Vascular Plants

Plants underpin every aspect of our lives, from the air we breathe to our food, clothes, medicines and more. They also support the vast majority of other species, and are usually the means by which we classify, define and subdivide ecosystems and habitats. And yet they are often overlooked: globally, two in five plants are estimated to be threatened with extinction.[1] Only 10% of plants have been formally assessed, and these assessments show considerable bias towards 'useful' species. Some of the most species-rich plant families, such as daisies (*Asteraceae*) and orchids (*Orchdaceae*) are among the most under-represented on the Global Red List.[1]

It is difficult to summarise the diversity of plants found across Greater Gwent. For a relatively small area, there is a huge diversity of habitats (woodlands, meadows, uplands, wetlands) on a wide variety of soils, altitudes and aspects. Greater Gwent supports one of the oldest trees in Wales, the Mamhilad Yew (thought to be between 2,000 and,3000 years old and with a girth over 35ft) and one of the world's smallest flowering plants, Rootless Duckweed (*Wolffia arrhiza*), which is found in the ditches of the Gwent Levels.

Gwent has two Important Plant Areas (IPAs). The Wye Valley IPA, along the English border, is identified for its 'exceptional richness of vascular plants in broadleaved woodland'.[3] These diverse woodlands support populations of the native Welsh Daffodil (*Narcissus pseudonarcissus)*, and rare Narrow-leaved Bitter-cress (*Cardamine impatiens*), Spreading Bellflower (*Campanula patula*) and Tintern Spurge (*Euphorbia serrulate*). The cliffs of the Brecon Beacons National Park IPA extend into Greater Gwent and include the Clydach Gorge, Pwlldu and several ridges of the Black Mountains. The cliffs are identified for the populations of endemic Whitebeams (*Sorbus*) and Hawkweeds (*Hieracia*).[4]

Plant recording in Greater Gwent owes much to the work of Trevor Evans MBE, former Botanical Society of Britain and Ireland (BSBI) county recorder, who spent 20 years compiling the *Flora of Monmouthshire*[5], a comprehensive atlas describing over 1,800 species found in Gwent. This incredible work remains a crucial reference for all local botanists. The local BSBI group, the Monmouthshire Botany Group, is active and organises regular field meetings. The local BSBI county recorders also compile the Rare Plants Registers, which list locally rare (≤ 3 sites in a vice-county) and locally scarce species (≤10 sites in a vice-county), as well as plants considered under threat in a Welsh or GB context. The vc35 Rare Plant Register lists 283[6]* species; the vc41 register lists 302[7] species.

Within the *Flora of Monmouthshire*, Evans notes many of the changes affecting the distribution and abundance of plants within Gwent. These include the loss of species-rich meadows, hedgerows and verges, and the increased shading within woodland. He attributes the losses in plant diversity, and their impact on other species, to several factors, including changes in agriculture, particularly the use of pesticides and herbicides, and loss of headlands, drainage of wetlands, introduction of non-native ornamental plants, and an over-zealous need for 'tidiness'.[5]

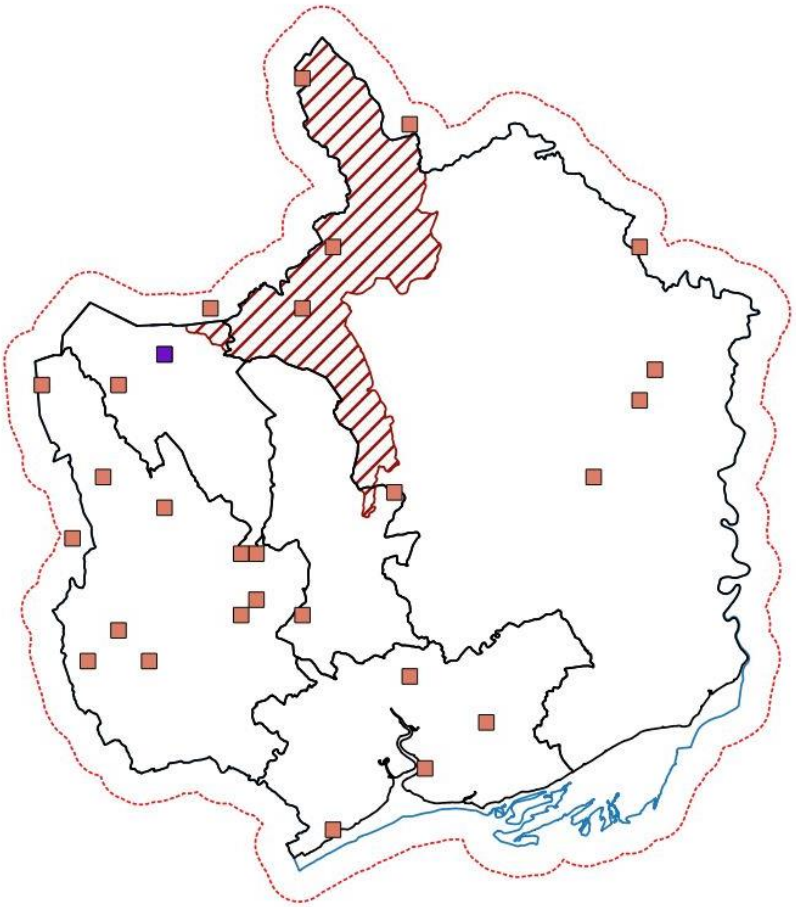
There are several recording schemes for plants. The BSBI has been collecting plant records since 1836 and is about to publish the third *Atlas of British and Irish Flora*. The BSBI also directs targeted surveys, such as the Threatened Plants Project, though their local members.[8] While the current record collection is exceptional, it does not have the power to determine trends in abundance. To address this, a new recording scheme, the National Plant Monitoring Scheme (NPMS), was launched by BSBI, UKCEH, Plantlife and JNCC in 2015.[9]

NPMS is based on 1km squares, allocated on a random-weighted basis to achieve representation of the different habitats across the UK.[9] Uptake within the study area is very good (96%), with just one square unadopted. Other plant recording schemes include Plantlife's Great British Wildflower Hunt, which encourages searches for particular species; Every Flower Counts (also Plantlife), surveying wildflowers and pollinators on lawns, and the BSBI Garden Wildflower Hunt, focused on wildflowers within gardens.

This section highlights just four plant stories: arable wildflowers (as a group), Spreading Bellflower, Lesser Butterfly Orchid (*Platanthera bifolia*) and Green-Winged Orchid (*Anacamptis morio*). While this is a tiny sample of the rich diversity of plants in Greater Gwent, they do illustrate the dramatic declines of some plant species, and the ongoing threats they face.

*this figure is from the 2007 list. This has since been updated with a 2019 list[10]; the exact number of species may have changed as species have been removed and added.

NPMS squares within the study area (pink – adopted, purple -unadopted)



Arable Wildflowers

Julian Woodman

Protection: Wildlife & Countryside Act (1981, as amended)

Conservation Status: Various, see below

Data Availability: Poor (303 records)

Context: This suite of annual plants, which thrive on frequent disturbance, is the single most threatened element of the UK flora. These species are characteristic of arable fields and other cultivated ground, sharing the ecological niche of the crop plants among which they grow.[11] Since they are so closely associated with traditional arable farming practices, their survival depends on suitable conditions being maintained on at least parts of some farms.

Many of these species are thought to be ancient introductions, brought to Britain with the first food crops by early farmers. More than 150 species of plant make up this group in Britain,[11] but because the distribution of individual species depends on geology, soil type and climate, many of these may never have occurred in Gwent. A selection of relevant species is shown in the table below.

A combination of factors has led to the decline of arable wildflowers. The development of more efficient seed-cleaning techniques may have been one of the first to have an effect, perhaps starting more than a century ago. Other reasons include the significantly increased use of fertiliser and herbicides, changes in type of crop (such as to maize and oilseed rape) and the use of modern crop varieties.

In the *Flora of Monmouthshire*, Evans states: 'Modern agricultural methods, notably the widespread use of herbicides on crops, has spelt the demise of most 'weeds' of arable land in Monmouthshire, as elsewhere in the UK. The modern practice of autumn sowing, rather than spring sowing of cereal crops, has led to the ploughing of stubble soon after harvest.'[5]

Historically, many more livestock farms than today would have had at least a small area of arable land, and field margins would have been managed less intensively. Small arable fields are now rare, having either been enlarged by the removal of field boundaries or converted to pasture.

Common Name	Scientific Name	Red List 2005[13]	Wales Red List 2007[26]	Number of Greater Gwent records	Most recent record
Blue Pimpernel	*Anagallis arvensis ssp foemina*	LC		2	1987
Bugloss	*Anchusa arvensis*	LC		10	2016

Corn Chamomile[+]	*Anthemis arvensis*	EN - (A2c)	EN	2	2010
Stinking Chamomile	*Anthemis cotula*	VU - (A2c)	VU	55	2019
Lesser Quaking Grass	*Briza minor*	LC		4	2018
Rye Brome	*Bromus secalinus*	VU - (A2c)		13	2019
Cornflower*	*Centaurea cyanus*	LC	CR	10	2019
Maple-Leaved Goosefoot	*Chenopodium hybridum*	LC		6	2018
Treacle-Mustard	*Erysimum cheiranthoides*	LC		8	2017
Dwarf Spurge	*Euphorbia exigua*	NT - A		14	2016
Broad Leaved Spurge	*Euphorbia platyphyllos*	LC		1	1980–1994
Tall Ramping-Fumitory	*Fumaria bastardii*	LC		1	2016
Red Hemp-Nettle[+]	*Galeopsis angustifolia*	CR (A2c)	CR	3	1999
Corn Marigold	*Glebionis segetum*	not listed		21	2019
Henbane	*Hyoscyamus niger*	not listed		6	2003
Smooth Cats Ear[+]	*Hypochaeris glabra*	VU - (A2c)		3	2004
Sharp-Leaved Fluellen	*Kickxia elatine*	LC		46	2019
Round-Leaved Fluellen	*Kickxia spuria*	LC		8	2005
Henbit Dead-Nettle	*Lamium amplexicaule*	LC		1	2015
Field Pepperwort	*Lepidium campestre*	LC	VU	12	2014
Weasels Snout	*Misopates orontium*	VU - (A2c)		2	1988
Prickly Poppy	*Papaver argemone*	VU - (A2c)	EN	1	1992
Corn Buttercup	*Ranunculus arvensis*	CR (A2c)	CR	5	1981
Annual Knawel	*Scleranthus annuus*	EN - (A2c)		1	2005
Field Woundwort	*Stachys arvensis*	NT - A	VU	65	2019
Spreading Hedge-Parsley	*Torilis arvensis*	EN - (A2c)		1	1994
Wild Pansy	*Viola tricolor ssp tricolor*	NT - A	VU	2	2012

[+]Unverified records

*Difficulty distinguishing wild and cultivated populations

Outlook: Past and current agri-environment schemes have included options which favour arable wildflowers by supporting cultivated field margins, unsprayed cereals and winter stubble. However, it appears that take-up of these options may not have been as great under Glastir than under its predecessor, Tir Gofal. The future prospects for some of these plants in Gwent will depend on the details of the Sustainable Farming Scheme, which is currently being designed.

Organic farming may be expected to provide some of the conditions that arable wildflowers need by avoiding the use of herbicides and artificial fertilisers.

Greater Gwent range: Records held by SEWBReC of the 27 species listed in the table are widely distributed across Gwent but with fewer from the west and north, reflecting the higher altitude and relative lack of arable farmland there.

However, from the third of the maps below, which shows the diversity of records, it can be seen that very few 1km squares (monads) have records of more than three of the species listed. The greatest concentration of such squares is in north-eastern Gwent where winter stubbles can still be found, particularly in wet winters when cultivation is difficult.

Evans, writing in the *Flora of Monmouthshire*, published in 2007, mentioned three sites that supported Field Woundwort and the two species of Fluellen: Kilpale near Caerwent, Llantrisant in the Usk Valley and some oat fields at Middle Hendre, west of Monmouth. (He also found other rare arable wildflowers in these oat fields.) Other locations where the SEWBReC records indicate clusters of species are Clytha Hill, Llangovan, Dingestow and Treowen. There are concentrations of older records at Llanbradach in the west of Gwent and Brockwells Meadow in the south.

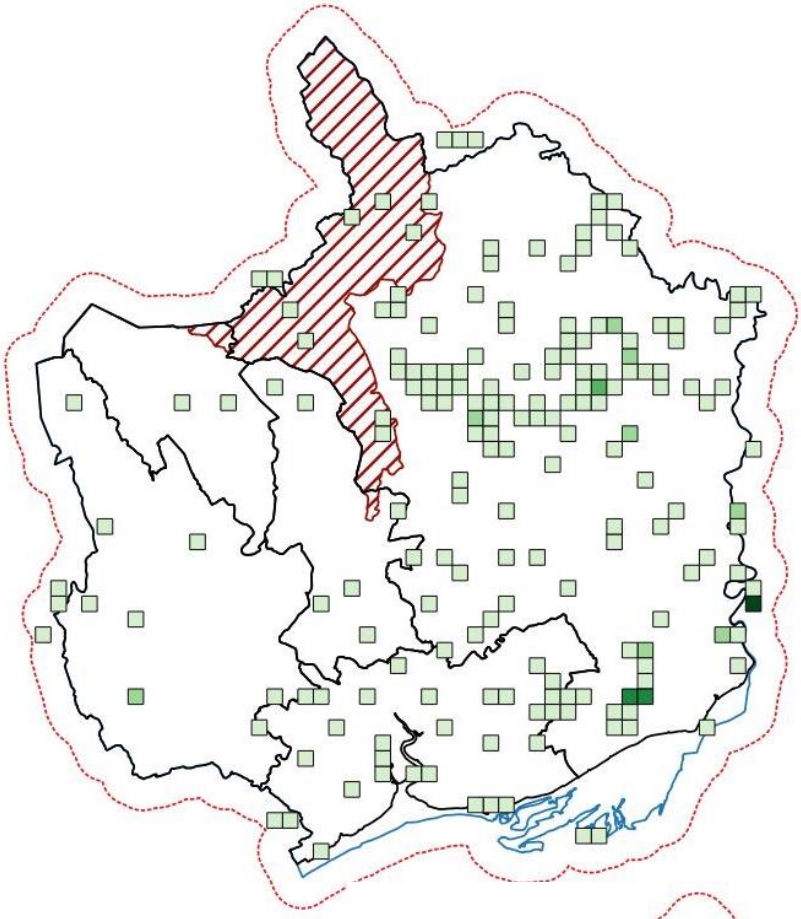
The maps show an apparent hotspot on the Gloucestershire border, but this is in fact an error arising from older non-specific records being attributed to the centre of squares. Records appearing to be from the Severn Estuary are the result of erroneous grid references.

There is some doubt over the validity of a few records in the table: records for Red Hemp-Nettle are unverified and some for Cornflower may be of cultivated origin.

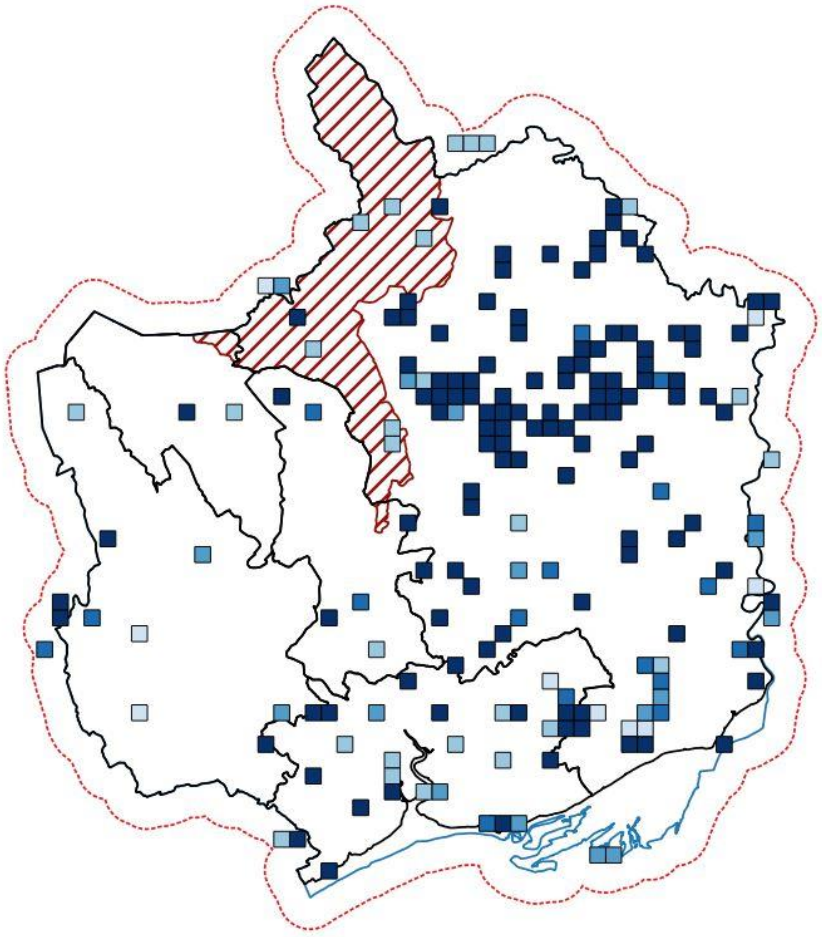
Plantlife published a report in 2015[12] which identified Important Arable Plant Areas based on 2km squares (tetrads). This report drew on records from a variety of sources, including monitoring of arable wildflowers for Tir Gofal between 2009 and 2012. Monmouthshire vice-county was found to have many tetrads with coincidences of three of the species selected in that report, and a few with five or six. These selected species, however, included Corn Spurrey (*Spergula arvensis*) and Corn Mint (*Mentha arvensis*), species which are more common than those in the list above and so not included in it or in the maps presented here. Ten tetrads were considered to be of national importance.

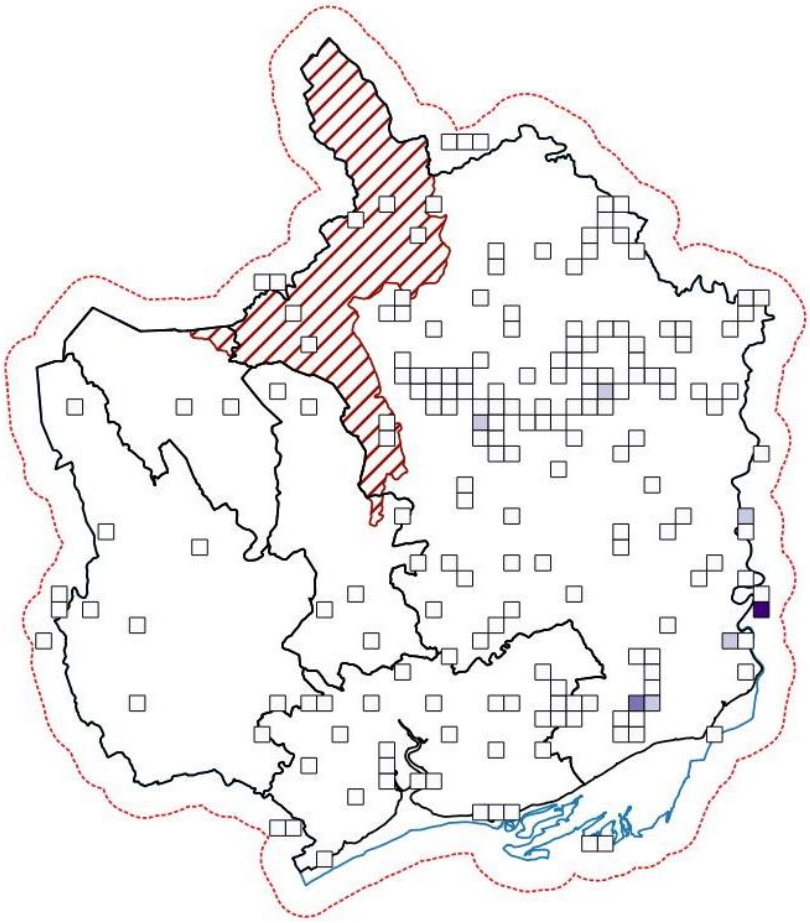
The strong message from the Plantlife report was that targeted searches would be worthwhile in Greater Gwent (both Monmouthshire vice-county and the adjacent vice-county of Glamorgan). Further surveys may be expected to reveal the presence of some arable wildflower species where they were recorded in the past and some new localities.

Distribution of arable wildflowers records (max 16 records/km^2)



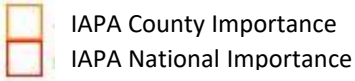
Records of arable wildflowers by decade

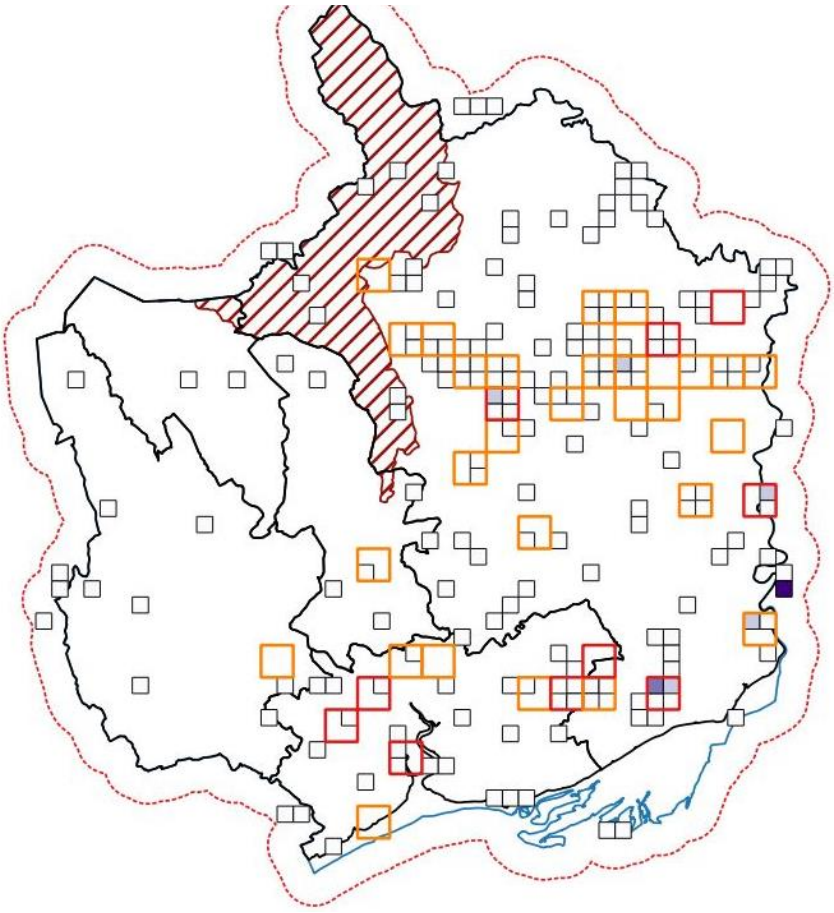




Diversity of arable wildflower records

Diversity of arable wildflower records with Important Arable Plant Areas[12]





Habitats Patterns: Arable wildflower communities and species show a surprisingly high fidelity to particular sites, so much so that many populations of rarer species have been recorded from particular fields for decades or even centuries.[11]

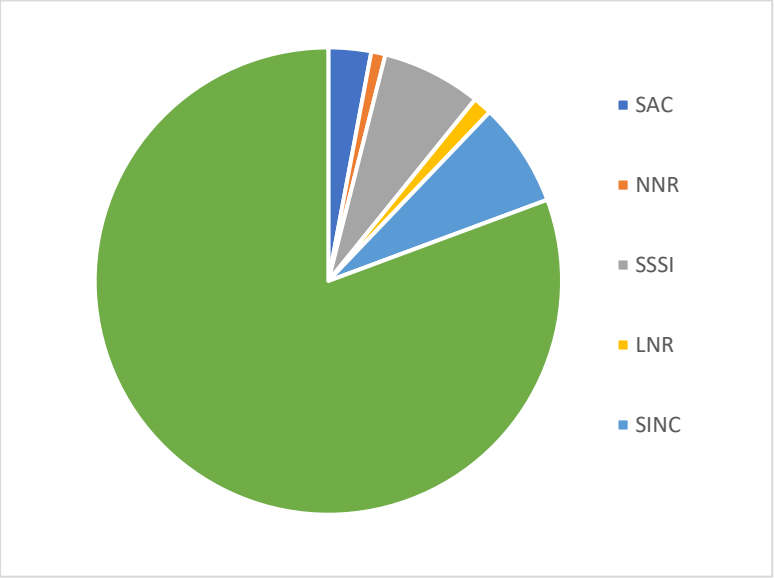
Arable wildflower populations are subject to great fluctuations in diversity of species from year to year, depending on crop management regimes and climatic conditions.[11] Arable wildflowers do not necessarily germinate every year that the field is cultivated and can remain dormant and undetected in the soil seed bank for many years until conditions are suitable.[12]

Population trends: Of the 30 vascular plant species that have shown the greatest relative decline across Britain between the 1930–69 and 1987–99 recording periods of the *Atlas of British and Irish Flora*, 18 are characteristic of arable and other cultivated ground.[11]

These levels of decline were reflected by the assessment of the threat status of Britain's vascular plant flora in the *Vascular Plant Red Data List for Great Britain,*[13] published in 2005, and supplementary surveys. No fewer than 7 species are regarded as extinct as arable wildflowers in Britain (although may occur as casuals on occasion), while a further 54 species are considered threatened.[11]

Protection: Most records are not from protected sites, as would be expected from the nature of the habitat. However, there are some records from SSSIs including from the Gwent Levels, Cwm Llanwenarth Meadows and Brockwells Meadow. Records from SSSIs which are also SAC include a few from the Severn Estuary, River Usk, Usk Bat Sites and the Wye Valley Woodlands. (Those from the Severn Estuary include some from the sea wall but also erroneous grid references.) The NNR records are from Newport Wetlands.

Arable Wildflower records from protected sites



Green-Winged Orchid *Anacamptis morio* (L.) (R.M. Bateman, Pridgeon & M.W. Chase)

Andy Karran

Protection: Wildlife & Countryside Act (1981, as amended)

Conservation Status: NEAR THREATENED (UK)[13]

Data Availability: Poor (162 records)

Context: The Green-Winged Orchid has a short spike bearing between six and twelve flowers. These are most often various shades of purple, but individuals also occur with pink or occasionally white flowers. The distinctive green veins of the lateral sepals are particularly clear in the paler forms. It is a perennial which reproduces by seed.

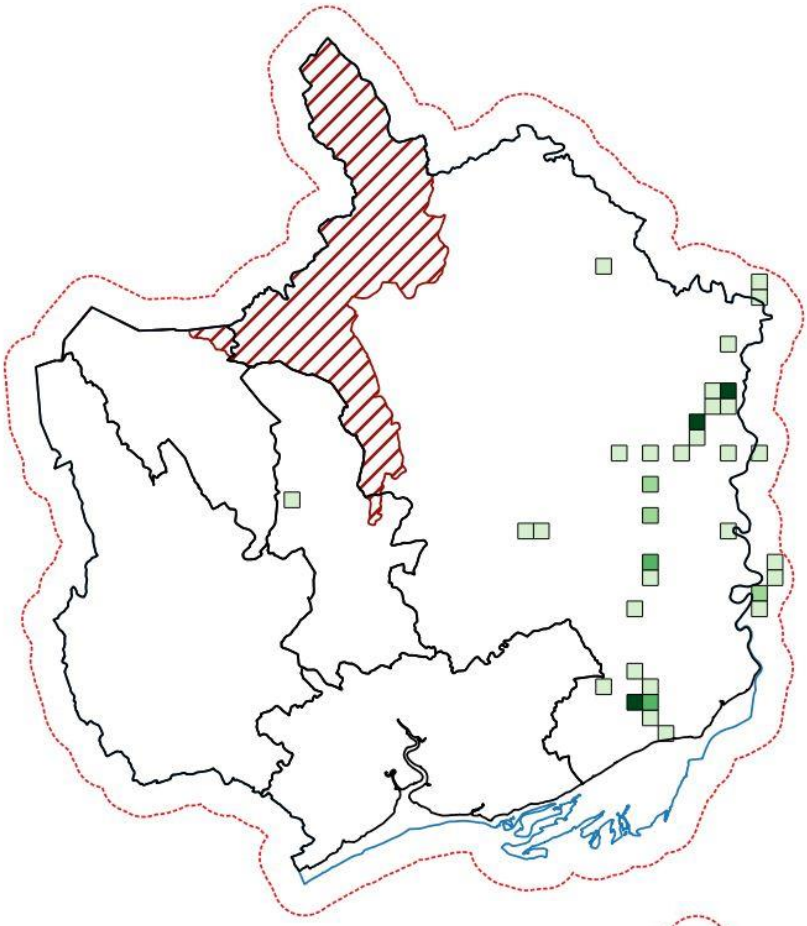
This species was formerly widespread in the lowlands of England and Wales, being commonest in the south and east of England and the coastal areas of Wales. It has declined very significantly since the 1950s as a result of agricultural improvement, and it is now rarely found except in grasslands managed for nature conservation or in other places, such as churchyards, where management is not intensive. It is usually regarded as a strong indicator of old agriculturally unimproved grasslands. [14]

It does, however, tolerate a wide range of soil conditions and management regimes. Soils in which it is found range from base-rich to base-poor and from dry to damp, while management varies from traditional hay meadow management to pasture. Plants can persist in a vegetative state for many years if the inflorescences are removed by mowing or grazing; they eventual flower and fruit when this pressure is released.[14]

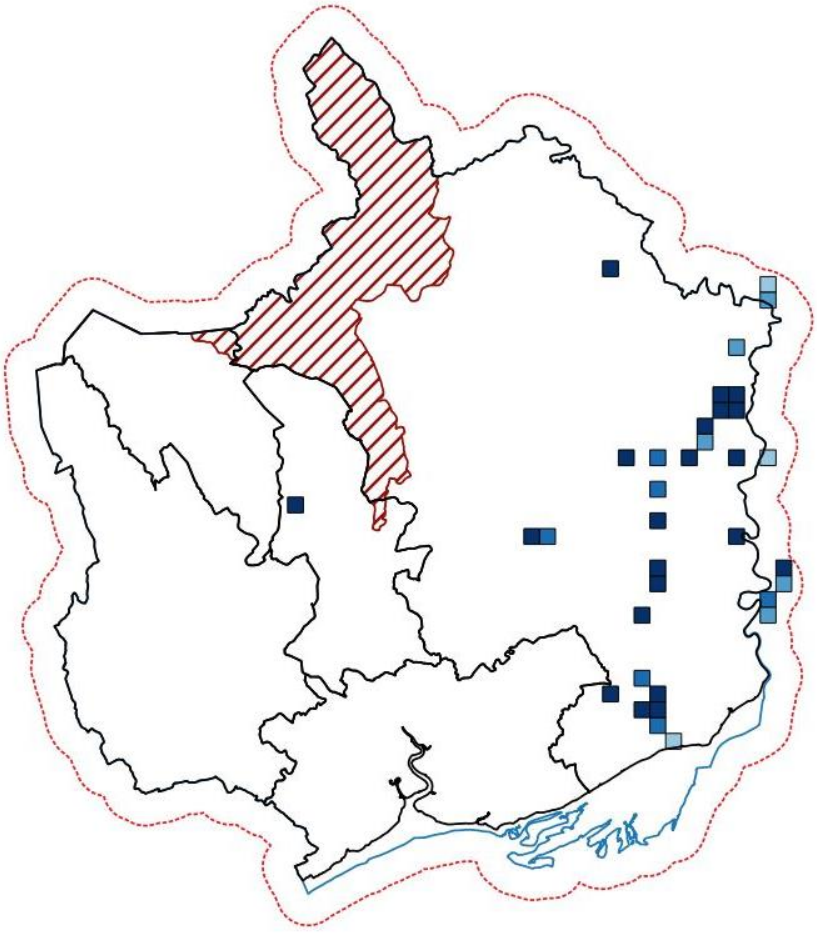
Outlook: While the UK population has declined drastically, it could now be considered relatively stable. This is because many of the remaining populations are found within nature reserves or other grasslands managed specifically for nature conservation. This is equally true in Gwent, where several populations, including the two largest, are in the care of the Gwent Wildlife Trust.

Greater Gwent range: Evans[5] quotes Wade[15] who described the Green-Winged Orchid as a frequent native in all districts. Evans went on to say that this no longer reflected the current (2007) situation. He described it as largely confined to the eastern quarter of the vice-county. The maps below indicate that this is still true, but with the notable exception of an outlier in Torfaen. This population, found in 2015, is at Blaenserchan, near Abersychan. Another new population was discovered near Tintern in 2014.

The two largest populations, both having as many as 4,000 flower spikes in recent years, are at the Gwent Wildlife Trust reserves of New Grove Meadows and Pentwyn Farm.[16,17] Another centre of population is further south, in the Caerwent area, where sites include Brockwells Meadows Wildlife Trust Reserve and land managed by the Ministry of Defence. Although there are several populations in this locality, the numbers of individuals are small in comparison with New Grove and Pentwyn.



Distribution of Green-Winged Orchid records across Greater Gwent (maximum 22 records/km^2)



Records of Green-Winged Orchid by decade

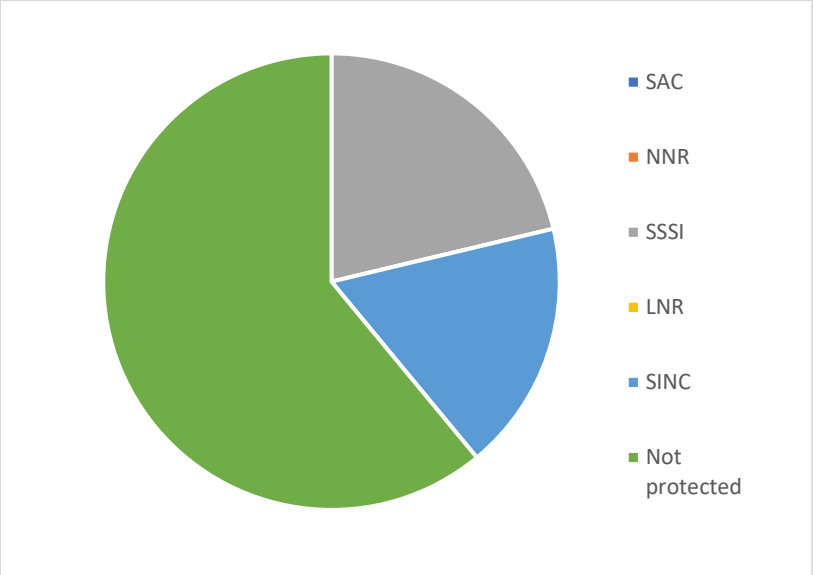
Population trends: There are encouraging signs that this orchid can become established, or re-established, in response to favourable management. Small numbers have been seen in fields undergoing restoration management close to sites which hold the large populations, for example at Gwent Wildlife Trust's Wysewood Common, near Pentwyn Farm.[17]

Protection: Several Gwent populations occur within Sites of Special Scientific Interest: Brockwells Meadows; Dinham Meadows; Cobblers Plain Meadows, Devauden; Lower Nex Meadows, Devauden and Pentwyn Farm Grasslands, Penallt.[18,6]

New Grove Meadows Wildlife Trust Reserve is a Site of Importance for Nature Conservation as well as being Monmouthshire's Coronation Meadow.[16] Protected sites (SSSI and SINC) together account for 39% of records held by SEWBReC.

In addition, Green-Winged Orchid is present at Trellech Wet Meadow, which is leased by the Monmouthshire Meadows Group.[19] It also occurs in some of the privately-owned meadows managed by members of the group.

Green-Winged Orchids records from protected sites



Lesser Butterfly Orchid *Platanthera bifolia* (L.) (Rich)

Andy Karran

Protection: None

Conservation Status: Vulnerable (UK)[13] Section 7 Priority (Wales)

Data Availability: Poor (18 records)

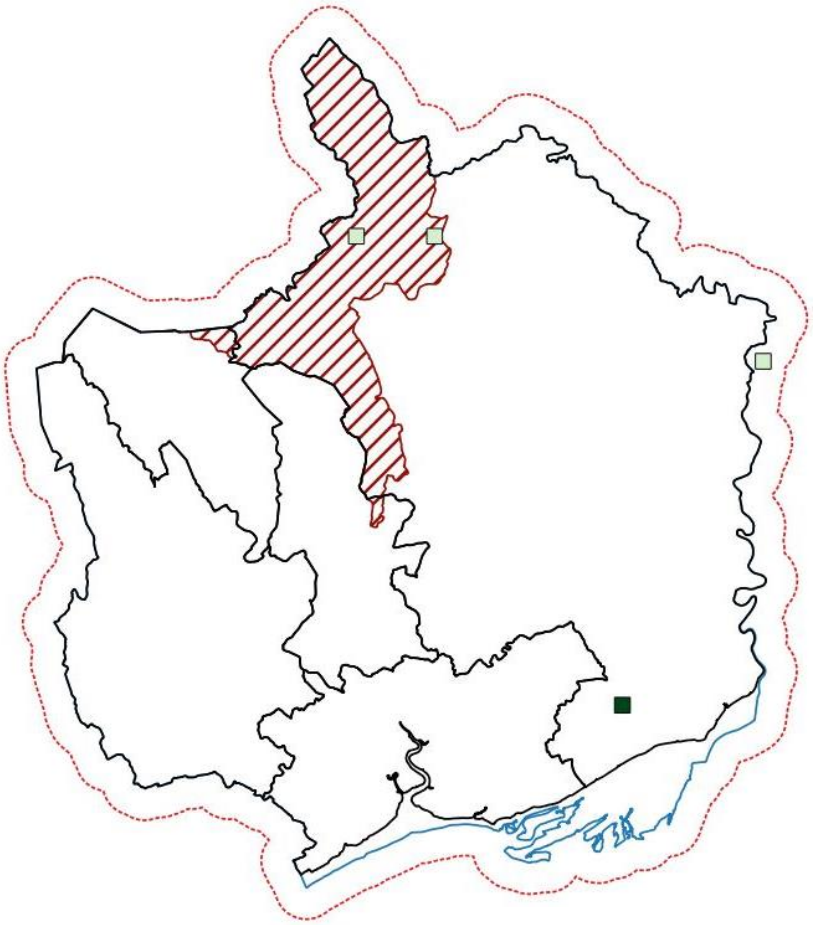
Context: Lesser Butterfly Orchid is a long-lived perennial with a tall spike of white flowers. It can be found in a wide range of habitats, including woodland, heathland, grassland and even some wetlands such as mires and bogs.[20] Despite this, there has been a long-term decline since the 1930s: Lesser Butterfly Orchid has been lost from about 75% its former range in England.[20] Declines are thought to be related to habitat changes such as overshading, agricultural improvement and scrub encroachment.

Outlook: Currently the UK population is predicted to continue to decline.[13] Evans[5] describes the decline in Gwent as 'remarkable'. From being described as 'locally frequent' in 1970,[5] the Gwent population is now confined to a single site[5,10] and is classified as 'Locally Rare' in VC35.

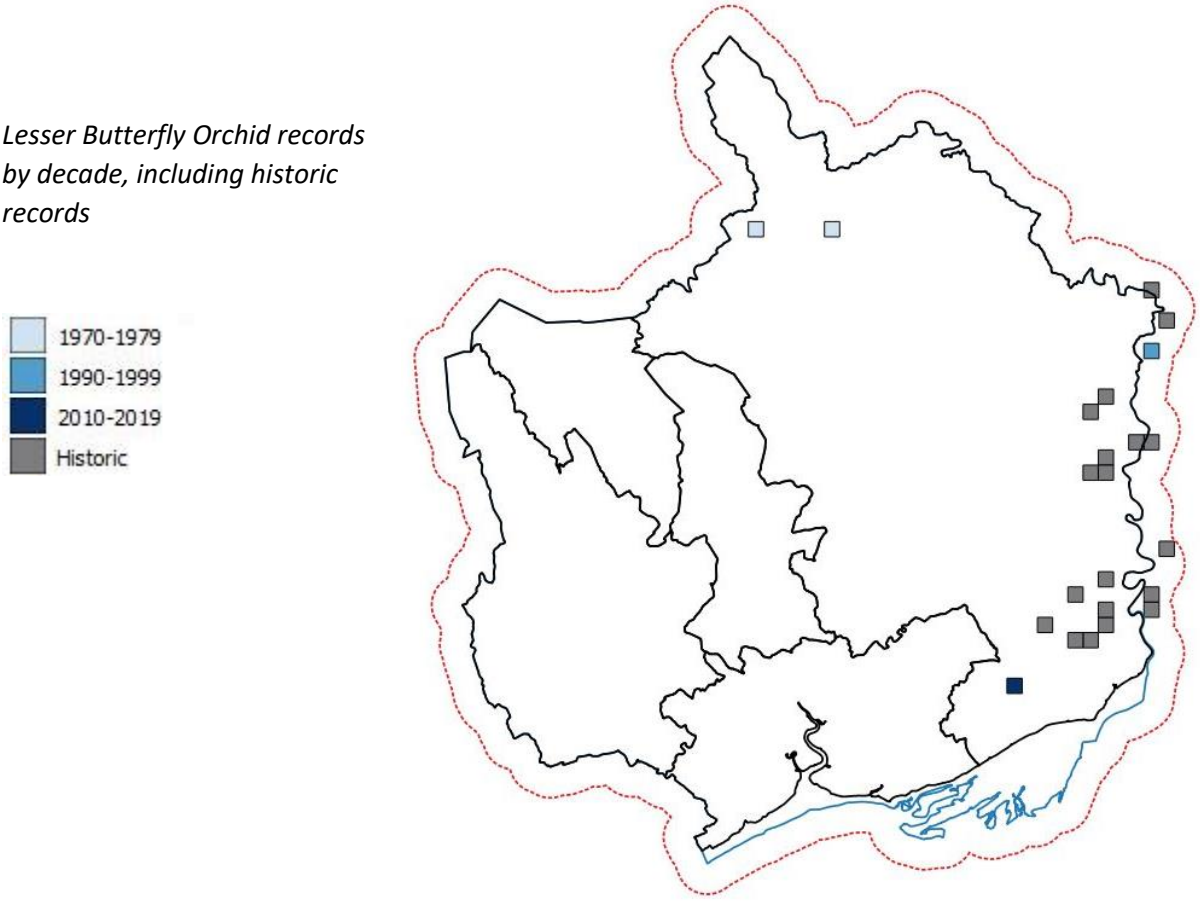
Greater Gwent range: Lesser Butterfly Orchids are currently only found at one site – Hardwick Plantation/Slade Wood; although there are records from the 1970s from within the Brecon Beacons National Park, and from the 1990s just over the border in Gloucestershire.

If historic records are considered, the population previously spread along the English border and across the southern part of Monmouthshire.

Lesser Butterfly Orchid records in Greater Gwent (maximum density 15 records/km^2)



Lesser Butterfly Orchid records by decade, including historic records



Population trends: If historic records (37 additional records dating back as far as 1850) are considered, as many as 23 monads have been occupied at some point. The only records from the last decade are from Hardwick Plantation/Slade Wood, although the most recent is from 2011.

Protection: Hardwick Plantation/Slade Wood is not a protected site, neither are the locations within the Brecon Brecons with older records. If Lesser Butterfly Orchids were found at any site then this should automatically be considered for SINC status,[21] although this is difficult to determine if plants do not flower regularly.

Spreading Bellflower *Campanula patula* (L.)

Protection: None

Conservation Status: ENDANGERED (UK)[13] CRITICALLY ENDANGERED (Wales)[10] Section 7 Priority (Wales)

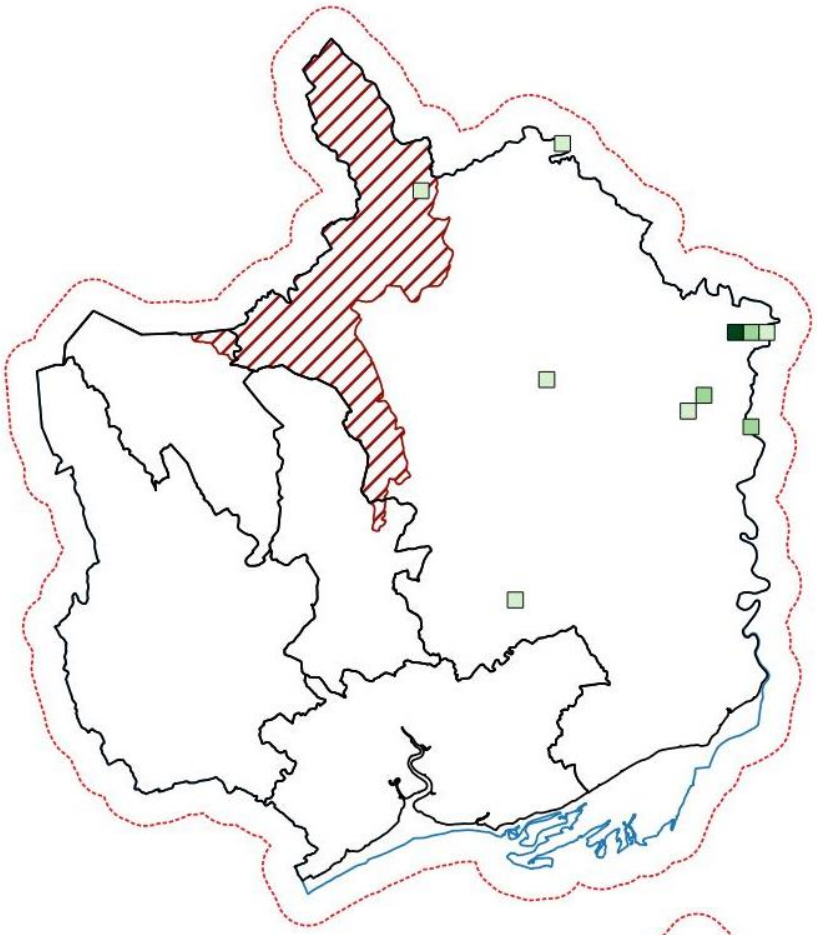
Data Availability: Poor (20 records)

Alistair Hotchkiss

Context: Spreading Bellflower is a biennial plant with purple-blue star-shaped flowers. It can be found on sunny banks and verges especially in open woodland or near woodland edges. The seed can be very long-lived but requires disturbance to germinate.[22] The UK population is believed to have been in decline since the early 1800s[23] and is limited to the Welsh borders and the West Midlands.[22] It is classified as Endangered due to the low number of remaining plants: in 2005 the population was estimated at just 330 individuals.[13]

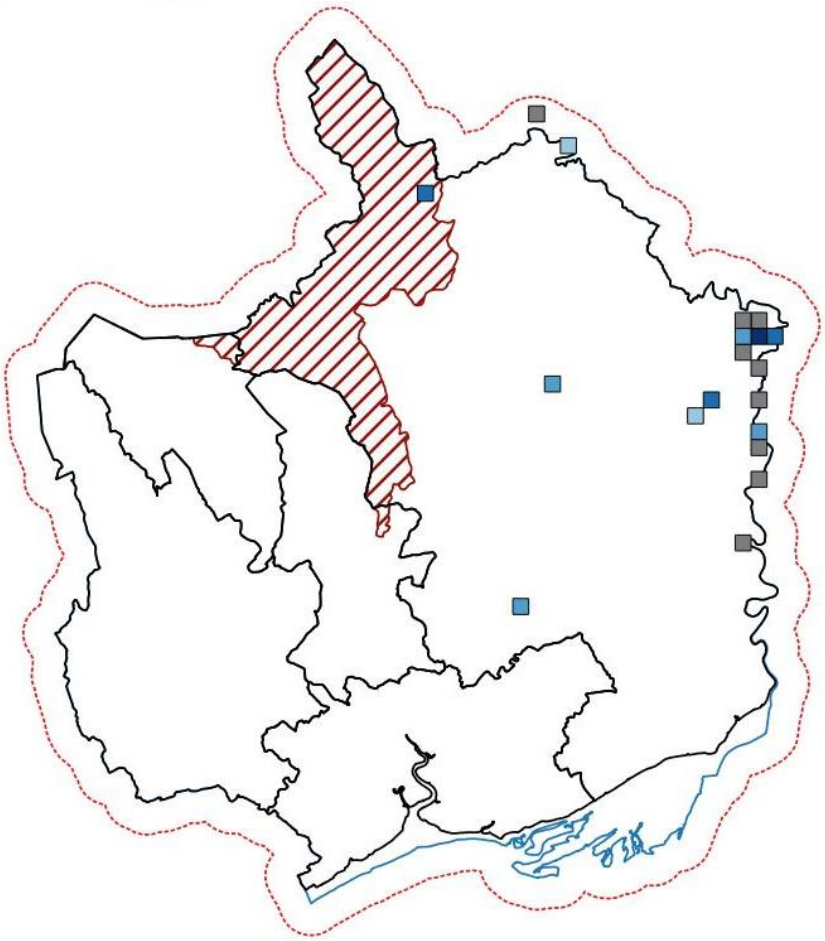
Outlook: Given the historic declines and extremely low numbers of plants, continued decline and eventual extinction from Greater Gwent seems likely, as Spreading Bellflower is limited to a single site, and just two plants. The National Botanic Garden of Wales suggests that some populations are unlikely to recover without supplementary planting or reintroductions.[23] Recent projects in Gloucestershire in 2016[24] and Herefordshire in 2019[25] have had some degree of success.

Greater Gwent range: Greater Gwent is at the south-west edge of the UK Spreading Bellflower range. The largest cluster of records is around Fiddlers Elbow NNR, and smaller woodlands to the east of it. A smaller cluster of records is at Lydart, to the south of Monmouth. There are several isolated records further south and west, but some of these are low resolution grid references, so may not be accurate.



Spreading Bellflower records in Greater Gwent (maximum density 10 records/km^2)

Spreading Bellflower records by decade, including historic records (pre-1970)

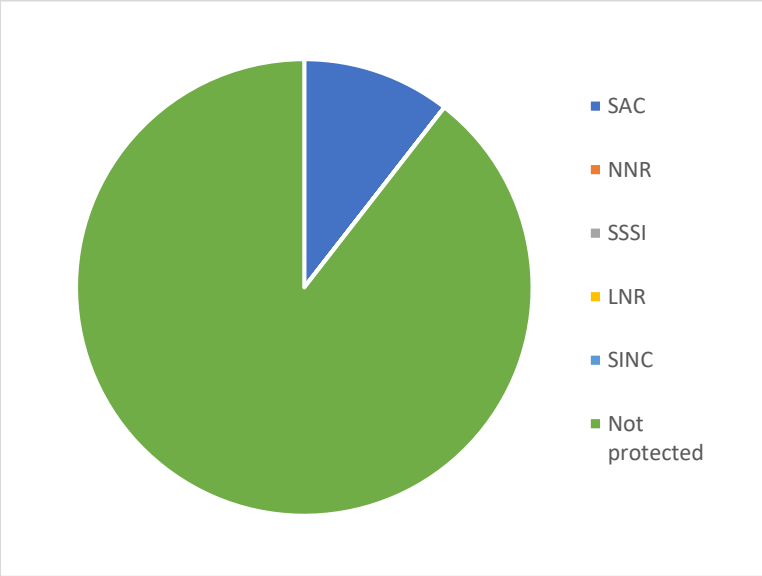


Population trends: If historic records (18 additional records dating back as far as 1850) are considered, as many as 19 monads have been occupied at some point, mostly along the English border. There are only ten monads with records after 1970, and just 1 record from the last decade. Evans[5] reports a more recent decline, stating that 'even the 8 tetrads of 1990 are now down to 3 tetrads, with only 1 plant in one of those sites'.

Despite the Lydart population once showing over 100 plants,[10] it seems likely that the population is now limited to a single site near Fiddlers Elbow, where two plants were observed in 2018.

Protection: Just over 10% of records (2 records) fall within the Wye Valley Woodlands SAC and Fidder's Elbow NNR. This is probably an underestimate of protection, as many of the more recent records are within close proximity to Woodland SINCs such as High Meadows Wood, Reddings Enclosure and Lydart Orles Wood, designated for their Ancient Woodland status. Any site with Spreading Bellflower should automatically be considered for selection as a SINC.[21]

Spreading Bellflower records from protected sites.



References:

1. Antonelli A, Fry C, Smith RJ, Simmonds MSJ, Kersey PJ, Pritchard HW (eds.). 2020. State of the World's Plants and Fungi 2020. Royal Botanic Gardens, Kew. https://doi.org/10.34885/172
2. Evans T. 2007. The Churchyard Yews of Gwent: https://www.ancient-yew.org/mi.php/the-churchyard-yews-of-gwent/94
3. Plantlife, Wye Valley IPA: https://www.plantlife.org.uk/uk/nature-reserves-important-plant-areas/important-plant-areas/wye-valley
4. Plantlife, Brecon Beacons National Park IPA: https://www.plantlife.org.uk/uk/nature-reserves-important-plant-areas/important-plant-areas/cliffs-brecon-beacons-national-park
5. Evans T. 2007. Flora of Monmouthshire. The Chepstow Society.
6. BSBI. 2007. VC35 Monmouthshire Rare Plant Register Checklist: https://database.bsbi.org/object.php?objectid=2cd4p9h.dnr59a&class=ChecklistInstance
7. BSBI. 2013. VC41 Glamorgan Rare Plant Register checklist (draft): https://database.bsbi.org/object.php?objectid=2cd4p9h.dnr59h&class=ChecklistInstance
8. BSBI. Threatened Plans Project: https://bsbi.org/threatened-plants-project (accessed 05/05/2021).
9. Pescott OL, Walker KJ, Harris F, New H, Cheffings CM, Newton N et al. 2019. The Design, Launch and Assessment of a New Volunteer-Based Plant Monitoring Scheme for the United Kingdom'. PLoS ONE 14(4): e0215891.
10. Tyler SJ & Wood E. 2019. Monmouthshire County Rare Plant Register. BSBI & Natural Resources Wales.
11. Byfield AJ & Wilson PJ. 2005. Important Arable Plant Areas: Identifying Priority Sites for Arable Plant Conservation in the United Kingdom. Plantlife International, Salisbury, UK.
12. Shellswell CH. 2015. Wales' Important Arable Plants. Plantlife, Salisbury.
13. Cheffings CM & Farrell L (eds.), Dines TD, Jones RA, Leach SJ, McKean DR, Pearman DA, Preston CD, Rumsey FJ, Taylor I. 2005. The Vascular Plant Red Data List for Great Britain. (Species Status no. 7): 1–116. Joint Nature Conservation Committee, Peterborough.
14. Chatters C. Species account in Stewart A, Pearman DA, Preston CD. 1994. Scarce Plants in Britain. Joint Nature Conservation Committee, Peterborough.
15. Wade AE. 1970. The Flora of Monmouthshire. National Museum of Wales, Cardiff.
16. Gwent Wildlife Trust: https://www.gwentwildlife.org
17. Green T. Pers. Com.
18. Natural Resources Wales: https://naturalresources.wales
19. Monmouthshire Meadows Group: https://monmouthshiremeadows.org.uk
20. Species Fact Sheet: Lesser Butterfly-Orchid. Natural England and Plantlife, Salisbury.
21. Gwent Wildlife Trust. 2004. Guidelines for the Selection of Wildlife Sites in South Wales. The South Wales Wildlife Sites Partnership.
22. Spreading Bellflower. Plantlife, Salisbury: https://www.plantlife.org.uk/application/files/2614/7913/4133/Brief20sheet20–20Spreading20bellflower20briefing_sheet.pdf
23. National Botanic Garden of Wales: https://botanicgarden.wales/science/saving-plants-and-fungi/conserving-welsh-plants-and-habitats/spreading-bellflower-campanula-patula/ (accessed 22/06/2020).
24. https://plantlife.love-wildflowers.org.uk/about_us/blog/rare-spreading-bellflower?display=one (accessed 22/06/2020).

25. https://www.ledburyreporter.co.uk/news/17834231.rare-blooms-frith/(accessed 22/06/2020).
26. Dines T. 2007. A Vascular Plant Red Data List for Wales. Plantlife Wales.