Dartford warbler
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Dartford Warbler *Sylvia undata* Boddaert

Climate Change Sensitivity:	POTENTIAL BENEFIT	Ability to Manage:	MEDIUM
Non climatic threats:	MEDIUM	Vulnerability:	LOW

Summary

The Dartford warbler reaches the northern limit of its range in the UK and is highly sensitive to cold winters. Recent climatic warming is benefitting the species in England, driving an expansion of both its range and population size. Across its full European range, climate change poses a threat, with substantial losses in the climate suitability in its core areas of France and Spain. The UK will therefore become more important for the conservation of this species in Europe. Ensuring the optimum management and protection of its core sites and facilitating its spread through habitat restoration and creation in new areas of climate suitability are the key adaptation responses.

Description

The Dartford warbler is a small, dark warbler, distinguished from other UK warblers by a long thin tail that it often cocks upwards like that of a wren, and the fact that it is one of only two warbler species to spend the whole year in this country. It frequently perches on top of gorse bushes to sing, and is often seen flying between the gorse.

Its plumage blends in with the vegetation of its preferred heathland habitat. The adult male has darkish grey upper parts and has dull wine-red colouration below, except for the centre of the belly which has an off-white patch. Its red eye-ring is striking. The sexes are similar, but the adult female is usually less grey above and paler below. Juvenile birds are similar to females, or even browner.

Ecology and distribution

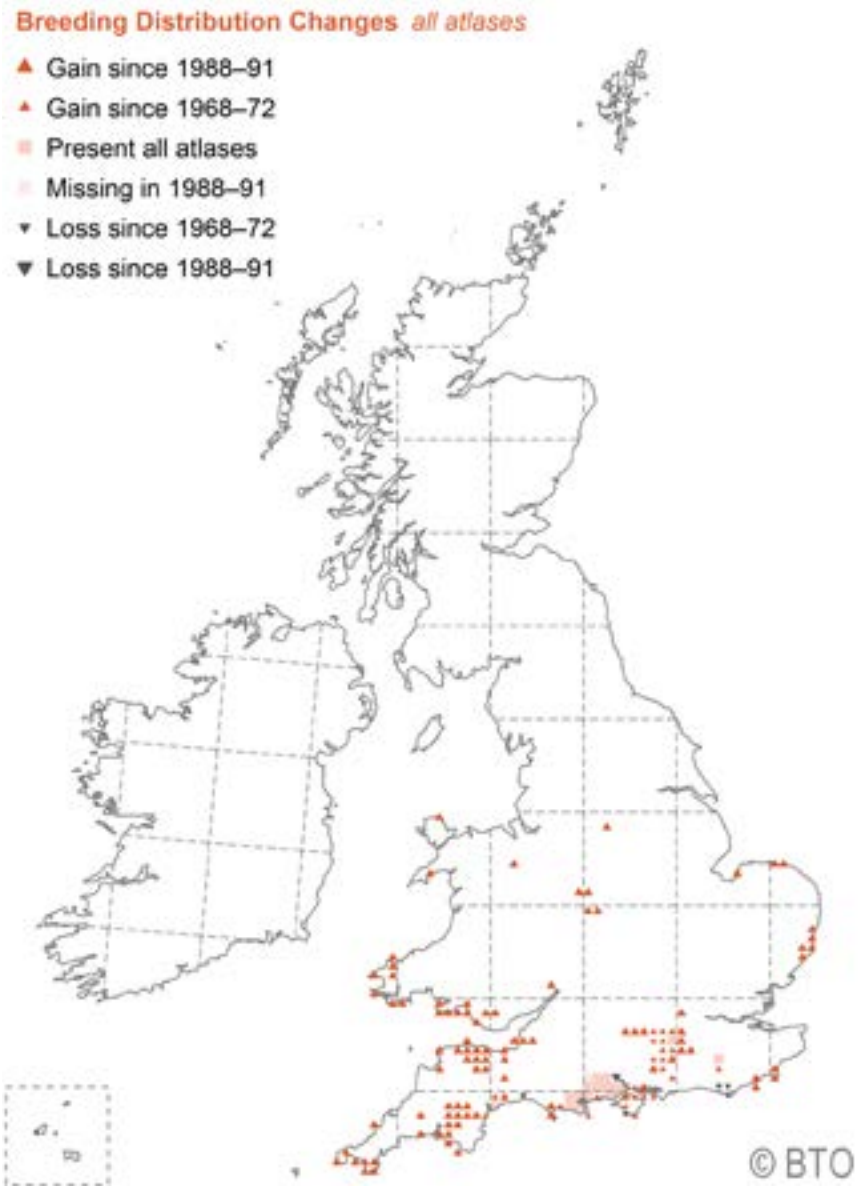
Unlike many warblers in England, the Dartford warbler is a resident. It is mainly found on heathland in the south and east of the country. The bird is territorial, favouring gorse dominated heathland (van der Berg *et al* 2001). The birds typically nest in gorse *Ulex europaeus* or common heather *Calluna vulgaris*. The nest is a compact cup-shape, usually located in dense bushes within 60 cm of the ground. Eggs are laid from mid-April in southern England. Chicks are fed on invertebrates by both parents. Fledging takes 10–14 days and the young are fed by their parents for up to a further two weeks. Two, and occasionally three, broods are raised in a year.

Gorse is the preferred habitat in England where it is present (Bibby 1979a) as it provides the majority of the bird's invertebrate food. In Europe, the Dartford warbler is a species of relatively early successional heathland and low Mediterranean scrublands (Cantos & Isenmann 1997), being able to colonise within two years of fire (Pons *et al* 2012). An increase in scrub and woodland reduces the habitat suitability (Pons *et al* 2012; Regos *et al* 2015).

The bird reaches the northern limit of its European range in the UK (Huntley *et al* 2007). Historically it was broadly distributed across the southern UK, stretching up into the Midlands (Holloway 1996). In the second half of the 20th century it suffered a considerable decline associated with the loss or degradation of its heathland habitat. Superimposed on this were periodic population crashes associated with severe winters (Bibby 1979b; Gibbons & Wotton 1996). The Dartford warbler has the ability to recover rapidly following population crashes due to repeated nesting and a high survival rate for the young. The birds are prone to human disturbance when nesting in heather (Murison *et al* 2007) and show an element of avoidance of small fragmented sites and those in close proximity to woodland, intensive agriculture and urban areas (van der Berg *et al* 2001).

Since the 1980s, it has extended its range northwards, colonised additional sites within its current range, and spread to additional sites to the east and west and at higher altitudes (Thomas *et al* 2012; Bradbury *et al* 2011). Colonisation of sites is more likely in landscapes containing protected areas (Gillingham *et al* 2015) than in landscapes with fewer designated sites.

Historic changes in the distribution of the Dartford warbler
(reproduced with permission of the BTO, from Balmer *et al* 2013)



Confidence in climate change impacts[23]

Distribution change: **HIGH CONFIDENCE** Mechanism: **HIGH CONFIDENCE**

Climate change projections suggest that the suitable climate space for the Dartford warbler will expand considerably within England and Wales, which aligns with the current range expansion. The latest national survey in 2006 showed that the population had increased from ten after the 1962/63 winter, to 3,214 territories in England and Wales, with range expansions in the southwest and in East Anglia and a few records from Staffordshire and West Midlands (Wotton *et al* 2009). Newly colonised sites tended to be on steeper, more south-facing slopes than previously colonised sites, and some were at higher altitudes than previously, suggesting that climate change has been influential in its range expansion (Bradbury *et al* 2011).

23 An assessment of the strength of evidence that distributions are changing and the mechanisms causing change are understood. Refer to Part B, section 5 of the species section introduction for more information.

In England, Dartford warbler populations suffer dramatically in extremely cold winters. Following the severe winters of 1961/63, the breeding population collapsed from 450 pairs to just 10. More recent cold winters have had an adverse impact, but have not been sufficiently cold to influence the long-term population trend (Palmer *et al* 2017). Dense gorse has been shown to afford some level of protection during periods of extreme cold. Unlike heather, it is able to maintain shelter and access to food beneath the canopy during periods of snow (Clark & Eyre 2012).

Recovery of populations from cold events is most rapid on heathland compared to sub-optimal habitats such as woodland (Jiguet & Williamson 2013), which are then recolonised once the core populations have recovered.

The Dartford warbler is vulnerable to the loss or degradation of habitat due to wildfire and inappropriate fire management regimes (Regos *et al* 2015). The species is also sensitive to the impact of drought impacting the food supply of juveniles (Bibby 1979b); a threat likely to become more prevalent, especially on sites in the south and east of England. Its sensitivity to human disturbance may also be important if warmer summers lead to increased recreational use of their breeding grounds.

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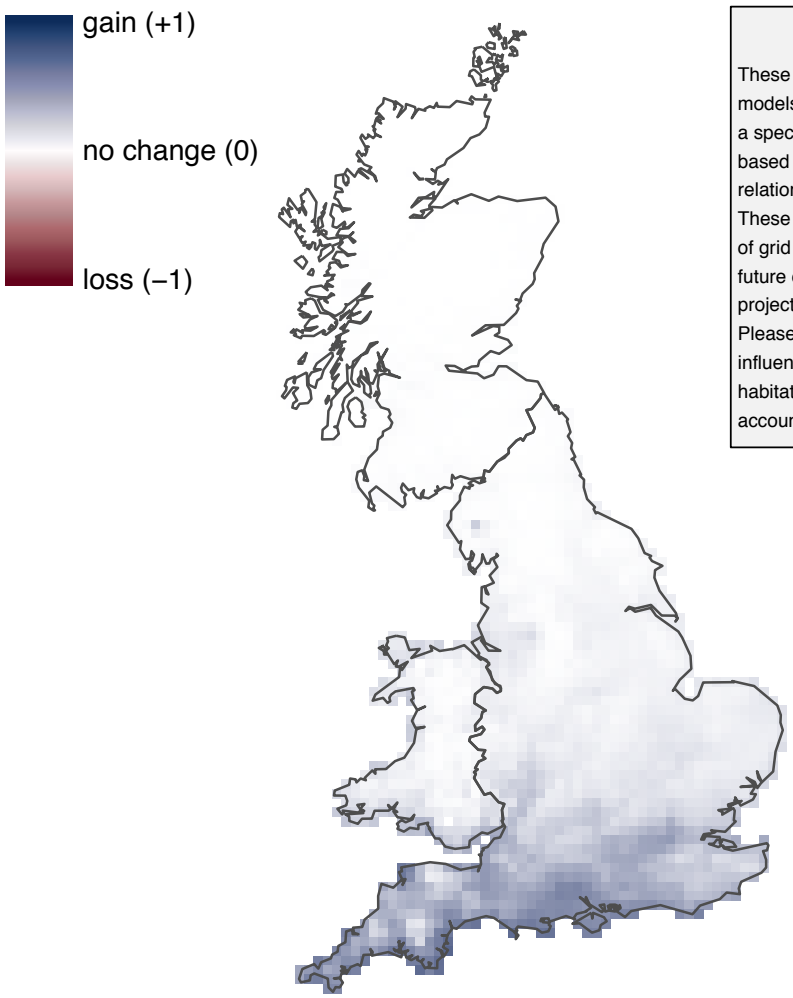
Projected change in potential distribution of Dartford warbler in the UK with a temperature rise of 2°C (Pearce-Higgins *et al* 2015).



Climate suitability

These maps are created using statistical models which describe the probability that a species will be found in a 10 km grid square, based on its current distribution and its relationship to a number of climatic variables. These can be used to model the suitability of grid squares for a species under possible future climates when climate change projections are taken into account.
Please note that other variables that influence species distributions, such as habitat and land–use change, are not accounted for in the modelling process.

Confidence of change

This species was not included as part of Natural England's Research Report NECR175 assessing the risks & opportunities for species in England as a result of climate change, so no assessment of confidence has been made for this species

Current climate scenario

Climate suitability

Low (2°C change) climate scenario

Created by:	University of York	Created for:	Natural England	Created on:	August 17 2016

Further information on these projections can be found in the introduction to the species section (Part A, Section 3 and Part B Section 5). Note that this is a guide to where a species may be able to survive, it does not capture other issues such as habitat availability and fragmentation – see text above for further details. Contains public sector information licensed under the Open Government Licence v3.0. Please also see acknowledgement and copyright at the beginning of this manual.

Please read this case study alongside the relevant habitat sheets.

Adaptation options

- Ensure optimum management on existing sites, including the promotion of patches of dense gorse of around 0.5-1.5 m in height and minimising disturbance.
- Where possible, expand the area of suitable habitat within existing heathland sites through the reduction of woodland and scrub, while conserving gorse, and in fragmented landscapes seek to link up patches of suitable habitat.
- On drought affected sites, especially in the south and east, address factors that adversely affect hydrology.
- Within a landscape, identify core areas and ensure appropriate management is in place. These areas may be based on the presence of suitable habitat, or topography that leads to a warmer microclimate and where the hydrology means it is less susceptible to drought. These will remain important refugia during extreme events.
- Consider creating, restoring and managing heathland adjacent or close to existing sites.
- In upland areas, particularly on south-facing slopes, create and manage suitable areas of heathland habitat, especially tall gorse and heather, and remove conifers.
- Put in place fire management contingency planning, especially in the drier heaths of the south and east.
- Put in place access controls on sensitive sites to avoid disturbance of breeding pairs.
- Ensure sufficient flexibility of management to enable winter operations to be undertaken within a shorter operation window, and during possible extreme weather events.
- Adjust conservation goals and objectives, particularly in northern sites, to reflect expanding populations and the increasing importance of the UK for the species.

Relevant Countryside Stewardship options

LH1 Management of lowland heathland

LH2 Restoration of forestry and woodland to lowland heathland

LH3 Creation of heathland from arable or improved grassland

Case Studies

In order to encourage the expansion of Dartford warblers in southern England, in 2002 the RSPB bought 164 ha of commercial conifer plantation at Farnham Heath in Surrey. A small (<5 ha) area of heath immediately adjacent, managed by the Amphibian and Reptile Conservation Trust, held good numbers of sand lizards, but was too small and isolated to support Dartford warblers.

The land was former heathland with good potential for restoration, and following an Environmental Impact Assessment process, felling began in 2004 to remove most of the plantation. This continued in phases until 2014, with just over 100 ha of heathland currently restored.

Regeneration of heather from the seedbank was excellent, so there was no need to import seed or turf. Common gorse regeneration, however, was patchy. Attempts to transplant seedlings from elsewhere on the reserve, or to grow gorse from seed and plant it out, have not been especially successful.

Dartford warblers first bred on the reserve in 2015, and had increased to five pairs by 2017. Woodlarks, nightjars, tree pipits and stonechats all breed on the restored heathland, as do silver studded blue and grayling butterflies, and sand lizards have spread from their isolated refuge to colonise the expanded heath.

References and further reading

Balmer, D.E., Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. & Fuller, R.J. (2013). Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland. BTO Books, Thetford.

Bibby, C. J. (1979a). Foods of the Dartford warbler Sylvia undata on southern English heathland (Aves: Sylviidae). Journal of Zoology, 188(4), 557-576.

Bibby, C.J (1979b) Dartford Warblers in England'; *British Birds*, 72,10–22.

Bradbury, R. B., Pearce-Higgins, J. W., Wotton, S. R., Conway, G. J., & Grice, P. V. (2011). The influence of climate and topography in patterns of territory establishment in a range-expanding bird. Ibis, 153(2), 336-344.

Cantos, F.J. & Isenmann, P. (1997) Dartford Warbler. In The EBCC Atlas of European Breeding Birds. (Ed. by Hagemeijer, W.J.M & Blair, M.J.): 585. Poyser, London.

Clark, J. M., & Eyre, J. (2012). Dartford warblers on the Thames Basin and Wealden heaths. *British Birds*, 105(6), 308.

Gibbons, D. W., & Wotton, S. (1996). The Dartford warbler in the United Kingdom in 1994. *British Birds*, 89(5), 203-212.

Gillingham, P.K., Bradbury, R.B., Roy, D.B., Anderson, B.J., Baxter, J.M., Bourn, N.A., Crick, H.Q.P., Findon, R.A., Fox, R., Franco, A. and Hill, J.K., 2015. The effectiveness of protected areas in the conservation of species with changing geographical ranges. Biological Journal of the Linnean Society, 115(3), pp.707-717.

E.J. Green. 2017. Population responses to climate change of two European warbler species. Unpubl. PhD Thesis, Uni of Cambridge.

Holloway, S.J. (1996). The historical atlas of breeding birds in Britain and Ireland: 1875-1900. T & AD Poyser, London.

Huntley, B., Green, R.E., Collingham, Y.C. & Willis, S.G. (2007) A climatic atlas of European breeding birds. Lynx Edicions, Barcelona.

Jiguet, F., & Williamson, T. (2013). Habitat-dependent population recovery in the Dartford Warbler Sylvia undata following a severe winter episode. Bird study, 60(3), 391-398.

Murison G., Bullock JM., Underhill-Day J, Langston, R., Brown, A. F., & Sutherland, W. J. (2007). Habitat type determines the effects of disturbance on the breeding productivity of the Dartford Warbler Sylvia undata. Ibis, 149(s1), 16-26.

Palmer, G., Platts, P.J., Brereton, T., Chapman, J.W., Dytham, C., Fox, R., Pearce-Higgins, J.W., Roy, D.B., Hill, J.K. and Thomas, C.D., 2017. Climate change, climatic variation and extreme biological responses. Phil. Trans. R. Soc. B, 372(1723), p.20160144.

Pearce-Higgins, J.W., Ausden, M.A., Beale, C.M., Oliver, T.H. & Crick, H.Q.P. (eds). 2015. **Research on the assessment of risks & opportunities for species in England as a result of climate change**. Natural England Commissioned Reports, Number 175.

Pons P, Clavero M, Bas JM, Prodon R (2012) Time-window of occurrence and vegetation cover preferences of Dartford and Sardinian Warblers after fire. J Ornithol 153:921–930.

Regos, A., D'Amen, M., Herrando, S., Guisan, A., & Brotons, L. (2015). Fire management, climate change and their interacting effects on birds in complex Mediterranean landscapes: dynamic distribution modelling of an early-successional species—the near-threatened Dartford Warbler (*Sylvia undata*). Journal of Ornithology, 156(1), 275-286.

RSPB **Gorse advisory sheet**.

Thomas, C.D., Gillingham, P.K., Bradbury, R.B., Roy, D.B., Anderson, B.J., Baxter, J.M., Bourn, N.A., Crick, H.Q., Findon, R.A., Fox, R. and Hodgson, J.A., 2012. Protected areas facilitate species' range expansions. Proceedings of the National Academy of Sciences, 109(35), pp.14063-14068.

van den Berg, L.J., Bullock, J.M., Clarke, R.T., Langston, R.H. and Rose, R.J., 2001. Territory selection by the Dartford warbler (Sylvia undata) in Dorset, England: the role of vegetation type, habitat fragmentation and population size. Biological Conservation, 101(2), pp.217-228.

Wotton, S., Conway, G., Eaton, M., Henderson, I., & Grice, P. (2009). The status of the Dartford Warbler in the UK and the Channel Islands in 2006. *British Birds*, 102(5), 230-246.