

Kent Rare Plant Register

Draft species accounts

Q & R



Kent rare plant register

This section of the register covers:

Q:

Roemeria argemone
Rosa agrestis
Rosa spinosissima
Rubia peregrina
Rumex crispus subsp. *uliginosus*
Rumex maritimus
Rumex palustris
Ruppia maritima
Ruppia spiralis

R

Ranunculus arvensis
*Ranunculus flammula**
Ranunculus hederaceus
Ranunculus parviflorus
Ranunculus peltatus
Ranunculus tripartitus
Raphanistrum raphanistrum subsp. *maritimus*
Rhinanthus angustifolius

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, generally not specific sites with no 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 vice counties 15 and 16 in white (the boundary between is a black line) and local authority boundaries by red lines. See the Kent webpage of the BSBI website at <http://www.bsbi.org.uk/kent.html> for the full Kent rare plant register list, the introduction to the register and a list of 'probably extinct' Kent plants.

Abbreviations used in the text:

Recorders' initials:

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 GMH G.M. Hemington
 HS Heather Silk
 JB John Badmin
 JBev Jim Bevan
 JC Juliet Cairns
 JE John Edgington
 JL Jackie Langton
 JP Joyce Pitt
 JPu John Puckett
 JRP John Palmer
 JS Judith Shorter
 JW Jo Weightman
 LR Liam Rooney

MB Mike Bax
 MJ Michael Jones
 MP M. Pickard
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 NFS Nick Stewart
 OL Owen Leyshon
 PH Peter Heathcote
 RL Richard Lansdown
 RMa Roger Maskew
 RMB Rodney Burton
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 RS Rebekah Smith
 SB Sue Buckingham
 SBRS Sussex Botanical Recording Society
 SC Steve Coates
 SL Stephen Lemon
 SP Sue Poyser
 TI Tim Inskipp
 TN Tony Nuthall
 TW Tim Wilkins

Other abbreviations:

BM Natural History Museum herbarium
 BSBI Botanical Society for Britain & Ireland (and predecessor)
 KBRG Kent Botanical Recording Group
 LWS Local Wildlife Site
 MOD Ministry of Defence
 SLBI South London Botanical Institute

Ranunculus arvensis L. (Corn Buttercup)

Draft account

vc15 and 16

Rarity / scarcity status

Ranunculus arvensis is an archaeophyte, or ancient introduction which used to be widespread as a cornfield weed, but is now **Critically Endangered** in Great Britain as a whole. In England, it is considered to be **Endangered**. 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 69% and its area of occupancy had declined so that



there was a 77% reduction in the likelihood of recording the species. It is a priority species for the UK biodiversity action plan, with planned actions of monitoring and targeted agri-environment schemes. In Kent, it apparently declined by 93% between 1971-80 and 1991-2005, and is currently very rare.

Mersham. Photo by Heather Silk, 13 May 2011

Account

The first Kent record for Corn Buttercup is by Thomas Johnson in his *Descriptio Itineris* (1632), in travelling from Sandwich to Canterbury. It is listed immediately after records for *Spergula arvensis* (Corn Spurrey) and *Spergularia rubra* (Sand Spurrey), which suggests that he had reached sandy arable land, probably the sands of the Thanet Formation by the road west of Ash. Early botanists do not pay much attention to it in the county because of its ubiquity: but amongst those

Flora writers who sought to cover all species, Edward Jacob (*Plantae Favershamienses*, 1777) refers to it as '*In Corn fields – very common*', echoed exactly by Thomas Forster (*Flora Tonbrigensis*, 1816) – '*In cornfields, very common*'. Hanbury and Marshall (1899) were comparatively appreciative: '*The finely cut leaves, sulphur-yellow flowers, and handsome, prickly fruit mark it off widely from our other British species*'. They regarded it as a plant of cultivated fields, usually among corn, showing a decided preference for chalk and clay, and common, recorded from every botanical district in the county except Thanet '*where no doubt it also occurs*'¹. It is a little surprising, however, that the near-contemporaneous *Woolwich Surveys* (1909) thought Corn Buttercup to be somewhat rare in north west Kent, but occasionally found established in arable fields.

Corn Buttercup continued to be recorded without any particularly discernible distribution pattern, although there are a lot of records in the 1950s, with preponderance in East Kent, and Philp (1982) gives 15 tetrad

¹ This seems to be the case, as it is listed by George Pittock in his *Flora of Thanet* (1903), albeit without any detail. However, the copy of Hanbury and Marshall (1899) which was acquired and annotated by him (now in the possession of John Badmin) contains a note against *Ranunculus arvensis*: '*Nash Court 1901 – Hewett*' (this was F. Hewett of Margate).

records: five of these on Sheppey, and the rest scattered across the county, other than in the south east. Its status was then assessed as long established as a cornfield weed but having become rare, found in cultivated fields or disturbed waste ground. After then, it virtually disappeared. Philp (2010) found it during the period 1991-2005 only in a field opposite Marden Meadow (where known at least since 1985). There have been just three sites recorded since 2010, including the Marden site.



Swift's Green. Photo by Owen Leyshon, 14 June 2019

Of these three sites, only Marden is an arable margin. At Mersham, it was (in 2011) by a public footpath through a hayfield, so in effect it was a marginal site, through the disturbance of footpath access. At Swift's Green (in 2019) it was in a grass ley and so with a degree of openness which enabled this and other arable weeds to grow.

The loss of this species generally in Great Britain appears largely attributable to the effectiveness of agricultural herbicides developed in and since the 1940s and 1950s. It is an annual, germinating principally in autumn and so almost entirely restricted to winter-sown crops. Smith (1994)² refers to Corn Buttercup's buried fruits remaining viable for many years, although an experiment found that over 60% of seed germinated within five months of sowing, which does not suggest that a great deal gets left for the seed bank. In a Spanish context, Torra et al (2018)³ found that *Ranunculus arvensis* had a comparatively low persistence index (a proxy for seed bank persistence). Accordingly, one interpretation of the rapid falling-off of records after the 1970s might be that adverse agricultural conditions could no longer be overcome by adventitious germination from the seed-bank: this seed-bank had simply become exhausted.

Marden, habitat. Photo by Sue Buckingham, 20 May 2012

Modern sources of introduction are with wild flower amenity sowings (such as 1994 and 2002 sightings at South Norwood Country Park) or with wild bird seed (as at Kemsing in 1982).

Ranunculus arvensis is an upright annual, with deeply divided middle and upper leaves. The sepals are spreading, not reflexed as in *Ranunculus parviflorus* (Small-



² Smith, A. (1994). *Ranunculus arvensis* L. Corn buttercup. In (eds.) Stewart, A., Pearman, D.A. & Preston, C.D. *Scarce Plants in Britain*, JNCC, Peterborough.

³ Torra, J., Recasens, J. & Royo-Esnai (2018). Seedling emergence response of rare arable plants to soil tillage by species. *PLoS ONE* **13**(6): e0199425.

flowered Buttercup). The achenes are very distinctive, usually with strong spines (*R. parviflorus* has achenes with a tubercular surface bearing only minute spines).

The following table excludes introductions and the Philp (1982) records where they are bare tetrad numbers without further detail. Those tetrads were: TQ45X, TQ53J, TQ56T, TQ65D, TQ66R, TQ74I, TQ94P, TQ95W, TQ96J, TQ97G, TQ97K, TQ97L, TR07A, TR15W, and TR36F.

Site	Grid reference	Site status	Last record date	Recorder	Comments
Farningham	TQ5666		1972	RMB	TQ 5667 6627, one plant in corner of a cornfield.
Marden	TQ7644		(1) 16 May 2010 (2) 9 May 2009 (3) 2 May 2005 (4) 26 May 2003 (5) 21 May 2002 (6) 16 May 2000 (7) 1991-99 (8) 1985 (9) 12 June 1984	(1) SB (2) DM (3) DM (4) JP (5) JA (6) JS (7) EGP (8) RoF (9) JP	(1) TQ 76393 44466, two plants. (2) (3) TQ 762 444. (4) TQ 763 444, over 30 plants seen, some in flower, some in fruit, in crop along northern edge of field. (5) In field margin near lane. (6) (7) Given as TQ74S, but taken to be TQ7644. (8) TQ 763 444. (9) TQ 763 444.
East of Headcorn	TQ8744		14 June 2019	KBRG meeting	Swift's Green, middle of large field along Rosemary Lane and south-east of Malthouse Farm. Seven flowering and fruiting plants seen on heavy clay near public footpath across a grass field. The first was in the grass crop at TQ 87484 44059 with three more a few metres away and a cluster of three further plants a few metres away at TQ 8749 4405. Associated species: <i>Anthemis cotula</i> , <i>Euphorbia platyphyllos</i> , <i>Lysimachia arvensis</i> , <i>Ranunculus sardous</i> and <i>Stachys arvensis</i> .
Sheppey	TQ9571		25 June 1987	JB	Brambledown, TQ957716.
Mersham	TR0438		13 May 2011	HS	TR 040 386, at least five plants on public footpath through hayfield, mown shortly after.

Ranunculus flammula L. (Lesser Spearwort)

Draft account

vc15 and 16

Rarity / scarcity status

Ranunculus flammula is widespread in wet places across the British Isles. Perhaps surprisingly, it is considered to be **Vulnerable** to the risk of extinction in England, where a comparison of its area of occupancy over the periods 1930-1969 and 1987-1999 produced a calculated decline of 32% in the likelihood of recording the species. The issue is therefore not that it is especially uncommon at present, but that the rate of decline, which appears to be mainly in the south east, is concerning. There is also evidence of decline in Kent, although Lesser Spearwort is still by no means rare or scarce here.

Account

The first Kent record for Lesser Spearwort is by Thomas Johnson in his *Descriptio Itineris* (1632), in travelling from Sandwich to Canterbury. He appears at this point to have reached the sandy woodlands east of Canterbury and, given that conditions were wet enough for him to have recorded *Potamogeton crispus* (Curled Pondweed) immediately beforehand, he may have reached the Lampen Stream. He recorded the plant twice, one being a form with serrated leaves.

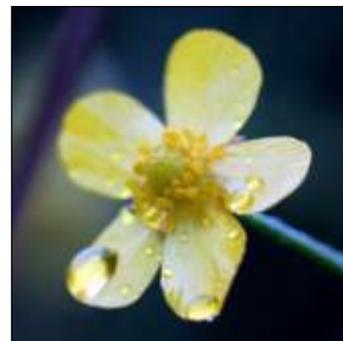


Orlestone Forest. Photo by David Steere, 9 July 2016

Hanbury and Marshall (1899), who treated Lesser Spearwort as common and generally distributed in ditches and marshes (other than in chalk districts where these habitats were rare or absent), were interested in the variability of the species. Kent botanists had been claiming the presence of varieties, such as var. *reptans* and var. *radicans*. G.E. Smith, for example, wrote about the former between Beachborough and Cheriton: 'This variety ...pushes forth roots, through the base of the foot-stalks of its leaves, at every joint... [which] swelling and gaining weight, bear gradually the erect stems to the earth: a colony is at once formed: the progeny rise, ungratefully trampling upon their parent; and in autumn, flowers are seen upon the young plants, whose dwarf habit constitutes them a distinct variety'. Hanbury and Marshall's conclusion was that *Ranunculus flammula* was remarkably variable, but apparently due to situation, which might cause it to be as large and stout as *Ranunculus lingua* (Greater Spearwort), but on poor soils, the leaves were apt to become linear and the whole plant dwarfed; in ditches, it was usually erect, but particularly on heaths it was more or less creeping.⁴

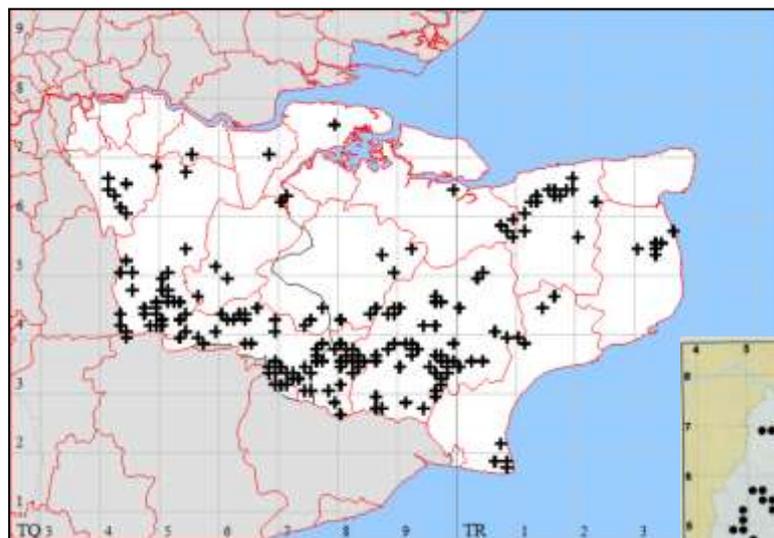
⁴ Current treatment of varieties of *R. flammula* subsp. *flammula*, in Sell, P. & Murrell, G. (2018), *Flora of Great Britain and Ireland* vol.1, recognises a procumbent one rooting at the nodes (var. *tenuifolius*) and a *R. lingua*-like one, var. *major*.

The county survey of 1971-80 (Philp, 1982) found Lesser Spearwort to be local in damp woodland rides, marshes and ditches. There were 174 tetrad records, mainly in the Weald, but also following damp ground on the Folkestone Formation in East Kent, and the acid woodlands of the Blean around Canterbury. However, the 1991-2005 survey (Philp, 2010) showed 134 tetrads, a reduction of 23%. The distribution was fundamentally similar as regards the areas of the count involved, but more sparse within those areas. The questions then arise, whether the decline is an artefact of differences in recording as between the two surveys, and whether that decline is continuing. As regards the latter, our 2010-19 records show no further decline, in standing at 147 tetrads (equivalent to 191 monads). However, the 1971-80 and 2010-19 data are all the product of networked recording (and the 1991-2005 data is from solo recording), and they are for fairly similar length periods, so differences in recording seem unlikely to account for the apparent decline. The cause of decline is not obvious and needs to be a county-wide factor. There may yet be some under-recording in the 2010-19 records, e.g. in TQ55.



Orlestone Forest. Photo by David Steere, 9 July 2016

As Lesser Spearwort is not uncommon in Kent, the distributional data maintained in this register will be at 1km square (monad) level, as shown in the 2010-19 distribution map. This entails recording at a finer scale than the tetrads given in Philp (2010), from which the following 1991-2005 map is taken (with kind permission of the late Eric Philp and the Kent Field Club).



Ranunculus flammula (Lesser Spearwort) 2010-19

Ranunculus flammula (Lesser Spearwort) 1991-2005



Ranunculus flammula is a plant of wet places, where it may spread by rooting at the nodes. It also spreads by seed, and individual flowers last longer than those of comparable *Ranunculus* species, while insect visitors have been recorded as more frequent⁵; so it would seem to maximise pollination opportunities. Our recent records note it especially on acid soils, but also present on acid to neutral terrain and in fen pasture. We have noted it in wet grassland, in forestry plantations, ancient woodland, pond margins, ditches, and flushed ground, flat or sloping.

⁵ Steinbach, K. & Gottsburger, G. (1993). Phenology and Pollination Biology of Five *Ranunculus* Species in Giessen, Central Germany. *Phyton* **34**(2): 203-218. A Danish study, however, noted fewer insect visitors than with *Ranunculus acris* (Meadow Buttercup), and that *R. flammula* was particularly well adapted to rain pollination. (O. Hagerup (1950) Rain-pollination. *Biol. Medd. Dan. Vid. Selsk* **8**(5)).

The plant has given its name to a Kentish expression, speer-worty, current c. 1735 and describing the liver of a rotten sheep, when it is full of white knots, supposed to have been caused by grazing it.⁶ Lesser Spearwort has apparently been a cause of horse and cattle poisoning.⁷

Ranunculus flammula is one of the spearworts, distinct from other yellow-flowered buttercups by virtue of its lanceolate stem-leaves. The nearest Kent spearwort in appearance is *Ranunculus lingua*, which is larger than most forms of *R. flammula* and has unfurrowed pedicels (furrowed in *R. flammula*).

Orlestone Forest. Photo by David Steere, 9 July 2016



⁶ Skeat, W.W. (1874). Dr.Pegge's Alphabet of Kenticisms, and Collection of Proverbial Sayings used in Kent. *Archaeologia Cantiana* 9: 50-147.

⁷ Forsyth, A.A. (1954). *British Poisonous Plants*. Ministry of Agriculture, Fisheries and Food, HMSO.

***Ranunculus hederaceus* L. (Ivy-leaved Crowfoot)**

Draft account: more records needed

vc15; ought still to be present in vc16

Rarity / scarcity status

Ranunculus hederaceus is frequent throughout the British Isles on mud and in shallow water, and its threat status is of 'Least Concern'. In Kent, it has been **scarce** for many years and its status requires further investigation – it may now be **rare**.

Account

The first published Kent record is probably by Thomas Johnson in his *Descriptio Itineris* (1632). In his notes of travelling from Sandwich to Canterbury – he may have been at Wingham or Littlebourne – he remarks on several aquatic plants and 'Ranunculus hederaceus' and 'Ranunculus aquaticus rotundifolius, forte Apium risus'. Both of these, in Francis Rose's view (expressed in the 1972 edition of Johnson's book), were either *Ranunculus hederaceus* or a related species: *Ranunculus omiophyllus* (Round-leaved Crowfoot) and *Ranunculus tripartitus* (Three-lobed Crowfoot) are presumably potential candidates. There is potential for wider confusion in earlier records: it would not be surprising if Edward Jacob's record (*Plantae Favershamienses*, 1777) by the creek wall leading from Faversham to Thorn was actually *Ranunculus baudotii* (Brackish Water-crowfoot). More persuasive is Thomas Forster's assessment (in *Flora Tonbrigensis*, 1816), in relation to the acid terrain around Tunbridge Wells, that the plant grew 'In watery places, near springs, and in ditches, common'.



Willesborough. Photo by Stephen Lemon, 16 May 2015

Hanbury and Marshall (1899) treated *R. omiophyllus* as a form of *R. hederaceus*, while taking *Ranunculus lenormandii* to be a separate species, which we would now place under *R. omiophyllus*. They considered *R. hederaceus* to be a frequent native of pools, ditches and muddy ground. The records which they cited were scattered across the county. They included acid ground in north west Kent (Keston Common, said in the *Woolwich Surveys* of 1909 to have been in mud at the top of the Lower Pond in 1906). In East Kent, records (if correct) appear to be associated with the Stour catchment and low ground; and there are also others which follow the line of the Folkestone Formation sands to include Brabourne Lees (boggy spots), Willesborough, Ashford, Hothfield and Bearsted – located also on the Lower Greensand Group in West Kent (e.g. Knole Park, Sevenoaks) and on Tunbridge Wells Sand (Bidborough, Southborough). There was also a record by Marshall on the high ground above Romney Marsh, near Ham Street, probably on the eastern end of the Tunbridge Wells Sand Formation which crosses the county.

The ten tetrad records of the 1971-80 county survey (Philp, 1982) fall into four areas which correspond to some of those of Hanbury and Marshall, relating to various geological sand formations. One of the areas has similarity with Marshall's Ham Street record, as the survey picked up the Crowfoot in a couple of tetrads north



of Appledore. Another area follows the Folkestone Formation from Sellindge (Gibbons Brook?) westwards to Ashford. A third group lies in the Sevenoaks area (TQ55); and a fourth at Southborough (Tunbridge Wells Sand) and Hever (either Lower Tunbridge Wells Sand or Weald Clay). Philp (1982) described plants as growing in and alongside muddy ponds and streams.

Willesborough. Photo by Stephen Lemon, 16 May 2015

Those ten tetrad records had reduced to seven in the 1991-2005 survey (Philp, 2010), when the species was said to be rather local and declining. It is unclear how far this actually represents a decline, since three of the seven records were new, in the sense of not being given in the earlier survey results. One of them, at Shottenden/Perrywood is indeed unexpected, as has no relationship with earlier records, or their associated geology. Another, near Sandhurst also has no earlier records, but probably relates to the Tunbridge Wells Sand Formation. This suggests continued potential for *R. hederaceus* to be found in the county in open, muddy conditions on sandy ground. It is all the more surprising that it has been found only twice during the period 2010-19. One sighting was in 2015, north east of Willesborough Lees, an area (at least as regards the Lees) with previous records going back to 1829. Plants were growing in a marshy flush across a low-lying sheep-grazed field where the underlying geology is Folkestone Formation sand, overlain in the wet areas by muddy peat; also on wet mud in an area dominated by *Juncus* spp.; and by a rivulet. Associated species noted were *Sparganium erectum* (Branched Bur-reed), *Typha latifolia* (Bulrush) and *Epilobium* spp. - as regards the latter, in 2016 *Epilobium obscurum* (Short-fruited Willowherb), *Epilobium ciliatum* (American Willowherb) and their hybrid *Epilobium x vicinum* were noted in the vicinity, that latter indicating disturbed conditions. The other sighting was in 2019, when a small amount was found growing on deep, deer-trodden mud in a pond on the Knole Park golf course, an acid habitat on Sandgate Formation geology.

Willesborough, habitat. Photo by Stephen Lemon, 16 May 2015

R. hederaceus usually self-pollinates before the buds open. After fertilisation, the flower stalks bend down so as to force the developing fruits into the mud below, where they may be dispersed by stock trampling and/or release into flooding waters. Germination appears more effective if ground conditions dry out before rewetting. It may behave as a winter or spring annual, depending on conditions; and also may, in consistent waterlogging,



survive as a perennial, being reduced to small, tight cushions in winter. Despite our Kent experience of preference for acid conditions, *R. hederaceus* grows on calcareous substrates as well⁸.

R. hederaceus is one of a small group of Crowfoots which comprises essentially terrestrial plants and which also includes *R. omiophyllus* (extinct in Kent) and *R. tripartitus*. It is distinguished from both of these by having its leaf lobes broadest at the sinus and petals scarcely longer than its spreading (not reflexed) sepals. It is also distinguished from *R. tripartitus* by never having divided, thread-like leaves – just lobed, laminar leaves (and the laminar leaves of *R. tripartitus* are much more deeply lobed).



From Willesborough. Photo by Lliam Rooney, 29 May 2015

Site	Grid reference	Site status	Last record date	Recorder	Comments
Hever	TQ44S		After 1970, before 1981	Philp (1982)	
Keston Common (metropolitan vc16)	TQ46C		(1) 1988 (2) 8 July 1987 (3) 1986	(1) GMH (2) RMB (3) JP	(2) TQ 418 641, SW corner of pond. [LNHS records for this location go back to 1917; searched for by RMB in 2000 and later, but not re-found.]
Eltham (metropolitan vc16)	TQ4374		1986	LEU	Pippenhall Meadows, TQ 438 743, central wet area.
Haysden Country Park (west)	TQ54M		26 July 2001	EGP, DG	
Southborough/Broomhill	TQ54Q		(1) 1991-99 (2) After 1970, before 1981	(1) EGP (2) Philp (1982)	
Sevenoaks (north)	TQ55I		After 1970, before 1981	Philp (1982)	
Sevenoaks (Knole Park)	TQ55L, TQ55M		(1) 18 June 2019 (2) 24 August 2001 (3) After 1970, before 1981 (4) October 1979	(1) GK (2) EGP, PH (3) Philp (1982) (4) ACJ	(1) TQ 54460 53910, a few small plants on deep, deer-trodden mud in south-western corner of steep-sided pond on Knole Park golf course, acid on Sandgate Formation. (2) Given as TQ55L (Fawke Common) and TQ55M (Godden Green), but both could have been deer-trampled pond edges in Knole Park (and at least one of these records was). (3) TQ55L, TQ55K. (4) Knole Park, TQ 544 538, det. EGP. [May be the same as (2) above, for TQ55L.]
Lamberhurst Quarter	TQ6539		16 September 1999	NFS	TQ 650 390, small patch in seepage.
Near Sandhurst	TQ82E		1991-99	EGP	Given as TQ82E 'Hoads Farm', but latter is tetrad name, not necessarily site-indicative.
Appledore Heath	TQ93K		After 1970, before 1981	Philp (1982)	[NB Francis Rose was aware of a record near the Royal Military Canal at Appledore.]
South of Woodchurch	TQ93L		After 1970, before 1981	Philp (1982)	
Ashford (north)	TR04C		After 1970, before 1981	Philp (1982)	

⁸ Cook, C.D.K. (1966). Studies in *Ranunculus* subgenus *Batrachium* (DC.) A. Gray: III *Ranunculus hederaceus* L. and *R. omiophyllus* Ten. *Watsonia* **6(4)**: 246-259.

Willesborough / Hinxhill	TR04L		(1) 16 May 2015 (2) 11 August 2001	(1) SL (2) EGP, JBev	(1) Marshy flush across sheep grazed field: TR 04210 42915 (small flowering patch in flooded field corner with <i>Sparganium erectum</i> , <i>Epilobium</i> , <i>Typha latifolia</i>), TR 04257 42891 (wet mud in <i>Juncus</i> dominated area), TR 04286 42853 (a few small plants next to rivulet), TR 04315 42831 (thick patch near rivulet). (2) Given as TR04L Hinxhill.
Perry Wood	TR05M		1991-99	EGP	
Sellindge	TR13E		After 1970, before 1981	Philp (1982)	[Gibbons Brook? Collected from Sellindge 1956, as mentioned in <i>Watsonia</i> (1966) 6: 246-259.]

***Ranunculus parviflorus* L. (Small-flowered Buttercup)**

Draft account

vc15 and 16

Rarity / scarcity status

Ranunculus parviflorus is more or less confined to the southern half of the British Isles, where it is most frequent in south west England. Its threat status in England and Great Britain as a whole is of 'Least Concern'. This is based in England on an assessment of records for the period 1930-1999, but a 41% decline has been detected when assessing data from 1987 onwards against all-time records, explicable if retreat to the south west had largely taken place by 1930. In Kent, it has appeared **scarce**, based on records in Philp (2010); but subsequent recording indicates that it is more common than that. It is, however, retained on the register for the time being because of the perception of its rarity in the county until now, as well as its very limited distribution outside two focal areas.



Strood/Cuxton. Photo by Liam Rooney, 24 June 2010

Account

The first published record for Small-flowered Buttercup in the county is by William Hudson, in the second edition of his *Flora Anglica*, 1778. He described it as a plant of fields and meadows, on gravelly ground, and found plentifully near Greenstreet Green, next to Dartford (Habitat *in arvis et pratis solo glareoso; prope Greenstreet Green juxta Dartford...copiose*). Thomas Forster in his *Flora Tonbrigensis* (1816) noted it as 'in the lane leading from High Rocks to Rusthall Common', so no doubt this was on dry, sandy soil. G.E. Smith in his *Catalogue of rare or remarkable plants collected in south Kent* (1829) referred to it as 'by the path-way in the road from the Castle towards Mr. Gill's House, Sandgate' (John Gill was the local surgeon, and the coastal



location of the castle means that the ground is likely to have been sandy, perhaps with consolidated shingle). All these early records accordingly point to the Buttercup being a plant of dry, well-drained, sandy or gravelly locations, reinforced by the description by Hanbury and Marshall (1899) as a rare plant of fields, dry banks, etc.

Betteshanger. Photo by Mel Lloyd, 5 May 2012

It was never common in the county, and Philp (1982) knew of it only from Luddesdown (TQ66S), Marden (TQ74N) and near Dungeness (TR01T and TR01U). Its

habitat was then noted as dry fields or banks, especially where disturbed by rabbits. By the county 1991-2005 survey (Philp, 2010) its recorded presence had risen to six tetrads, but the only continuity was at Dungeness, where it was found in three tetrads on small sandy banks over shingle. Elsewhere, it was on a motorway bank near Ashford and in two localities in the Medway valley: at field edges near Wouldham and Borstal, the latter in good quantity.

Records for 2010-19, however, have shown it as present in 15 tetrads (17 monads), although largely clustered in two areas. One of these remains Dungeness, where it grows on fairly bare consolidated shingle, generally in few numbers in its individual locations. The other is at Betteshanger (formerly Fowlmead) Country Park, where it was discovered in 2012 and grows widely wherever the sharp-draining colliery spoil is exposed, at concentrations of up to 100 plants per square metre. Both these areas have long-term suitability because there is much terrain which remains bare or with low vegetative cover. They account for two-thirds of our 2010-18 records in terms of tetrad totals: five tetrads at each of Dungeness and Betteshanger. The remaining records are miscellaneous in character: by paddocks at St Nicholas at Wade; consolidated shingle away from Dungeness (Hythe ranges, where ground had been disturbed); Burham Downs KWT reserve (either a derivative of the old inland 'dry banks' type of record, or brought in on the feet of reserve visitors); and the slopes of the Medway Valley below Cuxton Road, Strood (the only current West Kent site, with hundreds of thousands of plants in 2012).

Betteshanger car park. Photo by Mel Lloyd, 5 May 2012



Ranunculus parviflorus is an annual, germinating in winter and flowering as early as April. It is an opportunist, taking advantage of bare ground, often in temporary habitats, and sometimes flowering and fruiting as a very small plant.⁹ Disturbance seems required, whether to maintain the open habitat or to expose the seed-bank. This may be by man, as with Hythe ranges where a pipeline had been excavated; or by rabbits, as noted in Philp (1982, 2010) and at Strood, where ground had been scuffed up and the competing vegetation nibbled back, except for *Glechoma hederacea* (Ground-ivy), which is thought to be avoided by rabbits. Other plant associates observed are those growing with *Ranunculus parviflorus* at Betteshanger, and suited to open, well-drained conditions: *Cerastium diffusum* (Sea Mouse-ear), *Cerastium glomeratum* (Sticky Mouse-ear), *Erodium cicutarium* (Common Stork's-bill), *Vulpia* spp. (Fescues).



Ranunculus parviflorus (Small-flowered Buttercup) 2010-19

It may be distinguished from other buttercups by a combination of its annual nature; its possession of (normally) five small petals and five reflexed sepals; its achenes being less than 5mm across, their faces (but not edges) covered with tubercles

bearing short hooked spines; and the plant being hairy (other than the receptacle). Note that *Ranunculus sardous* (Hairy Buttercup) may also be found in field margin habitats, but these tend to be clay, and not well-drained. *Ranunculus sardous* also differs in having a hairy receptacle, larger pale yellow flowers and achenes with warts round the margin rather than being covered with spinous tubercles.

⁹ FitzGerald, R. (1994). *Ranunculus parviflorus* L. Small-flowered Buttercup. In (eds.) Stewart, A., Pearman, D.A. & P99reston, C.D. *Scarce Plants in Britain*, JNCC, Peterborough.

Site	Grid reference	Site status	Last record date	Recorder	Comments
Cudham (metropolitan vc16)	TQ45P		1984	JP	Chalky field edge.
Luddesdown	TQ66S		After 1970, before 1981	Philp (1982)	
Strood / Cuxton	TQ7267		(1) 22 May 2012 (2) 15 May 2002	(1) GK (2) JP	(1) Scattered along 350m length of site between Roman Road and A228, from TQ 72576 67918 to TQ 72289 67710, most frequent at north east end, where ground at times carpeted. Hundreds of thousands of plants overall. On tipped ground, clay, most frequent in semi-open parts. Site appeared to have been rabbit-grazed, with unpalatable plants frequent - <i>Glechoma hederacea</i> , <i>Hypericum perforatum</i> , <i>Dipsacus fullonum</i> , etc. Site known from previous years, when may have been even more of <i>R. parviflorus</i> . (2) TQ 725 678, in thin grassland, large numbers of plants spread across the area in open ground, heavily rabbitied.
Burham Down	TQ7362	KWT managed reserve	(1) 9 May 2011 (2) 29 April 2011 (3) 24 May 2010	(1) DG (2) DM (3) DG & SP	(1) TQ7362. (2) TQ 7340 6233. (3) TQ 73429 62336, Burham Down KWT reserve, patch of c. 55 plants in area of c. 1sq m. Close to fence at southern end of reserve, 50m up from gate.
Marden	TQ74N		After 1970, before 1981	Philp (1982)	
Wouldham	TQ76H		28 June 2006		Field edge.
Borstal	TQ76I		After 1990, before 2006	EGP (Philp, 2010)	Field edge, in quantity.
Oare	TR0064		1 June 2019	LR & DC	
Dungeness	TR0518		27 April 2014	TI	10 plants at TR 05997 18466.
Dungeness	TR0616		(1) 27 June 1996 (2) 1976	(1) EGP (2) EGP	(1) Given as TR01T, and may or may not belong to this monad. (2) TR0616.
Dungeness	TR0618		(1) 27 April 2014 (2) 27 May 2012	(1) TI (2) SB	(1) 15 plants at TR 06063 18528, 120 plants at TR 06360 18064 and 10 plants at TR 06778 18182. (2) Pathside on RSPB reserve at TR 06358 18060. [A record from Philp (1972) for TR01U may or may not belong here.]
Dungeness	TR0619		15 June 2010	GK	One plant on bare-ish consolidated shingle, TR 06462 19895.
Lydd airport	TR0621		June 2014	FJR	TR 06911 21331, from Lydd airport lands survey.
Dungeness	TR0718		27 April 2014	TI	15 plants at TR 07007 18578.
Dungeness	TR0816		14 May 2005	DM	One plant by a spoil heap in former gravel pit at TR 00316 64198, plus scattered plants there from TR 00480 64351 to TR 00488 64366.
Dungeness	TR0817		(1) 25 May 2012 (2) 14 May 2005 (3) 6 June 1995	(1) CO (2) JS (3) DW	(1) By old rail track south of Long pits, one extensive patch. (2) TR 081 171. (3) TR 08531 17214, new patch near Teasle Bank. [A record from Philp (1972) for

					TR01Y may or may not belong here.]
Dungeness	TR0818		(1) 2010 (2) 25 May 2012	(1) TI (2) CO	(1) (2) Sandy hillocks near southern long pit, few small plants. [A record by EGP on 27 June 1996 for TR01Z may or may not belong here.]
Mersham-le-Hatch	TR03U		25 May 2006	EGP	
Lydd ranges	TR1534		29 June 2013	SB & OL	MOD Ranges, plants spread along 30 metres of shingle at TR 150 810 where a pipe had been recently buried.
St Nicholas at Wade	TR2666		9 May 2016	CO	c. 1 sq metre, but sparse and patchy adjoining old fence post just off to north of public footpath at TR 2675 6685; plus three plants / very small patch along same fence line of next paddock north.
Betteshanger	TR3353		23 September 2015	SB & LR	A patch of plants on bare colliery spoil at TR 3383 5312.
Betteshanger	TR3453		1 June 2008	JS	TR 3494 5387, country park
Betteshanger	TR3553		14 May 2012	SB	On bare ground/colliery spoil around much of the cycle track and footpath margin within the Country Park e.g. at TR 35309 53463, also under new tree plantings at TR 35185 53677 and in many other places where the colliery spoil remains exposed. Density reaching as many as 100 plants to 1 sq metre.
Betteshanger	TR3554		(1) 19 April 2014 (2) 19 May 2013 (3) 14 May 2012 (4) 5 May 2012	(1) JL (2) KBRG meeting (3) SB (4) ML & SC	(1) TR 3563 5431, pathside, grassland. (2) (3) On colliery spoil on traffic roundabout at TR 35199 54018, in nearby car park and frequent in the Country Park wherever the colliery spoil remains exposed. Density reaching as many as 100 plants to 1 sq metre. (4) TR 35245 54059 & TR 35257 54049, on gravel / shale spoil at country park carpark, including in amenity planted areas.
Betteshanger	TR3653		(1) 19 May 2013 (2) 14 May 2012 (3) 23 June 2007	(1) GJ (2) SB (3) BL	(1) Edge of track at rear entrance to Fowlmead TR 36159 53772. (2) Frequent within the Country Park wherever the colliery spoil remains exposed e.g. at TR 36183 53915. Density sometimes as much as 100 plants to 1 sq metre. (3) TR 3494 5387, along slope by new planted trees ; and TR 36254 53985 on established old turf near colliery edge.
Betteshanger	TR3654		(1) 19 May 2013 (2) 14 May 2012	(1) KBRG meeting (2) SB	(1) (2) Frequent within the Country Park wherever the colliery spoil remains exposed e.g. at TR 36181 54244 with <i>Cerastium diffusum</i> , <i>C. glomeratum</i> , <i>Erodium cicutarium</i> , <i>Vulpia</i> sp etc. Density as much as 100 plants to 1 x 1 metre.

Ranunculus peltatus Schrank (Pond Water-crowfoot)

Draft account

vc15 and 16

Rarity / scarcity status

Ranunculus peltatus is an aquatic found through most of the British Isles except northern Scotland and its threat assessment for England and Great Britain as a whole is one of 'Least Concern'. In Kent, however, there is evidence of serious decline and, although current records do not demonstrate quite the extent of loss as had been supposed, they still show that it verges on being **scarce**.

The Dowels. Photo by Liam Rooney, 27 June 2012

Account

Early records are complicated by the names used: Hanbury and Marshall (1899) list separately under *R. peltatus* records which were then taken to be taxa called *truncatus* (this now appears to be a synonym of *R. peltatus*); *floribundus* (also a synonym of *R. peltatus*); *pencillatus* (this is now treated as a separate species, and in Kent is *R. pencillatus* subsp. *pseudofluitans*); and they also have a separate species *R. heterophyllus*, of which at least some records we would now put under *R. peltatus*. Pre-Linnean names are no less difficult, but it appears as though Thomas Johnson's *Ranunculus aquaticus hepaticae facie*, Lob. *Polyanthemum aquat.* Dod. is almost certainly *R. peltatus*, which places the first Kent record as found by him with other marsh dike flora travelling from Sandwich to Canterbury (*Descriptio Itineris*, 1632). Hanbury and Marshall regarded *R. peltatus* as locally abundant in ponds, streams, and marshes, although if one strips out their records of '*R. pencillatus*' (these belong to rivers), we are left with just ponds and ditches as habitats.



Monks Horton, habitat. Photo by Brian Banks, 29 April 2015

Indeed, Philp (1982) shows very clearly that for 1971-80, *R. pencillatus* subsp. *pseudofluitans* was a Water-crowfoot almost confined to the Darent and Stour, whereas *R. peltatus* was frequent in Wealden ponds, also occasionally elsewhere in deep slow-flowing marsh dikes. A total of 36 tetrads was recorded, so it is surprising that for 1991-2005 Philp (2010) located only seven tetrads, all in the Weald. Apparently, the plant was specifically searched for at a number of former locations and not

found; even allowing for where it may have been missed, there had been serious loss. It is not obvious to what this may be attributed. Ponds may be subject to a cycle of domination and over-shading by willows from

which they may or may not be rescued by clearance; but different, widely scattered sites are scarcely likely to have the same periodicity. It does not seem to be an artefact of recording, as our 2010-19 records are for 14 tetrads (15 monads) so, although the decline is not quite as serious as indicated by Philp (2010), it is still a loss of 61% since 1971-80.

Hamstreet. Photo by David Steere,
19 May 2019

The 2010-19 records have restored a little of the more extensive distribution known in 1971-80, by showing presence outside the Weald. A 2010-11 find in a small pond at Dartford Heath repeats a 1971-80 tetrad record here. Records for 2013-14 at Herne Common also repeat an earlier tetrad record, but show very different levels of abundance, as well as



different ponds. A 2019 record for a deer-tramped pond in Knole Park, TQ 54953 54188, is new, and a surprise (the recorders were expecting *Ranunculus hederaceus*). Although one of the 2010-19 records was for a ditch (at the Dowels, near the Royal Military Canal), all others were for ponds, and frequently those in fields grazed by sheep, cattle or horses. It may be that marginal trampling assists the species, but it must also be the case that grazing and pond maintenance for grazing access inhibits tree growth which might over-shade. A 2014 record near Staplehurst noted the Water-crowfoot in a small area of open water cordoned off for animals to drink, while the rest of the pond was shaded by trees.



Gibbins Brook. Photo by Liam Rooney, 30 June 2013

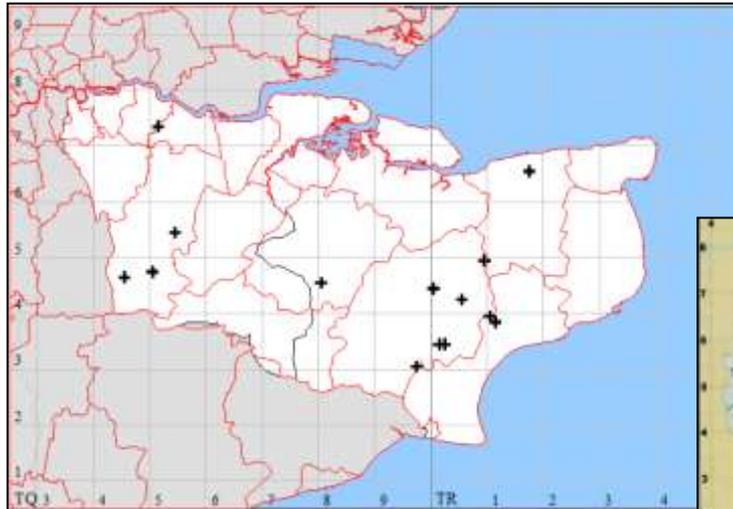
Apparently, *Ranunculus peltatus* can show considerable plasticity of form and behaviour according to season and under different environmental conditions, in nutrient-poor undisturbed sites having small flowers and achieving little sexual reproduction; in nutrient-rich undisturbed sites having long, branched shoots; and in weakly shaded disturbed sites being small but having many flowers.¹⁰ Its development may be regarded as taking place in four stages: elongation (April to June), flowering (May to June), decline/fragmentation (June to July) and regeneration (July to August): regeneration has been found to occur only for unshaded or 50% unshaded plants, darkness preventing plants from regrowing; maximum development occurs when growing at 32cm depth.¹¹ Somewhat surprisingly, the growth of buds and flowers in April appears to be enhanced by low concentrations of phosphorus

¹⁰ Garbey, C., Thiébaud, G. & Muller, S. (2004). Morphological plasticity of a spreading aquatic macrophyte, *Ranunculus peltatus*, in response to environmental variables. *Plant Ecology* **173**: 125-137.

¹¹ Dates relate to northern France semi-controlled experimental observations: ¹¹ Garbey, C., Thiébaud, G. & Muller, S. (2006). An experimental study of the plastic responses of *Ranunculus peltatus* Schrank to four environmental parameters. *Hydrobiologia* **570**: 41-46.

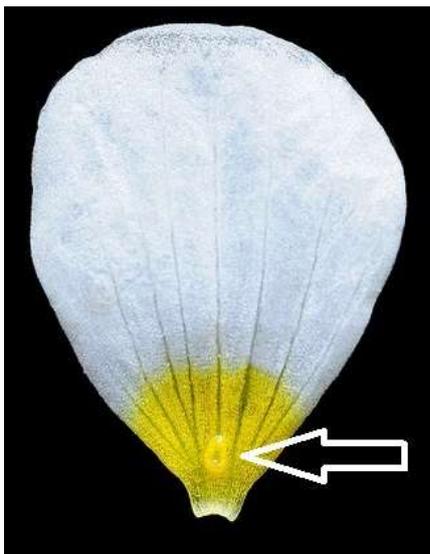
and restrained by higher ones.¹²

It should therefore not be unexpected that changes in a pond environment will affect the presence, or the flourishing of *Ranunculus peltatus* there, but we have not been able to correlate Kent records over time to demonstrate cause and effect, other than in relation to shading.



Ranunculus peltatus (Pond Water-crowfoot)
2010-19

Ranunculus peltatus (Pond Water-crowfoot)
1991-2005



Ranunculus peltatus may be distinguished from other Water Crowfoots by a combination of the following characters: the presence of both shallowly lobed laminar leaves and thread-like leaves (although it can have a temporary terrestrial state with thread-like leaves only); the latter leaves shorter than the adjacent stem internode; sepals spreading and non-blue tipped; pear-shaped nectar-pit on 11-22mm petals.

From The Dowels, showing
nectar-pit.
Photo by Liam Rooney, 28
June 2012



Hamstreet. Photo by David Steere,
19 May 2019

¹² Mony, C. Thiébaud, G. & Muller, S. (2007). Changes in morphological and physiological traits of the freshwater plant *Ranunculus peltatus* with the phosphorus bioavailability. *Plant Ecology* **191**: 109-118.

***Ranunculus tripartitus* DC. (Pond Water-crowfoot)**

Draft account

vc15 and 16

Rarity / scarcity status

Ranunculus tripartitus is a Water-crowfoot thinly spread across the south and west British Isles and regarded as an **Endangered** species in both England and Great Britain as a whole. The English 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 English range had reduced by 79% and its area of occupancy had declined so that there was a 57% reduction in the likelihood of recording the species. It is a UK biodiversity action plan priority species, with actions for keeping sites open and disturbed, especially through grazing management; extending areas of managed habitat; and preventing degradation of ephemeral pools through drainage, eutrophication and competing vegetation. In Kent it is on the edge of the species' British range and has always been rare, without particular recent decline; indeed, recent records have lifted it from being rare to **scarce, verging on rare**.



Hothfield. Photo by Liam Rooney, 19 April 2011

Account

The first published Kent record was by William Borrer in the *Phytologist* (1854, vol.5, p45), in which he stated 'Shown me, in 1852, by Mr. W.W. Reeves, near Tunbridge Wells, on the Kentish side of the boundary of the counties, where he had observed it several years'. Reeves died in 1892, before Hanbury and Marshall (1899) was published, but had communicated to the authors that his original find was in 1846, 'In a pond near the brickfield on the right-hand side of the road between Tunbridge Wells and Southborough'; Frederick Townsend collected it here

in a small pond in deep water, 1851 (specimen in **SLBI**). It is possible to place this at TQ 582 406, north of what is now Skinners' School, but the area has long since been developed. While Hanbury and Marshall (1899) describe the species as a rare native of ponds and ditches, it looks as though they did not know of any other Kent location.



Bethersden. Photo by Stephen Lemon, 23 May 2017

The next discovery seems to have been as late as 1971 (1976?)¹³, when Breda Burt came

¹³ Given as 1971 in the BSBI database, and there is no date in Philp (1982), but Eric Philp is understood to have said that the date was c.1976.

across *Ranunculus tripartitus* in a small pond near Bethersden, where it still continues (2017). There were no further Kent records after Breda Burt's find until the 1990s, when the adoption of *Ranunculus tripartitus* as one of the species covered by Plantlife's Back from the Brink Project resulted in well-documented surveys.¹⁴ Site information includes the following:

Combwell Wood. There does not seem to be evidence of any sighting here earlier than that by Brian Banks in 1996, following some tree clearance. The Water-crowfoot was found in an elongated hollow bearing a shallow pool some 2-5m wide and 80m long with clear but peaty water. It may be seasonal, and dried out at least in summer 1998. In 1998 the pool was largely shaded, with *Ranunculus tripartitus* concentrated around the water edge with a few terrestrial plants, but mostly growing in the water, in March; all aquatic plants in April when water levels had risen; and in decay in July when the water had gone, leaving a damp peaty surface. Associated species included *Juncus effusus* (Soft-rush), *Galium palustre* (Marsh-bedstraw), *Ranunculus flammula* (Lesser Spearwort), *Agrostis stolonifera* (Creeping Bent) and *Rubus fruticosus* agg. (Bramble). While the Water-crowfoot was restricted to the less shaded end of the pool in 1998-99, it did not grow throughout the less shaded area and showed a distinct preference for areas where the leaf litter was thinner. There are no records after 2005 and (2019) the location is very overshadowed.

Bethersden. The original 1970s site could not be found, when Plantlife were investigating records, in 1998-99. It was originally recorded as a tetrad, TQ93I, in which there are, or were, 134 ponds, generally fairly shallow hammer ponds on clay. Its re-finding in 2017 in a neighbouring tetrad was as an accidental result of a KBRG meeting targeting an area which lacked recent general records. *Ranunculus tripartitus* was present in two small ponds, 140m apart, in sheep pasture. In the first pond encountered, the Water-crowfoot was dominant and associated species included *Hottonia palustris* (Water-violet), *Galium palustre* (Marsh-bedstraw), *Ranunculus flammula* (Lesser Spearwort), *Potamogeton polygonifolius* (Bog Pondweed) and *Veronica scutellata* (Marsh Speedwell), nearly all these being Kent rare plant register or axiophyte species, indicating a good quality flora generally. This area also yielded a further find in 2019 in another neighbouring tetrad, at the margin of a large puddle in a woodland ride.

Bethersden, habitat. Photo by Stephen Lemon,
23 May 2017



Hothfield. Surprisingly for a well botanised area, *Ranunculus tripartitus* was not discovered at Hothfield Common until 1994¹⁵, when it was found in a vehicle rut in the lower (south western) part of Bog 1, about 30m north east of the ponds where it has since flourished. In the same year, tree clearance was carried out at the lower (south western) end of Bog 2 and then the bank which follows a sewer pipe crossing this area was

¹⁴ FitzGerald, R., Holyoak, D., Stewart, N. (1998). *Ranunculus tripartitus* DC Three-lobed crowfoot Progress report 1998. Plantlife Report no. 113.

FitzGerald, R. & Stewart, N.F. (2000). Three-lobed water crowfoot *Ranunculus tripartitus* report for 1999. Plantlife Report no. 157 (and appendix 157a).

¹⁵ Although Alex Lockton, in *The Flora and Vegetation of Hothfield Heath* (draft, 2019), suggest that historic records for *R. hederaceus* at Hothfield may have been the product of confusion between the species.

enlarged to form a raised footpath. As part of this work an elongated pool was created on the upper side of the bank and in the next year, 1995, *Ranunculus tripartitus* was found there. In 1996 two further ponds were created to mitigate flooding at a property outside the common, below Bog 1, and *Ranunculus tripartitus* was found there the same year. The initial spread of the species, given appropriate conditions, was therefore very rapid. But its appearance in the first place is not readily explicable. Occurrence in a vehicle rut might suggest transmission of seed on tyres, but there is no obvious place from which a vehicle might have brought it in. It is possible that it has long been present, but unseen, as very low population levels or as buried seed until conditions became favourable. Introduction with cattle grazing does not seem likely: this had ceased by the late 1950s when there were no commoners left, and grazing was not reintroduced until 1993 as regards part of the common, and 1995 as regards Bog 1 (by when the Water-crowfoot had already appeared). Introduction by birds is possible, as with any Water-crowfoot species, although there is no nearby candidate point of origin.

Orlestone Forest. Where found by Eric Philp in 1996, *Ranunculus tripartitus* was growing in a small pond 5 or 6 yards across which seemed fairly permanent with an old tree lying across it, but just in an area cleared of most trees and with a fairly open aspect. The forest is managed woodland, a patchwork of conifer and deciduous blocks with occasional regenerating birch and willow. The pond was re-found in 1998 and 1999, but *Ranunculus tripartitus* was not seen there: it was part shaded and was becoming increasingly overgrown, in June 1999 it was without water and carried a thick layer of leaf litter. Clearance around the pond in 2003-04 brought back a few seedlings, but subsequent finds in the Orlestone Forest area have not been in the woodland, but in neighbouring fields (two ponds in TQ9735 in 2016; one in TQ9736 in 2015).



Overall in Kent, there are two main types of habitat. One is in open ponds or pools; either on heathland or in pasture; either unshaded or lightly shaded; generally with some marginal trampling by livestock maintaining open conditions. The second is woodland pools (Combwell Wood, Orlestone Forest), with some access to light. It has been suggested¹⁶ that woodland sites in the south east may be a relict rather than a preferred habitat, with shade reducing competition but also restricting *Ranunculus tripartitus* growth until woodland management activities afford increased light and disturbance. However, if this is to suggest that these were originally open pools swallowed up by woodland, then this would have to be a very long time ago.

Hothfield. Photo by Lliam Rooney, 19 April 2011

Ranunculus tripartitus is a wintergreen perennial, rarely an annual, characterised by its deeply three-lobed laminar leaves; it may also develop thread-like leaves. It has short blue sepals, half as long as the petals; crescent-shaped nectar pits; and a hairy receptacle. There is often a degree of uncertainty attached to identification of *Ranunculus tripartitus* because its hybrid with *Ranunculus omiophyllus* (Round-leaved Crowfoot) can be very fertile and, if backcrossed sufficiently, virtually indistinguishable from the species. *Ranunculus omiophyllus*, however, appears extinct in Kent.

¹⁶ FitzGerald, R., Holyoak, D., Stewart, N. (1998), cited above.

Site	Grid reference	Site status	Last record date	Recorder	Comments
[Lamberhurst Quarter]	[TQ6439]	[SNCI]	[1997]		[Tentative record by English Nature at Old Swan Farm. Not found, 1999.]
Combwell Wood	TQ7134	SSSI	(1) 19 May 2005 (2) 4 February 2004 (3) 18 July 2003 (4) 24 April 2003 (5) 16 June 1999 (6) 13 February 1999 (7) 1998 (8) April/ May 1996	(1) PH (2) TW, BB (3) BB (4) RS (5) NFS (6) NFS (7) NFS (8) BB	(1) TQ 714 343. 80 plants; concerns over blanket weed coverage were discussed with Plantlife, who thought it not a problem. (2) TQ 714 343. 164 seedlings counted towards the south tip of the pond. Some concern over Soft Rush 'explosion'. (3) TQ 71504 34282, five plants flowering (35 plants in all counted that year). (4) TQ 715 336. South end of pond, on east side (5) c. 180 plants, main concentration on eastern side of pool around the 'shore' of <i>Juncus</i> tufts and other vegetation. (6) Some 160 plants in the same place as previous year, the similarity in distribution suggesting that shade is not the only factor. (7) TQ 714 343, pond by roadside in Horsegate Wood, c. 170 plants, but suffering from shade. (8) TQ 714 343, pond by roadside in Horsegate Wood. Discovered after tree clearance around pool.
Kilndown	TQ74C		1991-98	EGP	Tetrad reference only.
Headcorn	TQ8644		21 May 2018	SL	Sherway Road, east of Headcorn, pond at edge of pasture along road, near public footpath, TQ 86652 44401. Small patch of floating plants (not rooted) in poor condition. Laminar and capillary leaves present. Flowers very small, not contiguous and with nectar pits apparently (and anomalously) circular; sepals dark tipped / deflexing. Receptacle sparsely hairy with fruiting peduncles strongly deflexing, less than 50mm and shorter than opposing leaf petiole. Flowers the same after 5 months when plant kept in shallow water. Conf. RL.
Bethersden	TQ9138		23 May 2017	KBRG meeting	Dominant in a small peaty pond in grazing pasture at TQ 9111 3874. Associates: <i>Hottonia palustris</i> , <i>Potamogeton polygonifolius</i> , <i>Veronica scutellata</i> , <i>Ranunculus flammula</i> , <i>Galium palustre</i> . Also present in quantity in a nearby pond at TQ 9104 3862 but with fewer associates.
Bethersden	TQ9338		23 May 2019	KBRG meeting	TQ 9321 3808, Paul's & Plurenden Woods. A small patch of flowering and fruiting plants, at the margin of a large puddle in woodland track. A few other single scattered plants alongside.
Hothfield	TQ9645	SSSI, KWT managed	(1) 10 April 2018 (2) 20 April 2011	(1) SB (2) LR	(1) In full flower and covering a very large flooded area both at TQ

		reserve	(3) 15 June 2010 (4) 25 May 2010 (5) 1998	(3) JA (4) GK (5) NFS	9665 4562 and at TQ 9663 4557. (2) In full flower and it seems to be spreading. Recorder talked to the KWT warden who confirmed. At TQ 9663 4560 area in scattered patches, but it is apparently doing quite well on west side of the bogs and even in the less acidic areas. (3) c. 15m2 bog at TQ 96641 45579. (4) In wet or drying depressions, occasional east of track for 12m at TQ 96663 45635 then in similar habitats for 19m along the west side of that track, from TQ 96657 45645 to TQ 96644 45626, then again on eastern side of track in similar habitat from TQ 96657 45611 to 96654 45598, again at TQ 96660 45685, and again in considerable quantity at muddy (part shaded) pond margins from TQ 96653 45578 to 96640 45568. [There are earlier records by various botanists, of which the following is selected:] (5) Both ponds in western end of bog 1, TQ 968 453. Pond in bog 3, TQ 967 459, one plant. Western end of bog 2, either side of old pipeline, TQ 966 456.
Orlestone Forest	TQ9735		(1) 28 May 2016 (2) 15 April 2004 (3) 13 June 2002 (4) 1996	(1)SL (2) TN (3) TN (4) EGP	(1) (a) Circular pond with shallow margins in middle of cattle grazed field, immediately west of Sir Edward Street's Wood, TQ 97544 35230. Pond open on all sides with one old <i>Salix cinerea</i> tree. A few flowering plants in two areas less dominated by <i>Glyceria</i> and one of these slightly poached, growing among <i>Callitriche</i> . Pond ringed by <i>Glyceria fluitans</i> , also contained <i>Equisetum fluviatile</i> , <i>Sparganium erectum</i> , <i>Oenanthe aquatica</i> , <i>Potamogeton natans</i> , <i>Lemna minor</i> , <i>Eleocharis palustris</i> , <i>Alisma plantago-aquatica</i> , <i>Ranunculus flammula</i> . (b) Orlestone Pastures and Woods, Shadoxhurst LWS (AS63), Harp Meadows, large pond along north western edge of field, TQ 97208 35928. Large patch in only shallow / muddy open corner of pond, sharing habitat with <i>Callitriche</i> sp., <i>Glyceria fluitans</i> and <i>Ranunculus sceleratus</i> . Discovered previously in this pond by MB and confirmed to SL. (2) TQ 978 351, three seedlings; during 2003-04 winter the land around the pond had been cleared of scrub and rushes, clearance material flailed to a mulch. No plants had been visible the previous year. (3) TQ 978 351, one mature plant in clear water. (4) TQ 979 351, a small pond in

					Longrope Wood [not found in 1998].
Shadoxhurst	TQ9736		9 May 2015	SL, SB & AJ	Hart Meadows, TQ 97138 36013, in flower along open edge of pond in corner of field under light woodland shade with <i>Ranunculus flammula</i> , <i>Callitriche stagnalis</i> and <i>Callitriche brutia</i> . Pond margin muddy and well poached.

***Raphanus raphanistrum* subsp. *maritimus* (Sm.) Tell. (Sea Radish)**

Draft account

vc15

Rarity / scarcity status

Sea Radish grows around the coasts of the British Isles but, except for Suffolk, is largely absent from east England and north Scotland. Its threat status for conservation purposes is regarded as of 'Least Concern', both in England and in Great Britain as a whole. It has always been rare in Kent, and after two sightings were made in 1991-98, it was not recorded further on a confirmed basis until 2019; so its current Kent status remains **rare**.

Account

The first Kent record was at Broadstairs by Willam Hiern, a Devon botanist, in 1869, which may well be the basis for the attribution of Sea Radish to 'Kent east?' in H.C. Watson's *Topographical Botany* (1973). There appear to be no other records until, possibly, 1932 which is the date of a specimen from Ramsgate (collector unknown) in the University of Birmingham herbarium: the identification cannot be trusted, however, as there are no mature fruits. It was claimed by W.J.L. Sladen in a 1947 record attributed to Dungeness but otherwise not noted until Eric Philp's 1991-98 records of 'convincing plants ...found a little above high-tide mark at Minster (Sheppey) TQ97R and Kingsdown TR34Y'. A record 2.8km inland at Lydd Camp (TR 0346 2018) in June 2010 is unconfirmed, although there is a 1953 record also for the Lydd ranges.



Minster. Photos by
Liam Rooney, 26 June
2019

Presence at Minster (Sheppey) has continued, with the finding on 26 June 2019 by Sue Buckingham and Liam Rooney of a great spread of thousands of plants on shingle just above high tide mark at the base of the London Clay cliff from TQ 9606 7355 to TQ 9614 7350. These were mostly yellow-flowered but about 10% were white-flowered. Also present were some pink/lilac flowered *Raphanus* plants which may or may not be this taxon. Tim Rich, BSBI referee, commented that he had not seen pinkish flowers in *maritimus*, this being more characteristic of *Raphanus sativus* (Fodder Radish), for which basal laves and an ovule count would be relevant to determination, and introgression was a possibility for this population.



The other recent sighting was by Owen Leyshon on 24 August 2019 on the shingle strandline at Greatstone, TR 08392 21520. This was a single plant: it would not be unreasonable to expect more occurrences, both here and around the south of Dungeness. In East Sussex, Sea Radish is considered occasional, locally frequent, and showing increase during the period 1980-90 and

subsequently¹⁷; in 2003 it was found at Camber Sands, some 3.9km west along the coast from the vc14/15 boundary. Having regard that longshore drift along this coast is west-to-east (and hence pulls shingle along to the easterly point of Dungeness), any Sea Radish fruits which reach the sea ought to be capable of moving further in the direction of Kent. The fruits are often shed intact and 'clearly advantageous for their tidal dispersal but possibly of almost equal value, from size and buoyancy by ensuring that they tend to remain at, or near, the shingle surfaces that they colonize'.¹⁸ The seeds do not separate readily from their fruit casing.

Greatstone. Photo by Owen Leyshon, 24 August 2019



Minster. Photo by Liam Rooney, 26 June 2019



Sea Radish is a biennial or perennial of sand dunes, shingle, cliffs and open coastal grassland or disturbed coastal ground. While the normally yellow flowers (but white ones are known, as at Minster) separate it from subsp. *sativus* (Garden Radish), it is best distinguished from other Radish species by the fruits. These are strongly ribbed, with 1-5 bead-like segments (subsp. *raphanistrum*, Wild Radish, may have up to 8) which are each as long as wide (longer in subsp. *raphanistrum*), and with a beak usually no more than 3 times the length of the terminal segment((2.5)3-6 times in subsp. *raphanistrum*).

¹⁷ Abraham, F. et al. (Sussex Botanical Recording Society)(2018) *Flora of Sussex*, Pisces Publications.

¹⁸ Salisbury, Sir E. (1974). Seed size and mass in relation to environment. *Proc. R. Soc. Lond. B*, **186**:83-88.

***Rhinanthus angustifolius* C.C. Gmel. (Greater Yellow-rattle)**

Draft account

vc16

Rarity / scarcity status

Rhinanthus angustifolius was formerly a widespread weed of arable land in east Britain (being an archaeophyte or ancient introduction), but this distribution shrank to a very local presence in Surrey, Lincolnshire and Angus. As a result, it is regarded as **nationally rare** and **protected** from picking and sale under Schedule 8 of the Wildlife and Countryside Act 1981, although its threat status, both in England and Great Britain as a whole, is one of 'Least Concern'. It is not part of the traditional Kent flora but appears to have arrived as an accidental introduction and has been spreading in north west Kent, where it now verges on scarce, but is becoming more frequent.

High Elms. Photo by Geoffrey Kitchener, 24 June 2012

Account

The first account of *Rhinanthus angustifolius* in Kent is by Joyce Pitt¹⁹. She refers to its occurrence in Surrey, where it has been well known on the chalk downs at Happy Valley Coulsdon and at Chipstead since the 1960s. The City of London manages commons such as Coulsdon Common and Farthing Downs where the species grows and Spring Park Woods, West Wickham (which are bisected by the vc16/17 boundary) where it did not; but in 1992 the management of the grassland area at Spring Park was changed in favour of an annual hay cut. It appears that *Rhinanthus angustifolius* seed was



accidentally introduced on the hay cutting machinery from Surrey sites. After this, the species starting turning up on other sites where hay cutting is carried out by local authorities and presumably has the same cause.²⁰

In 2010 Orpington Field Club found it in an isolated area of grassland near Burwood School, Avalon Road, Orpington (TQ4765), cut for hay by the local authority. In 2012 it was recorded at Jubilee Country Park (TQ4367); also in High Elms Country Park (TQ4462, probably here at least since 2009); and Keston Common (TQ4164). In 2013 it was at Elmfield Meadow, Bromley Common (TQ4167) and at Tubbenden Meadow, Darrick Common/Newstead Wood Park (TQ4464). In 2014 it was seen at Lullingstone Park (TQ5164; also in TQ5264 in 2015); in 2015 it had extended further in Jubilee Park, reaching TQ4467; and in 2017 it was recorded in Glentrammon recreation ground (TQ4563 and TQ4663). Virtually all these sites are managed by Bromley Council and probably share in common their contractual mowing arrangements. One anomalous site, however, is the nature reserve at Saltbox Hill, Biggin Hill (TQ4061) where it was seen in 2011 on the steep grassland slope of a dry chalk valley. This was grazed (under management by London Wildlife Trust) rather

¹⁹ Pitt, J. (2010). Fifty years of botanical records. In *Orpington Field Club 50 years on...* pp.23-33.

²⁰ Spread on hay-cutting machinery was demonstrated experimentally in the Netherlands: Strykstra, R.J., Bekker, R.M. & Verweij, G.L. (1996). Establishment of *Rhinanthus angustifolius* in a successional hayfield after seed dispersal by mowing machinery. *Acta botanica neerlandica* **45**: 557-562.

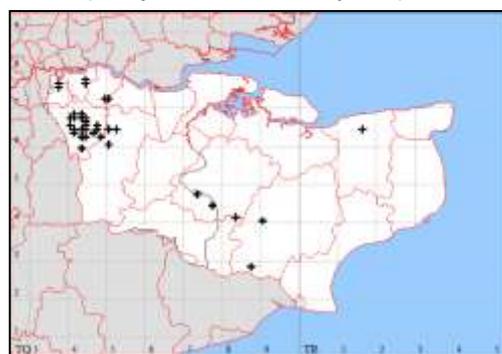
than cut, so that although the species is likely to have been introduced, given that it did not show up on earlier plant surveys, it will not have arrived on mowing machinery. More likely is introduction via grazing stock or from naturalists visiting both this butterfly-rich site and the similar Surrey *Rhinanthus angustifolius* sites



Our 2010-18 records amount to 12 tetrads (13 monads) and are shown on the accompanying map at monad level.

Rhinanthus angustifolius (Greater Yellow-rattle)
2010-19

Oenanthe pimpinelloides
(Corky-fruited Water-dropwort) 2010-19



This distribution is given in comparison with that of *Oenanthe pimpinelloides* (Corky-fruited Water-dropwort) because, although the latter has some native sites scattered across the county, it has also undergone the same sort of expansion as *Rhinanthus angustifolius*, over the same period, in north west Kent. It, too, is presumably a mower-spread plant.



High Elms. Photo by Geoffrey Kitchener,
24 June 2012

Rhinanthus angustifolius is a hemiparasite, attaching to the roots of various grasses and herbs to support its requirements for water and nutrients. It can grow without a host, or with other *Rhinanthus angustifolius* plants, but then is not so successful. Its growth characteristics are capable of being

affected by the host species, Swedish experiments having shown that growth on *Trifolium pratense* (Red Clover) resulted in the tallest, thickest stems, the longest internodes, the longest racemes and highest total flower production, but also delayed and extended flowering; plants grown on *Poa pratensis* (Smooth Meadow-grass) were relatively small with shorter flowering periods than those grown on other grasses; and growth on *Lolium perenne* (Perennial Rye-grass) and *Festuca rubra* (Red Fescue) produced plants with characteristics intermediate between those of plants hosted by *Trifolium* and *Poa*.²¹ It is an annual, whose seed has only short term viability, generally not more than a year. Accordingly it is vulnerable to population fluctuations, since spring drought may reduce seed production without an ability to recruit from a persistent seed-bank.²²

²¹ Jonstrup, A., Hedrén, M. & Andersson, S. (2015). Host environment and local genetic adaptation determine phenotype in parasitic *Rhinanthus angustifolius*. *Botanical Journal of the Linnean Society* **180**: 89-103.

²² Ameloot, E., Verheyen, K., Bakker, J.P., De Vries, Y. & Hermy, M. (2006). Long-term dynamics of the hemiparasite *Rhinanthus angustifolius* and its relationship with vegetation structure. *Journal of Vegetation Science* **17**: 637-646.

Rhinanthus angustifolius differs from the commoner *Rhinanthus minor* (Yellow-rattle) in generally being more robust and branched, with the purple teeth on the upper lip of the corolla being over 1mm long , longer than wide, and the corolla tube curved upwards.



High Elms. Photo by Geoffrey Kitchener, 24 June 2012

***Roemeria argemone* (L.) C. Morales, R. Mend & Romero Garcia (*Papaver argemone* L.) (Prickly Poppy)**

Draft account

vc15 and 16

Rarity / scarcity status

Prickly Poppy is an archaeophyte, or ancient introduction, of arable fields and (rarely) waste places, now more or less limited to central and south England, with a bias to the east. In conservation risk terms, it is treated as **Vulnerable** to the risk of extinction in Great Britain as a whole, and **Endangered** in England. This is on account of its area of occupancy in England being taken to have declined by 51% in comparing records for the periods 1930-69 and 1987-99; there was also a lesser decline, 39%, in its extent of occurrence. In common with many 'classic' arable weeds, it has suffered with the use of herbicides. In Kent, there has been a decline of 76% in the number of tetrad records in comparing surveys of 1971-80 and 1991-2005 (Philp, 1982 and 2010) and the species is on the verge of qualifying as scarce.

Account

The first published Kent (and second British) record is by John Gerard in his *Herball* (1597): 'These plants do growe in the corne fields in Somersetshire, and by the hedges and high waies; as yee travel from London to Bathe. 'L'Obelius found it growing in the next fielde unto a village in Kent called Southfleete, my selfe being in his companie, of purpose to discover some strange plants, not hitherto written of'. How do we read this passage? Gerard shows in the *Herball* much personal knowledge of the Southfleet area, but had not recognised this poppy until a field meeting in the company of his friend and distinguished botanist, Matthias de L'Obel, who was the person who first published it (in 1576) as known in the British Isles. While the passage does not mention L'Obel as the source of information of the species' presence in Somersetshire, it otherwise appears generous in its acknowledgement. This contrasts with the reputation which Gerard acquired for claiming other people's work as his own. An alternative reading, however, might suggest that the attribution of the find to L'Obel was not in the manuscript, but could have been a correction added by L'Obel when commissioned by Gerard's publishers to put right the deficiencies of the *Herball* as it appeared in proof. Gerard resented this commission and had him dismissed. It is generally reckoned that L'Obel had reached the third book of the *Herball* before this; the poppy is dealt with in the second, so he probably had the opportunity of reviewing this passage, however it originally appeared.



West Studdal. Photo by Danny Chesterman, 9 October 2017

Amongst later writers, Thomas Forster (*Flora Tonbrigensis*, 1816) noted the species as 'In cornfields, very common'; Matthew Cowell (*A Floral Guide for East Kent*, 1839) published records about Dover, in cornfields and on roadsides at Margate, at Swalecliffe undercliff, Groveferry and in cornfields near Rochester; and Daniel Cooper (*Flora Metropolitana*, 1836) gave it at Charlton chalk pit, roadsides between Crayford and Dartford, and beyond St .John's Hole turnpike, and between Lee and Eltham. Hanbury and Marshall (1899) pronounced it to be a plant of fields, roadsides, etc., frequent throughout the county, especially in north west Kent and the chalk country districts from Rochester to Wye and Dover to Canterbury, but unrecorded at Romney Marsh.

Francis Rose treated it as a species of arable land and waste ground on chalky and sandy soils: widely but thinly distributed and rather uncommon. Many of his localities were on chalk between the Darent and Medway (11 sites) and the chalk land from the Stour to the coast (eight localities, all in the eastern part). The latter area, the hinterlands of the coast from Dover to Kingsdown, is well populated in the mapping by Philp (1982), which identified 46 tetrad records across the county, the poppy being rather local, usually in cornfields on chalky or sandy soils. By the 1991-2005 survey (Philp, 2010), however, the position appears to have changed drastically, with only 11 tetrads recorded, of which five were in the previous East Kent stronghold, and the rest scattered around the Darent and Medway valleys.



Roemeria argemone (Prickly Poppy)
2010-19

Roemeria argemone (Prickly Poppy)
1991-2005



The distributional data maintained in this register for *Roemeria argemone* will be at 1 km square (monad) level, which entails recording at a finer scale than the tetrads given in Philp (2010), from which the accompanying 1991-2005 distribution map is taken (with kind permission of the late Eric Philp and the Kent Field Club). The 2010-19 data so far broadly affirm the position of catastrophic decline, but not as extensively as Philp (2010), at least as regards the former East Kent stronghold. We have found it in 16 tetrads (equivalent to 19 monads).

West Studdal. Photo by Danny Chesterman,
9 October 2017

Even where present, it does not seem numerous. Our 2010-19 records, where they give numbers of plants, mostly refer to a single plant. There have been sightings of 15 and 20 plants, and 40 seed heads plus a rosette; but other than these instances, or where the recorder has remarked on a scattered population, the general impression is that it is hanging on, and a cross on a distribution map may not account for much on the ground. The use of herbicides, and possibly crop competition (as *Roemeria argemone* appears to be only weakly competitive) generally



confines this poppy to field margins. At least three of our recent records relate to margins which are known to be on farms operating environmental stewardship schemes, and so likely to be protected from herbicide spraying. It is unsurprising that the species is present at Plantlife's Ranscombe Farm, where arable weeds are encouraged; and its appearance there on some experimental chalk scrapes suggests the presence of a seed-bank. Seed germination is supposed to be sporadic, dependent upon erosion of the seed-coat: seed can germinate in autumn (mostly in warm climate conditions²³), but germination is normally slow in any event and normally takes place in spring (March to April), leading to flowering from May onwards²⁴. However, all Kent records appear to be later, mostly July and August, occasionally from mid-June.

Accompanying species noted in our records are those of chalk arable margins: *Valerianella dentata* (Narrow-fruited Cornsalad), *Legousia hybrida* (Venus's-looking-glass), *Viola arvensis* (Field Pansy), *Aphanes arvensis* (Parsley-piert) and *Fumaria officinalis* (Common Fumitory).



Burham Down, habitat – also for *Clinopodium acinos* (Basil Thyme). Photo by David Steere, 3 August 2014

Roemeria argemone is separated from other British poppies, except for *Roemeria hispida* (*Papaver hybridum*, Rough Poppy), by its capsule bearing long stiff bristles, sometimes reduced in number (and very rarely without). From *R. hispida*, it is distinguished by its longer capsule, greater than 1.5cm long and often twice as long as wide, or more.

²³ Karlsson, L.M. & Milberg, P. (2007). A comparative study of germination ecology of four *Papaver* taxa. *Annals of Botany* **99**: 935-946.

²⁴ McNaughton, I.H. & Harper, J.L.(1964). Biological Flora of the British Isles: *Papaver*, L., *Journal of Ecology* **52**: 767-793.

Rosa agrestis Savi (Small-leaved Sweet-briar)

Draft account

vc15 and 16

Rarity / scarcity status

Rosa agrestis is very scattered in the British Isles and is **nationally scarce**. Due to the limited number of individual plants, it is considered to be **Near Threatened** in England and in Great Britain as a whole. In Kent, it has been treated as rare, but on the basis of recent records is **very scarce**.

South Bank of Swale. Photo by Liam Rooney, 1 June 2011



Account

Changing usage of *Rosa* names means that many early records in the genus are difficult to assign, but E.S. Marshall's publication in *Journal of Botany* (1891) 29:120 of what were then notes for Hanbury and Marshall (1899) appears to be the first published account of *Rosa agrestis* in Kent: '*Rosa agrestis* Savi ("*sepium*")'. Borders of chalk woods, between Chilham and Crundell. (Two stations, Webb, 1875; specimens in Herb. Brit. Mus.!). My plants have the leaves hairy on both sides, and white flowers.' In Hanbury and Marshall (1899), it was thought better to call the species *Rosa sepium* Thuillier, and as well as attributing the Chilham site to Marshall himself, the *Flora* elaborated on F.M. Webb's sites. One was at Sutton Valence; the other (1875) was 'On the edge of a wooded chalk bank about 1¼ mile from Adisham Station, towards Womenswold'. Material from both the Chilham and Adisham collections is in **BM** and has been confirmed by A.L. Primavesi²⁵. The first West Kent record is by the Rev. John Roffey in 1911 at Cobham Great Wood (confirmed material is also at **BM**).



South Bank of Swale. Photo by Liam Rooney, 25 September 2011

After these finds there was a long gap without any confirmed localised records until its discovery on the south bank of Swale Nature Reserve (Philp, 2010). This, when re-found in 2011, was a single bush in the open next to a dike landward of the estuarial wall. An analogous record was made in 2011 by Liam Rooney at Horrid Hill, Gillingham, a promontory projecting into the Medway estuary, where there were a couple of bushes (three in 2015) in an isolated area on coastal rocks. A single plant in Berengrave nature reserve

²⁵ Also in **BM** is a specimen gathered by T.B. Blow in September 1875 (the same month as Webb collected his specimen from near Adisham) marked as from Bekebourne. Blow was a botanist from Welwyn, who collected *R. stylosa* from near Adisham the same month (B.E.C. Report for 1875); so it is entirely possible that he was on an outing with Webb, the attribution to Bekebourne was approximate and his site was the same as Webb's.

followed in 2012; it is 100m from the Medway estuary, and about 1.8km from the Horrid Hill site, so there are similarities.

South Bank of Swale. Photo by Liam Rooney, 6 May 2011

Also in 2012, a bush in a hedgerow at Boughton-under-Blean was discovered; this does not seem to follow any pattern with the other sites. That is also the case as regards a find near the M25 south east of Crockenhill in 2015, and the discovery of *Rosa agrestis* in Ditton Quarry by the *Rosa* expert, Roger Maskew. The Ditton site, a former ragstone quarry, now a nature reserve, presents some difficulties for interpretation of the status of records made here. Subsequent investigation by Sue Buckingham indicates that an area which now includes *Rosa agrestis* was planted out by the owners in the early 2000s. Although *Rosa agrestis* looks 'natural' enough here and might be thought to be a surprising species to have been planted, we cannot assume with confidence that its presence here is 'wild', unless examples are found young enough to represent naturalisation, rather than planting. The rest of the quarry site was planted out in the early 1990s when quarrying had finished, and this included roses. There are roses of all sizes, clearly spreading, and it seems reasonable to regard hybrids as having formed there on their own account. One of these (a bush at TQ 715 574) is *Rosa agrestis* (f) x *canina* (m) (*R. x belnensis*), found by Roger Maskew.



Discounting the Ditton quarry introduction, the pattern of occurrence seems fairly random except for the estuarial plants. That randomness may be a product of bird dispersal, with estuarial sites representing landfall by birds travelling along the Thames and Medway; but this is speculation.

Rosa agrestis is a Sweet-briar, noticeable from the numerous glands on the leaf undersides with their fruity odour. From the other Sweet-briars it is differentiated by a high proportion of leaves having a cuneate base. Also, from *Rosa micrantha* (Small-flowered Sweet-briar) and *Rosa rubiginosa* (Sweet-briar) it may be separated by its smooth pedicels and from the latter by having reflexed sepals.



South Bank of Swale. Photos by Liam Rooney:

left, showing cuneate based leaves, 6 May 2011; right, showing reflexed sepals and smooth pedicel, 1 June 2011.

Site	Grid reference	Site status	Last record date	Recorder	Comments
South east of Crockenhill	TQ5165		28 July 2015	RMB	TQ 5105 6557 in belt of trees at edge of field parallel to M25 motorway and separated from it by a ditch and another belt three bushes, the SW one now 5 m tall, having scrambled up a small tree now dead, the middle one nearby as large but has fallen into it.
Ditton Quarry	TQ7157		14 August 2015	RMa	TQ715 575, TQ715 574, single bushes in former quarry.
Horrid Hill, Rainham	TQ8168	Medway Council managed country park	(1) 13 August 2015 (2) 27 July 2011 (3) 19 July 2011	(1) RMa, GK (2) LR, GK (3) LR	(1) TQ 81083 68883, TQ 81090 68890, TQ 81093 68889, just above shoreline on west side of Horrid Hill coastal promontory. Three bushes. Reconfirmation of 2011 record. (2) Material collected from a bush at TQ 81086 68884, Horrid Hill (small bush in coastal rocks, altitude 4 metres according to GPS, but probably closer to sea level); and from a nearby bush in rough vegetation by coastal path at TQ 81096 68890. Both conf. by RMa. (3) Two bushes: leaflets were covered in stalked glands that gave off a sweet sugary smell. Sepals were hairy, reflexed with lateral lobes, and covered in stalked glands; leaflets were small and very cuneate (not hairy, however) and the pedicels were hairless and glandless. Orifice of the hips about a quarter the width of the disc.
Berengrave, Rainham	TQ8267	Medway Council managed country park	13 August 2012	SB	Single plant at TQ 82295 67540 in Berengrave Nature Reserve.
Boughton-under-Blean	TR0659		(1) 12 August 2015 (2) 5 June 2012	(1) LR, RMa, GK (2) LR	(1) TR 06583 59624, south-facing roadside hedge, Staplestreet Road. Confirmation of 2012 record. (2) TR 06583 59624. One tall plant in the hedge on the north side of Staplestreet Road, Hernhill.
South Bank of Swale	TR0464	KWT managed reserve	(1) 6 May 2011 (2) 1991-99	LR	(1) TR 04612 64909. Cleve Marshes. Behind the Sea wall next to a dyke. (2) recorded as TR06M.

***Rosa spinosissima* L. (Burnet Rose)**

Draft account: Kent photos of plant and habitat needed, including ripe hips, preferably from native chalk habitat. Confirmation of continued presence at Boxley desirable.

vc15 and 16

Rarity / scarcity status

Rosa spinosissima is widespread in the British Isles especially in dry, sandy places near the sea, but also occasionally inland on sandy heaths or scrubby habitat on chalk or limestone. Its threat status is regarded as one of 'Least Concern' in England and in Great Britain as a whole. In Kent, it has been considered **scarce** and declining, although planting has the potential to obscure its status.

Account

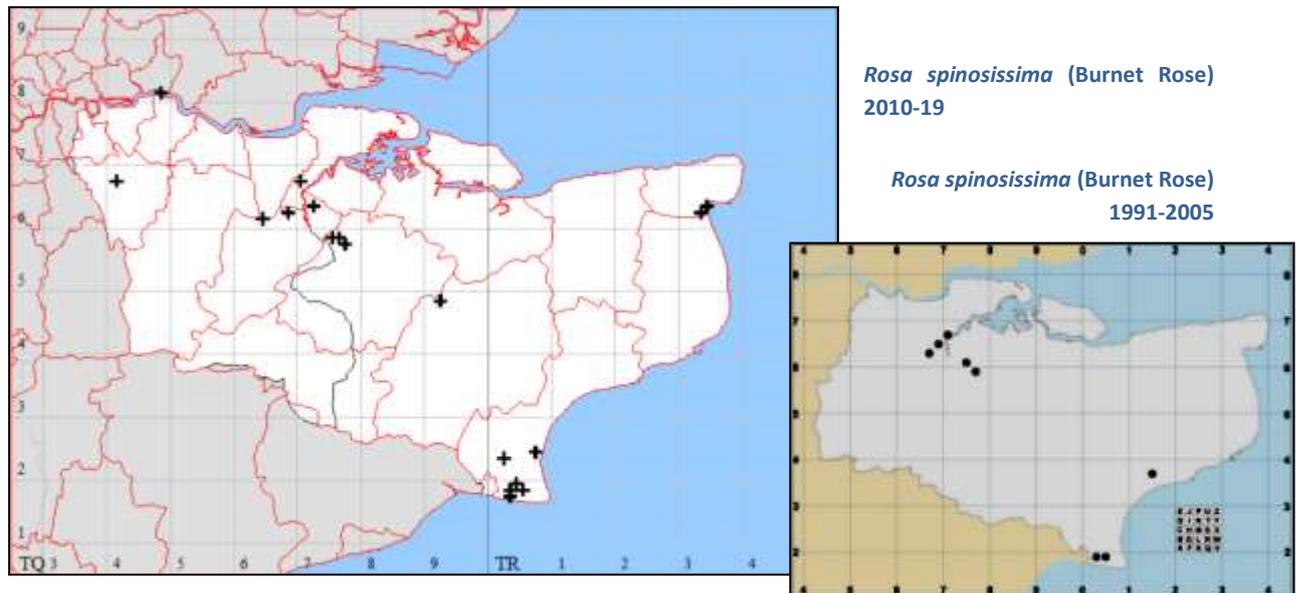
The first Kent record is by Thomas Martyn in his *Plantae Cantabrigienses* (1763), 'Between Milton and Chalk'. Hanbury and Marshall (1899) regarded the Burnet Rose as local, in bushy places, chiefly on chalk. Locations mentioned by them include a cluster around the Medway Gap and the North Downs on either side, all no doubt on chalk, although a sighting by Hanbury between Yalding and Cox's Heath would have been different: perhaps on the Hythe Formation. Too late for Hanbury and Marshall (1899) was Lady Davy's find of the rose at Denge Beach, Dungeness in June 1899. There is also a Dungeness specimen gathered by the Rev. Arthur Gregor in 1908 at **SLBI**.

There is continuity as regards many of these sites. There remains a scattering at Dungeness, although not necessarily at the old locations, but the sandy shingle affords one of the plant's habitats, being well-drained. Chalk is also a free-draining medium and provides the substrate for the principal Kent native sites. Hanbury and Marshall (1899) mention a record published in 1837 of the rose 'Between Cobham and Cuxton through Bush' which may well correspond to Mill Hill, where Henry Ridley collected it in 1881 and where a small colony still exists, managed with Ranscombe Farm. They also refer to having seen it at Upper Halling, and it is still present in the Crookhorn Wood area, especially where scrub clearance has restored some of the past degree of openness. E.S. Marshall found it in plenty on the downs above Ryarsh, which sounds as though it was between existing populations at Crookhorn Wood and at Trosley Country Park. Both Marshall and A. H. Wolley Dod found it abundant at Boxley Warren where Francis Rose noted it in 1954 (TQ7759) and Eric Philp recorded it in the period 1991-2000 (we lack more recent confirmation). The survival of the inland populations runs counter to the trend of southern Britain, where many of these were lost by 1930.

In contrast, the report of *Rosa spinosissima* being plentiful on the hills about Dover does not seem to have continued into modern unplanted records; nor does its presence near Sittingbourne and at Darland, Gillingham.

By the time of the 1971-80 survey (Philp, 1982), *Rosa spinosissima* was considered very local and scarce in the county, on chalk downland, in sandy scrub and on beach shingle, with 13 tetrad records. These included the Medway Gap cluster, Dungeness and also two tetrads at Littlestone. The 1991-2005 survey (Philp, 2010) gives it as decreasing, with only eight tetrads. Some of this reduction relates to odd records away from the core locations, but although Littlestone no longer featured, it has since been recorded there (2013). Our 2010-19 records, however, amount to 18 tetrads (18 monads), and so do not appear to support a case for decline. Nevertheless, they do include a clearly planted rose at Bromley Common, and one that is likely to have been planted, at Pegwell Bay; also a plant near Charing Heath probably associated with motorway construction. These 2010-19 records are shown here, mapped at 1 km square (monad) level, in comparison with the tetrad

mapping given in Philp (2010), from which the accompanying 1991-2005 distribution map is taken (with kind permission of the late Eric Philp and the Kent Field Club).



The BSBI database has records for metropolitan West Kent which are generally best ignored as no more than garden or amenity plantings, although a small plant has been seen, apparently unplanted, at Cross Ness sewage works, which may make a case for bird dispersal. Sometimes it is difficult to allocate a status to a plant, given the potential for birds to spread seed from garden plants (for which it is recommended as ground cover and/or for poor soil), or from plantings alongside new or reconstructed roads, where it has presumably been chosen as a native species. Several records in the Sandling / Pendenden Heath area are likely to have one or other of these origins; obvious highway planting has also been seen near Bluewater.

Rosa spinosissima is known to hybridise with other roses, namely:

- with *Rosa canina* (Dog-rose) at Red Wood, Luddesdown in 1951;
- with *Rosa sherardii* (Sherard's Downy-rose) in 1893 at Upper Halling, expertly determined, but there are no recent records of *R. sherardii* in the county, let alone the cross;
- with *Rosa mollis* (Soft Downy-rose) at Halling and Trottiscliffe in 1893, expertly determined, but the continued presence of *Rosa mollis* in the county is unclear – some coastal records have been assigned to *Rosa villosa* (Villous Downy-rose), other records to a wider treatment of the species (*R. mollis* agg.);
- with *Rosa rubiginosa* (Sweet-briar) at various places 1893-1900 including Boxley Warren and Upper Halling, expertly determined; and
- with *Rosa tomentosa* (Harsh Downy-rose), seen by E.S. Marshall in 1893 at Upper Halling and re-found in the same general area in 2015 on chalk slopes from which thick scrub had been cut back (it is not impossible that the suckering growth, derived from *Rosa spinosissima*, had enabled the hybrid to persist from Marshall's time).

The suckering habit of *Rosa spinosissima* enables extensive colonies to be formed, particularly in sand dune habitats, although we have little of these in Kent and the most spreading populations are probably those at Crookhorn Wood. It appears to be light-demanding, less shade-tolerant with its compound leaves than woody

species with simple leaves; and it prefers dry, warm sites.²⁶ The Trottiscliffe plants accord with this, being on the south-facing chalk down slopes, formerly less scrubby than now; the Boxley Warren site (subject to re-finding) is likely to be very similar; the Crookhorn Wood plants grow with southern and eastern aspects on a downland spur; and the Mill Hill site is at the top of a chalk hill with valleys on each side – old Ordnance Survey maps show this as open ground, which suffered encroachment from adjoining woodland by the 1990s, since opened up again. If shaded, it appears that *Rosa spinosissima* reduces flower production and hip formation, or has none at all.

Rosa spinosissima is distinctive by virtue of its stems having dense prickles and its leaflets being small and numerous: (7-)9-11. The flowers are solitary and the hips turn purplish-black on ripening. Hips may be larger on plants of cultivated origin (1.5 x 1.5cm for natural material in comparison with 2.3 x 1.9cm for nursery material has been reported from Germany).

²⁶ Mayland-Quellhorst, E., Föller, J. & Wissemann, V. (2012). Biological Flora of the British Isles: *Rosa spinosissima* L. *Journal of Ecology* **100**: 561-576.

Rubia peregrina L. (Wild Madder)

Draft account:

vc15

Rarity / scarcity status

Rubia peregrina is a scrambling plant, generally found in coastal places in south and west Britain and southern Ireland. Its conservation risk status is one of 'Least Concern'. It becomes much less frequent east of the Isle of Wight, so that Kent coastal populations are somewhat disjunct, and indeed represent the most north-easterly sites up the Channel, being the limits of its European distribution in this direction (the French cliffs on the other side face north and so do not provide the warmer conditions of the Kent chalk cliffs). It is sufficiently local in the county to be treated as **scarce**.

Langdon, Dover. Photo by Lliam Rooney, 12 July 2010

Account

The first published record for Kent is stated by Hanbury and Marshall (1899) to be in Turner and Dillwyn's *The Botanist's Guide through England and Wales* (1805). This gives the plant as at 'Cliffs at Dover, East of the Caves. *Dillwyn*. About Langdon Bay, and Lydden Spout near Dover. *Mr J. Woods, jun.*' However, Lewis Dillwyn had already published part of these records as 'On the cliffs east of the Caves, and in Langdon-bay' in a paper read to the Linnean Society in 1801 (*Catalogue of the more rare Plants found in the Environs of Dover, with occasional Remarks*) and published in their



Transactions (vol. 6) in 1802. Later nineteenth century records also extended south-westwards from Dover towards Folkestone, between Shakespeare Cliff and Abbotts Cliff. The furthest inland appears to have been Caesar's Camp, where the steep chalk slopes provide conditions in some respects comparable with those of the coastal cliffs.

Folkestone Warren. Photo by David Steere, 9 June 2018

Except for a pre-1899 sighting between Dymchurch and Hythe, as well as a 1903 record by the Royal Military Canal, Madder has not been known as a native Kent plant other than along this stretch of coastline. Francis Rose knew it east of Dover Castle (1950-55); below Abbotts Cliff (1947-62) and on upper slopes (1973); east of Lydden Spout (1945);

and at the end of Folkestone Warren (1947-62). This distribution would also be represented by three tetrads given in Philp (1982), where the species is described as very local and rare; but a further tetrad, TQ35Q at Deal, is also given, which seems surprising, as this is a fairly built-up area well separated from the core populations. It is also puzzling that Philp (2010) describes the plant as on the chalk cliffs from Folkestone to Deal, but gives

four tetrads, none of which is near Deal. Our 2010-19 records are for eight tetrads (11 monads), all within the traditional Dover-Folkestone area, except for a couple of sightings in or by roadside hedges near Faversham which are surprising but may have a relationship with a former nursery²⁷. It seems fair to conclude that the Kent populations are more or less constant, the increased number of recent records perhaps representing more thorough survey of the relevant area.

Madder grows as a perennial scrambling plant on the south-facing coastal chalk slopes. While it has been seen on bare chalk and on the concrete sea wall, it can thrive in less open habitats through its ability to climb over scrub, including *Ligustrum vulgare* (Wild Privet), *Crataegus monogyna* (Hawthorn) and *Cotoneaster* sp. The exposure to sun and the free-draining chalk substrate, with little overlying soil, is a particularly demanding habitat for which Madder has stress resistance²⁸. It has low transpiration with good photosynthesis in the aerial part and the capacity to conserve water and to have large starch reserves in the subterranean portion. The underground stems or stolons are partially red and partially yellow, the latter parts having starch reserves and a higher water content.



Habitat, Folkestone Warren. Photo by David Steere, 9 June 2018

Rubia peregrina is distinctive and differs from cultivated *R. tinctoria* in having dark (not light) green leaves with obscure (not prominent) lateral veins beneath.

Site	Grid reference	Site status	Last record date	Recorder	Comments
Faversham	TR0260		(1) 9 May 2014 (2) 10 October 2013	(1) & (2) LR	(1) TR 02376 60307, a well established plant in growing over a hedge in Selling Road. [This area has since been redeveloped but at the time this was a planted hedge bounding a former nursery, and the plant may have had a nursery-related origin.] (2) TR 02516 60346, a young plant present amongst <i>Galium aparine</i> on a bank at Love Lane; seemingly sown from an established parent plant nearby in a hedge. [This is not far from the previous site.]
Folkestone Warren	TR23N (including TR2437)		27 February 2014	OL	(a) TR 24630 37690. Several patches in what is called the 'Scrub Garden' between the two parking areas at the end of the access road into Folkestone Warren, near to the Network Rail metal gate. Well known for a number of years. (b) TR 24351 37454. Large patch

²⁷ It seems coincidental that Faversham was a centre of Madder cultivation and milling for dye in the late eighteenth century, as this would surely have involved *Rubus tinctoria* rather than *Rubus peregrina*.

²⁸ Antonielli, M., Ceccaelli, M. & Pocceschi (1989). *Rubia peregrina* L.: A stress resistant weed. *Environmental and Experimental Botany* 29: 467-471.

					on a north facing scrub bank in an area opened up for reintroduction of cattle grazing. This patch has been known for a few years. (c) TR 24329 37391. Four patches in a <i>Cotoneaster</i> thicket on a south facing chalk grassland slope, between the road and the sea wall, Folkestone Warren. Discovered in winter 2013/14 by M. Tuson and shown to recorder.
Folkestone Warren east of Capel-le-ferne	TR23P (including TR2538)		(1) 9 February 2019 (2) 9 June 2018 (3) after 1970, before 1981	(1) GK (2) KBRG meeting (3) Philp (1982)	(1) Scrambling through <i>Ligustrum vulgare</i> on coastal slopes. (2) TR 258 383, frequent in scrub on the undercliff. (3) TR23P.
Abbotts Cliff	TR23U (including TR2638, TR2738)		(1) 9 June 2018 (2) 30 September 2013 (3) 1991-98 (4) after 1970, before 1981	(1) KBRG meeting (2) SB (3) EGP (4) Philp (1982)	(1) TR2638. (2) Foot of Abbots Cliff at TR2752 3852, growing extensively through <i>Ligustrum vulgare</i> . (3) TR23U. (4) TR23U.
Samphire Hoe	TR23Z (including TR2838, TR2839, TR2939)		(1) 9 July 2013 (2) 16 August 2011 (3) 24 July 2010 (4) 26 April 2010 (5) 4 April 2010 (6) 8 May 2005 (7) 4 July 2006 (8) 1991-98 (9) after 1970, before 1981 (10) 8 July 1986	(1) CO (2) SB (3) SC (4) SB (5) SB (6) DM (7) JP & JW (8) EGP (9) Philp (1982) (10) RoF & MJ	(1) Common along old wire fence between railway and path. (2) (a) TR 28524 38816. (b) TR 29334 39211, on railway fence. (3) TR2939, spreading, at least ten or so plants. (4) TR 29764 39368, on concrete sea wall. (5) TR 28796 38956, on wire railway fence, three large plants. (6) TR 2936 3923. (7) TR2939, two colonies on fence to railway plus a few on the Hoe itself. (8) & (9) TR23Z. (10) TR 284 388, associated with <i>Orobanche caryophyllacea</i> .
Shakespeare Cliff	TR33E (including TR3039)		(1) 5 May 2012 (2) 1991-99	(1) SB (2) EGP	(1) Clifftop at TR 30114 39537, climbing on <i>Ligustrum vulgare</i> . (2) TR33E.
Dover - Langdon	TR3342		12 July 2010	KBRG meeting	Reported by SB as plant(s) stretching for 5 metres at TR 33403 42009.
Dover – Langdon Hole	TR34L (including TR3442)		(1) 12 July 2010 (2) 1991-98	(1) KBRG meeting (2) EGP	(1) Reported by SB as on bare chalk edge of footpath, cut into cliff face at TR 34548 42544. (2) TR34L.
Deal	TR35Q		after 1970, before 1981	Philp (1982)	

***Rumex crispus* L. subsp. *uliginosus* (Le Gall) Akeroyd (Curled Dock)**

Draft account: records and Kent photos needed.

vc16

Rarity / scarcity status

While *Rumex crispus* is an all-too-common agricultural weed, its subspecies *uliginosus* is a **nationally scarce** plant of estuarine mud with a limited distribution in Britain and Ireland, perhaps most extensively along the Rivers Barrow and Slaney in south-eastern Ireland; the River Fergus and other tributaries of the River Shannon in the south-west; and the Wye and other rivers flowing into the Bristol Channel. It is very scarce in the south east: the nearest to Kent are records at the Isle of Wight and in Suffolk, but it has been known on the tidal Medway. Its conservation risk assessment in England is of 'Least Concern'. If it still survives in Kent, it must be regarded as **rare**.

Account

The first record for Kent appears to be J.E. Lousley's collection of a specimen on 12 August 1934 from the mudbanks of the tidal Medway below Aylesford Bridge.²⁹ He first treated this (with qualification as regards the naming) as *Rumex elongatus* but after further study decided that it was *R. crispus* var. *uliginosus*. This taxon was raised to subspecific level by John Akeroyd in 1989, after which it began to be included in standard British Floras (i.e. from the first edition, 1991, of the *New Flora of the British Isles*). This should have encouraged recording, and Philp (2010) refers to it as having been noted on tidal mud in the River Medway but not mapped separately from *R. crispus* in general. This vagueness is unfortunate, as it has not been possible to trace any specific locations from Eric Philp's papers.

Subspecies *uliginosus* is separated from other subspecies by its lax inflorescence when in fruit, often having long branches, and by its more or less uncrisped leaves. With subspecies *littoreus*, it has a large nut (≥ 2.5 mm) and three prominent subequal tubercles. The latter probably assist the dispersal of the nuts by water. It is the earliest of the subspecies to come into flower, although plants do not normally flower in the first year, and may not do so until the third year, their resources being devoted to building up the taproot.³⁰ This may be another adaptation to growth in its tidal habitat, as also its height (1-2m). Akeroyd (2014³¹) refers to it as usually growing towards the upper limits of tidal influence and especially where the river banks are steep and unstable.

There are no recent Kent records and so its present status is uncertain.

²⁹ Lousley, J.E. (1944). Notes on British Rumices: II. *B.E.C. Report for 1941-42*, **XII**: 547-585. Also, Lousley, J.E. (1935). Short notes on some interesting British plants. *Journal of Botany* **73**: 256-260.

³⁰ Akeroyd, J.R. [given as J.K.] (1980). Variation in *Rumex crispus* L. *Watsonia* **13**: 76.

³¹ Akeroyd, J.R. (2014). *Docks and Knotweeds of Britain and Ireland*. Botanical Society of Britain and Ireland, Dorchester.

Rumex maritimus L. (Golden Dock)

Draft account

vc15 and 16

Rarity / scarcity status

Rumex maritimus has a scattered distribution in open damp habitats (not maritime, in spite of its name) in the British Isles, but is less frequent in the west and north. Its conservation risk status in England is one of 'Least Concern', assessed on the basis of trends for the period 1930-99, but its overall historic decline is significant (32%) if post-1987 records are compared with all earlier records. It has been listed for the rare plant register as being scarce, in view of the limited number of records given in Philp (2010) and Philp (1987). It transpires that, although it is very local in the county, there are (2010-19) about three times as many tetrad locations than had been supposed; but the species is for the time being retained in the register because of its history of relative scarcity.

Bewl Water. Photo by Liam Rooney, 30 August 2011

Account

The first Kentish record appears to be by James Petiver and James Sherard. The latter made notes of a journey undertaken by them through Kent in 1715 and this manuscript was consulted for Hanbury and Marshall (1899), who give from it a record (attributing it wrongly to New Romney – it should be Hythe): 'in ye marshes betwixt the Town and Beach we met with Anthoxanthon'. (*Anthoxanthon* or *Lapathum anthoxanthum* was a pre-Linnean name for Golden Dock, with *anthoxanthum* meaning golden flower.) This record was contributed to the third edition of John Ray's *Synopsis Methodica Stirpium Britannicarum* (1724) as 'Betwixt Hithe and the Sea in a Pond; Mr. J. Sherard'. There is a possibility that this record was preceded by Thomas Johnson's noting of *Hydrolapathum minus* at Erith Marshes in 1629, since the name could cover either *Rumex maritimus* or *Rumex palustris* (Marsh Dock), as Francis Rose mentions in the 1972 translation of Johnson's *Iter Plantarum*, given that *R. palustris* was still to be found there, and *R. maritimus* apparently has an 1877 record. On the whole, it is more likely that the find was *R. palustris*. Hanbury and Marshall (1899) considered Golden Dock to be scarce and very local, giving nineteenth century records for the flat marshland adjoining the Thames estuary, at Plumstead, Woolwich and Greenwich, and between Gravesend and Erith. Just too late for inclusion came a sighting by Lady Davy in June 1899 at Littlestone, showing continued presence in the south east.



Francis Rose considered it to be an extremely rare plant of alluvial marsh dikes and brackish fleets, limited to only two locations by the 1950s/60s. The first of these was at Egypt Bay in a brackish fleet where found by J. Braybrooke Marshall in 1938 and seen by Francis Rose in 1946 and 1958, when abundant. There had been other north west Kent sightings not included by him as current: Shornmead by G.M. Brown (one has to hope that this was not confusion with *Rumex palustris* which grows there) and Plumstead Marshes in 1935, which he could not re-find. The second then current location was at Marshside, Chislehurst, where first found by Roberts in 1955 when abundant, and where three plants were noted by Francis Rose and Trudy Side in 1962. Philp (1982) gave six tetrad records, nearly all at the edge of dikes on the estuarial marshes of the Hoo peninsula except for one which appears to relate to Teston / West Farleigh. The dock was considered to be rather rare

and uncertain in appearance. Philp (201) provided only five tetrad records for 1991-2005, again virtually all on the Hoo peninsula, at Cooling/High Halstow and Stoke Marshes, but with the dock having reappeared at Chislet Marshes. Not included in Philp(2010), although within its survey period, was a 2004 find by Geoffrey Kitchener of six plants well inland at Greatness pits, Sevenoaks, TQ5337: they were on clay ridging by a footpath and probably brought as seed by waterfowl to the pit lakes and then spread by pumping operations (the lakes have since been infilled by refuse tipping).

Our 2010-19 records, with 15 tetrads (24 monads) have transformed the position. Golden Dock has now been found at Chetney Marshes and, quite extensively, on the marshes of south west Sheppey. It has also appeared around a cattle-poached pond near Lydd and there are sightings which would have been outside the scope of Eric Philp's surveys because beyond the administrative county boundaries. One of these was in metropolitan vice county 16, at a dried-up water feature on a former golf course near Thamesmead; and the other was at a part of Bewl Water where the vice-county and administrative county boundaries differ.

Rumex maritimus (Golden Dock) 2010-19

Some records are for habitats which did not exist for at least part of the earlier survey periods: the Lydd pond was not there in 1990 and only took its present shape around 2007; some of Cooling Marshes area now part of Northward Hill RSPB reserve was arable in the 1990s; Bewl reservoir was completed in 1975.

However, much of the north Kent grazing marshes where Golden Dock occurs has remained a constant habitat subject to intensity of grazing, but appropriate conditions from year to year may change. It is found at the cattle-trampled edge of fleets and dikes where there is open ground, and in broad depressions



and the summer-dry, sinuous rills or runnels which show the historic pattern of saltmarsh drainage before the inning of the land brought it into usage as pasture. All these exhibit fluctuating water levels and are generally inundated over winter and late into spring. The importance of winter flooding was shown by the appearance in 2014 of thousands of plants at Elmley reserve, Sheppey where grazing marsh lay under water for four months over winter, due to a broken sluice. *Rumex maritimus* is usually an annual and requires open ground for germination and establishment. Winter flooding keeps potentially competitive species at bay and grazing and trampling by cattle helps preserve the openness of the terrain; withdrawal of grazing will limit suitable conditions for the dock.

Bewl Water. Photo by Liam Rooney, 30 August 2011

Growth is speedy, as must be the case with such a late start in the year, and flowering/fruitlet generally begins well before the plant has reached full size. We have on occasion found plants growing in the water, which early in the year are interpreted as, exceptionally, individuals behaving as biennials and later in the year as overtaken by autumnal flooding. It is, however, less tolerant to complete submergence than

Rumex palustris (Marsh Dock), and normally avoids issues of flooding through its short and rapid life cycle³². Typical associates are given by Mountford (1994)³³ as including *Bidens* spp. (Bur-marigolds) and *Chenopodium* spp. (Goosefoots), other annuals which also develop on wet nutrient-rich mud as it becomes exposed to water levels falling during the summer. Associates which we have noted include *Rumex conglomeratus* (Clustered Dock), *Rumex crispus* (Curled Dock), *Rumex palustris* (Marsh Dock), *Lycopus europaeus* (Gypsywort), *Samolus valerandi* (Brookweed) and, at Bewl, *Crassula helmsii* (New Zealand Pigmyweed).

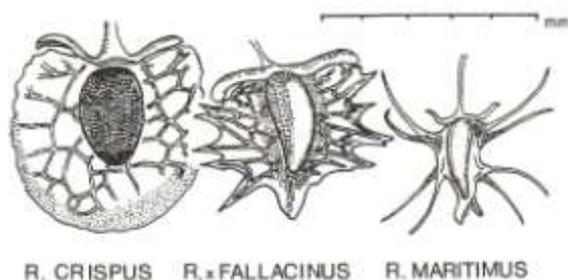
Rumex maritimus acts as a pioneer species, able to colonise new habitats speedily. Seed dispersal locally will generally be by water. The fruits are buoyed by their corky tubercles and may also, through the long teeth of the tepals, be supported by water surface tension. A seed-bank may develop in mud, demonstrated by the growth of plants on dike dredgings. More widespread dispersal is likely to involve birds.

Bewl Water. Photo by Lliam Rooney, 30 August 2011



It is not likely to be confused with other species, except for *Rumex palustris* (Marsh Dock), with which it sometimes grows, e.g. at Thamesmead and Sheppey. They may be separated by general appearance: *R. maritimus* develops a golden colour when mature (although it may have brown patches): *R. palustris* becomes brown or reddish brown. The tepal teeth of *R. palustris* are shorter, as long as the tepal width; those of *R. maritimus* are 2-3 times as long as the tepal width. Papillae may be found on the leaf midrib and petiole of *R. maritimus*; they are absent from *R. palustris*.

In Kent, *R. maritimus* has been found to hybridise with *R. crispus* (*R. x fallacinus*)³⁴ and with *R. conglomeratus* (*R. x knafii*). There are two Kent records for the former cross (1996 at Lower Stoke and 2013 at Chetney), which is very rare nationally.



Tepals of *Rumex x fallacinus* from Lower Stoke and its parents. Drawing by Geoffrey Kitchener

There are seven tetrad (eight monad) records for *R. x knafii* during the period 2010-19, including one atypical plant determined on the balance of probabilities: most were on the grazing marshes of the Hoo peninsula where hybrids were not infrequent in the presence of both parents, having a more etiolated and ragged panicle than *Rumex maritimus* and with tepals bearing shorter teeth.

³² Nabben, R.H.M., Blom, C.W.P.M. & Voeselek, C.J. (1999). Resistance to complete submergence in *Rumex* species with different life histories: the influence of plant size and light. *The New Phytologist* **144**: 313-321.

³³ Mountford, J.O. (1994). *Rumex maritimus* L. Golden dock, in (eds.) Stewart, A., Pearman, D.A. & Preston, C.D., *Scarce Plants in Britain*, JNCC, Peterborough.

³⁴ Kitchener, G.D. (1996). *Rumex x fallacinus* Haussknecht – a hybrid dock new to the British Isles. *Transactions of the Kent Field Club* **15**: 39-40.

Rumex palustris Sm. (Marsh Dock)

Draft account

vc15 and 16

Rarity / scarcity status

Rumex palustris has a scattered distribution in open damp habitats in the British Isles, but is much less frequent in the west and north. Its conservation risk status in England is one of 'Least Concern', assessed on the basis of trends for the period 1930-99, but its overall historic decline is significant (32%) if post-1987 records are compared with all earlier records. On the basis of data in Philp (2010), it would be considered rare in Kent, but having regard to metropolitan West Kent records not covered by that survey and to more recent records generally, it is treated as **scarce** in the county.

Account

The first published Kent record for Marsh Dock is to a degree ambiguous, as mentioned in the register account for *Rumex maritimus* (Golden Dock), but it is most likely that *Rumex palustris* was the identity of *Hydrolapathum minus* at Erith Marshes recorded by Thomas Johnson in 1629. He also noted this taxon in 1632, en route between Margate and Sandwich, probably near Pegwell Bay. Hanbury and Marshall (1899) treated it as a rare plant of marshy places, with records near the Thames estuary at Plumstead and Charlton, as well as a somewhat anomalous record ('On the sides of the new road from Tonbridge Town to the Wells') from Thomas Forster's *Flora Tonbrigensis* (1816)³⁵.



Thamesmead. Photo by Mike Robinson, 10 August 2016

Francis Rose regarded the species as a plant of bare muddy ground by ponds, and in marsh dikes, limited to the neighbourhood of the Thames (except for historic records and a 1997 sighting by a scrape west of Boulderwall Farm, Dungeness). It was present at the muddy edge of a pond by Lesnes Abbey in 1948-49; in alluvial marsh dikes at Plumstead Marshes in 1944 and 1949; in dikes, rarely, at Swanscombe Marshes in 1946; and near Shornmead Fort, where locally abundant in

1945-46 (and still is, 2018). Philp (1982) mentions it only in three tetrads, at the edge of ponds and dikes on Shorne Marshes, with the odd plant on Dartford Marshes. During the 1991-2005 survey (Philp, 2010), however, sightings in the administrative county³⁶ were limited to continued regular appearances on Shorne Marshes (one tetrad) and to healthy populations about pools and ditches in two tetrads at Dungeness.

³⁵ They remarked that it was not given as well in Edward Jenner's *Flora of Tunbridge Wells* (1845), so there may be a suggestion of caution in evaluating the record. Forster noted against his species the plate from Smith's *English Botany* relating to the named plant, in this case plate no. 1932. This plate was (as acknowledged by Syme in a later edition of *English Botany*) in part drawn from *Rumex x pratensis*, which is a more probable find. Lousley (in *Notes on British Rumices, I* (1939) *B.E.C. Report for 1938*) agreed that the plate did not represent *Rumex palustris*, but was a hybrid of somewhat doubtful identity.

³⁶ Just outside the county, however, but within vice county 16, was a record by John Palmer in 2000 by standing water on ground at Crayford Marshes, TQ 531 752, marshy in winter; it was thought probable that seeds had been brought in by wildfowl.

Three tetrads would warrant treatment as rare for the purposes of this register. However, 2010-19 records have been much fuller, with sightings from nine tetrads (12 monads). Three of these tetrads were in metropolitan West Kent and so fell outside the area covered by Philp (1982) and Philp (2010): they involved sites around Erith Marshes and Thamesmead, including a dried-up water feature in a former golf course, and a record from Gallions Reach, a part of vc16 which lies on the Essex side of the Thames in the London Borough of Newham. The remaining sites included the grazing marshes and cattle-trampled dike margins of Shorne Marshes; a new site at Walland Marsh, well to the north east of earlier Dungeness records; and new sites on winter-flooded ground at Sheppey and by a brackish fleet on the neighbouring Chetney Marshes peninsula. Marsh Dock, although still scarce, now appears to be more widespread and frequent in the county than has been known at any one time before, but there is still uncertainty as regards its appearance, which relies on availability of disturbed habitat and fluctuating water levels.

It grows as an annual, biennial or short-lived perennial and its association with mud, especially cattle-trampled, exposed by seasonally receding waters enables germination to take place where there is limited competition. It is adapted to withstand rising water levels, once established, by changing its growth characteristics³⁷. Within two to four hours of submergence, a plant will commence vertical orientation and growth of petioles and leaf blades and within six to eight hours the youngest leaves are almost vertical. In case the leaves do not reach above the surface, the growth of the youngest petioles is strongly enhanced in phases for several days; it reverts to normal if submergence ceases. Flooding also encourages the formation of adventitious roots enabling shoot-to-root diffusion of air.³⁸ These adaptations are significant for a plant which would normally need to survive flooding as a vegetative plant, in contrast with *Rumex maritimus* (Golden Dock), which would normally complete its life cycle between winter floods.

The fruits are shed onto the soil or into water and with autumn/winter flooding may be dispersed by water movement or the wind blowing them into a scumline at the edge of a waterbody as shown in the accompanying photo (where most fruits are *Rumex conglomeratus*, but some from *Rumex palustris* are arrowed).



Rumex fruits floating at margin of fleet at Chetney Marshes (*Rumex palustris* arrowed).

Photo by Liam Rooney, 23 Octobe 2012.

Fruits may also be dispersed by birds, which appears to be the origin of plants found on dredgings from Lullingstone Castle Lake, TQ5264, in 1993 with *Bidens cernua* (Nodding Bur-marigold) and *Bidens tripartita*

³⁷ Voesenek, L.A.C. J. *et al.* (2003). Interactions between plant hormones regulate submergence-induced shoot elongation in the flooding-tolerant dicot *Rumex palustris*. *Annals of Botany* **91**: 205-211. Vreeburg, R.A.M. *et al.* (2005). Ethylene regulates fast apoplastic acidification and expansin A transcription during submergence-induced petiole elongation in *Rumex palustris*. *The Plant Journal* **43**: 597-610. There have been many other studies of the mechanisms relating to the responses of *Rumex palustris* to flooding.

³⁸ Visser, E.J.W. *et al.* (1996). An ethylene-mediated increase in sensitivity to auxin induces adventitious root formation in flooded *Rumex palustris* Sm. *Plant Physiology* **112**: 1687-1692.

(Trifid Bur-marigold)³⁹ – none of these normally being plants of the Darent valley, but the lake is well frequented by waterfowl, which could have brought in seeds from elsewhere.

It is not likely to be confused with any other species except *Rumex maritimus* – for the differences, see under the account for that species.

Thamesmead. Photo by Mike Robinson,
10 August 2016



In Kent, *R. palustris* has been known to hybridise with *R. crispus* (*R. x heteranthos*) and this has been recorded in a cattle-tramped ditch at Shornmead Fort, TQ 694 747, in 2003; in a cattle-trampled area by a brackish dike at Shorne Marshes, TQ 6966 7407 in 2006; and by a ditch at Elmley Reserve, Sheppey, TQ 92668 69234 in 2014. The cross with *R. obtusifolius* (*R. x steinii*) has a pre-1987 record in the BSBI database for West Kent, TQ47. The hybrid with *R. conglomeratus* (*R. x wirtgenii*) has several West Kent records, these being docks which are likely to grow together, so far as the scarcity of *R. palustris* permits: near Shornmead Fort, TQ 694 746 in 1986; occasional in cattle-trampled dike margins on Shorne Marshes from TQ 694 739 to TQ 696 741 in 1996; at Erith Marshes in the same year; near Crossness in 2000; and again at Shorne Marshes, possibly on former dredgings, at TQ 6966 7407, in 2006.

Site	Grid reference	Site status	Last record date	Recorder	Comments
Woolwich (metropolitan vc16)	TQ4379		1997	NB	TQ 4303 7929.
Gallions Reach (metropolitan vc16)	TQ4480		2010	JE	From vc16 north of the Thames.
Thamesmead east (metropolitan vc16)	TQ4780		18 July 2018	RMB	One plant on bare west edge of scrape, TQ 47987 80481.
Crossness Nature Reserve (metropolitan vc16)	TQ4781		16 August 1997	JS	TQ476 814.
Thamesmead east (metropolitan vc16)	TQ4880		10 August 2016	MR	TQ 48112 80918 (grid ref for majority of plants), about 10 plants, at , edge of dried-up water feature part of former Thamesmead Golf Course, left to run wild after closure two or three years before. <i>R. maritimus</i> also present.
Erith Marshes (metropolitan vc16)	TQ4980		(1) 20 July 2013 (2) 17 July 2005 (3) 16 August 1997	(1) RMB (2) JP (3) KFC meeting	(1) Island Field west of bund, TQ 492 801. (2) TQ 490 802. (3) TQ 499 801, several good colonies
Dartford & Littlebrook Marshes	TQ57N		1971-80	JRP	
Shorne Marshes	TQ6973, TQ6974		(1) 9 October 2018 (2) 29 July 2010	(1) GK (2) GK	(1) TQ 6939 7477, scattered in wet stock-trampled ditch.

³⁹ Burton, R.M. (1994). Botanical records for 1993. *The London Naturalist* **73**: 191-198.

					(2) (a) several plants on grazing marshes at TQ 69326 73993. (b) 8 plants, TQ 695 740, along cattle-trampled dike margin. (c) 13 plants at cattle-trampled dike margin TQ 696 740.
Higham Marshes north west	TQ67X (includes TQ6975)		(1) 5 September 2012 (2) 1991-99	(1) JC (2) EGP	(1) One plant, TQ 69902 75012. (2) Shorne Marshes, TQ67X.
Shorne Marshes – Higham Common	TQ7074		(1) 27 June 2010 (2) 23 June 2010	(1) WFS meeting (2) GK	(1) Scattered along dikes between TQ 70301 73998 and TQ 70208 74257 and TQ 70056 74162 and TQ 70102 73983, generally wherever there were cattle-trodden down areas, surprisingly frequent along last ditch given extent of shading. (2) south eastern corner of Shorne Marshes, cattle-trampled dike margins (a) one plant at TQ70280 (b) eight plants at TQ70263 74111 (c) single plants at TQ70214 74256, TQ 70195 74258 (d) two plants at TQ 70185 74258 (e) 12 plants, may include <i>conglomeratus</i> hybrids, at TQ 70109 74200.
Iwade, Cheten Marshes	TQ8869, TQ8969		23 October 2012	GK & LR	(a) Present along margin of waterbody at TQ 889 692 and northwestwards when not fringed with <i>Bolboschoenus maritimus</i> , to tributary channel or depression at TQ 886 695. (b) Many plants in standing water on grazing marshes at TQ 8933 6907 and neighbouring wet depressions. Also frequent at TQ 8915 6922 in wet areas together with <i>Rumex maritimus</i> . (c) TQ 89540 69246.
Minster Marshes, Sheppey	TQ9269, TQ9368	Nature reserve	(1) 31 July 2014 (2) June 2008	(1) SB (2) AW	(1) Occasional plants by a ditch on Elmley Nature Reserve at TQ 92668 69234. The area had been inundated for several months during previous winter due to a broken sluice and this resulted in abundant growth of <i>Rumex</i> species. (2) TQ9368.
Waland Marsh	TQ9922		12 July 2017	SB & OL	Four small flowering and fruiting plants in a low-lying area TQ 9952 2288.
Dengemarsh	TR01P		25 June 1998	EGP	
Boulderwall, Dungeness	TR01U (includes TR0618)		(1) 1997 (2) 26 June 1996	(1) & (2) EGP	(1) TR0618. (2) TR01U.
Lydden Valley	TR3455		2003	CEC	TR 34270 55620, ditch 110 of Hacklinge Ditch Survey.

Ruppia maritima L. (Beaked Tasselweed)

Draft account

vc15 and 16

Rarity / scarcity status

Ruppia maritima is an aquatic of brackish ditches and pools, widespread round the British Isles, but whose conservation risk assessment for England became **Near Threatened** in 2014 (although of 'Least Concern' in Great Britain) when data analysis in comparing records 1930-1969 and 1987-1999 showed that its area of occupancy had declined so that there was a 25% reduction in the likelihood of recording the species. It was one of many species which, although widespread in England, were showing a sufficient rate of decline as to suggest that they were at risk in the longer term. In Kent, there appears to have been a decline of 31% in the number of tetrads recorded for *Ruppia maritima* between the periods 1971-80 and 1991-2005; since then, the decline has continued and it has become **scarce**.

Cliffe. All photos by Liam Rooney, 22 August 2013

Account

The first Kentish record was included by Dillenius in his third edition of John Ray's *Synopsis Methodica Stirpium Britannicarum* (1724) as one from his own observation of ditches on the Isle of Sheppey, where he saw it growing plentifully. Hanbury and Marshall (1899) described it as a not uncommon native of maritime or sub-maritime ditches and pools. They mentioned nineteenth century records for a ditch in the flats below Woolwich; near the Medway at Frindsbury and between Strood and Cuxton; salt-water ponds at Reculver; between Herne Bay and Whitstable; dikes near Faversham; ditches near Margate; between Ramsgate and Sandwich; and dikes, pools, muddy ditch and saltmarsh habitats near Dymchurch. The last location was written up at considerable length by G.E. Smith (*A Catalogue of rare or remarkable phaenogamous plants, collected in South Kent, 1829*) who had been searching for the species, which he found filling a narrow



dike, with pollen scattered across the surface of the water from emergent flower spikes. He was aware of botanical opinion that pollination takes place beneath the water surface within the leaf sheaths but, wading into the dike, was unable to find any submerged flower spikes with anthers which had already dehisced within the leaf sheaths so as to achieve underwater pollination. (Surface and underwater pollination will be considered further, later in this account.)

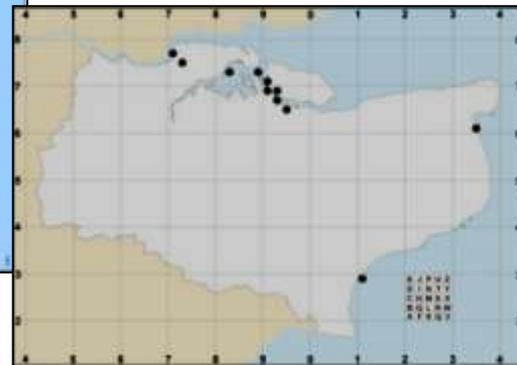
Francis Rose's manuscript *Flora of Kent* describes the species as a native of brackish ditches and fleets: rare but locally frequent in the Thames estuary. The twentieth century records which he noted were at Stone Marshes (1945); Higham (1944); Grain (1959); Harty; Shellness, Sheppey (1956); dikes below Faversham (1945); west of Seasalter; Whitstable boating lake (1959); Swalecliffe (1950). These give no signs of continuation of presence

by the Medway estuary, which figures in Philp (1982) nor of the populations near Sandwich which were also recorded in the 1971-80 survey. But the 1971-80 survey itself raises questions of continuity, for out of the 16 tetrads given in it, only one is repeated in the 11 tetrad records noted in the 1991-2005 survey of Philp (2010). Just as intriguingly, that same tetrad (at Sandwich Bay) is the only one from 1991-2005 are repeated in our 2010-19 records: there has been persistence here since before 1899. Maps from both date periods are given here for comparison.



Ruppia maritima (Beaked Tasselweed) 2010-19

Ruppia maritima (Beaked Tasselweed) 1991-2005

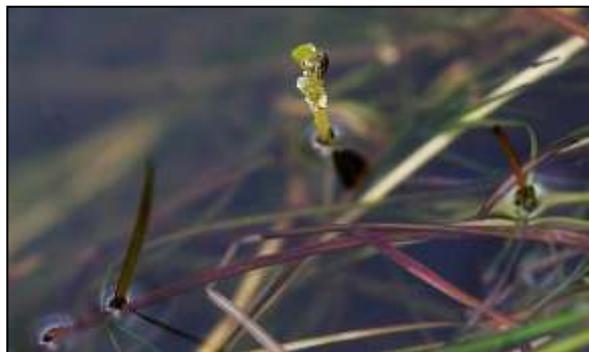


The most likely explanation for the apparent lack of continuity at sites is that it is being encountered more widely, but is either being taken for *Potamogeton pectinatus* (Fennel Pondweed), which grows in similar situations, or is being recognised as *Ruppia*, but if encountered in a vegetative state, it has not been readily capable of separation from *Ruppia spiralis* (*R. cirrhosa*, Spiral Tasselweed), so no record is being made. Failure to flower and fruit in a particular year may be a function of environmental factors such as water temperature and salinity. There is also potential for *Ruppia maritima* to move to new sites, through transmission by wildfowl (it is known as widgeongrass in North America, as supplying a food source for ducks, and the seeds can survive passage through bird gut; indeed viability and germination may be enhanced by this). A further factor in discontinuity of records seems to be a degree of variation in the extent of growth from year to year; Philp (1982) states that it is sometimes in large quantity where it is found; a corollary may be that it is sometimes not, in the same places.

Ruppia maritima is generally described as a perennial in Britain, although in North America annual populations of estuaries where late summer drying-out occurs have been contrasted with biennial or short-lived perennials in more saline coastal habitats not so subject to desiccation⁴⁰, and it may be that whether growth is perennial or annual depends substantially on the permanence of the waterbody concerned. The species grows rooted in the substrate of its dike, pool or other waterbody. Pollination has been widely described and may take place above or below the water level. Above, pollen is shed from dehiscent anthers on the inflorescence stalk when projecting from the water surface; the stalks then recline to lie on the surface where the stigmas may come into contact with the floating pollen. Underwater pollination may be cleistogamous, where anther dehiscence takes place in flowers still enclosed in their leaf sheaths, which may also protect against desiccation where a pool is drying out. Alternatively, pollination may be achieved underwater by gas bubbles emerging from the anther sac as the anther dehiscence, carrying pollen grains to the receptive stigmas of the same flower. Sometimes it has been maintained that *Ruppia spiralis* pollinates at the surface, but that *Ruppia maritima* does so below the surface. Nonetheless, it appears that *Ruppia maritima* may adopt either method, perhaps

⁴⁰ Richardson, F.D. (1983). *Variation, adaptation and reproductive biology in Ruppia maritima populations from New Hampshire coastal and estuarine tidal marshes*. PhD thesis, University of New Hampshire.

according to habitat conditions. Such conditions may encompass changing water depth and salinity. *Ruppia maritima* is supposedly more likely than *Ruppia spiralis* to be found in shallow waters (although this is not particularly confirmed by our Kentish observations) and has tolerance of a narrower range of salinity.



Both species are very similar and are best separated when in fruit. Below the stalked umbel-like head of fruits is a common peduncle which in the case of *R. maritima* is no longer than 2.6cm; that of *R. spiralis* can be 4cm long and it coils as a spiral. The fruits of *R. maritima* are 2.0-2.8mm long and asymmetrical; those of *R. spiralis* are 2.7-3.4mm long and nearly symmetrical. From *Potamogeton* (Pondweed) species they are distinguished by their fruits becoming long-stalked and their leaves not having lateral veins, only a midrib. However, this latter distinction does not help greatly in relation to *Potamogeton pectinatus*, because of the indistinctness of its lateral veins, but they also differ by *P. pectinatus* having a ligule and lacking minute tothing at the leaf tip (x20 lens required).



Site	Grid reference	Site status	Last record date	Recorder	Comments
Stone Marshes	TQ57S		After 1970, before 1981	Philp (1982)	

Stone Marshes	TQ57T		After 1970, before 1981	Philp (1982)	
East of Shorne Marshes	TQ67S		After 1970, before 1981	Philp (1982)	
Holborough Marshes	TQ67B		After 1970, before 1981	Philp (1982)	
Cliffe Creek/Pools	TQ77D (including TQ7176)		(1) 2 August 2013 (2) 28 August 2003	(1) SB & class (2) EGP, DG	(1) Dense growth in over 100 metres of coastal dike at TQ 7149 7658 with <i>Zanichellia palustris</i> . (2) TQ77D.
Cliffe, West Court	TQ77H		28 August 2003	EGP, DG	
Gillingham	TQ76Z		After 1970, before 1981	Philp (1982)	
East Hoo Creek	TQ87G		1991-98	EGP	
Stoke	TQ87H		After 1970, before 1981	Philp (1982)	
North Chetney Marshes/ Deadmans Island	TQ87W		(1) 8 July 1996 (2) After 1970, before 1981	(1) EGP (2) Philp (1982)	
Grain, North Level	TQ8678	MOD land	28 July 2017	BB	TQ 86556 78489, occasional.
Kingsferry	TQ96E		1991-98	EGP	
Elmley	TQ96I		1991-99	EGP	
Stray Marshes	TQ96J		1991-98	EGP	
West of Conyer	TQ96M		17 September 2001	EGP	
Rushenden	TQ97A		1991-98	EGP	
Seasalter Level	TR06S (including TR0764)		(1) 9 August 2016 (2) After 1970, before 1981	(1) AL, LR, JPu, CO (2) Philp (1982)	(1) TR0764. (2) TR06S.
Seasalter	TR06X		After 1970, before 1981	Philp (1982)	
Leysdown	TR07F		After 1970, before 1981	Philp (1982)	
Dymchurch	TR12E		1991-99	EGP	
Whitstable	TR16C		After 1970, before 1981	Philp (1982)	
Swalecliffe	TR16I		After 1970, before 1981	Philp (1982)	
Studd Hill	TR16N		After 1970, before 1981	Philp (1982)	
Reculver	TR2369		12 August 2013	CO	Fruits seen on dike behind seawall just to west of private gate onto oyster farm. One patch, many seed heads.
Great Stonar	TR35J		After 1970, before 1981	Philp (1982)	
Sandwich Bay	TR25P		After 1970, before 1981	Philp (1982)	
North Stonar	TR36F (includes TR3360)		(1) 5 June 2016 (2) After 1970, before 1981	(1) SB (2) Philp (1982)	(1) Abundant in coastal dike fringed by saltmarsh plants at TR 3357 6017. (2) TR36F.
Cliffsend	TR3463		17 July 2018	BS, MP	TR 345 637 and TR 344 636, Pegwell Bay cable route survey.
Sandwich Bay	TR36K (includes TR3561)		(1) 26 August 2013 (2) 1991-99 (3) After 1970, before 1981	(1) SB (2) EGP (3) Philp (1982)	(1) Margin of very shallow pool at TR 350 619. (2) & (3) TR36K

Ruppia spiralis L. ex Dumort (Spiral Tasselweed)

Draft account

vc15 and 16

Rarity / scarcity status

Ruppia spiralis, which has also been called *Ruppia cirrhosa* (and in the past has sometimes been bundled under *Ruppia maritima*)⁴¹ grows around the coasts of the British Isles, but more sparingly than *R. maritima*, and primarily on the eastern and southern coasts of England. So far as concerns its conservation risk status, it is the reverse of *R. maritima*, that is to say that it is **Near Threatened** in Great Britain but of 'Least Concern' in England. The latter designation, however, masks a situation where there is less evidence of decline over 1930-99 than if 1987+ data had been compared with all records including pre-1930 data: this would show a 48% decline in England. In Kent, its status is indeed concerning: an assessment based on Philp (2010) would treat it as rare in the county, but it is probably better regarded as **very scarce**.



Plumpudding Island, fruits and spiral peduncle. Photo by Liam Rooney, 22 August 2012

Account

The first published Kentish record for Spiral Tasselweed is likely to be its discovery by E.S. Marshall and A.H. Wolley Dod on 28 June 1893 in ditches at Port Victoria, then a railway station on the Isle of Grain. It was written up in *Journal of Botany* (1893) **31**: 249. Hanbury and Marshall (1899) refer to having been informed by Dr. Druce that there was a specimen from Sheerness in the herbarium of Dillenius; but there is some uncertainty about this, as Druce in his *The Dillenian Herbaria: An Account of the Dillenian Collections in the Herbarium of the University of Oxford* (1907) refers only to a specimen at Sheerness which he called *Ruppia rostellata*, a synonym of present-day *R. maritima*.⁴² Other records in Hanbury and Marshall (1899) are from Sheppey (Harty Isle, and small ponds on the coast east of Sheerness); Seasalter; east of Whitstable; and between Dymchurch and Hythe. It was treated as rare, in ponds and ditches near the sea.

Conyer. Photo by Liam Rooney, 3 September 2012



Francis Rose noted records from Grain (a saline pool behind the north beach, 1959); Cliffe; Sheppey (viz. Harty in 1938, Elmley, Shellness in 1956); west of Seasalter (a saline pool

⁴¹ Molecular analysis indicates that separation of *Ruppia* into two widespread species, *R. maritima* and *R. spiralis*, is not straightforward because the latter has a range of genetic variability wider than might be expected of a single species, and might better be regarded as a *R. spiralis sensu lato* complex – see Manino, A.M. *et al.* (2015), The genus *Ruppia* L. (Ruppiales) in the Mediterranean region: an overview. *Aquatic Botany* **124**: 1-9.

⁴² This may well link up with the reference in John Ray's *Synopsis Methodica Stirpium Britannicarum* (the third edition, 1724, by Dillenius) to *Potamogeton maritimum ramosissimum grandiusculis capitulus*, abundant in ditches around Sheerness (p.150); but that work also gives with similar synonymy on p.135 *Potamogeton maritimum gramineis longioribus foliis, frustu fere umbellato*, again in ditches at Sheppey, which has been attributed to *R. maritimus* – see register account for that species. It looks as though there is an attempt here to deal with two species, but early records are difficult to assign: some standard nineteenth century Floras treat what we now know as *R. spiralis*, as *R. maritima* instead.

behind the beach, 1959, and west of the Sportsman pub); and Richborough to 1954. The general impression is one of a degree of continuity with some of the general areas where found before, and some overlap with the general areas where the more common species *Ruppia maritima* has also been recorded. In contrast, Philp (1982) mapped quite distinct distributions for both species, although finding that the differences between the species are very slight and overlap at times, giving rise to doubts about the value of retention of specific rank for both. Six tetrads were given for Spiral Tasselweed, described as rare in pools and dikes near the sea. These had declined to two in Philp (2010), one from Allhallows and the other continuing from the previous survey, at Plumpudding Island between Reculver and Birchington.

Our 2010-19 records, however, despite that earlier apparent decline, show no change from the total of six tetrads given in Philp (1982), although the sites themselves are on the whole different. Most are at Lydd Ranges, Dungeness, where there is a series of shallow lagoons in consolidated shingle, saline by virtue of seepage through the coastal shingle bank. Here, as at Plumpudding Island in north Kent, *R. spiralis* has been found growing in very shallow water, although *R. maritima* is supposed to be more tolerant of shallows. In the lagoons, *R. spiralis* has to compete with algal growth, which could limit its photosynthetic ability⁴³, and the waters were found to be very warm, which may be expected to encourage flowering.



Lydd Ranges, habitat. Photo by Sue Buckingham, 6 August 2012



Plumpudding Island, habitat. Photo by Lliam Rooney, 22 August 2012



The flowers, as with *R. maritima*, initially enjoy protection under water by virtue of a translucent sheathing leaf. They are brought up to the surface, where pollination mainly takes place, and the length of the peduncle, which is spiral or nearly so in fruit, varies according to water depth but generally is longer than that of *R. maritima*, as well as different in shape.

Plumpudding Island, emergent flower. Photo by Lliam Rooney, 22 August 2012

Conyer, sheathed flowers. Photo by Lliam Rooney, 10 September 2012



⁴³ There may also be anoxic effects from the decomposition of algae, and the combination of these appears to be responsible for the decay of the roots and rhizomes of *R. spiralis*, which could affect its reproductive strategy as between perennial and annual – see Mannino, A.M. & Graziano, M. (2016) Differences in the growth cycle of *Ruppia cirrhosa* (Petagna) Grande in a Mediterranean shallow system, *Plant Biosystems* **150**:1, 54-61.

As regards identification, differences between *R. maritima*, *R. spiralis* and *Potamogeton pectinatus* are dealt with in the account for *R. maritima*.

Site	Grid reference	Site status	Last record date	Recorder	Comments
Allhallows	TQ8478		9 August 1992	EGP	TQ8478.
Conyer	TQ9565		3 September 2012	LR	TQ 95840 65948, small scattered patches in a dike behind the seawall near Conyer.
Jury's Gap, Dungeness	TQ9917		7 August 2012	OL, GK, TI, SB	Saline pool at TQ 998 179.
Kingsferry	TQ96E		After 1970, before 1981	Philp (1982)	TQ96E.
Sheerness	TQ97C, TQ97H (includes TQ9374)		(1) July 2002 (2) After 1970, before 1981	(1) JP (2) Philp (1982)	(1) TQ 938 745, Barton Point Country Park. (2) TQ97C, TQ97H.
Lydd Ranges	TR0017		(1) 9 August 2013 (2) 6 July 2003	(1) OL, GK, TI (2) SBRS	(1)(a) TR 00761 17944, shallow saline lagoon. (b) TR 00882 17972, shallow saline lagoon. (2) TR 0026 1789.
Lydd Ranges	TR0018		(1) 9 August 2013 (2) 7 August 2012	(1) OL, GK, TI (2) OL, GK, TI, SB	(1) TR 0037 1818 and TR 0041 1806, growing in mats in shallow saline lagoons. (2) In warm shallow saline pool at TR 0022 1844
Lydd Ranges	TR01I (includes TR0217)		(1) 6 August 2012 (2) After 1970, before 1981	(1) OL, GK, TI, SB (2) Philp (1982)	(1) In north east corner of coastal lagoon, TR 02650 17496, saline by virtue of seepage through coast shingle bank. (2) TR01I.
Lydd Ranges	TR0118		1 November 2011	ACJ	TR 018 180.
Faversham	TR06B		After 1970, before 1981	Philp (1982)	TR06B.
Plumpudding Island, between Reculver and Birchington	TR26U (includes TR2669)		(1) 22 August 2012 (2) 1991-98 (3) After 1970, before 1981	(1) SB, LR (2) EGP (3) Philp (1982)	(1) Completely filling a small (50 x 20 m) lagoon at TR 2665 6919, marginal plants <i>Phragmites australis</i> and <i>Tripolium pannonicum</i> , suggesting water just brackish. (2) & (3) TR26U