British Lichen Society

The British Lichen Society
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Dear Sir/Madam

17/04601/FUL Development of 18-hole golf course, etc.

The British Lichen Society (BLS) wish to register an objection to the proposed planned 18-hole golf course at Coul Links, part of Loch Fleet SSSI (Highland Council Planning Application 17/04601/FUL). We consider that from the point of view of lichen interest at Coul Links, the case made by the ES was not sufficient, and we should respond on behalf of the lichens. The consultancy report did not adequately acknowledge the lichen interest and there seems to have been little effort to gain more information, either by contacting the BLS or commissioning a specialist survey of the site. The SNH case for objecting to the development on the basis of the lichen interest is very good, and Dr David Genney of SNH (Genney 2017) recommended a specialist survey to enable a full assessment of the lichen interest and a better understanding of likely impacts of the proposed development.

The lichenological importance of Coul Links has long been known. In a report to the then Nature Conservancy Council, on a *Survey and Assessment of Lowland Heath, Dune and Machair Lichen Habitats in the UK*, the BLS assessed Ferry-Coul Links as of National [UK] importance (Fletcher *et al*. 1984). Their closing comment was "The site is unique, of Oceanic Northern Dunes type and is reminiscent of some features of Culbin, Forvie and Cuthill Links. It stands alone, however, no back-up sites can be suggested." After 34 years this assessment has not changed.

Fryday (1991) carried out a rather cursory survey of only the northern part of Coul Links, and recorded much of it as rather 'disappointing' compared to Ferry Links, but he did not record 3 of the Red-listed species recorded between 2016–18 and this probably reflects the limited areas visited by him. Nevertheless, Fryday did record the Red-listed *Cladonia mitis*, further to the north.

More recently, the site has been visited by staff from SNH (October 2017), and Stewart Taylor (December 2017). These visits were of a walk-over nature, but certainly raised awareness of the potential lichen importance of Coul Links by finding nationally important populations of the rare and endangered lichen *Peltigera malacea*

and the nationally scarce *Peltigera neckeri* (Halfhide 2017, Genney 2017, Stewart Taylor pers. com.).

The 2018 field visit to Coul Links

The BLS were concerned that the lichen interest of the site may be somewhat under represented, given that there has been no comparable full lichen survey similar to that afforded to Ferry Links to the north (Coppins & Coppins 1998). Consequently, a brief visit to the site was made on 3rd May 2018 by four members of the BLS: Andy Acton, Paul Cannon (current President BLS), Brian Coppins and Heather Paul, accompanied by local ecologist and expert on dune systems, Tom Dargie. There was not time for a full lichen survey, but we aimed to cover some ground not covered by David Genney and Stewart Taylor in October and December 2017 respectively. Some of the locations for the proposed golf greens, fairways and access tracks were also included in our walk-over. GIS readings were taken of locations of notable species and are shown in **Figs 1 & 2**. Although the distribution of lichen interest will inevitably partly reflect recording effort, it is clear that the footprints of the proposed greens, fairways and access tracks coincide with some key areas of high lichen interest.

The visit confirmed that the site was under-recorded as we added 34 species to the site total, including 14 terricolous lichens (soil growing species), 7 epiphytic lichens (growing on plants, mostly on *Calluna*), 3 saxicolous lichens (growing on rocks, on shingle at northern end) and 10 lichenicolous fungi (growing on lichens). Much of the site is still unexplored and more species can be expected to occur there.

We also recorded more locations for the priority species, *Peltigera malacea* (**Figs. 4 & 5**), and also for other notables, namely *Leptogium palmatum* and *Stereocaulon condensatum*. (**Figs. 6 & 8**). Notable new finds at Coul were *Massalongia carnosa* (elsewhere in dunes systems only at Findhorn), *Polychidium muscicola* and *Bryobilimbia sanguineoatra*, the last two being new finds for a dune system anywhere in the British Isles, their usual habitat being mossy tree trunks or rocks in oceanic areas of the western Highlands. These emphasise the uniqueness of the Loch Fleet dune system. More expected additions were *Cladonia rangiferina*, *C. uncialis* subsp. *uncialis* and *C. zopfii*.

Lichen importance of the Loch Fleet SSSI dunes system in a national context.

The combined total number of terricolous lichens [lichens growing on the ground, on mineral soil, sand or decaying vegetation] at Loch Fleet is 101 species , the highest total found at any coastal dune system in the British Isles. **We would reiterate and strongly endorse the comments made by Genney (2017), that both parts of the dune systems within Loch Fleet SSSI must be considered as a whole: the two halves of the Loch Fleet SSSI are complementary to one another, as both have features not found in the other. Ferry Links has a total of 87, with 31 not found on Coul Links, whereas Coul Links, with a total of 71, has 14 lichens not found on Ferry Links (see Table 2).**

[The SSSI total is arrived at by taking the 87 species found at Ferry Links, and adding the 14 additional species found at Coul Links, = 101].

In this overall total of 101 terricolous species, there are 17 notable species (see **Table 1**) including four Red-listed species. The four Red-listed species are also Scottish

Biodiversity List species that Scottish Ministers consider to be the highest priority for biodiversity conservation in Scotland (Scottish Biodiversity List, 2013).
Formal assessment criteria have recently been developed for heathland, moorland & coastal heath habitats (Sanderson *et al*., in press), and assessing against these criteria also supports the high importance of Loch Fleet SSSI for lichens.

The lichen evidence now gathered significantly raises the profile of the lichen importance of Coul Links, and reinforces the points and comments made in the Statements from SNH – accessed from Highland Planning website:
Letter (including Annex A), dated 24 November 2017 from SNH (Nick Halfhide); (David Genney (2017?) *Coul Links, Dornoch – Proposed Golf Course Development (Ref CDM 147883). Comments on the Environmental Statement* by David Genney, Bryophytes, Lichens and Fungi).

Table 1 Notable lichen species recorded from Coul Links (as of May 2018)

Species	Conservation status/rarity	Species	Conservation status/rarity
Agonimia gelatinosa	NS	Lepraria elobata	NS
Bacidia caligans	NS	Leptogium palmatum	**NT, NS, Sc**
Bryobilimbia sanguineoatra	NS	Moelleropsis nebulosa	NS
Cladonia mitis	**NT, NR, Sc**	Peltigera malacea	**EN, NR, P, Sc**
Cladonia uncialis subsp.. uncialis	**NT, NS, Sc**	Peltigera neckeri	NS
Cladonia zopfii	NS	Polychidium muscicola	NS
Cryptodiscus gloeocapsa	NS	Psoroma hypnorum	NS
Lecania subfuscula	NS	Stereocaulon condensatum	NS
Lecanora zosterae	NS		

Conservation Evaluation etc.: EN = Endangered; NT = Near Threatened; NR = Nationally Rare; NS = Nationally Scarce; P = UK BAP priority species; Sc = on Scottish Biodiversity List [Sect.2(4)].

Reasons for the lichen importance of the Loch Fleet SSSI dune system

- Size: there is a large extent and variety of nutrient-poor habitats that are able to support lichens;
- To maintain a high lichen biodiversity a sufficiently large land area is required, such as there is at Loch Fleet SSSI, providing opportunity for the dynamic events, of disturbance and recovery across a spectrum of local niches;
- Habitats: mainly dune heathland, acid grassland, calcareous grassland and co-occurring areas of stabilized or semi-stabilized shingle and shell-sand;
- Dune systems are notably dynamic at various scales; it is these dynamic processes that allow the terricolous lichen to thrive and not be out-competed in a mosaic of niches as succession by tall herbs, shrubs or trees is periodically arrested.
- Periodic disturbance events are important to halt succession to shrubs and trees, but importantly, disturbance must be followed by periods of recovery, enabling a bare sand to be colonized by a biological crust (**Fig. 6**); this is the essential dynamism of the dune lichen habitats;

- The disturbances required to maintain a long-term lichen interest can vary from major dune blow-outs and sand accretion to minor blow-outs and rabbit scrapes occupying only a square metre or so.
- During our recent visit to Coul, we found areas of rabbit activity to be the key or main niche for most of the more notable species in the dune heath, namely *Leptogium palmatum*, *Massalongia carnosa*, *Moelleropsis nebulosa*, *Peltigera malacea* and *Stereocaulon condensatum*. (**Figs. 3, 6 & 7**). Old tracks and track edges were also found to be important niches for development of these communities.
- In many cases these areas seem to be associated with rabbit burrows and scrapes. The necessary rabbit control needed by a golf course management, could lead to the marked decline or loss of this valuable habitat niche.

The role of rabbits is emphasised in the report of *Management of Natura 2000 Habitats – fixed coastal dunes with herbaceous vegetation "grey dunes"* (Houston 2008): "Rabbit activity – grazing, burrowing, scraping, trampling and dunging are all important factors in the maintenance of the habitat and its heterogeneity."

Undesirability of nutrient input into dune systems:
Where lichens are able to avoid competition from higher plants, they are in general evolved to cope with high levels of stress. In the case of heathland lichens the stresses provided by the habitat are a low nutrient status, combined with often rapid fluctuations from wet to dry conditions. Fertilisers are toxic to lichens (e.g. Remke *et al*. 2009, Vagts & Kinder 1999). We are concerned that fertiliser treatment to greens and fairways would increase the nutrient status of ground outwith these playing areas.

Undesirability of fungicide treatment:
Lichens are symbiotic organisms between fungi and algae. Hence, any fungicidal treatment of the playing area would kill them, and there would always be the danger of accidental drift.

Summary points for the BLS's objection to the Golf Course proposal

- Physical destruction of existing habitat in a site of national and international importance, through creation of greens, fairways and vehicular access.
- Fragmentation of an intact dune system of national and international importance.
- Reduction of small scale, localised disturbance from control of rabbits.
- Increased nutrient input into the system through fertiliser treatment, for vegetation that is dependent on low nutrient status.
- Possible impact of fungicide treatment.
- Transplantation of lichens is not considered a workable mitigation in the long-term.
- Nearby areas for the location of a golf course are apparent, leaving an intact Coul Links as an impressive back-drop.

Table 2. Tabulation of number of terricolous lichens from a selection of important dune systems in UK and Isle of Man.

Scottish sites are ordered from north to south, the others are arranged numerically as to number of terricolous lichens recorded. The list includes only lichens found on the ground, and **does not include** those found only on shingle, shell fragments, shrubs, or man-made structures.

UK locations	**County**	**No. of terricolous lichens**
Scotland:		
Loch Fleet SSSI (Ferry + Coul)	East Sutherland	101
Ferry Links		87
Coul Links		71
Cuthill Links	East Sutherland	71
Morrich More	East Ross	26
Whiteness Head	Easterness	37
Culbin Sands, Culbin Forest and Findhorn Bay SSSI	Moray	86
Culbin Sands & Forest		73
Findhorn Dunes		63
Sands of Forvie	Aberdeenshire	41
Menie Links (pre golf course)	Aberdeenshire	30
Kinnaber Links	Angus	50
Barry Links	Angus	51
Tentsmuir	Fife	48
Aberlady Bay	East Lothian	41
Sandy Knowes & West Links	East Lothian	30
Yellow Craig & East Links	East Lothian	21
Tyninghame (N of Bathan's Strand)	East Lothian	16
Belhaven Bay	East Lothian	24
Barns Ness	East Lothian	12
Torrs Warren	Wigtownshire	45
England, Wales & Isle of Man:		
Braunton Burrows	Devon	48
Blakeney Point	Norfolk	46
Ainsdale/Freshfield	Lancashire	44
Penhale Sands	Cornwall	40
Winterton – Horsey Dunes	Norfolk	38
Studland	Dorset	33
Newborough Warren	Anglesey	32
Nicholaston Burrows	Glamorgan	24
Point of Ayre	Is of Man	21
Morfa Harlech	Merioneth	16
Scolt Head	Norfolk	14
Kenfig Burrows	Glamorgan	8
Ynyslas Dunes	Ceredigion	6

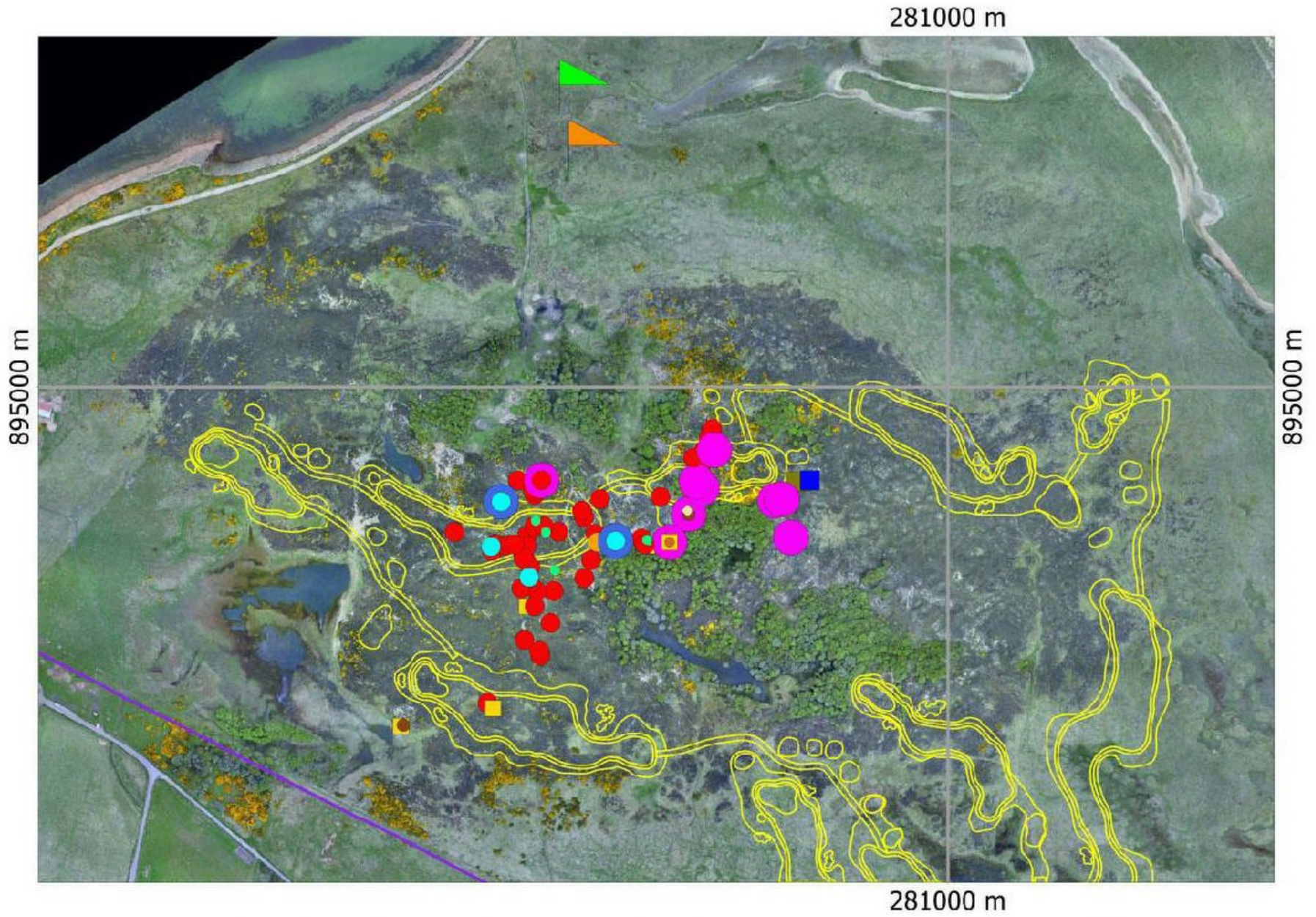

Fig. 1. See caption for Fig. 2. The arrows in the upper (northern part) of the map show locations for *Peltigera leucophlebia* (orange) and *P. leucophlebia* with *P. neckeri* (green).

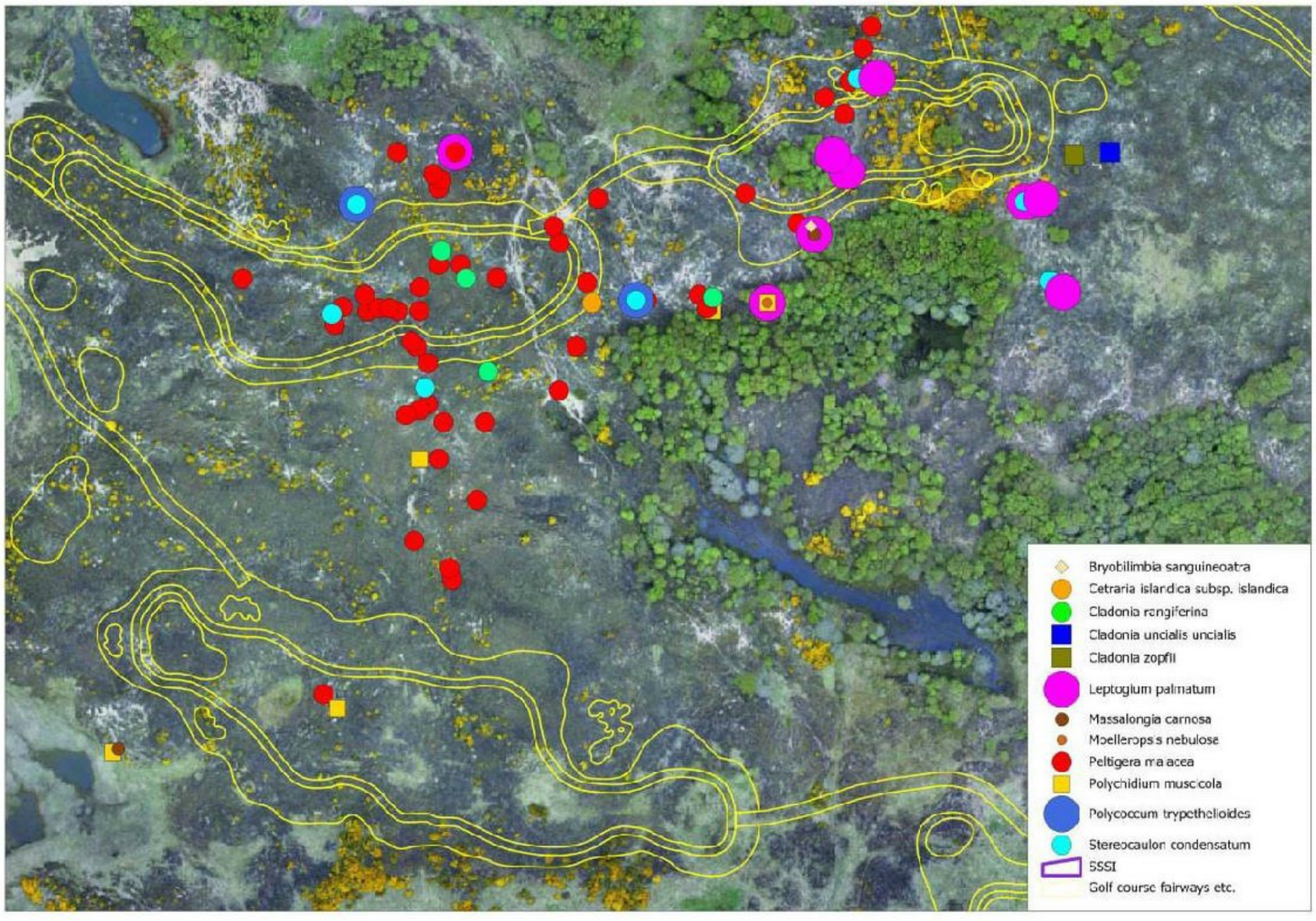

Fig. 2. Locations for some notable lichens at Coul Links. Records made on 03/05/2018, with some additional records from David Genney and Stewart Taylor made in late 2017. Prepared by Andy Acton.

Fig. 3. A typical site for *Peltigera malacea* around a rabbit hole. NH80623 94821. Photo. Brian Coppins.

Fig. 4. *Peltigera malacea* in dry state at location in Fig. 3. NH80623 94821. Photo. Brian Coppins.

Fig. 5. *Peltigera malacea* in a wet state showing its distinctive green coloration. Culbin Forest. Photo. Sandy Coppins.

Fig. 6. *Stereocaulon condensatum* forming a 'biological soil crust' at NH80593 94858. Photo. Brian Coppins.

Fig. 7. A location for *Leptogium palmatum*, *Massalongia carnosa* and *Moelleropsis nebulosa* alongside narrow eroded channel/path at NH80769 94887. Photo: Brian Coppins.

Fig. 8. Close-up of *Leptogium palmatum* in rabbit scrape at NH80639 94918. Photo. Andy Acton.

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Report authorship and acknowledgements:

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