

## SOUND COMMON, BRYOPHYTE SURVEY

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### DATE OF SURVEY

August 31<sup>st</sup>, 2012.

### PURPOSE OF SURVEY

This intricate mosaic of lowland wetland and woodland has been known to include parts with a characteristic bryophyte and vascular plant flora of heath and bog. The survey has been undertaken in order to establish the current status of the bryophyte flora in the context of the site's considerable diversity of habitat. Its purpose is to provide up-to-date information about the bryophyte flora as an important factor for consideration in determining future management plans. The opportunity has also been taken to compare the results with detailed records of the bryophyte flora of Sound Common as it was up to 1995 (J. Griffiths).

### PROCEDURE

The area was divided arbitrarily into six sections (Fig. 1) for the survey itself as well as for documenting results. Because of the great variety of habitat within section 3, particularly in terms of its hydrology and associated species, that section was also further divided. Those areas are as follows:

- 1) The easternmost section, consisting of the car-park, adjoining open grassland as well as the adjacent southern boundary ditch and trees.
- 2) Woodland immediately west of section 1, bounded respectively by a track and a footpath to the south-west and south and, along the north-east side, by a public lane separating it from section 6.
- 3) All remaining woodland to the west, bounded along its northern edge by an east-west lane. The area includes a N.-S. ditch, either side of which are significant areas of wetland. To the east, it is bounded by a track that separates it from section 2.
- 4) A freshwater mere, within and close to the northern boundary of section 3.
- 5) A triangular piece of woodland, bounded on all sides by public lanes.
- 6) A broad fringe of dense woodland, separated from sections (1) and (2) by the N.W.- S.E. lane.

Nomenclature throughout follows Hill *et al.* (2008) for bryophytes, whereas vascular plant nomenclature is that of Stace (2010). Wherever this has involved changes, reference has also been made to recently used synonyms.

### RESULTS

A total of 58 bryophytes was found, including 51 mosses and seven liverworts (Table 1). Many are epiphytes, growing on trees, although not all of them are exclusively epiphytic. They include species of *Orthotrichum* (of special interest being *O. lyellii*), *Uloa*, *Metzgeria*, *Frullania* and, of special interest, *Cololejeunea minutissima*. Also significant is the preponderance of species that are dependent on acidic conditions, among which are those of the genera *Campylopus*, *Mnium* and *Plagiothecium* as well as the wetland species, *Sphagnum palustre* and *Warnstorfia fluitans*. There is,

however, localised evidence of more base enriched substrates, such as those indicated by *Drepanocladus aduncus*, *Cirriphyllum crassinervium* and *Eurhynchium striatum*. The ecological significance of these indicator species is considered separately in the context of each of the six subdivisions of the site (Tables 2 - 9).

<u>Table 1. Bryophytes recorded at Sound Common (2012).</u>	
<u>Mosses</u>	
<i>Amblystegium serpens</i>	<i>Hypnum jutlandicum</i>
<i>Aulacomnium androgynum</i>	<i>Kindbergia praelonga</i> (= <i>Eurhynchium praelongum</i> )
<i>Aulacomnium palustre</i>	<i>Leptodictyum riparium</i> (= <i>Amblystegium riparium</i> )
<i>Barbula sardoa</i> (= <i>Barbula convoluta</i> in part)	<i>Mnium hornum</i>
<i>Brachythecium rutabulum</i>	<i>Orthotrichum affine</i>
<i>Bryum argenteum</i>	<i>Orthotrichum diaphanum</i>
<i>Bryum capillare</i>	<i>Orthotrichum lyellii</i>
<i>Bryum dichotomum</i> (= <i>Bryum bicolor</i> in part)	<i>Orthotrichum pulchellum</i>
<i>Calliergonella cuspidata</i> (= <i>Calliergon cuspidatum</i> )	<i>Orthotrichum diaphanum</i>
<i>Campylopus flexuosus</i> (= <i>Campylopus paradoxus</i> )	<i>Oxyrrhynchium hians</i> (= <i>Eurhynchium hians</i> )
<i>Campylopus introflexus</i>	<i>Plagiothecium denticulatum</i>
<i>Campylopus pyriformis</i>	<i>Plagiothecium undulatum</i>
<i>Ceratodon purpureus</i>	<i>Pohlia melanodon</i> (= <i>Pohlia carnea</i> )
<i>Cirriphyllum crassinervium</i> (= <i>Eurhynchium crassinervium</i> )	<i>Polytrichastrum formosum</i> (= <i>Polytrichum formosum</i> )
<i>Dicranella heteromalla</i>	<i>Pseudoscleropodium purum</i> (= <i>Scleropodium purum</i> )
<i>Dicranella rufescens</i>	<i>Pseudotaxiphyllum elegans</i> (= <i>Isopterygium elegans</i> )
<i>Dicranum scoparium</i>	<i>Rhynchostegium confertum</i>
<i>Didymodon rigidulus</i> (= <i>Barbula rigidula</i> )	<i>Sphagnum palustre</i>
<i>Didymodon vinealis</i> (= <i>Barbula vinealis</i> )	<i>Straminergon stramineum</i> (= <i>Calliergon stramineum</i> )
<i>Drepanocladus aduncus</i>	<i>Tortula muralis</i>
<i>Eurhynchium striatum</i>	<i>Ulota bruchii</i>
<i>Fissidens viridulus</i>	<i>Ulota phyllantha</i>
<i>Hylocomium splendens</i>	<i>Ulota</i> sp.
<i>Hypnum andoi</i> (= <i>Hypnum mammillatum</i> )	<i>Warnstorfia fluitans</i> (= <i>Drepanocladus fluitans</i> )
<i>Hypnum cupressiforme</i> var. <i>cupressiforme</i>	<i>Zygodon conoideus</i>
<i>Hypnum cupressiforme</i> var. <i>resupinatum</i> (= <i>Hypnum resupinatum</i> )	
.....	
<u>Liverworts</u>	
<i>Calypogeia muelleriana</i>	<i>Lophocolea heterophylla</i>

<i>Cololejeunea minutissima</i>	<i>Metzgeria furcata</i>
<i>Frullania dilatata</i>	<i>Metzgeria violacea</i> (= <i>Metzgeria fruticulosa</i> )
<i>Lophocolea bidentata</i>	

**Section 1.** Bryophytes in this section are ecologically diverse, reflecting the range of habitat within this disturbed area. None of them is locally or nationally uncommon.

<u>Table 2.</u> With details of specific habitat within section 1.	
<u>Mosses</u>	<u>Liverworts</u>
<i>Barbula sardoa</i> (exposed soil in grassland)	<i>Lophocolea bidentata</i> (on brash in boundary ditch)
<i>Brachythecium rutabulum</i> (on living trees as well as fallen timber throughout the woodland and in grassland by car-park)	
<i>Bryum argenteum</i> (exposed soil in grassland and car-park)	
<i>Bryum dichotomum</i> (exposed soil in grassland and car-park)	
<i>Calliergonella cuspidata</i> (wet ground in and by the car-park)	
<i>Didymodon rigidulus</i> (sandstone blocks)	
<i>Didymodon vinealis</i> (car-park and exposed soil in grassland)	
<i>Kindbergia praelonga</i> (frequent on ground as well as tree trunks, branches and exposed roots).	
<i>Leptodictyum riparium</i> (on <i>Acer pseudoplatanus</i> , sycamore)	
<i>Orthotrichum diaphanum</i> (epiphytic)	
<i>Oxyrrhynchium hians</i> (steep sides of boundary ditch)	
<i>Plagiothecium denticulatum</i> (loamy soil in ditch)	
<i>Pohlia melanodon</i> (damp ground in grassland)	
<i>Rhynchostegium confertum</i> (tree boles and roots by boundary ditch)	
<i>Tortula muralis</i> (sandstone blocks)	

**Section 2.** Although none of the bryophytes in this section are uncommon, it is notable that the abundance of epiphytic species, particularly of *Orthotrichum*, *Ulota*, *Zygodon* and *Metzgeria* is a reflection of the variety of tree species and hence of a range of suitable habitat. *Orthotrichum affine* and *O. diaphanum* were among the earliest epiphytes to re-colonise parts of Britain in which they had declined during the industrial revolution. *O. pulchellum*, *Ulota phyllantha*, *Zygodon conoideus*, *Metzgeria furcata* and *M. violacea*, however, are all species that have extended their range in Britain more recently.

Table 3. With details of specific habitat within section 2.	
<u>Mosses</u>	<u>Liverworts</u>
<i>Amblystegium serpens</i> (on living trees and fallen timber)	<i>Lophocolea bidentata</i> (epiphytic on <i>Betula pubescens</i> , birch; on fallen timber; and on compacted soil banks)
<i>Bryum capillare</i> (on rotten timber)	<i>Lophocolea heterophylla</i> (on soil as well as brash)
<i>Campylopus flexuosus</i> (damp bank by <i>Molinea caerulea</i> , purple moor grass)	<i>Metzgeria furcata</i> (epiphytic on <i>Sambucus nigra</i> , elder, and <i>Salix</i> sp., willow)
<i>Campylopus pyriformis</i> (on organic soil and leaf mould at base of <i>Quercus</i> , oak)	<i>Metzgeria violacea</i> (epiphytic on <i>Salix</i> sp., willow by 3 <sup>rd</sup> electricity pole from entrance to car-park)
<i>Cirriphyllum crassinervium</i> (usually found in calcareous habitats, but growing here on <i>Salix</i> sp., willow bark)	
<i>Dicranella heteromalla</i> (on exposed soil)	
<i>Dicranella rufescens</i> (on exposed soil)	
<i>Dicranum scoparium</i> (epiphytic on <i>Betula pubescens</i> , birch bole)	
<i>Hypnum andoi</i> (epiphytic on horizontal trunk of <i>Betula pubescens</i> , birch)	
<i>Hypnum cupressiforme</i> (epiphytic on <i>Quercus</i> , oak, and <i>Salix</i> sp., willow)	
<i>Hypnum jutlandicum</i> (on sandy ground and at the foot of <i>Betula pubescens</i> , birch trunks)	
<i>Kindbergia praelonga</i> (damp soil and timber)	
<i>Orthotrichum affine</i> (epiphytic on <i>Salix</i> sp., willow) - abundant	
<i>Orthotrichum diaphanum</i> (epiphytic on <i>Salix</i> sp., willow) - frequent	
<i>Orthotrichum pulchellum</i> (epiphytic on <i>Sambucus nigra</i> , elder) - occasional	
<i>Plagiothecium undulatum</i> (in nutrient poor banking by <i>Quercus</i> , oak)	
<i>Polytrichastrum formosum</i> (on nutrient poor, acid banking)	
<i>Pseudoscleropodium purum</i> (damp, sandy ground)	
<i>Pseudotaxiphyllum elegans</i> (on partially exposed sandstone rock)	
<i>Rhynchostegium confertum</i> (damp soil, and fallen timber)	
<i>Ulota bruchii</i> (epiphytic on <i>Salix</i> sp., willow)	
<i>Ulota phyllantha</i> (epiphytic on <i>Salix</i> sp., willow)	
<i>Zygodon conoideus</i> (epiphytic on <i>Salix</i> sp., willow; also on willow brash)	

**Section 3 (including N.- S. ditch, but excluding wetland areas E. & W. of ditch.** Evidence of organic substrates within this section is seen in the presence of species such as *Mnium hornum*, *Campylopus flexuosus* and *C. pyriformis*. *Aulacomnium androgynum* and *Hypnum jutlandicum* are also typical of such habitat although their ecological amplitude is not confined to peat and/or leaf mould. Section 3 is generally wetter than others, a feature that, combined with the capacity of the woodland canopy to conserve atmospheric humidity, provides scope for the presence of the epiphytic liverwort *Cololejeunea minutissima*. *C. minutissima* is a Hyperoceanic Southern-temperate species (Hill & Preston, 1998) that has greatly increased its British distribution in recent years. Its first discovery in Cheshire was made in 2008 (*cf.* Blackstock, 2009).

Table 4. With details of specific habitat and location within the section.	
<u>Mosses</u>	<u>Liverworts</u>
<i>Aulacomnium androgynum</i> (on rotting timber)	<i>Calypogeia muelleriana</i>
<i>Brachythecium rutabulum</i>	<i>Cololejeunea minutissima</i> (epiphytic on leaning <i>Salix</i> sp. at top of eastern bank of ditch)
<i>Campylopus flexuosus</i>	<i>Frullania dilatata</i>
<i>Campylopus pyriformis</i>	<i>Lophocolea heterophylla</i> (ground below <i>Alnus glutinosa</i> , alder; tree stumps)
<i>Dicranella heteromalla</i>	<i>Metzgeria furcata</i> (epiphytic on <i>Quercus</i> , oak; leaning <i>Salix</i> sp. willow)
<i>Hypnum andoi</i>	
<i>Hypnum cupressiforme</i> (tree stumps)	
<i>Hypnum cupressiforme</i> var. <i>resupinatum</i> (epiphytic on <i>Salix</i> sp., willow)	
<i>Hypnum jutlandicum</i>	
<i>Kindbergia praelonga</i>	
<i>Mnium hornum</i> (organic soil at foot of <i>Quercus</i> in eastern bank of ditch south of footbridge; also by <i>Alnus glutinosa</i> , alder)	
<i>Orthotrichum affine</i> (epiphytic on <i>Salix</i> sp., willow)	
<i>Plagiothecium denticulatum</i>	
<i>Pseudoscleropodium purum</i>	
<i>Pseudotaxiphyllum elegans</i>	
<i>Ulota</i> sp. (epiphytic on <i>Salix</i> sp., willow)	

*Cololejeunea minutissima* on Sound Common (Fig. 1) can be located as follows:

Fig. 2 - compass bearing of 299° to plank bridge across N.-S. ditch, used as origin of following illustrations.

Fig. 3 - compass bearing of 13° from east end of bridge to site on central, leaning tree.

Fig. 4 - closer view on compass bearing of 340° from nearest sloping tree in Fig. 3 to site of *C. minutissima* on *Salix* sp. at centre.

Fig. 5 - close view, on compass bearing of 11°, to marked site of *C. minutissima* at centre.

Fig. 6 - closer view of site outlined by yellow-headed pins.

Fig. 7 - close view of marked site.

Fig. 8 - close view of *Cololejeunea minutissima*.

**Section 3, wetland area E. of ditch.** (G.P.S. = SJ/62044-48022 ± 2m; altitude = 67m) Despite intensive searching, no *Sphagnum* was found and the site (Fig. 1 & Table 5) is not rich in bryophytes. The area supports *Calluna vulgaris* (ling), which is normally an early associate of the peat-forming species of *Sphagnum*, including *S. capillifolium* which has been previously recorded on Sound Common (J. Griffiths). *Ulex gallii* (western gorse) and *Molinia caerulea* (purple moor grass) are also well represented and there has been substantial invasion of *Rubus fruticosus* (bramble), *Chamerion angustifolium* (rosebay willow herb) and *Betula pubescens* (birch) saplings. All are currently indicative of inappropriate habitat for *S. capillifolium* in terms of water levels and/or water quality, for it is a species that is characteristic of very much lower pH levels and nutrient levels than are the moss, *Pseudoscleropodium purum* and the vascular plant, *Chamerion angustifolium*.

Table 5. (No <i>Sphagnum</i> was found)	
<i>Hypnum cupressiforme</i>	
<i>Hypnum jutlandicum</i>	
<i>Pseudoscleropodium purum</i>	

**Section 3, wetland area W. of ditch.** (G.P.S. = SJ/62004-48025 ± 2m; altitude = 67m) This piece of land is wetter than that on the opposite side of the ditch. Among its taller vegetation, *Calluna vulgaris* (ling), *Molinia caerulea* (purple moor grass) and *Chamerion angustifolium* (rosebay willow herb) are prominent. Two large patches of *Sphagnum palustre* were also found to occur, together with a number of other wetland bryophytes (Table 6). It should be noted, however, that *S. palustre* is not one of the characteristically peat-forming species, which require lower pH and nutrient levels, *i.e.* pH in the region of 3 or 4 as opposed to pH around 5.

Table 6.	
<i>Aulacomnium palustre</i> (among <i>Calluna vulgaris</i> , ling)	<i>Lophocolea bidentata</i>
<i>Hylocomium splendens</i> (among <i>Calluna vulgaris</i> , ling)	
<i>Hypnum jutlandicum</i> (under and among <i>Calluna vulgaris</i> , ling)	
<i>Sphagnum palustre</i> , site (a). (diameter = c. 2m; under <i>C. vulgaris</i> , ling; associates include 2 small oak saplings, birch sapling, <i>Molinia caerulea</i> , purple moor grass and <i>Chamerion angustifolium</i> , rosebay willow herb)	G.P.S. = SJ/62004-48030 ± 2m; altitude = 67m.
<i>Sphagnum palustre</i> , site (b). (diameter = c. 1m; under <i>Molinia caerulea</i> , purple moor grass, <i>Calluna vulgaris</i> , ling and <i>Chamerion angustifolium</i> , rosebay willow herb, with <i>Aulacomnium palustre</i> )	G.P.S. = SJ/62010-48027 ± 2m; altitude = 67m.
<i>Straminergon stramineum</i> (scattered shoots)	

among <i>Sphagnum palustre</i> )	
<i>Warnstorfia fluitans</i> (under <i>Calluna vulgaris</i> , ling)	

Location of the two areas of *Sphagnum palustre* can be determined by reference to the Ordnance Survey grid-references in Table 6, which are plotted in Fig. 1.

**Section 4.** With the exception of *Ceratodon purpureus* and *Campylopus introflexus*, the bryophyte flora demonstrates a considerable bias towards base-enrichment of habitats and elevated fertility. The presence of the aquatic moss, *Drepanocladus aduncus* in and by the pool is indicative of high fertility and perhaps also of eutrophication. Whether this might have occurred naturally or as a consequence of past or present land use, it is deserving of investigation in view of the proximity of the pool to site (b) of *Sphagnum palustre* in section 3 and, indeed, of characteristic heath or mire plant communities. Depending on the direction of water seepage away from the pool, species potentially at risk in section 3 could include *Calluna vulgaris* and *Erica tetralix* (cross-leaved heath), as well as *S. palustre*.

Table 7. With details of habitat within the section.	
<u>Mosses</u>	<u>Liverworts</u>
<i>Amblystegium serpens</i>	<i>Metzgeria furcata</i> (epiphytic on <i>Salix</i> sp., willow)
<i>Brachythecium rutabulum</i> (epiphytic on horizontal branch of <i>Salix</i> sp.)	
<i>Bryum capillare</i>	
<i>Calliergonella cuspidata</i> (wet ground around pool)	
<i>Campylopus introflexus</i> (compacted soil by northern edge of pool)	
<i>Ceratodon purpureus</i> (compacted, nutrient-poor soil at edge of pool)	
<i>Drepanocladus aduncus</i> (aquatic in S.W. side of pool)	
<i>Eurhynchium striatum</i> (under <i>Betula pubescens</i> , birch and <i>Quercus</i> , oak on ground S.E. of pool)	
<i>Fissidens viridulus</i> (brick at edge of water at N.W. side of pool)	
<i>Hypnum cupressiforme</i>	
<i>Hypnum cupressiforme</i> var. <i>resupinatum</i> (epiphytic on <i>Salix</i> sp., willow)	
<i>Leptodictyum riparium</i> (wet timber by pool)	
<i>Orthotrichum affine</i> (epiphytic on <i>Salix</i> sp., willow)	
<i>Orthotrichum diaphanum</i> (epiphytic on <i>Salix</i> sp., willow)	
<i>Rhynchostegium confertum</i> (epiphytic on <i>Salix</i> sp., willow)	
<i>Ulota phyllantha</i> (epiphytic on <i>Salix</i> sp., willow)	

**Section 5.** The bryophyte flora of this small, detached section has much in common with that of section 2. The open nature of the woodland is, however, reflected in the relatively lower diversity of epiphytic species.

<u>Table 8.</u> With details of habitat within the section.	
<u>Mosses</u>	<u>Liverworts</u>
<i>Brachythecium rutabulum</i>	<i>Metzgeria furcata</i> (epiphytic on <i>Salix</i> sp., willow)
<i>Hypnum cupressiforme</i>	
<i>Hypnum jutlandicum</i>	
<i>Kindbergia praelonga</i>	
<i>Orthotrichum affine</i>	
<i>Pseudoscleropodium purum</i>	
<i>Ulota bruchii</i> (epiphytic on <i>Quercus</i> , oak; also <i>Betula pubescens</i> , birch)	

**Section 6.** It is clear that this part of the site resembles section 2 in its epiphytic interest. All of the site could not be surveyed in the time available, but a significant discovery was that of *Orthotrichum lyellii*, which was first recorded in Cheshire as recently as 2011 (*cf.* Blockeel, 2012).

<u>Table 9.</u> With details of habitat within the section.	
<u>Mosses</u>	<u>Liverworts</u>
<i>Brachythecium rutabulum</i>	<i>Frullania dilatata</i> (epiphytic on <i>Quercus</i> , oak)
<i>Hypnum cupressiforme</i>	
<i>Kindbergia praelonga</i>	
<i>Orthotrichum affine</i>	
<i>Orthotrichum lyellii</i> (epiphytic on <i>Quercus</i> sp., oak close to <i>Sorbus aucuparia</i> , rowan)	
<i>Oxyrrhynchium hians</i>	
<i>Rhynchostegium confertum</i>	

Within this site, *Orthotrichum lyellii* can be located by reference to the following photographs:

Fig. 9 - compass bearing of 133° to leaning *Quercus* (oak) at centre, with *Sorbus aucuparia* (rowan) in right foreground.

Fig. 10 - closer view on compass bearing of 133° to site of *O. lyellii* on lower branch at centre.

Fig. 11 - closer view of part of the population seen in Fig. 10.

Fig. 12 - close view of shoots of *O. lyellii* with its characteristic vegetative propagules, gemmae.

## RECOMMENDATIONS

Future management of this complex intermingling of habitats will require, not only a knowledge of the plant communities that occur, but also a clear definition of the conservational priorities and outcomes it is wished to pursue. In the context of bryophytes currently present, it might be suggested that the following should be considered.

- 1) Sites 3(a) and 3(b) of *Sphagnum palustre* would appear to be at risk of loss of habitat as a consequence of the invasive nature of birch and oak saplings, gorse, brambles and rosebay willow herb. It is also important in this context to be alert to the damage that can be done to *Sphagnum* by undue trampling.

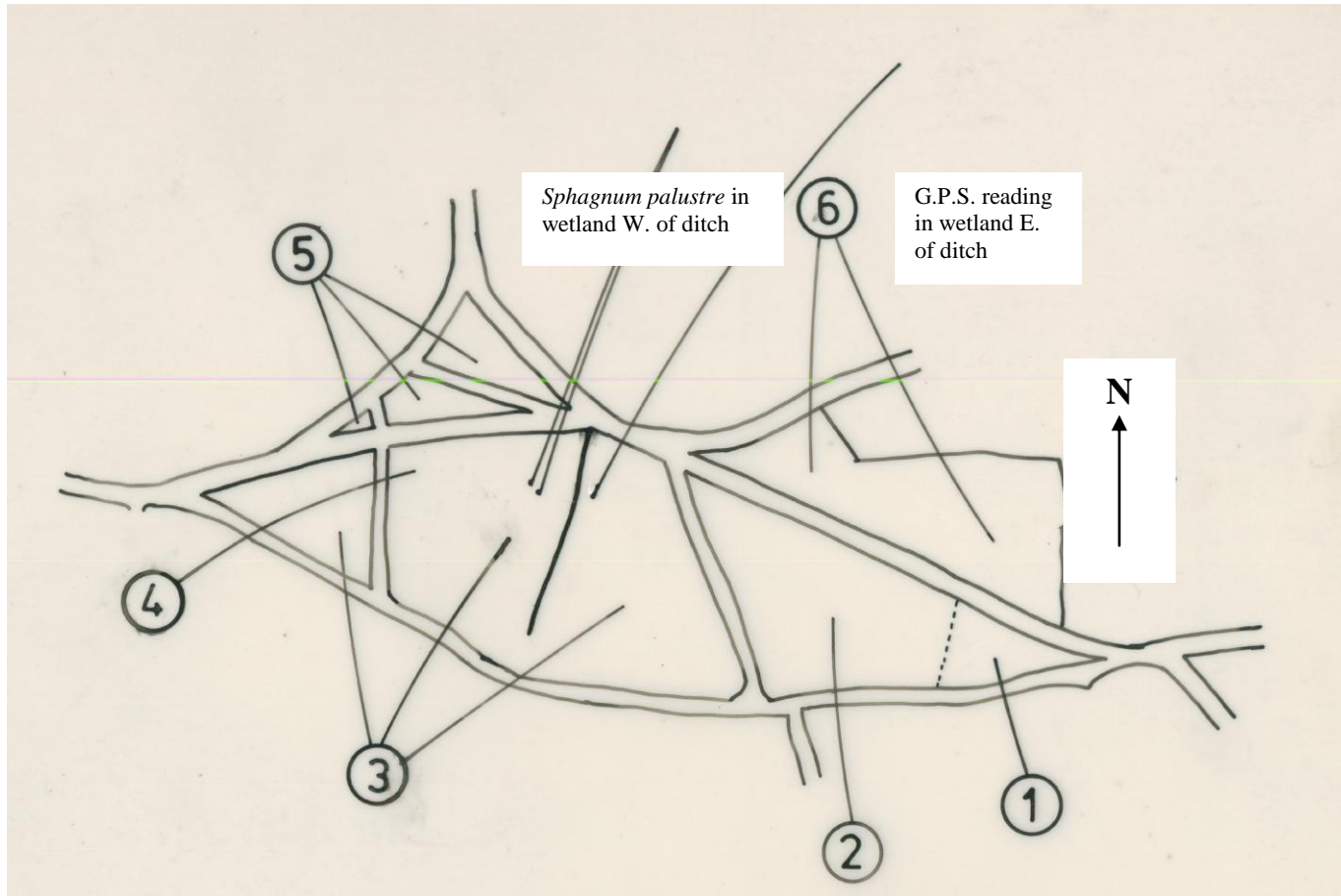


- 2) Sites 3(a) and 3(b) and their heath/mire plant communities are potentially jeopardised by the proximity of the pool in section 4 and the possibility of basic and/or eutrophic water seeping into an area in which low pH and nutrient levels are essential to the existing communities.
- 3) If attempts to raise water levels in section 3 by strategic blocking of the N.-S. ditch are envisaged, it is recommended that the source(s) of drainage into the ditch and the pH and base-status of the held water should be investigated in the context of the requirements of relevant species it is intended to benefit.
- 4) Without detailed knowledge of the woodland management envisaged, I am not in a position to comment, but I trust that the bryophyte survey of woodland areas will be helpful in coming to a decision.

#### REFERENCES

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**Figure 1.** Sketch map of Sound Common, to identify sections 1 - 6 as defined in the text.



Figure 2. *Cololejeunea minutissima*: 299° to plank bridge across ditch in Section 3.



Figure 3. *Cololejeunea minutissima*: 13° from E. end of bridge in Fig. 2 to leaning tree in middle distance.





Figure 4. *Cololejeunea minutissima*: 340° to site on leaning willow.



Figure 5. *Cololejeunea minutissima*: 11° to marked site at centre.



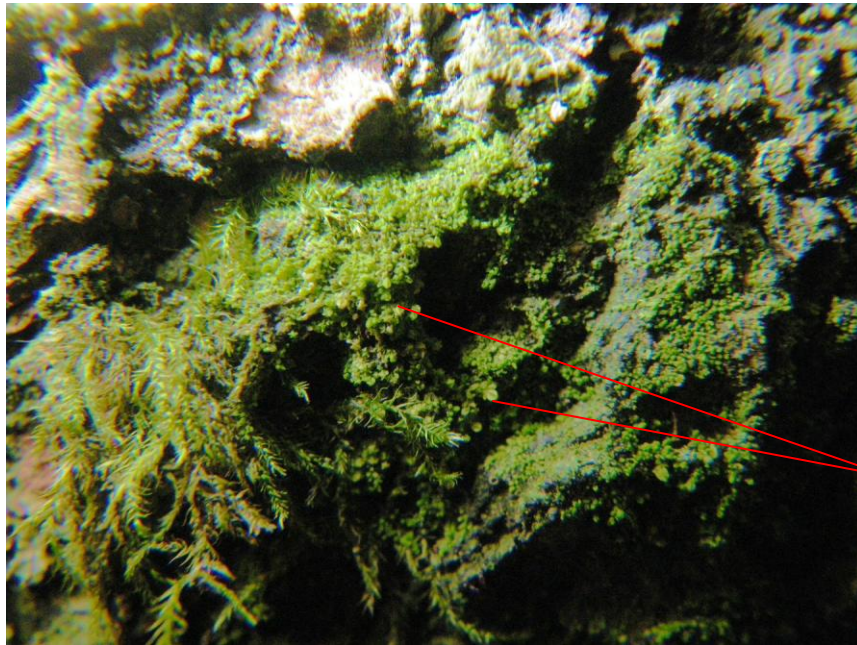


Figure 6. *Cololejeunea minutissima*: outlined by yellow-headed pins.



Figure 7. *Cololejeunea minutissima*: closer view.





perianths  
assist field  
identification

Figure 8. *Cololejeunea minutissima*: with visible perianths.



Figure 9. *Orthotrichum lyellii*: 133° to leaning oak, with rowan in right foreground.



Figure 10. *Orthotrichum lyellii*: closer view of site on lower, horizontal branch.



Figure 11. *Orthotrichum lyellii*: close view of part of population.



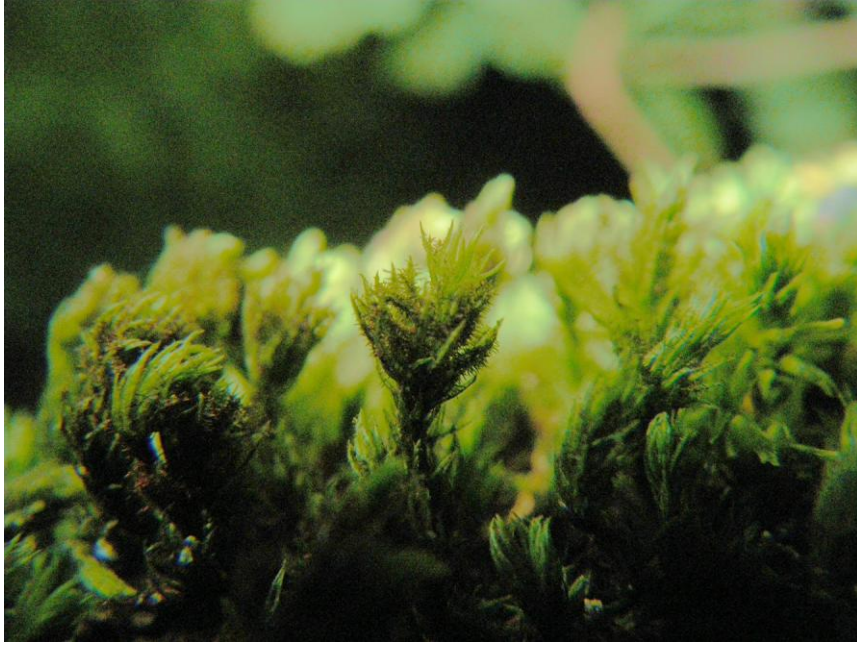


Figure 12. *Orthotrichum lyellii*: with diagnostic linear propagules (gemmae) on both surfaces of silhouetted leaves.