suitable habitat (Conway *et al.* 2007).

A national survey of nightjar was undertaken in 2004 on 1-km squares with recent known breeding populations, and a random sample of 1-km squares containing suitable habitat within 10 km of the known range, to detect range expansion. This survey was primarily undertaken by volunteers, but supported by professional ornithologists where needed. A minimum of two visits to a site was required, either at dawn or at dusk, performed between the last week of May and mid-July, with at least three weeks between visits and at least one visit in June. Each surveyor covered no more than 80 ha per visit, being sure to pass within 200 m of all potentially suitable habitat. The locations of 'churring' males were recorded onto 1:2500 scale maps. Additional surveying was also undertaken in 2005 to complete gaps in the national survey coverage.

Results of the national survey indicated an increase in the UK population of nightjars of 36% between 1992 and 2004, which was attributed to habitat protection, management and restoration of heathlands, and the continued availability of clear-fell/young plantations in conifer forests (Conway *et al.* 2007). These national trends were mirrored in the New Forest, where a 28% increase in the number of territories was recorded over the same period (Table 2). It should be noted however, that the New Forest population had never been fully surveyed before 2004. Figures provided for the SPA designated in 1993 were based on a limited survey and extrapolation to other suitable habitat (although most of the Forest was surveyed in 1992). Distribution maps produced for the New Forest indicate a continual expansion in the number of sites colonised from 1981

Figure 4
Distribution of nightjar in the New Forest.



onwards, such that the species is now widespread throughout the New Forest heathlands. However, loss of the species from some sites was recorded in the 2004 survey (Figure 4).

Table 2
Trends in the status of nightjar in the New Forest
(*actual territories counted)

Year	Number of UK territories*	Number of territories in New Forest (SPA)
1981	1,784	78 (4.3% of UK population)
1992	3,093	313 (10% of UK population)
2004 (2005)	4,131	647 (15.7% of UK population)

National Woodlark Survey

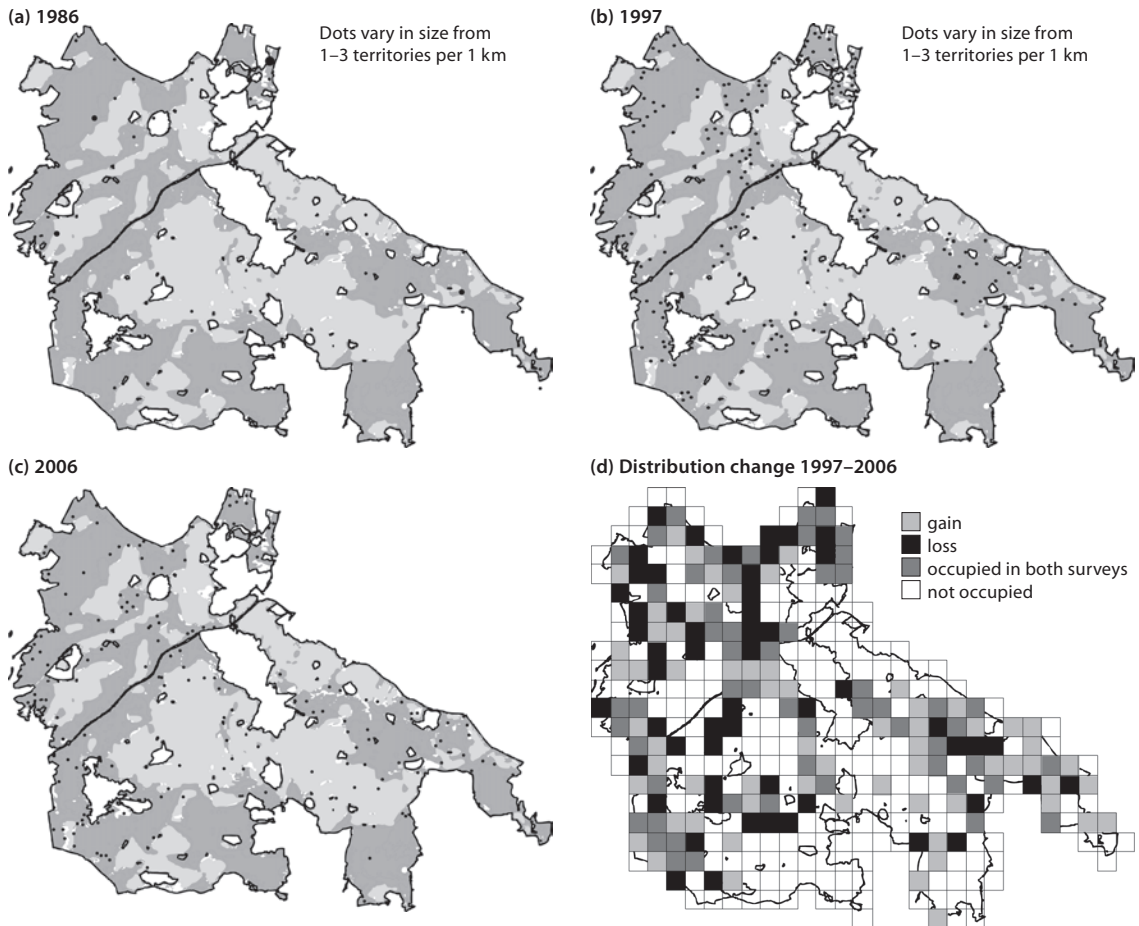
In the UK, the woodlark is at the northern limit of its range in Europe, which appears to be constrained by warm summers and mild winters. European trends for woodlark suggest that a large decline occurred between 1970 and 1990, but numbers have been relatively stable

since, although there have been localised increases in countries such as France, Netherlands, Romania and Sweden (Burfield and Van Bommel 2004).

In the UK, the woodlark was widespread across much of southern Britain during the middle of the 20th century, probably peaking in the early 1950s. Subsequently it underwent a dramatic decline in numbers and a contraction in range. An estimate of 200–450 pairs was derived from the 1968–72 breeding bird atlas (Sharrock 1976). In 1981 the population was estimated at 400–430 territories but the hard winter of 1981/82 resulted in a reduction to an estimated 200–250 territories (Sitters 1986).

The first full national survey of the species in 1986 found that the population had declined to a minimum of 241 pairs (Sitters *et al.* 1996), but it then increased once again; the 1988–91 breeding bird atlas produced an estimate of 350 territories (Gibbons *et al.* 1993). The second full survey in 1997 showed that this increase had continued, to 1,426–1,552 pairs, with a range of 90 10-km squares (Wotton and Gillings 2000).

Figure 5
Distribution of woodlark in the New Forest.



Conway *et al.* (2009) describe the results of an additional national survey undertaken in 2006. One kilometre squares containing suitable habitat (i.e. lowland heathland, young conifer plantation, farmland, etc.) were surveyed, including previously occupied sites and all potentially suitable habitat for which there was no recent evidence of occupation, occurring within 5-km and 10-km buffers around such sites. Surveyors were also encouraged to visit other sites, such as those historically supporting woodlarks. Additional squares were surveyed that contained potential habitat for woodlarks and entire SPAs designated for this species. Surveys were undertaken during the period 15 February to 31 May, with a minimum of two visits required, ideally at least three weeks apart. Observers were requested to completely cover each 1-km square, walking within 100 m of all areas of suitable habitat to maximise the detection of territorial individuals.

At the national scale, results of the survey identified a strong increase in the breeding population and range of woodlarks in Britain between 1997 and

2006 (Conway *et al.* 2009). A population estimate of 3,064 territories was obtained, giving an increase of 88% since 1997, while the range of occupied 10-km squares had increased by 46%. The majority of territories were associated with two main habitat types; heathland (66.7%) and forest plantation (32.4%), and farmland in the southwest (13.4%). Sandy soils held the majority of territories (80.3%) (Conway *et al.* 2009). This population recovery was attributed to the designation of statutory nature conservation sites, with the majority of breeding woodlarks found on SPAs; together with appropriate restoration and re-creation of heathland and increasingly sympathetic management of key forests (Conway *et al.* 2009). The authors conclude that maintaining the condition of heathland in the face of increasing pressure for development and recreation is imperative for the future population of woodlarks in Britain.

In the New Forest, a similar positive trend in abundance was observed, with a 12.5% increase in the number of territories recorded between 1997 and 2006 (Table 3). Results also indicate that the New Forest

Table 3
Trends in the status of woodlark in the New Forest
(*actual territories counted)

Year	Number of UK territories*	Number of territories in New Forest (SPA)
1986	241	36 (14.9% of UK population)
1997	1,552	183 (11.8% of UK population)
2006	1,747	163 (9.3% of UK population)

continues to be an important stronghold for the species, accounting for 9.3% of the UK population in terms of number of territories located. Distribution maps produced for the New Forest indicate a pronounced expansion in the number of sites colonised between 1986 and 1997, and a slight increase thereafter, such that the species is now widespread throughout the New Forest heathlands. However, loss of the species was recorded from a number of sites in the 2006 survey (Figure 5).

National Dartford Warbler Survey

The Dartford warbler is another species at the northernmost limit of its geographical range in Britain. More than 80% of the world population, of between 1,900,000 and 3,700,000 pairs, is found in Spain (BirdLife International 2004), where it is characteristic of Mediterranean scrub habitats. In the UK the preferred habitat is mature lowland heath, generally with stands of mature gorse (Brown and Grice 2004).

The abundance and geographic range of the species has fluctuated markedly in the UK over the past two centuries, partly reflecting its susceptibility to severe winters, although the species also exhibits an ability to disperse into suitable habitats as conditions become favourable (Wotton *et al.* 2009). During the 19th century, the breeding distribution probably extended from Cornwall to Kent, with records in Staffordshire and Suffolk (Witherby *et al.* 1938). By the end of the 19th century, however, the bulk of the population was restricted to Hampshire and Surrey, with the rest of the population mainly located in Berkshire, Dorset, Isle of Wight, Sussex and Wiltshire (Holloway 1996). This range contraction from SW England is probably partly attributable to severe winters in 1880/81 and 1886/87. However, as a result of a succession of mild winters, there were again good numbers on the southern English heaths by the mid-1930s.

The continued loss of lowland heath throughout much of the 20th century, through afforestation, agricultural development and urban development, negatively affected the species, partly through the increasing fragmentation of suitable breeding habitat (Tubbs 1963). Severe winter weather also had an impact, particularly in the early 1960s, when numbers fell from c. 450 pairs in 1961 to just 11 pairs in 1963, following two consecutive hard winters. At this point, the population of Dartford warbler in the New Forest accounted for 55% of the population in the UK (Tubbs 2001; Table 4).

National surveys of the species were undertaken in 1974, 1984 and 1994, and the species is also monitored annually through the Rare Breeding Birds Panel (RBBP) (e.g. Hollings *et al.* 2008). The 1974 survey indicated that numbers had recovered well from the population crash in the early 1960s, with 560 territories recorded. The 1984 survey showed a slight decline, when 420 territories were recorded, much of the decline being attributed to some harsh winters and to heathland fires (Robins and Bibby 1985). An estimated maximum population of 1,889 territories was recorded in the last national survey in 1994 (Gibbons and Wotton 1996), a more than fourfold increase since 1984.

A fourth national Dartford warbler survey in Britain was undertaken in 2006, as described by Wotton *et al.* (2009). The aim was to survey all of the 1-km squares occupied in 1994, together with a random selection of squares within 5-km and 10-km buffers around them and entire SPAs designated for this species. As a result of the survey, the population was estimated at 3,214 (95% confidence limits, 2,878–3,591) territories, an increase of 70% since 1994 (Wotton *et al.* 2009). The number of occupied 10-km squares was 126, an increase of 117% since the previous survey. The main areas of range expansion were in Southwest England and Wales. The species is closely associated with lowland heathland with nearly 90% of the territories found in 2006 recorded in this habitat (Wotton *et al.* 2009). The positive trend in abundance of the species may partly reflect the considerable work undertaken on the restoration and recreation of lowland heath in recent years in counties such as Dorset, Suffolk and Surrey. However, climatic change may also have been a contributory factor (Wotton *et al.* 2009).

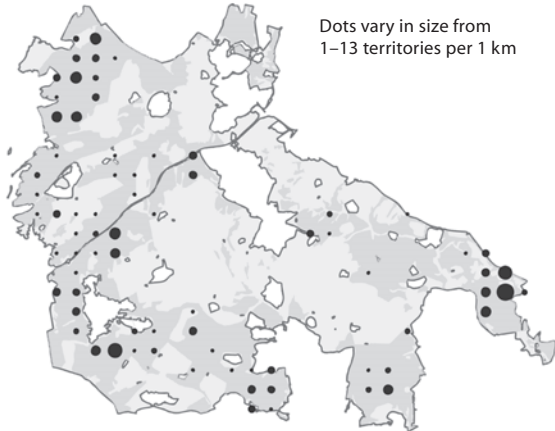
In the New Forest, the number of Dartford warbler territories declined by 21% between 1994 and 2006, in contrast to the national trend. Analysis of the distribution maps (Figure 6) suggest that this decline has occurred throughout the New Forest, and was not concentrated in a single area. Although the Dartford warbler is currently more than twice as abundant in the New Forest than it was in 1984, the decline recorded over the past decade is significant and should be of concern, particularly as such declines have not been widely recorded in the UK (Wotton *et al.* 2009). The reasons for the decline are not clear, but might be a consequence of current approaches to heathland management. The influence of climatic factors, and / or increasing recreational pressure are possible factors requiring more research.

Table 4
Trends in the status of Dartford warbler in the New Forest
(*actual territories counted)

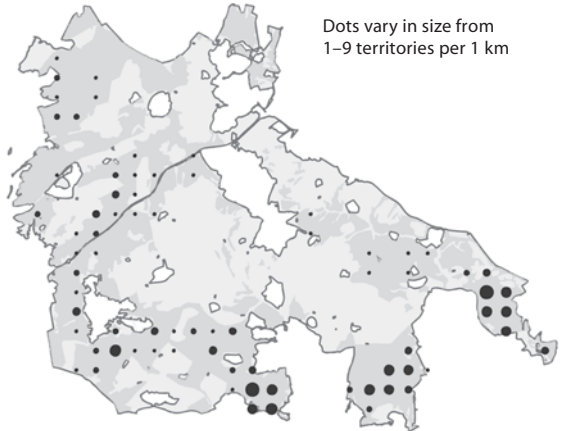
Year	Number of UK territories*	Number of territories in New Forest (SPA)
1960	c.460	c.350 (76% of UK population)
1963	11	6 (55% of UK population)
1974	560	c.250 (45% of UK population)
1984	420	187* (45% of UK population)
1994	1,690	535* (32% of UK population)
2006	2,553	420* (16% of UK population)

Figure 6
Distribution of Dartford warbler in the New Forest.

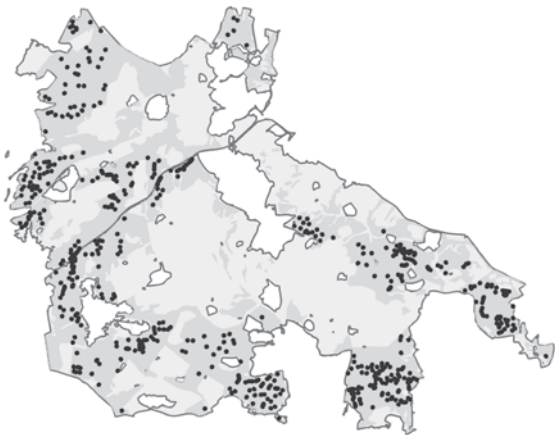
(a) 1974



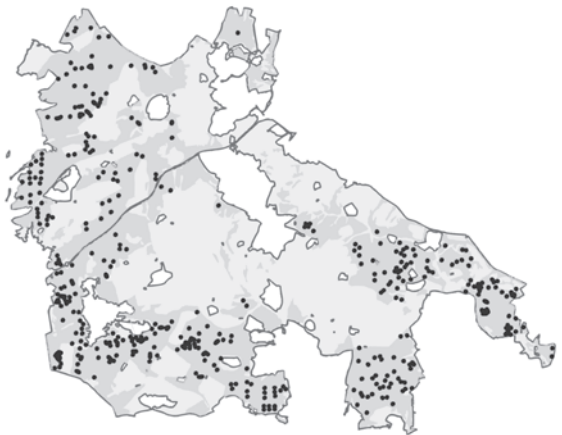
(b) 1984



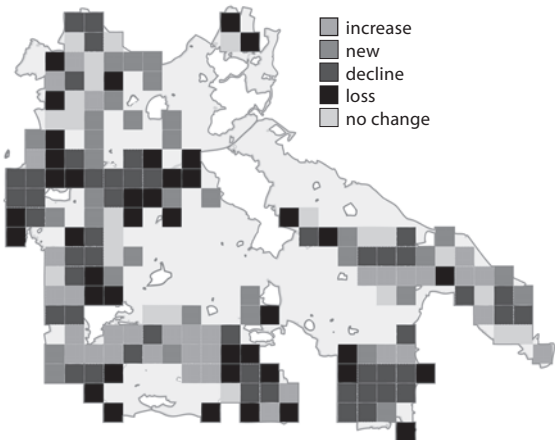
(c) 1994



(d) 2006



(e) Distribution change 1994–2006



New Forest Breeding Wader Surveys

The importance of the New Forest valley mires and wet heaths as valuable habitats for breeding waders has long been recognised (Tubbs 2001). In 1994, Colin and Jennifer Tubbs surveyed the breeding waders in the New Forest's valley mires using a standard, repeatable methodology to assess a random sample of the potential habitat. Results of the survey confirmed the critical importance of the New Forest as a site for breeding lapwings, snipe, curlews and redshanks (Tubbs and Tubbs 1994). With the exception of lapwings, the breeding waders of the New Forest were found to be largely dependent on valley bogs, wet heaths and the wetter humid heaths. Relatively intensive grazing and the continuation of a regime of controlled burning were identified as important habitat management actions for maintenance of populations (Tubbs and Tubbs 1994).

As described by Goater *et al.* (2004), the survey was repeated in 2004, using the same methods as those employed by Tubbs and Tubbs (1994). A sample of 31 of the New Forest's 93 1-km squares holding at least 15 ha of valley bog and/or wet heath vegetation was surveyed. Each 1-km square received three visits, respectively between 10 and 30 April, between 1 and 21 May, and between 22 May and 22 June. A minimum of two weeks separated visits to any one square. Almost all visits commenced at or shortly after sunrise and were concluded within three hours (Goater *et al.* 2004). Results of the survey confirmed that the New Forest mires remain extremely important for breeding snipe, curlews and redshanks. However, comparison

with the 1994 results indicated that their numbers have been reduced by 29%, 25% and 22–26%, respectively, over the area surveyed (Goater *et al.* 2004; Figure 7). However, the number of breeding lapwing pairs, a species that is less dependent on mire habitats than the other three species surveyed, increased by 34–39% between 1994 and 2004. These changes may be indicative of Forest-wide trends, but this has yet to be established with certainty.

Further work is suggested to establish whether such trends are indeed widespread over the Forest, and to examine the factors responsible, such as recreational pressure and changes in the condition of wetland habitat (Goater *et al.* 2004). From the results obtained in the 2004 survey, it was difficult to draw any firm conclusions about the possible causes of decline; all of the squares showing the most marked declines in populations seemed, to the surveyors, to contain typical valley mire habitats well suited to breeding waders (Goater *et al.* 2004). The increases in numbers of lapwings recorded may be owed to the burning and cutting programme carried out by the Forestry Commission. As noted by Tubbs and Tubbs (1994), such interventions can increase the area of potential breeding habitat. It should also be noted that these declines in breeding waders mirror those recorded at the national scale (Wilson *et al.* 2005), attributed to loss of grassland to other land uses, and to significant changes in grassland management, including drainage, reseeded and changes in grazing regimes (Wilson *et al.* 2004).

Long-term changes in woodland bird populations

Amar *et al.* (2006) present the findings of a major four-year national-scale project, the Repeat Woodland Bird Survey (RWBS), which investigated trends in breeding bird populations in British broadleaved and mixed woods. Woodland plots were surveyed in 2003 and 2004, repeating previous surveys dating mainly from the 1980s. A total of 406 woodland sites were surveyed throughout the UK. Results indicated that eight out of a total of 34 species showed large national declines (>25%), namely hawfinch, garden warbler, lesser redpoll, lesser spotted woodpecker, spotted flycatcher, tree pipit, willow tit, willow warbler and wood warbler. A further eleven species showed large national increases (>25%) in both datasets: blackcap, blue tit, chiffchaff, coal tit, great spotted woodpecker, great tit, green woodpecker, goldcrest, robin, treecreeper and wren. Overall, more species breeding in woodland were found to have increased rather than decreased, and patterns of population change differed across groups of species. For example, all long-distance migrants have declined, whereas the two medium-distance migrants, blackcap and chiffchaff, have increased. Common species (such as blue tit and great spotted woodpecker) tended to fare better than less common ones (such as willow tit and lesser spotted woodpecker) (Amar *et al.* 2006). These trends reflect factors such as changes in the structure of early successional and understorey vegetation within

Figure 7
Trends in abundance of breeding waders between 1994 and 2004 (using data from Goater *et al.* 2004).

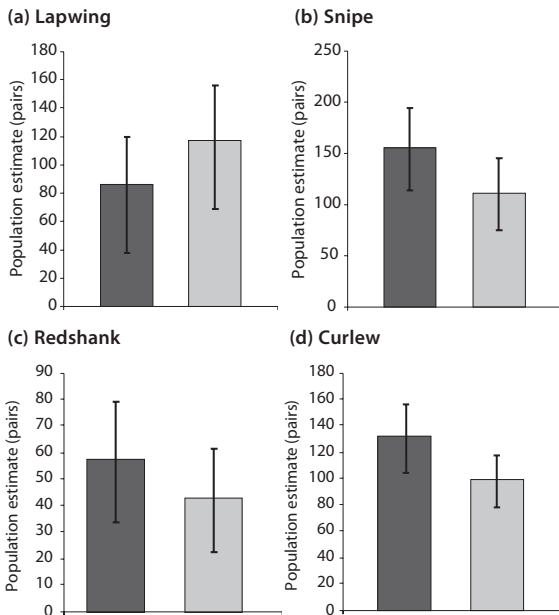
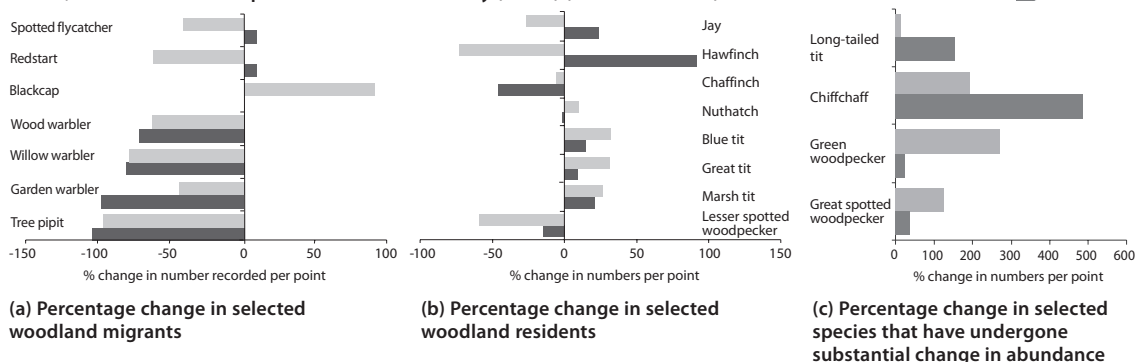


Figure 8
Changes in the abundance of selected woodland bird species between 1985 and 2004, compared to national trends, derived from the Repeat Woodland Bird Survey (RWBS) (Amar *et al.* 2006).



woodland, climate change, reductions in invertebrates, and wider patterns of changing land-use and predation (Fuller *et al.* 2007).

In the New Forest, 21 New Forest woods were surveyed in 1985; these were resurveyed in 2003/04, using a series of counts at randomly selected points throughout the study woods. Results highlighted contrasting trends in a number of species, with some (such as tree pipit, garden warbler, willow warbler and wood warbler) demonstrating marked declines in New Forest woodlands, consistent with trends recorded nationally (Figure 8a). Others, such as jay and hawfinch, demonstrated increases in the New Forest, in contrast to national trends (Figure 8b). Woodland species that have undergone particularly marked changes in the New Forest included green woodpecker, great spotted woodpecker, chiffchaff and long-tailed tit, all of which were consistent with national trends (Figure 8c). Again, the precise reasons for these changes remain unclear.

Conclusions and implications for management

The various monitoring schemes presented here have provided a rich source of information regarding the status of trends of selected bird species in the New Forest, and also provide a valuable baseline against which future change can be evaluated. The results obtained highlight the contrasting fortunes of different bird species in the area. Some species of conservation concern, such as woodlark and nightjar, have increased markedly in recent years, suggesting that management approaches have been effective. Other species, notably Dartford warbler and the breeding waders snipe, curlew and redshank, appear to be undergoing significant declines, suggesting that management approaches may need to be amended. It is difficult to separate the impacts of local-scale management approaches from regional- or global-scale processes that may also be influential, such as climate change and external impacts on migratory species. However, it is important that the specific needs of declining species are considered when developing management proposals.

The SAC management plan provides the overarching policy and guidance that all the subsequent management plans take consideration of, and the Crown lands management plan (Forestry Commission 2007) forms one of these (see Chapter 19).

A recent focus has been on monitoring the impacts of visitor movements, and managing visitors through the seasonal closure of car parks and laybys, coupled with greater use of interpretation. The draft National Park Plan (NPA 2008) similarly places particular emphasis on visitor management, reflecting the growing concern about the effects of disturbance on ground nesting birds. Recent research has indicated that recreational use can have an adverse effect on nightjar (Langston *et al.* 2007, Liley and Clarke 2003), woodlark (Mallord *et al.* 2007) and Dartford warbler (Murison *et al.* 2007). For example, in the case of the latter, Murison *et al.* (2007) showed that increased breeding productivity can adversely affect breeding productivity, at least in heather-dominated territories.

In the New Forest, Sharp *et al.* (2008) have recently examined current and projected visitor numbers, and explored the potential impacts on bird species. Housing development forecasts in local regions are likely to result in a significant increase in visitor numbers in the future. The three heathland Annex I bird species (nightjar, woodlark and Dartford warbler) are notable in that their densities within the New Forest National Park are relatively low when compared with other heathland areas (such as Dorset and Thames Basin Heaths). Preliminary analyses provided tentative evidence that areas of high visitor pressure are being avoided (particularly by woodlarks). As noted by Sharp *et al.* (2008), further research is clearly needed to understand the generally low densities and to determine the specific impacts of recreational disturbance. It may be that low densities are associated with particular aspects of habitat structure in the New Forest, associated with high grazing pressure and other management interventions. For example, the combination of burning, cutting and grazing can reduce the suitability of habitats for Dartford warblers, by inhibiting gorse regeneration (Bibby 1979), but can greatly increase woodlark and lapwing breeding territories.

Tubbs (2001) also refers to the negative impacts of human disturbance on breeding waders (lapwing, redshank, curlew, snipe and ringed plover). Observations made by Tubbs and co-workers suggested that declines have occurred in those areas where the level of recreational use has increased most steeply. Some former concentrations of breeding birds that have diminished greatly in size were located close to popular car parks and were heavily visited by people and their dogs (Tubbs and Tubbs 1996). There is also concern that breeding waders associated with coastal SPA and Ramsar sites are also being adversely affected by human disturbance (NPA 2008). Again, further research and monitoring work is required to evaluate the relative effects of human disturbance and other factors that might account for bird declines, such as habitat structure, invertebrate abundance and climate change.

Acknowledgements

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B Bird monitoring in the New Forest: raptors

Andrew Page

Introduction

Covering over 250 square kilometres of mixed conifer plantation, ancient broadleaved woodland, heaths, and wetlands, the New Forest has long been recognised as a special place for birds and not least of these would be its diurnal raptors. With the possibility of up to eight species breeding and another six being encountered at other times, it is inevitable that the area attracts its share of bird watchers generally and raptor enthusiasts specifically.

The Forestry Commission, as the major land managers of the Forest, have the difficult job of accommodating numerous potentially conflicting interests, from large-scale timber felling and cut and burn heathland management, to permissioning a host of recreational activity, and all in a way that is compatible with its unique nature conservation interest and status.

Key to this is a knowledge and understanding of what we have, where it is, and how it can be safeguarded from these activities where possible. To this end, a host of contributors both within and outside the organisation, both professional and amateur, assist and update the biological records that form a working document for the most heavily managed areas of the Forest. In the author's twenty years with the Forestry Commission, a small group of New Forest Keepers and enthusiastic and committed volunteers have monitored some of the area's raptor species. Many other visiting bird watchers have also provided casual observations, or have gathered notes and observations, some of which filters through to official bodies. Sadly, some potentially useful information for land managers is also lost, fragmented or not archived for the county.

Because of the huge task involved, much of the monitoring effort has been targeted at those species most vulnerable to commercial timber felling during the breeding season, particularly buzzard and sparrowhawk. A breeding attempt cannot be protected without knowing where the nest is. At the height of the studies, when time and fitness permitted, this progressed to recording nest success, ringing young, and removing addled and unhatched eggs for analysis at the Institute of Terrestrial Ecology (ITE, now the Centre for Ecology and Hydrology, CEH) at Monks Wood, Huntingdon.

It is important to stress that all activities involving Schedule One or specially protected bird species require the appropriate licences from the relevant agency (e.g. Natural England) and/or the BTO, and work carried out also needs consent from the landowner. Over the years the methods and equipment have been modified and fine-tuned, so that the climbing, nest data collection and ringing are conducted quickly, efficiently and professionally to minimise disturbance. Members of the climbing team are trained in arboricultural techniques and standards of safety.

Most monitoring visits occur when young are in the nest; very often, parent birds are far away hunting and not even aware a nest inspection has taken place. Some birds are more tolerant of disturbance than others and there is variability within individuals and at different stages of the nesting cycle. As a general rule, most birds are more tolerant of nest disturbance with young than they are with eggs, but there is no substitute for good fieldwork and the ability to interpret behaviour to guide the process of learning about different species.

As with any monitoring work, although desirable, achieving total coverage and population estimates that

are completely accurate is rarely possible or even provable, and the reports and records summarised in this chapter make no such claims. They represent the culmination of fieldwork and reliable reports drawn together from various sources and observers over each season. Throughout this chapter references to territories, unless stated, are defined as the area around the nest that is defended by the pair against others of its species, and contains the nest and roost areas, but does not include the whole of its hunting range.

Sparrowhawk *Accipiter nisus*

Since 1988 we have found and recorded information on five hundred nesting attempts by sparrowhawk pairs in the New Forest. The vast majority of fieldwork was concentrated on the coniferous forest areas and also excluded the south-east corner of the Forest. From the outset we accepted that this focus on conifer habitats had the capacity to produce a significant bias in population estimates. Over time new sites were added from records submitted when young were heard calling, post fledging, but interestingly records for sites in broadleaved woodland remain very few, and are probably not as numerically important as first thought.

Nearly 100 different sites have held breeding pairs at some time over this period, but no more than 36 nests have ever been recorded in any one year, with nearer 25 nests per year on average. Within each site, pairs have moved, vacated the site permanently or have been absent in some years. Very few sites have been consistently occupied throughout the study period.

Unlike other larger raptor species, long periods of observation of suitable habitat reveal little to aid the process of finding sparrowhawk nests, and the only reasonably reliable method is systematic searching of suitable woodland. Our early studies quickly identified a preference for Scots pine of a certain age and thinning density, but as the Inclosures have been further thinned and opened up, the number of these prime blocks available for breeding has been reduced.

Our fieldwork coverage until very recently has been consistent and had revealed a relatively stable population, albeit with local fluctuations. However our observations suggest the occurrence of a dip in population size in recent years, which could be attributable to a number of factors, none of which are easily determined. One possibility is that the density of the tree stand used for nesting is more important than we first envisaged. It was our opinion that as with most species, providing they have a relatively rich food source available within the territory, then finding a suitable nest site should not be a limiting factor. Studies elsewhere show that commercial forests go through different stages of suitability for breeding sparrowhawks, being largely unsuitable at thicket and final cropping stages but highly suitable in mid-growth thinning phases.

The New Forest has undergone some major changes within its timber Inclosures during recent years, particularly in stands dominated by conifers.

Driven by changing conservation priorities and commercial pressures, heavy thinning and clearfells for reversion to broadleaf have rendered large areas unsuitable as potential nest sites for hawks. This increase in forestry activity, while making some nesting compartments unsuitable, compel those birds that are present to move to a different nesting site. This makes relocation more difficult and can also cause neighbouring pairs to move, as they spatially adjust within the population. Our efforts therefore have had to be extended to cover new ground, and we may be failing to relocate a number of pairs.

Finally, with a new and expanding goshawk population in the Forest, there may be an influence of direct predation affecting the resident sparrowhawks. We have found at least two instances of sparrowhawk remains being found at goshawk sites. Further monitoring is required to determine whether this perceived decline in numbers is real, whether it simply represents a result of reduced survey effort, or whether it is the result of a combination of the factors mentioned above. That said, there is generally greater availability of prey around the periphery of the Forest and around villages, and consequently the density of pairs can be slightly higher in such areas than in mainly coniferous forest blocks, where food availability is believed to be lower.

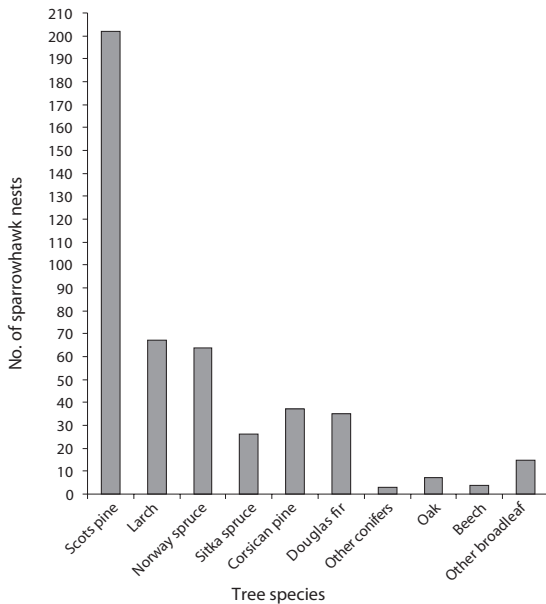
It was our opinion that the New Forest population of sparrowhawks numbered between 30 and 40 pairs in any one year, but in recent years the total number has been as low as 25 pairs in some years. Any long-term monitoring project has the advantage of being able to differentiate normal fluctuations in population size from genuine increases in numbers or density, or conversely, long-term declines that may be the subject of concern. Recording nest and fledging success can show whether declines are linked to increased adult mortality, or a sustained drop in fledging success owing to change or loss in habitat quality.

The nest

Sparrowhawks build a new nest every year but often build on a platform that was already in place. This can be the base of an old squirrel drey, woodpigeon nest or just a few sticks lodged in a tree. Less than 2% of all nests found were the result of refurbishing an old sparrowhawk nest, and these records were almost entirely attributable to one site in broadleaved woodland.

As mentioned above, the main determining factor with respect to nest location is the density of the tree stand within the area chosen. It was at first thought that forestry stock maps could provide the information needed to aid nest finding, and although a useful source of information with respect to tree spacing, the different growth rates and thinning regimes can vary substantially from compartment to compartment, which in turn effect tree density. Within the Forest there has been a high preference for sparrowhawk nesting in Scots pine (Figure 9). This could however be a reflection of the prevalence of this tree species within the Forest, rather than it being a superior tree as a nest choice.

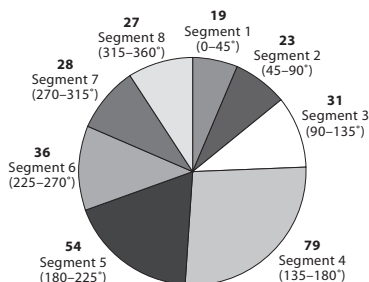
Figure 9
The number of sparrowhawk nests recorded in different tree species in the New Forest.



Almost all nests were constructed from twigs found immediately adjacent to the nest. Therefore nests in Scots pine were constructed of Scots pine twigs, those in larch were constructed of larch twigs, and those in spruce were constructed of spruce twigs. A number of nests, particularly those in broadleaved woodland, contained birch twigs. Larch was the only material that on occasions was brought longer distances, and this undoubtedly is because of its unique ability to hold together in a strong and durable platform. Larch nests were also the largest, consistently measuring 55 cm × 45 cm. Many Scots pine nests measured only 45 cm × 35 cm, and a few were as small as 30 cm × 30 cm.

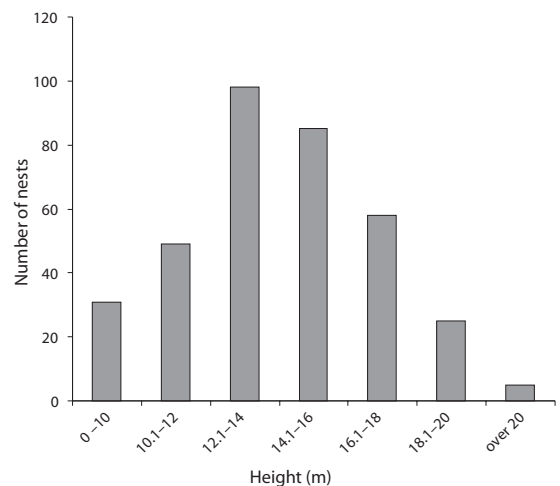
Of a sample of 242 nests, 230 were positioned on branch whorls against the main trunk, which is by far the preferred position. The remaining 12 nests were in main forks or crotches, out on a limb or in the crown of a tree. Aspect was recorded for those nests positioned on branch whorls and against the main trunk, by taking a compass reading directly away from the tree through the centre of the nest. Results highlight the tendency of nests to be located on south-facing parts of the tree (Figure 10).

Figure 10
The number of sparrowhawk nests falling within each of the eight 45° segments, and also expressed as a percentage of the total sample of 297 nests.



Completed nests were lined with flakes of Scots pine or spruce bark to prevent the eggs from working down through the framework of twigs during incubation and so becoming chilled. With failed nests, this was used as a measure of whether eggs had been laid. Throughout incubation, an accumulation of downy under-feathers from the sitting female gathers on the nest twigs and the immediate vicinity, and is diagnostic in confirming an occupied nest. Nest heights varied between sites, with those in broadleaved woodland featuring amongst the lowest (Figure 11). The highest nest we have recorded was at 23 m and the lowest was at 6.2 m, with the commonest category being 12–14 m (Figure 11).

Figure 11
The number of sparrowhawk nests in each of the height ranges measured directly from nest to ground, in a sample of 351 nests.



Clutch size

Very little recording of clutch size was undertaken, but the generally accepted range of 3–6 eggs seemed the norm from subsequently observed brood sizes. One clutch of seven was recorded and a nest containing nine eggs that failed was the product of two separate hens. In over a dozen nests we have recorded complete clutch failures, despite the incubating female often continuing to sit into early July.

Around 500 nests have been found over the past 20 years, from a minimum of 19 nests in 2007 to a maximum of 36 in 1999. Of these known nests, 396 were successful and 103 failed at either the egg or the chick stage as a result of a variety of different factors. Over an 18 year period, 240 unhatched eggs were removed from nests and forwarded to ITE / CEH for chemical analysis. Owing to financial cutbacks in recent years many eggs were not analysed, but have been stored for possible future work. Of those eggs that were analysed, no significantly harmful chemical residues were found, although increased concentrations were found in a number of samples.

Chicks

The sexual dimorphism exhibited in sparrowhawks means that males and females carry a differently sized leg ring. For nest inspection to include ringing therefore requires that the young be sufficiently grown to enable accurate sexing to take place. Over the years we have aimed to begin our monitoring from 1 July. As with all species, there is variation in the earliest and latest fledging dates, and this inevitably means that there will be occasional early nests in which the young are too advanced to attempt climbing and ringing, and others that will require a subsequent visit because they are too small. In general, however, the majority of work can be successfully completed during the first week in July. Our latest record for a potentially successful nest was one that contained small young on 19 July.

The optimum age for sexing the young is between two and three weeks of age. Problems can occur with large broods where, because of staggered hatching days, young that are a fortnight old may be found in the same nest as those that are only a few days old. The number of young fledged from successful nests has varied from as few as one to as many as six. The annual productivity of successful nests has ranged from 3.2 to 4.2 with a mean of 3.6. These figures suggest that any population changes are not attributable to poor productivity. A total of 1,012 young have been ringed as part of the survey, including 489 males and 523 females. Tawny owls were occasionally responsible for preying on young hawks in the nest, and where possible sparrowhawks seemed to avoid nesting in areas regularly used for roosting by tawny owls.

Prey

As one would expect, our records of prey remains found at plucking posts and at nests reflect a cross-section of the birds most abundant in that environment. During incubation, tit species, robins, wrens, chaffinches, etc., feature highly in what the male is provisioning. During the latter period of chick growth, when the female begins hunting, slightly larger prey features, including a predominance of blackbird and song thrush and often great spotted woodpecker. At one nest where the young had already fledged, a climb to the empty nest revealed a number of fresh and partly plucked carcasses including two song thrush, one blackbird, one woodcock and two green woodpeckers. Unusual items occasionally occur such as snipe and hawfinch, and during 2007 plucks of lesser spotted woodpecker were found at three separate sites. This was a significant number given the current scarcity of this species in the New Forest.

Ringling recoveries

Over 30 ringling recoveries have been reported; although most of these involve only short distances and occur within the bird's first year, some recoveries demonstrate the dispersal distances that some young hawks undertake. A female ringed in the nest within the Forest on 6 July 1991 was found dead in Chepstow, Gwent, a distance of 116 km, and a male was found dead at Chippenham, Wiltshire, 80 km away and only

45 days after it was ringed as a nestling. Another female was released alive from a pigeon loft near Newbury during its first winter. The longest-lived bird identified from recovery was a female ringed at Manor Wood near Lyndhurst on 8 July 1999 and found dead at Brook Wood, Bramshaw, on 13 July 2005. A high proportion of recorded fatalities occur after impacts with windows, patio doors, etc.

Northern goshawk *Accipiter gentilis*

As a native breeding species, the goshawk was eradicated from the UK during the early 19th century, primarily as a result of persecution. Its perceived conflict with game rearing and shooting interests is still responsible for its absence from parts of Britain today. Its return as a breeding bird, initially to the large and remote forests of northern and western Britain, has been as a direct result of deliberate and accidental releases of birds kept for falconry purposes. Despite many rumours to the contrary, until 2002 Hampshire Ornithological Society recorded goshawk as 'a bird with few substantiated records and not proven to breed in the County'. This was also the conclusion we reached for our fieldwork in the New Forest, with occasional confirmed sightings but no proof of attempted breeding.

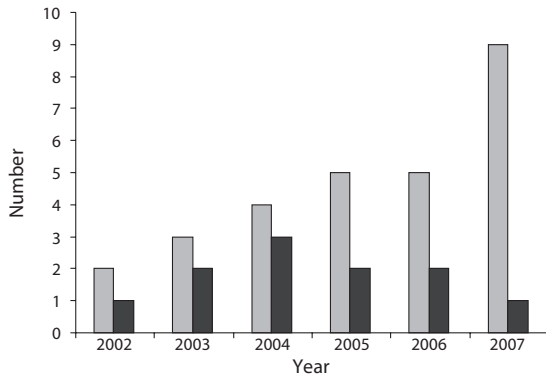
Sightings of an individual during the summer of 2001 were the precursor to a major change to this situation in 2002, when intensive fieldwork from January to March led to the discovery of two separate pairs in display, and subsequently nest building, laying, and eventually successfully fledging of young. That three of the four parent birds exhibited streaked brown plumage in first-year birds indicated that these were probably the first colonisers of the county from a known breeding source in south Wiltshire. It must be said that the original source of these birds is questionable and is rumoured to have originated from birds imported without the correct paperwork and illegally released.

For a large raptor, the goshawk can be extremely unobtrusive for much of the year. Even with young to feed, their hunting forays to and from the nest are not easily observed. During the late winter months, however, male goshawks can regularly be seen in display and soaring flight, over and around their preferred nesting areas. Late morning with blustery, cloudy conditions seems to be preferable to still clear days and interaction with neighbouring males produces the most vigorous and prolonged display. Sightings of the females are not so frequent and decline considerably as egg laying approaches. Indeed at some sites a number of sustained visits have been required to prove that some males occupying territories have a mate.

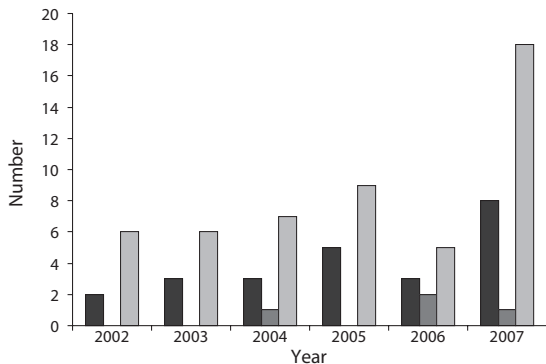
The year 2003 saw three pairs successfully raise young in the Forest, the two pioneer pairs plus a third new pair. During 2007 at least 10 sites were occupied by either pairs or single birds. Eight pairs raised a minimum of 18 young with the brood of a further pair failing during incubation. To date, a minimum of 52

Figure 12
The gradual increase in goshawk numbers in the New Forest.

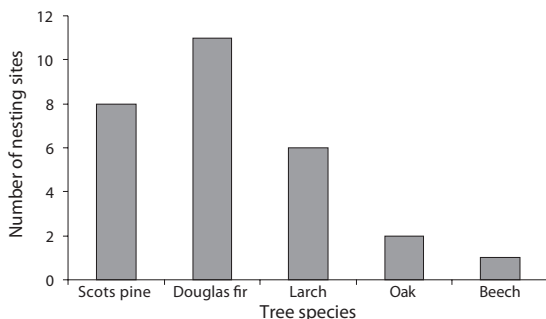
(a) Numbers of breeding pairs and individuals. Light grey, number of breeding pairs; filled bars, singles or pairs holding territory but not breeding.



(b) Number of breeding pairs and numbers of fledged young. Filled bars, successful pairs; dark grey, failed pairs; light grey, minimum number of young fledged.



(c) Tree species used by goshawk as nesting sites in the New Forest.



young have fledged within the protection of the Crown lands (Figure 12). This report excludes individuals or pairs that may be residing or breeding outside of the Crown lands. As the population expands to encompass private land, this will inevitably cause potential conflicts with game-rearing interests. It is hoped that cooperation and understanding will enable these issues to be better understood and any conflict minimised.

Montagu's harrier *Circus pygargus*

In 1995 the New Forest was the focus of local ornithological attention when a pair of rare Montagu's harriers took up residence in the north of the forest after an absence of 30 years, and proceeded to nest. This summer visitor is scarce and highly mobile, needing large areas of productive hunting ground, just the right height and structure of nesting habitat and, being a ground-nesting bird, a large slice of luck where natural predation is concerned. Where the Forestry Commission could assist was in ensuring that casual human disturbance was minimised, and that bird watchers generally could watch and enjoy the birds without adversely affecting them.

Large clutches and the ability to repeat lay are both strategies of birds with increased chances of natural predation or nest loss, and both were illustrated by the Forest pair. The majority of Montagu's harrier nests found in the UK today occur in arable or farmed environments, so it was pleasing to have the chance to observe nesting attempts at close quarters in a more natural heathland environment. However a harrier just needs a suitably high sward of rough vegetation, be it heather or a stand of growing barley.

The relatively late arrival date of these birds in the Forest strongly suggests a failed breeding attempt at their more regular or preferred site. In 1995 an adult male was first observed on 12 May and between 17 and 21 May, a pair was seen in courtship and undertaking nest site selection. The first egg was laid on 23 May, but by 26 May it was evident that the part clutch had been predated. Fortunately the birds selected a second site some 20 metres away and resumed completion of the clutch, laying another three eggs. Two hatched and successfully fledged, with the remaining egg being added.

The nest itself consisted of a small pad of *Molinia* grass, constructed in an opening in the heather approximately 30 cm across, and was added to regularly throughout the incubation period. The observation of food being taken to the nest on 25 June indicated hatching of the first chick. Fledging of the eldest chick was noted on 23 July, and the adults and two young were last seen in the area on 29 August. As is normal with most raptors, the male did most of the food provisioning, with the female not seen to commence hunting until 11 July and then only locally and infrequently. Identification of prey was almost impossible but on one occasion a male nightjar was brought in, and repeated visits locally to a single spot were almost certainly the depletion of a brood of

nestling birds such as stonechat or pipit. Voles and lizards were also identifiable on occasion.

In 1996 the female returned on 17 April and the male on 26 April. Breeding again commenced in the same general area as in 1995, but unfortunately the four well-grown young were taken by a fox on 28 June. In 1997 the female was first observed on 11 April, quartering the Black Gutter valley and paying particular attention to the areas previously used for nesting. The adult male of previous seasons failed to return and the female was joined by a second-summer male on 1 May. A number of visiting ornithologists were of the opinion that the male was too young to breed successfully but this was disproved when prey was seen going into the nest site on 11 June. By 9 July, two young could be seen standing on the heather and their first short flight was made early on 11 July. These two juveniles went on to fledge successfully, with an addled egg remaining in the empty nest. Of 123 recorded visits by the male with food for the incubating female, only two occurred before 8 am; 37 were between 8 am and midday, 54 were between midday and 4 pm, and 30 between 4 pm and 8 pm.

Contentious as it may be, the decision was taken to carry out crow and fox control in the nest area following the losses occurring in 1996, with a total of 21 foxes being accounted for in the period. This potential predation level for all ground-nesting birds is a thought for quiet reflection. In 1998 the first egg laid was predated by crows; as in the first year, the birds quickly moved site and continued to lay. Unfortunately these eggs were again predated by crows and the birds vacated the area completely. It is highly probable that the same scenario that saw their arrival in the Forest during 1995 was repeated here, and the birds moved to another unknown area and attempted to breed again. It was unfortunate that the area chosen for nesting by the harriers was in a part of the Forest attracting larger than usual numbers of corvids, which were visiting the nearby landfill site. Harsh as those losses seemed at the time, a 50% success rate from nesting attempts is a very good result for harriers generally.

Montagu's harriers are still occasionally seen on passage in the New Forest but to date no more nesting attempts have been recorded. The habitat in the Open Forest is thoughtfully and carefully managed, considering the many functions that it has to fill, and large areas are eminently suitable for Montagu's harrier to again breed in. Pressure from disturbance will always be an issue, particularly when birds are prospecting for potential breeding sites. It has been shown, however, that with a little help, successful breeding and viewing opportunities for the public can be achieved if these birds choose once again to favour the Forest in the future.

Common buzzard *Buteo buteo*

The common buzzard in the New Forest has been the subject of a lengthy and continuing study to monitor overall population and breeding success. Started many

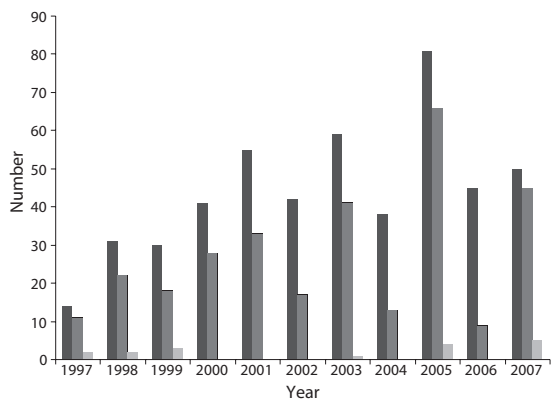
years ago by the late Colin Tubbs and others, and the subject of much written and published work by him, the basic elements of this study are still being continued today. Interested readers are strongly encouraged to consult Tubbs' classic work for further details (Tubbs 1974, 2001; Tubbs and Tubbs 1985). It is pleasing that the New Forest Keepers continue to help with sightings and collection of information.

Throughout most of the last century the buzzard was confined to the western half of Britain, being almost totally absent from eastern areas. The New Forest population was therefore at the extreme eastern edge of its known range. This, coupled with the fact that the area is largely free from widespread chemical use, emphasises the importance of population monitoring.

From 1962 until 1973 the New Forest study area held between 33 and 37 pairs of buzzard. From 1973 until 1982, the number of occupied territories dropped to between 19 and 21 and then remained at this number until 1993. For the next three years the population increased again, reaching a then maximum for the area of 38 pairs. Since then, numbers have continued to increase (Figure 13).

As with a number of other raptor species, the common buzzard is currently undergoing a period of range expansion and increase in abundance, but is still subject to fluctuating breeding success owing to variation in the weather and prey availability. A point not widely appreciated is that prey availability and sometimes weather are often far more crucial in the pre-laying period, for the female to gain good breeding condition, than they are in determining the survival of any hatched or dependant young. Good mast years boost the small mammal population within the New Forest, which in turn boosts the breeding buzzard population the following Spring. This was particularly evident in 2006 when a number of buzzard pairs failed to progress past nest building, despite having established and held territory throughout the year.

Figure 13
Numbers of common buzzard in the New Forest. Note that the 1997 data are incomplete and the number of occupied territories in 2006 is an estimate. Filled bars, occupied territories; dark grey, successful nests; light grey, failed nests or outcome unknown.



Analysis of the data obtained in 2005, when numbers were particularly high, indicated that of the 81 occupied territories, 69 held breeding pairs, leaving a maximum of 12 sites held by non-breeders. Sixty-five pairs successfully raised 112 young and four pairs failed to do so. Of the successful broods 31 had two chicks, 26 had one chick and eight had broods of three.

Honey buzzard *Pernis apivorus*

Unquestionably the most mysterious and elusive raptor of renowned association with the New Forest is the honey buzzard. Until recently almost nothing of any note had been published on this species in this country, and most records here and elsewhere were heavily suppressed from the birding world as a whole. Much of this was wholly justified for what was, and still is, a very scarce and fluctuating population, which is now known to be scattered throughout England, Scotland and Wales (Roberts and Lewis 2003). The difficulties involved in gathering quantitative data on the species have resulted in some previously written work of dubious merit and much assumption unsupported by evidence.

In the New Forest, numbers vary from odd individuals to a handful of scattered pairs, which are often non-breeding (Figure 14). Slowly, our many hundreds of hours of observation on this species are adding to the national picture through communication with field workers elsewhere, and are improving our knowledge of the ecology of the species. Dedicated watchers and enthusiasts have always monitored the small population known in the Forest. Historically a target for illegal egg collectors, much of the early pioneering work was aimed at nest protection, and suspicion and suppression were rife.

In today's more enlightened environment, it is recognised that there is still much to learn about this species in the UK. However, the huge time commitment demanded of honey buzzard watchers means that accumulation of information is a slow and painstaking task. This is obviously reflected in the completeness of the records and information that follows, and by no means can a complete knowledge of the breeding population every year be inferred from the information that has been gathered. New advances in radio and satellite tracking are opening up areas of study that will hopefully increase the pace of our understanding of individual and pair behaviour.

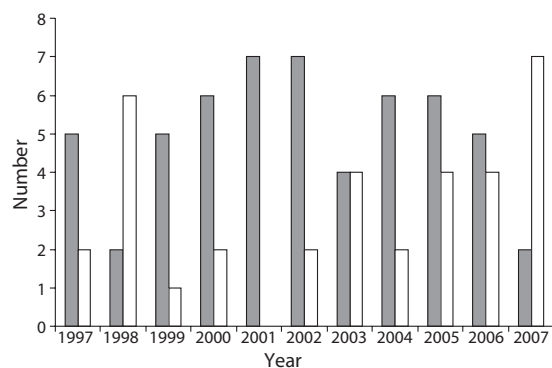
Honey buzzards arrive back in the Forest in early to mid-May, and adult birds that have bred in previous years will commence nest building or refurbishment almost immediately. For the bird watcher, visual sightings are rare before the third week of May as the birds are very discreet at this time. They are also recovering from the rigours of migration and replenishing lost body mass. It is believed that frogs form a large part of the diet at this time, as the nests of the social insects that form a large part of their diet later in the season are only in their early stages of development at this time of year.

Display from breeding pairs is nowhere near as common as much of the literature would indicate. Unmated birds however display vigorously and regularly towards neighbouring birds. Nest selection and building is rarely witnessed but re-occupation of old nests occurs relatively frequently, which enables us to monitor and protect a site in the extremely difficult locating-period around the early stages of incubation. As with common buzzard, some nests are large structures copiously decorated with green shoots and branches, while others can be quite small affairs and not exhibiting much in the way of visible greenery from below. The nest cup itself is however usually well lined with fresh greenery.

Two eggs make up the normal clutch, although ones and threes are occasionally recorded. Laying dates here in the Forest are normally from the last week of May to the end of the first week of June. Incubation is shared by both sexes, although the female is probably responsible for the greater share, with the off-duty bird foraging and feeding for itself. It is assumed but not proven that some of the off-duty bird's time is spent in locating the nests of wasp species for future plundering.

Contrary to some literature, we have no reason to think that weather plays a significant part in honey buzzard reproductive success, although the results of the 2007 season may appear to cast a small query over this view. Even in prolonged wet conditions the birds seem well capable of finding and excavating the nests of a variety of wasp species including hornets. This has also been proven for pairs nesting in the more adverse wet conditions found in North Wales and Scotland. The difficulties of finding nests early in the breeding cycle can obviously bias the information in favour of successful pairs and undoubtedly some pairs fail in incubation. However, we have only recorded one definite failure to date, and this was due to the two eggs being infertile. Known breeding attempts invariably lead to successful fledging.

Figure 14
Numbers of honey buzzard in the New Forest. This includes birds living or nesting outside the area but known to use the Forest for foraging at various times. Filled bars, number of pairs known to attempt breeding; open bars, sites containing singles or pairs but not thought to be breeding.



What seems more significant in determining successful breeding is whether the birds establish a pair bond. New pairs or established individuals trying to attract a new mate often spend their first summer together in mutual fights and territory familiarisation, without attempting breeding. Nest building often occurs late in the season and is known as a 'summer nest'. These structures are often half-hearted affairs but can also be more substantial constructions. If the same pair of young or non-breeders return the following year, then successful breeding is much more likely and the previous year's summer nest can become the focus for the pair, often being refurbished and then used for a full breeding attempt. Some pairs can be quite long-lived and can continue to occupy a territory for some years. Once this pair is lost, however, it can be many years before successful breeding is re-established in the area.

Kestrel *Falco tinnunculus*

One of the least common raptors in the forest is the kestrel. Primarily feeding on a range of small mammals, grazing of the New Forest by cattle, ponies and deer prevents the development of long rough grass favoured by these animals. Many of the kestrels seen hunting the Forest are ranging from more suitable marginal land around the edge, and are hunting lizards and larger insects. Unlike the rest of the raptor species, the numbers of kestrel in the UK have shown a recent decline, thought to be linked to declines in several species of farmland bird associated with more intensive agriculture. Between 1961 and 1981, the New Forest population fluctuated between 16 and 24 pairs.

Hobby *Falco subbuteo*

The summer-visiting and breeding hobby is a bird with an historic association with the lowland heaths of southern Britain, which continues to this day. As it is a most difficult and time-consuming bird to find at the nest, accurate assessment of the breeding population is difficult. Tubbs (1974) suggests a New Forest population of around 19 pairs, whereas Parr (1985), in his study of the ecology of the hobby partly undertaken in the New Forest during 1981 and 1982, found 12 and 16 pairs in these years respectively. During the last twenty years I have known over 20 separate sites that have held breeding hobbies, but how many are occupied in any one year I am unable to say with certainty. Given normal fluctuations in the number of breeding territory holders and non-breeding territory holders, I have no reason to believe the current population is significantly different to that assessed by Parr (1985) and probably numbers around 12–14 pairs. That said, 2007 seems to have been a particularly poor year for hobbies, with a number of sites seemingly devoid of birds.

As with many raptors, hobbies exhibit a high preference for traditional sites, with many clumps or

belts of trees that held nesting birds fifty or more years ago still holding birds today. Hobbies arrive from their African wintering quarters around mid- to late April and on warm sunny afternoons in May can be observed feeding low over the heaths and mire, hunting day-flying moths, dragonflies and other insects. Some of the more productive areas of the Forest can become a magnet for a number of feeding hobbies, and I have watched up to 13 birds feeding in the Bishops Dyke, Denny area at one time. Emperor and fox moths are caught effortlessly by this superbly agile falcon, and provide high-energy food in return for low-energy hunting, which is key to the birds gaining breeding condition after the rigours of migration. Latterly the abundance of many of these larger moth species appear to have declined markedly, and the length of time spent hunting this food source has dropped correspondingly. Feeding observations such as these were almost non-existent through the very poor weather conditions of 2007.

Hobbies are the last of all our raptors to begin breeding. They make no nest themselves but select an old or recently vacated nest of a crow or other suitable structure. New Forest pairs have a strong preference for using crow nests, which in turn have a preference for choosing Scots pine. It is somewhat debatable how much choice is involved in nest selection by a species that uses another bird's nest, but as breeding crow numbers are significantly higher than hobby it can be assumed that a degree of choice is available. Preferred sites are often older, open-grown Scots pine or 'mother' trees occurring in clumps on the open forest, or belts of trees adjacent to heath, large clearings, clearfells or suchlike, and usually command a good view over the surrounding area.

Laying dates of hobbies are fairly precise and commence in early to mid-June. Two or three eggs form the normal clutch, and incubation is 28 days. Fledging occurs after a further 28–30 days. Some pairs can be extremely noisy around the nest site and vigorously defend it against other birds, particularly buzzards. On the other hand, some can be extremely unobtrusive and are easily overlooked.

Peregrine falcon *Falco peregrinus*

Until fairly recently, any sightings of peregrine falcon would have largely been confined to the winter months, and only then made very sporadically. In recent years any reasonable period of raptor observation is likely to yield a sighting of a peregrine. With known breeding sites now scattered around the edge of the Forest, their hunting forays regularly make them observable to serious raptor watchers. Most nest sites are high on pylons or other tall man-made structures, but it is anticipated that in future a tree-nesting pair might be located high on a woodland or heathland edge, in an old crow or raven nest.

In recent years 1994 was the first recorded breeding in the county, with two pairs breeding in 1995.

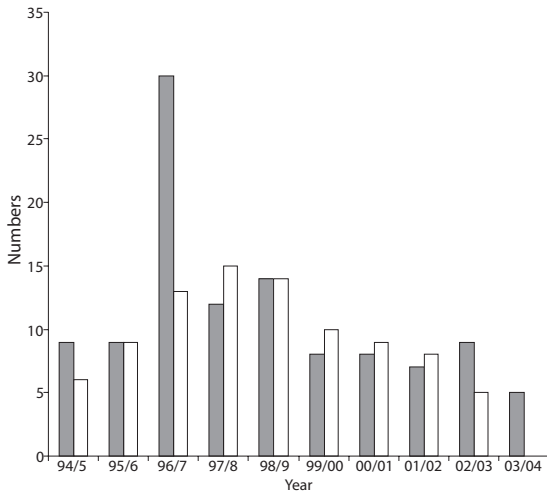
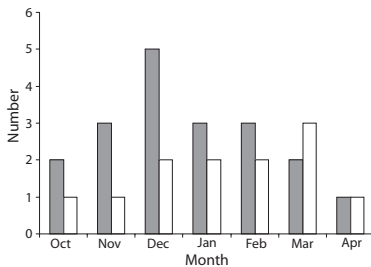


Figure 15
Numbers of hen harriers in the New Forest.

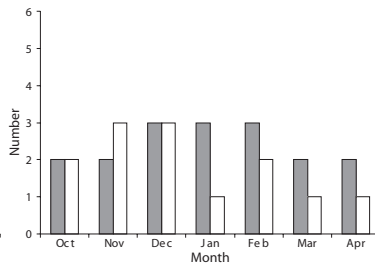
(a) Peak forest counts from Hampshire bird reports (produced by the Hampshire Ornithological Society) for three monthly winter periods. Note that the exceptional influx observed in late December 1996 was the result of a very harsh cold spell of weather moving birds south. Filled bars, October–December; open bars, January–March.

Peak monthly counts of hen harriers using the northern New Forest roost. Filled bars, grey males; open bars, ringtails.

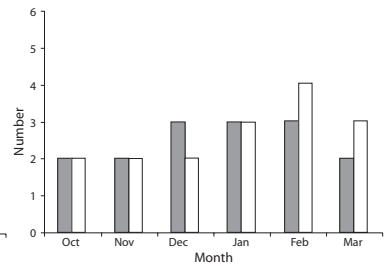
(b) 2004/05



(c) 2005/06



(d) 2006/07



Hen harrier *Circus cyaneus*

During the winter months a few hen harriers still grace the heaths with their distinctive low-quarterming flight. Still a much-persecuted bird on their breeding grounds, it is sad to report a decline in the numbers frequenting the known roost areas in the Forest.

During the late 1980s and early 1990s, up to six areas of the Forest held roosts, although only two of these north of the A31 regularly held birds. All sites were in heather and in the same localities each year. Sadly, in recent years this situation has regressed further and only the very northern roost is regularly used (Figure 15). It is known that birds are occasionally using other sites within the Forest, and work needs to be done to evaluate these irregular roost areas and record the frequency and number of individuals present. The current heathland management burning programme is examining the maintenance of some of these preferred roost sites past normal rotation to assist the birds.

Merlin *Falco columbarius*

Another regular winter visitor to watch out for is the small and easily overlooked merlin. Never a common

bird in the New Forest, it can be seen with perseverance in very small numbers hunting pipits and finches on the heaths and around the woodland edges. Although many of these birds are hunting well beyond the boundaries of the Forest, particularly along the coast, three to four small roosts have been known to occur annually since the 1970s. The number of records of this species seems to have increased slightly in recent years. With three or four birds probably occurring in the north of the Forest, similar numbers are thought to occur along the coastal strip between Calshot and Lymington, and two or three more along the Avon Valley.

The future

These are exciting times for raptor watchers in the New Forest, with common buzzard, sparrowhawk, honey buzzard and hobby populations fairly stable or increasing, peregrine now regularly observed, goshawk added to the list of breeding birds and the increasing possibility that red kite may soon colonise the area. Although never a place that features highly for rare migrants or vagrants, there is always the possibility that osprey, marsh and Montagu's harrier can be seen, and

in most years there are occasional records of red-footed falcon.

Increasing demands for more recreational time, and tolerance to more varied pursuits within the New Forest environment place increasing pressure on all our wildlife and wild places. We all have an obligation to understand how our presence in the Forest can impact both positively and negatively on a range of species, both intentionally and unintentionally. Our interest in wildlife does not exclude us from the equation, and needs to be borne in mind whenever we are out enjoying those special places, such as the New Forest.

Acknowledgements

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Winter Harrier roost data; Matthew Davies, Tim Creed, John Gulliver and Robert Colin-Stokes for their climbing skills and data collection; and Forest keepers and other individuals who pass on useful sightings and information that aid completion of the annual raptor data.

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