



## Wylfa Newydd Project

### 6.4.35 ES Volume D - WNDA Development App D9-2 - Lichen Technical Summary Report

PINS Reference Number: EN010007

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Application Reference Number: 6.4.35

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June 2018

Revision 1.0

Regulation Number: 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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**Horizon Nuclear Power (Wylfa) Ltd.**

**Consultancy Report:  
Baseline Lichen Surveys 2013**

**February 2014**

**Steve Chambers**

**Document Number: B1496000/WP6-2/R014  
Horizon Ref: W202.01-S5-PAC-REP-00025  
Document Date: December 2015  
Version: 3**

**Document control sheet**

**BPP 04 F8**

version 16 Oct 2013

<b>Project:</b>	Wylfa Newydd Project		
<b>Client:</b>	Horizon Nuclear Power (Wylfa) Ltd	<b>Project Number:</b>	B1496000
<b>Document Title:</b>	Baseline lichen surveys 2013		
<b>Ref. No:</b>	B1496000/WP6-2/R014		

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<b>DATE</b>	20/03/14	<b>Document status Final</b>	

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<b>DATE</b>	16/10/15	<b>Document status Final</b>	

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<b>DATE</b>	16/11/15	<b>Document status : Final</b>	

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## Executive Summary

Horizon Nuclear Power Wylfa Ltd. (Horizon) is currently planning to develop a new nuclear power station on Anglesey (the Wylfa Newydd Generating Station) as identified in the National Policy Statement for Nuclear Power Generation (EN-6). The Wylfa Newydd Project (the Project) will require a number of applications to be made under different legislation to different regulators. Jacobs UK Ltd (Jacobs) was commissioned to collect baseline data to inform the various applications, assessments and permits that will be submitted for approval to construct and operate the Wylfa Newydd Generating Station.

A lichen survey focusing on specific locations which are representative of a wide range of semi-natural and synanthropic habitats on land proposed for the Wylfa Newydd Generating Station was undertaken in November 2013. The survey recorded a total of 262 taxa of lichens (252) and lichenicolous fungi (10), including 26 Nationally Scarce, two Nationally Rare, three Welsh Red Data List Vulnerable, four International Responsibility species and 21 species (17 lichens and four lichenicolous fungi) new for Vice County (VC) 52 Anglesey - the majority being recently recognised taxonomic 'splits' or under-recorded and common lichenicolous fungi. In addition, an undescribed crustose lichen common in upland Britain and of no conservation concern was found.

High quality maritime lichen habitats associated with Trwyn Pencarreg supported a rich flora comparable in quality with some of the best coastal locations elsewhere on the island. The rare *Pertusaria monogona* was re-found at its sole known Anglesey location on Wylfa Head. Further areas of rich coastal lichen habitat were identified east of Wylfa Head at Location 6 and Location 7, at the latter of which the recently recognised macro-lichen *Parmotrema pseudoreticulatum* was found.

Lichen epiphytic habitats were found to be of less interest, but old estate ornamental woodland east of the station at Location 5 supported the rare Section 42 (the Natural Environment and Rural Communities Act, 2006 (NERC)) species of 'Principle importance' *Schismatomma graphidioides*. Other conservation-significant epiphytes included *Eopyrenula grandicula*, *Ramalina fraxinea* and *Strigula taylorii*.

Representative lengths of old wall and field banks (cloddiau) surveyed in detail were found to support minimal lichen interest.

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**1.1 Overview**

Horizon Nuclear Power Wylfa Ltd. (Horizon) is currently planning to develop a new nuclear power station on Anglesey as identified in the National Policy Statement for Nuclear Power Generation (EN-6). The Wylfa Newydd Project (the Project) comprises the proposed new nuclear power station (the Wylfa Newydd Generating Station), including the reactors, associated plant and ancillary structures and features, together with all of the development needed to support its delivery, such as highway improvements, worker accommodation and specialist training facilities. The Project will require a number of applications to be made under different legislation to different regulators. As a nationally significant infrastructure project under the Planning Act 2008, the construction and operation must be authorised by a development consent order.

Jacobs UK Ltd (Jacobs) was commissioned by Horizon to undertake a full ecological survey programme within the vicinity of the Power Station Site. This work has included the gathering of baseline data to inform the various applications, assessments and permits that will be submitted for approval to construct and operate the Power Station and Associated Development.

This report details the results of a systematic lichen survey targeting various locations of potential higher lichenological interest within the study area.

**1.2 Wylfa Newydd Project**

The Project includes the Wylfa Newydd Generating Station and Associated Development<sup>1</sup>. The Wylfa Newydd Generating Station includes two UK Advanced Boiling Water Reactors to be supplied by Hitachi-GE Nuclear Energy Ltd, associated plant and ancillary structures and features. In addition to the reactors, development on the Power Station Site (the indicative area of land and sea within which the majority of the permanent Wylfa Newydd Generating Station buildings, plant and structures would be situated) will include steam turbines, control and service buildings, operational plant, radioactive waste storage buildings, ancillary structures, offices and coastal developments. The coastal developments will include a Cooling Water System (CWS) and breakwater, and a Marine Off-Loading Facility (MOLF).

**1.3 Site Description**

The Wylfa Newydd Development Area (the indicative areas of land and sea, including the Power Station Site, the Wylfa NPS Site<sup>2</sup> and the surrounding areas that would be used for the construction and operation of the Wylfa Newydd Generating Station) covers an area of approximately 380ha. It is bounded to the north by the coast and the Existing Power Station. To the east, it is separated from

<sup>1</sup> Development needed to support delivery of the Wylfa Newydd Generating Station is referred to as Associated Development. This includes highway improvements along the A5025, park and ride facilities for construction workers, Logistics Centre, Temporary Workers' Accommodation, specialist training facilities, Horizon's Visitor Centre and media briefing facilities.

<sup>2</sup> The site identified on Anglesey by the National Policy Statement for Energy EN-6/NPS EN-6 as potentially suitable for the deployment of a new nuclear power station.



Cemaes by a narrow corridor of agricultural land. The A5025 and residential properties define part of the south-east boundary, with a small parcel of land spanning the road to the north-east of Tregele. To the south and west, the Wylfa Newydd Development Area abuts agricultural land, and to the west it adjoins the coastal hinterland.

The Wylfa Newydd Development Area includes the headland south of Mynydd-y-Wylfa candidate Wildlife Site. There is one designated site for nature conservation within the Wylfa Newydd Development Area; Tre'r Gof Site of Special Scientific Interest (SSSI). It is also within 1km of the Cae Gwyn SSSI, Cemlyn Bay Special Area of Conservation (SAC) SSSI, and the Ynys Feurig, the Skerries and Cemlyn Bay Special Protection Area (SPA).

Tre'r Gof is a small basin mire adjacent to the Existing Power Station, west of Cemaes. The area receives mineral-enriched waters from the surrounding boulder clay leading to the development of notable flora. It is the botanical interest that provides the reason for the designation of the site as a SSSI.

Cae Gwyn SSSI is located immediately to the south of the Wylfa Newydd Development Area to the west of Llanfechell. The SSSI comprises two wetland areas separated by an outcrop of rock with heathland vegetation. The southern wetland is confined by a rock basin and is dominated by bogmoss (*Sphagnum* spp.) and a wide variety of common wetland herbs. The northern wetland has a different flora containing denser areas of willow (*Salix* spp.) and common reed (*Phragmites communis*).

## 1.4 Study Aims and Objectives

The objective of the surveys is to characterise the environment and collect baseline data to inform the various applications, assessments and permits required to construct and operate the Wylfa Newydd Generating Station.

As part of the Environmental Impact Assessment (EIA) and the need for detailed knowledge of temporal and spatial data on lichens has been identified. This report presents the findings of survey work undertaken in November 2013.

Of particular concern were specific areas identified from Phase 1 and Phase 2 vegetation maps and scoping discussions with Jacobs ecologists. Section 1.7 provides details of the previous work carried out in the study area. These comprised a representative selection of landscape features including:

- freestanding trees;
- groups of trees;
- traditional stone field boundaries (cloddiau); and
- coastal rock outcrops.

## 1.5 Terminology

Lichen nomenclature follows Smith, C.W., et al (2009) *The Lichens of Great Britain and Ireland*, updated by more recent changes published in the 'Literature Pertaining to British Lichens' series in the biennial Bulletin of the British Lichen Society. Marine littoral zone species of *Verrucaria* recently transferred to segregate genera are here retained in *Verrucaria* for ease of referencing names.

## 1.6 Glossary

**Apothecia** – This is the fruiting body of an ascomycete fungus.

**Apothecium** – A fungal reproductive structure.

**Ascomycetes (Ascomycota)** – A large phylum of fungi that includes species which have formed symbiotic associations with green algae to form lichens.

**Ascospore** – This is a kind of spore specific to fungi classified as ascomycetes.

**Basidia** – A microscopic, spore-producing structure found on the hymenophore of fruiting bodies of basidiomycete fungi.

**Basidiomycetes** – A class of fungi.

**Calcicoles** – A fungi that thrives in a calcareous soil (a term also applied to plants).

**Commensals** – Commensal species relate to commensalism which is a class of relationship between two organisms where one organism benefits without affecting the other.

**Conidia** – Asexual non-motile spores of fungi.

**Crustose** – The habitat of lichen to grow tightly pressed to a substrate forming a biological layer of the adhering organism.

**Epiphytes** – A lichen (or plant) that grows non-parasitically upon another plant (such as a tree).

**Heterobasidiomycetes** – Includes jelly fungi, smuts and rusts, which are basidiomycetes with septate basidia.

**Hymenium** – The tissue layer on the hymenophore of a fungal fruiting body where the cells develop into basidia, which produce spores.

**Hymenophore** – Refers to the hymenium-bearing structure of a fungal fruiting body.

**Lichenicolous** – Lichenicolous fungi live exclusively on lichen, most commonly as host-specific parasites, but also as broad-spectrum pathogens, saprotrophs or commensals.

**Lignicole** – Growing or living on or in wood.

**Muscicolous** – Growing on mosses.

**Nitrophile** – A lichen with an affinity for growing on improved nitrogen rich substrates.

**Obligate** – Lichen requiring specific growing conditions e.g. saline conditions.

**Saprotrophs** – Organisms that get their energy from non-living organic matter e.g. rotting wood.

**Saxicolous** – Growing on or living among rocks.

**Segregate species** – A species of lichen that has been recently taxonomically split from previous historical groupings.

**Siliceous** – Sedimentary rocks that have silica as the principle constituent.

**Squamules** – Small scales.

**Synanthropic** – Synanthropes are organisms often (but not necessarily) considered pests, which are not domesticated but live near and benefit from humans and their dwellings.

**Terricolous** – Living on the ground or in the soil.

**Thalii (thallus singular)** – The body of the lichen.

**Vice-County (VC)** – A geographical division of the British Isles used for the purposes of biological recording and other scientific data-gathering (sometimes also called Watsonian Vice Counties).

## 1.7 Previous Work

Previous vegetation surveys in the study area have comprised Phase 1 habitat surveys completed in 2009, 2010, and 2012a by Ove Arup and Partners Ltd, and most recently in 2013 by Jacobs. Additionally a Lower Plant Appraisal Report was completed in 2012b and a Phase 2 Lichen Report in 2013, both by Ove Arup and

Partners Ltd. A review of all these reports was used to produce a targeted approach to the survey methodology.

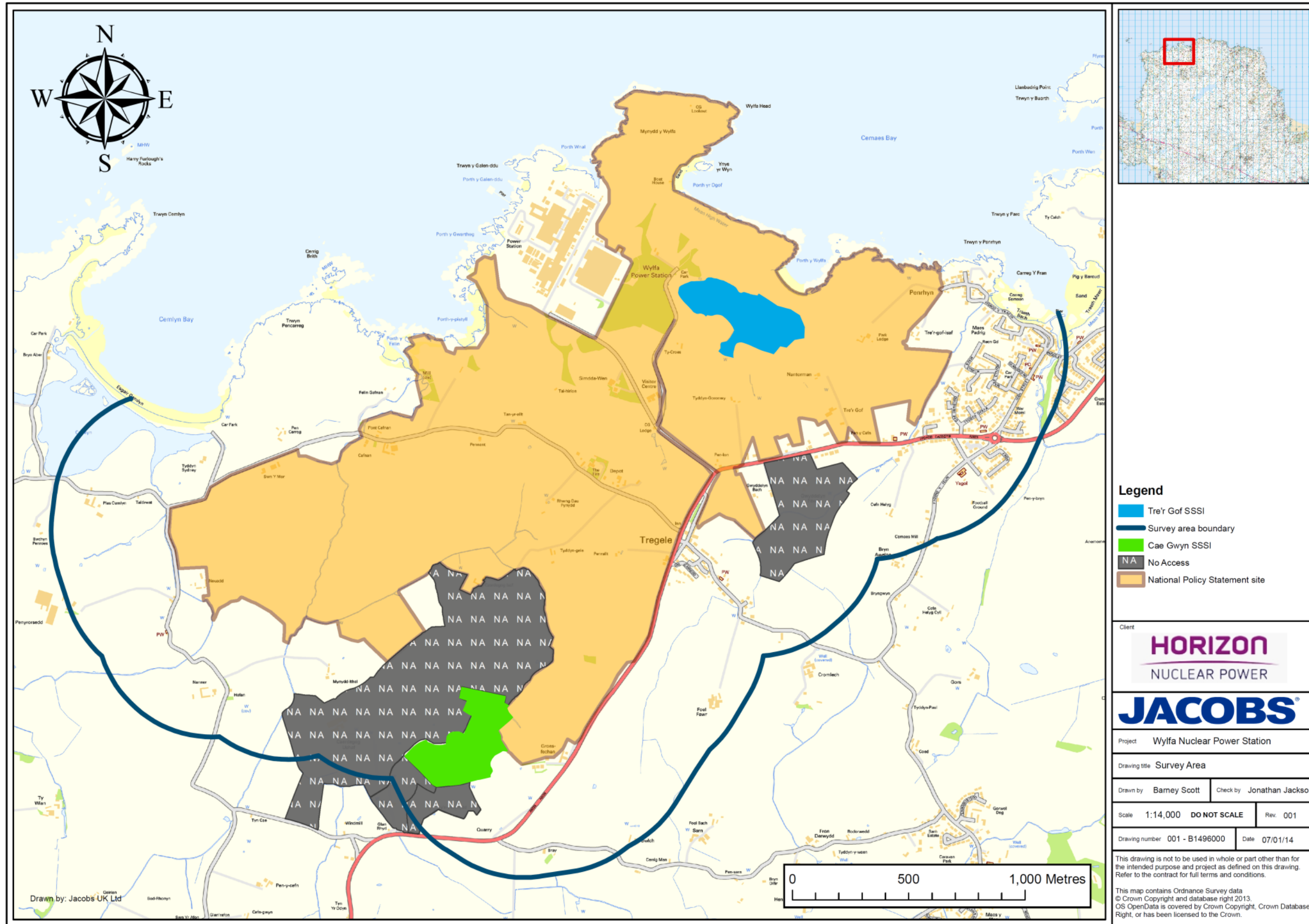


Figure 1 Study area

Specific areas identified in advance from Phase 1 and Phase 2 vegetation maps and scoping discussions with Jacobs ecologists/project managers were visited, together with a representative selection of landscape features, such as freestanding trees, groups of trees, traditional stone field banks (cloddiau) and sundry miscellaneous habitats, having the potential to support lichen interest.

At each location lichen species were identified by the selective scanning of supporting substrata using x10 hand-lens. Standard lichen reagent spot tests were employed to identify and/or confirm species in the field. For species requiring microscopic examination for critical determination or confirmation, small samples were removed for later anatomical study. The amount of time spent at each survey location varied and was dependent on its extent, habitat scale, complexity and inherent richness.

Comprehensive species inventories were not made for each and every study location, except for some of the richer semi-natural habitats, e.g. coastal rock outcrops. Instead over the survey period an additive, sequential list of species was assembled, covering all locations and habitats. For minor locations lichen species best typifying the habitat were listed, together with any species of particular note.

In the summaries below as a general rule the fuller the description, the better the habitat quality and significance of the location for lichens. Notable species are **emboldened** in the following text and their statuses described in Appendix C. In this case 'Notable' refers to a species' listing on one or a combination of the following:

- UK Post-2010 Biodiversity Framework (WBP, 2013);
- Section 42 NERC 2006 species of 'principle importance' (WBP, 2013);
- Welsh Red data list (Woods, 2010); and/or
- Rarity categories established by IUCN Red list (IUCN, 2001).

Each subsection below gives species lists and habitat descriptions for each of the numbered survey locations shown in Figure 2.

### 3.1 Location 1: Concrete sea wall by Esgair Cemlyn car park

The concrete of the sea wall fronting the car park supported a range of common calcicoles, including *Agonimia tristicula* (sterile squamules), *Candelariella aurella*, ***Caloplaca arcis***, *C.flavescens*, *Lecania erysibe* f. *erysibe*, *L.erysibe* f. *sorediata*, *Lecanora albescens*, *L.campestris*, *L.dispersa*, *Rinodina gennarii*, *Sarcogyne regularis*, *Verrucaria nigrescens* and *V.viridula*. A smaller boulder block wall perpendicular to the sea front on the east side of the car park had ***Amandinea lecideina*** and frequent ***Caloplaca vitellinula*** on the vertical side faces of siliceous blocks.

### 3.2 Location 2: Trwyn Pencarreg headland, west section: coastal rock exposures (clifftop exposures, sea-cliffs and rocky shore).

Hard rock maritime lichen communities were well developed all around the headland, displaying full zonation from eulittoral to supralittoral to terrestrial. Only parts of the cliff where it was possible to descend were examined. Species recorded included *Acarospora fuscata*, *Anaptychia runcinata* (very fertile), ***Arthonia phaeobaea***, *Aspicilia leproscens*, *Buellia aethalea*, ***B.stellulata***, *B.subdisciformis*, *Candelariella vitellina*, *Catillaria chalybeia*, *Cladonia cervicornis* ssp. *cervicornis*, *Cliostomum tenerum*, *Diplotomma chlorophaeum*, ***Lecania atrynoides***, *Lecanora actophila*, *L.fugiens*, *L.gangaleoides*, *L.helicopis*, *L.orosthea*, *L.polytropa*, *L.rupicola*, *Lecidella asema*, *L.scabra*, *Melanelixia fuliginosa* (fertile), *M.glabratula*, *Myriospora smaragdula*, *Ochrolechia parella*, *Opegrapha calcarea* ('conferta' morphs), *O.gyrocarpa*, *Peltigera hymenina*, *Pertusaria lactescens*, *P.pseudocorallina*, *Physcia tenella* ssp. *marina*, *Polysporina simplex*, *Porpidia platycarpoides*, *P.tuberculosa*, *Ramalina cuspidata*, *R.siliquosa*, *Rhizocarpon geographicum*, *R.richardii*, *Rinodina gennarii*, *Scoliciosporum umbrinum*, *Solenopsora vulturiensis*, *Tephromela atra*, *Verrucaria fusconigrescens*, *Xanthoparmelia loxodes*, *Xanthoria aureola* and *X.parietina*.

Exposed ground-level clifftop outcrops, sheltered but not over-shaded by gorse *Ulex* sp. thickets in the terrestrial zone just back from the sea cliff edge, supported such species as ***Caloplaca arenaria***, *C.crenularia*, *Fuscidea cyathoides*, *Hypotrachyna britannica*, *Parmelia saxatilis*, *P.sulcata*, ***Pertusaria excludens***, *Ramalina subfarinacea*, *Rinodina atrocinerea*, *Solenopsora vulturiensis*, *Trapeliopsis wallrothii*, ***Xanthoparmelia delisei*** and *X.verruculifera*. Maritime grass-heath in the vicinity of the outcrops had *Cetraria aculeata*, *Cladonia diversa*, *C. foliacea*, *C.furcata*, *C.portentosa*, *C.rangiformis* and *Peltigera membranacea*. Farther inland still more terrestrial exposures supported additional species, including *Buellia ocellata*, *Cladonia chlorophaea* agg., *C.uncialis* ssp. *biuncialis*, *Flavoparmelia caperata*, *Lecanora orosthea*, *L.sulphurea* (seen once), *Lecidea fuscoatra* (hosting *Marchandiomyces corallinus*), *Ochrolechia parella* (hosting *Dactylospora parellaria*), *Parmelia omphalodes*, *Parmotrema perlatum*, *Pertusaria corallina*, ***Rimularia furvella*** (seen once, inhabiting the periphery of *Rhizocarpon geographicum* thalli) and *Trapelia glebulosa* s.s.

Low tide on the shore coinciding with the time of the visit enabled survey of the littoral communities on sea cliff base and rocky shore, species recorded included *Caloplaca ceracea*, *C.marina*, *C.microthallina*, *C.thallicola*, *Collembopodium foveolatum* (barnacles), *C.halodytes*, *Lecanora helicopis*, *Lichina confinis*, *L.pygmaea*, ***Verrucaria ditmarsica***, ***V.halioza***, ***V.prominula***, *V.striatula*, *V.maura* and *V.mucosa*.

Dry soil terracettes on the cliff edge were searched for specialist terricoles of the habitat, but only ***Leptogium tenuissimum*** was seen. A few tiny lobelets of *Anaptychia runcinata* were found growing directly on soil. *Lepraria ecorticata* occurred in a dry underhang.

Towards the east end of the open cliff section, west of the boundary drystone wall marking the start of the coastal heath area (see Location 3 below), an underhung dry rock cavity below a large cliff top boulder at GR23 (SH) 33748.93453, alt 13m, had *Opegrapha cesareensis*, and on damp, partly salt-encrusted soil on the floor of the recess, a small colony (c.7 thalli) of ***Solenopsora holophaea***.

On many occasions during the survey, at different places around the headland and elsewhere on the coast, pinkish-orange-red discoloured thalli of a number of normally whitish-grey lichens were observed, affected species included *Pertusaria pseudocorallina* (commonly), *Ramalina siliquosa* (occ.) and *R.subfarinacea* (rarely), probably damaged as a result of severe salt spray loading in recent storms.

### 3.3 Location 3: Trwyn Pencarreg headland, east section: Coastal heath and rock outcrops

The east part of the headland supported extensive areas of high quality common heather *Calluna vulgaris* coastal heathland in which *Cladonia*-dominated communities were locally well developed. A specific search was made for the rare *Cladonia peziziformis*, without success. Although the heathland habitat looked ideal for this species the apparent absence of burning management was presumably the causative factor precluding its presence. Gorse areas appeared to be managed by cutting alone.

Lichen species within the coastal heath areas included *Baeomyces rufus*, *Cladonia cervicornis* ssp. *cervicornis*, *C.cervicornis* ssp. *verticillata*, *C.ciliata* var *ciliata*, *C.diversa*, *C.floerkeana*, *C.macilenta*, *C.portentosa*, *C.ramulosa*, *C.squamosa* var. *squamosa*, *C.subcervicornis*, *Hypogymnia physodes*, ***Lichenomphalia umbellifera***, *Micarea lignaria* (on peaty soil and muscicolous on *Polytrichum piliferum*), *Placynthiella uliginosa*, *Platismatia glauca*, *Trapeliopsis granulosa*, *T.pseudogranulosa* and *T.wallrothii* (fertile on a peaty path edge). Small stones in peaty gullies had *Porpidia crustulata* and *P.macrocarpa*. The overlooked ***Catillaria atomarioides*** was seen on a sun-exposed rock fragment.

Tump-like rock exposures added ***Aspicilia intermutans***, *A.leproscens* (very fertile on bird perches), *Lecidea swartzioidea*, *Ochrolechia androgyna*, *Pertusaria aspergilla*, *Porpidia cinereoatra*, *P.tuberculosa* (hosting *Endococcus propinquus*) and *Xanthoria candelaria* (nutrient enriched bird perch apexes)

Around a low flushed outcrop at GR23 (SH) 33923.93488, alt 20m, a few small (2-3cm across) patches of *Cladonia strepsilis* occurred over an area c. 5 x 8m on damp, seasonally flushed peaty ground, and nearby *Cladonia furcata* and *C.gracilis* nestled in amongst *Calluna*, and on a dead *Calluna* stem, *Micarea peliocarpa*. An enriched rock spine had *Acarospora fuscata* hosting ***Polycoccum microsticticum***.

A flushed rockface had *Trapelia glebulosa* 'big pink', the field name for an undescribed crustose lichen in the *T.glebulosa* group, common in Wales.

### 3.4 Location 4: Sheltered east-facing shore at west end of Porth y Felin

*Ramalina cuspidata* was notably abundant and commonly fertile on shelving rock exposed on the upper shore, together with *R.subfarinacea* and, in the mesic supralittoral zone, *Caloplaca maritima*, *C.thallincola* and abundant *Lichina confinis*. The maritime lichen communities here were of good quality, but no species were seen that were not present elsewhere.

Mortared wall of footpath gate: *Caloplaca holocarpa* s.s., **C.oasis**, *Clauzadea monticola*, *Lecanora campestris*, *Protoblastenia rupestris*.

A patch of willow *Salix* sp. scrub above the bay produced *Anisomeridium bifforme*, *Lecanora chlorotera*, *Lecidella elaeochroma* f. *elaeochroma* and *L.elaeochroma* f. *soralifera* and *Xanthoria parietina*.

### 3.5 Location 5: Woodland near Candidate Wildlife Site Car Park, centred on GR23 (SH) 356.938

This site was surveyed in detail in 2012 and was consequently not resurveyed this visit, except to look briefly for the Red Data Book (Woods, 2010), UKBAP (now superseded see Appendix C), NERC Section 42 and Nationally Rare ***Schismatomma graphidioides***, which was re-found on the sycamore *Acer pseudoplatanus* by the north wall where it had been recorded in 2012. ***Strigula taylorii*** was seen again on sycamore and elm *Ulmus* sp. *Bacidia viridifarinosa* (not recorded in 2012) was seen on a damp rockface beside a path while passing through. *Lecania hutchinsiae* and *Porina chlorotica* were noted on a damp stone. A picnic bench had *Amandinea punctata*, *Buellia griseovirens*, *Lecanora saligna*, *Melanelixia glabratula* and *M.subaurifera*. Rusting metal of an abandoned farm roller had *Buellia aethalea* and a gorse stem in an *Ulex* sp. scrub patch, *Bacidia laurocerasi*. ***Normandina acroglypta*** was noted on the mossy trunk of a sycamore. At the north end of the wood a small stone quarry pit had *Cladonia chlorophaea* agg., *Peltigera membranacea* and *Porpidia soledizodes*. Limestone gateway pillars beside the track entranceway had *Caloplaca citrina sensu auct. brit.*, *C.flavocitrina*, *C.saxicola* and *Diplotomma alboatrum*.

### 3.6 Location 6: Coastal rock outcrop in pasture

Centred on GR23 (SH) 35760.93958, an extensive outcrop of hard, white, quartz rock, in open sheep pasture, cloaked in common gorse *Ulex europaeus* scrub at the east end, supported a very rich lichen flora due to the combination of size, the range of aspects, from fully open brightly lit south-facing to north-facing on the seaward side, a strongly maritime position and the rock type.

An attempt at a comprehensive inventory of saxicoles and terricoles produced the following list (52 spp.): *Anaptychia runcinata* (abundant and very fertile), *Acarospora fuscata* (hosting ***Polycoccum microsticticum***), ***Amandinea lecideina***, *Aspicilia caesiocinerea*, ***A.intermutans*** (locally abundant on south side at west end, forming large patches c. 5-8 (-10) cm across; material confirmed microscopically: conidia c.7-9 x 0.5um; ascospores c. 24-29 x 10.8-18 um), *A.leproscens*, *Buellia aethalea*, *B.ocellata*, ***B.stellulata***, *B.subdisciformis*, *Candelariella vitellina*, *Catillaria chalybeia*, *Cladonia diversa*, *C.fimbriata*, *C.furcata*, *Diploicia canescens*, *Flavoparmelia caperata*, *Hypotrachyna britannica*, *Lecanora fugiens*,



*L.gangaleoides*, *L.polytropa*, *L.rupicola*, *Lecidea fuscoatra*, *Lecidella scabra*, *Melanelixia fuliginosa*, *Ochrolechia parella*, *Parmelia omphalodes*, *P.saxatilis*, *P.sulcata*, *Parmotrema perlatum*, *Peltigera hymenina*, *Pertusaria corallina*, *P.lactescens*, *P.pseudocorallina*, *Polysporina simplex*, *Porpidia cinereoatra*, *P.platycarpoides*, *P.tuberculosa*, *Protoparmeliopsis muralis*, *Ramalina siliquosa*, *R.subfarinacea*, *Rhizocarpon geographicum*, *R.richardii*, *Trapelia glebulosa* s.s., *Rinodina atrocinerea*, *Verrucaria fusconigrescens*, ***Xanthoparmelia delisei***, *X.loxodes*, *X.verruculifera* and *Xanthoria parietina*. Of particular note ***Buellia abstracta*** [(Nyl.) Olivier] was seen growing along fine cleavage crevices on the south side of the outcrop.

An area of smaller, lower outcrops to the north, close to the sea cliff edge, in addition had *Arthonia varians* (on *Lecanora rupicola*) and, in short turf, *Cladonia rangiformis* and *Hypogymnia tubulosa* (one tuft seen).

The short coastal turf around and between the outcrops was carefully searched on hands and knees for a lengthy period for *Teloschistes flavicans* and *Heterodermia* spp. without these species being found.

### 3.7 Location 7: Rock outcrops along small north-south coastal valley running c. 40m down to the rocky shore, west of bay inlet, centred on GR2 (SH) 36044.93876.

Sheltered outcrops dispersed along this short and shallow valley produced a number of interesting species, including some not seen elsewhere along the surveyed coast, including *Buellia subdisciformis* (superabundant on a long face), ***Cercidospora epipolytropa*** (on *Lecanora polytropa*), *Cladonia foliacea* (on a dry slope with *Thymus polytrichus*), ***Diploschistes caesioplumbeus*** (several thalli on a well-lit rock rib), ***Pertusaria excludens***, ***Rimularia insularis*** (lichenicolous on *Lecanora rupicola*; one thallus c.3-4mm across).

Near the seaward end, on the south-facing north side, a weakly nutrient-enriched, sloping-topped large boulder had ***Tephromela grumosa***. A short distance below, a large outcrop just on the upper edge of the rocky shore had a strong colony (several patches) of ***Parmotrema pseudoreticulatum***, a segregate species in the *P.reticulatum* group only recently recognised in Britain. The same outcrop on its vertical south-facing side had three small thalli of *Schaereria fuscocinerea*.

### 3.8 Location 8: Old stone field walls, centred on GR23 (SH) 35625.93997.

Lengths of old field walls in this area, many sections tumbled and/or in part derelict, were inspected and found to support a range of common and expected saxicoles, such as ***Amandinea lecideina***, *Buellia aethalea*, *Lecanora gangaleoides*, *L.orosthea*, *L.polytropa*, *L.rupicola*, *Lecidella scabra* (fertile), *Porina chlorotica*, *Porpidia tuberculosa*, *Ramalina siliquosa* (mainly grazed down holdfasts) and *Scoliciosporum umbrinum*. Exposed soil had *Cladonia pyxidata*. Further to the west the wall joined a perpendicular mortared length where a large limestone gatepost in a trackway gap had *Caloplaca saxicola*, *Lecanora albescens*, *L.crenulata* and *Xanthoria parietina*.

### 3.9 Location 9: Old walls and grounds of demolished property.

Common species noted on the old walls included *Amandinea lecideina*, *Caloplaca citrina* s.l., *C.flavescens*, *C.flavocitrina*, *Collema crispum*, *Diploicia canescens*, *Lecanora campestris*, *L.rupicola*, *Lecidella scabra*, *Lepraria lobificans*, *Ramalina siliquosa*, *Verrucaria hochstetteri* and *V.muralis* (mortar). Old ash *Fraxinus excelsior* and sycamore trees against the wall on the field-side had, *inter alia*, *Anisomeridium biforme*, *Enterographa crassa*, *Lecidella elaeochroma*, *Opegrapha atra*, *O.vulgata*, *Pyrenula chlorospila*, *P.macrospora*, *Ramalina canariensis*, *R.farinacea*, *R.fastigiata* and *Xanthoria parietina*.

Within the grounds of the demolished property a mature ash tree had *Arthonia radiata*, *Caloplaca obscurella*, *C.ulcerosa* (sparsely fertile on trunk), *Hyperphyscia adglutinata*, *Lecanora chlarotera*, *L.expallens*, ***L.persimilis***, *Pertusaria hymenea*, *P.leioplaca* and ***Strigula taylorii***. A large sycamore had *Diploicia canescens*, *Opegrapha herbarum*, *O.varia* and *Pyrrhospora quernea*.

### 3.10 Location 10: Picnic benches and paving slabs near the Magnox Visitor Centre Car Park.

Weathered surfaces of the worked softwood picnic benches supported common lignicoles, including *Buellia griseovirens*, *Fuscidea lightfootii*, *Lecanora confusa*, *Micarea denigrata*, *M.peliocarpa* and *Trapeliopsis flexuosa*. Of note, a few apothecia of ***Caloplaca asserigena***, only recently reported in Britain, were present on one tabletop slat and another slat had a small basal holdfast of *Ramalina siliquosa*. Concrete patio slabs had *Caloplaca flavovirescens*.

### 3.11 Location 11: Sandstone entranceway gate pillars and old estate walls alongside the driveway in the grounds of the Wylfa Sports and Social Club.

*Lecania hutchinsiae* was noted on the damp north-west side of a sandstone pillar, while the old estate wall, of mortared siliceous slab construction, had *Bilimbia sabuletorum* (over bryophyte mats on base of the south wall), *Botryolepraria lesdainii*, *Collema tenax* var. *tenax*, *Lecania erysibe* var. *erysibe*, *Leptogium teretiusculum* (lime mortar-washed block faces), *Placopyrenium fuscillum*, *Toninia aromatica* and *Verrucaria elaeina*.

### 3.12 Location 12: Trees in the grounds of the Wylfa Sports and Social Club.

Mature trees, mainly sycamore and ash, originally forming part of the old estate plantings, supported a range of typical epiphytes, including *Caloplaca obscurella*, *Cliostomum griffithii*, *Diploicia canescens* (occasionally fertile), *Evernia prunastri*, *Flavoparmelia caperata*, *F.soredians* (seen on c. four trees), *Lecanora expallens*, *Melanelixia glabratula*, *Parmelia sulcata*, *Parmotrema perlatum*, *Pertusaria hymenea*, *Phlyctis argena*, *Physconia enteroxantha* (fertile on one tree, rarely so), *Ramalina canariensis* (extensive swards on well-ventilated trunks), *R.farinacea* and *R.fastigiata*. ***Strigula taylorii*** was present on smooth bark on the trunks of a number of sycamore trees.

### 3.13 Location 13: Trackside trees and track surface

A good, strong, solitary tuft of *Ramalina fraxinea* was seen on a canopy branch of a young well-branched sycamore. Other species on sycamore branches included *Candelariella reflexa*, *Lecanora carpinea*, *Phaeographis dendritica*, *Physcia adscendens* and *P.tenella*. The dry side of one tree had several small thalli of the under-recorded and likely spreading nitrophile *Lecanora compallens*. The heterobasidiomycete lichenicolous parasite *Syzygospora physciacearum* was seen on *P.tenella* on the branch of an elm species. Tarmac on the track had *Amandinea punctata* and *Physcia caesia*.

### 3.14 Location 14: Lengths of drystone walls around small pastures, centred on GR23 (SH) 35079327

Low (to c. 0.75m high), partly derelict fieldwall lengths constructed from un-mortared slaty-siliceous blocks and typical of those in the general area supported a range of common saxicoles, including *Acarospora fuscata*, *Amandinea lecideina*, *Buellia aethalea*, *Lecanora gangaleoides*, *L.polytropa*, *L.rupicola* (the dominant 'white lichen'), *Melanelixia fuliginosa*, *Parmelia sulcata*, *Pertusaria pseudocorallina*, *Porpidia tuberculosa* and *Ramalina siliquosa*. The under-recorded and often overlooked *Pertusaria lactescens* was seen on one block top.

### 3.15 Location 15: Low rock outcrops in field, centred on GR2 (SH) 3476.8337, alt 18m

Extensive shelving rock outcrops here, plus a smaller extent north of the track crossing the field to the west of the station, supported a well-developed, high quality and species-rich community of sub-coastal-maritime saxicoles, especially rich in *Xanthoparmelia* spp.

The following list represents an attempt at a complete inventory of all species present (42): *Abrothallus caerulescens* (lichenicolous on *Xanthoparmelia conspersa*), *Acarospora fuscata*, *Amandinea lecideina*, *Anaptychia runcinata*, *Aspicilia caesiocinerea*, *Buellia aethalea*, *B.subdisciformis*, *Caloplaca ceracea*, *Candelariella vitellina*, *Cladonia chlorophaea* agg. *C.furcata*, *C.pyxidata*, *C.ramulosa*, *C.rangiformis*, *Hypotrachyna britannica*, *Lecanora dispersa*, *L.gangaleoides*, *L.polytropa*, *L.rupicola*, *Lecidea fuscoatra*, *Lecidella scabra*, *Melanelixia fuliginosa*, *Ochrolechia parella*, *Parmotrema perlatum*, *Pertusaria pseudocorallina*, *Physcia tenella* ssp. *tenella*, *Porpidia platycarpoides*, *P.tuberculosa* (hosting *Endococcus propinquus*), *Protoparmeliopsis muralis*, *Punctelia subrudecta*, *Ramalina siliquosa*, *Rhizocarpon reductum*, *R.richardii*, *Rinodina atrocinerea*, *Scoliciosporum umbrinum*, *Verrucaria fusconigrescens*, *Xanthoparmelia conspersa*, *X.delisei* (locally very frequent), *X.loxodes* (abundant and occasionally fertile), *X.verruculifera* and *Xanthoria parietina*.

### 3.16 Location 16: Consolidated soil and shingle face on beach head terrace

Abundant *Solenopsis vulturiensis* was very locally frequent on compacted moist soil, while stones embedded in the soil had *Myriospora smaragdula*.

### 3.17 Location 17: Headland and coastal rocks directly W of the station

*Leptogium schraderi* was present in crevices in a mound of tipped concrete on top of the low sea cliff. *Cladonia humilis* was noted on a dry slope by a small colony of *Koeleria macrantha* crested hair-grass. In the bay the guano-enriched sloping top of a small prominent sea stack had abundant *Caloplaca verruculifera*, many thalli of which were fertile.

### 3.18 Location 18: Concrete drain cover in field

A drain cover supported a number of common mural calcicoles, including *Aspicilia contorta* ssp. *contorta*, *Clauzadea monticola*, *Placynthium nigrum*, *Protoblastenia rupestris* and *Verrucaria nigrescens*.

### 3.19 Location 19: Trees in planted shelter strip beside sports field

Young stems of aspen *Populus tremula* yielded *Arthopyrenia punctiformis* and *Bacidia arceutina*, while dust-impregnated *Betula* birch twigs had *Arthonia punctiformis* and *Physcia aipolia*.

### 3.20 Location 20: Sports centre wall

An old wall had *Caloplaca flavocitrina*, the recently recognised (in Britain) ***C.limonia*** and *Verrucaria viridula*. A damp slab on the ground nearby at the edge of a shrubbery produced *Verrucaria dolosa* and ***V.elaeina***.

### 3.21 Location 21: Planted trees on verges beside road

Open groups of established planted trees, predominantly *Acer pseudoplatanus* sycamore, on the wide verge on the W side of the road. A strong population of ***Ramalina fraxinea*** was noted (c.15 tufts seen on a total of c. six trees) on the canopy branches of sycamore. Other species included *Flavoparmelia soledians*, *Physconia distorta*, *Vouauxiella lichenicola* (on *Lecanora chlarotera*) and *Xanthoriicola physciae* (on *Xanthoria parietina*).

### 3.22 Location 22: Planted trees on verge beside road

Smooth bark islands on the trunks of white willow *Salix alba* had ***Eopyrenula grandicula***, normally a species of well-established and old-growth woodland, and (on branches) fertile *Parmelia sulcata*. A single small tuft of *Usnea subfloridana* was seen on a branch of a *Populus alba* white poplar. A large roadside stone boulder had a colony of saxicolous *Flavoparmelia soledians*.

### 3.23 Location 23: Edge of haul road around station

Open, dry, sandy road edges had locally frequent concentrations of pulpy tufts of *Collema tenax* var. *ceranoides*.

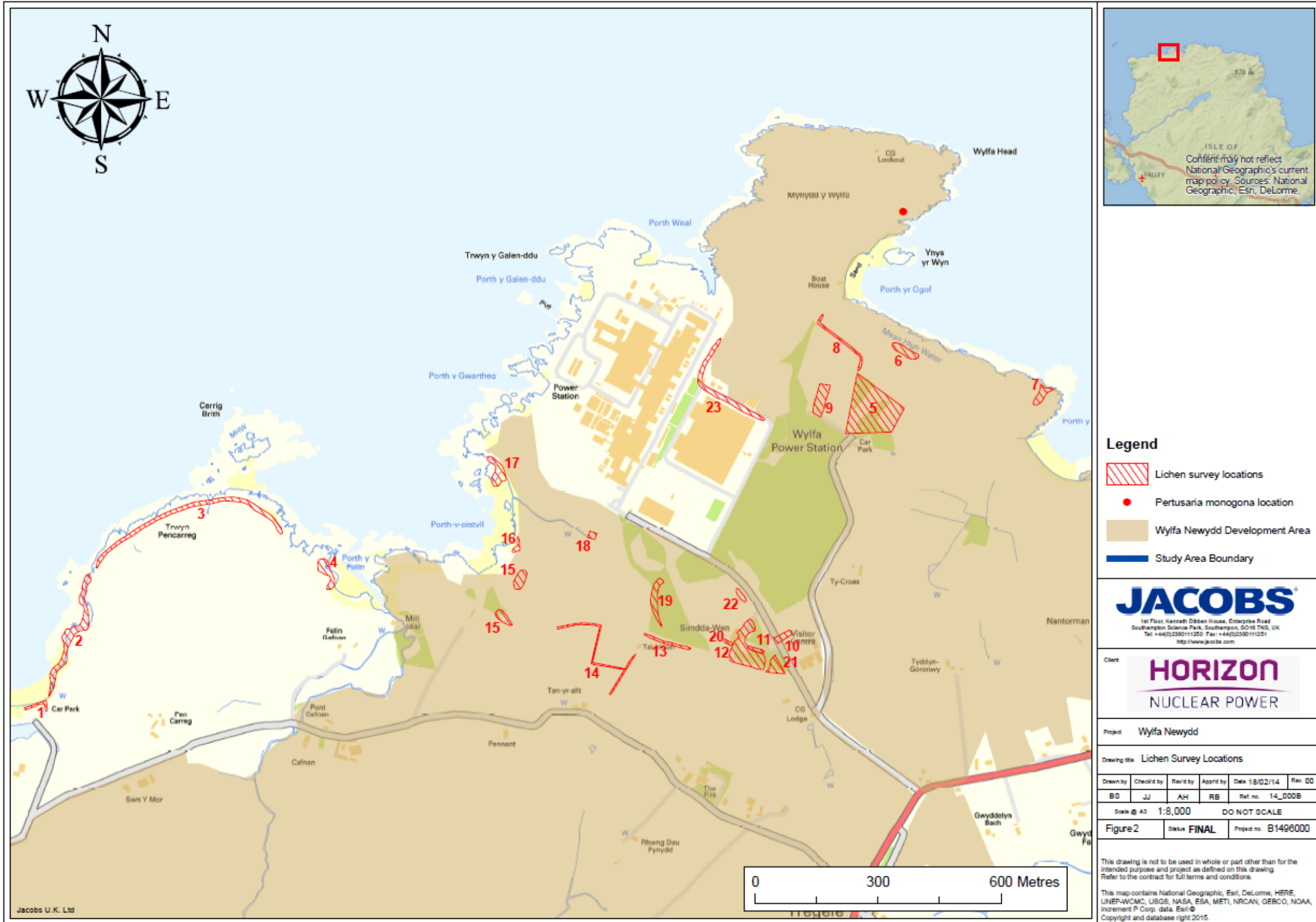


Figure 2 Study area locations

### 3.24 Summary

In total 262 taxa of lichens (252) and lichenicolous fungi (10) were recorded from all habitats (see Appendix A).

Twenty-one species (17 lichens and four lichenicolous fungi) are reported new to VC52 Anglesey, viz. *Abrothallus caerulescens*, *Caloplaca arcis*, *Caloplaca asserigena*, *Caloplaca limonia*, *Caloplaca oasis*, *Caloplaca vitellinula*, *Catillaria atomarioides*, *Cercidospora epipolytropa*, *Eopyrenula grandicula*, *Lecanora compallens*, *Lecanora persimilis*, *Leptogium tenuissimum*, *Normandina acroglypta*, *Lichenomphalia umbellifera*, *Parmotrema pseudoreticulatum*, *Polycoccum microsticticum*, *Rimularia furvella*, *Rimularia insularis*, *Syzygospora physciacearum*, *Tephromela grumosa* and an undescribed species of *Trapelia* in the *T.glebulosa* group.

The relatively large number of species (262 taxa) encountered during the survey is a reflection of the spatially broad scope of the study area (for what are diminutive organisms), the wide range of habitats encompassed, ranging from near-natural to fully synanthropic, across wide ecological spectra (from marine to coastal to terrestrial), and the inclusion of some notably lichen-rich semi-natural habitats, in particular the marine and supralittoral communities of the rocky shore, sea-cliff and coastal heathland around Trwyn Pencarreg (Location 3). The littoral and supralittoral maritime lichens associated with Trwyn Pencarreg are of high quality and its lichen flora is typical of the best sites represented for these species on Anglesey, where hard rock coastal lichen habitats are among some of the best in the British Isles.

Comparing the two principal maritime lichen locations within the study area, Trwyn Pencarreg and survey location 6, overall Trwyn Pencarreg is the richer of the two, due in the main to the more extensively developed lower to upper shore communities. However, survey location 6 is not without interest, supporting for example the notable *Aspicilia intermutans*, and *Pertusaria monogona* being recorded on the Wylfa Head peninsula (figure 2).

As an artefact of the British biological grid-recording system, maritime species are statistically disproportionately more likely to be categorised as Nationally Scarce (NS) than non-maritime species, as demonstrated by 14 of the recorded 26 NS species (53.8%, i.e. over half) being either obligate or near-faithful maritime lichens, viz. *Amandinea lecideina*, *Arthonia phaeobaea*, *Buellia abstracta*, *B.stellulata*, *Caloplaca maritima*, *Diploschistes caesioplumbeus*, *Lecania atrynoides*, *Pertusaria excludens*, *P.monogona*, *Rimularia insularis*, *Solenopsora holophaea*, *Verrucaria ditmarsica*, *V.halioza* and *V.prominula*.

Although 21 species were found new for VC52 Anglesey, compared with other Welsh vice-counties the island has been relatively under-recorded in the last decade or so, during which time considerable taxonomic change, revision of species concepts and dismemberment of artificial morphological aggregates resulting from new molecular/DNA approaches affecting mycological systematics in general, have occurred, and many of the 'new' species represent recently recognised segregates that are proving to be common in Britain, especially members of the large genus *Caloplaca*, e.g. *C.arcis*, *C.asserigena*, *C.limonia* and *C.oasis*. The VC novelties also include a number of lichenicolous fungi, which as a group are poorly known and little-studied or recorded even by lichenologists, for example *Abrothallus caerulescens* and *Syzygospora physciacearum*. The latter species is very common in Wales.

With a couple of notable exceptions lichen epiphytes overall were fairly unremarkable due to the lack of ancient semi-natural or old-growth woodland areas, or ancient trees. Although established old ornamental deciduous trees were present about the former estate grounds and woodland (e.g. Location 5 and Location 12) they supported in the main only common and expected epiphytes. Of the species of note, *Ramalina fraxinea* (Location 13 and Location 21) (International Responsibility (IR)) (Woods and Coppins, 2012), of which a strong population was found at Location 21, is widespread in coastal areas in Wales. Being a canopy species it tends to grow high up and in consequence is probably under-recorded. *Eopyrenula grandicula* (IR) is a sub-microscopic, minute and inconspicuous species of smooth bark, found mostly on hazel *Corylus avellana*, in both ancient and secondary

woodland, and is significantly under-recorded in most of Wales. *Strigula taylorii* (IR) is also locally common in Wales, mainly on ash in woodland in mild coastal areas, and is significantly under-recorded and in west Wales seems to be spreading. Location 5 is the standout woodland area, supporting *Schismatomma graphidioides* (NS, Red List VU, s.42) and *Normandina acroglypta* (Red List VU) was added on this visit.

The lengths of field walls looked at in detail (Location 8 and Location 14) were typical of others in the study area and all were unremarkable, supporting only common saxicoles. Most were in a semi-dilapidated state. New wall lengths could be constructed, or old ones repaired, to enhance their value as lichen habitats. It is highly unlikely that walls and banks of similar construction and condition elsewhere within the study area would support any significant lichen interest.



Due to the variety of habitats present and the wide extent of the study area the combined survey locations together produced a large number (262) of taxa of lichens and lichenicolous fungi. Notable species (Appendix B) included 26 Nationally Scarce, two Nationally Rare, three Welsh Red Data List Vulnerable, four International Responsibility and 21 first VC52 Anglesey records, plus an undescribed crustose lichen common in upland Britain but of no conservation concern.

Species of prime conservation significance in the context of Anglesey/Wales and the United Kingdom are: *Pertusaria monogona*, recorded on the Wylfa Head peninsula *Schismatomma graphidioides* recorded in woodland (survey location 5) and the recently recognised macro-lichen *Parmotrema pseudoreticulatum* recorded at the rock outcrops of survey location 7.

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**Appendix A Complete species list**

**Lichens and Lichenicolous Fungi [LF] Recorded at Wylfa Survey Locations, November 2013.**

*Abrothallus caerulescens* [LF]  
*Acarospora fuscata*  
*Agonimia tristicula*  
*Amandinea lecideina*  
*Amandinea punctata*  
*Anaptychia runcinata*  
*Anisomeridium bifforme*  
*Anisomeridium polypori*  
*Arthonia phaeobaea*  
*Arthonia punctiformis*  
*Arthonia radiata*  
*Arthonia varians* [LF]  
*Arthopyrenia punctiformis*  
*Aspicilia caesiocinerea*  
*Aspicilia contorta* ssp. *contorta*  
*Aspicilia intermutans*  
*Aspicilia leproscens*  
*Bacidia arceutina*  
*Bacidia laurocerasi*  
*Bacidia viridifarinoso*  
*Bilimbia sabuletorum*  
*Botryolepraria lesdainii*  
*Buellia abstracta*  
*Buellia aethalea*  
*Buellia griseovirens*  
*Buellia ocellata*  
*Buellia stellulata*  
*Buellia subdisciformis*  
*Caloplaca arcis*  
*Caloplaca arenaria*  
*Caloplaca asserigena*  
*Caloplaca ceracea*  
*Caloplaca citrina* sensu auct. *brit.*  
*Caloplaca crenularia*  
*Caloplaca flavescens*  
*Caloplaca flavocitrina*  
*Caloplaca flavovirescens*  
*Caloplaca holocarpa* s.s.  
*Caloplaca limonia*  
*Caloplaca marina*  
*Caloplaca maritima*  
*Caloplaca microthallina*  
*Caloplaca oasis*  
*Caloplaca obscurella*  
*Caloplaca saxicola*  
*Caloplaca thallicola*  
*Caloplaca ulcerosa*  
*Caloplaca verruculifera*

*Caloplaca vitellinula*  
*Candelariella aurella*  
*Candelariella reflexa*  
*Candelariella vitellina*  
*Catillaria atomarioides*  
*Catillaria chalybeia*  
*Cercidospora epipolytropa* [LF]  
*Cetraria aculeata*  
*Cladonia cervicornis* ssp. *cervicornis*  
*Cladonia cervicornis* ssp. *verticillata*  
*Cladonia chlorophaea* agg.  
*Cladonia ciliata* var. *ciliata*  
*Cladonia diversa*  
*Cladonia fimbriata*  
*Cladonia floerkeana*  
*Cladonia foliacea*  
*Cladonia furcata*  
*Cladonia gracilis*  
*Cladonia humilis*  
*Cladonia macilenta*  
*Cladonia portentosa*  
*Cladonia pyxidata*  
*Cladonia ramulosa*  
*Cladonia rangiformis*  
*Cladonia squamosa* var. *squamosa*  
*Cladonia strepsilis*  
*Cladonia subcervicornis*  
*Cladonia uncialis* ssp. *biuncialis*  
*Clauzadea monticola*  
*Cliostomum griffithii*  
*Cliostomum tenerum*  
*Collema crispum*  
*Collema tenax* var. *ceranoides*  
*Collema tenax* var. *tenax*  
*Collemopsidium foveolatum*  
*Collemopsidium halodytes*  
*Dactylospora parellaria* [LF]  
*Diploicia canescens*  
*Diploschistes caesioplumbeus*  
*Diplotomma alboatrum*  
*Diplotomma chlorophaeum*  
*Endococcus propinquus* [LF]  
*Enterographa crassa*  
*Eopyrenula grandicula*  
*Evernia prunastri*  
*Flavoparmelia caperata*  
*Flavoparmelia soledians*  
*Fuscidea cyathoides*  
*Fuscidea lightfootii*  
*Hyperphyscia adglutinata*  
*Hypogymnia physodes*  
*Hypogymnia tubulosa*  
*Hypotrachyna britannica*  
*Lecania atrynoides*  
*Lecania cyrtella*

*Lecania erysibe* forma *erysibe*  
*Lecania erysibe* forma *sorediata*  
*Lecania hutchinsiae*  
*Lecania naegelii*  
*Lecanora actophila*  
*Lecanora albescens*  
*Lecanora dispersa*  
*Lecanora campestris*  
*Lecanora carpinea*  
*Lecanora chlarotera*  
*Lecanora compallens*  
*Lecanora confusa*  
*Lecanora crenulata*  
*Lecanora expallens*  
*Lecanora fugiens*  
*Lecanora gangaleoides*  
*Lecanora helicopis*  
*Lecanora orosthea*  
*Lecanora persimilis*  
*Lecanora polytropa*  
*Lecanora rupicola*  
*Lecanora saligna*  
*Lecanora sulphurea*  
*Lecanora symmicta*  
*Lecidea swartzioidea*  
*Lecidella asema*  
*Lecidella elaeochroma* forma *elaeochroma*  
*Lecidella elaeochroma* forma *soralifera*  
*Lecidea fuscoatra*  
*Lecidella scabra*  
*Lepraria ecorticata*  
*Lepraria lobificans*  
*Leptogium schraderi*  
*Leptogium tenuissimum*  
*Leptogium teretiusculum*  
*Lichenomphalia umbellifera*  
*Lichina confinis*  
*Lichina pygmaea*  
*Marchandiomyces corallinus* [LF]  
*Melanelixia fuliginosa*  
*Melanelixia glabratula*  
*Melanelixia subaurifera*  
*Micarea denigrata*  
*Micarea lignaria*  
*Micarea peliocarpa*  
*Myriospora smaragdula*  
*Normandina acroglypta*  
*Normandina pulchella*  
*Ochrolechia androgyna*  
*Ochrolechia parella*  
*Opegrapha atra*  
*Opegrapha calcarea* ('conferta' morphs),  
*Opegrapha cesareensis*  
*Opegrapha gyrocarpa*  
*Opegrapha herbarum*

*Opegrapha niveoatra*  
*Opegrapha varia*  
*Opegrapha vulgata*  
*Parmelia omphalodes*  
*Parmelia saxatilis*  
*Parmelia sulcata*  
*Parmotrema perlatum*  
*Parmotrema pseudoreticulatum*  
*Peltigera hymenina*  
*Peltigera membranacea*  
*Pertusaria aspergilla*  
*Pertusaria corallina*  
*Pertusaria excludens*  
*Pertusaria hymenea*  
*Pertusaria lactescens*  
*Pertusaria leioplaca*  
*Pertusaria monogona*  
*Pertusaria pertusa*  
*Pertusaria pseudocorallina*  
*Phaeographis dendritica*  
*Phaeophyscia orbicularis*  
*Phlyctis argena*  
*Physcia adscendens*  
*Physcia aipolia*  
*Physcia caesia*  
*Physcia tenella* ssp. *marina*  
*Physcia tenella* ssp. *tenella*  
*Physconia distorta*  
*Physconia enteroxantha*  
*Placopyrenium fuscillum*  
*Placynthiella uliginosa*  
*Placynthium nigrum*  
*Platismatia glauca*  
*Polycoccum microsticticum* [LF]  
*Polysporina simplex*  
*Porina chlorotica*  
*Porpidia cinereoatra*  
*Porpidia crustulata*  
*Porpidia macrocarpa*  
*Porpidia platycarpoides*  
*Porpidia soledizodes*  
*Porpidia tuberculosa*  
*Protoblastenia rupestris*  
*Protoparmeliopsis muralis*  
*Punctelia subrudecta*  
*Pyrenula chlorospila*  
*Pyrenula macrospora*  
*Pyrrhospora querneae*  
*Ramalina canariensis*  
*Ramalina cuspidata*  
*Ramalina farinacea*  
*Ramalina fastigiata*  
*Ramalina fraxinea*  
*Ramalina siliquosa*  
*Ramalina subfarinacea*

*Rhizocarpon geographicum*  
*Rhizocarpon reductum*  
*Rhizocarpon richardii*  
*Rimularia furvella*  
*Rimularia insularis*  
*Rinodina atrocinerea*  
*Rinodina gennarii*  
*Sarcogyne regularis*  
*Schaereria fuscocinerea*  
*Schismatomma decolorans*  
*Schismatomma graphidioides*  
*Scoliciosporum umbrinum*  
*Solenopsora holophaea*  
*Solenopsora vulturiensis*  
*Strigula taylorii*  
*Syzygospora physciacearum* [LF]  
*Tephromela atra*  
*Tephromela grumosa*  
*Toninia aromatica*  
*Trapelia glebulosa* s.s.  
*Trapelia glebulosa* 'big pink'  
*Trapeliopsis flexuosa*  
*Trapeliopsis granulosa*  
*Trapeliopsis pseudogranulosa*  
*Trapeliopsis wallrothii*  
*Usnea subfloridana*  
*Verrucaria ditmarsica*  
*Verrucaria dolosa*  
*Verrucaria elaeina*  
*Verrucaria fusconigrescens*  
*Verrucaria halizoa*  
*Verrucaria hochstetteri*  
*Verrucaria maura*  
*Verrucaria mucosa*  
*Verrucaria muralis*  
*Verrucaria nigrescens*  
*Verrucaria prominula*  
*Verrucaria striatula*  
*Verrucaria viridula*  
*Vouauxiella lichenicola* [LF]  
*Xanthoparmelia conspersa*  
*Xanthoparmelia delisei*  
*Xanthoparmelia loxodes*  
*Xanthoparmelia verruculifera*  
*Xanthoria aureola*  
*Xanthoria candelaria*  
*Xanthoria parietina*  
*Xanthoriicola physciae* [LF]

## Appendix B List of Notable/Significant Species

Conservation evaluations follow Woods, R.G., (2010), *A Lichen Red Data List for Wales*, Plantlife, Salisbury.

***Abrothallus caerulescens***: 1<sup>st</sup> VC52 Anglesey record.

***Amandinea lecideina***: Nationally Scarce.

***Arthonia phaeobaea***: Nationally Scarce.

***Aspicilia intermutans***: Data Deficient; Nationally Rare; 2<sup>nd</sup> and subsequent VC52 Anglesey records.

***Buellia abstracta***: Nationally Scarce.

***Buellia stellulata***: Nationally Scarce.

***Caloplaca arcis***: 1<sup>st</sup> VC52 Anglesey record. Data Deficient. Nationally Scarce.

***Caloplaca arenaria***: Nationally Scarce.

***Caloplaca asserigena***: 1<sup>st</sup> VC52 Anglesey record. Nationally Scarce.

***Caloplaca limonia***: 1<sup>st</sup> VC52 Anglesey record. Nationally Scarce (too recently recognised for considered evaluation).

***Caloplaca maritima***: Nationally Scarce.

***Caloplaca oasis***: 1<sup>st</sup> VC52 Anglesey record. A common species previously grouped in the *C.holocarpa* agg.

***Caloplaca vitellinula***: 1<sup>st</sup> VC52 Anglesey record. Data Deficient. Nationally Rare.

***Catillaria atomarioides***: 1<sup>st</sup> VC52 Anglesey record. Nationally Scarce.

***Cercidospora epipolytropa***: 1<sup>st</sup> VC52 Anglesey record.

***Diploschistes caesioplumbeus***: Nationally Scarce.

***Eopyrenula grandicula***: 1<sup>st</sup> VC52 Anglesey record. Nationally Scarce. International Responsibility.

***Lecania atrynoides***: Nationally Scarce.

***Lecanora compallens***: 1<sup>st</sup> VC52 Anglesey record. Data Deficient. Nationally Scarce.

***Lecanora persimilis***: 1<sup>st</sup> VC52 Anglesey record. Data Deficient. Nationally Scarce.

***Leptogium tenuissimum***: 1<sup>st</sup> VC52 Anglesey record. Vulnerable. Nationally Scarce.



***Lichenomphalia umbellifera***: 1<sup>st</sup> VC52 Anglesey record.

***Normandina acroglypta***: 1<sup>st</sup> VC52 Anglesey record. Vulnerable. Nationally Scarce.

***Parmotrema pseudoreticulatum***: A recently recognised segregate of *P.reticulatum* s.l. The respective distributional range and status of the two species in Britain is currently unclear, though both are present in Wales, where *P.pseudoreticulatum* has otherwise only been confirmed from VC46 Cardiganshire.

***Pertusaria excludens***: Nationally Scarce.

***Pertusaria monogona***: Wales Red Data List: Vulnerable; Nationally Scarce; Sole VC 52 Anglesey location. First found (new for Anglesey) in 2012; the same single individual thallus re-found on its rockface on Wylfa Head this survey.

***Polycoccum microsticticum***: 1<sup>st</sup> VC52 Anglesey records.

***Ramalina fraxinea***: International Responsibility.

***Rimularia furvella***: 1<sup>st</sup> VC52 Anglesey record.

***Rimularia insularis***: 1<sup>st</sup> VC52 Anglesey record. Nationally Scarce.

***Schismatomma graphidioides***: Wales Red Data List: Vulnerable; British Red List Threat Status: Vulnerable; Nationally Scarce; International Responsibility. NERC Act s.42 species. Sole known VC 52 Anglesey locality, discovered in 2012, re-found during this survey.

***Solenopsora holophaea***: Nationally Scarce.

***Strigula taylorii***: Nationally Scarce; International Responsibility.

***Syzygospora physciacearum***: 1<sup>st</sup> VC52 Anglesey record.

***Tephromela grumosa***: 1<sup>st</sup> VC52 Anglesey record.

***Trapelia glebulosa* 'big pink'**: the working/fieldname for an apparently undescribed crustose lichen in the *Trapelia glebulosa* group. A common species of damp siliceous rocks in Wales, especially in the uplands (Chambers, unpublished).

***Verrucaria ditmarsica***: Nationally Scarce.

***Verrucaria elaeina***: Nationally Scarce.

***Verrucaria halizoa***: Nationally Scarce.

***Verrucaria prominula***: Nationally Scarce.

***Xanthoparmelia delisei***: Nationally Scarce.

## Appendix C Legislation and Conservation Designations

### **NERC Act**

The Natural Environment and Rural Communities (NERC) Act (2006) places a statutory duty on public bodies to take, or promote the taking by others, steps to further the conservation of the listed habitats and species. In Wales, this is sanctioned by Section 42 which requires the identification of habitats and species of 'Principal importance'. These are material considerations in the planning process. There are currently 67 lichen species listed in accordance with Section 42 (WBP, 2013).

### **UK Post 2010 Biodiversity Framework**

The UK Biodiversity Action Plan (UK BAP), published in 1994, was the UK's response to the commitments of the Rio Convention on Biological Diversity (1992). This has since been replaced by the UK Post-2010 Biodiversity Framework. This framework covers the period 2011 - 2020 and forms the UK government's response to the new strategic plan of the United Nations Convention on Biodiversity (CBD) published in 2010. The UK BAP partnership therefore no longer operates, with the framework that replaces it promoting a focus on individual countries delivering targets for protection for biodiversity through their own strategies.

In Wales the strategy adopted has been the transfer of the species and habitats listed under the defunct UK BAP, to accord with Section 42 of the NERC Act (described above). However, many of the tools and resources originally developed under the UK BAP still remain of use, including background information on UK BAP priority habitats and species which form the basis of county level biodiversity protection initiatives e.g. Local Biodiversity Action Plans (LBAP).

### **International Responsibility**

British populations identified by the symbol "IR" are considered to be of international significance (in a European or global context). This is an attempt to place British populations of lichen species in an international context. This classification should be used with caution until a well-researched database can be created to support these listings and well-defined criteria are established. For the present Woods and Coppins (2012) consider that on the balance of probabilities it is likely that further research will demonstrate that Britain supports more than 10% of the extant European and/or World's population of these species.

### **Nationally Scarce**

The term Nationally Scarce, originally coined for plants, is applied to species that are only known to occur in 16 to 100 ten-km squares (or hectads) in the UK (Woods & Coppins, 2012).

### **Nationally Rare**

The term Nationally Rare is used for plant and lichen species that occur in 15 or fewer hectads in Britain and is used in SSSI designation and Common Standards Monitoring (Woods & Coppins, 2012).

## Vulnerable

The term vulnerable is one of three categorisations that comprise the IUCN Red List Categories and Criteria as set out in Version 3.1 of the Guidance (IUCN, 2001 from Woods & Coppins, 2012). A taxon is Vulnerable when the best available evidence suggests that it is considered to be facing a high risk of extinction. This risk is quantified by assessing the population status of a taxon based on elements of the following five criteria:

1. The relative reduction in population size.
2. The relative reduction in geographic range.
3. Population size estimated to number <10 000 mature individuals.
4. Population very small or restricted.
5. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.