Lost life: England's lost and threatened species

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2010 International Year of Biodiversity

NATURAL ENGLAND

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England's lost species

This panel lists all those species known to have been lost from England in recent history. Species are arranged alphabetically by taxonomic group, then by scientific name. The common name, where one exists, is given in brackets, followed by the date or approximate date of loss – if date is known. Dates preceded by a 'c' are approximate.

Foreword

No one knows exactly when the last Ivell's sea anemone died. Its final known site in the world was a small brackish lagoon near Chichester on the south coast of England. When the last individual at this site died, probably in the 1980s, the species was lost forever: a global extinction event, in England, on our watch.

We live in a small country blessed with a rich variety of wildlife – one in which the natural world is widely appreciated, and studied as intensely as anywhere in the world. Today this variety of life is under pressure from human activities as never before. As a result, many of our native species, from the iconic red squirrel to the much less familiar bearded stonewort, are in a fight for survival.

This report documents for the first time the nearly 500 species we've lost from England in the recent past. This figure is by no means the true total since, for many species groups like fungi, algae and the marine invertebrates, we don't know the full extent of those that exist, let alone those that have disappeared. We do know that 12% of land mammals, 22% of amphibians and 24% of our native butterflies have been lost, though fortunately most of these, unlike Ivell's sea anemone, do still occur in other countries. In addition to these losses, many more species are threatened and need our help.

2010 is designated by the United Nations as the International Year of Biodiversity. We hope that by highlighting the scale of losses and current threats to England's species, and the successful efforts to improve the fortunes of some of our threatened species, this report will stimulate even greater action to conserve our natural environment. It may be too late for Ivell's sea anemone, but let's not just be the generation who realised the scale and impact of the loss of biodiversity, let's also be the generation that did something about it.

Dr Helen Phillips
Chief Executive

England's lost species

Ants ■ *Formica pratensis* (Black-backed meadow ant) 1988 **Bees** ■ *Andrena floricola* 1939 ■ *Andrena nana* 1930 ■ *Andrena nanula* 1877 ■ *Andrena polita* 1934 ■ *Andrena tridentate* 1944 ■ *Andrena vaga* 1946 ■ *Bombus cullumanus* (Cullem's bumblebee) 1941 ■ *Bombus distinguendus* (Great yellow bumblebee) 1981

Pasque flower – threatened

Executive summary

England is rich with life. Our diverse natural heritage includes myriad animals, plants and fungi. These species provide us with food and livelihoods; they help form the distinctive English landscapes and seascapes that we love; they have inspired and delighted through generations. They are England's life.

This life is being lost. Although changes in species populations are a natural consequence of environmental change, recent technological advances have led to humans altering species' habitats in ways and at rates that make it impossible for them to adapt. This has led to the decline and loss of many of England's native species, losses that matter both for the intrinsic value of the species themselves, and because they are associated with damage to our natural environment.

England's lost species

■ *Bombus pomorum* (Apple bumblebee) 1864 ■ *Bombus subterraneus* (Short-haired bumblebee) 1990 ■ *Chalicodoma (Megachile) ericetorum* 1844 ■ *Coelioxys afra* 1892 ■ *Dufourea halictula* 1953 ■ *Halictus maculates* 1930 ■ *Halictus subauratus* 1850s ■ *Hoplitis leucomelana* pre 1800 ■ *Hylaeus punctulatissima* 1840 ■ *Lasioglossum leave* pre 1800

In this report, we highlight the fauna and flora for which England is special, and provide the first assessment of decline and loss across all types of species in England. We also identify those species at greatest risk of being lost next from England, should current trends continue. Finally, we describe the main actions that need to be taken to halt and then reverse the decline in these species. We have timed the release of the report to coincide with the United Nation's International Year of Biodiversity 2010 to help raise awareness of England's biodiversity and the fact that species are being lost from our own shores.

England has approximately 55,500 species of animals, plants and fungi. These include five groups of species considered to be of outstanding significance in an international context: Atlantic ferns, mosses and lichens; breeding seabirds; wintering and passage waterbirds and gulls; grassland and woodland fungi; and heathland invertebrates. We also have at least 40 species endemic to England (ie they occur nowhere else on Earth) and 54 species recognised as threatened at an international level.

We have been able to document the loss of 492 species from England, the vast majority of these being lost since 1800. This is likely to be a considerable underestimate of the true number of native species lost because relatively little is known about losses (or indeed the very existence) of species in the larger groups such as the many invertebrates, lower plants and fungi. The information on losses for the better studied groups reveal:

- 24% of butterflies, 22% of amphibians, 15% of dolphins and whales, 14% of stoneworts, 12% of terrestrial mammals and 12% of stoneflies have been lost from England.

Some species that have been lost from England, such as the great auk and Ivell's sea anemone, are now globally extinct. The latter was lost from its last known site in the world, a brackish lagoon in West Sussex, as recently as the 1980s.

The principal agents of species loss and decline have been the destruction of natural habitats or their inappropriate management, and the persecution of wildlife that was considered a nuisance, a threat to livelihood or a prize specimen. Rates of loss have varied over time and between species groups. In invertebrates the rate of loss increased steadily during the 19th century to a peak in the first decade of the 20th century and has apparently since declined.

On a regional and local scale, the loss of species has been even more significant. Red squirrels have been lost from most counties in England while the purple emperor butterfly has been lost from the West Midlands and East of England regions. Some of the best data regarding local losses are from flowering plants. An assessment of loss from 23 English counties concluded that, on average, one species of plant has been lost every two years at a county level since 1900. Rates of loss in southern and eastern counties have generally been highest.

As a result of these local and regional losses, a significant number of England's remaining species are under threat. A total of 943 English species were identified in 2008 as priorities for conservation action under the England Biodiversity Strategy and UK Biodiversity Action Plan (BAP). Further species have declined in recent historic times to precariously low ('depleted') levels. In the better known groups, the proportion of native species which appear on the BAP list or which have historically depleted populations represent:

- all of the remaining reptiles, whales and dolphins, 57% of amphibians, 43% of freshwater fish, 37% of terrestrial mammals and seals, 35% of bumblebees and 33% of butterflies.

England's lost species

■ *Megachile lapponica* 1847 ■ *Melecta luctuosa* 1912 ■ *Nomada errans* 1982 ■ *Osmia xanthomelana* 1998 ■ *Rhophites quinquespinosus* 1878 **Beetles** ■ *Aglyptinus agathidioides* 1912 ■ *Ampedus sanguineus* 1830 ■ *Anthrenus pimpinellae* 1895 ■ *Anthrenus scrophulariae* 1800s ■ *Apalus muralis* c1969 ■ *Bagous arduus* 1800s ■ *Bagous binodulus* 1861

On average, 26% of England's species are depleted or on the BAP list.

Taking account of recent declines and emerging threats, in particular climate change, we have identified 12 groups of species that are of particular concern:

- Species now severely restricted in range
- Internationally important wintering and passage waterbird populations
- Internationally important breeding seabird populations
- Species associated with coastal habitats
- Species losing their English 'climate space'
- Specialist farmland wildlife
- Long-distance migrants
- Predators exposed to illegal persecution
- Native species under pressure from invasive non-natives
- Amphibian species at risk from disease
- Marine fish at risk from overfishing
- Species exposed to nutrient enrichment.

Many of the species losses and declines that have occured were avoidable. Whilst some of the species lost can never be brought back, there are reasons to be hopeful that we can reverse current trends in declining species. Some species that had been lost, such as the chough, have returned to England in recent years and have stayed in the much-improved habitat now available to them. We have also successfully re-introduced two species to England (red kite and large blue butterfly) and have re-introduction programmes underway for pool frog, corncrake, great bustard and interrupted brome. Targeted conservation efforts have resulted in improving fortunes for many priority species on the original BAP list: 12% were reported as increasing in England in 2008, and a further 33% had stabilised. Nevertheless, the challenge ahead of us is significant, made all the more so by climate change, and we identify six priorities for action:

- Better protect and manage the remaining wildlife habitats
- Restore and create additional high-value wildlife habitat including through enhancements at a landscape scale
- Establish a coherent network of Marine Protected Areas
- Establish more sustainable practices for all our land and seas
- Reduce the impact of invasive non-native species
- Take further steps to reduce illegal killing and collecting of our native species.

The fate of England's species is not only in the hands of government or large landowners – we all have a role to play. Past losses and declines have been the consequence of the choices that we have made in the past. We now need to take responsibility and plan for the future. Our aim must be to restore a healthy natural environment with functioning ecological processes, in which species can thrive and reach new self-sustaining levels, for the benefit of us all. The time for action is now.

England's lost species

■ *Bagous diglyptus* 1897 ■ *Bagous petro* 1895 ■ *Bidessus minutissimus* (Minutest diving beetle) 1908 ■ *Bostrichus capucinus* 1908 ■ *Bothynoderes (Chromoderus) affinis* 1883 ■ *Cardiophorus gramineus* 1863 ■ *Cardiophorus ruficollis* 1833 ■ *Ceutorhynchus hepaticus* 1909 ■ *Ceutorhynchus syrites* 1800s ■ *Chrysomela tremula* 1958 ■ *Clytra laeviuscula* 1895

Pink sea fan – threatened

Introduction

This report is the first assessment of decline and loss among England's native species. In International Year of Biodiversity, the year by which EU governments have committed to halt biodiversity loss in Europe, it is particularly relevant to ask: Which species has England lost? Our aims in producing this report are to raise awareness of biodiversity loss, to describe the serious consequences for biodiversity if current trends continue, and to encourage greater action by highlighting some early successes in halting and reversing decline.

England's lost species

■ *Coniocleonus hollbergi* 1815 ■ *Cryptocephalus exiguus* (Pashford pot beetle) 1986 ■ *Cryptocephalus violaceus* 1864
■ *Ebaeus pedicularius* 1800s ■ *Hister illigeri* 1800s ■ *Hister quadrinotatus* 1800s ■ *Hypera arundinis* 1800s
■ *Hypocassida subferruginea* 1800s ■ *Hypocoprus latridioides* 1902 ■ *Lamprohiza splendidula* 1884

Extinction and change in species populations are a natural, indeed inevitable, part of environmental change. But for thousands of years humans have shaped the environment, and, in doing so, we have also had a powerful influence on the distribution, abundance and survival of other species. Technological advances, particularly since the Industrial Revolution, have led to a significant increase in the rate and scale of environmental change. Many species have been unable to adapt, and it is estimated that, globally, species extinction rates have increased to over 1,000 times the natural rate. These human-induced losses matter, both for the intrinsic value of the species, and because they are associated with damage to our natural environment. Unnaturally high rates of species loss are a clear sign of the unsustainable exploitation of our natural environment.

This report describes **England's natural treasures**, the species groups for which England is important in an international context. In **From first life to the Industrial Revolution** we briefly describe the geological and historical record of the evolution and extinction of species through to the Industrial Revolution.

In **Scale of loss to the present day** we then detail the scale of the loss of species in England. We have attempted to document all the species known to have been lost from England since the first century AD, where the data are available. Because the total number of species in some less well-known groups is not known, this report although authoritative, cannot be entirely comprehensive. We have also not attempted to assess numbers of species or losses among micro-organisms or bacteria.

In **Regional losses** we highlight some of the species losses that have occurred in each region.

In **Threatened species** we have identified those species which are declining and most threatened now.

The chapter on **Our concerns for the future** identifies where we most fear future losses and declines in England.

Continued species losses at the rates we are currently seeing are not inevitable. In **Turning the tide**, we describe a number of conservation successes that demonstrate how species declines can be halted and reversed through targeted conservation action.

Finally, in **Conclusions and priorities for action** the report highlights the priorities for future action if we are to provide a better future for England's remaining species.

Throughout the report we provide case studies to illustrate the loss, threats and recovery of English species.

In raising awareness of species loss and decline through this report, we do not seek to turn the clock back to some species-rich point in the past. Rather, we wish to inform the choices that will determine which species will remain and thrive in our future.

England's lost species

■ *Leiodes triepkii nec pallens* 1933 ■ *Lepturobosca virens* 1800s ■ *Lepyrus capucinus* 1897 ■ *Lixus angustatus nec algirus* 1928 ■ *Lixus paraplecticus* 1958 ■ *Lixus vilis* 1905 ■ *Meligethes coracinus* 1870s ■ *Meligethes corvinus* 1873 ■ *Meloe autumnalis* 1952 ■ *Meloe cicatricosus* 1906 ■ *Meloe mediterraneus* 1800s ■ *Meloe variegatus* 1882 ■ *Murmidius ovalis* 1831

Knots and grey plovers – internationally important

England's natural treasures

Amongst our great diversity of species is a small number of groups for which the country is internationally important. This may be because the groups are exceptionally diverse, because they are unusual or range-restricted or because the sheer numbers of individuals involved constitute large fractions of their international totals. There are also groups of species for which we have special international responsibilities for their conservation – species found nowhere else, for example, and those which are very rare at a global scale. Five groups of species in England are considered outstanding in an international context:

- Atlantic ferns, mosses and lichens
- Breeding seabirds
- Wintering and passage waterbirds and gulls
- Grassland and woodland fungi
- Heathland invertebrates.

England's lost species

■ *Mycterus curculioides* 1882 ■ *Nephus bisignatus* 1800s ■ *Obrium cantharinum* 1929 ■ *Paederus rubrothoracicus* 1870 ■ *Philonthus confinis* 1902 ■ *Plagionotus arcuatus* 1800s ■ *Platycerus caraboides* (Blue stag beetle) 1839 ■ *Pleurophorus caesus* 1890 ■ *Polyphylla fullo* mid-1800s ■ *Pterostichus aterrimus* 1973 ■ *Rhynchites auratus* 1839 ■ *Rhynchites bacchus* 1843

Atlantic ferns, mosses and lichens

The Atlantic community of ferns, mosses and lichens (termed cryptogams – plants that reproduce using spores instead of seeds) has developed along the eastern Atlantic seaboard in the warm, moist climate produced by the Gulf Stream. A relatively unpolluted atmosphere and a high level of rainfall promote the luxuriant growth and survival of an impressive array of species, many of which have close relatives in tropical areas. This

Fissidens polyphyllus, the largest British species of this distinctive genus of moss and an extremely rare plant of our Atlantic cryptogamic communities.

community is particularly well-represented along the Cornish and north Devon coasts and in the southern Lake District, and also in Scotland and Wales. Sheltered microclimates afforded by the rugged topography and deeply faulted fissures of the Wealden sandstones, and to a lesser extent the millstone grits of northern England, support a smaller sub-set of these special plants, including the filmy ferns, which are present in globally significant populations.

Breeding seabirds

England's seas provide food for enormous numbers of seabirds. A total of 41 species feed regularly in English waters, including the globally threatened Balearic shearwater.

Almost 5 per cent of the global population of shags live in English coastal areas.

Twenty two species breed regularly along the coast of England. The English populations of six of these species equate to 1-5% of the global totals. The herring gull total is 18% of the global total of birds of the race *argenteus* and that of the lesser black-backed gull approaches a quarter of the global total. Little terns and Sandwich terns form 8% of the European populations.

Wintering and passage waterbirds and gulls

An estimated 5 million wildfowl and waders (together termed waterbirds) and gulls are present in England in winter and at times of spring and autumn passage. Sites supporting 20,000 or more waterbirds are recognised as internationally important – between 35 and 40 inland and coastal wetlands in England regularly support such numbers, with fourteen of these, and an additional 12, also supporting 20,000 or more gulls in winter. The five most important sites in Britain for wintering and

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■ *Rhyncolus (Phloeophagus) gracilis* 1897 ■ *Rhyssemus germanus* 1800s ■ *Saprinus subnitescens* 1892 ■ *Selatosomus cruciatus* 1840 ■ *Strangalia attenuate* 1845 ■ *Tarsostenus univittatus* 1800s ■ *Tilloidea unifasciatus* 1877 ■ *Trichodes alvearius* 1800s ■ *Trichodes apiaries* 1830 ■ *Tychius polylineatus* 1909 ■ *Vibidia duodecimguttata* 1905


More than 25 per cent of the international population of redshank total is found in England in winter.

passage waterbirds are all in England. The Wash, which regularly supports 320,000 wildfowl and waders and a further 47,000 gulls in winter, is by far the most important in Britain and is one of the most important wetlands for waterbirds in Europe. A total of 35 species of wader, wildfowl and gulls are found on one or more English sites in numbers of international significance. The English populations of knot, grey plover, dunlin, redshank, bar-tailed godwit, pintail, brent goose, Bewick's swan, and the Svalbard population of barnacle goose and of black-headed and common gulls, each constitute 25 per cent or more of the species' international totals. Indeed the English populations of knot, and the Svalbard populations of brent and barnacle geese make up more than 50% of the international total.

Grassland and woodland fungi

Three groups of fungi, one associated with grassland, one closely associated with veteran trees and another associated with wooded habitats, are of international importance. 'Waxcap grasslands' occur on nutrient-poor soils and have a high fungal species diversity. They support a group of fungi including the colourful species of waxcap from which the habitat gains its name: pink gills, floury false-waxcaps, fairyclubs and earthtongues.

England has some internationally outstanding examples of waxcap grasslands. Sites rich in grassland fungi are scarce and threatened at an international scale with the main threats coming from agricultural improvement, atmospheric nitrogen deposition, declines in grazing, and housing or other development.

England has more veteran trees than most other northern European countries and one group of fungi, including oak polypore, bearded tooth and the zoned rosette, dependent on veteran trees and a sustainable resource of large decaying timber, occurs in internationally important numbers. The rot caused by these fungi may be of importance to the longevity of these trees as hollow trees are less prone to wind-throw.


Pink waxcap, a key species in waxcap grasslands.

Also of international importance and closely associated with wooded habitats, are the thermophilous or warmth loving boletes. They include royal bolete, the pretender and devil's bolete. These summer-fruiting species form close associations with both mature and veteran trees in open woodland and parkland.

England's lost species

Birds ■ *Charadrius alexandrines* (Kentish plover) 1928 ■ *Chlidonias niger* (Black tern) 1840s-1850s ■ *Crex crex* (Corncrake) early-1990s ■ *Haliaetus albicilla* (White-tailed eagle) late-1700s ■ *Jynx torquilla* (Wryneck) 1970s ■ *Lagopus mutus* (Ptarmigan) 1700s ■ *Lanius collurio* (Red-backed shrike) 1988 ■ *Otis tarda* (Great bustard) 1833

Heathland invertebrate communities

England's lowland heathlands are acknowledged as being of international significance. They support a series of nationally important invertebrate assemblages representing the entire succession from bare ground to mature semi-shaded wooded heath. The heathlands also support some species in internationally important numbers. The Dorset heaths, for example, support probably the largest colony of Purbeck mason wasp in the world. Many heathland species require different stages of heathland succession (eg open ground, dwarf shrub). None can survive on small, isolated sites or those maintained at one stage in that succession.

They require a landscape-scale approach to heathland management that encompasses continuous change, so much still needs to be done to secure their future in England.

The very rare ladybird spider is found on a very small number of heathland sites in Dorest.

Our international responsibilities for species

We have special responsibility for those species found in England and nowhere else in the world. At least 40 species endemic to England (2 fish, 2 mosses, 4 invertebrates, 9 lichens and 23 vascular plants). Loss of these would be global extinction. We have similar responsibilities for those English species endemic to the UK and nearby Europe (including 38 vascular plant species, 4 mosses, 3 liverworts and 35 sub-species of birds). We also have special responsibility for 54 species occurring in England that are threatened by global extinction (Table 1).

Table 1 Internationally threatened: English species on the IUCN Global Red List

Critically Endangered		
Species Group	Common name	Scientific name
Birds	Eskimo curlew	*Numenius borealis*
	Balearic shearwater	*Puffinus mauretanicus*
Reptiles	Leatherback turtle	*Dermochelys coriacea*
Fish	Sturgeon	*Acipenser sturio*
	European eel	*Anguilla anguilla*
	Arctic Char	*Salvelinus lonsdalii*
	Blue skate	*Dipturus batis*
	Angel shark	*Squatina squatina*
Bivalves	Spengler's freshwater mussel	*Margaritifera auricularia*
Mosses		*Thamnobryum angustifolium*
		Weissia multicapsularis
Vascular plants		*Sorbus wilmottiana*

Endangered		
Species Group	Common name	Scientific name
Cetaceans	Sei whale	*Balaenoptera borealis*

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■ *Pinguinus impennis* (Great auk) 1820s ■ *Tetrao urogallus* (Capercaillie) 1500s **Bugs** ■ *Macropsis glandacea* 1800s **Butterflies** ■ *Aporia crataegi* (Black-veined white) 1890s/1920s ■ *Argynnis niobe* (Niobe fritillary) 1895 ■ *Boloria dia* (Weaver's fritillary) c1890 ■ *Carcharodus alceae* (Mallow skipper) c1925

	Blue whale	*Balaenoptera musculus*
	Fin whale	*Balaenoptera physalus*
	Northern right whale	*Eubalaena glacialis*
Fish	Schelly	*Coregonus stigmaticus*
	Vendace	*Coregonus vandesius*
	Dusky grouper	*Epinephelus marginatus*
	Atlantic halibut	*Hippoglossus hippoglossus*
	Red porgy	*Pagrus pagrus*
	Undulate ray	*Raja undulata*
	White skate	*Rostroraja alba*
Bivalves	Freshwater pearl mussel	*Margaritifera margaritifera*
Vascular plants	Whitebeam	*Sorbus bristoliensis*
Mosses		*Ditrichum cornubicum*

Vulnerable		
Species Group	Common name	Scientific name
Cetaceans	Sperm whale	*Physeter macrocephalus*
Birds	Aquatic warbler	*Acrocephalus paludicola*
	Great bustard	*Otis tarda*
Fish	Atlantic cod	*Gadus morhua*
	Haddock	*Melanogrammus aeglefinus*
	Thresher shark	*Alopias vulpinus*
	Thorny skate	*Amblyraja radiata*
	Basking shark	*Cetorhinus maximus*
	Tope shark	*Galeorhinus galeus*
	Shortfin mako	*Isurus oxyrinchus*
	Porbeagle	*Lamna nasus*
	Sandy ray	*Leucoraja circularis*
	Common smoothhound	*Mustelus mustelus*
	Angular rough shark	*Oxynotus centrina*
	Smooth hammerhead	*Sphyrna zygaena*
	Spurdog	*Squalus acanthias*
Crustaceans	White-clawed crayfish	*Austropotamobius pallipes*
Insects	Dark guest ant	*Anergates atratulus*
	Greater capricorn beetle	*Cerambyx cerdo*
		Graphoderus bilineatus
		Myrmica hirsuta
Cnidarians	Pink sea fan	*Eunicella verrucosa*
	Starlet sea anemone	*Nematostella vectensis*
Vascular plants		*Sorbus anglica*
		Sorbus eminens
		Sorbus subcuneata
		Sorbus vexans
Lichens	Marsh earwort	*Jamesoniella undulifolia*

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■ *Carterocephalus palaemon* (Chequered skipper) 1976 ■ *Chazara briseis* (The Hermit) c1850 ■ *Cyaniris semiargus* (Mazarine blue) 1903 ■ *Euchloe simplonia* (Mountain dappled white) ■ *Iphicles podalirius* (Scarce swallowtail) c1850 ■ *Lasiommata maera* (Large wall brown) c1935 ■ *Lycaena dispar* (Large copper) 1864