



# **South West Bees Project: *Andrena hattorfiana* in Cornwall**

*Cornwall – June/July/August 2016*

September 2016

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*Saving the small things that run the planet*

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## 1. Summary

The survey revealed that *Andrena hattorfiana* populations are limited in Cornwall.

- The population at Kelsey Head represented the most successful with the vast majority of bees recorded here. Further planting of Scabious in this area will increase the population's strength.
- Small populations present on Gwithian Towans seem vulnerable and limited to very small areas. This could be due to the lack of suitable habitat on the dunes which could lead to a local extinction of the populations here. Prior management of the dunes to make the area more suitable for Scabious should be performed before planting. Habitat creation and Scabious planting along road verges in this area will have a positive effect for the small populations present. Lelant churchyard represents the most productive site in this area but is at risk from becoming rank due to lack of management.

Golf courses are present in close proximity to all sites where the bee was recorded. This creates an opportunity to plant Scabious flowers in the rough of the courses which will aid the strength of the bee's populations.

## 2. Introduction



Female *Andrena hattorfiana* on Scabious at Kelsey Head.

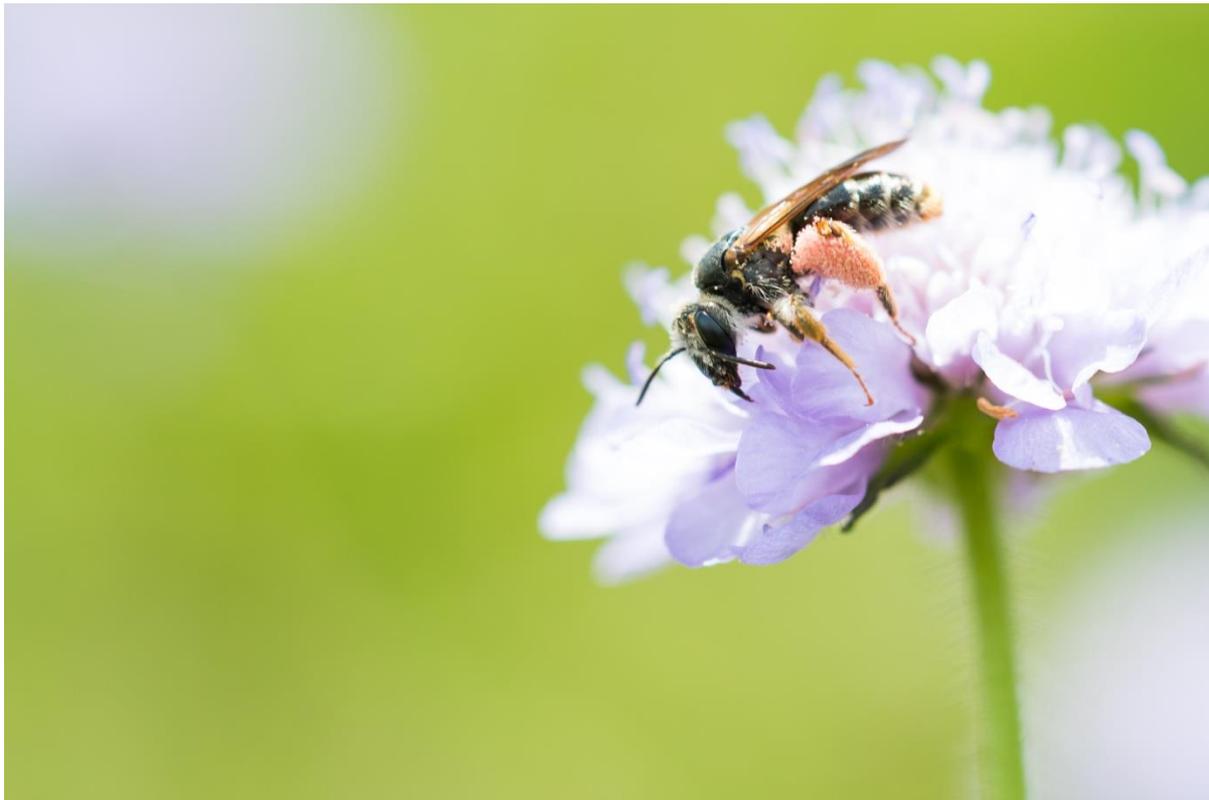
The Large scabious mining bee (*Andrena hattorfiana*), as its name suggests, is dependent on the presence of good numbers of scabious flowers (*Knautia arvensis* and *Scabiosa columbaria*). Large scabious mining bee populations are declining in the UK (Falk 1991) and this is in no small part down to the dearth of flower rich grasslands available. In Cornwall, this lovely bee is known only from the North Coast because the underlying geology to provide the alkaline soils needed by scabious occurs only there.

This project, run by Buglife and funded by the University of Exeter's Access 2 Internships scheme, aims to assess the status of *Andrena hattorfiana* in Cornwall; to map suitable scabious patches and to recommend areas that can be developed by land owners and managers.

Many surveys were carried out in suitable locations (kindly provided by Patrick Saunders of Kernow Ecology) and the results of these revealed mixed fortunes for the bee but with plenty of hope for the future; two areas with historical records of the bee were rediscovered and found to be strong colonies (Rock dunes and Constantine bay). Many more individuals were recorded during the 2016 iteration of this project compared to the 2015 edition (54:7). This is not likely to be a reflection of increased population but may be attributed to a number of factors, primarily that in 2015 the then surveyor could not start surveying until mid July (mid-way through the bee's flight season). The 2016 study had much more comprehensive coverage of the population areas.

High concentrations of the bee were found in the Kelsey Head area suggesting that the population is doing well here (however this is not the case on nearby Penhale Dunes). More bees were found than expected on Gwithian Towans too but these populations seem weak and vulnerable to localised extinction. However, these sites are isolated from each other and for the long term success of this bee in Cornwall it may be of use to attempt to connect these sites, although priority should go to first improving the areas where the bee currently occurs.

### 3. Species Description



Female *Andrena hattorfiana*.

Her hind legs pink with Scabious pollen, the Large scabious mining bee is a rare beast. Front legs tipped with orange, dark tinted wings and short white hairs gracing her face. With females reaching up to 1.6cm long, she is Britain's largest mining bee.

Collecting pollen to feed her brood only from Scabious flowers, she relies indirectly on the underlying geology for the Chalk and Limestone loving Scabious flowers to occur and enable her appearance in the countryside. Males are slightly smaller and more orange but only slightly less impressive. Despite sharing the Scabious with a wide range of other pollinators, the Large scabious mining bee is not necessarily keen on sharing her flower; everything from small Swollen thighed beetles (*Oedemera nobilis*) to Burnet moths (*Zygaena spp.*) steer well clear of this sizeable bee.

This bee is provisionally registered as a Nationally Rare species (pRDB3) (Falk 1991) and so requires special attention. Its UK distribution is limited to Southern England from Cornwall to Norfolk. On the continent however it is widespread from Southern Scandinavia right down into Northern Africa.

Buglife's South West Bees Report (Horsley *et al* 2013) identifies *Andrena hattorfiana* as a conservation priority for the region.

The female will nest, like others of her *Andrena* genus, in small ground based burrows which she will dig into the soil. However, she seems to be less dependent on bare soil than some other species. She will collect pollen only from Field scabious (*Knautia arvensis*) and Small scabious (*Scabiosa columbaria*) making her an oligolectic forager (Larsson 2007) (focuses on just a single genus of small family of flowering plants). This pollen will attach to the bee's hind legs in a pink sticky clump making the already pretty bee all the more striking. She will return to her nest with the pollen and will store it to feed her developing larva.

#### 4. Field Surveys



Wren the dog in her insect hunting hat.

Between Late-June and Mid-August Field surveys were carried out on the North Coast of Cornwall. These involved walking the sites with a GPS tracker recording patches of Scabious and number of *Andrena hattorfiana* present upon them. All sites were visited multiple times to ensure as much data was collected as possible.

The main site that I visited was Kelsey Head and Cubert Common. This area was visited 10 times throughout the bee's flight period amounting to over 70 hours of survey time. Lelant and Gwithian Towans were visited five times adding up to roughly 45 hours of survey time. Various reconnaissance missions to smaller and presumed less attractive sites were carried out throughout the flight period to cover as many bases as possible.

As many surveys were carried out as possible with only the days where the weather was certainly unfavourable were avoided. Days where the weather was below 17°C and the winds were high or there was heavy rain forecasted were avoided as trips on days like this as well as consultation with P Saunders showed that the bees would not be flying in these conditions. Days where the weather was hot and bright were favoured, if the forecast looked on the edge of being unfavourable then I would perform a survey regardless just to make sure.

Data was recorded using a notebook as well as a note-taking application on my phone. Data collection involved primarily sight. I would wander along before spotting a Scabious patch and counting the number of bees and flowers present. I would then move on to the next patch of Scabious and do the same thing. The number of individual bee sightings relates to the greatest number of bees I saw on each particular patch, along the course of the season, before adding together each count from all the Scabious patches. Grid references were taken for each Scabious patch.

## 5. Survey Sites

### 5.1 Overview of Sites

Sites were chosen with the help of Patrick Saunders who so kindly gave me all the grid references necessary and then patiently listened while I tried to work out directions to each spot. Sites such as the Kelsey Head area had been studied in the 2015 project, but many of the other locations were given to me by P. Saunders as areas where there was hope that the bee still existed. In some of these areas, most notably Gwithian Towans, this hope paid off and new (or at least modern) records were made for these locations.

Patrick Saunders has also kindly been carrying out some survey work of his own on *A. hattorfiana* in North West Cornwall where he has found new populations of the bee. I am therefore deeply indebted to him for his help with this project.

### Map of *Andrena hattorfiana* and Scabious recordings overview



Map 1. Overview of *Andrena hattorfiana* and Scabious sites across North Cornwall 2016 (P. Saunders Kernow Ecology)

### 5.2.1 Gwithian Towans



Female *Villa modesta* bee fly coating her eggs in sand.

Nestled between Lelant churchyard and Godrevy, the site is a large dune system measuring roughly 6km length and roughly 1km in width at its widest point.

Gwithian Towans is an extensive dune system with high peaks and deep troughs, a variety of vegetation coverage mostly dependent on where humans prefer not to walk. The predominant vegetation is Marram grass which covers large areas of the dunes. Ragwort is plentiful but strangely lacked cinnabar moth caterpillars. There are dense patches of Bramble in which seems to be less disturbed areas, along with Wild Roses which are invariably covered in Bumblebees. Areas of the dunes are also heavily frequented by rabbits which graze the vegetation down to a level acceptable for a palatial lawn. This, coupled with the sandy loam, creates good habitat for a range of pollinators such as the Leafcutter bee *Megachile leachella* and the rare bee fly *Villa modesta*. Scarlet pimpernels break up the green as large numbers of Common Blue and Dark Green Fritillaries flutter above.

Scabious wise, the dunes are very limited, (but this may be because of strong rabbit populations or the fact that the dunes are more acidic and it would require testing to establish this) with the majority found on the back end of the system. More reasons for the lack of Scabious on the dunes includes the fact that Scabious may just not have had the opportunity to grow. The plant likes disturbed ground when in seed but prefers uncut, tussocky vegetation to mature. There is a track leading back from the dunes (SW 581 406) on the other side of the road (B3301) which has the greatest frequency and abundance of Scabious plants anywhere on the dune system.

*Andrena hattorfiana* sightings have been extremely low on the dunes with just three individuals spotted over the course of the season. Of these three, just one was recorded actually on the dunes themselves (on a patch of Scabious with just three flowers), the other two were found the other side of the B3301 (down the track situated at SW 581 406) happily sitting on the more plentiful Scabious there. All the bees sighted were female.

The lack of Scabious on the dunes coupled with the more frequent Scabious just the other side of the road suggests that the dunes do not provide a preferred habitat for the plants. This means that efforts should be focused on contacting the agricultural landowners and local councils to sow more scabious on road verges and in field margins rather than on the dunes. Although a trial patch (after taking suitable measures to accommodate Scabious) should be identified on the dunes just in case there is scope for development here.

If this was the only patch of Scabious on Gwithian Towans, the future would look fairly bleak for *A. hattorfiana*. However, across the Hayle estuary on the Eastern point of the dunes is a town called Lelant. The churchyard of Lelant Church is full of Scabious (500+ flowers) and seems to be a stronghold for the bee. On the 7<sup>th</sup> of July I recorded four males and five females feeding here. Only half of the churchyard is covered in Scabious though and it could be worth contacting the church to suggest sowing the rest of their land also. They may be inclined to accept as the entire churchyard is wildflower meadow-like. However, this Scabious population in the churchyard seems to be under threat of competition from ornamental Ox-eye daisies which are beginning to cover the site.

Surrounding the churchyard is West Cornwall Golf Club. This area has large amounts of rough between the fairways which looks as though Scabious could flourish there with a bit of encouragement. This development would increase the security of the continual presence of Scabious in Lelant as the churchyard is in danger of becoming rank in the forthcoming years if not actively managed.

The areas to the west of the Towans (Godrevy Head to Portreath) seem to be too exposed for Scabious to prosper and the majority of the vegetation is short, tough heather which prefers acidic soil.

### **5.2.2 Areas to improve on Gwithian Towans:**

- Management of Lelant churchyard to limit succession and ensure Scabious survival such as weeding out the daisies which are taking over (SW5437).
- Approach West Cornwall Golf Course to ask whether they can sow Scabious seeds in their rough areas. The area is very near to churchyard and so the potential increased pollen source can only be helpful (SW544378).
- Planting more Scabious by council and landowners at the back of the dunes on the road verges and in neighbouring field verges (SW5840).
- Advise against seeding the dunes without previous management as the Scabious may not grow due to the unsuitability of the substrate (SW5740).
- Improving Churchyard life for Scabious (SW5437).
- Management of rabbit populations to reduce over grazing on the dune systems should occur to allow vegetation to recover which will create more suitable Scabious habitat.
- Planting plugs of Scabious in areas on the dunes where it may not usually seed may also be an option.

**5.2.3 Table 1.** Breakdown of Scabious sites and *Andrena hattorfiana* sightings:

<b>Gwithian Towans</b>					
	Scabious Patch no.	Grid reference (SW)	Number of Flowers	Bee sightings	Bee sightings breakdown
Lelant Church	1	5476 3770	500+	9	4 males 5 females
Golf Course	2	5474 3779	60	0	
Gwithian Towans	3	58079 40917	3	1	1 female
	4	5816 4047	87	0	
	5	5824 4033	20	0	
	6	5809 4064	21	1	1 female
	7	5814 4056	60	0	
	8	5815 4056	41	0	
	9	5817 4055	8	0	
	10	5827 4052	31	1	1 female
	11	5821 3987	40	0	
Total	11		~871	12	4 males 8 females

## Map of Gwithian Towans



Map 2. Location to show Scabious sites and *Andrena hattorfiana* sightings across Gwithian Towans (P. Saunders Kernow Ecology)

### 5.3.1 Kelsey Head and West Pentire



*Bombus terrestris* on Kelsey Head.

A small sandy alcove of a beach named Polly-joke bay nestles comfortably between two headlands, the waves from an azure sea lap softly on the sand.

To the left Kelsey Head extends determinedly into the sea. The tip is covered in Thrift, umbellifers and tough grasses but wander further inland and a sea of Scabious appears. With 3000+ flowers, this bounty of Scabious represents the largest patch I have found across both Gwithian Towans and this site. Strangely, it is only within this sheltered cove where you will find Scabious. The outer edges of both headlands are almost void of Scabious plants save for one small patch near West Pentire where one female *Andrena hattorfiana* bee was found.

Kelsey Head, in contrast to Pentire Point, has no agricultural development. Further back from the point the long Marram grass reigns, with thistles spiking through in places. Yellow Bird's-foot trefoil dots throughout the vegetation while the occasional deep purple stroke of a Pyramidal orchid brings a variation to the scene. Ragwort is again plentiful but this time it is covered in the yellow and black striped caterpillars of the Cinnabar Moth which is good to see. On the patches of rabbit grazed grass, purple Self-heal plants are abundant. In the scrub at the margins bramble flowers attract a range of pollinator species.

Larks sing happily overhead and, as for the invertebrate life, there is an abundance. Six-spot burnet moths are everywhere, their discarded chrysalises hanging on the Marram grass stems. Large and Small Skippers flit low over the ground in good numbers. Meadow Browns are also extremely common as are Ringlets. Butterflies that seem to be less frequently spotted are the Dark Green Fritillary and the Small Heath. Silver Y moths can occasionally be seen fluttering in the vegetation. Covering the Scabious and white umbellifers are two beetles of differing colours: The Red soldier beetle (*Rhagonycha fulva*) and the yellow Sulphur beetle (*Ctenopius sulphureus*) can be seen everywhere on Kelsey head. Almost bumblebee-like in appearance the Tachnid fly, *Nowickia ferox*, is seen alighting on Scabious flowers. These large flies may look menacing but have quite endearing and kind faces if you look closely.

At times you will come across a small tent like web a few inches off the ground, this is the nursery web of the Nursery web spider (*Pisaura mirabilis*). A caring mother, she will stay with her eggs and young in her web until they have all left safely.

Behind the headlands is an area known as Cubert Common. A large expanse of National Trust owned land it is home to a wide range of species. Bordering on to Holywell Bay Golf Course the margins are covered in Scabious where *Andrena hattorfiana* can be found in fairly good numbers. The Great green bush-cricket was also been found here, wandering slowly through the grasses. Thick-headed flies such as *Siccus ferugineus* are seen here, potentially planning which bumblebee they will lay their eggs in next. These margins represent the best place to find Scabious on the common because the vegetation is long enough to appeal to the plants.

The rest of the Common is covered in white clover where, if you're lucky, you can spot the scarce Blunthorn bee *Melitta leporina*. Flying with a higher pitched buzz and with more purpose than many *Andrena* species, this bee is fairly easy to recognize once you know what to look for.

Walking down towards Polly-joke Beach there is a small car-park just next to Treago Farm campsite. Within this car-park there is a sandy path, packed hard by the clumping footprints of many. This path is dotted with multiple (31 at my count but this will change throughout the season) holes burrowing into the sand. Large spoils of dirt are pushed out by furry yellow legs, scooping the sandy loam out. Once finished the bee emerges as a wonderfully named Pantaloon bee (*Dasypoda hirtipes*) so named because of her amazing yellow trousers used as pollen baskets. Her estate of path is shared by many neighbours of the same species as well as Large shaggy bees (*Panurgus banksianus*) which are black and smaller but keep the yellow trousers. *Ecteminus* species of wasps can also be seen exploring the holes. On a sunbaked patch to the edge of the path tens of tiny wasps can be seen zipping about. These are *Oxybelus uniglumis* and specialize in catching small fly species, spearing them on their sharp abdomens, before burying them underground, presumably laying an egg in them, before re-covering and going to catch another!

In the dunes at the base of the beach the leaf cutter bee *Megachile leachella*, the males with their bright green eyes, can be found. Incidentally, speaking of sand dunes, on nearby Penhale dunes where no Scabious or *Andrena hattorfiana* can be found I spotted a few rare bee flies – *Villa modesta*. Back to the site now and further up from the Leafcutters, moving onto Pentire Point there is a large area of Scabious, specifically planted by Paddy Saunders. This area has become the most abundant Scabious patch on Pentire Point and I found 25 individual *Andrena hattorfiana* bees present on the same day at this site. Slightly more South facing than the patch on Kelsey Head coupled with an extremely hot day meant that this count of 25 was my most successful over the entire flight season of this bee. This finding shows that the planting of Scabious will really help the bee and is a worthwhile use of time and effort.

The rest of Pentire Point is quite arable with large expanses of crop fields which, although dotted with flowers which provide good pollinator habitats, are not great for Scabious so the *Andrena hattorfiana* is lacking here. One bee was found on the other side of Pentire Point on a small patch of Scabious consisting of 22 flowers.

The tips of both headlands including the SSSI area on Pentire Point seem too exposed to the elements for successful *A hattorfiana* and Scabious populations. The bee seems to be quite affected by the wind as even if the temperature is up and there are lots of Scabious plants, if there is a strong wind these bees tend to shelter until it has all blown over.

Across Pentire Point there are multiple Cornish hedgerows which seem to lend themselves well to scabious introduction although this should be performed on the sheltered side to give the plants the best chance in life. Around the SW 773 608 area.

The Holywell Bay Golf Course looks a prime location for expanding habitats. The rough area at the moment does not contain any scabious but the plant is abundant on the hedgerows surrounding the course. Contacting the golf course to ask to plant more would be beneficial as it would hugely expand the bee's foraging range in the area. Increasing scabious density on Cubert Common would be beneficial to the bee's fortunes.

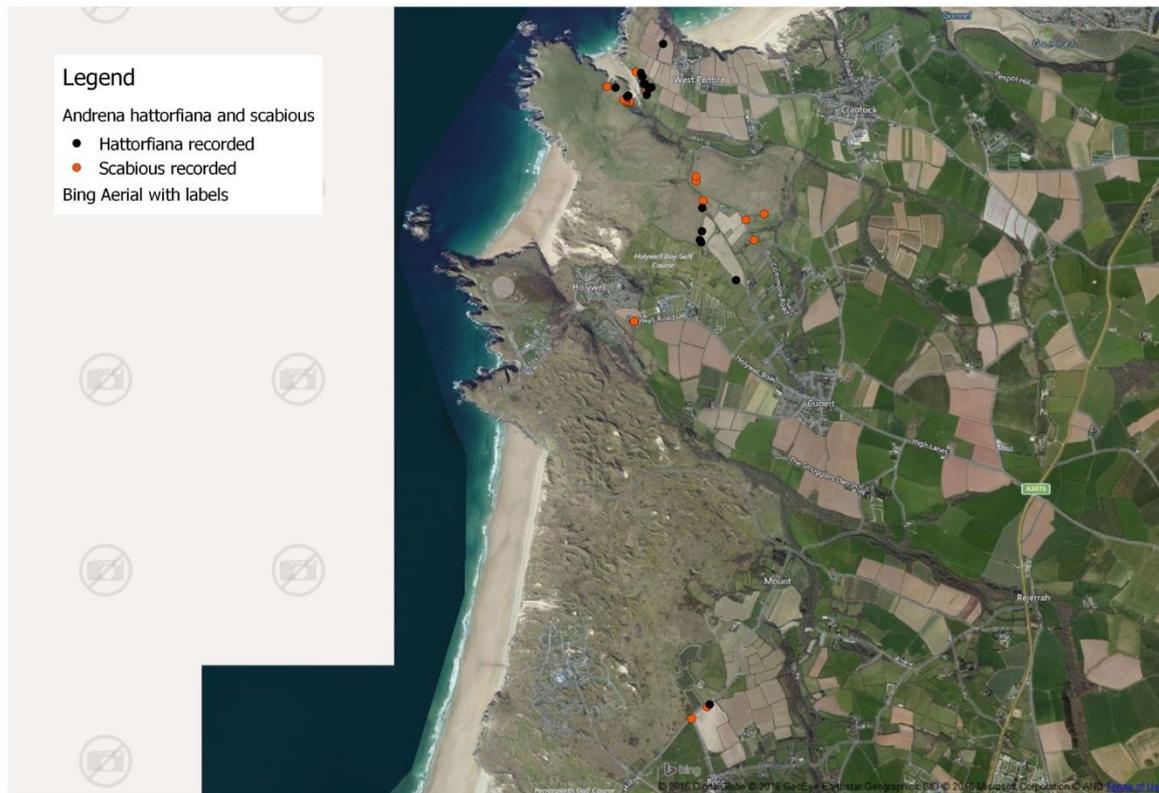
### **5.3.2 Areas to improve at Kelsey Head and West Pentire:**

- Approaching Holywell Bay Golf Course to plant Scabious in rough (SW776590).
- Increase planting on Cubert Common (SW773597).
- Introduce plants to Penhale Dunes (back end: SW779570).
- Planting scabious in the hedgerows across Pentire Point (SW774605).

**5.3.3 Table 2.** Scabious and *Andrena hattorfiana* sightings:

<b>Cubert Common, Kelsey Head and Pentire Point</b>					
	<b>Scabious Patch no.</b>	<b>Grid reference (SW)</b>	<b>Number of Flowers</b>	<b>Bee sightings</b>	<b>Bee sightings breakdown</b>
Cubert Common	1	7798 5888	52	2	1 male 1 female
	2	7772 5929	100	2	1 male 1 female
	3	7771 5920	124	1	1 female
	4	7770 5922	60	2	1 male 1 female
	5	7773 5948	13	1	1 male
	6	7774 5954	11	0	
	7	7769 5970	12	0	
	8	7769 5974	22	0	
	9	7823 5941	27	0	
	10	7808 5937	66	0	
	11	7814 5920	130	0	
	12	7714 5858	30	0	
Kelsey Head	13	7718 6037	150	0	
	14	7707 6049	100	4	1 male 3 female
	15	7715 6037	40	0	
	16	7715 6038	125	0	
	17	7715 6040	60	0	
	18	7713 6039	80	0	
	19	7716 6041	90	1	1 female
	20	7717 6042	95	1	1 female
	21	N: 7109 6051 W: 7700 6050 S: 7698 6040 E: 7714 6044	3000	0	
Pentire Point	22	7732 6042	160	2	2 females
	23	7732 6046	100	0	4 females
	24	7734 6047	200	4	8 females
	25	7736 6048	140	8	4 females
	26	7731 6051	80	4	2 females
	27	7730 6051	60	2	3 females
	28	7729 6057	140	3	2 females
	29	7728 6060	125	2	
	30	7724 6061	290	0	1 female
	31	7747 6083	22	1	5 males 35 females
<b>Total</b>	31		~5704	40	

## Map of Kelsey Head and West Pentire



Map 3. Scabious sites and *Andrena hattorfiana* sightings of Kelsey Head and West Pentire. Also, Gear Farm sightings (P. Saunders Kernow Ecology)

### 5.4.1 Extra Sites

Paddy Saunders has found large numbers of Scabious on Constantine bay (SW8575) and Rock dunes (SW9276) which look to be in prime locations to support large populations of *Andrena hattorfiana* (see Map 1). Historic records for the bee occurred at these sites and they have been refound in good numbers. These areas are larger and more bees were recorded than at Gwithian Towans making the populations important. However, these areas were found fairly late into the season and so, while a few bees were recorded, this does not show the true state of the population at these sites. The weather was also extremely windy on survey days leading to fewer bees sighted.

Low numbers of Scabious were found on Penhale dunes indicating an unsuitable habitat. However, scabious was found on the back edge of the dune and around Gear Farm and good numbers were found here. Incidentally this is the only area where the bee was found (2 males). In this area scabious should be encouraged by planting along the road verges (SW 776 554 area).

### 5.4.2 Table 3. Extra site Scabious and *Andrena hattorfiana* records

Scabious Patch no.	Grid reference (SW)	Location notes	Number of Flowers	Bee sightings	Bee sightings break-down
1	7747 5532	Road Leading to Gear Farm Track turn off	38	0	
2	7760 5541	Road Leading to Gear Farm Track turn off	20	0	
	7761 5594	Penhale Dunes	54	0	
3	7762 5543	Gear Farm Track in full	300	2	2 males
4	7783 5561	Near Gear Farm	25	0	
5	7788 5572	Near Gear Farm	35	0	
6	7789 5580	Near Gear Farm	30	0	
7	7789 5584	Near Gear Farm	40	0	
8	5946 4128	Farm track near Gwithian	50	0	
<b>Total</b>	<b>8</b>		<b>~592</b>	<b>2</b>	<b>2 males</b>

## 6. Conclusions

It may not be a good idea to seed Gwithian Towans without prior management as the soil composition and pH, the general compactness of the substrate and the presence of grazing animals such as rabbits may prove unsuitable for Scabious planting. Potentially focusing efforts on road verges and field margins would have more efficient positive consequences for the health of the bee in Cornwall.

Instead of starting new populations of Scabious in areas where the geology would not be suitable and instead the focus should be on adding to pre-existing areas or giving great research to areas where the geology itself will be suitable for the Scabious. Management of the rabbit grazing occurring on Gwithian Towans and Penhale Dunes should also occur to allow vegetation to recover. Coastal churchyards may be a promising resource as it is likely that the local community would be keen to help out with the project. Thorough testing of Gwithian Towans dunal system to determine its pH will be of great use to enhance the efficiency of further development plans.

Interestingly, golf courses seem to be present near all of the sites where *Andrena hattorfiana* was found. This allows scope for coordinating a project where scabious is planted within the rough of the courses to encourage the bee. Incentives for getting the golf courses to become more environmentally friendly could be working towards the STRI's Golf Environment Awards (<https://golfenvironmentawards.com/>) which may encourage the owners to aid the conservation of *A. hattorfiana*. Positives for the golf courses include: more aesthetically pleasing roughs and potential recognition for their work in conservation.

Focussing on improving current sites should be the priority ahead of linking the existing sites across Cornwall for the time being.

## 7. Acknowledgements

I would like to thank Patrick Saunders for the huge amount of help offered including site grid references, survey techniques and general bee knowledge.

I would also like to thank Andrew Whitehouse and Laura Larkin from Buglife South West for their continued support and for giving me the opportunity to carry out this project in the first place.

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## 9. Appendix

### 9.1 Pollinator sightings



Female *Dasygaster hirtipes* with her yellow pantaloons.

**Table 4.**

Order	Binomial Name	Common name	Location
Lepidoptera	<i>Maniola jurtina</i>	Meadow Brown	Kelsey Head, Gwithian Towans
	<i>Thymelicus sylvestris</i>	Small Skipper	Kelsey Head, Gwithian Towans
	<i>Ochlodes sylvanus</i>	Large Skipper	Kelsey Head, Gwithian Towans
	<i>Polyommatus icarus</i>	Common Blue	Kelsey Head
	<i>Aphantopus hyperantus</i>	Ringlet	Kelsey Head, Gwithian Towans
	<i>Vanessa atalanta</i>	Red Admiral	Kelsey Head
	<i>Argynnis aglaja</i>	Dark Green Fritillary	Kelsey Head, Gwithian Towans
	<i>Aglais urticae</i>	Small Tortoiseshell	Kelsey Head
	<i>Lycaena phlaeas</i>	Small Copper	Holywell Dunes
	<i>Pyronia tithonus</i>	Gatekeeper	Kelsey Head
	<i>Pieris brassicae</i>	Large White	Kelsey Head, Gwithian Towans
	<i>Pieris rapae</i>	Small White	Kelsey Head
	<i>Hipparchia semele</i>	Grayling	Perranporth
	<i>Pararge aegeria</i>	Speckled Wood	Kelsey Head, Gwithian Towans
	<i>Coenonympha pamphilus</i>	Small Heath	Kelsey Head, Gwithian Towans, Holywell dunes
	<i>Camptogramma bilineata</i>	Yellow Shell	Kelsey Head
<i>Autographa gamma</i>	Silver Y	Kelsey Head	
<i>Mythimna litoralis</i>	Shore Wainscot	Kelsey Head	

	<i>Callimorpha dominula</i>	Scarlet Tiger	Kelsey Head
	<i>Agriphila tristella</i>		Kelsey Head
	<i>Xanthorhoe fluctuata</i>	Garden Carpet	Kelsey Head
	<i>Zygaena filipendulae</i>	6 spot burnet	Kelsey Head
Coleoptera	<i>Oedemera nobilis</i>	Swollen Thighed Beetle	Kelsey Head, Gwithian Towans
	<i>Cteniopus sulphureus</i>	Sulphur Beetle	Gwithian Towans
	<i>Nicrophorous vespilloides</i>		Holywell Dunes
	<i>Rhagonycha fulva</i>		Kelsey Head, Gwithian Towans, Holywell dunes
	<i>Phyllopertha horticola</i>	Garden Chafer	Gwithian Towans
Hymenoptera	<i>Andrena hattorfiana</i>	Large Scabous Mining Bee	Kelsey Head, Gwithian Towans
	<i>Andrena minutula</i>		Kelsey Head
	<i>Andrena ovatula</i>		Kelsey Head
	<i>Anthidium manicatum</i>		Kelsey Head
	<i>Apis mellifera</i>	Honeybee	Kelsey Head
	<i>Bombus hortorum</i>	Garden Bumblebee	Kelsey Head, Gwithian Towans, Holywell dunes
	<i>Bombus hypnorum</i>	Tree Bumblebee	Gwithian Towans
	<i>Bombus humilis</i>	Brown-banded Carder	Kelsey Head
	<i>Bombus lapidarius</i>	Red-tailed Bumblebee	Kelsey Head, Gwithian Towans
	<i>Bombus lucorum</i>	White-tailed Bumblebee	Gwithian Towans
	<i>Bombus muscorum</i>	Moss Carder	Kelsey Head
	<i>Bombus pascuorum</i>	Common Carder	Kelsey Head
	<i>Bombus pratorum</i>	Early Bumblebee	Kelsey Head, Gwithian Towans
	<i>Bombus terrestris</i>	Buff-tailed Bumblebee	Kelsey Head, Gwithian Towans
	<i>Bombus vestalis</i>	Vestal Cuckoo Bee	Kelsey Head
	<i>Coelioxys conoidea</i>		Holywell Dunes
	<i>Colletes spp</i>		Kelsey Head, Holywell dunes
	<i>Dasygaster hirtipes</i>	Pantaloony Bee	Kelsey Head
	<i>Halictus rubicundus</i>		Kelsey Head
	<i>Megachile leachella</i>	Silvery Leafcutter	Kelsey Head, Gwithian Towans, Holywell Dunes
	<i>Megachile cetuncularis</i>		Gwithian Towans
	<i>Megachile maritima</i>		Kelsey Head
	<i>Epeolus variegatus</i>		Kelsey Head
	<i>Melitta leporina</i>		Kelsey Head
	<i>Panurgus banksianus</i>		Kelsey Head
	<i>Panurgus calcaratus</i>		Kelsey Head
	<i>Oxybelis uniglumis</i>		Kelsey Head, Gwithian Towans
	<i>Cerceris spp</i>		Kelsey Head
	<i>Gorytes spp</i>		Kelsey Head
	<i>Ectemnius spp</i>		Kelsey Head
Diptera	<i>Chrysotoxum bicinctum</i>		Kelsey Head
	<i>Cheilosia illustrata</i>		Kelsey Head
	<i>Volucella bombylans</i>		Kelsey Head, Gwithian

			Towans
	<i>Siccus ferrugineus</i>		Kelsey Head
	<i>Helophilus trivittatus</i>		Kelsey Head, Holywell Dunes
	<i>Oplodontha viridula</i>		Holywell Dunes
	<i>Dysmachus trigonus</i>		Holywell Dunes
	<i>Volucella pellucens</i>		Kelsey Head
	<i>Volucella zonaria</i>		Kelsey Head
	<i>Villa modesta</i>		Holywell Dunes
	<i>Nowickia ferox</i>		Kelsey Head
	<i>Tachnia grossa</i>		Gwithian Towans
Mecoptera	<i>Panorpa communis</i>		Gwithian Towans
Dermaptera	<i>Forficula auricularia</i>	Common Earwig	Kelsey Head
Orthoptera	<i>Tettigonia viridissima</i>	Great Green Bush Cricket	Kelsey Head

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