

Suffolk State of Nature

Heathland



S.B.R.C.

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1. Introduction

This is the first in a series of planned publications from the Suffolk Biological Records Centre covering the important habitats in Suffolk. It has been commissioned by the Suffolk Biodiversity Action Plan Steering Group with the aim of providing an overview of the current condition of BAP habitats and species and an idea of progress towards BAP targets.

This first report provides information on the current state and extent of heathland in Suffolk and examines how a variety of pressures impact upon the habitat and the species within it. It reviews progress on conservation through the Biodiversity Action Plan and other initiatives and puts this work in the context of past changes. Problems with defining terms and with measuring and monitoring habitats and species are discussed.

Thanks to all the people and organisations who have helped to provide data used in this report. There are too many to list, but without their help in recording, measuring and monitoring Suffolk's countryside it would have been impossible to produce the maps and figures.

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Dunwich Heath, one of the few good stands of heather in Suffolk.

This is not a typical Suffolk heathland scene and, although heather was probably a more frequent constituent in the past, it is likely that most Suffolk heaths have always supported a more varied mix of communities with acid grassland, scrub and bare earth making up a significant proportion.

This variation in the habitat has made it difficult to accurately measure change. It has also meant that there are more species associated with Suffolk heaths than there are with the more typical dwarf shrub heaths of northern and western Britain.

2. Definitions

“Lowland heathland is a colourful mosaic of dwarf shrubs, such as heather and gorse. It is found on poor, acidic soils, and supports rare plant and bird species, including nightjar and Dartford warbler. It also supports all 12 of the UK’s reptile and amphibian species, and over half of the species of British dragonflies, damselflies and true bugs. Heathlands were once part of the farming system, managed mainly by low-intensity grazing. They provided many products such as turf, vegetation for fodder and fuel, and honey and wax, often harvested through common rights. Most of these traditional management practices have now disappeared, and our heathlands are suffering as a consequence” (Townshend *et al.* 2004 - *State of Nature, Lowlands*). In Britain heathland has suffered an 84% loss between 1800 and the late 1980s (Farrell 1993).

The major problem with mapping and monitoring the heathland resource has been in defining the habitat. Most heathland in Suffolk is made up of a matrix of acid grassland with some dwarf shrub and scrub communities and very little of it fits well into the heathland types described by the National Vegetation Classification (Rodwell 1991; Elkington *et al.* 2001).

All definitions need to recognise the dynamic nature of heathlands. This creates problems for those wishing to measure and monitor such a moving target.

The strict definition used by the Lifescapes project - *‘To include any habitat where the vegetation is dominated by Ericoids, or dwarf gorse plants, and/or associated acid grassland. To also include areas of light-to-medium bracken coverage (up to 50%) where heathland species persist beneath the bracken canopy. To include internal bare ground patches (where these do not exceed 10 m at maximum width, otherwise mapped separately) associated ponds and scattered scrub (canopy <25%). Not to include dense periphery scrub. Where heathland is present as part of a golf course the major areas of tightly mown grass to be excluded. Where heathland is present within a woodland ride its width will be mapped as ending at the base (trunk) of the abutting woodland trees. Phase 1 codes D1-D6. Includes acid grassland where dwarf shrub cover does not exceed 25% B1’* is much more precise than that used by previous mapping.

Much of what had been mapped as heathland in the past included areas which were on free draining soils (some of them chalky, particularly in Breckland) but which did not support typical heathland communities.

The Suffolk BAP definition recognises these problems:

‘Heathland in Suffolk is characterised by a mixture of vegetation communities. In the Sandlings area, these include dwarf ericaceous shrubs, acid grassland, bracken, scrub and trees. In Breckland, the habitat is a more complex combination of different communities, reflecting the mix of acid and chalky soils. The mixture of communities found in Breckland is unique in Britain. Because acid grassland is a component of heathland in Suffolk, this plan runs concurrently with the one for acid grassland.’

There is a separate Action Plan for Lowland Dry Acid grassland but its targets overlap with those for heathland as a whole.

The East of England Heathland Opportunity Mapping Project (EEHOMP, see Eglinton 2004) also compromised on definitions and erred on the generous side to include many areas where there was rough vegetation on suitable soils. As much of the mapping was based on aerial photography with very little ground-truthing it will undoubtedly have included some small non-heathland areas.



In general, over time the definitions have become more precise. This has probably meant that the extent of losses has been exaggerated due to older mapping being more inclusive. It is therefore surprising that the Lifescapes mapping actually significantly increased the known area of heathland in the Suffolk Coast & Heaths even though it was using a tighter definition than previous attempts. Previous assessment of the resource had largely relied on measuring the area within designated sites and did not pick up small fragments within forestry plantations, golf courses and the like.

3. Suffolk BAP targets for heathland

First published 1998, amended 2004

1. Secure without damage or loss, all existing areas of heath and implement restoration management where it is needed.
2. Identify, and secure sympathetic management for all designated heathland areas with the aim of achieving favourable status by 2010.
3. Maintain and improve the wildlife value of existing heathland through appropriate and sustainable grazing management systems where this is feasible.
4. Encourage the establishment of heathland in the Sandlings and in Breckland (Norfolk and Suffolk) from arable and forestry use where possible. The Lifescapes heathland potential model should be used to target links between fragmented heaths for re-establishment to create sustainable heathland units.
5. Maintain and strengthen populations of key BAP species associated with heathland.

For both Breckland and Sandlings the aim is to maintain and restore through appropriate management 100% of the existing resource. In the Sandlings there is a target to create 520 ha from arable and forestry and in Breckland (Norfolk & Suffolk) to create 1,500 ha by 2005.

Targets in this plan are short-term and based on current knowledge, assumptions about the ecological functionality and limits imposed by current funding streams and competition from other land uses. Targets should be regularly revised taking account of improved knowledge of species requirements, climate change and the amount of habitat required to achieve ecological functionality.

UK Targets will be reviewed in 2005 leading to revised targets for maintenance, restoration and recreation being agreed. It is likely that this will also result in a revision of the Suffolk targets.

Several terms used in these targets require definition:

Maintain: Prevent loss through land use change and work to prevent the condition of existing habitat areas declining

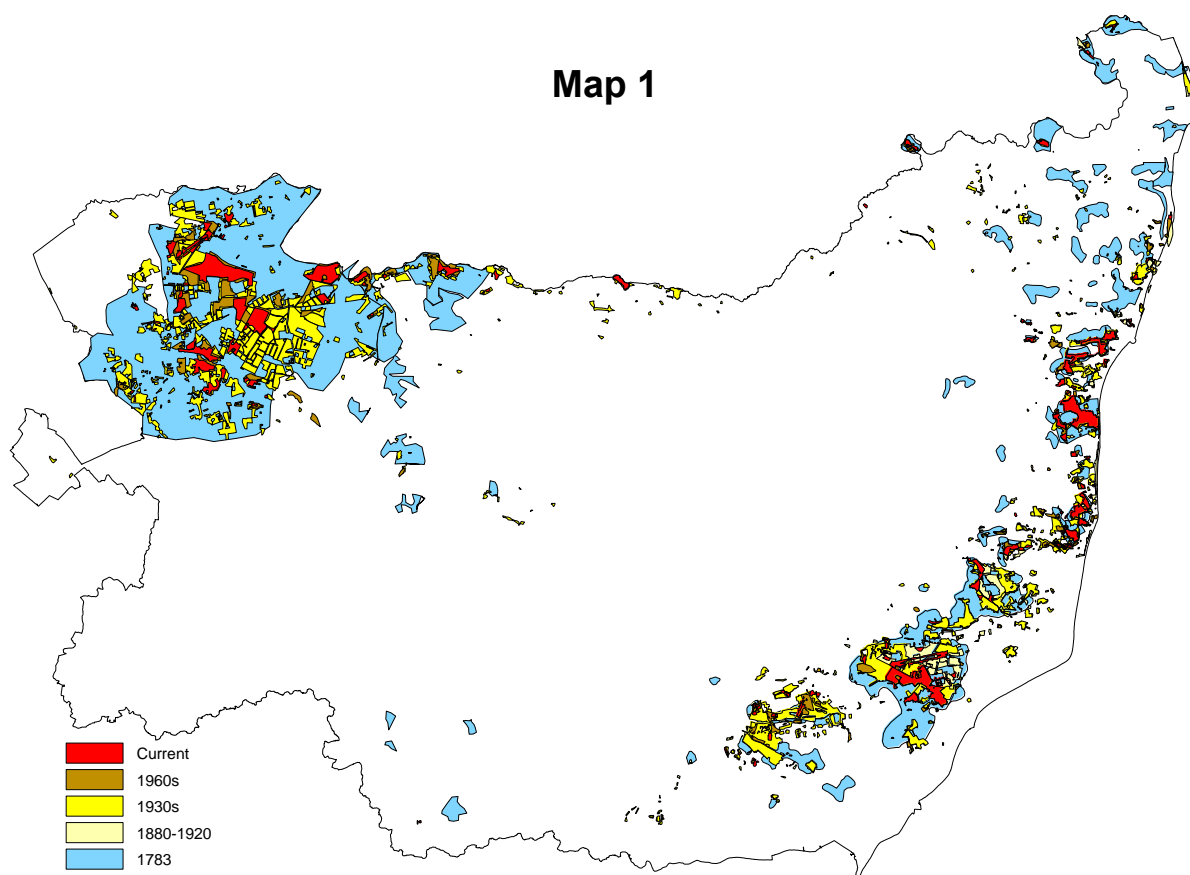
Restore: also called 'achieving condition', this is work to improve the condition of areas of existing habitat where they are not in 'favourable condition', would include scrubbed up or bracken covered heathland

Re-create: New habitat from different land uses in areas that have supported this habitat at some time in the past, would include removal of pine plantation on former heathland

Create: New habitat from different land uses not necessarily in areas that have supported this habitat at some time in the past

There is obviously some overlap between the terms create and re-create with no guidelines on how long ago past habitats were lost before re-creation becomes creation.

4. The past and present extent of heathland in Suffolk



Two important regions of lowland heathland are found in Suffolk: the Sandlings, along the coastal belt; and Breckland on the Norfolk/Suffolk border. Heathland in Suffolk is largely confined to these areas although smaller areas can be found in the upper Waveney Valley at Wortham Ling and Redgrave and Lopham Fens.

Map 1 shows the extent of heathland in Suffolk over the past 200 or so years. Table 1 provides a numerical breakdown of these changes by Natural Area.

It should be noted that the older maps are less accurate and detailed than more recent ones and only the current mapping has been drawn from aerial photography. Hodkinson's map (1783) provides a rough baseline against which the changes can be assessed. At that time there were over 50,000 ha of heath in the County with vast swathes of Breckland uncultivated. Compared with the current (1999) total of 4821 ha this gives a decline of about 90% - comparable with the national figures quoted on p. 2.

Heaths are quite clearly shown on the early Ordnance survey maps (1880-1920) but it can be difficult to define their edges where they adjoin other rough ground such as Fens and Saltmarshes. The Land Utilisation Survey in the 1930s (Butcher in Dudley Stamp 1941) produced the first real field by field analysis of habitats. Again, it is difficult to tell from the maps where heathland ends and rough grassland, fen or saltmarshes begin. In the 1960s there was another attempt to map habitats at the field scale, this was co-ordinated by Professor Alice Coleman (Coleman & Shaw 1980).

Recent surveys have been able to draw on other existing data such as the Land Use Survey (Phase 1) in the 1980s, satellite data (Land Cover Map 1990 & 2000), soil survey, text descriptions of SSSIs and CWS as well as more recent aerial



photography and distribution maps of key indicator species. Although satellite information is quite good for measuring well-defined habitats like conifer forests, the technology needs to improve before it can be used to pick out the more subtle colours and variation shown by heathland; even the areas of good dwarf shrub heath at Dunwich and Cavenham are not picked out well on the Land Cover 2000 maps.

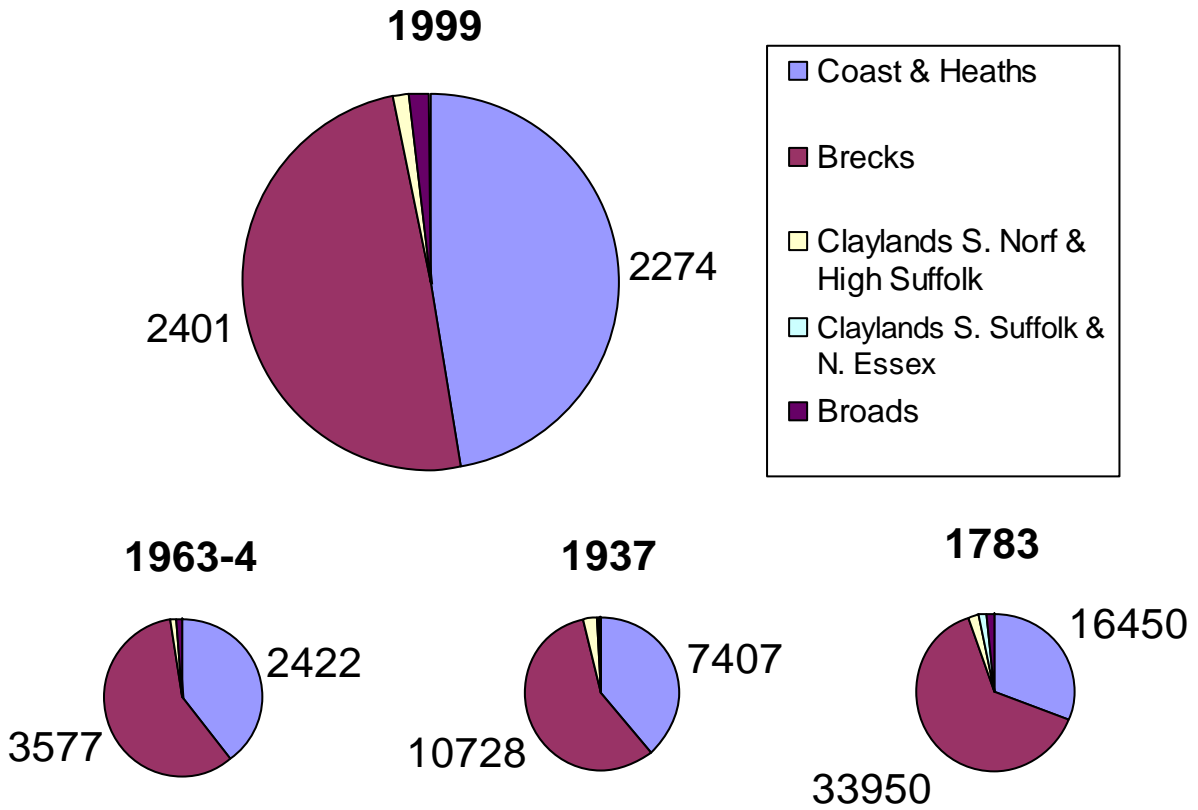
TABLE 1. CHANGES IN AREA OF HEATHLAND OVER TIME IN JOINT CHARACTER AREAS OF SUFFOLK

Natural Area	35 yrs		27 yrs		154 yrs		
	1999	1964	1937	1783	Area ha	Area ha	
	Area ha	decline %	Area ha	decline %	Area ha	decline %	
Coast & Heaths	2274	6	2422	67	7407	55	16450
Brecks	2401	33	3577	66	10728	68	33950
Claylands S. Norf & High Suffolk	60	16	71	87	553	61	1448
Claylands S. Suffolk & N. Essex	4	0	0	100	28	95	555
Broads	81	2	83	54	182	80	911
Total	4821	22	6154	68	19191	64	53300

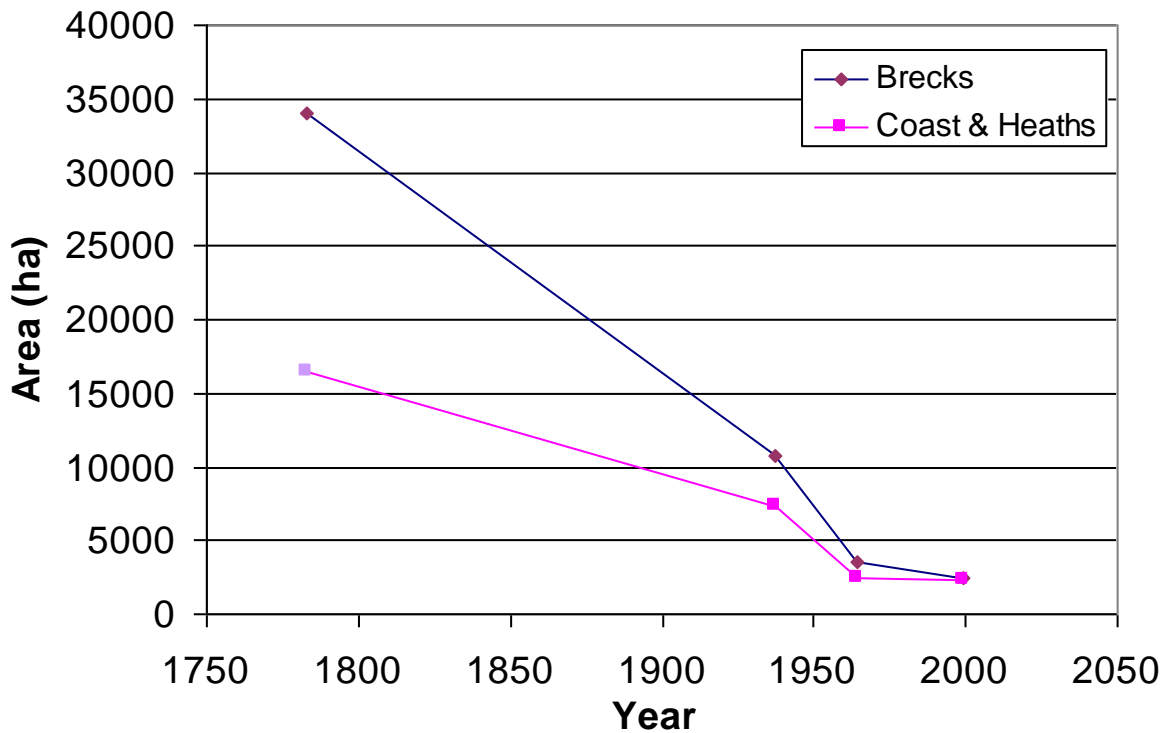
Historical changes

The decline in heathland has happened at different rates and times in Breckland and the Sandlings. By the time Hodskinson produced his map in 1783 many of the Sandlings heaths were already fragmented. Much of this part of East Suffolk was enclosed much earlier and the survival of the heaths was due to their protection as common land. The rate of decline since 1783 is therefore less steep than that for Breckland which was still largely unenclosed at that time. The lack of settlements in the Brecks meant that Hodskinson did not map the area as thoroughly and the map probably overstates the amount of heathland in the Brecks. Nevertheless, Breckland had a lot more heath to lose and the enclosures of the next 120 years meant that by 1900 the area of heathland had halved. In the early 20th century large areas in both Sandlings and Brecks were bought by the Forestry Commission and the rate of decline increased. By the time of the Dudley Stamp survey in 1937 forestry had already made significant inroads: Breck heaths were down to 30% of the 1783 level and the Sandlings were at 45%.

Economic and cultural changes in the early part of the 20th century meant that the close links between people and heaths were broken as the agricultural system no longer included heathland. With the decline in the market for wool and mutton large scale sheep grazing was no longer financially viable. By the 1920s sheep farming had largely ceased in the Sandlings along with most other heathland management. Fuel, timber and animal bedding came from other sources and fewer people had their own grazing animals. Large areas were ploughed during and after the war as demand for food and national self-sufficiency increased and improved agricultural technologies such as agrochemicals and irrigation allowed marginal land to be cultivated. There were also strong demands for land for other uses such as forestry, building, airbases and recreation



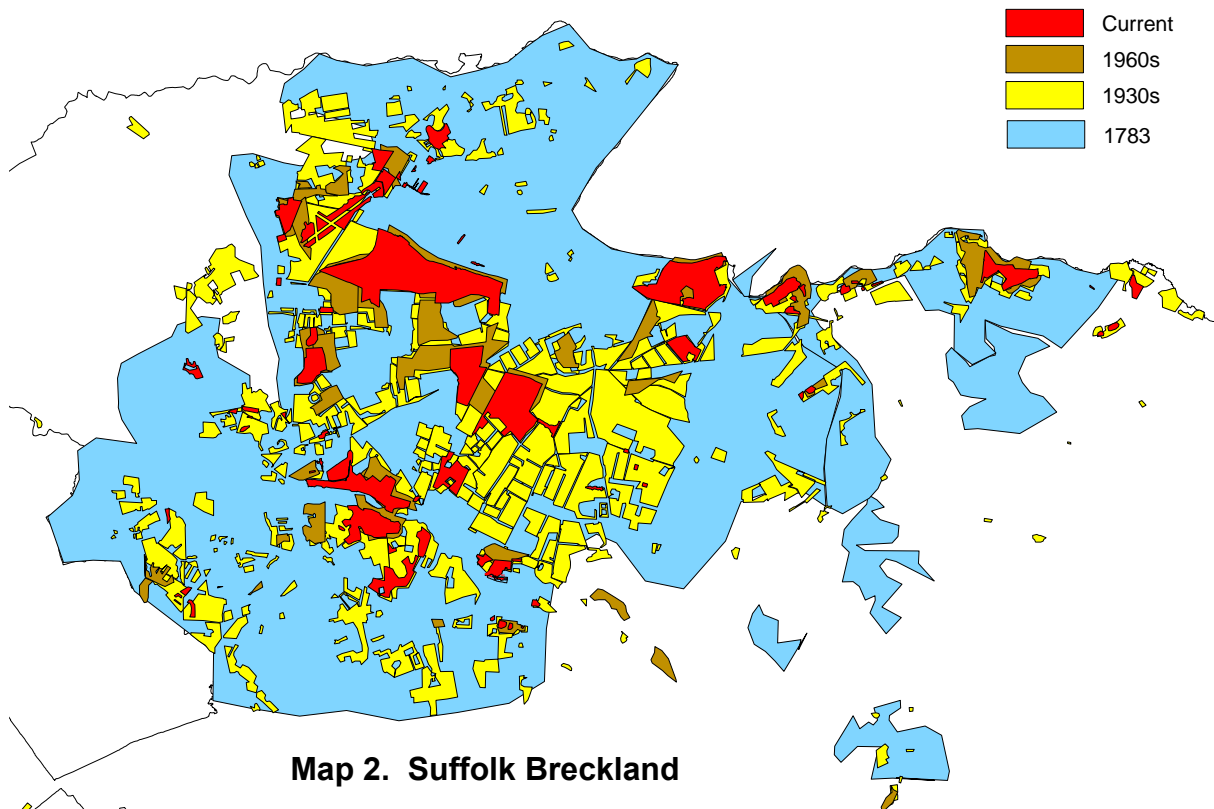
Relative proportion of total heathland in Suffolk for each joint character area. Figures are in hectares, data as for Table 1.



Relative declines of heathland in Brecks and Coast & Heaths (Sandlings) over the last 200 years. Data as for Table 1.



Between 1932-1983 Sandlings heaths declined by 83%; losses were largely to forestry (30%), agriculture (30%), buildings (9%) and military bases (5%). There were similar losses in Breckland and it was not until the 1960s that the rate of decline slowed as designation and protection of sites started to have an effect. Neglect is now the main threat to the remaining heathlands; lack of management leads to encroachment by bracken, scrub and tree. In the Sandlings (1986) only 38% of heaths were dominated by true heathland communities. Of the remaining heathland areas 16% were being lost to woodland, 13% to scrub and 33% were dominated by dense bracken stands.



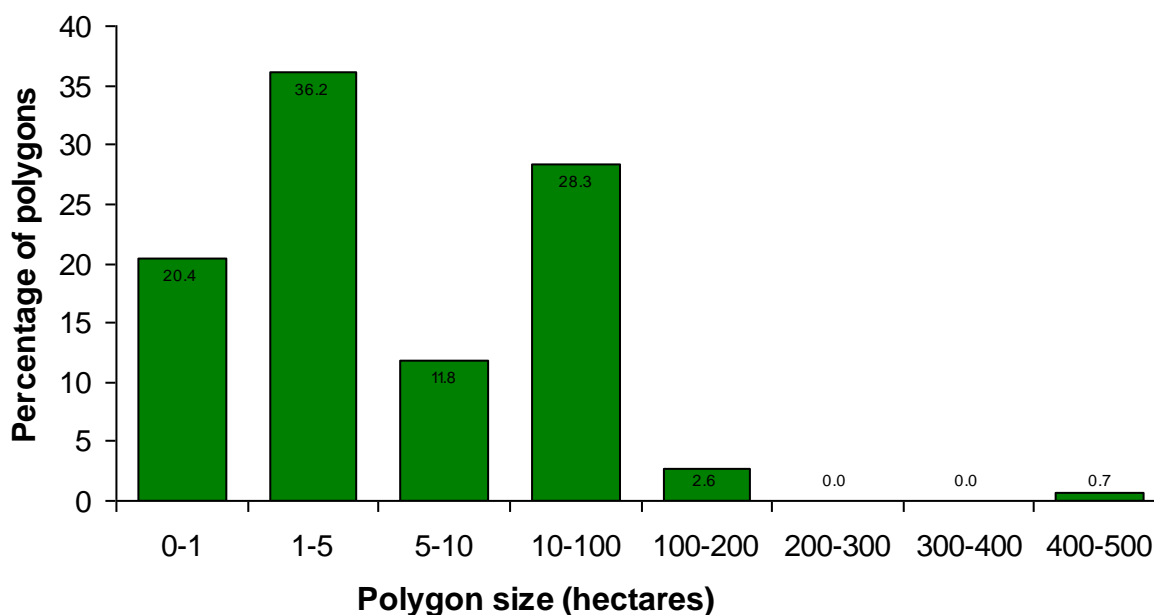
In Breckland as a whole 4,500 ha of heath remain of which 2,400 ha are found in Suffolk. There are 55 heathland sites in Suffolk Breckland ranging in size from Lakenheath Warren (570 ha) to those less than 3 ha. (Map 2)

The Breck heaths are very diverse as a result of the complex make up of soils in the area. They range from typical heather heaths at Cavenham to 'chalk heaths' at Thetford which support a mixture of species adapted to dry soils including the Spanish Catchfly (*Silene otites*) and others not normally seen on typical acid heaths. The term 'breck' refers to open sandy fields which went in and out of cultivation; they support species typical of early successional stages of heaths with low competitive ability and a preference for well-drained soils and open sites. The area has a more continental climate than the rest of Britain with hot dry summers and colder winters than other parts of Suffolk. There can be frosts in any month of the year. The unique combination of soils and climate, not unlike that of the Steppes of eastern Europe, has meant Breckland supports a variety of plant and insect species not found elsewhere in Britain, many of them Nationally Scarce or rare.



Wangford Warren, Breckland — one of the last areas with mobile sand dunes.

In the Coast & Heaths (Sandlings) 2274 ha of heath remain, approximately 14% of what were once extensive heaths. There are 42 heaths ranging from 247 ha at Minsmere and Walberswick to fragments under 2 ha (Map 3). The remaining heaths are far more fragmented and isolated than those in the Brecks.

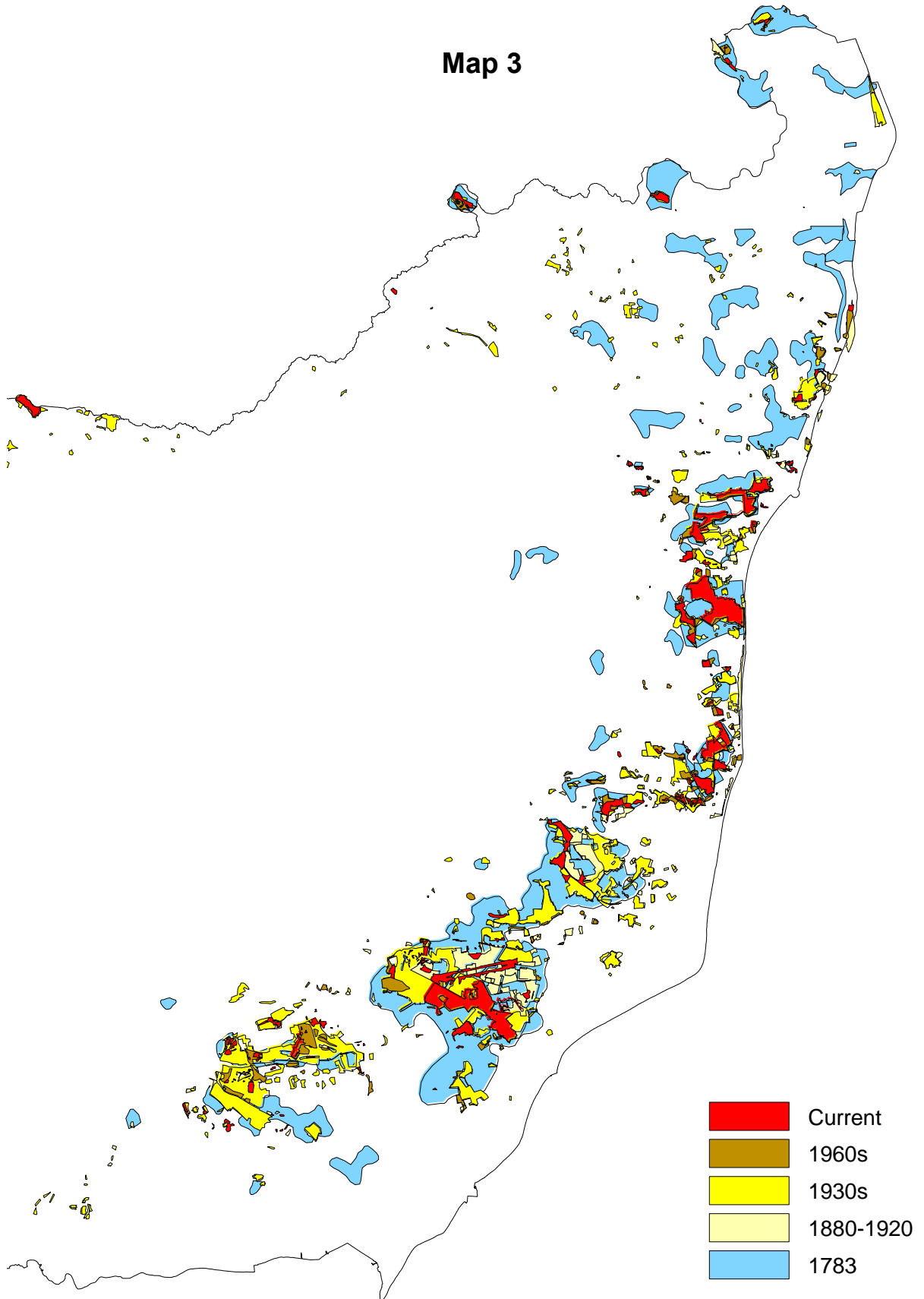


Variation in heathland polygon size in Suffolk Coast & Heaths



Suffolk Coast and Heaths

Map 3



The proximity of the sea ameliorates the temperature in winter to produce a more oceanic climate than that of the Brecks. It is for this reason that heathland species such as Bell Heather (*Erica cinerea*), Western Gorse (*Ulex gallii*) and Climbing Corydalis (*Ceratocarpus claviculata*) are found in the Sandlings and not in the Brecks.



Wenhaston Commons, typical of the mixed heathland communities found in the Sandlings.

Designation

Of the current heathland (1999) 3290 ha (68%) are within SSSIs and 865 ha (18%) are within CWS—there is some overlap between these designations and there are many small areas of heathland (especially within Forestry plantations) that are not designated. Undesignated area amounts to 666 ha (14%).

Seventeen Breckland heaths are designated as SSSIs in Suffolk, and most of the larger heaths are designated as pSPA and cSAC because of their European importance for rare habitats and species.

In the Sandlings, 85% of the heathland area is designated as SSSI and most of the larger heaths are designated SPA or cSAC.

There is a concern that forestry sites which have been designated SSSI (and SPA) because of important breeding birds (Woodlark & Nightjar) may not include sufficient protection (i.e. list of PDOs) for their associated flora.



Relationships with other habitats

Although this report is looking at this habitat in isolation, it is important to remember that heaths are part of the matrix of habitats in the countryside and that many of the interesting species associated with them will also utilise other habitats. Some of the rarer species may be associated with the edges especially where heaths merge with wetlands. There is very little wet acid habitat in Suffolk and consequently species like Cotton Grass and Cross-leaved Heath which are common in the north and west of Britain, are rare here. In most instances these species will not be priorities for conservation as they are common elsewhere, but occasionally the isolation of small East Anglian populations may lead to genetic variation (speciation) or they may come into contact with species or habitats that are not present in the main part of their range leading to unusual communities of interest in their own right. This is certainly the case around the edges of Breckland where small fens with a unique flora and fauna have developed.

In a few places there are still links between heathlands and other semi-natural habitats. Many heathlands have elements of scrub and grassland within them and quite a few have woodlands either adjacent or are even becoming woodland through lack of management. In heaths adjacent to forestry plantations rapid encroachment by pines is a serious problem.

Relatively few heaths now have direct links with wetland habitats; the fen reserves at Redgrave and Walberswick are good examples of this gradient from wet to dry. At one time, many of the Breck fens also had links with heathland but most of these have been lost as the water table lowered. Pashford Pools and Lakenheath Pools Fens have retained small fragments of what must have once been a common feature.



Pine encroachment

Equally rare are heaths that have connection with maritime habitats, again Walberswick has a little remaining and there are a few sand dunes at Benacre and Lowestoft which have elements of maritime heath.

In Breckland there are heathland sites which have bare open soil, a key feature for many invertebrates which also need the vegetated heath for nectar and foodplants. This combination has declined greatly as sites become more fertile due to nitrogen deposition and eutrophication through fertiliser run-off. The reduction in the rabbit population as a result of myxomatosis has also meant loss of soil disturbance.

In the Sandlings some heaths have been isolated as islands surrounded by intensive arable farming for centuries. The small heaths at Wenhaston are interesting examples that have been protected as common land, but have been separated for centuries by farmland; each developing a slightly different flora in response to variations in management. Without buffering of some kind the effects of intensive agriculture will penetrate well within the margins of these small sites, further reducing the available habitat for more sensitive species (for example Purdis Heath as shown in the photo below).



Purdis Heath, isolated by intensive arable farmland.



There is scope for restoring and re-creating heathland as part of a matrix of semi-natural habitats when 'large area initiatives' consider landscape level conservation. There is much more potential for connecting and buffering heathland sites if they are treated as part of a whole dynamic system rather than viewed in isolation from other habitats.

Threats

Neglect is now the main threat to the remaining heathlands; lack of management leads to encroachment by trees and scrub.

Development and change of land use are still a threat to some heathlands. Recent examples include road schemes, development at Red Lodge, activities on both redundant and active MOD land and pressure to develop land around Ipswich.

5. Restoration and Re-creation

Condition

English Nature has a regular reporting system (maximum 6 year cycle of assessment) to monitor the condition of all SSSIs. This uses broad habitat categories which probably do not exactly match the definitions of heathland given earlier (see definitions p. 3). Using the categories of acid grassland, bracken and dwarf shrub heath, there are 3290 ha of heathland designated as SSSI in Suffolk. In 2004, 2954 ha (90%) were classified as either in favourable condition or unfavourable 'recovering' condition (i.e. the management regime is in place to bring the unit into favourable condition). 336 ha (10%) were classified as in unfavourable condition (without suitable management).

Although there are not the resources to monitor all the CWS heathland on an annual basis, these sites are reviewed on a (roughly) five-yearly cycle. Several small heathland sites have been removed from the register since the system was set up in 1992 but there are usually a few new heathland sites added each year. It is likely that a higher percentage of the 865 ha of heathland CWS will be in unfavourable condition than is the case for SSSIs.

In some cases populations of indicator species (e.g. Silver-studded Blue, Nightjar, and Woodlark) can be used as a 'proxy' for the health (condition) of the site as a whole. As there are special interest groups who are willing to put volunteer time into recording these species it is a cheaper alternative to complete surveys. However, the assumptions that such species are representative of more general habitat condition have rarely been tested. For this reason, if indicator species are used for condition monitoring they should be used in combination across different taxonomic groups rather than singly.

Restoration

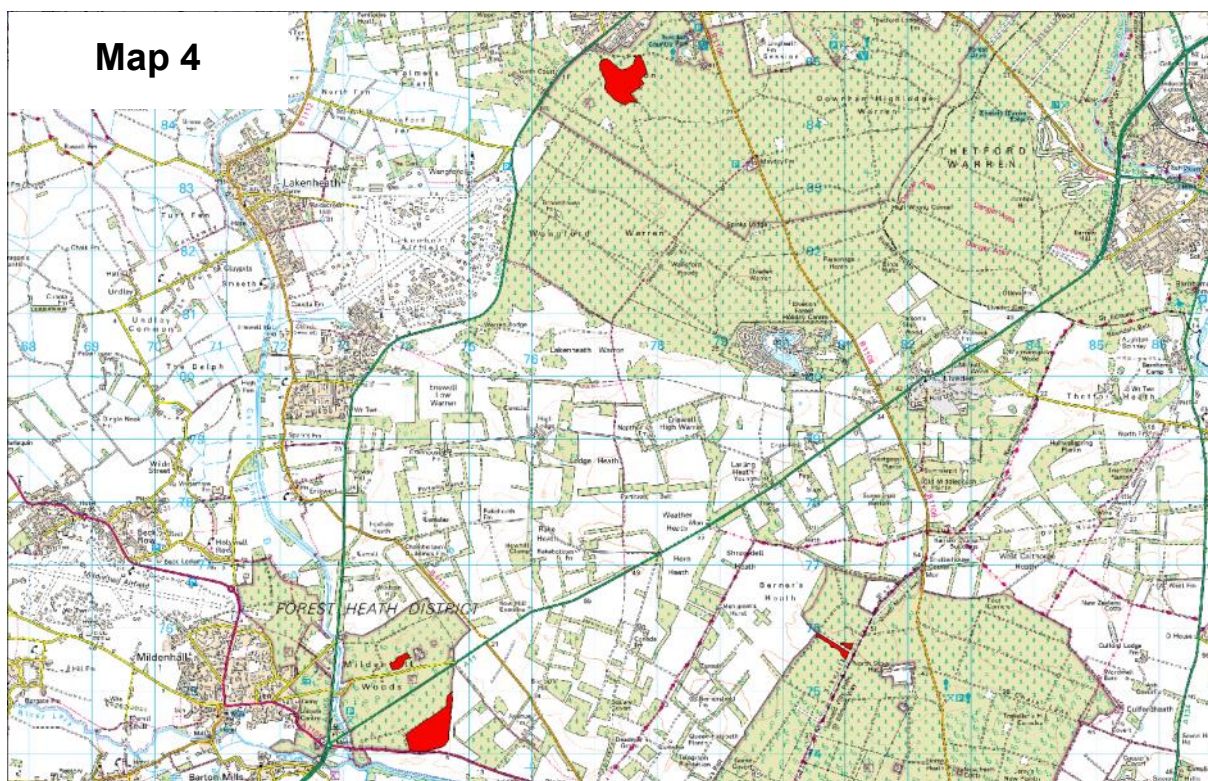
The Breckland ESA, funded by Defra and introduced in 1988, has been one of the main mechanisms for funding management of the Breckland heathlands. The scheme has successfully reintroduced grazing to many sites and has undoubtedly prevented the loss of heathland by tree and scrub encroachment. By December 1996 2,668 ha had been entered into the ESA heathland management tier representing 63% of eligible heathlands. The ESA scheme is being replaced by Environmental Stewardship but many of the heathland sites will be eligible for the Higher Level Stewardship payments which should ensure continuity of management started under ESA.

In Breckland a total of 300 Ha has been re-created under the Tomorrow's Heathland Heritage Project on Forestry Commission land in both Norfolk and

Suffolk. Much of this is in Norfolk and only 35 ha at Brandon Park Heath and 31 ha at Warren Hill near Mildenhall are in Suffolk (Map 4).

In the Sandlings the THH Project aims to restore 1872 ha and re-create 66 ha of heathland, through techniques such as scrub clearance and re-seeding, as well as the extending of traditional heathland grazing management.

To put this in context, by 2003, 33,800 ha of lowland heathland were being restored nationally as part of the THH scheme, with a further 2,180 ha having been re-created. The national Lowland Heathland Biodiversity Action Plan (BAP) has targets to restore 58,000 ha and re-create a further 6,000 ha. Suffolk has 4821 ha of extant heathland (8% of the national resource) and the (at least) 374 ha re-created so far amounts to 6.2% of the national target.

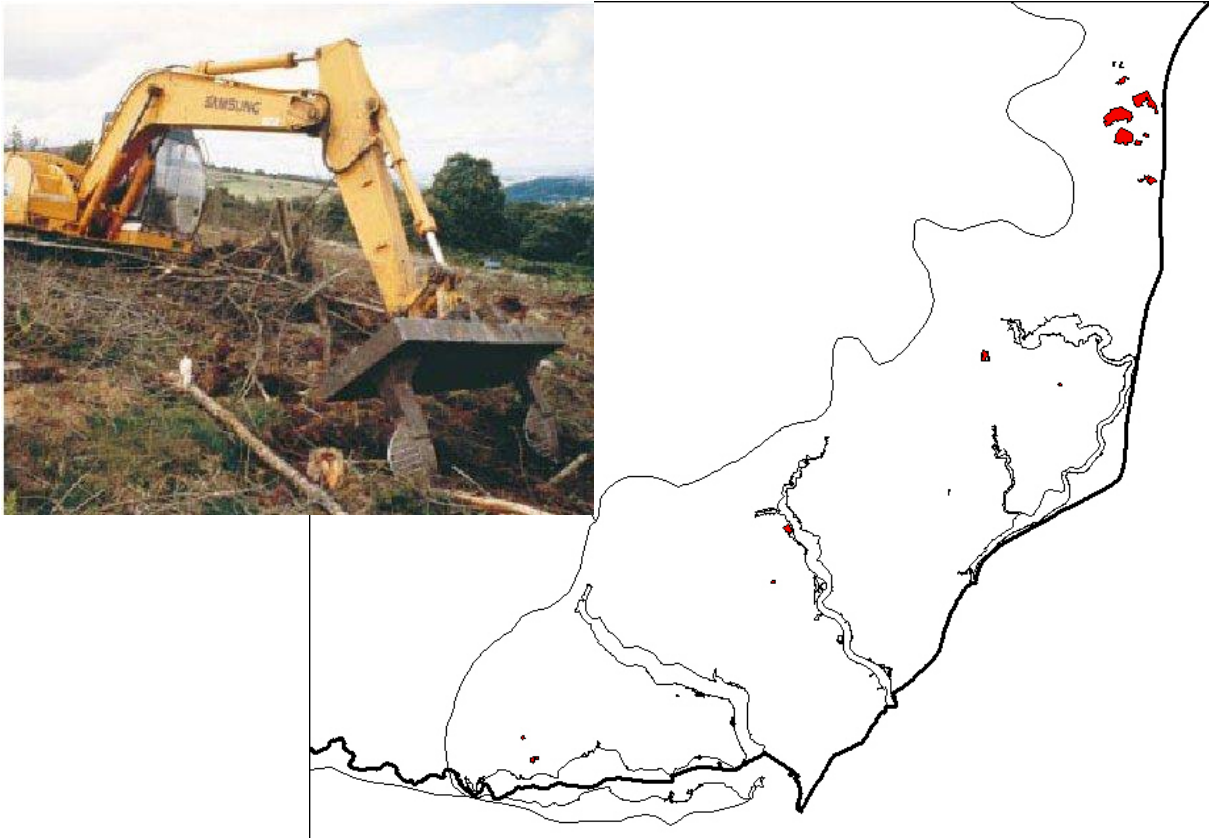


Heathland re-creation on Forestry land in Breckland.

Suffolk progress on BAP heathland targets

	Target	Achieved by 2004
Maintain	4821 ha	
Restore	All resource to favorable condition	< 90%
Create/Re-create	c. 1000 ha	374 ha





Heathland re-creation in Suffolk Coast & Heaths, 20 sites, 308 hectares, large sites are in Westleton.

Lack of reporting / monitoring systems

Another problem has been the lack of recording for restoration and re-creation work. Despite requests sent out during the Lifescapes Project in 2003 to many organisations involved in habitat management and creation in the Suffolk Coast & Heaths there has been very little data provided. The Lifescapes Project identified 20 sites in SC&H that had re-creation or creation work ongoing, amounting to 308 ha (Map 2).

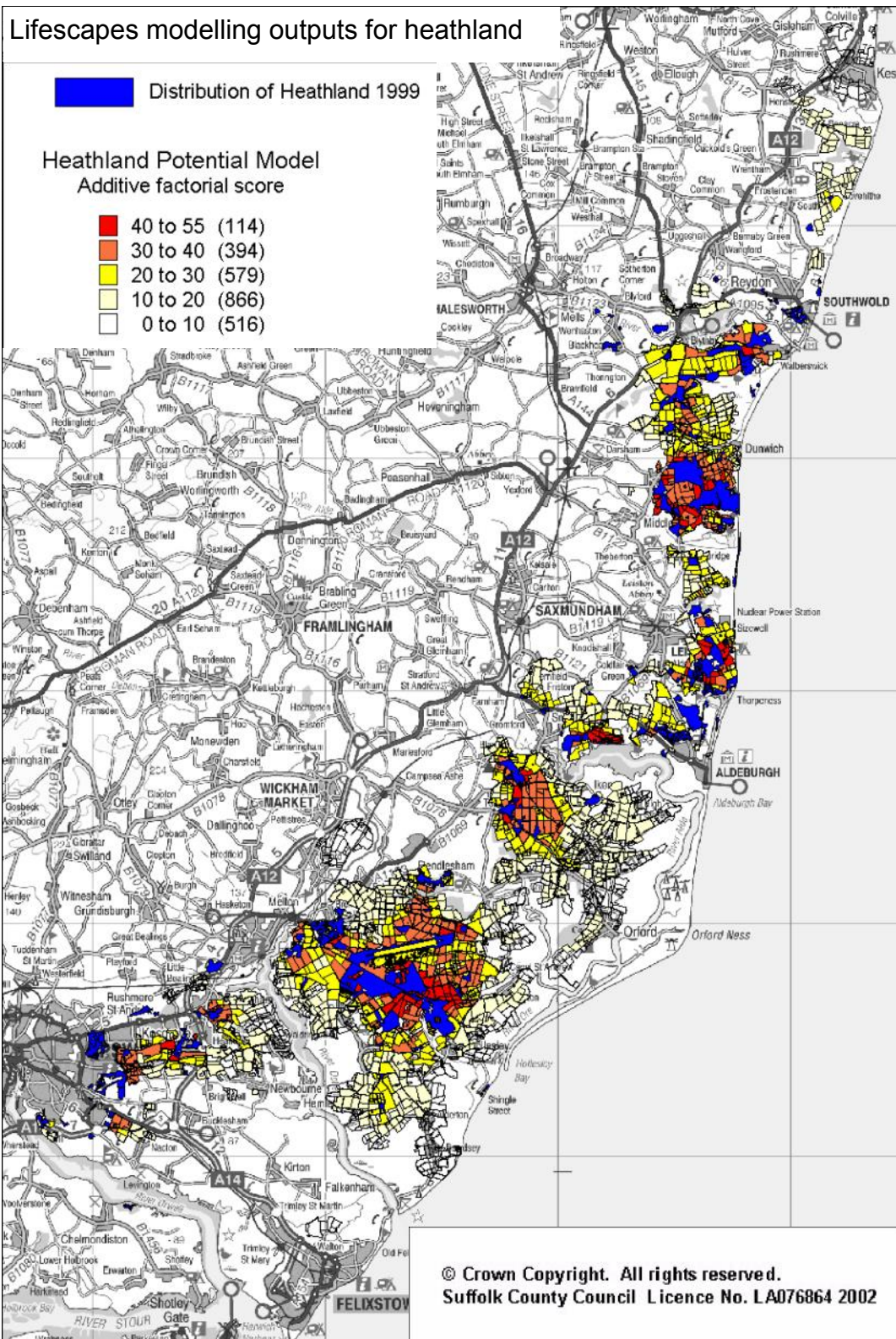
Again, there have been problems with definitions: much of what has been called 're-creation' has actually been restoration management on existing heaths. There is also no agreed method for assessing when 're-created' sites become existing heathland. This has meant it has not been possible to accurately assess the amount of re-created habitat. National guidance on criteria for monitoring re-creation work would improve consistency in any future reporting.

Many of the re-creation attempts have been frustrated that they have been unable to produce 'typical heather heath' although, as we have seen, this type of heath is quite scarce in Suffolk anyway. Heather heaths are now restricted to the most acid, nutrient-poor soils and it has proved very difficult (in a short timescale) to reproduce these conditions on sites that have been cultivated.

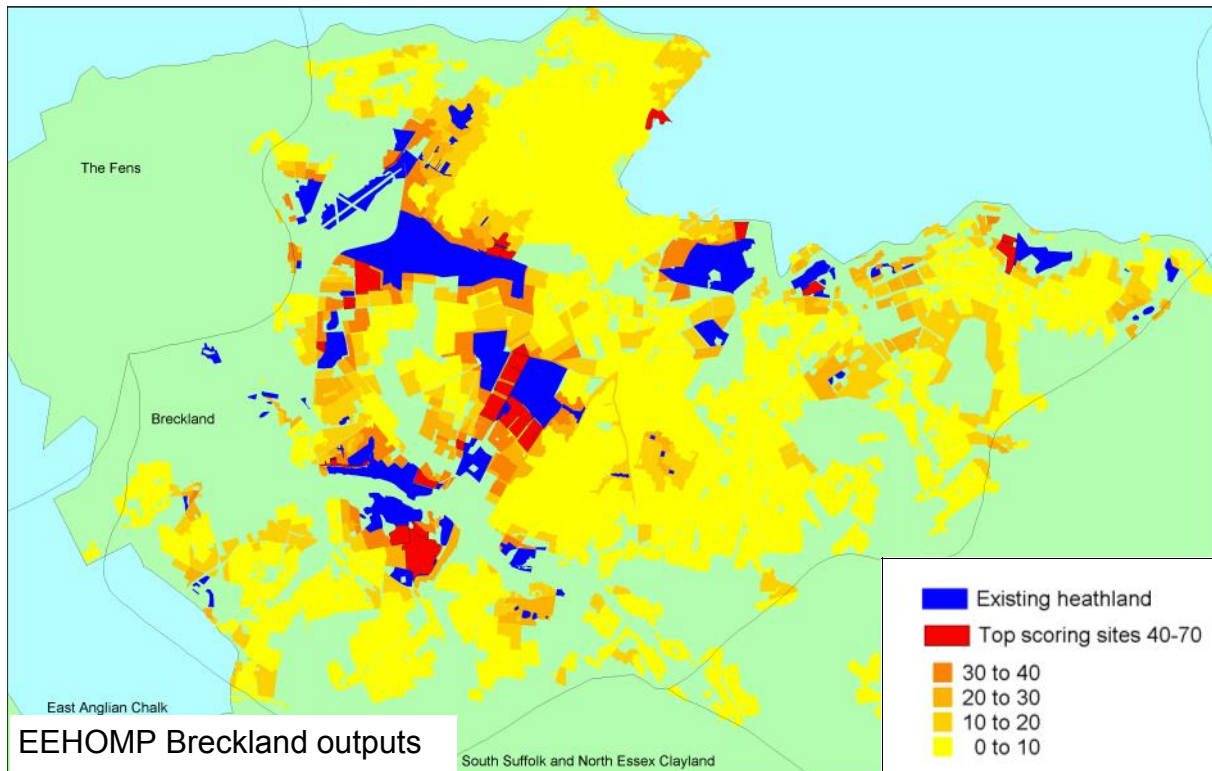
Mapping projects to target creation

There have been two recent mapping projects in Suffolk which have looked at targeting creation (and re-creation) through GIS modelling.

The Lifescapes Project focused on the Suffolk Coast and Heaths Natural Area and assessed potential sites using a matrix of ecological factors to score suitability. The key factor for potential sites was soil type (see Williamson & Howard 2004).



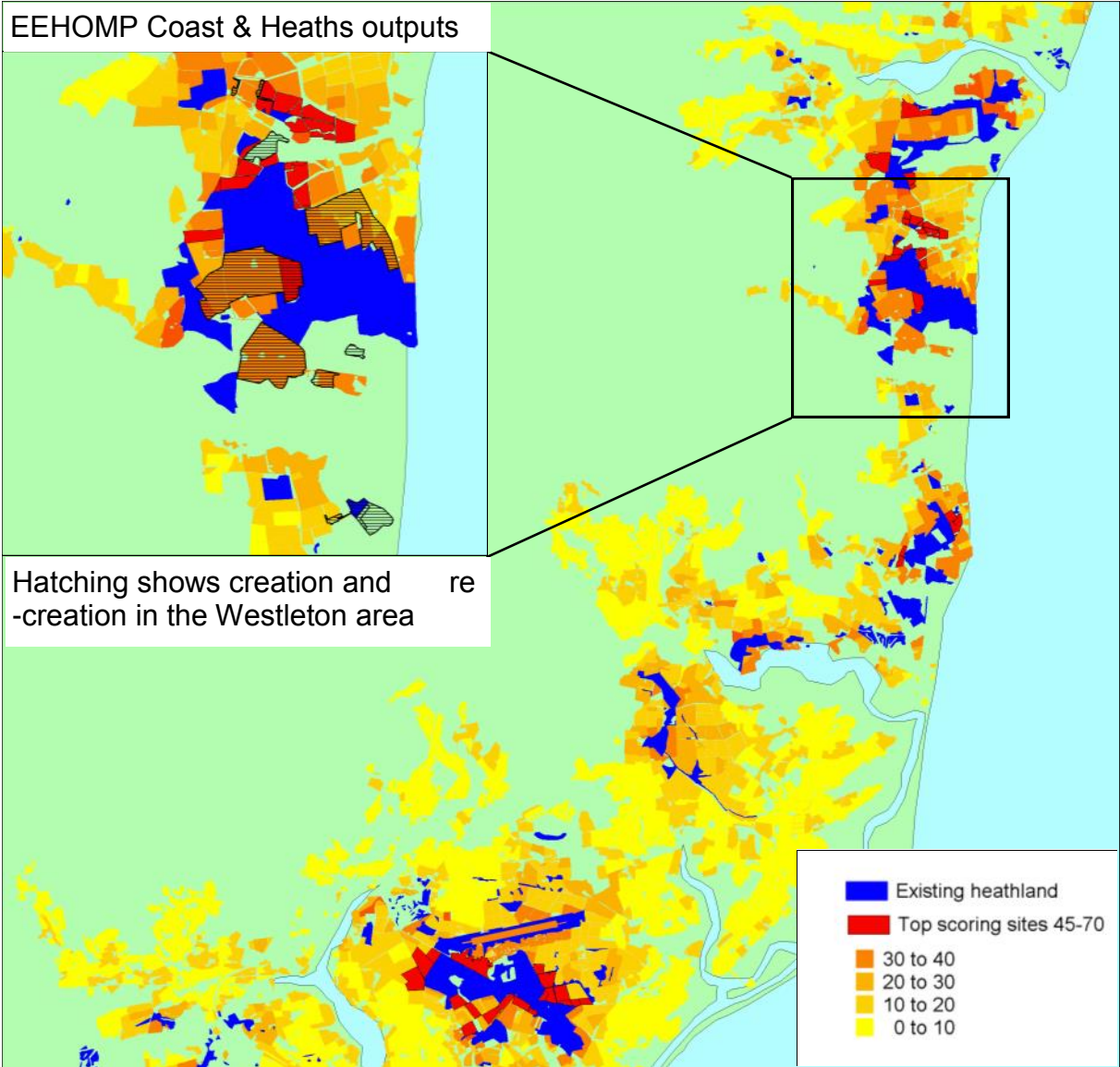
The East of England Heathland Opportunity Mapping Project (EEHOMP) had a regional focus but again used soil type as the key factor for initial selection of potential sites on ecological grounds. See Eglington (2004) for details of methodology.



In the Brecks the top 27 sites for ecological factors all have scores above 39 and add up to 607 ha, they are highlighted in red on the map above. This roughly equates to the Suffolk half of the BAP re-creation target for Breckland (Norfolk & Suffolk) of 1500 ha. Most of these sites are quite large and all build on existing heathlands (shown in blue). The restoration work done under THH is included in the existing heathland. There is good scope to join up some of the existing heaths at least with corridors and in the longer term, to create large areas of pure heathland. These could be big enough to incorporate the full range of heathland types and allow for dynamic processes to take place.

In the Coast and Heaths Natural Area, there are more sites that score highly, but their average area is much smaller. The top 47 sites all have scores above 44 and add up to 519 ha which matches the BAP target for the Sandlings. As with the Brecks, most of the high scoring potential sites build on existing heaths, but because heathland in the Sandlings is already quite fragmented there is less potential for building large areas with heathland as the major component. Modelling in complex landscapes such as this will need to include a wider variety of semi-natural habitats in order to build large areas. Land holdings are also much smaller than in the Brecks so that large-scale re-creation will also involve a much greater number of landowners.

It is interesting to note that very little of the creation/re-creation that has been done so far in this area (see inset map of the Westleton area opposite) has occurred on top scoring sites.



6. Monitoring

Apart from condition monitoring on SSSIs, there is currently no regular program of monitoring heathland in Suffolk. Recently there have been two GIS modelling projects which have required assessment of the current resource. Lifescapes in the Coast and Heaths, and East of England Heathland Opportunity Mapping Project at the regional scale have both attempted to map all existing heathland, mainly from aerial photography. Both projects have documented their methodology (Williamson & Howard, 2005; Eglington 2004) and have achieved their objectives within quite a short timescale. The key factor which will affect whether this work is repeated is the availability of new aerial photos covering the whole county. It is disappointing that Suffolk County Council were unable to fund a new fly-over in 2004 as this would have provided a five year interval from the last photo series done in 1999. At present there is no indication of when a new set may be done and, as it is such an expensive exercise, it is not something that the conservation organisations are likely to be able to pay for on their own.

Satellite survey data will probably be available again in 2010, by which time remote sensing techniques should have improved considerably (the change between the surveys of 1990 and 2000 was considerable). The ability to integrate such data with other remote sensing data such as water table information and other GIS data on soils etc. should enable much more accurate mapping of habitats that that provided in 2000. It is however, unlikely that it will totally remove the requirement for actual field survey, if only to verify the results.

Heathland is a dynamic habitat which, without management, will rapidly progress to scrub and woodland. The potential effect of global warming and tighter controls on water for irrigation may mean that much marginal land currently under cultivation in Breckland and the Sandlings may become uneconomic. It is possible that large areas of land in these areas may be given over to heathland restoration for which the new Environmental Stewardship scheme may offer reasonable incentive compared to the expense of farming them. Equally, the recent Countryside and Rights of Way legislation allowing open access to heathland may deter landowners from increasing the area of this habitat. Whatever the outcome, these changes will require monitoring which, without adequate resources, will not happen.

Monitoring quality of heathlands

As well as measuring the overall extent of the habitat we also need data on the structure and species present on heathland sites. Recent national surveys (Countryside Survey, New Atlas of the British and Irish Flora - Preston *et al.* 2002) have shown that many of the small herb species (such as Sheep's-bit, Shepherd's Cress and Harebell) adapted to the dry, nutrient-poor soils of our heaths are suffering from eutrophication and are being swamped by taller, more vigorous common species. Site-based flora recording and NVC surveys will allow us to measure this change and to recommend appropriate remedial management. In large sites it may be possible to create a cycle of management so that species can move to more suitable areas as succession progresses. Careful monitoring can ensure that these jigsaws are actually working. Whilst many heathland species are relatively mobile so that they can move as the habitat changes, those adapted to the late plagioclimax stage (such as the Silver-studded blue) often have more subtle requirements which are not as easy to manage for.

Important heathland sites, particularly those with important assemblages of sensitive herbs, lichens and invertebrates should be surveyed on a regular basis to ensure such species are not lost through neglect.

Other groups which can be used as indicators of quality in heathlands are beetles, butterflies and moths, spiders and aculeate hymenoptera. Where resources allow, surveys should attempt to monitor important sites for at least the key BAP species in these groups.

Monitoring restoration and creation projects

There has already been a lot of work done, particularly by RSPB and the Forestry Commission, to re-create heathland both on ex-arable sites and on forestry land. So far there has been no strategic monitoring of this work to see how much has been achieved towards the BAP targets. This is partly due to the lack of a single co-ordinator to manage the recording.

There is also a need for sharing of best practice amongst the organisations undertaking restoration projects so that limited resources are not wasted on inappropriate methods and sites.

BARS

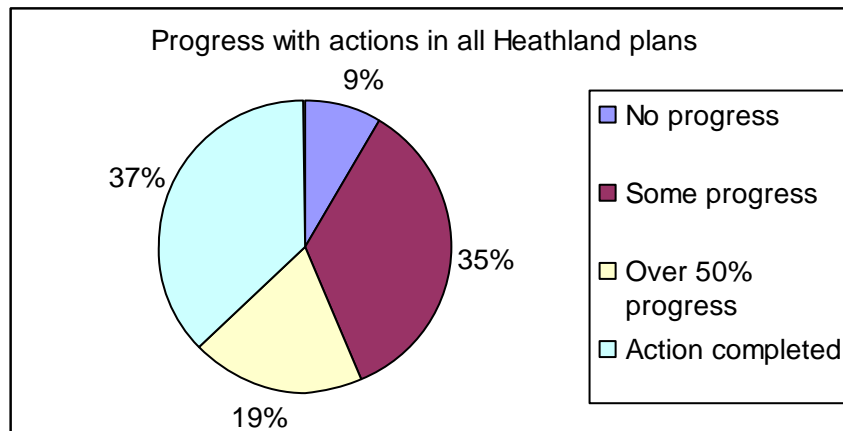
This new web-based system is due to go 'on line' in 2005. It will have the capacity to store and monitor all BAP actions and report on progress towards national targets. It is not yet clear whether it will also be able to provide such information at the local county scale. Early feedback from trial users indicates that it will require a considerable resource in terms of time spent inputting. Unless we are successful in establishing a permanent BAP Development Officer as part of SBRC staff we will not have the capacity to maintain this system and there is a danger that work undertaken in Suffolk may not get properly reported.

There is a strong need for co-ordination of the reporting of BAP work if we are to avoid duplication of effort.



7. Assessment of BAP Progress

The recent audit of actions in the Suffolk BAP (Shackle 2003) has provided a good overview of overall progress.



Key Achievements (from Shackle 2003)

- English Nature's Wildlife Enhancement Scheme (WES) for Breckland Stone curlew sites now has 21 landowners in Norfolk and Suffolk involved in the scheme. WES provides payments to landowners in the SSSI area to help manage land to ensure breeding success of Stone Curlew
- Launch of Suffolk Amphibian & Reptile Group (SARG) survey to record Adders in Suffolk, the aim being to gain an idea of status and key populations during Spring and Summer 2003
- Continued monitoring of Woodlark (183 males), Nightjar (103 males) and Silver-studded blue butterflies (slight drop in numbers but new colony found at Hollesley) by the Sandlings Group (associated partners and volunteers) during 2002
- Ipswich Greenways Project volunteers have removed invasive birch scrub to improve Purdis Heath for the Silver-studded Blue butterfly
- Around 100 ha of heathland are currently being restored and re-created as a result of the Sandlings Walk Project and further areas in the Brecks through the Tomorrow's Heathland Heritage project
- Lifescapes Project mapping and modelling outputs will enable better targeting of restoration and recreation work in Suffolk Coasts and Heaths area.

Since 2003 the East of England Heathland Opportunity Mapping Project has further developed the idea of landscape scale re-creation work and has identified key areas across the whole county for targeting such work.

Summary of key data

There are about 4800 Ha of heathland habitats in Suffolk of which 3290 Ha are designated as SSSI and 865 Ha as County Wildlife Sites. All of the large sites are designated and most (90%) of the SSSIs are in favourable or 'recovering' condition. Designation has provided considerable protection against further losses to agriculture and development although these factors still pose a threat to some sites.

The key factors for survival of heathland habitats and species are:

- lack of sustainable management
- nutrient enrichment from air-borne pollution and agricultural run-off

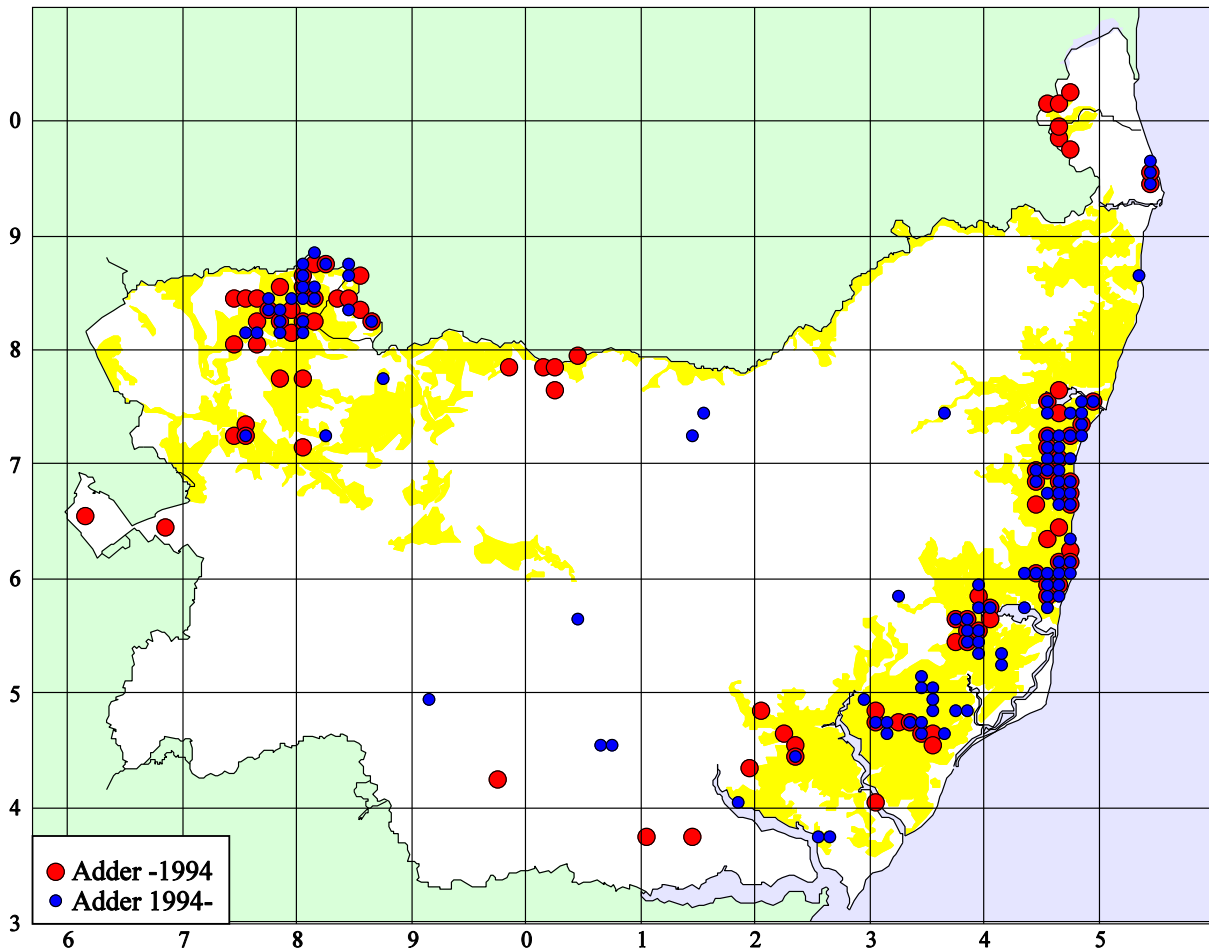
So far, the only extinction has been the Starry Breck Lichen but although this species has more exacting requirements than most, it should act as a warning that other species adapted to the open, low-competition, low-nutrient, free-draining soils are also under threat.

The Biodiversity Action Plan process has provided an important forum for the various bodies working in the County to get together and share objectives and best practice. Although the BAP process has not directly generated much new money, it has proved effective in prioritising work and has stimulated research and monitoring of the species covered by the priority lists.



Heathland BAP Species





Adder *Vipera berus*

Most progress has been through general heathland restoration and management work. Past survey work has been ad-hoc, but a survey co-ordinated by Suffolk Amphibian and Reptile Group (SARG) in 2003-4 has provided much better data on current distribution and status. Local Authorities need better management guidance and records of local populations.

Current distribution

A recent (2004) survey by the Suffolk Amphibian and Reptile Group has been able to confirm that the Adder is almost exclusively found on the Sandlings heaths and associated habitats, the Brecks, and valley mire habitats extending from the Brecks.

There are also populations northwest of Lowestoft, and old, unconfirmed reports around Newmarket. Apparent changes in distribution shown by the map above may simply be due to survey differences rather than the species actually having disappeared from the Herringfleet hills area.

There are also a few outlying populations on the claylands, mainly in woods. Heathland is ideal habitat, but they can also be found in rough grassland, fens, scrubby areas, sand dunes, the roughs of golf courses, along forestry rides and in clear-felled areas and on railway embankments and sea walls.

Trends

The last review of status (Langton 1988) showed there were 46 known populations, of which most were considered small, isolated and/or vulnerable. Anecdotal evidence indicates a continued decline although the recent survey by SARG turned up several sites in the claylands where the species had not been recorded before.



There is evidence of a decline in status nationally in adders (Baker *et al.* 2004) who suggest that Adder populations have been in decline since the 1930s. A third of adder and almost a quarter of slow-worm populations were reported to consist of fewer than 10 adults.

Threats

The fragmentation of most heathland means that most populations are effectively isolated as islands with little gene flow between them. Most sites supporting adders are relatively large and retain areas of undisturbed habitat.

On isolated sites adders showed more population decreases and fewer stable populations. Population decreases were more frequent on small (up to 5 ha) sites, and stability was more frequent on large (more than 5 ha) rather than small sites. Analysis of the variation in heathland polygon size (p. 13) shows that more than half the sites in the Sandlings are 5 ha or less.

Adverse effects of inbreeding (low genetic variability and an increase in deformed and stillborn young) have been reported from Sweden in a small, isolated adder population containing fewer than 30 adults

The following are known to affect Adder sites in Suffolk (in approximate order of perceived severity):

- Fragmentation of habitat by roads and arable farming.
- Unsympathetic habitat management, particularly over-grazing, mowing and scrub clearance.
- Agricultural intensification, particularly encroachment into grassland and heathland.
- Damage and disturbance to habitats by public pressure, such as recreational use.
- Persecution by landowners and the public.
- Habitat loss through development.

Monitoring

Key to the BAP plan is locating adder sites, so that appropriate habitat management can be encouraged, to maintain existing sites and improve linkage between them. In order to assess changes in distribution a full county survey should be attempted every five years. All known sites should be revisited to record, at least presence and if possible population size should be estimated. All sightings, and in particular, locations of hibernacula, should be recorded to at least 6-figure grid accuracy. Site-based recording should map locations so that wardens can monitor on an annual basis.

Biodiversity Action plan objectives and targets

Determine the current distribution and status of Adders in Suffolk by 2007.

Maintain viability, range and status of adders in the Brecks and Sandlings by 2010.

Assess status and viability of other populations by 2008.

Produce conservation/management strategy for non Brecks/Sandlings populations by 2010.





Antlion *Euroleon nostras*

Current distribution

This unusual creature is found breeding nowhere else in the UK and has now been found on a number of Sandlings heaths with new sites being added all the time as interest in and knowledge of this species increases.

In 1997, 1998 and 2000 studies showed that there is a sizeable population present in the Suffolk Sandlings (Plant 1998; Kirby 2001). It is mainly concentrated around Minsmere and the Dunwich Forest area. Antlion larvae and imagos have been recorded from Gorleston southwards to Bawdsey and westwards approximately to the line of the A12. Larvae occur in areas where Norfolk crag, Red crag and other sands outcrop and where quarrying, forestry operations or other factors have destroyed the surface vegetation, exposing fine, loose sand. The distribution is thus limited by the availability of light sandy soils (see yellow on inset map).

Trends

Although it is a common European species, *E. nostras* is endangered in Germany. The status of the Antlion in Suffolk is not clear. The first confirmed record was in 1931 and since then there have been occasional reports of single adults. These data may be interpreted to show that the insect has been present in the district for 70 years or more but because it needs experience to find and identify the Antlion pits and the concealed larvae it has largely gone unnoticed. Alternatively the region may have been colonised a number of times by mated females blown across the North Sea from the populations in mainland Europe. Kirby (2001) suggests that it could be found almost anywhere the habitat was suitable. Recording has not been



Larval Pit

Larva

running long enough to pick up changes in numbers or range. Nor do we know what sort of natural fluctuations in numbers this species might have. Although it seems possible that global warming would favour a species adapted to bare soils and a hot sunny climate there may be other limiting factors (e.g. availability of suitable prey).

Threats

The availability of suitable habitat is largely controlled by disturbance from outside factors such as vehicle damage on roadsides and forestry rides. Changes in forestry practice or indeed a reduction of forestry in favour of heathland reversion might reduce habitat for this species.

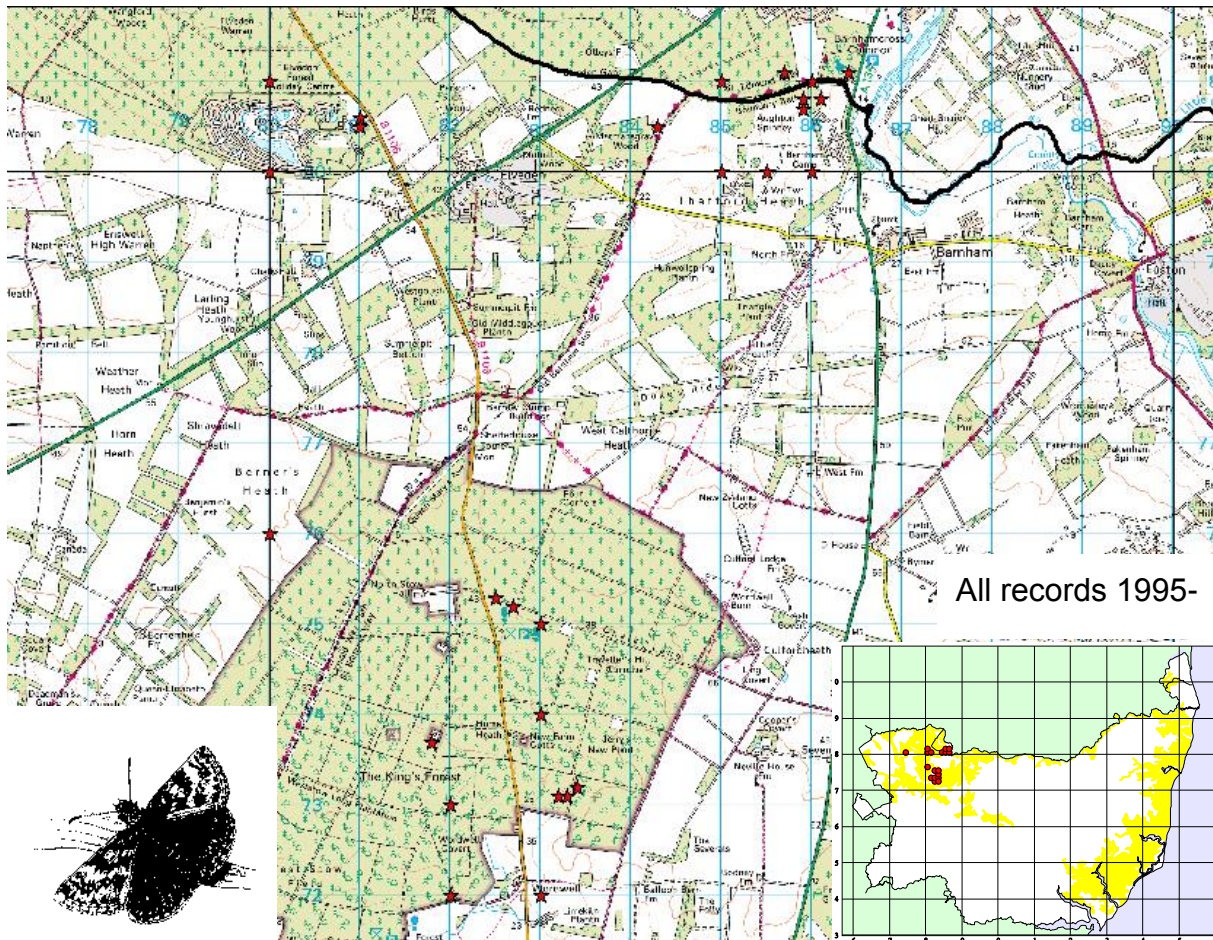
Monitoring

Annual monitoring is done at Minsmere, North Warren, Sizewell and Dunwich Heath with the results co-ordinated by the Sandlings Group and Heathland Habitat Working Group. Now that there is some public interest in the species occasional passive records are received from other sites. At present there is no indication that this species is in decline but the current level of recording is not good enough to pick up any changes in distribution.

Biodiversity Action plan objectives and targets

- Monitor the status of the Antlion both in distribution, and population size on all currently known sites.
- Monitor and characterise the origin of new sites created by routine forestry operations, road verge management and conservation management.
- Undertake further research to establish autoecology of the Antlion.





Dingy Skipper *Erynnis tages*

Current distribution

This species is now Suffolk's rarest resident breeding butterfly species. The species appears to be holding its own in a very limited area of the Suffolk Brecks. It is known from about eight sites in five tetrads in Suffolk. All of the colonies are on residual heathland in the Breckland, mostly where shelter is provided by coniferous forest. The strongest colony is on the RAF Barnham Training Area (SSSI); just to the west there have been recent records from Center Parcs leisure development but none lately from Marmansgrave Wood. Further south, the former stronghold of the King's Forest still supports small populations in several rides.

As part of a BAP survey co-ordinated by Butterfly Conservation (Parker 2004) a total of ten sites were visited during the 2003 flight period. Dingy Skippers were found at five sites; two in the King's Forest including the important Chalk Lane site, where it had been feared the colony had perished. The Center Parcs colony was stronger than ever before recorded and numbers at RAF Barnham were normal with 2 individuals found on Barnhamcross Common some 100 m from the main colony.

Surveying was limited by suitable weather and there may still be small colonies surviving unrecorded in the Brecks.

Trends

Once considered common, the dingy skipper has undergone a dramatic decline in Suffolk due to habitat loss and fragmentation. It now survives in a handful of small colonies in the Breckland, mostly in clearings or rides in conifer plantations. Mendel & Piotrowski (1986) note that this species became much scarcer as early as the early 1950s and note that '*the species has declined drastically over the last twenty-*



five years'. Stewart (2001) noted a decline from eight tetrads in 1986 to five in 1999. Parker (2004) reports 'there has been progressive degradation of habitat at some sites'.

Threats

The Dingy Skipper is probably Suffolk's most threatened butterfly. Although the larval foodplant, Bird's-foot Trefoil, *Lotus corniculatus* is still quite widespread, especially on lighter, poorer soils, the area of suitable habitat patches has decreased. Populations in more southerly counties are able to take advantage of warmer summers with a second brood but this has not been noted in Suffolk. Breckland clearings are

a sub-optimal habitat, further threatened by the following:

- Fragmentation and isolation of sites caused by agricultural intensification.
- Lack of management of suitable sites. The populations at RAF Barnham are threatened by shading from the adjacent plantation and have declined over the last few years.
- Loss of open grassy rides in conifer plantations.
- Myxomatosis affecting rabbit grazing regime.
- Unsympathetic forestry operations.

Monitoring

The recent survey undertaken by Butterfly Conservation (co-ordinated by Sharon Hearle) with support from the BAP partnership (see Parker 2004 for details of individual sites) is a good example of how the BAP Steering Group can help improve knowledge of species etc. The survey concentrated on visits to known colonies and sites where colonies have existed in the past. All visits were conducted with landowner's consent, or along public rights of way.

Forest Enterprise is aware of the location of the remaining breeding areas in King's Forest. Rides supporting Dingy Skipper have been designated as conservation rides. A management prescription is in place and "dragons teeth" have been erected to exclude heavy plant from one key area.

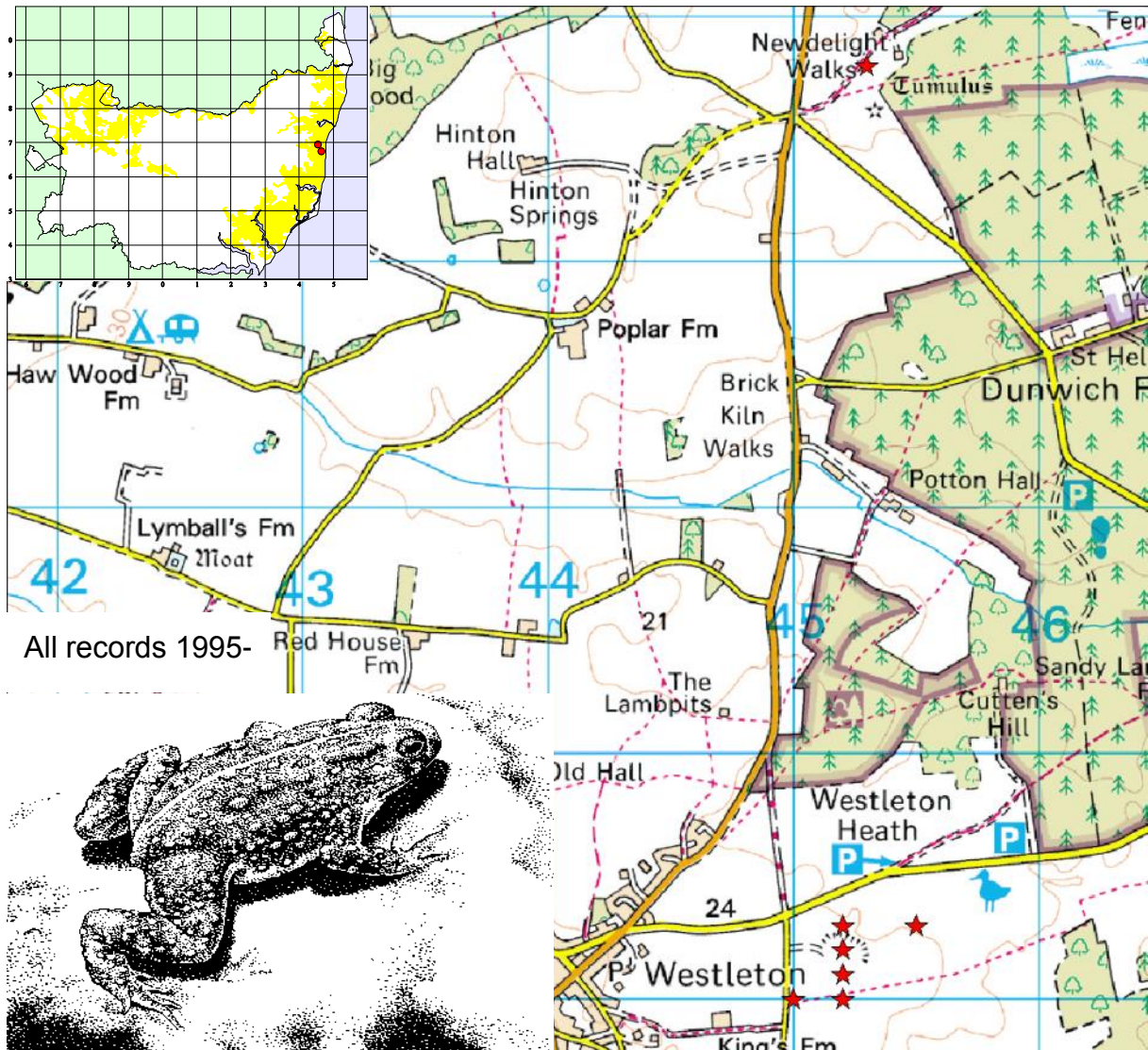
Center Parcs domain is managed sympathetically for wildlife, and the Dingy Skipper flies in a relatively small area of recently seeded wildflower rich grassland with a man-made embankment. A regular recording transect is conducted at Center Parcs.

Populations are monitored by site visits conducted on suitable days during the flight period (May /early June).

Biodiversity Action plan objectives and targets

- Enhance the existing population at current sites through appropriate management.
- Identify areas where suitable habitat can be extended, with a view to natural re-colonisation.
- Further survey work on potential sites including a review of past records.





Natterjack Toad *Bufo calamita*

Current distribution

Under the Species Recovery Project spawn from a site in Norfolk was translocated to a former site at Walberswick and from there a second site was established at Westleton. Although the species did not prosper at Walberswick it has been able to maintain numbers at Westleton. Although individuals can now be found throughout the northern heathland area of the Minsmere Reserve, the toads are concentrated in the three artificial ponds, two in Compartment 4 and the other in compartment 3. In 2004 six spawn strings were noted, the southern pond was not used. The species has not yet moved away from these introduction sites to colonise new areas but perhaps with global warming, it may extend its range

Trends

The last Natterjack Toad colonies in Suffolk became extinct during the 1950s and 1960s. This species was formerly found in colonies, at sandy locations, scattered all down the east coast from the Waveney to the Deben. They were extremely abundant at some places within the district of Lothingland where they were found at Burgh Castle, Bradwell, Belton, Caldecott Hall, Fritton, St Olaves, Herringfleet, Lound, and Gorleston. Elsewhere Natterjacks were found at Easton Warren, Wangford Wood, Southwold, Walberswick, Coldfair Green, Aldeburgh, Alderton and at Bawdsey. Inland they formerly occurred at Wortham Ling and at Tostock.



Creation of further suitable habitat on the Sandlings heaths close to the translocated populations was undertaken in 2000. Four new ponds were created/restored in 2003 as part of the Suffolk Sandlings Project and the three ponds at RSPB Minsmere were recently relined. Two ponds have been constructed at Sizewell by SWT and the Herpetological Conservation Trust in 2004. Spawn and/or toadlets will be introduced in Spring 2005.

Threats

- Significant reduction in the area of formerly suitable habitat due to the loss of heathland to agriculture, forestry, lack of grazing and to scrub encroachment.
- Loss of former breeding ponds due to the lowering of the water table, the change of drainage patterns, infilling and, perhaps, acidification.
- Habitat fragmentation preventing the dispersal of animals to new sites and genetic isolation may become a problem for existing populations.
- Predation by rising levels of corvids due to presence of outdoor pig units and waste disposal sites.

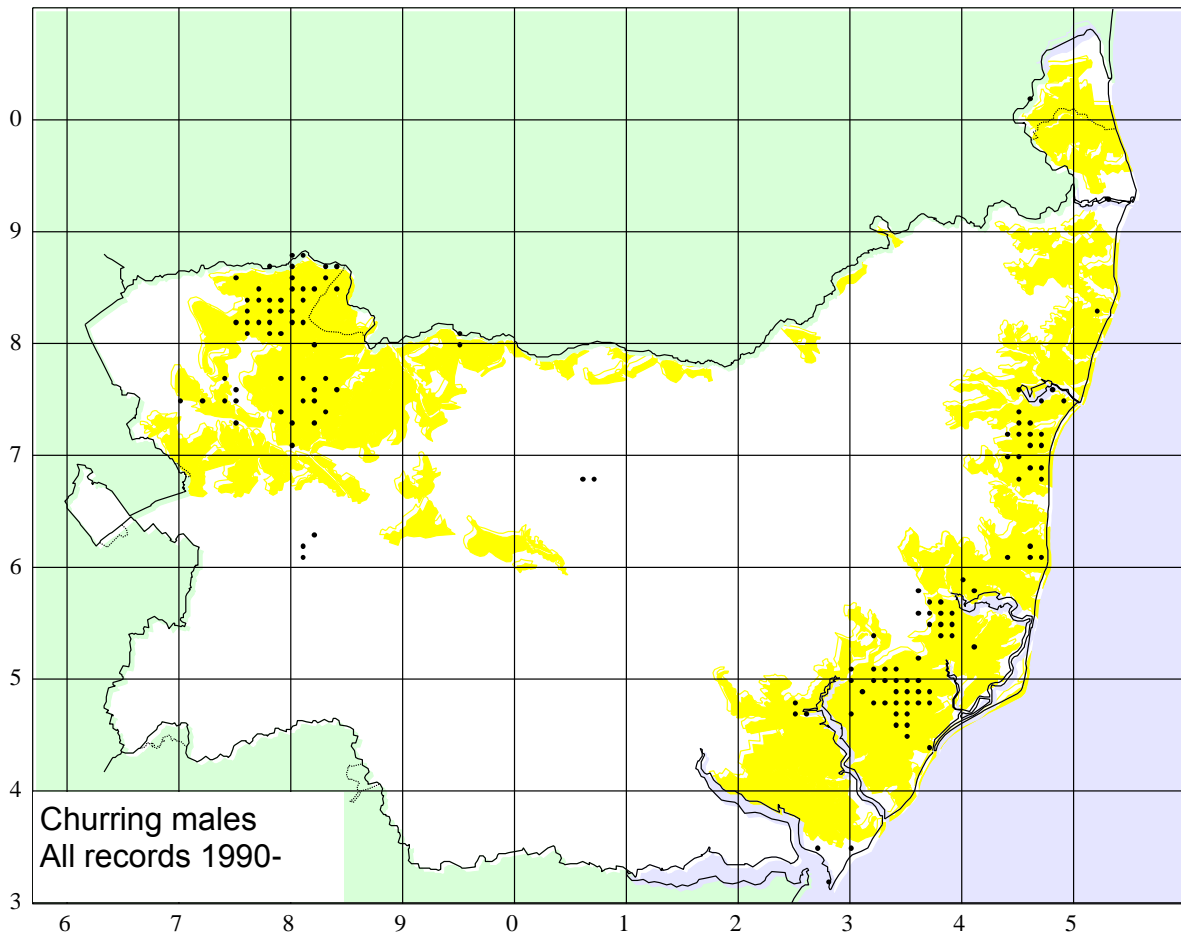
Monitoring

The two translocation sites at Westleton and Walberswick are monitored annually by RSPB and EN. At Minsmere there are regular visits to ponds from early April to June, particularly after heavy rainfall and on warm evenings.

Biodiversity Action plan objectives and targets

- Maintain and enhance the existing colonies – linking them with suitable habitat if feasible.
- Monitor the existing populations.
- Identify further reintroduction sites within the historical range of the species in Suffolk and ideally link to existing colonies at Westleton and Walberswick.
- Initiate at least one more re-introduction by 2007 within the area above





Nightjar *Caprimulgus europaeus*

Current distribution

Nightjars can be found in suitable habitat, particularly in forestry plantations and larger heaths, in both the Sandlings and Brecks. It is estimated that the Breckland heaths (Norfolk & Suffolk) support about 10% of the UK population. The Sandlings are also very important with about 5% of the British population nesting here. Suffolk therefore has at least 10% of the British population. Breeding data from favoured sites in 2003 was 'encouraging' (*Suffolk Birds* 2003) with a marked increase noted at Minsmere where 22 churring males were heard compared to 13 in 2002. This was attributed to habitat improvement with 'areas clear-felled in the preceding winter proving popular' (RSPB).

Trends

Although the recent increase in Nightjar numbers in this region is dramatic, a long term decline has been noted from the early part of this century. The causes of the decline nationally are also the most likely candidates for local decline in this period. The recent upturn in numbers could be attributed to the clearing of forests and the subsequent creation of wide rides and glades, or equally, to the October 1987 storm which destroyed large areas of forestry in the Suffolk Coastal Forest. Here, the increases in numbers may be reversed when the plantations reach an age unsuitable for Nightjars. Nightjars nest in the young stages of plantations, while there is still bare ground between trees. If no other suitable habitat becomes available in other new or young stands, local population declines could occur as the recently planted blocks mature.

Between 1981 and 1992, the population of males in Suffolk increased by 157% to 308. The number of sites where these individuals were found has also increased at a similar rate. The Breckland population may have increased since the start of afforestation.



The 1997 survey of forest plantations in Norfolk and Suffolk up to 12 years of age produced an estimate which

suggested an increase in the number of pairs since the 1992 survey. This study concluded that the creation of a more diverse age class structure will help the Nightjar.

Detailed research into the ecology of Nightjars nesting in Thetford Forest has been carried out by the RSPB with FC help. FE's forestry practice is now aimed at maintaining a constant area of young plantation as good habitat for breeding Nightjars (included in the Thetford Forest Design Plan).

As so much of the suitable habitat is within forestry land, the Nightjar has not benefited as much as the Stone Curlew from management encouraged by the Breckland ESA (Tiers 1 and 2 where heathland is promoted with suitable grazing regimes - a site specific Management Plan is drawn up taking local factors into account). The 2004 survey has revealed an 8% decline contrary to the national trends with a total of 284 reeling males. Most of the declines are in the Sandlings Forests and are attributed to the age of the plantations that were planted after the 1987 storm.

Threats

The main causes of the decline of this species are probably habitat degradation through changes in forestry practices, pesticide use which seriously reduce or eliminate populations of insects, afforestation and road mortality.

Where heathland lacks appropriate management, it will become unsuitable as nesting habitat due to invasion by bushes and trees.

Nightjars require extensive areas of suitable feeding habitat, especially uncultivated land. The loss of such habitats within a few kilometres of the nesting area may result in a decline in the number of birds.

It is possible that a decline in the availability of large insects caused by changes in agriculture (such as the indirect effects of pesticides) and/or climatic change, may have affected Nightjar populations.

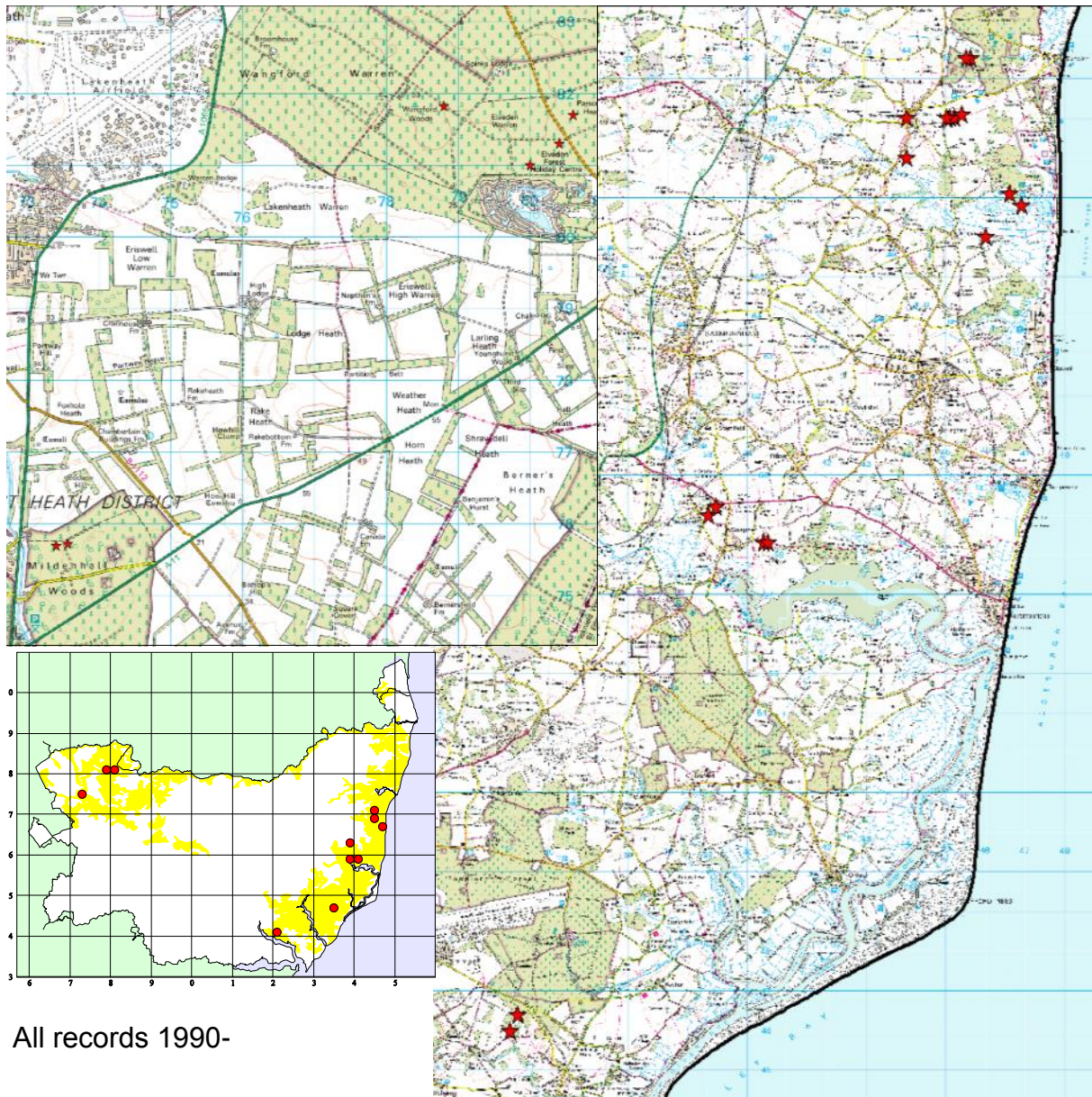
Monitoring

The species has had good publicity both in the Brecks and Coasts & Heaths project areas. The 2004 national survey has shown we currently have numbers within the BAP target range.

Biodiversity Action plan objectives and targets

- Maintain a local population of at least 280-300 churring males in Suffolk.
- Restore forest plantation territories to pre-1997 levels.





All records 1990-

Red-tipped Cudweed *Filago lutescens*

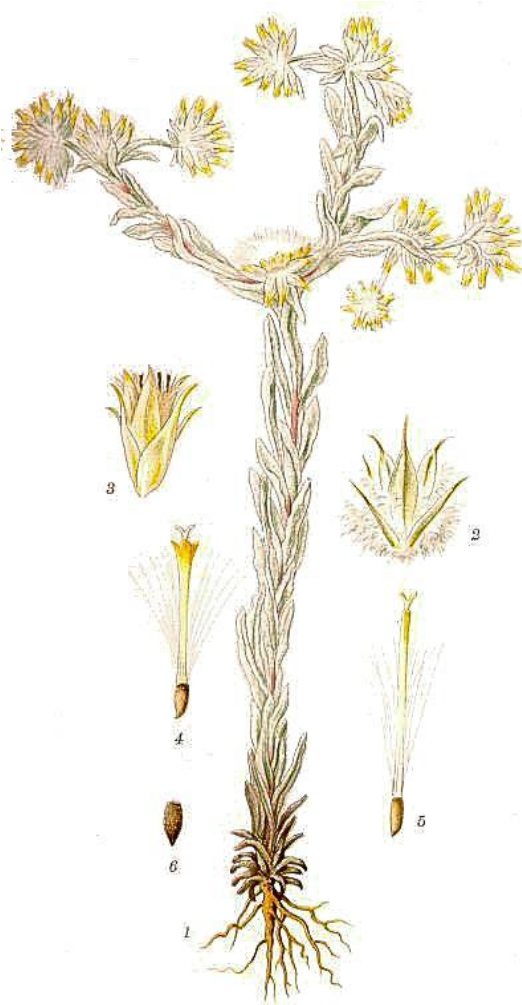
Current distribution

This species has always been confined to the south-eastern corner of England, but over the last fifty years it has suffered a major decline, leaving Surrey and East Suffolk with the largest and most stable populations at the present time. Red-tipped cudweed has been recorded from five sites in the Sandlings in recent years and since 2000 it has been found in four areas of Suffolk Breckland. It has persisted for over ten years in a field at Snape, where it was originally introduced.

This is a winter or spring annual of dry open places such as the edges of fields, tracks, sand pits and rabbit scrapes. It cannot be said to be a typical heathland species and will only be found on heaths where there is a high degree of disturbance.

Trends

In the last ten years there has been a significant increase in the number of records as a result of special surveys and conservation management. The new records from



forestry sites in the Brecks suggest that the species may have found a new and more sustainable niche with the necessary disturbance factor being provided by vehicles using forest tracks. This is a species which is capable of rapidly colonising new sites and it may benefit from global warming.

Threats

- Conversion of marginal arable land to permanent grassland or intensive crops.
- Increased use of herbicides and fertilisers.
- Destruction of field boundaries.
- Earlier summer harvests followed by cultivations which destroy plants before they flower and set seed.
- Spraying of set-aside fields in spring and early summer.
- Reduction in rabbit population following myxomatosis, resulting in loss of soil disturbance on heathland.
- Habitat neglect, resulting in loss of open areas for regeneration.
- Loss of heathland to housing, industry, airfields, forestry, as well as agriculture.
- Changes to trackside habitats due to reduction in grazing and disturbance; fertiliser run-off and hard surfacing.

Monitoring

Extensive national studies of this species have been carried out by Plantlife under their "Back from the Brink" project, which is supported by English Nature's Species Recovery Programme. This has included regular monitoring of all sites.

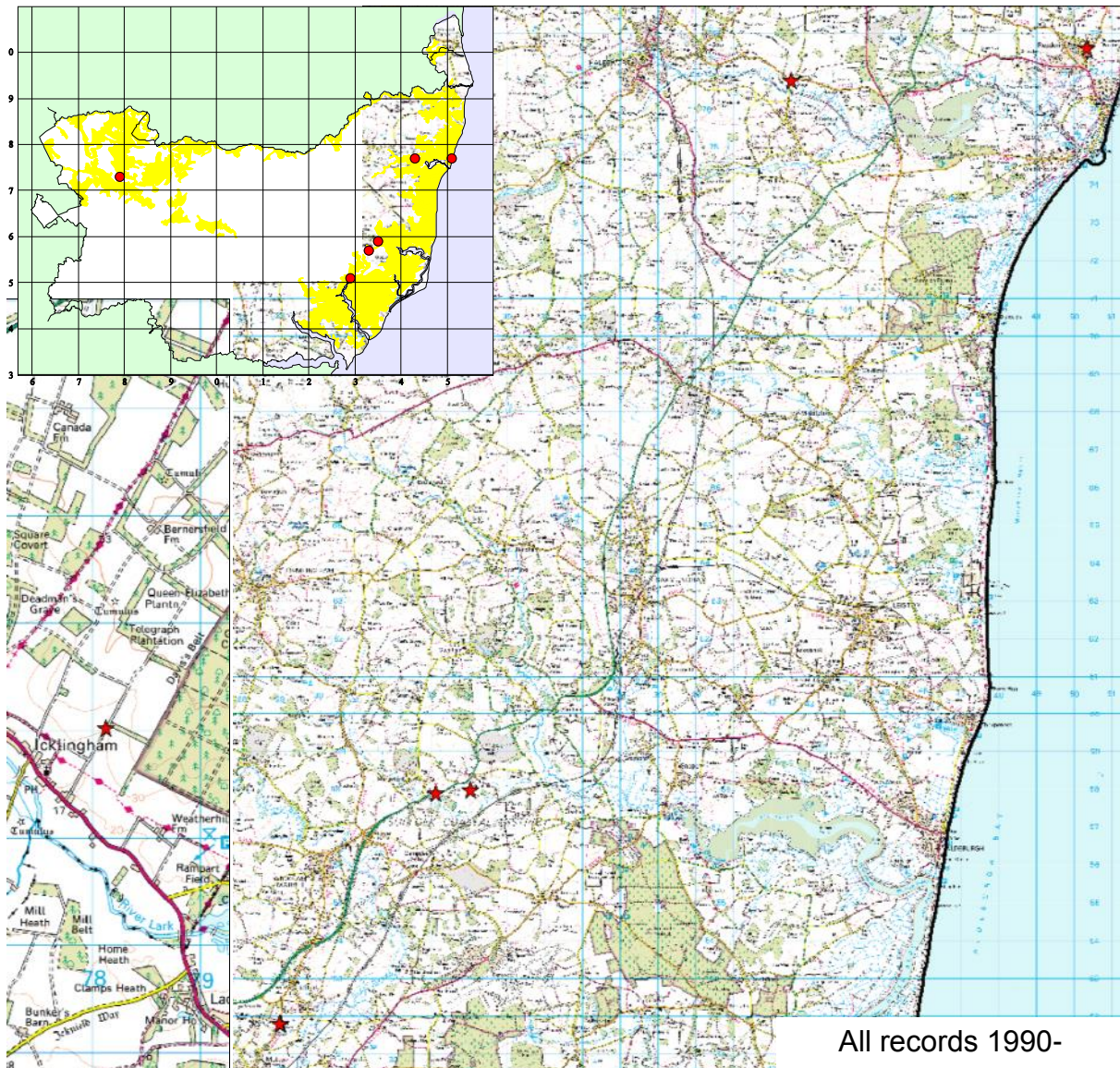
Biodiversity Action plan objectives and targets

- Seek to ensure viable populations exist at all current sites.
- Apply the results of management research to all sites as appropriate.
- Collect seed for National Millennium Seed Bank Project from viable populations.
- Ensure suitable habitat is available for colonisation close to existing sites.

Current Action

- Annual management by rotovation at Westleton Common and Minsmere RSPB.
- Continue scientific experiments on introduction site at Snape Hall to find effects of different cultivation regimes.
- Further new sites may be found as a direct result of the county-wide survey in progress for a new Suffolk Flora.
- All natural sites, with the exception of Snape (Sailor's Path), are protected by either SSSI (Hollesley and Westleton) or County Wildlife Site (Breckland) designations.





Sandy Stilt Puffball *Battarraea phalloides*

Current distribution

Although rare in Europe, Sandy Stilt Puffball has been recorded from most countries except those in the north, and it is also known from North America. It is usually a Mediterranean or Atlantic species, and has a scattered distribution in Europe. It has also been recorded from Africa and Australia, but it may have been confused with another species. This fungus appears to have been seen first in England in 1782 in the area of Earsham and Kirby Cane, in south Norfolk, just north of the town of Bungay and was formally described in 1785. In Britain it is now known mainly from the south and east of England; the best-known location is a 70m stretch of hedgebank in Suffolk where it is protected as a Roadside Nature Reserve. Found in very dry areas on sandy soils, on banks and at the edges of woods. It seems to be associated with decaying wood, and can sometimes be located inside hollow trees facing towards the light. It has been found in association with ash, yew and pine, and in Suffolk it is most often found under elm hedges.

Battarraea phalloides only appears to be known from about 30 UK sites, of which there are six in Suffolk. It has been noted in the parishes of Blyford, Melton, Campsea Ashe, Marlesford, Reydon and Icklingham. It has appeared at several sites since the last war, principally at Blyford near Halesworth, where over 80 were seen



in the mid 1970s. It has appeared in much smaller numbers in most years since then, sometimes in spring as well as summer and autumn. In the period 1984-86 a few fruiting bodies occurred on a hedge bank at Campsea Ashe some 20 miles further south, but none have been recorded at this site since then. A new location was discovered by D. & C. Orme at Melton, East Suffolk in August 1997, when two large fruiting bodies were noted on a small heap of sand excavated by rabbits under an old oak tree. This verge bank is dry and has little vegetation and faces east. The Blyford bank faces east and has elm scrub and annual weeds over its length. It is backed by a good hedge of Small leaved elm (*Ulmus minor*) for most of its length. The Campsea Ashe bank is less scrubby, but has the same elm at various stages from scrubby bushes to quite tall trees. It faces north and supports mainly weed species in its sandy soil.

At neither site has the fungus been seen inside hollow trees, a habitat mentioned in the National Biodiversity Action Plan, although at Blyford in late August 1997 two fruiting bodies appeared close to the base of a large elm which was felled some years earlier.

Trends

As it appears rather randomly, it is possible it has always been rare and therefore may not be significantly more threatened now than it was when discovered two centuries ago

Threats

The Reydon site has recently been involved in a planning enquiry, resulting in houses being built just behind the site. The site owner has volunteered to look after the site as a private nature reserve. The fungus is still present here (2003).

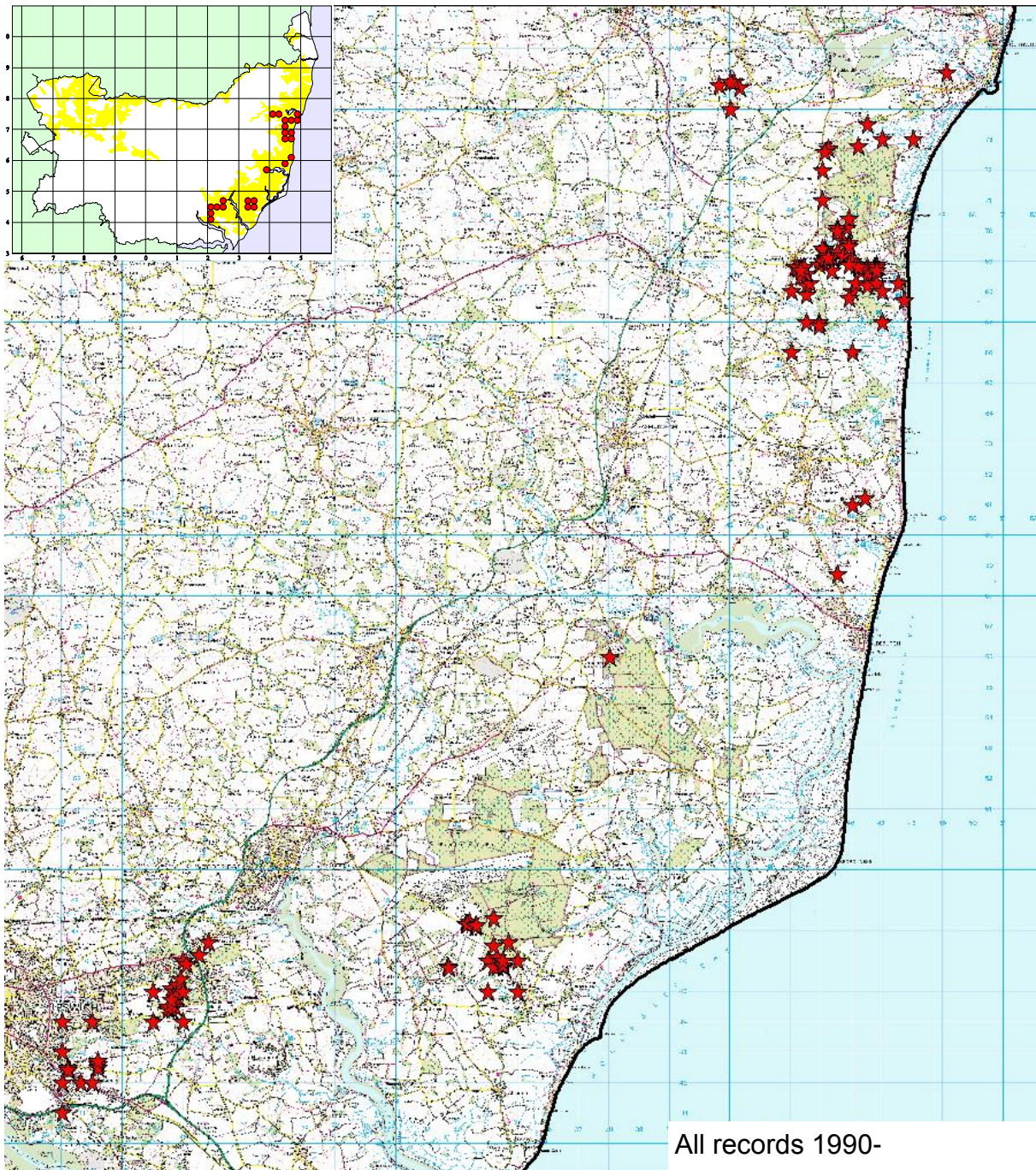
Monitoring

All sites are monitored fairly regularly to check for fruiting bodies

Biodiversity Action plan objectives and targets

- Maintain seven known Suffolk sites in favourable condition and ensure adequate protection.
- Monitor all sites for appearance of fruiting bodies.
- Encourage local wildlife recorders to search for the fungus at other suitable sites.





Silver-studded Blue *Plebejus argus*

Current distribution

The species was abundant in the Suffolk Brecklands, especially between Brandon and Tuddenham, as little as 50 years ago, but the last record was made in 1965. It is now confined to the Sandlings and here it was also formerly widespread, occurring on most heaths between Lowestoft and Ipswich. Colonies now occur only on the extensive heathlands of Westleton and Minsmere in the north and on a few heaths close to Ipswich and Hollesley in the south. Most are small by national standards and occupy patches of heathland of less than 2 ha. Two sites were established by introductions in 1986; one is now the largest colony in the county and has stimulated the colonisation of nearby heathland. Two new sites have been colonised naturally.



Trends

Like so many other heathland species, the survival of the silver-studded blue goes hand in hand with the survival of the heaths and its decline has followed that of its heathland habitat.

Threats

The species requires heathland on light sandy soils in an early stage of development after disturbance or burning that is characterised on the Sandlings by the presence of Bell heather (*Erica cinerea*), patches of loose soil and short turf. Conditions, once attained, can be prolonged by intense rabbit or sheep grazing or occasionally by mowing, but eventually soils will either grass or moss over and stabilise, or Ling (*Calluna vulgaris*) dominates, excluding large nests of the ants on which it depends (*Lasius niger* and *L. alienus*). Most colonies in Suffolk are on previous summer burns or areas of disturbance. Colonies in Suffolk are largely adequately managed and there are few factors causing further loss of colonies. However, management of many current colonies is seldom harsh enough to encourage fresh conditions for the butterfly and there is a general succession trend on many colonies. The small size of colonies restricts this type of management at many sites. Other threats include:

- Destruction of heathland habitat through industrial, housing or recreational development particularly in the Ipswich area.
- Destruction of heathland for agriculture or forestry (the latter was probably largely responsible for the loss of the Breckland population).
- Decline in traditional management such as grazing by livestock, cutting and burning that maintained heathland and prevented succession.
- Isolation of current heathland sites limits the potential of the species for expansion to other parts of the Sandlings.
- Inappropriate management which leaves cut material and leaf litter on the ground.
- Colonisation of bare ground by the naturalised encrusting moss *Campylopus introflexus*.

Many sites could become suitable again through a programme of specific management to remove vegetation and litter layer and encourage patches of a bare ground/short turf/bell heather mosaic within the range of existing colonies.

Monitoring

All known colonies are monitored annually with counts coordinated by the Sandlings Group. Informal monitoring of populations is performed by Martlesham Conservation Group and the RSPB at Martlesham Heath and within Minsmere respectively, and by Butterfly Conservation elsewhere on the Sandlings. Reviews of the effects of management and monitoring of all populations, including those established at introduction sites, have occurred at regular intervals since 1985. Work on population sizes and their relation to recent management was carried out in 1994 and repeated for some sites in 2003.

Biodiversity Action plan objectives and targets

- Protect heathland habitat.
- Enhance the existing population at current colonies through appropriate management.
- Increase the number of colonies of the Silver-studded blue on the Sandlings by two by 2008.
- Increase awareness and understanding of Silver-studded Blue ecology.



Starry Breck Lichen *Buellia asterella*

This lichen is one of many that grow on the surface of the soil rather than on a raised surface such as stone or on trees. Like most other lichens, it is slow-growing and needs a bare surface to form colonies. This particular species grows on chalky soil, forming small white rosettes with small black discs about 0.5 millimetres across on the upper surface; these are the spore-producing structures. It requires dry, sandy soil over chalk and a short, well-grazed open grass sward, preferably nibbled and disturbed by rabbits.

Current distribution

The species is found in Germany, France, Norway and Switzerland, but in the UK it has always been confined to the Brecklands where it was once found on four sites. Three of these had been disturbed by man's activities in the past. One was found on the site of 19th century flint mines, and on two, the ground had been disturbed by the digging of trenches to deter the landing of gliders during World War Two. Until recently it was restricted to one site, at Lakenheath Warren.

Trends

The species has been the subject of an English Nature Species Recovery Programme Project to assess habitat requirements and also investigate the success of transplanting the lichen between Breckland sites. Six Breckland sites were assessed in 1991 and 2002. Transplanting populations of the lichen was not successful. At Lakenheath Warren, the last remaining site, sward closure due to aerial nitrogen inputs from agriculture or transport contributed to the demise of the lichen. Introduction of cattle grazing, to improve the condition of the grassland, may have caused trampling damage to the lichens but it is not likely that the lichens would have survived without grazing. Starry Breck Lichen is now believed to be extinct in the UK.

Threats

Starry Breck Lichen has become extinct during the period 1998-2002. The cause of this decline is that the previously open grassland has closed up due to the spread of higher plants and bryophytes, denying the lichens the light and calcareous mineral soil they require as a substrate. It is believed a reduction in the rabbit population through myxomatosis and the ending of sheep grazing led to the loss of the open sward required by this species. On the main site, there is also a threat from pine seedlings, which are thought to have affected the microclimate of the site. Spray drift and nitrogen deposition may also pose a threat.

Monitoring

A count of the number of plants present at Lakenheath Warren showed that it had declined by 60% between 1997-99. For full reports of surveys on this species see Gilbert (1997, 1999).

Condition monitoring of Lakenheath Warren SSSI should include regular checking of past sites and other areas with suitable substrate.

Biodiversity Action plan objectives and targets

A series of protective measures have been introduced to conserve this species and the unique habitat it grows in. A translocation of the lichen using transplanted plugs was undertaken on two sites away from the main one where conditions appeared favourable. In the long term, it has been agreed that rabbit grazing be encouraged on these sites and the invasive pine seedlings be controlled. As the lichen also



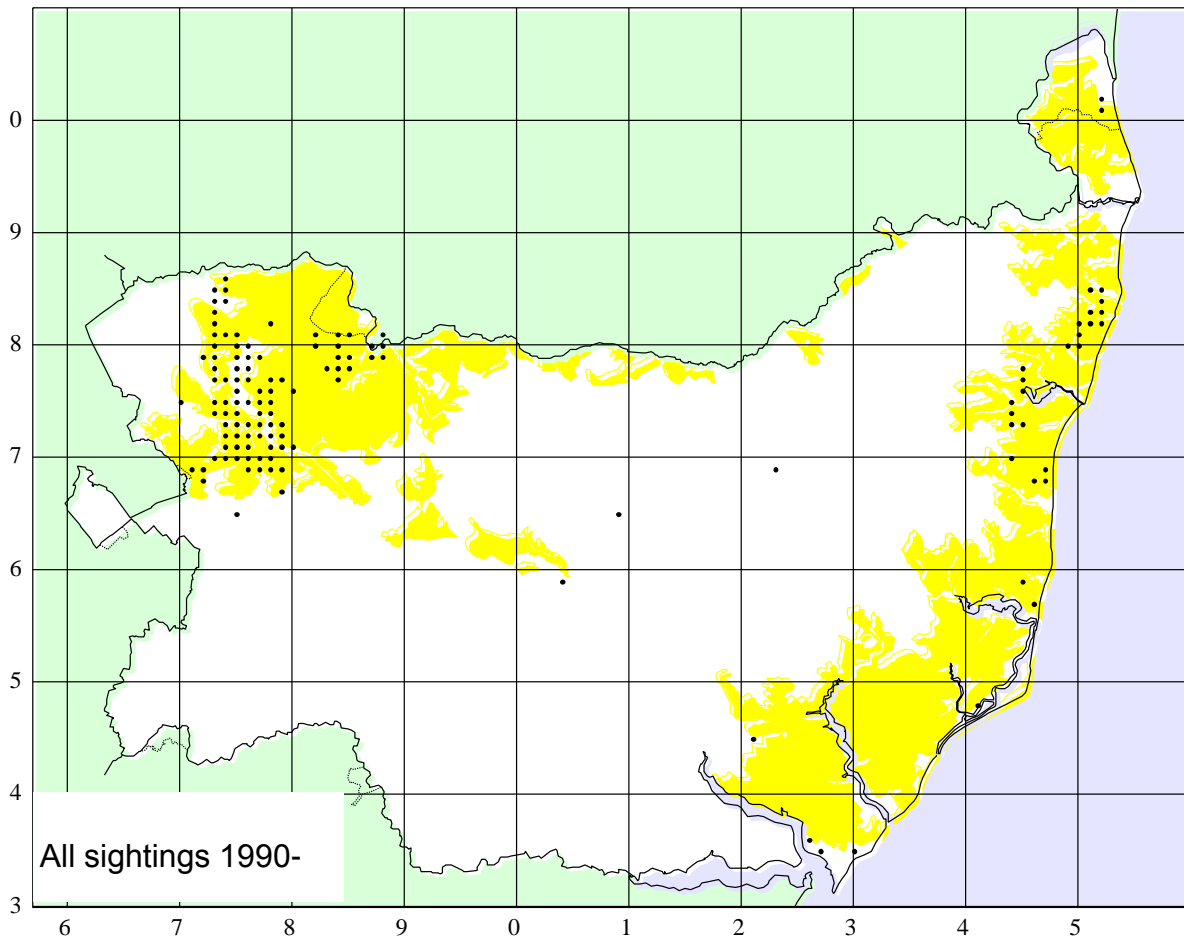
Buellia asterella

requires open ground, the turf has been stripped from several plots in the hope that it will re-colonise these areas over time, along with a suite of the mosses and rare flowering plants with which it is associated.

Objectives for the species

Maintain Breckland calcareous grassland sites for benefit of rare lichens. There is a very small chance Starry Breck Lichen propagules could drift in naturally from the continent and could grow if habitat conditions were suitable.





Stone Curlew *Burhinus oedicephalus*

The Stone Curlew is a UK Red list species, having declined by over 50% in the last 25 years, as well as being a rare breeder and a species with an unfavourable conservation status in Europe (SPEC 3).

Current distribution

Its stronghold is in the Breckland of Suffolk and Norfolk but there are still a few pairs breeding in the Sandlings, largely confined to arable land. Norfolk and Suffolk together held 183 pairs in 2000 (72% of UK breeding Stone Curlews). The Suffolk breeding population currently ranges from 40-50 pairs.

Trends

Rare and localised in the UK, Stone Curlew numbers have fallen by some 85% since the 1940s and the species is now largely confined to Wessex and the Breckland. Described in the 1920s as being as common as wood pigeons on the heath, until 1956 they bred in every Sandlings parish from Covehithe to the Orwell estuary. A survey in 1949 located 634 individuals in Breckland but a rapid decline took place during the 1950s as the rabbit population was decimated by myxomatosis. Stone Curlews decreased from over 300 pairs in 1948 to 60-80 pairs a decade later.

The coastal population declined even faster and by the 1970s was reduced to four pairs. Much management work has focussed on increasing the east Suffolk population by providing wide open areas of close-cropped acid grassland and disturbed, stony ground to attract new breeding pairs. Sympathetic management of arable land where they occur is also encouraged.

Threats

- Loss of semi-natural grasslands. The conversion to arable farmland or forestry of suitable short-grazed, sparsely vegetated grasslands, particularly chalk and heath grasslands, is thought to be the main reason for the decline in breeding Stone Curlews in England.
- Reduced grazing by Rabbits and livestock. The reduction or loss of grazing pressure by both Rabbits and livestock has resulted in areas becoming unsuitable for breeding stone curlews due to the growth of tall grass and scrub.
- Changes in farming systems. Breeding can occur on arable land, mostly spring-sown field crops since these retain their open structure (and therefore suitability as a breeding habitat) until June or July. The reduction in spring-sown crops and the general trend of agricultural intensification has led to a reduction in availability and suitability of this habitat. This is a less serious problem in Breckland than elsewhere in the UK.
- Agricultural operations such as mechanical hoeing can destroy eggs and young where nesting occurs on agricultural land.
- Fox, Crow and possibly stoat predation, particularly on grasslands.
- Disturbance prevents the species using some areas that are otherwise suitable.
- Egg collecting.
- Impact of noise or lights from roads

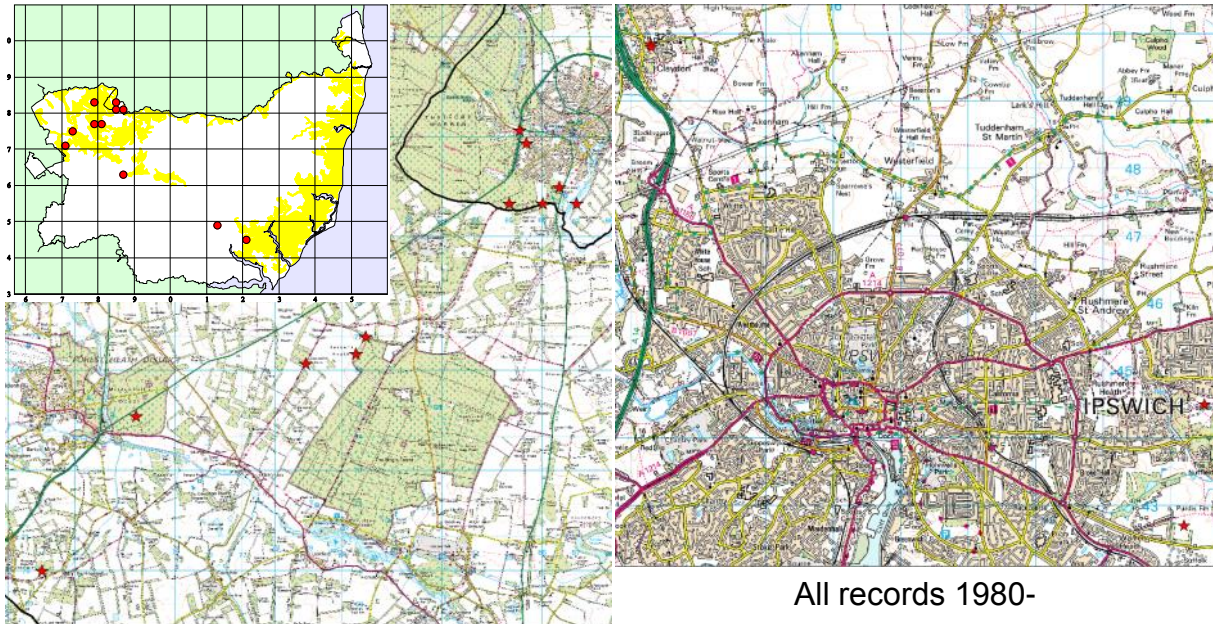
Monitoring

- Monitor Stone Curlew breeding population in Suffolk to assess whether the action plan is attaining its objectives.
- Monitor the condition of SSSI heaths for Stone Curlew with particular attention to sward height and grazing levels and adjust management as necessary.
- Analyse crop mapping survey to determine recovery potential for the Stone Curlew in east Suffolk.
- Elveden Estate landowners are monitoring and ringing Stone Curlew.
- Investigate mechanisms determining the avoidance of major roads by Stone Curlew and make recommendations for the mitigation of these affects.

Biodiversity Action plan objectives and targets

- Maintain the breeding population in Breckland (Norfolk as well as Suffolk) at no fewer than 172 pairs.
- Increase the breeding population (East Anglia-wide) to at least 225 pairs by 2005.
- Maintain a minimum of 3 breeding pairs in the Sandlings with a target of 7 breeding pairs by 2010.
- Encourage Stone Curlews to return to semi-natural grasslands and grass heaths where their future would be more sustainable and less costly. Target is to achieve 55 breeding pairs on Breck heaths in 2010 (in Suffolk).
- Maintain a minimum productivity of 0.70 fledged chick per pair by intervention on arable and reserve management where appropriate.





Tower Mustard *Arabis glabra*

Tower Mustard is a tall, erect biennial member of the crucifer family. It grows in grassy and waste places on free-draining sandy soils, including woodland rides, road verges and heath. It is rare in Britain and consequently is included in the British Red Data Book which classes it as vulnerable. It has also been included in English Nature's Species Recovery Programme and Plantlife's *Back from the Brink* project.

Current distribution

This species is now known from only six sites in southern England (North Wiltshire, North Hampshire and Surrey) and about twelve sites in East Anglia (West Norfolk and West Suffolk). A Breckland species, it has been recorded at more than one site in Suffolk recently. Sporadic appearances may be due to its persistence in the seed bank. Although its seeds appear to be viable for many years, they are dependent on open areas for germination. The main stronghold in Suffolk is just south of Thetford at Barnhamcross Common, here the population appears stable and healthy and is particularly abundant where scrub clearance has taken place. A significant colony was discovered in 1998 on a roadside bank in Claydon Village, and there are a number of other earlier records, mainly from the Ipswich area, all of which are believed to be extinct. Another new record was made in 2004 when several plants were found on a verge in Bury St Edmunds.

Trends

This species has declined strongly across most of its British range. The majority of extinctions occurred in the 19th century and the first half of the 20th century but losses continue. The current area occupied by this species is only 15% of its total historic area. Much of its decline is probably due to the enclosure of commons, the agricultural improvement of pastureland, urban development, forestry and the abandonment of traditional management over the remaining sites. These processes, particularly the latter, continue to threaten the few remaining sites. Though in small numbers and threatened in southern England, numbers have increased in parts of the Norfolk Breckland in recent years. Trist (1979) describes it as usually occurring singly, but some colonies in the Breck now consist of thousands of plants, although they occupy very restricted areas. This may in part be due to more open habitat



created after the 1987 storm which devastated East Anglian plantations. *A. glabra* will presumably decline again with the closing over of its habitats. When these sites become overgrown with a dense cover of grasses or are shaded by newly planted trees, individual plants appear able to hold their own for a while, but with no open space for seedlings, the population may decline to extinction. It is often found in association with *Lactuca serriola* and *Verbascum thapsus*, both being species that can take advantage of temporary clearances and open soil, and it often behaves like an invasive weed. Whilst some colonies have fallen to very low numbers, a persistent seed-bank may allow recovery, and at some sites it has reappeared after long intervals. Recovery is often rapid: for example, scarification of one Hampshire site in 1994 resulted in a

doubling of the population (to 200) in 1995. Wire cages have been used locally to protect against rabbit-grazing. However, because of its rather invasive tendencies in Breckland, special conservation measures are not required in that area at the present time.

Threats

- Habitat decline due to agricultural intensification.
- Destruction of heathland for housing, industry, airfields, forestry and agriculture.
- Habitat neglect, resulting in loss of open areas for regeneration.
- Overgrazing by rabbits, sheep, deer and cattle.

Monitoring

The West Suffolk sites are monitored as part of English Nature's rare species recording programme with most sites being surveyed every year for either two or three consecutive years, with a year's break, then the pattern repeated. The Claydon verge site is included in the County's Protected Roadside Verge scheme and is checked as part of condition monitoring.

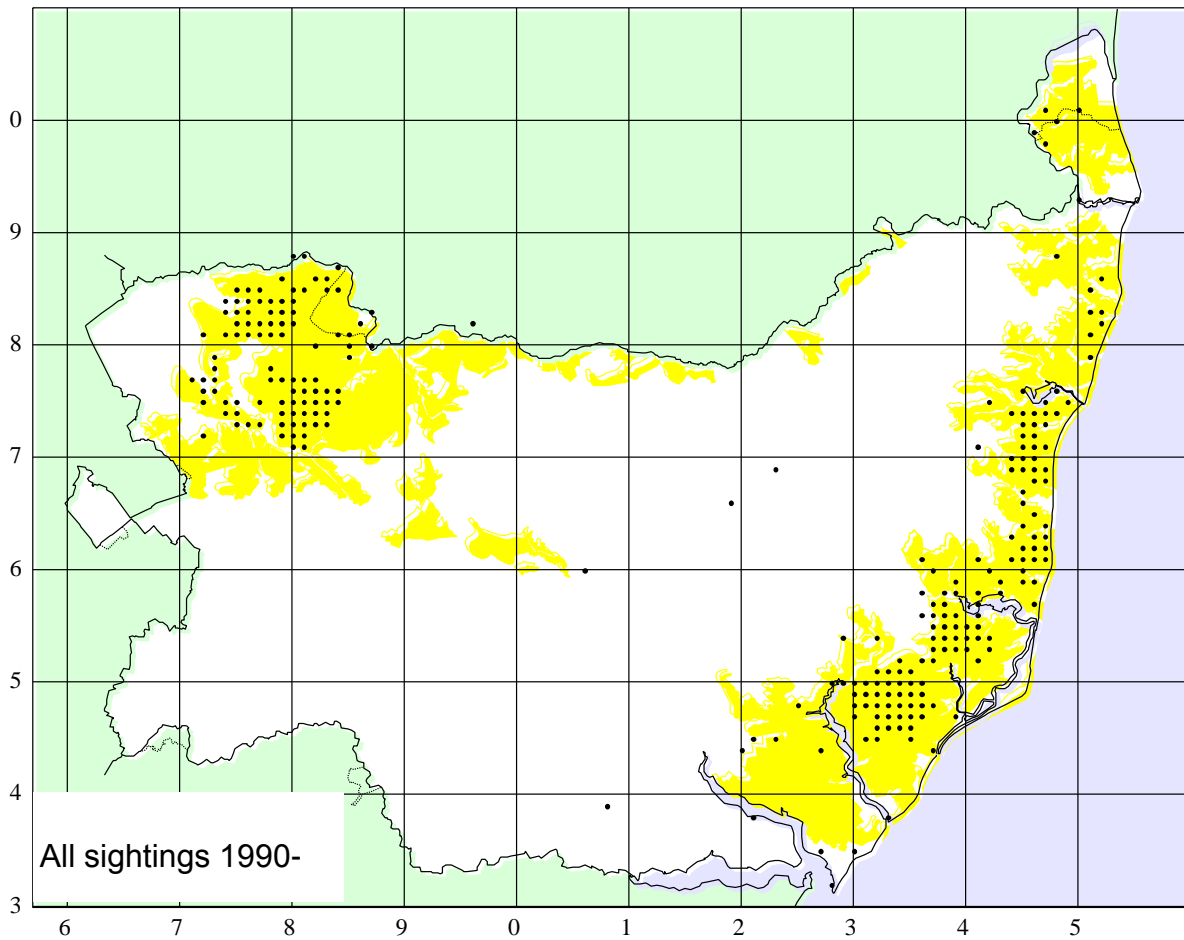
Biodiversity Action plan objectives and targets

- Regular monitoring of Breckland site.
- Establishment of a Roadside Nature Reserve to protect its vulnerable urban site in Claydon, followed by regular monitoring.
- Further new sites may be found as a direct result of the county-wide survey in progress for a new Suffolk Flora.
- Action plan objectives and targets
- Maintain current sites and increase awareness.
- Increase knowledge of former sites.
- Investigate means of establishing the species at former sites.



Arabis glabra
Foto: Per M. Hagen





Woodlark *Lullula arborea*

The Woodlark is found throughout much of the Western Palearctic, but in many parts of its European range it has declined as a result of loss and degradation of dry grassland and heathland. In Britain the Woodlark is a rare breeder, being now mainly confined to southern England and is listed as a species of high conservation concern.

Current distribution

The 1997 national survey found between 403 and 457 breeding pairs in Suffolk (30% of the UK population). Nearly 340 pairs were found in Thetford Forest (Norfolk and Suffolk) which represents a substantial proportion of the local (and national) population. The Suffolk Sandlings held around 245 territories, 16% of the national total, and Suffolk Breckland held around 450 territories, 30% of the national total.

Trends

Nationally, the number of 10km squares occupied in the breeding season decreased by 62% (from 198 to 73 10km squares) between 1968-72 and 1988-91. However, since 1986 (when the population was estimated to be around 250 pairs) the population has increased with up to 620 pairs breeding in 1993, and around 1,500 pairs in 1997. The nesting habitats are varied and include farmland, recently felled forestry plantations (mainly in East Anglia) and heathland in southern England and the Suffolk coast. Although still relatively rare in Britain, the population of this species grew rapidly between the mid 1980s and mid 1990s rising from an estimated 250 pairs in 1986 to more than 1500 pairs in 1997. In Suffolk total territories have risen from 22 in 1968-72 to 694 in 1997.



In the Sandlings its fortunes were favoured by the storms of 1987 and the increased intensity of management on neglected heathlands which has led to the clearance of large areas of trees, scrub and bracken and the reintroduction of grazing to many heathland sites. This created bare ground and short turf which are hotspots for invertebrates and a rich feeding and breeding ground for woodlark.

Results from the 1997 survey suggest that around 50% of breeding pairs across the country are now nesting on set-aside and other weedy fields. The recent increase in the population has resulted largely from new plantation habitats within the core areas. Recent RSPB / FE research (1997) has shown the Woodlark population to be increasing on all surveyed sites (except two, where there was no change) within Thetford Forest, and on surrounding heath.

Now, however numbers seemed to have peaked and we may be experiencing a decline in spite of management work. Heathland is its main home but it may be that in the Sandlings forestry clearfell is the woodlark's preferred habitat. Large areas of suitable habitat will soon become too densely covered to support the current Woodlark population, and the number of breeding pairs may decline in the future.

The Woodlark populations in East Anglia utilise those plantations with trees up to 4 years old, or up to 6 six years when ploughing between rows of 3-6 year old conifers is included. This means that regular clear-felling and re-planting is required for a healthy population.

Threats

The main causes of the decline are habitat loss and deterioration through intensive arable agriculture, reduction of pastoral activity and afforestation.

Monitoring

Another national survey in 2007 would provide a useful comparison with the 1997 data and enable assessment of the population trends now that the amount of available clearfell for this species has stabilised.

Biodiversity Action plan objectives and targets

- Maintain as a minimum a population of between 403 and 457 breeding pairs within Suffolk in the existing range of 11 10 km squares.
- By increasing the area of suitable heathland (through initiatives like ESA, and FE's commitment to recreate heath), increase the possible breeding and feeding areas for the Woodlark, and so provide scope for further population expansion in the region. By offering winter stubble options in ESA, wintering populations may be aided.



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