A REPORT TO NATIONAL TRUST FOR SCOTLAND

St Kilda
Lichen Survey

April 2014

Andy Acton, Brian Coppins, John Douglass & Steve Price

Looking down to Village Bay, St. Kilda from Glacan Conachair

the National Trust for Scotland
a place for everyone

Andy Acton andy.acton.esm@gmail.com
Brian Coppins lichenel@btinternet.com

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1 INTRODUCTION

1.1 Background

The St. Kilda Archipelago is c. 40 miles west of the Outer Hebrides and includes three main islands Hirta, Boreray and Soay (see Fig. 1). This report deals just with Hirta as this was the only island visited during this 2013 survey.

The islands are currently owned and managed by the National Trust for Scotland (NTS). Soay sheep currently graze all accessible ground on Hirta. Apart from in Village Bay where occasional NTS work parties maintain/restore buildings and Cleits, there appears to be little other active management of the semi-natural habitats.

The lichen flora has been studied by Oliver Gilbert (Gilbert *et al.* 1979) but has otherwise been little visited by lichenologists due to the remote nature of the site and the difficulty of access (section1.2). In 2013, Richard Luxmoore (NTS) commissioned a new lichen survey of St. Kilda.

1.2 Previous lichen recording

The first lichens recorded from St Kilda appear to be the 18 listed by the entomologist C. Gordon Hewitt (1885–1920) following his visit in July 1906 (Hewitt 1907). It was not until 1958 that the next contribution was made: during Donald McVean's vegetation studies. A few records are found in his paper on the vegetation of St Kilda and North Rona (McVean 1961), but a fuller list, mainly of macrolichens, is in a typed list prepared for Oliver Gilbert. Next was Roy Watling's visit for two weeks in September 1967, when he made extensive collections of lichens as well as of fungi and algae. All his lichen records (65 species) are supported by specimens housed in the Herbarium of the Royal Botanic Garden Edinburgh (E), and were identified by Peter James of the Natural History Museum and by Brian Coppins. His finds are incorporated in Gilbert *et al*. (1979). The lichen list for St Kilda was greatly increased by Oliver Gilbert during his two week stay in July 1978. His results are presented in Gilbert *et al*. (1979), and more background information and anecdotes can be found in Gilbert (2000, 2004) and Love (2009). A brief visit to Hirta was made in 2010 by Chris Ellis and Paul Harrold. They recorded a few lichens, but their lists are not yet available.

Most of the lichen recording given above was from Hirta, although Oliver Gilbert did visit Dun for a day. There is only one record from Soay, that of *Lecanora straminea* on aluminium from a crashed Wellington bomber (Gilbert 2004: 80). Gilbert's attempts to get to Boreray were unsuccessful, and so far the only records from the island are the 35 lichens recorded by Judith Roper-Lindsay on The Boreray 1980 Expedition, in July 1980 (Duncan *et al*. 1981), determined by Brian Coppins. All the species she recorded are known from Hirta with the exception of *Parmotrema reticulatum*.

Fig. 1. A map of North West Scotland indicating the location of the St. Kilda archipelago. Map from Ordnance Survey OpenData © Crown copyright 2011.

1.2 Study areas

Lichen survey is time consuming so within the available time it was decided to focus survey effort on several key lichen habitats based on examination of the Ordnance Survey maps, and the information in Gilbert (1979).

The habitats surveyed included a variety of coastal habitats, 'inland' outcrops and cliffs, moorland, freshwater habitats, Cleits, stone walls and buildings in Village Bay, and the graveyard.

Figure 2. The main areas visited during the survey as indicated by the locations of records for a range of notable species (the red dots). The data on which this map is based is presented in the Table in Appendix 4. A GIS shapefile of the data has also been supplied to NTS. Contains Ordnance Survey Data © Crown copyright and database right 2014.

2 METHODOLOGY

2.1 Field survey

The survey took the form of a walkover survey of the study site. Potential lichen habitats within the study site were searched for lichens, lichenicolous fungi and non-lichenized fungi traditionally recorded by lichenologists. Survey effort concentrated on those habitats likely to support well developed lichen communities and/or notable species. Species identifiable in the field were recorded together with their micro-habitat. The locations of any Nationally Rare, Scarce or Threatened (e.g. Red List) species were recorded with a handheld Garmin Global Positioning System (GPS). Samples were collected (using a knife or hammer and chisel) of species not readily identifiable in the field using a x10 hand lens, for subsequent identification in the laboratory.

Within main habitat types (moorland, inland rock outcrops, coastal habitats etc.) the different micro-habitats or niches available for lichens were examined. Lichens can grow on shrubs (epiphytic lichen habitat), on the ground (terricolous habitat), on rocks (saxicolous habitat), on other lichens (lichenicolous), over bryophytes (bryicolous) and on lignum (lignicolous).

Note that the distinctions are not always clear cut. For example terricolous lichens can grow amongst vegetation on the ground, on soils (including soil accumulations in rock crevices, on rock ledges or exposed soils at edges of turf). Terricolous lichens can often spread onto rocks at rock/soil interfaces especially on crumbling rocks or where there is flushing of nutrients from above (e.g. from turf capped ledges). They commonly grow over mosses and can spread onto the bases of low growing vegetation (e.g. over the bases of dwarf shrubs) or over decaying vegetation (e.g. dead tussocks of vascular plants).

2.2 Data collation, laboratory work

Samples collected in the field were identified in the laboratory using the standard literature (Smith *et al.*, 2009 and various keys in the published and unpublished literature), compound/binocular microscopes, and chemical analysis, with reference to herbarium specimens where necessary. Lists were compiled of all species identified in the field and in the laboratory. The conservation status of each species recorded was listed (following Woods & Coppins, 2012).

All records will be submitted to the Scottish Sites Lichen Database (SSLD) and subsequently uploaded to the National Biodiversity Network (http://data.nbn.org.uk/.)

2.3 Ecological importance

The ecological importance of the study site for lichens was assessed on the basis of:

- The presence of Threatened and Near Threatened species i.e. IUCN Red List species (Critically Endangered (**CR**), Endangered (**EN**), and Vulnerable (**VU**) species) and species that are considered to be Near Threatened (**NT**) by Woods & Coppins (2012).
- The presence of species with International Responsibility (**IR**) status i.e. those species for which Britain supports populations that are important in a European or global context (Woods & Coppins, 2012).
- The presence of Nationally Rare (**NR**), Nationally Scarce (**NS**), Biodiversity Action Plan (**BAP**) Priority species and species on Schedule 8 (**S8**) of the Wildlife and Countryside Act (1981).

2.4 Constraints

Practical considerations restricted the coverage of the site. Time was limited so many suitable lichen habitats remain unexplored. In addition, access was difficult along many sections of the coast due to very steep slopes, unstable ground and cliffs. H&S considerations precluded access to many of these sections.

Even in areas visited, lichens may have been overlooked. Many lichens are very small and inconspicuous or only identifiable under a microscope. Field survey cannot hope to identify all locations of such species. It is inevitable that some locations/species will be overlooked.

There is undoubtedly still much to explore and discover on St. Kilda. Recording in 2013 was undertaken only on Hirta (and there is still much to explore here). The bird colonies on Dun are known to be of high interest for lichens (Gilbert *et al.* 1979) and the other islands and Stacks (e.g. Soay, Boreray, Stac an Armin and Stac Lee) will almost certainly support additional notable lichen interest.

3 RESULTS SUMMARY

The main lichen habitats of interest in the study area were: maritime grassland and heath (including wind blasted areas that appear to be little more than gravel patches until closely inspected, and terracettes associated with sheep grazing/trampling), and rocky cliff habitats subject to salt spray and/or enrichment from bird droppings. Sections 4–10 of this report describe the lichen flora of main lichen habitats encountered during the survey work. Note: In sections 4–10 the frequency (rare, scarce, occasional, frequent etc.) refers to the frequency within the particular area/habitat under discussion unless stated otherwise (e.g. qualified by on 'Hirta').

The lichen survey recorded 323 taxa including 295 lichens and 28 lichenicolous fungi. Seventy-six of these are new records for VC110, and 160 species were new records for St. Kilda.

Many of the taxa recorded are common and widespread species in Britain, but a substantial number are of conservation importance. A full list of taxa recorded is given in Appendix 1. This also includes details of the conservation status of each species. The numbers of notable species records are summarized below in Table 1. Table 2 lists the Red Data Book listed species recorded.

Table 1. Numbers of notable species recorded during the lichen survey on St. Kilda.

Conservation status	**Number of taxa**
Threatened (Red List Vulnerable)	**2**
Near Threatened (**NT**)	**6**
Data deficient (**DD**)[3]	**5**
Nationally Rare (**NR**)[1]	**8**
Nationally Scarce (**NS**)[1]	**68**
Internationally Responsibility (**IR**)[2]	**15**
Endemic species (**E**)	**4** (incl. 3 undescribed taxa)
UKBAP species	**2**
Scottish Biodiversity List (**Sc**) species	**18**

[1] Some Nationally Rare and Scarce taxa may be of relatively low conservation concern because they are considered not to be under major threat. This may be, for example, because there is no shortage of suitable habitat for a species but it is considered to be under-recorded (e.g. because it is very inconspicuous). Following Woods & Coppins (2012) these populations are assessed as of Least Concern (LC) at the National Level in Appendix 1. However, some species with Least Concern status can be indicators of good quality habitat, and some may still be of some conservation importance (e.g. because they rare or threatened at the regional level).

[2] British populations of IR species are of international significance because Woods & Coppins (2012) estimate that Britain supports more than 10% of the European or global population of these species.

[3] Data Deficient (DD) means that there is a significant possibility that the species may be threatened because it appears to be restricted to a sparse or declining habitat but there is insufficient data to evaluate it fully (Woods & Coppins 2012).

Table 2. Red Data Book listed species recorded on Hirta.

Species	**Conservation Status**
Agonimia repleta	DD NR
Anaptychia ciliaris subsp. *mamillata*	NT NS
Caloplaca caesiorufella	VU NR P Sc
Caloplaca scopularis	NT NS
Degelia ligulata	VU NR Sc IR
Gyalideopsis 'hirtensis'	NE NR
Lecania suavis	DD NR
Lecanora straminea	NT NR Sc
Leptogium palmatum	NT NS Sc
Opegrapha sphaerophoricola	DD NR Sc
Placopsis gelida	DD NS
Porina interjungens	NT NS
Sphinctrina tubiformis	DD NR
Stigmidium hageniae	NT NR

4 MARITIME GRASSLAND (INCLUDING SWARDS DOMINATED BY *PLANTAGO MARITIMA* AND *ARMERIA MARITIMA*)

Some maritime grasslands where vascular plants form a closed sward provide few niches for lichens to develop – for example tight swards of *Plantago* species in low cliff-top maritime grassland that is generally wet because it is flushed and/or very regularly drenched by salt spray; dung enriched swards with *Holcus lanatus, Trifolium repens* and *Cerastium fontanum*; or rank *Festuca rubra* grasslands inaccessible to sheep (restricted to coastal cliffs, cliff ledges and to Dun).

However, where vascular plants are suppressed by exposure, trampling and/or grazing the short, (often micro-broken) vascular sward includes biotic soil crusts, bryophytes and dead cushions, exposed roots and stems of vascular plants such as *Armeria maritima* and *Plantago maritima* that can all provide an excellent substratum for terricolous lichens. Typical lichens recorded include *Protopannaria pezizoides, Cladonia rangiformis, C. subcervicornis, Micarea lignaria* var. *lignaria*, *Parmelia omphalodes, Parmotrema crinitum, Peltigera hymenina* and *P. membranacea.*

More locally there are also records for *Leptogium britannicum* (occasional, **NS**), *Leptogium gelatinosum* (occasional)*, Lobaria virens* (occasional to locally frequent, also spreading onto rock) and *Nephroma laevigatum* (occasional, also on rocks) and a range of rare species in particular specialist niches (see below). Although some lichens growing in the terricolous habitat did spread onto adjacent or embedded stones, saxicolous lichens on maritime rocks are considered more fully in section 5.

Locally some maritime communities with *Armeria maritima* and *Plantago maritima* on the exposed ledges, tops and edges of maritime cliffs have developed a particularly lichen rich terricolous lichen flora. Additional species here can include *Vahliella leucophaea* (occasional), *Normandina pulchella* (occasional), *Thelenella muscorum* (occasional), and on vertical faces *Catapyrenium cinereum* (occasional), *Collema tenax* var. *ceranoides* (scarce), *Micarea lignaria* var. *lignaria* (frequent), *Placynthiella icmalea* (occasional), *Psoroma hypnorum* (scarce, **NS**) and *Solenopsora vulturiensis* (scarce). The very best areas have a very rich terricolous lichen flora and include records for *Bacidia arceutina* (rare) and a number of notable species including *Degelia ligulata* (scarce but locally frequent **VU NR**), *Lecidea sanguineoatra* (rare, **NS***) Lecidea hypnorum* s. str. (rare, **DD NS***), Vahliella atlantica* (occasional, **NR**)*, Lecanora zosterae* (occasional, **NS**).

The best examples of species rich maritime grassland were:

4.1 Maritime grassland above Geo Chille Brianan, Ruaival

A rich terricolous lichen assemblage was recorded here including *Degelia ligulata* (locally frequent, **VU NR**), *Lecanora zosterae* (**NS**), *Megalaria pulverea*, *Normandina acroglypta*, *Rinodina conradii* (rare, **NS**) *Thelenella muscorum* and *Vahliella atlantica* (**NR**). The lichen niches here are maintained by exposure and grazing.

Figure 3. A very short sward along the top edge of the cliff above Geo Chille Brianan with a rich terricolous assemblage.

Figure 4. Andy surveying the top of the cliff edges for Degelia ligulata*.*

Figure 5. A closer view to show the niche for terricolous lichens. The area with the richest lichen flora is at the edge of the cliff where vascular plans are not dominant (especially amongst the brownish patches in this photograph that have the appearance of 'thin' or 'bare' patches amongst the grass sward). Photo looking towards Ruaival.

Figure 6. Degelia ligulata *was recorded growing amongst the short broken vascular sward. In this photo the thallus (the grey-brown patch) is growing at the interface with a stone embedded in the sward.*

4.2 Maritime grassland east of village Bay (northwest of Rubha Challa)

A rich terricolous lichen assemblage was recorded here including *Catapyrenium cinereum* (**NS**), *Gyalideopsis muscicola* (**NS**), *Degelia ligulata (*occasional, **VU NR**), *D. cyanoloma* (seen once), *Lecidea sanguineoatra* (rare, **NS***)*, *L. hypnorum* s. str. (rare, **DD NS**), *Leptogium britannicum* (**NS**), *L. palmatum* (**NT NS**), *Psoroma hypnorum* (**NS**), *Thelenella muscorum* and *Trapeliopsis wallrothii*. The lichen niches here are maintained by exposure, grazing and trampling (an important niche here was the terracettes acting as sheep tracks).

Figure 7. The maritime grassland northwest of Rubha Challa (within area defined by yellow line).

4.3 Maritime communities at the top of the steep west-facing slopes of Ruaival

Gravelly maritime communities along the very exposed top edges of the steep west facing slopes supported an outstanding terricolous maritime assemblage that included a number of notable species. Thirty-three lichens were recorded growing in the terricolous micro-habitat here including *Agonimia repleta* (rare, **DD NR**), *Caloplaca caesiorufella* (rare, **VU NR**), *Caloplaca cerinelloides* (rare, normally a corticolous species; but the St Kilda population may represent a possibly unidentified species), *Catapyrenium cinereum* (**NS**), *Degelia ligulata* (rare, **VU NR**), *Lecania subfuscula* (**NS**), *Lecanora zosterae* (**NS**), *Leptogium britannicum* (**NS**), *Lobaria pulmonaria* (rare but locally frequent)*, Lobaria virens* (occasional, locally frequent), *Psoroma hypnorum* (rare but locally frequent, **NS**), *Rinodina conradii* (rare, **NS**), *Toninia sedifolia* (rare, BAP species) with some thalli parasitized by *Stigmidium tabacinae*, *Vahliella atlantica* (**NS**) and *Solenopsora vulturiensis* parasitized by an undescribed species of *Arthonia*. The lichen niches here appear to be maintained primarily by extreme exposure, and nutrient input from salt spray probably plays a major role in maintaining this community.

Other species recorded in this important habitat were:

Anaptychia runcinata
Arthonia muscigena
Bacidia arceutina
Cladonia cervicornis
C. foliacea
C. furcata
C. rangiformis
Lecanora expallens
Leptogium gelatinosum
Nephroma laevigatum
Parmelia omphalodes
P. saxatilis
Parmotrema crinitum
Peltigera canina
P. membranacea
P. rufescens
Protopannaria pezizoides
Thelenella muscorum

Figure 8. Lichen rich broken/stony maritime grassland on Ruaival (Dun in the distance).

Figure 9. Wind blasted maritime grassland below the Maiden stone (visible in the distance). The broken sward and dead/dying maritime vegetation supports a rich terricolous lichen flora.

Figure 10. Brian examining the typical broken sward of very exposed lichen rich maritime grassland. Caloplaca cerinelloides *and* Lecanora zosterae *were frequent here.*

Figure 11. Psoroma hypnorum.

Figure 12. The 'old woodland' species Tree Lungwort Lobaria pulmonaria *(the olive green patches) growing amongst a short exposed maritime sward.* L. pulmonaria *was rare on St. Kilda.*

Figure 13. A closer view of Lobaria pulmonaria.

Figure 14. The 'old woodland' species Lobaria virens *(the olive green warty patches) growing amongst a short exposed maritime sward.* L. virens *was occasional on St. Kilda and locally frequent on several areas.*

Figure 15. Dead and decaying maritime plants are an important niche for terricolous lichens. This photo shows a typical niche. Some Caloplaca cerinelloides *just visible at the yellow arrow.*

Figure 16. Lecanora zosterae *growing as a thin pale greyish crust growing on dead roots and cushions of maritime plants (typically thrift or* Plantago *spp.). Note the minute brownish fruits with a pale rim. This species was not uncommon on St. Kilda in lichen rich examples of exposed maritime grassland*

Figure 17. Dead cushions of maritime plants with Caloplaca cerinelloides *(the orange fruits) and Lecanora zosterae (the brownish fruits with a pale rim).*

Figure 18. Location of the terricolous lichen Caloplaca caesiorufella *(in front of Brian). This species is only otherwise known from two sites in Shetland, both on old fence posts.*

Figure 19. A close-up view of Caloplaca caesiorufella*.*

4.4 Maritime grassland associated with the Claish na Bearnaich screes

The mix of maritime grassland and stones at edge of screes is probably subject to some nutrient enrichment from sea spray, but the grassland here is not so exposed as at other lichen-rich maritime grassland areas, grazing is relatively more important here in preventing the terricolous lichen flora from being smothered by vascular plants. The stones appear to provide some protection from excessive trampling and probably exposure (thus retaining a humid micro-climate suitable for *Lobarion* lichens). The terricolous niches and small stones/rocks here support the best development of *Lobaria virens* recorded during the survey (frequent to locally abundant here) as well as a fairly healthy population of *Nephroma laevigatum* (locally frequent), *Sticta 'dufourii'* [blue-green morphotype of *S. canariensis*] (3 locations), and the only two locations recorded for *Degelia atlantica* during the 2013 survey.

Figure 20. The Claish na Bearnaich screes, crags and the prominent gully known as 'The Chimney' as viewed from The Village.

Figure 21. Brian, John & Steve examining the edges of the screes. The interfaces of the scree and maritime grassland support lichens of the Lobarion *community. This community is more usually associated with old woodlands but it is not uncommon on coastal rocks in oceanic areas of western Scotland, typically in sheltered areas.*

Figure 22. The 'old woodland' species Lobaria virens *was frequent and locally abundant at the edges of the screes growing amongst stony maritime grassland. It was often best developed in the sheltered crevices between the stones.*

Figure 23. A closer view of Lobaria virens*.*

Figure 24. Nephroma laevigatum *on stones at the edges of the screes.*

Figure 25. The top edge of the screes looking up to the crags with Degelia atlantica *growing on stone by the notebook and pencil.*

Figure 26. Closer view of Degelia atlantica *growing on a stone.*

4.5 Terracettes on steep southwest facing grassy slopes between Claigeann Mor and Mullagh Bi

These slopes were heavily grazed with a nutrient enriched form of maritime species rich *Nardus* grassland with *Thyme, Carex pulicaris* and locally much *Holcus lanatus, Trifolium repens* and *Cerastium fontanum*. The vertical faces of terracettes associated with sheep tracks, lie up areas and Manx Shearwater burrows here supported a community that typically included *Micarea lignaria* var. *lignaria*, *Parmotrema crinitum*, and more locally *N. laevigatum*. This area is very important for lichens as the best populations of *Gyalideopsis 'hirtensis'* recorded on site were recorded here growing on bryophytes on the vertical faces of the terracettes on these slopes. Grazing is crucial in maintaining an abundance of suitable habitat features for this species.

Figure 27. The steep slopes between Claigeann Mor and Mullach Bi viewed from Mullach Bi. The yellow arrows indicate the approximate locations for the populations of Gyalideopsis *'*hirtensis*' recorded in this area and the red arrow indicates the approximate location of some outcrops with* Lobarion *lichens including* Lobaria virens *growing in rock crevices and on ledges at the bases of* Sedum rosea*, and* Sticta 'dufourii' *in a rock crevice.*

Figure 28. Location of the Claigeann Mor population of G. 'hirtensis'.

Figure 29. A closer view of the population. The two white plant labels indicate two patches of G. 'hirtensis' *found growing over mosses on rock in a sheltered position under a boulder.*

Figure 30. The thalli of Gyalideopsis *'hirtensis' are the 2 discrete pale patches (2x2cm and 1.5 x1.5cm) below the plant labels. One of these patches was taken for DNA analysis.*

Figure 31. Looking up towards Mulach Bi from the steep slopes and showing the terracettes and bird burrows. The habitat is maintained by sheep grazing and exposure.

Figure 32. A closer view of the habitat. Seven patches of Gyalideopsis *'hirtensis' were recorded in this area and there is plenty of suitable habitat so there are likely to be more. The top of Mullach Bi just visible in the distance.*

Figure 33. The typical niche for G. 'hirtensis' here is growing over the bryophytes on the vertical faces of terracettes.

5 MARITIME CLIFFS, OUTCROPS, BOULDERS

Sea cliffs were inaccessible and so could not be examined closely but typical macrolichens visible with binoculars on exposed faces include *Ramalina* spp, *Anaptychia runcinata* and more locally *Sphaerophorus globosus*. Cliff top rocks regularly exposed to salt spray and/or nutrient enrichment from birds supported species such as *Xanthoria* spp., *Candelariella vitellina*, *Lecanora poliophaea* and occasionally a suite of more specialist species (see below). The seashore species *Hydropunctaria* [*Verrucaria*] *maura* was common in many areas and the maritime influence was greatest some other species more typical at sea-level in the mesic-supralittoral zone were recorded. The best development was seen on the headland at Ruaival with *Halecania ralfsii, Lichina confinis* (at 230m!).

Many of the large boulders and outcrops on and steep slopes above the sea and along the tops of cliffs supported a flora that was typical of 'inland' rocks away from the coastal strip (e.g. *Coccotrema citrinescens*, *Fuscidea* spp., *Pertusaria pseudocorallina*, *Lecidella asema* etc.)

Some examples of maritime lichens and lichen assemblages associated with maritime cliffs, outcrops and boulders are described in sections 5.1–5.5.

5.1 Sea cliffs near the Gap

Lobaria virens was recorded from 2 ledges near the top of the sea cliffs south east of The Gap. The top of a boulder at The Gap (NG10686 99826) provided our single find of *Platismatia glauca*, a species thought to be absent from St. Kilda by Gilbert *et al*. (1979).

Figure 34. Lobaria virens on sea cliff ledges south-east of the Gap.

Figure 35. The brown leafy lobes of a small thallus of Platismatia glauca *at The Gap.*

Figure 36. Hypogymnia physodes *(the pale grey inflated lobes) with* Sphaerophorus globosus *(tinged orange),* Cetraria aculeata *(the spiky brown thallus) and* Parmelia omphalodes *(the flat brown leafy lobes with whitish speckles).*

5.2 Dolerite dyke north of The Gap

Sheer sea cliff faces to the northwest of The Gap (presumably the dolerite dyke marked on the geology map) were surveyed with binoculars and an outstanding population of *Lobaria pulmonaria* (previously recorded by Oliver Gilbert (Gilbert *et al*., 1979). A small damp flush on the face supported a patch of *Degelia* (unidentifiable with x8 binoculars) and a small colony of *Dermatocarpon miniatum*.

Figure 37. Looking down towards 'The Gap' and the dolerite dyke (indicated by the yellow arrow) from the northern slopes of Oiseval.

Figure 38. The dolerite dyke with the Tree Lungwort Lobaria pulmonaria *(abundant in the area defined by the yellow ellipse).*

Figure 39. A small patch of Lobaria pulmonaria *was recorded on a cliff face to the south (downslope) of the main patches on the slabs shown in the above photograph.*

5.3 Maritime rocks along the SW top of Ruaival

A healthy population of 4 separate colonies of *Anaptychia ciliaris* subsp. *mamillata* (**NT NS**), was recorded on rocks along the top edge of the southwest facing slopes of Ruaival. Other species recorded in the area include *Caloplaca scopularis* (**NT NS**) and in sheltered crevices below the Maiden Stone *Caloplaca britannica* (rare?, **DD NS ?E**).

Figure 40. The maiden stone Caloplaca scopularis *was recorded on a bird perch rock at the red arrow and* Caloplaca britannica *in a gully below the Maiden stone (at the yellow arrow).*

Figure 41. Andy, Brian and Steve surveying Anaptychia ciliaris subsp. mamillata on exposed slabs to the north of the Maiden Stone. View from the Maiden Stone looking along the coast towards Mullach Bi (just visible in the mist).

Figure 42. Exposed slabs with Anaptychia ciliaris subsp. mamillata *just to the north of the Maiden Stone. Thirty eight thalli were counted between the red bumbag and the walking pole (yellow tape on the pole just visible on the right). These are the same slabs being examined by the team in the above photograph, and those indicated by the top red arrow in the photograph below. Two thalli of* Degelia ligulata *were also recorded here.*

Figure 43. The red arrows indicate locations for Anaptychia ciliaris *subsp*. mamillata*. Photo looking south towards the Maiden Stone. The area within the yellow ellipse is the area shown in Figure 9 (section 4.3).*

Figure 44. Steve, Andy and Brain searching for Anaptychia mamillata and Degelia ligulata (at the location indicated by the middle arrow in the above photo).

Figure 45. Andy pointing to a small population of Degelia ligulata*.* Anaptychia ciliaris *subsp*. mamillata *was also recorded on the rock in this area (at the middle arrow in Figure 43).*

Figure 46. Another location for A. ciliaris *subsp.* mamillata *(on a rock by Brian on the right hand side of the photo).*

Figure 47. A healthy thallus of Anaptychia ciliaris *subsp*. mamillata

Figure 48. A close view of Anaptychia ciliaris *subsp*. mamillata *to show the dark hair like structures (cilia) on the narrow brown thallus lobes.*

5.4 Outcrops on steep southwest facing slopes between Claigeann Mor and Mullach Bi

Outcrops and ledges here supported maritime tall herb vegetation including *Festuca rubra* and *Sedum rosea.* The terricolous habitats associated with ledges supported two 'old woodland' *Lobarion* lichens *(Lobaria virens, Nephroma laevigatum)* as well as *Vahliella leucophaea* and the bryophilous species *Micarea cinerea* f. *tenuispora* (rare, **NR**) and *Thelenella muscorum.* Lichens recorded as epiphytic on *Sedum rosea* included *Porina leptalea, Dimerella lutea, Lobaria virens and Mycoblastus caesius.* Saxicolous species included *Dermatocarpon miniatum, D. intestiniforme, Lobaria virens* and *Sticta 'dufourii'* (a healthy population of which was recorded in one rock crevice).

Figure 49. A healthy population of Sticta *'*dufourii*' was found growing in a rock crevice (between the red arrows).*

5.5 Glacan Mor

Most of the more easily accessible crags, cliffs and outcrops in this area supported a typical saxicolous assemblage with good populations of siliceous species such as *Coccotrema citrinescens* (frequent to abundant, **NS**) and *Tylothallia biformigera*.

However locally there was greater interest including *Toninia thiopsora* (rare, **NS**) and *Porina guentheri* (rare, **NS**). *Lobaria pulmonaria* was noted on 2 (possibly 3) small cliff ledges at Glacan Mor. *Lobaria amplissima* has been reported form this area (Gilbert *et al*. 1979) but was not seen in 2013.

Figure 50. Cliffs and outcrops at Glacan Mor. These supported a typical acidic saxicolous flora but additional interest on the rocks shown in this photograph include Toninia thiopsora *(growing on the outcrop indicated by the yellow arrow).*

Figure 51. Toninia thiopsora at *Glacan Mor.*

Figure 52. Cliffs at Glacan Mor with Lobaria pulmonaria *(three patches seen with x8 binoculars at locations indicated by yellow arrows).*

6 SEASHORE ROCKS

Seashore rocks support littoral and supralittoral communities i.e. as communities regularly inundated by the tide or under the direct influence of salt spray. The lichen communities of maritime rocks can conveniently be thought of as occurring with 4 separate zones, though there is some overlap and not every zone is always found to occur. These zones are discussed in sections 6.1-6.3. A specialist community is associated with bird perches and seabird colonies (section 7). Salt spray over much of Hirta means that species more typical at sea-level in the mesic-supralittoral zone were often recorded high up on rocky habitats and on 'inland' rock habitats (see section 5). Easy access to seashore rocks was restricted to areas around Village Bay, between Ruaival and Dun and at Glen Bay near to the outflow of Abhainn a Ghlinne Mhoir. Seashore rocks were examined at Village bay in the south at NF 098 988 – 987 and east of the Pier at NF 104 990-989; Between Ruaival and Dun at NF 097–8 978–9 and Glen Bay at NA 085 002–3. An attempt was made to examine the littoral zone between Ruaival and Dun on 5th July but this had to be abandoned due to high gusting winds. This area was revisited in good weather on 10th July.

Figure 53. Inlet between the Ruaival peninsula of Hirta and Dun looking ENE with Giasgeir (rock, centre).

Figure 54. Inlet between the Ruaival peninsula of Hirta and Dun looking SW to the cliffs of Dunn.

Figure 55. Inlet between the Ruaival peninsula of Hirta and Dun looking SE to Dun. The small cave (left) supports Hydropunctaria oceanica, Verrucaria halizoa *and* V. striatula*. Hydropunctaria maura* is dominant on exposed surfaces.

6.1 The black zone (littoral)

The area below high tide with the *Verrucarietum maurae* lichen community. This community is dominated by black crustose species (*Verrucaria* and *Hydropunctaria* spp.) and small seaweed-like lichens (*Lichina* spp.)

Species found on rocks closest to the sea include *Verrucaria mucosa* (occasional to frequent), *V. striatula* (occasional) and *Collemopsidium halodytes* (occasional to rare) on siliceous rocks and *Collemopsidium foveolatum* (frequent) and *C. sublitorale* (occasional) on barnacles and limpets. *Hydropunctaria maura* was abundant and *Verrucaria halizoa* was local between Ruaival and Dun and was also found on siliceous rock behind the church. *Hydropunctaria oceanica* was occasional to frequent in the zone between *V. mucosa* and *H. maura* and was occasionally found in low shady and sheltered spots inland on stones behind the church and in the village and graveyard. *Lichina confinis* was frequent to occasional and occasionally found inland on exposed outcrops.

6.2 The orange zone (mesic and sub-mesic-supralittoral)

Above the black zone is an orange zone which is rarely submerged but is subject to regular sea spray. This *Caloplacetum marinae* lichen community is dominated by orange *Caloplaca* species. Black crusts (e.g. *Hydropunctaria maura*) are still present but often overgrown by *Caloplaca* spp.

Species found in this zone include: including *Caloplaca marina* (F-A)*, C. maritima* (O-R), *C. microthallina* (O-R), *C. thallincola* (O-F), *C. verruculifera* (O). Other species include *Arthonia phaeobaea* (O), *Aspicilia leprosescens* (O-R), *Halecania ralfsii* (O-F), *Lecanora helicopis* (O-F), *L. actophila* (O), *L. hagenii* (occasional on tops of boulders at Village Bay south), and *L. poliophaea* (O). A generally frequent species in this zone, *Diplotomma alboatrum*, was recorded as "frequent on sunny rocks near the sea" by Gilbert (1978), but not by us anywhere on Hirta.

6.3 The grey zone (xeric-supralittoral)

Above the orange zone is a grey zone. This *Ramalinetum scopularis* lichen community of this zone is very variable but characteristic species can include whitish crusts such as *Lecanora gangaleoides, Ochrolechia parella, Pertusaria* spp. and *Tephromela atra*, the brown worm-like *Anaptychia runcinata*, the grey leafy Crottle *Parmelia saxatilis*, the yellow leafy *Xanthoria parietina* and the pale greyish-green shrubby *Ramalina* spp. that when abundant can make the rocks near the coast look 'hairy' !

Species found on exposed rock surfaces here include: *Anaptychia runcinata* (F), *B. aethalea* (F), *B. stellulata* (O), *Caloplaca crenularia* (O), *C. littorea* (rare on vertical rock face at Glen Bay (NA 0857 0027), *Catillaria chalybeia* (O-R)*, Fuscidea cyathoides* (O-R), *Lecidella asema* (O), *L. scabra* (O-R), *Lecanora polytropa* (O), *L. rupicola* (R), *Lecanora sulphurea* (R), *Candelariella vitellina* (O-R), *Ochrolechia parella* (O-F), *Opegrapha calcarea* (O-R), *Parmelia omphalodes* (R), *Parmelia sulcata* (R), *Phaeophyscia orbicularis* (R), *Pertusaria pseudocorallina* (O-F), *Physcia dubia* (R), *P. tenella* (R), *Porpidia cinereoatra* (O), *Porpidia platycarpoides* (O), *Ramalina cuspidata* (O-F), *R. siliquosa* (F-A), *Rhizocarpon richardii* (O), *Rhizocarpon geographicum* (O-R), *Tephromela atra* (F), *Verrucaria fusconigrescens* (F), *V. internigrescens* (O-R), *Xanthoria aureola* (O-F)*, X. calcicola* (R, between Ruaival and Dun), *X. parietina* (O-F).

Species found in sheltered crevices include: *Bacidia scopulicola* (O-F), *Caloplaca britannica* (rare; near the Mistress Stone and east side of Glen Bay), *C. limonia* (rare at Glen Bay (NA 0857 0027), *Collema crispum* (rare at Glen Bay at NA 0857 0027)*, Leptogium gelatinosum* (rare at Glen Bay NA 0872 0054), *S. holophaea* (rare at Glen Bay (NA 08566 00281)*, S. vulturiensis* (O-F) and *Toninia aromatica* (O-R).

The extensive rocky shore on the east side of Glen Bay (Leacan an t-Sluic Mhoir) has a large area of transition between the xeric-supralittoral zone and terrestrial rocks. Here we found *Amandinea coniops*, *Collema furfuraceum*, *Dermatocarpon luridum* on flushed rocks (some thalli parasitized by *Opegrapha pulvinatum*), *Lecanora straminea* and *Rinodina luridescens*.

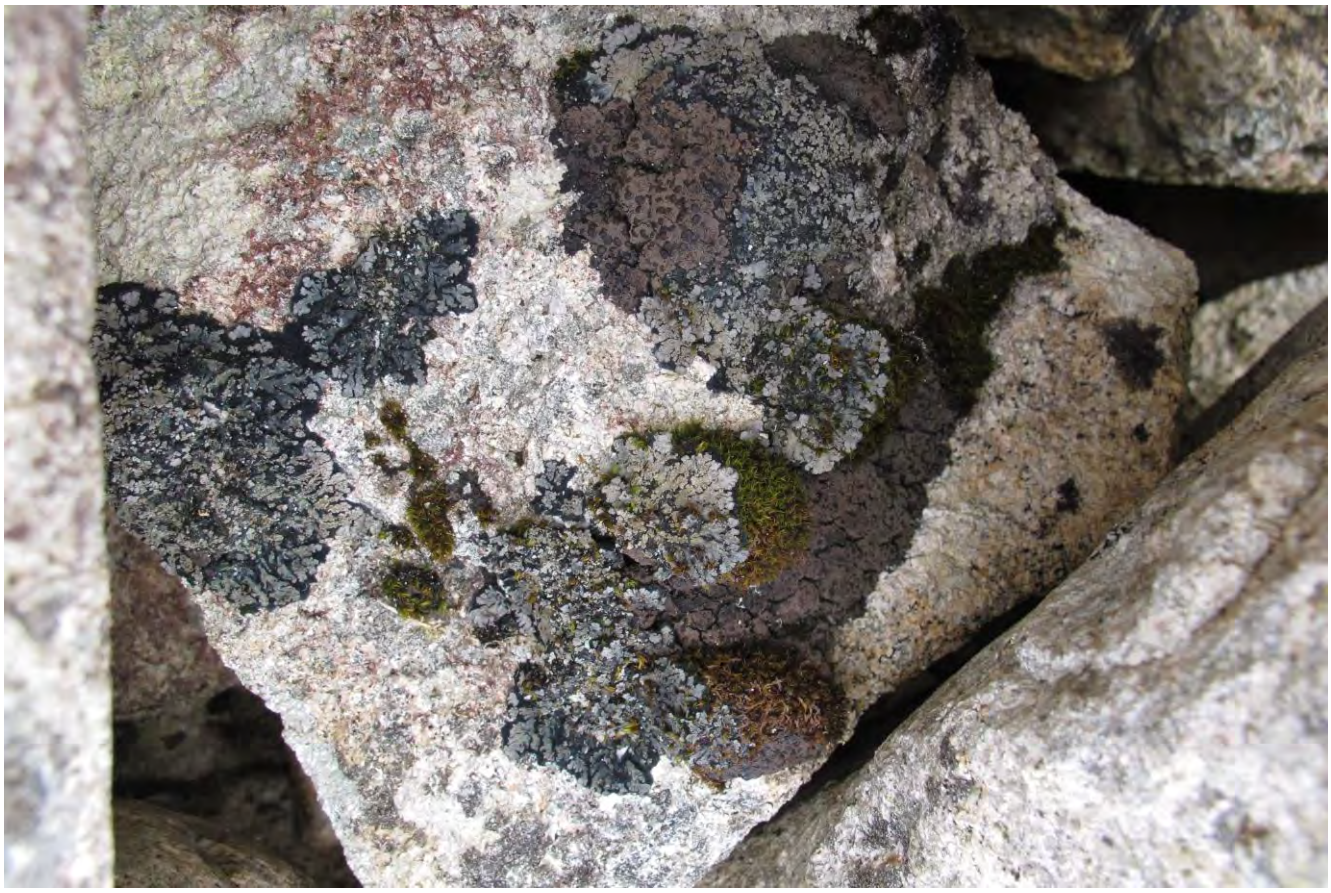
Species found on soil include: *Catapyrenium cinereum* (O-R), *Collema tenax* var. *ceranoides* (O-R on soil) *C. tenax* var. *tenax* (O-R), *Lepraria lobificans* (R), *Peltigera canina* (R), *Protopannaria pezizoides* (O-R) and *Vahliella atlantica* (R), and *V. leucophaea* (O-F).

6.4 Boulder beach at the back of Village Bay

A *Lobarion* community was supported in the sheltered crevices between the boulders at the back of Village Bay beach. The species well represented here were: *Degelia atlantica, Degelia ligulata* (**VU NR**), *Vahliella leucophaea and Nephroma laevigatum*. Species represented on the upper exposed surfaces of the boulders included *Lecania baeomma* (**NS**).

Figure 56. Village Bay boulder beach.

Figure 57. Degelia ligulata (grey patches) and Vahleiella leucophaea (brown patches) in sheltered areas amongst the boulders on the boulder beach at Village Bay.



7 BIRD PERCH ROCKS AND SEA BIRD COLONIES

In inland areas of the mainland and larger islands, 'bird-perch' rocks stand out in the landscape with a contrasting, often more brightly coloured lichen assemblages with orange and yellow lichens of *Caloplaca*, *Candelariella* and *Xanthoria*, compared to the surrounding nutrient-poor rocks dominated by white, grey, and browns, apart from the ubiquitous yellow-green of *Rhizocarpon geographicum*. On Hirta the contrast is blurred owing to the strong maritime influence and large sea-bird populations. However, bird-perch boulders and 'more than usual' bird-influenced rocks can be recognized. Typical species are *Aspicilia leprosescens*, *Candelariella vitellina*, *Xanthoria aureola, X, calcicola, X. parietina, Physcia caesia, P. tenella*. Less common specialist species of areas heavily enriched by bird occurring on Hirta are *Caloplaca scopularis*, *Candelariella coralliza*, and *Lecania aipospila*. Some examples are given below.

7.1 Bird colony at Leacan an t-Sluic Mhoir

The guano splattered rocks here supported a well-developed specialist flora including *Amandinea coniops* (frequent, **NS**), *Aspicilia leprosescens* (abundant), *Lecanora straminea* (scarce but locally frequent, **NT NR**) and *Rinodina luridescens* (frequent).

Figure 58. Bird perch colonies at Leacan an t-Sluic Mhoir. View looking over from the Abhainn a' Ghlinne Mhoir (just visible in foreground).

Figure 59. Steve examining bird perch communities with Lecanora straminea *at Leacan an-t Sluic Mhoir. View looking back towards the Abhainn a' Ghlinne Mhoir.*

Figure 60. Flushed *rocks associated with this area supported large healthy populations of* Dermatocarpon *luridum. At the northern end of the bird colony some flushed slabs rocks (shown in this photo) supported a good population of* Degelia ligulata.

Figure 61. Dermatocarpon luridum *on flushed slabs.*

Figure 62. A close view of one of the patches of Degelia ligulata *growing on flushed rock slabs shown in Figure 60.*

7.2 Bird perch areas at Ruaival

Boulders in grassland had *Candelariella coralliza, Caloplaca scopularis* (rare, **NT NS**), *Lecania aipospila* (local, **NS**), *Lecanora poliophaea and Rinodina oleae*.

Figure 63. John examining a bird perch community on an isolated boulder at Ruaival. This rock supported large patches of Lecania aipospila. The island of Dun beyond.

Figure 64. Lecania aipospila *on the rock shown in the above Figure.*

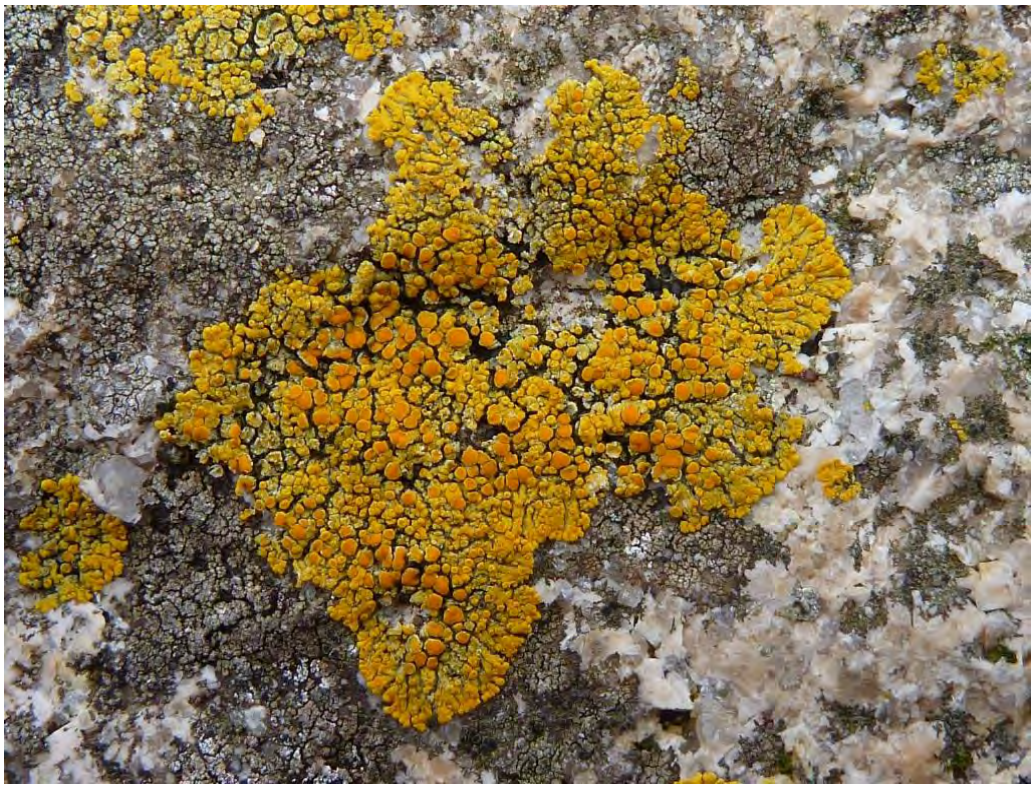
- **Several boulders below the High street at Village Bay**

Several boulders here supported a bird perch community that included *Caloplaca scopularis* (**NT NS**), *Lecania aipospila* (**NS**) and *Lecanora straminea* (on 3 boulders, **NT NR**).

Figure 65. Brian, Steve and John examining a boulder with Lecanora straminea *in Village Bay.*

Figure 66. A well-developed patch of Lecanora straminea *on a rock in Village Bay.*

Figure 67. Caloplaca scopularis *on bird perch rocks in Village Bay.*



7.3 Old walls above *Geo Chille Brianan*

Old walls above Geo Chille Brianan support a bird perch community that includes a population of *Lecanora straminea* (**NT NR**) as well as *L. poliophaea* and *Caloplaca scopularis* (**NT NS**). Six separate 'colonies' of 17 well established thalli of *Lecanora straminea* were found on the cap-stones of these walls. Care should be taken to retain these stones in their existing positions if re-building of these walls is ever undertaken.

Figure 68. Lecanora straminea *on old walls above Geo Chille Brianan. The locations of some of the thalli are indicated by the white plant labels.*

Figure 69. Lecanora poliophaea *on old walls above Geo Chille Brianan.*

8 *CALLUNA VULGARIS* HEATH (INCLUDING MARITIME HEATH)

Much of the *Calluna* heath on Hirta is typically species poor with a lichen flora of common species that are often limited to a few common *Cladonia* species (mostly *C. subcervicornis* and *C. pyxidata*), *Baeomyces rufus*, *Lichenomphalia umbellifera* and *Micarea lignaria* var. *lignaria* (growing on bryophytes). More locally the terricolous lichen flora can be better developed with a greater diversity of *Cladonia* species (e.g. *C. ciliata* var*. ciliata, C. ciliata* var. *tenuis, Cladonia portentosa*, *C. uncialis* subsp. *biuncialis*), as well as *Cetraria aculeata, Gyalideopsis muscicola*, *Lichenomphalia alpina*, *Parmotrema crinitum*, and much more locally *Sphaerophorus globosus* and *Megalaria pulverea*. A more montane element to the flora was recorded on Oiseval (with *Cetraria islandica*, (scarce), *Cladonia rangiferina* (rare) and *Ochrolechia frigida* var. *lapuensis* (rare, **NR**)) and on Mullach Sgar (with *Cetraria islandica*).

The epiphytic flora on heather was generally not well developed but species recorded on old heather stems included *Anisomeridium ranunculosporum* (occasional), *A. viridescens* (rare, **NS**) and below the crags at Glacan Chonachair *Jamesiella anastomosans*, *Mycoblastus caesius* and the 'old woodland' species *Parmeliella parvula* (both rare on *Calluna*).

Some areas of heath with notable lichens are described in sections 8.1–8.3.

8.1 Heathy ledges in 'The Chimney' (Clash na Bearnaich)

A relatively sheltered gully with records for the 'old woodland' species *Dimerella lutea* (scarce), *Megalaria pulverea* (occasional), *Lecidea sanguineoatra* (rare, **NS**), and *Normandina pulchella* (scarce). *Protopannaria pezizoides* was also recorded growing on plant roots. Flushed rocks supported *Dermatocarpon intestiniforme.*

Figure 70. Tall herb ledges and heathy ledges in 'The Chimney'.

Figure 71 Protopannaria pezizoides *growing on exposed plant roots on crags in 'The Chimney'.*

8.2 Heathy ledges in gullies and outcrops at Glacan Chonachair

The outcrops, crags and gullies here were only examined very briefly but the sheltered northeast face of an outcrop and a sheltered gully here supported some heath that included healthy populations of terricolous *Bunodophoron melanocarpum* (an 'old woodland' species that is scarce and local on Hirta) and *Trapeliopsis pseudogranulosa* (rare).

Figure 72. Looking down a gully to the screes below Glacan Chonachair and Village Bay beyond.

Figure 73. Large healthy patches of Bunodophoron melanocarpum *in a gully at Glacan Chonachair.*

8.3 Terracettes on the steep north facing slopes of Oiseval

An important terricolous flora was recorded on a narrow band of terracettes on the steep north facing slopes of Oiseval. The bare vertical faces of the terracettes supported a good population of the 'old woodland' species *Bunodophoron melanocarpum* and *Gyalideopsis 'hirtensis'* was first discovered growing over bryophytes associated with two of the terracettes. The upland species *Ochrolechia frigida* was also recorded here.

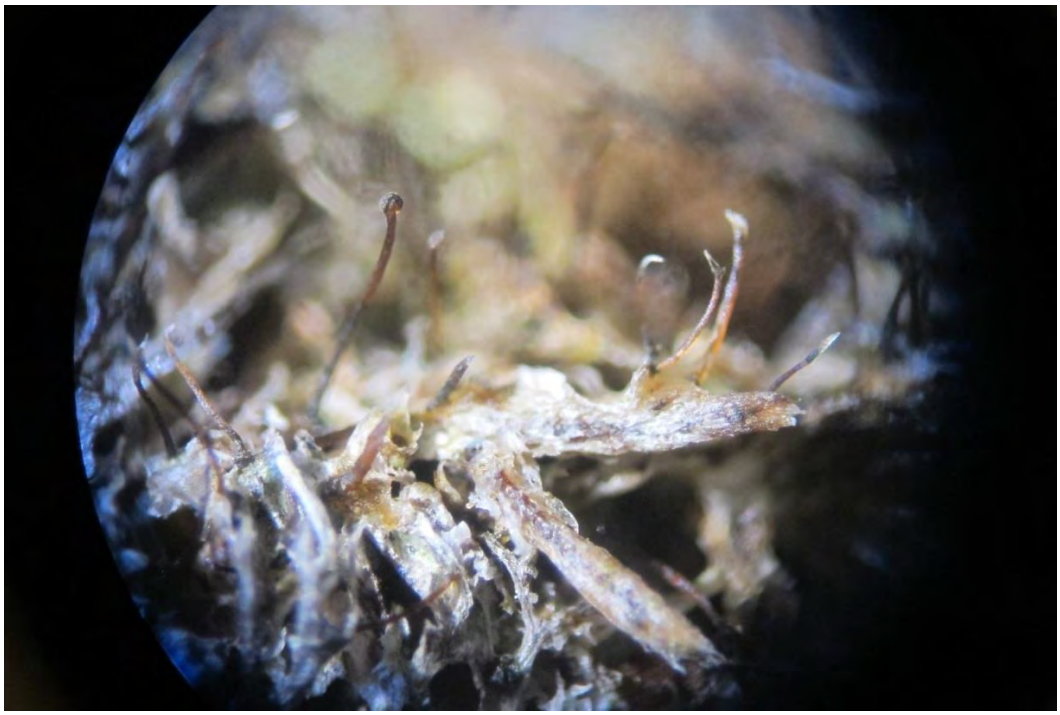
Figure 74. Looking down to 'The Gap' and the steep north facing slopes of Oiseval. View from the track up to Conachair.

Figure 75. Terracettes on the steep north-facing slopes of Oiseval with Bunodophoron melanocarpum*.*

Figure 76. Bunodophoron melanocarpum *and the hyperoceanic fern* Hymenophyllum wilsonii *(bottom left) growing on the vertical faces of terracettes on the north slopes of Oiseval.*

*Figure 77. A terracette with '*Gyalideopsis hirtensis*' growing over bryophytes on the vertical face of the terracette.*

Figure 78. Gyalideopsis *'*hirtensis*' growing as a thin pale crust over bryophytes with thin-stalked reproductive structures ('hyphophores'). Photo taken through the eyepiece of a binocular microscope.*



8.4 Sub-montane heaths on Oiseval and Mullach Sgar

The plateau heathlands of Oiseval (NF 10911, NF 10899 99203 & NF 10756 99725) and Mullach Sgar (NF 09563 98760) supported small populations of the upland terricolous lichen *Cetraria Islandica*. The vegetation of these exposed sites was extremely stressed and in many places absent. It was in and around the more bare areas that the lichen was found.

On the occasions that these sites were visited the wind conditions made detailed surveying impossible. The associated species included *Cladonia arbuscula, C. furcata, C. portentosa, C. uncialis* subsp. *biuncialis* and *Cladonia rangiformis*.

Figure 79. Steve photographing Cetraria islandica *on the summit of Mullach Sgar.*

Figure 80. Cetraria islandica *on the summit of Mullach Sgar.*

Figure 81. Position of Cetraria islandica (near hammer) *on the summit of Oiseval.*

Figure 82. Cetraria islandica (the shiny brown leafy thallus) on the exposed top of Oiseval.

9 'INLAND' ROCK HABITATS

Typical spp. of cliffs, boulders and screes not obviously subject to frequent sea spray supported a flora dominated by varying mixtures of common crustose saxicolous species of siliceous rocks especially *F. cyathoides, Lecidella asema, Porpidia tuberculosa, Coccotrema citrinescens, Ochrolechia parella, Pertusaria pseudocorallina*, *Caloplaca crenularia*, and *Rhizocarpon* spp. often with common foliose lichens such as *Parmelia saxatilis*, and *Melanelixia fuliginosa.* Other common crustose species recorded included small amounts of *Catillaria chalybeia*, *Acarospora fuscata*, *Myriospora smaragdula*, other *Fuscidea* spp. and where more sheltered from sunlight/desiccation– the marine species *Hydropunctaria maura*. No *Umbilicaria* species were recorded despite intensive searching.

Damp, flushed rocks supported *Ionaspis lacustris* (occasional, locally abundant), *Lecidea phaeops* (scarce), *Herteliana gagei* (rare, **NS**), *Dermatocarpon intestiniforme* (occasional) and *D. lurida* (rare but locally frequent), *Ephebe lanata* (scarce) and *Cystocoleus ebeneus*.

Species recorded from shaded underhangs and crevices included *Bacidia scopulicola* (frequent), *Bacidia carneoglauca* (rare, **NS**), *Dimerella lutea* (scarce), *Opegrapha gyrocarpa* (occasional), *O. lithyrga* (rare, **NS**), *Micarea botryoides* (rare), *Porina leptalea* (scarce) and *Enterographa hutchinsiae* (occasional).

The basaltic scree slopes below Clash na Bearnaich (NF0998) supported a typical saxicolous flora of upland acidic rock with mosaics of mainly white or grey crustose lichens inhabiting the upper surfaces of the boulders, e.g.:

Buellia stellulata
Caloplaca crenularia
Candelariella coralliza
C. vitellina
Catillaria chalybeia
Fuscidea cyathoides
F. lygaea
Lecanora gangaleoides
L. polytropa
Lecidea lactea
Lecidella asema
L. scabra
Ochrolechia androgyna
O. parella
Pertusaria aspergilla
P. corallina
P. excludens (**NS**)
P. lactescens
P. pseudocorallina
Porpidia cinereoatra
P. melinodes (**NS**)
P. platycarpoides
P. tuberculosa
Rhizocarpon geographicum
R. reductum
R. richardii
Tephromela atra
Varicellaria lactea

Smaller or less conspicuous crustose species, often in more sheltered niches included:

Lecania baeomma (**NS**)
Myriospora smaragdula
Opegrapha calcarea
O. lithyrga
Porina chlorotica
Rimularia badioatra (**NS**)
Trapelia coarctata
T. glebulosa
T. placodioides

Moribund bryophytes on and between the boulders were sometimes inhabited by *Lepraria lobificans*, *Micarea lignaria* and *M. leprosula* (rare).

Macrolichens on the upper surfaces are few: the fruticose *Ramalina siliquosa* and *Stereocaulon vesuvianum*, and the foliose *Anaptychia runcinata*, *Parmelia omphalodes* and *P. saxatilis*. The patches between stones and interfaces between maritime grassland and screes supported an 'old woodland' *Lobarion* community that included *Degelia atlantica*, *Lobaria virens*, *Megalaria pulverea, Nephroma laevigatum* and *Sticta 'dufourii'*– see section 4 (maritime grassland), as well as more widely occurring species, such as *Cladonia furcata*, *C. polydactyla*, *C. pyxidata*, *Leptogium teretiusculum*, *Normandina pulchella*, *Parmotrema crinitum*, *Peltigera hymenina*, *P. membranacea* and *Protopannaria pezizoides*, and the maritime *Vahliella atlantica* (**NR**) and *V. leucophaea*.

The granite boulder scree below Lag Altimir (NF0999) was similarly clothed with typical saxicolous flora of upland acidic rock, but the mosaics had fewer species, with notable absentees being *Buellia stellulata, Caloplaca crenularia, Fuscidea lygaea, Lecanora gangaleoides, Lecidella asema, Ochrolechia* spp*., Pertusaria aspergilla, P. lactescens*, *Stereocaulon vesuvianum*, and *Tephromela atra*. However, additions included *Acarospora fuscata, Buellia aethalea, Lecidea brachyspora, Schaereria fuscocinerea and Tylothallia biformigera.* There was no 'old woodland' element overgrowing mosses on and between the boulders, although there were more *Cladonia* species, and *Gyalideopsis muscicola* (**NS**) and *Micarea xanthonica* (**NS**) were additions, not seen below Clash na Bearnaich.

Terricolous lichens associated with heathy ledges in crags and gullies are considered in section 8.

Figure 83. The crags below Claish na Bearnaich were examined (between the left and right hand yellow arrows). The photo also shows the screes and 'The Chimney' (indicated by the red arrow).

Figure 84. Crags north of 'The Chimney' . Photo looking south-south-east towards Dun.

Figure 85. Flushed slabs on the crags to the south of 'The Chimney' with Dermatocarpon miniatum*, typically in cracks, crevices and depressions that dry out less readily than exposed bare faces (e.g. at locations indicated by yellow arrows).*

Figure 86. Looking up 'The Chimney'.

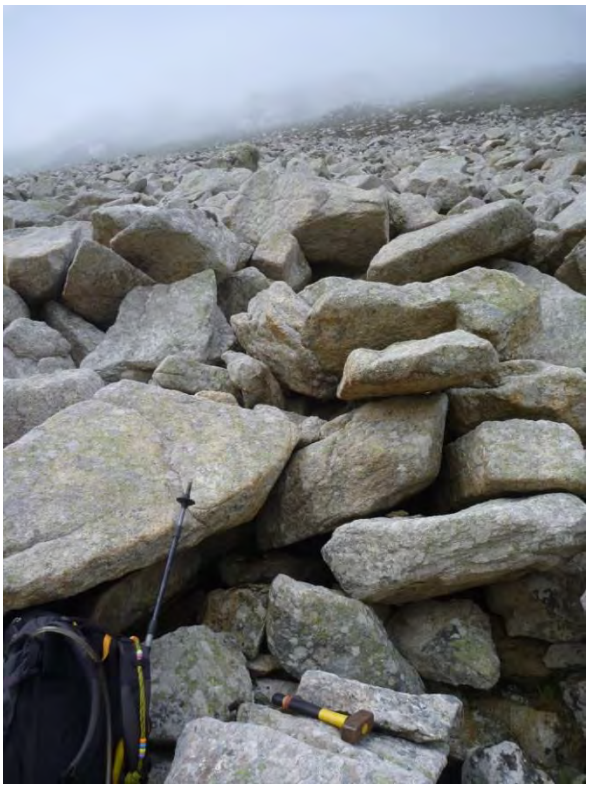
Figure 87. Dermatocarpon intestiniforme *on flushed rocks in a crack in 'The Chimney'.*

Figure 88. The Screes below Clais na Bearnaich looking south-south-east towards Dun.

Figure 89. Looking over to the Crags, gullies and screes at Glacan Chonachair.

Figure 90. Looking up at the screes, gullies and crags at Glacan Chonachair. Only the lower section of one gully was briefly explored (the gully indicated by the red arrow). A large patch of Honeysuckle Lonicera periclymenum *was found on ledges in the gully.*

Figure 91. Large boulder scree below Glacan Chonachair with a typical upland saxicolous flora.



10 FRESHWATER HABITATS

Freshwater lichen habitats include rocks/outcrops submerged in streams, subject to regular or periodic inundation and rocks/outcrops or in the splash zone (so subject to water spray). The main watercourses examined were the Abhainn Mhòr in Village Bay and the Abhainn a' Ghlinne Mhoir in Gleann Mor.

Typical species recorded included species that are common and widespread in such habitats in upland Britain (e.g. *Amygdalaria pelobotryon* (rare at Abhainn a' Ghlinne Mhoir at NF 08722 99766), *Ionaspis lacustris* (F-A)*, Ephebe lanata* (O-F)*, Polyblastia cruenta* (O)*, Porina lectissima* (O-R), *Porpidia hydrophila* at Abhainn a' Ghlinne Mhoir at NF 08724 99830 and by a stream above the Village at NF10351 99433, *Rhizocarpon lavatum* (O), *Rhizocarpon reductum* (O-F), *Trapelia coarctata* (O) and *T. placodioides* (O). In addition the following Nationally Scarce species were also recorded from such habitats including: *Catillaria atomarioides* on a boulder at the edge of Abhainn Mhòr, *Collemopsidium halodytes* found 2–3 cm above the water level of Abhainn Mhòr at NF 09840 99311, *Porina interjungens* (occasional at Abhainn Mhòr), *Verrucaria aethiobola* occasional to frequent at Abhainn Mhòr, Abhainn a' Ghlinne Mhoir and the Abhainn Ruiaval (near Geo Chille Brianan) at NF 09732 98361.

Humid, sheltered rocky habitats close to watercourses supported species including *Enterographa hutchinsiae* and *Lobaria virens* at Abhainn a' Ghlinne Mhoir at NF 08691 99958, *Rhizocarpon infernulum* subsp. *sylvaticum* R at Abhainn Mhòr at NF 097 994 and Abhainn a' Ghlinne Mhoir at NF08714 99864.

More exposed outcrops supported species including: *Aspicilia grisea* O - R at Abhainn Mhòr, *Porpidia melinodes* (O) and *Stereocaulon leucophaeopsis* rare at Abhainn Mhòr at NF 097 994.

Terrestrial riparian zone with typical 'inland rock' and terricolous flora of turf banks and heath patches include species such as: *Anisomeridium robustum*, *Dimerella lutea* and *Jamesiella anastomosans* on the west side of Abhainn Mhòr at NF 097 994; *Lecidea sanguineoatra* at Abhainn a' Ghlinne Mhoir at NF 08724 99830, *Peltigera rufescens* (R) at Abhainn Mhòr, and *Vahliella atlantica* and *V. leucophaea* at Abhainn Mhòr.

In addition three lichenicolous fungi were found on *Ionaspis lacustris* including: *Endococcus verrucosporus*, *Verrucaria conturmatula* plus one unidentified parasite and *Rhizocarpon lavatum* was host to *Muellerella pygmaea* at Abhainn Mhòr at NF 097 994.

Figure 92. Looking down the Abhainn Mhòr towards Village Bay.

Figure 93. Habitat shot for Porina interjungens *along the Abhainn Mhòr.*

Figure 94. The Abhainn a' Ghlinne Mhoir in Gleann Mor.

Figure 95. Abhainn a' Ghlinne Mhoir in Gleann Mor. Brian and Andy examining terricolous lichens associated with well drained banks with short cropped heath, including good patches of Cetraria aculeata.

Figure 96. Cetraria aculeata *in short cropped heath on banks along the Abhainn a' Ghlinne Mhoir.*

Figure 97. John examining sheltered underhangs along the Abhainn a' Ghlinne Mhoir with Enterographa hutchinsiae.

Figure 98. Andy examining underhangs with Enterographa hutchinsiae *and sheltered rocks with* Lobaria virens *along the Abhainn a' Ghlinne Mhoir.*

Figure 99. Aquatic lichens on plane wreckage along the Abhainn a' Ghlinne Mhoir. The orange colour is due to the common freshwater lichen Ionaspis lacustris.

11 OTHER HABITATS

11.1 Buildings, walls and Cleits

The cleits and walls built of local stone carry lichen assemblages typical of 'inland rock' habitats (see **9**), although those close to the shore carry more maritime or ornithocoprophilous species, such as *Caloplaca scopularis* (**NT NS**) and *Lecanora straminea* (**NT NR**) on the old walls above Geo Chille Brianan (see **7.3**). Common species include the crusts *Acarospora fuscata*, *Caloplaca crenularia*, *Fuscidea cyathoides*, *Lecidella asema*, *Ochrolechia parella*, *Opegrapha calcarea*, *Pertusaria pseudocorallina, Schaereria fuscocinerea,* and *Verrucaria fusconigrescens*, the foliose *Melanelia fuliginosa*, *Parmelia omphalodes*, *P. saxatilis* and *Parmotrema crinitum*, and the fruticose *Ramalina siliquosa*. The cleits on the upper slopes of Oiseval have frequent *Usnea flammea,* as well *Hypogymnia physodes*. The latter is one of our commonest British lichens, but is exceedingly rare on St. Kilda. The Nationally Scarce *Lecania baeomma* (**NS**) was seen several times on cleits and walls, and the deep crevices and cave-like entrances to the cleits were sometimes occupied by the pale green powdery thallus of *Lepraria ecorticata* (**NS**). Turf caps on cleits are relatively (but not entirely – see Figure 101) free from heavy grazing, dunging and trampling), and often have a well-developed terricolous flora with *Cladonia* species (e.g. *C. ciliata* and *C. squamosa*), *Baeomyces* rufus, *Micarea lignaria* and occasional *Bunodophoron melanocarpum* and *Trapeliopsis* gelatinosa. In Village Bay the turf of the cleit caps and wall tops (as in Figure 102) carried a maritime heath flora, with *Agonimia tristicula*, *Leptogium britannicum* (**NS**), *L. palmatum* (**NT NS**), *Moelleropsis nebulosa* (**NS**) , *Nephroma laevigatum*, *Parmeliella parvula*, *Vahliella atlantica* (**NR**) and *V. leucophaea*.

An intriguing question with regard to such remote islands as the St Kilda group, is how did the lichens get there? And, how long does it take for colonization? Interesting in this respect are lichens that are found on Hirta only on calcareous stonework: cement, concrete, marble (gravestone) and mortar. It may be that such substrata were not present and available on the island until the construction of the Manse in 1830. However, there are now at least 19 lichens confined to calcareous stonework, and we presume they have arrived, somehow, on Hirta in the last 180 years or so. These lichens are:

Caloplaca arcis
C. austrocitrina
C. flavescens
C. oasis
Candelariella aurella
Catillaria lenticularis
Clauzadea monticola
Collema auriforme
Collema tenax var. tenax
Lecania erysibe s. str.
Lecania inundata
L. rabenhorstii
Lecanora albescens
L. campestris
Placynthium nigrum
Protoblastenia rupestris
Verrucaria muralis
Verrucaria nigrescens
Verrucaria viridula

Figure 100. Steve, Brian and Andy examining a Cleit in Glen Bay. Twenty four taxa were recorded on this Cleit.

Figure 101. The tops of Cleits are accessible to the agile Soay sheep. Grazing on the turf caps maintains suitable habitat for terricolous lichens provided trampling damage is not too heavy.

Figure 102. John and Steve examining the wall outside 'The Lab' (the common room). The turf cap is well grazed but supports a well-developed terricolous flora including Moelleropsis nebulosa (**NS***, and only recorded once on St. Kilda), and the old woodland species* Parmeliella parvula..

11.2 The church and graveyard

Churches and graveyards can provide extra substrata which would not normally be available in natural habitats.

11.2.1 The Kirk

The kirk is situated directly behind the manse just NE of the Pier and was originally erected in the 1830's and renovated between 1971 and 1980 (Steel 1994). Twenty two species were recorded from on and around the church building. The rendering on the church supports four species found nowhere else on the island: *Caloplaca austrocitrina*, *Candelariella aurella*, *Lecania erysibe* and *L. inundata*. Loose siliceous stones at the base of the church near the entrance support species which are usually found much closer to the sea: *Hydropunctaria oceanica* and *Verrucaria halizoa* (**NS**).

11.2.2 Graveyard

The graveyard is a situated in a small oval shaped drystone enclosure behind cottages 10 and 11. According to Steele (1994) "There was never a church service for the dead. The funeral service was always carried out at the graveside, whatever the weather". The graveyard contains a wide variety of stone types, some of which are imported including marble and sandstone. This provides habitats for a diverse range of species within a small area. Fifty three species were recorded from the graveyard. These include the Nationally scarce *Amandinea lecideina* on granite headstones and the boundary wall, *Buellia stellulata* on a granite headstone, *Caloplaca arcis* and *Clauzadea monticola* on a concrete plinth, *Lecania baeomma* in sheltered crevices of the boundary wall and *Lecidella meiococca* on a sandstone headstone and the boundary wall. A marble monument had the calcicole *Catillaria lenticularis*, not seen elsewhere on the island. A granitic stone at the base of the boundary wall was found to support *Porina leptalea,* the only time this normally corticolous species was recorded on the island. Six lichenicolous fungi were also recorded including the Nationally scarce *Abrothallus parmotrematis* on *Parmotrema perlatum* and the Nationally scarce *Pyrenidium actinellum* (**NS**) and Nationally rare *Dactylospora tegularum* (**NR**) on *Caloplaca crenularia*.

Figure 103. Brian examining stones in the graveyard.

11.3 Species on deadwood and worked timber

No natural deadwood substrata were encountered. Such is not provided by trees or shrubs, as there are none, and no long-stranded driftwood was seen even in the more remote parts of the island. Any driftwood in Village Bay would soon be utilized for firewood! Lignum was available only as worked timber, but this resource is very scarce, and limited to a few posts, the wooden frame for the ship's bell, the rails around the Factor's House, a wooden crate behind House 1, and a wooden seat. Only 11 lignicolous species were recorded, and none can be considered as 'lignum specialists', except for perhaps *Trapeliopsis flexuosa*. The lichens recorded from this habitat are all common and widespread species in Britain, and five of them are normally saxicolous (rock inhabiting). The lignicolous species recorded are:

Candelariella vitellina[1]
Lecanora expallens
L. pulicaris
L. symmicta
Lecidella elaeochroma
Melanelixia fuliginosa[1]
Parmelia saxatilis[1]
Pertusaria pseudocorallina[1]
Placynthiella icmalea
Scoliciosporum umbrinum[1]
Trapeliopsis flexuosa

[1] = most often *saxicolous*

11.4 Tracks and turning area

The 'turning area' at Am Blaid (NF092991) is an open habitat with small stones and masonry fragments embedded in soil, but the 'hoped for' rarer specialist of such a habitat (e.g. *Vezdaea* spp.) were not found. However, the list from here was not without interest; (T) = on soil:

Acarospora fuscata
Catillaria chalybeia
Cladonia diversa (T)
C. subcervicornis (T)
Fuscidea lygaea
Ionaspis lacustris
Lecidea diducens (**NS**)
Leptogium britannicum (**NS**) (T)
Myriospora smaragdula
Peltigera membranacea (T)
Porpidia cinereoatra
P. crustulata
P. macrocarpa
P. platycarpoides
Protopannaria pezizoides (T)
Rhizocarpon reductum
Trapelia coarctata
Vahliella leucophaea (T)

Unstable ground on the side of the concrete road down to the village from Am Blaid was colonized by the calcicoles *Agonimia tristicula*, *Collema tenax* (including its var. *ceranoides*) and *Leptogium gelatinosum*.

11. 5 Quarry

The quarry itself was not explored but several rocks below the quarry were briefly examined.

Figure 104. Brian and Steve examining rocks below the quarry.

Figure 105. *Amagdalaria pelobotryon* on a boulder by the Quarry.

12 DISCUSSION

12.1 Overall evaluation of the lichen assemblage

The survey recorded a large number of notable species (section 3). Although some of the notable species, especially the Nationally Scarce species, are generally under-recorded species, many are good quality habitat indicators, many are genuinely scarce/rare and a number are threatened or near threatened (section 3). It is clear that St. Kilda supports a rich and notable lichen of national importance including one lichen species new to science *Gyalideopsis 'hirtensis'*., and perhaps three 'new' lichenicolous fungi, here provisionally called *Arthonia* '*pertusariae*' (on *Pertusaria pseudocorallina*), *Arthonia* '*solenopsorae*' (on *Solenopsora vulturiensis*) and *Sagediopsis* '*coccotremae*' (on *Coccotrema citrinescens*).

12.2 Comparisons with other islands

Comparing the lichen flora of Hirta with other islands is difficult, as the other islands that have been moderately to well recorded are all so very different from one another in terms of geology, topography, climate, exposure, etc. A summary comparison of selected islands is given in Table 6. In this table the species total recorded has been adjusted to exclude the species recorded only from trees and larger shrubs (e.g. *Sambucus*).

Interestingly, our total species recorded for St. Kilda (Hirta) of 323 exceeds that of the whole of Harris (310), the nearest large land mass. How real this situation is remains to be seen. Most records from the 'mainland' Outer Hebrides (Lewis, Harris and Uists) are from rather casual 'holiday' visits. Valuable as these are, they tend to skip over the more critical or elusive species. So far the 'mainland' Outer Hebrides have not attracted any commissioned bioinventory surveys or a British Lichen Society field meeting.

The smaller islands such as the Flannans and North Rona are heavily influenced by salt spray and by nutrients from bird colonies, and so they have much smaller species totals (63 and 87 respectively). They have few (North Rona) or no niches available for lichens that are halophobic and/or intolerant of high nutrient conditions. Hirta, with its larger size and varied topography and geology, has many such habitats and niches allowing for the development of halophobic lichen communities on heathland, inland or leeward rocks and stream courses.

From Table 6, the species total on Hirta (323) compares most closely with that for Muck (327), as does the saxicolous/terricolous 'epiphyte element' of cyanophilous lichens. However, Muck lacks such species of extreme conditions as *Caloplaca scopularis* and *Lecanora straminea*. The windswept cliff-top turf lichen communities on Muck, although present, are nowhere as species-rich as those on Hirta. Also similar to the Hirta list, is that for Tanara Mor of the Summer Isles, though less species diverse in most respects. Why is Hirta so special with regard to the richness of its *Lobarion* element

and other cyanolichens, together with the not uncommon occurrences of *Gyalideopsis* and *Jamesiella* species occurring out in the open? The answer may be that because of its topography, the island experiences a greater amount of occult precipitation (sea-mists and low cloud) than experienced on many other islands and on the 'mainland' of Outer Hebrides. Also, St. Kilda experiences mild winters and a very low daily range of temperature (Gilbert *et al*. 1979).

An island that deserves a closer comparison with Hirta is Handa, but that island has never received a detail lichen survey, and only 28 species are recorded. However, recent casual observations (Anthony Taylor-Piggott, pers. comm.) revealed cliff communities with *Lobaria amplissima*, *L. pulmonaria* and *L. virens*, as found on Hirta. Also, of potential interest for comparison are The Shiants, currently with only nine lichens recorded, but one was *Lobaria pulmonaria*! However, a lichenological visit there is planned for August this year (2014).

Going further north, one might expect a similarity with Foula. At the time of Gilbert's survey of St. Kilda (1978) the total list for Foula was 72 species. The island has still not been fully surveyed, but Andy Acton's records made in 2011 have more than doubled the total to 153. It has very few 'specials' in common with Hirta, but does have 'specials' of its own, including *Bryoria bicolor*, and two lichens more 'at home' in the Ben Lawers range: *Lecidea berengeriana* and *Leptogium imbricatum*. Comparisons with Fair Isle are even trickier as that island has not been surveyed for lichens since 1961 (see below). It has two 'specials' in common with Hirta, namely *Anaptychia ciliata* subsp. *mamillata* and the arctic maritime *Lecanora straminea*, and it also has *Lobaria virens*, but more may be expected – a re-survey is much overdue. Apart from *L. virens* on Fair Isle, there are no records of *Lobaria* spp. from Shetland, nor of *Pseudocyphellaria* or *Sticta* spp. The reasons for this are unclear: it is certainly not a matter of latitude, as such species are well represented further north in Norway. This is something needing more investigation and consideration.

The southern islands of Skomer and Lundy, both with large bird colonies, have a comparable lichen total to that of Hirta, but have very few 'special' lichens in common. However, these islands have 'specials' of their own, mostly of a southern distributional tendency, e.g. *Roccella* spp. and *Teloschistes flavicans*, not expected to occur in Scotland. Saying that, it should be said that there is a confirmed 18th century record of *Teloschistes flavicans* from Ailsa Craig, and attempts to refind it there have so far failed.

Gilbert *et al.* (1979) remarked on several species that are generally common along the west coast of Scotland, but not yet found on St. Kilda. However, most of these have now been found, namely, *Hypogymnia physodes*, *Lecanora intricata*, *Ochrolechia androgyna* and *Platismatia* glauca, although *H. physodes* and *P. glauca* are indeed very rare and localized. On the other hand, we failed to find *Ophioparma ventosa* or any *Umbilicaria* species.

Comparisons between sites are made difficult also by differences in recorder effort, in terms of recorder expertise and the time taken and weather conditions under which surveys were made. There is also the factor of 'state of knowledge at the time'. For example, 26 lichens (excluding lichenicolous fungi) now recorded from Hirta were either not described or realised as being British in 1978, when Oliver Gilbert carried out his survey. The current lichen list for the larger Fair Isle (768

ha) is low, only 114 species, even though carried out at the time (1961) by Ursula Duncan, one of Britain's foremost lichenologists. Knowledge and expectations have increased to such a level that if such a survey were carried out today by one or more of Britain's foremost lichenologists, a total of more than double that number would be expected.

For those of us who are smitten, there is nothing more enjoyable than days spent in the field in charismatic places seeking out lichens, especially in the company of like-minded colleagues. However, close scrutinizing for lichens for several days can be extremely tiring, on the eyes if nothing else. Also one can experience something like a gross reduction in RAM, and a need to re-boot becomes necessary. Such seems to have happened to the great "Lichen Hunter" Oliver Gilbert while on Hirta. He says (Gilbert 2004: 80) "After eight days the novelty of the lichens was wearing off and my enthusiasm for investigating them was diminishing. I was rarely surprised anymore." Towards the end of our stay on the current survey such a state of mind crept in to some degree, but there being four of us, we were able to buoy one another up, and suggest new challenges [potentially unexplored niches and the like]. For this reason, in addition to health & safety considerations, it is better to have a site surveyed by two [or more] experts simultaneously. In addition, no two 'experts' have the same expertise. 'With some 2500 species of lichens and lichenicolous fungi on the British Isles, and innumerable niches to house them, there is plenty of scope for specialism, both taxonomically and ecologically – too much scope for one person!

12.3 Management

The lichen interest should be included within the management planning process. No management activities were observed that would appear to threaten the lichen interest. Many of the habitats features/niches important for terricolous lichens are grazing and/or exposure dependent. For example where maritime grasslands are short cropped they are often lichen rich. Grazing also maintains a cropped turf edges on low walls and Cleits which can locally (e.g. in Village Bay) support a well-developed lichen assemblage.

The main potential threat to the lichen interest would be any drastic reduction in grazing. If any reduction in stocking levels is proposed then a lichenologist should be consulted and monitoring should be put in place to monitor those habitats most at threat.

12.4 Recommendations for further survey/monitoring

Some suggestions for monitoring (primarily niches that could be affected by grazing/lack of grazing, trampling or human impacts:

- Monitoring the lichen flora spp. lichen rich maritime grasslands of exposed cliff edges e.g. at Geo Chile Brianan, species-rich grassland just east of Village Bay (main threat in both cases would be under-grazing).
- Monitoring *Lecanora straminea* on boulders in Village Bay below High Street (main threat would be human activities). Possibly suitable for monitoring by volunteers.
- Exposed gravelly maritime communities with *Lobaria pulmonaria* along western top edge of Ruaival.
- *Bunodophoron melanocarpum* on terracettes on north slopes of Oiseval.
- Populations of *Gyalideopsis 'hirtensis'* on terracettes on north face of Oiseval and maritime grassland on steep south west facing slopes between Claigeann Mor and Mullagh Bi.
- *Lobaria virens* and *Nephroma laevigatum* – grazing appears to be important to maintain the good population of *L. virens* and *N. laevigatum* associated with the margins of the screes on the eastern slopes of Claish na Bearnaich. The screes are traversed regularly by sheep (there are large sheep tracks traversing through the scree). *L. virens* appears to be currently very healthy with a seemingly dynamic population (lots of young thalli seen). However excessive trampling (by sheep or humans) could potentially have a negative impact on the *Lobarion* community here. Most at risk would appear to be the very small population of *Degelia atlantica*. *Pseudocyphellaria intricata* was previously collected by Roy Watling in 1967 at Claish Na Bearnaich screes, but was not found during the 2013 survey despite extensive searching.
- Survey for the population of *Anaptychia ciliaris* subsp. *mamillata* near The Gap (recorded by Oliver Gilbert (Gilbert *et al*. 1979) but not found 2013).

Other ideas for monitoring

The following project ideas are possibly suitable for survey by NTS staff or volunteers with suitable ecological survey skills – though some would probably require a baseline to be set up by a lichenologist.

- *Lobaria pulmonaria* on maritime cliffs north of The Gap (would require a telescope).
- *Lecanora straminea* on boulders in Village Bay.
- *Anaptychia ciliaris* subsp. *mamillata* at Ruaival.
- Monitoring sward heights of lichen rich grasslands (to ensure swards don't become rank and smother lichens).

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Acknowledgements

Thanks to Richard Luxmoore (NTS) for letting the contract. Pete Holden (NTS) for discussion on management etc. and pointing out the snowy owl hiding in a cleit. Alan Orange for some critical determinations of *Verrucariaceae*. Thanks to the bryologists (Nick, Ron & Clare) for company. Thanks to the chef with the NTS work party who left us a pot of St. Kilda lamb tagine and home-baked soda bread; and Bill & Ben for the homemade scones. Special thanks to Sandy Coppins for organising travel and accommodation arrangements and Anna Griffith for printing the reports.

APPENDIX 1 SPECIES LIST

Lichens and lichenicolous fungi recorded on Hirta in July 2013

Taxon name: follows BLS Taxon Dictionary, as of 06/11/2013: http://britishlichensociety.org.uk/resources/lichen-taxon-database ; except for provisional names.

Status (see Woods & Coppins, 2012; http://jncc.defra.gov.uk/pdf/Lichens_Web.pdf):

RDB Status: VU = Vulnerable; DD = Data Deficient; NT = Near Threatened

Rarity: NR = known from1–15 hectads in UK; NS = known from 16–100 hectads in the UK

Scottish Biodiversity list: Sc = listed. http://www.biodiversityscotland.gov.uk/advice-and-resources/scottish-biodiversity-list/

International Responsibility: IR = listed by Woods & Coppins. Species considered of international significance (in a European or global context).

UK BAP priority species: P = listed. http://jncc.defra.gov.uk/page-5165

New to VC 110, Outer Hebrides: by comparison with BLS Scottish Lichen Database as of 06/11/2013.

New to St Kilda: by comparison with BLS Scottish Lichen Database as of 06/11/2013.

Table 3. Lichens and lichenicolous fungi recorded on Hirta in July 2013.

Taxon name	Status	New to VC 110	New to St Kilda
Absconditella delutula	LC NS	X	X
Acarospora fuscata	LC		
Acarospora veronensis	LC NS	X	X
Agonimia repleta	DD NR	X	X
Agonimia tristicula	LC		X
Amandinea coniops	LC NS		
Amandinea pelidna	LC		
Amygdalaria pelobotryon	LC		X
Anaptychia ciliaris subsp. *mamillata*	NT NS		
Anaptychia runcinata	LC		
Anisomeridium ranunculosporum	LC	X	X
Anisomeridium robustum	LC NS	X	X
Anisomeridium viridescens	LC NS Sc IR	X	X
Aspicilia caesiocinerea	LC		
Aspicilia grisea	LC		X

Taxon name	Status	New to VC 110	New to St Kilda
Aspicilia intermutans	LC NS	X	X
Aspicilia leprosescens	LC		
Bacidia arceutina	LC		
Bacidia carneoglauca	LC NS	X	X
Bacidia scopulicola	LC		
Baeomyces rufus	LC		
Buellia aethalea	LC		X
Buellia stellulata	LC NS		X
Bunodophoron melanocarpum	LC		
Caloplaca arcis	LC NS	X	X
Caloplaca britannica	LC NS Sc IR	X	X
Caloplaca caesiorufella	VU NR P Sc	X	X
Caloplaca ceracea	LC		
Caloplaca cerinelloides	LC NS	X	X
Caloplaca crenularia	LC		
Caloplaca flavescens	LC		
Caloplaca flavocitrina	LC		X
Caloplaca holocarpa s.str.	LC		
Caloplaca limonia	LC	X	X
Caloplaca marina	LC		
Caloplaca maritima	LC NS	X	X
Caloplaca microthallina	LC		
Caloplaca oasis	LC	X	X
Caloplaca scopularis	NT NS		
Caloplaca sorediella	LC NR	X	X
Caloplaca thallincola	LC		
Caloplaca verruculifera	LC		
Candelariella aurella f. *aurella*	LC		X
Candelariella coralliza	LC		
Candelariella vitellina f. *vitellina*	LC		
Catapyrenium cinereum	LC NS		
Catillaria atomarioides	LC NS	X	X
Catillaria chalybeia var. *chalybeia*	LC		
Catillaria lenticularis	LC		X
Cetraria aculeata	LC		
Cetraria islandica subsp. *islandica*	LC		
Cetraria muricata	LC		X
Cladonia arbuscula subsp. *squarrosa*	LC		
Cladonia cervicornis subsp. *cervicornis*	LC		X
Cladonia chlorophaea s. lat.	LC		
Cladonia ciliata var. *ciliata*	LC		
Cladonia ciliata var. *tenuis*	LC		
Cladonia coniocraea	LC		

Taxon name	Status	New to VC 110	New to St Kilda
Cladonia crispata var. *cetrariiformis*	LC		
Cladonia diversa	LC	X	X
Cladonia fimbriata	LC		
Cladonia floerkeana	LC		
Cladonia foliacea	LC		
Cladonia furcata subsp. *furcata*	LC		
Cladonia polydactyla var. *polydactyla*	LC		
Cladonia portentosa	LC		
Cladonia pyxidata	LC		
Cladonia ramulosa	LC		X
Cladonia rangiferina	LC		
Cladonia rangiformis	LC		
Cladonia squamosa var. *squamosa*	LC		X
Cladonia squamosa var. *subsquamosa*	LC		
Cladonia subcervicornis	LC		
Cladonia uncialis subsp. *biuncialis*	LC		
Clauzadea monticola	LC		X
Cliostomum tenerum	LC	X	X
Coccotrema citrinescens	LC NS		X
Collema auriforme	LC		X
Collema crispum var. *crispum*	LC		X
Collema furfuraceum	LC L		
Collema tenax var. *ceranoides*	LC		
Collemopsidium foveolatum	LC		X
Collemopsidium halodytes	LC NS		
Collemopsidium sublitorale	LC NS		X
Cystocoleus ebeneus	LC		
Degelia atlantica	LC IR		
Degelia cyanoloma	LC NS IR		X
Degelia ligulata	VU NR Sc IR		X
Dermatocarpon intestiniforme	LC		X
Dermatocarpon luridum	LC		
Dermatocarpon miniatum	LC		
Dibaeis baeomyces	LC		
Dimerella lutea	LC		
Enterographa hutchinsiae	LC	X	X
Ephebe lanata	LC		
Epigloea soleiformis	LC NS		X
Fuscidea cyathoides var. *cyathoides*	LC		
Fuscidea gothoburgensis	LC NS		X
Fuscidea lygaea	LC		
Fuscidea praeruptorum	LC		X
Fuscidea recensa	LC		X

Taxon name	Status	New to VC 110	New to St Kilda
Fuscidea sp. ? C+ O, K+ y			
Gyalideopsis 'hirtensis'	NE NR	X	X
Gyalideopsis muscicola	LC NS Sc IR	X	X
Haematomma ochroleucum var. *porphyrium*	LC		
Halecania ralfsii	LC NS		
Herteliana gagei	LC NS		X
Hydropunctaria maura	LC		
Hydropunctaria oceanica	NE NR	X	X
Hypogymnia physodes	LC		X
Ionaspis lacustris	LC		X
Jamesiella anastomosans	LC	X	X
Lecania aipospila	LC NS		
Lecania baeomma	LC NS	X	X
Lecania erysibe s. str.	LC		X
Lecania hutchinsiae	LC		X
Lecania inundata	LC NS	X	X
Lecania rabenhorstii	LC		X
Lecania suavis	DD NR	X	X
Lecania subfuscula	LC NS		X
Lecanora actophila	LC		
Lecanora albescens	LC		X
Lecanora campestris subsp. *campestris*	LC		
Lecanora dispersa	LC		
Lecanora expallens	LC		
Lecanora gangaleoides	LC		
Lecanora hagenii	LC	X	X
Lecanora helicopis	LC		
Lecanora intricata	LC		
Lecanora poliophaea	LC		
Lecanora polytropa	LC		
Lecanora pulicaris	LC		X
Lecanora rupicola var. *rupicola*	LC		X
Lecanora straminea	NT NR Sc		
Lecanora sulphurea	LC		
Lecanora symmicta	LC		
Lecanora zosterae	LC NS	X	X
Lecidea brachyspora	LC NS		X
Lecidea diducens	LC NS		X
Lecidea grisella	LC		X
Lecidea hypnorum	LC NS		
Lecidea lactea s. str.	LC		X

Taxon name	Status	New to VC 110	New to St Kilda
Lecidea phaeops	LC		X
Lecidea sanguineoatra	LC NS		X
Lecidea sp. (white thallus)			
Lecidella asema	LC		
Lecidella elaeochroma f. *elaeochroma*	LC		X
Lecidella meiococca	LC NS		X
Lecidella scabra	LC		
Lepraria ecorticata	LC NS		X
Lepraria incana s. str.	LC		
Lepraria lobificans	LC		X
Lepraria membranacea	LC		X
Leprocaulon microscopicum	LC		
Leptogium britannicum	LC NS Sc IR		
Leptogium gelatinosum	LC		
Leptogium palmatum	NT NS Sc		X
Leptogium pulvinatum	LC		X
Leptogium teretiusculum	LC		
Lichenomphalia alpina	LC		
Lichenomphalia hudsoniana			
Lichenomphalia umbellifera	LC		
Lichina confinis	LC		
Lobaria pulmonaria	LC Sc IR		
Lobaria virens	LC Sc IR		
Megalaria pulverea	LC		
Melanelixia fuliginosa	LC		
Melanelixia glabratula	LC		
Melanelixia subaurifera	LC		X
Micarea botryoides	LC		X
Micarea cinerea f. *tenuispora*	LC NR	X	X
Micarea leprosula	LC		X
Micarea lignaria var. *endoleuca*	LC NS IR		
Micarea lignaria var. *lignaria*	LC		
Micarea peliocarpa	LC		X
Micarea prasina s. lat.			
Micarea subviridescens	LC NR		
Micarea xanthonica	LC NS Sc IR	X	X
Moelleropsis nebulosa	LC NS		
Mycoblastus caesius	LC	X	X
Myriospora smaragdula	LC		
Nephroma laevigatum	LC Sc IR		
Normandina acroglypta	LC	X	X
Normandina pulchella	LC		
Ochrolechia androgyna	LC		

Taxon name	Status	New to VC 110	New to St Kilda
Ochrolechia frigida f. *frigida*	LC		
Ochrolechia frigida f. *lapuensis*	LC NR	X	X
Ochrolechia parella	LC		
Ochrolechia tartarea	LC		X
Opegrapha calcarea	LC		
Opegrapha gyrocarpa	LC		
Opegrapha lithyrga	LC NS		X
Opegrapha multipuncta	LC	X	X
Opegrapha saxigena	LC NS Sc IR	X	X
Parmelia omphalodes	LC		
Parmelia saxatilis	LC		
Parmelia sulcata	LC		
Parmeliella parvula	LC Sc IR	X	X
Parmotrema crinitum	LC		
Parmotrema perlatum	LC		
Peltigera canina	LC		
Peltigera hymenina	LC		
Peltigera membranacea	LC		
Peltigera rufescens	LC		
Pertusaria albescens var. *corallina*	LC		
Pertusaria amara f. *amara*	LC		X
Pertusaria aspergilla	LC		
Pertusaria corallina	LC		
Pertusaria excludens	LC NS		X
Pertusaria flavicans	LC		X
Pertusaria lactea	LC		
Pertusaria lactescens	LC	X	X
Pertusaria pseudocorallina	LC		
Phaeophyscia orbicularis	LC		
Physcia adscendens	LC		
Physcia caesia	LC		
Physcia dubia	LC		
Physcia tenella	LC		
Placopsis gelida	DD NS		
Placynthiella icmalea	LC		X
Placynthium nigrum	LC		X
Platismatia glauca	LC		X
Polyblastia cruenta	LC		X
Porina chlorotica f. *chlorotica*	LC		X
Porina guentheri var. *guentheri*	LC NS	X	X
Porina interjungens	NT NS		
Porina lectissima	LC		
Porina leptalea	LC	X	X

Taxon name	Status	New to VC 110	New to St Kilda
Porpidia cinereoatra	LC		
Porpidia crustulata	LC		
Porpidia flavocruenta	LC NS	X	X
Porpidia hydrophila	LC		X
Porpidia macrocarpa f. *macrocarpa*	LC		
Porpidia melinodes	LC NS	X	X
Porpidia platycarpoides	LC		
Porpidia tuberculosa	LC		
Protoblastenia rupestris	LC		X
Protopannaria pezizoides	LC		
Psoroma hypnorum	LC NS		X
Racodium rupestre	LC	X	X
Ramalina cuspidata	LC		X
Ramalina siliquosa	LC		
Ramalina subfarinacea	LC		
Rhizocarpon geographicum	LC		
Rhizocarpon infernulum f. *sylvaticum*	LC NS	X	X
Rhizocarpon lavatum	LC	X	X
Rhizocarpon reductum	LC		
Rhizocarpon richardii	LC		
Rimularia badioatra	LC NS	X	X
Rinodina atrocinerea	LC		X
Rinodina conradii	LC NS	X	X
Rinodina luridescens	LC		X
Rinodina oleae	LC		
Schaereria fuscocinerea var. *fuscocinerea*	LC		
Scoliciosporum umbrinum	LC		
Solenopsora holophaea	LC NS		
Solenopsora vulturiensis	LC		
Sphaerophorus globosus	LC		
Stereocaulon leucophaeopsis	LC NS	X	X
Stereocaulon vesuvianum var. *nodulosum*	LC NS		X
Stereocaulon vesuvianum var. *vesuvianum*	LC		
Sticta canariensis (dufourii)	LC Sc IR		X
Tephromela atra var. *atra*	LC		
Thelenella muscorum var. *muscorum*	LC		X
Thelocarpon superellum	LC NR	X	X
Toninia aromatica	LC		
Toninia sedifolia	LC P		X
Toninia thiopsora	LC NS	X	X

Taxon name	Status	New to VC 110	New to St Kilda
Trapelia coarctata	LC		X
Trapelia glebulosa	LC		
Trapelia obtegens	LC		
Trapelia placodioides	LC		X
Trapeliopsis flexuosa	LC		
Trapeliopsis gelatinosa	LC		X
Trapeliopsis wallrothii	LC	X	X
Tremolecia atrata	LC		
Tylothallia biformigera	LC		X
Usnea flammea	LC		
Vahliella atlantica	LC NR Sc		X
Vahliella leucophaea	LC		
Verrucaria aethiobola	LC NS		
Verrucaria dolosa	LC	X	X
Verrucaria fusconigrescens	LC		
Verrucaria halizoa	LC NS		
Verrucaria internigrescens	LC NS		
Verrucaria mucosa	LC		
Verrucaria muralis	LC		
Verrucaria nigrescens f. *nigrescens*	LC		X
Verrucaria striatula	LC		
Verrucaria viridula	LC		X
Xanthoparmelia conspersa	LC		X
Xanthoria aureola	LC		
Xanthoria calcicola	LC		
Xanthoria candelaria s. str.	LC		
Xanthoria parietina	LC		
Lichenicolous Fungi			
Abrothallus parmeliarum	LC NS		X
Abrothallus parmotrematis	LC NS	`X	`X
Arthonia 'pertusariae'	NE NR	X	X
Arthonia 'solenopsorae'	NE NR	X	X
Cecidonia xenophana	LC NS		X
Cercidospora epipolytropa	LC NS	X	X
Dactylospora parellaria	LC NS	X	X
Dactylospora tegularum	NE NR	X	X
Endococcus perpusillus	NE NR	X	X
Endococcus propinquus	LC NS	X	X
Endococcus verrucosporus	NE NR	X	X
Homostegia piggotii	LC	X	X
Muellerella lichenicola	LC	X	X
Muellerella pygmaea	LC	X	X

Taxon name	Status	New to VC 110	New to St Kilda
Nesolechia oxyspora	LC	X	X
Opegrapha pulvinata	LC NR Sc	X	X
Opegrapha sphaerophoricola	DD NR Sc	X	X
Phaeospora parasitica	LC NS		
Pronectria santessonii	NE NR	X	X
Pyrenidium actinellum	LC NS	X	X
Sagediopsis 'coccotremae'	NE NR	X	X
Sclerococcum sphaerale	LC		X
Sphinctrina tubiformis	DD NR	X	X
Stigmidium eucline	NE NR	X	X
Stigmidium epiramalina	NE NR	X	X
Stigmidium hageniae	NT NR	X	X
Stigmidium tabacinae	NE NR	X	X
Verrucaria conturmatula	NE NR	X	X

APPENDIX 2 'OLD WOODLAND' SPECIES

A number of species normally associated with ancient woodland exist on Hirta in the absence of woodland due to high humidity/oceanicity. Most species can also be found in coastal rocky habitats outwith woodland in other parts of western Scotland, but most often in the vicinity of oceanic woodland or areas likely to have been part of a more generally wooded landscape at some point in the past. The list below includes all 'old woodland' species known from St. Kilda. The species listed in **bold** text were not recorded in 2013 despite extensive searching (See Appendix 5).

Bunodophoron melanocarpum	
Degelia atlantica	At least some of the previous records could refer to *D. ligulata* which had not been formally described in 1979.
Degelia cyanoloma	
Degelia plumbea	Probably *D. ligulata* or D. cyanoloma, which had not been formally described in 1979.
Dimerella lutea	
Megalaria pulverea	
Leptogium lichenoides	Likely to have *Leptogium pulvinatum*, which had not been formally described in 1979. *L. pulvinatum* is a species of open, non-wooded habitats.
Lobaria amplissima	Recorded at Mullach Bi, Carn More and one thallus at Glacan Mor, Gilbert *et al.* 1979.
Pseudocyphellaria intricata	Collected by Roy Watling in 1967 at Claish Na Bearnaich screes; confirmed by Brian Coppins.
Lobaria virens	
Lobaria pulmonaria	
Nephroma laevigatum	
Nephroma parile	Listed in Gilbert et al. 1979 as only having been recorded by McVean in 1958.
Collema furfuraceum	
Parmeliella parvula	See note for *P. triptophylla*.
Parmeliella triptophylla	Possibly *P. parvula* or even *Vahliella atlantica*, neither of which were listed by Gilbert *et al.* (1979) but were recorded in 2013.
Peltigera horizontalis	Last recorded by Hewitt in 1906 (Gilbert *et al.* 1979), probably a misidentification for *P. hymenia*.
Sticta limbata	Listed as rare at Glacan Mor in Gilbert *et al.* (1979).
Sticta canariensis ('dufourii')	First recorded 2013

APPENDIX 3 GLOSSARY

Assemblage	The lichen assemblage at a location refers to the lichen communities and lichen species present.
Bryicolous	Growing on bryophytes (mosses or liverworts).
Corticolous	Growing on bark.
Ecological continuity	Habitats with a high degree of ecological continuity are those which have existed in a more natural state for longer. For example, ancient woodland.
Epiphytic	Growing on other plants (generally on trees in this report) for mechanical support (and not parasitic).
International Responsibility (IR) status	In this report, this category only applies to lichen species. British populations of lichens with International Responsibility are considered to be of international significance. Woods & Coppins (2012) estimate that Britain supports more than 10% of the European and/or world's population of these species. Many of these species are member of the *Lobarion pulmonariae* lichen community.
Least Concern	An IUCN Red List category for a taxon that has been evaluated against the IUCN criteria but does not qualify for Critically Endangered, Endangered, or Vulnerable. The category also excludes Near Threatened species (see below). Although many widespread and abundant taxa are included in this category, Least Concern does NOT necessarily mean that a species is unimportant. For example – a species of Least Concern at the National Scale may be regionally scarce or threatened.
Lichenicolous	Growing on lichens.
Lignicolous	Growing on deadwood (lignum).
Nationally Rare	Occurring in 15 or fewer hectads (10 x 10 km squares) in Great Britain.
Nationally Scarce	Occurring in 16-100 hectads (10 x 10 km squares) in Great Britain.
Near Threatened	A taxon that is Near Threatened has been evaluated against the IUCN Red List criteria but does not qualify for Red List Threatened categories (i.e. is not Critically Endangered, Endangered or Vulnerable) at the moment, but is close to qualifying for or is likely to qualify for a threatened category in the near future (follows Woods & Coppins, 2012).

Non-lichenized fungi	A fungus that has been traditionally recorded by lichenologists but is not strictly a lichen as it has no photobiont (algal partner).
Not Evaluated	A taxon is Not Evaluated when it has not been assessed against IUCN criteria.
Oceanic	Species with a 'western' distribution occurring in western Europe extending east to Norway, Denmark and Central France.
Old woodland indicator	Species which are poor colonisers of new woodland habitats and so tend to be associated with long–established or ancient woodland.
Priority Habitat	These are habitats for which a Species Action Plan has been agreed under the UK BAP (or LBAP) because they have been assessed to be in a sub-optimal state. It does not necessarily imply they are of particular conservation importance.
Priority Species	Species for which Species Action Plan has been agreed under the UK BAP (or LBAP) because they have been assessed to be in a sub-optimal state. It does not necessarily imply they are of particular conservation importance.
Red List species	A taxon that has been evaluated against IUCN criteria and qualifies as threatened (Critically Endangered, Endangered, or Vulnerable).
Saxicolous	Growing on rock.
Terricolous	Growing on the ground. Includes those species growing on soils, decaying vegetation, and low mats of bryophytes and occasionally spreading to overgrow the bases of vegetation at ground level.
Vulnerable	An IUCN Red List category for a taxon that is considered to be facing a high risk of global extinction, according to IUCN criteria.

APPENDIX 4 LOCATIONS OF NOTABLE SPECIES

Table 4. Locations of some of the more interesting species.

Species	OS grid square	Easting	Northing	Location	Other Notes
Collema furfuraceum	NA	8720	00552	Glen Bay east shore	bedrock
Degelia ligulata	NA	8729	00550	Glen Bay east shore	8 thalli also several thalli of Collema furfuraceum. Bedrock – location shot.
Dermatocarpon luridum	NA	8717	00513	Glen Bay east shore	flushed bedrock
Lecanora straminea	NA	8706	00507	Glen Bay east shore	bedrock
Lecanora straminea	NA	8706	00507	Glen Bay east shore	bedrock
Lobaria pulmonaria	NA	9116	00701	Sea cliffs en route to Glacan Mor	
Lobaria virens	NA	8718	00441	Glen Bay slope above east shore	boulders on hillside, 8in thallus
Lobaria virens	NA	8723	00451	Glen Bay slope above east shore	boulders on hillside, 15 in thallus
Toninia thiopsora	NA	9133	00664	Glachan Mor	Cliff edge outcrops and turf species and location shot
unknown sterile crust	NA	9069	00732	Glachan Mor	is this OLG's 1978 sterile crust from The Gap? specimen with BJC
Agonimia repleta	NF	09476	98295	Ruival	Conf. BJC
Anaptchyia ciliaris subsp. mamillatum	NF	09493	98213	cliff-top	amongst stones in cliff-top turf
Anaptchyia ciliaris subsp. mamillatum	NF	09527	97984	Ruival	12 thalli
Anaptchyia ciliaris subsp. mamillatum	NF	09527	97983	Ruival	large colony
Anaptchyia ciliaris subsp. mamillatum	NF	09534	97977	Ruival	frequent thalli

Species	OS grid square	Easting	Northing	Location	Other Notes
Anaptchyia ciliaris subsp. mamillatum	NF	09538	97958	Ruival	c. 6 thalli; photo location - behind top of stick
Anaptchyia ciliaris subsp. mamillatum	NF	09544	97940	Ruival	38 thalli counted between the bumbag and the pole in AA photos.
Anaptchyia ciliaris subsp. mamillatum	NF	09545	98050	Ruival	frequent
Aspicilia intermutans	NF	09836	99694	Glacan Chonachair	
Bacidia carneoglauca	NF	08709	98953		
Bunodophoron melanocarpum	NF	09847	99787	Glacan Chonachair	Large healthy patches on ledges in gully
Bunodophoron melanocarpum	NF	09870	99755	Glacan Chonachair	
Bunodophoron melanocarpum	NF	10042	99586	village area; turf of cleit	
Bunodophoron melanocarpum	NF	10817	99658	The Gap	
Bunodophoron melanocarpum	NF	10824	99645	The Gap	Several locations in this vicinity - recorded as terricolous on terracettes and saxicolous in sheltered locations on the sea cliffs
Bunodophoron melanocarpum	NF	10864	99596	The Gap	
Caloplaca caesiorufella	NF	09535	98130	wind-swept turf	on bryo
Caloplaca 'cerinelloides'	NF	09500	98199	wind-swept turf - on Armeria	on Armeria w. Bacidia arcutina
Caloplaca 'cerinelloides'	NF	09527	98079	Ruabhal, Cliff top	habitat pics
Caloplaca 'cerinelloides'	NF	09531	98135	cliff top	
Caloplaca sorediella	NF	09598	97905	Ruabhal	
Cetraria islandica	NF	09565	98760	Mullach Sgar	habitat and close up pics
Cetraria islandica	NF	10896	99214	summit of Oiseval	plateau heath several thalli in this area
Cetraria islandica	NF	10898	99195	summit of Oiseval	plateau heath a few thalli in this

Species	OS grid square	Easting	Northing	Location	Other Notes
					area
Cetraria islandica	NF	10899	99203	summit of Oiseval	plateau heath a few thalli in this area
Cetraria islandica	NF	10911	99212	summit of Oiseval	plateau heath a few thalli in this area
Cetraria muricata	NF	10688	99825	The Gap	
Cetraria muricata	NF	10895	99252	summit of Oiseval	plateau heath
Cladonia rangiferina	NF	10887	99517	among Calluna nr cliff edge	
Degelia atlantica	NF	09785	98689	Clais na Bernaich screes	
Degelia atlantica	NF	09822	98785	lower edge of upper scree	
Degelia atlantica	NF	09822	98784	W side Village Bay	
Degelia atlantica	NF	09825	98779	lower edge of upper scree	
Degelia atlantica	NF	09832	98983	scree	
Degelia atlantica	NF	09843	98954	scree	
Degelia atlantica	NF	09844	98994	scree	habitat pics
Degelia atlantica	NF	10152	99137	boulder beach Village bay	4 thalli
Degelia atlantica	NF	10158	99144	boulder beach Village bay	1 thallus
Degelia cyanoloma	NF	10532	98985	coastal turf/terracettes	1 thallus, 8 cm diam
Degelia ligulata	NF	09530	97970	Ruival	location shot
Degelia ligulata	NF	09534	97979	Ruabhal, Cliff top	Small thallus of D. ligulata.
Degelia ligulata	NF	09544	97940	Ruabhal, Cliff top	2 thalli counted. Location shots & close ups
Degelia ligulata	NF	09824	98400	Frequent in area shown in photo	
Degelia ligulata	NF	09824	98401	coastal turf	
Degelia ligulata	NF	10152	99137	boulder beach Village bay	3 thalli
Degelia ligulata	NF	10158	99144	boulder beach Village bay	6 thalli
Degelia ligulata	NF	10497	98998	coastal turf/terracettes	4 thalli
Degelia ligulata	NF	10504	98996	coastal turf/terracettes	large patch, 50 x 13 cm
Degelia ligulata	NF	10508	98996	coastal	c. 1 m length

Species	OS grid square	Easting	Northing	Location	Other Notes
				turf/terracettes	along terracette
Degelia ligulata	NF	10517	99003	coastal turf/terracettes	2 thalli
Degelia ligulata	NF	10526	98993	coastal turf/terracettes	c. 10 thalli below split boulder
Degelia ligulata	NF	10835	98894	s face of Oiseval	4 thalli on sheltered cliff face
Dimerella lutea	NF	08310	99251	On roseroot	
Dimerella lutea	NF	08366	99286		
Dimerella lutea	NF	08699	98969		base of crevice between 2 boulders
Dimerella lutea	NF	08700	98963		
Dimerella lutea	NF	09592	98775	in gully	
Epigloea soleiformis	NF	08368	99285		
Gyalideopsis 'hirtensis'	NF	08338	99194		1 patch seen but probably more present
Gyalideopsis 'hirtensis'	NF	08353	99185		At least 7 patches on several terracettes by the walking pole in the photo. Lots of available habitat in vicinity.
Gyalideopsis 'hirtensis'	NF	08667	98965		2 patches: 2x2 cm and 1.5x1.5cm. One patch collected as reference sample..
Gyalideopsis 'hirtensis'	NF	09427	99230		photo - habitat
Gyalideopsis 'hirtensis'	NF	10000	99000	cliff edges of upper slope of Oiseval & summit	microscope photo
Gyalideopsis 'hirtensis'	NF	10839	99623		
Gyalideopsis 'hirtensis'	NF	10879	99577		
Lecania suavis	NF	09766	98948	sheep fank	habitat pics
Lecania subfuscula	NF	09535	98130	wind-swept turf	on bryophytes
Lecania subfuscula	NF	09538	98075		
Lecanora straminea	NF	08055	99370	Mullach Bi	Grid ref of viewpoint (photo by SP). Just south of summit of

Species	OS grid square	Easting	Northing	Location	Other Notes
					Mullach Bi. Vertical streak c. 4 foot long.
Lecanora straminea	NF	09782	98397	sites a&b walls s west of village bay	6 thalli, location photo
Lecanora straminea	NF	09809	98405	site c walls s west of village bay	1 thallus, location photo
Lecanora straminea	NF	09810	98423	site d walls s west of village bay	
Lecanora straminea	NF	09814	98423	site d walls s west of village bay	2 thalli, location photo
Lecanora straminea	NF	09814	98423	site d walls s west of village bay	close up with overgrowing lichens
Lecanora straminea	NF	09814	98427	site e walls s west of village bay	3 thalli, location photo
Lecanora straminea	NF	10146	99266	Village Bay field	on boulder
Lecanora straminea	NF	10149	99217	Village Bay field	boulders in field, site photo and specimen
Lecidea hypnorum	NF	10531	98988	coastal turf/terracettes	
Lecidea sanguineoatra	NF	08721	99794	Abhainn a' Ghlinne Mhòir	on banking on burn
Lecidea sanguineoatra	NF	09662	98817	The Chimney	
Lecidea sanguineoatra	NF	10524	99003	coastal turf/terracettes	
Lecidella meiococca	NF	09766	98948	sheep fank	habitat pics
Lepraria ecorticata	NF	10724	99707	w slope of Oiseval	inside cleit is this the Lecidea (Psilolechia) lucida – Hewitt 1906?
Leptogium britannicum	NF	09534	98076		
Leptogium britannicum	NF	09781	98461	grassland below Ruival	grassland
Leptogium britannicum	NF	09801	98509		
Leptogium britannicum	NF	09840	98572		
Leptogium britannicum	NF	09860	98826	screes below gully e side of Mullach Sgar	
Leptogium britannicum	NF	09863	98839	screes below gully e side of Mullach Sgar	
Lobaria pulmonaria	NF	09527	98143	Ruabhal, Cliff top	habitat and close up pics

Species	OS grid square	Easting	Northing	Location	Other Notes
Lobaria pulmonaria	NF	09531	98135	cliff top	
Lobaria pulmonaria	NF	09531	98135	wind-swept turf	
Lobaria pulmonaria	NF	09537	98072	Ruival	maritime heath habitat shot
Lobaria pulmonaria	NF	09537	98072	Ruival	maritime heath habitat shot
Lobaria virens	NF	09537	98072	Ruival	maritime heath habitat shot
Lobaria virens	NF	08310	99251		
Lobaria virens	NF	08691	99958	Abhainn a' Ghlinne Mhòir	
Lobaria virens	NF	08699	98969		base of crevice between 2 boulders
Lobaria virens	NF	08700	98963	W side Village Bay	
Lobaria virens	NF	08709	98944	Rubha Mhuirich	under large boulder near summit
Lobaria virens	NF	09473	98257	cliff-top	
Lobaria virens	NF	09476	98247		
Lobaria virens	NF	09531	98135		
Lobaria virens	NF	09537	98072	Ruival	maritime heath
Lobaria virens	NF	09785	98689	Clais na Bernaich screes	
Lobaria virens	NF	09786	98674		
Lobaria virens	NF	09788	98808		
Lobaria virens	NF	09803	98604		
Lobaria virens	NF	09810	98804		
Lobaria virens	NF	09822	98784	W side Village Bay	habitat and close up pics
Lobaria virens	NF	09824	98400		
Lobaria virens	NF	09828	98398	W side Village Bay	
Lobaria virens	NF	09835	98759	W side Village Bay, cliff top	
Lobaria virens	NF	09836	98712	W side Village Bay	
Lobaria virens	NF	09842	98994	scree	
Lobaria virens	NF	09844	98994	scree	Close up and close habitat pics
Lobaria virens	NF	09845	98791	W side Village Bay	
Lobaria virens	NF	09849	98790	W side Village Bay, cliff top	
Lobaria virens	NF	09854	98801	W side Village Bay, cliff top	

Species	OS grid square	Easting	Northing	Location	Other Notes
Lobaria virens	NF	09860	98826	screes below gully e side of Mullach Sgar	
Lobaria virens	NF	09864	98834	W side Village Bay	
Lobaria virens	NF	09874	98900	screes below gully e side of Mullach Sgar	4 inch thallus in grassland below scree
Lobaria virens	NF	09889	98880	To the west of Village Bay	exposed coastal maritime grassland with terracettes
Lobaria virens	NF	10025	99568	back of village outside of dyke	12 inch diameter thallus
Lobaria virens	NF	10338	99199	Village Bay	on wall near opening
Lobaria virens	NF	10497	98998	coastal turf/terracettes	
Lobaria virens	NF	10504	98996	coastal turf/terracettes	
Lobaria virens	NF	10505	98997	coastal turf/terracettes	
Lobaria virens	NF	10508	98996	coastal turf/terracettes	
Lobaria virens	NF	10517	99003	coastal turf/terracettes	
Lobaria virens	NF	10524	99003	coastal turf/terracettes	
Lobaria virens	NF	10543	98983	by sheep track	
Lobaria virens	NF	10780	98959	sw slope of Oiseval	on face of terracettes in this area
Lobaria virens	NF	10782	99716	The Gap	
Lobaria virens	NF	10799	98895	s face of Oiseval	boulders across steep slope
Lobaria virens	NF	10799	99692	The Gap, s face of Oiseval	boulders across steep slope
Lobaria virens	NF	9844	98994	scree	Close up and close habitat pics
Micarea cinerea f. tenuispora	NF	08310	99251	Pycnidial form det. BJC	
Nephroma laevigatum	NF	09785	98689	Ruival	
Nephroma laevigatum	NF	09819	98738	W side Village Bay	habitat and close up pics
Nephroma laevigatum	NF	09828	98572	Clais na Bernaich screes	
Nephroma laevigatum	NF	09845	98791	W side Village Bay	

Species	OS grid square	Easting	Northing	Location	Other Notes
Opegrapha sphaerophoricola	NF	08056	99375	Mullach Bi	microscope shot
Porina interjungens	NF	09827	99360	Abhainn Mhor	habitat shot
Rimularia badioatra	NF	9833	98891	lower screes Mullach Sgar	microscope shot
Rinodina conradii	NF	09531	98135	wind-swept turf	
Rinodina conradii	NF	09860	98419		
Sticta dufourii	NF	08436	99169		
Sticta dufourii	NF	09822	98784	W side Village Bay	habitat and close up pics
Sticta dufourii	NF	09825	98779	lower edge of upper scree	a scrap
Sticta dufourii	NF	09841	98990	scree, W side of Village Bay	habitat pics
Sticta dufourii	NF	09851	98826	lower edge of lower scree	patch 14 x 14 cm
Thelocarpon superellum	NF	9620	99200		Peaty crud in flush, microscope shot
Toninia sedifolia	NF	09531	98135		
Vahliella atlantica	NF	09744	99455	Abhainn Mhor	on soil on banking
Vahliella atlantica	NF	09823	98829	W side Village Bay	habitat and close up pics
Vahliella atlantica	NF	09828	98398	Abhainn Mhor	on soil on banking
Vahliella atlantica	NF	09845	98622	W side Village Bay	
Vahliella atlantica	NF	09852	98807	W side Village Bay	coastal turf. Habitat pic
Xanthoparmelia conspersa	NF	08104	99449	e side of Mullach Bi	single thallus on outcrop
Lobaria pulmonaria	NF	10440	99990	E slope of Conachair	view of site

APPENDIX 4 NAME CHANGES SINCE GILBERT *ET AL.* (1979)

*Table 5. Name changes since the publication of Gilbert et al. (1979). * Species suffixed are discussed further below.*

Gilbert *et al*. (1979)	**BLS Taxon Dictionary November 2013**
Acarospora smaragdula	*Myriospora smaragdula*
Anaptychia fusca	*Anaptychia runcinata*
Anaptychia mamillata	*Anaptychia ciliaris* subsp. *mamillata*
Arthonia aspersella	*Arthonia didyma*
Arthopyrenia halodytes	*Collemopsidium foveolatum**
Arthopyrenia sp. (Fletcher, 1975: 27)	*Collemopsidium elegans**
Aspicilia gibbosa	*Aspicilia caesiocinerea*
Aspicilia lacustris	*Ionaspis lacustris*
Buellia coniops	*Amandinea coniops*
Buellia punctata	*Amandinea pelidna* & *A. punctata**
Caloplaca caesiorufa	*Caloplaca ceracea*
Caloplaca citrina	*Caloplaca arcis, C. flavocitrina* &/or *C. limonia**
Caloplaca ferruginea	*Caloplaca crenularia*
Caloplaca heppiana	*Caloplaca flavescens*
Caloplaca holocarpa	*Caloplaca holocarpa* s. lat.
Catillaria cf. *littorella*	*Lecania hutchinsiae*
Cetraria chlorophylla	*Tuckermannopsis chlorophylla**

Gilbert *et al*. (1979)	**BLS Taxon Dictionary November 2013**
Cornicularia aculeata	*Cetraria aculeata*
Cystocoleus niger	*Cystocoleus ebeneus*
Dermatocarpon cinereum	*Catapyrenium cinereum*
Dermatocarpon fluviatile	*Dermatocarpon luridum*
Fuscidea tenebrica	*Fuscidea lygaea*
Huilia albocaerulescens	*Porpidia cinereoatra*
Huilia crustulata	*Porpidia crustulata*
Huilia macrocarpa	*Porpidia macrocarpa*
*Lecania erysibe**	*Lecania spp.*
Lecanora atra	*Tephromela atra*
Lecidea granulosa	*Trapeliopsis granulosa*
Lecidea lucida	*Psilolechia lucida*
Lecidea percontigua	*Porpidia platycarpoides*
Lecidea sulphurea	*Lecanora sulphurea*
Lecidea symmicta	*Lecanora symmicta*
Lecidea templetonii	*Lecidea hypnorum*
Lecidea tenebrosa	*Schaereria fuscocinerea*
Lecidea tumida	*Porpidia tuberculosa*
Lecidea uliginosa	*Placynthiella uliginosa & P. icmalea*
Lecidella subincongrua	*Lecidella asema*
Lepraria neglecta auct.	*Lepraria caesioalba*
cf. *Lepraria* sp.	*Megalaria pulverea*

Gilbert *et al*. (1979)	**BLS Taxon Dictionary November 2013**
Leptogium sinuatum	*Leptogium gelatinosum*
Leptogium tremelloides auct. angl.	*Leptogium britannicum*
Lobaria laetevirens	*Lobaria virens*
Micarea lignaria s. l. sp.	*Micarea lignaria* var*. endoleuca*
Opegrapha confluens	*Opegrapha calcarea*
Pannaria leucophaea	*Vahliella leucophaea*
Pannaria pezizoides	*Protopannaria pezizoides*
Parmelia conspersa	*Xanthoparmelia conspersa*
Parmelia crinita	*Parmotrema crinitum*
Parmelia glabratula	*Melanelixia glabratula*
Parmelia glabratula subsp*. fuliginosa*	*Melanelixia fuliginosa*
Parmelia laevigata	*Hypotrachyna laevigata**
Parmelia perlata	*Parmotrema perlatum*
Parmelia pulla	*Xanthoparmelia pulla*
Parmeliella atlantica	*Degelia atlantica*
Parmeliella plumbea	*Degelia plumbea**
Pertusaria dealbata	*Pertusaria aspergilla*
Pertusaria lactea	*Varicellaria lactea*
Polyblastia gelatinosa	*Agonimia gelatinosa**
Rhizocarpon constrictum	*Rhizocarpon richardii*
Rhizocarpon obscuratum	*Rhizocarpon reductum*
Rinodina subexigua	*Rinodina oleae*

Gilbert *et al*. (1979)	**BLS Taxon Dictionary November 2013**
Sphaerophorus melanocarpus	*Bunodophoron melanocarpum*
Trapelia involuta	*Trapelia glebulosa*
Verrucaria latebrosa	*Verrucaria aethiobola**
Verrucaria maura	*Hydropunctaria maura*
Verrucaria microspora auct.	*Verrucaria halizoa**
Xanthoria aureola	*Xanthoria calcicola*

APPENDIX 5 NOTES ON SPECIES LISTED IN GILBERT *ET AL*. (1979) BUT NOT FOUND IN THE 2013

Below are notes on species that we failed to re-find in 2013. In some cases we suspect that this is because of previous misidentifications, although in the absence of voucher material we cannot be absolutely certain. Most of the previous records are not supported by voucher material, except in the case of Watling's 1967 records, all of which are supported by specimens in RBGE Edinburgh (E). We have located only a few of Oliver Gilbert's specimens. It would seem that his other collections were either not retained by him, or have been lost. Searches of collections at the Natural History Museum (BM) and RBGE Edinburgh (E), have not been successful. Prof. Mark Seaward and Mr Ivan Pedley were responsible for retrieving Oliver Gilbert's lichenological effects following his death in 2005, and both have failed to find any St Kilda specimens.

The other reason for not re-finding species is if they are of a low frequency of occurrence or very inconspicuous in the field. Some, such as *Cladonia gracilis* and *C. strepsilis*, are by no means inconspicuous, but previous records suggest they had a very restricted occurrence. However, their heathland/moorland habitat is extensive on the island, such that perhaps we were just unlucky in not being able to find them (often in the mist!).

Agonimia gelatinosa (as *Polyblastia gelatinosa*), recorded in 1978: among bryophytes on ledge, Tot a Chombaiste. A very inconspicuous species that we may well have overlooked. However, we did find *Agonimia repleta*, a very similar species that was not described until 2000.

Amandinea punctata (as *Buellia punctata*), recorded in 1978. Gilbert's records from rock were almost certainly *A. pelidna* (syn. *A. lecideina*). However, his records from wood or turf were likely to be *A. punctata*, although we failed to find it.

Arthonia didyma (as *A. aspersella*), recorded by Watling in 1967 on a *Calluna* stem. This is a very inconspicuous species, and its find was a chance happening from a heather stem collected for other purposes. It is probably still present on the island.

Aspicilia laevata, recorded in 1978: "boulders in bed of the Abhainn Mhor". We were surprised not to re-find this species. The only *Aspicilia* we recorded here was the sorediate, *A. grisea*. This we saw several times, but it was not recorded by Gilbert. The two species can look rather similar if not well-developed.

Caloplaca citrina, recorded in 1978. The *Caloplaca citrina* group is undergoing substantial revision, and *C. citrina* s. str. may not be correctly recorded from the British Isles. The

species was recorded on cement rendering, and in 2013 members of this group recorded from concrete or rendering were *C. arcis*, *C. flavocitrina* and *C. limonia*. Surprisingly, *Caloplaca austrocitrina*, a very common species of such habitats in most parts of Britain, was not found in 2013.

Cladonia digitata, recorded in 1958 by McVean (unpublished list). Possibly an error.

Cladonia gracilis, recorded in 1978 as "rare, among *Calluna*".

Cladonia strepsilis, recorded in 1967 by Watling: "peaty soil near The Gap.

Collemopsidium elegans (as "*Arthopyrenia* sp. (Fletcher, 1975: 27)"). This is a species of the lower shore (eulittoral), which we did not examine in great detail. It is possible we overlooked it for *Verrucaria striatula*, which looks very similar in the field.

Degelia plumbea (as *Parmeliella plumbea*), recorded in 1967 and 1978. The Watling specimen from 1967 is *Degelia ligulata*. Gilbert's records are most likely to be this species, which was not described until 1990. Gilbert's records may also have included the recently recognized *D. cyanoloma*, seen at least once in 2013. We are sure that *D. plumbea* s. str. has not been correctly reported from St Kilda.

Diplotomma alboatrum, recorded in 1978 as "frequent on sunny rocks near the sea". We were surprised not to find this species.

Hypotrachyna laevigata (as *Parmelia laevigata*), recorded by McVean in 1958 (unpublished list). Considered a probable error by Gilbert *et al*. and we support that opinion.

Lecania erysibe, recorded in 1978 as "generally distributed in the maritime zone". At that time "*L. erysibe*" had a broad concept, and is now taken to comprise several species, including: *L. erysibe* s. str., *L. hutchinsiae*, *L. inundata* and *L. rabenhorstii*, all of which were found on Hirta, but not on the sea-shore. We are not clear as to what Gilbert was recording.

Lepraria crassissima, recorded in 1978: locally abundant on an overhanging cliff, Tet a Chombaste". This name has been misused in the past, and the species Gilbert saw was almost certainly not *L. crassissima* s. str. A voucher for TLC examination is required for accurate determination.

Leptogium lichenoides, recorded in 1978: "occasional among bryophytes in *Festuca* grassland; wall top in Main Street". These records must refer to *L. pulvinatum* which we found to be well-represented in such habitats. It was not recognized as distinct from *L. lichenoides* until 2010.

Lobaria amplissima, recorded in 1958 by McVean (unpublished list) as "Cliffs. Not common", and later by Gilbert as "rare on rock faces Mullach Bi, Carn Mor, and Glacan More (one thallus)". This species is probably still present, but in habitats we didn't feel safe in exploring.

Nephroma parile, recorded in 1958 by McVean (unpublished list). Possibly a confusion with sterile *Nephroma laevigatum*.

Parmeliella triptophylla, recorded in 1978. It is possible that this species could be on St Kilda, but the statement of "rare on peaty overhangs" is more suggestive of two species seen several times in 2013: *Parmeliella parvula* and *Vahliella atlantica*. The former species was not recognized as occurring in Britain until 1978, and the latter was not described as new to science until 2005.

Peltigera horizontalis, recorded only by Hewitt (1907). Probably a misidentification for *P. hymenina*, which was not recorded by Hewitt, even under the broader concept of "*P. polydactyla*" (as would have been used in those days).

Porina mammillosa, recorded in 1978 "among *Calluna* at 240 m on Conachair. Not found in 2013, although Conachair was not well studied. The specimen is in E.

Pseudocyphellaria intricata, recorded on scree below Clash na Bearnaich in 1967. The voucher specimen in E is correctly identified. Unfortunately, efforts by Gilbert in 1978, and by us in 2013 failed to refind it.

Psilolechia lucida (as *Lecidea lucida*), recorded only by Hewitt in 1906 on cleit stones. It is possible this record refers to *Lepraria ecorticata*, which although not so brightly green coloured as *P. lucida*, was found common in shady parts of cleits in 2013.

Ramalina polymorpha: recorded by Hewitt. We agree with Gilbert *et al*. (1979) that this is an error for *Ramalina siliquosa*. There are no confirmed records for *R. polymorpha* from the Hebrides or the west coast of Scotland.

Rhizocarpon hochstetteri, recorded in 1978, "acid scree, Conachair". We failed to find this species, but Gilbert's record could have referred to *R. infernulum* f. *sylvaticum*, which would have been called "*R. hochstetteri*" at that time.

Tuckermannopsis chlorophylla (as *Cetraria chlorophylla*), recorded in 1978: "locally abundant on walls of a gully at 270 m, east face Oiseval". It is probable that we did not visit this gully, so the species may well still be present there.

APPENDIX 6 COMPARISONS WITH OTHER ISLANDS

The two tables below accompany section **12.2**.

Annotations for Tables 6, 7

Island. According to current expectations: **bold** type – well recorded; normal type – moderately recorded; *italic* type – poorly recorded.

Species total: where necessary species recorded only on trees or large shrubs have been excluded.

DLV: date last visited, or date of last significant survey.

[**'Special species'**]:

Lobarion or 'epiphyte element': Datl = *Degelia atlantica*; Dpl/cy = *Degelia plumbea* of *D. cyanoloma* [2 species only recently distinguished]; Lamp = *Lobaria amplissima*; Lpul = *Lobaria pulmonaria*; Lvir = *Lobaria virens*; Nlae = *Nephroma laevigatum*; Pcro = *Pseudocyphellaria crocata*; Pint = *Pseudocyphellaria intricata*; Sduf = *Sticta* '*dufourii*' [blue-green morphotype of *S. canariensis*]; Sful = *Sticta fuliginosa*; Ssyl = Sticta sylvatica.

Cliff-top rocks/turf species: Amam = *Anaptychia ciliaris* subsp. *mamillata*; Dlig = *Degelia ligulata**; Ppez = *Protopannaria pezizoides*; Phyp = Psoroma *hypnorum*; Vatl = *Vahliella atlantica*.

Exposed, nutrient enriched: Csco = *Caloplaca scopularis*; Lstr = *Lecanora straminea*; Rpol = *Ramalina polymorpha*.

* On Canna *Degelia ligulata* was recorded on exposed but damp/wet flushed slabs near the shore; *D. ligulata* was also found on flushed slabs on Hirta.

Table 6. *Comparison with some other islands* – Lobarion *element. Additional* Lobarion *lichens from coastal habitats on Canna include*: Collema furfuraceum *(locally frequent),* C. subflaccidum *(rare),* Fuscopannaria mediterranea *(rare, coastal gully),* Leptogium cyanescens, L. teretiusculum *(scarce). Other old woodland species in coastal heaths (included* Polychidium muscicola *(rare) and* Micarea stipitata *(rare).*

Island	Area (Ha)	Sp. total	Alt.	DLV	Datl	Dpl/cy	Lamp	Lpul	Lvir	Nlae	Pcro	Pint	Sduf	Sful	Ssyl
St Kilda - Hirta	638	323	430	2013	1	1	(1)	1	1	1		(1)	1		
Sula Sgeir	15	3	70	1972											
Flannans - Eileann Mor	18	63	88	1975											
North Rona	109	87	108	1976	1										
Foula	1265	153	418	2011											
Fair Is	768	114	217	1961					1						
Shiant Islands	143	9	160	1970				1							
Mingulay	640	214	273	1982		1							1		
Summer Is - Tanera Mor	310	286	122	2012		1				1					
Muck	559	327	137	2012	1			1	1	1	1		1	1	1
Handa	309	28	123	2013	1		1	1	1						
Canna	1130	210	210	2010	1					1					
Ailsa Craig	99	180	338	1979						1					1
Is of May	45	201	50	2010											
Skomer	292	229	79	1994											
Lundy	445	267	142	1995											
Calf of Man	250	116	126	1990											
Farne Is	100	54	20	2013											
Harris		310	799	2013		1		1							

Skellig Michael	21.9	128	218	2009											
Tory	317	130	83	2008				1	1	1					
Great Saltee	77	99	58	2010											
Little Saltee	34	59	32	2010											

Table 7. Comparison with some other islands – maritime turf and bird-influenced rocks

Island	Area (Ha)	Sp. total	Alt.	DLV	Amam	Dlig	Ppez	Phyp	Vatl	Csco	Lstr	Rpol
St Kilda - Hirta	638	323	430	2013	1	1	1	1	1	1	1	
Sula Sgeir	15	3	70	1972								
Flannans - Eileann Mor	18	63	88	1975							1	
North Rona	109	87	108	1976								
Foula	1265	153	418	2011			1	1				
Fair Is	768	114	217	1961	1						1	
Shiant Islands	143	9	160	1970								
Mingulay	640	214	273	1982	1		1					
Summer Is - Tanera Mor	310	286	122	2012		1				1		
Muck	559	327	137	2012		1						
Handa	309	28	123	2013								
Canna	1130	210	210	2010		1	1					
Ailsa Craig	99	180	338	1979					1			
Is of May	45	201	50	2010	1							1
Skomer	292	229	79	1994						1		1
Lundy	445	267	142	1995	1							

Island	Area (Ha)	Sp. total	Alt.	DLV	Amam	Dlig	Ppez	Phyp	Vatl	Csco	Lstr	Rpol
Calf of Man	250	116	126	1990								
Farne Is	100	54	20	2013	1							1
Harris		310	799	2013		1	1					
Skellig Michael	21.9	128	218	2009	1	1			1			
Tory	317	130	83	2008		1		1	1			
Great Saltee	77	99	58	2010								
Little Saltee	34	59	32	2010								