



Natterjack toad – threatened

## Threatened species

In addition to species that have already been lost, others have been reduced in range and numbers to the point that they are vulnerable to extinction in England.

### BAP priority species

The England Biodiversity Strategy sets out the action and co-ordinating framework needed to halt biodiversity loss and to rebuild our natural environment. At the UK level, Biodiversity Action Plan (BAP) priority species have been identified in order to give strong direction to where we need to focus our conservation efforts. The UK BAP prioritises those species that are globally threatened and species whose populations are in rapid decline (by 50 per cent or more in range or numbers over the last 25 years). It also identifies species that occur in the

UK in internationally important numbers but are in 'moderate' decline (by at least 25 per cent or more in range or numbers), as well as other species whose populations are considered to be threatened in the UK.

The UK BAP species that occur in England have been listed as species of 'principle importance for the conservation of biological diversity' under section 41 of the Natural Environment and Rural Communities Act 2006. Table 3 provides a summary of the number of species involved for each major species group where we have detailed information on English numbers. The proportion of native species listed as BAP priority species varies considerably between groups – ranging from 0-100 per cent, with rates of 30 per cent or more in the reptiles, whales and dolphins, amphibians, freshwater

### England's lost species

**Lichens** ■ *Arthonia galactities* 1879 ■ *Arthothelium spectabile* ■ *Bacidia auwerswaldii* 1937 ■ *Bacidia beckhausii* ■ *Bacidia polychroa* ■ *Biatora cuprea* 1975 ■ *Biatoridium monasteriense* 1981 ■ *Brigantiaea fuscolutea* 1960 ■ *Bryoria nadvornikiana* 1995 ■ *Buellia asterella* 1992 ■ *Calicium abietinum* ■ *Calicium quercinum* ■ *Caloplaca atroflava* 1973

fish, terrestrial mammals, butterflies and stoneworts. Species on this list usually benefit from targeted conservation action but even this is not always enough: seven BAP priority species have gone extinct in England since the publication of the first UK BAP list in the late 1990s (the bordered gothic, orange upperwing and Brighton wainscot moths, the starry breck-lichen, Irish lady's tresses orchid, Pashford pot beetle and a diving beetle *Laccophilus poecilus*).

**Table 3** Number of UK BAP priority species in England, ordered by percentage in group

A full list of priority species can be found at [www.ukbap.org.uk](http://www.ukbap.org.uk)

Major groups of plants and animals	Number of native English species	Number that are BAP priority species	Percentage that are BAP priority species
Reptiles	7	7	100
Mammals – regularly occurring whales and dolphins	13	12	92
Amphibians	9	4	44
Freshwater fish	37	14	38
Mammals – terrestrial (including seals)	49	16	33
Butterflies	75	24	32
Algae - stoneworts	29	9	31
Birds (residents and regular visitors)	281	54	19
Ants	50	7	14
Grasshoppers and crickets	28	4	14
Marine fish	275	28	10
Vascular plants	1,307	128	10
Liverworts	252	22	9
Mosses	679	61	9
Bees	265	20	8
Lichens	1438	99	7
Moths	2530	142	6
Dragonflies and damselflies	40	2	5
Spiders	640	31	5
Wasps	236	8	3
Water beetles	391	11	3
Stoneflies	34	1	3
Bugs	561	10	2
Hoverflies	264	5	2
Caddisflies	196	4	2
Mayflies	52	1	2
Fungi	>12,000	61	<1
Hornworts	4	0	0

The table does not include every species that appears on the BAP list – those 158 not listed are in groups for which we do not know the number of species native to England.

### England's lost species

- *Caloplaca borneri* ■ *Caloplaca haematites* ■ *Caloplaca pollini* ■ *Chaenotheca phaeocephala* ■ *Chaenothecopsis debilis* 1846 ■ *Cladonia cenotea* ■ *Cladonia peziziformis* 1968 ■ *Cladonia phyllophora* ■ *Collema conglomeratum* ■ *Collemopsidium argilospilum* ■ *Dictyonema interruptum* 1959 ■ *Diplotomma pharcidium* 1879 ■ *Hypogymnia vittata*

## Other species causing concern

The BAP priority species are not the only ones for which we have concern. For example, we know that an additional 36 bird species have undergone a decline of 25-50 per cent in range or numbers over the last 25 years, but these do not qualify as BAP species as they do not occur in the UK in internationally important numbers. Whilst it is highly likely that species in other groups also fall into this category, we do not have the information on recent population trends that would allow us to make a comprehensive analysis of these groups.

In a small number of groups (those for which there is an excellent written record of their abundance in earlier times) we also know that some species have been in decline over much longer periods – perhaps over many decades or even a century or more. It is evident that some of these species now occupy a range or occur in numbers which are a shadow of former times. Yet they may no longer be in decline and nor are they completely lost. Without restoration of these depleted populations there is a risk

of further extinctions. The identification of historically declining species relies on records of distribution and abundance. Whilst for most groups this simply does not exist, we have sufficient information to indicate that we should add an additional mammal, eight breeding birds, two freshwater fish, two butterflies, two bumblebees and no less than 194 vascular plants to our list of species for which we have conservation concern.

The overview of nine well-studied groups in Table 4 indicates that from 0-24 per cent of the species in these groups are lost, with a further 24-100 per cent of species either depleted or listed on the UK BAP list of priority species. An average of these values, but ‘weighted’ by the number of native species in each of the groups, indicates that over a quarter of extant species (26%) are depleted or appear on the UK BAP list. We do not know whether similar rates apply in the less well-studied groups, but these figures certainly give considerable cause for concern.

**Table 4** Overall loss, depletion and decline in better-studied groups, ordered by percentage threatened

Species group	Total number of native English species	Number (percentage) that are now lost	Number of extant species	Number of extant species on the UK BAP list	Number not on BAP list but with historically depleted populations	Proportion of extant species with historically depleted populations or on BAP list
Reptiles	7	0 (0%)	7	7	0	100%
Mammals – regularly occurring whales and dolphins	13	2 (15%)	11	11	0	100%
Amphibians	9	2 (22%)	7	4	0	57%
Freshwater fish	37	2 (5%)	35	13	2	43%

### England’s lost species

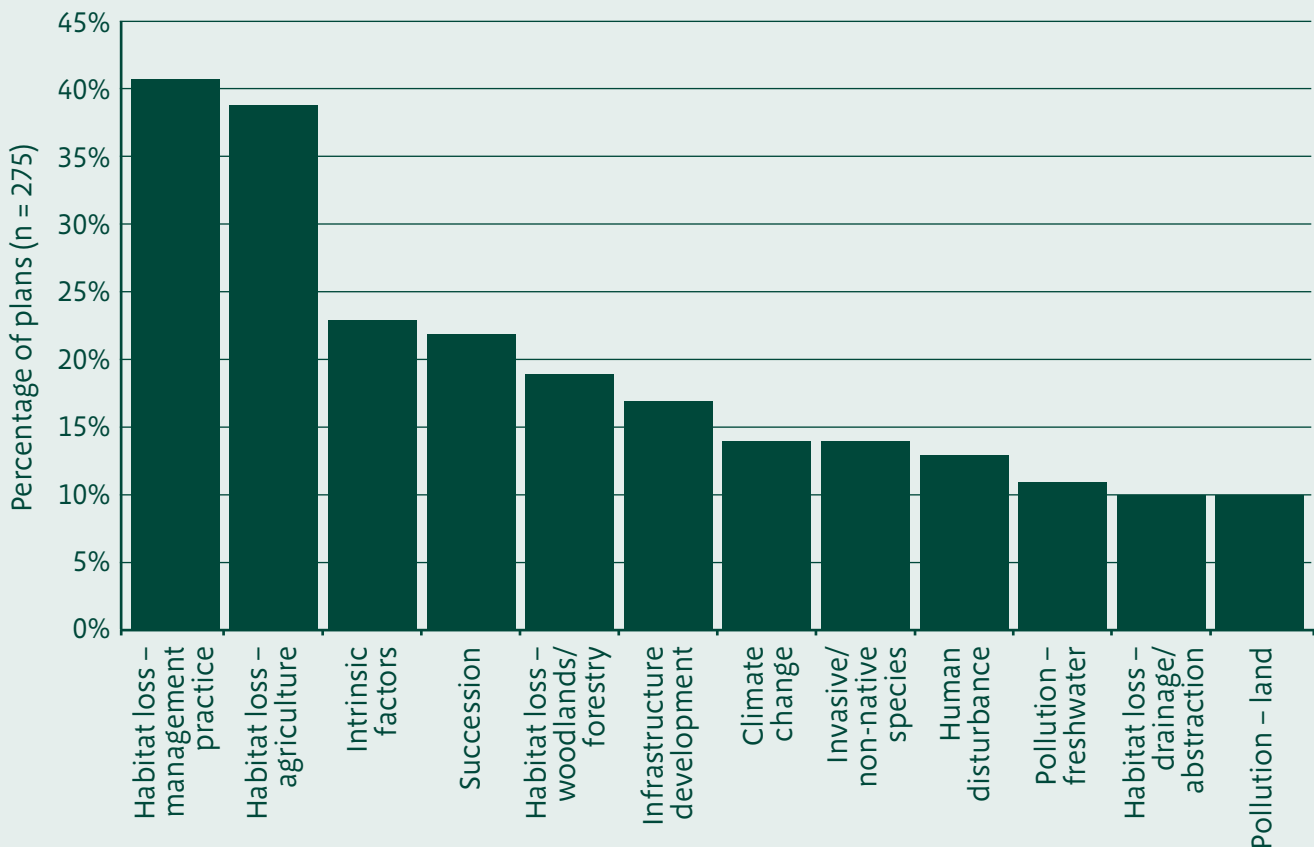
- *Lecania coeruleorubella* ■ *Lecania olivacella* ■ *Lecanora frustulosa* ■ *Lecanora populicola* ■ *Lecidella pulveracea*
- *Leptogium burgessii* ■ *Leptogium hildenbrandii* ■ *Leptogium saturninum* ■ *Melaspilea leciographoides*
- *Menegazzia subsimilis* ■ *Orphniospora moriopsis* ■ *Peltigera malacea* ■ *Pseudocyphellaria norvegica* ■ *Pyrenula nitidella*

Mammals – terrestrial (including seals)	49	6 (12%)	43	15	1	37%
Bumblebees	24	4 (17%)	20	5	2	35%
Butterflies	75	18 (24%)	75	23	2	33%
Breeding birds	185	10 (5%)	175	40	8	27%
Vascular plants	1,307	20 (<2%)	1297	121	194	24%

Information here may differ from that in earlier tables as it is re-presented here to ensure strict mutual exclusion between categories.

The factors driving decline in populations of BAP priority species are generally better known than the factors which led to the total loss of species from England. Habitat loss and degradation are factors that affect most BAP priority species, along with widespread impacts of air and water pollution, and intrinsic factors such as low population size and limited dispersal abilities. Agricultural intensification (such as increased levels of grazing and the use of fertiliser and pesticides) and changes in management practices are the most important underlying causes of species decline, followed by infrastructure developments, habitat succession and the effects of invasive non-native species. Figure 5 shows the most significant threats to BAP priority species.

**Figure 5** The most significant threats faced by BAP priority species in 2008



Source: Biodiversity Action Plan Reporting System, 2009; Natural England

### England's lost species

- *Sclerophora farinacea* ■ *Spironema paradoxum* ■ *Stereocaulon condensatum* ■ *Thelenella modesta* ■ *Thermutis velutina*
- *Toninia opuntioides* ■ *Toninia tumidula* ■ *Tornabea scutellifera* ■ *Usnea silesiaca* ■ *Vulpicida juniperinus* **Liverworts**
- *Diplophyllum taxifolium* 1950s ■ *Fossombronina mittenii* (Mitten's frillwort) 1972

## The red squirrel – lost to an alien invasion

The red squirrel is native to England and was widespread here until about 70 years ago. In the last quarter of the 19th century, the grey squirrel was introduced to various parts of the UK from North America. It has had a devastating impact, replacing the native species whenever the two come into contact and causing significant damage to forestry through its bark-stripping activities. The red squirrel is now confined to the Isle of Wight and the Poole Harbour islands, where there are no grey squirrels, and an area of northern England, mainly in Cumbria and Northumberland, into which grey squirrels are continuing to expand. This replacement has involved two factors. Firstly, grey squirrels out-compete red squirrels in most, if not all, types of woodland, perhaps because they are larger, live at higher density and are better adapted to foraging in

broadleaved woodland than the red squirrel, which evolved in northern coniferous forests. Secondly, the grey squirrel carries a virus, squirrelpox, which does not cause it any harm, but is almost invariably fatal to red squirrels. Where the virus is present in grey squirrels they replace the reds much faster.

Maintaining mainland populations of red squirrels will be difficult. The primary conservation strategy has been to identify large forest strongholds where the forest type minimises the competitive advantage of the grey squirrel, and defend these against grey squirrel incursions by organised trapping and removal in a surrounding buffer. Nevertheless it is highly likely that all mainland red squirrel populations will be lost within the next 20-30 years, unless effective action is taken.



Red squirrel – threatened

### England's lost species

■ *Liochlaena lanceolata* (Long-leaved flapwort) 1966 ■ *Scapania praetervisa* 1952 **Mammals** ■ *Canis lupus* (Wolf) late-1200s ■ *Castor fiber* (Beaver) late-1700s ■ *Eschrichtius robustus* (Grey whale) 1600s ■ *Eubalaena glacialis* (Northern right whale) mid-1800s ■ *Felis silvestris* (Wildcat) late-1800s ■ *Lynx lynx* (Lynx) early first century

## The northern bluefin tuna – fished to the brink



Recreational sea anglers off Scarborough enjoying a good haul of bluefin tuna in 1933

The northern bluefin tuna is the largest of the tunas. It can grow to a length of over two metres and weigh more than 500 kg. In England, observations of bluefin tuna in the North Sea date back to 1912, when government fisheries staff recorded bluefin schools feeding on the herring falling from fishing nets as they were being hauled aboard. They had little value then and were often used for pet food or discarded.

This situation began to change during the 1930s as a tuna sport fishery developed between Scarborough and the Dogger Bank. English sport fishery landings began to be recorded in 1932, with annual catches ranging from 20 to 80 fish per year. At roughly the same time, the Norwegians were developing a bluefin fishery and by 1949, a total of 43 boats were involved. In just one year, this figure leapt to over 200 vessels. Annual catches of over 10,000 tonnes were common during the 1950s and

represented a large proportion of the entire North Sea tuna catch. By the 1960s catches had collapsed and the abundance of bluefin tuna in the waters around England is now considered too low to support commercial or recreational fishing. Whilst factors such as ocean temperature changes may have affected the population, the main reason for the collapse would appear to be over fishing.

A single tuna recently sold in Japan for £110,000 so, in addition to pressures from legal fishing, there is a large illegal fishery. The International Commission for the Conservation of Atlantic Tunas (ICCAT) estimated that, in 2007, the illegal landings were equal to that of the legal fishery. Recent calculations suggest that the adult population in 2011 will be 75 per cent lower than 2005 and that fishing quotas will permit the capture of all the remaining adult fish. There would seem to be little hope for the survival of the northern bluefin tuna.

### England's lost species

■ *Myotis myotis* (Greater mouse-eared bat) 1985 ■ *Ursus arctos* (Brown bear) late first century **Mayflies** ■ *Arthroplea congener* 1920 ■ *Heptagenia lonicauda* 1933 **Mosses** ■ *Andreaea mutabilis* (Changeable rock-moss) 1950s ■ *Aplodon wormskjoldii* (Carrion-moss) 1974 ■ *Aulacomnium turgidum* (Swollen thread-moss) 1878 ■ *Bartramia stricta* (Upright apple-moss) 1864

## The natterjack – a toad in a hole

At the start of the 20th century, the strident call of natterjack toads could be heard in many areas with shallow, temporary pools in a sandy landscape. Natterjacks were common in parts of the southern and eastern counties, and along the Irish Sea coast.

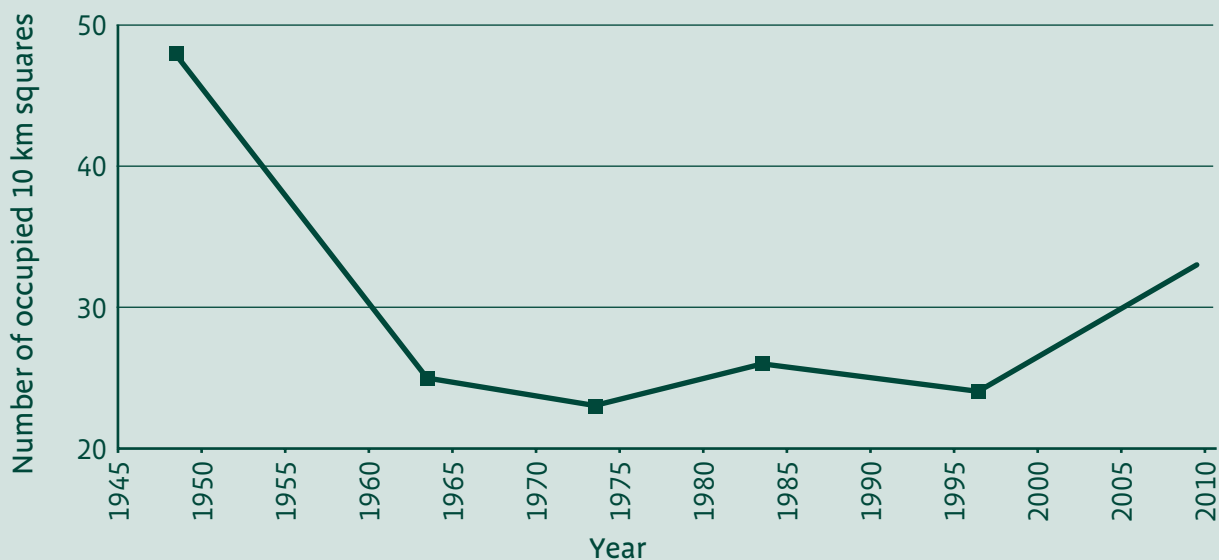
There has since been a substantial decline of natterjack habitat, due to agricultural intensification, pond acidification and development for housing, holiday parks and golf courses. Additionally, scrub encroaching onto dunes and heathlands, often due to reduced grazing, has resulted in the common toad replacing natterjacks. A typical 'pioneer species', the natterjack is rapidly out-competed by its closely related cousin when habitats become more fixed and densely vegetated.

By 1970, only 43 natterjack populations remained in England. In the space of a century, natterjacks had lost around 80 per cent of their range. Furthermore, many colonies that survived were reduced in size, connectivity and security.

More recently there have been two further threats. The decline in the natterjack population at Saltfleetby, Lincolnshire, despite intensive habitat enhancement, has occurred because it is genetically impoverished due to its isolation from other colonies for many decades. And recently, a potentially lethal fungus has been detected in natterjack toad populations.

Research, trial habitat management, intensive monitoring and re-introductions have led to some recovery, and there are now around 50 populations.

Recorded range of the natterjack toad, 1948-2009



Recorded range of the natterjack toad in Great Britain, from 1948-2009. Note: there was additional decline prior to 1948, but precise data are not available. Units are 10x10 km squares, derived from surveys. Data from: Amphibian and Reptile Conservation and from Beebee, TJC, Wilkinson, JW & Buckley, J, 2009, Amphibian declines are not uniquely high amongst the vertebrates: trend determination and the British perspective. Diversity 2009, 1, 67-88.

## England's lost species

■ *Bryum calophyllum* (Matted bryum) 1983 ■ *Bryum cyclophyllum* (Round-leaved bryum) 1930s ■ *Bryum turbinatum* 1940s ■ *Bryum uliginosum* (Cernous bryum) 1950s ■ *Ceratodon conicus* (Scarce redshank) 1991 ■ *Conostomum tetragonum* (Helmet-moss) 1950s ■ *Cynodontium polycarpon* 1960s ■ *Dicranum elongatum* (Dense fork-moss) late-1800s

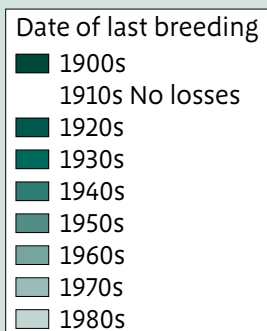
## The corncrake – cut down in its prime

The corncrake once bred in meadows and grasslands in almost all English counties. The males arrived from their African winter quarters in late April and their loud, rasping call, delivered with particular vigour at night, gave many a country dweller sleepless nights. A decline in numbers was readily apparent by the start of the 20th century. A 'Land Rail Inquiry' undertaken in 1911 found that although large populations were found in the north of the country, they were already scarce or absent from much of central and southern England. Subsequent surveys in 1938 and 1939 found the bird breeding in 19 English counties but it was absent or very localised south of a line from north Shropshire to the Tees Estuary. Just 11-17 singing males were located in England during the 1978 & 79 surveys, eight during the 1993 and just two during the 2003 survey.

The cause of decline was the mechanisation and intensification of grassland management. Corncrakes are extremely reluctant to break cover, so many adults and chicks were killed and nests destroyed by machinery. The simple measures of cutting fields from the inside outwards, late cutting and the provision of tall vegetation at field margins have seen corncrake numbers increase substantially in the Western Isles of Scotland and such management has been introduced on a number of nature reserves and adjacent farmland in England. Corncrakes have recently been re-introduced into one such area, the Nene Washes in Cambridgeshire, and the early signs are encouraging. The bird is declining throughout its range and is recognised as globally-threatened, so action in England has international significance.



### Decades in which English counties lost their regular breeding corncrake populations



### England's lost species

- *Didymodon icmadophilus* 1950s ■ *Eurhynchiastrum pulchellum* (Elegant feather-moss) 1980 ■ *Grimmia anodon* 1961
- *Gyroweisia reflexa* 1938 ■ *Helodium blandowii* 1901 ■ *Herzogiella striatella* (Muhlenbeck's feather-moss) 1950s
- *Kiaeria falcate* (Sickle-leaved fork-moss) 1950s ■ *Paludella squarrosa* 1916



## The large blue – fall and rise of a butterfly



Large blue – re-introduced

The large blue butterfly used to inhabit most counties across southern England, from Cornwall to Kent northwards to Northamptonshire and Herefordshire. It occurred in scattered colonies and was highly prized by collectors. Colonies in Kent, Hampshire, Buckinghamshire and Bedfordshire had gone by 1830. Seven Northamptonshire colonies, first discovered in 1837, were collected out by 1859. Of 33 sites where the large blue had been found in the Cotswolds, just six remained by the 1950s and the last was ploughed up in 1963. Of more than 30 sites on the north coast of Devon and Cornwall, most were gone by the 1950s, with the last colony dying out in 1973. The very last surviving colony in England, on south Dartmoor, finally died out in 1979. In all, 90 large blue colonies were recorded over a period of about 150 years.

The causes of the large blue's extinction in England include abandonment of burning and appropriate grazing management in its preferred habitat; ploughing of any land that could grow crops; and afforestation, urbanisation and quarrying of areas that were unsuitable for agriculture. Collectors then speeded up the final decline.

In 1983, a re-establishment project was launched using stock collected in Sweden. Success, built on sound science, secure funding and the efforts of volunteers and professionals, has seen the large blue returned to 35 sites in south-west England by 2009. However, much still needs to be done to restore this species to its former strongholds throughout southern and central England.

### England's lost species

■ *Palustriella decipiens* (Lesser curled hook-moss) 1950s ■ *Philonotis tomentella* 1950s ■ *Pohlia prolifera* 1950s  
■ *Pseudoleskeella rupestris* 1950s ■ *Pterygoneurum lamellatum* 1970 ■ *Schistidium frigidum* 1950s ■ *Seligeria diversifolia* 1971 ■ *Sphagnum obtusum* 1911 ■ *Sphagnum platyphyllum* (Flat-leaved bog-moss) 1950s

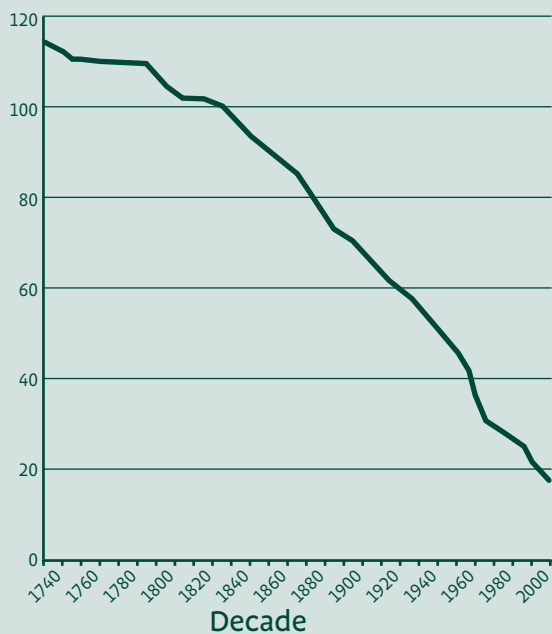
## The pasque flower – a grazing solution in England

The pasque flower grows in short chalk and limestone grassland in England. Since its discovery in 1551 it has been recorded at around 120 sites. The majority of these were lost during the 18th and 19th centuries due to ploughing for arable cropping or mineral extraction and urban development.

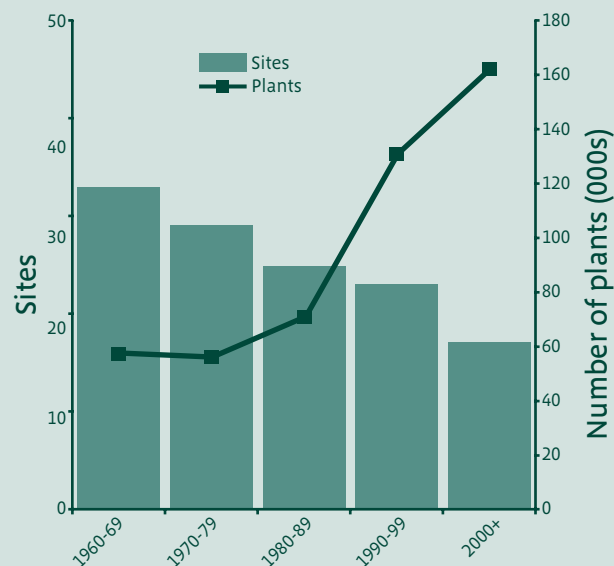
Only a quarter of populations remained by the mid-20th century, almost all on designated conservation sites. The plant subsequently disappeared from a further 16 sites due to lack of grazing (seven sites), ploughing (four sites), overgrazing (two sites) and the dumping of rubble on one site. Eighteen populations remain: five appear to be thriving, accounting for over 99 per cent of the entire English (and UK) population of some 162,000 plants. Ten populations support less than 50 individuals, many within grazing exclosures.

The main cause of decline has been a reduction in the level of grazing on small or isolated sites where livestock farming is no longer economically viable. Indeed, unless grazing is re-introduced to four sites soon, the plants may well be lost to them. Undergrazing enables coarse grass species to out-compete and shade other plants and to dominate the sward. The restoration of an appropriate level of grazing can have a marked positive effect, both on this species and on other chalk grassland specialities. Following the re-introduction of winter sheep grazing to sites holding three of the largest pasque flower colonies, the swards became significantly shorter and more herb-rich. The cover of the coarse grass species fell to about 10 per cent and the numbers of 'flowering' pasque flowers increased by 260 per cent.

(a) The decline in the number of pasque flower sites recorded in England



(b) Changes in the number of sites and plants recorded since 1960. Note that although the number of sites has declined, the overall population has increased due to the reinstatement of winter grazing on three sites.



Adapted from Walker, K. J., 2009. Ecological Changes in the British Flora. PhD thesis, University of Durham.

## England's lost species

■ *Sphagnum strictum* (Pale bog-moss) 1950s ■ *Tetodontium repandum* (Small four-tooth moss) 1958 ■ *Weissia mittenii* (Mitten's beardless-moss) 1970 **Moths** ■ *Acrolepiopsis betulella* ■ *Acrionicta auricoma* (Scarce dagger) 1912 ■ *Acrionicta strigosa* (Marsh dagger) 1933 ■ *Aethes margarotana* 1966 ■ *Agonopterix capreolella*