

Bee survey of the Isles of Scilly 2023

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Photo by Jilly Halliday

1. Introduction – recording the bees of Scilly

This report presents the results of a survey of wild bees and their habitats carried out by me during June 2023, set against the backdrop of my regular entomological recording on Scilly since the 1990s, including visits in all months of the year from March to October. The survey was initiated by Grace Twiston-Davies (University of Exeter and [Wildflower Collective CIC](#)), in partnership with the [Isles of Scilly Wildlife Trust](#) and the [Tresco Estate](#), with Jilly Halliday representing Tresco Estate and the [Scillonian Bee Project](#). Funding for boat trips to the uninhabited islands was kindly provided by the [Duchy of Cornwall](#), or through the Wildlife Trust's breeding seabird survey, supported by Natural England and the Isles of Scilly National Landscape partnership.

Bees have been recorded intermittently on Scilly by visiting entomologists since the 1800s. However, more systematic recording did not begin until the 1960s, with the first definitive list of species being published by I H H Yarrow in 1967. The list was supplemented by G M Spooner who made several visits between 1966 and 1985, although his observations were never published and survive only in his manuscript journals at the Natural History Museum. My records date mainly from 1995 onwards, and I have visited in most years since then. The focus here is on wild bees such as solitary bees and bumblebees rather than managed honeybees.

The all-time species list for Scilly, as documented in the Appendix, amounts to 52 species. However, there is no point at which all of these would have existed on the islands simultaneously. The fauna of offshore islands like Scilly is subject to a constant but unpredictable succession of colonisation and extinction events. Thus the bee fauna of the Isles of Scilly is constantly changing, with species unpredictably appearing and disappearing, along with evidence of 'potential colonisation' (records of isolated individuals with no evidence of permanent establishment). The majority of species resident today form a core of long-established (presumably since the end of the last Ice Age) permanent inhabitants, but there are several well-documented examples of recent successful colonisation, as well as evidence for former colonisation events that were in the long term not successful, and for species in which periods of establishment have alternated with periods of absence. Some of the core resident species, most notably the Scilly Bee (*Bombus muscorum scyllonius*), have declined to near or definite extinction in the modern era (post 1960) due to habitat changes.

2. Bee habitats on Scilly – a historical perspective

As is the case throughout most of the British Isles, the habitats we see today on Scilly are mostly not pristine or wholly 'natural' but are the product of human interaction with and management of the natural environment over thousands of years. Native flora and fauna became adapted to human activity introduced at a slow pace and then maintained over many generations, because newly created habitats mostly offered an acceptable substitute for their pre-existing counterparts. Even the larger of the currently uninhabited islands were at some stage inhabited or at least used for grazing domestic animals, and in the pre-mediaeval era these were (apart from St Agnes and Annet) all part of one land mass and treated accordingly. So while there will always have been open flower-rich habitats frequented by bees, those we have today are not identical to those that existed before human settlement. This means that the natural processes (such as grazing by wild deer) which once maintained those original open habitats may no longer prevail in their later equivalents, making today's habitats dependent on human activity to preserve them. So when long-established practices like coastal grazing are abandoned relatively suddenly, open habitats and the bees that depend on them are in danger of disappearing.

On Scilly today open coastal habitats (heathland and flower-rich grassland) are the most vital for maintaining healthy populations of wild bees, and for offering any hope of reintroducing the lost Scilly Bee. Some of these habitats are more susceptible to negative change than others. The more barren walled heath (typified by Chapel Down on St Martin's and Castle Down on Tresco) are maintained more or less free from encroaching vegetation by their thin soils and exposed situation, but these are not capable of sustaining a diverse bee fauna because there is little floral interest outside the heather flowering season in late summer. This leaves the grassland – and more sheltered heathland – areas as the most essential bee habitats, but it is these that have suffered most from the encroachment of invasive plants – mainly bracken, gorse and bramble – since the cessation of regular grazing in the modern era. Although these plants are native, and gorse and bramble at least do provide resources for bees when in flower, they are detrimental as a monoculture because they eliminate the succession of low-growing flowers that is required to sustain bee populations throughout the season from early spring to mid-autumn.

Historically, these open coastal habitats were treated as 'commons' and maintained by informal grazing of sheep and cattle which were allowed to wander at will – the stone hedges we see in these areas would have been erected to keep the animals out of standing crops rather than to enclose them. Regular grazing created and preserved a flower-rich turf and kept the taller invasive plants at bay. The invasive plants were also utilised in various ways by the islanders – for example, bracken as winter bedding for cattle and gorse as fuel. Other human activities such as gorse-burning and turf-cutting (for fuel) also served to maintain open habitats. Under such conditions, species like the Scilly Bee will have flourished in the period up to about 1960. It is no coincidence therefore that the decline of the Scilly Bee followed the decline and eventual cessation of coastal grazing post-1960, with the associated spread of invasive vegetation into formerly grazed areas, and that the island where it held out for longest – St Agnes – was the one where informal grazing continued longer than elsewhere. Bumblebees require more floral resources than solitary bees because of the need to support large colonies, so inevitably a bumblebee adapted to an open flowery landscape will suffer more severely than those solitary species which can hang on in relatively small enclaves of surviving habitat. However, it is reasonable to assume that solitary bees will have declined in numbers too over the same period. The introduction of conservation grazing in recent years has improved coastal bee habitats in many places, but sadly proved insufficient – despite some promising indications in the early years – to reverse the decline of the Scilly Bee.

It would be useful for someone with regular access to the appropriate archival resources – presumably in the Isles of Scilly Museum – to research historic maps and images to gain a more detailed understanding of what these open habitats looked like under traditional forms of land management, and what changes have taken place since the mid-20th century. Oral history may also be a useful adjunct, where there is generational memory of how landscapes were managed in the earlier half of the 20th century. As well as informing present day management, the results would no doubt be helpful in public education and advocacy for habitat restoration, as visual images can serve to capture people's imagination and counter suggestions that 'it's always been this way'.

3. Habitat requirements for the bees of Scilly

Scilly offers a variety of habitats for bees, whose requirements may be more or less specific, depending on the species. Bees are universally sun-loving creatures, and so are mostly characteristic of open flower-rich habitats. Dense, shady woodland or scrub is not suitable for bees, but if there are wide sunny paths and clearings that allow flowers to grow bees will take advantage of them. Some bees, especially the social species, are highly mobile creatures, and may travel relatively long

distances to feed, forage or nest; while others are more sedentary and will stay within small pockets of habitat – this makes them vulnerable to habitat deterioration or removal. A good site for bees will fulfil three general requirements: flowers where both sexes can feed and at which females can forage (gather nectar and pollen as a food store for their larvae), sites that are suitable for nesting, and focal points where males and females assemble to pair.

Many bee species, especially the social species (honeybee and bumblebees), will visit a wide variety of flowers, while others are much more specific in their requirements. A few focus more or less exclusively on one plant species, or a couple of closely related ones, and in these cases looking for the plant is usually the best way of finding the bee in question. Solitary bees often have prominent nest sites, either in bare or sparsely vegetated ground in which the females burrow, or in various pre-existing natural and manmade cavities. In such spots, many females of a range of species may nest in close proximity. Sunny south-facing banks, soft cliffs, and other vertical exposures, as well as stone hedges and terrace walls (where there is earth between the stones), are typical places where nesting activity is likely to be seen. Cuckoo bees (which take advantage of the food stores gathered by other species) will normally be found exploring the nest sites of their hosts. In their search for a mate, male bees commonly engage in a range of activities known variously as swarming or lekking: they may fly persistently over a nest site, or around a prominent bush, or along a linear feature such as a hedgerow. Females are attracted to these focal points both by visual cues and by pheromones which the males produce.

Some of the best sites for bees are to be found in coastal grassland, heathland and dunes. These include: on St Mary's, Peninnis Head, the perimeter of the Garrison, the south coast between Old Town and Porth Hellick, and the northern coast path from Carn Morval around to Pelistry; on Treco, the Appletree Banks dunes and heathland, and the coast path from New Grimsby around Castle Down; on St Martin's, Great Bay, the coastal path around Chapel Down, and the west coast between Lower Town and Pernagie; on St Agnes, Wingeltang Down and Castella Down, as well as much of the coast around Gugh; and on Bryher, Shipman Head Down and the open ground between Rushy Bay and Great Pool. In many places the coastal heathland is fringed by rapidly eroding soft cliffs which provide ideal nesting conditions for mining bees, as do the low vertical exposures often seen on the shoreline.

Among the most significant inland sites are Lower and Higher Moors (and the more open section of the Holy Vale nature trail) on St Mary's, along with the fringes of Abbey Pool and Great Pool on Treco. Gardens can provide important 'honey pot' sites, drawing in feeding and foraging bees from the surrounding area and often providing other resources too. The two major public gardens – Treco Abbey, and Carregh Dhu on St Mary's – are significant hot-spots for bees, as they provide many potential nesting and assembling sites as well as abundant nectar and pollen sources.

4. The current state of bee habitats on individual islands

The notes in this section mainly reflect my observations from the June 2023 survey and a subsequent visit in September of the same year. The focus is on identifying existing bee habitats that should be maintained, and enhanced where required, as well as areas currently under threat or lost which have potential for restoration. To avoid tiresome repetition, my recommendations for habitat restoration and management are often implicit rather than, for example, being spelled out on each occasion where encroachment of invasive vegetation is mentioned.

4.1. St Mary's

4.1.1 South coast heathland and grassland. In the long grassland at Tolman Point and beside the sheltered path around Porth Minick there is a good range of flowers attractive to bees, including cat's-ear, wild carrot and other umbellifers, and birdsfoot trefoil.

The downs eastward from Porth Minick offer an attractive open habitat for bees, with little evidence of encroachment by rough vegetation. There are plenty of fine grasses with floral resources including thrift, wild carrot and birdsfoot trefoil. Around Giant's Castle the habitat changes to a more barren waved heath, but still with extensive cover of tormentil. Further towards Porth Hellick, the habitat shows deteriorating resources for bees, although with great potential if loss of open heathland can be arrested and reversed. On the west side of Porth Hellick, gorse and bracken are encroaching upon a potentially fine area of heather (Salakee Down), and flowers like cat's-ear have become restricted to the sides of the coastal path. On the east side of Porth Hellick (Porth Hellick Down), gorse, bracken and bramble are seriously encroaching upon the heather, and there are substantial areas where bracken is covering the heather. Short turf with birdsfoot trefoil and sheepsbit on top of the large burial chamber shows a type of habitat lost from the wider area which would be attractive for bees if it could be recovered elsewhere – such turf would presumably have been maintained by sheep grazing in the past.

4.1.2 North coast heathland and grassland. The area around Carn Morval has fine flower-rich turf with attractive plants for bees including birdsfoot trefoil and thrift. Following the coast path between Carn Morval and Bant's Carn, there is good heathland vegetation on the slopes but bracken is spreading down the slope and encroaching upon the heather. Between the path and the sea is a strip of flower-rich turf with birdsfoot trefoil, thrift and cat's-ear.

Along the coast path between Innisidgen and Watermill Cove, there is extensive encroachment by bracken, so that in many places heather and grassland flowers like cat's-ear only flourish alongside the mown path. The mown turf around the two burial chambers with heather and birdsfoot trefoil shows the potential of this area if it could be more extensively reverted back to open habitat. On the slopes above the path east of the burial chambers extensive bracken clearance some years ago was successful in regenerating heathland, but bracken is currently reasserting itself.

The coastal path between Watermill Cove and Pelistry passes through dense cover of bracken, gorse and bramble, with heather and grassland flowers surviving by the sides of the path.

South of Pelistry there is a narrow strip of good coastal heathland and grassland with heather, thrift and birdsfoot trefoil. The waved heath around Deep Point and Porth Wreck is inevitably rather barren as regards resources for pollinators. However, Porth Wreck itself does provide a sheltered enclave with floral interest and soft cliffs for mining bee nesting; some clearance of impenetrable gorse and bracken to encourage lower growing flowers could be beneficial here.

At Mount Todden there is a flower-rich path near the fort with cat's-ear, red campion and yarrow.

The path is keeping back the widespread gorse encroachment in this area, and shows the potential if open habitat could be extended here.

4.1.3 Bant's Carn heathland and grassland. Here management of encroaching vegetation to maintain the open character of the prehistoric site has preserved open habitats which in the surrounding area have been largely swamped by bracken and gorse. There are good heather clumps on and around the prehistoric structures, and areas of grassland with cat's-ear and yarrow. The wide path running along the bottom of the site also allows grassland flowers to appear alongside. Flowering ivy beside the path provides a resource for autumnal pollinators.

4.1.4 Garrison and Peninnis heathland and grassland. On the outside of the Garrison walls there is a good strip of coastal grassland with thrift and birdsfoot trefoil. However, some bracken and bramble encroachment is in evidence here.

Along the west side of the Peninnis headland and around the lighthouse there is substantial open coastal grassland with thrift and birdsfoot trefoil. On deeper soils towards the allotments, the coast

path allows flowers such as cat's-ear and wild carrot to grow that would otherwise be swamped by bracken, bramble and gorse descending the slope.

4.1.5 Harry's Walls. The mown turf around Harry's Walls maintains a short turf allowing plants like birdsfoot trefoil, cat's-ear and sheepsbit to flourish, a type of grassland flora that sheep grazing would once have encouraged. In the autumn the flowering ivy around the boundary of the site is also useful for pollinators.

4.1.6 Lower and Higher Moors, and Holy Vale. These long-established wetland nature reserves offer substantial floral resources (including white umbellifers, cat's-ear, bramble and ivy) for foraging bees, along with sheltered path-side vegetation for lekking behaviour. The drier section of the 'loop trail' at the Porth Hellick end of Higher Moors has something akin to a woodland glade flora. The more open southern section of the Holy Vale trail has considerable floral interest with flowers including white umbellifers and purple loosestrife, and sunny sheltered path-sides with ivy bloom in autumn further on before the denser shade of the elms is reached.

4.1.7 Carregh Dhu garden. The public garden in a sheltered old quarry area illustrates the potential of gardens more generally to provide habitats for bees. Many cultivated plants provide forage sources for bees, and the sunlit leaves of plants and shrubs offer focal points for lekking activity. The old quarry walls offer nesting sites for mining bees. There are also wildflowers like cat's-ear in the turf alongside and between the plantings, and the mowing regime should take these into account with at least some areas left unmown through the spring and summer.

4.1.8 Old Town churchyard. Churchyards, like gardens, have great potential for bees, providing floral resources and nest sites within an overall sheltered environment. Having been carved out of pre-existing grassland, Old Town Churchyard has a natural flower-rich turf. Patches of wildflowers such as cat's-ear and red campion, especially on fenced graves where mowing cannot reach, show what could be growing more generally if a more relaxed maintenance regime were adopted.

4.1.9 Enclosed fields. Many fields and field edges with flowers useful for bees can be spotted around St Mary's. For example, the coast path from Juliet's to Carn Morval passes through fields that were formerly grazed and contain flowers such as hogweed and greater birdsfoot trefoil. There are some old overgrown flower fields on Helvear Down (next to the community orchard) that used to attract good numbers of pollinators (both to ground flora and the flowering windbreak hedges), but have become almost completely swamped by bracken and bramble. The community orchard also has potential to support pollinator-attractive flowers in the grassland between the trees. On the landward side of the coast path around Porth Minick are old flower fields with considerable floral interest, including clover, cat's-ear and wild carrot. Towards the Hugh Town end of the Peninnis coast path, there is an old bulb field with abundant corn marigold, and the path through the allotments is fringed with abundant sheltered flowering ivy in the autumn. Just beyond the allotments there is a large flower-rich sloping field bounded by the footpath which in early June had a fine display of cat's-ear, red campion and yarrow; however, this was all mown prematurely between 8 and 19 June. Although there was limited regrowth of cat's-ear and yarrow by September, this field would benefit from a delayed (early autumn) hay cut.

4.1.10 Inland footpaths. Footpaths often provide open linear habitats with flowers along the sides that are absent from the rest of the areas through which they pass. For example, the start of the coast path from Juliet's to Carn Morval is fringed by pollinator-friendly plants like cat's-ear and hogweed. However, on a narrow path like this such flowers are liable to get cut down before they are over.

Paths through woodland, if wide enough to allow plenty of sunlight and path-side growth of low-growing plants, can have much to offer pollinators, with the added advantage of providing shelter in windy conditions. The path that passes the Long Rock menhir (McFarland's Down) has the character of a sunny woodland glade with flowers such as cat's-ear. The path holds back bracken that would otherwise cover the area completely. Along this same path is a dead tree with an abundant cover of flowering ivy that attracts many pollinators in autumn.

Paths through the woodland on Helvear Down also have potential that is currently not often realised. What is possible here can be seen by the little flower-rich glade (including cat's-ear and red campion) that leads off at right angles from the path leading north from Trenoweth.

There are sheltered sunny paths through the woodland on the Garrison that are of especial interest in the autumn for their abundant flowering ivy. There is potential for creating wider sunny glades within this area which would no doubt produce ground flora such as cat's-ear in the summer.

Along the route between Pelistry and the Cove Vein café there is an attractive sheltered 'green lane' with considerable floral interest including cat's-ear, red campion and hogweed.

4.1.11 Roadsides. As with footpaths, roadsides have the potential to offer significant floral resources for bees, often substantially better than the wider areas through which they pass. Many stone hedges have a good growth of flowers like cat's-ear and red campion, as well as providing nest sites for mining bees in the soil between the stones. However, in many cases these flowers are smothered by bracken, coarse grasses, gorse and bramble, as well as the exotic invasive *Muhlenbeckia*. It is worth exploring if there are ways of managing these habitats to encourage floral diversity and diminish the dominance of coarser vegetation.

4.2. Tresco

4.2.1 Appletree Banks heathland. The thin sandy soils at the south end of the island support extensive heathland vegetation and are generally resistant to bracken encroachment which requires deeper soils. Although some heathland areas lack floral interest outside the heather flowering season, there are some earlier flowers here including good patches of birdsfoot trefoil.

4.2.2 Abbey Gardens. The Abbey Gardens are a sheltered 'honeypot' site for bees with an abundant range of cultivated flowers providing pollen and nectar sources throughout the season from spring to autumn. The network of paths and terraces provide sheltered linear features for lekking activity, and males of many species of solitary bees may be found patrolling together and settling briefly on sunlit foliage. Soil between the stones of the many terrace walls and the abbey ruins offer sunny nesting sites for mining bees. The lawns which are currently maintained as closely mown turf contain many wildflowers such as white clover, birdsfoot trefoil, selfheal and storksbill, and it would be worth considering a somewhat more relaxed mowing regime to allow for a short flower-rich turf like that seen at Harry's Walls on St Mary's.

4.2.3 Abbey environs. Areas of now regularly mown grassland such as between Abbey Pool and the wall of the Gardens, and by the Gardens entrance, have flowers such as cat's-ear and white clover and could be converted to wildflower meadows simply by relaxing the mowing regime. There are some good areas of rough grassland with cat's-ear and other flowers on the high ground of Abbey Hill overlooking the west coast.

There is significant floral interest along the sides of Abbey Drive where bees forage at plants like hogweed and *Echium*, and where sunlit foliage provides a focal point for lekking activity. This area has the character of a sunny woodland ride, unusual on Scilly.

Abbey Wood has some sunny glades and a substantial clearing which have some potential as bee habitat.

4.2.4 New and Old Grimsby and environs. Some of the cottages by the harbour at New Grimsby have front gardens containing a natural flower-rich turf with cat's-ear which has potential for bees if not mown too enthusiastically.

Areas of mown grassland among the modern holiday cottages also contain wildflowers and could provide more of a meadow habitat if managed differently.

There is a coastal strip of sandy ground in front of the seaside cottages at Old Grimsby which have a mix of cultivated plants and wildflowers like wild carrot and cat's-ear. Although small, this is an attractive area for bees.

4.2.5 Churchyard. St Nicholas' churchyard has considerable potential as bee habitat, having been carved out of a natural flower-rich turf with white clover, cat's-ear, oxeye daisy and birdsfoot trefoil. Around the edges are taller herbs like hogweed. The grassland wildflowers are showing well on graves and in certain other unmown areas, but a more relaxed mowing regime overall would be beneficial.

4.2.6 West coast heathland and grassland. The area along the coast path between New Grimsby and Cromwell's Castle has considerable potential for bees, but is suffering greatly from encroachment by gorse, bracken and bramble cover descending the slopes and only kept at bay by the path itself. Small coastal strips of flower-rich grassland with birdsfoot trefoil and thrift show what the habitat would have looked like more generally when regularly grazed.

4.2.7 Castle Down. As with other areas of exposed waved heath around Scilly, there is little floral interest here outside of the heather flowering season, although a few flowers of birdsfoot trefoil are in evidence.

4.2.8 East coast heathland and grassland. Along the coast path southwards from Blockhouse Point there is extensive evidence of heather, birdsfoot trefoil and other flowers under bracken cover and revealing themselves alongside the path. This area has great potential to be converted back to a more open flower-rich habitat.

4.2.9 Roadsides and enclosed fields. The track from Gimble Porth to Old Grimsby passes between fields that have potential to provide flower-rich meadow habitat for bees, including hogweed, birdsfoot trefoil and cat's-ear.

The track from Old Grimsby up past Borough Farm (Borough Road) has considerable roadside floral interest with plants including red campion, cat's-ear and hogweed, with birdsfoot trefoil occasionally on banks. The same is true of the road between New and Old Grimsby.

4.3. St Martin's

4.3.1 North-west coast heathland and grassland. Along the coastal path from Lower Town to Pernagie there are a number of small enclaves of flower-rich coastal grassland with birdsfoot trefoil and thrift. But in most places this habitat has been swamped by bracken and bramble cover descending the slopes unbroken to the cliff edge.

Around the NW tip of the island, as the coast path continues to Great Bay, there are areas of rough grassland with flowers like white clover, hogweed, cat's-ear, and greater birdsfoot trefoil.

Opposite White Island there is a good area of thin sandy soil where the stone mazes have been constructed which has plenty of thrift and birdsfoot trefoil.

4.3.2 Great Bay. The thin sandy soils with heathland vegetation on the slopes above the bay provide good open habitat for bees, and there are a variety of flowers growing beside the sheltered coast path along the top of the dunes.

4.3.3 North coast heathland and grassland. Along the coast path east of Great Bay there is serious encroachment by invasive exotics (New Zealand flax and Chilean myrtle) on to coastal grassland, in addition to bracken and bramble descending the slopes.

4.3.4 Chapel Down and surrounding heathland and grassland. The coast path clockwise from Turfy Hill on the north coast to English Island Point on the south coast is the stronghold for the rare Red-barbed Ant which usefully benefits from the same sunny open heathland and grassland habitats as bees do. The areas of waved heath on the north and west sides of Chapel Down (along with the plateau itself) are quite barren as regards floral resources for bees outside the heather flowering season, but more attractive flower-rich habitat with plants like birdsfoot trefoil occurs on the south side. There are issues with bracken encroachment in sheltered spots. On the more sheltered slopes between Perpitch and English Island Point there is extensive encroachment by gorse, bracken and other coarse vegetation on to what would once have been much more extensive flower-rich grassland. In places there is a narrow coastal strip with thin sandy soil where heather, birdsfoot trefoil and other significant plants still have space to flower: the coastal footpath here has a significant role in protecting remnants of open ground.

4.3.5 South-west coast. The path along the south coast from Lower Town Quay in the direction of Higher Town passes a series of small flower fields and allotments which offer a range of sheltered, sunny and often flower-rich habitats.

4.4. St Agnes and Gugh

4.4.1 Coastal grassland and heathland. Wingletang Down was historically a stronghold of the Scilly Bee, which outside of the heather flowering season was supported by earlier flowers like birdsfoot trefoil, but it has suffered major gorse encroachment over the heathland and coastal grassland. The effectiveness of restored grazing has been demonstrated by good quantities of thrift and birdsfoot trefoil now appearing in open short turf on the coastal strip.

The coast path between Wingletang and Castella Downs has some fine coastal grassland with birdsfoot trefoil, thrift and wild carrot, but this is a very narrow strip hemmed in by the field wall on the landward side and is threatened by increasing bracken and bramble encroachment.

Castella Down has a very short turf with heather patches, and earlier in the season thrift and birdsfoot trefoil. Scilly Bee used to be found here, but floral interest is no longer consistent – on some occasions in recent years there has been scarcely a flower to be seen.

At Kallimay Point there is a good but restricted area of flower-rich short turf with clumps of birdsfoot trefoil and thrift.

4.4.2 Big Pool grassland. The open grassy area by the Pool used to be another stronghold for Scilly Bee, but floral resources here have become very intermittent in recent years. On some occasions there are good patches of plants like thrift, birdsfoot trefoil and red clover to be seen, but at other times floral interest is poor.

4.4.3 Gugh. On the NW coast path facing the harbour there is a good strip of coastal grassland with a short turf supporting thrift and birdsfoot trefoil. However, the extent of this inland is limited by dense cover of bracken, bramble and gorse cascading down the slope from Kittern Hill to the edge of the path. Similar flower-rich grassland occurs at the NW and NE corners of the island.

Along the NE coast facing St Mary's there is a mixed picture. There are some good areas of flower-rich turf with fine grasses, thrift and birdsfoot trefoil, but this is starting to be displaced in part by bracken spreading down the slopes. In other places bracken and other encroaching vegetation has swamped the grassland altogether, coming right down to the shoreline.

4.5. Bryher

4.5.1 Coastal grassland and heathland. On the west side of the island between Rushy Bay and Great Pool, there are extensive areas of flower-rich grassland with thin soils encouraging plants like thrift and birdsfoot trefoil. Some areas with deeper soils have bracken growth but also extensive stands of hogweed which is attractive to bees.

Shipman Head Down, which is too windswept for bracken encroachment, has a mix of somewhat barren waved heath with coastal grassland supporting thrift, birdsfoot trefoil and tormentil.

4.5.2 Great Pool. Thin sandy soils beside the path around the pool support fine grasses with flowers like thrift, birdsfoot trefoil and wild carrot. Low bare sandy banks beside the path offer popular nest sites for mining bees.

4.5.3 Enclosed fields and footpaths. The coast path at Green Bay offers sheltered foraging areas for bees with a mixed flora including cultivated plants like Aeonium alongside wildflowers like hogweed and some natural flower-rich turf with cat's-ear.

The coast path from Green Bay around the edge of Samson Hill to Rushy Bay has a good range of flowers alongside, including red clover, red campion, hogweed and cat's-ear. On the landward side are old disused fields some of which are full of bee-attractive flowers like hogweed and greater birdsfoot trefoil, while others have extensive bracken encroachment.

Along the coast path north of Great Pool and at the foot of Shipman Head Down are more old fields with plenty of clover, birdsfoot trefoil and hogweed but also some bracken encroachment. Similarly, between Shipman Head Down and Watch Hill are a series of fields with floral interest such as clover and hogweed but also bracken cover.

The fields along the permissive path to Church Quay contain flowers like cat's-ear and hogweed.

4.5.4 Churchyard. Like other churchyards on Scilly, this would have been carved out of pre-existing flower-rich grassland. Plants like birdsfoot trefoil can be spotted in the current mown turf, and others such as oxeye daisy and cat's-ear appear on graves that have escaped the mower. A more relaxed management could allow for an attractive bee-friendly meadow here.

4.6. The uninhabited islands

4.6.1 Samson. In the vicinity of the landing (Bar Point), there is a good area of flower-rich sandy ground with plants like birdsfoot trefoil, cat's-ear and sea bindweed.

North Hill is dominated by unbroken bracken and bramble cover cascading down the slopes. On the high ground where soils are too thin for bracken, the waved heath mostly has little to offer bees outside of the heather flowering season, but in sheltered spots there are some more attractive patches of grassland with birdsfoot trefoil and cat's-ear.

There is some grassland with cat's-ear between the two hills that has escaped bracken encroachment.

South Hill has largely impenetrable bracken and bramble cover, but the path on the outside of the deer-park wall allows abundant cat's-ear to grow, providing an attractive resource for bees in an

otherwise unpromising area and giving a glimpse of the open habitat that would have existed here when the island was inhabited. There are also some small patches of cat's-ear on high rocky ground.

4.6.2 St Helen's. There is widespread bracken cover over areas that would once have been open flower-rich grassland, so that flowers are only able to appear in areas that are subject to mowing. Thanks to current management there is a good sunny patch of long grassland with plants like cat's-ear, birdsfoot trefoil and hogweed around the mediaeval ruins, and a similar flora can be seen beside mown paths leading off from here.

Beside the path leading uphill from the ruins, heather can be seen struggling with bracken and bramble but appearing more strongly on rocky ground on the summit.

The waved heath on high ground looks generally quite barren, but there are some good patches of cat's-ear and birdsfoot trefoil in this habitat too. There is some low bracken appearing here which may be unable to develop further but needs monitoring in case it is a threat to these open flower-rich spots.

On the coast in the NW and SW of the island, there are some bracken-free areas of fine coastal grassland with thrift and birdsfoot trefoil.

4.6.3 Tean. Much of the island is covered by extensive bracken and bramble cover that has taken over formerly open habitats from the time when the island was inhabited and used for grazing. However, there are still some surviving areas of coastal grassland on thin soils with thrift, birdsfoot trefoil and mayweed.

Some deeper soils on the coast have also escaped bracken encroachment and support flowers like hogweed, sea radish and cat's-ear.

4.6.4 Annet. The island still boasts extensive areas of coastal grassland with thrift (including the unique and iconic giant tussocks), birdsfoot trefoil and mayweed. Some areas of richer soil on the coast have taller plants like sea mallow and hogweed.

However, there are also extensive areas of bracken cover which could spread to threaten the coastal grassland.

4.6.5 Great Ganilly and Nornour. There are some good areas of coastal grassland with thrift, birdsfoot trefoil and cat's-ear, and some areas of deeper soil with tree mallow and hogweed. The shorter coastal turf still supported Scilly Bee as late as 1999, but it is now no longer to be found. Heathland survives on the higher ground. But there is also very extensive encroachment by bracken and bramble cascading down the slopes and in some cases reaching the shoreline.

4.6.6 Great and Little Arthur. The condition of the Arthurs is similar to that of Great Ganilly and Nornour. There are still some good areas of coastal grassland with thrift, birdsfoot trefoil and cat's-ear which supported Scilly Bee at the turn of the millennium (although it is no longer to be found there). There is heathland on the higher ground, with cat's-ear appearing in some high rocky areas. But there is substantial encroachment by bracken and bramble on the slopes threatening the remaining open areas along the coast.

5. Conclusions and summary of recommendations

Scilly has historically supported a diverse bee fauna, with a number of significant species including endemic forms that have evolved in response to long isolation. There is potential for additional species from the British mainland to establish themselves, and a number of new colonisation events have been observed in recent years. Although most of that historic fauna still exists, the demise of the Scilly Bee and increasing rarity of Red-tailed and Heath Bumblebees is an indicator of habitat

deterioration since the mid-20th century, the primary cause being the decline of informal grazing on open heathland and grassland and other traditional agricultural practices such as bracken cutting.

The detailed observations above offer many examples of different kinds of habitats that are not currently realising their full potential for supporting wild bee populations, and which would historically have had more to offer these creatures. But the overall principle is straightforward enough: we should be aiming to maximise the extent of open flower-rich habitats that provide floral resources throughout the months from early spring to mid-autumn when bees of various species are actively feeding and foraging.

The main focus for habitat restoration should be on coastal grassland and heathland, including the larger uninhabited islands, as these are the most important and least-altered semi-natural landscapes that will have supported bee populations since before the first human settlement. These areas also have the advantage of being (with one exception) under the uniform management of the Isles of Scilly Wildlife Trust and can therefore be subject to a consistent long-term policy of enhancement. The exception is of course the Tresco Estate, which should ideally take a lead from the Wildlife Trust, so that management is consistent across the whole archipelago. These coastal landscapes also happen to be most visible in terms of public access, and the kind of management that benefits bees will also have many other beneficial effects, including increasing the diversity and numbers of wildflowers, expanding resources for butterflies and other pollinators, and revealing antiquities formerly buried in undergrowth.

Alongside this core focus, there are many opportunities to maintain and enhance flower-rich habitats within the agricultural landscape and residential areas. The main public gardens (Tresco Abbey and Carregh Dhu) can take into account the needs of bees and other pollinators both in their plantings and in their management of less formal areas such as open grassland. Churchyards too have great potential, as they commonly preserve ancient semi-natural grassland, and a more bee-friendly mowing regime, allowing wildflowers to grow and educating sceptics that they are not 'weeds', would make a useful contribution to the overall conservation effort. Private gardens too can provide useful floral resources and often retain relics of prior habitats from before building such as flower-rich grassland and even heathland, which should be appreciated and nurtured. Wooded areas can be made more hospitable for bees by maintaining or creating sunny pathways and glades with sufficient space for wildflowers to flourish. Many enclosed fields within the current or former agricultural landscapes support wildflowers, and these should be valued and protected against encroachment by bracken and other invasive vegetation. Unnecessary mowing of flower-rich meadows should be avoided. There is potential for more disused fields to provide similar floral resources, but aspirations to 'create wildflower meadows' should be well-informed in terms of using native species rather than imported seed mixes.

Public education and advocacy is an important part of any nature conservation initiative, and especially perhaps on Scilly where management changes have in the past proved contentious. Publications (both physical and online), social media, public events such as talks and guided walks, exhibitions, and working with schools and community groups, can all play their part in communicating the message. The restoration of historic landscapes – with benefits for all kinds of heritage (human history as well as flora and fauna) – seems the most effective framing, rather than the rhetoric of 'rewilding' which can be controversial. That framing is also more historically accurate, because it acknowledges that the landscape of Scilly is the product of a millennia-long collaboration between humanity and the rest of the natural world.

Appendix – The bees of Scilly

This following all-time annotated list of bees recorded from Scilly is based on my previous publications in the Isles of Scilly Bird and Natural History Review, updated to reflect the results of the 2023 survey. I have placed in brackets those species that are long extinct or at least not seen in the last twenty years, as well as those presumed vagrants that are represented only by a single record not repeated for a number of years.

Plasterer and Yellow-face Bees (Colletidae)

Colletes similis. Bare-saddled Colletes. This species, which flies from the end of May through to mid-August, is widespread on coastal grassland and heathland on all the inhabited and larger uninhabited islands. Its favourite flower for feeding and pollen-gathering is sea mayweed, but it visits several other species including yarrow and wild carrot. Females nest in flat sandy ground, but not usually in groups as its relatives regularly do.

Colletes succinctus. Heather Colletes. This species emerges much later than *C. similis* and the first males are unlikely to be seen before the very last days of July. The peak flight period is through August, and females often remain active well into September, overlapping with *C. hederæ*. It can be found wherever heather grows on both the inhabited and uninhabited islands, but is mostly found on open coastal heathland. Females feed (as do males) and forage almost exclusively from heather, but as the heather flowers die off with the onset of autumn they begin visiting ivy, often at inland sites some distance from their regular habitat. They nest in bare and sparsely vegetated ground, often in large aggregations in short coastal turf or soft cliffs. Mate-searching males often swarm around these dense nest sites, and can also be seen flying wildly and persistently over heather and adjacent foliage

Colletes hederæ. Ivy Bee. This is a recent arrival on Scilly, being first recorded in 2016. It had been known from the Channel Islands for many years, but did not begin to colonise the British mainland until 2001. It is now well established on St Mary's and can be found, often in large numbers, wherever ivy flowers profusely. It has been recorded from all the other inhabited islands, but only in small numbers due to the relative shortage of flowering ivy in comparison with St Mary's. Both sexes are almost exclusively associated with ivy blossom, at which the females forage, although early males emerging at the end of August may sometimes visit other flowers where ivy is not yet available. The main flight period is through September and October. Females nest in bare ground, including soft cliffs, commonly in dense aggregations.

Hylaeus brevicornis. Short-horned Yellow-face Bee. Although recorded from all the inhabited islands, this small bee is scarce and easily missed. It is found on open coastal grassland and heathland, where both sexes visit a range of flowers such as yarrow, wild carrot and sea mayweed. Nationally, its flight period extends from late May to mid-September, although most records from Scilly have been in July. Females nest in the dry hollow stems of plants such as bramble.

Hylaeus dilatatus. Chalk Yellow-face Bee. I recorded a single male of this species new to Scilly visiting hogweed in grassland near Great Porth, Bryher, during the June 2023 survey.

Mining Bees (Andrenidae)

Andrena angustior. Groove-faced Mining Bee. Flying generally from the end of April to the beginning of July, this species is common in both inland and coastal localities on the inhabited islands, and is also found on Samson. In spring at favoured sites such as the Abbey Gardens on

Tresco, numerous males of varying sizes may be seen swarming around and settling on sunlit foliage. The females nest inconspicuously in bare or sparsely vegetated ground.

[*Andrena argentata*. Small Sandpit Mining Bee. There is a single record from the east coast of Tresco in 2003. Subsequent searching has failed to produce any more, so this was probably a vagrant that failed to establish itself. Although it is generally thought of as a heathland species, in the Channel Islands it nests in bare sand among coastal dunes.]

[*Andrena barbilabris*. Sandpit Mining Bee. Found by the same recorder as *A. argentata*, and in the same area on the east coast of Tresco in 2003, this too has not been seen since and was probably a vagrant. In mainland Britain, this species nests in bare sandy ground, including loose sand among dunes.]

Andrena cineraria. Ashy Mining Bee. This very distinctive species is a recent colonist on Scilly. A nest site at Holy Vale, St. Mary's, has been observed since 2021, and individuals have appeared at a number of nearby sites.

Andrena flavipes. Yellow-legged Mining Bee. A relatively recent colonist, this was first recorded on St Mary's in 1997, and it has since been found in both coastal and inland habitats on all the inhabited islands. It is particularly noticeable around the coast where the females nest, often in large aggregations and associated with other species, in soft cliffs and lower areas of bare vertical ground on the shoreline. Patrolling males are commonly seen swarming over nest sites or coursing wildly along the length of one of these coastal features. It is most likely to be seen from March through to August, in two generations which commonly overlap.

[*Andrena fulvago*. Hawksbeard Mining Bee. There is a single very old record from Tresco for this no doubt long extinct species which is characteristic of flower-rich grassland. It could well have disappeared from Scilly as a result of the decline of flower-rich coastal habitats in the second half of the 20th century.]

Andrena fuscipes. Heather Mining Bee. This bee is even more exclusively associated with heather than *Colletes succinctus* and has not been observed to visit any other flower. It is widespread in coastal heathland, or wherever heather grows, on both the inhabited and uninhabited islands. It flies mainly in August, although the first males often emerge in the last days of July and some of both sexes may remain active into early September. When freshly emerged, the males appear distinctly blue-grey as they fly low and evasively over heather clumps, patrolling in search of females.

[*Andrena haemorrhoa*. Orange-tailed or Early Mining Bee. Although common in mainland Britain, this distinctive species has only been recorded once on Scilly, from a hedgerow beside Borough Road, Tresco, in June 2007. As there have been no further records, this must have been an isolated vagrant that failed to establish itself.]

Andrena nigroaenea sarnia. Buffish Mining Bee. This and *A. thoracica* are the most abundant *Andrena* on Scilly and commonly fly together in spring. The population on Scilly forms a distinct subspecies which is shared with the Channel Islands and is more brightly coloured than the mainland form. This bee is widespread in both inland and coastal locations on all the inhabited islands, visiting a wide variety of flowers, and it also occurs on the larger uninhabited islands. The main flight period extends from March to June, with numbers peaking in April and May; occasional later records may represent a small second generation. Females are often seen nesting, sometimes in large aggregations and alongside *A. thoracica* and other species, in soft cliffs or small patches of vertical ground just above the shore. Nest sites are also to be found in similar exposures inland, as well as in

the earth of roadside stone hedges. Mate-searching males are commonly seen coursing wildly over nest sites or linear features such as hedgerows and strips of path-side foliage.

Andrena ovatula. Small Gorse Mining Bee. This medium-sized bee occurs on all the inhabited islands in coastal grassland and heathland, and also inland in fields and other grassy places where white clover, one of its favoured flowers, grows. Other flowers commonly visited include birdsfoot trefoil and heather. It flies from early April through to the end of August in two generations. Females have been observed nesting in soft cliffs, with males swarming over turf and low herbage nearby. In the Abbey Gardens, Tresco, males have been seen swarming over cultivated heathers and other sunlit foliage.

Andrena scotica. Chocolate Mining Bee. Although common in mainland Britain, this species is rare on Scilly and recorded only from St Mary's and Tresco. Dates range from April to June, although the mainland flight period starts in March, and it has mostly been seen in gardens such as Carregh Dhu, St Mary's, and the Abbey Gardens on Tresco. Nesting has not been observed on Scilly, but on the mainland females nest in the ground and sometimes share a communal nest entrance. The gap between Spooner's single record in 1966 and my first encounter in 1997 is so great that this may probably be regarded as an intermittent colonist rather than a native.

Andrena thoracica. Cliff Mining Bee. Like the similarly large *A. nigroaenea*, this bee is common in a range of habitats across the inhabited and larger uninhabited islands. There are two generations per year, one flying with *nigroaenea* from March to early June, and the second in July and August. It is not commonly seen through most of June. Females nest on the coast and inland in similar places to *nigroaenea*, and often together with it in the first generation. The mate-searching behaviour of the males is also similar, and mixed swarms of both species often occur in the spring.

Andrena wilkella. Wilke's Mining Bee. This bee is a close relative of the slightly smaller and less robust *A. ovatula*. Although recorded from all the inhabited islands except Bryher, it is very scarce and easily overlooked. It favours flower-rich grassland, mostly inland rather than on the exposed coast, and occasionally appears in gardens. It flies mainly from early May through June.

Andrena semilaevis. Shiny-margined Mini-miner. The mini-miners are a distinct subgenus (*Micrandrena*) within *Andrena*, distinguished by their diminutive size. Only one of the several mainland species occurs on Scilly. Although recorded from all the inhabited islands, it is generally uncommon and most records are from St Mary's. It is characteristic of inland and some sheltered coastal sites, where it usually feeds and forages at white umbellifers such as hogweed, flying from May to August.

Furrow and Blood Bees (Halictidae)

Halictus rubicundus. Orange-legged Furrow Bee. This bee is found on all the inhabited and larger uninhabited islands but is usually seen singly and rarely in numbers. It mainly frequents inland and sheltered coastal sites, and is often found in association with brambles bordering tracks and footpaths. Most records are from May to August, but since the females hibernate as adults much earlier and later appearances are possible; males do not appear until summer and do not survive the winter. Nest burrows are made in bare or sparsely vegetated ground, including on the shoreline.

Halictus tumulorum. Bronze Furrow Bee. This species occurs on all the inhabited islands, but is not particularly common, recorded mainly from inland and sheltered coastal sites. The first records from the uninhabited islands were during the 2023 survey, when it was found on St Helen's and Tean. Females emerging from hibernation may appear very early in the year, but most records are from

May to October. Groups of males have been observed coursing over sunlit brambles, bracken, rocks, and the soft cliffs and bare coastal exposures where the females nest.

Lasioglossum calceatum. Common Furrow Bee or Slender Mining Bee. This bee is widespread and common on all the inhabited islands, preferring inland or sheltered coastal spots, although it has also been recorded from most of the larger uninhabited islands. Its favoured flowers include yellow composites such as cat's-ear, as well as ragwort (which the males are especially fond of), and brambles. Females fly from March to October, with the males emerging in July. Females nest, sometimes in groups, in bare or sparsely vegetated ground such as the sides of footpaths or soft cliffs; patrolling males have been seen flying persistently over path-side foliage.

Lasioglossum albipes. Bloomed Furrow Bee. Recorded only from the inhabited islands, this bee is very similar to *L. calceatum* but seems to be much scarcer. The flight period and habits are similar to that of its relative.

Lasioglossum lativentre. Furry-claspered Furrow Bee. This rare and elusive bee has been recorded from all the inhabited islands except Bryher, on dates ranging from April to October. The total number of records is very small. These records show no obvious habitat preferences: most are from inland sites, but it has also appeared in open coastal grassland.

Lasioglossum leucozonium. White-zoned Furrow Bee. This common grassland species occurs on all the inhabited islands, where it is mainly found inland or in sheltered places on the coast, and has also been recorded from the larger uninhabited islands. Its favoured flowers include yellow composites such as cat's-ear, and brambles. Females fly from April to October, with males appearing in July.

Lasioglossum nitidiusculum. Tufted Furrow Bee. This is an uncommon species, recorded between April and August mostly from a mixture of inland and coastal sites on St Mary's, although it is known from all the inhabited islands except Bryher. The first record from the uninhabited islands was on Tean during the 2023 survey. Females nest in bare vertical ground such as soft cliffs on the coasts or old quarry sides inland.

Lasioglossum punctatissimum. Long-faced Furrow Bee. This small black bee, very similar to *L. nitidiusculum*, is a widespread and common species found on all the inhabited islands and also recorded from Annet and the Eastern Isles. It occurs in a variety of coastal and inland sites. Favoured flowers include yellow composites such as cat's-ear. Females nest in bare vertical ground, both inland and on the coast. Groups of males have been observed coursing over sunlit foliage, hovering low over the bare ground of footpaths, and exploring soft cliffs that are used as nest sites. Females fly from April to October, and males appear in July.

Lasioglossum villosulum. Shaggy Furrow Bee. This small shiny black bee is common on all the inhabited and larger uninhabited islands. It is most characteristic of open grassland and adjacent heathland on the coast, where it especially visits yellow composites such as cat's-ear, although it is also found in suitable inland sites. Females nest in bare vertical ground; their flight period is from March to October, and males appear in June.

Lasioglossum morio. Green Furrow Bee. Although found on all the inhabited islands, it is rather uncommon, with the majority of records from St Mary's. It is most often seen on or near the coast, usually in more sheltered spots, flying over or settled on sunlit rocks and stone walls, or visiting flowers such as brambles and yellow composites. Nesting is typically in bare vertical ground. The flight period is from March to October, males appearing in June.

Lasioglossum smeathmanellum. Smeathman's Furrow Bee. This close relative of *L. morio* is fairly common on St Mary's but less so on the other inhabited islands. The first records from the uninhabited islands were during the 2023 survey, when it was found on St Helen's, Annet, Great Ganilly and Tean. Most records are from coastal areas, with a preference for more sheltered spots. It is most often seen flying over or settled on sunlit rocks, soft cliffs, stone walls, gates, and fences, or visiting flowers such as brambles, yellow composites and white umbellifers. Females nest in bare vertical ground such as soft cliffs and quarry sides, and males may be seen swarming over such sites. The flight period is generally from April to September, although it has been recorded in October; males appear in July.

Sphecodes gibbus. Dark-winged Blood Bee. The genus *Sphecodes* are cuckoo bees which lay their own eggs in the nest burrows of *Lasioglossum* and *Halictus*. The habits and flight period of the Scillonian species are similar, and females of different species may often be seen flying together over and closely exploring actual or potential nest sites of their hosts in bare or sparsely vegetated ground at both coastal and inland sites. The females, which hibernate as adults, fly from April to September; males appear in July but do not survive the winter – they are often seen feeding at flowers such as white umbellifers. *S. gibbus* is widespread, but not numerous, on all the inhabited islands. On the mainland it is reported to parasitise *Halictus rubicundus*, but host associations are not entirely clear for this genus and may be different on Scilly: the same may be said for the other species listed here.

Sphecodes monilicornis. Box-headed Blood Bee. More common than *S. gibbus* on all the inhabited islands, this species has a range of hosts including *Halictus rubicundus* and *Lasioglossum calceatum*.

Sphecodes ephippius. Bare-saddled Blood Bee. This is common on all the inhabited islands. It has a range of potential hosts on Scilly, including *Halictus tumulorum* and *Lasioglossum leucozonium*.

Sphecodes geoffrellus. Geoffroy's Blood Bee. Found on all the inhabited islands, this is the commonest *Sphecodes* on Scilly and the only one recorded from the uninhabited islands (on St Helen's, Annet and Tean during the 2023 survey). It parasitises a range of small *Lasioglossum* including *L. morio* and *L. nitidiusculum*.

Sphecodes crassus. Swollen-thighed Blood Bee. Although recorded from all the inhabited islands, this species is much less common than the similarly sized *S. geoffrellus*. Their hosts are the small black *Lasioglossum*, of which *L. punctatissimum* and *L. nitidiusculum* occur on Scilly.

Blunthorn Bees (Melittidae)

Melitta leporina. Clover Melitta. The only member of its small genus found on Scilly is very localised in its occurrence. It is found only in flower-rich grassland on St Mary's and St Agnes, where its favoured flower is white clover. On St Agnes it mainly occurs on the coast, but on St Mary's it is more characteristic of inland fields, field edges and grassy path-side areas. Females nest in soft cliffs and other exposures of bare vertical ground. Patrolling males have been seen flying low and persistently over patches of clover, and over thrift clumps on the coast. The flight period is quite brief, from the end of June to the beginning of August.

Leafcutter Bees & their relatives (Megachilidae)

[*Anthidium manicatum*. Wool-carder Bee. The only records of this large and distinctive bee are from a garden on the Garrison, St Mary's, in 1967 and 1985. In the absence of earlier or later records, it must be assumed that this was a temporary colonist that failed to survive.]

Megachile centuncularis. Patchwork Leafcutter Bee. Although common in mainland Britain, the Patchworker Leafcutter is an intermittent colonist rather than a long-standing native species. Now recorded from all the inhabited islands, it is mostly seen on St Mary's, occurring in inland and sheltered coastal sites. Leafcutter bees get their name from the females' habit of cutting neat semicircular or circular pieces from leaves to make individual cells within their nest burrows in a variety of natural and manmade cavities. Records range from May to September.

Megachile willughbiella. Willughby's Leafcutter Bee. This species, the only native leafcutter on Scilly, is found on all the inhabited islands, but is not particularly common. The first record from the uninhabited islands was during the 2023 survey, when a single male was noted on St Helen's. It occurs both at sheltered inland sites and in open heathland and grassland on the coast. A favoured plant for both sexes is birdsfoot trefoil, and patrolling males may be seen flying low, fast and evasively over patches of this flower. Females have been observed nesting in bare vertical ground on the coast. The flight period is from May to August.

Nomad Bees (Apidae – genus *Nomada*)

Nomada rufipes. Black-horned Nomad Bee. The nomads are a distinctive group of cuckoo bees, wasp-like in appearance, most of which parasitise the nest burrows of *Andrena* mining bees. *N. rufipes* is one of the smaller members of its genus and the only one native to Scilly. *N. rufipes* has a specific association with *Andrena fuscipes*. Like its host, it occurs in coastal heathland and wherever heather grows on the inhabited and larger uninhabited islands. Both sexes feed at heather along with their host species, flying from late July to early September.

Nomada flava. Flavous Nomad Bee. Although common in mainland Britain, this species is rare on Scilly and is assumed to be a recent colonist, first recorded in 1997. It is known only from Tresco, being seen regularly in the Abbey Gardens and along Abbey Drive just outside, with one record along Borough Road. On the mainland, its primary host is *Andrena scotica* which is itself rare on Scilly and has the Abbey Gardens as one of its few known sites. It is a spring-flying species, and the records from Scilly are all in April or May.

Nomada fucata. Painted Nomad Bee. This is the cuckoo bee specifically associated with *Andrena flavipes*, which is itself a relatively recent arrival on Scilly. For many years there was only one record from Scilly, in July 2008 on the south-east coast of Chapel Down, St Martin's. At the time it seemed likely that it would match the spread of its host across the islands, but there were no signs of this until the early spring of 2021 when it was recorded from single sites on St Mary's and St Martin's. In mainland Britain there are two generations, one flying from April to June and the other through July and August.

Flower Bees (Apidae – genus *Anthophora*)

[*Anthophora retusa*. Potter Flower Bee. There is a single record from 1904 for this species which still occurs commonly in coastal habitats on the Channel Islands. It is likely to be a long extinct native. It has disappeared from much of mainland Britain, and its loss from Scilly may well have been part of that same process. This is one of the flower bees which somewhat resemble small all-brown bumblebees but have a much faster darting flight.]

Bumblebees, Cuckoo Bumblebees and Honeybees (Apidae – genera *Bombus* and *Apis*)

Bombus terrestris. Buff-tailed Bumblebee. By far the commonest bumblebee on Scilly, found on all the inhabited and larger uninhabited islands, this species is often seen in abundance and is equally at home in gardens and out on the open heathland. Traditionally, bumblebee colonies come to the end of their life in autumn, and only queens survive the winter in hibernation to start the cycle again in spring. However, in recent years there has been a trend in the milder parts of Britain like Scilly for Buff-tailed colonies to persist throughout the winter. As a result, queens and workers may now be seen in any month of the year.

Bombus hortorum. Garden Bumblebee. This bee occurs on all the inhabited islands, and there are records from the larger uninhabited islands too. It is, however, easily missed as it is hugely outnumbered by the Buff-tailed. It is mostly found in inland areas, including gardens, or sheltered spots on the coast, and it is rarely found in open heathland. There are two generations per year, and it generally flies from late March to September.

Bombus jonellus. Heath Bumblebee. Historically, this was a fairly common species on all the inhabited and larger uninhabited islands, but it has declined substantially since 1970 and is nowadays difficult to find. It is most likely to be seen in flower-rich coastal grassland and heathland, especially when the heather is out, but there are garden records too. There are two generations per year, the first foraging from a variety of flowers but the second, which is the one most commonly seen, specialising on heather. The overall flight period is from March to September.

Bombus lapidarius. Red-tailed Bumblebee. This was once a common species on Scilly, found on all the inhabited and larger uninhabited islands. But in the late 1990s and early 2000s it went into rapid decline and is now rarely seen. In mainland Britain it is regarded as a common urban species, but it may be that the population on Scilly evolved a closer attachment to flower-rich grassland and has suffered from the decline of that habitat. Nowadays it is most likely to be seen in coastal heathland and grassland, although in the past it occurred in gardens too. The potential flight period is from March to October.

Bombus muscorum scyllonius. Scilly Bee. This iconic subspecies of what in mainland Britain is known as the Moss Carder Bee is one of a number of distinct island forms, stretching from Shetland round the west coast of Britain and Ireland to the Channel Islands, which were once collectively known as *Bombus smithianus*. Sadly, the Scilly Bee has been in decline since the 1960s and is probably now extinct. Historically, it occurred in flower-rich coastal grassland and heathland on all the inhabited and larger uninhabited islands. By the 1980s it was largely restricted to St Agnes where it could still be found fairly reliably, if only in small numbers, up to around 2005. The disappearance of this species can be attributed to the decline of open flower-rich habitats due to the cessation of informal coastal grazing. The flight period was from May to September. There have only been two confirmed records since 2006, the last in 2012. There have been many unsuccessful searches since then. One aim of the 2023 survey was to check for its presence on the uninhabited islands, as it was recorded from the Eastern Isles as late as 1999, but none were found: although there is still some surviving flower-rich habitat here, it has evidently not been enough to sustain a population.

Bombus pratorum. Early Bumblebee. As some species of bumblebee have declined on Scilly, the Early Bumblebee has colonised. It was first discovered in 2002 in sheltered inland sites on both St Mary's and Tresco, and it has continued to appear at a number of sites on these two islands, although only in small numbers. It was reported for the first time from St Agnes in 2015. Most records remain from inland sites such as gardens, but a few have been found in more open country on the coast. There are two generations per year, and the overall flight period is from March to September.

[*Bombus vestalis*. Vestal Cuckoo Bee. The females of this species invade the nests of *Bombus terrestris* and displace the queen; the flight period in mainland Britain is from late March to September. Despite the abundance of its host on Scilly, the Vestal Cuckoo Bee has declined dramatically since 1970: there is no obvious explanation for this. Historically, it occurred on all the inhabited and larger uninhabited islands, but the last record was in 2002. As it is too conspicuous to have been missed for so long, we must conclude it is now extinct.]

[*Bombus rupestris*. Hill Cuckoo Bee. This species is a long extinct native, recorded in the past from Treseo and St Martin's, but not found since the 1960s. It is the cuckoo bee which parasitises *Bombus lapidarius*, so its disappearance was no doubt due to the long-term decline of its host.]

Apis mellifera. Honeybee. Honeybees can be found commonly throughout the inhabited islands in a range of habitats from gardens to open heathland, and foraging workers may turn up on the larger uninhabited islands too. Some come from domestic hives, swarms may on occasions escape and establish themselves in the wild and some may be wild colonies. As colonies continue through the winter, workers may be seen visiting flowers in any month of the year when the weather permits.

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