

SURVEY OF RARE LICHENS WEST PENWITH MOORS CORNWALL (2013)

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Foreword

Natural England commission a range of reports from external contractors to provide evidence and advice to assist us in delivering our duties. The views in this report are those of the authors and do not necessarily represent those of Natural England.

Background - Natural England is gathering evidence to support the potential notification of key areas of semi-natural habitat in the West Penwith Moors area of west Cornwall as a Site of Special Scientific Interest (SSSI). Habitat and specialist species surveys are being commissioned within the overall area.

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Further information

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SURVEY OF RARE LICHENS
WEST PENWITH MOORS
CORNWALL
2013



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Cover Picture: Carn Galver (Site CG021), a north east facing granite tor, with *Cladonia azorica* Nb (NS), new to the West Penwith Moors, on a rock below the clipboard and on the mossy slab to the right.

SURVEY OF RARE LICHENS, WEST PENWITH MOORS, CORNWALL 2013

1.0 INTRODUCTION

1.1 Brief for West Penwith Moors, Cornwall Lichen Survey

Natural England is gathering evidence to support the potential notification of key areas of semi-natural habitat in the West Penwith Moors area of west Cornwall as a Site of Special Scientific Interest (SSSI). Habitat and specialist species surveys are being commissioned within the overall area (**Map 1**).

Requirements: a list of nationally rare and scarce lichen records within the overall survey was determined by Natural England (**Table 1**). The requirement for this survey is to update these records by confirming the presence or absence of these species at their previously recorded locations or on suitable habitat in their vicinity. In addition, details should be recorded for any other nationally rare or nationally scarce species found during the surveys, either:

- i. a species listed on Annex 2 occurring at a new location, and/or;
- ii. a species not listed on Annex 2 occurring at any location surveyed.

All species locations must be recorded to at least 10 figure grid reference.

Where possible a note of the health of the population of each species within each survey location should be made, including reference to potential threats such as loss of a population due to natural succession.

TABLE 1
Nationally Rare and Nationally Scarce Lichens Data as Supplied by Natural England

Name	Status	Location	Grid Reference	Most recent record	Habitat	Further information (where available)
<i>Parmelinopsis minarum</i>	Sch 8, NR, LC.	Rosewall Hill	SW486394	2008	Granite tors	
<i>Pertusaria monogona</i>	NS, LC.	Rosewall Hill	SW486394	2008	Granite tors	
<i>Parmelinopsis minarum</i>	Sch 8, NR, LC.	Trencrom Hill	SW517360	2008	Granite tor	
<i>Pertusaria monogona</i>	NS, LC.	Trencrom Hill	SW517360	2008	Granite tor	
<i>Hypotrachyna endochlora</i>	NS, LC, IR.	Trencrom Hill	SW5136	1972	Tor and adjacent woodland	Survey area does not include Higher Hill Wood.
<i>Bryoria bicolour</i>	NS, LC.	Trencrom Hill	SW5136	1972	Tor and adjacent woodland	Survey area does not include Higher Hill Wood.
<i>Moelleropsis nebulosa</i>	NS, LC.	Leswidden	SW394308	2007	China clay spoil	
<i>Absconditella celata</i>	NR, LC.	Leswidden	SW394308	2007	China clay spoil	
<i>Ramalina chondrina</i>	NR, VU.	Carn Galver	SW4236	2001	Granite outcrops	On west-facing side of the north outcrop.
<i>Pertusaria monogona</i>	NS, LC.	Carn Galver	SW4236	2001	Granite outcrops	Frequent on vertical granite.
<i>Parmelinopsis minarum</i>	Sch 8, NR, LC.	Carn Galver	SW4236	2001	Granite outcrops	
<i>Parmelinopsis horrescens</i>	NS, NT.	Carn Galver	SW4236	2001	Granite outcrops	
<i>Bryoria bicolor</i>	NS, LC.	Carn Galver	SW4236	2001	Granite outcrops	

NB *Parmelinopsis minarum* is Nationally Scarce in the most recent lichen RDB (Woods & Coppins, 2012), not Nationally Rare as stated in NEs data.

2.0 METHODS

2.1 Survey Methods

2.1.1 Timing & Conditions

The survey was carried out over the week of the 6th October 2013 to 11th October 2013, with some half days as well as full days. Weather conditions were generally good, with conditions mainly dry except for heavy drizzle at the end of the day on the 8th. The rocks were dry or only slight wet through out the week.

2.1.2 Areas Surveyed

The areas visited were those with data for which Nationally rare or Nationally Scarce discovered by Natural England (**Map 1**), which are listed below.

Trencrom Hill, SW5136

Rosewall Hill, SW4839 & SW4939

Carn Galver, SW4236

Leswidden (Busvargus & Tregeseal Commons), SW3831 & SW3930

The survey routes are shown on **Maps 2 – 5**.

2.1.3 Locating Lichens of Interest

The full species data for the species listed by Natural England was downloaded from the NBN website for the general West Penwith area. In most case the detailed records only produced either four figure grid references or spurious six figures, which were fixed at site centres not on species locations. The one case where an accurate grid reference was available, *Absconditella celata* and *Moelleropsis nebulosa* at Leswidden, there was no permission to enter the land at this location.

A 2008 BLS field trip to Trencrom Hill and Rosewall Hill was written up (Lambley, 2008) and this aided the 2013 survey. In addition, Barbara Benfield sent photographs of the 2001 sites recorded for *Ramalina chondrina* and *Bryoria bicolor*, which allowed these to be relocated.

The four figure grid references and site centred grid references were used as an indication of the general areas of search and the heathland walked in these areas, where permission had been obtained for the survey on this land. The habitats were rapidly assessed as to suitability for rare lichens and then the most promising habitats searched. The general heathland communities were very unfavourable for lichen diversity. The soils are clearly quite productive and even if well grazed, produce heath that is too vigorous to allow a significant lichen flora to survive. Where ungrazed they appear to very rapidly overgrow to an extent that makes access difficult, let alone eliminating any ground growing lichen assemblages. The one exception was low productivity patches of wet heath, where open ground is conserved by seasonal flooding reducing vascular plant growth. These were checked where they existed within the areas of searched but other area of heaths were largely ignored. Any extensive bare ground that existed was examined, but this was rare, even in the former china clay mining area at Leswidden.

The rocks were clearly the main habitat of interest for lichens and the main concentration was on visiting these. All rock habitats were looked on a site, but once rare lichens were located, the particular niches of these species were searched for specifically. Large complex tors and wet rock slabs, including peat banks on their edges, were the most productive habitats. Isolated large boulders could be productive, but stands of clutter composed of smaller rocks were rarely productive. On the large tors, shaded sides and crevices were generally more productive than faces fully exposed to the sun.

2.1.4 Recording Lichens

The following lichens were found recorded in detailed:

<i>Cladonia azorica</i>	Nb (NS)
<i>Cladonia callosa</i>	Nb (NS)
<i>Lecanora alboflavida</i>	Nb (NS)
<i>Lecanora praepostera</i>	Nb (NS)
<i>Micarea xanthonica</i>	Nb (NS/IR)
<i>Parmelinopsis horrescens</i>	NT (NS/IR)
<i>Parmelinopsis minarum</i>	Nb (NS/S8)
<i>Pertusaria monogona</i>	Nb (NS)
<i>Usnea esperantiana</i>	NT (NR/IR)

The following lichens were searched for and not refound:

<i>Absconditella celata</i>	Nb (NR)
<i>Bryoria bicolor</i>	Nb (NS)
<i>Hypotrachyna endochlora</i>	Nb (NS)
<i>Ramalina chondrina</i>	VU (NR)

(See section 2.2.3 for an explanation of the abbreviations).

Four species found in 2013 are, or may be Nationally Scarce, but were not recorded in detail:

Abrothallus microspermus (NS): a widespread parasite of the common *Flavoparmelia caperata*, which is not described in Smith et al (2009) and is likely to be very under recorded and is of no conservation interest.

Cladonia coccifera s. str. (DD/NS?): a poorly understood taxa, until recently assumed to be to be a rare arctic alpine species, but actually potentially widespread in high quality moorland and heathlands, including lowland heath as in the New Forest. Not recorded in detail as taxonomy insecure.

Cladonia cryptochlorophaea (NS): a member of the *Cladonia grayi* senso lato group that is actually very common (probably accounting for the majority of British records of *Cladonia chlorophaea* s. lat.).

Micarea viridileprosa (NS): a recently described member of the *Micarea prasina* s. lat. group, which is actually very common on acid substrates, including bark, wood, soil and rock, and is of limited conservation interest.

Two species were listed as Nationally Scarce in Woods & Coppins (2012) but are no longer nationally scarce (NBN website) and it was not thought that there was much to gain from recording them in detail. There was an editing oversight in Woods & Coppins (2012), where the Nationally Scarce and Nationally Rare status were not updated from the original 2008 draft of the red list, so the scarcity data is rather out of date.

Opegrapha saxigena Nb (NS/IR): a species of damp shaded rock, which is widespread in Wales and south west England but rare beyond. It was very under recorded in the south west until recently but is now widely recorded and is no longer Nationally Scarce, but is an international responsibility species and of some conservation interest. It was not recorded in detail, but all locations were noted in the field notes (**Annex 1**).

Pertusaria excludens Nb (NS): a specialist lichen of coastal rocks and inland granite in the west of Britain. Now known from over 120 10km national grid squares, due to wider recording in both south west England and especially western Scotland. The lichen is frequent on the West Penwith Moors granite. Some records of *Pertusaria monogona* from West Penwith Moors proved to be errors for this species.

In addition *Usnea esperantiana* has very under recorded until recently and although recorded as Nationally Rare in Woods & Coppins (2012) it is actually now Nationally Scarce.

For species recorded in detail, the location was recorded on a Garmin GPSmap 62s GPS receiver, with new site defined as a site more than 10m from another rare species site. The location was described and the location of the rare lichen noted. The numbers or extent and frequency of the thalli were noted, and associated species recorded. The habitat was recorded, including the aspect of the site and any threats noted. Photographs were taken showing the location of the site and a closer view of the lichen location. Where possible the extent of the lichen was indicated on the latter photographs, but many of the lichens were small grey thalli on grey rock; not easy to photograph. The field notes were recorded on an iPhone and are reproduced in **Annex 1**, with the photographs.

As well as recording the rare lichens, lists were maintained of other lichen species seen on passing on rock and soil, with epiphytes only rarely recorded. This allowed the construction of species lists, which are given in **Annex 2**. The species data was also put in a BLS Recorder Import Spreadsheet <BLS_General_v6b West Penwith.xlsx>, allowing NBN import via the BLS database. Specimens retained by the author are listed in **Annex 4**.

2.2 Data Analysis

2.2.1 Nomenclature

The nomenclature follows Woods & Coppins (2012) for lichens and lichenicolous fungi. Woods & Coppins (2012) and the new flora Smith et al (2009) introduces considerable changes from the previous checklist (Coppins, 2002) and very many from the original edition of the flora (Purvis et al, 1992). To avoid confusion the new names and synonyms are given in **Annex 3**.

2.2.3 Rarity & Threat

The above indicator lists assess the quality of whole floras but the rarity of individual species is also important. The British Lichen Society reassessed the rarity and level of threat to lichen species (Woods & Coppins, 2003) and this replaced previous Red Data Books and lists of Nationally Rare and Scarce species. A second review has been completed and was published in 2012 (Woods & Coppins, 2012).

The following categories are used:

Rarity. This is a simple assessment of geographical rarity:

- Nationally Rare: recorded from 15 or less 10 x 10km national grid squares.
- Nationally Scarce: recorded from 16 to 100 10 x 10km national grid squares.

Hodgetts (1992) gives a scoring system with 200 points given to a Schedule 8 species, 100 points given to a Nationally Rare species and 50 to a Nationally Scarce species with a total of 300 or more in south western England indicating an SSSI quality rare lower plant assemblage. Hodgetts (2007) stressed that this is intended as a guideline rather than a rule. This system always seem to be fitted more to bryophytes than lichens. It is now even less satisfactory; with the application of the Red Data Book (RDB) threat criteria to the whole lichen flora, many Nationally Scarce species are now recognised as being Near Threatened or an even higher threat level. In addition, some Nationally Rare species are under recorded ephemeral species and have not been assessed as threatened at all. As a result, a different scoring system was proposed and tested in the recent Exmoor SSSI site dossiers (Sanderson, 2009) and is now published (Sanderson, 2011) (see below) but the NR & NS scores are given as well. Woods & Coppins (2012) have also given the NR & NS status for fungi parasitising lichens (lichenicolous fungi), which are not included within the lichen flora (Smith et al, 2009). These are mainly very under recorded and are not used in any calculations of scores or numbers of NR or NS species in this report.

Threat. This is based on the International Union for Nature Conservation criteria (IUNC, 2001) that takes factors such as decline and population into account, as well as geographic restriction. A series of complex, but fairly self explanatory, categories are used. Of these, Extinct, Critically Endangered, Endangered, Vulnerable and Near Threatened are collectively referred to here as Red Data Book (RDB) species. The occurrence of any of these species is of national significance. Data Deficient species are those that may be of RDB status but for which insufficient data was available to fully assess their status.

International Responsibility Species. This was a new category in Coppins & Woods (2003) that recognises that some species are commoner in Britain than elsewhere. They are absent, rare or threatened in the rest of Europe and are thought, on existing data, to have 10% or more of their European or World population in Britain. These could be considered as more important than some Red Data Book species, which are common elsewhere in the world. The significance of these species depends on their actual British and local rarity but special attention needs to be paid to them in management.

Section 41 Species/Biodiversity Action Plan Species. Any priority species listed in the former UK Biodiversity Action Plan are also indicated in the above summary (S41). The BAP priority species are species thought to be under particular threat. The BAP list had been revised (Biodiversity Reporting and Information Group, 2007) and, unlike the earlier list, is a reasonably comprehensive list of those lichen species likely to be under particular stress and amenable to conservation action to reverse this. Conservation of these species is regarded as being an important contribution to Britain's obligations under the Rio Convention on Biodiversity. Collectively, however, they are not an objective tool for assessing site conservation importance, RDB assessments and the Nationally Rare and Scarce assessments of restricted national distribution provide this.

The English species in the BAP list have now been made into Species of Principal Importance in England under The Natural Environment and Rural Communities (NERC) Act. The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the Natural Environment and Rural Communities Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions.

Summary & RDB/Notable Scoring System. The above system, with three separate assessments, is rather complex, so the rarity and threat status of species is summarised in the text below as 'Red Data Book species' as defined above, with all other Data Deficient, Nationally Scarce or International Responsibility species called 'Notable species'. With both categories, the rarity or International Responsibility status is indicated in brackets e.g. Near Threatened (NS/IR) or Notable (IR). This is not an official system but simply used as a presentational convenience. Any priority species listed in the UK Biodiversity Action Plan are also indicated in the above summary (BAP).

It has, however, been used as the basis of a more appropriate scoring system than that given in Hodgetts (1992). In this system the following scores are used:

- Red Data Book species with a threat level of Vulnerable or higher = 200
- Red Data Book species with a threat level of Near Threatened = 100
- Notable species (NR, NS, IR or BAP species which are not RDB NT or higher. Includes species listed as Data Deficient in the RDB) = 50.

Trials with this system indicated that a score of 600 was a reasonable guideline threshold for SSSI quality across southern English epiphytic sites, with scores of over 1000 typical of the best sites. The system has not yet been tested on inland rock assemblages. There is not a noticeable increase in the combined RDB and Notable species in the south west England over south central England (there tend to be less RDB and more Notables in the SW and the reverse in south central England) that would justify a differential score for the two regions as given in Hodgetts (1992). This regional differential appears to be a feature of bryophyte floras not epiphytic lichen floras.

Abbreviations used in the text are listed below:

RDB = Red Data Book Species, (CR, EN, VU & NT Species)
CR = Critically Endangered Red Data Book species
EN = Endangered Red Data Book species
VU = Vulnerable Red Data Book species
NT = Near Threatened Red Data Book species
DD = Species listed as Data Deficient in the Red Data Book
Nb = Notable species (NR, NS, IR or BAP species not RDB NT or higher)
NR = Nationally Rare
NS = Nationally Scarce
IR = International Responsibility species
BAP = Priority Biodiversity Action Plan species

Local Status. Local rarity was determined by consulting Sandell & Rose (1996) and from personal experience.

Local rarity was determined from 10km national grid square national distribution maps held by the BLS (unpublished).

2.2.4 Mapping

The GPS data recording the locations of rare lichens and the survey routes were saved to Garmin Basecamp software, where comments were added to the rare and scarce species locations. From Garmin Basecamp the data was exported as GIS readable formats (GDB & CVS) for export to Natural England's GIS system. In addition the data was exported to MacGPS Pro as GPX files. PDFs of OS maps and aerial photographs were geo-referenced in MacGPS Pro and the data mapped on to these maps and aerial photographs to produce the maps used in this report (**Maps 2 – 31**).

2.2.4 Glossary

Lichenological technical terms have been kept to a minimum, but some are unavoidable. The following are used in the text:

Apothecia: a sexual reproductive structure, with an open usually disk like structure. Typically distinctively coloured and prominent features of lichens.

Cilia: hair-like out-growth of the thallus.

Cortex: outer, upper or lower layer of a thallus; the "skin" of the lichen.

Cyanobacteria: blue-green algae.

Epiphytic: growing on trees.

Grey zone: the higher parts on sea cliffs, still strongly influenced by salt spray, but marked by the dominance of gray lichens, as opposed to the dominance of yellow and black lichens in more severely exposed lower zones.

Isidia: an algae containing fragile outgrowth of the lichen thallus, still with a cortex. Acts as an asexual reproductive structure when broken off.

Medulla: the loose layer of tissue without algae found below the cortex and algal containing layer.

Podetia: in *Cladonia* comprises the upright, shrubby part of the thallus, with apothecial discs at the tips but the latter are frequently absent

Prothallus: the initial structure of fungal tissue without algae from which a lichenised thallus develops, it is often visible along the edge of the thallus

Pruina: a frost-like or flour-like surface covering.

Soralia: a structure or region of a thallus bearing soredia, which are a non-corticate, loose weft of algae cells and fungal hyphae, the 'granules' variously appearing flour-like, castor sugar-like or granular. These act as asexual reproduction propagules.

Squamule: a small leaf like scale, not corticate below.

Synonym: an old name that was once applied to a species, but is now judged to be invalid, either because the taxonomy has changed, e.g. where was one species in now considered two, or the name contravenes nomenclatural rules, e.g. an earlier name validly applied to the same species is found.

Thalline exciple: the margin of an apothecium which contains algae as well as fungal cells; usually of the same colour and consistency as the thallus

Thallus: the vegetative body of the lichen

Spot tests and fluorescence are colour reactions to chemicals applied to the lichen, or fluorescence from a 365µm UV light, which aid identification:

C = Calcium or sodium hypochlorite solution, usually as undiluted commercial 'thin' bleach.

K = A solution of 10% potassium hydroxide or sodium hydroxide in water.

Pd = Paraphenylenediamine

UV = UV fluorescence

3.0 SURVEY

3.1 Lichen Flora

3.1.1 Totals

The total species lists recorded in 2013 are listed in **Annex 2**. A total of 108 taxa were recorded from the rocks and soils, while two species were noted on passing on a tree. The totals are listed below by site in **Table 2**.

Species of interest recorded included two Near Threatened (NT) Red Data Book species. A total of ten Nationally Scarce (NS) species have been recorded along with four International Responsibility species (IR). In summary two Red Data Book species and 11 Notable (Nb) species were recorded.

TABLE 2
Number of rock & Soil Lichens Recorded from West Penwith Moors 2013

West Penwith Moors	Trencrom Hill	Rosewall Hill	Carn Galver	Leswidden	Total
Total Taxa	69	71	73	13	108
Near Threatened RDB	2	1	1	0	2
Notable	7	8	8	0	11
Nationally Rare	0	0	0	0	0
Nationally Scarce	5	7	7	0	9
International Responsibility Spp	3	3	2	0	4
Schedule 8	1	1	1	0	1
RDB/Nb Score	550	500	500	0	750
S8/NR/NS Score	450	500	500	0	650

3.1.2 Lichen Species of Conservation Interest

The lichen species of conservation interest recorded from the West Penwith moors area are described below.

Absconditella celata (Notable, NR): an obscure and tiny ephemeral species of bare ground and rotten wood. Most often recorded on bare ground in the south west and Wales, but this may reflect that only two people are recording the species. Also recorded from eastern England, south east Scotland and Orkney. It is not possible yet to say if this is a species of conservation significance or not, but one record from Wales, bare ground in a cemetery maintained by frequent herbicide applications, suggests not. In the south west it has been widely recorded on china clay waste and is it is now on the margin of becoming Nationally Scarce. In West Penwith moors it has been recorded once (NBN website):

- “Pendwith” - clay tip (SW394 308), Between January and April, 2006, Barbara Benfield. (Pendwith is the name in the BLS database, which is not recorded on the OS maps, possibly an error for Penwith?)

This is in the Leswidden former china clay mining site. The grid reference fell outside of the area for which permission was gained for the 2013 survey, but Google Earth and overlooking this area in the field suggested the bare ground had been lost to succession by 2013. There was no suitable clayish bare ground in the areas with

access. The species is likely to have been lost from the site due to natural succession in the absence of disturbance, grazing or other positive habitat management.

Bryoria bicolor (Notable, NS): a brown shrubby upland and western lichen, which has shown significant declines in the edges of its range, potentially for more than one reason. Typically found amongst mosses on soil or rock sometimes on trees. There are quite a few unlocalised 10km national grid squares from the west of Cornwall but few localised records, itself suggesting a decline. There are two localised records from the West Penwith moors (NBN website):

- Lelant - Trencrom Hill, SW5136 02/04/1972, Peter James
- Carn Galver, SW4236, September, 2001, Barbara Benfield

The NE data (**Table 1**) gives the habitat for the first record at Trencrom Hill as “tor and adjacent woodland” but the raw data lacks any indication that the species occurred in the adjacent Higher Hill Wood, which is a recent secondary Turkey Oak plantation. This would be a singularly improbable habitat for *Bryoria bicolor* Nb (NS) and it is likely that this species never occurred in Higher Hill Wood. It most probably occurred on the mossy edges of granite slabs. In 2008 the BLS (Lambley, 2008) found the more widespread *Bryoria fuscescens* on “turf over rock” but in 2013 even this species could not be found. The extent of suitable habitat was very small in 2013 and the habitat is likely to have been lost to the long term lack of positive management such as grazing at Trencrom Hill, which has largely wiped out the heathland habitat here.

At Carn Galver, the *Bryoria bicolor* Nb (NS) was recorded on the edges of a granite slab in 2001. A picture was obtained of the site from Barbara Benfield and the slab relocated (CG034, **Map 27**). The short mossy slab edge habitat had been completely lost by 2013 and it was remarkable how much more overgrown the landscape was in comparing with the 2001 picture. Andrew McDouall of Natural England, noted that “Carn Galver was subject to several large scale uncontrolled fires in the 1990s. Since around 2000 there have been no fires and the vegetation has responded accordingly. Grazing and cutting has recently been re-introduced under a HLS agreement with the National Trust’s tenant farmer at Bosigran Farm. This colony at Carn Galver, was certainly lost to vegetation over growth in the absence of significant grazing or other management pressure. It is very interesting to note that *Bryoria bicolor*, which is likely to be very sensitive to fire actually survived several wild fire but succumbed to the general overgrowth that occurred in the absence of fire and lack of grazing or another management.

Cladonia azorica (Notable, NS): a relatively recently identified Reindeer Moss similar to the common *Cladonia portentosa*, but distinguished by finer branching, spot tests and UV + fluorescence. A western species characteristic of rocky humid locations in the west of Britain, most commonly recorded in Wales, but also known from Western Scotland and Devon and Cornwall. The thin scatter of records in the south west, as opposed to Wales, suggests local under recording, but it has been yrecorded from granite tors in Dartmoor and Bodmin, and coastal locations in Lundy Island and the Isles of Scilly. In 2013 it was found on three locations on shaded granite slabs and faces on the north east side of the northern summit Carn Galver, new to mainland west Cornwall (**Map 6 & Annex 1**).

***Cladonia azorica* Carn Galver**

Site	Grid Reference	Altitude	Population	Aspect	Threats
CG020	SW42783 36044	250m	11 thalli	NE	None
CG021	SW42790 36025	250m	30cm across	NE	None
CG024	SW42802 36016	250m	5 small thalli	E	Ivy

The species is strongly restricted to the shaded side of the tallest tor examined during the survey. The species is likely to be a special species of larger tors in south west England but its full range is not yet clear. One slab was seriously threatened by Ivy due to a lack of positive habitat management such as grazing. A more indirect threat would be large scale wild fires reaching up into the rocks, fuelled by the accumulation of biomass on the ungrazed and unburned heathland below.

The lichens associated with *Cladonia azorica* are listed below:

Associated Species	No of Occurrences
<i>Cladonia coccifera</i> s. str.	1
<i>Cladonia cyathomorpha</i>	1
<i>Cladonia furcata</i> subsp. <i>furcata</i>	2
<i>Cladonia ochrochlora</i>	1
<i>Cladonia polydactyla</i> var. <i>polydactyla</i>	1
<i>Cladonia squamosa</i> var. <i>subsquamosa</i>	1
<i>Flavoparmelia caperata</i>	3
<i>Sphaerophorus globosus</i>	2

Bold = Other systematically recorded species

Cladonia callosa (Notable, NS): a small *Cladonia* that typically occurs as largely sterile mats of squamules, with occasional distinctive small podetia. Actually relatively easily identified; it has strong UV + bluish fluorescence, similar to *Cladonia crispata*, but with a white tomentose underside to the squamules as opposed to the smooth white undersides of *Cladonia crispata*. This distinction is not made in Smith et al (2009) and the species is certainly very under recorded. The species is a western European oceanic endemic found from Norway to France. In Britain it is very sparsely recorded. There are scattered records from upland Britain from Scotland to a single record in Dartmoor. It was until recently unknown for lowland England but it has a large and internationally important population in the Netherlands. Recent intensive survey of the New Forest (Wessex Lichen Group, Website, 2014a) has worked out methods of field identification and found the species to be a widespread specialist species of open bare damp peat in disturbed heathland there. It is quite a rapid coloniser of recently disturbed peat and has also very recently been recorded from a post industrial site in Essex. This is a very under recorded species and Britain is likely to support a much larger population than the Netherlands and potentially to support the bulk of the world population. In 2013 *Cladonia callosa* was recorded on one site at Rosewall Hill and three sites at Carn Galver, new to Cornwall (**Map 7**).

***Cladonia callosa* Rosewall Hill**

Site	Grid Reference	Altitude	Population	Habitat	Threats
RW011	SW48663 39283	205m	Occasional	Slab edge	None

***Cladonia callosa* Carn Galver**

Site	Grid Reference	Altitude	Population	Habitat	Threats
CG028	SW42731 35920	235m	Occasional	Pan	None
CG029	SW42721 35917	230m	Occasional	Pan	None
CG030	SW42718 35915	235m	Frequent	Pan	None
CG031	SW42658 35961	230m	Frequent	Path side	None
CG033	SW42331 36606	140m	Occasional	Slab edge	None

At Rosewall Hill a single colony (RW011) was found on peat exposed at the upper edge of a sloping granite slab on a large tor at the western end of the hill. At Carn Galver, it was found in a similar situation low on the north west side of the hill (CG033) and at scattered locations on the saddle to the west of the northern summit tor. These are in different habitats, with a group of three colonies (CG029 – CG030) on peat in open pans in level wet heath, the pans formed around ephemeral ponds formed over sunken boulders. A fourth colony on the more sloping edge of this area of wet heath occurred on worn peat at the edge of a path (CG031). There were no obvious threats to these sites. On the Penwith Moors the species is likely to have been reduced from a wider distribution when the heaths were more open and is surviving only in very favourable sites. Evidence from the New Forest suggests that the species is well adapted to recover from cool to moderate fires and is promoted by controlled burning, grazing and a degree of path erosion (**Map 7 & 8**).

The lichens associated with *Cladonia callosa* are listed below:

Associated Species	No of Occurrences
<i>Cladonia crispata</i> var. <i>cetrariiformis</i>	1
<i>Cladonia floerkeana</i>	3
<i>Cladonia portentosa</i>	1
<i>Cladonia ramulosa</i>	1
<i>Cladonia squamosa</i> var. <i>squamosa</i>	1
<i>Cladonia subcervicornis</i>	4
<i>Cladonia verticillata</i>	1
<i>Trapeliopsis granulosa</i>	1

Cladonia cyathomorpha (Notable, NS): a Pixie Cup *Cladonia* similar to the common *Cladonia pyxidata* but with distinctive white veining on the underside of the large basal squamules, the veining can be coloured orange-brown or slightly pinkish at the base. There are also differences on the podetia. Unlike *Cladonia pyxidata*, a species of open neutral habitats, the species is confined humid lower productivity sites. In Europe an oceanic Atlantic – Mediterranean species. It is widely recorded in the south west Scottish Highlands, the Lake District and Wales. It has been very rarely recorded in the south west, but the author has recently found it in several shaded mossy granite sites both during this survey and in Dartmoor. It has been almost entirely overlooked in the south west, but is likely to be local but widespread on mossy shaded acid rock. This under recording appears be due to the poor description of *Cladonia cyathomorpha* in Smith et al (2009), which incorrectly implies that the veining on the underside of the large basal squamules is largely pinkish, not predominately white. A recent find in The New Forest, suggests the species also occurs on large fallen logs in old growth woods in the lowlands as well (Wessex

Lichen Group, Website, 2014b). In 2013 it was recorded at one location on Trencrom Hill and two on Carn Galver (**Maps 9 & 10**).

Cladonia cyathomorpha Trencrom Hill

Site	Grid Reference	Altitude	Population	Habitat	Threats
TH021	SW51629 36285	145m	Small amount	Open wet slab	

Cladonia cyathomorpha Carn Galver

Site	Grid Reference	Altitude	Population	Habitat	Threats
CG022	SW42795 36014	250m	Occasional	Crevice	
CG024	SW42802 36016	250m	Rare	E facing slab	Ivy

Only mature material can be easily identified, so the lichen may occur more widely as stunted or sterile material. The three sites were on mossy rocks in shaded or open but wet sites. One slab at Carn Galver was seriously threatened by Ivy due to a lack of positive habitat management such as grazing.

The lichens associated with *Cladonia cyathomorpha* are listed below:

Associated Species	No of Occurrences
<i>Cladonia azorica</i>	1
<i>Cladonia coccifera</i> s. str.,	1
<i>Cladonia cyathomorpha</i>	1
<i>Cladonia furcata</i> subsp. <i>furcata</i>	1
<i>Cladonia ochrochlora</i>	1
<i>Cladonia squamosa</i> var. <i>subsquamosa</i>	1
<i>Cladonia subcervicornis</i>	1
<i>Flavoparmelia caperata</i>	1
<i>Stereocaulon evolutum</i>	1

Bold = Other systematically recorded species

Hypotrachyna endochlora (Notable, NS): a leafy lichen with a strongly oceanic distribution. It is mainly epiphytic but can occur on shaded rocks in woods. It is frequent in the western Scottish Highlands and north Wales, but rare beyond. In the south west most records are from coastal locations in Exmoor, inland in Dartmoor and about Boconnoc Park. The only records from west Cornwall are from Trencrom Hill and the Isles of Scilly. The NBN website gives the Trencrom Hill record as:

- Lelant - Trencrom Hill, SW5136, between 1966 and 1972, Peter James & Gordon Graham

The NE data (**Table 1**) gives the habitat for the first record at Trencrom Hill as “tor and adjacent woodland” but the raw NBN data lacks any indication that the species occurred in the adjacent Higher Hill Wood, which is a recent secondary Turkey Oak plantation. This would be a singularly implausible habitat for *Hypotrachyna endochlora* Nb (NS) and it is likely that this that this species never occurred in Higher Hill Wood. Trencrom Hill itself is also a very marginal habitat for this species, but conceivably this highly oceanic species could have occurred deep within a crevice on a granite tor. Given the calibre of the determiner the record must be accepted but its

occurrence at Trencrom is surprising. In 2013 the species was not refound. During the survey, *Hypotrachyna laevigata*, a much commoner species, normally found at *Hypotrachyna endochlora* sites at a ratio of well over of 100 *Hypotrachyna laevigata* thalli to one of *Hypotrachyna endochlora* was found only once, deep in a crevice at Rosewall Hill.

Lecanora alboflavida (*Ochrolechia inversa*) (Notable, NS) is a crust forming lichen and is a NIEC Ancient Woodland Indicator. It is a western and southern species, which is found from western Scotland and is most frequent in the south west and the New Forest. It is a western European and Macaronesia oceanic endemic. It is overwhelming recorded as an epiphyte in ancient woodlands and is on the NIEC index as an ancient woodland indicator in southern oceanic woodlands (Coppins & Coppins, 2012). There are a couple of records from rocks in ancient woodland in the south west and one from Scotland in the BLS data on the NBN website. It had previously not been recorded from the West Penwith Moors. In 2013 it was surprisingly found to be local but widespread on damp rocks at Carn Galver and present at Rosewall and Trencrom Hills. At the latter two sites it was initially recorded as *Lecidella scrabra*, a common yellow soresdiate C + orange crust of nutrient rich rocks, which was also recorded from Rosewall Hill by Lambley (2009). The well developed thalli at Carn Galver, however, were clear not *Lecidella scrabra* and were also UV + orange, which *Lecidella scrabra* is not. The habitat is actually unsuited to *Lecidella scrabra* and it likely that the BLS record in 2008 for *Lecidella scrabra* was mistaken for *Lecanora alboflavida*, which was unexpected on rock away from woods. A second oceanic mainly epiphytic species *Mycoblastus caesius* was also found in the same habitats and on peat as well. *Mycoblastus caesius* has no records for West Penwith and only two from rocks in the south west, both from woods. The occurrence of crust forming woodland epiphytic species on low lying granite outside of woodland appears to be newly discovered feature of the Penwith Moors. Such species are presumably absent from the upland granite in Dartmoor, or they would have been recorded from these much more intensively studied habitats. In 2013 it was on one location each in Trencrom Hill and Rosewall Hill and nine sites at Carn Galver (Maps 11 – 13).

Lecanora alboflavida Trencrom Hill

Site	Grid Reference	Altitude	Population	Habitat	Threats
TH017	SW51731 36265	170m	A few small thalli	Open damp slab	Ivy

Lecanora alboflavida Rosewall Hill

Site	Grid Reference	Altitude	Population	Habitat	Threats
RW009	SW48783 39178	230m	Rare	Crevice facing SE	

Lecanora alboflavida Carn Galver

Site	Grid Reference	Altitude	Population	Habitat	Threats
CG007	SW42556 36415	230m	1 thallus	E facing slab	
CG010	SW42576 36383	230m	Rare	Crevice	
CG011	SW42563 36417	225m	7 thalli	E facing rock	
CG015	SW42721 36079	240m	Occasion	Open damp slab	
CG018	SW42743 36092	240m	4 thalli	NE facing face	
CG020	SW42783 36044	250m	Rare	N facing crevice	

CG024	SW42802 36016	250m	Rare	E facing slab	Ivy
CG026	SW42802 36016	250m	7 thalli	NE facing rock	
CG027	SW42801 36004	250m	Frequent	E facing slab	

This species was clearly better developed and more frequent in the wetter Carn Galver sites but as the identity was not sorted out until later in the survey, small thalli were probably overlooked at the other two sites. Confined to damp rock, either east or north east facing, in crevices or on flushed parts of slabs in more open areas. Two sites were threatened by Ivy due to a lack of positive habitat management such as grazing at grazing at Trencrom Hill and Carn Galver.

Associated Species	No of Occurrences
<i>Acarospora fuscata</i>	1
<i>Cladonia subcervicornis</i>	5
<i>Flavoparmelia caperata</i>	4
<i>Fuscidea cyathoides</i> var. <i>cyathoides</i>	3
<i>Hypogymnia physodes</i>	2
<i>Hypotrachyna afrorevoluta</i>	3
<i>Lepraria caesia</i> alba	1
<i>Melanelixia fuliginosa</i>	1
<i>Micarea viridileprosa</i>	1
<i>Mycoblastus caesius</i>	4
<i>Parmelia omphalodes</i>	2
<i>Parmelia saxatilis</i>	2
<i>Parmelinopsis horrescens</i>	3
<i>Parmelinopsis minarum</i>	4
<i>Pertusaria amara</i> f. <i>amara</i>	1
<i>Pertusaria corallina</i>	1
<i>Pertusaria excludens</i>	1
<i>Pertusaria pseudocorallina</i>	1
<i>Porpidia cinereoatra</i>	2
<i>Trapelia glebulosa</i>	1
<i>Usnea flammea</i>	1
<i>Xanthoparmelia conspersa</i>	1

Bold = Other systematically recorded species

Lecanora praepostera (Notable, NS): a crust forming lichen found on dry overhanging rocks in coastal habitats. It is mainly recorded from the south west of England and Wales, with a few records north to Scotland. It is a typical *Lecanora*, with a white thallus and apothecia with thalline margins, but has dark brown or black, often piebald disks, distinctive spot test reactions, a zoned prothallus and is found in a characteristic habitat. It is widely recorded on the West Penwith peninsula but previous records have all been on the coastal side of the road. In 2013 it was found on one overhang on Trencrom Hill (TH018) (**Map 14**), which appears to be the first record from the West Penwith Moors.

***Lecanora praepostera* Trencrom Hill**

Site	Grid Reference	Altitude	Population	Habitat	Threats
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TH018	SW51726 36270	165m	Abundant over c 40 x 25cm	NE & N facing overhang	Ivy
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Then only site recorded was threatened by Ivy due to the long history positive habitat management such as grazing at Trencrom Hill.

Associated Species	No of Occurrences
<i>Opegrapha saxigena</i>	1
<i>Ramalina siliquosa</i>	1

Micarea xanthonica (Notable, NS/IR): is a crust forming lichen recently separated from the common *Micarea prasina*. It has a disjunct world distribution, being found in the north west Europe and the Pacific Northwest of North America. This lichen appears to be a widespread oceanic species of acidic bark in oceanic woodland in western Britain to the New Forest and Sussex, also occurring occasionally on peat banks and rarely on porous sandstone. In the south west it has mainly been recorded from Dartmoor and Exmoor, with single records from Bodmin Moor and Wheal Peavor Mine, Redruth. The latter may have been a terricolous record but the others were all on bark or dead wood. In 2013 it was found on bryophytes on a shaded wet slab of granite at Rosewall Hill, new to the West Penwith Moors (**Map 15**)

***Micarea xanthonica* Rosewall Hill**

Site	Grid Reference	Altitude	Population	Habitat	Threats
RW003	SW48805 39354	210m	Occasional	North facing slab	

There were no threats in this well grazed section of Rosewall Hill.

Associated Species	No of Occurrences
<i>Micarea lignaria</i> var. <i>lignaria</i>	1

Moelleropsis nebulosa Notable (NS): a crust forming species with a cyanobacteria algal partner. It is a pioneer species on light, often sandy and well-drained, open, often recently disturbed, soils in coastal cliffs, road cuttings or earthy wall tops. The species is widespread along the western coast of Britain. It is fairly frequent in the south west along the coast, with some inland records on post-industrial sites and granite tors. In West Penwith moors it has been recorded once (NBN website):

- Pendwith - clay tip (SW394 308), Between January and April, 2006, Barbara Benfield. (Pendwith is the name in the BLS database, which is not recorded on the OS maps, possibly an error for Penwith?)

This is in the Leswidden forming china clay mining site. The grid reference fell outside of the area for which permission was gained in 2013, but Google Earth and over viewing this area in the field suggested the bare ground had been lost to succession by 2013. There was no suitable bare ground in the areas with access. The species is likely to have been lost from the site due to natural succession in the absence of disturbance, grazing or other positive habitat management.

Parmelinopsis horrescens (Near Threatened, NS/IR): a strongly southern oceanic leafy lichen confined to the New Forest, Dartmoor and Cornwall and north west

Wales. It is an uncommon species in Europe but a widespread pantemperate and montane tropical species. It mainly grows on acid bark of mature to ancient trees in sheltered situations but also occurs on shaded rocks and rarely old Heather or Gorse. This small leafy lichen is quite distinctive and can only be confused with *Parmelinopsis minarum* Nb (NS/S8). It can be separated by the sliver-grey slightly flattened isidia with cilia growing from base or tips of isidia and the negative C + spot test on the medulla. The BLS database (NBN website) has unlocalised 10km national grid squares records covering the north side of the West Penwith peninsula, but only a single localised record from the West Penwith Moors (NBN website):

- Carn Galver, SW4236, September 2001, Barbara Benfield.

Curiously this lichen was missed on both Trencrom and Rosewall Hills by the BLS field trip (Lambley, 2008), although at both sites they clearly recorded *Parmelinopsis minarum* Nb (NS/S8) from locations where mixed populations occur. In 2013 *Parmelinopsis horrescens* was found widely at Trencrom Hill, Rosewall Hill and Carn Galver at 27 separate locations (Maps 16 – 18):

***Parmelinopsis horrescens* Trencrom Hill**

Site	Grid Reference	Altitude	Population	Habitat	Threats
TH001	SW51784 36030	145m	A few thalli	NE facing	
TH002	SW51786 36049	150m	Dominant	NE facing	Ivy
TH013	SW51759 36139	165m	2 thalli	E facing	
TH014	SW51759 36139	165m	c10 thalli	N crevice	
TH016	SW51747 36261	170m	3 thalli	E crevice	Ivy
TH024	SW51684 36203	155m	2 thalli,	SW facing	
TH025	SW51684 36199	155m	Occasional,	SE facing	
TH026	SW51690 36213	160m	1 thallus	NE facing	

***Parmelinopsis horrescens* Rosewall Hill**

Site	Grid Reference	Altitude	Population	Habitat	Threats
RW001	SW48772 39365	205m	Frequent	Crevice	
RW004	SW48743 39329	215m	Frequent	Crevice	
RW014	SW49507 39342	190m	Frequent	NE facing	
RW015	SW49499 39325	205m	Rare	E facing	

***Parmelinopsis horrescens* Carn Galver**

Site	Grid Reference	Altitude	Population	Habitat	Threats
CG006	SW42547 36431	225m	2 thalli	E facing	
CG008	SW42564 36398	235m	Occasional	E facing	Ivy
CG009	SW 42566 36392	235m	1 thallus,	N facing	
CG010	SW42576 36383	230m	Occasional	Crevice	
CG012	SW42595 36310	225m	Occasional	NE & E facing	
CG013	SW42628 36267	230m	Occasional	Crevice	
CG014	SW42723 36088	245m	1 thalli, SE		
CG015	SW42721 36079	240m	3 thalli	Crevice	
CG017	SW42745 36080	245m	Frequent	Crevice	
CG019	SW42766 36071	240m	Frequent	Crevice	Ivy
CG020	SW42783 36044	250m	Frequent		

CG023	SW42793	36010	255m	Frequent	Crevice SE	
CG025	SW42804	36000	255m	1 thallus	SW facing	Ivy, Bramble
CG027	SW42801	36004	250m	3 thali	E facing	
CG035	SW42536	36415	125	Occasional	Crevice	

The species is nearly always found on north or north east facing rocks or inside crevices on tors and rock jumbles. It typically grows with other mainly tree leafy lichens especially *Flavoparmelia caperata*, *Hypotrachyna afrorevoluta* and *Hypotrachyna revoluta* s. str., the woodland oceanic crust forming lichens *Lecanora alboflavida* and *Mycoblastus caesius* along with typical rock lichens. It is often found with *Parmelinopsis minarum* Nb (NS/S8) but is less frequent over all than this species, especially on Trencrom and Rosewall Hills. It is much more strictly confined to shaded niches than *Parmelinopsis minarum* but the latter will also go deeper into shade than *Parmelinopsis horrescens*. It appears that *Parmelinopsis horrescens* has a narrower niche than *Parmelinopsis minarum* and is less tolerant of strong sunshine and deep shade. The frequency with which it was found in the 2013 survey suggests that *Parmelinopsis horrescens* is likely to occur at most large rock outcrops on the West Penwith Moors. At Trencrom Hill and Carn Claver several sites were threatened by Ivy or Bramble due to a lack of positive habitat management such as grazing. The mainly grazed Rosewall Hill was in better condition.

Associated Species	No of Occurrences
<i>Acarospora fuscata</i>	2
<i>Cladonia subcervicornis</i>	4
<i>Flavoparmelia caperata</i>	10
<i>Fuscidea cyathoides</i> var. <i>cyathoides</i>	2
<i>Hypogymnia physodes</i>	1
<i>Hypotrachyna afrorevoluta</i>	12
<i>Hypotrachyna revoluta</i> s. str.	10
<i>Lecanora alboflavida</i>	4
<i>Lecanora gangaleoides</i>	1
<i>Lecanora polytropia</i>	1
<i>Melanelixia fuliginosa</i>	4
<i>Micarea viridileprosa</i>	2
<i>Mycoblastus caesius</i>	6
<i>Opegrapha saxigena</i>	1
<i>Parmelia omphalodes</i>	2
<i>Parmelia saxatilis</i>	8
<i>Parmelinopsis minarum</i>	17
<i>Parmotrema perlatum</i>	1
<i>Pertusaria excludens</i>	1
<i>Pertusaria pseudocorallina</i>	2
<i>Platismatia glauca</i>	1
<i>Ramalina siliquosa</i>	1
<i>Ramalina subfarinacea</i>	1
<i>Usnea esperantiana</i>	1
<i>Usnea flammea</i>	6

Bold = Other systematically recorded species

Parmelinopsis minarum (NS/Schedule 8): a strongly southern oceanic leafy lichen scattered along the south coast with larger populations in south west Devon, in Cornwall and the New Forest. There are rare records from north west Wales. It is a common species in southern Europe and a widespread pantemperate and montane pantropical species and is a cosmopolitan species of warm temperate or montane tropical oceanic climates. It is a species of moderately acid habitats, mainly on trees but also on coastal rocks and old Gorse bushes, the latter in the far west. It is listed in Schedule 8 of the Wildlife and Countryside act, but this is now questionable, as many new sites have been added in recent years. Much confused with *Parmelinopsis horrescens* in the past but can be separated by the cylindrical brown isidia, lacking ciliata and a C + red spot test on the medulla. The BLS database (NBN website) has three localised records from the West Penwith Moors:

- Carn Galver, SW4236, September 2001, Barbara Benfield.
- Rosewall Hill, SW486394, 27/04/2008, BLS & Peter Lambley, on rock
- Trencom Hill, SW517360, 27/04/2008, BLS & Peter Lambley, on rock

In 2013 *Parmelinopsis minarum* was found widely at Trencom Hill, Rosewall Hill and Carn Galver at 43 separate locations (**Maps 19 – 21**):

Parmelinopsis minarum Trencom Hill

Site	Grid Reference	Altitude	Population	Habitat	Threats
TH001	SW51784 36030	145m	15 thalli	SE & NE facing	
TH002	SW51786 36049	150m	Abundant	NE facing	Ivy
TH003	SW51798 36110	150m	2 thalli	NE facing	
TH007	SW51865 36107	160m	4 thalli	S & N facing	
TH008	SW51878 36111	160m	2 thalli	S facing	Bramble
TH009	SW51881 36125	165m	Frequent	NE facing	
TH011	SW51881 36100	150m	A. small thalli	E facing	
TH012	SW51882 36093	150m	3 small thalli	SE facing	T. Oak
TH013	SW51759 36139	165m	5 + thalli	E facing & <i>Ulex</i>	
TH014	SW51759 36139	165m	c5 thalli,	N crevice	
TH015	SW51777 36280	170m	2 thalli	Open slab	
TH016	SW51747 36261	170m	19 thalli	E crevice	Ivy
TH017	SW51731 36265	170m	2 thalli	Open slab	Ivy
TH018	SW51726 36270	165m	6 thalli	Open slab, SW facing	Ivy
TH019	SW51738 36271	170m	Frequent	Crevice	
TH020	SW51758 36319	170m	7 thalli	Crevice	
TH023	SW51644 36321	155m	Abundant	N & SW Crevice	
TH024	SW51684 36203	155m	Small amount	Crevice	
TH027	SW51802 36236	180m	Frequent	NE facing	
TH028	SW51808 36232	180m	4 thalli	NE facing	

Parmelinopsis minarum Rosewall Hill

Site	Grid Reference	Altitude	Population	Habitat	Threats
RW001	SW48772 39365	205m	Frequent	N crevice	
RW004	SW48743 39329	215m	Abundant	Crevice	
RW005	SW48800 39196	230m	1 thallus	NE crevice	
RW006	SW48801 39190	235m	Abundant	E facing	
RW009	SW48783 39178	230m	Rare	SE crevice	

RW012	SW49176	39100	220m	Abundant	NE & E crevice
RW013	SW49181	39084	220m	Abundant	E facing
RW014	SW49507	39342	190m	Occasional	NE facing
RW015	SW49499	39325	205m	Frequent	E facing

***Parmelinopsis minarum* Carn Galver**

Site	Grid Reference	Altitude	Population	Habitat	Threats
CG004	SW42479	36412	210m	Small amount	Crevice
CG005	SW42539	36415	225m	Frequent	NE facing
CG006	SW42547	36431	225m	1 thallus	E facing
CG008	SW42564	36398	235m	Frequent	E facing
CG009	SW 42566	36392	235m	3 thalli	N facing
CG010	SW42576	36383	230m	Abundant	Crevice
CG012	SW42595	36310	225m	Abundant	NE & E facing
CG014	SW42723	36088	245m	6 thalli	SE facing
CG016	SW42719	36047	240m	Abundant	Crevice
CG019	SW42766	36071	240m	Frequent	Crevice
CG020	SW42783	36044	250m	Occasional	N facing
CG022	SW42795	36014	250m	1 thallus	SW crevice
CG027	SW42801	36004	250m	Occasional	E & SW facing
CG035	SW42536	36415	215m	Occasional	Crevice

The species is less strictly confined to north or north east facing rocks or inside crevices on tors and rock jumbles than *Parmelinopsis horrescens* NT (NS/IR).

Although frequent in these habitats, it can also occur on south facing rocks in full sun, although it is uncommon in this situation. It typically grows with other mainly tree leafy lichens especially *Flavoparmelia caperata* and *Hypotrachyna afrorevoluta* the woodland oceanic crust forming lichens *Lecanora alboflavida* and *Mycoblastus caesius* along with typical rock lichens. It is often found with *Parmelinopsis horrescens* NT (NS/IR) but is more frequent over all than this species, especially on Trencrom and Rosewall Hills. It appears that *Parmelinopsis minarum* has a wider niche than *Parmelinopsis horrescens* and is more tolerant of strong sunshine and deep shade. The frequency with which it was found in the 2013 survey suggests that *Parmelinopsis minarum* is likely to occur at most large rock outcrops on the West Penwith Moors. At Trencrom Hill and Carn Galver several sites were threatened by Ivy or Bramble due to a lack of positive habitat management such as grazing. The mainly grazed Rosewall Hill was in better condition.

Associated Species	No of Occurrences
<i>Acarospora fuscata</i>	3
<i>Anaptychia runcinata</i>	1
<i>Aspicilia caesiocinerea</i>	1
<i>Cladonia polydactyla</i> var. <i>polydactyla</i>	1
<i>Cladonia subcervicornis</i>	3
<i>Flavoparmelia caperata</i>	18
<i>Fuscidea cyathoides</i> var. <i>cyathoides</i>	2
<i>Hypogymnia physodes</i>	1
<i>Hypotrachyna afrorevoluta</i>	20
<i>Hypotrachyna revoluta</i> s. str.	2
<i>Lecanora alboflavida</i>	5

<i>Lecanora gangaleoides</i>	2
<i>Lecanora polytropia</i>	3
<i>Lecanora rupicola</i> var. <i>rupicola</i>	1
<i>Lepraria caesioalba</i>	2
<i>Melanelixia fuliginosa</i>	7
<i>Micarea viridileprosa</i>	2
<i>Mycoblastus caesius</i>	7
<i>Opegrapha saxigena</i>	1
<i>Parmelia omphalodes</i>	5
<i>Parmelia saxatilis</i>	14
<i>Parmelinopsis horrescens</i>	17
<i>Parmotrema perlatum</i>	2
<i>Parmotrema reticulatum</i>	1
<i>Pertusaria corallina</i>	1
<i>Pertusaria excludens</i>	1
<i>Pertusaria pseudocorallina</i>	2
<i>Platismatia glauca</i>	1
<i>Porpidia cinereoatra</i>	1
<i>Ramalina siliquosa</i>	3
<i>Ramalina subfarinacea</i>	2
<i>Rinodina atrocinerea</i>	1
<i>Sphaerophorus globosus</i>	1
<i>Usnea flammea</i>	11
<i>Xanthoparmelia conspersa</i>	3
<i>Xanthoparmelia verruculifera</i>	1

Bold = Other systematically recorded species

Pertusaria monogona Notable (NS): a crust forming southern coastal rock lichen. Most records are from the Lizard, Isles of Silly and West Penwith, with very few records, beyond in Wales and Western Scotland, some rather doubtful. A southern Atlantic species in Europe. It is a species of well lit vertical rocks. It is very similar to the more widespread *Pertusaria excludens*, but this species has soralia arising from wide low warts and rarely has apothecia. When present, apothecia are poorly formed and lack spores. *Pertusaria monogona* in contrast, lacks soralia and is abundantly fertile with the black disk veiled by white pruina and a raised thalline exciple (see **Photo Galver 2013-03**). There are many records from the coastal cliffs of West Penwith but few for the West Penwith Moors (BLS data, NBN website). There are four records from three locations the moors of which only one was confirmed by this survey;

- Carn Galver, SW4236, September 2001, Barbara Benfield.
- Rosewall Hill, SW486394, 27/04/2008, BLS & Peter Lambley, on rock
- Trencrom Hill, SW517360, 27/04/2008, BLS & Peter Lambley, on rock
- Lelant - Trencrom Hill, SW5136, 02/04/1972, Peter James

The species was recorded from Rosewall and Trencrom Hills by the BLS on a brief visit looking at both sites in an afternoon (Lambley, 2008). After the 2013 survey, the author has no doubt that these records were for partially fertile *Pertusaria excludens*, which is frequent at both sites but was not recorded by the BLS. More credible is the 1972 record from Trencrom Hill in 1972 by Peter James, suggesting a little true

Pertusaria monogona may have occurred. In 2013 good material of *Pertusaria monogona* was found at four sites on Carn Galver and reasonable material on one rock at Rosewall Hill beyond the area likely to have been visited by the BLS (Maps 22 & 23).

***Pertusaria monogona* Rosewall Hill**

Site	Grid Reference	Altitude	Population	Habitat	Threats
RW008	SW48799 39103	230m	1 thallus	E facing vertical	

***Pertusaria monogona* Carn Galver**

Site	Grid Reference	Altitude	Population	Habitat	Threats
CG001	SW42179 36487	145m	12 thalli	N facing vertical	
CG002	SW42276 36470	165m	1 + thalli	N facing vertical	Ivy
CG003	SW42298 36452	170m	3 thalli	N facing vertical	
CG032	SW42311 36630	120m	3 thalli	SE facing vertical	

All sites were vertical granite faces in open situations. At Carn Galver four sites were found on boulders low on the slope, all with well developed material. The species was completely absent from the higher slopes. With the frequent records from the costal cliffs, this gives the impression that Carn Galver is on the edge of a larger population found below the coast road. The association with *Ochrolechia parella* is interesting, as this species is absent from the higher slopes as well and probably depends on salt spray increasing the pH of the granite to grow here. The Rosewall Hill thallus looked OK for this species but was further inland. The only constantly associated species was the closely related *Pertusaria excludens*, with the next most frequent species, *Fuscidea cyathoides* var. *cyathoides*, reflecting the vertical rock habitat. Ivy is a active threat on the isolated boulders low on Carn Galver, due to under past a lack of positive management such as grazing in the. A potential threat in this area could also be hot wild fires scorching the isolated boulders due to biomass build up resulting the past absence of grazing, controlled burning or other management.

Associated Species	No of Occurrences
<i>Flavoparmelia caperata</i>	1
<i>Fuscidea cyathoides</i> var. <i>cyathoides</i>	3
<i>Lecanora gangaleoides</i>	2
<i>Lecanora polytropa</i>	2
<i>Melanelixia fuliginosa</i>	1
<i>Ochrolechia androgyna</i>	1
<i>Ochrolechia parella</i>	2
<i>Parmelia omphalodes</i>	3
<i>Parmelia saxatilis</i>	1
<i>Pertusaria corallina</i>	1
<i>Pertusaria excludens</i>	5
<i>Pertusaria pseudocorallina</i>	1
<i>Ramalina siliquosa</i>	3

Ramalina chondrina Vulnerable (NR): a shrubby lichen with pendent cylindrical and thread like branches resembling an *Usnea* or *Alectoria*. It typically grows entangled amongst *Ramalina cuspidata* and *Ramalina siliquosa* on sea cliffs in the grey zone. The lichen has a very restricted in distribution in Britain, being confined to the

Isles of Scilly, where it is described as “not uncommon locally on exposed, steep north to north west facing, granite cliffs” (Smith et al, 2009) with two records for West Penwith given in the BLS data (NBN website). It is a southern Atlantic species occurring from south west Ireland to Madeira. The West Penwith records are a 1975 record from the sea cliffs at Land's End and from the West Penwith Moors:

- Carn Galver, the west facing side of the north outcrop, SW4236, September 2001, Barbara Benfield.

Barbara Benfield supplied the author with a photograph of the site (**Benfield 2001–02**) but also expressed strong reservations about this record. The overhang was located (CG035, **Map 27**) but nothing resembling *Ramalina chondrina* was found. All that was present was light starved *Ramalina siliquosa* with UV + white fluorescence from the medulla (*Ramalina chondrina* is UV–). This record of *Ramalina chondrina* was discounted by agreement with Barbara Benfield and the author. The habitat in any case is wrong, this is a rare species of the grey zone on sea cliffs, not sites some way inland from the sea.

Usnea esperantiana (Near Threatened, NS/IR): a shrubby lichen found in sheltered locations on twigs. In 2006 dot maps, this species is shown as a Nationally Rare species largely confined to the south west. The 2014 BLS data on the NBN website shows a very different situation, however, with the species frequent in the south west with occasional records in Wales and western Scotland. The author understands that part of the reason is that earlier records had recorded *Usnea esperantiana* as *Usnea glabrescens*. The species is never very frequent where it is found, but seems widespread and under no threat. It is likely to lose its Near Threatened status in the next review. To date the species only appears to have been recorded from twigs but in 2013 it was found on a rock at Trencrom Hill, apparently new to the West Penwith Moors (**Map 24**).

Usnea esperantiana Trencrom Hill

Site	Grid Reference	Altitude	Population	Habitat	Threats
TH024	SW51684 36203	155m	4 thalli	SW facing rock	

A small colony was found on a single rock. The species is also likely to occur on thorn scrub elsewhere on the edges of the moors.

Associated Species	No of Occurrences
<i>Hypotrachyna afrorevoluta</i>	1
<i>Hypotrachyna revoluta</i>	1
<i>Parmelia omphalodes</i>	1
<i>Parmelinopsis horrescens</i>	1

Bold = Other systematically recorded species

3.2 Sites

3.2.1 Trencrom Hill

Trencrom Hill was found to consist of long abandoned heathland, with dense and nearly impenetrable Bracken – Bramble (NVC W25) dominating the site. With considerable effort (and lacerations) all the main tors were reached but only a

selection of large boulders were reached (**Map 2**). More unrecorded lichen interest will exist on the larger rocks not reached. There was no heathland lichens surviving at all, but the granite outcrops supported rich and varied rock assemblages. Records of *Bryoria* species indicate that there had been an interest mossy slab edge assemblage but this appears to have been lost entirely along with *Bryoria bicolor* Nb (NS), not seen since 1972. Species of thinner wet moss on slabs are still present including *Cladonia cyathomorpha* Nb (NS) and *Stereocaulon evolutum*.

The rock assemblage was still of considerable interest with a varied granite assemblage including some inland records for maritime species including *Lecanora praepostera* Nb (NS) and *Rhizocarpon richardii*. Although the rock species are varied assemblage of crust forming typical rock lichens, the main tranche of rare and scarce species are all oceanic species, which are more typical of trees. These include large population of the leafy species *Parmelinopsis horrescens* NT (NS/IR) and *Parmelinopsis minarum* Nb (NS/S8) and rare occurrences of the crust forming *Lecanora alboflavida* Nb (NS) and the shrubby *Usnea esperantiana* NT (NR NS/IR). An oceanic and mainly epiphytic lichen recorded from the hill in 1972, *Hypotrachyna endochlora* Nb (NS) was not refound in 2013.

The 2013 survey recorded 23 locations with rare or scarce lichens, which were found mainly on tors and large boulders, although one small boulder of interest (TH003) was found (**Map 28**). Of these six (26%) were directly threatened by shade from Ivy, Bramble or invading Turkey Oak, due to the long term lack of positive habitat management such as grazing on the hill. This is a higher percentage than found on the less neglected Carn Galver, and unlike at Carn Galver entire rocks had disappeared under Ivy in places. Potentially many vulnerable populations of rare or scarce lichens had been lost already. Another threat could be from hot wild fires scorching the rocks resulting from biomass build up from the lack of grazing or controlled burns. Wildfires have occurred as can be seen in the aerial photograph supplied by NE. The larger tors are likely to offer some protection from fire but smaller rocks are vulnerable.

3.2.2 Rosewall Hill

The bulk of Rosewall Hill was well grazed by sheep and ponies and was an interesting contrast to the ungrazed sites. The rocks were much more accessible and all sizable rocks and tors in the grazed area could be easily accessed (**Map 3**). There were ungrazed areas to the east and west, where some large tors were sampled but the issues of difficult of access found at other sites again impeded survey here. A small area of lichen rich wet heath was located but this supported no scarce species.

The rocks were not as frequent as at the other sites, but where they occurred supported a similar assemblage. Some scarce species were recorded on the edges of damp slabs on peat banks and moss: *Cladonia callosa* Nb (NS) and *Micarea xanthonica* Nb (NS/IR). The main interest was on the tors, with a single thallus of the costal southern species *Pertusaria monogona* Nb (NS) and three normally epiphytic woodland species *Lecanora alboflavida* Nb (NS), *Parmelinopsis horrescens* NT (NS/IR) and *Parmelinopsis minarum* Nb (NS/S8), the latter two with sizable populations.

The 2013 survey recorded 12 locations with rare or scarce lichens, which were found mainly on tors but with some interest at slab edges (**Map 29**). None of these sites were threatened by Ivy, in contrast to the other rocky ungrazed areas. There is some

Ivy invasion beginning on the eastern ungrazed tor, but the grazed areas are clear. The grazed section of Rosewall Hill is a very good example of how the West Penwith Moors could be managed.

3.2.3 Carn Galver

An impressive rock hill, with boulders on the lower slopes and large tor complexes on the north and south of the summit ridge. Grazing has recently been restored and was beginning to make an impact on the impenetrable overgrown vegetation. Access was still very difficult off paths and the survey represents a transect across the terrain. A lot more lichen interest will be on the hill in areas that could not be reached (**Map 4**). The lower eastern slopes in particular were not reached at all but samples were made of the boulders on the western lower slopes, wet heath and the large tors.

An area of wet heath on the saddle to the south west, supported a rich heathland lichen flora with a strong population of *Cladonia callosa* Nb (NS). The large boulders on the lower slopes supported well developed *Pertusaria monogona* Nb (NS) colonies and the peat edges of slabs more rich heathland *Cladonia* communities. The latter included more *Cladonia callosa* Nb (NS). The richest sites are on the large north and south tor complexes. The rich lichen assemblage here includes two *Cladonia* species of shaded humid locations, *Cladonia azorica* Nb (NS) and *Cladonia cyathomorpha* Nb (NS) and three normally epiphytic woodland species *Lecanora alboflavida* Nb (NS), *Parmelinopsis horrescens* NT (NS/IR) and *Parmelinopsis minarum* Nb (NS/S8), the latter two with sizable populations.

The 2013 survey recorded 34 locations with rare or scarce lichens, which were found mainly on tors but with some interest at slab edges (**Maps 30 & 31**). The interest is concentrated in the tor complex, but the wet heath to the south west and scattered boulders and slabs on the lower slopes also support lichen interest. Of these six (21%) were directly threatened by shade from Ivy or Bramble, due to the lack of positive habitat management grazing on the hill until recently. There may be some current constraints on Ivy as some populations on the summit tors were dying back, which was not seen at Trencrom Hill. Another threat could be from hot wild fires scorching the rocks resulting from biomass build up from the lack of positive habitat management such as grazing until recently or controlled burns.

3.2.4 Leswidden

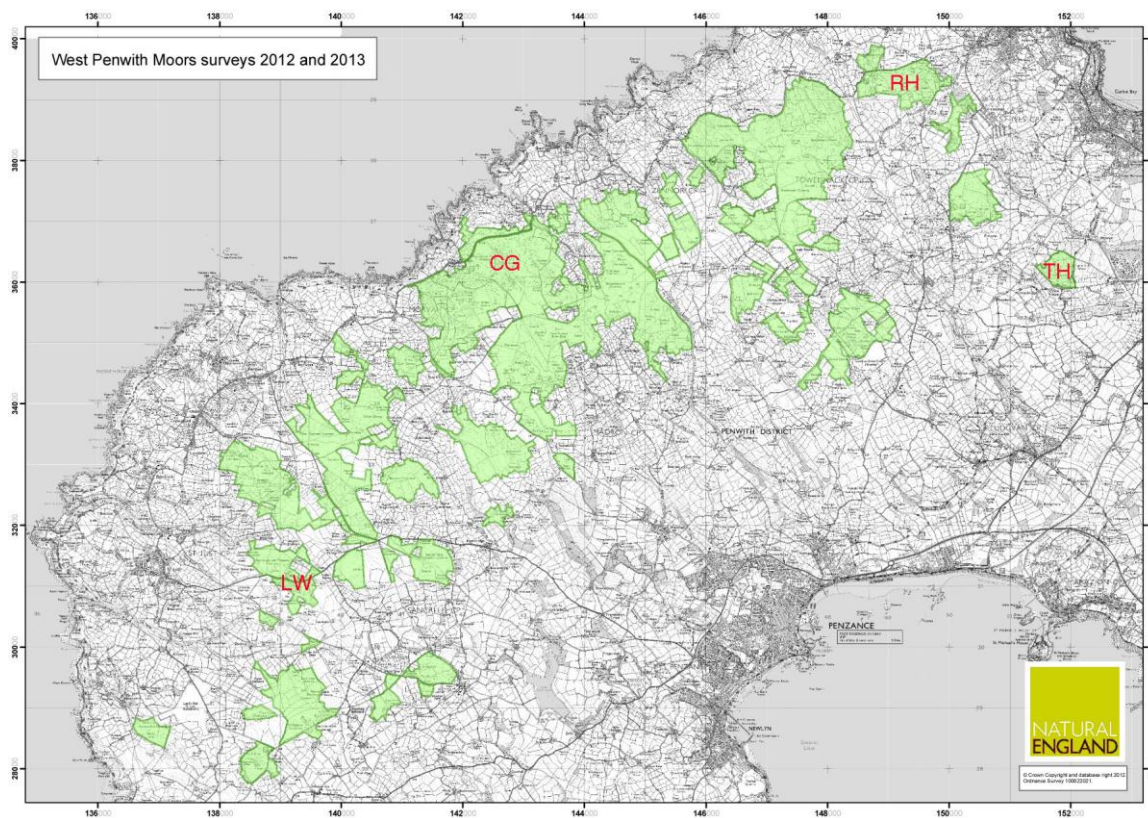
This site is a former china clay quarrying site within ungrazed heathland. Some limited lichen interest had been recorded on open bare quarry waste, but this was overgrown by 2013 due to natural succession. The limited area of still exposed bare banks had only common species. A small area of wet heath was included in the area of search, but this had only a impoverished lichen assemblage. The dry heathland was very overgrown and had no lichens at all. The lichen interest that was found previously, would have been dependant on the gross disturbance of china clay quarrying and was probably lost once the disturbance had stopped.

3.3 Maps

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Rare Lichens, West Penwith Moors

West Penwith, Survey Locations Map 1



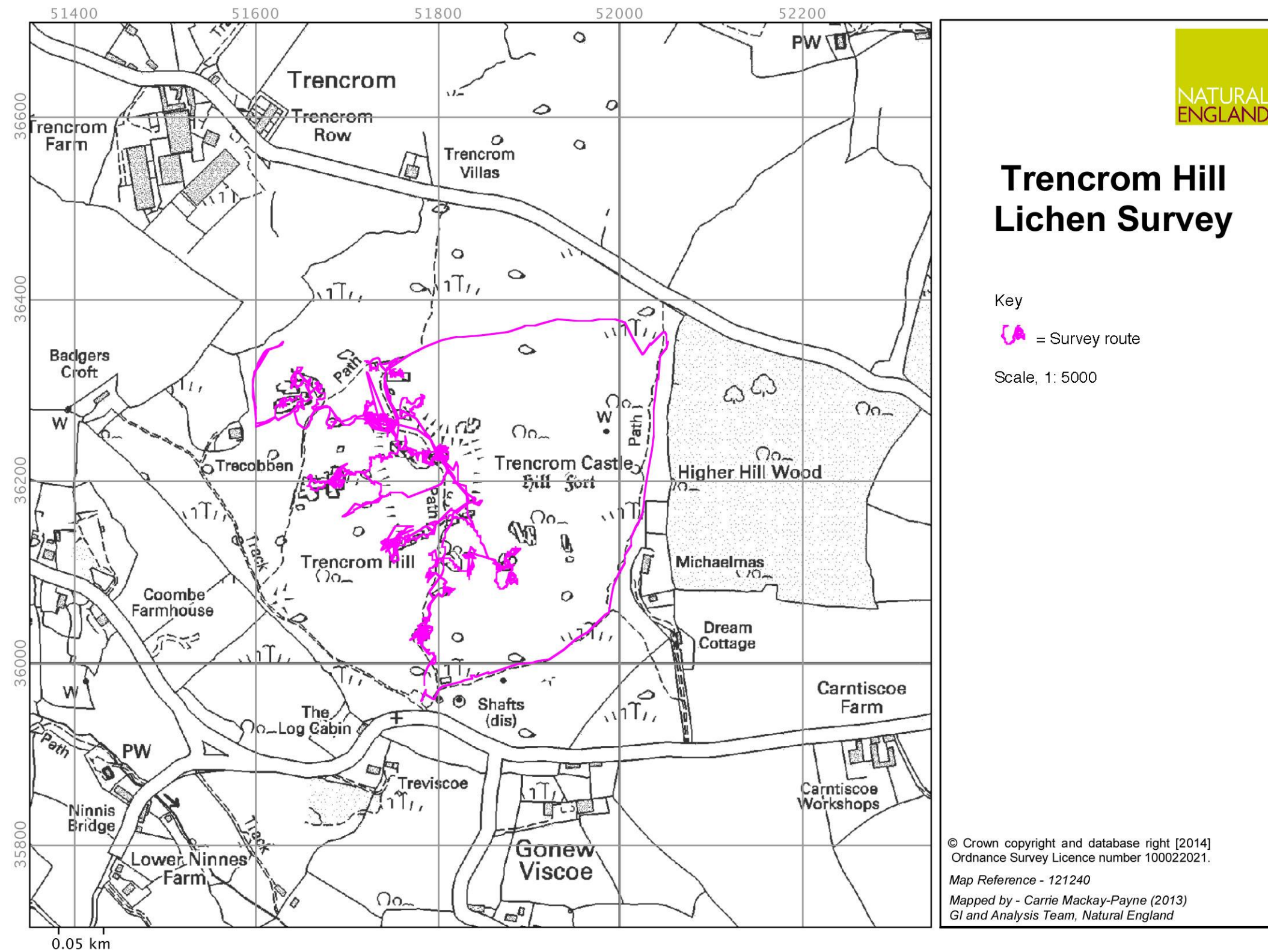
Locations:
TH = Trencrom Hill
RH = Rosewall Hill
CG = Carn Galver
LW = Leswidden

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Rare Lichens, West Penwith Moors

Trencrom Hill, Survey Route

Map 2

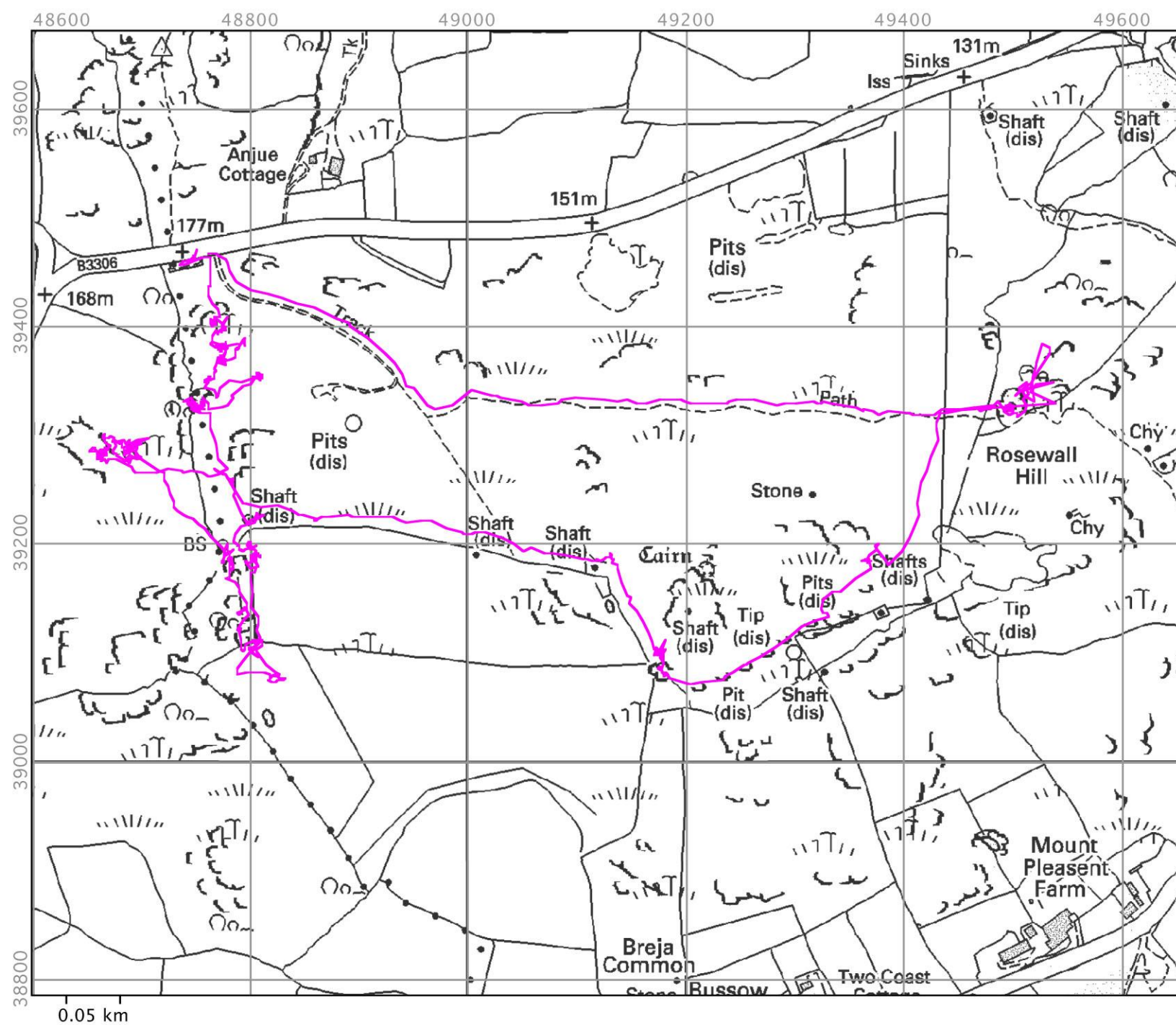


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Rare Lichens, West Penwith Moors

Rosewall Hill, Survey Route


Map 3



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Rosewall Hill Lichen Survey

Key

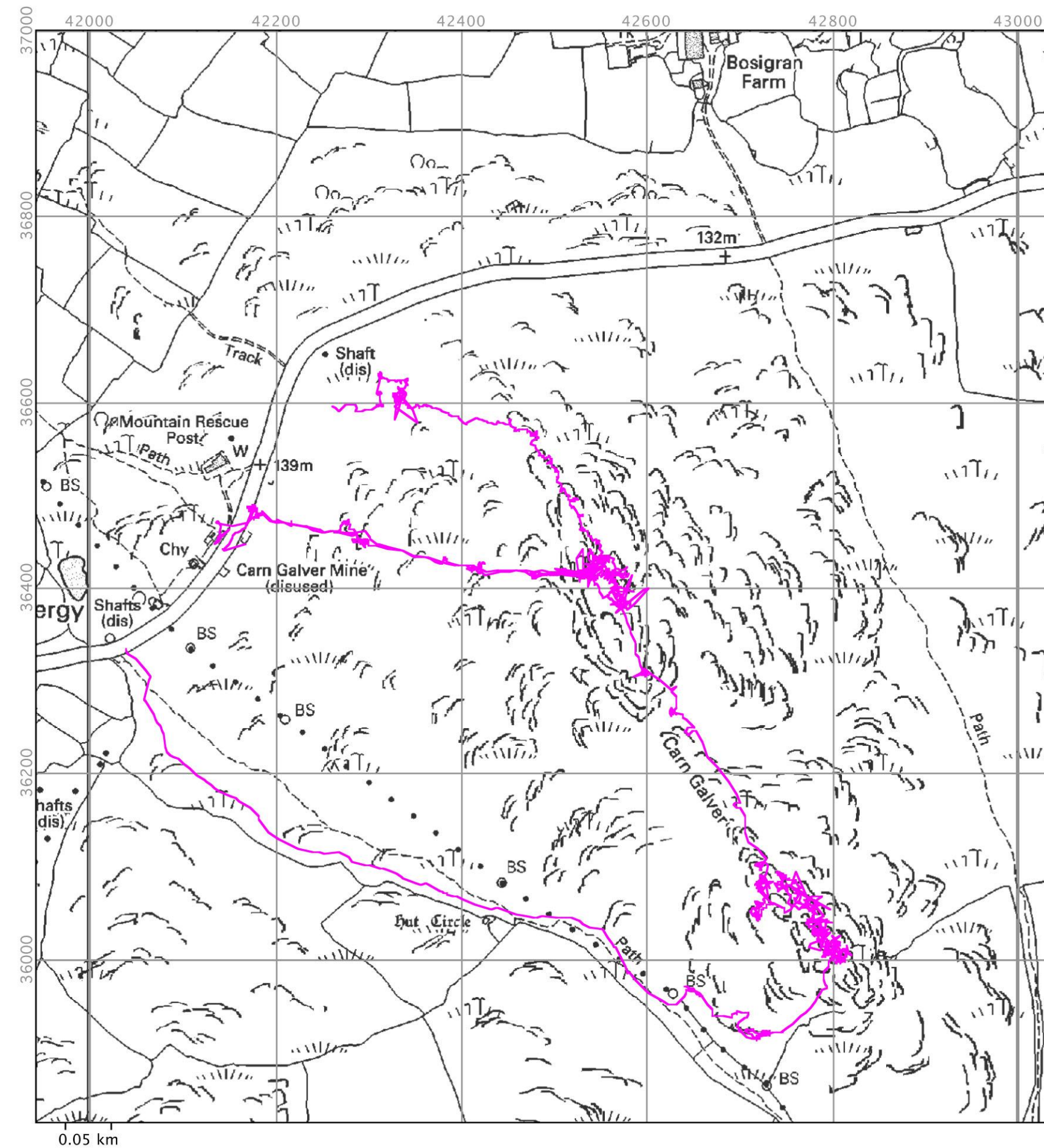
 = Survey route

Scale, 1: 5000

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Map Reference - 121240

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Rare Lichens, West Penwith Moors


Carn Galver, Survey Route

Map 4



Carn Galver Lichen Survey

Key

 = Survey route

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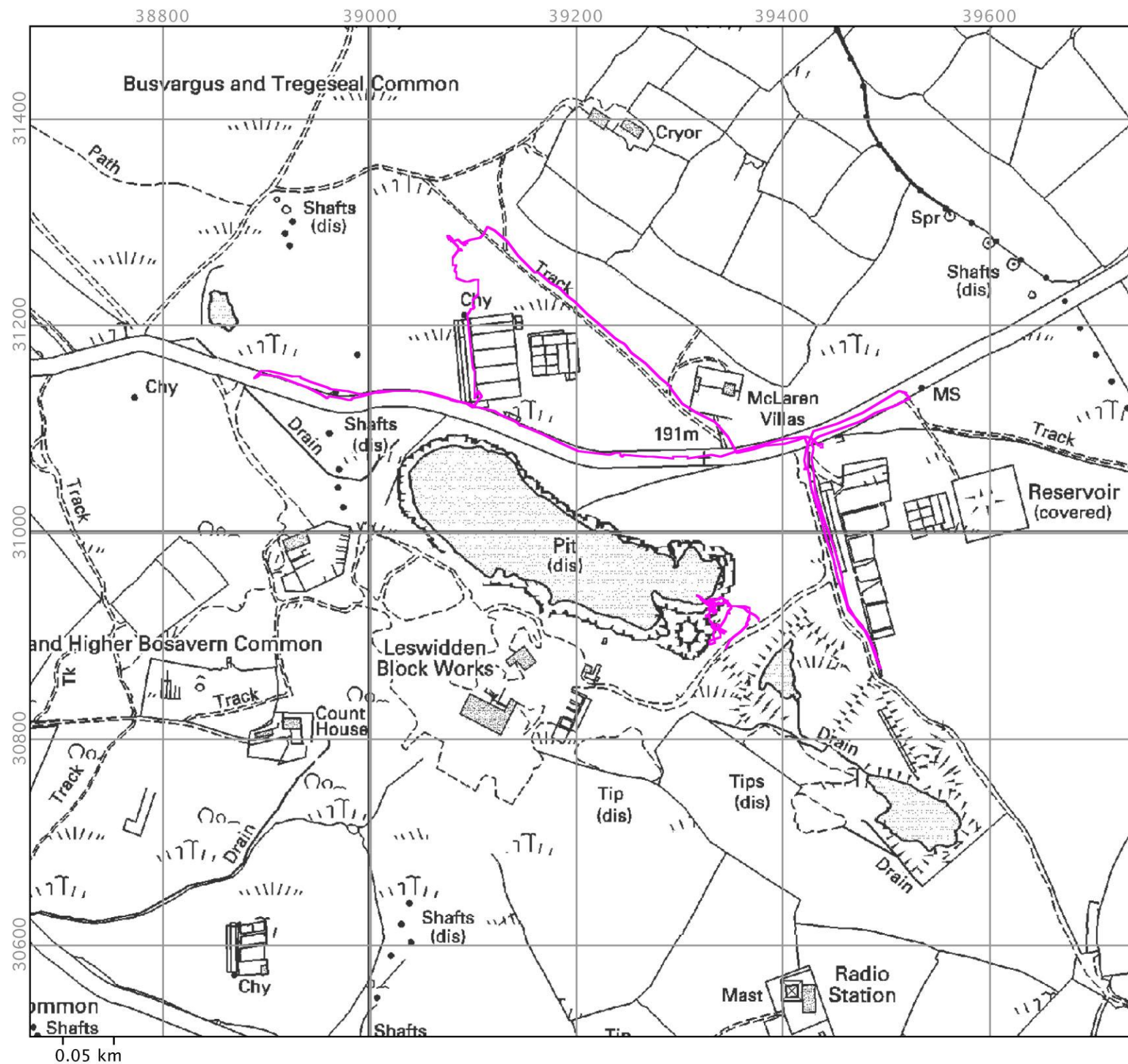
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Rare Lichens, West Penwith Moors

Leswidden, Survey Route

Map 5



Leswidden Lichen Survey

Key

 = Survey route

Scale, 1: 5000

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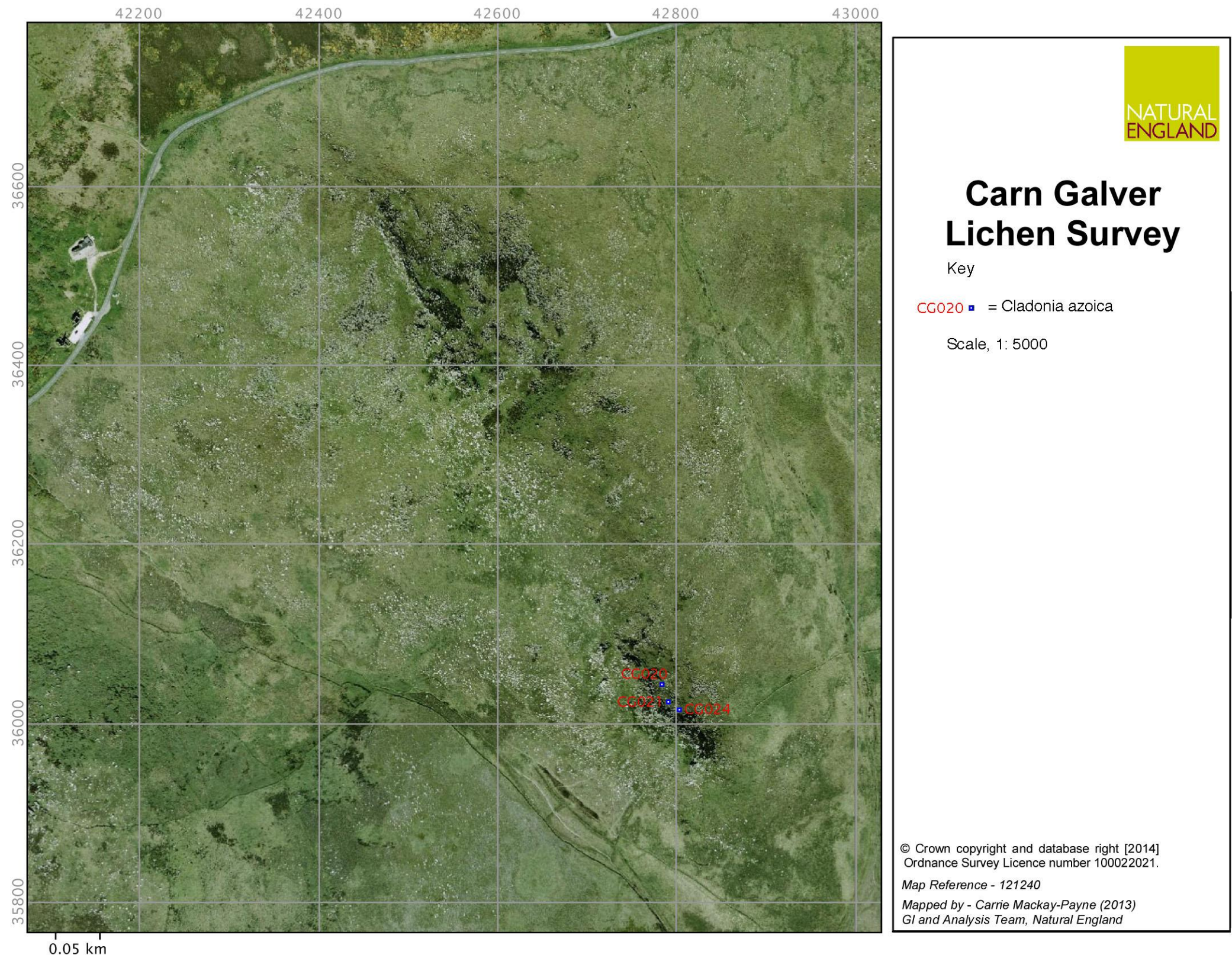
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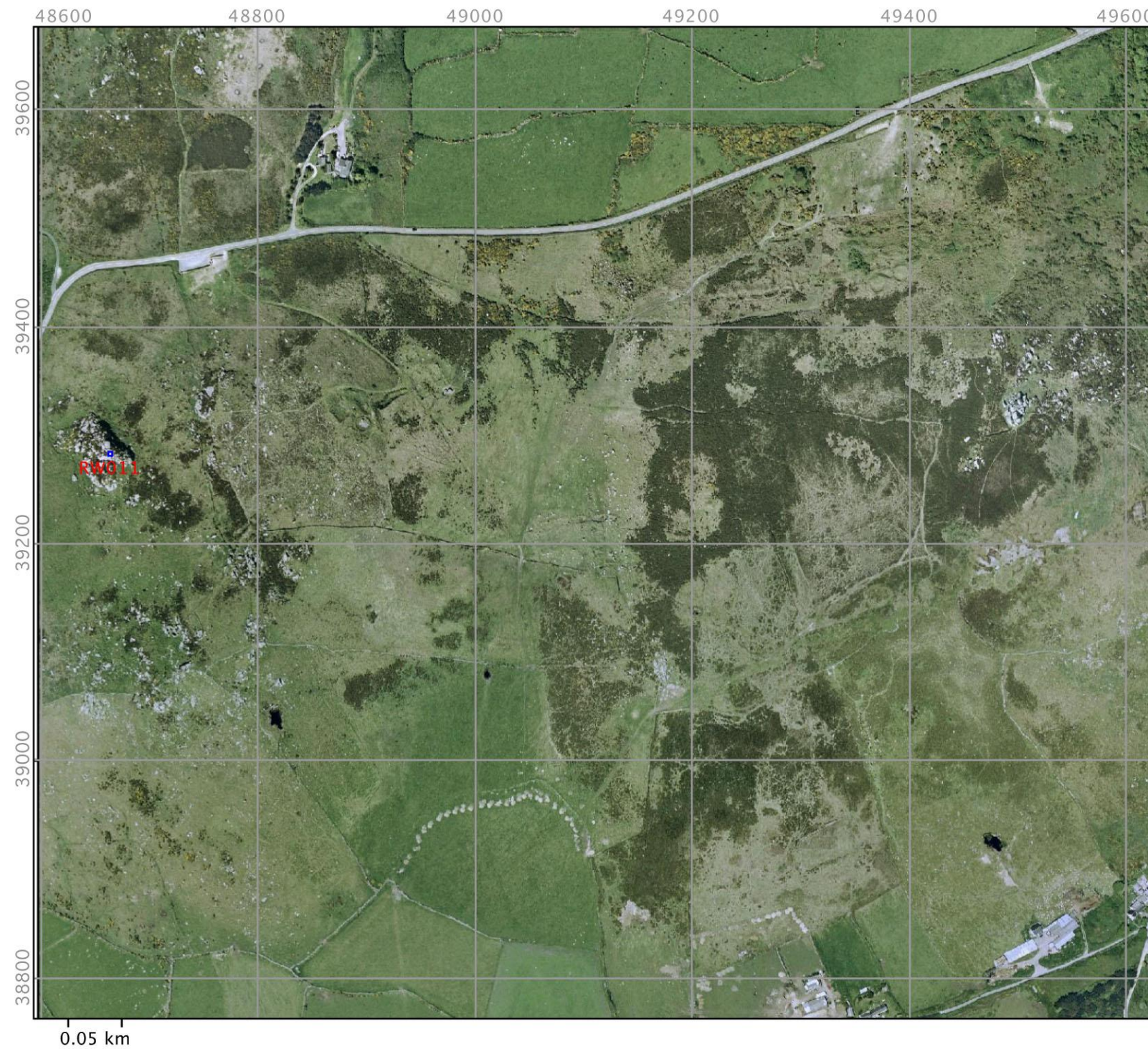
Cladonia azorica, Carn Galver Map 6



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Rare Lichens, West Penwith Moors

Cladonia callosa, Rosewall Hill Map 7



Rosewall Hill Lichen Survey

Key

RW011 ■ = Cladonia callosa

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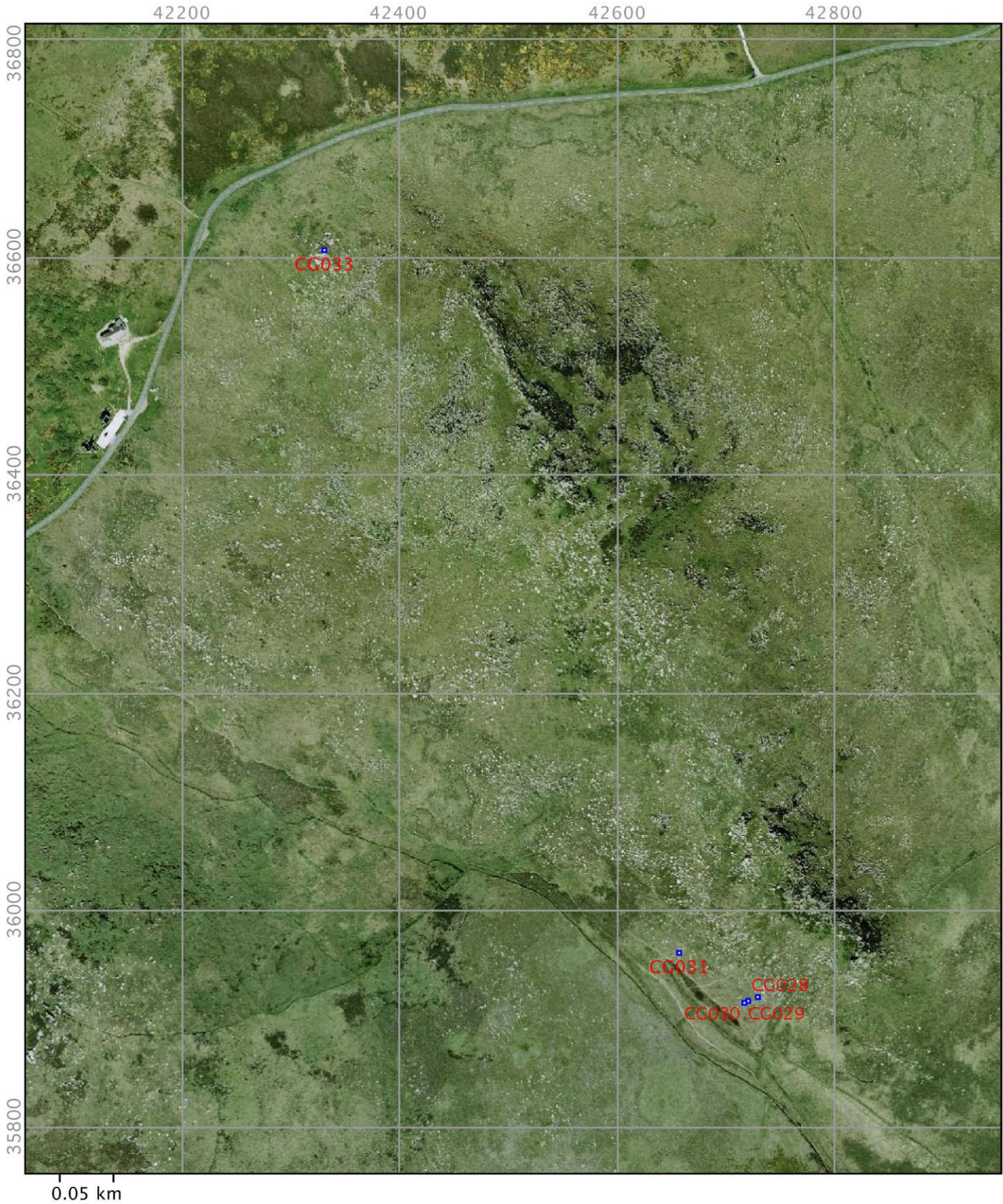
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Rare Lichens, West Penwith Moors

Cladonia callosa, Carn Galver Map 8





Carn Galver Lichen Survey

Key

CG028 ■ = Cladonia callosa

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Rare Lichens, West Penwith Moors

Cladonia cyathomorpha, Trencrom Map 9



Trencrom Hill Lichen Survey

Key

TH021 ■ = Cladonia cyathomorpha

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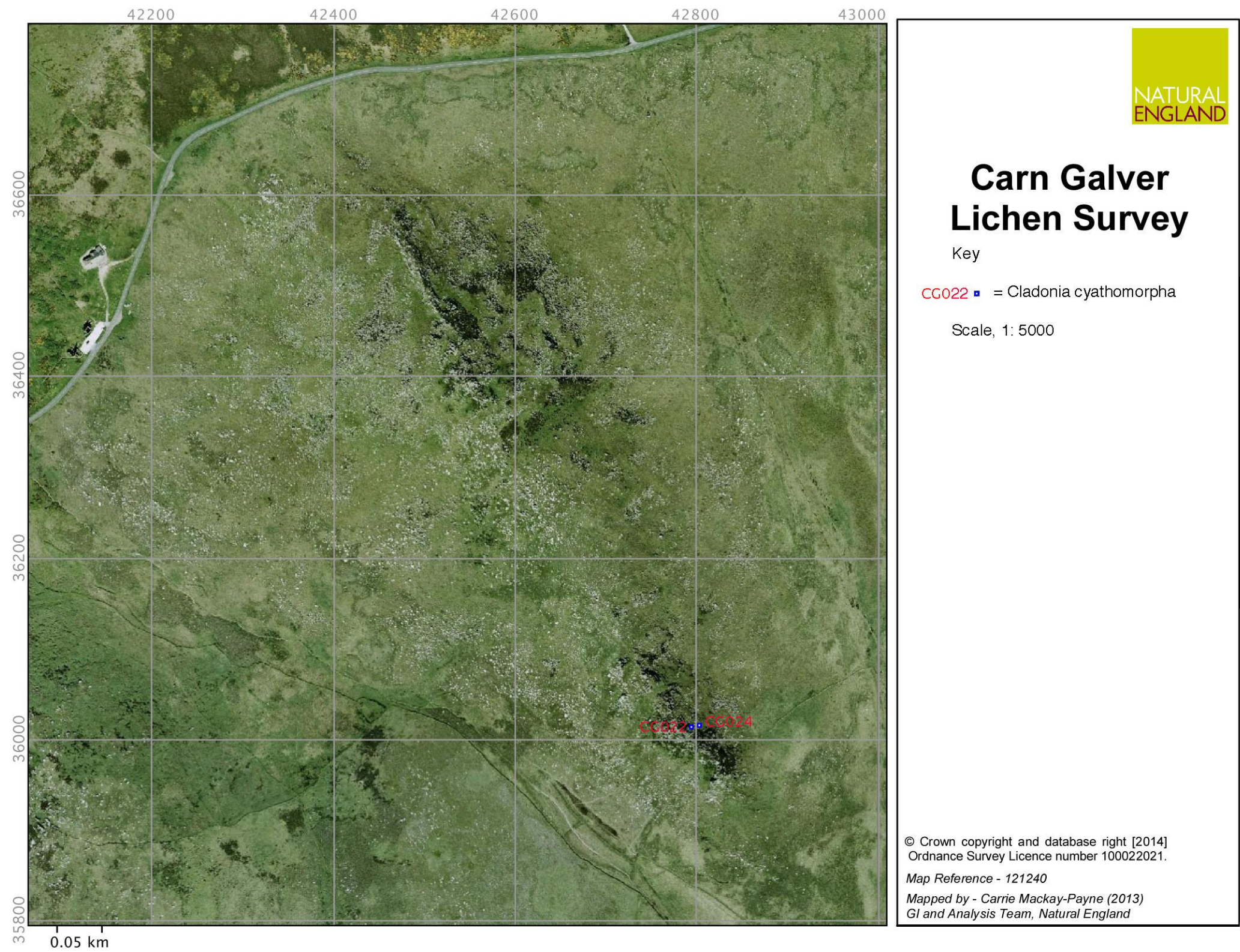
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Rare Lichens, West Penwith Moors

Cladonia cyathomorpha, Galver Map 10



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Rare Lichens, West Penwith Moors

Lecanora alboflavida, Trencrom Hill Map 11



Trencrom Hill Lichen Survey

Key

TH017 ■ = Lecanora alboflavida

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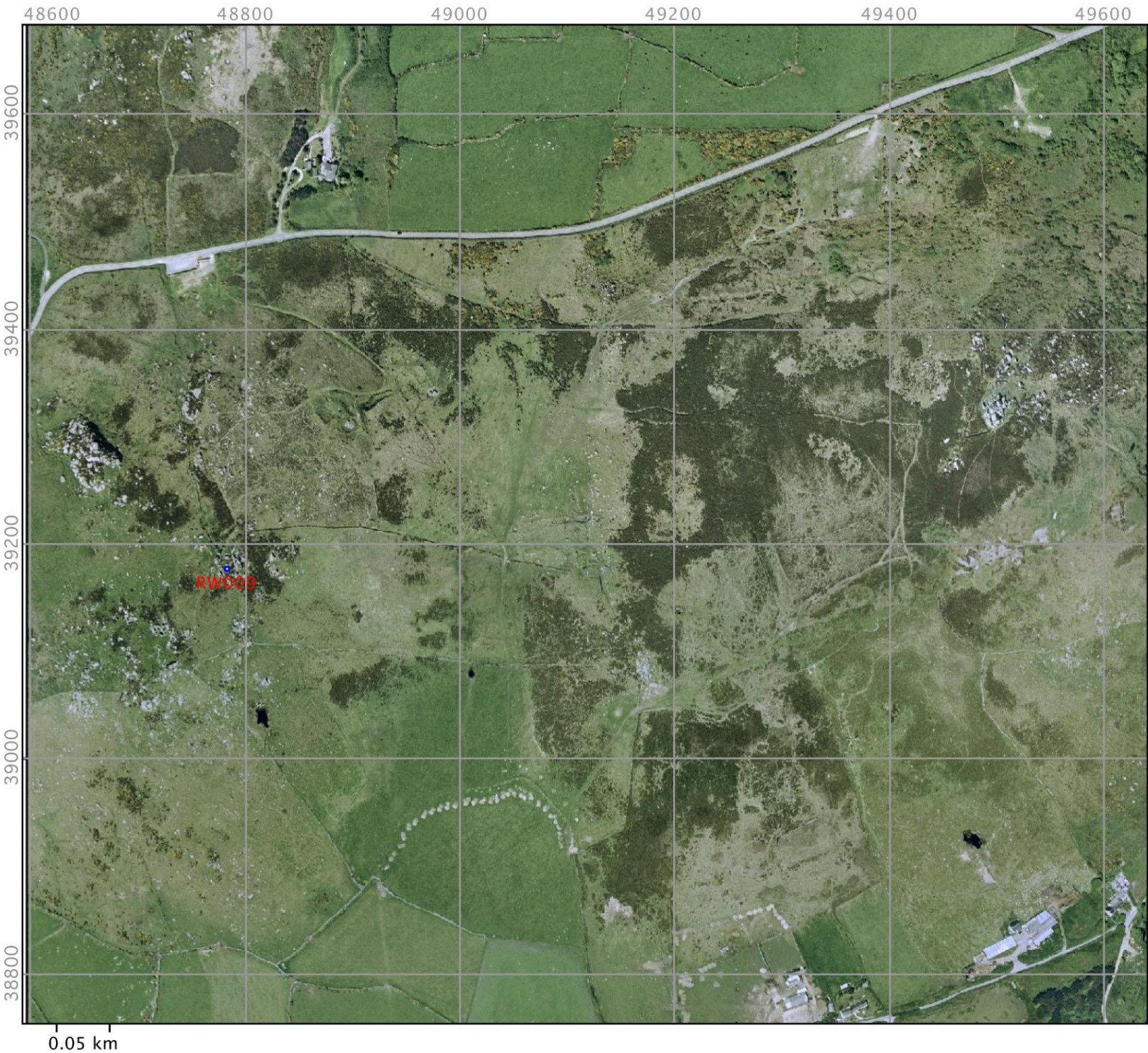
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Rare Lichens, West Penwith Moors

Lecanora alboflavida, Rosewall Hill Map 12



Rosewall Hill
Lichen Survey

Key

RW009 ■ = Lecanora alboflavida

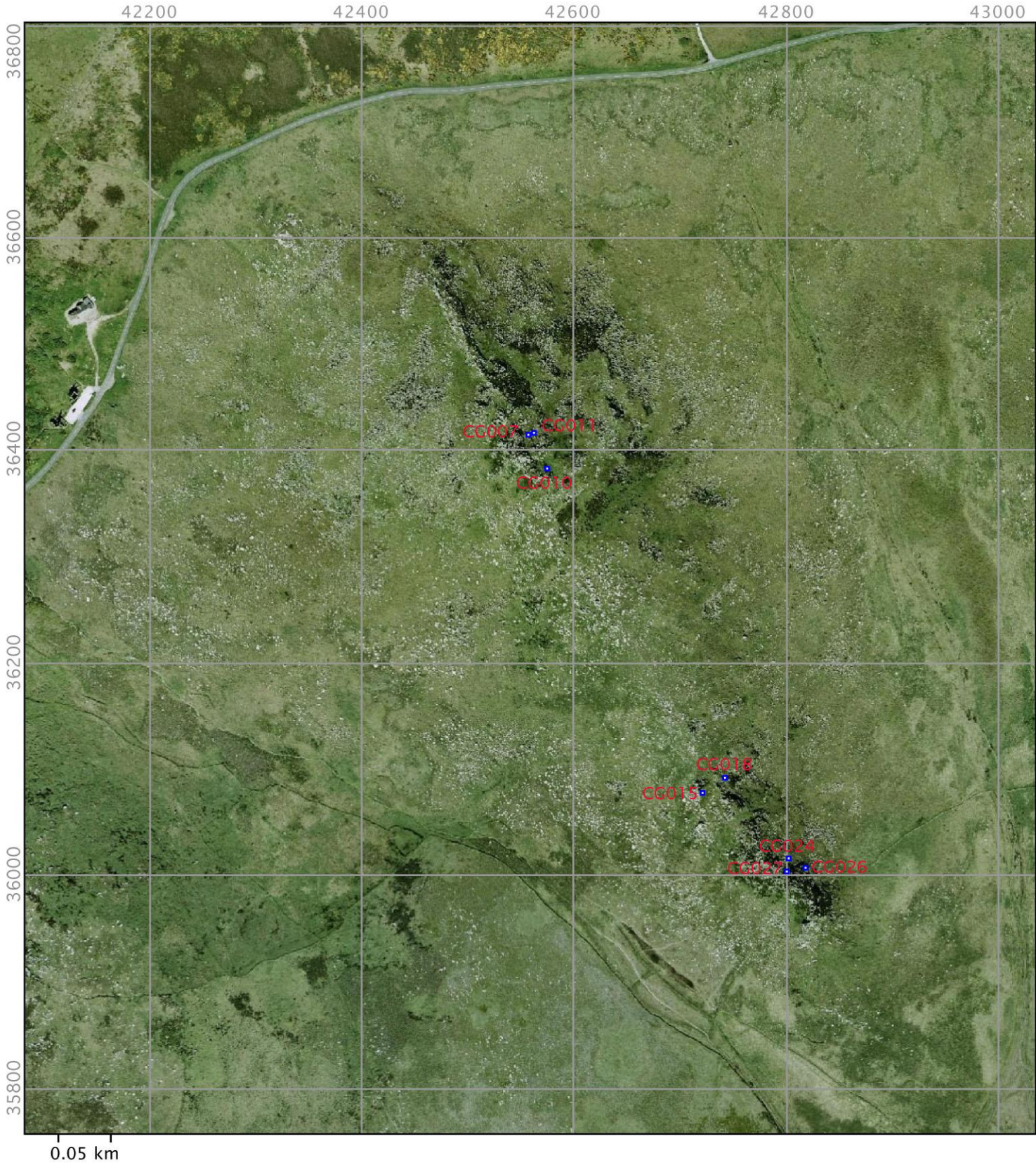
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Rare Lichens, West Penwith Moors

Lecanora alboflavida, Carn Galver Map 13



Carn Galver Lichen Survey

Key

CG007 ■ = Lecanora alboflavida

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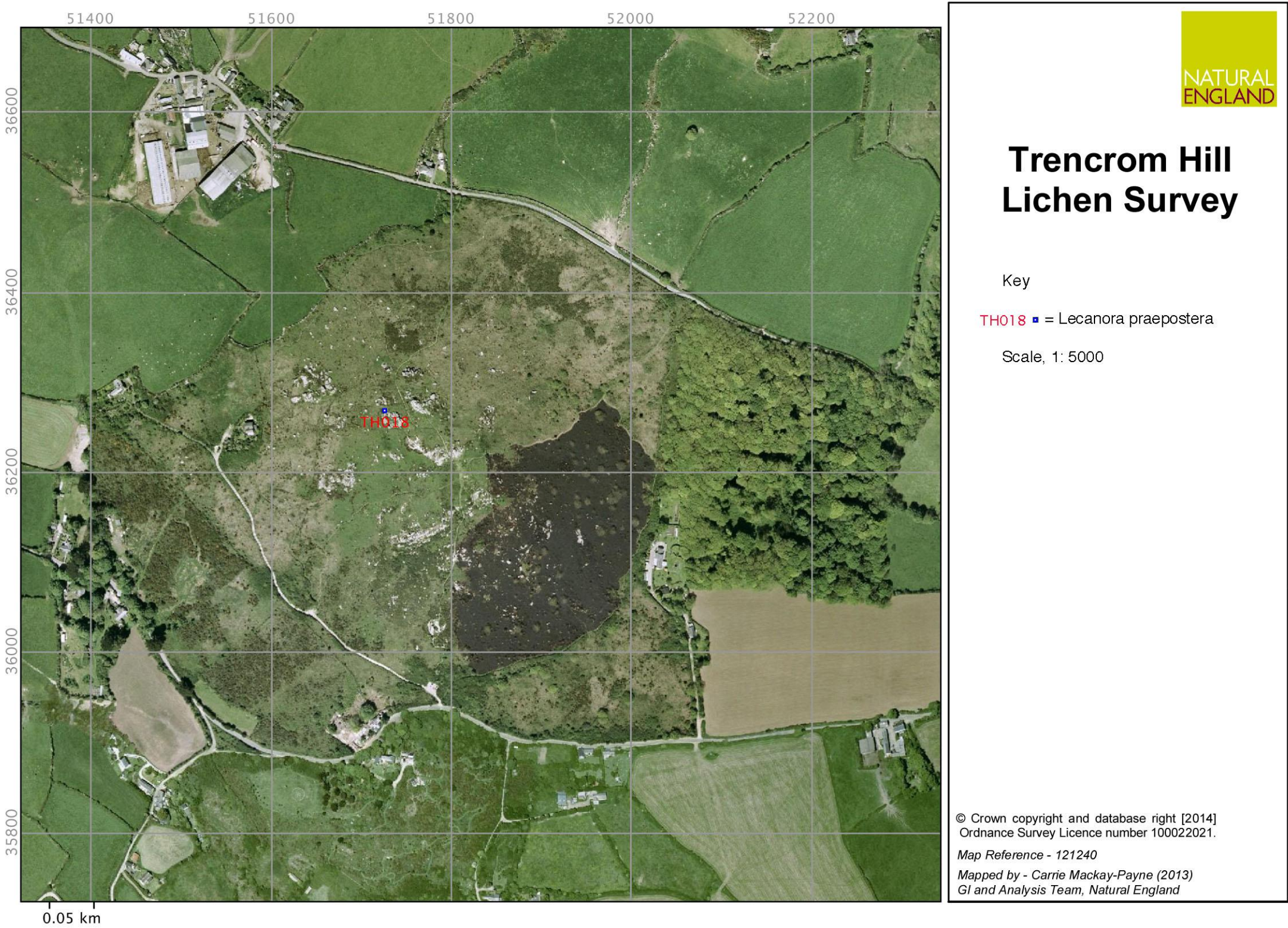
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Rare Lichens, West Penwith Moors

Lecanora praepostera, Trencrom Map 14



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Rare Lichens, West Penwith Moors

Micarea xanthonica, Rosewall Hill Map 15



Rosewall Hill
Lichen Survey

Key

RW003 ■ = *Micarea xanthonica*

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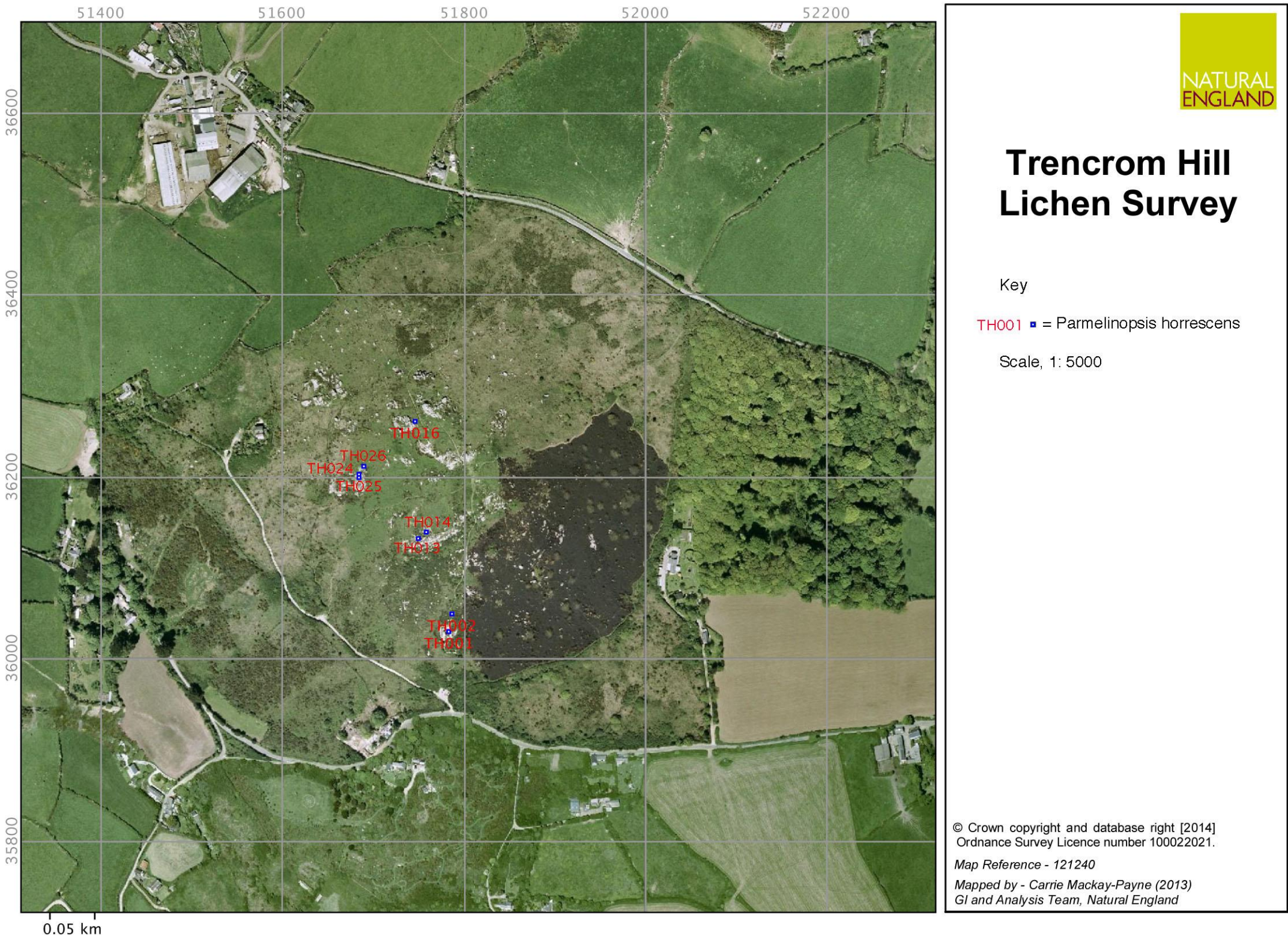
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Rare Lichens, West Penwith Moors

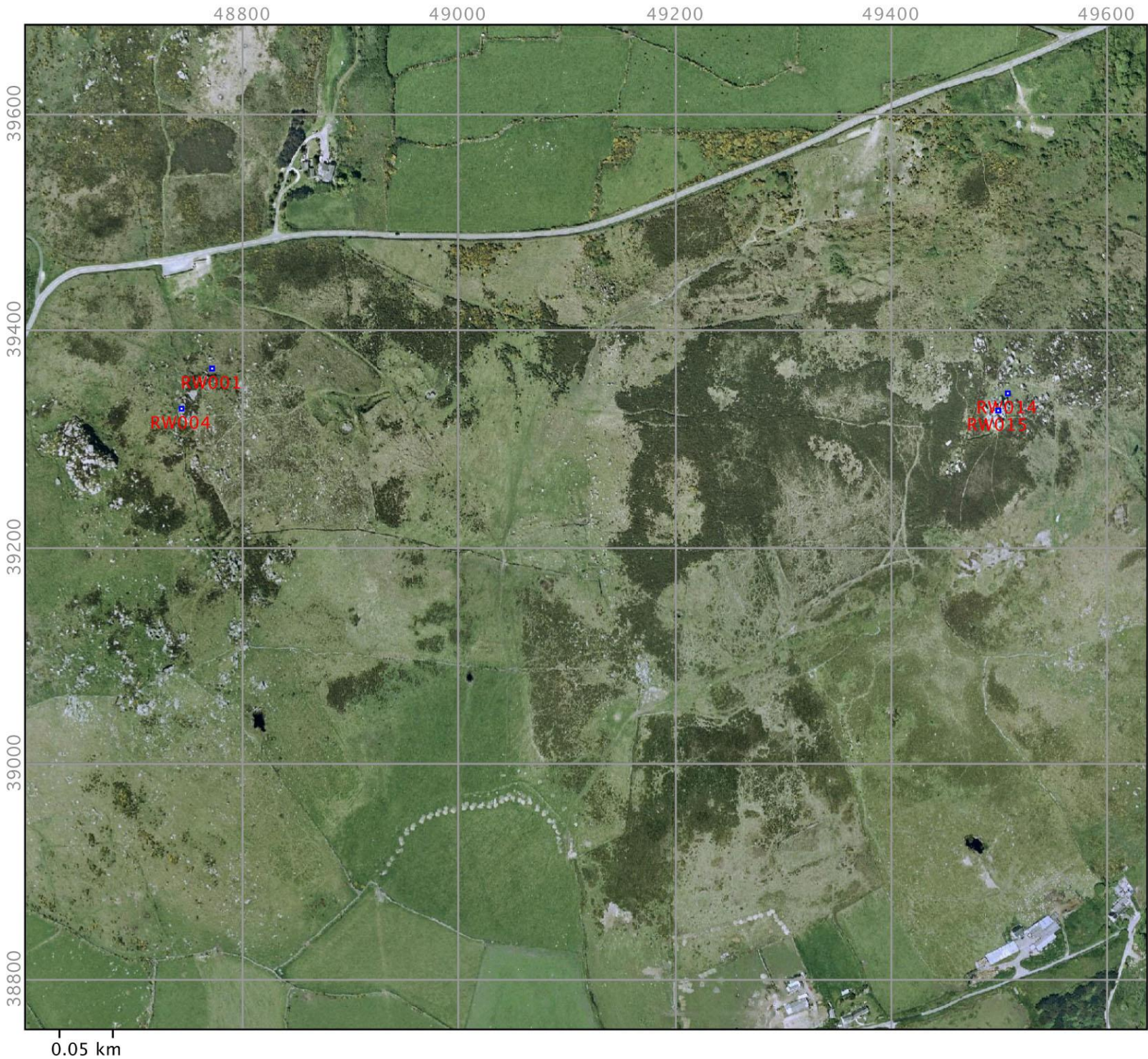
Parmelinopsis horrescens, Trencrom Map 16



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Rare Lichens, West Penwith Moors

Parmelinopsis horrescens, Rosewall Map 17



Rosewall Hill Lichen Survey

Key

RW001 ■ = Parmelinopsis horrescens

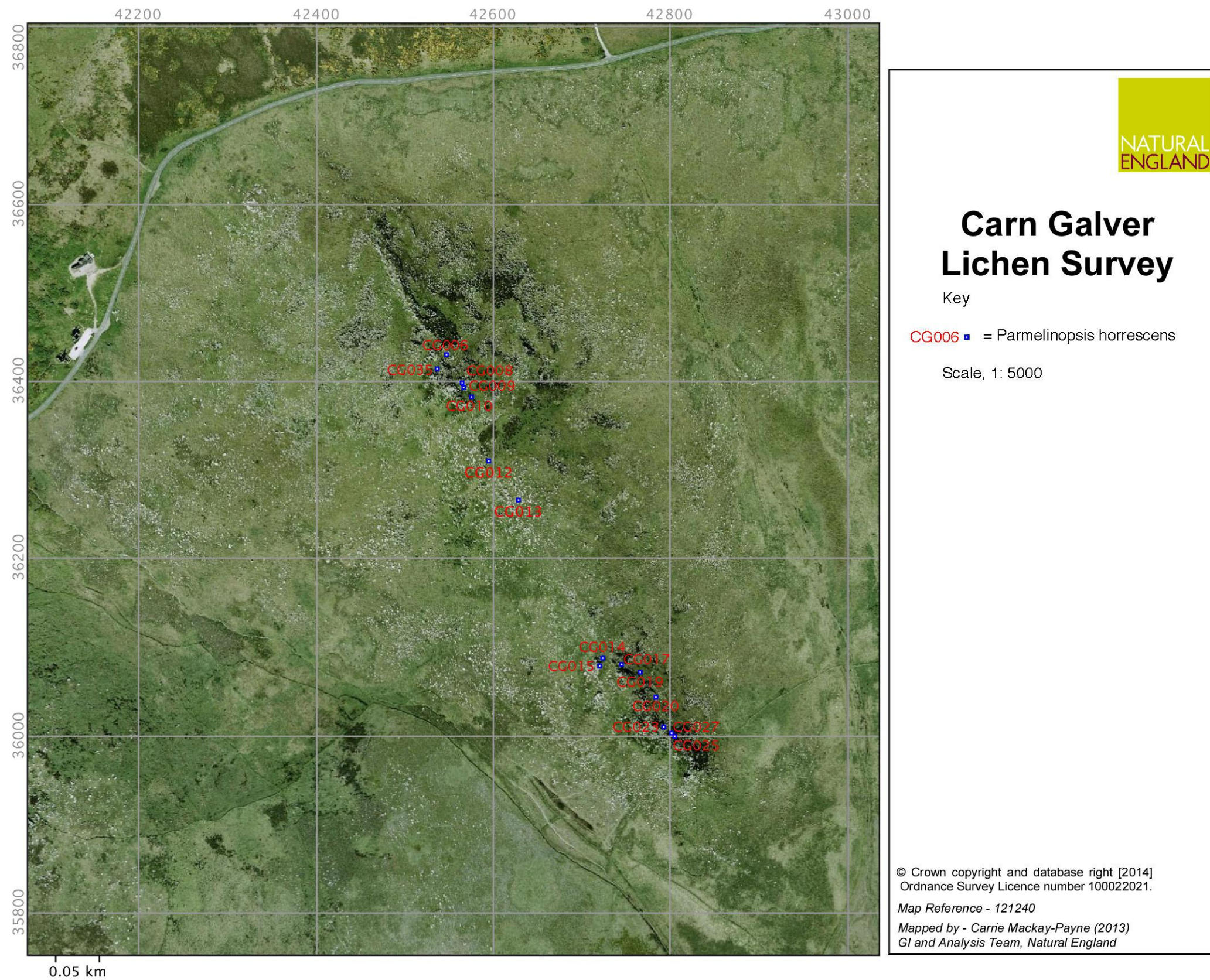
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Rare Lichens, West Penwith Moors

Parmelinopsis horrescens, Galver Map 18




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Rare Lichens, West Penwith Moors

Parmelinopsis minarum, Trencrom Map 19





Trencrom Hill Lichen Survey

Key

TH001 ■ = Parmelinopsis minarum

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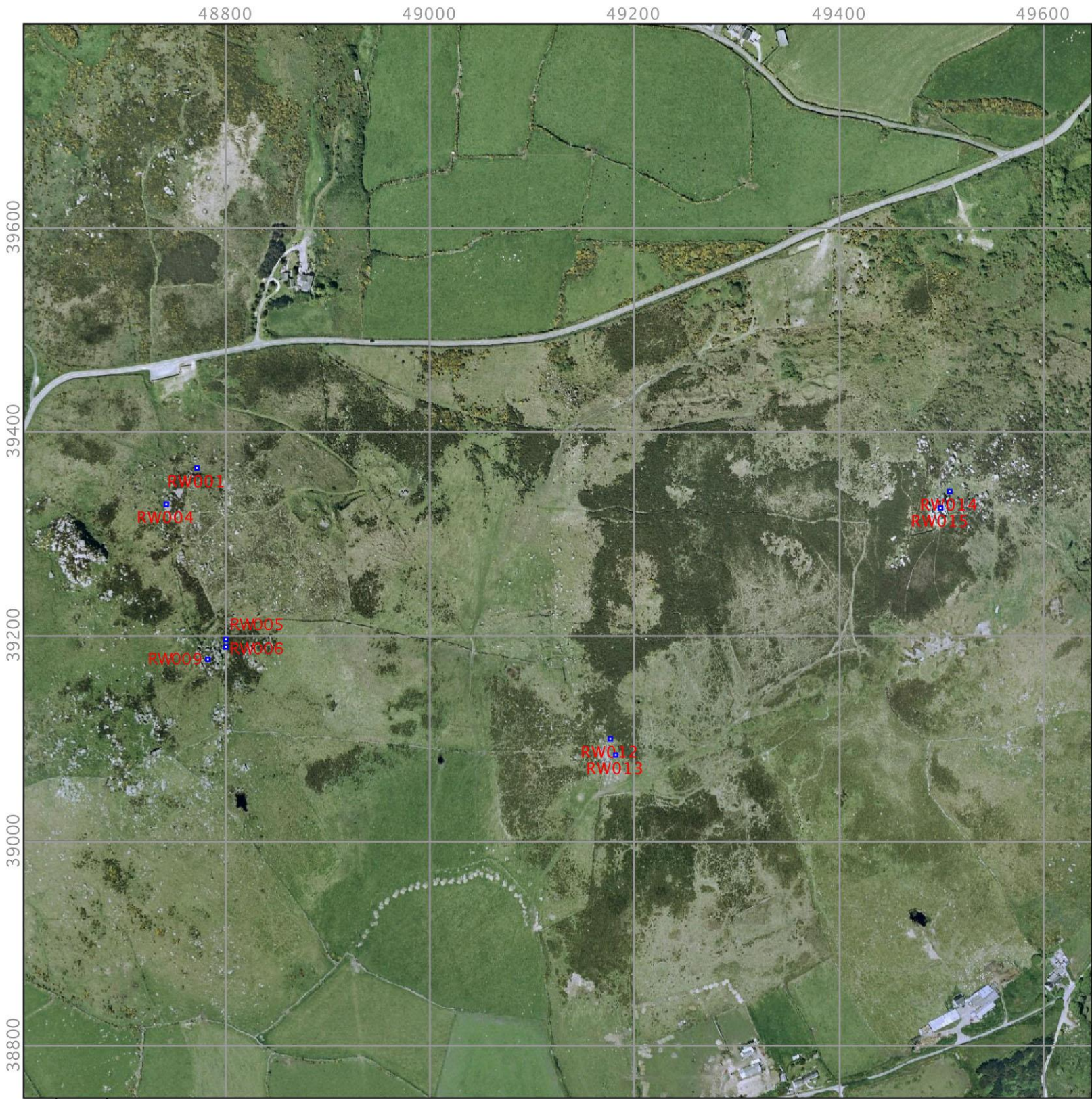
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Rare Lichens, West Penwith Moors

Parmelinopsis minarum, Rosewall Map 20



Rosewall Hill
Lichen Survey

Key

RW001 ■ = Parmelinopsis minarum

Scale, 1: 5000

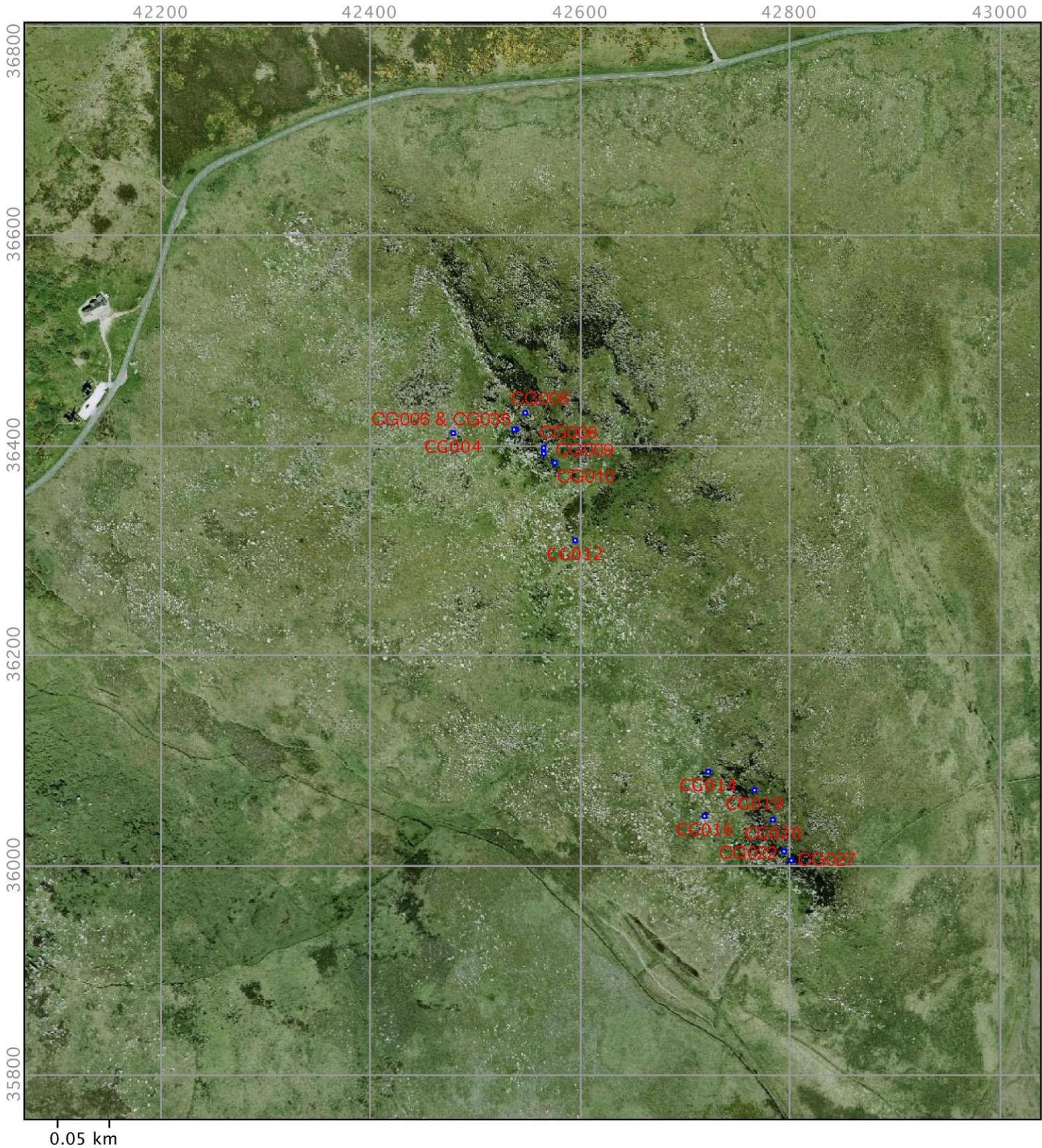
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Map Reference - 121240
Mapped by - Carrie Mackay-Payne (2013)
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3 Green Close, Woodlands, SO40 7HU
023 8029 3671

Rare Lichens, West Penwith Moors

Parmelinopsis minarum, Galver Map 21



Carn Galver Lichen Survey

Key

CG004 ■ = Parmelinopsis minarum

Scale, 1: 5000

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Rare Lichens, West Penwith Moors

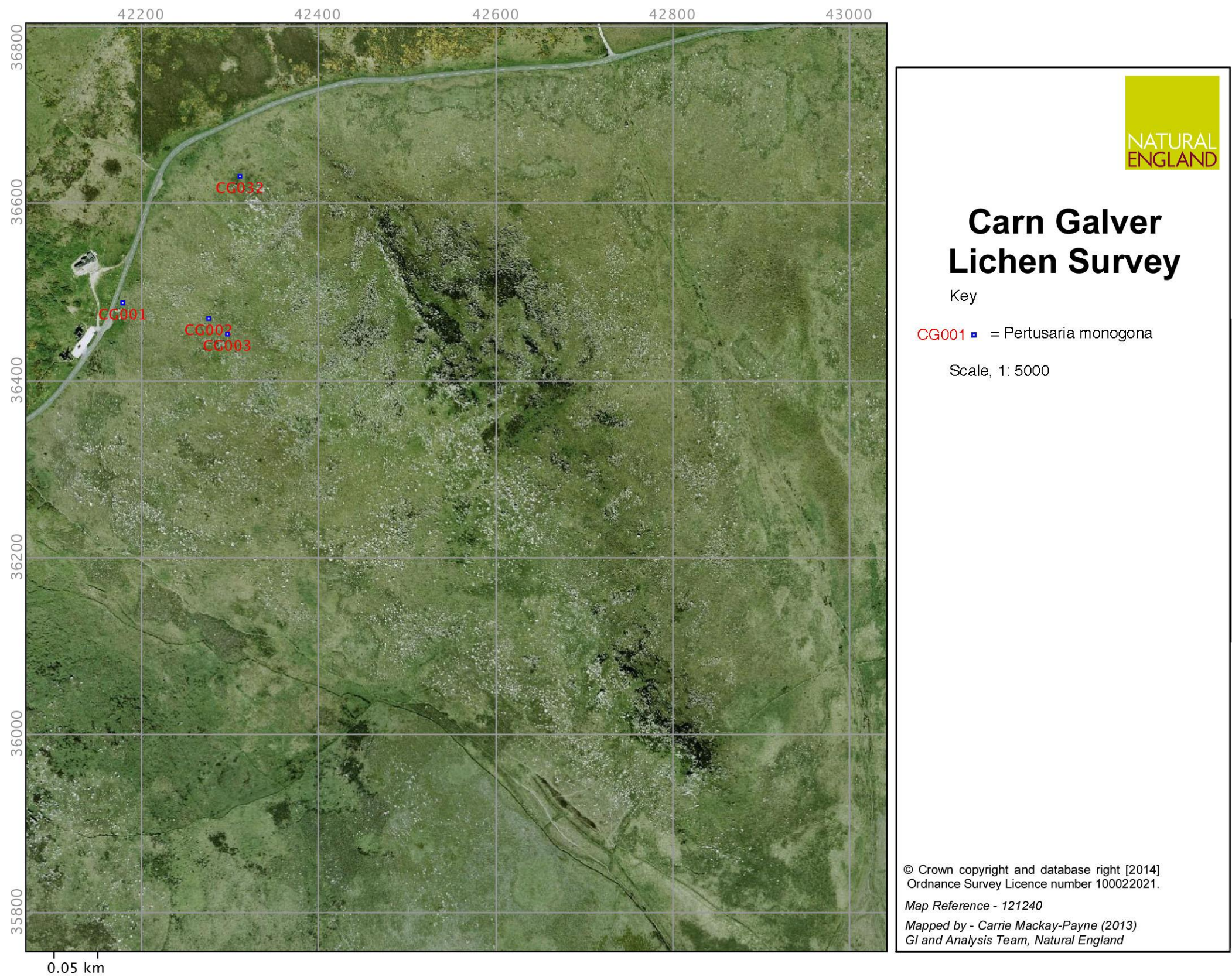
Pertusaria monogona, Rosewall Hill Map 22



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Rare Lichens, West Penwith Moors

Pertusaria monogona, Carn Galver Map 23



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Rare Lichens, West Penwith Moors

Usnea esperantiana, Trencrom Hill Map 24



Trencrom Hill
Lichen Survey

Key

TH024 ■ = Usnea esperantiana

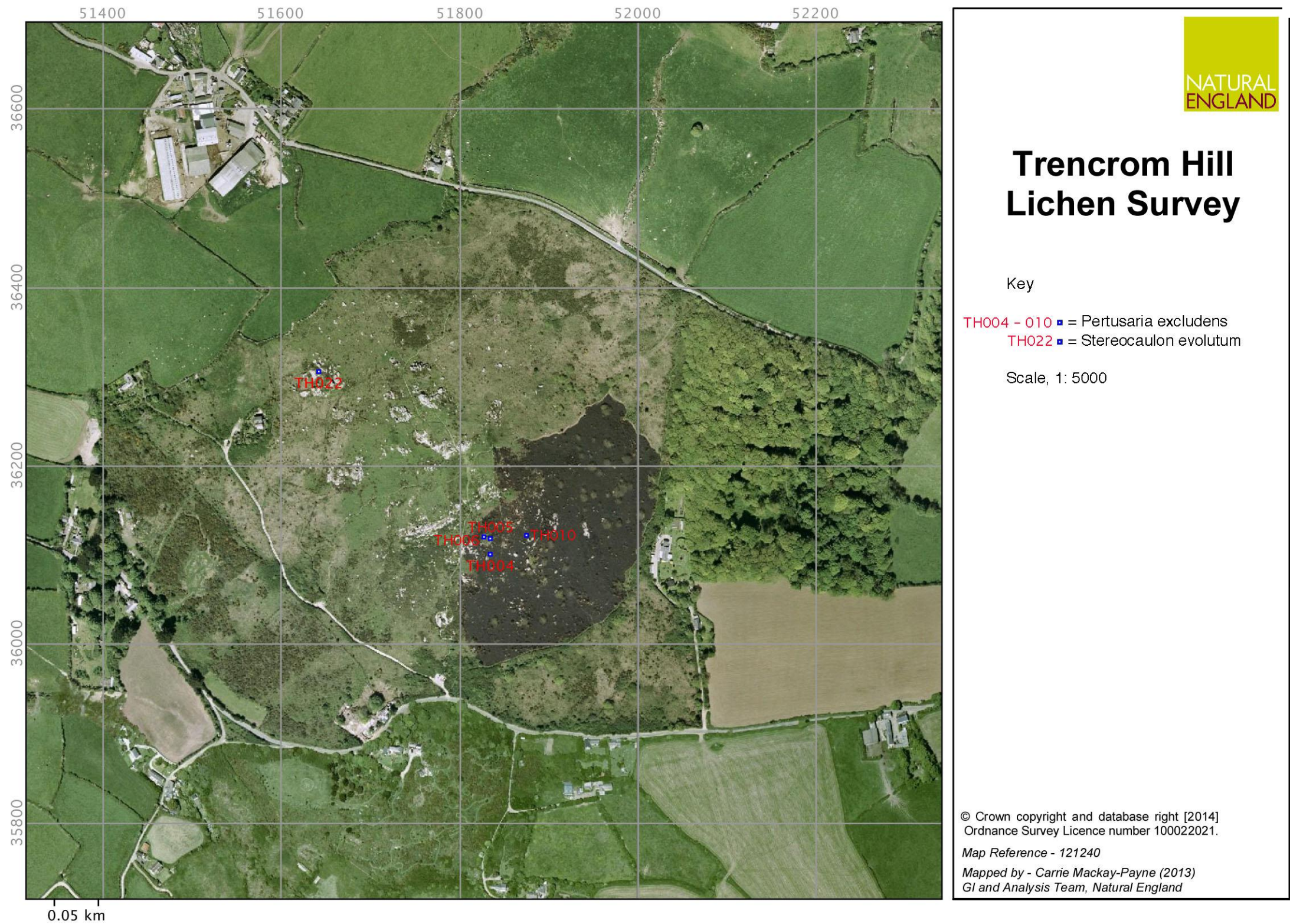
Scale, 1: 5000

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Rare Lichens, West Penwith Moors

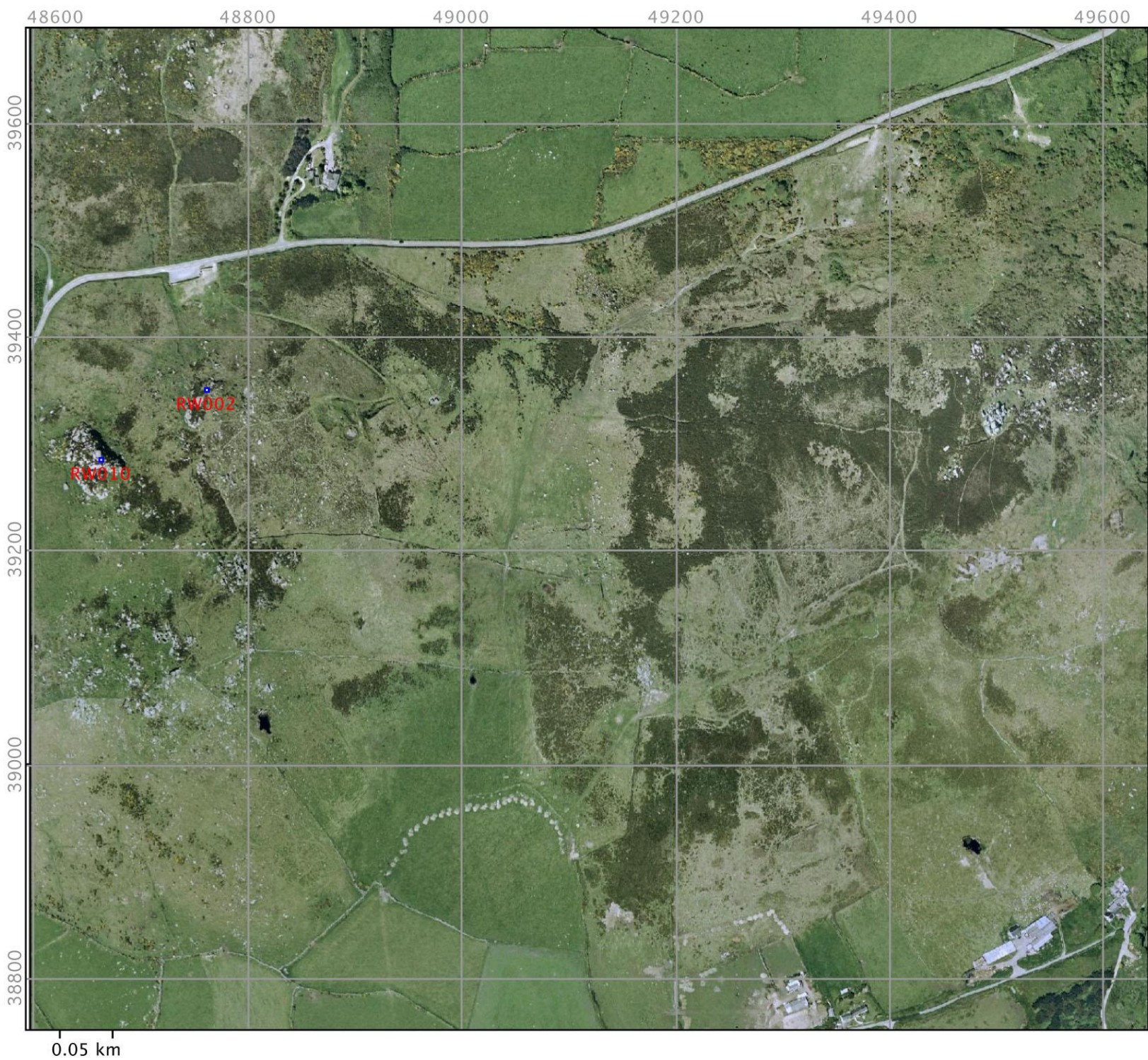
Target Notes, Trencrom Hill Map 25



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Rare Lichens, West Penwith Moors

Target Notes, Rosewall Hill Map 26



Rosewall Hill
Lichen Survey

Key

RW002 & 010 ■ = Stereocaulon evolutum

Scale, 1: 5000

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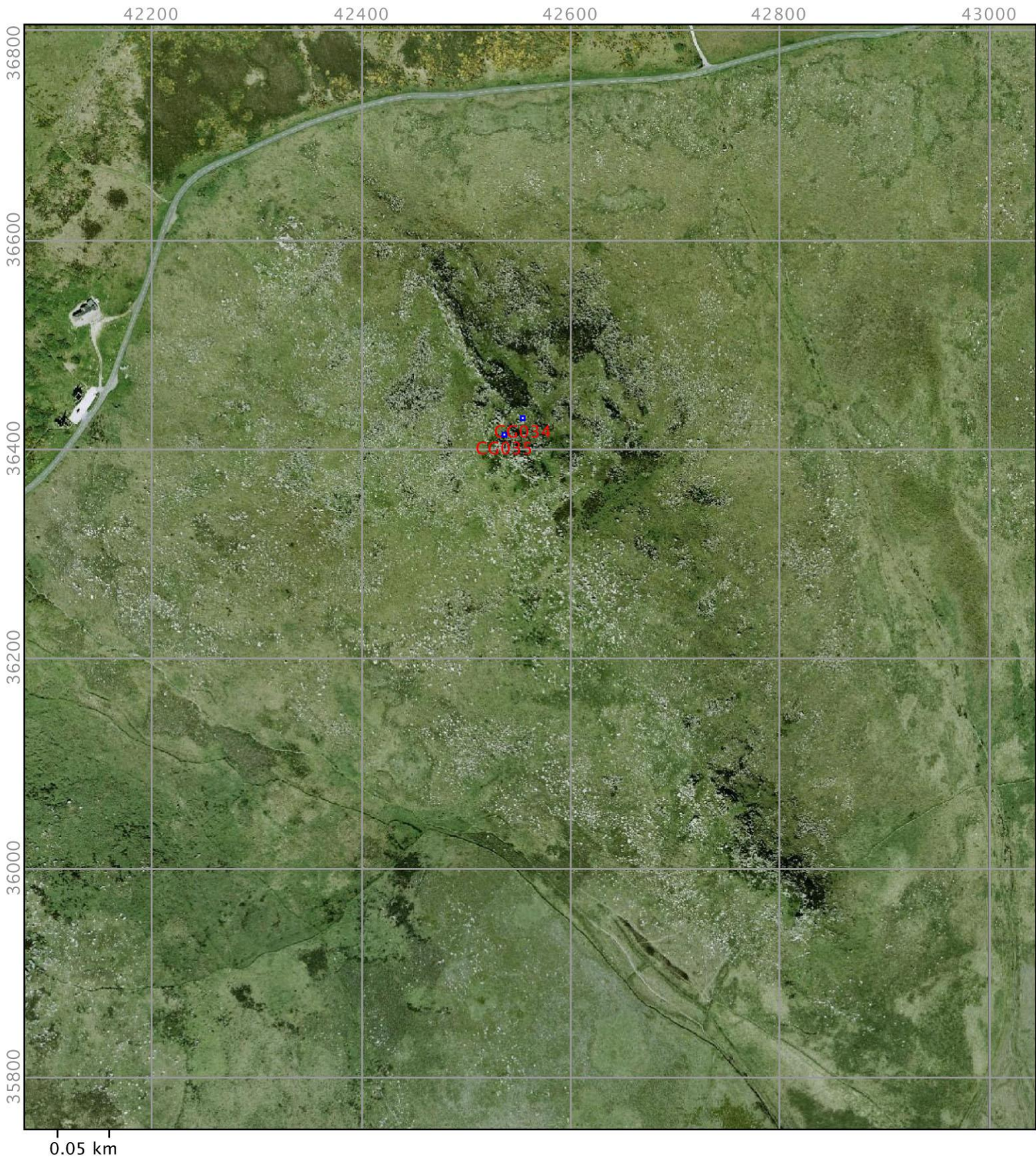
Map Reference - 121240

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Rare Lichens, West Penwith Moors

Target Notes, Carn Galver Map 27



Carn Galver
Lichen Survey

Key

- CG034 ■ = Bryoria bicolor site 2001
- CG035 ■ = Site of mistake identification of Ramalina chondrina 2001

Scale, 1: 5000

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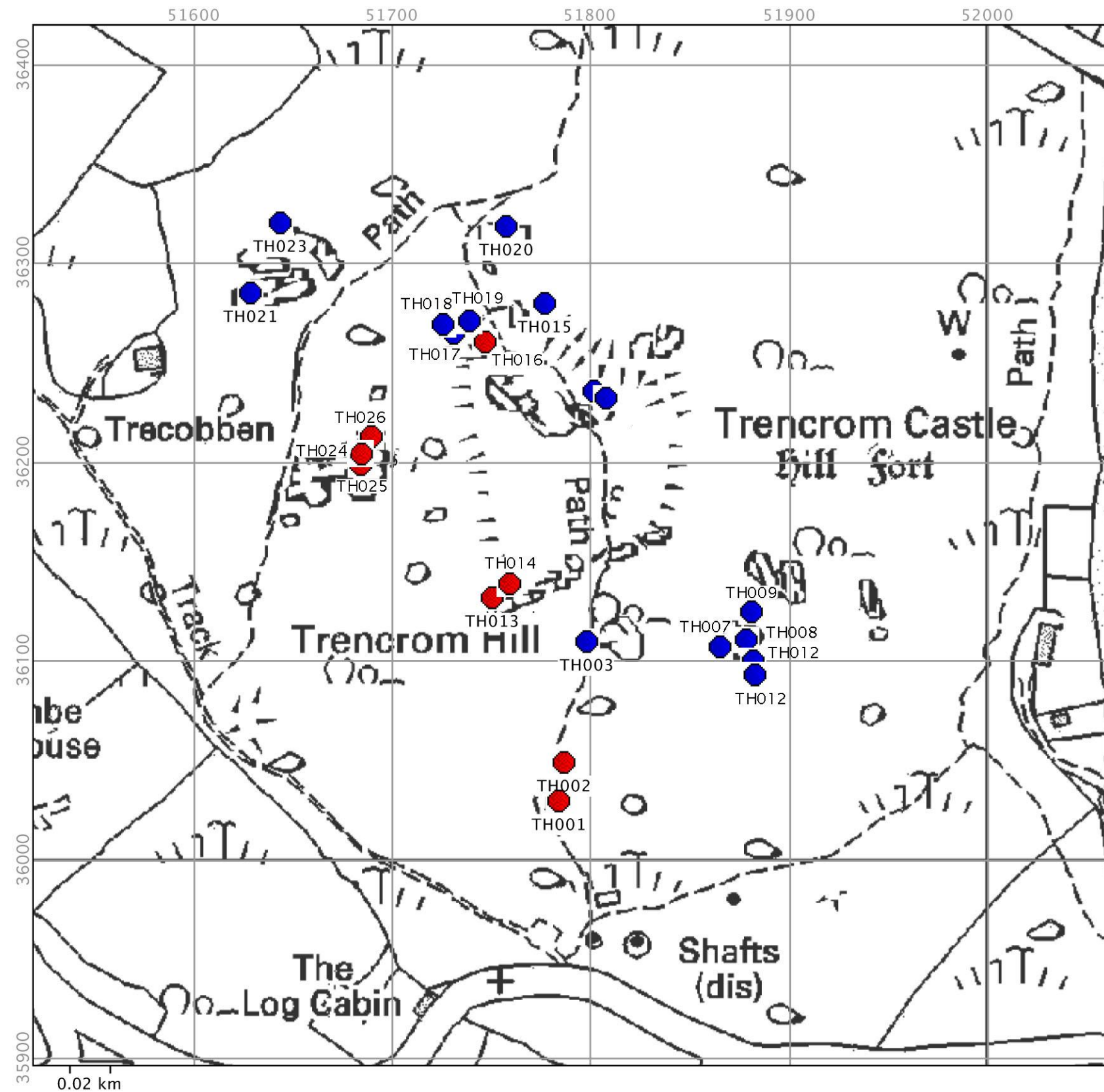
Map Reference - 121240

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Rare Lichens, West Penwith Moors

Lichen Interest, Trencrom Hill Map 28



Trencrom Hill Lichen Survey

Key

- TH001 ● = Site with Near Threatened RDB species
- TH003 ● = Site with Notable species

Scale, 1: 2500

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Map Reference - 121240

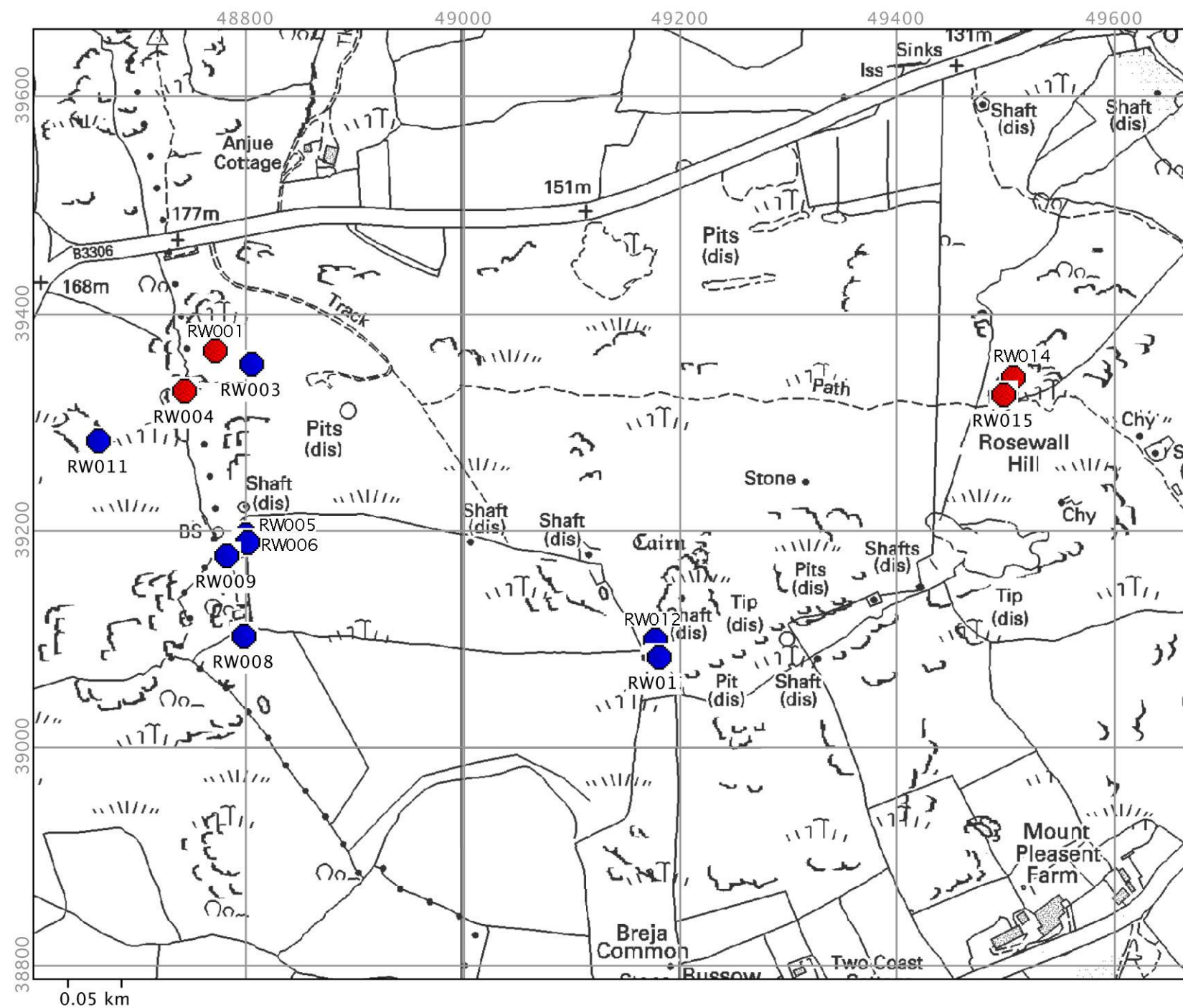
Mapped by - Carrie Mackay-Payne (2013)
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Rare Lichens, West Penwith Moors

Lichen Interest, Rosewall Hill

Map 29



Rosewall Hill Lichen Survey

Key

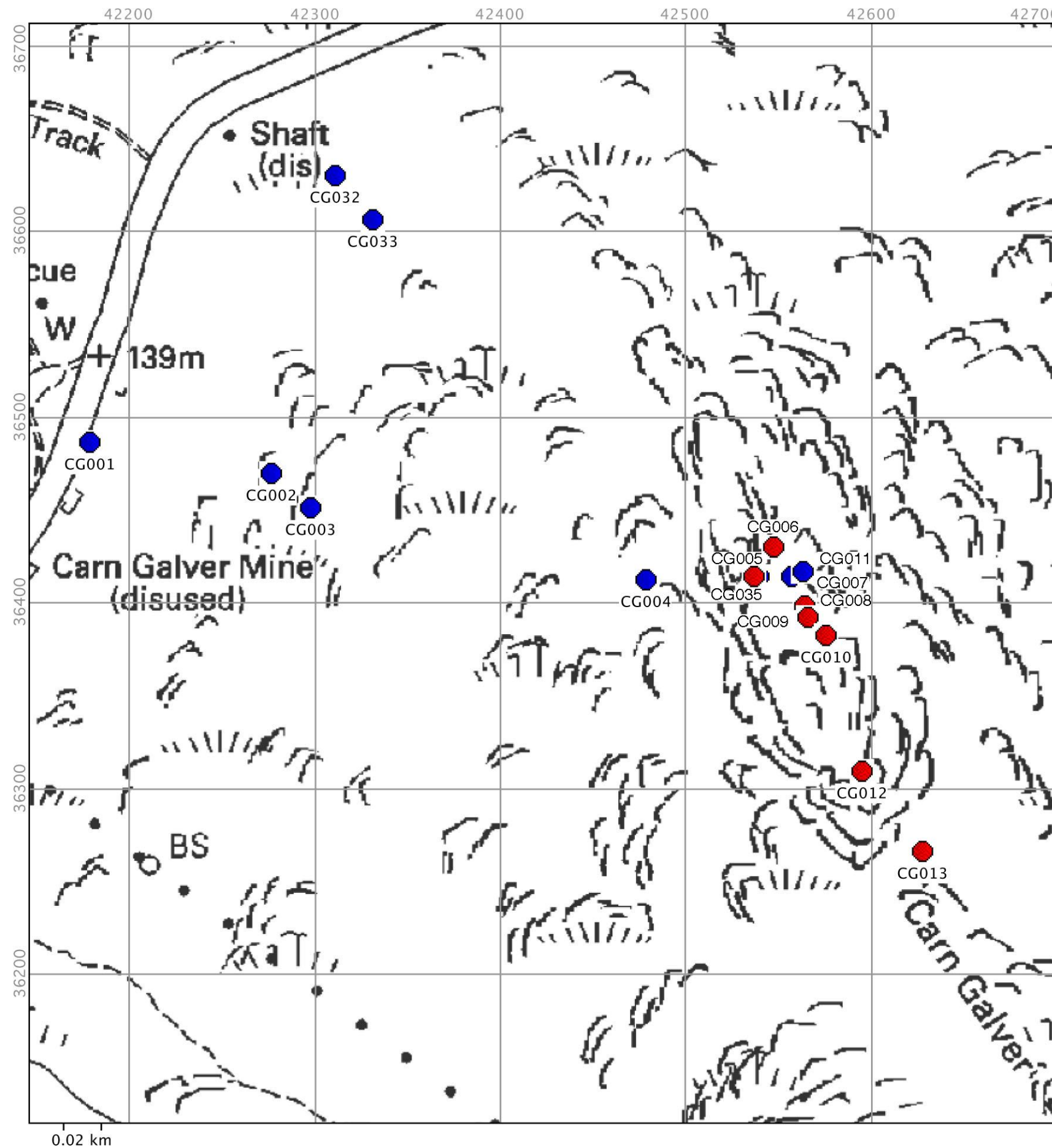
- RW001 ● = Site with Near Threatened RDB species
- RW003 ● = Site with Notable species

Scale, 1: 5000

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Rare Lichens, West Penwith Moors

Lichen Interest, Carn Galver NW Map 30



Carn Galver Lichen Survey

Key

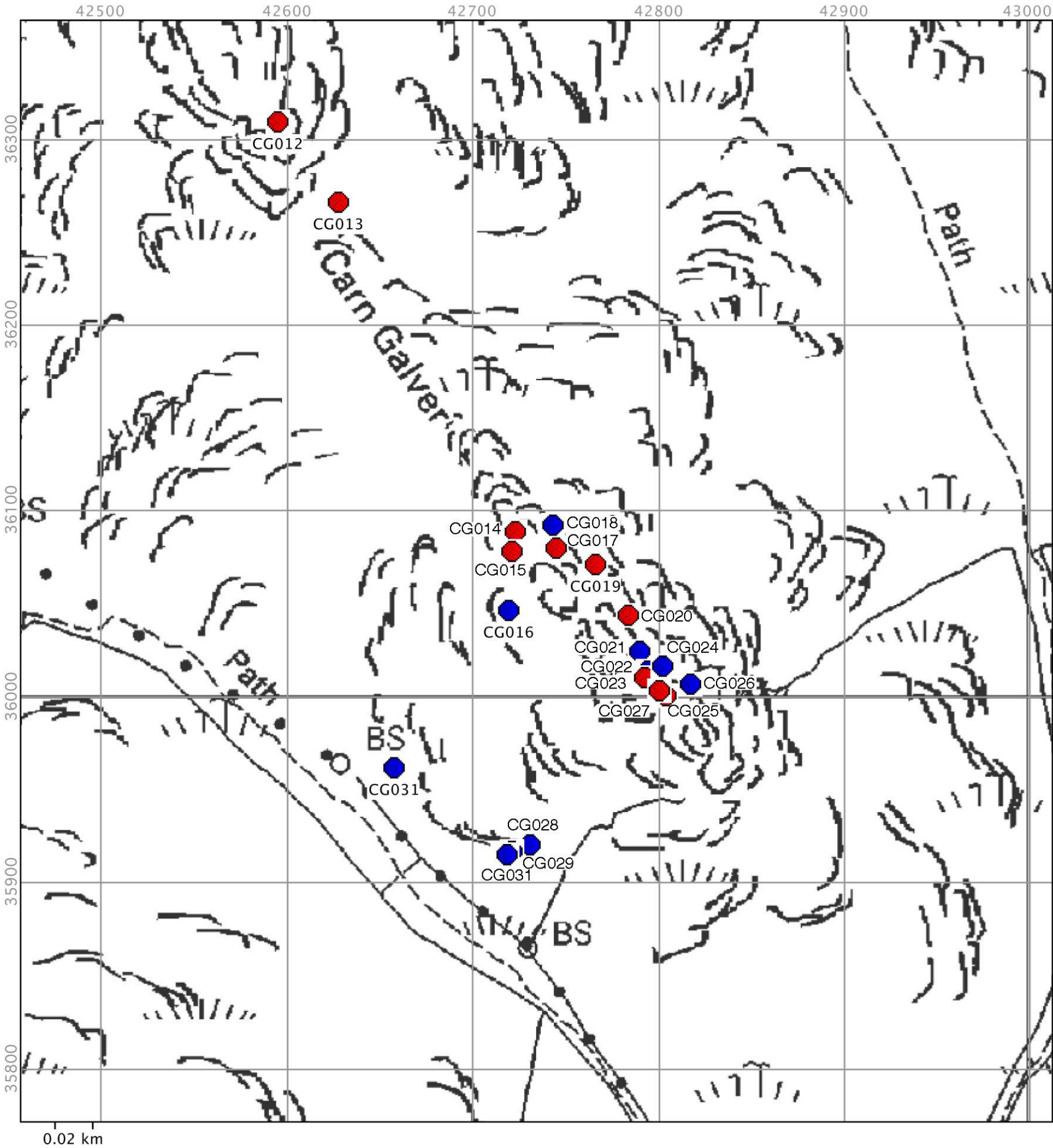
- CG005 ● = Site with Near Threatened RDB species
- CG001 ● = Site with Notable species

Scale, 1: 2500

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Rare Lichens, West Penwith Moors

Lichen Interest, Carn Galver SE Map 31

Carn Galver Lichen Survey

Key

CG012 = Site with Near Threatened RDB species

CG016 = Site with Notable species

Scale, 1: 2500

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4.0 NATURE CONSERVATION VALUE AND MANAGEMENT

4.1 Nature Conservation Value

4.1.1 Lichen Assemblages

The main sites of lichen interests are associated with the granite outcrops. Most of the heathland is too fertile to support interesting heathland lichen assemblages, even when grazed. When ungrazed it rapidly builds up biomass, making access very difficult and increasing the risk of hot wildfires that will damage rock and rock edge lichen assemblages.

The wet heaths and peat banks at the edge of granite slabs, however are much more open and stable and support an interesting heathland lichen assemblage. This included *Cladonia callosa* Nb (NS), new to west Cornwall and the mainly woodland *Micarea xanthonica* Nb (NS/IR) new to West Penwith Moors. Mossy slab edges have supported *Bryoria subcana* Nb (NS), but the known sites appear to have been lost to vegetation over growth. More humid rock edges and mossy slabs add *Cladonia azorica* Nb (NS) and *Cladonia cyathomorpha* Nb (NS), both new to West Penwith Moors. A heathland lichen index of conservation interest is being developed, The *Cetrelia*, *Cladonia* and *Pycnothelia* Index (CCP Index) (Wessex Lichen Group website, 2014a). This simply counts all the species of those genera found within the heathland, with a rich site expected to produce about 10 taxa, while scores of over 15 per 1km square would be expected on a wider basis. The 2013 survey recorded a CCP index scored 23 for the whole survey, 13 for Trencrom Hill, 18 for Rosewall, 21 for Carn Galver and four for Leswidden. This indicates, that although the areas of *Cladonia* rich habitat are small they can be significant.

The granite lichen assemblage is well developed but consist of mainly upland species that are widespread in the UK. To properly assess the value of the granite assemblage, an indicator list would be a much more efficient way to do this than relying on Threatened or Notable species. However, no index has been developed as yet. The rare and scarce species recorded on the granite were mainly species with their core habitats not being inland granite. These include maritime coastal species such as *Pertusaria monogona* Nb (NS) and *Lecanora praepostera* Nb (NS) and normally woodland epiphytes such as *Lecanora alboflavida* Nb (NS), *Parmelinopsis horrescens* NT (NS/IR), *Parmelinopsis minarum* Nb (NS/S8) and *Usnea esperantiana* NT (NS/IR). The occurrence of woodland oceanic species on shaded rock appears to be special feature of the low lying granite of West Penwith Moors, not as well developed in more upland granite outcrops in the south west.

The lichen assemblages of the West Penwith Moors are certainly a significant component of the overall conservation interest of the heaths.

4.1.2 Rare and Scarce Species

The new RDB/Nb scoring system (Sanderson, 2011) for the survey is 750, with 500 to 550 for rocky sites and zero for the former china clay quarrying area at Leswidden. The older S8/NR/NS scoring system (Hodgetts, 1992) gives 650 over all and 450 to 500 and zero for the former china clay quarrying area at Leswidden. If the Schedule 8 status of *Parmelinopsis minarum* Nb (NS/S8) is removed, as is likely, then the

S8/NR/NS scoring system would give 500 for the whole survey 300 to 350 for the three rocky sites.

Hodgetts (1992) gives a score of 300 or more as indicating an SSSI quality lichen assemblage, although to the author's knowledge this was never actually tested on lichen data and was certainly a very low hurdle for woodlands (Sanderson, 2011). The RDB/Nb score gives much higher and more meaningful results for woodlands, than the S8/NR/NS scoring system. This is partly due to the high numbers of International Responsibility species found in woods. The RDB/Nb scoring system gives closer scores to that of the S8/NR/NS scoring system for habitats with lower numbers of International Responsibility species. The RDB/Nb scoring system has not been tested on inland rock, a habitat that tends not to be rich in Threatened or Notable species. A lower hurdle than that for woods (for 600 to 1000) would likely be appropriate, possibly about 400 to give a similar cut off to that of the S8/NR/NS scoring system. On balance, however, inland rock is probably best assessed by a quality index, which has yet to be produced.

4.1.3 Representativeness of Survey

The survey was a sample of areas with localised records of lichens of conservation interest. Many other areas of the West Penwith Moors survey area (**Map 1**) are potentially of interest and have either never been visited by lichenologists or the records were not localised.

The frequency with which they were found in the 2013 survey suggests that *Parmelinopsis horrescens* Nb (NS/S8) and *Parmelinopsis minarum* Nb (NS/S8) are likely to occur at most, if not all, larger rock outcrops on the West Penwith Moors. These are likely to represent major populations in UK terms for both species. Beyond this other species were patchy in the areas surveyed. Most of the rock associated lichens found in 2013 are likely to occur in other areas, given the extent of unvisited habitat and at least a few new rare species would probably be found on unvisited outcrops. *Cladonia callosa* Nb (NS), will certainly occur in other areas of low productivity wet heath. Suitable areas of wet heath can clearly be seen on Google Earth as occurring elsewhere in West Penwith Moors.

Although the sample was limited some differences can be discerned between the sites. Carn Galver is a rich site with varied habitats including very large tor complexes. Here oceanic lichens are more frequent than at other sites. Rosewall Hill has less varied habitats and the area surveyed lacks very large tors. It appears essentially similar to Carn Galver but with less rock and smaller areas of wet heath. Trencrom Hill is rather different with the overall assemblages indicating sunnier, drier and slightly more nutrient enriched conditions. In these characters the isolated Trencrom Hill is likely to be different from most outcrops on the moors. Other unvisited sites are likely to be broadly similar to Carn Galver and Rosewall Hill

4.2 Management

The comparison of the grazed sections of Rosewall Hill and the ungrazed areas of heath elsewhere was stark. On a very basic level the ungrazed heaths are actually effectively inaccessible other than by narrow paths due to the dense overgrowth of the vegetation. As far as the lichens are concerned only the wet heathlands and granite slab edges habitats are of low enough productivity to support lichens, even with grazing. These low productivity habitats are fairly resistant to the degradation

of the ungrazed heathlands, especially the wet heaths. The drier slab edge niches have survived locally but others have been lost, with clear photographic evidence of the loss of a *Bryoria bicolour* Nb (NS) colony to shade from tall heath obtained on Carn Galver. A major issue is burning regimes. The wet heath assemblage is relatively fire resistant; in fact species such as *Cladonia callosa* Nb (NS) are partly fire dependent. The assemblage can survive and benefit from long rotation cool controlled spring burns but frequent, hot and uncontrolled wild fires can still be damaging. The slab edge assemblage includes *Bryoria* species that are likely to be more sensitive to burning. Reducing the potential for wild fires by reducing standing biomass by grazing, controlled burning or other positive habitat management, will also help protect burning sensitive species.

There are two main threats to the granite assemblages. In the absence of grazing, or other positive habitat management, Ivy, and sometimes Bramble, overgrows the rocks and removes all lichen growth from the rocks. This was very advanced in Trencrom Hill with whole rocks lost in places. Smaller rocks are also threatened by hot wild fires. Rock lichens have no resistance to fire and there are few benefits to burning around rocks, other than removing the Ivy.

Restoring grazing will control Ivy and slow down the build up of biomass. In addition controlled winter or spring burning of heath away from rocks can help maintain fire refuges around rocks; no fire regimes are usually a very good way of causing a few very hot fires that reach into fire refuges. In badly overgrown and long little managed sites, such as Trencrom Hill active clearance of Bramble – Bracken vegetation and cutting back Ivy on rocks may be required to restore good condition.

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<http://wessexlichengroup.org/news/Cladonia_cyathomorpha_New_Forest/>

ANNEX 1 Field Notes

A1.1 Trencrom Hill

A1.1.1 Trencrom Hill 6/10/2013

Weather: mostly overcast, some sun and some mist.

Lower slopes choked in Bracken and Bramble. Blackthorn and Hawthorn scrub at base. Granite outcrops as slabs and boulders.

General rock assemblage (SW5136):

Abrothallus microspermus on *Flavoparmelia caperata*

Acarospora fuscata

Anaptychia runcinata (enriched summit rocks)

Buellia aethalea

Candelariella coralliza

Cladonia cervicornis subsp. *cervicornis*

Cladonia coccifera s. str.

Cladonia diversa

Cladonia floerkeana

Cladonia furcata subsp. *furcata*

Cladonia pyxidata

Cladonia ramulosa

Cladonia subcervicornis

Flavoparmelia caperata

Fuscidea cyathoides var. *cyathoides*

Hypogymnia physodes

Hypogymnia tubulosa

Hypotrachyna afrorevoluta

Hypotrachyna britannica

Hypotrachyna revoluta s.str.

Lecanora gangaleoides

Lecanora polytropa

Lecanora rupicola var. *rupicola*

Lepraria caesioalba (Pd + o/r)

Marchandiomyces corallinus on *Ramalina subfarinacea*, *Cladonia subcervicornis*, &

Parmelia saxatilis

Melanelixia fuliginosa

Mycoblastus caesius

Ochrolechia parella (enriched summit rocks)

Parmelia omphalodes

Parmelia saxatilis

Parmelinopsis horrescens

Parmelinopsis minarum

Parmotrema perlatum

Pertusaria aspergilla

Pertusaria corallina

Pertusaria excludens (some partly fertile but also still soresiate, resulting in previous errors for *Pertusaria monogona*)

Pertusaria pseudocorallina

Platismatia glauca
Polysporina simplex
Porpidia tuberculosa
Psilolechia lucida
Punctelia subrudecta s. str.
Ramalina siliquosa
Ramalina subfarinacea
Rhizocarpon geographicum
Rinodina atrocinerea
Sclerococcum sphaerale on *Pertusaria corallina*
Trapelia coarctata
Trapelia glebulosa
Usnea flammea
Xanthoparmelia conspersa
Xanthoparmelia verruculifera

TH001 (SW51784 36030, 145m): first big rock outcrop up from car park. Possible *Pertusaria monogona* on vertical south and western facing faces Right reactions but not fertile that I could see, so *Pertusaria excludens*. With *Fuscidea cyathoides* var. *cyathoides*, *Rhizocarpon geographicum*, *Melanelixia fuliginosa*.

In Gorse and Bracken, Ivy a threat.

Second tier of rock above, *Parmelinopsis minarum*, one large and four small thalli on granite face, facing south east, with *Hypotrachyna afrorevoluta*, *Xanthoparmelia conspersa*, *Lecanora polytropia*, *Melanelixia fuliginosa* and *Ramalina subfarinacea*. More thalli on north east side, about 10 small thalli and a few small *Parmelinopsis horrescens* thalli.

Photos: Trencrom 2013-01 to 05.



Photo Trencrom 2013-01. TH001: looking towards the south east facing side of the second tier of rock.



Photo Trencrom 2013-02. TH001: closer view of the south east facing side of the second tier of rock, *Parmelinopsis minarum*, colony ringed in red.



Photo Trencrom 2013-03. TH001: closer view of the south east facing side of the second tier of rock, *Parmelinopsis minarum*, larger thalli indicated (Pm).



Photo Trencrom 2013-04. TH001: on the south east facing side of the second tier of rock., the largest *Parmelinopsis minarum* thalli.



Photo Trencrom 2013-05. TH001: the north east side facing side of the second tier of rock, a colony of small *Parmelinopsis minarum* and *Parmelinopsis horrescens* thalli, in streak below book and to right.

TH002 (SW51786 36049, 150m): boulder in Bracken just west of path, abundant *Parmelinopsis minarum* on north east side to left, with *Flavoparmelia caperata*, *Lecanora polytropa*, *Melanelixia fuliginosa* and *Pertusaria pseudocorallina*. To right *Parmelinopsis horrescens* dominant. Ivy a threat.

Photos: Trencrom 2013-06 & 07.



Photo Trencrom 2013-06. TH002: *Parmelinopsis minarum* and *Parmelinopsis horrescens* on the north east side facing side of boulder above clipboard. Ivy a threat.



Photo Trencrom 2013-07. TH002: *Parmelinopsis minarum* circled red on left and *Parmelinopsis horrescens* circled red on right on the north east side facing side of boulder.

TH003 (SW51798 36110, 165m): low outcrop west of path, two *Parmelinopsis minarum* thalli in dominant *Hypotrachyna afrorevoluta* on slab below overhang. In H4 heath.

Photos: Trencrom 2013-08 & 09)



Photo Trencrom 2013-08. TH003: *Parmelinopsis minarum* on north east slab, left of book.



Photo Trencrom 2013-09. TH003: closer view, *Parmelinopsis minarum* by pen.

East of the main path the terrain between outcrops from TH004 to TH012 has dreadful tangled Bracken and Bramble (W25) vegetation, which is extremely difficult to get through. These rocks are close to inaccessible.

TH004 (SW51834 36100, 160m): steep face facing south west with *Pertusaria excludens* like material but more convincingly fertile, with abortive apothecia, but still with soredia so not *Pertusaria monogona*. Three big thalli with *Fuscidea cyathoides* var. *cyathoides*, *Lecanora gangaleoides* and *Melanelixia fuliginosa*.

Candidate *Cladonia coccifera* s. str. collected on adjacent slab.

TH005 (SW51835 36118, 165m): vertical face, facing south east, with more partly fertile *Pertusaria excludens*, over c40cm, *Lecanora polytropa*, *Acarospora fuscata*, *Lecanora gangaleoides* and *Fuscidea cyathoides* var. *cyathoides*. Ivy threat, Pedunculate Oak above.

TH006 (SW51827 36120, 165m): more partly fertile *Pertusaria excludens*, to west of Pedunculate Oak. South east facing two thalli *Pertusaria excludens*, with *Fuscidea cyathoides* var. *cyathoides* dominant.

TH007 (SW51865 36107, 160m): big isolated bolder in difficult to access tangled vegetation east of the main path, with *Parmelinopsis minarum* high up on north facing side, at least two big (10cm) thalli, with *Parmelia saxatilis*, *Usnea flammea*, *Parmelia omphalodes*, *Hypotrachyna revoluta* s. str. More *Parmelinopsis minarum* on south side with two small thalli.

Photos: Trencrom 2013-10 to 12.



Photo Trencrom 2013-10. TH007: looking to north facing side with, *Parmelinopsis minarum* high up.



Photo Trencrom 2013-11. TH007: closer view of north facing side with at least two *Parmelinopsis minarum* thalli high up. Lower thallus marked by pen lid, second thallus up and to right.



Photo Trencrom 2013-12. TH007: closer view of south facing side with at two small *Parmelinopsis minarum* thalli high up. One thallus above pen lid.

TH008 (SW51878 36111, 160m): east of TH007, above Oak, south facing sloping slab with *Parmelinopsis minarum*, two thalli, with *Parmelia omphalodes*, *Flavoparmelia caperata*, *Xanthoparmelia conspersa* and *Parmelia saxatilis*. Bramble a threat

Photos: Trencrom 2013-13 & 14.



Photo Trencrom 2013-13. TH008: looking east to slab two *Parmelinopsis minarum* thalli marked by pen.



Photo Trencrom 2013-14. TH008: closer view of with two *Parmelinopsis minarum* thalli marked by pen.

TH009 (SW51881 36125, 165m): big boulder on top outcrop, *Parmelinopsis minarum* on north east facing side, three isolated thalli with *Hypotrachyna afrorevoluta* and big coalesced mass to the south (left) of this.

Photos: Trencrom 2013–15 & 16.



Photo Trencrom 2013–15. TH009: looking west to face with *Parmelinopsis minarum* thalli.



Photo Trencrom 2013–16. TH009: closer view of to face with *Parmelinopsis minarum* thalli.

TH010 (SW 51874 36123, 165m): south side boulder just west of TH009, two small fertile *Pertusaria excludens* resembling *Pertusaria monogona* thalli on steep face.

TH011 (SW51881 36100, 150m): on the east side of a boulder to east of TH007, *Parmelinopsis minarum* abundant as small thalli, with *Hypotrachyna afrorevoluta*, *Flavoparmelia caperata*, *Pertusaria pseudocorallina*, *Melanelixia fuliginosa*, *Lepraria caesia* alba

Photos: Trencrom 2013–17 & 18.



Photo Trencrom 2013–17. TH011: looking west to the east face, with abundant small *Parmelinopsis minarum* thalli, with TH007 beyond.



Photo Trencrom 2013-18. TH011: closer view of the east face, with abundant small *Parmelinopsis minarum* thalli below the book.

TH012 (SW51882 36093, 150m): sloping south east slab just clear of shade of Turkey Oak, three small thalli of *Parmelinopsis minarum*. Shade from Oak a threat.

Photos: Trencrom 2013-19 & 20.



Photo Trencrom 2013-19. TH012: looking north to the east face, *Parmelinopsis minarum* thalli, are on right hand face of left hand rock.



Photo Trencrom 2013–20. TH012: pen marking location of three small *Parmelinopsis minarum* thalli.

Climbed up to the summit, the vegetation again barely passable. Then went west of summit; mostly low slabs but more interest steeper faces to the west

TH013 (SW51759 36139, 165m): east facing vertical face, *Parmelinopsis minarum*, at least five moderate sized thalli, three fertile, with *Hypotrachyna revoluta* s. str., *Ramalina subfarinacea*, *Ramalina siliquosa*, *Hypotrachyna afrorevoluta*. *Parmelinopsis horrescens* just below, two thalli. *Parmelinopsis minarum* also on adjacent old Gorse.

Photos: Trencrom 2013–21 to 24.



Photo Trencrom 2013-21. TH013: looking west to face with *Parmelinopsis minarum* and *Parmelinopsis horrescens* thalli. Pm = largest *Parmelinopsis minarum* thalli.



Photo Trencrom 2013-22. TH013: closer view of best area Pm = *Parmelinopsis minarum* and Ph = *Parmelinopsis horrescens* thalli.



Photo Trencrom 2013-23. TH013: closer view of big fertile *Parmelinopsis minarum* thallus.



Photo Trencrom 2013-24. TH013: closer view of two large *Parmelinopsis horrescens* thallus.
Also with *Ramalina subfarinacea* and *Hypotrachyna afrorevoluta*

TH014 (SW51759 36139, 165m): north facing crevice in boulders, *Parmelinopsis horrescens* (c10 thalli), with, *Mycoblastus caesius*, *Flavoparmelia caperata*, *Parmelinopsis minarum* (c 5 thalli), *Cladonia subcervicornis*, *Usnea flammea* and *Hypotrachyna afrorevoluta*. Shady site with the woodland oceanic species *Mycoblastus caesius*, which is new to the far west of Cornwall.

Photos: Trencrom 2013–25 to 26.



Photo Trencrom 2013–25. TH014: location of crevice between boulders with *Parmelinopsis horrescens* and *Parmelinopsis minarum* thalli.



Photo Trencrom 2013-26. TH014: *Parmelinopsis horrescens* and *Parmelinopsis minarum* thalli on slab in front of plastic container.

TH015 (SW51777 36280, 170m): slightly sloping slab on the south side of the summit tor to north of the summit, with two thalli of *Parmelinopsis minarum* by ridge in slab.

Photos: Trencrom 2013-27 to 28.



Photo Trencrom 2013-27. TH015: flat slab with two *Parmelinopsis minarum* thalli by clipboard.



Photo Trencrom 2013-28. TH015: flat slab with the location of the two *Parmelinopsis minarum* thalli indicated by red pen cap.

A1.1.2 Trencrom Hill 7/10/2013

Weather: as day before plus brief drizzle.

General list continued (SW5136):

Aspicilia caesiocinerea
Cladonia cryptochlorophaea
Cladonia cyathomorpha
Cladonia polydactyla var. polydactyla
Cladonia portentosa Terrestrial
Lecanora alboflavida
Lecanora praepostera
Opegrapha saxigena
Parmelia sulcata
Parmotrema reticulatum
Peltigera hymenina
Rhizocarpon richardii
Stereocaulon evolutum
Xanthoparmelia pulla

Extensive mossy slabs west of summit tor but no Bryoria found.

TH016 (SW51747 36261, 170m): large colony of *Parmelinopsis minarum* on east facing face in open crevice, at least 15 good sized thalli (c4cm diam), two *Parmelinopsis horrescens* with *Melanelixia fuliginosa*, *Parmelia saxatilis*, *Usnea flammea*, *Flavoparmelia caperata*, *Parmelia omphalodes*, *Lecanora gangaleoides*. Also four *Parmelinopsis minarum* and one *Parmelinopsis horrescens* on opposite face of crevice. Ivy a threat.

Photos: Trencrom 2013-29 to 30.



Photo Trencrom 2013-29. TH016: east facing crevice with the location of the main *Parmelinopsis minarum* colony indicated.



Photo Trencrom 2013-30. TH016: east facing crevice the main *Parmelinopsis minarum* colony, the abundant pale grey thalli below the dark grey *Parmelia*.

TH017 (SW51731 36265, 170m): sloping slab on tor, two thalli of *Parmelinopsis minarum*, with *Lepraria caesia* alba, *Lecanora alboflavida* (new to West Penwith Moors), *Xanthoparmelia conspersa*, *Hypotrachyna afrorevoluta*, *Parmelia omphalodes* and *Flavoparmelia caperata*. Ivy a threat.

Photos: Trencrom 2013-31 to 32.



Photo Trencrom 2013-31. TH017: slab on tor with two *Parmelinopsis minarum* thalli, to the left of the clipboard.



Photo Trencrom 2013–32. TH017: closer view of the slab two *Parmelinopsis minarum* both to the left of the pen and pen top.

TH018 (SW51726 36270, 165m): overhanging angle facing north and north west, thalli of *Lecanora praepostera* abundant over c 40 x 25cm, with *Opegrapha saxigena* and *Ramalina siliquosa*. Direct Ivy threat.

A sloping rock 3m north of the above, with two *Parmelinopsis minarum*, thalli. In an unusual community for the hill with *Rinodina atrocineria*, *Aspicilia caesiocinerea*, *Buellia aethalea*, *Hypotrachyna afrorevoluta*, *Flavoparmelia caperata*, *Melanelixia fuliginosa*, *Lecanora polytropia* and *Parmelia saxatilis*. Four more *Parmelinopsis minarum* thalli on vertical face below. Ivy is a threat

Photos: Trencrom 2013–33 to 37.



Photo Trencrom 2013–33. TH018: *Lecanora praepostera* colony ringing in red on small shaded overhang. Threatened by Ivy.



Photo Trencrom 2013-34. TH018: part of *Lecanora praepostera* colony showing spot tests, K + yellow to red above and Pd + orange – yellow below.



Photo Trencrom 2013-35. TH018: part of *Lecanora praepostera* colony showing Ivy encroachment.



Photo Trencrom 2013-36. TH018: *Parmelinopsis minarum* on rounded slap below book, *Lecanora praepostera* colony can be seen to right.



Photo Trencrom 2013-37. TH018: *Parmelinopsis minarum* on rounded slap below book between pen and pen top.

TH019 (SW51738 36271, 170m): a narrow crevice with *Parmelinopsis minarum* frequent inside, with *Usnea flammea* and *Hypotrachyna afrorevoluta*.

Photos: Trencrom 2013–38 to 39.



Photo Trencrom 2013–38. TH019: the crevice with *Parmelinopsis minarum* in foreground.



Photo Trencrom 2013–39. TH019: looking down deep crevice with *Parmelinopsis minarum*.

TH020 (SW51758 36319, 170m): wide gap between boulders, with two large *Parmelinopsis minarum* thalli on either side and five smaller on west side.

Photos: Trecrom 2013-40 to 42.



Photo Trecrom 2013-40. TH020: the gap between boulders with *Parmelinopsis minarum* indicated by Pm. Serious Ivy invasion of lower rocks.



Photo Trecrom 2013-41. TH020: the gap between boulders with *Parmelinopsis minarum* indicated by Pm on both side of gap.



Photo Trencrom 2013-42. TH020: the west side of the gap between boulders with a large thallus of *Parmelinopsis minarum*.

The north western tor was reached after a considerable struggle through nearly impenetrable Bracken and Bramble.

TH021 (SW51629 36285, 145m): mossy slab with locally frequent *Stereocaulon evolutum*, on moss. With this was a small amount of a pixy cup *Cladonia*, which was well enough developed to determine as *Cladonia cyathomorpha* (new to Cornwall).

Photos: Trencrom 2013-43



Photo Trencrom 2013–43. TH021: the slab with *Cladonia cyathomorpha*, by clipboard.
TH022 (SW51642 36306, 155m): mossy slab to north, tiny amount *Stereocaulon evolutum* on moss and more 5m to north.

TH023 (SW51644 36321, 155m): south west side of boulder, two *Parmelinopsis minarum* thalli with *Hypotrachyna afrorevoluta* in open, abundant in shade under boulder. Two more *Parmelinopsis minarum* thalli on north side.

Photos: Trencrom 2013–44



Photo Trencrom 2013–44. TH023: the boulders with *Parmelinopsis minarum* is to the right.

Waked round eastern side of hill, to the wood edge Turkey Oak is colonising into the common. Limited interest:

Phaeographis dendritica
Phaeographis smithii

A1.1.3 Trencrom Hill 11/10/2013

Weather: sunny & windy

Used the time left over from Leswidden being so uninteresting, to finishing off last main area of unvisited rocks, to the south west. As with other tors isolated from the paths, these were extremely difficult to get at.

General list continued (SW5136):

Sphaerophorus globosus
Cladonia ciliata var. *ciliata*
Peltigera membranacea on summit tor
Usnea esperantiana

TH024 (SW51684 36203, 155m): north west facing face of tor, two small thalli of *Parmelinopsis horrescens*, also with four small *Usnea esperantiana* thalli near by, with *Hypotrachyna afrorevoluta*, *Hypotrachyna revoluta* s. str., *Parmelia omphalodes*. Also a little *Parmelinopsis minarum* under the boulder.

Photos: Trencrom 2013-45 & 46



Photo Trencrom 2013-45. TH024: the boulder, with *Parmelinopsis horrescens* and *Usnea esperantiana* above the book and *Parmelinopsis minarum* behind the book.



Photo Trencrom 2013-46. TH024: close up of the boulder, with *Parmelinopsis horrescens* and *Usnea esperantiana*.

TH025 (SW51684 36199, 155m): south east facing overhang face of boulder on tor, occasional small *Parmelinopsis horrescens* above book in photo

Photos: Trencrom 2013-47 & 48



Photo Trencrom 2013-47. TH025: the boulder, with *Parmelinopsis horrescens* above the book.



Photo Trencrom 2013-48. TH025: closer view with *Parmelinopsis horrescens* above the book.

Between TH025 and TH026 at SW5165 3620: *Stereocaulon evolutum* on wet slab.

TH026 (SW51690 36213, 160m): a single *Parmelinopsis horrescens* thallus on ledge on the north east side of the tor.

Photos: Trencrom 2013-49 & 50



Photo Trencrom 2013-49. TH026: the ledge, with *Parmelinopsis horrescens* by the book.



Photo Trencrom 2013-50. TH026: the ledge, with *Parmelinopsis horrescens* by the end of the pen cap.

Finally the Summit tor was checked again

TH027 (SW51802 36236, 180m): north north east facing small boulder in tor, with frequent *Parmelinopsis minarum*.

Photos: Trencrom 2013-51 & 52



Photo Trencrom 2013-51. TH027: the NNE facing boulder side, with *Parmelinopsis minarum* above the book.



Photo Trencrom 2013-52. TH027: closer view of the NNE facing boulder side, with *Parmelinopsis minarum* frequent above the book.

TH028 (SW51808 36232, 180m): north east facing side of top of tor, four *Parmelinopsis minarum* thalli, with *Hypotrachyna afrorevoluta*, *Parmotrema perlatum*, *Flavoparmelia caperata*, *Usnea flammea*, *Ramalina siliquosa*, *Parmelia omphalodes*, *Lecanora gangaleoides*, *Parmotrema reticulatum*, *Anaptychia runcinata*, *Xanthoparmelia verruculifera*, *Parmelia saxatilis*, *Pertusaria excludens* and *Lecanora rupicola* var. *rupicola*.

Photos: Trencrom 2013-53 & 54



Photo Trencrom 2013-53. TH028: the NE facing tor top side, with four *Parmelinopsis minarum* below the book.



Photo Trencrom 2013-53. TH028: the NE facing top side, with four *Parmelinopsis minarum* between the book and the chemical bottle.

A1.2 Rosewall Hill

A1.2.1 Rosewall Hill 7/10/2013

Weather: sun and cloud

The far west with biggest outcrop is not grazed, rest well grazed, far east was also not grazed.

General granite list (SW4839)

Acarospora fuscata

Baeomyces rufus

Biatoropsis usnearum parasitic on *Usnea flammea*

Buellia aethalea

Cladonia cervicornis subsp. *cervicornis*

Cladonia coccifera s. str.

Cladonia coniocraea

Cladonia cyathomorpha

Cladonia diversa

Cladonia furcata subsp. *furcata*

Cladonia ochrochlora

Cladonia polydactyla var. *polydactyla*

Cladonia ramulosa

Cladonia subcervicornis

Flavoparmelia caperata

Fuscidea cyathoides var. *cyathoides*

Hypogymnia physodes

Hypotrachyna afrorevoluta

Lecanora gangaleoides

Lecanora polytropa

Lecidella scabra

Lichenomphalia umbellifera

Melanelixia fuliginosa

Micarea lignaria var. *lignaria*

Micarea xanthonica

Mycoblastus caesius

Parmelia omphalodes

Parmelia saxatilis

Parmelinopsis horrescens

Parmelinopsis minarum

Parmotrema perlatum

Pertusaria corallina

Pertusaria excludens (on first rocks, so likely BLS *Pertusaria monogona* record)

Pertusaria pseudocorallina

Platismatia glauca

Porpidia cinereoatra

Porpidia tuberculosa

Ramalina siliquosa

Rhizocarpon geographicum

Sphaerophorus globosus
Stereocaulon evolutum
Trapeliopsis pseudogranulosa
Usnea flammea
Xanthoparmelia conspersa
Xanthoparmelia verruculifera

RW001 (SW48772 39365, 205m): slightly sloping slab under over hang, frequent *Parmelinopsis minarum* and frequent *Parmelinopsis horrescens*, also on east facing vertical face, with *Flavoparmelia caperata*, *Parmelia saxatilis* and *Parmotrema perlatum*. *Mycoblastus caesius* on open rock above with *Sphaerophorus globosus*.

Photos: Rosewall 2013-01 & 02.



Photo Rosewall 2013-01. RW001: clipboard by ledge with frequent *Parmelinopsis minarum* and *Parmelinopsis horrescens*.

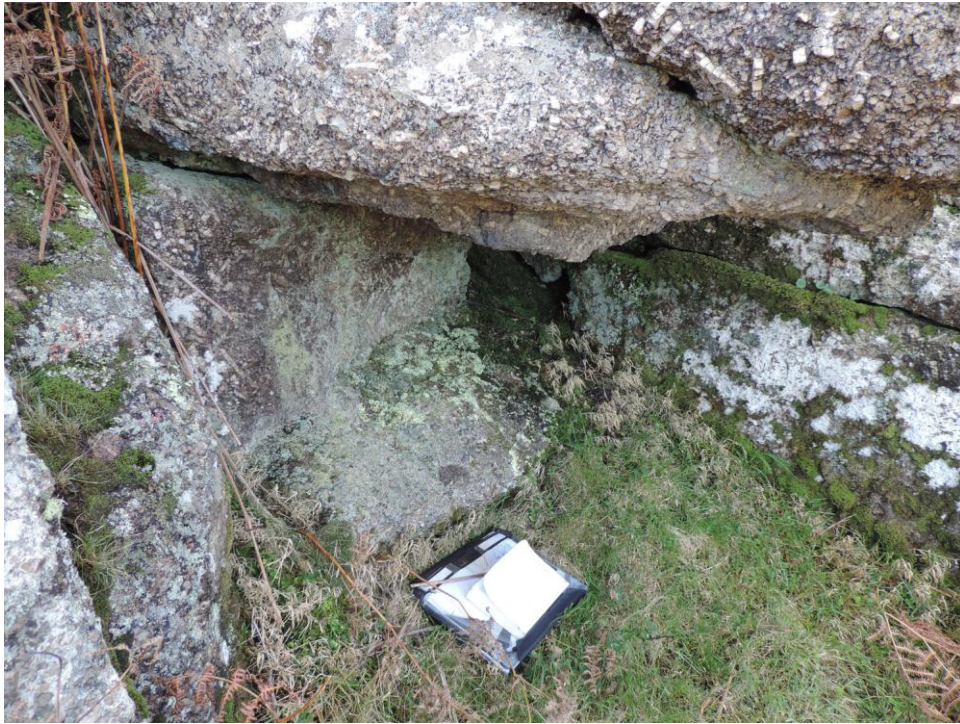


Photo Rosewall 2013-01. RW001: clipboard by ledge and face below the underhang with frequent *Parmelinopsis minarum* and *Parmelinopsis horrescens*.

RW002 (SW48762 39351, 210m): slab with abundant *Stereocaulon evolutum*.

RW003 (SW48805 39354, 210m): big area of north facing slabs with abundant *Stereocaulon evolutum*, mossy low overhang at top on east side of slab with *Micarea xanthonica* (new to west Penwith) occasional on moss with *Micarea lignaria* var. *lignaria*.

Photos: Rosewall 2013-03 & 04.



Photo Rosewall 2013-03. RW003: wet slab with abundant *Stereocaulon evolutum*, with clipboard by low overhang with *Micarea xanthonica*.



Photo Rosewall 2013-04. RW003: wet slab, closer view of mossy area below low overhang with *Micarea xanthonica*.

RW004 (SW48743 39329, 215m): rock just west of the fence, chock stone in deep crevice, *Parmelinopsis minarum* abundant and *Parmelinopsis horrescens* frequent with *Flavoparmelia caperata* and *Usnea flammea*.

Photos: Rosewall 2013-05 & 06.



Photo Rosewall 2013-05. RW004: location of crevice with abundant *Parmelinopsis minarum* and frequent *Parmelinopsis horrescens* indicated.



Photo Rosewall 2013-06. RW004: location of chock stone with abundant *Parmelinopsis minarum* and frequent *Parmelinopsis horrescens* indicated.

The western summit tors in the grazed area were looked at next. Additional species noted listed below

General granite list continued (SW488 391 & SW487 391)

Anaptychia runcinata
Candelariella coralliza
Cladonia floerkeana
Hypotrachyna laevigata
Parmotrema reticulatum
Peltigera hymenina
Pertusaria aspergilla
Pertusaria monogona
Ramalina subfarinacea

RW005 (SW48800 39196, 230m): an area of jumbled rocks on the NE side of a tor. One *Parmelinopsis minarum* thallus under overhang, *Hypotrachyna laevigata* nearby, but not associated.

Photos: Rosewall 2013-07 & 08.



Photo Rosewall 2013-07. RW005: location of underhang with a single *Parmelinopsis minarum* thallus by clipboard.



Photo Rosewall 2013-08. RW005: location of underhang with a single *Parmelinopsis minarum* thallus by pen.

RW006 (SW48801 39190, 235m): east ledge facing on tor with *Parmelinopsis minarum*, c 12 thalli. Abundant on same ledge 3m to south, with *Hypotrachyna afrorevoluta*, *Parmelia saxatilis* and *Flavoparmelia caperata*.

Photos: Rosewall 2013-09 to 12.



Photo Rosewall 2013-09. RW006: location of northern part of ledge with 12 *Parmelinopsis minarum* thalli right of clipboard.



Photo Rosewall 2013-10. RW006: closer view of northern colony on ledge with 12 *Parmelinopsis minarum* thalli (grey thalli).



Photo Rosewall 2013-11. RW006: location of southern part of ledge with abundant *Parmelinopsis minarum* thalli below pen.



Photo Rosewall 2013-12. RW006: closer view of southern colony on ledge with abundant *Parmelinopsis minarum* thalli below pen (grey thalli).

RW007: code not used.

RW008 (SW48799 39103, 230m): vertical east facing rock with one definite *Pertusaria monogona* thallus (exciple frequently visible under pruina, no soralia), with *Pertusaria excludens*, *Lecanora gangaleoides*, *Pertusaria corallina* and *Parmelia omphalodes*.

Photos: Rosewall 2013-13 to 15.



Photo Rosewall 2013-13. RW008: a single *Pertusaria monogona* thallus below the book.



Photo Rosewall 2013-14. RW008: a close up of the *Pertusaria monogona* thallus showing apothecia.



Photo Rosewall 2013-15. RW008: a close up of a *Pertusaria excludens* thallus showing the lack of apothecia and the presence of soralia.

RW009 (SW48783 39178, 230m): rare *Parmelinopsis minarum* on flat slab below boulder, SE facing, with a small amount of *Lecanora alboflavida* (new to West Penwith Moors).

Photos: Rosewall 2013-16 & 17.



Photo Rosewall 2013-16. RW009: location of rare *Parmelinopsis minarum* and a small amount of *Lecanora alboflavida* indicated.



Photo Rosewall 2013-17. RW009: closer view with location of rare *Parmelinopsis minarum* and a small amount of *Lecanora alboflavida* indicated by pen.

Next looked west of the fence into the ungrazed area of moor in Towednack. An area of exposed peat at SW4875 3932 unusually supported the oceanic tree and rock species *Mycoblastus caesius*:

On peat SW4875 3932:

Micarea lignaria var. *lignaria*

Mycoblastus caesius

Trapeliopsis granulosa

The big tor was looked at. The north east facing side not as interesting as hoped and access was stopped by dense Bramble.

Cladonia squamosa var. *subsquamosa*, typical form with no cups

Lecanora rupicola var. *rupicola*

Overhang at SW4869 3929:

Lepraria caesioalba

Opegrapha gyrocarpa

Opegrapha saxigena

Opegrapha zonata

On the south west side of the tor were mostly dry slabs, but flushed wet slabs were more interesting:

Cladonia callosa

Cladonia crispata var. *cetrariiformis*

Cladonia portentosa

Stereocaulon evolutum

Trapeliopsis granulosa

Cladonia subcervicornis

RW010 (SW48663 39286, 210): occasional *Stereocaulon evolutum* on wet slab. Small amount of UV + blue-white *Cladonia* on top of peat bank at top, was thought to be potentially *Cladonia callosa*, but the undersides of the squamules were not quite tomentosa enough, so probably just *Cladonia crispata* var. *cetrariiformis*.

RW011 (SW48663 39283, 205m): second peat bank above wet slab, this had well grown *Cladonia callosa* (new to Cornwall) over about 20cm, with small podetia, on with *Cladonia subcervicornis*, *Cladonia portentosa* and *Trapeliopsis granulosa*. *Stereocaulon evolutum* on wet rock below.

Photos: Rosewall 2013-18 & 19.



Photo Rosewall 2013-18. RW011: location of *Cladonia callosa* colony indicated below clipboard.



Photo Rosewall 2013–19. RW011: *Cladonia callosa* colony is the small brown squamules above the pen.

Then walked to the east into east into SW4939

The general moorland assemblage is very poor, the heath is too grassy and fertile for lichens to compete but small patches of wet soil in more level ground produced patches with open short heather with much bare humus, and here a more diverse *Cladonia* assemblages was noted:

Terricolous heathland species (SW4939)

Baeomyces rufus

Cladonia cryptochlorophaea

Cladonia diversa

Cladonia floerkeana

Cladonia furcata subsp. *furcata*

Cladonia portentosa

Cladonia rangiformis

Cladonia squamosa var. *squamosa*, heathland form with wide cups

Peltigera membranacea

Placynthiella icmalea

Trapeliopsis granulosa

The western tor was examined (SW491 391), species noted:

Hypotrachyna afrorevoluta

Lepraria caesiaalba

Parmelinopsis minarum

Sphaerophorus globosus

RW012 (SW49176 39100, 220m): on north side of tor, western colony: sloping face under north east facing overhang, with a few *Parmelinopsis minarum* thalli. Eastern colony: also abundant and fertile on flat slab under boulder on the eastern side of the first colony, facing east.

Photos: Rosewall 2013–20 to 23.



Photo Rosewall 2013–20. RW012: location of the western *Parmelinopsis minarum* colony indicated WC and the eastern *Parmelinopsis minarum* colony indicated EC.



Photo Rosewall 2013-21. RW012: location of the western *Parmelinopsis minarum* colony indicated by the pen.



Photo Rosewall 2013-22. RW012: location of the eastern *Parmelinopsis minarum* colony indicated EC.



Photo Rosewall 2013-23. RW012: location of the eastern *Parmelinopsis minarum* colony is between the pens, where it is abundant and fertile.

RW013 (SW49181 39084, 220m): on south side of tor, *Parmelinopsis minarum* abundant on east facing overhung ledge, with *Hypotrachyna afrorevoluta*.

Photos: Rosewall 2013-24 & 25.



Photo Rosewall 2013-24. RW013: the *Parmelinopsis minarum* colony is on the ledge above the book.



Photo Rosewall 2013-25. RW013: closer view of the *Parmelinopsis minarum* colony, which is between the pens.

The eastern tor was then visited, this is in under grazed heath and Ivy is a threat to the lichen assemblage. Species noted:

The western tor was examined (SW495 393), species noted:

Flavoparmelia caperata
Hypotrachyna afrorevoluta
Micarea viridileprosa
Mycoblastus caesius
Parmelia saxatilis
Parmelinopsis horrescens
Parmelinopsis minarum
Platismatia glauca
Usnea flammea
Xanthoparmelia mougeotii

RW014 (SW49507 39342, 190m): north east facing wall in gully, with frequent *Parmelinopsis horrescens* and occasional *Parmelinopsis minarum*, with *Hypotrachyna afrorevoluta*, *Usnea flammea*, *Parmelia saxatilis*, *Platismatia glauca*, *Micarea viridileprosa*, *Mycoblastus caesius* and *Flavoparmelia caperata*.

Photos: Rosewall 2013–26 to 28.



Photo Rosewall 2013–26. RW014: looking into the gully with the main *Parmelinopsis horrescens* colony indicated (Ph).



Photo Rosewall 2013-27. RW014: closer view the gully with the main *Parmelinopsis horrescens* colony indicated (Ph).

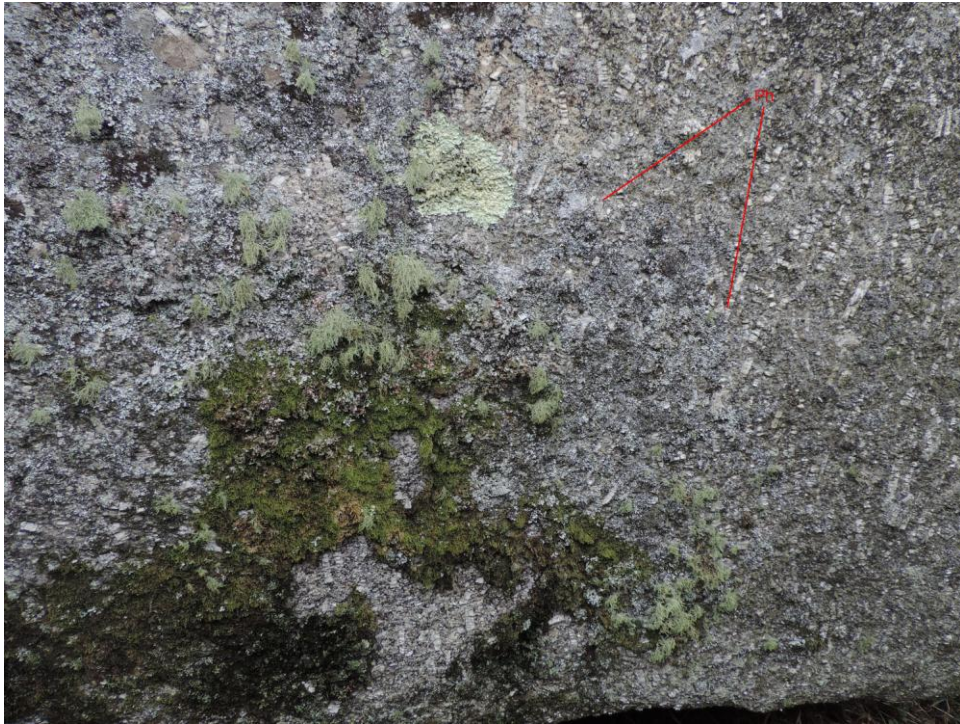


Photo Rosewall 2013-28. RW014: closer view the gully with the main *Parmelinopsis horrescens* colony indicated (Ph).

RW015 (SW49499 39325, 205m): shallow horizontal grove in east facing block, rare *Parmelinopsis horrescens* and occasional *Parmelinopsis minarum*. Frequent *Parmelinopsis horrescens* on ledge below.

Photos: Rosewall 2013-29 & 30.



Photo Rosewall 2013-28. RW014: the *Parmelinopsis horrescens* and *Parmelinopsis minarum* on the upper ledge are above the clipboard, with a large *Parmelinopsis horrescens* colony beyond the clipboard.



Photo Rosewall 2013-29. RW014: the *Parmelinopsis minarum* colony on the lower ledge.

A1.3 Carn Galver**A1.3.1 Carn Galver 8/10/2013**

Weather: overcast, misty on top, heavy drizzle later.

Moor recently gridded and grazing restored beginning to have an effect. The Bracken is still full of Bramble, but cattle trails developing and allow some access, still much Ivy on the smaller rocks.

General granite list, from CG001 (SW4217 3648):

Acarospora fuscata
Cladonia furcata subsp. *furcata*
Cladonia rangiformis
Cladonia subcervicornis
Flavoparmelia caperata
Fuscidea cyathoides var. *cyathoides*
Lecanora gangaleoides
Lecanora polytropa
Lecanora rupicola var. *rupicola*
Melanelixia fuliginosa
Ochrolechia parella
Parmelia omphalodes
Pertusaria excludens
Pertusaria monogona
Porpidia cinereoatra
Ramalina siliquosa
Usnea flammea
Xanthoparmelia conspersa

CG001 (SW42179 36487, 145m): a rock facing on to road by the car park, with *Pertusaria monogona* frequent on near vertical face c12 definitely fertile thalli, with *Pertusaria excludens* also present, also with *Fuscidea cyathoides* var. *cyathoides*, *Ochrolechia parella*, *Ramalina siliquosa*, *Lecanora polytropa*, *Parmelia omphalodes*, *Melanelixia fuliginosa*,

Photos: Galver 2013-01 to 03.



Photo Galver 2013-01. CG001: rock with frequent *Pertusaria monogona* by road to right



Photo Galver 2013-02. CG001: face with frequent *Pertusaria monogona*.



Photo Galver 2013-03. CG001: close up of *Pertusaria monogona*, with apothecia and no sorelia, to lower right, with *Pertusaria excludens*, with sorelia and without apothecia to the left and above.

Above CG001 are scattered of occasional large rocks, many with Ivy.

General granite list, from about CG002 and CG003 (SW422 364):

Cladonia coniocraea
Cladonia diversa
Cladonia polydactyla var. *polydactyla*
Fuscidea cyathoides var. *cyathoides*
Hypogymnia physodes
Lecanora gangaleoides
Ochrolechia androgyna
Parmelia saxatilis
Parmotrema perlatum
Peltigera hymenina
Pertusaria corallina
Pertusaria excludens
Pertusaria monogona
Pertusaria pseudocorallina
Ramalina siliquosa
Sphaerophorus globosus
Trapelia glebulosa

CG002 (SW42276 36470, 165m): boulder to east of path in dense Bracken – Bramble (W25), Ivy threat, *Pertusaria monogona* present, on north facing vertical slab, best thallus below clipboard, some less well developed thalli to left, much *Pertusaria excludens*, also *Ramalina siliquosa*, *Fuscidea cyathoides* var. *cyathoides* and *Lecanora gangaleoides*.

Photos: Galver 2013-04 & 05.



Photo Galver 2013-04. CG002: rock with *Pertusaria monogona*, on skyline to left.



Photo Galver 2013-05. CG002: *Pertusaria monogona* on north facing vertical slab, best thallus below clipboard, some less well developed thalli to left.

CG003 (SW42298 36452, 170m): a tor to west of path, with the eastern most north facing vertical face with *Pertusaria monogona*, at least three good thalli among *Pertusaria excludens*, with *Parmelia saxatilis*, *Fuscidea cyathoides* var. *cyathoides*, *Ochrolechia androgyna* and *Ramalina siliquosa*.

Photos: Galver 2013-06 & 07.



Photo Galver 2013-06. CG003: tor with *Pertusaria monogona*, on skyline to right of path.



Photo Galver 2013-07. CG003: three *Pertusaria monogona* thalli below the clipboard.

Higher up are clitter fields with diverse lichen assemblages but largely lacks the *Hypotrachyna afrorevoluta* community with *Parmelinopsis minarum* and *Parmelinopsis horrescens* is replaced by mixtures of *Hypogymnia physodes* and *Sphaerophorus globosus*. A tiny amount of *Parmelinopsis minarum* was found in one especially deep crevice.

General granite list, from clitter field (SW424 364)

Biatoropsis usnearum, parasitic on *Usnea flammea*

Cladonia gracilis

Cladonia ochrochlora

Cladonia squamosa var. *subsquamosa*

Marchandiomyces corallinus, parasitic on *Porpidia cinereoatra*

Parmelinopsis minarum

Platismatia glauca

Porpidia cinereoatra

Rhizocarpon geographicum

Usnea flammea

CG004 (SW42479 36412, 210m): in clutter of large boulders to right of path walking up, a small amount of *Parmelinopsis minarum* was spotted deep down in cleft.

Photos: Galver 2013-08 & 09.



Photo Galver 2013-08. CG004: location of crevice with *Parmelinopsis minarum*, indicated.



Photo Galver 2013-09. CG004: the crevice with *Parmelinopsis minarum*, is the one between Ollie the terrier and the clipboard.

The northern summit tor complex was reached and the density of interest increased considerably. The rare species were entirely found on shaded or east facing rocks or wet slabs. Sunnier western rocks supported no special interest.

General granite list, from the northern summit (SW425 364)

Acarospora fuscata
Cladonia polydactyla var. *polydactyla*
Cladonia squamosa var. *squamosa*
Cladonia subcervicornis
Flavoparmelia caperata
Fuscidea cyathoides var. *cyathoides*
Hypogymnia physodes
Hypotrachyna afrorevoluta
Lecanora alboflavida
Micarea viridileprosa
Mycoblastus caesius
Opegrapha gyrocarpa
Opegrapha saxigena
Parmelia saxatilis
Parmelinopsis horrescens
Parmelinopsis minarum
Pertusaria amara f. *amara*
Pertusaria aspergilla
Pertusaria corallina
Porpidia cinereoatra
Porpidia tuberculosa
Ramalina siliquosa
Sclerococcum sphaerale, parasitic on *Pertusaria corallina*
Sphaerophorus globosus
Usnea flammea
Xanthoparmelia verruculifera

CG005 (SW42539 36415, 225m): flat ledges under north east facing over hang in large tor complex, south from path, *Parmelinopsis minarum* frequent on three ledges (between equipment in photo), with *Usnea flammea*, *Ramalina siliquosa*, *Cladonia polydactyla* var. *polydactyla*, *Sphaerophorus globosus*, *Parmelia saxatilis*, *Flavoparmelia caperata*, *Pertusaria corallina*, *Fuscidea cyathoides* var. *cyathoides* and *Mycoblastus caesius*. Ivy a threat.

Photos: Galver 2013-10 & 11.



Photo Galver 2013-10. CG005: viewed from path, overhang with *Parmelinopsis minarum*, in centre, rocks of CG035, just visible to right.



Photo Galver 2013-11. CG005: ledges with *Parmelinopsis minarum*, between equipment.
CG006 (SW42547 36431, 225m): ledge under east facing boulder with single *Parmelinopsis minarum* thallus (right of clipboard), with *Cladonia subcervicornis*, *Porpidia cinereoatra*, *Mycoblastus caesius*, *Acarospora fuscata* and *Usnea flammea*.
Parmelinopsis horrescens on vertical face above (below book), two small thalli

Photos: Galver 2013-12 & 13.



Photo Galver 2013-12. CG006: viewed from path, prominent boulder with *Parmelinopsis minarum* and *Parmelinopsis horrescens*.



Photo Galver 2013-13. CG006: viewed from path, prominent boulder with *Parmelinopsis minarum*, right of clipboard and *Parmelinopsis horrescens*, below book.

Overhang with *Opegrapha saxigena* frequent SW4254 3642

CG007 (SW42556 36415, 230m): well light boulder on east side of tor, single thallus of *Lecanora alboflavida* (new to West Penwith), 12cm long, with *Cladonia subcervicornis*, *Usnea flammea*, *Fuscidea cyathoides* var. *cyathoides* and *Pertusaria amara* f. *amara*.

Photos: Galver 2013-14 & 15.



Photo Galver 2013-14. CG007: viewed from path, prominent boulder with *Lecanora alboflavida*, thallus below clipboard.



Photo Galver 2013-15. CG007: *Lecanora alboflavida* thallus is pale yellow upper centre.

CG008 (SW42564 36398, 235m): east facing ledge, very threatened by Ivy with frequent *Parmelinopsis minarum* and occasional *Parmelinopsis horrescens* with *Parmelia saxatilis* and *Hypotrachyna afrorevoluta*.

Photos: Galver 2013-16 & 17.



Photo Galver 2013-16. CG008: east facing ledge with *Parmelinopsis minarum* and *Parmelinopsis horrescens*, between book and clipboard.



Photo Galver 2013-17. CG008: closer view of east facing ledge with *Parmelinopsis minarum* and *Parmelinopsis horrescens*, between book and clipboard. Ivy a serious threat.

CG009 (SW42566 36392, 235m): ledge on north facing outcrop, three *Parmelinopsis minarum* and one large *Parmelinopsis horrescens* (more in light), with *Hypotrachyna afrorevoluta*, *Flavoparmelia caperata*, *Mycoblastus caesius* and *Usnea flammea*.

Photos: Galver 2013-18 & 19.



Photo Galver 2013-18. CG009: north facing ledge with *Parmelinopsis minarum* and *Parmelinopsis horrescens*, to right of clipboard.



Photo Galver 2013-19. CG010: closer view of north facing ledge with *Parmelinopsis minarum* and *Parmelinopsis horrescens*, to right of clipboard.

CG010 (SW42576 36383, 230m): crevice in tor by squeeze on path through, *Parmelinopsis minarum* abundant deep on shade, occasional *Parmelinopsis horrescens* in stronger light, with *Flavoparmelia caperata*, *Parmelia saxatilis*, *Micarea viridileprosa*, *Usnea* sp, *Mycoblastus caesius*, *Hypogymnia physodes* and *Lecanora alboflavida*.

Photos: Galver 2013-20 & 21.



Photo Galver 2013-20. CG010: crevice with *Parmelinopsis minarum*, *Parmelinopsis horrescens* and *Lecanora alboflavida* to left of the path.



Photo Galver 2013-21. CG010: crevice with *Parmelinopsis minarum*, *Parmelinopsis horrescens* and *Lecanora alboflavida*.

CG011 (SW42563 36417, 225m): wet slab in heather, *Lecanora alboflavida*, c 7 thalli with abundant *Mycoblastus caesius*, *Parmelia saxatilis*, *Cladonia subcervicornis*, *Porpidia cinereoatra*

Photos: Galver 2013-22 & 23.



Photo Galver 2013-22. CG011: east facing slab in heather with *Lecanora alboflavida* below rucksack.



Photo Galver 2013-23. CG011: east facing slab in heather with *Lecanora alboflavida*, the smaller yellowish thalli in the top right hand of the slab, with extensive paler *Mycoblastus caesius*.

A1.3.2 Carn Galver 9/10/2013

Weather: dry cloud and sun, clouder latter

Passing through the northern summit tor complex, (SW425 364), a few more species noted:

Micarea lignaria var. *lignaria* Terricolous
Mycoblastus caesius Terricolous
Cladonia portentosa Terricolous & Granite

There were a few small tors between the two summit tor complexes, two of which supported *Parmelinopsis minarum* or *Parmelinopsis horrescens*.

CG012 (SW42595 36310, 225m): small tor between big tors, first on west side from southern tor, frequent *Parmelinopsis minarum* and some *Parmelinopsis horrescens* in low sheltered crannies:

a) north north east facing corner with dominant *Parmelinopsis minarum* associated with *Hypotrachyna afrorevoluta* in crevice at base plus occasional *Parmelinopsis horrescens*.

Photos: Galver 2013-24 to 25.

b) east facing side, *Parmelinopsis minarum* abundant in crevices and along split in rock, *Parmelinopsis horrescens* occasional, with *Hypotrachyna afrorevoluta*, *Parmelia saxatilis*, *Flavoparmelia caperata*, *Usnea flammea*

Photos: Galver 2013-26 to 28.



Photo Galver 2013-24. CG012: north north east facing corner of tor, with *Parmelinopsis minarum* and *Parmelinopsis horrescens*, on ledge above rucksack.



Photo Galver 2013-25. CG012: closer view of ledge with dominant *Parmelinopsis minarum* and some *Parmelinopsis horrescens*.



Photo Galver 2013-26. CG012: east facing side of tor, with *Parmelinopsis minarum* and *Parmelinopsis horrescens*, in vertical crevices.



Photo Galver 2013-27. CG012: east facing side of tor, with *Parmelinopsis minarum* and *Parmelinopsis horrescens*, in vertical crevices above clipboard and book.



Photo Galver 2013-28. CG012: east facing side of tor, with *Parmelinopsis minarum* and *Parmelinopsis horrescens*, close view of vertical crevice above clipboard with abundant *Parmelinopsis minarum*.

CG013 (SW42628 36267, 230m): occasional *Parmelinopsis horrescens* deep under boulder.

Photos: Galver 2013-29 & 30.



Photo Galver 2013-29. CG013: boulder with *Parmelinopsis horrescens*, underneath it.



Photo Galver 2013-30. CG013: closer view of boulder with *Parmelinopsis horrescens*, underneath it.

The southern summit tor complex was reached. As with the northern, the rare species were mainly found on shaded or east facing rocks or wet slabs. Sunnier western rocks supported no special interest.

General granite list, from the southern summit tor complex (SW427 360):

Abrothallus microspermus, parasitic on *Flavoparmelia caperata*

Acarospora fuscata

Cladonia azorica

Cladonia coccifera s. str.

Cladonia cryptochlorophaea

Cladonia cyathomorpha

Cladonia furcata subsp. *furcata*

Cladonia ochrochlora

Cladonia polydactyla var. *polydactyla*

Cladonia squamosa var. *subsquamosa*

Cladonia subcervicornis

Flavoparmelia caperata

Fuscidea cyathoides var. *cyathoides*

Hypotrachyna afrorevoluta

Lecanora alboflavida

Lecanora sulphurea

Melanelixia fuliginosa

Mycoblastus caesius

Opegrapha saxigena

Parmelia omphalodes

Parmelia saxatilis

Parmelinopsis horrescens

Parmelinopsis minarum

Parmotrema reticulatum

Pertusaria corallina

Pertusaria excludens

Pertusaria flavicans

Pertusaria pseudocorallina

Porpidia cinereoatra

Porpidia tuberculosa

Sphaerophorus globosus

Trapelia glebulosa

Usnea flammea

CG014 (SW42723 36088, 245m): east south east facing ledge at base of north west section of tor complex, c 6 small thalli of *Parmelinopsis minarum*, one *Parmelinopsis horrescens* thallus, with *Parmelia saxatilis*, *Flavoparmelia caperata* and *Melanelixia fuliginosa*. Ivy threat.

Photos: Galver 2013–31 to 32.



Photo Galver 2013–31. CG014: tor with *Parmelinopsis horrescens* and *Parmelinopsis minarum* on a ledge by the base, by book.



Photo Galver 2013-32. CG014: closer view of ledge with *Parmelinopsis horrescens* and *Parmelinopsis minarum* right of book.

CG015 (SW42721 36079, 240m): boulder on slab on west side of tor complex, *Parmelinopsis horrescens* deep under boulder. Strong growth c15cm across. Damp slab to north has *Lecanora alboflavida* occasional with *Mycoblastus caesius*, *Hypotrachyna afrorevoluta*, *Cladonia subcervicornis*, two minute *Parmelinopsis horrescens* thalli, *Fuscidea cyathoides* var. *cyathoides*, *Pertusaria excludens* and *Pertusaria pseudocorallina*.

Photos: Galver 2013-33 & 34.



Photo Galver 2013-33. CG015: boulder with *Parmelinopsis horrescens* underneath it, with additional tiny thalli along with occasional *Lecanora alboflavida* on damp slab in front.



Photo Galver 2013-33. CG015: under boulder with large *Parmelinopsis horrescens* thallus marked by pen.

CG016 (SW42719 36047, 240m): deep crevice on west side of tor complex, abundant *Parmelinopsis minarum*. Ivy near by.

Photos: Galver 2013–35 to 37.



Photo Galver 2013–35. CG016: a large crevice under boulders with abundant *Parmelinopsis minarum*.



Photo Galver 2013–36. CG016: a closer view of a large crevice under boulders with abundant *Parmelinopsis minarum*.



Photo Galver 2013-37. CG016: abundant *Parmelinopsis minarum* in a large crevice under boulders.

CG017 (SW 42745 36080, 245m): deep in crevice in rock jumble below north east tor, some *Parmelinopsis horrescens*, not easily to see how much.

Photos: Galver 2013-38 & 39.



Photo Galver 2013-38. CG017: location of crevice with *Parmelinopsis horrescens* in a rock jumble below tor.



Photo Galver 2013-39. CG017: looking down into inaccessible crevice with *Parmelinopsis horrescens* in a rock jumble below tor.

CG018 (SW42743 36092, 240m): *Lecanora alboflavida* on base of north east facing rock, four thalli with *Porpidia* sp, *Cladonia* sp and *Cladonia subcervicornis*.

Photos: Galver 2013–40 & 41.



Photo Galver 2013–40. CG018: location of *Lecanora alboflavida* thalli indicated (La).



Photo Galver 2013–41. CG018: location of *Lecanora alboflavida* thalli (pale yellow thalli) indicated by pen.

East facing tor face, small amount *Opegrapha saxigena* SW4279 3605

CG019 (SW42766 36071): rare *Parmelinopsis minarum* and occasional *Parmelinopsis horrescens* in rubble filled crevice on east facing side of tor, with *Hypotrachyna afrorevoluta*, *Flavoparmelia caperata*, with *Abrothallus microspermus*, *Parmelia saxatilis*, *Lecanora alboflavida*, *Mycoblastus caesius*, *Cladonia subcervicornis*, *Opegrapha saxigena*, *Fuscidea cyathoides* var. *cyathoides* and *Acarospora fuscata*.

Both *Parmelinopsis minarum* & *Parmelinopsis horrescens* frequent in next crevice to south and on north facing side of wider crevice into which the other two crevices open into. Ivy present.

Photos: Galver 2013–42 to 46.



Photo Galver 2013–42. CG019: first rubble filled crevice with *Parmelinopsis horrescens* and *Parmelinopsis minarum* indicated.



Photo Galver 2013-43. CG019: first rubble filled crevice with *Parmelinopsis horrescens* and *Parmelinopsis minarum* above book.



Photo Galver 2013-44. CG019: crevice connecting through to the second crevice, also with *Parmelinopsis horrescens* and *Parmelinopsis minarum*.



Photo Galver 2013-45. CG019: second crevice with *Parmelinopsis horrescens* and *Parmelinopsis minarum* indicated.



Photo Galver 2013-46. CG019: second crevice with *Parmelinopsis horrescens* and *Parmelinopsis minarum* above book and clipboard.

CG020 (SW42783 36044, 250m): open ledge on north east facing tor face, c 11 clumps of *Cladonia azorica* (new to West Penwith) on mossy ledge part shaded by heather, growing on a bryophyte mat with *Scapania gracilis* dominant with *Dicranum scoparium* frequent, with the vascular plants *Sedum anglicum* and *Polypodium* species, *Sphaerophorus globosus* and *Flavoparmelia caperata* present.

At head of gully above frequent *Parmelinopsis horrescens* on north facing side of crevice, with occasional *Parmelinopsis minarum* above. Tiny amount *Lecanora alboflavida* nearby.

Photos: Galver 2013–47 to 50.



Photo Galver 2013–47. CG020: location of *Cladonia azorica* (Ca) site.



Photo Galver 2013-48. CG020: *Cladonia azorica* colony.



Photo Galver 2013-49. CG020: close up of largest *Cladonia azorica* thallus.



Photo Galver 2013-50. CG020: head of gully above the *Cladonia azorica* colony, with *Parmelinopsis horrescens* and *Parmelinopsis minarum* above, close ups not possible.

CG021 (SW42790 36025, 250m): mossy boulder top on broken north east facing slope, *Cladonia azorica*, coalescing clumps over c30cm, with liverwort *Scapania gracilis*, vascular plant *Polypodium* and lichens *Cladonia furcata* subsp. *furcata*, *Flavoparmelia caperata*, *Parmelia saxatilis* and *Cladonia polydactyla* var. *polydactyla*. A single clump of *Cladonia azorica* on adjacent face, with also *Sphaerophorus globosus*. *Pertusaria flavicans* noted below the second thallus. Ivy present.

Photos: Galver 2013-51 to 54.



Photo Galver 2013-51. CG021: the clipboard is just above the main *Cladonia azorica* colony, the other thallus is on the mossy face visible just above the clipboard.



Photo Galver 2013-52. CG021: the clipboard is just above the main *Cladonia azorica* colony, seen from below.



Photo Galver 2013-53. CG021: the main *Cladonia azorica* colony.



Photo Galver 2013-54. CG021: the single *Cladonia azorica* thallus on face opposite.

CG022 (SW42795 36014, 250m): single *Parmelinopsis minarum* thallus in horizontal crevice facing south west, with frequent *Cladonia cyathomorpha* in crevice behind, with *Cladonia subcervicornis*.

Photos: Galver 2013-55 & 56.



Photo Galver 2013-55. CG022: ledge below crevice with location of *Parmelinopsis minarum* (Pm) thallus indicated, *Cladonia cyathomorpha* is behind.



Photo Galver 2013-56. CG022: location of *Parmelinopsis minarum* (Pm) thallus indicated by silver end of pen, *Cladonia cyathomorpha* is bluish green lichen behind.

CG023 (SW42793 36010, 255m): slab under boulder, south east facing, frequent *Parmelinopsis horrescens*. Ivy and Bramble present.

Photos: Galver 2013-57 & 58.



Photo Galver 2013-57. CG023: slab under larger slab with *Parmelinopsis horrescens* right of book.



Photo Galver 2013-58. CG023: slab under larger slab with frequent *Parmelinopsis horrescens* between book and bramble.

CG024 (SW42802 36016, 250m): sloping east facing slab with five small young *Cladonia azorica* clumps, with the bryophytes *Frullania fragilifolia* and *Campylopus flexuosus* and the lichens *Cladonia ochrochlora*, *Flavoparmelia caperata*, *Cladonia squamosa* var. *subsquamosa*, *Cladonia cyathomorpha* (rare), *Cladonia coccifera* s. str., *Cladonia furcata* subsp. *furcata* and on the rock *Lecanora alboflavida*. Ivy threat.

Photos: Galver 2013-59 & 60.



Photo Galver 2013-59. CG024: moss slab with *Cladonia azorica* below clipboard.



Photo Galver 2013-59. CG024: moss slab with *Cladonia azorica* thalli indicated (Ca).

CG025 (SW42804 36000, 255m): single *Parmelinopsis horrescens* thallus in south west facing corner on way up southern tor, with *Hypotrachyna afrorevoluta*, with more *Lecanora alboflavida* on rock adjacent.

Photos: Galver 2013-61 & 62.



Photo Galver 2013-61. CG025: single thallus of *Parmelinopsis horrescens* above clipboard.



Photo Galver 2013-61. CG025: single thallus of *Parmelinopsis horrescens* with pen pointing to thallus.

CG026 (SW42817 36007, 250m): sloping boulder top, north east facing, with *Lecanora alboflavida*, c7 thalli, with *Fuscidea cyathoides* var. *cyathoides*, *Cladonia subcervicornis*, *Mycoblastus caesius*, *Parmelia omphalodes*, *Hypogymnia physodes*, *Pertusaria corallina*, *Porpidia tuberculosa*, *Flavoparmelia caperata*, *Porpidia cinereoatra* and *Trapelia glebulosa*.

Photos: Galver 2013-63 & 64.



Photo Galver 2013-63. CG026: rock with *Lecanora alboflavida* below clipboard.



Photo Galver 2013-64. CG026: rock with *Lecanora alboflavida*, with pale yellow thalli.

CG027 (SW42801 36004, 250m): east facing slab at base of boulder by path up southern end of tor, three *Parmelinopsis minarum* thalli along top edge, three *Parmelinopsis horrescens* below, *Lecanora alboflavida* frequent on slab, with *Hypotrachyna afrorevoluta*, *Parmelia saxatilis*, *Acarospora fuscata*, *Melanelixia fuliginosa* and *Flavoparmelia caperata*. Also *Parmelinopsis minarum* on same slab on west side of boulder.

Photos: Galver 2013–65 & 66.



Photo Galver 2013–65. CG027: slab with *Parmelinopsis minarum*, *Parmelinopsis horrescens* and *Lecanora alboflavida* left of clipboard.



Photo Galver 2013–65. CG027: slab with *Parmelinopsis minarum*, *Parmelinopsis horrescens* and *Lecanora alboflavida*.

The southern most section of tor was not accessed due to very dense vegetation making further progress south impossible. Descending down the path an area of wet heath was crossed, which proved to be rich in lichens, with *Cladonia callosa* (new to west Cornwall) frequent.

General list from wet heath (SW427 359):

Cladonia callosa

Cladonia cervicornis subsp. *verticillata*

Cladonia ciliata var. *ciliata*

Cladonia diversa

Cladonia floerkeana

Cladonia portentosa

Cladonia ramulosa

Cladonia squamosa var. *squamosa*, heathland form.

Cladonia subcervicornis

Pseudevernia furfuracea s. lat.

CG028 (SW42731 35920, 235m): small amount of *Cladonia callosa* with podetia on bare humus by a pan over a rock in wet heath, with *Cladonia floerkeana*, *Cladonia crispata* var. *cetrariiformis*, *Cladonia subcervicornis*.

Photos: Galver 2013–67 & 68.



Photo Galver 2013–67. CG028: a pan between the clipboard and the rucksack with *Cladonia callosa*.



Photo Galver 2013–68. CG028: a closer view of the pan with *Cladonia callosa*, which is marked by a pen.

CG029 (SW42721 35917, 230m): strong patch of largely sterile *Cladonia callosa* in similar open pan over a rock in wet heath.

Photos: Galver 2013-69 & 70.



Photo Galver 2013-69. CG029: a pan by the pen in front of the rucksack with *Cladonia callosa*.



Photo Galver 2013-70. CG029: a closer view of the pan with *Cladonia callosa*, which is marked by a pen.

CG030 (SW42718 35915, 335m): small sterile thalli *Cladonia callosa* widespread, with a single podetia, around peaty pan, by small rock.

Photos: Galver 2013-71 & 72.



Photo Galver 2013-71. CG030: a pan between the clipboard and the rucksack with *Cladonia callosa* by the pen.



Photo Galver 2013-72. CG030: a closer view of the pan with *Cladonia callosa*, which is around the pen.

CG031 (SW42658 35961, 230m): humus exposed at path side, *Cladonia callosa* frequent with podetia, along with *Cladonia ramulosa*, *Cladonia floerkeana* and *Cladonia subcervicornis*.

Photos: Galver 2013-73 & 74.



Photo Galver 2013-73. CG031: a worn path edge with *Cladonia callosa* between the clipboard and the flat rock.



Photo Galver 2013-74. CG031: a worn path edge with *Cladonia callosa* the brown squamules between the clipboard and the flat rock.

A1.3.2 Carn Galver 11/10/2013

Weather: sunny and windy.

After receiving picture of the missed *Bryoria bicolor* and *Ramalina chondrina* sites from Barbara Benfield during the survey, an attempt was made to relocate the sites from the pictures. This involved lining up the landscape north of the road in the *Bryoria bicolor* picture and walking up slope through some very difficult to traverse overgrown heath. Ironically, the site was relocated by the main path round the northern summit tor complex and could have been easily reached up the path. On the lower slopes rare lichens were searched for:

General granite list, first big boulder (SW4231 3663):

Flavoparmelia caperata

Lecanora polytropia

Melanelixia fuliginosa

Ochrolechia parella

Parmelia omphalodes

Pertusaria excludens

Pertusaria monogona

Pertusaria pseudocorallina

CG032 (SW42311 36630, 120m): first big boulder on the lower slope, south east facing steep face with three *Pertusaria monogona* thalli down west side, one *Pertusaria excludens* thallus to the east. With *Pertusaria pseudocorallina*, *Flavoparmelia caperata*, *Ochrolechia parella*, *Parmelia omphalodes*, *Lecanora polytropia*, *Pertusaria excludens* and *Melanelixia fuliginosa*.

Photos: Galver 2013-75 & 76.



Photo Galver 2013-75. CG032: an isolated boulder with *Pertusaria monogona*.



Photo Galver 2013-75. CG032: a closer of an isolated boulder with *Pertusaria monogona* (Pm) and *Pertusaria excludens* (Pe).

Above this were some interesting slabs. With *Stereocaulon evolutum* on a SW4234 3662 on wet slab and a rich *Cladonia* assemblage on low peat banks at the edges of the slabs.

List from slabs above bend in road and pull off (SW423 366):

Cladonia callosa
Cladonia cervicornis subsp. *verticillata*
Cladonia coccifera s. str.
Cladonia crispata var. *cetrariiformis*
Cladonia cryptochlorophaea
Cladonia floerkeana
Cladonia ochrochlora
Cladonia portentosa
Cladonia ramulosa
Cladonia squamosa var. *squamosa*
Cladonia subcervicornis
Porpidia macrocarpa, granite
Stereocaulon evolutum
Trapeliopsis flexuosa
Trapeliopsis pseudogranulosa

CG033 (SW42331 36606, 140m): peat bank at top of slab on slope, two small patches of *Cladonia callosa*, with *Cladonia subcervicornis*, *Cladonia floerkeana*, *Cladonia verticillata* and *Cladonia squamosa* var. *squamosa*. Nearby *Cladonia coccifera* s. str.

Photos: Galver 2013-77 & 78.



Photo Galver 2013-77. CG033: peat bank on a slab edge with *Cladonia callosa*, marked by red pen.



Photo Galver 2013-78. CG033: closer view of peat bank on a slab edge with *Cladonia callosa*, marked by red pen.

After the slabs, the ridge up to the northern summit tor complex was climbed as rapidly as possible through appallingly overgrown heath, without searching the largely inaccessible rocks on the way up. The *Bryoria bicolor* slab was eventually lined up with the 2001 photograph (**Photo Benfield 2001-01**) but none found (**CG034**, SW42553 36429, 125m). The site was on the main path around the southern summit tors. The difference between the pictures was marked; the landscape was much more overgrown in 2013 (**Photo Galver 2013-79**) than in 2001. This alone could account for the loss of the *Bryoria bicolor*; it is likely to have been shaded out by the taller heather. The slab is also on the main path over the tor, but if trampling the main problem then the heather would not have overgrown the short vegetation at the exposed rock edge.



Photo Benfield 2001-01. CG034: the *Bryoria bicolor* slab in 2001, generally short and open vegetation, with the *Bryoria* probably in the open grassy fringe on the edge of the exposed rock



Photo Galver 2013-79. CG034: the landscape is much more overgrown than in 2013 and the *Bryoria* habitat lost

The potential *Ramalina chondrina* was then found by lining up with the 2001 photograph (CG035). Barbara Benfield, had already expressed strong reservations about this record and nothing resembling *Ramalina chondrina* was found, only light starved *Ramalina siliquosa* with UV + white fluorescence (*Ramalina chondrina* is UV-). The record of *Ramalina chondrina* was discounted by agreement with Barbara Benfield and the author. *Parmelinopsis horrescens* and *Parmelinopsis minarum* were found under this overhang in 2013.

CG035 (SW42536 36415, 125m): distinctive outcrop just off main path up the southern summit tors, *Parmelinopsis horrescens* on vertical face under overhang and *Parmelinopsis minarum* on a flat slab below.

Photos: Benfield 2001–02, Galver 2013–80 & 81.

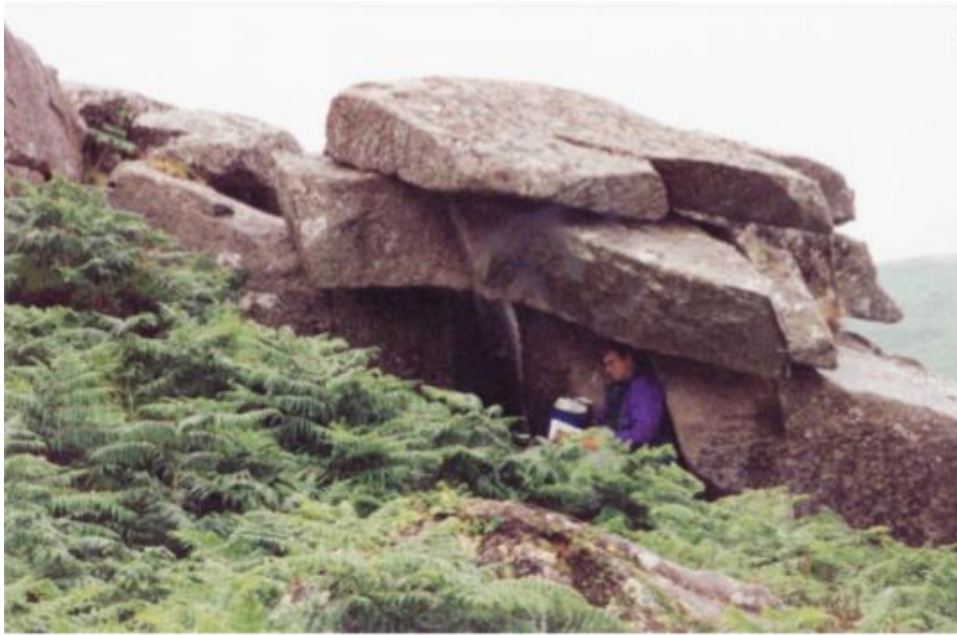


Photo Benfield 2001–02. CG035: the purgative *Ramalina chondrina* location in the crevice left of the sheltering lichenologist in 2001



Photo Galver 2013–80. CG035: no *Ramalina chondrina* was found in 2013 but *Parmelinopsis horrescens* and *Parmelinopsis minarum* were found on the left side of the underhang.



Photo Galver 2013-81. CG035: is on the *Parmelinopsis horrescens* on vertical face above and *Parmelinopsis minarum* on the flat slab below.

On this rock a new species for the survey was added:

General granite list, near CG035 (SW425 364)
Haematomma ochroleucum var. *ochroleucum*

A1.3 Leswidden

A1.3.1 Leswidden 11/9/2013

Weather: sunny and windy

Areas follow numbering on map supplied with property boundaries, this is not reproduced but the owners names are given to allow relocation.

Area 3 (Mr S May): western section, mainly tall dense H8 heath. Open edge to track supports *Collema auriforme*. North west edge has more open wet heath, with very limited lichen assemblage, adding *Cladonia portentosa*, *Micarea lignaria* var. *lignaria* and *Cladonia crispata* var. *ceptrariiformis*. The old china clay works was totally overgrown. No lichens apart for concrete weeds ob concrete riuns, which were not recorded.

General terricolous list (SW392 311 & SW390 312)

Cladonia crispata var. *ceptrariiformis*

Cladonia portentosa

Collema auriforme

Micarea lignaria var. *lignaria*

Area 3 (Mr S May): eastern section, very overgrown, Bracken and some heath, no lichens.

Area 1 (Mr T Mc Fadden): no permission to enter so overlooked from road; dense H8 heath, spoil totally overgrown. Not likely to be of any lichen interest.

Area 5 (Mr C Rolinson): no permission to enter so overlooked from road; it looks very overgrown now, except for some disturbance about an occupied caravan. Not likely to be of any lichen interest.

Area 4 (Mr M and Mrs E Roberts, Leswidden Block Works and Building Supplies): mainly dense overgrown heath, Bramble and Gorse, with no lichens. Some small exposures of soil and rotten granite at western end of pit were safe to approach (SW3933 3092), but others could not be reached as they plunged into the lake. The accessible banks had a limited lichen assemblage of acidic shaded soil rock banks of no significant interest.

General terricolous list (SW3933 3092)

Baeomyces rufus

Cladonia pyxidata

Cladonia ramulosa

Micarea bauschiana.

Micarea lignaria var. *lignaria*

Micarea prasina s. lat.

Mycoblastus caesius

Porpidia crustulata, granite

Rhizocarpon reductum, granite

Trapeliopsis pseudogranulosa

ANNEX 2 Species Lists Recorded 2013.**SPECIES LIST**
Lichens Recorded From West Penwith Moors 2013

Species	Trencrom	Rosewall	Carn Galver	Busvargus & Tregeseal Commons	Conservation Status
Abrothallus microspermus	1	1	1		NS
Acarospora fuscata	1		1		
Anaptychia runcinata	1	1			
Aspicilia caesiocinerea	1				
Baeomyces rufus		1	1	1	
Biatoropsis usnearum		1			
Buellia aethalea	1	1			
Candelariella coralliza	1	1			
Cladonia azorica			1		Nb (NS)
Cladonia callosa		1	1		Nb (NS)
Cladonia cervicornis subsp. cervicornis	1	1			
Cladonia cervicornis subsp. verticillata			1		
Cladonia ciliata var. ciliata	1		1		
Cladonia coccifera s. str.	1	1	1		DD/NS?
Cladonia coniocraea		1	1		
Cladonia crispata var. cetrariiformis		1	1	1	
Cladonia cryptochlorophaea	1	1	1		NS
Cladonia cyathomorpha	1	1	1		Nb (NS)
Cladonia diversa	1	1	1		
Cladonia floerkeana	1	1	1		
Cladonia furcata subsp. furcata	1	1	1		
Cladonia gracilis			1		
Cladonia ochrochlora		1	1		
Cladonia polydactyla var. polydactyla	1	1	1		
Cladonia portentosa	1	1	1	1	
Cladonia pyxidata	1			1	
Cladonia ramulosa	1	1	1	1	
Cladonia rangiformis		1	1		
Cladonia squamosa var. squamosa		1	1		
Cladonia squamosa var. subsquamosa		1	1		
Cladonia subcervicornis	1	1	1		
Collema auriforme				1	
Flavoparmelia caperata	1	1	1		
Fuscidea cyathoides var. cyathoides	1	1	1		
Haematomma ochroleucum var. ochroleucum			1		
Hypogymnia physodes	1	1	1		
Hypogymnia tubulosa	1				
Hypotrachyna afrorevoluta	1	1	1		
Hypotrachyna britannica	1				
Hypotrachyna laevigata		1			
Hypotrachyna revoluta s.str.	1				
Lecanora alboflavida	1	1	1		Nb (NS)
Lecanora gangaleoides	1	1	1		
Lecanora polytropa	1	1	1		
Lecanora praepostera	1				Nb (NS)
Lecanora rupicola var. rupicola	1	1	1		
Lecanora sulphurea			1		
Lepraria caesioalba	1	1			
Lichenomphalia umbellifera		1			
Marchandiomyces corallinus	1		1		
Melanelixia fuliginosa		1	1		
Micarea bauschiana				1	
Micarea lignaria var. lignaria		1	1	1	
Micarea prasina s. lat.				1	
Micarea viridileprosa		1	1		NS
Micarea xanthonica		1			Nb (NS/IR)
Mycoblastus caesius	1	1	1	1	
Ochrolechia androgyna			1		
Ochrolechia parella	1		1		
Opegrapha gyrocarpa		1	1		
Opegrapha saxigena	1	1	1		Nb (NS/IR)
Opegrapha zonata		1			
Parmelia omphalodes	1	1	1		
Parmelia saxatilis	1	1	1		
Parmelia sulcata	1				
Parmelinopsis horrescens	1	1	1		NT (NS/IR)
Parmelinopsis minarum	1	1	1		Nb (NS/S8)
Parmotrema perlatum	1	1	1		
Parmotrema reticulatum	1	1	1		
Peltigera hymenina	1	1	1		
Peltigera membranacea	1	1			

Species	Trencrom	Rosewall	Carn Galver	Busvargus & Tregeseal Commons	Conservation Status
Pertusaria amara f. amara			1		
Pertusaria aspergilla	1	1	1		
Pertusaria corallina	1	1	1		
Pertusaria excludens	1	1	1		Nb (NS)
Pertusaria flavicans			1		
Pertusaria monogona		1	1		Nb (NS)
Pertusaria pseudocorallina	1	1	1		
Phaeographis dendritica	0				
Phaeographis smithii	0				
Placynthiella icmalea		1	1		
Platismatia glauca	1	1			
Polysporina simplex	1				
Porpidia cinereoatra		1	1		
Porpidia crustulata				1	
Porpidia macrocarpa			1		
Porpidia tuberculosa	1	1	1		
Pseudevernia furfuracea s. lat.			1		
Psilolechia lucida	1				
Punctelia subrudecta s. str.	1				
Ramalina siliquosa	1	1	1		
Ramalina subfarinacea	1	1			
Rhizocarpon geographicum	1	1	1		
Rhizocarpon reductum				1	
Rhizocarpon richardii	1				
Rinodina atrocinerea	1				
Sclerococcum sphaerale	1		1		
Sphaerophorus globosus	1	1	1		
Stereocaulon evolutum	1	1	1		
Trapelia coarctata	1				
Trapelia glebulosa	1		1		
Trapeliopsis flexuosa			1		
Trapeliopsis granulosa		1			
Trapeliopsis pseudogranulosa		1	1	1	
Usnea esperantiana	1				NT (NS/IR)
Usnea flammea	1	1	1		
Xanthoparmelia conspersa	1	1	1		
Xanthoparmelia mougeotii		1			
Xanthoparmelia pulla	1				
Xanthoparmelia verruculifera	1	1	1		

Key 1 = recorded on rock or soil & 0 = only recorded as an epiphyte.

ANNEX 3 Synonyms For New Names Used in this Report**New Name**

Hypotrachyna afrorevoluta
 Hypotrachyna britannica
 Hypotrachyna laevigata
 Hypotrachyna revoluta s. str.
 Lecanora alboflavida
 Parmelinopsis horrescens
 Parmelinopsis minarum
 Parmotrema perlatum

Parmotrema reticulatum
 Punctelia subrudecta s. str.
 Xanthoparmelia conspersa
 Xanthoparmelia mougeotii
 Xanthoparmelia pulla

Xanthoparmelia verruculifera

Old Name

Parmelia revoluta s. lat.
 Parmelia britannica
 Parmelia laevigata
 Parmelia revoluta s. lat.
 Ochrolechia inversa
 Parmelia horrescens
 Parmelia minarum
 Parmelia perlata
 Parmotrema chinense
 Parmelia reticulata
 Parmelia subrudecta
 Parmelia conspersa
 Parmelia mougeotii
 Parmelia pulla
 Neofuscelia pulla
 Parmelia verruculifera,
 Neofuscelia verruculifera

Old Name

Neofuscelia pulla
 Neofuscelia verruculifera
 Ochrolechia inversa
 Parmelia britannica
 Parmelia conspersa
 Parmelia horrescens
 Parmelia laevigata
 Parmelia minarum
 Parmelia mougeotii
 Parmelia perlata
 Parmelia pulla
 Parmelia reticulata
 Parmelia revoluta s. lat.
 Parmelia revoluta s. lat.
 Parmelia subrudecta
 Parmelia verruculifera
 Parmotrema chinense

New Name

Xanthoparmelia pulla
 Xanthoparmelia verruculifera
 Lecanora alboflavida
 Hypotrachyna britannica
 Xanthoparmelia conspersa
 Parmelinopsis horrescens
 Hypotrachyna laevigata
 Parmelinopsis minarum
 Xanthoparmelia mougeotii
 Parmotrema perlatum
 Xanthoparmelia pulla
 Parmotrema reticulatum
 Hypotrachyna afrorevoluta
 Hypotrachyna revoluta s. str.
 Punctelia subrudecta s. str.
 Xanthoparmelia verruculifera
 Parmotrema perlatum

Future Changes

Smith et al (2009) was conservative and did not adopt some changes that are likely to be accepted later. In particular the genus *Parmelinopsis* is now widely sunk within *Hypotrachyna*. In addition, *Hypotrachyna britannica* has every appearance of being simply a sunshine form of *Hypotrachyna afrorevoluta*, but genetic work is required to confirm this. *Cladonia cervicornis* subsp. *verticillata* had long been regarded as a species in Europe and the failure to update this in Smith et al (2009) reflects the lack of revision in this genus in the 2009 edition.

Potential Future Old Name

Cladonia cervicornis subsp. cervicornis
Cladonia cervicornis subsp. verticillata
Hypotrachyna britannica
Parmelinopsis horrescens
Parmelinopsis minarum

Potential New Name

Cladonia cervicornis s. str.
Cladonia verticillata
Hypotrachyna afrorevoluta s. lat.
Hypotrachyna horrescens
Hypotrachyna minarum

ANNEX 4 Specimens Retain 2013

Number	Species	Substrate	Habitat	Locality	Grid Ref	Date	Collected	Determined by
1960	<i>Cladonia azorica</i>	On moss on ledge on NE facing granite cliff	Granite tor in moorland, 240m	CG020, Carn Galver, West Penwith, W Cornwall, VC01	SW42783 36044	9/10/2013	N A Sanderson	NAS
Identification Features Podetia fine, branching in twos and threes tips Pd + red-orange, lower cortex UV + blue-white								
1990	<i>Cladonia coccifera</i> s. str.	On moss on granite slab	Granite boulders in moorland, 160m	TH004, Trencrom Hill, West Penwith, VC01	SW51834 36100	6/10/2013	N A Sanderson	NAS
Identification Features Bullate granules in cup and podetia. Underside of squamules granular.								
1964	<i>Cladonia cyathomorpha</i>	On moss on sloping slab on NE facing granite tor	Granite tor in moorland, 250m	CG024, Carn Galver, West Penwith, W Cornwall, VC01	SW42802 36016	9/10/2013	N A Sanderson	NAS
Identification Features Pd + red-orange; cups with large flattened granules, to 0.2mm long, leavy squamules on cup edge, poditia largely vericose, without leafy granule, underside of squammules, vined and strongly mealy								
1991	<i>Pertusaria excludens</i>	On steep face granite, facing south west	Granite boulders in moorland, 160m	TH004, Trencrom Hill, West Penwith, VC01	SW51834 36100	6/10/2013	N A Sanderson	NAS
Identification Features Medulla K+ yellow to blood-red, Pd+ yellow-orange, UV± pale grey; with abortive apothecia, with no spores, soredia present								