



Definition of Favourable Conservation Status for Twite *Linaria flavirostris*

Defining Favourable Conservation Status Project

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About the DFCS project

Natural England's Defining Favourable Conservation Status (DFCS) project is defining the minimum threshold for thriving habitats and species in England.

We are doing this so we can say what good looks like, recommend actions to get them there and keep them that way.

Using Natural England's expert evidence and specialist knowledge, our DFCS definitions will set out our aspirations for these species and habitats in England.

We are publishing these tools so that you, our partners and decision-makers can do your bit for nature, better.

As we publish more of our work, the format of our definitions may evolve, however the content will remain largely the same.

This definition has been prepared using current data and evidence. It represents Natural England's view of FCS based on the best available information at the time of production.

All blocks of evidence within the definition should be given one of three confidence levels [High, Moderate, Low], based on the quality of the evidence, its applicability and the level of agreement.

Quality of evidence is defined as follows:

- Robust evidence is that which has been reported in peer-reviewed literature, or other reputable literature, from well-designed experiments, surveys or inventories that shows signs of being applicable generally.
- Medium evidence is that reported from well-designed experiments, surveys or inventories but from only one or a small number of sites, with uncertainty over its more general applicability, or is correlational or circumstantial evidence.
- Limited evidence includes 'expert opinion', based on knowledge of ecological factors that plausibly suggest an effect, but there is no circumstantial or direct evidence available.

Confidence levels are assigned as shown in the following matrix (after IPCC 2010):

High agreement Limited evidence	High agreement Medium evidence	High agreement Robust evidence
Medium agreement Limited evidence	Medium agreement Medium evidence	Medium agreement Robust evidence
Low agreement Limited evidence	Low agreement Medium evidence	Low agreement Robust evidence

Introduction

This document sets out Natural England's view on the contribution England needs to make to achieve Favourable Conservation Status (FCS) for **Twite *Linaria flavirostris***. The England contribution is defined in terms of the natural range and population of the species and the extent of habitat necessary for long-term maintenance of populations.

This section contains the summary statement of the England contribution. Sections 2 – 5 describe the evidence considered when defining FCS for each of the three parameters. Annex 1 contains references and Annex 2 sets out the UK and England position in the 10th Birds Directive report.

This document does not include any action planning, or describe actions, to achieve FCS where the species is not considered to be in FCS. These will be presented separately, for example within restoration strategies.

England contribution to FCS

Favourable conservation status for Twite will be achieved when its range reflects that identified in the 1968-72 atlas with breeding birds present, in scattered populations, throughout the Pennine chain and associated uplands of Northern England and its population has recovered to approximately 8000 breeding pairs. This would be more than a tenfold increase over its population in 2013 (the date of the most recent targeted survey) and would require the restoration of a moor-edge landscape of deep heather or bracken on the moor in proximity to vascular plant-rich pastures and meadows. Winter population size is dependent in part on breeding success in Scotland, but the species winter range largely reflects the distribution of salt marshes around the English coast. It should be noted however that this is a species at the southern edge of its range and climate change may have an impact on future distribution and abundance.

Definitions and ecosystem context

Species definition

Twite *Linaria flavirostris* (previously *Carduelis flavirostris*)

Subspecies: *bensonorum/pipilans*.

Subspecies *pipilans* breeds and winters in Britain and Ireland, with some birds wintering on near-continental coasts of The Netherlands, Belgium, Germany and France. Subspecies *bensonorum* breeds in the Outer Hebrides and some of these birds may winter in north-west England (as we know birds from the western Scottish islands winter in north-west England).

Source: Brown & Grice 2005

Confidence: High

Species status

Red list status:

- **Global:** Least Concern *Source: The IUCN Red List of Threatened Species. Version 2016-2*
- <http://www.iucnredlist.org/details/22720438/0>
- **European:** Least Concern *Source: European Red List, The IUCN Red List of Threatened Species. Version 2016-2*
- **GB:** Red List *Source: Birds of Conservation Concern 4*
https://www.bto.org/sites/default/files/shared_documents/publications/birds-conservation-concern/birds-of-conservation-concern-4-leaflet.pdf

Habitat for the species definition

Nesting habitat in England is now limited to unenclosed upland moorlands adjacent to grasslands. Tall heather and bracken are strongly favored for nest placement. Birds will forage regularly up to 3.5 km from the nest to feed in moorland and grassland habitats rich in small plant seeds, including pastures and hay meadows, providing a continuous seed supply through the breeding season, typically from late March to the end of September. Outside the breeding period the species tends to form flocks, with favoured winter habitats in the coastal lowlands – especially open salt marshes where the birds feed on seeds of sea aster, annual sea-blite, glasswort and other coastal plants - although some birds remain in the uplands and use moorland or agricultural habitats. In the coastal lowlands they also need thicker vegetation for roosting and a supply of fresh water for drinking.

The height, cover, variation and composition of vegetation are important characteristics of the breeding, winter and passage habitats used by this species, variously providing nesting, rearing, concealment, feeding and roosting areas.

This species is known to favour large areas of open terrain, largely free of obstructions, in and around its roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within feeding and roosting habitat to detect approaching predators, or to ensure visibility of display behaviour.

Sources:

Terrestrial SPA species feature framework - Natural England Internal Document

Brown & Grice 2005

Confidence: Moderate

Ecosystem context

The species has a disjunct breeding distribution across Eurasia with two population centres in Europe and a further population in central Asia. In Europe, twite occurs in two widely separated populations, one in north-west Europe, and the other in the Caucasus mountains, eastern Turkey and states between the Black and Caspian Seas.

In north-west Europe, three subspecies are described: the nominate race *C. f. flavirostris* which breeds in Norway and north-west Russia; *C. f. pipilans* which breeds in Britain and Ireland (except the Western Isles) and which, as a breeding bird, is a Britain and Ireland endemic, and; *C. f. bensonorum* which, as a breeding bird, is endemic to the Western Isles of the UK.

The nominate race is migratory; wintering from southern Norway and southern Sweden down into central Europe as far south as northern France, Austria and Hungary. The British and Irish subspecies *pipilans* and *bensonorum* are only partially migratory. The bulk of the population breeds in western and northern Scotland, with scattered populations throughout the rest of Scotland, Northern England, Wales and the coasts of Ireland. Birds from the English breeding population generally move south east in winter from their Pennine breeding grounds to winter on the coast of the southern North Sea from the Humber to the Thames Estuaries, with some birds continuing to the south coast of Kent and on to continental Europe. Birds wintering on the Irish Sea coasts of north west England mainly originate in western Scotland, while birds wintering on the coast of north east England may be Scottish breeders.

Sources: Twite *Carduelis flavirostris* in the UK: consideration of treatment under Article 4 of the Birds Directive, JNCC 2002 <http://jncc.defra.gov.uk/pdf/twite.pdf>

Brown & Grice 2005

Confidence: Moderate

Natural range and distribution

Metric
10 km square
Historic range
<p>In both short and long term the range trend of this species is considered to be decreasing.</p> <p>Breeding: Formerly present in both moorlands and lowland peatlands in northern England and upland areas as far south as Devon, by the time of the 1968-72 breeding bird atlas the range had contracted to the Pennines from Cumbria to the Peak District with only a few scattered pairs or colonies in other northern locations.</p> <p>The reasons for this range contraction are not clearly understood but are likely to have included a combination of factors including intensification of upland management, loss and degradation of lowland peatlands and climatic change impacting on a species at the southern limit of its north-west European range.</p> <p>Non-Breeding: At the time of the 1981-84 wintering bird atlas twite were found in salt marsh areas around the entire English coast with a more scattered inland distribution focused mainly on the upland fringe close to breeding areas.</p> <p>Sources: <i>Brown & Grice 2005; Sharrock 1976; Lack 1986.</i> Confidence: <i>Low/Moderate</i></p>
Current range
<p>Breeding: Between the first and second breeding bird atlas (1988-91), the breeding distribution stabilised and may have slightly increased (breeding season birds were recorded in 81 10km squares in the 1988-91 atlas compared to 72 in first atlas) but since then this decline has continued. In the most recent atlas (2007-11 evidence of breeding was recorded in only 37 10km squares with confirmed breeding in only 14 10 km squares in England). All confirmed breeding records were in the South Pennines or Peak District with only scattered breeding season records from the rest of its former range including the Cheviots, North Pennines and the Lakeland Fringe. In recent years, the range has contracted further: in 2013 twite were recorded in only eight 10 km squares and only recorded as probably breeding in three (all in the South Pennines).</p> <p>Non-Breeding: There has also been a reduction in winter range. Former wintering areas on the South coast and in the Severn Estuary are now largely deserted so that in winter twite are now mainly restricted to the north-west and the east coasts with a still scattered, but reduced, inland distribution, north and east of a line from the Mersey to the Thames Estuary. The principal wintering areas in England are the saltmarshes between the Humber and North Kent, Northumberland and between the Ribble and the Solway.</p> <p>Sources: <i>Lack 1986; Gibbons and others 1993; Balmer and others 2013; Wilkinson and others In prep.</i> Confidence: <i>Moderate</i></p>
Range required for future maintenance of populations and diversity
<p>On the breeding grounds this species is dependent on a landscape mosaic that provides tall moorland vegetation to nest in and a temporal continuum of small seeds supplied from nearby grasslands and sparsely vegetated areas. Restoring former range would involve the re-</p>

establishment of this mosaic over a wide area of the upland fringe in northern England. Associated with lowland raised bog restoration, there is potential to restore suitable habitat in additional areas of the species former lowland range. However, this would also require the management of adjacent land to support seed provision through the breeding season.

As a minimum, the range required should be based on that of the breeding population identified in the 1968-72 breeding atlas which recorded birds in 72 10 km squares, virtually all in the Pennines. The expectation of wintering range should be that this is species' distribution should continue to reflect salt marsh distribution around the English coast as is shown in the 1981-84 wintering bird atlas where birds were recorded around estuaries from Poole Harbour to Rye Harbour on the South Coast; Pegwell Bay to the Humber, and Teesmouth to the Scottish Border on the East; the Dee to the Ribble and the Solway in the North West; and around the Severn Estuary in the South West

Source: Lack 1986

Confidence: Moderate

Potential for restoration of the natural range

While the full reasons for decline are uncertain, agricultural intensification in the uplands, especially in the form of the destruction of flower-rich swards by ploughing and re-seeding to create a monoculture of non-native rye grass, the improvement of any remaining grasslands by rolling, harrowing, the addition of fertilisers and an increase in the frequency of cutting to produce silage rather than hay, and increased sheep numbers causing overgrazing of the both the moorland and the enclosed pastures have all been implicated in declines. These changes can all be managed, and where appropriate reversed, through appropriate application of agri-environment schemes. As these changes have been identified as playing a role in the decline of a number of upland fringe species, the restoration of suitable conditions for twite is likely to benefit a suite of other species. However, climate change may also be having an impact on the species in England, which is at the southern edge of its north-west European range. Declines in range have been noted in England from the 1800s, pre-dating much of the recent agricultural intensification (but not of the loss of lowland wetlands). In Ireland twite has been lost as a breeding species along the western seaboard from most of the southern 250 km of their 1970s range. Thus, although habitat creation is technically feasible, restoration of range may not follow if other, climatic, factors are also determining the range of the English breeding population.

Winter range may be affected by salt marsh management but population size will also be important with a reduced UK breeding population being reflected in a smaller and more localised winter distribution. Large scale changes such as salt marsh loss due to sea level rise and climatic warming may also be affecting distributions. Twite are found in association with the most sheltered areas of saltmarsh towards the end of winter, these areas then still supporting seeds for use by the birds as food. Increasing storminess as a result of climate change may reduce the extent and availability of such late season seed-rich areas.

Sources: Brown & Grice 2005; Lack 1986; Balmer and others 2013; Langston and others 2006.

Confidence: Medium

Favourable range

Breeding – 72 10km squares

Wintering – over 120 coastal 10km squares

Data gathered as part of repeat atlas surveys

Comparison with situation in 1981

The favourable range reflects the most complete survey before the directive came into force.

Population

Population metric
Breeding: breeding pairs Non-breeding: individuals wintering
Historic populations
<p>In both short and long term the population trend of this species is decreasing</p> <p>Breeding: There was a consistent decrease in the UK population through most of the 20th Century. The first UK survey in 1999 produced an English estimate of 600-800 pairs and a UK population of 10,000 breeding pairs. Earlier estimates have a wide margin of error, for instance inferring the size of the English breeding population from the numbers on their wintering grounds. Davies estimated an English population of 8,400-25,300 pairs in 1968-72 a period from which Sharrock produced a 'conservative' British and Irish population estimate of 20,000 – 40,000 pairs.</p> <p>Non-breeding: The current English wintering population is unknown, but is (perhaps optimistically) believed to be at the lower end of the range of 1001 to 10,000 individuals. The wintering population has undergone significant declines at monitored sites around the UK coast with loss from many sites and declines in in the order of 90% between the 1970s and the 2000s at others. Wintering ground declines mirror those recorded in breeding areas. It is likely that historic populations were an order of magnitude greater than current estimates. Given the uncertainty over wintering numbers and their potentially close association with the numbers and productivity of birds breeding in England, we do not propose an FCS metric referring to winter numbers.</p> <p>Sources: Langston and others 2006; McGhie and others 1994; Davies 1988; Musgrove and others 2013; Raine and others 2009; Brown & Grice 2005. Confidence: Low (population)/ High (scale of decline)–.</p>
Current population
<p>Breeding: 600-800 pairs based on a targeted 1999 study. More recent surveys suggest a further decline in the English population to about 169 pairs (95% Confidence Limit: 79-297) in 2013 and in the UK population to 7,831 pairs (95% CIs 5,780-10,415). Wintering: 1001 - 10,000 individuals.</p> <p>Sources: Langston and others 2006; Brown & Grice 2005; Wilkinson and others In prep. Confidence: Low/Moderate</p>
Population required for future maintenance of populations and diversity
<p>A population in the order of 8,000 pairs breeding based on Davies (1988).</p> <p>There is wide variation in population estimates for this difficult to survey species. The 1999 breeding survey concluded that the English population was less than 10% of the UK population. Given this and the estimation of the UK population in first atlas, it is likely that the English population was towards the lower end of Davies' estimate.</p> <p>Sources: Langston and others 2006; Davies 1988 Confidence: Low</p>
Potential for restoration of populations
<p>While climate may be having a bearing on population trends, land management is also believed to play a significant role. Restoration of populations would require re-establishment of sympathetic</p>

land management, providing the habitat mosaic the species requires within their breeding range on the fringes of the Pennine uplands.

In many areas wintering populations have declined at a rate that is apparently unrelated to changes in local habitat management or habitat extent. Wintering population size is likely to be determined more by breeding success in England and Scotland than by winter habitat resource and consequently there is little reason to conclude that winter habitat resource would limit restoration of historic populations.

Source: *NE expert view 2016*

Confidence: *Low*

Favourable population

8,000 breeding pairs

Monitored by a repeat of 1999 & 2013 surveys.

Comparison with situation in 1981

There is no estimate of 1981 breeding population. This is a species at the southern edge of its range with some range shifts being consistent with responses to climate change.

There is no estimate of the 1981 wintering populations, but many monitored sites had already experienced significant declines from earlier populations by this time.

Habitat for the species

Metric
Hectare.
Historic area
<p>Past distribution of the habitat mosaic required by breeding twite is not known, however, based on past distributions and known changes in the agricultural landscape it is likely to have included much of the upland fringe of the Pennines and possibly the Lake District, as well as some adjacent lowlands. Historically breeding has been recorded as far south as Devon, well beyond the limits of its twentieth century range. Historic winter distribution is not well documented but is likely to have been linked to saltmarshes with some birds wintering in lowland farmland.</p> <p>Source: <i>Sharrock 1976, Raine and others. 2009</i> Confidence: <i>Low</i></p>
Current habitat area
<p>On breeding grounds the habitat requirement is a landscape-scale mosaic of moorland and good quality vascular-plant-rich grassland with a diverse range of species that are allowed to set seed through the breeding season. Habitat management is therefore as important as habitat extent. Given the species' dependence on a habitat mosaic with fine-scale key attributes, it is not currently possible to map available habitat extent other than on a local basis. However, the loss of hay meadows and of management for hay, it is likely that the loss of the mosaic where tall heather or bracken on unenclosed land abuts flower-rich meadows is all but total.</p> <p>On wintering grounds salt marsh is the favoured habitat with an abundant supply of small seeds a key resource. Current habitat is centred on saltmarshes in the North East; from the Humber to the Thames Estuary; and around the North West coast. In some areas there is an association with pioneer saltmarsh communities.</p> <p>Sources: <i>Langston and others 2006; Brown & Grice 2005.</i> Confidence: <i>Low</i></p>
Habitat area required for future maintenance of populations and diversity
<p>For breeding population - not currently identifiable. With confidence though the English Twite Recovery Project seeks to ensure that 10ha of suitable grassland habitat is present within 2.5km of each of the extant colonies known from the south Pennines. The species' need for habitat mosaics with fine-scale attributes and the impact of this on population densities preclude identification of required extent.</p> <p>Wintering population size is likely to be determined more by breeding success in England and Scotland than by winter habitat resource and consequently there is little reason to conclude that winter habitat resource would limit restoration of historic populations</p> <p>Confidence: <i>Low</i></p>
Potential for habitat restoration
<p>Breeding habitat restoration, of both component habitats and their distribution in a fine-scale mosaic is technically feasible but dependant on securing tailored management. This approach has been adopted by the Twite recovery programme.</p> <p>Restoration of salt marsh is dependent on the process by which it has been modified, however, restoration management to provide for the key habitat needs of twite is possible.</p> <p>Source: <i>NE expert view 2016</i> Confidence: <i>Moderate</i></p>
Favourable supporting habitat
<p>Breeding: Not currently identifiable. The species' need for habitat mosaics and the fine-scale attributes and this impact of this on population densities preclude identification of required extent.</p>

Non-breeding:

Area can be inferred from extent of salt marsh around English Coastline. At favourable status the habitat should be providing a prolific winter supply of small seeds in proximity to areas of freshwater for drinking.

Annex 1: References

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Annex 2: 10th UK Birds Directive Reporting

UK context from the 10th UK Birds Directive report

Current UK conservation status: no status defined within Birds Directive Article 12 reporting

- **Range:** 54,400 km² *Confidence: Complete survey or statistically robust estimate*
- **Population:** 6,000 to 15,000 breeding pairs *Confidence: Complete survey or statistically robust estimate*
- **Habitat for species:** N/A
- **Overall:** N/A

Source: 10th UK Birds Directive Reporting 2012, species factsheet

http://cdr.eionet.europa.eu/Converters/run_conversion?file=gb/eu/art12/envuzl7q/UK_birds_report_s-14328-12614.xml&conv=343&source=remote

Current UK favourable reference values:

- **Range:** no UK FRVs set
- **Population:** no UK FRVs set

Proportion of UK species within England

No England level data available

Proportion of UK species within protected sites

No protected sites information available

European context from the 10th Birds Directive reports

Proportion of Atlantic biogeographic region within UK: Data not available

Further information

Natural England evidence can be downloaded from our [Access to Evidence Catalogue](#). For more information about Natural England and our work see [Gov.UK](#). For any queries contact the Natural England Enquiry Service on 0300 060 3900 or e-mail enquiries@naturalengland.org.uk .

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Twite *Linaria flavirostris*
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