

# Lichen survey of NRW-managed parts of Fairy Glen Woods SSSI



Dave Lamacraft

Evidence Report No. 792

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# 1. Crynodeb gweithredol

Cafodd Dave Lamacraft ei contractio gan Cyfoeth Naturiol Cymru i gynnal arolwg o gennau ar y rhannau o SoDdGA Ffos Anoddun sydd yn Ystad Goetir Llywodraeth Cymru a reolir gan CNC, ar Afon Conwy ger Betws-y-coed, VC49. Canolbwyntiwyd ar dacsonau epiffytig nodedig a fyddai'n berthnasol o ran diddordeb SoDdGA, a gwneud argymhellion ar gyfer rheoli cynefinoedd. Cynullwyd cofnodion blaenorol hefyd. Gwnaed 427 cofnod o 111 tacson o gennau a ffyngau sy'n byw ar gennau. Mae 51 o'r rhain yn nodedig, gan gynnwys:

- ***Porina atlantica*** Yn brin yn genedlaethol, 2il gofnod ym Mhrydain ac yn newydd i Gaernarfon;
- ***Mycoporum lacteum*** Dan beth bygythiad ym Mhrydain, yn brin yn genedlaethol, 3ydd safle yng Nghymru, newydd i Gaernarfon;
- ***Skyttella mulleri*** Yn brin yn genedlaethol.

Ychydig o gofnodion blaenorol sydd am gennau ar gyfer y SoDdGA: arolwg gan Alan Orange o 2013, a oedd yn canolbwyntio ar yr afon, yw'r unig arolwg arall. Mae 209 o dacsonau wedi'u cofnodi i gyd yn y SoDdGA ac mae 98 o'r rheiny'n nodedig. Gan ddefnyddio cofnodion o'r arolwg hwn ac arolwg Orange, byddai diddordeb cennau'r safle yn gymwys am statws SoDdGA ar gyfer cennau epiffytig y Mynegai Coetir Cefnforol Deheuol, gyda sgôr o 35.

Mae'n debyg y byddai hefyd yn gymwys ar y Mynegai o Ansawdd Cyrsiau Dŵr Asid, gyda sgôr o 13 ar gyfer y safle. Fodd bynnag, nid yw'n glir a yw'r holl rywogaethau a ddefnyddir i sgorio yn dod o fewn rhan 1km o'r afon gan nad oes cofnodion cwbl leol ar gyfer pob un. Mae sgôr o 14 ar y Mynegai o Goedwigoedd Glaw'r Ucheldir ychydig islaw'r trothwy o 15. Mae'n debyg y byddai'r boblogaeth o *Porina atlantica* hefyd yn gymwys fel nodwedd annibynnol, ond nid oes gan y rhywogaeth hon werthusiad cadwraeth ym Mhrydain eto.

Mae'r prif fygythiadau i'r diddordeb cennau'n deillio o'r coedwigoedd a blannwyd yn yr 20fed ganrif, er enghraifft coed conwydd, ffawydd a choed derw coch o ogledd America, sy'n effeithio ar y cysgod ac ar addasrwydd y swbstrad sy'n cyfyngu ar allu'r diddordeb cennau a'r cynefin i ehangu. Yn lleol mae yna Rywogaethau Estron Goresgynnol eraill, e.e. Clymog Japan a *Rhododendron ponticum*.

Mae argymhellion ar gyfer cynefinoedd yn canolbwyntio ar fynd i'r afael â'r materion hyn, e.e. ehangu'r ardaloedd o goetir hen dyfiant a brodorol ar hyd ymylon y ceunant ar ddwy ochr yr afon, cylch-deneuo'r holl hen goed llydanddail o fewn y planhigfeydd, rheoli'r holl Rywogaethau Estron Goresgynnol a rheoli tyfiant newydd o goed ffawydd a chonwydd ar hyd ymylon y ceunant. Yn y bôn, dylid trin y safle fel prosiect adfer PAWS (Planhigfa ar Safle Coetir Hynafol) sensitif.

Mae'r arolwg hwn yn darparu llinell sylfaen ar gyfer monitro yn y dyfodol. Awgrymir y dylid arolygu'r rhannau o'r SoDdGA ble nad oes unrhyw gofnodion o gennau, o ystyried y diddordeb eithriadol yn yr ardal a arolygwyd yn 2024. Er y gall y rhan fwyaf o'r gwaith rheoli gael ei wneud gan contractwyr rheoli cynefinoedd, arbenigwr cennau ddylai ymgymryd â'r gwaith rheoli eiddew ar y clogfeini *Porina atlantica* yn FG40, a hefyd y gwaith o drawsleoli *Porina atlantica* o goed ynn os bydd yr onnen yn FG34 yn ildio i Glefyd Coed Ynn.

## 2.Executive summary

Dave Lamacraft was contracted by Natural Resources Wales to undertake a lichen survey of the NRW-managed Welsh Government Woodland Estate parts of Fairy Glen Woods SSSI on the Afon Conwy near Betws-y-coed, VC49. The focus was on notable epiphytic taxa which would be relevant to SSSI interest and making recommendations for habitat management. Past records were also collated. 427 records were made of 111 taxa of lichens and lichenicolous fungi. 51 of these are notable including:

- ***Porina atlantica*** Nationally Rare, 2<sup>nd</sup> British record and new to Caernarfon;
- ***Mycoporum lacteum*** GB Near Threatened, Nationally Scarce, 3<sup>rd</sup> Welsh site, new to Caernarfon;
- ***Skyttella mulleri*** Nationally Rare.

There are few previous records of lichens for the SSSI: a survey by Alan Orange from 2013, which focussed on the river is the only other survey. A total of 209 taxa have been recorded in the SSSI of which 98 are notable. Using records from this survey and the Orange survey the lichen interest of the site would qualify for SSSI status for epiphytic lichens of the Southern Oceanic Woodland Index, with a score of 35.

It would probably also qualify on the Acid Watercourses Quality Index, with a score of 13 for the site. However it is not clear if all the scoring species fall within a 1km section of the river as they do not all have fully localised records. A score of 14 on the Upland Rainforest Index falls just short of the threshold of 15. The population of *Porina atlantica* would probably also qualify as an independent feature, but this species does not have a conservation evaluation in Britain as yet.

The main threats to the lichen interest stem from the 20<sup>th</sup> Century forestry planting of e.g. conifers, Beech and American Red Oak which have impacts around shade and the unsuitability of the substrate which limits the potential expansion of the lichen interest and the habitat. Locally there are other Invasive Non-Native Species e.g. Japanese Knotweed and *Rhododendron ponticum*.

Habitat recommendations centre around addressing these issues e.g. expanding the areas of old-growth and native woodland along the ravine edges on both sides of the river, halo-thinning all the old broadleaved trees within the plantations, controlling all Invasive Non-Native Species and controlling Beech and conifer regeneration along the ravine edges. The site should essentially be treated as a sensitive PAWS restoration project.

This survey provides a baseline for future monitoring. It is suggested that parts of the SSSI lacking any lichen records are surveyed given the exceptional interest in the area surveyed in 2024. Whilst most management can be undertaken by habitat management contractors, the control of Ivy on the *Porina atlantica* boulders at FG40 should be undertaken by a lichenologist, as should translocation of the *Porina atlantica* from ash if the tree at FG34 succumbs to Ash Dieback.

## 3.Introduction

Dave Lamacraft was contracted by Natural Resources Wales (NRW) to undertake lichen survey work of the NRW-managed, Welsh Government Woodland Estate (WGWE) parts of Fairy Glen Woods SSSI.

### 3.1. Scope of the project

The specification was as follows:

- Survey the lichens of the areas indicated [in Appendix 1], focusing particularly on notable (SOWI / URI / RDB) species;
- Record the notable lichen flora on as many separate trees as possible (GPSed to 10-figure Grid Reference accuracy), and produce a map of the distribution of important trees; focus on area north of the river, as south of the river has significantly less mature trees.
- Identify areas of woodland that would be particularly suitable for PAWS restoration that would expand on currently restricted lichen-rich areas and identify specific broadleaf trees that would benefit from halo-felling;
- Combine 2023 survey data with older records, where available, to produce a site dossier in the form of a report;
- Produce a spreadsheet of records suitable for importing into GIS.

The location of the SSSI, WGWE ownership (survey area, referenced as Appendix 1), and the survey route are shown in Figure 1.

## Method

As much of the WGWE woodland within the SSSI was examined on foot as possible, concentrating on mature native broadleaved trees. A 10x Lichen Candelaris hand lens was used to search for and identify lichens in the field, focussing on epiphytic species and especially on those mentioned in the SSSI citation or otherwise notable. Recording was made using an iPhone SE, which was also used for taking photos. GPS readings were made using a Garmin GPSMAP 64s.

Every effort was made to identify lichens in the field, limiting the need for collection for later confirmation in the laboratory. The chemicals commonly used by lichenologists in the field, potassium hydroxide (KOH), and sodium hypochlorite (NaClO), in this case Milton Sterilising Fluid, were used for chemical tests to aid in field identification. Some specimens were collected for later microscopic confirmation with a Meiji 20-40x stereo microscope and a Leica compound microscope.

Records of notable species were mapped using QGIS and input into the standard British Lichen Society recording spreadsheet.

The concept of individual equivalents (Bergamini et al 2019) is applied here as a means to assess population size.

Previous records were collated from the British Lichen Society database and from previous survey reports made available. There was one of the latter, a report by Alan Orange from 2013 (Orange 2013).

### 3.2. Synonyms

Recent name changes for species recorded are listed below. The current names – per British Lichen Society Taxon Dictionary – are used in the report.

| Old name                       | Current name                    |
|--------------------------------|---------------------------------|
| <i>Arthonia cinnabarina</i>    | <i>Coniocarpon cinnabarinum</i> |
| <i>Arthonia elegans</i>        | <i>Coniocarpon fallax</i>       |
| <i>Aspicilia caesiocinerea</i> | <i>Circinaria caesiocinerea</i> |
| <i>Bacidia inundata</i>        | <i>Bacidina inundata</i>        |
| <i>Bacidia squamellosa</i>     | <i>Bacidina celtica</i>         |
| <i>Bryobilimbia ahlesii</i>    | <i>Lecidea ahlesii</i>          |
| <i>Dimerella lutea</i>         | <i>Coenogonium luteum</i>       |
| <i>Dimerella pineti</i>        | <i>Coenogonium pineti</i>       |
| <i>Graphina ruiziana</i>       | <i>Graphis ruiziana</i>         |
| <i>Graphis scripta</i> s. lat. | <i>Graphis betulina</i>         |
| <i>Graphis scripta</i> s. lat. | <i>Graphis scripta</i> s. str.  |
| <i>Graphis scripta</i> s. lat. | <i>Graphis pulverentula</i>     |
| <i>Leptogium gelatinosum</i>   | <i>Scytinium gelatinosum</i>    |
| <i>Leptogium lichenoides</i>   | <i>Scytinium lichenoides</i>    |



| Old name                                          | Current name                      |
|---------------------------------------------------|-----------------------------------|
| <i>Lobaria virens</i>                             | <i>Ricasolia virens</i>           |
| <i>Mycobilimbia pilularis</i>                     | <i>Mycobilimbia sphaeroides</i>   |
| <i>Opegrapha atra</i>                             | <i>Arthonia atra</i>              |
| <i>Opegrapha gyrocarpa</i>                        | <i>Gyrographa gyrocarpa</i>       |
| <i>Opegrapha ochrocheila</i>                      | <i>Alyxoria ochrocheila</i>       |
| <i>Opegrapha saxigena</i>                         | <i>Gyrographa saxigena</i>        |
| <i>Opegrapha sorediifera</i>                      | <i>Zwackhia sorediifera</i>       |
| <i>Opegrapha zonata</i>                           | <i>Enterographa zonata</i>        |
| <i>Pertusaria albescens</i> var. <i>albescens</i> | <i>Lepra albescens</i>            |
| <i>Pertusaria corallina</i>                       | <i>Lepra corallina</i>            |
| <i>Pertusaria excludens</i>                       | <i>Lepra excludens</i>            |
| <i>Pertusaria hemisphaerica</i>                   | <i>Varicellaria hemisphaerica</i> |
| <i>Pertusaria lactea</i>                          | <i>Varicellaria lactea</i>        |
| <i>Pertusaria multipuncta</i>                     | <i>Lepra multipuncta</i>          |
| <i>Schismatomma decolorans</i>                    | <i>Dendrographa decolorans</i>    |
| <i>Schismatomma quercicola</i>                    | <i>Schizotrema quercicola</i>     |
| <i>Sparria endlicheri</i>                         | <i>Sparria endlicheri</i>         |
| <i>Sticta fuliginosa</i> s. lat.                  | <i>Sticta ciliata</i>             |
| <i>Sticta fuliginosa</i> s. lat.                  | <i>Sticta fuliginoides</i>        |
| <i>Sticta fuliginosa</i> s. lat.                  | <i>Sticta fuliginosa</i> s. str.  |
| <i>Verrucaria hydrela</i>                         | <i>Verrucaria hydrophila</i>      |

## Fairy Glen Woods SSSI

Location, NRW ownership and survey route

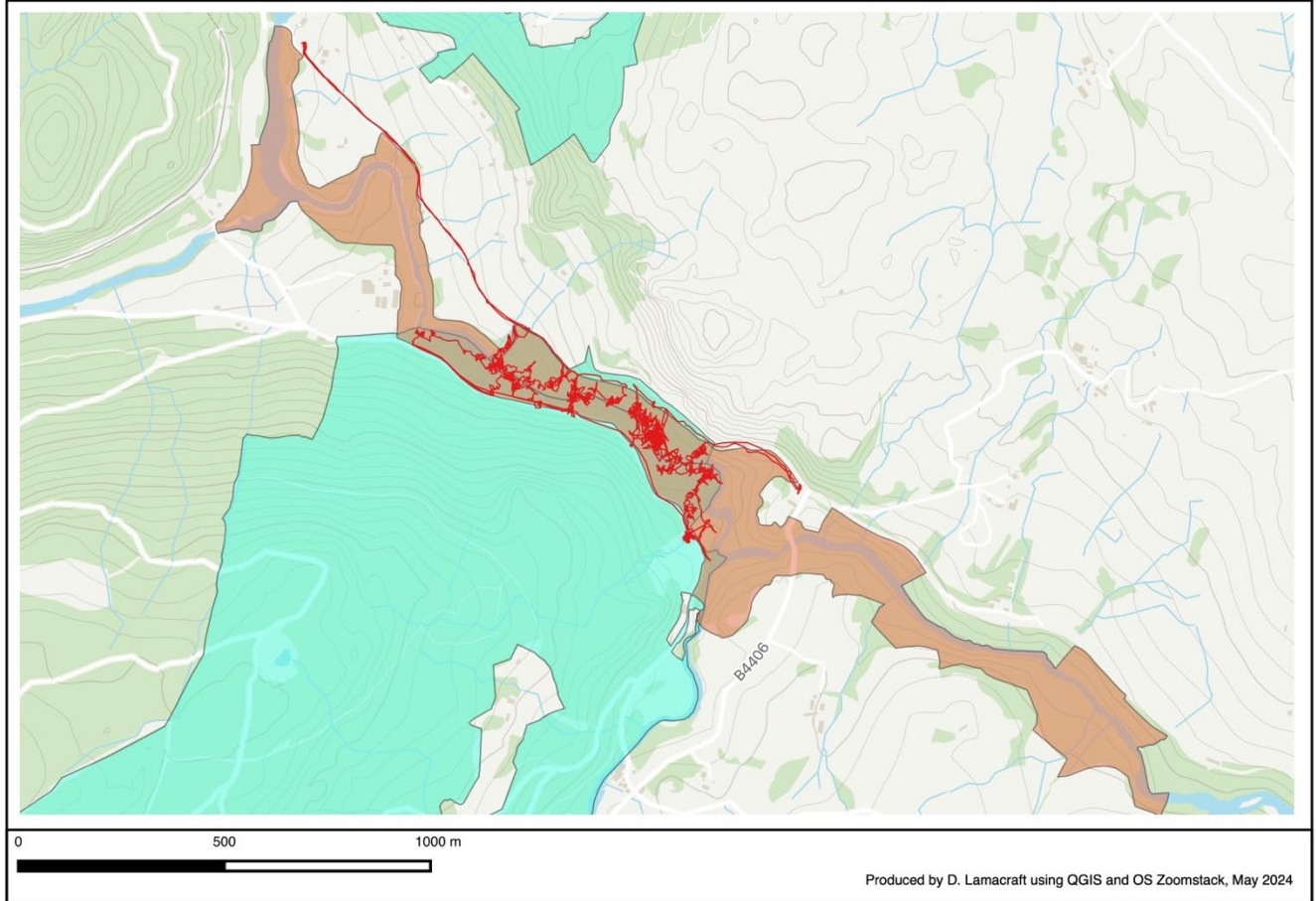


Figure 1. Location of SSSI (red shading), NRW management boundary (cyan shading) and the survey route (red line).

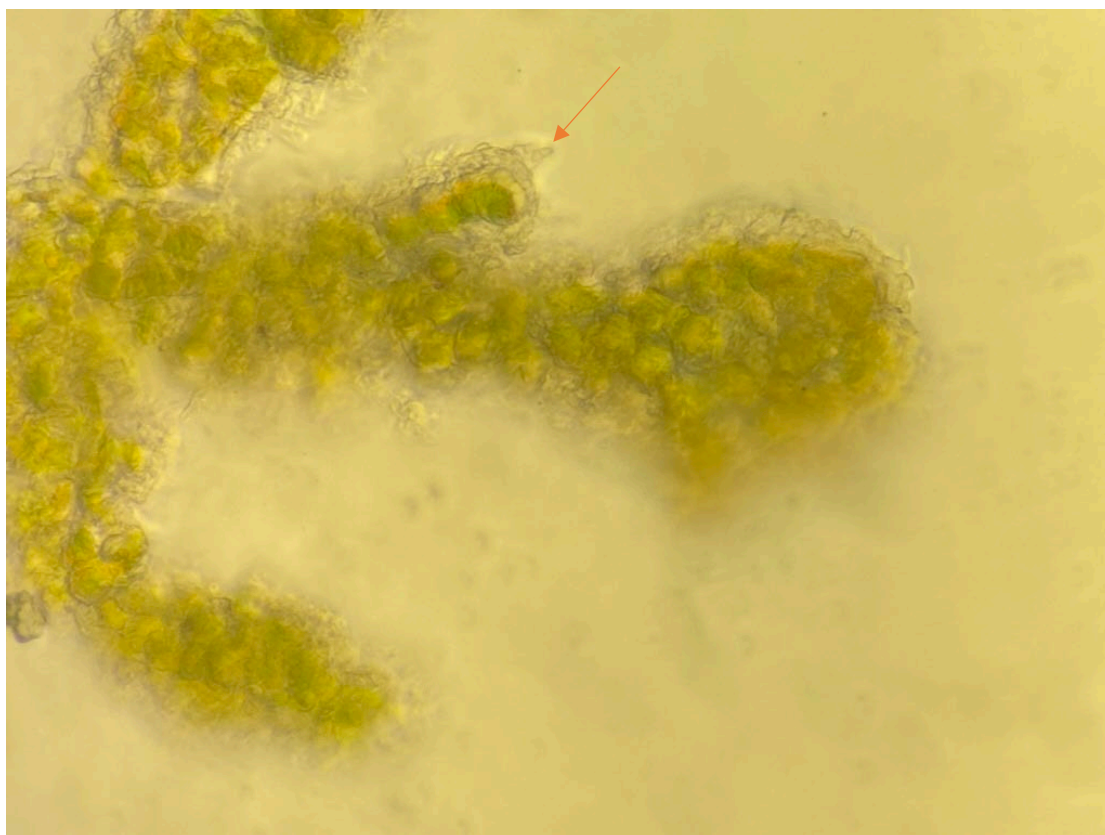
## 4. Results

### 4.1. 2024 survey

427 records were made of 111 taxa of lichens and lichenicolous fungi in the 2024 survey (see Appendix 1), 51 of these are notable (see Appendix 2) including:

***Porina atlantica*** Status not assessed, 2<sup>nd</sup> British record and new to VC49. In Britain and Ireland there are just a handful of records from temperate rainforest in SW Ireland, and a recent discovery in Britain at Ceunant Llennyrch, another North Wales ravine where it was found on Oak (Sanderson 2021). Globally it appears very rare with just a scattering of records from the tropics and sub-tropics (GBIF 2024). Known mainly from base-rich Oak and occasionally overgrowing bryophytes and on rock (Sanderson 2021). In Fairy Glen Woods SSSI it was found in two locations, both on the north bank of the ravine, in the old-growth woodland that has survived the 20<sup>th</sup> Century planting along the immediate ravine edge. In one location it was on bark and over bryophytes on a stunted ash (FG34), and at the other location upstream it was more frequent growing over bryophytes on an ash and several boulders (FG40).

*Porina atlantica* isidium at x400 showing the distinctive projecting, papillate, cortical cells (one indicated with an arrow):

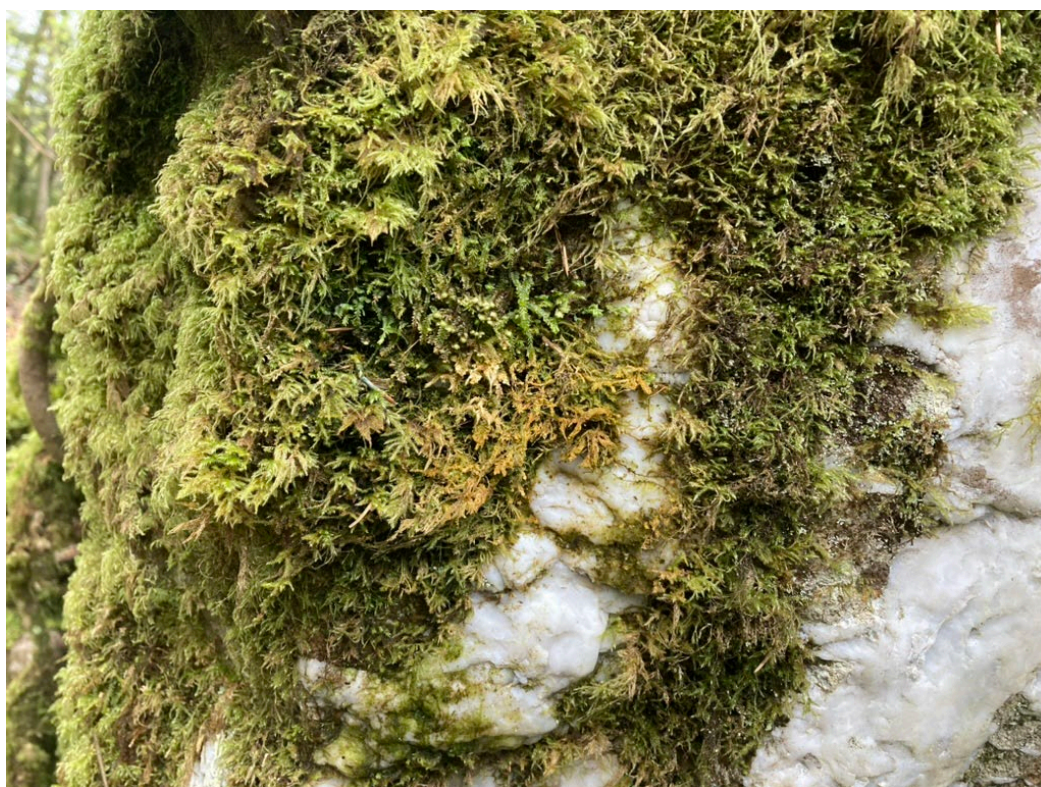




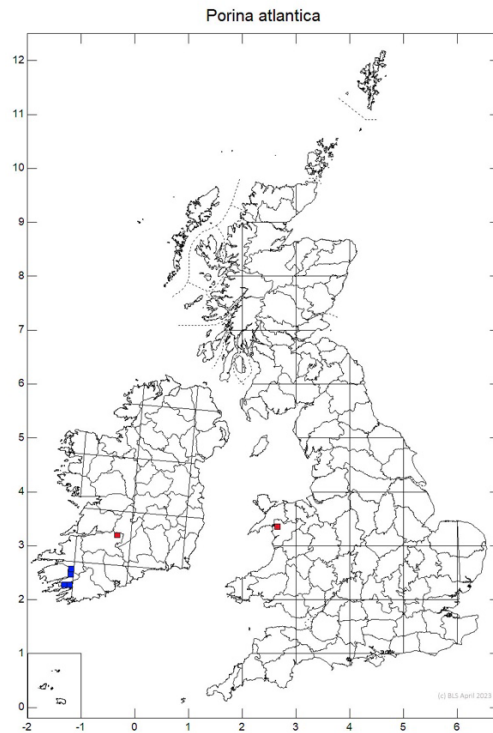
*Porina atlantica* specimen at x20 showing coralloid isidia on a lumpy thallus:



*Porina atlantica*, the orange growing over bryophytes on a large boulder riverside boulder at FG20:

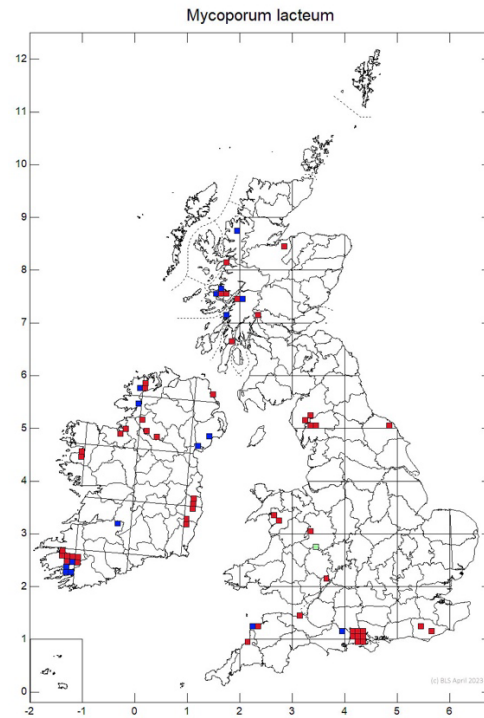


Distribution of *Porina atlantica* in Britain and Ireland (BLS, 2023); red: post 2000 record / blue: 1960-1999 / green: 1650-1959

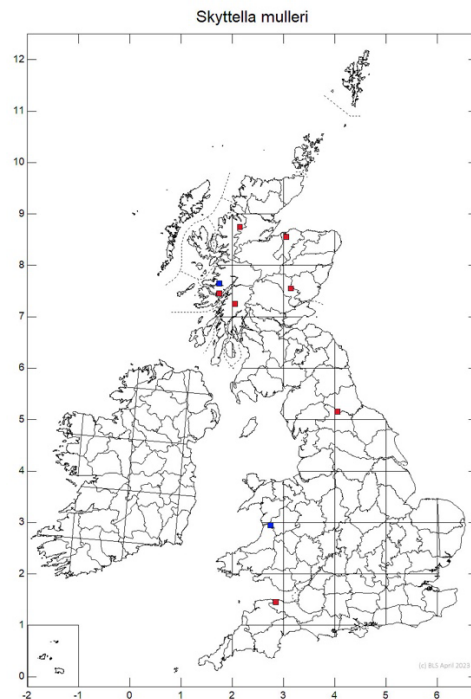


***Mycoporum lacteum*** GB NT, Wales NE (not known in Wales at time of red-listing), NS, 3<sup>rd</sup> Welsh site, new to VC49; a species of the lower parts of trunks of ancient Holly and rarely Birch, Oak, Beech, Rowan and Hazel in old woodland; locally abundant in *Ilex* dominated woods in the New Forest, Hampshire and thinly across Ireland but otherwise rare and very local; in many western woods it is a relict species of former cattle grazed pasture woodlands now found on cliff *Ilex*, where they have survived grazing and browsing pressure. Found new to Wales by Neil Sanderson at Ganllwyd in 2012, and subsequently at Ceunant Llennyrch by Neil Sanderson and Andy Cross. This is the third Welsh site, found on a small holly close to the river on the north bank at the downstream end of the survey area (FG30).





***Skyttella mulleri*** GB NE, Wales NE, NR; a distinctive but little recorded lichenicolous fungus of *Peltigera*, seemingly mostly recorded from *P. praetextata* in ravines in Britain, as is the case here at Fairy Glen SSSI where it was recorded from two locations on *P. praetextata* on boulders close to the river (FG40)



Detailed records of the survey findings can be found in Appendix 4 with maps of locations of notable taxa in Appendix 5.

## 4.2. Previous records

Previous records have been collated and are summarised below in Table 1. The site has had surprisingly little recording effort, with just a handful of records from the British Lichen Society database and just one previous formal lichen survey, the latter by Alan Orange (2014) which had a particular focus on saxicolous/aquatic taxa species associated with the river and recorded 53 notable taxa. In addition Orange (2014) mentions records by Peter Benoit but these records have not been located.

This recording brings the total number of taxa recorded to 209 with 93 notable taxa. Appendices 1 and 2.

Table 1. Previous recording effort

| Year | Recorder       | Number of taxa recorded | Notable taxa recorded                                   |
|------|----------------|-------------------------|---------------------------------------------------------|
| 1961 | Kerry Dalby    | 1                       | <i>Protopannaria pezizoides</i>                         |
| 1962 | Ursula Duncan  | 11                      | <i>Mycobilimbia sphaeroides</i> , <i>Sticta limbata</i> |
| 1969 | Tony Fletcher  | 1                       | <i>Aspicilia aquatica</i>                               |
| 1974 | Brian Coppins  | 5+                      | <i>Peltigera horizontalis</i>                           |
| 2007 | Alan Orange    | 2                       | <i>Verrucaria elaeomelaena</i> s. lat.                  |
| 2014 | Alan Orange    | 50+                     | Summarised in this report                               |
| 2024 | Dave Lamacraft | 111                     | This report                                             |

## 5. Discussion

### 6.1 Survey coverage

The survey route is shown in Figure 1. The survey coverage was iterative, guided by where interest was found and on the older areas of woodland and tree cover, notably the immediate edges of the ravine that escaped the 20<sup>th</sup> Century planting.

### 6.2 Importance of the lichen flora

Fairy Glen Woods SSSI supports an important lichen interest, with almost half of the taxa recorded being notable (40 taxa), including the rare *Porina atlantica* at only its 2<sup>nd</sup> British site.

Using current SSSI selection criteria for lichens (Sanderson et al 2018) Fairy Glen SSSI qualifies on the Southern Oceanic Woodland Index (SOWI) with a score of 35, exceeding the threshold of 30. A score of 14 on the Upland Rainforest Index falls just short of the threshold of 15. Based on Orange's 2014 survey, the site also likely meets the criteria for the Acid Watercourses Quality Index (AQWI) with a score of 13 for the site however it is not clear if all the scoring species fall within a 1km section of the river as not all AQWI species have fully localised records.

The SSSI should probably also qualify for its population of *Porina atlantica*. This species was only recently found new to Britain so has not had a conservation status assessment but is included on the TNTN list. This is only its second site in Britain and given its rarity in Britain and Ireland, and globally (GBIF 2024), it would be surprising if it did not meet the criteria for qualification as an independent species feature once it has a conservation evaluation.

Population sizes are presented in Appendix 3.

### 6.3 Areas of interest

Maps of the locations of the SSSI assemblages of notable species – the SOWI, URI and AQWI – from both the Alan Orange 2013 survey and this survey are shown below in Figures 2-4. Maps of the locations of all notable species, again from the 2013 and 2024 surveys, are presented in Appendix 5.

Virtually all of the interest is associated with the older trees, especially Oak and Ash but also some Sycamore, Hazel and Willow, and areas of undisturbed native woodland. The former are scattered through the site on both sides of the river, but concentrated, with the latter along the edges of the ravine which have escaped the 20<sup>th</sup> Century planting. The majority of the NRW-owned part of the SSSI has been modified by planting including conifer, Beech and American Red Oak which has significantly altered the ecology of the site through shading, leaf litter build-up and competition with native tree species. Interestingly the northern side of the river is not mapped as PAWS on the Ancient Woodland Inventory and reference to historic maps show that this area became a plantation between 1875 and 1899, being mapped as open ground in 1875. There are old scattered trees present, which look to be older than 125-150 but perhaps this isn't actually the case as the 1830s Ordnance Survey map shows a line of trees only along the river. The south side does have more obviously

older oaks and seems to support more lichen species that have a stronger link to old woodland sites e.g. *Agonimia octospora* than on the north side. These areas appear as Ancient Semi-Natural Woodland or Restored PAWS on the AWI (NRW 2022). Habitat management issues and recommendations are discussed in Section 7.

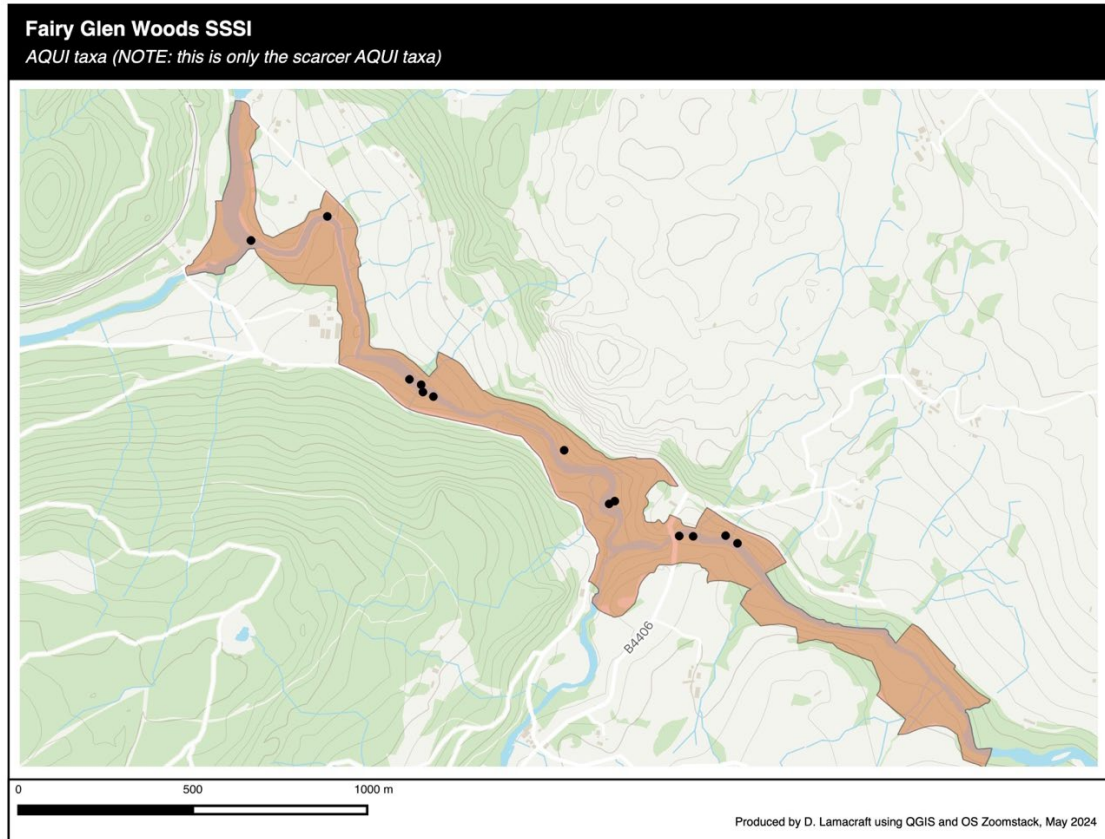


Figure 2. Locations of some AQUI taxa from the 2013 and 2024 surveys



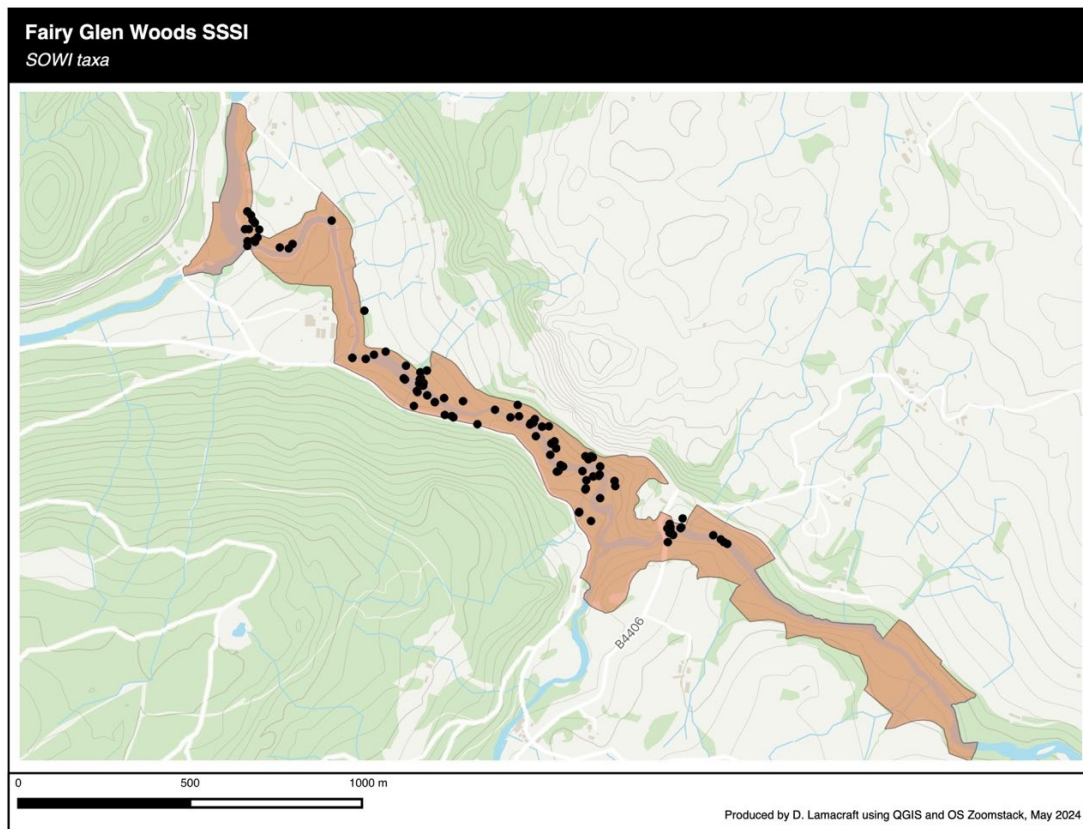


Figure 3. Locations of SOWI taxa from the 2013 and 2024 surveys

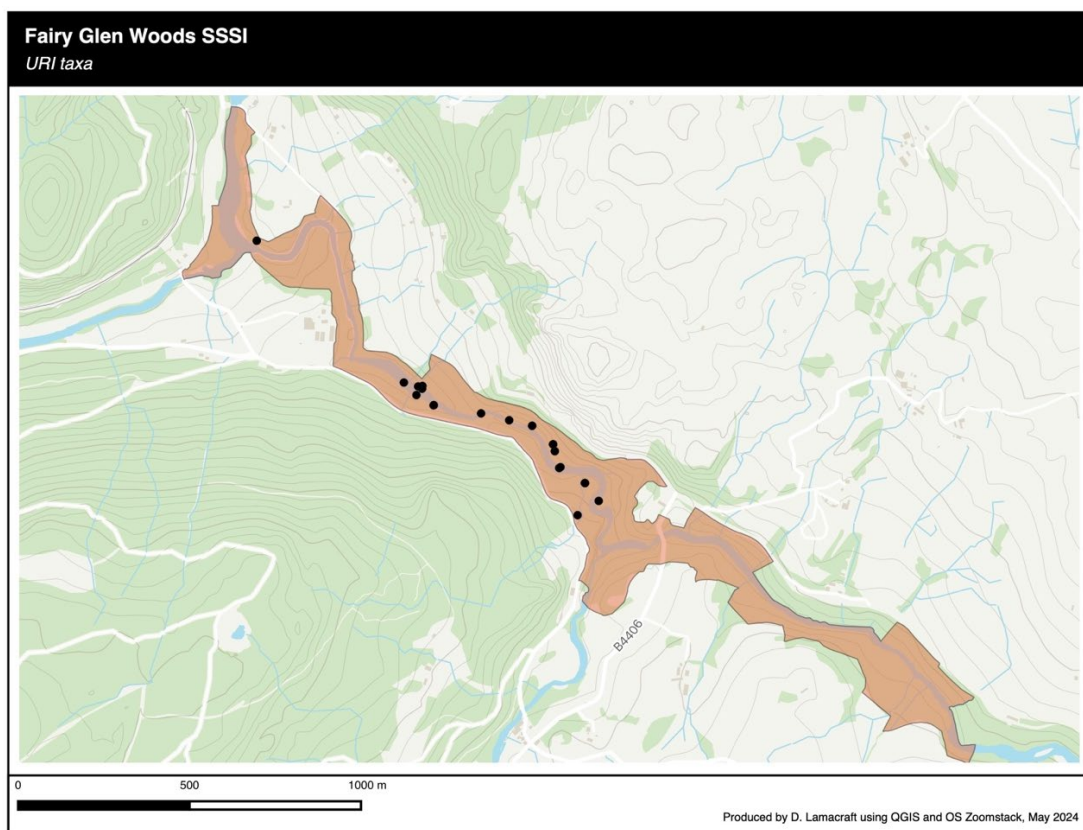


Figure 4. Locations of URI taxa from the 2013 and 2024 surveys

## 6. Habitat management issues and recommendations

The main issues impacting the lichen interest here stem from the 20<sup>th</sup> Century forestry planting of e.g. conifers, Beech and American Red Oak. This has rendered much of the site unsuitable for notable epiphytic lichens typical of sites such as this, and has had – and is having – a negative impact through seedling establishment in the areas of interest e.g. along the edge of the ravine which support the bulk of the lichen interest. The impacts are principally around shade and the unsuitability of the substrate which limits the potential expansion of the lichen interest and the habitat.

Locally there are other Invasive Non-Native Species e.g. Japanese Knotweed and *Rhododendron ponticum*.

A more difficult issue is that the ideal management for epiphytic lichens in such sites is grazing and browsing which will help to maintain open conditions, control bramble, tree regeneration etc. This is probably a challenge here but would be ideal and would likely be more achievable now with the availability of Nofence collars.

Ash is not as significant a tree here as at some sites, so the impact of Ash Dieback will not have such a major impact on the lichen interest of the site as a whole. However it does support one of the populations of *Porina atlantica*. It was unclear if the tree was infected but translocation could be attempted if the tree is or becomes infected.

### 7.1 Habitat recommendations

In general terms aims should be to:

- expand the areas of old-growth and native woodland along the ravine edges on both sides of the river, by pushing back the non-native, plantation species e.g. Beech, American Red Oak, conifer from these areas to allow expansion,
- halo-thin as many of the old broadleaved trees within the plantations as possible, following a targeted programme of works, these are mostly Oak, and suffering from competition from the plantation trees (see Figures 5 and 6),
- deal with all Invasive Non-Native Species
- deal with all Beech and conifer regeneration along the ravine edges.

The site should essentially be treated as a sensitive PAWS restoration project.





Figure 5. Dense Beech plantation that could be thinned to promote better conditions for lichens (and bryophytes) on the woodland floor. Surviving Oaks, such as seen left of centre, should be halo-thinned.



Figure 6. An Oak hemmed in by Beech which hasn't been allowed to develop its crown and is looking in poor health, this should be gradually halo-thinned to reduce canopy competition and allow natural growth.

Specific habitat management recommendations are:

| Grid ref     | Tag  | TN                                               | Figure | Management recommendation                                                                                 |
|--------------|------|--------------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------|
| SH8087253581 | none | FG5<br>(upstream<br>of) + FG7<br>and<br>vicinity | 7      | Remove/kill conifer regen,<br><i>Rhododendron</i> and beech saplings, kill<br>any seed source Beech       |
| SH80875358   | none | FG7                                              | 8, 9   | Remove/kill conifer, Beech and<br><i>Rhododendron</i>                                                     |
| SH8044953751 | 0998 | FG13                                             | 10     | Monolith Ash if ADB work required                                                                         |
| SH8030853861 | none | FG20                                             | 11     | Remove/kill Beech saplings in area, kill<br>any source of seed and treat Knotweed                         |
| SH8019453921 | none | FG21                                             | 12, 13 | Remove/kill all Beech saplings, kill any<br>seed source Beech                                             |
| SH8037253887 | 0063 | FG25                                             | 14     | Halo all along wall                                                                                       |
| SH8035353882 | 0026 | FG26                                             | 14     | Halo all along wall                                                                                       |
| SH8036253851 | none | FG28                                             | 15     | Control Knotweed                                                                                          |
| SH8036253851 | none | FG29                                             | 16, 17 | Remove/kill mature Beech and saplings<br>along riverbank                                                  |
| SH8063653787 | 0066 | FG32                                             | 18     | Remove Holly and cut Ivy                                                                                  |
| SH8064053754 | 0056 | FG35                                             | 19     | Halo thin                                                                                                 |
| SH8085053638 | 0070 | FG36                                             | 20     | Halo thin, remove rather than sned<br>conifer                                                             |
| SH8076153612 | 0074 | FG39                                             | 21     | Halo, push back Beech                                                                                     |
| SH8073153642 | 0059 | FG40                                             | 22, 23 | Remove <i>Rhododendron</i> and any Beech<br>in vicinity, carefully cut holly on <i>Porina</i><br>boulders |
| SH8074353681 | none | FG42                                             | 24     | Push Beech back from the area of<br>interest                                                              |
| SH8068953696 | none | FG44                                             | 25     | Halo, removing/killing surrounding Beech                                                                  |
| SH8067253730 | none | FG45                                             | 26     | Remove/kill Sycamore, Beech, conifers                                                                     |
| SH8068253735 | 0028 | FG46                                             | none   | Halo thin                                                                                                 |
| SH8068653746 | 0048 | FG47                                             | 27     | Halo thin                                                                                                 |
| SH8072753725 | 0046 | FG48                                             | 28     | Monolith Ash if ADB work required                                                                         |





Figure 7. Oak upstream of FG5: remove/kill conifer and Beech threat



Figure 8. FG7, an Oak nearby the one above: remove/kill conifer, Beech and *Rhododendron* threat





Figure 9. Inaccessible Oak nearby: remove/kill conifer and Beech threat



Figure 10. FG13, Ash left, Oak right: monolith Ash if it needs ADB management





Figure 11. Ash FG20 centre background and boulders with interest in the foreground: remove/kill Beech saplings in area, kill any source of seed and treat Knotweed



Figure 12. Oak FG21, top of steep bank above river with serious shade threat from young Beech: remove/kill all Beech regeneration and nearby seed-source Beech





Figure 13. Oak FG21



Figure 14. FG25 and Ash, upslope, and FG26 an Oak in foreground left: halo thin all up this boundary





Figure 15. Area adjacent to river with FG28 and other trees with interest. Slightly leaning Oak FG27 can be seen on the far right of the photo: control Knotweed



Figure 16. FG29, remove/kill Beech saplings and mature Beech





Figure 17. Upstream of FG29: remove/kill Beech saplings and mature Beech



Figure 18. FG32, large Oak: remove Holly and cut Ivy





Figure 19. Ash FG35: halo thin



Figure 20. Oak FG36 centre: halo thin (retain Sycamore in foreground)





Figure 21. FG39 Oak, and boulder adjacent right: halo thin, remove/kill Beech regeneration



Figure 22. FG40, Looking downstream: remove *Rhododendron* and push back Beech in vicinity





Figure 23. FG20, *P. atlantica*, orange patches overgrowing bryophytes (inc. bryophytes over Ivy stems) on small boulders below Ash and Sycamore, Ivy needs cutting very carefully



Figure 24. FG42 Birch centre: remove/kill Beech regeneration within the strip of native woodland on the ravine edge and push back the dense Beech plantation back





Figure 25. FG44, Oak centre: halo thin

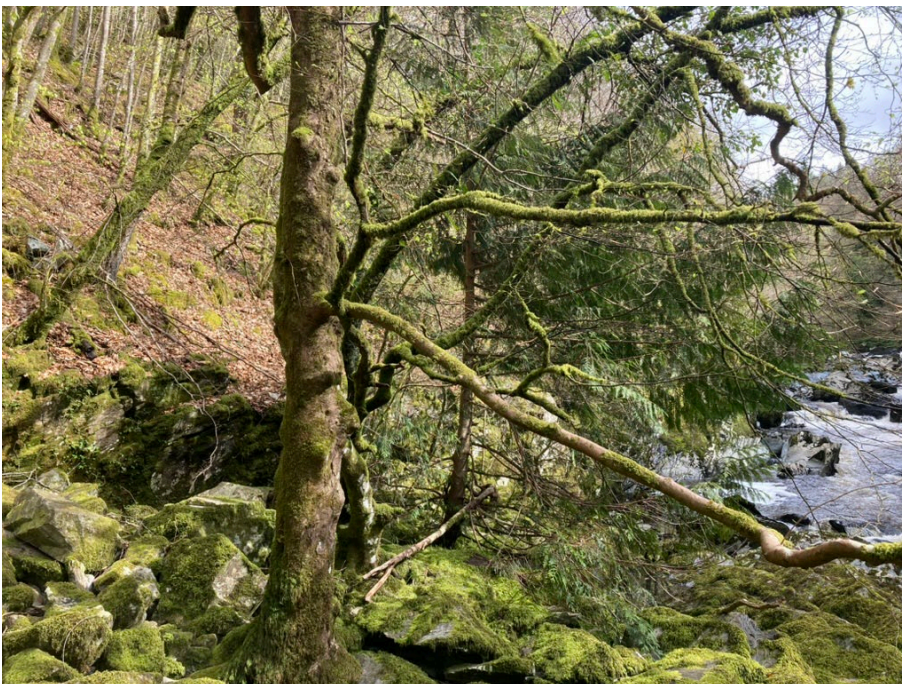


Figure 26. FG45: remove conifer and other tree cover over boulders





Figure 27. FG47, Oak centre: halo thin



Figure 28. FG48, Ash beside path: halo thin

## 7.Future recommendations

This survey provides a baseline for future monitoring.

Some parts of the SSSI have no lichen records, nor survey reports, suggesting they have probably never been looked at. These areas are:

- the south/left bank downstream of the NRW-owned area to the confluence with the Afon Lledr, this area looked good for lichens,
- upstream of the B4406 bridge (Bont Newydd) over the Conwy. Orange surveyed an area close to the bridge in 2013, but the rest of the SSSI upstream of here appears not to have been looked at.

Given the exceptional interest in the area surveyed in 2024, these areas would be well worth surveying as they could support significant interest.

Whilst most management can be undertaken by habitat management contractors, the control of Ivy on the *Porina atlantica* boulders at FG40 should be undertaken by a lichenologist, as should translocation of the *Porina atlantica* from Ash if the tree at FG34 succumbs to Ash Dieback.



## 8. References

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## Appendices

The Appendices of species lists tables, tree location photos and species maps have been removed from this version of the report because it is not possible to make them comply with Accessibility legislation. Full versions of the report are held by Natural Resources Wales and the Deposit Libraries.



## Data Archive Appendix

Data outputs associated with this project are archived on server-based storage at Natural Resources Wales.

The data archive contains:

- [A] The final report in Microsoft Word and Adobe PDF formats.
- [B] A spreadsheet of lichen records made during the survey.

Metadata for this project is publicly accessible through Natural Resources Wales' Library Catalogue <https://libcat.naturalresources.wales> (English Version) and <https://catllyfr.cyfoethnaturiol.cymru> (Welsh Version) by searching 'Dataset Titles'. The metadata is held as record no NRW\_DS161562

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