

Kent Rare Plant Register

Draft species accounts

E



Compiled by Geoffrey Kitchener and the Kent Botanical Recording Group
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Kent rare plant register

This section of the register covers:

<i>Eleocharis acicularis</i>	<i>Erica cinerea</i>	<i>Euphorbia cyparissias</i>
<i>Eleocharis multicaulis</i>	<i>Erica tetralix</i>	<i>Euphorbia exigua</i>
<i>Eleocharis uniglumis</i>	<i>Eriophorum angustifolium</i>	<i>Euphorbia paralias</i>
<i>Eleogiton fluitans</i>	<i>Erodium maritimum</i>	<i>Euphrasia confusa</i>
<i>Epilobium palustre</i>	<i>Erophila glabrescens</i>	<i>Euphrasia officinalis</i> subsp. <i>anglica</i>
<i>Epipactis palustris</i>	<i>Eryngium campestre</i>	<i>Euphrasia pseudokernerii</i>
<i>Epipactis phyllanthes</i>	<i>Eryngium maritimum</i>	<i>Euphrasia tetraquetra</i>
<i>Equisetum sylvaticum</i>	<i>Erysimum cheiranthoides</i>	

It is issued in draft, pending further development. Records, photographs and information regarding the occurrences of these plants in Kent will be welcome.

The register accounts give priority to data from 2010 onwards, but some historic data are also included (however, in the data tables, generally no specific sites without post-1970 records) so as to indicate trends and where the plant may yet be discovered or rediscovered. Distribution maps for records from 2010 onwards show the boundary between vice counties 15 and 16 by a black line. See the Kent webpage of the BSBI website at <https://bsbi.org/kent> for the full Kent rare plant register list, the introduction to the register and a list of 'probably extinct' Kent plants.

There are two other Part E species which were originally listed for the purposes of the rare plant register, as having less than 11 tetrad records since 1990, but which have since been withdrawn, in the light of subsequent discoveries. *Epilobium roseum* (Pale Willowherb) has been widely found, especially in urban habitats, e.g. at Deal, Dover, Edenbridge, Greenwich, Maidstone, Sevenoaks, Tonbridge and Tunbridge Wells – see Kent Botany 2011. *Erodium moschatum* (Musk Stork's-bill) is widespread on grassy verges or banks, and may have arrived at some of these when originally seeded – see Kent Botany 2010 and 2011.

Abbreviations used in the text:

Recorders' initials:

AB Alan Blackman
AC Andrew Craven
ACla Ann Clarke
AG Alfred Gay
AH A.C.B. Henderson
AL Alex Lockton
AS Alan Showler
AW Tony Witts
BB Brian Banks
BBe Brian Benatt
BF Brian Ferry
BG Bob Gomes
BS Bob Smith
BW Brian Woodhams
CAS Clive Stace
CH C. Harris
CJC & AP James Cadbury & A. Parker
CP Chris Pogson
CR Chris Rose
DC David Carder
DG Doug Grant
DJ David Johnson
DM Daphne Mills
DN David Nicolle

DS David Steere
DW D. Worsfold
EB Enid Barrie
EGP Eric Philp
ES E. Scott
FB Fred Booth
FJR Fred Rumsey
FR Francis Rose
FRB F.R. Bryson
GH G. Hemington
GK Geoffrey Kitchener
GPS G.P. Smith
GT Gill Tysoe
HS Heather Silk
IR Ian Rickards
JA Jan Armishaw
JBe Jim Bevan
JEL J.E. Lousley
JH J. Hendey
JL J. Lockward
JoG José Gibbs
JLM J. Le Mesurier
JM Joumana Mobarak
JP Joyce Pitt
JRP J.R. Palmer
JS Judith Shorter
JW Jo Weightman
L&DH Lorna & Derek Holland
LBB L. Breda Burt

LM Lesley Mason
LR Liam Rooney
LS Leonie Seymour
MAS Mark Spencer
MB Mervyn Brown
MG Margot Godfrey
MH Margaret Holdaway
MP Mike Porter
MPa Mary Page
MCS Mary Clare Sheahan
MW M. Waite
NH N. Holmes
NS Nick Stewart
OL Owen Leyshon
PA Pat Acock
PAk Peter Akers
PH Peter Hodge
PHe Peter Heathcote
RB R.A. Boniface
RBr Robert Brooks
RC Ray Clarke
RD Dick David
RF Lady Rosemary FitzGerald
RG Bob Gomes
RM Richard Moyses
RMB Rodney Burton
RP R.D. Porley
RR Rosemary Roberts
RS R.M. Stokes

RW R.H. Woodall
SA Sheila Anderson
SB Sue Buckingham
SC Steve Coates
SK Sarah Kitchener
SL Stephen Lemon
SP Sue Poyser
TH-D Tom Hart-Dyke
TI Tim Inskipp

Other abbreviations:
BPS British Pteridological Society
CROW Countryside & Rights of Way Act 2000
in litt. stated in correspondence
KBRG Kent Botanical Recording Group
KWT Kent Wildlife Trust
MNE Maidstone Museum Herbarium
RNR roadside nature reserve
SLBI South London Botanic Institute
WFS Wild Flower Society

Eleocharis acicularis (L.) Roem. & Schult. (Needle Spike-rush)

Draft account

vc 15; not seen recently in vc 16

Rarity / scarcity status

Eleocharis acicularis has a scattered but patchy distribution across the British Isles, mostly on pond or lake margins. Its conservation status in Great Britain as a whole does not present any concerns; but in England it is regarded as **Near Threatened**. Kent comprises one of the patches of relative absence. Indeed, it has hardly been seen, and was supposed likely to be extinct, until recorded anew in 2012 and 2016. It is accordingly **rare** in Kent.

Account

The Needle Spike-rush was not known in the county to Hanbury and Marshall (1899), although considered by the authors as quite likely to occur at the edge of pools on heaths, but to be overlooked due to its inconspicuousness. If one discounts an unconfirmed report from Chislehurst Common, it was first found by Francis Rose, abundant on the gravelly bed and edges of a small pond nearly one mile east of Hale Street, near East Peckham (TQ 683 493). It persisted there from 1954 at least until 1992, but could not be found in 1999. A visit in 2013 (SL) found two ponds, one with dominant *Crassula helmsii* (New Zealand Pigmyweed) around the edges or otherwise occupied by willows, the other nutrient-enriched and surrounded by rank vegetation and woodland. In neither was *E. acicularis* present or likely.



A further record from the middle lake of the group east of Birling Ashes (TQ 689 598) was made in September 1997, det. N.F. Stewart, but this has not been repeated.

In May 2012, however, the species was discovered by Sue Buckingham (conf. Jeremy Roberts, BSBI referee) at Betteshanger (formerly Fowlmead) Country Park, TR 35795 53774, where it was growing vigorously in abundance at the margins of an ephemeral pool on the former spoil tip derived from Betteshanger colliery. Here it

had developed turf-like patches as a result of the species' creeping rhizomatous growth. The coal spoil substrate is nutrient-poor, and hence general colonisation by plants of the Country Park is slow, and habitats remain open longer than would otherwise be the case.



This is an artificial site, where the plant is scarcely likely to have originated from the surrounding marshland, which is at a much lower level than the colliery spoil. It is possible that Needle Spike-rush at Betteshanger

(Fowlmead) is an aquarists' introduction. It is a plant favoured for aquascaping, because of its ability to grow totally submerged, presenting a lawn-like appearance in an aquarium. (It may be relevant that a more permanent pond elsewhere in the Park bore in 2012 a flourishing population of goldfish.) Alternatively, but perhaps less likely, it may be that the introduction was by natural means, through wildfowl.

A second site was discovered by Sharon Pilkington in October 2016 in a normally 'out of bounds' area (protecting breeding Lapwing) at the Dungeness RSPB reserve in the course of a bryophyte survey of damp sand habitats. There was quite a substantial population, growing submerged in shallow water in a sheltered corner of a gravel pit, TR 0729 1929. There were no flowers/fruits but a dense 'lawn' of leaves, some of which were detached and floating together with their rhizome. She surveyed a number of other pit margins that day, but found the extent of *Crassula helmsii* (New Zealand Pigmyweed) was such as would be likely to limit opportunities for the spread of the *Eleocharis* elsewhere. This colony looks to be one more likely to have arrived through the agency of wildfowl than the other current East Kent one, at Betteshanger Country Park.

Eleocharis acicularis is a tufted perennial, shorter and more slender than such similar species as *E. multicaulis* (Many-stalked Spike-rush) and *E. quinqueflora* (Few-flowered Spike-rush). The Betteshanger (Fowlmead) plants were (at 0.4mm stem diameter) not quite as slender as the norm for this species, apparently associated with their general vigour. The lowest glume of *E. acicularis* does not completely surround the base of the spikelet, as it does with those similar species. That glume is normally empty, but Betteshanger (Fowlmead) material included spikelets with a flower in the lowest glume.



Betteshanger (Fowlmead), Deal. All photos by Sue Buckingham, 16 May 2012

Eleocharis multicaulis (Sm.) Desv. (Many-stalked Spike-rush)

Draft account

Vc 15 and 16

Rarity / scarcity status

Eleocharis multicaulis is common in wet acid places in western Britain and Ireland, but sparse in eastern parts. There are no conservation concerns in Great Britain overall, nor in England, and its risk status is regarded as of 'Least Concern'. In Kent, however, it is reduced to two localities (in one of which it has not been recorded recently), and is **rare**.

Account

M.H. Cowell first purported to record *Eleocharis multicaulis* in Kent, as to be seen in June in terrain bordering Oare Creek and at The Brooks near the Barn, Bysing Wood, Faversham (*A Floral Guide for East Kent, etc.*, 1839). Some doubt has been expressed as regards his identification, and as to whether *E. quinqueflora* (now extinct in Kent, but more appropriate in a saltmarsh environment) might have been involved. Hanbury and Marshall (1899) regarded *Eleocharis multicaulis* as rare in swampy places, especially



on heaths, and gave a few widespread locations, including at Hothfield Heath, where one at least of the joint authors observed it.



Hothfield. Photo by Liam Rooney, 19 June 2011

Hothfield. Photo by Sue Buckingham, 29 May 2012

It has remained rare in Kent, and in Philp (2010) it is given as only recorded in wet boggy areas at Hothfield Common and on the edge of Louisa Lake, Bedgebury Forest (where it was also seen by Francis Rose in a floating sphagnum mat around 1947). A few plants at the gravelly edge of a small pond at East Peckham were also noted in the earlier survey published as Philp (1982), but not subsequently. Plants at Hawkenbury Bog (sometimes credited to Kent, but actually in East Sussex, vc14) were lost with the decline of the habitat there and those at Keston Bog were gone at some point after 1963, when seen by Francis Rose.

Eleocharis multicaulis is a small tufted perennial, requiring wet acid conditions, and its distribution in Kent is limited by the paucity of good bog habitats.

Site	Grid reference	Site status	Last record date	Recorder	Comments
East Peckham	TQ64Z		After 1970, before 1981	Philp (1982)	A few plants on sandy gravel at edge of small pond.
Hothfield	TQ94S	SSSI, KWT managed reserve	(1) 8 August 2015 (2) 25 May 2010 (3) After 1990, before 2006	(1) BW (2) GK (3) EGP (Philp, 2010)	(1) TQ9645. (1) TQ9645 (also see dates as credited under photographs for other sightings at this location).
Bedgebury Forest	TQ733Z		13 July 1991	EGP	

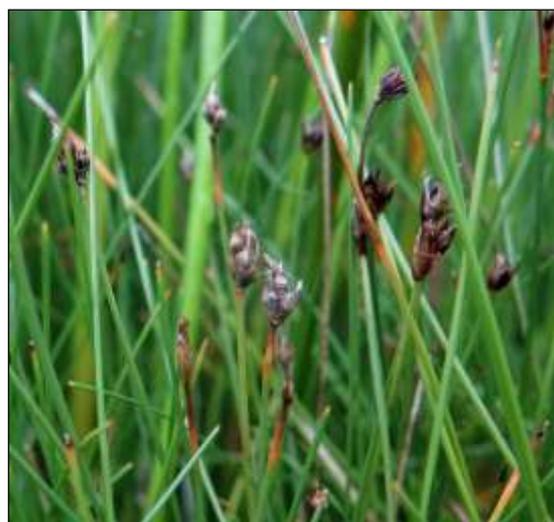
Eleocharis quinqueflora (Hartmann) O. Schwartz (Few-flowered Spike-rush)

Draft account

vc 15

Rarity / scarcity status

Few-flowered Spike-rush is widespread in the British Isles, at its most common in Scotland, north west England and Wales and more or less absent from central and south east England. Its conservation risk assessment in England and in Great Britain as a whole is one of 'Least Concern', but as it has been lost from over half of its extant 10km square occurrences in lowland England since 1930-60, then this assessment glosses over what must at least be considered an element of concern for its future. There have been hardly any historic records in Kent and it was considered extinct since 1875 until, remarkably, it was rediscovered in 2017 at a site with no records since the 1830s. It must be considered extremely **rare** in the county.



Ham Fen. Photo by Sue Buckingham. 26 July 2017

Account

Hanbury and Marshall (1899) attribute the first Kent record to Lewis Dillwyn, as mentioned by Sir J.E. Smith in *Flora Britannica* (1800). This is not quite right, as there is no such record in the 1800 edition of that work, but it was amongst additions made to the 1804 edition by Dr. J.J. Römer, who no doubt acquired the information from Dillwyn's Catalogue of the more rare Plants found in the Environs of Dover (*Transactions of the Linnean Society*, 1802, 6: 177-184). Dillwyn recorded it as *Scirpus pauciflorus* 'About Ham Ponds' and as his catalogue was presented as a paper to the Society in March 1801, then his sighting cannot be later than 1800. It may well have persisted, as G.E. Smith's manuscript notes (1830-33) to his own *Catalogue of rare or remarkable phaenogamous plants collected in south Kent* (1829) gives the species as 'about Ham Ponds' on the authority of Andrew Matthews, a gardener who was to be employed by the Horticultural Society of London to collect plants in South America and was presumably capable of recognizing the species, if he was not just repeating Dillwyn's words. M.H. Cowell, in publishing the Mathews record in his *Floral Guide for East Kent etc.* (1839), placed it at Ham, 'About the Brooks', which Francis Rose equated to Ham Ponds (*The East Kent Fens, Journal of Ecology*, 1950, 38: 292-301). No other sightings appear to have been made here until 2017.

F.J. Hanbury recorded the species at Dungeness in 1875, but other old records have some doubt attached. A specimen in **SLBI** collected by R.R. Hutchinson under this name from marshes at Tenterden in 1898 appears to be *Eleocharis palustris* (Common Spike-rush). A 1903 report by W. H. Griffin at Keston in the *Woolwich Surveys* (1909) appears, from his 1904 specimen at **SLBI**, also to be erroneous. F.M. Webb speculated as to whether a record of *Scirpus multicaulis* (*Eleocharis multicaulis*, Many-stalked Spike-rush) at the Brooks, Faversham (in Cowell's *Floral Guide*, 1839) might have been *Scirpus pauciflorus* (*Eleocharis quinqueflora*), but this is speculation. Perhaps of more credit, Francis Rose (in his unpublished MS *Flora of Kent*) considered Marshall's record (in Hanbury and Marshall, 1899) of *Scirpus caespitosa* (*Trichophorum caespitosum*, Northern Deergrass) in marshy ground about a mile north of Sandwich to be almost certainly *Eleocharis quinqueflora*.

In summary, the species cannot have been other than extremely rare in Kent and gave every impression of having been long extinct. Then, in July 2017, it was found by Sue Buckingham and Stephen Lemon with others at KWT's Ham Fen reserve. It was spread over an area of about 2 x 4 square metres of calcareous peat at TR 33165 55164. The relevant part of the reserve was, when taken over by KWT some years before, a field of undistinguished rank 'improved' grassland, sloping down from higher ground at its southern end (Joyce Pitt, pers. comm.). At the lowest part of the field, KWT management had entailed c. 1996-98 (with some re-profiling work continuing at the reserve in 1999 and until 2003) scraping off soils in the parts nearest the stream, with the resultant exposure of the peaty substrate. The original derivation of this substrate will have been from peat formation associated with freshwater lakes related to the Great Stour estuary, when this was much more extensive, coupled with incoming drainage from the chalk. Ham Ponds represented the remains of open water areas and by G.E. Smith's time the area was 'a black boggy, or pasture tract'.



Ham Fen, habitat. Photo by Sue Buckingham. 26 July 2017

The scraping and re-profiling undertaken by KWT¹ was directed towards enabling fen/marshland communities to re-assemble, recognizing that the peat had in places mineralized due to desiccation caused by several episodes of agricultural land drainage. Restoration was perceived as requiring either the raising of water levels, where there were practical limitations, or excavation down to the then current summer water levels; and experimentation suggested that top substrate removal down to 30cm would be most successful. Less would merely result in re-mineralisation of the peat surface. This work seems likely to have exposed the seed-bank, which was since recognized with the recording of *Lysimachia tenella* (Bog Pimpernel) and *Baldellia ranunculoides* (Lesser Water-plantain), and which may have applied to *Carex rostrata* (Bottle Sedge), discovered in the vicinity on the same occasion as the Spike-rush. Water levels have become higher with the introduction of beavers in 2001, active further south along the stream. Their ecological impact has become apparent since 2006-2007 when numbers began to increase, and they have completely transformed more-or-less secondary woodland into an uneven-aged fen mosaic. This is likely to have encouraged the Spike-rush, which provides evidence for the success of KWT's conservation approach.



From Ham Fen, fruit. Photo by Stephen Lemon, 19 July 2017

The dominant associated species were *Juncus subnodulosus* (Blunt-flowered Rush) and *Lysimachia tenella*. *Juncus articulatus* (Jointed Rush) and

¹ Work details kindly provided by John McAllister.

Ranunculus flammula (Lesser Spearwort) were also frequent and there were also, in lesser quantity, *Carex distans* (Distant Sedge), *Carex flacca* (*Glaucous Sedge*) and seedling plants of *Lythrum salicaria* (Purple-loosestrife).

Presence of the Spike-rush was again confirmed on 21 July 2018, by a KBRG meeting.

Eleocharis quinqueflora is a plant of wet peaty mires, especially if base-enriched, as with Ham Fen, and it dislikes competition. Compared with many other Spike-rushes its spikelet has relatively few flowers (2-7) and its lowest glume encircles the base and is usually over 2.5mm in length and at least half as long as the spikelet. The characters of the nut are distinctive: black when fresh; three stigmas; and the style base which sits on top has an outline flowing into the nut without a constriction between (this style base character is shared only with *Eleocharis parvula* (Dwarf Spike-rush) among the British *Eleocharis* species).



Ham Fen. Photo by Sue Buckingham. 26 July 2017

Eleocharis uniglumis (Link) Schult. (Slender Spike-rush)

Draft account

vc 15 and 16

Rarity / scarcity status

Slender Spike-rush is not uncommon in appropriate habitats across the British Isles and its conservation status is of 'Least Concern' both in England and in Great Britain as a whole. In Kent, however, there have never been many locations and in the early 21st century it was considered possible that it had gone from the county. It is still present, however, but is **very scarce**, verging on **rare**.

Account

The first reasonably unequivocal occurrence of *Eleocharis uniglumis* in Kent appears to be an 1870 record (published 1871) at Sandhills, Deal by Professor J.F. Duthie, who subsequently became Superintendent of Saharanpur Botanical Gardens. It is cited by Hanbury and Marshall (1899) as the first county record (although they give incorrect dates), but at the same time they also refer to Duthie having found it at Ham Ponds and they list an earlier (1861) specimen from Denge Marsh in John Stuart Mill's herbarium. It is possible that the 1861 record was not thought by Hanbury and Marshall to be sufficiently accredited for citation as a first record. After all, the specimen sheet, which is at Kew, has a label on which Mill marked the identity as '(perhaps)', and it was re-determined by C.B. Clarke in 1887 as *Eleocharis palustris* (Common Spike-rush); it is by no means clearly *Eleocharis uniglumis* (pers. comm. Stephen Lemon, who has examined the original), even though the species was found at Denge Marsh in 2018.

There has been a scattering of records across the county since then, at sites such as those known to Francis Rose north of Shoreham (1954), at Stowting (1954) and Footh Cray Marshes (1946-55 and subsequently), all of which appear to have gone. Francis Rose also remarked on the Spike-rush being rare but locally abundant in the Thames-Medway estuary, specifically Shorne and Higham Marshes, and it seems surprising that sightings have not continued there. Philp(1982) noted that the species could not be found in several former sites affected by land drainage or agricultural improvement, and that the 1971-80 county survey could only trace it in the Lydden Valley area and in one meadow at Snodland. In fact, there were two such meadows at Snodland (per JP), but the other has since been lost to development. In the course of the 1991-2005 survey (Philp, 2010), there were no sightings despite repeated search. Accordingly, although Eric Philp had expressed some



Holborough, habitat. Photos (left) by Stephen Lemon. 15 June 2013 and (right) by Geoffrey Kitchener, 25 June 2013.

hope that Slender Spike-rush might yet be found in grazing meadows along the Swale or in the Lydden Valley (to which one might also add the Stour Valley), the species was in 2012 placed on the Kent Rare Plant Register supplement of 'probably extinct' Kent plants.

Then in June 2013, nine patches (the number depends on how one interprets discontinuities) were found by Stephen Lemon at the Holborough Marshes KWT reserve in a damp field which may well represent one of the meadow sites previously noted as at Snodland (Holborough is within Snodland parish). There is probably a history for such a location, as it appears to be one of those studied by Walters (1949)² and described as 'Rough grazed brackish marsh, Medway Estuary, Snodland, Kent 2. ix. 47'. The field is subject to increasingly brackish influence where it approaches the tidal Medway flood banks to the west. *Eleocharis uniglumis* grew along the edges of the shallow dry ditches in an old drainage system in the centre of the field, usually where the ground was bare and less dominated by *Juncus* spp. A further survey later that month found that the most consistently associated species were, in order of frequency of association: *Carex otrubae* (False Fox-sedge) and *Equisetum palustre* (Marsh Horsetail) (both present in every case); *Juncus inflexus* (Hard Rush) and *Potentilla anserina* (Silverweed); *Rumex conglomeratus* (Clustered Dock); *Poa trivialis* (Rough Meadow-grass); and then *Alopecurus geniculatus* (Marsh Foxtail), *Elytrigia repens* (Common Couch) and *Holcus lanatus* (Yorkshire-fog).

Holborough, plant showing reddish-purple stem / sheaths base.

Photo by Liam Rooney, 25 June 2013



Eleocharis palustris (Common Spike-rush) was also present in the field, generally in and beside the wet dykes rather than the shallow dry ditches. However, there was one dried-out ditch with both Slender and Common Spike-rushes present, including some plants of unusual vigour; but no signs of hybridity were identified by Jeremy Roberts (BSBI referee) in material examined by him. Intriguingly, Walters (1949) refers to a west Kent plant which had cytological irregularities, giving haploid numbers varying from $n=19$ to 24 in the pollen-grain mitoses, seemingly the same plant as regards which he wrote in 1987 (*in litt.*) as on cytological evidence 'probably *palustre* ($2n=38$) x *uniglumis* ($2n=46$)'. This putative hybrid may be inferred as having been found at Snodland / Holborough. In spite of the very limited recognition of this hybrid in the British Isles, sterile intermediates have been found by Stephen Lemon in mixed populations at Hacklinge (2018) and Dengemarsch (2019), in both cases with lowest glume encircling the one opposite, or almost so, and both such glumes being empty or infertile.

In August 2016, *E. uniglumis* was found by Stephen Lemon to be still present near Hacklinge, in an area which had been described by Francis Rose in 1950³ as a tract west of the main road south of Hacklinge Farm, dominated in part by *Blysmus compressus* (Flat-sedge) and *E. uniglumis*. He considered it to be (as at 1950) an area whose vegetation had been modified by grazing and mowing for hay over a long period, dominated largely by grasses and sedges characteristic of moist calcareous soils and subjected to brackish water conditions at some time past. The 2016 rediscovery was in a cattle-grazed, marshy, sedge-rich fen pasture in Ham valley, on the west side of the A258 south of Hacklinge Farm, within Hacklinge Marshes SSSI. Plants were widespread but not obvious, due to heavy grazing, and they were most noticeable in the lush ungrazed growth that fringed the edges of old cow-pats. In June 2018, it was also found in a neighbouring monad. Hacklinge, Ham Fen and, to a lesser degree, the Lydden Valley are associated areas where Francis Rose had known the

² Walters, S.M. (1949). Biological Flora of the British Isles: *Eleocharis* R. Br. *J. Ecol.* 37: 192-206.

³ Rose, F. (1950). The East Kent Fens. *Journal of Ecology* 38: 292-302.

species to be present. Its presence, however, is wider than this: in June 2020, Stephen Lemon and Sue Buckingham found it further north east, in damp meadows near the Sandwich Bay estate.

Despite the doubtfulness of John Stuart Mill's Denge Marsh 1861 record, the species has been found there by Stephen Lemon in June 2018 and more extensively in July 2019. Plants were by a flooded gravel pit but are likely to have been present in a field here before gravel extraction began.



Eleocharis uniglumis (Slender Spike-rush)
2010-20

Eleocharis uniglumis in Kent has generally been a plant of damp meadows, grazing marshes or fen, often with calcareous influence, as with the Holborough site, Ham Fen/Hacklinge and as is assumed to have been the case with Shoreham and Stowting sites. It may grow in a near-brackish habitat, but many of its sites are remote from the sea or tidal rivers.

It is a patch-forming perennial, resembling *Eleocharis palustris* (Common Spike-rush), but with thinner stems and with the base of the stems and sheaths reddish-purple (yellowish-brown in *E. palustris*). The lowest glume, which is empty, more or less completely encircles the base of the spikelet, whereas the encirclement of the base of the *E. palustris* spikelet is shared by two empty glumes. The spikelet of *Eleocharis uniglumis* often shows a pronounced lean on one side.



Material from Holborough, showing (left) *Eleocharis uniglumis* with single encircling basal glume and (right) *Eleocharis palustris* with two basal encircling glumes. Photo by Stephen Lemon. 15 June 2013

Site	Grid reference	Site status	Last record date	Recorder	Comments
North Erith Marshes (metropolitan vc16)	TQ4880		3 August 2004	JP	Grazing marsh at TQ 48831 80054.
Snodland	TQ76B		After 1970, before 1981	Philp (1982)	Probably the same site as that at TQ7062 below.
Holborough	TQ7062	KWT managed reserve	(1) 13 May 2018 (2) 7 June 2014 (3) 25 June 2013 (4) 15 June 2013	(1) DS (2) KBRG meeting (3) GK & LR (4) SL	(1) Present. (2) TQ 70690 62363, previously found by SL, a small patch mixed with <i>E. palustris</i> in low ground of old drainage runnel near <i>Dactylorhiza x kerneriorum</i> . Also, at TQ 70687 62304, previously found by SL, a patch 1 x 2 metres, <i>E. palustris</i> being present a little to the south. (3) (a) TQ 70749 62369, 1m x 2m

					<p>patch by dried-out shallow (east-west) ditch.</p> <p>(b) TQ 70756 62371 to TQ70762 62373, a 2m x 2m patch and then for 4 or 5m along the south side of dried-out shallow (east-west) ditch.</p> <p>(c) TQ 70767 62311, a 3m x 2m patch along the upper edge of dried-out shallow (north-south) ditch.</p> <p>(d) TQ 70763 62321, a 5m x 4m patch along a dried-out shallow (north-south) ditch, <i>with Eleocharis palustris</i> at bottom.</p> <p>(e) TQ 70753 62340 (a 2m x 1m patch), TQ 70751 62346 (a 2m x 1m patch) and TQ 70749 62352 (a 2m x 0.5m patch), all along a dried-out shallow (north-south) ditch.</p> <p>(4) TQ 70761 62366, nine patches along a dry ditch system in field centre, usually where ground bare and less dominated by <i>Juncus</i> spp.</p>
North east of Queenborough	TQ97G		27 July 1991	JP	Marsh dyke near farm.
Denge Marsh	TR0518		9 June 2018	SL	<p>Dungeness RSPB Reserve, Denge Marsh, small field west of the public footpath containing Denge Marsh hide, bordering eastern corner of the Barge Pit, TR 05878 18310. A few patches along a few metres of damp grassland immediately behind <i>Phragmites</i> / <i>Bolboschoenus</i> dominated edge of pit. Specimen confirmed by MP. Associates along edge include <i>Eleocharis palustris</i>, <i>Carex hirta</i> and <i>Mentha aquatica</i>. Base rich nature of substrate here demonstrated by presence of <i>Chara connivens</i> in shallow edge of pit. Historic imagery shows this field as a remnant of a larger field that existed prior to creation of the gravel pit and that the area was disturbed by gravel extraction when pit was created. One previous claimed record for this species from Denge Marsh in 1861 within the herbarium of John Stuart Mill. [examined by SL at Kew, and carries annotations casting doubt on ID; the material itself is currently not confirmable.]</p>
Denge Marsh	TR0519, TR0619	SSSI	7 July 2019	SL	<p>Dungeness SSSI (Unit 67), RSPB Reserve, north-west of Hamilton Farm area, pond, TR 0598 1911 and .TR 0606 1900. Colony along southern edge of pond mixed with <i>Eleocharis palustris</i> and intermediates between two, with lowest glumes circling one opposite, but both sterile.</p>
Hacklinge	TR3354		17 June 2018		<p>Hacklinge, west side of A258, cattle grazed pasture and ditches (Unit 56), area north of the North Stream, TR 339 543 / TR 339 544 / TR 338 545. Found sporadically over pasture, with more common</p>

					Eleocharis palustris and intermediates. Intermediates have lowest glume almost encircling base of spike combined with two lowest glumes empty/infertile.
Ham Fen / Hacklinge	TR3454	SSSI	(1) 13 August 2016 (2) 24 July 1991	(1) SL (2) FR	(1) Cattle grazed marshy sedge rich fen pasture in Ham valley, on west side of A258 south of Hacklinge Farm (Unit 56 within Hacklinge Marshes SSSI). Area south of the dividing dyke, TR340542 / TR341542 / TR340541 / TR341541. Widespread but not obvious due to heavy grazing. Notable in lush ungrazed growth that fringed edge of old cow pats. (2) Recorded as Ham Fen. This area's records go back to 1871.
Lydden Valley	TR35M		After 1970, before 1981	Philp (1982)	(This may be the same location as TR3454 above.)
Sandwich Bay estate	TR3557		28 June 2020	SL & SB	(a) In a mixed population with <i>Eleocharis palustris</i> at TR 35632 57605. A winter-flooded meadow still damp and with <i>Carex disticha</i> , <i>Oenanthe fistulosa</i> and <i>Dactylorhiza praetermissa</i> . (b) TR 3563 5759. Meadow along north-east side of Guilford Road. Colony mixed with <i>Eleocharis palustris</i> in a depression next to the Old Haven stream, on east side of public footpath.
North of Cooper Street	TR36A		2 August 1987	RF&AH	Visits on 23 May 1987 and 2 August 1987 were recorded just as at TQ36A. RF's annotated maps, however, show presence along ditches at TR 3146 6056; and at TR 3008 6145 and TR 3029 6196 (both off Potts Farm Drove, but it may be that the latter ditch no longer exists). In an adjoining monad, TR2962, a ditch is also marked for the species at TR 2983 6222 [not seen, 22 July 2014, GK, a small marshy area at a field ditch junction may have been this location, but perhaps susceptible to herbicidal treatment of adjoining arable].

Eleogiton fluitans (L.) Link (Floating Club-rush)

Draft account.

vc 16; apparently gone from vc 15

Rarity / scarcity status

Floating Club-rush is not uncommon in the British Isles as a whole, and so is regarded as of 'Least Concern' in relation to risks to its survival, both as regards England and Great Britain, but it has a primarily western distribution. The plant's fewer eastern occurrences are related to the availability of peaty water. This is a restricted habitat in Kent, and as *Eleogiton fluitans* is now only to be found there in one station, it is treated as **rare** in the county.



Account

Eleogiton fluitans was first published for Kent by Colin Milne and Alexander Gordon in *Indigenous Botany* (1793) as seen 'in the river Ravensbourne, betwixt Deptford and Lewisham'. Hanbury and Marshall (1899) regarded it as local, to be found in streams, pools and ditches, especially on heaths. It had been seen by, or reported to, them from West Kent localities such as Keston Common, Stone Marshes and Tunbridge Wells; historic East Kent records appeared to have been limited to a sighting near Brabourne, probably between 1829 and 1838.

Bedgebury. Photos by Liam Rooney, 15 August 2014

By the time of Philp (1982), records for the administrative county were down to two sites: Bedgebury Forest and Appledore. The species had also continued to be present in a pond at Keston Common, in metropolitan West Kent, which was outside the scope of the 1971-1980 administrative county survey. Only the Bedgebury Forest site was recorded in the course of the 1991-2005 survey (Philp, 2010), where it grows in the nutrient-poor acidic waters of Louisa Lake.



Eleogiton fluitans is very different from related British species, by virtue of being an aquatic with branched, narrow-leaved stems which float in the water. It may be found with other submerged aquatics, such as *Potamogeton* spp. (see habitat photo).

Site	Grid reference	Site status	Last record date	Recorder	Comments
Keston Common (metropolitan vc16)	TQ4164		(1) 1988 (2) 8 August 1987 (3) 21 September 1986	(1) GH (2) RMB (3) JP	(1) As TQ46C. (2) TQ419640, east side of pond. [Not seen on 18 June 2000 or since, RMB.] (3) Abundant in upper pond.
Bedgebury Forest	TQ7333		(1) (2) 26 July 2016 (3) 11 August 2012 (4) 4 August 1994 (5) After 1970, before 1981	(1) (2) SB & OL (3) KBRG meeting (4) EGP (Philp, 2010) (5) Philp (1982)	(1) Bedgebury Forest, Stone Pool, north-eastern quarter, TQ 7351 3368. Flowering patch sprawling over water and <i>Potamogeton natans</i> at pond edge. (2) Still in the same woodland pool (Stone Pool) but the surface now much taken over by <i>Potamogeton natans</i> . Plants continuing in a vegetative state, still no flowers present. (3) TQ 73515 33694, covering about 3 square metres of mud and water at margin of woodland pool, non-flowering. (4) Louise Lake, Bedgebury Forest, TQ73G. (5) Abundant in small lake in Bedgebury Forest, TQ73G. Also present at Bedgebury in 2014 as indicated by photo captions.
Near Appledore	TQ9629 and TQ9630 (latter included in TQ93Q)	SSSI	(1) 7 June 2019 (2) After 1970, before 1981	(1) SL (2) Philp (1982)	Romney Marsh SSSI (Units 114 / 124), The Dowels, north-east of Appledore / immediately south of the Royal Military Canal, drainage ditch orientated north / south, separating sheep grazed rushy pastures, TQ 9613 3000 to TQ 9615 2991. Showing very well at the northern end in taller vegetation. (2) In fair quantity in a marsh dyke, given as TQ93Q.

Bedgebury,, habitat. Photo by Liam
Rooney, 15 August 2014



Epilobium palustre L. (Marsh Willowherb)

Draft account

vc 15 and 16

Rarity / scarcity status

Epilobium palustre is common in west acidic sites across the British Isles, and in 1978-99 it was recorded in 72% of 10km squares in Great Britain. Its English and Great British conservation status is one of 'Least Concern'. However, other than in parts of East Anglia, it is distinctly less common in south east England, and there have been losses, particularly since 1950. These have probably arisen from agricultural improvements, drainage and eutrophication. In Kent, there are relatively few recent records, and the species is **scarce**.

Hothfield. Photo by Liam Rooney, 9 September 2011

Account

Marsh Willowherb was first recorded in Kent by Edward Jacob in his *Plantae Favershamienses* (1777), referring to it as "In moist Places – common". Hanbury and Marshall (1899) refer to it as local, in ditches and swamps, and give 16 locations for the species, in some of which it is said to be common or very common. The authors (although no doubt this is attributable to Marshall, who was particularly interested in willowherbs) say that "Doubtless, it is considerably more frequent than these few notes indicate. Our British willow-herbs have been much neglected, owing to the difficulty of separating their 'varieties', most of which are really hybrids". Uncertainties of identification – although this is not a particularly 'difficult' species – have probably continued to obscure population trends in the county. However, it is likely that the losses of good wet acid habitats in the county since Hanbury and Marshall's time have operated to reduce the frequency of this species.



Philp (1982) gave 29 tetrad records, mostly in the southern half of the county, with a concentration in TR04, around Ashford. Marsh Willowherb was then said to be rather local and scarce, in marshes and wet ditches. In Philp (2010) only four tetrad records are given: from Hothfield Common (two tetrads, this being a Hanbury and Marshall site), Hatch Park and Gibbin's Brook. This major reduction in records as between 1971-80 and 1991-2005 surveys could be interpreted as a population collapse. If it were attributable to habitat changes, one would expect to see parallel reductions in Kent populations of other species of bog and wet heathland habitats; but changes of this order are not apparent from the two surveys. However, there is also the possibility that the ostensible change is an artefact of recording. The records in Philp (2010) were derived from Eric Philp's own observations; those in Philp (1982) were contributed by volunteer recorders, with varying degrees of expertise. It is possible that *Epilobium palustre* was at the time of the 1971-80 survey much scarcer in Kent than the survey results indicate. So, whereas the records of Hanbury and Marshall (1899) may, according to Marshall, have suffered from under-estimate, the records of Philp (1982) may have suffered from over-estimate. Nine tetrads (the equivalent of 11 monads) have 2010-20 records, aligning better with the Philp (2010) results than those of Philp (1982).

Epilobium palustre is in Kent found in bogs and in the vegetation of sandy or gravelly ground, generally acid and with a peaty / mossy overlay, around the margin of ponds or in damp hollows. It particularly favours areas which are subject to winter inundation and may grow with *Juncus* spp. and occasionally *Phragmites australis* (Common Reed). The plant spreads by wind-borne seed and by means of turions, small fleshy buds growing at the end of thread-like stolons, which are capable of regenerating in situ or becoming detached, and spreading with winter floods.



Lydd Ranges. Photo by Sue Buckingham, 7 August 2012

Recording errors may arise through the plasticity of many *Epilobium* species, and it should certainly not be assumed that a willowherb in a marsh is Marsh Willowherb. *Epilobium palustre* may also grow with *Epilobium obscurum* (Short-fruited Willowherb), but the Marsh Willowherb is distinguishable by its very narrow leaves, inrolling beneath at the margins, and by its long, narrow seeds, which exceed 1.3mm in length, and may be 2 mm. The thread-like stolons, with their turions, are also characteristic, but sampling may be destructive.

Hothfield. Photo by Liam Rooney, 9 September 2011

Hybrids with *Epilobium hirsutum* (Great Willowherb) and *E.*

obscurum have been recorded at Dungeness, the former in 1913 and the latter by Marshall in 1891, where he found it to be frequent, with the parents. Such hybrids are now limited by the scarcity of *Epilobium palustre* itself, but the cross with *E. obscurum* was recorded again in 2012, on MoD land at Lydd Ranges, within vc15 East Kent, but on the East Sussex side of the administrative county border.



Site	Grid reference	Site status	Last record date	Recorder	Comments
Chiddingstone Causeway	TQ5146, TQ5147		(1) 24 August 2013 (2) 27 June 1982	(1) SL (2) KFC meeting	(1) In good numbers in winter flooded grassland and around the edges of ponds in two separate areas on Chiddingstone reserve. Noted at TQ 51128 46983, TQ 51097 46992, TQ 51055 47083 and TQ 51057 47077. Grows amidst <i>Juncus</i> spp. and also <i>Salix</i> regrowth, sometimes with other <i>Epilobium</i> species nearby. (2) Grid reference not given.
Hothfield Common	TR94S	SSSI & KWT managed reserve	(1) 15 August 2013 (2) 9 September 2011 (3) After 1990, before 2006	(1) CO (2) SB (3) EGP (Philp, 2010)	(1) TQ9645. Two plants in full flower c.4 metres west of northern end of boardwalk over main bog. (2) Several plants in bog at TQ96945 45685.
Hothfield Common	TR94T	SSSI & KWT managed reserve	(1) 17 September 2018 (2) 8 August 2015 (3) 9 September 2011	(1) AW (2) BW (3) SB (4) EGP (Philp, 2010)	(1) TQ9645 (2) TQ9645. (3) A few scattered plants in sphagnum bog at TQ 96755 46114. (4) Recorded as TQ94T.

			(4) After 1990, before 2006		Recorded at least back to 1944.
Lydd Ranges	TR0118	MoD land	7 August 2012	OL, GK, SB & TI	Scattered at TR 01436 18750 with <i>Juncus effusus</i> . In East Sussex administrative county (but vc15).
Lydd Ranges	TR0319	MoD land	7 August 2012	OL, GK, SB & TI	On west, north and east sides of pond on acid ground, with fluctuating water levels. Small quantities on margins, shady areas close to surrounding <i>Salix</i> (at TR 0353 1939, TR 0351 1938 and TR 0356 1936). Large quantities at western end in wet moss below <i>Phragmites</i> , e.g. at TR 0348 1937.
Hatch Park	TR04Q	SSSI	(1) 29 August 2013 (2) 1 August 2012 (3) After 1990, before 2006	(1) & (2) GK (3) EGP (Philp, 2010)	(1) One plant by Heron Pond, TR0640. (2) Occasional in marshy acid ground in rushes on north west side of Heron Pond, Hatch Park, TR 0663 4064, with <i>E. obscurum</i> . (3) Recorded as TR04Q.
Dungeness	TR0618, TR0717, TR0718	RSPB reserve	(1) 4 June 2018 (2) 2012	(1) AW (2) BB	(1) TR0718 (2) Present in pits 4 (TR0717), 8 (TR0718) & 6 (TR0618); in the latter, frequent in peaty area following <i>Salix</i> clearance. Was present in pit 4 in 2002, as also pit 5 (TR0618), from which it appears to have gone.
Gibbin's Brook	TR1138	CROW access land, SSSI	(1) 30 June 2013 (2) After 1990, before 2006	(1) KBRG meeting (2) EGP (Philp, 2010)	(1) Widespread in northern bog, less so in southern bog other than in wetter areas amidst <i>Juncus</i> spp. (2) Recorded as TR13E.
Sandwich Bay	TR3555		23 June 2001	FR	In dune slacks.

Epipactis palustris (L.) Crantz (Marsh Helleborine)

Draft account.

vc 15; probably gone from vc 16

Rarity / scarcity status

The Marsh Helleborine enjoys a widespread but patchy distribution in England, Wales and Ireland, but with only minor presence in Scotland. In Great Britain its risk status for conservation purposes is regarded as being of 'Least Concern', but in England it is treated as **Near Threatened**. In Kent it is very local and **scarce**.

Account

The first published county record – indeed, the first British record - for *Epipactis palustris* appears in the *Stirpium Illustrationes* of Matthias de L'Obel, edited by William How and published in 1655, well after L'Obel's death. The book describes it as a plant with a stem a span tall (seven inches) and with a spurred flower becoming purplish from white, found in 1601, in the water meadows of the village called Mary-cray. Hanbury and Marshall (1899) assessed the species as local, found in boggy places, usually among bushes or long herbage, and gave a scattering of records from L'Obel onwards across the county. By the time of Philp (1982) and Philp (2010), records had reduced to two areas: a chalk pit at Swanscombe and scattered colonies on fixed sand dunes over three tetrads in the Sandwich Bay area. Both these areas are representative of habitat types for this species, but the species now survives only at Sandwich.

The Swanscombe pit held 200 plants in 1976, including a yellowish-white flowered form (forma or var. *ochroleuca*), when seen by John Palmer⁴, and the population had become over 1000 in several patches on the pit floor by 1982, according to David Johnson. Even then, the habitat was beginning to dry out with partial infilling of the pit, which continued into the early 1990s, and the Marsh Helleborine did not long survive these changes; it could not be found in 1994. It is not the only West Kent record related to chalk pit floors which may be subject to periodic inundation. James Sherard recorded it as very common in old chalk pits between Eltham and North Cray, as mentioned in the third edition of John Ray's *Methodica Stirpium Britannicarum* (1724). There are also records relating to chalk pits at Greenhithe and near Empire Paper Mills (probably both TQ57X) in the 1940s and 1950s. The latter site may be responsible for literature references⁵ to a dwarf form, possibly affected by drying out. Appearances in drier chalk habitats have been suggested to be residual from what were originally damper conditions, or to reflect seasonal dampness.



Sandwich. Photo by Liam Rooney, 9 July 2010

The fixed dunes of Sandwich Bay, with lime content from their shelly sand, provide another calcareous substrate, and the slacks are also subject to periodic inundation, providing an environment analogous to chalk

⁴ *BSBI News* (September 1993) 64: 17. This appears to be the only recorded Kent sighting of this form other than a couple of plants seen at Sandwich Bay by David Johnson in 1992.

⁵ E.g., V.S. Summerhayes (1952), *Wild Orchids of Britain*.

pit floors, despite being so different in appearance. Records here go at least as far back as 1839 when M.J. Cowell (in *A Floral Guide for East Kent, etc.*) published plants lists, including this species for the marshes near the sand downs between Deal and Sandwich noted by the Revd. M.J. Berkeley. Marshall also found *Epipactis palustris* to be locally abundant near Sandwich, so there is a history of continuity for what is now its only Kent station. It has also been known north of Sandwich, at Stonelees, where there was a colony of over 1000 spikes in the mid-1950s amongst grass and sparse *Phragmites australis* (Common Reed), seemingly a habitat which was drier than would normally be expected. This population apparently rapidly declined afterwards, perhaps related to a cessation of grazing.⁶ Colonies may expand, as well as contract: what was described as a 'small colony' in 2011 on Sandwich Bay Bird Observatory land had grown to 1,672 flowering spikes in 2019.

Sandwich. Photo by Sue Buckingham, 6 July 2019

Inland, south of Sandwich has also provided a habitat where the Marsh Helleborine may yet be re-found. Lewis Dillwyn provided to the Linnean Society in 1801 a catalogue of plants which included this species as present in boggy ground about Ham Ponds, marshes about Hacklinge between Deal and Sandwich, and in Wingham Marshes. Its presence about Ham Ponds was also known to Hanbury and Marshall (1899), and Marsh Helleborine was seen here by at least one of the authors. It was known here to Francis Rose from 1946, growing with *Cladium mariscus* (Great Fen-sedge) and *Juncus subnodulosus* (Blunt-flowered Rush) and was still present in July 1991, when seen by him. The peaty fen of Ham Ponds has a calcareous content related to historic changes in the direction and outlets of the River Stour, and the taking of drainage from the chalk. This different habitat accordingly has features in common with the chalk and dune habitats.



Sandwich. *E. palustris* var. *albiflora*. Photo by Daphne Mills, July 2010



Epipactis palustris is a distinctive orchid, not readily confused with any of the other British species, particularly because of the generally whitish flowers ambiguously streaked or suffused with brown, green or reddish coloration, and with a frilly lip. Pure white flowers have been recorded at Sandwich – var. *albiflora* Luscher, which lacks even the purple veining of the interior of the hypochile which would normally be found in white variants (forma or var. *ochroleuca*).

The plant may form a patch of spikes or rosettes from shoots

⁶ Dennis Harle (1977), in *Sandwich Bay Observatory Report*, comm. D. Johnson.

arising at the ends of branching rhizomes creeping horizontally just below ground surface. The shallow rhizomes place the plant at risk of permanent changes in water table levels.

Sandwich. Photo by Liam Rooney, 9 July 2010



Site	Grid reference	Site status	Last record date	Recorder	Comments
Swanscombe	TQ6074		(1) After 1990, before 2006 (2) 19 July 1986 (3) 1982 (4) 10 July 1976	(1) EGP (Philp, 2010) (2) GK (3) DJ (4) JRP	(1) Chalk pit, recorded as TQ67C. (2) TQ 607 746. (3) Over 1000 plants, plants growing in several patches with very robust <i>Dactylorhiza fuchsii</i> , <i>Neottia ovata</i> and <i>Pyrola rotundifolia</i> . (4) Over 200 plants, including var. <i>ochroleuca</i> . Also present: <i>Dactylorhiza praetermissa</i> , <i>Anacamptis pyramidalis</i> , <i>Pyrola rotundifolia</i> .
Ham Fen	TR3454		24 July 1991	FR	
Sandwich / Pegwell Bay	TR3463		23 June 1997	JS	TR 341 632.
Sandwich Bay area	TQ3560		4 August 1996	FR	TR3560. Locally frequent in slacks by pool.
Sandwich Bay area	TR35N, includes TR3557		(1) 19 June 2020 (2) 6 July 2019 (3) 1 August 2011 (4) 22 June 2002	(1), (2) & (3) (4) EGP (Philp, 2010)	(1) Thriving colony on Bird Observatory land at TR 3587 5753, now spreading with new small satellite colonies growing at TR 3590 5754 and at TR 3579 5751. (2) Colony on bird observatory land at TR 35803 57536 and described as small colony in 2011 has grown to have 1,672 flowering spikes (counted by warden) (3) Small colony in damp dune grassland at TR 35803 57536 (4) Fixed sand dunes.
Sandwich Bay area	TR35P, includes TR3559		(1) 6 July 2019 (2) 16 July 2013 (3) 17 July 2010 (4) 9 July 2010 (5) 24 June 2010 (6) After 1990, before 2006 (7) 4 August 1996	(1) SB (2) CO (3) DM, FB & JS (4) JA (5) SB (6) EGP (Philp, 2010) (7) FR	(1) (a) 570 flowering spikes in dune hollow at TR 3550 5956, west side of the road leading to Prince's golf clubhouse. (b) 33 flowering spikes alongside Prince's 'old practice range' from TR 35212 59192 to TR 35177 59243. Also a small colony of ten beside a newly created wetland, close by, at TR 35132 59140. (c) 48 flowering spikes in old dune slack by public footpath between golf courses at TR 3538 5916. (2) At least 75 flowering spikes in damp hollow by willows adjoining ditch just past barrier gate across track, (+1) c TR 355 592. (3) Var. <i>albiflora</i> Luscher found at TR3559 in a damp, Salix-bordered depression in part of the golf

					<p>course, beside a public footpath and a small drainage channel. (Two flowering spikes also seen in TR3559 by AB, 11 July 2012.)</p> <p>(4) 30 spikes at TR 35383 59158, 30 at 35386 59164, 14 at TR 35302 59140.</p> <p>(5) TR 35385 59158, large colony in dune slack by public footpath, possible threat from trampling.</p> <p>(6) Fixed sand dunes, TQ35P..</p> <p>(7) TR3559. Locally abundant in dune slack.</p>
Sandwich Bay area	TR35T, includes TR3657		<p>(1) 19 June 2020</p> <p>(2) 1 August 2011</p> <p>(3) 27 June 2010</p> <p>(4) After 1990, before 2006</p>	<p>(1) & (2) SB</p> <p>(3) SC</p> <p>(34) EGP (Philp, 2010)</p>	<p>(1) Several hundred flowering spikes at TR 3629 5727, in an old wet dune slack with <i>Salix repens</i>, <i>Hydrocotyle vulgaris</i> and <i>Dactylorhiza praetermissa</i>. The habitat is kept open by volunteers from Sandwich Bay Bird Observatory.</p> <p>(2) 12 plants in dune slack at TR 36300 57265.</p> <p>(3) TR 362 573.</p> <p>(4) Fixed sand dunes.</p>

Epipactis phyllanthes G.E. Sm. (Green-flowered Helleborine)

Draft account

vc 16; gone from vc 15

Rarity / scarcity status

The Green-flowered Helleborine is a nationally scarce plant with a scattered distribution in England and Wales, and few locations in Ireland. Its overall distribution is not static, as it has been found that populations tend not to be long-lived, but there has been a general decline in southern England, partly compensated by new populations in the north. The threat level to this species in Great Britain and in England is one of 'Least Concern'. In Kent, it is **scarce**.

Foots Cray Meadows. Photo by Ann Clarke, 9 August 2008

Account

The first Kent record appears to have been at Rubery Down (otherwise Three Burrows Down), Womenswold in East Kent (TR247497), a colony which Donald Young⁷ described as being still extant around 1952 with less than 10 plants, having been seen irregularly since 1926 in a small beech copse on chalk with thick ivy ground cover. It was written up by Brooke and Rose⁸ as being covered by a new nomenclatural combination of *Epipactis vectensis*, a name which is not now used, but which was broader in concept than the variety known as var. *vectensis*. Young considered that the Womenswold plants were var. *degenera*, a variety from southern England in which the lip of the flower is degenerate in the sense that it is not, or is imperfectly, differentiated



into two parts (the differentiation of the lip into hypochile and epichile being a normal character of the genus *Epipactis*). No records from this site are known since the 1950s.



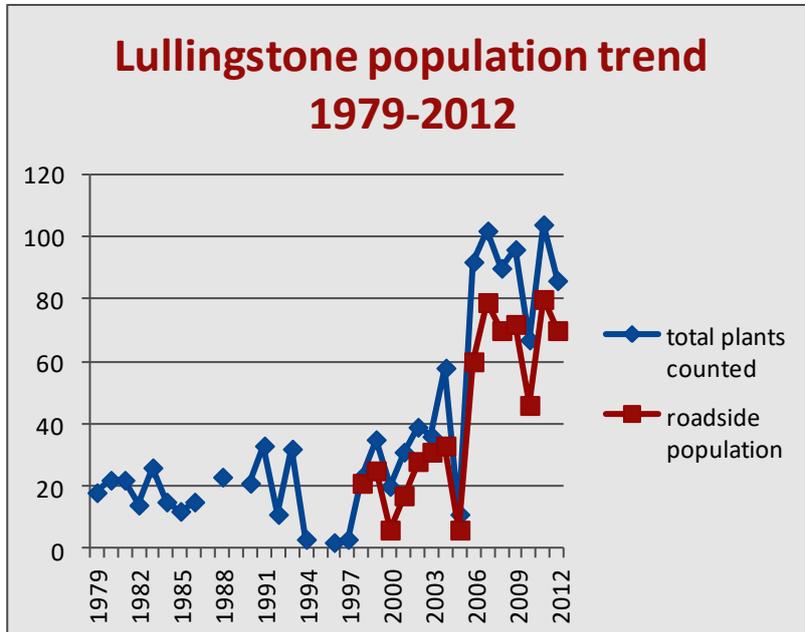
Lullingstone, roadside habitat, in beech litter. Photo by Lliam Rooney, 16 August 2013

Green-flowered Helleborine was first found in West Kent at Lullingstone in 1956, communicated by Mrs Denton to Donald Young for confirmation. It was described by Francis Rose as being abundant in a beech belt by the railway. The population was damaged as a result of the realignment of the A225 few yards away in early 1973, which created a chalk embankment cutting into the edge of the plantation and let in

⁷ D.P. Young. Studies in the British *Epipactis*. Part IV. A revision of the *phyllanthes-vectensis-pendula* group. *Watsonia* (1952) 2:259-276.

⁸ B.J. Brooke & F. Rose. A new species of British *Epipactis*. *Journal of Botany* (1940) 78: 81-89.

the light. It was feared lost after this (*Flora of the London Area*, 1983), but it was seen in 1975 and its survival was monitored by David Johnson⁹ from 1979. More recently, regular counts have also been made by KWT. Numbers have risen from 20-30 each year to over 100 in 2007 and 2011. The road embankment has scrubbed up so as to restore shade, and the helleborine has spread from the wooded top of the bank where a path runs,

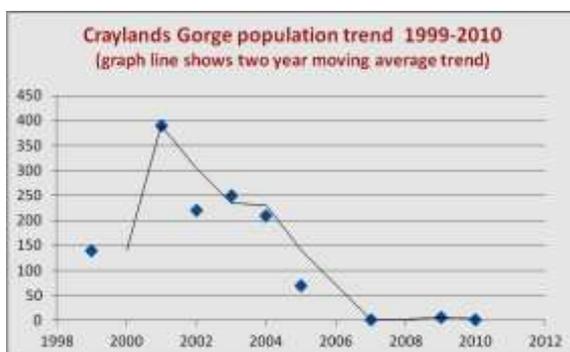


to the road-verge at the shaded foot of the embankment, close to the carriageway. Those plants at the top of the bank, under the shade of mature tree cover, tend to be larger, 20-35cm tall with up to 15 florets. The roadside plants (see illustration) tend to be small and weedy, seldom more than 20cm high with 5-10 florets.

In effect the roadside plants have comprised an extension of the original embankment colony which has become more prolific than the original. The accompanying chart shows how

the roadside plants regularly out-number the others. Their appearance on the chart in 1998 reflects when they were first observed in the course of monitoring. They may well have been present before then, although it is a relatively new habitat, created by roadworks. The 'crash' in numbers for 2006 was at least in part the impact of highway strimming. An odd plant was found in 2017 some 890m south of the colony. Highway strimming again assailed the roadside population in 2018, reducing a count of over 120 plants on 12 July to seven or eight very small specimens later that month.

There have been other shaded chalk sites of north west Kent in which this species has been discovered – some pits in the Stone / Greenhithe /Swanscombe area are mentioned in the table below. These have in the past sometimes harboured significant numbers of plants. David Johnson has pointed out that the Craylands Gorge population probably held the largest British population in the early 21st century. This is a deep shaded chalk cutting, excavated to serve as a mineral railway connecting chalk pits, but long disused in relation to its original purpose. *Epipactis phyllanthes* seems to have been first found here by John Palmer in 1979 and the maximum



numbers recorded were 390 in 2001. Since then, the population has fallen away (see chart) without any obvious explanation – there do not seem to have been any marked habitat changes. This may be no more than the recognised tendency of the plant to come and go. A.J. Richards¹⁰ has stated that site occupancy seems rarely to exceed 30 years. He also mentions that the species is frequently associated with *Pyrola minor* (Common Wintergreen); however, at Craylands

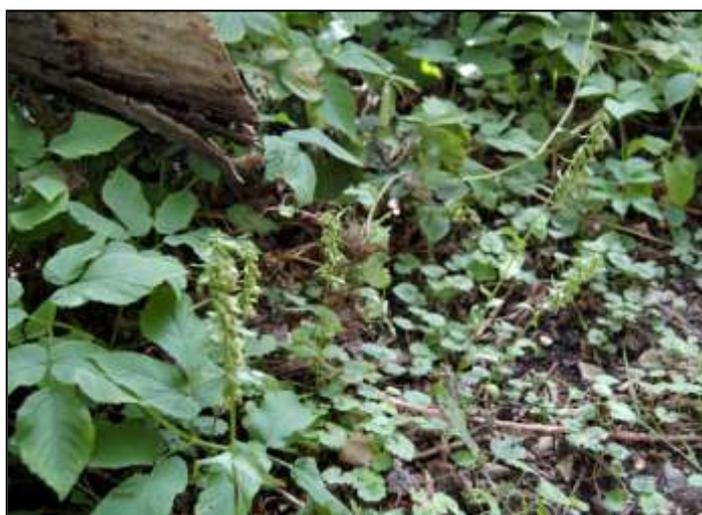
⁹ An interesting discussion generally as regards north west Kent occurrences, from which some of the following observations are taken, is provided by David Johnson in More notes on Kentish Orchids: Green-flowered helleborine (*Epipactis phyllanthes*), *The Newsletter of the Kent Field Club* (February 2008) 67: 4-6. He has also kindly assisted with comments on an early draft of this account.

¹⁰ A.J. Richards, *Epipactis phyllanthes* G.E.Sm., in (eds.) A. Stewart, D.A. Pearman & C.D. Preston, *Scarce Plants in Britain* (1994), JNCC.

Gorge its association is with *Pyrola rotundifolia* (Round-leaved Wintergreen), also a plant of damp, shaded calcareous habitats, and *Hedera helix* (Common Ivy).

The prospects for records of continued and new occurrences of this species on the north west Kent chalk are diminished by the decline of the Craylands Gorge population and by the position regarding old chalk pit habitats. Kent was historically of international importance for cement production, and much chalk was excavated for this purpose, especially in the area from Dartford to Northfleet. The habitats which the former chalk workings have supplied for *Epipactis phyllanthes* are disappearing with development, and the increasing installation of palisade security fencing has reduced accessibility to those which remain.

Within the British Isles as a whole, *Epipactis phyllanthes* is known to grow in a wider range of habitats, often on sandy soil, including dunes. Such occurrences are not yet recorded in Kent, but another habitat-type which does have Kent records is riverside terrain subject to occasional flooding and sometimes with *Salix* spp. present. One such population existed by the River Darent in the grounds of Lullingstone Castle, mainly under *Aesculus hippocastanum* (Horse-chestnut), but also amongst the roots of *Alnus glutinosa* (Alder), down to water level. This colony usually consisted of 30 to 40 flowering plants, with a maximum of about 60. It was extinguished by the trees being blown down in the great Storm of 1987. Although not far from the Lullingstone A225 site on chalk, it was a distinct site, in a distinct habitat. An analogous population was discovered in August 2008 by Ann Clarke at Foots Cray Meadows. There were then 14 plants on flat ground near the River Cray under *Salix x fragilis* (Crack-willow) with very ordinary vegetation of shaded disturbed



ground: *Aegopodium podagraria* (Ground-elder), *Glechoma hederacea* (Ground-ivy) and *Urtica dioica* (Common Nettle).

Foots Cray Meadows. Photo by Ann Clarke, 9 August 2008

Green-flowered Helleborine is a fairly inconspicuous green plant, distinguishable from other similar helleborines by its inflorescence-axis being glabrous and the flowers drooping as soon as they open. The flowers may not open properly at all, and the species is self-pollinating, which can result in local variability. Currently, five

variants are known in the British Isles, although intermediates exist between these. In Kent, var. *degenera* has been identified at Womenswold and Lullingstone; and var. *phyllanthes* at Foots Cray.

Site	Grid reference	Site status	Last record date	Recorder	Comments
Foots Cray Meadows (metropolitan vc16)	TQ4872	London Borough of Bexley public open space	5 August 2008	ACla	TQ 4836 7204, 14 plants at pathside near river under <i>Salix x fragilis</i> .
Lullingstone, riverside	TQ5364		Before October 1987	TH-D, comm. DJ	TQ 532 643, in Lullingstone Castle grounds, destroyed by Great Storm of October 1987. See account in text above.
Lullingstone, A225	TQ5263	RNR	29 June 2016	GT & KWT volunteers	TQ 52965 63482, on wide, open section of road verge, c.890m distant from long-established colony. Noticed because close to a

					quadrat survey unrelated to this species.
Lullingstone, A225	TQ5364	Part of site is RNR	See text and comments		Many records from 1956 onwards, in area of TQ 533 642 to TQ 534 655. More recent counts are 102 (2007, DJ); 90 (2008, DJ); 96 (2009, DJ); 67 (2010, DJ - a KWT count of 79 was also made); 104 (2011, DJ -the equivalent KWT count was 82); 86 (2012, DJ); .70 (2013, DJ), 81 on roadside, 4 in plantation (2014, DJ); 54 on roadside, 11 in plantation (2015, DJ); 118 (KWT, 2016); 163 (KWT).
Stone	TQ5774 (TQ57S)		(1) July 2001 (2) 23 July 2001	(1) DJ (2) EGP & PHe	(1) A single plant flowering on the edge of a tarmac path close to a new housing estate built a couple of years previously close to Stone Churchyard. (2) May be the same plant, recorded as in TQ57S. Tetrad TQ57S has a history of records. Philp (1982) refers to a small colony in a chalk quarry. This appears to refer to a pit at TQ 578 748 near Stone Churchyard. DJ recorded between 20 and 30 plants flowering there under scrub in the late 1970s and early 1980s. The last record was 14 flowering in 1986; by 1988 the area had completely scrubbed over and has since been developed. A larger colony at another pit in this tetrad, the Atlas Stone Company pit at Stone, was destroyed (Philp, 1982).
Craylands Gorge	TQ5974		(1) 21 July 2018 (2) 13 July 2010	(1) reported to DJ (2) DJ	(1) TQ 5988 7479, Craylands Gorge, 19 plants of which 2 dried up and 1 broken off, all singletons, the tallest 30cm with 8 florets (2) TQ 5988 7479, only one plant found growing in dense ivy. No apparent changes in the part of the Gorge where the plant grows. Numbers have grown and declined: one spike (1979, JRP), 27 (13 July 1982, JRP), 140 (1999, DJ), 390 (2001, DJ), 220 (2002, DJ), 250 (2003, DJ), 210 (2004, DJ), 70 (2005, DJ), 2 (2007, DJ), 6 (2009, DJ), 1 (2010, DJ). The record for TQ57X in Philp (2010) – seen 23 July 1999 by EGP and PHe – refers to this location.
Swanscombe	TQ67C		14 July 2000	EGP & PHe	Found earlier by PHe and RBr, in chalk pit, when there were three plant below <i>Salix</i> surrounded by <i>Buddleja</i> (c. TQ 612 746, per DJ and subsequently affected by high speed 1 rail link).

Equisetum sylvaticum L. (Wood Horsetail)

Draft account

vc 15 and 16

Rarity / scarcity status

Wood Horsetail is widespread in suitable habitats in western Britain from Wales northwards, in northern England and Ireland, and throughout Scotland. It is not regarded generally as at risk and its English and Great British conservation status is one of 'Least Concern'. In southern lowlands, it appears to be in long term decline and in Kent it is **scarce**.

Hunstead Wood near Chartham Hatch. Photo by Liam Rooney, 9 May 2011

Account

The first published notice of Wood Horsetail in Kent is by Christopher Merrett, in his *Pinax rerum naturalium Britannicarum* (1666), where he listed the species as "In Charlton woods". Hanbury and Marshall (1899) were able to give only a few records and regarded it as rare in Kent, to be found in damp copses. Philp (1982) recorded it in six tetrads: one near Chartham Hatch and the remainder near Tunbridge Wells. In Philp (2010) these were reduced to the Chartham Hatch population and only three tetrads near Tunbridge Wells (albeit that one of these was a different tetrad, where seen by Joyce Pitt in 1986). This diminution may represent part of the general decline in the lowlands of southern Britain, or it may be that further search would restore the missing populations. However, it is likely that the species is moving from scarcity towards rarity in Kent.



Pembury. Habitat photo by Sue Buckingham, 16 May 2013

The current areas of presence represent long term locations. Chartham Hatch was a location contributed to Hanbury and Marshall's *Flora* (1899) by the Right Revd. John Mitchinson (formerly Bishop of Barbados and subsequently Master of Pembroke College, Oxford). Tunbridge Wells area records were known at least as far back as 1805, when Dawson Turner and Lewis Dillwyn state that Mr J. Woods junior reported it from "Woods North East of Tunbridge Wells".

Equisetum sylvaticum grows mainly on acidic, humus-rich soils, particularly where groundwater seeps through. Most of the Kent occurrences appear related to soils over the acidic Tunbridge Wells Sands or the junction of that formation with Wadhurst Clay, although the Chartham Hatch location is on Thanet Sand. Whilst Wood Horsetail is named for its growth in shady conditions, observations at the latter site, and at Pembury, where it is exposed to light at a roadside, suggest that water movement may be more important than shade. It is a species readily distinguished by the drooping branches of its shoots, whose delicate appearance arises from their slenderness and repeated branching.

Site	Grid reference	Site status	Last record date	Recorder	Comments
Speldhurst	TQ54K		(1) June 1991 (2) 1986	(1) EGP (2) JP	(1) Wood in Danemore Park, TQ5440.
High Brooms	TQ54V, includes TQ5940	Roundabout Wood is part of Local Nature Reserve owned by Tunbridge Wells Borough Council	(1) 14 July 2018 (2) 17 September 2016 (3) 4 Aug 2015 (4) After 1990, before 2006	(1) KFC meeting (2) BPS meeting (3) GK & PA (4) EGP & JBe (Philp, 2010)	(1) Roundabout Wood, TQ 5946 4073. Abundant in spring lines. (2) TQ 5947 4073, abundant plants under light shade of mature Alder, in spring lines flushes issuing down gentle slope at top of Roundabout Wood, at junction of Tunbridge Wells Sand and Wadhurst Clay. (3) Roundabout Wood, Grosvenor and Hilbert Parks, where originally discovered by MPa. Present in three locations on a north-east facing slope in dappled shade of alder wood, especially where seepage (presumably from junction of Tunbridge Wells Sand Formation and Wadhurst Clay) keeps the wet peaty ground open from bramble encroachment, although the <i>Equisetum</i> also occupied marginal bramble areas. (a) TQ 59498 40724, c.220 stems spread over area at least 6x9m. Associated plants: <i>Ranunculus repens</i> , <i>Carex remota</i> , <i>Cardamine</i> sp., <i>Solanum dulcamara</i> , <i>Hypericum androsaemum</i> , <i>Rubus fruticosus</i> agg. (b) TQ59475 40741, many stems in area c. 9x18m. Associated plants: <i>Mentha aquatica</i> , <i>Galium palustre</i> , <i>Fraxinus excelsior</i> , <i>Ranunculus repens</i> , <i>Carex remota</i> , <i>Rubus fruticosus</i> agg., <i>Ilex aquifolium</i> , <i>Alnus glutinosa</i> , <i>Dryopteris dilatata</i> , <i>Juncus effusus</i> , <i>Deschampsia cespitosa</i> . Also, an outlier to this colony of eight stems on a path to the south west. (c) TQ59483 40763, 27 stems in small area just over 1x1m around open wet peaty/ferruginous flush. Associated plants: <i>Rubus fruticosus</i> agg., <i>Hedera helix</i> , <i>Dryopteris dilatata</i> , <i>Fraxinus excelsior</i> , <i>Carex remota</i> , <i>Ilex aquifolium</i> , <i>Viburnum opulus</i> , <i>Alnus glutinosa</i> . (3) EGP referred (pers. comm.) to the plant as being down a bank on the west side of a minor road, which must be a different site, or an extension of the woodland site.

					It may well correspond to a location c. TQ 5968 4045 which was known to CAS around 1952 before the Pinewood Road houses were fully built up, spreading from boggy ground into what are now their gardens. (4) TQ54V.
Lamberhurst Quarter	TQ63P		After 1970, before 1981	Philp (1982)	[Flushed slopes of Brooklands Wood searched without re-finding, SL, August 2016.]
East of Lamberhurst Quarter	TQ63U		After 1970, before 1981	Philp (1982)	[as above.]
Pembury Hall	TQ6242		(1) 9 June 2014 (2) 16 May 2013 (3) After 1990, before 2006	(1) PS (2) SB (3) EGP (Philp, 2010)	(1) TQ 62639 42555 ±6m, 10 plants on lower part of lane bank, west of Old Church Road, south-facing, but overshadowed by holly and oak. Close to road surface and vulnerable to damage by lorries turning. Apparently well drained and not particularly damp, but may benefit from seepage from nearby springs in scrubby woodland. <i>Betonica officinalis</i> and <i>Luzula forsteri</i> associated, bank dominated by <i>Melica uniflora</i> . (2) 18 plants on roadside bank at TQ 62626 42570 at road junction opposite waterworks. Bank under oak woodland but fairly well lit and on spring line. Accompanying species <i>Luzula pilosa</i> , <i>Melica uniflora</i> , <i>Carex flacca</i> . (3) Recorded as TQ64G. Records in this area go back to 1845 ('Bog near Pembury Church' – Edward Jenner, Flora of Tunbridge Wells) and the location was variously described by FR as in damp woodland at road T-junction near Pembury Church and waterworks (1952) and opposite waterworks on spring line in oakwood on Tunbridge Wells Sand (1962). Cf. record at TQ 626 426, by A. Wilmot in September 1972.
Brenchley Wood	TQ6441	KWT reserve	25 April 1993	SB	Known at least from the 1970s, and continuously from 1985 to 1993, c. TQ 648 419. Just a very small patch under Alder in a wet part of the wood which gradually dried out.
Brookland Wood	TQ6638	SSSI	(1) 25 August 1987 (2) 15 August 1987	(1) JP (2) KFC meeting	(1) TQ 661 388. May be same as 1979 record by FR for wood at Lamberhurst Quarter, but this is given as TQ 659 387 in his MS Flora. [Not found, SL, 2016.]
Knock Wood, Tenterden	TQ8934		1988	JP	c. TQ892347, a peaty flush on a north-facing slope, which also supported <i>Osmunda regalis</i> , not re-found when subsequently revisited by JP, although the site remained suitably wet and boggy. Also not re-found, SL, in 2017; maybe due to overshadowing, woodland was secondary following clearance between 1870 and 1900.
Near Chartham	TR05Y	Part KWT	(1) 31 May 2014	(1) BW	(1) TR0956

Hatch		reserve	(2) 9 May 2011 (3) After 1990, before 2006	(2) LR (3) EGP (Philp, 2010)	<p>(2) TR 09724 56914 at Hunstead Wood. Most plants (100+shoots) were outside the reserve in a ditch bounding the wood and in the border of adjoining ploughed arable; only scattered plants in the wood.</p> <p>Formerly known from around a woodland pond, but this seems (2011) to have dried up and water table changes may be affecting residual woodland plants as well. In 2013, however, the pond was full, draining to the adjoining field ditch.</p> <p>Hunstead Wood has a long history of records: FR saw it in 1956 by a stream on the east side of the wood and remarked that this was probably the 1899 Flora of Kent site.</p> <p>(2) Denstead Wood (where known at least back to 1957).</p>
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Erica cinerea L. (Bell Heather)

Draft account. Some further scope for recording.

vc 15 and 16

Rarity / scarcity status

Bell Heather is widespread in heathland throughout the British Isles, other than in central England, and its conservation status in Great Britain has been one of 'Least Concern'. However, in England there is some evidence of decline, and it is considered to be **Near Threatened**. A comparison of its area of occupancy in England over the periods 1930-1969 and 1987-1999 produced a calculated decline of 29% in the likelihood of recording the species. In Kent, it is neither rare nor scarce, albeit more or less limited to west Kent and the Weald, but Philp (2010) shows a decline in tetrad records of 35% over those given in Philp (1982).



Account

In Kent the first published record for *Erica cinerea* is that of Edward Jacob in his *Plantae Favershamienses* (1777) where he gives it as 'Upon Charing Heath –not common'. Hanbury and Marshall (1899) noted the species as being one of dry sandy ground, frequent near London and on the lighter soils of the Weald, the comparative rarity of *Erica* spp. in Kent being evidently due to the great prevalence of chalk and clay, which they avoid. The reference to metropolitan Kent brings in the acid sandy/gravelly terrain of the north west Kent commons – Blackheath and Keston being mentioned as sites in Daniel Cooper's *Flora Metropolitana* (1836), and Paul's Cray Commons being added for 1904 in the *Woolwich Surveys* (1909).

[Pembury Walks](#). Habitat photo of *Erica cinerea* against a background of *Calluna vulgaris*, by Sue Buckingham, August 2014

Philp (1982) regarded the species as rather local on dry sandy heaths and woodland rides, its distribution being shown as primarily on the Greensand and the Tunbridge Wells Sands, together with a presence at Dartford Heath (the metropolitan commons being outside the scope of that work). However, the follow-up 1991-2005 survey of Philp (2010) gave a reduction from 52 tetrads to 34, Bell Heather having apparently gone from some sites through loss of habitat. The result is a distribution which resembles a reduced version of that for *Calluna vulgaris* (Heather), given that the latter species was also present in all but two of the 34 tetrads. Many of the same factors applicable to Heather (see separate account) apply to Bell Heather as well – the reliance on heathland, a habitat which has undergone a long decline in Kent before a degree of reversal, reflecting restoration work largely carried out since the 1991-2005 survey. However, the position of Heather and Bell Heather in Kent cannot be fully equated, because the recent 35% decline in Bell Heather tetrad records shows greater sensitivity to the causes of decline in Kent than Heather (11% over the same period). This may be a function of smaller populations of Bell Heather placing the species at greater risk. It is generally found together with Heather, but in smaller quantity and not growing in dense uniform stands as Heather may do, so that habitat changes are likely to render Bell Heather extinct at a site before the last Heather disappears as

well. Its relationship with Heather in Kent will be worth exploring: elsewhere, it has been noted as on occasion out-competed by Heather or alternatively growing as an understorey to Heather¹¹.

Erica cinerea is a plant of well-drained, acid ground without accumulation of humus. Whilst typically favouring open habitats, in Kent it is found particularly in the context of coniferous forests, along paths and rides or where trees have been cleared. This reflects the limited extent of heathland available in the county, as also the commercial use of sandy, infertile terrain. Although recently recorded at Hothfield Common, it is desirable that any such sightings be confirmed in view of the lack of older records and of the likelihood that the wetness of much of the land better suits *Erica tetralix* (Cross-leaved Heath) and *Calluna vulgaris* is also more tolerant to this. It has been suggested that distribution patterns of Bell Heather and Cross-leaved Heath may be affected by the former being more sensitive to the toxic effect of iron in the soil, increased by water-logging and Bell Heather's higher transpiration rate¹². Seed production is large – up to half a million seeds per square metre from a mature plant – and germination can be enhanced by heat treatment¹³, which may be relevant to fires which occur from time to time at Dartford Heath.



Pembury Walks. Photo by Sue Buckingham, 16 August 2014

Erica cinerea may be distinguished from *Calluna vulgaris* by its larger flowers, and by the leaves spreading in whorls, not opposite/adpressed; it also flowers earlier (mostly July to early August). From the downy *Erica tetralix* it may be separated by virtue of being hairless. A variant (var. *schizopetala*) with the corolla split nearly to the base, and so appearing to have four petals, was collected by two botanists in 1897 at Crockham Hill Common¹⁴. This variant seems capable of reproducing by seed, as it did spontaneously in David McClintock's garden at Platt, from a plant of non-Kent origin.



Crockhamhill Common, habitat. Photo by Geoffrey Kitchener, 29 December 2014

As this species is (as yet) not uncommon in Kent, the distributional data maintained in this register will be at 1km square (monad) level. This will entail recording at a finer scale than the tetrads given in Philp (2010), from which the following 1991-2005 distribution map is taken (with kind permission of the late Eric Philp and the Kent Field Club). The distribution map for 2010-20 records shows broadly the pattern of spread which was recorded in 1991-

2005, but the occurrences are more scanty. There is an anomalous 2016 record of a patch on the landward

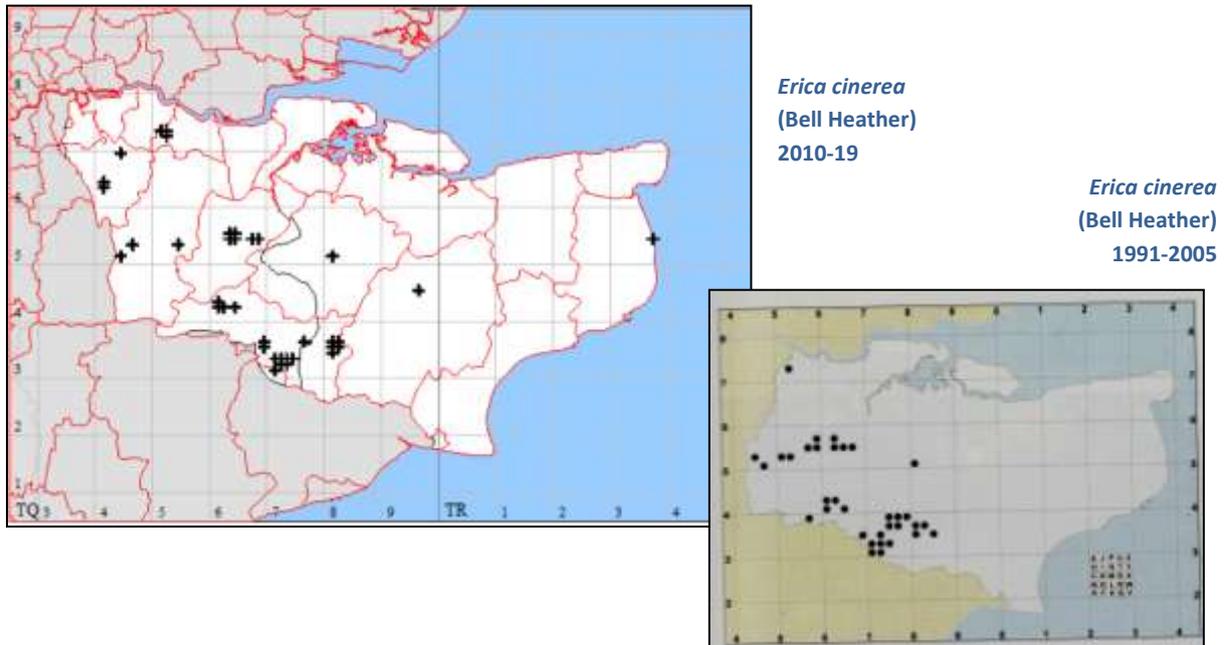
¹¹ Bannister, P. (1965). *Erica cinerea* L. (Biological Flora of the British Isles). *Journal of Ecology* **53**: 527-542.

¹² Discussed, and sources given, in Webb, N. (1986). *Heathlands*.

¹³ Bannister P. (1965), cited above.

¹⁴ McClintock, D. (1980). Bell heathers with split corollas. *The Plantsman* **2**: 182-191.

side of the sea bank near Deal, which is assumed to be an introduction. The total of 2010-20 records (38 monads amounting to 29 tetrads, in comparison with 34 tetrads in Philp, 2010) is suggestive of further decline although there is probably further scope for recording in West Kent chartlands and in TQ73 woodlands, especially from Old Park Wood eastwards to Hocker Edge and the Brewers Wood complex.



Erica tetralix L. (Cross-leaved Heath)

Draft account

vc 15 and 16

Rarity / scarcity status

Bell Heather is widespread in mires and wet heaths throughout the British Isles, other than in central England, and its conservation status in Great Britain has been one of 'Least Concern'. However, in England there is some evidence of decline, and it is considered to be **Near Threatened**. A comparison of its area of occupancy in England over the periods 1930-1969 and 1987-1999 produced a calculated decline of 29% in the likelihood of recording the species – the same as that for *Erica cinerea* (Bell Heather). In Kent, it is (taking account of metropolitan vc16 records) on the verge of being scarce, and Philp (2010) shows a decline in tetrad records of 38% over those given in Philp (1982).

Hothfield. Photo by Sue Buckingham, June 2012



Account

The first published Kent record for *Erica tetralix* is Edward Jacob's reference in his *Plantae Favershamienses* (1777) to the species being found, but not common, 'At the Bottom of Jud's Wood' (there is still a Judd's Wood, south west of Ospringe, on the Thanet Formation, which could provide an acid sandy substrate). Hanbury and Marshall (1899) considered it to be local¹⁵ on moist heaths, preferring a somewhat loamy sand. They noted historic records on the north west Kent metropolitan commons – Keston, Blackheath and Chislehurst – and mentioned records in heaths elsewhere, such as Benenden Heath and Hothfield. However, it is possible that the species was not restricted to moist heaths, for they gave woodland records as well: Seal Chart and Chiddenden Wood (near Cranbrook), as well as Jacob's original record in Jud's Wood. The species develops best in the open, but is capable of withstanding shade of Scottish woodland with a daylight factor of 1/3 to 1/6¹⁶. On the other hand, it may that the Kent woodland name has been assigned to a site which actually represented open ground there. Francis Rose knew it (1940s-60s) as present in 20 localities: in wet-heaths, valley bogs; and locally abundant, but generally rare, and absent from all of north east Kent and the chalk and marsh districts. He considered its main centres to be the north west Kent heaths, Hothfield Common and the High Weald woods between Tunbridge Wells and Biddenden; it had presumably been much commoner on the sands of the Folkestone Formation before most of the heaths were enclosed and cultivated.

By the 1971-80 county survey (Philp, 1982), it was regarded as rather local and scarce in Kent because of the lack of suitable habitats (bog and wet heaths) and it was recorded in only 13 tetrads in the administrative county. That number reduced to eight tetrads by 1991-2005, although three of those tetrads represent sites where it was not recorded in 1971-80. It is not clear whether this is a consequence of the recording process, or whether there is a degree of coming and going of the plant with changes in habitat. However, the central

¹⁵ Marshall was a little more forthright in the *Victoria History of the County of Kent* (1908), where he declared the species to be very rare except on the moist sands of three of the botanical districts making up the county.

¹⁶ Cited in P. Bannister (1966). *Erica tetralix* L. (Biological Flora of the British Isles). *Journal of Ecology* **54**: 795-813.

issue for this species in the county is habitat availability. Heathland has long been in decline in Kent, with a slight recent reversal due to restoration work, as described in the account for *Calluna vulgaris* (Heather); but any reversal really needs to bring back wet heathland for *Erica tetralix*, in spite of some historic records for probably drier locations. *Erica tetralix* copes with much wetter conditions than either *Calluna vulgaris* or *Erica cinerea*, and is more tolerant of iron toxicity than the latter in these circumstances¹⁷; and accordingly in such habitats can avoid being out-competed by the other heaths. On the basis of Philp (1982), *Erica tetralix* is four times scarcer in the administrative county than *Erica cinerea* and 35 times scarcer than *Calluna vulgaris*. This must at least in part reflect the scarcity of wet heathland or bog in comparison with similar, but drier, ground.



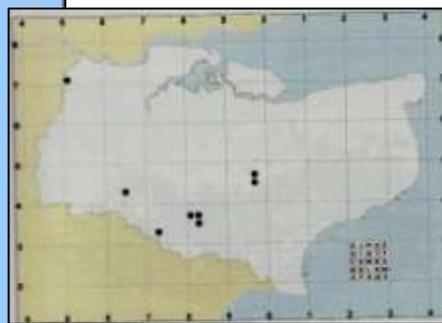
Hothfield, habitat, amidst *Juncus* and *Carex* spp. Photo by David Steere, 2 July 2013

For records from 2010 onwards, the distributional data maintained in this register will be at 1km square (monad) level. This will entail recording at a finer scale than the tetrads given in Philp (2010), from which the following 1991-2005 distribution map is taken (with kind permission of the late Eric Philp and the

Kent Field Club). The distribution map for 2010-19 records shows finds at Keston, St Paul's Cray, Pembury Walks (in wet areas over *Sphagnum*), Angley, Clowes and Brenchley Woods, Bedgebury and Hothfield. Records for 2010-20 (11 tetrads, equivalent to 14 monads have caught up with those in Philp (2010) irrespective of the inclusion of metropolitan vc16, so further decline has not taken place, and perhaps more records could be obtained from any wet open terrain at Joyden's Wood, Petts Wood, Whitley Forest and Hemsted Forest.



Erica tetralix (Cross-leaved Heath) 2010-20



Erica tetralix (Cross-leaved Heath)
1991-2005

Cross-leaved Heath is an evergreen perennial shrub, bushy if growing in isolation on drier ground, straggly with lower branches ramifying through moss and litter on wetter ground. Its leaves are set in whorls of (generally) four- hence both English and Latin names – which distinguish it from Bell Heather (whorls of three) and from Heather (opposite leaves in rows). Its hairiness distinguishes it from Bell Heather, and also provides a greenish-grey foliage colour which enables it to be identified at a distance. The flowers are urn-shaped, distinct from those of Heather, and generally slightly larger than Bell Heather flowers.

¹⁷ Discussed, and sources given, in Webb, N. (1986). *Heathlands*.

Eriophorum angustifolium Honck. (Common Cottongrass)

Draft account

vc 15 and 16

Rarity / scarcity status

Common Cottongrass is indeed common over much of the British Isles, where there are suitable habitats, and the risks to this species are regarded in Great Britain as a whole as being of 'Least Concern'. In central and south east England, however, it is in long term+ decline and now largely absent. Accordingly, its English status is, through drainage and loss of traditional grazing management, **Vulnerable** to extinction. A comparison of its area of occupancy in England over the periods 1930-1969 and 1987-1999 produced a calculated decline of 33% in the likelihood of recording the species. Southern counties such as Hampshire and Surrey still possess enough acid bogs to supply habitat for this species, but there is very little suitable terrain in Kent, where it is scarce.

Account

Hanbury and Marshall (1899) refer to a 1682 manuscript list in John Ray's *Catalogus Plantarum Angliae* then at the British Museum which gave this species as at Pett Bog, Chislehurst – this appears to be the first Kent record. Post-1682 records have been thinly but widely spread over the county, avoiding the chalk. *Eriophorum angustifolium* was considered to be rather scarce in the county by 1899 ("thinly distributed" was Marshall's comment in 1908).



Hothfield. Photo by Geoffrey Kitchener, 25 May 2010

In the 1940s and 1950s it was known to Francis Rose from Gibbin's Brook, from fen meadow east of Hacklinge and (surprisingly) from Swanscombe Wood¹⁸. Overall, he knew of eleven localities, and treated it as a plant of fens, valley bogs and wet heaths in acid (pH 3-5) to calcareous (pH7.5) waters; also in artificial ponds and ditches, probably once being common on the Lower Greensand bogs.

By the time of Philp (1982) the species was apparently gone from several former localities through land drainage or lowering of the water table. It was then (1971-80) only noted in two localities, Hothfield Common and Hawkenbury Bog. The latter site, however, was actually in vc14, East Sussex, and in any event afterwards lost its character through drying out. The subsequent survey of 1991-2005 (Philp, 2010), however, located Common Cottongrass in four tetrads. To these must be added its continued presence at Keston Bog, excluded from Philp (2010) because in metropolitan West Kent. These further locations include two tetrads at Dungeness which do not seem to represent an expansion of the plant, but rather its continuance, albeit not mentioned in Philp (1982). It was known at Dungeness to Hanbury before 1899 and collected at Denge Beach

¹⁸ This was actually in the cutting of an old mineral railway leading from Swanscombe Park towards an old chalk pit near Southfleet Road, and one may surmise that it was introduced in the course of the mineral working. The geology was probably Thanet or Lambeth Sand, so as to provide acid conditions; but the whole area was subsequently excavated down to the chalk, becoming Eastern Quarry, east of Bluewater.

in 1934 (specimen at University of Birmingham herbarium). Francis Rose recorded it in fen conditions by the Dungeness Open Pits (1945-62).

Both Hothfield and Keston are old localities. The presence of Common Cottongrass at Hothfield was communicated to the authors of Hanbury and Marshall (1899) by Frederick Webb, who died in 1880. The species was also listed for Keston Mark or Common by Daniel Cooper in his *Flora Metropolitana* (1836), representing the results of excursions in 1833-35; it was still abundant in what was described by W.H. Griffin in 1906 as a boggy valley at the common, doubtless Keston Bog; and it still survives there.

Eriophorum angustifolium is nationally found in a range of acid communities, whether bogs or wet heaths, and its Kent localities are characterised by an acid peaty substrate, often with standing water, through which its extensive rhizomes spread. Although the 'cotton' appears to be an adaptation for wind dispersal of seeds, spread generally seems to be vegetative. It has been maintained that the current British climate is unsuitable for the establishment of seedlings¹⁹, and on this basis expansion beyond existing Kent sites would seem unlikely. It is a distinctive plant when in flower or fruit, and other *Eriophorum* species are either not known in Kent or have not been seen for many years.



Hothfield. Photos by Liam Rooney, 15 June 2010 and 19 April 2011 (fruiting and flowering)



Site	Grid reference	Site status	Last record date	Recorder	Comments
Keston Bog (metropolitan vc16)	TQ4164		(1) 6 August 2016 (2) 28 May 2011 (3) 13 June 2007	(1) SL (2) OFC meeting (3) JP	(1) Keston Bog, small valley between TQ 4170 6423 and TQ 4171 6434. (2) TQ 417 643. (3) TQ 41715 64324, in middle marsh area of bog.
[Hawkenbury Bog]	[TQ43Y]		[After 1970, before 1981]	[Philp (1982)]	Since gone from this location, which was in vc14, East Sussex.
Hothfield Common	TQ9645	SSSI, KWT managed reserve	(1) 1 July 2019 (2) 2 June 2019 (3) 17 July 2016 (4) 8 August 2015 (5) 25 May 2010 (6) 1 June 2009 (7) After 1990, before 2006	(1) AL & JM (2) AW (3) AW (4) BW (5) GK (6) IR (7) EGP (Philp, 2010)	(1) M21 <i>Nartheicum ossifragum</i> valley mire by boardwalk in bog 2; M29 <i>Hypericum elodes</i> soakway at top of bog 2; M6 <i>Carex echinata</i> mire at middle of bog 2; and M21 <i>Nartheicum ossifragum</i> valley mire at middle of bog 2. (2) TQ9645 (3) Main bog. (4) TQ9645. (5) TQ9645, abundant across the

¹⁹ M.E. Phillips (1954), Biological Flora of the British Isles. *Eriophorum angustifolium* Roth. *Journal of Ecology* 42: 612-622.

					whole width of (main) bog no.2, including in standing water; less common in bog no.1 to south. (6) TQ 969 453, bog no. 1; TQ 968 456, bog no.2; TQ 968 459, bog no. 3. (7) Recorded as TQ945
Hothfield Common	TQ9646	SSSI, KWT managed reserve	1 June 2009	IR	TQ 967 460, bog no. 4.
Dungeness	TR01T	SSSI	(1) 10 July 2016 (2) 2012 (3) After 1990, before 2006	(1) KBRG/KFC meeting (2) BB & BF (3) EGP (Philp, 2010)	(1) Open Pit 4, acidic marsh on managed northern edge, Denge Beach, Dungeness, TR07281776. (2) TR0717. (3) Recorded as TR01T. In 1983, it was recorded as occasional in marsh at the Open Pits, nos. 2 & 4 ²⁰ , both in TR0717, but (comm. BB from unpublished English Nature survey data) it had gone from pit 2 by 2002, albeit then present in 4 & 8 (the latter in TR0718) in small unshaded areas. On re-survey in 2012, presence in pits 4 & 8 was recorded in additional transects following <i>Salix</i> clearance.
Dungeness	TR01U	SSSI	(1) 15 June 2010 (2) 25 June 2005 (3) 13 May 2004	(1) GK (2) PAK (3) EGP	(1) A few plants in wet area of pit no. 8, where <i>Salix</i> cleared, TR 072182. (2) TR 074 183. (3) Recorded as TR01U.
Gibbin's Brook	TR1138		(1) 30 June 2013 (2) 28 April 2011 (3) 18 June 2003	(1) KBRG meeting (2) LS & AG (2) EGP & BW	(1) Same patch seen as found in 2011 thriving at TR 116 384, together with small secondary patch in vicinity. (2) Marshy grassland on peat with sphagnum moss. (3) Recorded as TR13E.
Ham Fen	TR3454		24 July 1991	FR	

²⁰ B. Ferry & A. Henderson (1984): The vegetation of natural freshwater pits at Dungeness – I: Higher plants. *Transactions of the Kent Field Club* 9: 143-153.

***Erodium maritimum* (L.) L'Hér. (Sea Stork's-bill)**

Draft account

vc15

Rarity / scarcity status

The core distributional range of Sea Stork's-bill in the British Isles is along the British west coast northwards to the Rhinns of Galloway and southwards to Cornwall, thence to Dorset with a few outliers further east. It is also on the east and south coasts of Ireland. There appear to be no conservation concerns, its risk status being one of 'Least Concern' both for England and for Great Britain as a whole. Kent is one of the eastern outliers, and so on the fringes of British distribution; the species is **rare** in the county.

Account

Erodium maritimum was first recorded in Kent by Edward Jacobs in his *Plantae Favershamienses* (1777) as present "On the Sand Downs near Deal – not common". The likelihood is that this record was a contribution by William Boys, the historian of Sandwich. It was later listed by Lewis Dillwyn as "Found by my friend, Joseph Woods, jun. and myself on the walls of Sandgate Castle" in his *Catalogue of the more rare Plants found in the Environs of Dover, with occasional Remarks* presented to the Linnean Society in 1801 and appearing in their 1802 Transactions.



Dungeness. Photos by Lliam Rooney, 20 July 2010



After this, nothing was heard of the plant until recent years, although Hanbury and Marshall (1899) were hopeful that careful search at Deal might be successful. In 1996, however, it was rediscovered on sandy tracks on the Dungeness RSPB reserve (TR0618) and since then it has spread prolifically along paths in the reserve, being recorded in thousands, and from 2010 began to be observed in other locations. By 2012 it was also known not far from the original location, having been found in monads TR0619, TR0716 and TR0817, but additionally had been recorded further afield in a car park on secure MoD land at Lydd Ranges, TR0320. By 2017, it had been found in ten monads, including an anomalous inland record at Hothfield, where it appeared either from imported sand or from a scraped-up car park surface to which it may have travelled with visitors from the Dungeness reserve.

Although the species is known in other parts of the British Isles from sea cliffs and sand dunes, the south east Kent plants inhabit low-lying compacted shingle or sand/shingle surfaces of car parking or paths where they

grow with a prostrate, flattened habit. The very small size of this annual renders it susceptible to over-shading competition and little else grows with it in its trampled environment. It is probably self-pollinating and, without a need to attract pollinators, often lacks petals or drops them readily (see illustrations above).



Although Sea Stork's-bill was native to Kent, it is likely that its appearance on the RSPB reserve is as a result of seed being brought inadvertently on footwear or car tyres of a birdwatcher from a coastal site in western Britain. Normal dispersal for the seeds of *Erodium* spp. is by explosive release and self-burial, but Sea Stork's-bill's spread along paths suggests that seeds are readily capable of being picked up with wet sand and gravel on footwear.

Dungeness. Photo by Sue Buckingham, 20 August 2011

Site	Grid reference	Site status	Last record date	Recorder	Comments
Hothfield	TQ9746		8 August 2017	HS	TQ9705 4600, over 20 plants (spreading along sandy bank which was constructed 2013 (info per Ian Rickard, KWT) when the adjoining land ceased to be a car park, at which point the tarmac/gravel surface was scraped off and used to create this bank. Two or three years later a neighbour supplemented it with additional sandy material.
Lydd Ranges	TR0320	MoD land	(1) 7 August 2012 (2) 8 August 2012	(1) OL, GK, TI & SB (2) SB & TI	(1) At car park, Lydd Camp. (2) Many plants at edge of road by MOD car park TR03477 20013.
Dungeness	TR0617		10 August 2013	TI	
Dungeness RSPB reserve	TR0618	RSPB reserve	(1) 29 September 2017 (2) 23 June 2010 (3) 3 June 2010 (4) 16 November 2007 (5) 29 April 1999	(1) BBe (2) SB (3) DG (4) RG (5) EGP	This monad has been the subject of records by many recorders since 1996 to (at least) 2012, and a selection is given here. (1) TR 06774 18442, RSPB car park, a few plants. (2) TR 067 181 to TR 067 184, thousands of plants. (3) TR 067 184, in car park and on paths throughout the reserve. (4) TR 065 185, TR 066 184, TR 067 184. (5) Location given as TR01U.
Dungeness	TR0619		(1) 1 May 2019 (2) June 2014 (3) 18 April 2011 (4) 15 June 2010	(1) AW (2) FJR (3) SB (4) GK	(1) TR0619 (2) TR 0628 1944, TR 0625 1962, TR 0625 1963, TR 0624 1962, TR 0623 1960, TR 0622 1960. (3) On shingle at TR 06420 19490. (4) ARC site..
West of Lade	TR0620		(1) June 2014 (2) 30 June 2012	(1) FJR (2) TI	(1) TR 06840 20140, c.10 plants, and TR 06796 20168.

Near Dungeness power station	TR0716		(1) 15 September 2017 (2) 22 June 2014 (3) 20 August 2011	(1) BBe (2) BW (3) SB	(1) TR 07361 16673, large patch at least 30 x 10m. (2) – (3) TR 07754 16647, abundant on sand and shingle on both sides of concrete road westwards for 600 metres.
Dungeness power station	TR0717		22 June 2014	KBRG meeting	Growing abundantly on the sandy margins of the power station car park.
West of Lade	TR0720		15 June 2013	TI	
Dungeness	TR0817		(1) 4 June 2011 (2) 14 May 2005	(1) TI (2) JS	(1) TR 081 177. (2) TR 08525 17266, 109 plants confined to small area (1 sq metre) by Bird Observatory.

Erophila glabrescens Jord. (Glabrous Whitlowgrass)

Draft account.

vc 15 and 16

Rarity / scarcity status

Erophila glabrescens is a plant whose distribution is known imperfectly, because it is not always easy to distinguish from *Erophila verna* (Common Whitlowgrass). However, it appears to be distributed widely, but perhaps patchily, in the lowlands of the British Isles, and presents no particular conservation concerns for England and Great Britain as a whole. In Kent, it has only been identified on a few occasions and with increasing knowledge is being assessed as no longer rare, but instead **scarce**. It is possible that it may eventually be found not to warrant rare plant register status.



Hockley. Photo by Liam Rooney, March 2011

Account

The earliest record identified so far is a specimen at Kew Herbarium from 1893, gathered at Oldwall (presumably Old Walls, Church Road), Hythe and determined by Tim Rich. There are also specimens similarly determined and which were collected by H.E. Fox from Walmer-Deal (1915, National Museum of Wales Herbarium), and Kingsdown-Deal (1916, Oxford University Herbarium); by J.E. Lousley from Hythe Rifle Range (1927, Reading University Herbarium); and there is a specimen from Chislehurst Common in the Natural History Museum.

Although *Erophila glabrescens* was first named in 1852, it was not until 1987 that its recognition as a species became the norm in British Botany, through inclusion in the *Flora of the British Isles* by A.R. Clapham, T.G. Tutin and D.M. Moore. In consequence, all Kent *Erophila* records in Philp (1982) were treated as *Erophila verna*. The split of this taxon so as to recognize *Erophila glabrescens* as separate was reflected in the Kent survey of 1991-2005, published as Philp (2010). There, Eric Philp stated that he had taken great care over the identification of *Erophila*, but many specimens seemed to vary on the same plant as to stem hairiness or petal shape, characters used to distinguish between *Erophila verna* and *Erophila glabrescens*. He assigned any doubtful plants to *Erophila verna* and was left with only three tetrad records for *Erophila glabrescens*. These were from Teston, Eccles and Greatstone.



Upper Halling, habitat Photo by Sarah Kitchener, 21 March 2020

Other Kent recorders have also experienced difficulty with this taxon. It does not seem to have habitat preferences distinct from those of

Erophila verna; both species can be found together; and frequent sampling from Whitlowgrass colonies can be a wearisome activity. The species are keyed apart on the basis that *Erophila verna* has petioles as long as the leaf blades (or less, down to half as long); petals are bifid from half to three quarters to the base; and the plant is usually hairy. *Erophila glabrescens* has petioles from one and a half to two and a half times as long as the leaf blades, petals are bifid for no more than half their length, and the plant is usually sub-glabrous. It is, however, often not easy to identify the boundary between petiole and leaf for measurement purposes. Also, “usually hairy” and “usually sub-glabrous” imply that there is potential for overlap of hairiness; and in any event, the density of pubescence changes with development and hairs tend to be lost with age. There are therefore risks of mis-determination of plants other than those which have petals clearly divided less than half-way, and scapes which are glabrous or virtually so.



What we are able to say about the Kent status of *Erophila glabrescens* so far, however, is that historically this small, early-flowering annual was present on the sandy / shingly east coast, and there have been recent finds which demonstrate some continuity; its inland records on roadsides and the like do not show any particular pattern, but there has been a degree of persistence at its Teston site; and that the preponderance of records is in East Kent, with some West Kent records being close to the vice county border.

Erophila glabrescens from Littlestone; *Erophila verna* from Teston. Photos by Lorna Holland, 2011

Site	Grid reference	Site status	Last record date	Recorder	Comments
Wateringbury - Teston	TQ6953		(1) 6 March 2011 (2) 15 May 2010	L&DH	(1) TQ 69707 5391, prolific on kerbside by A26. (2) TQ 69714 53394, A26, verge in front of 64, Tonbridge Road. Later flowering than most <i>Erophila</i> .
Upper Halling	TQ6964		21 March 2020	GK & SK	TQ 6908 6444, patch on bare ground by farmyard, Petals split to 1.5mm out of total length of 3.5mm. Few hairs only towards base of scape; petiole and lamina not well separated.
Teston	TQ7053 TQ75B		(1) 6 March 2011 (2) After 1990, before 2006	(1) L&DH (2) EGP (Philp, 2010)	(1) TQ 70175 53466, TQ 70175 53466, reappeared on turf-soil after being weed-killed last year. (2) Recorded as TQ75B.
Cliffe	TQ7477		30 March 2012	SA	TQ 74193 77668. Petals split to half length and petioles appreciably longer than leaf blades, especially in lower leaves. However, within the same patch were some plants not well fitting either <i>E. verna</i> or <i>E. glabrescens</i> .
Eccles	TQ76A		After 1990, before 2006	EGP (Philp, 2010)	
Wouldham	TQ76C		May 1987	EGP	Ministry of Defence land.
Hockley, near Throwley	TQ9855		11 March 2011	LR	TQ 98074 55511, Hockley, near Throwley. On Stalisfield Road, just before it reaches Church Road and Kettle Hill Road. By large stones on imported gravel/shingle by the road side.
Dungeness –Old	TR0817		15 May 2010	TI	

Coastguard Cottis					
Dungeness – Long Pits	TR0818		2011	TI	
	TR0826		9 March 2011	L&DH	TR 08895 26770 and TR 08774 26368. The plants were minute but abundant all over the dunes, too early for any seeds.
Dungeness	TR0917		2011	TI	
Greatstone	TR02W		After 1990, before 2006	EGP (Philp, 2010)	
Canterbury	TR1457		14 January 2014	EB	Several plants at Rosemary Lane car park.

Eryngium campestre L. (Field Eryngo or Watling Street Thistle)

Draft account

Vc 15 and 16

Rarity / scarcity status

Field Eryngo is a nationally rare plant, mostly present in south west England, which has formerly been assessed for Great Britain as being **Critically Endangered**, i.e. incurring severe risk of becoming extinct in the wild, but has since reverted to the English assessment of being **Near Threatened**, based on a low number of sites (but not low enough to qualify for a higher risk level) and continuing decline since 1930. This latter assessment did not identify a sufficient decline in area of occupancy or extent of occurrence to fulfil criteria which gave rise to the earlier Great British assessment, although to all intents the same populations were being considered. It is treated as a UK Biodiversity Action Plan priority species, for which the planned action includes identifying sites at which sustainable management regimes can be implemented and securing the open ground, low-competition, low nutrient conditions favoured by this taxon. There are only three locations for this species in Kent, and so it is **rare**.

Account

The origins of *Eryngium campestre* in Kent are somewhat mysterious, given that one would expect such a distinctive plant to have been noticed early, at least if it were flourishing. However, the first publication of this species for Kent is as late as H.C. Watson's *Topographical Botany* (1873), which simply refers to F.J. Hanbury. This must relate to Hanbury's find described in Hanbury and Marshall (1899) as previously being "On the Warren between Romney and Dymchurch, near the targets, some way from the sea; growing in sand, associated with *Ammophila arundinacea*". Although still present in 1880, it could not be found in 1892, following alterations to the ground. Hanbury and Marshall, discounting an unconfirmed record at Cobham, were obliged to consider the species not just very rare in Kent, but apparently lost. They pointed out – as have other botanists since – that it is plentiful about Calais, and there was no reason to doubt it having been native at Romney.

Darenth. Photo by Mervyn Brown, 24 August 2011

Taking Britain as a whole, populations at Devon have been hailed as native, and most other populations considered likely to have been introduced; but currently the species is regarded as an archaeophyte, or ancient introduction, in Britain, both as regards Devon and all other colonies. This status is probably not a fully resolved issue and is considered further at the end of this account.



Since its disappearance from Romney, *Eryngium campestre* has been seen at four sites in Kent, only three of which are known still to survive. All are, or were, related to the chalk of the North Downs, including its dip slope towards the Thames. The lost site was, according to Francis Rose, towards the top of the North Downs, one mile north of Wrotham (TQ605597, per R.A. Graham). It was seen up to 1947 at least from 1922 ("a good patch on the open chalk down", "in July 1930...a nearly circular patch of about five yards in diameter", G.C.

Druce). J.E. Lousley commented in 1934 that it was looking native. Although long unrecorded, it was searched for here in 2012, but without success.

The other sites are also on chalk grassland. It was found at Darenth by H.M. Pratt in the grounds of Darenth Park Hospital, an institution for learning disabilities, where he then lived. One source gives 1950 for this discovery, but from Mr Pratt's papers at Dartford Library, it was on 8 July 1968 and was found on chalk ground disturbed after the Lower Southern Hospital was demolished, adjacent to the entrance road where a gas main lay, and originally extending over an area of no more than two square metres. The seed-bank for this area has provided evidence of an arable past. It seems likely that the immediate disturbance was the bulldozing of the area, with rubble being heaped not far from the plant's site, together with the removal of a boundary fence, whose concrete anchoring currently adjoins the *Eryngium*.

The number of plants (or more probably, ramets from the same clone) has varied over the years, and their centre has migrated about a metre southwards. The rhizomes are very deep and occur within the undisturbed chalk rendzina, which is overlain by about 20cm of tertiary deposits – medium particle sized sand with a little clay. The patch was circular, at least from the 1970s, but limited to the north by a tarmac road, so that in the course of management of its surroundings by Mervyn Brown on behalf of the health authorities from 1979 to 1988, when the hospital closed, the patch expanded away from the road to cover 15 to 20 square metres, producing at maximum five flowering plants per annum. This management continued until the site was taken



over by Dartford Borough Council and developed, as a National Millenium project so as to become a country park. In the course of this development, the tarmac road was removed, with serious consequences for the *Eryngium*. It appears that the road had deterred rabbits approaching from the north and provided a water reservoir underneath for dry years, accessible to the deep roots of the *Eryngium*, as well as warming the soil (because of the black surface), which is beneficial to the species' successful growth. The removal led to an explosion in vegetation and a vast increase in rabbit numbers around the plants. The rabbits dug for the roots, ate young leaves and severed mature leaves, eating only a small part of the petiole.

Darenth. Leaf severed by rabbit grazing. Photo by Mervyn Brown, 1990s

Darenth, habitat. Photo by Geoffrey Kitchener, May 2012

From 1997, numbers of plants declined until in 2009, when Mervyn Brown revisited, scrub levels were found to be too high and the *Eryngium* could not be seen. He arranged a joint inspection by Natural England, when a single juvenile leaf of about 12 square cm was located, at some distance from the previous centre of clonal strength. He drew up a recovery plan, adopted by Dartford Borough Council and approved by Natural England. Scrub clearance was undertaken and open wire fencing installed which is intended to deter rabbits by virtue of rendering them easier prey for foxes. After four kills by foxes, rabbits rarely entered the area and seem to have learnt to avoid it. By 2012, the *Eryngium* had been restored to a state in which ramets were visible over an area of 8 to 12 square metres within a developing favourable grass composition of *Festuca rubra* (Red Fescue) and *Agrostis stolonifera* (Creeping Bent). This restored state



(about 250 ramets by 2015) largely represents growth from the remains of rhizomes whose growth had been suppressed by scrub and rabbits: only four new ramets had been detected and several weaker ramets had failed.

The Princes Park colony was discovered by Martin Hall, at the beginning of the 1990s, on grassy banks (predominately *Bromopsis erectus*, Upright Brome) on chalk, maintained as public open space by Medway Unitary Authority. Its appearance followed the construction of a footpath cut into the slope using earth moving machinery. Three plants occurred in two separate locations some 10 metres apart, flowering in some years but not in others. The plant most remote from the path has since disappeared at least from above ground and was last seen in the late 1990s. The remainder also disappeared shortly after 2000, in the absence of specific management measures. A single flowering plant was discovered in 2009 by Mervyn Brown with Simon Bellinger, who was the ranger for the site at that time. The site had been affected by a grass fire the previous year, recreating a ruderal site. Careful searching of the nearby grassland unaffected by the fire revealed continued presence of the species, dormant under the vegetation. Management was initiated and the clone



Bredhurst, habitat. Photo by Liam Rooney, 2013

The occurrence of *Eryngium campestre* at Bredhurst has been written up in 1984 by Joyce Pitt.²¹, who observed the colony in most years since the early 1970s, following its discovery by Nora Miller in 1969. She described it as located on the south-facing slope of a dry chalk grassland valley, where the steep slope begins to flatten out at the crest of the down. The chalk is nodular and so admits root penetration. Plant numbers then generally fluctuated between 10 and 30, although 50 were counted in 1983. Flowering was only occasional, not

least because it was usually cut down during haymaking. The general area was one of chalk grassland flora, including *Poterium sanguisorba* (Salad Burnet), *Plantago media* (Hoary Plantain) and *Primula veris* (Cowslip), but stated to have been affected by 'improvement' in the 1960s. This raises the possibility of introduction if the location had been re-seeded with a contaminated grass-seed mixture of continental origin, as may have happened²² as an origin of Cornish populations. Joyce Pitt noted that the area where the plant grows was then

improved, although erratically in some parts. It is mown where the clone impinges on the path and the pressures of public access generated by the large adjacent housing estate cause some problems, although the species (at least from its French habitats) appears tolerant of a degree of disturbance.

Princes Park, habitat. Photo by Mervyn Brown, 24 August 2011



²¹ J. Pitt. Habitat notes on Watling Street Thistle (*Eryngium campestre*) near Bredhurst, Kent. *Bulletin of the Kent Field Club* (1984) 29: 30-31.

²² According to D. Junghanns and M.J. Wiggington in their account, *Eryngium campestre* L. (Apiaceae), in (ed. M.J. Wiggington) *British Red Data Books 1 Vascular Plants* (1999), JNCC. This view was based on the plant having been found after pasture was re-seeded, rather than on any separate evidence that *Eryngium campestre* is known as a grass seed contaminant. The late maturation of *Eryngium campestre* seed in comparison with that of grasses militates against it being a normal contaminant.

somewhat different, being disturbed and broken, partly due to rabbits, but also perhaps due to agricultural use, whether by animals or machinery. At some stage in the 1980s it appears that the field was ploughed about 8 inches deep and drilled for a crop of barley, with the intention of again laying to grass afterwards; and the plant survived this disturbance. It also seems possible to interpret the field slope as showing more signs of an arable past in the upper parts, where the *Eryngium* grows, than the lower parts, which carry a chalk flora more consistent with grazing.

The current Kent colonies each comprise a coherent patch (Darenth is semi-circular, Princes Park is selectively radial and Bredhurst is circular) consisting of what appear to be separate, but associated plants which do not recruit from seedlings. Indeed, they seldom flower. Mervyn Brown, who had long studied the Kent populations, gave data for their size and flowering as follows:

- Darenth: 90 to 100 plants with 4 flowered in 2011; 80 to 100 plants with none flowered in 2012
- Princes Park: 120 to 150 plants with 1 flowered in 2011; 140 to 150 plants with none flowered in 2012
- Bredhurst: c.500 plants with 55 flowered in 2011; over 700 plants with 20 flowered in 2012.

It is reasonable to conclude that each of these colonies represents a single clone, where the associated individuals are ramets, deriving from vegetative spread and perhaps continuing plant growth which might otherwise cease with senescence of upper roots. The average clonal spread, in the absence of checks, appears to be 8 to 10 cm per annum, from Mervyn Brown's observations. He considered that the plant expands radially, but seemingly may cease to expand in a direction where a problem is encountered or otherwise may expand away from unsuitable areas. It could be, however, that the apparent cessation of expansion is represented by unseen underground growth, which may appear later at some distance from the nearest ramet. The management implications are for surrounding terrain to be maintained in a suitable condition for clonal expansion. Discouragement of coarse grasses assists in this and also reduces habitat which capable of harbouring slugs and snails which might otherwise graze on early young shoots, so retarding growth.



Bredhurst. Juvenile leaf of ramet, beginning to show first insection. Flowering does not take place before five insections have developed on each side of the leaf, reaching the central vein. Photo by Mervyn Brown, 21 April 2011

Mervyn Brown found that the species in cultivation grows rampantly in free-draining soil and is capable of reproducing from seed from his Kent garden, albeit virtually only in pots subject to very specific germination requirements, of which constant moisture is one and warmth (preferably 15°-20°C) is another. Garden seed fails to germinate if placed in habitats comparable with its Kent wild localities. Also, no seedlings have been observed with the Kent wild plants, even where seed is known to have fallen. Failure to reproduce by seed in the wild does not seem to be an issue of viability. It seems as though the Kent localities and their local climate are sub-optimal for the species, and conservation measures are unlikely to achieve anything more than vegetative spread of existing plants.

The different wild plants demonstrate differing relative vigour. This relative vigour has been assessed by Mervyn Brown (for 2011) so that the Darenth and Princes Park colonies may be regarded as exhibiting 4% and 10% respectively of the vigour shown by the Bredhurst colony. Vigour is taken as a function of healthy rootstock. It may be demonstrated by factors such as the extent of flowering, the number of heads per flowering stalk and the diameter at the base of the stem, but is measured by the total leaf area index (relating total leaf area to the ground area occupied) of a colony at the beginning of July. The relative vigour for 2015 was taken to be for Darenth and Princes Park 15% and 5% in relation to the 100% of Bredhurst, so the Darenth

colony appears still to be improving, both relative to Bredhurst and in absolute terms. Its spread as at 2015 was in excess of 20 metre squared and the leaf area index was about 0.1 (ranging from 0.4 to less than 0.01); the total leaf area was 2 metre squared with 9 flowering plants and an estimated ramet count of 250. For a healthy colony, land management is considered to be the overriding factor with climate as secondary; predation and competition appear to be the two main negative factors.

It is possible that there is a genetic difference between East and West Kent plants. The shapes of leaf and capitule of the Darenth colony differ from those of the Bredhurst and Princes Park colonies, Darenth resembling some plants from Spain and southern France, Bredhurst and Princes Park resembling continental mainland plants nearer the English Channel. In considering differences in vigour, however, there is also the recent history of the colonies' relationship with their individual environments to be taken into account, in so far as this is understood.

It appears that the species responds to a degree of disturbance²³, which may be associated with an appropriate (but not excessive) grazing or simulated grazing regime, without which a colony will decline, the plants becoming dormant. Failing vigour, tending to dormancy, is shown by the petiole length declining for a colony, year on year, until any grass cover swamps the plant. This dormancy has been observed at all three sites in Kent at different times. It seems to entail the decay of the upper root system through attack by pathogenic fungi. If this decay is sufficiently extensive, it may be that dormancy could only be broken by disruption to the root system, e.g. removal of topsoil or the slicing of deeper roots. The sites at Darenth and Princes Park are recovering from dormancy and near-extinction around 2009, and as yet remain fragile. However, appropriate management is strengthening both clones, although it is estimated that five to ten years are required for recovery of a colony weakening towards extinction, so that the rootstock has developed sufficient resistance to fungal attack. The site at Bredhurst, although sometimes erratic in performance, is increasing in strength with the current management by the site owner.

Although the species is currently regarded as an archaeophyte (brought to Britain by man, intentionally or unintentionally) and naturalized between the start of the Neolithic period (c. 4000 BC) and AD 1500), this is not a status readily capable of proof. The absence of British fossil record is perhaps a pointer, but by no means conclusive, especially as the pollen of *Field Eryngo* is viscid, rather than wind-borne, and so less likely to be deposited widely. If it were to be treated as native in Britain (which was generally the norm until 1985²⁴), then Kent has the best geographic credentials, Francis Rose stating (c. 1980) that it is "very common on sand dunes...west of Calais, and on the chalk inland from Cap Nez Blanc, so probably native in Kent, it is only surprising that it is so rare with us"²⁵.

The strength of the case for regarding Kent as a native area, as part of a distribution which includes the European mainland, appears somewhat weakened by the lack of ancient record and the reluctance of plants to reproduce by seed. (Seed spread would need to be identified by the presence of cotyledons on seedlings, which would otherwise closely resemble small plants emerging from shoots from the deep rhizomes.) However, if each occurrence has been an introduction, there does not seem to be a single explanation which covers all of these. Any suggestion that they have come from travellers from northern France is perhaps

²³ The accounts of each Kent colony given above include various disturbance events, not all of which have been by any means destructive to the plants, which may be rejuvenated by ruderalization. Re-sprouting after cutting back is recognized more widely. E. Masson Phillips reported this in relation to a colony at Plymouth cut back to the roots in 1935, but growing as strongly as before in 1936 (*BEC Report for 1936*, p.257).

²⁴ Status was re-assessed by D.A. Webb (1985), What are the criteria for presuming native status? *Watsonia* 15: 231-236. This account, however, does not adduce any new evidence.

²⁵ Unpublished remarks, quoted by Rosemary FitzGerald (1987) *Eryngium Campestre* L. *Field Eryngo* (The 'Watling Street Thistle'), unpublished NCC report.

unduly influenced by the name Watling Street Thistle (which derives from a Northamptonshire occurrence, rather than the road in Kent); and the known Kent sites, other than at Darenth, are not all particularly near the historic Watling Street route. Whilst the possibility is mentioned above of re-seeding having introduced the Bredhurst clone, it would have been entirely possible for its existence to have preceded this event and for the clone, being deep-rooted, to have survived the associated ploughing as it did in the 1980s. The Darenth clone has been associated with ground disturbed by works, but it cannot necessarily be inferred that it was introduced as part of the disturbance. Similarly, the Princes Park clone came to light following footpath works. So all three current clones have a common background of site disturbance and, given the absence of any known seed-bank and the reluctance of the species to germinate seed in 'wild' Kent conditions, it could be maintained that their discovery was a consequence of the revival of dormant clones through disturbance, rather than any recent introduction.

Mervyn Brown postulated that the Kentish relationship with the species' European distribution is an ancient one, which precedes the discontinuance of the land bridge between Britain and continental Europe c. 6500 BC; and that some or all of the Kent occurrences could represent continuous clonal growth from before then. Clonal growth in other species has of course been recognised as feasible over tens of thousands of years; and survival need be no more surprising than the persistence in the Kent Weald of *Trichomanes speciosum* (Killarney Fern) gametophytes (discovered in 2016) since an era of very different climate conditions. The reluctance of the Kent plants to set seed in the wild would then not necessarily be an impediment to inferring native status, but could be a reflection of the suitability of their locations on original establishment having declined since that establishment. This may perhaps be due to climate changes over this lengthy period, although established plants are still capable of sustaining growth both in the wild and in garden conditions²⁶. However, this hypothesis does rely upon habitat remaining suitable for survival over a very long period, against a background of relatively recent losses and near failures, and it would appear that survival will have been something of a matter of chance. The status of *Eryngium campestre* accordingly remains intriguing.

The following records represent a series of sightings by various botanists since 1970, but only include a sample of observations by Mervyn Brown, others of which have gone towards the summaries of clonal development set out above.

Site	Grid reference	Site status	Last record date	Recorder	Comments
Darenth	TQ5672	Darenth Country Park, managed by Dartford Borough Council	(1) 27 September 2019 (2) 22 July 2017 (3) 23 April 2015 (4) 29 May 2012 (5) 1992 (6) 21 Aug 1985 (7) 1973	(1) & (2) RR (3) MB (4) GK (5) MB (6) RF (7) EGP	(1) TQ568725, non-flowering, from leaves there appeared to be about a dozen ramets. (2) Flowering, TQ 56793 72493. (3) 240 ramets, some emerging from an area where root presence was weak. (4) Patch 5m x 2m (MB assesses as c. 5m x 3m) from TQ 56793 72491 to TQ 56898 72493, chalky ground (possibly disturbed by former uses of the site) maintained open. No sign of potential flowering.

²⁶ Germination may be supposed to have been favoured by a climate with warmer springs than at present. In relation to the current Kent sites, it would also have been assisted by damper springtime conditions, with increased water flow through the (now) dry valleys on the chalk downs. At present, Bredhurst is the only site with any damp indicators, the presence of *Ajuga reptans* (Bugle) being suggestive. The importance of high water potential for satisfactory germination of *E. campestre* is noted, in a Spanish context, by E. Bochet et al. (2007), Soil water availability effects on seed germination account for species segregation in semiarid roadslopes, *Plant Soil* **295**: 179-191. From this paper, it appears that *E. campestre* is also slow to germinate and this slowness increases with decreasing water availability. This would be compatible with a plant strategy which allocates resources to energy storage at the cost of seed production, seedling survival and growth rates; the payback for which is the ability to re-sprout as an established adult, resisting soil surface aridity and persisting continuously after disturbance.

					<p>(5) TQ 568 724. Just one ramet flowered this year and a small collection made for the Millennium Seed Bank.</p> <p>(6) TQ 568 724. At least 30 ramets in rough grass in clearing between thorn bushes at Darenth Hospital. Ground previously disturbed, but chalk grassland flora re-establishing.</p> <p>(7) TQ 568 724. Plenty at Darenth Hospital but not in flower.</p>
Princes Park, Chatham	TQ7665	Public open space managed by Medway UA	<p>(1) 17 August 2011</p> <p>(2) 1993</p>	<p>(1) SP & DG</p> <p>(2) SP, DC & EGP</p>	<p>(1) TQ 76835 65221, Princes Park, on banks, beside footpath, spread over 2 sq metres.</p> <p>(2) Recorded as TQ765.</p>
Bredhurst	TQ8061	CROW access land	<p>(1) 2 July 2015</p> <p>(2) 28 May 2012</p> <p>(3) 8 May 2011</p> <p>(4) 1985</p> <p>(5) 15 November 1975</p>	<p>(1) DS</p> <p>(2) SL</p> <p>(3) KFC meeting</p> <p>(4) RF</p> <p>(5) GPS</p>	<p>(1) TQ 80578 61890, half square metre patch, hundreds of flower heads but only two flowering.</p> <p>(2) Top of the field edge at TQ 80565 61894, appearing to be a large clone, comprising small interconnected patches of plants, spread thinly over an area of about 6m x 6m, where they co-exist with other species without dominating.</p> <p>(3) TQ 805 618, Patch about 3 metres in diameter along top edge of field. (But measured as 6 metres in diameter that year by MB, who considered that the colony had benefited from grass suppression through off-road motor cycling.)</p> <p>(4) TQ 805 618</p> <p>(5) A good patch growing in an old meadow.</p>

Eryngium maritimum L. (Sea-holly)

Draft account

vc 15 and 16

Rarity / scarcity status

Sea-holly grew widely around the coasts of the British Isles and, although it has largely gone from north and east Scotland as well as north east England, its conservation status in Great Britain as a whole has been one of 'Least Concern'. However, in England there is some evidence of decline such that it is considered to be **Near Threatened**. This risk assessment is based on a reduction both in the overall geographical extent of its occurrence and in the area of occupancy within that range. A comparison over the periods 1930-1969 and 1987-1999 showed that its overall range had reduced by 28% and its area of occupancy had declined so that there was a 30% reduction in the likelihood of recording the species. In Kent, it is neither rare nor particularly scarce, but appears to be countering the wider trend by increasing its range by 67% between 1971-80 and 1991-2005.

Sandwich Bay, in light grassland. Photo by David Steere, 11 July 2013



Account

Sea-holly was first recorded in Kent by John Gerard in his *Herball* (1597), who states that '*Eryngium marinum* growth by the sea side upon the baich and stonie ground; I found it growing plentifully at Whitstable in Kent' (where it is still present, although not plentiful). There is a good range of historic records, ranging from Grain (by B.D. Jackson, before 1899); Sheppey (by Thomas Johnson, 1629, at Queenborough, where the Mayor summoned Johnson and his party to account for their presence); along the north coast, e.g. between Graveney Wall Sluice and Seasalter, where seen by the Rev. John Bateman (d.1700) and at Westgate Bay where recorded by Thomas Johnson in 1632; and around Thanet where, on the beach at Margate, the Rev. Robert Hunter listed it in a catalogue of plants in his *Short Description of the Isle of Thanet* (1796). Further round the east coast, its presence was published by G. E. Smith in 1829 as among sand by the roadside between Pegwell and Sandwich,



and also on the shore at Dymchurch; and at least one of the joint authors of Hanbury and Marshall (1899) saw it at New Romney – their assessment of its county status was 'frequent'.

Reculver, on shingle. Photo by David Steere, 1 August 2015

Philp (1982), however, regarded *Eryngium maritimum* as growing in good quantity only in the Sandwich Bay area and on the north

beach at Grain. Elsewhere (west Sheppey, Graveney, Ramsgate, Greatstone) it was only really just hanging on, and the total number of tetrads within which it was recorded during 1971-80 was 12. However, this total had increased to 20 by 1991-2005, and Philp (2010) commented that the species appeared to be doing well and

was more widespread and numerous than ever recorded before. The reasons for this are unclear, but it appears to be a continuing trend. The 1991-2005 distributional data are given in the following map from Philp (2010), with kind permission of the late Eric Philp and the Kent Field Club. Data acquired from 2010 onwards has been recorded at 1km square (monad) level, i.e. at a finer scale than the tetrads given in Philp (2010). The 2010-20 distribution map shows 40 monad records, which are the equivalent of 28 tetrads (an increase of 133% over the 1971-80 position), with fresh sites along the north coast from Herne Bay to eastern Thanet. It is unlikely that the trend is an artificial product of recording sampling. *Eryngium maritimum* has probably always been well recorded, as a conspicuous plant in a generally accessible habitat.

Sandwich Bay. Photo by David Steere, 11 July 2013

In Kent, Sea-holly is found only as a coastal plant. It has been noted on sand dunes, sandy beaches, shingle, grassland/shingle and a few plants have been seen on the concrete apron of the former hoverport at Pegwell Bay. A number of sightings are of the odd plant or two, which may suggest incipient colonisation. There remain large populations at Grain (an area of 350 x 30m sandy beach was noted in 2010 as being almost completely covered) and Sandwich, where it has long been abundant on the fixed dunes between the golf course and beach. In this latter location, it often grows in close association with broomrape, which led to it being mentioned in Philp (1982) as host to *Orobanche amethystea* (Sea-holly Broomrape), regarded as new to Britain here. The status of this broomrape population was discussed by Rumsey & Jury (1991)²⁷, who considered that some plants approached *O. amethystea* in some respects, but that there was a full range of intermediates through to typical *Orobanche minor* (Common Broomrape) to which species the plant was referable, and the population as a whole consisted of plants parasitic on a wide range of species, not just Sea-holly. Subsequently, however, the population was regarded as sufficiently distinct in morphology and ecology, to be named as *O. minor* var. *pseudoamethystea*.²⁸



Eryngium maritimum (Sea-holly) 2010-20

Eryngium maritimum is a perennial with a strong tap-root, enabling penetration and anchoring in its sand or shingle substrate. The seeds are capable of spread by water, and this may be the origin of the occasional odd plant found just above the strandline. Further spread may be achieved by the plant acting as a tumbleweed in autumn/winter.



Eryngium maritimum (Sea-holly) 1991-2005

²⁷ Rumsey, F.J. & Jury, S.L. (1991). An account of *Orobanche* L. in Britain and Ireland. *Watsonia* **18**: 257-295.

²⁸ Thorogood, C.J. & Rumsey, F. (2020). An account of Common Broomrape *Orobanche minor* (Orobanchaceae) in the British Isles. *British & Irish Botany* **2**: 223-239.

Erysimum cheiranthoides L. (Treacle-mustard)

Draft account.

vc 15and 16

Rarity / scarcity status

Erysimum cheiranthoides is an archaeophyte, or ancient introduction, scattered across the British Isles, but mostly in southern and central England. Despite a degree of general decline, its conservation status in Great Britain has been one of 'Least Concern'. However, in England there is some evidence of decline, and it is considered to be **Near Threatened**. A comparison of its area of occupancy in England over the periods 1930-1969 and 1987-1999 produced a calculated decline of 22% in the likelihood of recording the species. In Kent, the decline has been much more dramatic, with tetrad records falling by 73% between the surveys of 1971-1980 and 1991-2005. Whilst the species is not necessarily scarce in Kent — this remains to be tested with current data — if the county decline were replicated in national terms, this decline would have resulted in a much higher risk rating.

Account

The first Kent record for Treacle-mustard is given by Hanbury and Marshall (1899) as at Gravesend, and is said to have been mentioned by Robert Pocock in p.217 of his *Natural History of Kent* (1809). No such publication was ever issued, however, and the reference in N.D. Simpson's *Bibliographical Index of the British Flora* (1960) to a manuscript of that date is noted as something which had not been checked. It would appear, however, that there has been some confusion and the page reference actually belongs to a publication by George Arnold²⁹. At p.217 of Arnold's work, there is an account of a botanical manuscript by Pocock dated 1821¹ which includes a list of rare plants found in the vicinity of Gravesend, concluding on p.219 with mention of *Erysimum cheiranthoides* 'In Mr. Pete's³⁰ garden, November 5th, 1824' (sic). The date is presumably accounted for by an addition to the 1821 manuscript (the original of which is held by Gravesend Library); and the garden is probably that of Dr. William Peete, a botanist of Dartford, which raises the possibility that, even if the plant was growing 'wild' there, it may have been introduced by Dr. Peete for botanical interest.

Oxney. Photo by Sue Buckingham, 29 August 2014

In view of the ambiguity of the first record's status, it may be worth mentioning the next record — members from the Botanical Society of London in 1839, 'about the middle of the Sandy Hill leading from Woolwich to Plumstead Common... found in the hedge-banks on the left a small plot of *Erysimum Cheiranthoides*, a plant whose foliage and flowers rival each other in elegance'³¹. These references aside, Hanbury and Marshall cited no printed



sources, but gave a scattering of records from contributors to their *Flora of Kent* across the county, and referred to the species as a rather rare colonist, growing on cultivated and waste ground, chiefly on a sandy

²⁹ George M. Arnold (1883). *Robert Pocock, the Gravesend historian, naturalist, antiquarian, botanist, and printer*. Thanks are due to Malcolm Jennings and Pauline Heathcote for helping to unravel the position.

³⁰ 'Pett's' in the original manuscript.

³¹ *Proceedings of the Botanical Society of London* (1839): 84.

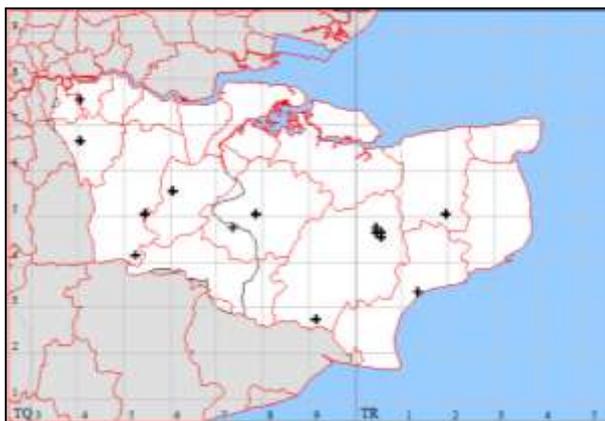
soil. The lack of early printed record for the county is unusual in the context of archaeophyte arable weeds, where the normal position would be early recognition of abundance, followed by a twentieth century decline with changing agricultural methods.

Wye. Photo by Geoffrey Kitchener, 13 January 2016

Despite Treacle-mustard being 'rather rare' in 1899, Philp (1982) gave it in 100 tetrads across the county for the 1971-80 survey, quite local, but often common where found. Records were fuller in the north west and south east of the county, but otherwise were widely scattered. By the 1991-2005 survey published in Philp (2010), the total had reduced to 27 tetrads, without any discernible pattern, although lacking from the north east. It was then said to be a plant of cultivated and waste ground, particularly arable fields, and appeared to have declined in recent years, probably through changes in farming practices. Rich (1991)³² mentions its susceptibility to herbicides, and these may have a role in the decline, especially if more effective herbicides or more substantial dosages were being used in the 1980/90s than in the 1960s/70s (cf. herbicide data given in the register account for *Spergula arvensis*).



The 1991-2005 distributional data are given in the following map from Philp (2010), with kind permission of the late Eric Philp and the Kent Field Club. Data acquired from 2010 onwards has been recorded at 1km square (monad) level, i.e. at a finer scale than the tetrads given in Philp (2010). The distribution map for 2010-20 records shows that very little is being seen of *Erysimum cheiranthoides* in the county at all, which suggests that the decline is continuing. Recent sites have included arable, a rubbish tip on a golf course, a road verge, soil from ditch clearance adjoining arable, a broad bean field, allotments or similar land and the weedy margin of a *Chenopodium quinoa* crop.



Erysimum cheiranthoides (Treacle-mustard) 2010-20

Erysimum cheiranthoides (Treacle-mustard) 1991-2005

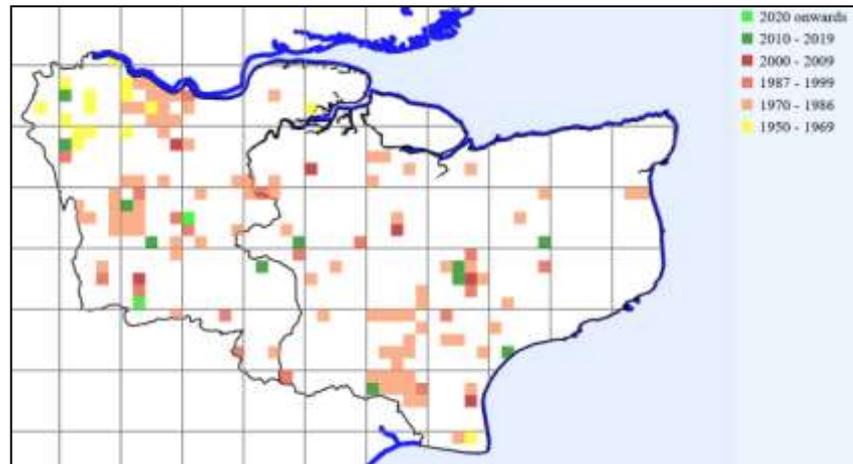


A further distribution map is provided below from BSBI database tetrad records to demonstrate how rapidly the recorded occurrences dropped after the 1970-82 survey (to which nearly all the pale pink squares belong) as the national trends for herbicide applications increased.

³² T.C.G. Rich (1991). *Crucifers of Great Britain and Ireland*.

Erysimum cheiranthoides tetrad records (to 2021) from BSBI database

Treacle-mustard is, at least as regards the subspecies considered to be usually present in Britain, an annual and is capable of forming a seed bank which may result in local persistence. Normal flowering is from May to November, but the mild winter of 2015-16 demonstrated an ability to flower and fruit on young plants into January (see photographs at Wye).



The narrow, entire leaves, the small yellow flowers and the presence of hairs on the plant which are rough to touch should together distinguish Treacle-mustard from other crucifers.

Wye. Photo by Geoffrey Kitchener, 13 January 2016.



Barham. Photo by Colin Osborne, 13 July 2015.

Euphorbia cyparissias L. (Cypress Spurge)

Draft account

vc 15 (introduced and possibly native) and vc 16 (introduced)

Rarity / scarcity status

Cypress Spurge is included in the rare plant register by virtue of its potentially native status in East Kent, although this status is not a generally accepted position. It is currently treated as a neophyte, or introduced plant in the British Isles, where it is widespread and generally an obvious garden escape, but it is acknowledged as 'Possibly native in chalk grassland in East Kent and perhaps elsewhere in SE Eng[land]'³³ and 'sometimes regarded as a native of chalk grassland in S.E. England'³⁴. Because it is labelled as a neophyte, it enjoys no conservation standing. In Kent, it is **scarce**, but its potential native occurrences are to a degree obscured by introductions. Its site at Whinlees Down, Dover has the best claim to native status and is probably the finest population in the British Isles³⁵.

Account

As a potentially native plant, its first Kent records were made by Eyre de Crespigny, who collected material where plentiful on a chalky hill-slope near Dover in 1876 (specimen noted by Hanbury and Marshall, 1899, and now in Cambridge University Herbarium). He elaborated on this in the *Botanical Exchange Club Report for 1879*, from which it appears that the plant was on the slope of the hill under Diggle's Tower, Dover, 'plenty and to all appearances wild'. Diggle's Tower was also known as Diggle's Folly, situated at TR3006 4160, and



the general area is Whinlees Down, where it is still present (2011). Hanbury and Marshall (1899) also record correspondence from Sydney Webb of Dover, who thought that there must be localities other than Diggle's Hill, as he saw the same plant in children's garlands on May-Day, presumably in circumstances which suggested that it was gathered elsewhere.

Whinlees Downs. Photo by Paul Sampson, 22 April 2009

Other early records (Sydenham, 1859 and near Peshurst, before 1899) were not credited as native. However, the Dover occurrence was treated by Hanbury and Marshall (1899) as perhaps indigenous, on the basis that the Continental distribution of the species rather favoured this. Cypress Spurge is frequent in continental Europe up to, but not within 20 miles of, the Channel coast and its growth in dry, chalky situations in Normandy and elsewhere mirrors the Dover occurrence.

Francis Rose's unpublished Flora of Kent listed five East Kent sites of a status to support an assessment of being almost certainly native in East Kent. These were at Whinlees Down, Langdon Barracks (east Dover), Gravel Castle (Barham), Juliberry Downs (Chilham) and Down Wood (Chilham). There was also an unconfirmed record from near Acrise in the 1950s. Philp (2010) added that its presence on the chalk at Darland Banks also

³³ C.A. Stace (2010). *New Flora of the British Isles*, third edition.

³⁴ (eds.) C.D. Preston, D.A. Pearman & T.D. Dines (2002). *New Atlas of the British & Irish Flora*.

³⁵ Assessment by Rosemary FitzGerald in manuscript notes of May 1987 which include much information that has been drawn on for this account.

looked convincing, although this is some distance from the other Dover- and Chilham-based records. *Euphorbia cyparissias* is rhizomatous and persistent, so one would expect continuity from these locations, but the Gravel Castle site was destroyed by A2-related works around 1949 and there do not seem to be recent records from Chilham (first recorded in 1932 and seen by Francis Rose, 1945-59). Philp (2010) lists Darland Banks and two tetrads for Dover, with garden escapes at two other East Kent locations.

The generous growth of *Euphorbia cyparissias* renders it all too 'easy' a garden plant. Garden catalogue descriptions such as 'ground-cover' or 'vigorously spreading' suggest that one should read between the lines – 'can run amok if left unattended' is probably fairer warning, and indicates how the scatter of roadside throw-out records may have arisen. The rhizomes tend to break up with their adventitious buds, each a source of fresh growth, when disturbed. There will have been plenty of opportunities for escape, as the species has been in cultivation in the British Isles at least since 1640, when John Parkinson (in his *Theatrum Botanicum*) stated that it occurred 'no where naturall in England that I can heare, but in the gardens of those that are lovers of plants...often-times found in the Country gardens of poore folkes in many places with us'.

Littlestone, an escape.

Photo by Liam Rooney, 17 April 2012



Parkinson's assessment was accordingly against the species being of native status in England; and a species being first recorded in gardens before it is recorded in the wild is one of the criteria used in the *New Atlas of the British & Irish Flora* for identifying plants as non-native, as described by David Pearman (2007)³⁶. Indeed, this point (against a background of disagreement between previous authorities) is perhaps the most persuasive one here, together with the evidence of Cypress Spurge's scattered and increasing British distribution, which is suggestive of a series of introductions. There can be little doubt that in general it is an introduced species in the British Isles, although this should not necessarily mean that every population is



introduced, as Pearman then infers. It is questionable that potentially native status within a small area should be ruled out by an assertion that local Flora writers do not stand back and look at the national or European position, and that amongst optimists, Marshall and Francis Rose head the list of consistent pleaders for native status for favoured species.

Whinlees Downs. Photo by Lady Rosemary FitzGerald, 5 May 1987

However, as much as one can say is that the Dover *Euphorbia cyparissias* is reasonably related to its continental European distribution in terms of geography and habitat; it is at least a fairly long-established population; and it looks as native as the rest of the good native flora which accompanies it.

³⁶ D.A. Pearman (2007). 'Far from any house' – assessing the status of doubtfully native species in the flora of the British Isles. *Watsonia* 26: 271-290.

At Whinlees Down, it occurs in large quantity on the south-facing slope at the Dover end of the Down. The Down is used for recreational walking and is *Bromopsis erecta* grassland, with a fine chalk flora. Associated species listed by Joyce Pitt in 1987 comprised *Avenula pratensis* (Meadow Oat-grass), *Bromopsis erecta* (Upright Brome), *Carex flacca* (Glaucus Sedge), *Cirsium acaule* (Dwarf Thistle), *Centaurea scabiosa* (Greater Knapweed), *Genista tinctoria* (Dyer's Greenweed), *Helianthemum nummularium* (Common Rock-rose), *Helminthotheca echioides* (Bristly Oxtongue), *Hippocrepis comosa* (Horseshoe Vetch), *Leontodon hispidus* (Rough Hawkbit), *Lotus corniculatus* (Common Bird's-foot-trefoil), *Origanum vulgare* (Wild Marjoram), *Pilosella officinarum* (Mouse-ear Hawkweed), *Pimpinella saxifraga* (Burnet Saxifrage), *Polygala vulgaris* (Common Milkwort), *Poterium sanguisorba* (Salad Burnet), *Primula veris* (Cowslip) and *Ranunculus bulbosus* (Bulbous Buttercup).

Whinlees Downs.

Photo by Sue Buckingham, June 2014



Cypress Spurge is a perennial, spreading by its rhizomes and by seed, except for a sterile diploid form propagated as a garden ornamental, which is believed to have arisen as a mutant between 1768 and 1818³⁷. At Whinlees Down, a rare rust (*Uromyces scutellatus*, a potential biocontrol agent for some weedy spurges) has been found growing on some of the sterile shoots, which then deform, developing broad, instead of linear, leaves with dark spore masses on the undersides.

Site	Grid reference	Site status	Last record date	Recorder	Comments
Sidcup (metropolitan vc16)	TQ4572		3 July 2015	RMB	Coming up through tarmac of pavement outside 66 Brooklands Avenue, spread from garden.
Tripcock Ness (metropolitan vc16)	Probably TQ4580		20 May 1984	RMB	SW of the Ness, a large patch with another of <i>E. x pseudovirgata</i> . Site since fenced off and unviewable.
Hall Place, Bexley (metropolitan vc16)	TQ5074		1999	JRP	Weed on walls.
Hextable	TQ5270		13 September 2007	JRP	
Sole Street - Camer	TQ6567		(1) 29 July 2011 (2) 23 July 1993	(1) RR (2) JP	(1) At TQ 658 671 beside the Wealdway footpath bordering an arable field a large patch in bloom. The patch extended for c.20 metres in length and c.1 metre in depth. (2) TQ 658 671, by Wealdway.
Chalk	TQ6772		2 May 2017	GK	Pavement weed, garden escape.
South of Ditton	TQ7156		31 July 2019	BW	Garden escape
Medway Bridges area	TQ7267		30 April 2010	GK	TQ 72699 67930, patch c. 3x2m on chalk roadside, Roman Road, spreading into rough vegetation and presumed to be an escape (still present 22 May 2012).
Wainscott	TQ7371		13 July 2011	BS	
East Aylesford	TQ7458		29 April 2019	DM	15 plants opposite Cobtree entrance TQ 74274 58667, road verge adjoining industrial estate.
North Boughton Monchelsea	TQ7651		20 April 2016	BW	

³⁷ A.E. Stahevitch, C.W. Crompton & W.A. Wojtas (1988). The biology of Canadian weeds 85. *Euphorbia cyparissias* L. Canadian Journal of Plant Science 68: 175-191.

North Maidstone	TQ7657		6 April 2017	BW	
Darland Banks	TQ7865		After 1990, before 2006	EGP (Philp, 2010)	Given as TQ76X and may well be the same as EGP's 1989 record at TQ 785 650.
Darland Banks	TQ7965		(1) 28 May 2015 (2) 4 May 2014 (3) 7 June 2010	(1) DC (2) DS (3) SP & DG	(1) TQ7965 (2) TQ 791 656, patches covering 10m x 0.5m either side of path on sw facing slope, Darland Bank. (3) TQ 79348 65458, Darland Banks, patch about 5 x 5 metres.
Charing Heath	TQ9248		24 June 2018	SL	Proposed extension to Hurst Wood, Charing Heath (AS68), KWT survey, plantation/scrub on north bank of HS1, TQ 92980 48496. 10 metre patch in flower in middle of fairly dense scrub under gap in canopy above, unlikely to survive in long term as scrub develops.
Lade	TR02V		14 September 2006	EGP	Roadside verge, garden escape.
Selling	TR0546		4 September 2010	LR	A couple of plants, although of uncertain status on earth piles following excavations.
Dungeness	TR0816		25 May 2013	OL	Four plants by a large <i>Crambe maritima</i> about 200 metres away from a garden spreading patch (TR 08877 16844) next to the Old Lighthouse garden, TR 08859 16714.
Dungeness – Long Pits	TR0818		31 May 2013	OL	One small clump on north side of Battery Road, Dungeness/Lydd-on-sea. TR 08936 18592.
Lade	TR0820		28 May 2013	OL	One clump at base of railway sign on the Romney, Hythe and Dymchurch railway at the Williamson Road crossing, Lade, TR 08495 20501.
Littlestone	TR0824		(1) 17 April 2012 (2) 20 April 2010	(1) LR (2) GK	(2) TR08433.24831, verge of St Andrew's Road, presumed originally planted but spreading strongly.
Western Dover (Elms Vale or Whinlees Down)	TR2941	CROW access land	(1) 23 October 2011 (2) 25 July 2010 (3) 5 May 1987	(1) SB (2) SC (3) NS & RF	(1) Plants spread over 10 metres of chalk grassland, TR29800 41671. (2) Strong colonies. (3) TR292413, steep chalk scarp, south-facing <i>Bromopsis erecta</i> grassland. This location approximately where first recorded in East Kent, in 1876, and the next three sites below are probably all related.
Western Dover (Farthingloe)	TR24V	CROW access land	After 1990, before 2006	EGP (Philp, 2010)	
Western Dover	TR34A	CROW access land	25 June 1999	EGP & PHe	
Western Dover (Tower Hamlets)	TR3041	CROW access land	23 October 2011	SB	Many plants spread over 5 x 2 metres of chalk grassland TR30052 41598.
Dover, Langdon Barracks	TR3344			FR & RF	[TR334411]. This grid reference is not quite accurate, for it lies within the waters of Dover Harbour, but it was intended for the chalk grassland above the cliffs, below the former barracks, where also recorded by FR in 1948.
Martin Mill	TR34I		23 August 2006	EGP	Roadside verge, garden escape.

Euphorbia exigua L. (Dwarf Spurge)

Draft account. Associated species?

vc 15 and 16

Rarity / scarcity status

Euphorbia exigua is a fairly common arable weed across south and east England, largely absent in Scotland and infrequent in Ireland. It has, as with many arable weeds, long been in decline with agricultural intensification. This trend continues, such that it is regarded **Vulnerable** to a risk of extinction, both in England and in Great Britain as a whole. In Kent, there is also evidence of serious decline in recent years, although it is still sufficiently frequent that no rarity / scarcity designation is called for.

Kitchen Field, Ranscombe Farm, habitat.

Photo by Liam Rooney, 24 July 2012

Account

The first record of Dwarf Spurge in Kent was by Thomas Johnson on 13 July 1629, as he travelled by the main road from Gravesend to Rochester (*Iter Plantarum*, 1629). Where noted at all by the early local Flora writers, it is regarded as very common in cornfields, and Hanbury and Marshall (1899) had little to say about this species other than that was frequent in cornfields, etc. in all districts.

By the time of Philp (1982), it was regarded as somewhat local, primarily a plant of the northern half of the county; and it was seen particularly in cornfields on the chalk, where it was usually common when found. This survey (1971-80) produced 200 tetrad records across the administrative county. The survey of 1991-2005 (Philp, 2010) shows a dramatic change, with only 74 tetrad records. The species seems to be in retreat to core areas of chalk arable in East Kent and around the Medway Gap. Agricultural practices, especially the heavy application of herbicides, appear to have been discouraging Dwarf Spurge, with other arable weeds.

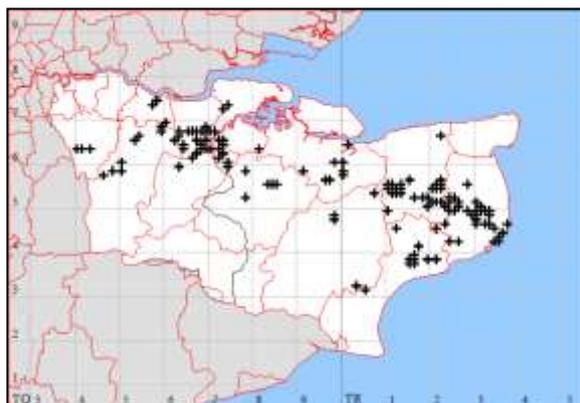


Ranscombe Farm. Photo by
Liam Rooney, 24 June 2010

As this species is not uncommon in Kent, the distributional data maintained in this register will be at 1km square (monad) level. This will entail recording at a finer scale than the tetrads given in Philp (2010), from which the following 1991-2005 distribution map is taken (with kind

permission of the late Eric Philp and the Kent Field Club).

From the 2010-20 map it will be seen that records made for that period confirm the overall distribution pattern and the core areas. With presence identified in 100 tetrads (covering 140 different monads), we have well exceeded Eric Philp's 74 tetrads (1991-2005) and it may be that the position is stabilising following the decline between the surveys in Philp (1982) and Philp (2010).

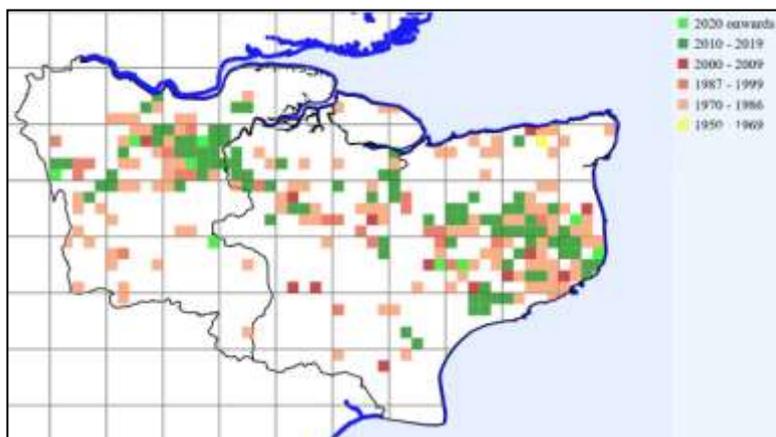


Euphorbia exigua (Dwarf Spurge) 2010-20



Euphorbia exigua (Dwarf Spurge) 1991-2005

However, a measure of those very heavy losses around the 1980s is given by the following distribution map with tetrad records in the BSBI database. The pale pink squares for 1970-86 are nearly all from the 1971-80 survey and *Euphorbia exigua* has not been found there since; in effect, occurrences fell by 63% in a very short space of time (if one assumes that Philp (2010) fairly recorded frequency, and there has been recovery since), 50% if one assumes that Philp (2010) somewhat under-recorded its status.



Euphorbia exigua tetrad records (to 2021) from BSBI database

Euphorbia exigua is an annual, rarely perennial, and distinctive by virtue of its generally small size, linear leaves and greyish-green colour.

Ranscombe Farm. Photo by Liam Rooney, 9 June 2010



The overwhelming majority of our sightings have been on arable margins, principally on chalk, but Gault Clay has also been noted. We have also recorded it in orchards and vineyards, especially when newly established. The near-exclusive preference for arable raises the question as regards how cultivation affects germination. It is regarded as a spring germinator, with seed viability of one to five years in the seed-bank. French studies indicate that seed buried at 20cm in September so as in effect to provide a seed-bank had their germinative ability increased by this over time, and if the seed was extracted at different times of year and re-buried at 1.5cm to simulate cultivation, *Euphorbia exigua* seedlings were found to emerge from April to early June, with a maximum of 13% viable seed producing seedlings. May cultivation was the least beneficial and germination is closely correlated with low temperatures and duration of burial.³⁸

³⁸ Lonchamp, J.P. et al. (1988). Effets de l'enfouissement des semences d'*Aethusia cynapium*, *Chenopodium album*, *Euphorbia exigua* et *Sinapis arvensis* sur leur capacité germinative et leur levée au champ. *Agronomie* 8: 591-601.

We have little data on associates, although *Fumaria officinalis* (Common Fumitory) and *Euphorbia platyphyllos* (Broad-leaved Spurge) have been listed.

Euphorbia paralias L. (Sea Spurge)

Draft account

vc 15

Rarity / scarcity status

Sea Spurge is locally distributed on sandy shores and dunes of the British Isles, but is absent from the east coast north of the Wash and virtually absent all of Scotland. This distribution is fairly stable, and its conservation status is one of 'Least Concern', both in England and in Great Britain as a whole. In Kent, it may well be expanding its range, although it is still more or less **scarce** (and non-existent in West Kent).

Sandwich Bay. Photos by Liam Rooney, 22 June 2010

Account

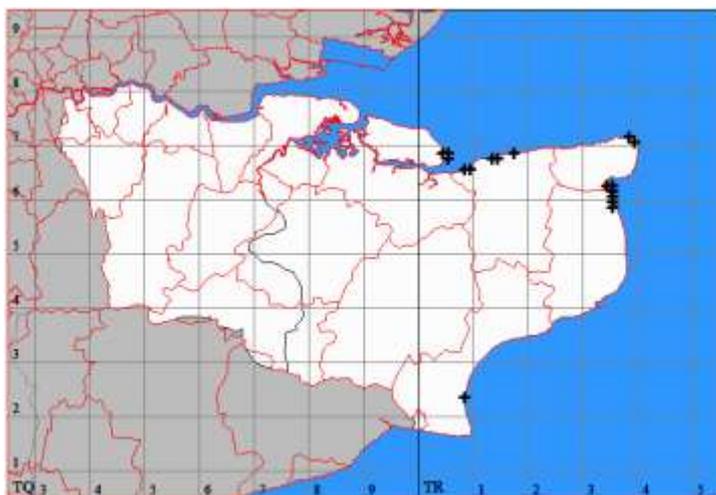
The first published record for Kent is by John Gerard in his *Herball* (1597), where he states that 'it groweth by the sea side upon the rowling sande



and baich....at Whitstable in Kent, and many other places'. Marshall stated in the *Victoria History of the County of Kent* (1908) that it had 'become extremely scarce owing to the inroads of the sea'. Hanbury and Marshall (1899) listed a number of historic records – including at Queenborough, Sheerness, Reculver, South Foreland and Lydden Spout – but had



regarded it as extinct at most of its stations. It is likely, then as now, that its main station remained the Sandwich area, where it has been present since 1632. By the time of Philp (1982), this was considered to be the only locality, albeit present in three tetrads.



Euphorbia paralias (Sea Spurge) 2010-20

The dynamism of its habitats may be responsible both for decline and expansion or re-establishment, given its growth on sandy shore dunes. Since the low point of the 1971-80 survey, it has been found at Swalecliffe and also (Philp, 2010) at Shellness in Sheppey and at the Greatstone dunes, and so should be regarded as scarce, rather than rare, in the county. Indeed, our

2010-20 records amount to 11 tetrads (the equivalent of 17 monads), which raises the issue as to whether it should continue as a rare plant register taxon. This may be as, if not more, plentiful as it has ever been in the

county, given that it is likely to have been reasonably well recorded at any time, through the nature of its habitat. In view of the number of records, a distribution map is included here as well as a data table.

Euphorbia paralias is a distinctly fleshy, grey-green perennial which grows deep-rooted in the sand. The other maritime spurge, *Euphorbia portlandica* (Portland Spurge), has thinner leaves with a prominent midrib beneath; but should not be present on the Kent coast (albeit that an inland colony of Portland Spurge, no doubt of anthropogenic origin, was found in 2010). Sea Spurge is adapted to the shifting sands by the anchorage of its tap-root, its ability to throw out long shoots from the root-crown when buried and by the shoots being able to develop side branches to grow through an accumulation of sand. Seeds are spread by explosive dispersal up to 2 metres away, but may spread further through wind or sand slopes. They are also buoyant and so capable of being spread to fresh sites where within reach of the tides, although usually the plant is to be found on the mobile fore-dunes at the upper beach and only sometimes near the strandline. Its Kent habitats include sand with a mixture of shingle, but shingle is evidently not favoured.

Site	Grid reference	Site status	Last record date	Recorder	Comments
Shellness	TR0468		29 November 2014	SB	A good number of plants in dunes at TR 04948 68825.
Shellness	TR0567		(1) 12 April 2015 (2) 14 October 2010 (3) 30 May 2010	(1) KBRG meeting (2) SB (3) SP & DG	(2) TR 05311 67672, One plant at top of shell sand beach. (3) TR 0531 6767, one plant by track.
Shellness	TR0568		14 October 2010	SB	Small dune area at top of shell sand beach. One plant at TR 05141 68445, two more at TR 05249 68306. Recorded in this area by FR in 1959.
Littlestone	TR0823		11 June 2011	KBRG meeting	Not uncommon on Greatstone dunes.
West of Seasalter	TR0865		29 April 2016	KBRG meeting	A few plants on the beach at TR 08902 65234.
Seasalter	TR0965		(1) 12 March 2017 (2) 29 April 2016	(1) AL & JM (2) KBRG meeting	(1) TR 092 653, occasional along the beach. (2) A few plants on the beach at TR 0919 6533 and at TR 0900 6525.
Tankerton / Swalecliffe	TR1367		13 December 2016	CO	Not yet flowering on landward side of stream outflow on sandy shingle at TR 135 676.
Swalecliffe	TR1467		(1) 22 May 2017 (2) 15 September 2011	(1) & (2) CO	(1) Two new plants top of shingle beach against seawall. (2) One plant at back of beach against seawall at c.TR 143 677, first noticed before 2010.
Herne Bay	TR1768		30 July 2017	CO	First plant found on East end of harbour beach followed by two more individual plants and small clump of five stems.
Sandwich - Shellness	TR3462		20 June 2011	SB & LR	Dune grassland, TR 34848 62675.
Sandwich Bay	TR3558		(1) 16 July 2013 (2) 27 June 1985	(1) CO (2) RF	(1) Two clumps on shingle beach.
Sandwich Bay	TR3559		(1) 3 July 2016 (2) 6 June 2015 (3) 16 July 2013 (4) 24 June 2010	(1) AW (2) DS (3) CO (4) SB	(1) NNR (2) TR 35630 59622, over 20 plants scattered along beach just above high tide mark, flowering. (3) Common at top of beach. (4) TR 35549 59968, plants scattered in dunes of sand with shingle southwards for 300 metres, declining as shingle takes over from sand.

Sandwich Bay	TR3560		(1) 1 September 2010 (2) 22 June 2010	(1) SB (2) LR	(1) TR 35521 60126, seaward edge of sand dunes and also near drift line on sand and shingle beach. (2) About TR 354 605 to TR 351 617.
Sandwich Bay	TR3561		(1) 1 September 2010 (2) 22 June 2010	(1) SB (2) LR	(1) TR 35362 61007, In profusion on seaward edge of sand dunes, backed by a continuous belt of <i>Hippophae rhamnoides</i> . (2) About TR 354 605 to TR 351 617.
Sandwich / Pegwell Bay	TR3562		23 September 2015	KBRG meeting	
Sandwich Bay	TR3658		After 1970, before 1981	Philp (1982)	Recorded as TQ35U.
Cliftonville	TR3871		13 September 2010	CO	One small, non-flowering patch.
Kingsgate Bay	TR3970		(1) 14 May 2013 (2) 18 May 2012 (3) 13 September 2010 (4) 28 September 2008	(1) SB (2) & (3) CO (4) JoG	(1) Patch of plants c. 15 x 10m on sand dunes at TR 3956 7063. (2) 50+ clumps on sandy dune area, taking over dune. (3) One patch with six distinct clumps on sand dune area of Kingsgate Bay. (4) TQ 395 706, about 10 plants at sandy beach. Seen also in this area by EGP & BW, but not given in Philp, 1982 or 2010.

Euphrasia confusa Pugsley (Confused Eyebright)

Draft account. Luddesdown to be re-surveyed.

vc 15 and 16

Rarity / scarcity status

Euphrasia confusa is widespread in the British Isles, particularly favouring hill pastures in the north and west, but is largely absent from central and south east England. In the list for Great Britain It is not assigned any particular threat status for conservation purposes, but this is because of lack of knowledge, *Euphrasia* being a critical group which may not be well recorded in general. There is, however, sufficient confidence in current English data for it to be treated as **Vulnerable** to a risk of extinction in that country. In Kent, it appeared to have been reduced to one area (two tetrads), but a 2020 report indicates another; the species is accordingly **rare** in the county.

Account

Euphrasia confusa was not named until 1919, although plants of this species were previously called *Euphrasia minima*. Marshall was aware of this taxon from other parts of Britain, but was not aware of it in Kent, as it receives no mention in Hanbury and Marshall (1899). The first published Kent records were given by Francis Rose (1960)³⁹ as at Gossy Banks, north east of Hythe, and at Sandling Park, north west of Hythe, discovered by L.J. Margetts and det. E.F. Warburg. However, it seems that Francis Rose had already found this taxon in 1954 at Hoad's Wood (TQ94L) near Ashford, on a heathy ride on Weald Clay. The specimen, which is in MNE, was not determined by Warburg until 1961 ('seems to be *E. confusa*').



Pedlinge / Sandling Park, habitat. Photo by Sue Buckingham, 20 September 2013.

Although Philp (1982) gave the species for both Dartford Heath and Sandling Park, the 1991-2005 survey published as Philp (2010) only recorded it at Sandling Park, albeit in two tetrads. Its usual Kent habitat is heathy grassland, including in woodland rides. When re-found in those tetrads in 2013, one of the sites was a pocket of heathy grassland on sand, with *Galium saxatile* (Heath Bedstraw) and *Calluna vulgaris* (Heather) present, protected on three sides

by woodland and with a margin of *Pteridium aquilinum* (Bracken). The other tetrad site held coarser vegetation, but with acid indicators present such as *Veronica officinalis* (Heath Speedwell) and *Agrostis capillaris* (Common Bent), the ground appearing impoverished.

In 2020, however, a few plants were reported from chalk grassland at Henley Down, Luddesdown with *Euphrasia nemorosa* (Common Eyebright) and hybrids. This was a surprising habitat for Kent, although elsewhere in the British Isles it is known in calcareous as well as acid grassland; our nearest other calcareous

³⁹ F. Rose (1960). Botanical Records for Kent, 1955-58 – Vascular Plants. *Transactions of the Kent Field Club* 1: 56-65.

site appears to be the short chalk turf on the banks of the prehistoric earthwork at Cissbury Ring, West Sussex, where first recorded in 1998.

Confused Eyebright may be distinguished from other Kent species of *Euphrasia* by a combination of features: the middle and upper leaves either lack glandular hairs (as was the case with the 2013 Kent records), or if they possess them, their stalks are not more than six times as long as their gland-heads; it is an inland plant with flexuous stems and branches (i.e. not straight or gradually curved); the leaves near the base of the branches are very small; and the lower bracts are mostly alternate. In comparison with *Euphrasia nemorosa* (Common Eyebright), the lilac flowers appear large and the plants themselves slender and somewhat delicate.



Confused Eyebright at Pedlinge / Sandling Park. Photos by Liam Rooney, 20 September 2013



The hybrid with *Euphrasia nemorosa* (Common Eyebright) is, despite under-recording, known to be widespread in the British Isles. Francis Rose's collection from Hoad's Wood included possible candidates; and it was considered present at the 2020 site at Luddesdown (see above). The hybrid with *Euphrasia officinalis* subsp. *anglica* (English Eyebright) has been found at Knole Park – see the account for that species.

Site	Grid reference	Site status	Last record date	Recorder	Comments
Dartford Heath	TQ57G		August 1979	EGP (Philp, 1982)	
Luddesdown	TQ6666		15 July 2020	MAS	TQ 664 665, chalk grassland, Luddesdown, Henley Down, only one or two <i>confusa</i> plants (most were <i>nemorosa</i>); hybrids also present.
Sandling Park area	TR1336		(1) 4 September 2015 (2) 20 September 2013 (3) After 1990, before 2006	(1) SB (2) SB, LR & AG (3) EGP (Philp, 2010)	(1) Estimated population size this year at known site, TR1366 3618, was c. 300 plants. (2) 200 plants scattered in heathy grassland from TR 13641 36192 to TR 13680 36147. Associated species <i>Agrostis capillaris</i> , <i>Galium saxatile</i> , <i>Veronica officinalis</i> and <i>Rumex acetosella</i> . The area adjoins deciduous woodland with a margin of <i>Pteridium aquilinum</i> and two patches of <i>Calluna vulgaris</i> .

					(3) Given as TR131.
Sandling Park area	TR13N		(1) 20 September 2013 (2) After 1990, before 2006	(1) SB, LR & AG (2) EGP (Philp, 2010)	(1) Many hundreds of plants on open grassy hillside within Sandling Park beginning at TR 14029 36165 and continuing (full extent not ascertained). Associated plants <i>Holcus lanatus</i> , <i>Agrostis capillaris</i> , <i>Anthoxanthum odoratum</i> , <i>Veronica officinalis</i> , <i>Potentilla anserina</i> and <i>Polygala serpyllifolia</i> . (2) Given as TR13N.

Euphrasia officinalis subsp. *anglica* (Pugsley) Silverside (English Eyebright)

Draft account.

vc 15 and 16

Rarity / scarcity status

English Eyebright is probably endemic to the British Isles and is local in southern Britain and in Ireland, although its distribution is imperfectly known. Despite this uncertainty, there appears to be evidence of decline, and the species is regarded both in England and Great Britain as a whole as **Endangered**, carrying a very high risk of extinction in the near future. It is treated as a UK Biodiversity Action Plan priority species, for which the planned action includes ensuring appropriate agricultural management at key sites; ensuring that agri-environment schemes provide for benefits to all *Euphrasia* species in the surrounding landscape; and producing a definitive *Euphrasia* identification handbook (published 2018). The number of county sites has reduced to a level at which this taxon would almost qualify for local scarcity on these grounds, and in view of its decline as well, it is treated as **scarce** in Kent.



Lord's / Wichling Wood. Photo by Sue Buckingham, 7 July 2014

Account

Euphrasia officinalis subsp. *anglica* was only named (as *Euphrasia anglica*) in 1929, and earlier references to eyebrights are not easy to interpret. Hanbury and Marshall (1899) confessed that the various species and subspecies had received hardly any attention in Kent and this is apparent from the vagueness of their statements in relation to contemporary taxa ('Doubtless abundant'; 'Likely to occur frequently'; 'Probably quite common'; 'This should be found on many of the heaths'). Marshall did find in Surrey what later became known as this taxon, but it is not apparent that he also succeeded in Kent. The

earliest Kent record currently traced is probably a specimen of 1838 in MNE marked as from Tunbridge Wells (det. P.F. Yeo), although one cannot be confident which side of the vice county boundary it was found.

Lord's / Wichling Wood, chalk grassland habitat.
Photo by Sue Buckingham, 7 July 2014

In the 1940s and 1950s it was widely recorded in the county, including from Holwood Park, Snodland, Halling, Covert Wood, Temple Ewell, Folkestone Warren, King's Wood (Langley), Hothfield, Kilndown Wood, Bedgebury, Goudhurst, Tenterden and Saltwood. Thereafter it continued to be recorded as widely scattered, albeit scarce, in Kent, with 19 tetrads recorded in Philp (1982). By the time of Philp (2010) the number of tetrads had reduced to ten in the administrative county, with a focus in the Weald, so there is some evidence of recent decline; and, indeed, only seven tetrad records have been made in 2010-16 (the equivalent of ten monads).



In Kent it has been recorded in grassy areas on acid soils, whether sand or wet clay. However, it has also been confirmed from short turf on the chalk downs. It hybridizes with *Euphrasia nemorosa* (Common Eyebright) and Philp (2010) noted the cross as present during the period 1990-2005 at Luddesdown (TQ66S, chalky bank), Mount Ephraim (TQ66W, open chalk scrub), Thurnham (TQ85E, chalk grassland) and Queendown Warren (TQ86G, chalk grassland slopes). Plants broadly resembled *E. nemorosa*, but upper leaves had the glandular hairs of English Eyebright. At none of these locations was pure English Eyebright then recorded. Possible hybrids with *Euphrasia pseudokernerii* (Chalk Eyebright) were noted near Snodland in 1954. Material collected from Knole Park in 2015 in the expectation that this was English Eyebright was determined by the expert panel of the BSBI project *An Eye for Eyebrights* as *Euphrasia officinalis* subsp. *anglica* (English Eyebright) x *E. confusa* (Confused Eyebright). Details are given in blue in the table below; but this determination may also have implications for earlier records from this location.

English Eyebright is somewhat greyish-looking and distinctly glandular-haired. The length of the glandular hairs on middle and upper leaves is diagnostic for this species amongst Kent *Euphrasia*: the hair stalks should be at least six times, and generally 10 to 12 times, the length of the glandular heads borne by them.

Glandular hairs. Material from Lord's / Wichling Wood.
Photo by Liam Rooney, 7 July 2014



Site	Grid reference	Site status	Last record date	Recorder	Comments
Gilridge / Shernden	TQ44L		(1) 14 June 2015 (2) 8 July 2005	(1) SL (2) PHe & EGP	(1) TQ 4598 4320, widespread plants in flower across valley bottom at Cowden Pound Pastures KWT reserve, with large flowers and long glandular hairs on leaves. (2) Recorded as TQ44L.
Markbeech	TQ44R		8 July 2005	PHe & EGP	
Hayes Common (metropolitan vc16)	TQ4065		(1) 12 August 1989 (2) 1988	(1) LNHS meeting (2) GH	(1) Shown by GH, in (NE?) angle of West Common Rd / Croydon Rd crossroads. [Not refound by RMB when the exact location was revisited in 2006.] (2) TQ 406 651.
Keston (metropolitan vc16)	TQ4164		(1) 6 August 2106 (2) 6 July 2012	(1) SL (2) SB & class	(1) Keston, sloping meadow north of ponds, TQ 418 644. In flower at base of meadow. (2) Frequent in meadow, Keston Common, TQ 4181 6440.
Chiddingstone Hoath	TQ5141		1989	JP	Tubb's Hole Pastures, TQ 517 415.
Knole Park Fawke Common	TQ5452, TQ5453, TQ5533	SSSI	[(1) 23 July 2015] (2) 11 August 2014 (3) After 1990, before 2006	[(1) GK] (2) SB (3) EGP (Philp, 2010)	[(1) For at least 50m along Chestnut Walk, but probably much more extensive than this. Acid grassland, deer-grazed, on Greensand. Most plants were found on the southern side of Chestnut walk, where there is some tree shade and the sward is higher. Concentrations at (a) TQ54929 53382, a patch of 40 x 20cm, (b) TQ54925 53340, a patch of 10 x 10 cm, (c) TQ54932 53345, a patch of 2 x 1.5m, (d) TQ54961 53373, an area with plants scattered over 3 x 50m. Associated

					<p>spp. <i>Agrostis capillaris</i>, <i>Anthoxanthum odoratum</i>, <i>Linum catharticum</i>, <i>Potentilla erecta</i>, <i>Senecio jacobaea</i>, <i>Trifolium repens</i>, <i>Viola riviniana</i>.] Material collected was subsequently, however, redetermined as the hybrid with <i>E. confusa</i>.</p> <p>(2) Frequent in acid grassland alongside Chestnut Walk in Knole Park e.g. at TQ 54338 52823, TQ 5495 5336 and TQ 5458 5306. Also at TQ 5503 5344 near the gate into Park. In all cases, associated spp: <i>Agrostis capillaris</i>, <i>Anthoxanthum odoratum</i>, <i>Potentilla erecta</i> and <i>Galium saxatile</i>.</p> <p>(3) Given as TQ55L, Fawke Common, but the site name may be general for the tetrad and represent part of Knole Park.</p>
Pembury Walks	TQ6142		9 September 2004	JP & JW	TQ 619 424.
Pembury Hall	TQ64G		After 1990, before 2006	EGP (Philp, 2010)	
Upper Halling	TQ66X		After 1990, before 2006	EGP (Philp, 2010)	
Combwell	TQ73B		24 July 2002	EGP	
Bedgebury	TQ7133		28 August 2016		Bedgebury Pinetum, path along edge of pond, TQ 7180 3355, with <i>Tormentil</i> , <i>Carex pilulifera</i> , <i>Solidago virgaurea</i> and <i>Calluna</i> .
Bedgebury	TQ7233		(1) 10 August 2011 (2) 10 July 1988	(1) KBRG meeting (2) EGP	(1) TQ 7209 3360, small colony of plants in valley bottom near <i>Oreopteris limbosperma</i> . (2) TQ 725 335.
Bedgebury	TQ7333		(1) 15 August 2014 (2) 26 August 1986	(1) LR & JA (2) JP	(1) Present on a woodland ride at TQ 73488 33421. (2) TQ 735 330.
Little Pix Hall	TQ73F		After 1990, before 2006	EGP (Philp, 2010)	
Three Chimneys	TQ73H		After 1990, before 2006	EGP (Philp, 2010)	
Lord's Wood / Wichling Wood	TQ95C		(1) 22 August 2015 (2) 7 July 2014 (3) 2 July 2003	(1) KFC meeting (2) SB (2) BW & EGP	(1) A few plants scattered about midway up the slope at TQ 91864 56682, with typical calcicoles. (2) Very plentiful around TQ 901 558, some growing alongside <i>Anacamptis pyramidalis</i> and <i>Blackstonia perfoliata</i> . <i>E. nemorosa</i> also noted in some areas, but hybrid not seen. (3) TQ9055.

Euphrasia pseudokernerii Pugsley (Chalk or Large-flowered Eyebright)

Draft account

vc 15 and 16

Rarity / scarcity status

Chalk Eyebright is a plant of chalk and limestone in south east England, also found rarely in Wales and Ireland. It is probably endemic to the British Isles; it is nationally scarce; and as the species appears to be decreasing through ploughing up of habitat and through agricultural improvement of downland pastures, it is regarded as **Endangered** in Great Britain as a whole, although in England falling just short of qualifying for this status, with a level of decline rendering it **Vulnerable** to the risk of extinction in the wild. It is also a UK Biodiversity Action Plan priority species, for which the planned action includes ensuring appropriate agricultural management at key sites; ensuring that agri-environment schemes provide for benefits to all *Euphrasia* species in the surrounding landscape; and producing a definitive *Euphrasia* identification handbook. The Kent North Downs are one of its British strongholds and the number of county sites is such that no local scarcity / rarity designation is required.



Lydden / Temple Ewell. Photo by Liam Rooney, 4 September 2012

Account

Chalk Eyebright was first published for Kent by Frederick Townend in his *Monograph of the British Species of Euphrasia* (Journal of Botany, 1897, at p.470), where he listed it (then known as *E. kernerii*) as found by A.H. Wolley Dod on chalk at Upper Halling in September 1894. It may not be the first finding, as there is a specimen at Manchester Museum collected by Dr Gustavus St Brody at Maidstone in 1891, which purports to be this species. Hanbury and Marshall (1899) had no records other than Upper Halling, but considered Chalk Eyebright likely to occur frequently on the downs. This no doubt was true, but there are relatively few records until the 1950s. Philp (1982) listed 42 tetrad records for the period 1971-80, along the North Downs from the Surrey border to the cliff tops of the east coast. By 1990-2005, the record total had become 28 tetrads (Philp, 2010), so this may be possible evidence of decline in Kent (as nationally), but not really supported by the number of sightings made subsequently.

Euphrasia pseudokernerii is a hemiparasitic annual of short downland turf, particularly on grazed higher slopes. It germinates in spring and is a late flowerer, in August, September or even October; and Alan Silverside (1994)⁴⁰ surmises that this perhaps affords some reproductive isolation from *Euphrasia nemorosa* (Common Eyebright), with which it hybridises. The latter species starts flowering in late June or early July and continues into the flowering period of Chalk Eyebright. *Euphrasia nemorosa* may replace Chalk Eyebright on lower slopes or rougher grassland, with hybrid swarms where species overlap. Philp (1982) refers to intermediate plants

⁴⁰ A.J. Silverside, *Euphrasia pseudokernerii* Pugsley, in (eds.) A. Stewart, D.A. Pearman & C.D. Preston (1994), *Scarce Plants in Britain*, JNCC.

usually being present where the two species grow together, although the hybrid was not recorded specifically in that survey; and in Philp (2010) the only hybrid record was near Otford (TQ56A). There are earlier finds in chalk grassland (Hogtrough Hill at Brasted, 1954; Snodland, 1954; Luddesdown, 1959; St Margaret's Bay, 1959) which have been expertly determined as either possibly or probably this hybrid.

Euphrasia nemorosa x *pseudokernerii*, 2018-20

More recently, convincing hybrids have been seen at Folkestone Warren (TR 258 383, KBRG meeting on 9 June 2018) with corollas up to 10mm long (and so outside the range of *E. nemorosa*), flowering well before *E. pseudokernerii* begins⁴¹. From 2020, we started paying more attention to plants which were flowering in late May / early June but which bore larger corollas than usual for *E. nemorosa* and it appears that these putative hybrids are not uncommon.



The two species are usually separated on the basis of:

- bracts (mostly long bristle-tipped in *E. pseudokernerii*, not so pronounced in *E. nemorosa* (but still acute to acuminate));
- capsule and calyx (capsule much shorter than the calyx in *E. pseudokernerii*; usually slightly shorter in *E. nemorosa*);
- flower size (corolla (6)7-9(11)mm in *E. pseudokernerii*; 5-7.5(8.5)mm in *E. nemorosa*).



Lydden / Temple Ewell. Photo by Liam Rooney, 4 September 2012



The range of variation means that no single description will cover hybrid plants and, indeed, the variability of a population may best afford recognition; but those hybrid plants which may be identified more readily will have the large flowers and very sharp bract teeth of *E. pseudokernerii*, but the habit of *E. nemorosa*

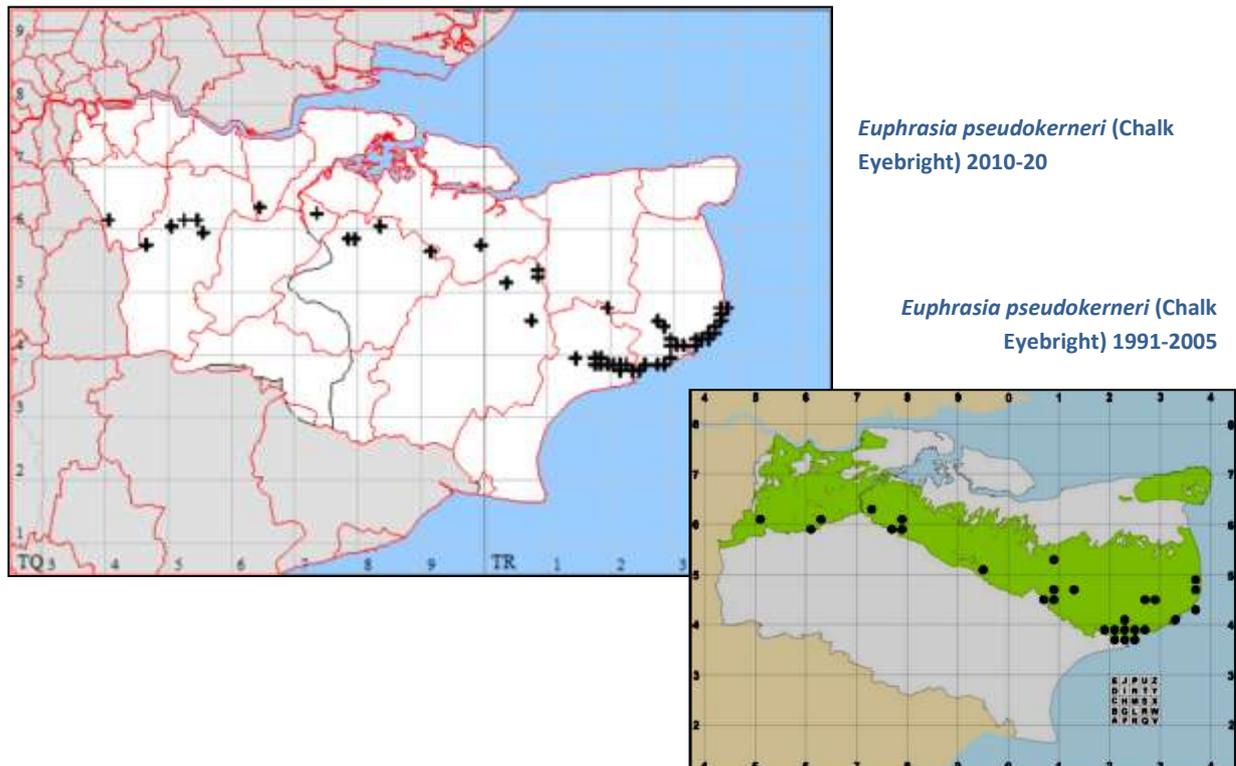
Hope Point, habitat. Photo by Geoffrey Kitchener, 21 September 2014

As this species is not uncommon in Kent, the distributional data maintained in this register will be at 1km square (monad) level. This will

⁴¹ Indeed, the hybrid often flowers before either parent: Metherell, C. & Rumsey, F.J. (2018). *Eyebrights (Euphrasia) of the UK and Ireland*. Botanical Society of Britain and Ireland, Bristol.

entail recording at a finer scale than the tetrads given in Philp (2010), from which the following 1991-2005 distribution map is taken (with kind permission of the late Eric Philp and the Kent Field Club).

Records from 2010-20 relate to 51 different monads (the equivalent of 39 tetrads) and suggest that Philp (2010) understates the position and that any previous decline of the species is not as extensive as indicated, at least in East Kent and particularly along the chalk cliffs from Kingsdown to Folkestone, where the eyebright has been noted as especially abundant in the short cliff-top turf.



Euphrasia tetraquetra (Bréb.) Arrond. (Western Eyebright)

Draft account

vc 15

Rarity / scarcity status

Western Eyebright is, in the British Isles, primarily a coastal species and, as its English name suggests, mainly distributed in the west. Although its conservation status in Great Britain as a whole has been one of 'Least Concern', it is now regarded as requiring further investigation before a status may be assigned; in England, however, it is considered to be **Near Threatened**. A comparison of its area of occupancy in England over the periods 1930-1969 and 1987-1999 produced a calculated decline of 27% in the likelihood of recording the species. It is absent from much of eastern England and in Kent its records have been extremely limited and for a while the species was considered probably extinct. It has persisted near Dover, however, but is very **rare** in the county.

Account

Euphrasia tetraquetra was not recognised as a Kent species by Hanbury and Marshall (1899), but Marshall mentioned in the *Victoria History of the County of Kent* (1908) that he had received specimens (then called *Euphrasia occidentalis*) collected by C.P. Hurst near Walmer. There is an East Kent specimen in **CGE** gathered by C.P. Hurst in July 1901 (det. P.F. Yeo) which appears to be the first Kent record. Francis Rose collected specimens in 1952 from the Folkestone/Dover area (TR26) and in 1953 from western East Kent (TQ76).

Dover. Photo by Stephen Lemon, 4 August 2017



By the 1971-80 Kent survey (Philp, 1982), the species was only known from grassland on chalk cliffs above Dover Harbour (TR34G), although it was surmised that it could perhaps be expected in similar habitats nearby. However, a dearth of subsequent records resulted in the species being placed on the county 'probably extinct' list until a KBRG meeting in August 2017. At this session several plants were identified as *Euphrasia*



tetraquetra (at TR 34098 42324, TR 33839 42172 and TR 33832 421710) by Fred Rumsey in an area of cliff overlooking Dover Harbour, where the ground had been levelled off as part of railway construction at the end of the nineteenth century, so as to form what is now a grassy plateau about 80m above sea level, with chalk cliffs both above and below.

Dover, habitat. Photo by Sue Poyser, 4 August 2017

They grew in a southerly aspect, exposed to wind and sun, both in short chalk

grassland turf and in barer areas near the cliff edge. Plants were also accompanied by *Euphrasia nemorosa* (Common Eyebright) and Eyebrights with a range of variation which rendered determination of individual plants in the field not straightforward, especially as *E. nemorosa* is apparently capable, in exposed coastal situations, of mimicking the growth form of *Euphrasia tetraquetra*. Some plants carried flowers of a size which suggested the influence of *Euphrasia pseudokernerii* (Chalk or Large-flowered Eyebright), although as a pure species this does not appear to be characteristic of the site, albeit plentiful along the coast further north east.

Specimens exhibiting potential hybridity were subsequently determined by Chris Metherell, BSBI referee, as including on balance *E. pseudokernerii* x *tetraquetra* (at TR 34098 42324) and *E. nemorosa* x *tetraquetra* (at TR 34014 42364 and TR 33916 42318), as well as plain *E. nemorosa*. The latter cross had the sharp leaf toothing of *E. nemorosa* but with lower floral leaves too broad and flowering too low for that species. The former cross had the habit and facies of *E. tetraquetra* (i.e. with broad cauline and lower floral leaves, very congested lower



floral internodes and occasional short glandular hairs); but was flowering too high for *E. tetraquetra* (some at node 13), and the large corolla size and white and papery calyces of some of the specimens pointed to involvement of *E. pseudokernerii*. It was likely that the area carried a hybrid swarm involving three species and in the centre of the swarm would be specimens showing a complete mix of characters produced by crossing and back-crossing. The rarity of “good” *E. tetraquetra* might be due to it effectively having been hybridised out.

Dover. Photo by Liam Rooney, 4 August 2017

Euphrasia tetraquetra is distinguished from other Kent species by its stout, compact growth form, the main (or sometimes only) stem carrying a cylindrical, or slightly 4-sided, inflorescence. The lowest flower is present at node (3) 5-7 (9) of the main stem; other Kent species from similar habitat are likely to have the lowest flower at a higher node. The leaves are distinctively fleshy; and if there are glandular hairs on them, then they are relatively short, i.e. no more than six times as long as the glandular head which they bear.