



Bryophyte survey and assessment of land at Port Talbot Docks



Authored by: Dr Des Callaghan

Date: 19 October 2022

Disclaimer

This Report was completed by the author on the basis of an agreed scope of works and under terms and conditions agreed with the Client. I confirm that in preparing this Report I have exercised all reasonable skill and care. The author accepts no responsibility to any parties whatsoever for any matters arising outside the agreed scope of works. This Report is issued in confidence to the Client and the author has no responsibility to any third parties to whom this Report may be circulated, in part or in full, and any such parties rely on the contents of the Report solely at their own risk.

CONTENTS

Introduction	1
Legislation.....	2
Method.....	3
Scope of the assessment	3
Desk study	3
Field survey.....	3
Assessment.....	3
Baseline conditions	6
Assessment of effects and mitigation measures	11
Potential impacts	11
Mitigation measures	11
Significance of residual effects	11
Conclusions	12
References	13
Appendix 1 – Bryophyte species listed by legislation in England.....	14
Appendix 2 – Species inventory	16

INTRODUCTION

All work reported here has been undertaken by Dr Des Callaghan (Bryophyte Surveys Ltd), a professional consultant bryologist and an expert on the bryophyte flora of Britain. The work was commissioned by RPS, in relation to the proposed development of land at Port Talbot Docks. The purpose of this report is:

- To identify and describe all potentially significant effects on bryophytes associated with the proposed development;
- To set out the mitigation measures required to ensure compliance with nature conservation legislation as it relates to bryophytes and to address any potentially significant effects; and
- To provide an assessment of the significance of any residual effects.

LEGISLATION

The below provides an overview of legislation that is specifically relevant to the conservation of bryophytes. It does not include any mention of more general nature conservation policy and legislation.

Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora ('the Habitats Directive')

No bryophytes are specially protected under Annex IV ('European Protected Species'). The only inclusion of bryophytes is under Annex II, which includes five species (see Appendix 1). For these, signatories are required to contribute to a coherent European ecological network of protected sites by designating a selection of their sites as Special Areas of Conservation (SACs).

The Conservation of Habitats and Species Regulations 2017 (as amended)

This piece of legislation transposes into domestic law the European Habitats Directive and European Birds Directive. Besides the requirements mentioned above under the Habitats Directive, there are no additional measures for the conservation of bryophytes.

The Natural Environment and Rural Communities Act 2006 ('the NERC Act')

Section 41 (S41) of the NERC Act requires the Secretary of State to publish a list of species and habitats of principal importance for conserving biodiversity, which includes 79 bryophyte species (see Appendix 1). The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40 of the NERC Act, to have regard to the conservation of biodiversity when carrying out their normal functions.

The Wildlife and Countryside Act (WCA) 1981

The Act makes it an offence (subject to exceptions) to intentionally pick, uproot or destroy any wild plant listed in Schedule 8, which includes 37 bryophyte species (see Appendix 1).

METHOD

Scope of the assessment

The scope of the assessment is limited to bryophytes (mosses, liverworts and hornworts) within the area of land that would be impacted by the proposed development (Figure 1).

Desk study

A desk study undertook a review of all bryophyte records from the local area held on the NBN Gateway and within the national bryophyte recording database of The British Bryological Society.

Field survey

Fieldwork was undertaken during 10–11 October 2022, in favourable weather conditions. The survey area was split into five areas (Figure 1) and each was searched thoroughly for bryophytes, with an inventory made of all species found. Small samples of critical species were collected for determination by microscopy.

Assessment

Important bryophyte features

Legally protected species

Bryophytes with special legal protection include only those listed on Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) (see Appendix 1). No bryophytes are legally protected via Annex IV of the EC Habitats Directive.

Species of conservation interest

Bryophyte species of conservation interest are considered to be any of the following:

- Species listed on Annex II of Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora ('The Habitats Directive').
- Species listed on Schedule 8 of the Wildlife and Countryside Act 1981 (as amended).
- Species listed on Section 41 of The Natural Environment and Rural Communities Act 2006 (as amended).
- Species listed as nationally threatened on the UK Red List (Critically Endangered, Endangered or Vulnerable) by Callaghan (in press).
- Nationally Rare species, recorded from ≤ 15 hectads (10 km grid squares) in Britain during 1970-2013 (Pescott 2016).
- Nationally Scarce species, recorded from 16-100 hectads (10 km grid squares) in Britain during 1970-2013 (Pescott 2016).

Assemblages of conservation interest

Bryophyte assemblages, i.e. collections of species, of conservation interest are considered to be those which qualify as such under the selection criteria for biological Sites of Special Scientific Interest (SSSIs) (Bosanquet et al. 2018).

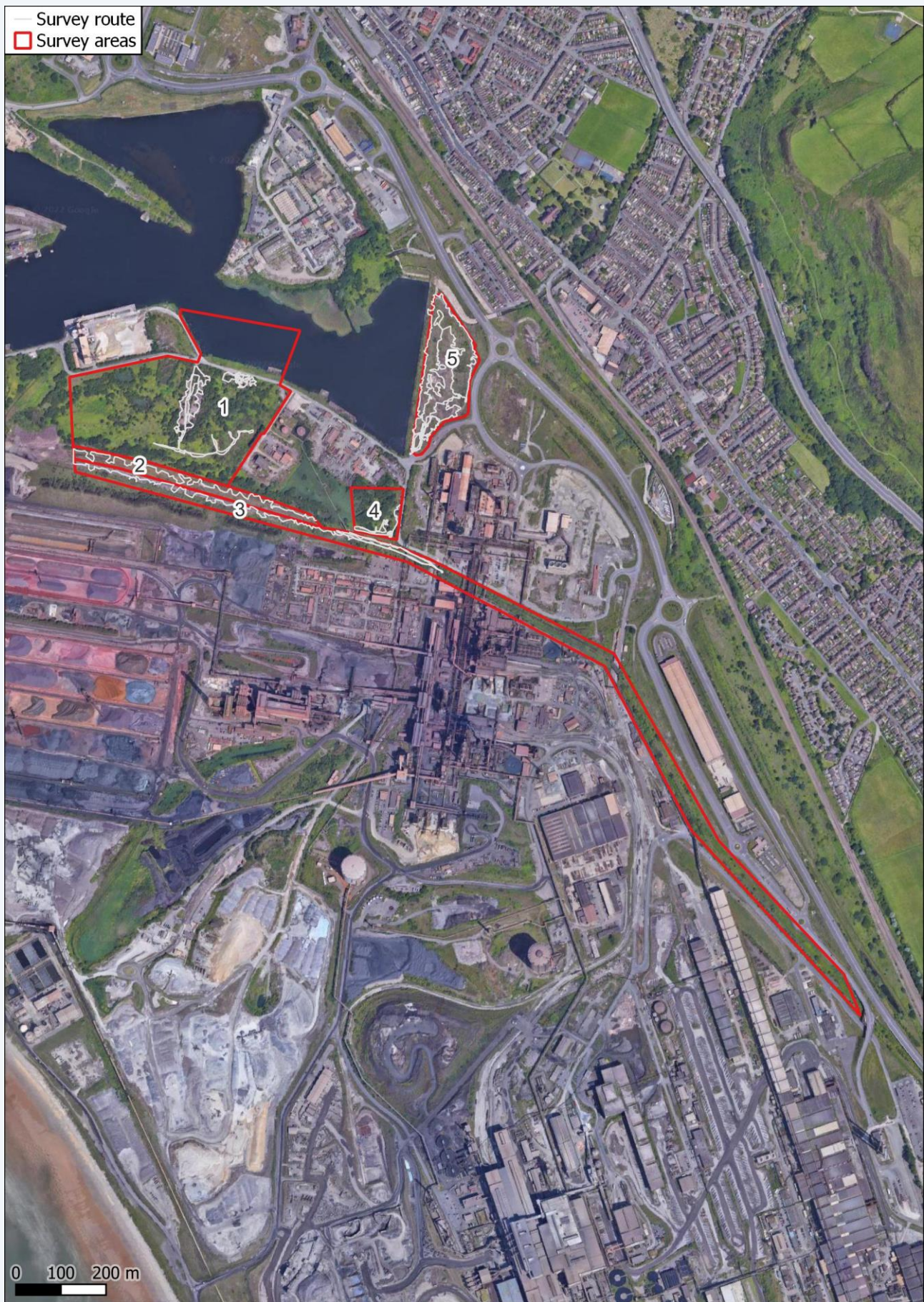


Figure 1. Locations of survey areas and survey routes.

BASELINE CONDITIONS

Previous bryophyte records

There are various bryophyte records collected previously from Port Talbot Docks, but all are frequent or common species and there are no records of any species of conservation interest.

Survey constraints

All habitat of potential interest for bryophytes was accessed and surveyed thoroughly. Significant areas of land in some areas could not be accessed due to dense Japanese Knotweed or scrub, as shown by the survey routes in Figure 1, but such habitat contained very few bryophytes, including a notable absence of epiphytes.

Species composition

A total of 50 bryophytes was found across all of the survey areas, including 48 mosses and two liverworts (Appendix 2). All are frequent or common species in Britain.

Survey Area 1

The area comprises a complex mosaic of willow scrub, bramble scrub, grassland, stands of Japanese Knotweed and sparsely vegetated ground (Figure 2). Some of the grassland in the south of the area, around SS76448857, approximates dune grassland, having developed on a sandy substrate. Access to much of the area was not possible due to dense scrub. Bryophytes are almost entirely limited to the areas of sparsely vegetated ground and grassland on sandy substrates, all of which were accessed and surveyed in detail. Epiphytes within the scrub were very poorly developed and almost all trees were completely devoid of bryophytes. A total of 44 species were recorded (Appendix 2). The community of sparsely vegetated ground, including derelict concrete padding, was dominated by common species such as *Didymodon fallax*, *Cratoneuron filicinum*, *Homalothecium lutescens*, *Schistidium crassipilum*, *Streblotrichum convolutum* and *Syntrichia ruralis*. The 'dune grassland' contained no wet depressions and the bryophytes included a narrow range of common species, such as *Homalothecium lutescens* and *Syntrichia ruralis*. *Calliergonella cuspidata* was locally abundant, including within the damper areas of grassland. No species of conservation interest were found.



Figure 2. View across part of Survey Area 1. SS76438862.

Survey Area 2

The area comprises a derelict railway sidings and contains a mosaic of dry grassland and sparsely vegetated ground. The bryophyte flora includes a narrow range of common species, with locally abundant *Calliergonella cuspidata*, *Homalothecium lutescens*, *Hypnum cupressiforme* var. *lacunosum*, *Streblotrichum convolutum* and *Syntrichia ruralis*. A total of 22 species were recorded (Appendix 2), none of which are of conservation interest.

Survey Area 3

The area comprises a derelict railway line, with a mosaic of scattered scrub, dry grassland and sparsely vegetated ground (Figure 3). A large part of the area could not be accessed due to dense *Buddleja* scrub. The bryophytes of the grassland and sparsely vegetated ground, including the concrete railway sleepers, comprised a narrow range of common species, including frequent *Calliergonella cuspidata*, *Grimmia pulvinata*, *Homalothecium lutescens*, *Schistidium crassipilum*, *Streblotrichum convolutum* and *Syntrichia ruralis*. The scrub contained very few epiphytes, largely limited to *Bryum capillare* and *Orthotrichum diaphanum*. A total of 19 species were recorded (Appendix 2), none of conservation interest.



Figure 3. View across part of Survey Area 3. SS76888836.

Survey Area 4

The area comprises a mosaic of dense willow scrub, bramble scrub, stands of Japanese Knotweed, *Phragmites* fen, grassland and some areas of sparsely vegetated ground, including derelict concrete padding. A large part of the area could not be accessed due to dense scrub. The bryophytes of the grassland included a very small range of common species, dominated by *Calliergonella cuspidata* and *Pseudoscleropodium purum*. The bryophytes of the sparsely vegetated ground comprised a range of common species, including frequent *Didymodon fallax*, *Schistidium crassipilum*, *Streblotrichum convolutum* and *Syntrichia ruralis*. A total of 17 species were recorded (Appendix 2), none of conservation interest.

Survey Area 5

The area comprises a relatively large area of open ground, including a mosaic of grassland and sparsely vegetated ground, with some small stands of scrub (Figure 4). All areas could be accessed for surveying. The bryophytes of the grassland most often included *Calliergonella cuspidata* and *Homalothecium lutescens*, and in some damp depressions there were large stands of *Drepanocladus aduncus*. The bryophytes of the sparsely vegetated ground, including on gravel spoil and concrete padding, comprised a moderately diverse range of frequent to common ruderal species, most often *Ceratodon purpureus*, *Cratoneuron filicinum*, *Didymodon fallax*, *Streblotrichum*

convolutum and *Syntrichia ruralis*. *Bryum archangelicum*, *Didymodon nicholsonii*, *Encalypta streptocarpa* and *Trichostomum crispulum* were also frequent. A total of 36 species were recorded (Appendix 2), none of conservation interest.



Figure 4. View across part of Survey Area 5. SS76968861.

Important bryophyte features

Legally protected species

No legally protected species are present.

Species of conservation interest

No species of conservation interest are present.

Assemblages of conservation interest

No bryophyte assemblages of conservation interest are present.

Summary

No legally protected bryophytes, species of conservation interest or assemblages of conservation interest are present within the survey areas. The ruderal communities of bryophytes, including those on areas of derelict concrete padding and areas where spoil has been spread historically, are moderately diverse, though nothing exceptional. The epiphyte flora is particularly poor,

including a notable absence of common epiphytes such as *Frullania dilatata*, *Lewinskya affinis* and *Ulotia bruchii* from areas of willow scrub, seemingly due to air pollution from local industrial activity.

ASSESSMENT OF EFFECTS AND MITIGATION MEASURES

Potential impacts

Legally protected species

The proposed development will have no effect on any legally protected bryophyte species.

Species of conservation interest

The proposed development will have no effect on any bryophyte species of conservation interest.

Assemblages of conservation interest

The proposed development will have no effect on any bryophyte assemblage of conservation interest.

Mitigation measures

No mitigation measures are considered necessary.

Significance of residual effects

There will be no significant adverse residual effects from proposed works on any legally protected bryophyte, species of conservation interest, or assemblage of conservation interest.

CONCLUSIONS

- The present report provides a comprehensive bryophyte survey and assessment of land at Port Talbot Docks.
- No species of conservation interest have previously been recorded within Port Talbot Docks.
- A total of 50 species of bryophytes were found during the present survey, including 48 mosses and two liverworts.
- No legally protected bryophytes, species of conservation interest or assemblages of conservation interest are present.
- No mitigation measures are considered necessary.
- There will be no significant adverse effects from proposed development on any legally protected bryophyte, species of conservation interest, or assemblage of conservation interest.

REFERENCES

Blockeel TL, Bell NE, Hill MO, Hodgetts NG, Long DG, Pilkington SL, Rothero GP. 2021. A new checklist of the bryophytes of Britain and Ireland, 2020. *Journal of Bryology*. 43:1–51.

Blockeel T, Bosanquet S, Hill M, Preston C. 2014. *Atlas of British and Irish bryophytes*. Newbury: Pisces Publications.

Bosanquet S, Genney D, Cox J. 2018. *Guidelines for the Selection of Biological SSSIs. Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 12 Bryophytes*. Peterborough: JNCC.

Callaghan DA. In press. IUCN Red List of bryophytes in Britain. *Journal of Bryology*.

Pescott O. 2016. Revised lists of nationally rare and scarce bryophytes for Britain. *Field Bryology*, 115, 22-30.

APPENDIX 1 – BRYOPHYTE SPECIES LISTED BY LEGISLATION IN ENGLAND

Species	Habitats Directive Annex II	WAC Act S8	NERC Act S41
<i>Acaulon triquetrum</i>		x	x
<i>Adelanthus lindenbergianus</i>		x	
<i>Anomodon longifolius</i>		x	x
<i>Aplodon wormskioldii</i>			x
<i>Atrichum angustatum</i>			x
<i>Bartramia stricta</i>		x	
<i>Bruchia vogesiaca</i>	x		
<i>Bryum calophyllum</i>			x
<i>Bryum cyclophyllum</i>			x
<i>Bryum gemmiparum</i>			x
<i>Bryum knowltonii</i>			x
<i>Bryum marratii</i>			x
<i>Bryum salinum</i>			x
<i>Bryum schleicheri</i>		x	
<i>Bryum warneum</i>			x
<i>Buxbaumia viridis</i>	x	x	
<i>Cephaloziella baumgartneri</i>			x
<i>Cephaloziella calyculata</i>			x
<i>Cephaloziella dentata</i>			x
<i>Cephaloziella integerrima</i>			x
<i>Cephaloziella nicholsonii</i>			x
<i>Ceratodon conicus</i>			x
<i>Cyclodictyon laetevirens</i>		x	x
<i>Dendrocryphaea lamyana</i>		x	x
<i>Dicranum spurium</i>			x
<i>Dicranum undulatum</i>			x
<i>Didymodon cordatus</i>		x	
<i>Didymodon glaucus</i>		x	x
<i>Didymodon tomaculosus</i>			x
<i>Ditrichum cornubicum</i>		x	x
<i>Ditrichum plumbicola</i>			x
<i>Ditrichum subulatum</i>			x
<i>Dumortiera hirsuta</i>			x
<i>Entosthodon pulchellus</i>			x
<i>Ephemerum cohaerens</i>			x
<i>Fissidens curvatus</i>			x
<i>Fissidens serrulatus</i>			x
<i>Fossombronia foveolata</i>			x
<i>Geocalyx graveolens</i>		x	
<i>Grimmia crinita</i>			x
<i>Grimmia elongata</i>			x
<i>Grimmia unicolor</i>		x	
<i>Gymnomitrium apiculatum</i>		x	
<i>Habrodon perpusillus</i>			x
<i>Hamatocaulis vernicosus</i>	x	x	
<i>Homomallium incurvatum</i>			x
<i>Hygrohypnum polare</i>		x	
<i>Hypnum vaucheri</i>		x	
<i>Jamesoniella undulifolia</i>		x	x
<i>Leiocolea rutheana</i>		x	x
<i>Leiocolea rutheana</i> var. <i>laxa</i>		x	x

Species	Habitats Directive Annex II	WAC Act S8	NERC Act S41
<i>Leiocolea rutheana</i> var. <i>rutheana</i>		x	x
<i>Lejeunea mandonii</i>			x
<i>Leptodontium gemmascens</i>			x
<i>Liochlaena lanceolata</i>			x
<i>Lophozia capitata</i>			x
<i>Marsupella profunda</i>	x	x	x
<i>Micromitrium tenerum</i>		x	x
<i>Mielichhoferia mielichhoferiana</i>		x	
<i>Orthodontium gracile</i>			x
<i>Orthotrichum obtusifolium</i>		x	
<i>Orthotrichum pallens</i>			x
<i>Orthotrichum pumilum</i>			x
<i>Pallavicinia lyellii</i>			x
<i>Petalophyllum ralfsii</i>	x	x	x
<i>Philonotis marchica</i>			x
<i>Physcomitrium eurystomum</i>			x
<i>Plagiothecium piliferum</i>		x	
<i>Pseudocalliergon turgescens</i>		x	
<i>Rhynchostegium rotundifolium</i>		x	x
<i>Rhytidiadelphus subpinnatus</i>			x
<i>Riccia bifurca</i>		x	x
<i>Riccia canaliculata</i>			x
<i>Riccia nigrella</i>			x
<i>Saelania glaucescens</i>		x	
<i>Scopelophila cataractae</i>			x
<i>Seligeria carniolica</i>			x
<i>Southbya nigrella</i>		x	x
<i>Sphaerocarpos texanus</i>			x
<i>Sphagnum balticum</i>		x	x
<i>Splachnum vasculosum</i>			x
<i>Telaranea europaea</i>			x
<i>Thamnobryum angustifolium</i>		x	x
<i>Thamnobryum cataractarum</i>			x
<i>Tortula cernua</i>		x	x
<i>Tortula cuneifolia</i>			x
<i>Tortula freibergii</i>			x
<i>Tortula vahlana</i>			x
<i>Tortula wilsonii</i>			x
<i>Weissia condensa</i>			x
<i>Weissia levieri</i>			x
<i>Weissia multicapsularis</i>			x
<i>Weissia squarrosa</i>			x
<i>Weissia sterilis</i>			x
<i>Zygodon forsteri</i>		x	x
<i>Zygodon gracilis</i>		x	x

APPENDIX 2 – SPECIES INVENTORY

The below provides an inventory of bryophytes recorded within the survey areas. Taxonomy follows Blockeel et al. (2021).

CC No	Division	Family	Species	Survey area				
				1	2	3	4	5
L004.01	Marchantiophyta	Lunulariaceae	Lunularia cruciata	x	x			
L013.03	Marchantiophyta	Pelliaceae	Pellia endiviifolia	x				
M010.06	Bryophyta	Polytrichaceae	Polytrichum juniperinum	x				
M014.01	Bryophyta	Encalyptaceae	Encalypta streptocarpa	x	x	x		x
M015.01	Bryophyta	Funariaceae	Funaria hygrometrica	x				
M031.05	Bryophyta	Dicranellaceae	Dicranella varia	x			x	x
M050.01	Bryophyta	Ditrichaceae	Ceratodon purpureus	x	x	x	x	x
M055.02	Bryophyta	Pottiaceae	Trichostomum crispulum	x				x
M067.01	Bryophyta	Pottiaceae	Pseudocrossidium hornschurchianum	x	x		x	x
M068.01	Bryophyta	Pottiaceae	Bryoerythrophyllum recurvirostrum	x	x	x	x	x
M070.01.a	Bryophyta	Pottiaceae	Streblotrichum convolutum var. convolutum	x	x	x	x	x
M070.01.b	Bryophyta	Pottiaceae	Streblotrichum convolutum var. commutatum	x	x	x		x
M071.01	Bryophyta	Pottiaceae	Barbula unguiculata	x	x		x	x
M072.02	Bryophyta	Pottiaceae	Didymodon ferrugineus				x	
M072.04	Bryophyta	Pottiaceae	Didymodon fallax	x	x		x	x
M072.06	Bryophyta	Pottiaceae	Didymodon luridus	x			x	x
M072.07	Bryophyta	Pottiaceae	Didymodon tophaceus	x				
M072.08	Bryophyta	Pottiaceae	Didymodon nicholsonii	x				x
M072.10	Bryophyta	Pottiaceae	Didymodon insulanus	x	x		x	x
M072.13	Bryophyta	Pottiaceae	Didymodon rigidulus	x	x	x		x
M076.03	Bryophyta	Pottiaceae	Aloina aloides	x				x
M077.10	Bryophyta	Pottiaceae	Tortula muralis	x		x		x
M082.01.a	Bryophyta	Pottiaceae	Syntrichia ruralis var. ruralis	x	x	x	x	x
M082.04.a	Bryophyta	Pottiaceae	Syntrichia montana var. montana					x
M092.17	Bryophyta	Grimmiaceae	Schistidium crassipilum	x	x	x	x	x
M093.16	Bryophyta	Grimmiaceae	Grimmia pulvinata	x	x	x		x
M110.05	Bryophyta	Bryaceae	Bryum argenteum	x		x		x
M110.09	Bryophyta	Bryaceae	Bryum dichotomum	x				x
M110.39	Bryophyta	Bryaceae	Bryum archangelicum	x	x			x
M110.42	Bryophyta	Bryaceae	Bryum capillare	x	x	x		x
M110.48	Bryophyta	Bryaceae	Bryum pseudotriquetrum	x				
M110.52	Bryophyta	Bryaceae	Bryum rubens	x				
M122.07	Bryophyta	Orthotrichaceae	Orthotrichum diaphanum	x		x		
M150.01	Bryophyta	Amblystegiaceae	Cratoneuron filicinum	x		x	x	x
M152.02	Bryophyta	Amblystegiaceae	Campylium stellatum	x				
M157.02	Bryophyta	Amblystegiaceae	Drepanocladus aduncus	x				x
M180.01	Bryophyta	Brachytheciaceae	Pseudoscleropodium purum	x		x	x	x
M183.01	Bryophyta	Brachytheciaceae	Eurhynchium striatum					x
M184.04	Bryophyta	Brachytheciaceae	Rhynchostegium confertum	x				
M188.01	Bryophyta	Brachytheciaceae	Oxyrrhynchium hians	x	x			x
M189.01	Bryophyta	Brachytheciaceae	Kindbergia praelonga	x				x
M191.01	Bryophyta	Brachytheciaceae	Brachythecium albicans	x	x			x
M191.05	Bryophyta	Brachytheciaceae	Brachythecium mildeanum	x				x
M191.06	Bryophyta	Brachytheciaceae	Brachythecium rutabulum	x	x	x	x	x
M195.01	Bryophyta	Brachytheciaceae	Homalothecium sericeum			x		
M195.02	Bryophyta	Brachytheciaceae	Homalothecium lutescens	x	x	x	x	x

CC No	Division	Family	Species	Survey area				
				1	2	3	4	5
M196.01.b	Bryophyta	Hypnaceae	Hypnum cupressiforme var. lacunosum		x			
M201.01	Bryophyta	Pylaisiaceae	Calliergonella cuspidata	x	x	x	x	x
M210.01	Bryophyta	Hylocomiaceae	Rhytidiadelphus squarrosus					x
M218.01	Bryophyta	Cryphaeaceae	Cryphaea heteromalla	x				
Total:				44	22	19	17	36