Dartford Warblers on the Thames Basin and Wealden Heaths

John M. Clark and John Eyre

Abstract The most recent full UK survey of Dartford Warblers Sylvia undata was carried out in 2006. At that time, the numbers located on the Thames Basin and Wealden Heaths Special Protection Areas (SPAs) represented over 25% of the national population. Taken together, these two SPAs held more Dartford Warblers than either of the traditional strongholds, the New Forest and the Dorset Heaths. Numbers on the Thames Basin and Wealden Heaths SPAs and some peripheral heathland areas have been monitored annually by experienced local observers since the region was recolonised following the severe winters of 1961/62 and 1962/63. The results of those surveys are reported here, including evidence of a dramatic population crash following the severe winters of 2008/09 and 2009/10. Factors affecting the populations over the period and prospects for the future are discussed.

In the UK, the Dartford Warbler Sylvia undata is more strongly associated with lowland heath than any other bird species. As a consequence, it has attained almost iconic status as an indicator of the condition and quality of its specialised habitat. It has been the subject of regular national surveys, so that the recent history of its population is comparatively well known (Wotton et al. 2009).

Since the Dartford Warbler’s discovery, in Kent in 1773, numbers in the UK have
fluctuated, building up during periods with mild winters but falling again after years with heavy snowfall and/or prolonged frost. The population crash which occurred as a result of the 1961/62 and 1962/63 winters has been well documented (Tubbs 1963, 1967). Numbers fell from c. 450 territories in 1961 to just 11 in 1963 (Tubbs 1967).

The species’ susceptibility to harsh winters has also meant that its range has expanded and contracted, sometimes extending to suitable habitat throughout southern England (Wotton et al. 2009) but at other times, as in 1963, being restricted to small areas of prime habitat near the south coast (Tubbs 1967).

Following the population collapse in the early 1960s, national surveys were carried out in 1974 (Bibby & Tubbs 1975), 1984 (Robins & Bibby 1985), 1994 (Gibbons & Wotton 1996) and 2006 (Wotton et al. 2009). Over that period, Dartford Warbler numbers recovered, relatively slowly at first, reaching 560 territories by 1974, falling back to 420 in 1984 after several colder-than-average winters, but then growing more rapidly, to 1,889 in 1994 and an estimated record high of 3,214 in 2006. Over the same period, the range expanded until, at the time of the 2006 survey, suitable habitat was occupied as far north as Norfolk and Staffordshire, and in several counties in south Wales. As the population grew, habitat at higher altitudes was colonised. In 1974 none was found above an altitude of 120 m above sea level but by 2006 6.8% of the UK population was found on heathland above 250 m (Bradbury et al. 2011).

Three successive winters in the past decade, those of 2008/09, 2009/10 and 2010/11, were particularly severe in southeast England. A postscript to the 2006 survey report (Wotton et al. 2009) refers to ‘anecdotal reports, particularly from sites in the Thames Basin and Wealden Heaths, that Dartford Warbler numbers… appear to have crashed following this cold spell of weather [in early 2009]’. The purpose of this paper is to document the history of these populations, particularly in recent years, and consider the factors, including climatic conditions, which have influenced their numbers.

**The Thames Basin and Wealden Heaths SPAs**

Both of these SPAs are composite sites incorporating remaining fragments of lowland heath in the Thames Basin and Western Weald of southern England (fig. 1). Both qualify as SPAs under Article 4.1 of the EC Birds Directive (79/409/EEC) by supporting populations of European importance of three species listed in Annex 1 of the Directive: European Nightjar *Caprimulgus europaeus*, Woodlark *Lullula arborea* and Dartford Warbler.

The Thames Basin Heaths SPA comprises 13 Sites of Special Scientific Interest (SSSIs) in Berkshire, Hampshire and Surrey (table 1). It covers a total area of 8,275 ha, of which 3,641 ha are classified as lowland heath (http://jncc.defra.gov.uk). The Wealden Heaths SPA, which lies immediately to the south, in Hampshire, Surrey and West Sussex, comprises five SSSIs and covers a total area of 3,924 ha, of which 2,061 ha is lowland heath.

![Fig. 1. Map showing the boundaries of Thames Basin and Wealden Heaths component SSSIs, and the main population centres of the area.](image-url)

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Wealden Heaths component SSSIs

A Woolmer Forest
B Broxhead & Kingsley Commons
C Bramshott & Ludshott Commons
D Devil’s Punch Bowl
E Thursley, Hankley & Frensham Commons

178. Dartford Warbler habitat on Ash Ranges, part of Ash to Brookwood SSSI, March 2011.
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(table 1). With a combined area of 5,702 ha of heathland, these two SPAs represent an important remnant of once far more extensive areas of this specialised habitat, around 80% of which has been lost from the region over the past 200 years (C. R. Tubbs in litt.).

Classification of the Wealden Heaths SPA occurred in two stages. Phase 1, comprising Thursley, Hankley and Frensham Commons SSSIs, was classified in February 1994. Based on the 1984 survey results, this area held 1.3% of the national population of breeding Dartford Warblers. Classification of Phase 2 followed in March 1998 when four additional SSSIs (Bramshott & Ludshott Commons, Broxhead & Kingsley Commons, Devil’s Punch Bowl and Woolmer Forest) were incorporated into the SPA. Together, these added another 1% of the national Dartford Warbler population, based on the 1994 survey. The Thames Basin Heaths SPA was proposed in 2000 but classification was delayed until March 2005 while some of the component sites were designated as SSSIs. At the time of the proposal, it held 445 territories or 27.8% of the UK breeding population of Dartford Warblers based on survey work co-ordinated by the RSPB in 1999 (http://jncc.defra.gov.uk).

Land use and habitat
Most of the remaining heathland in these two SPAs exists in the form of large commons, many of which are owned by the Ministry of Defence and used as rifle ranges or training areas. Other landowners include the National Trust, Natural England, the Hampshire and Surrey Wildlife Trusts and various local authorities. Some sites were planted with conifers in the middle years of the twentieth century and are managed by the Forestry Commission or Crown Estates. Some of these have undergone, or are undergoing, gravel extraction during the rotational harvesting of the trees. The whole area is heavily populated, with several large towns interspersed among the SPA component sites (fig. 1). There are also plans for further major housing developments in proximity to many of them.

Of the combined area of 12,199 ha, 46.7% (5,702 ha) is described in the SPA data forms (http://jncc.defra.gov.uk) as heathland (more specifically as ‘heath, scrub, maquis and garigue, and phygrana’), but this percentage varies markedly from site to site. For example, in the Thames Basin, virtually the entire Ash to Brookwood Heaths SSSI, 1,576 ha in total, is classed as mainly lowland heath.

179. Transient Dartford Warbler habitat following clear-felling of forestry plantation on Bramshill SSSI, January 2012.
(www.sssi.naturalengland.org.uk), although in fact only about 60% is suitable for Dartford Warblers. Here, the extensive dry areas support open heathland dominated by Heather Calluna vulgaris together with Bell Heather Erica cinerea, Gorse Ulex europaeus, Dwarf Gorse U. minor and in some areas Bracken Pteridium aquilinum. In contrast, the 673 ha of Bramshill SSSI is predominantly conifer plantation, where suitable habitat is both scarce and transient, occurring only between periods of clear-felling and regrowth of forestry compartments.

Survey history
The Thames Basin and Wealden Heaths straddle the county boundaries of Berkshire, Hampshire, Surrey and Sussex. Given the county-based recording system in the region, co-ordinated monitoring of the area may not have happened but for the emergence in the late 1960s of an enthusiastic group of young birdwatchers at Farnborough Grammar School, led by biology teacher Ewart Jones. This group began regular bird recording in an area which extended up to 8 km either side of the Hampshire/Surrey border and thus included most of the heathland sites which now constitute the Thames Basin and Wealden Heaths SPAs. The first Hants/Surrey Border Bird Report (HSBBR), for 1971, edited by one of the authors of this paper (JMC), appeared in April 1972, and contained the results of a survey of the east Hampshire heathlands; no Dartford Warblers were found. Subsequent editions contained much more information as many other local observers contributed.

In the early and mid 1970s, available information was collected in a post hoc fashion. From 1977, most heathland sites were surveyed annually for a suite of species, either by individuals or by teams of observers on the larger sites. However, there were still gaps in the coverage, especially at Chobham Common, which was outside the HSBBR area. The announcement of the national Dartford Warbler survey for 1994 was the trigger for JMC to formalise the organisation of annual heathland surveys. Recording forms and instructions were sent to observers with the aim of monitoring the full range of heathland birds, including Hobby Falco sub-buteo, Tree Pipit Anthus trivialis, Meadow Pipit A. pratensis, Common Redstart Phoenicurus phoenicurus and European Stonechat Saxicola rubicola as well as the three Annex 1 species.

It was also in 1994 that the EC Habitats Directive was adopted into UK law. This gave added momentum to the establishment of heathland SPAs, which in turn provided stimulus and purpose to the Thames Basin and Wealden Heaths monitoring programmes. The data were used both to justify and to classify the SPAs and, subsequently, to inform decisions relating to development control and land and access management in the face of increasing recreational pressure from the burgeoning human population in the region.

In 2003, the value of the data was recognised by Natural England (then English Nature) with the formalisation of an agreement with the authors to co-ordinate monitoring of Annex 1 birds across the proposed Thames Basin Heaths SPA. This has continued on an annual basis. Although a similar agreement is not in place for the Wealden Heaths, possibly because developmental pressure is less, annual surveys have been maintained.

Survey methods
The method used to monitor Dartford Warblers remained largely unchanged throughout the 1994–2011 recording period. It was based on that used for the 1994 national Dartford Warbler survey (Gibbons & Wotton 1996), for which coverage of the two SPAs was organised by the authors. Most sites were covered by local observers who had worked on the same areas for several years and as a consequence were very familiar with their patches. Some of the larger sites were subdivided to facilitate coverage. Observers were asked to visit their designated sites at least twice, but preferably more frequently, between April and July and to record all Dartford Warbler contacts on their field maps. Most contacts were with singing males, which were considered as indicative of breeding territories.

At the end of the survey period, observers were requested to interpret their survey results and to indicate on their maps the number and locations of Dartford Warbler territories. In general, further interpretation of the data was
not required, the numbers of territories estimated by the observers being considered the most reliable information available.

**Results**

**Pre 1994**

As a result of the severe winter of 1946/47, Dartford Warblers were apparently wiped out from the study area and were not recorded again until 1952. A slow recovery followed and by 1961 there were estimated to be 45–50 territories (Tubbs 1963), although this was probably below the true figure. A period of heavy snow in late December 1961 largely exterminated the species (Raynsford 1963). In 1962, single territories survived at one site in Surrey and at two in Hampshire with breeding proved at one of them (Clark 1984). However, the infamous severe winter of 1962/63 undoubtedly accounted for any survivors. Elsewhere, only 11 territories were recorded in England, with six in the New Forest, four in Dorset and one on the downs in East Sussex (Tubbs 1967). The species’ recovery was slow, but the first return to the study area was noted in 1969, when one pair bred at Chobham Common on the Thames Basin Heaths (D. Parr *in litt.*). There were no further records from Chobham until 1984 but regular breeding recommenced at Ash Ranges in 1970, while the first breeding on the Wealden Heaths was at Hankley Common in 1973.

The numbers of Dartford Warbler territories in the Thames Basin and Wealden Heaths area for the period 1968–93 are shown in fig. 2. Coverage was almost complete in 1977–85 but less so in other years. In years when certain sites were not covered, data from earlier and later years and trends at surveyed sites were used to estimate the missing data.

**Post 1994**

In 1994, to coincide with the national survey of Dartford Warblers, the organised monitoring of all the heathlands described above began. The numbers of territories for 1994–2011 are shown in fig. 3. Coverage was complete in some years but estimates were necessary in a few instances when particular sites were not surveyed or only partially covered.

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**Fig. 2.** Number of Dartford Warbler territories on the Thames Basin and Wealden Heaths, 1968–93 (estimated portion of total shown in pale blue).

**Fig. 3.** Number of Dartford Warbler territories on the Thames Basin and Wealden Heaths, 1994–2011 (estimated portion of total shown in pale blue).
Interpretation of results

As figs. 2 and 3 show, the population of Dartford Warblers on the Thames Basin and Wealden Heaths SPAs increased from zero in 1968 to a peak of almost 1,000 territories in 2004 before collapsing to just 50 territories in 2010. During more than 40 years of recording, the data show periods of rapid growth followed by setbacks, which can be explained by two factors: severe winters and major fires.

The population increase through the 1970s was tempered by extensive heath fires, which destroyed much suitable habitat in 1974 and again in the hot summer of 1976. Dartford Warblers were also badly affected by heavy snowfall in the winters of 1978/79, 1981/82, 1985/86 and 1986/87. Nonetheless, in 1990 the population in the study area surged to an estimate of 140 territories, the first time it had reached this level since the 1930s. However, a double disaster was to strike. On Ash Ranges (part of Ash to Brookwood Heaths SSSI), which held 69 territories, a massive fire in the late summer of 1990 destroyed almost all the suitable habitat (plate 180), while a further spell of severe winter weather in early 1991 depleted the population to just 24 known territories (including only three on Ash Ranges) and an estimated total of 32. Mild winters and a lack of heath fires permitted a rapid recovery, however, such that the 1990 level was exceeded in 1994.

The Dartford population continued to grow through the 1990s. The main setback during this decade was in early 1996, when a spell of hard weather had localised effects, most noticeably at Ludshott Common, where numbers fell from 43 territories in 1995 to one in 1996. At 170 m, this Wealden site is the highest in the study area apart from the nearby Devil’s Punch Bowl, and as a consequence it suffered comparatively heavy snowfall. In 1999 the population reached an estimated 808 territories, although a late-summer fire on Ash Ranges, the most important site with 212 territories, destroyed the habitat in 48 (22.6%) of those territories. Subsequently numbers increased slowly and peaked in 2004, when 886 territories were counted and a total of 987 was estimated. This figure would almost certainly have been higher but for an extensive fire in early 2003 on Pirbright Ranges (part of Colony Bog & Bagshot Heaths SSSI); this held 114 territories in 2001, an estimated 105 in 2002 but only 23 in 2003. At this time, densities at sites with optimum habitat reached or even exceeded 20 territories per 100 ha. On 785 ha of good habitat on Ash Ranges, probably the most densely populated area in the UK, numbers peaked at 253 territories in 2003, a density of 32.2 per 100 ha.

180. Ash Ranges following the major heath fire in August 1990. The blackened ground and ‘burnt-out’ Silver Birch Betula pendula trees give an almost unworldly feel to the landscape.
The winter of 2005/06 was colder than average and the 2006 total was 32% lower than that in 2005 (and the lowest in the first eight years of the decade), at an estimated 659 territories. The national survey in 2006 still produced a record total, however, estimated at 3,214 territories (Wotton et al. 2009). Wotton et al. applied a correction factor to allow for birds that may have been missed when sites were visited fewer than four times. Thus the total counted on the two SPAs was increased from 654 (counted) to 691 (95% confidence limits of 500–897). We considered this to be an overestimate and, to be consistent with the methodology adopted for our other counts, increased the observers’ counts by only five additional territories (to the 659 shown in fig. 3). Mild weather prevailed in the winters 06/07 and 07/08, allowing a further increase to an estimated 978 territories in 2008. Following that summer, however, the species’ extreme vulnerability to severe weather was graphically demonstrated. Prolonged spells of hard frost and heavy snowfall in the winters of 08/09 and 09/10 triggered a decline to 112 territories in 2009 (a fall of 88.5%) and 50 territories in 2010 (55.4%). This brought the population to its lowest level since 1991. Despite a further spell of severe winter weather in December 2010, numbers increased slightly to 53 territories in 2011.

Weather in the 2008/09, 2009/10 and 2010/11 winters

The percentage drop in Dartford Warbler numbers after the 2008/09 winter was the largest on record since the 1960s, when the species was eliminated on the Thames Basin and Wealden Heaths. This suggests that conditions in the 08/09 winter were more severe than in any during the intervening years. In fact, the first ten days of January 2009 were particularly cold across the region. With high pressure and little wind, temperatures fell quickly to bring unusually severe frosts. At Farnborough, Hampshire, the mean daily temperature exceeded freezing point on only one day between January 3rd and 10th, with the lowest temperature of -10.7°C recorded on 7th January (www.tutiempo.net). That prolonged spell of freezing conditions would undoubtedly have taken its toll on a small insectivorous passerine but the situation
worsened in early February. There were heavy snowfalls overnight on February 1st/2nd with Hampshire and Surrey particularly badly hit. On 2nd February, snow depths of 31 cm were recorded at Epsom, Surrey (in the Thames Basin), and 23 cm at Alice Holt, Hampshire, on the western edge of the Weald (www.metoffice.gov.uk). The evidence suggests that the Thames Basin and Wealden Heaths area had its heaviest snowfall since late December 1962. The thick snow cover lay through the following week, blanketing Dartford Warbler habitat on all the heathland sites.

Low temperatures and heavy snowfall are unusual in the Thames Basin and Western Weald, so it was surprising that, during the following winter, January 2010 was the coldest month on record since 1987. In Fleet, snow showers began on 2nd January and heavy falls on 5th and 6th gave a maximum cover of 23 cm on 6th (Climatological Observers Link 477, January 2010). As in 2009, snow blanketed Dartford Warbler habitat for several days and resulted in a further fall in their numbers. Together, the two consecutive winters resulted in a population reduction of almost 95%.

In the 2010/11 winter, December was the coldest in over 100 years and the coldest month since February 1986, with the average temperature 5°C below the 1971–2000 mean. Snow fell to a depth of 25 cm in Surrey on 1st–2nd and further heavy falls were recorded on 18th and 20th. A gradual thaw set in at the end of the month and conditions during the rest of the winter were generally mild with few frosts. Local observers feared the worst but, surprisingly, survey work in 2011 revealed an overall increase from 50 to 53 territories, although this masked a greater increase on the Thames Basin Heaths, from 38 to 47 territories, and a decrease on the Wealden Heaths from 12 to 6, two of which held unpaired males.

Discussion
Implications for habitat management
Prior to 2009, there was a widespread perception that the growth in Dartford Warbler numbers over the preceding two decades was due, at least in part, to active management of the habitat on both SPAs. It is certainly true that clearance of scrub and woodland on some of the sites had created additional habitat but the impact of the 2008/09 and 2009/10 winters suggests that the population growth owed more to the run of mild winters than to increased availability of habitat. The fact that numbers did not fall further following a third successive hard winter is surprising. A possible explanation is that in 2010/11 the heavy snowfall occurred early in the winter, when the birds would have been in better physical condition to locate food supplies and survive through to the spring.

However, the survey results do give some clues about how habitat might be better managed to maximise the chances of the birds surviving hard winters. Although almost 95% of the population succumbed during the 2008/09 and 2009/10 winters, most of the birds that survived were found in areas containing extensive areas of dense gorse. Sites with less gorse, such as Ash Ranges and Hankley Common, suffered the heaviest losses. This observation is consistent with previous findings (Bibby 1977) and points to gorse management as a key factor in optimising Dartford Warbler habitat. Studies have shown that the birds obtain the majority of their invertebrate food from gorse where it is available (Bibby 1979). Dense gorse also provides a refuge during periods of heavy snowfall because, unlike heather, it is able to support the snow thus maintaining shelter and access to food beneath the canopy. For Dartford Warblers, we believe that one of the aims of heathland management should be to retain areas of dense, medium-height gorse. Its wholesale removal, through cutting, overgrazing or fires, risks reducing the chances of birds surviving hard winters. This is more critical for Dartford Warblers than for other gorse-dwelling insectivorous birds, such as Stonechats. Whereas most adult Dartford Warblers remain on the Thames Basin and Wealden Heaths throughout the year, the majority of Stonechats leave in autumn and do not return until late February or March.

The Thames Basin and Wealden Heaths populations in the national context
Long-term monitoring has shown how important the Thames Basin and Wealden
Heaths SPAs are to the UK population of Dartford Warblers. A total of almost 1,000 territories at times of peak numbers represents in excess of 25% of the national figure. In the national survey of 2006, their combined populations exceeded those of both the New Forest and the Dorset Heaths SPAs (Wotton et al. 2009). The protection afforded by SPA status should ensure that the area of lowland heath in the Thames Basin and Western Weald is not further eroded. However, plans to build many new houses in proximity to both areas means that recreational pressures at some of the sites are likely to increase, leading to more fires and higher levels of disturbance. If the SPAs are to retain their value as prime sites for Dartford Warblers in the UK, it is crucial that the habitat is maintained in the best possible condition and plans to minimise disturbance are implemented as soon as possible. Then, weather permitting, the population of this iconic species should recover and be sustainable at the high level recorded in recent years.

Acknowledgments
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References

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John Clark is a lifelong resident of Hampshire and started birding in the county in 1968, at the age of 15. Having produced the annual Hants/Surrey Border Bird Report from 1971 onwards, his Birds of the Hants/Surrey Border was published in 1984 (and he is currently working on a new edition). He joined the county records panel in 1977, edited the Hampshire Bird Report through the 1980s, co-edited (with John Eyre) Birds of Hampshire, published in 1993, and was county recorder from 1993 to 2010. John Eyre began birding in Hampshire in 1976 when he moved into the county from Cheshire. Subsequently, he has been actively involved in Hampshire Ornithological Society, first as Chairman of the Field Studies Committee and then as Chairman of the Society, from 1992 to 2012. He co-edited Birds of Hampshire with John Clark, co-author of this paper. He is particularly interested in heathland birds and is currently working on the productivity of Woodlarks Lullula arborea on the Thames Basin Heaths SPA.