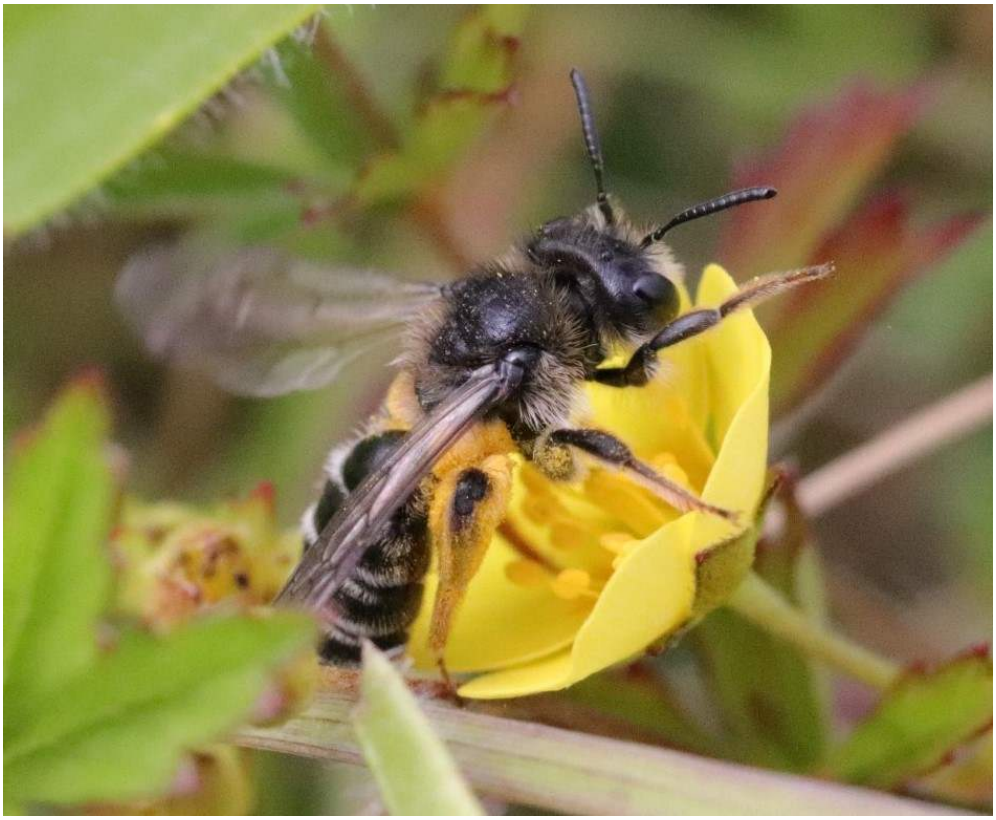
Tormentil Mining Bee within the Penwith Landscape Recovery project



Picture 1: Tormentil Mining Bee (Andrena tarsata)

September 2025

Patrick Saunders

Kernow Ecology

Tormentil Mining Bee within the Penwith Landscape Recovery Project.

Table of Contents

Summary

- There is a strong population of Tormentil Mining Bee (Andrena tarsata) across the Penwith Landscape Recovery Project area.

- The population of Tormentil Nomad Bee (Nomada roberjeotiana) in West Penwith is potentially of European Importance.

- Quite a broad range of acid grassland and heathland habitats could support potential sites within Penwith Landscape Recovery Project area. The highest quality lightly grazed acid grassland habitats required for key sites are scarcer.

- The bee is northern and boreal species and appears to be retreating to areas with a cooler temperature envelope.

- It is likely that a multiple site network across the area is needed to maintain a viable population.

- Lack of grazing is likely to be a critical threat on West Penwith Moors generally, this is probably interacting with climate change to mean the species is more threatened.

- A range of targetted actions should be implemented to safeguard populations, mainly through promoting Tormentil rich habitats through conservation grazing regimes but also where possible creation of bare ground features is recommended.

- Conservation strategies for the species should be focussed on creating key sites with high abundance of Tormentil flowers in June and July, 100 flowers per 1m2 should be used as a guide for site managers. General moorland management throughout the West Penwith Moors to encourage small patches of lower quality habitat is also important.

- West Penwith Moors are highly important for a range of scarce upland and maritime bees. Actions to promote high summer flower abundance are also recommended for these other species.

Introduction

This report is a desk-based review of the modern status and conservation priorities for the Tormentil mining bee (Andrena tarsata) within the Penwith Landscape Recovery Project area.

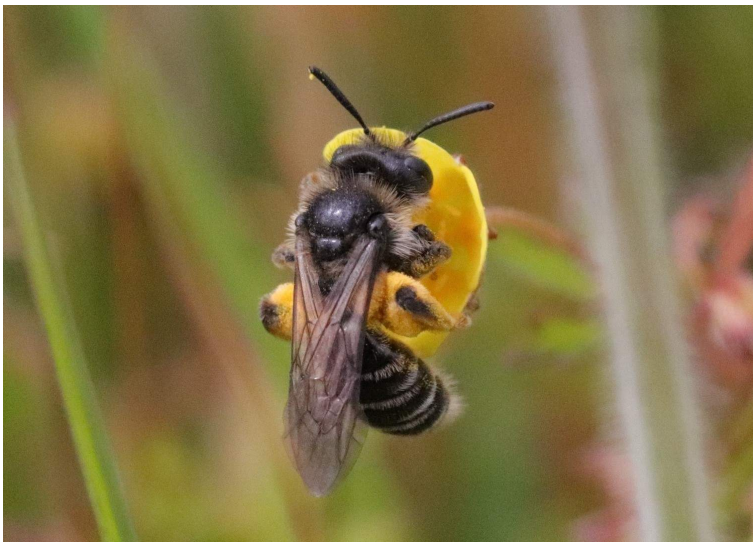
Previous surveys of West Penwith Moors SSSI have emphasized the importance of the area for specialist bee species (Saunders 2015) and The population of the Tormentil Mining Bee at Bartinney Reserve has been monitored since 2015 (Saunders 2024). The review discusses the threats and opportunities for Tormentil Mining Bee and also some other associated important bees.

Methodology

This review used the results from previous surveys including West Penwith Moors SSSI targeted species survey (Saunders 2015) and monitoring work at Bartinney CWT from 2015-2024 (Saunders 2024). Additional data and observations from independent surveys by the author in summer 2025 are also included.

Picture 2 Tormentil Nomad Bee (*Nomada robertjeotiana*)

The Tormentil Mining Bee



The Tormentil Mining Bee (Andrena tarsata) is a ground nesting bee which forages exclusively on Tormentil (Potentilla erecta) to provision its offspring. The species is listed as section 41. species (BRIG 2007). The Tormentil Mining Bee is widespread across England, Wales and Scotland. However, BWARS data shows post 2000 recorded sites to have declined by about 50% (BWARS 2020).

Picture 3: The Tormentil Mining Bee (Andrena tarsata)

The Tormentil Mining Bee has a cuckoo or cleptoparasite called the Tormentil Nomad Bee (*Nomada robertjeotiana*) which usurps the nest and provisions stored by the Tormentil Mining Bee. The nomad bee relies on a strong host population of the Tormentil Mining Bee (making it an extremely rare bee).

There are only 12 UK sites with recent RDB Tormentil Nomad Bee (*Nomada robertjeotiana*) records (BWARS 2020). Tormentil Nomad Bee (*N. robertjeotiana*) is listed as Near Threatened in the EU red list (Nieto 2014). The West Penwith area is probably of national importance, as it currently has more recorded sites for the Tormentil Nomad Bee (*N. robertjeotiana*) than anywhere else in the UK (Saunders 2015).

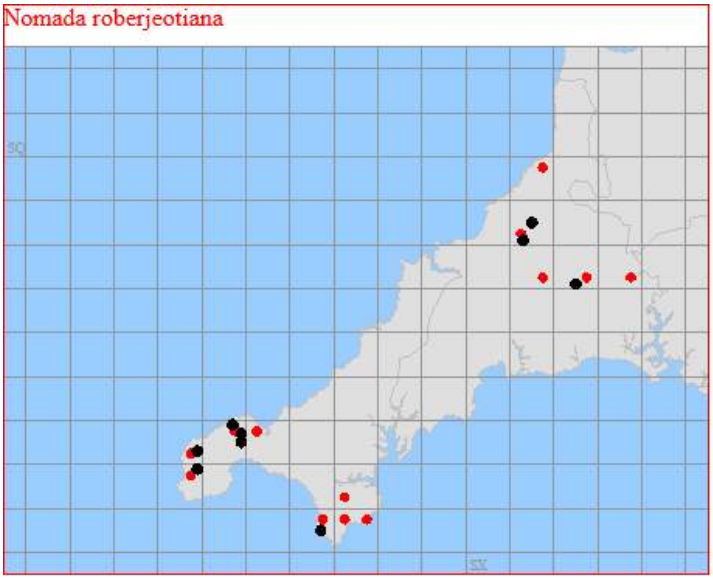


Figure 1 Distribution of Tormentil Nomad in Cornwall, Black dots post 2000's Red dots pre 2000's

Tormentil Mining Bee within the PLR

This review found Tormentil Mining Bee still occurs across the PLR area in 2025 (Fig. 2.). The population appears to be relatively secure but there is some evidence of decline. Some sites with 2014-16 records were found to no longer to support the species and the national data does suggest there should be concerns.

Precise comparison with historical populations is very difficult as there has not been consistent recording effort. In West Penwith (and Cornwall generally) modern survey effort has been greater than historical coverage. This is more generally probably a problem in interpreting trends in bee data as since 2015 interest in recording as greatly increased with easier identification guides and social media.

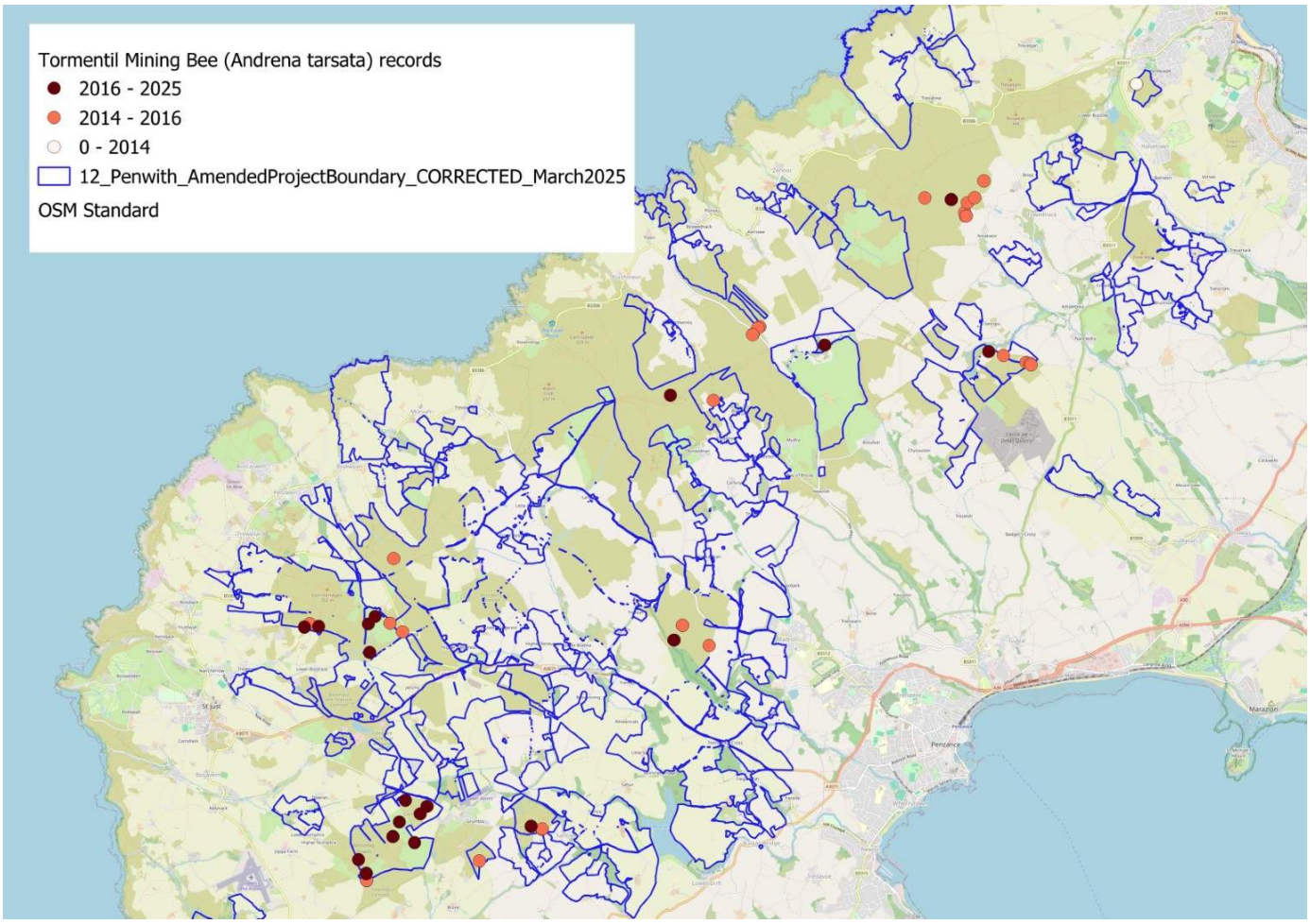


Figure 2 The project area and Tormentil Mining Bee records

The sites with a strong populations (such as Bartinney CWT) have large areas of dense flower resources through favourable management whereas singletons are also observed on sites with less optimal flowers such as more heavily grazed sites or small habitat patches within more scrubby landscapes.

Cornish records overlaid on climate data (Fig 3.) suggest most of the modern records are clustered in areas with cooler July maximum temperatures (<18.7c) whereas areas with higher absence of modern records are associated with warmer July maximum temperatures (>18.7c). The national data also suggests decline may be associated with climate (Fig.4.). Tormentil Mining Bee has not been recorded in repeat surveys since 2015 from one of the best sites on south Bodmin moor (Park Lake SWW) which still has extremely good flower resources. The Tormentil Bee is found with difficultly on the Lizard, despite some good flower habitat. Both might be consistent with climate envelope becoming unsuitable for the species as both the Lizard and southern Bodmin moor appear to have warmer summer maximum temperatures (Fig 2). It is highly complex to compare all the macro climate variables and even more so for micro climate and individual site variables such as nest soil microclimate. Rainfall may be an important factor Tormentil is associated with wet areas and the data from Bartinney CWT (Saunders 2022) suggests flower resources are poorer in dry summers.

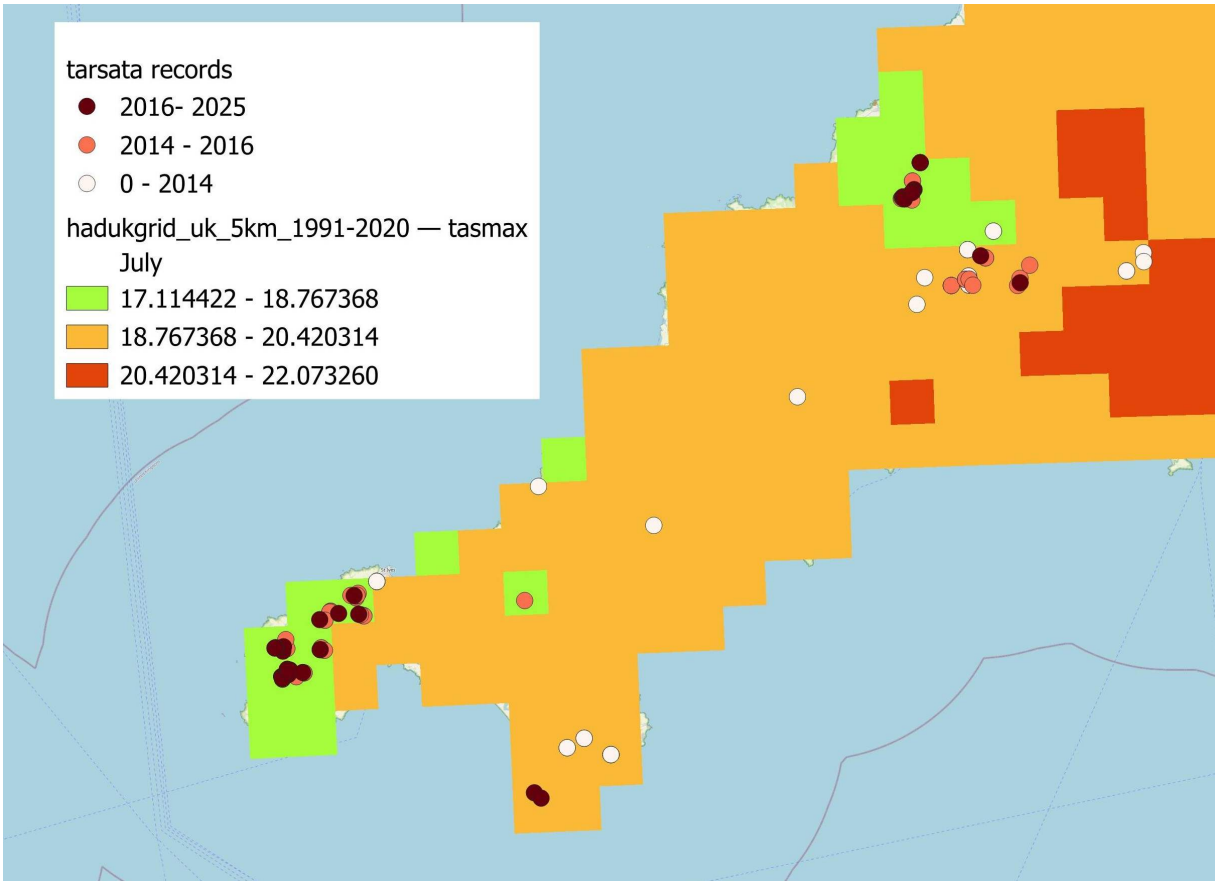


Figure 3 Tormentil Mining Bee records plotted on maximum July temperature, HadUK-Grid Gridded Climate Observations on a 5km grid over the UK (Met Office 2024):

West Penwith Moors generally has low levels of grazing, with low influence of active common rights. No open moor sites where found with high levels of sheep grazing unlike Bodmin moor which still has very high levels of common grazing by sheep and ponies. Deer grazing is probably increasing on West Penwith Moors (Hocking per. comm.).

A number of areas visited in 2024-25 with records (Men-an-tol Moors, Treen common, Chykembro common) were in poorer condition than 2015 with little stock grazing apparent and increased bracken and other scrub. Some unauthorized tree planting has taken place at Beagleton Downs in former habitat. Woodland creation targets are likely to be a further threat.

Large nest aggregations are likely to require dense and abundant flower resources near (ca <700m) the nests and this is the case at the key sites. The singleton records suggests the bee can adapt to more dispersed flowers by nesting solitary or in very small aggregations over a wider landscape or could indicate failing populations. More research is needed on the question of minimum viable population but it seems likely that key sites with large aggregations provide greater population resilience and allow a cross-flow between very small populations colonising poorer sites. This is also probably the case on Bodmin moor, where the bee is present at 2 or 3 sites with large populations but occurs very sporadically on the southern end of Bodmin moor where the bee is more usually found as single bees across a number of sites.

Picture 4 Bartinney CWT In 2025 at least 35 Tormentil Mining Bee were recorded at this nest site

Other important bee and wasp species within the PLR

Table 1.

	Status	
Tormentil Nomad Bee (Nomada roberjeotiana)	RDB (EU RDB NT)	Cuckoo bee of Tormentil Bee. Recorded on 7 1km squares in WPM. West Penwith is of national and possibly European significance for this species
Perkin's Mining Bee (Andrena rosae)	NS (Na) (RDB Falk)	Quite widespread in WPM. Recorded on 28 1km squares in WPM. Probably the strongest populations in the UK possibly of European significance.
Small Flecked Mining Bee (Andrena coitana)	NS (Nb) pNT (BWARS 2024)	The bee has been recorded at one site on WPM. The species was relatively widely recorded in Cornwall pre-2000's but single site on Bodmin moor and the single WPM site are the only modern records. Should be regarded as very high threat status.
Catsear Nomad Bee (Nomada integra)	NS (Nb)	The Cats ear nomad bee (Nomada integra) is very difficult to find but recorded on 3 1km squares in WPM. Its host Cats ear mining bee (Andrena humilis) is local rather than rare.
A ruby tailed wasp (Hedychrum niemelai)	NS (Nb)	3 1km records within WPM. Needs further review but possibly increasing and not particularly threatened.
Black-headed Mining Bee (Andrena nigriceps)	NS (Nb)	This bee is found at 10 1km records with WPM. The bee is scarce rather than rare in Cornwall. Nationally the species is quite widespread but Cornwall does represent a key population area. The status should be reviewed as is there is evidence of modern decline and the wpm population may be important.
Brown-banded Carder Bee (Bombus humilis)	S41	The bee is generally a coastal bee in Cornwall but in 2025 I found at two inland WPM sites. Associated with high quality flower-rich grassland. The species should be included as a target species in WPM habitat advice
Small Scabious Mining Bee (Andrena marginata)	NS	Probably extinct in Cornwall. Recorded as recently as 2007 in WPM. But significant effort put into surveys since.
Moss Carder Bee (Bombus muscorum)	s41	Not recorded on WPM recently. But is associated with high quality flower-rich Moorland habitats and has some modern coastal records in west Cornwall. Should be included in long list of target species.

This review applied criteria used by Falk (1991) on the post 2000 National BWARS data (BWARS 2024) to establish provisional modern red data book categories for the species below. See Appendix 1. for further information.

Picture 5 Tormentil rich habitat at Bartinney, with rotational autumn hay-cut and winter grazing has been successful. approximately 100 tormentil flowers per 1m2 should be used as a auide for site manaaers

Picture 6 Perkins Mining Bee another species of European importance within PLR

Important habitat features within the PLR

Flower habitats	Comment	Threats
Acid grassland	Many of the best sites for this bee are where Tormentil rich acid grassland habitats are treated as meadows with light summer grazing.	Acid grassland/upland hay meadows under optimal management are not common. There are many WPM sites which have been improved or are under unfavourable management or abandonment.
Bracken rich mosaics	Bracken rich habitats can be very good. Where suitable grazing creates Tormentil rich rides, trackways and glades. Quite undervalued ecologically.	Dense stands of species poor Bracken dominated habitat probably increasing. Bracken under favourable management is more scarce.
Dry Heathland	Can be important but more often is the edges or track-sides which are richest in Tormentil than the main body of dry heaths. Management important to promote Tormentil.	Some high quality heaths occur across the WPM. But is much scrub succession and under-grazing is an issue.
Wet heath/Molinia	Wetter Molina rich habitats can be very rich in Tormentil and important for this bee. But does depend on management as rank Molinia or willow scrub suppresses Tormentil habitat.	Some very good examples of wet heathland on WPM. But under-grazing is probably more common than overgrazing.
Nest habitats		
Bare ground Permanent	Banks, Track-sides and other bare ground features very important. friable or Small particle size such as sand, silt and clay probably critical.	Lack of winter grazing and rotational disturbance. These areas need some management to insure bare ground coverage is maintained.
Other features		
Angelica	Angelica highly important for Diptera and Perkins mining bee.	Is common across the moors in lightly managed habitats but a WPM speciality
Other flower rich grassland	Aster rich grassland with Yellow composites and important for Catsear Nomad Bee (Nomada integra). Legumes in species rich grassland important for Brown-banded Carder Bee (Bombus humilis)	Yellow composites occur across the moors but very high quality species rich grassland is rare.
Other scrub and ruderal areas	Scrub important for range of pollinators. Particularly Eared willow (Salix aurita) for Perkin's Mining Bee (Andrena rosae). There are a large range of scrub habitats important for invertebrates outside this document.	Probably expanding across the moors. WPM has some rich and important scrub and ruderal habitats, through being less grazed than Bodmin Moor. But balanced management is needed, rather than total abandonment which is happening at many difficult sites.

Note mosaics of above occur .

Management checklist

Encourage bare ground-

Through winter poaching and/or creating bee banks. Track-sides or Gates very important. Permanent poaching or disturbance should not be seen as problem. Not all bare ground the same if too compacted or rocky may not be suitable for mining bees. Likely to be dependant on soil type small particle size such as sand, silt and clay probably best

Banks very important. These areas likely to need some management to insure bare ground coverage is maintained. On some sites high levels of grazing (probably in winter) may be enough. On others creating new bare areas by mechanical means or by hand with volunteers is needed. Ideally rotate a key section of bank to ensure a turn over of different successional stages.

Encourage abundant flowering Tormentil (100 flowers pr metre)

Suitable grazing regime and stock density- may depend on habitat, Tormentil is a widespread and tolerant of many management regimes, but very light or no grazing June/July and raised stocking levels autumn to early spring is likely to deliver the best flower habitat. Treating acid grassland as hay meadow with autumn cut and collect will be very effective. Generally Ponies and Cattle are most suitable, but sheep grazing can be effective given the right prescriptions. Burning of over mature Molinia or Gorse heaths is effective and should be considered for neglected sites.

Picture 8 Scrub edge habitats rich in Tormentil

Picture 7 Bracken mozaics rich in Tormentil

Review of national trends in climate and distribution

BWARS 10 km records (BWARS 2024) of The Small Flecked Mining Bee (*Andrena coitana*) and Tormentil Mining Bee (Andrena tarsata) was plotted on the highest daily maximum temperature from the summer (June-July-August) period averaged over a 1981-2000 baseline (Fig. 3.) (UKCP18 data set Met Office Hadley Centre 2023). The species data was joined to the climate data (Fig.4.).

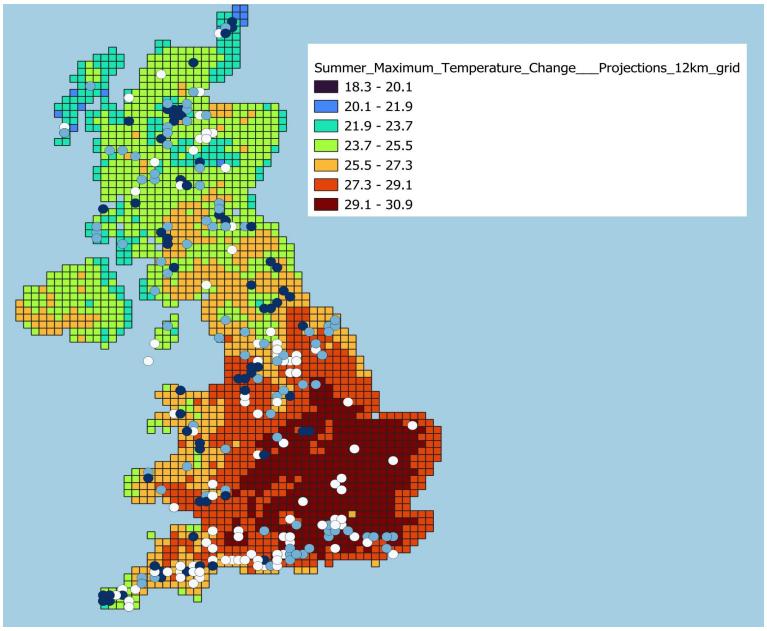
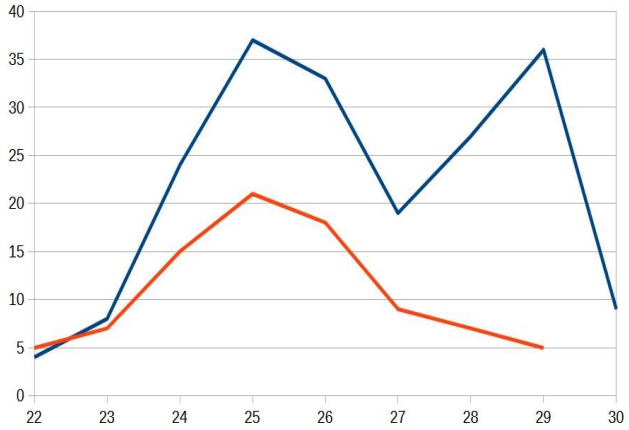


Fig. 3. Tormentil Mining Bee (Andrena tarsata) records on the UKCP18 data set. Dark Blue dots represent post 2010 records

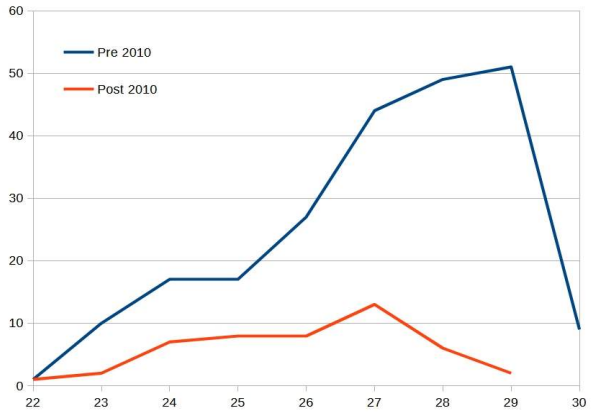
Fig 4. **Count of BWARS (10km) locations by summer maximum temperature.**

Red= Post 2010 Blue= Pre 2010

Tormentil Mining Bee (Andrena tarsata)



The Small Flecked Mining Bee (Andrena coitana)



Conclusion

West Penwith Moors has a nationally important or possibly European important population of Tormentil Nomad Bee (*Nomada roberjeotiana*). The area also has important populations of other threatened Upland and Maritime bee species. The main threats are climate change and reduction in stocking density or abandonment of traditional farming. Joined up action and agri-environment support is needed to support this species.

References

Biodiversity Reporting and Information Group. (2007)**.** ***Report on the Species and Habitat Review*****.** http://jncc.defra.gov.uk/PDF/UKBAP_Species-HabitatsReview-2007.pdf

BWARS (2024), **BWARS data at 10km resolution (2023 April)** Available at: https://bwars.com/content/bwars-data-download (Accessed: 10/11/24)

Falk, S. (1991) **A review of the scarce and threatened bees, wasps and ants of Great Britain** (No.35). Nature Conservancy Council for England.

Fitzpatrick, U, TE Murray, A Byrne, RJ Paxton, and MJF Brown. 2006. **Regional Red List of Irish Bees**. Publ. Rep. to National Parks and Wildlife Service (Ireland) and Environment and Heritage Service (N. Ireland), 1–38.

Horsley, C., Whitehouse, A., & Falk, S. (2013). **South West Bees Project**.

Met Office; Hollis, D.; Carlisle, E.; Kendon, M.; Packman, S.; Doherty, A. (2024): **HadUK-Grid Gridded Climate Observations on a 5km grid over the UK**, v1.3.0.ceda (1836-2023). NERC EDS Centre for Environmental Data Analysis, 18 July 2024. doi:10.5285/5ba67d62cdc249a3bc5b1c38b339beb3. https://

Met Office Hadley Centre (2023): **UKCP18 Probabilistic Climate Projections.** Centre for Environmental Data Analysis, *2023*. http://catalogue.ceda.ac.uk/ (Accessed: 10/12/24)

Nieto, Ana, Stuart P M Roberts, James Kemp, Pierre Rasmont, Michael Kuhlmann, Mariana García Criado, Jacobus C Biesmeijer, et al. 2014. **European Red List of Bees**. https://doi.org/10.2779/77003. (Accessed: 10/12/24)

Saunders, P., (2015) **West Penwith Moors targeted rare insect species survey**, Natural England, Available at:http://kernowecology.co.uk/Publications/West%20Penwith%20Moors%20survey%202015.pdf (Accessed: 10/12/24)

Saunders, Patrick. (2020). **Review of Perkin's mining bee (Andrena rosae) in Cornwall** BWARS newsletter 2020. Autumn. 12. (Accessed: 10/12/24)

Saunders, P., (2022). **Tormentil Mining Bee on Cornwall Wildlife Trusts Bartinney Nature Reserve**, Available at: http://kernowecology.co.uk/public_html/Publications/Bartinney%20report%202022.pdf

Saunders, P. (2024). **Tormentil Mining bee monitoring at Bartinney Hay Meadows..** , Available at: https://www.researchgate.net/publication/390056786_Tormentil_Mining_bee_monitoring_at_Bartinney_Hay_Meadows

Appendix 1.

Species summary

Perkin's Mining Bee (Andrena rosae)

Perkin's Mining Bee (Andrena rosae) has a very restricted distribution in the UK, was designated as RDB (Falk 1991) and is threatened or Red Data Book listed in five EU Countries (Fitzpatrick et al., 2006). The West Penwith area may support the strongest population of this bee in the UK (Saunders 2020). Spooner (1984) in his Cornish aculeate register notes that this bee "has become scarcer in recent years". The species occurs in two broods. The spring brood (March to May) is found associated with scrub edge habitats mainly with Blackthorn and Salix sp. Whereas the summer brood is mainly found on Angelica, but on some sites is associated with Bramble

Picture 1 ***Perkin's Mining Bee***

Small Flecked Mining Bee (Andrena coitana)

Picture 2: Small Flecked Mining Bee (Andrena coitana)

The find of Small Flecked Mining Bee (Andrena coitana) was particularly interesting,. The species was relatively widely recorded in Cornwall pre-2000's but I can only find it at one other site in Cornwall. The species is not listed in (Falk 1991) and needs modern update of its status. It is not listed as a flower specialist, but may be a climate vulnerable as generally Northern or Upland. The very rare Flat-ridged Nomad Bee (*Nomada obtusifrons*) associated with this bee is found at the other Cornish site. Flat-ridged Nomad Bee (*Nomada obtusifrons*) is listed as Near Threatened in European Red List (Nieto 2014).

Black-headed Mining Bee (*Andrena nigriceps*)

Black-headed Mining Bee (Andrena nigriceps) is listed as Nationally Scarce (Falk 1991) but these statuses are currently under review. Cornwall is a stronghold for this species, which is generally found in very small numbers or singletons. The bee is coastal but also a moorland species. The national BWARS data (2024) suggests this bee has had a large decline post 2000's. It is considered threatened in 5 European countries (Nieto 2024)

Picture 3 Black-headed Mining Bee (Andrena nigriceps)

Catsear Nomad Bee (Nomada integra)

The Cats ear nomad bee (Nomada integra) and its host Cats ear mining bee (Andrena humilis) are both listed as Nationally Scarce (Falk 1991) but these statuses are currently under review. The Catsear Nomad Bee (Nomada integra) is quite a difficult bee to find and has very few modern records in Cornwall, but many of them being in West Cornwall. Its host is not particularly scarce in Cornwall. Both are associated with flower-rich habitats rich in Cat's Ears or Hawk-bits.

Appendix 2.
Site list with date of latest record of Andrena tarsata

Site Name	Gridref	Year
Amalveor downs	sw47823800	2023
Amalveor downs	sw48013776	2015
Amalveor downs	sw48003781	2015
Amalveor downs	sw48023776	2015
Bakers Pit CWT	SW482358	2023
Bartinney cwt	SW390291	2025
Bartinney CWT Carn Glaze	SW395294	2024
Brook cottage	SW437354	2025
Caer Bran	SW407290	2015
Carnyorth Common	sw38523249	2015
Chykembro common	SW450363	2014
Chykembro Common	sw45023633	2014
Foage Farm	sw47453804	2014
Ladydown Newbridge	SW459360	2019
Mulfra Hill to Treen Common	sw44943624	2014
Nine Maidens Common	sw443353	2015
Sancreed beacon	SW4129	2022
ST.IVES	SW5039	1931
tregwainton	SW43633201	2025
Trendrine Hill and Beagleton Downs	sw48293824	2015
Trendrine Hill and Beagleton Downs	sw480379	2015
Trendrine Hill and Beagleton Downs	sw48153801	2015
Trengwainton Carn	SW4332	2025
Truthwall common	SW386324	2023
Truthwall CWT	SW384324	2025
Woon gumpus	SW397333	2014