

**CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES**

SITE OF SPECIAL SCIENTIFIC INTEREST CITATION

GWYNEDD/CONWY

ERYRI

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SH56SE, SH55NE, SH75NW,
SH55SE, SH64NW

Site Area: 20,343.5 ha

Description:

This site has been selected for its features of geological, geomorphological and biological interest. The site is situated to the south-east of Bangor and includes the area between the Conwy Valley in the east and Beddgelert in the south-west. The three adjacent massifs of Yr Wyddfa, Glydeiriau and the Carneddau contain some of the highest mountains in the British Isles south of the Scottish Highlands, and are separated by the spectacular glaciated valleys of Llanberis and Nant Ffrancon. The area is geologically complex with a mixture of igneous and sedimentary rocks which are well-exposed in the strongly glaciated terrain. This bedrock geology has both an acid and basic geochemical composition and supports a wide range of upland and montane habitats with a large number of rare and scarce species from several taxonomic groups.

It is of special interest for its upland habitats including lichen and bryophyte heath, montane heath, dry heath, wet heath, blanket bog, flush and spring, calcareous grassland, tall herb and fern ledges, vegetated scree and broadleaved woodland communities and for its inland rock exposures with crevice vegetation and low nutrient lakes, with a mixture of other habitats including acid and neutral grasslands, fen, rush pasture and marshy grassland, swamp, bracken and scrub along with a large number of streams and rivers. The site supports vascular plant species of special interest including Snowdon lily *Lloydia serotina*, floating water-plantain *Luronium natans*, tufted saxifrage *Saxifraga cespitosa*, Killarney fern *Trichomanes speciosum*, oblong woodsia *Woodsia ilvensis* and alpine woodsia *W. alpina*, along with assemblages of rock, cliff ledge and crevice plants, montane grassland plants and aquatic and marginal plants. Lower plants of special interest include the slender green feather-moss *Hamatocaulis vernicosus*, the moss *Seligeria brevifolia*, tarn lecanora lichen *Lecanora achariana*, slender stonewort *Nitella gracilis*. The fungi *Entoloma bloxamii* and *Hygrocybe spadicea* are also present. The site also supports large assemblages of bryophytes and lichens of special interest. The site is also of special interest for chough *Pyrrhocorax pyrrhocorax* and for an assemblage of upland moorland and grassland birds. Other animal species of interest include salmon *Salmo salar*, the rainbow leaf beetle *Chrysolina cerealis* and an upland invertebrate assemblage. Geologically the site is special interest for its Cambrian stratigraphy, Ordovician igneous geology, mineralogy and

Caledonian structural geology. These geological features are exposed in natural outcrops, disused mines, and quarries and along road cuttings. The site is also of special interest for its geomorphology with an outstanding range of large-scale glacial erosional and depositional features.

Geology/Geomorphology:

The site is geologically varied and provides some of the most spectacular glaciated scenery in Britain. The site contains fourteen separate areas of geological and geomorphological importance.

Cwm Graianog (Cambrian)

This site contains magnificent exposures of the Upper Cambrian Marchlyn Formation. The upward passage from mudstones and fine-grained sandstones into quartzites and conglomerates with subsidiary mudstones is well demonstrated, and the rocks are of much coarser facies than, and of different provenance to, correlations in the Harlech Dome. Various sedimentary structures (cross-bedding, many varieties of ripples, convolute lamination, washouts, groove casts etc.) are abundant and superbly displayed, demonstrating derivation from the north or north-west and deposition in a high-energy, sub-littoral environment.

Trace fossils are abundant and varied, being mostly trilobite-produced *Cruziana*, *Rusophycus* etc. but other ichnogenera also occur. This is the type locality for *Cruziana semiplicata* Salter which, with several other forms, is of great value in correlations between otherwise unfossiliferous sequences of a similar age.

Snowdon Massif (Ordovician Igneous)

Snowdon Massif is one of ten localities which form a network of sites in northern Snowdonia displaying key elements of volcanism related to the 1st and 2nd Eruptive Cycles of Caradoc age. The site provides important sections detailing the main phases of extrusive and intrusive volcanic activity associated with the Snowdon Centre, a major caldera which developed in a predominantly marine setting. Three formations of the Snowdon Volcanic Group (2nd Eruptive Cycle) are exposed at the site, namely the Lower Rhyolitic Tuff, Bedded Pyroclastic and Upper Rhyolitic Tuff formations, together with intrusive basalts, rhyolitic sills and domes. The sections offer an unrivalled opportunity to study the three-dimensional relationships within a part of the caldera structure. Investigations have revealed the complex interrelationships, through time, between alternating acid and basic magmatism, changing styles of volcanic activity and the background sedimentation. These relationships, most clearly expressed within the later stages of basaltic activity represented by the Bedded Pyroclastic Formation, provide valuable insights into the ancient environments of northern Snowdonia during Caradoc times.

Cwm Idwal (Ordovician Igneous)

Cwm Idwal provides a key section through the lower part of the mid-Caradoc Series Snowdon Volcanic Group. Good exposures of the Longvillian Pitt's Head, Lower Rhyolite Tuff and Bedded Pyroclastic formations allow a clear understanding of both the changing character of the volcanic activity and its relation to local stratigraphy. The site shows magnificently displayed structural features including the Idwal Syncline and is of outstanding research and educational value.

Braich Tŷ Du (Ordovician Igneous)

The steep western slopes of the ridge of Braich Tŷ Du, which form the eastern side of Nant Ffrancon, exhibit a classic condensed section up through a heterogeneous sequence of acid ash-flow tuffs, intrusions and marine sedimentary rocks. The section includes representatives of both the 1st (Llewelyn Volcanic Group) and 2nd (Snowdon Volcanic Group) Eruptive Cycles of Caradocian caldera activity in North Wales, and provides evidence for the background sedimentation, all of which contribute valuable information on the general palaeoenvironment in northern Snowdonia during Caradoc times.

Capel Curig (Ordovician Igneous)

This site lies within the type area of the Capel Curig Volcanic Formation, the youngest unit of the Llewelyn Volcanic Group (Caradoc Series, Soudleyan Stage), and is the type locality for three of the four constituent ash-flow members, namely the Garth Tuff, Racks Tuff and Dyffryn Mymbyr Tuff. Excellent exposures demonstrate subaqueous welding of ash-flow tuffs within a shallow marine environment. The presence of features such as flame structures, isolated pods of tuff and disturbed sedimentary strata indicate that the ash-flows transgressed a shoreline from sub-aerial to a sub-marine environment, interacting with semi-lithified and water-saturated sands and silts on the seabed. Capel Curig is an internationally important site both for the study of Ordovician volcanic rocks of North Wales and as one of the first documented examples of the emplacement of pyroclastic flows in an ancient sub-marine environment.

Llyn Dulyn (Ordovician Igneous)

A succession of three acid tuff members belonging to the Soudleyan Capel Curig Volcanic Formation crop out in the section along the south side of Llyn Dulyn. These exposures demonstrate the sub-aerial nature of the tuffs in this area, in contrast to their sub-aqueous aspect at Capel Curig. Thus, this site is crucial in obtaining a full appreciation of the details and significance of Ordovician volcanicity in North Wales.

Dyffryn Mymbyr (Caledonian Structures)

The crags east of Dyffryn Mymbyr contain excellent examples of volcanogenic strain markers which give an important indication of strain values in the Ordovician volcanic rocks of Snowdonia. The site consists of a single exposure of the Dyffryn Mymbyr Tuff, the highest tuff unit of the Caradoc Capel Curig Volcanic Formation. This member only occurs on the north-west limb of the periclinal Capel Curig Anticline and is characterised by beds rich in whole and fragmented accretionary lapilli, indicative of subaerial deposition. The lapilli record the state of strain in this component fold of the Snowdonia Syncline. The accretionary lapilli tuffs at Capel Curig provide an excellent example of strain markers in deformed volcanogenic rocks. They provide a representative locality in Snowdonia for measuring the intensity of deformation recorded by the Ordovician volcanic succession.

Cwm Idwal (Caledonian Structures)

Cwm Idwal provides one of the clearest British examples of a major Caledonian fold, the Idwal Syncline, which is clearly visible in the cliffs at the back of the cirque and also in plan view on the floor and flanks of the valley. Also illustrated at the site are various small-scale structures associated with the Caledonian Orogeny. These include originally spherical concretions and volcanic ash aggregates whose distortion during folding and cleavage development have recently been the subject of research. In addition, there are deformed fossils and columnar joints which enable researchers to pursue quantitative studies of Caledonian strain. The vein arrays provide important information on folding processes and the relationship between the timing of folding and cleavage development.

Cwm Tregalan and Shadow Gully (Mineralogy of Wales)

These small exposures provide the best example of an unusual facet of vein mineralization within the Snowdon Caldera. While most veins in this terrain are dominated by pyrite-chalcopyrite at Cwm Tregalan a magnetite-hematite assemblage, with minor cassiterite and scheelite, is developed within north-west and south-east striking veins hosted by pillow basalts and welded tuffs which lie at the base of the Lower Rhyolitic Tuff Formation, of Caradoc age. In the brecciated volcanic rocks which floor Shadow Gully, hematite is later in the paragenesis than magnetite. The presence of tin- and tungsten-bearing minerals is indicative of a magmatic input to the mineralising fluids. The mineralization is developed along the synvolcanic faults and within host rocks that overlie sandstones rich in detrital magnetite, is unique within the overall context of the Snowdonian volcanogenic mineralization. However, the age relationship of this mineralisation to the more widespread copper, lead and zinc mineralization within the Snowdon Caldera has yet to be determined.

Lliwedd Mine (Mineralogy of Wales)

Lliwedd Mine is a key locality for the study of lead, zinc and copper mineralization associated with Caradoc igneous activity in North Wales. An arcuate ENE- to SE-striking vein occurs within basic tuffs and basaltic lavas belonging to the Bedded Pyroclastic Formation of the Snowdon Volcanic Group. The sulphide mineral assemblage is hosted by quartz and chlorite and comprises, in paragenetic order, pyrite and chalcopyrite, overprinted by a later assemblage of colloform pyrite, galena, chalcopyrite, pyrrohotite and sphalerite which commonly displays a complex emulsoid intergrowth. Gold and native copper also occur while secondary mineralization is limited to occasional malachite spots and iron oxides. Vein geometry at Lliwedd Mine indicates synchronous emplacement along ENE- and SE-striking fractures which were active during volcanotectonic extensional movements associated with a phase of resurgence of the Snowdon Caldera at a late stage in the volcanic cycle.

Llanberis Mine (Mineralogy of Wales)

This easily accessible and well-preserved mine is the best of a group of mines around the western margin of the Snowdon Caldera, a Caradoc volcanic feature which has associated cogenetic copper, lead- and zinc-bearing vein mineralization. At Llanberis Mine, the mineral deposits occur at a relatively lower stratigraphical level, being hosted by Middle Cambrian clastic sedimentary rocks belonging to the Bronllwyd and Marchlyn formations of the St David's and Meirioneth series. Although broadly similar to the Caradoc hosted intra-caldera veins, the mineralization at Llanberis Mine exhibits some notable differences, a sign perhaps of vertical, and possible lateral, zonation of mineralization in the volcano-sedimentary pile. The principal differences are in the presence of substantial amounts of arsenopyrite and pyrrohotite, both minor species in the intra-caldera veins, and lesser quantities of lead and zinc sulphides. At some mines along this belt, arsenopyrite was sufficiently abundant as to be worked as an ore.

Yr Wyddfa (Pleistocene/Quaternary of Wales)

The mountain area of Snowdon contains a wide range of glacial and periglacial landforms of exceptional interest for Pleistocene geomorphology. The large spectacular features of glacial erosion (cwms, arêtes, troughs) were among the first to be described and have few parallels in Wales. Numerous fine examples of medium-scale, ice-sculptured features include rock steps and roches moutonnées. Further enhancing the interest of the area, particularly around Llyn Llydaw, are many well-developed, small-scale erosional features such as glacial striae and friction cracks. This assemblage of erosional forms is also accompanied by a multitude of depositional

landforms, particularly moraines and proglacial ramparts. Although many of the latter have been assigned to the Younger Dryas, other more diffuse depositional landforms may relate to wastage of the last ice sheet. Therefore, in addition to providing classic landform examples, the Snowdon area is important for interpreting patterns of Late Pleistocene mountain glaciation and deglaciation in North Wales.

Y Glydeiriau (Pleistocene/Quaternary of Wales)

Y Glydeiriau is important for an assemblage of excellently developed glacial and periglacial landforms. Principal features include a series of impressive cirques, notably Cwm Idwal, and the classic glacial trough of Nant Ffrancon. Ice-smoothed bedrock and roches moutonnées occur extensively and are best developed to the north and east of Llyn Idwal. Moraines are present in most of the cirques and some have been dated by pollen analysis to the Younger Dryas. A number of the depositional landforms, for example within Cwm Idwal, are controversial in origin. The interest of the site is enhanced by well-developed periglacial features, including a massive proglacial rampart (or possible rock landslide) along the eastern flank of Nant Ffrancon, a fine series of vegetated periglacial stripes below Y Garn, numerous scree slopes, and the summit tors of Y Glydeiriau. Peat deposits located behind moraines in many of the cirques, and on the floor of Nant Ffrancon, provide a key pollen record of climatic and environmental changes in the latest Devensian and Holocene. The wide range of landforms and their classic development makes Y Glydeiriau of considerable interest for Quaternary studies.

Y Carneddau (Pleistocene/Quaternary of Wales)

The Carneddau area is important for a range of glacial and periglacial landforms including well-developed cirques and Devensian late-glacial moraines, for example at Ffynnon Llugwy and Melynlyn. It is particularly noted for periglacial landforms associated with frost action both during the late Pleistocene and at the present day. Patterned ground features (small sorted stone circles) on the broad ridge between Carnedd Llewelyn and Foel Grach at 915-945 m are the finest of their kind in Wales. Some of the features are of Devensian late-glacial age, others are actively forming.

Biology:

The prevailing vegetation on the site is sub-montane acidic grassland interspersed with areas of dry and wet heathland, blanket bog, acidic and calcareous flushes, calcareous grassland and vegetated scree slopes, with small areas of woodland on the lower slopes. At higher levels, the vegetation takes on a more montane character with areas of lichen and bryophyte heath, summit heath and snow-bed communities. Around the mountain peaks there are large areas of scree and cliffs. The ledges of these cliffs support a range of rare arctic-alpine plants where they remain protected from grazing animals. Within the valleys and cwms of the mountain massifs, there are a number of water bodies. Many of these have low levels of nutrients and support interesting aquatic flora and fauna.

The areas of acid grassland are characterised by a mixture of sheep's fescue *Festuca ovina* and common bent *Agrostis capillaris* with a range of other species including wavy hair grass *Deschampsia flexuosa*, mat-grass *Nardus stricta*, heath rush *Juncus squarrosus*, bilberry *Vaccinium myrtillus*, heath bedstraw *Galium saxatile*, and the moss *Racomitrium lanuginosum* depending upon topographic location and the nature of the underlying soil. At the higher levels, there are areas of montane acid grassland with tufted hair grass *Deschampsia cespitosa* and heath bedstraw. A particular feature of some of the acid grasslands of Eryri is the presence of

abundant alpine clubmoss *Diphasiastrum alpinum*, fir clubmoss *Huperzia selago* and stag's-horn clubmoss *Lycopodium alpinum*. At the highest altitudes, where there is snow lying for considerable periods of time, some small areas of snow-bed vegetation are found, which are dominated by mat-grass and stiff sedge *Carex bigelowii* but also contain such species as *R. lanuginosum*. They are the southernmost types of this vegetation in Britain.

Both montane and sub-montane calcareous grassland is also found on the site, supporting such species as sheep's fescue, common bent, wild thyme *Thymus polytrichus*, lady's-mantle *Alchemilla glabra*, moss campion *Silene acaulis* and harebell *Campanula rotundifolia*. In two locations, mountain avens *Dryas octopetala* is found at the southern most extent of its range within the United Kingdom.

The site supports a wide range of different heathland types including sub-montane, montane, summit and wet heath. The sub-montane heath is dominated by heather *Calluna vulgaris* with bilberry and bell heather *Erica cinerea* in varying amounts. The ground layer can support the mosses *Sphagnum capillifolium*, *Hylocomium splendens*, *Racomitrium lanuginosum*, *Rhytidiadelphus loreus* and various lichens of the *Cladonia* family. In the various types of montane heath, mosses such as *R. lanuginosum* or *Cladonia spp.* may become more dominant with the heather and bilberry often becoming shortened or prostrate due to the severe climate. A particular type of montane heath has a dominant form of prostrate juniper *Juniperus communis ssp. nana* with *Cladonia spp.*, sheep's fescue and heath bedstraw. Cross-leaved heath *Erica tetralix* predominates in the wetter areas with deergrass *Scirpus cespitosus* and *Sphagnum compactum*, while stiff sedge, dwarf willow *Salix herbacea* and *R. lanuginosum* occur frequently in summit heath vegetation.

The high rainfall of the mountains of Eryri has led to the development of extensive areas of bog and soligenous mires which are fed by rainfall and also numerous springs and flushes. The blanket bog vegetation is dominated by *Sphagnum spp.*, common cotton grass *Eriophorum angustifolium* and hare's tail cotton grass *E.vaginatum*, with deergrass, heath rush, heather, cross-leaved heath, bog asphodel *Narthecium ossifragum* and round-leaved sundew *Drosera rotundifolia* occurring frequently. Areas of peat more strongly influenced by lateral water movement typically support vegetation dominated by rushes *Juncus spp.* and purple moor-grass *Molinia caerulea*, with frequent marsh bedstraw *Galium palustre* and tormentil *Potentilla erecta*. Where the grazing pressure on the vegetation is very high, or there has been excessive draining, there are also areas of modified bog which are dominated by species such as deergrass, hair's tail cotton grass and heath rush.

Due to the complex underlying geology, there are both acidic and calcareous flushes and springs within the site. The acidic flushes support such species as bottle sedge *Carex rostrata*, star sedge *C.echinata*, bog pondweed *Potamogeton polygonifolius*, and *Sphagnum* mosses, particularly *Sphagnum recurvum*, *S. auriculatum* and *S. papillosum*. In a small number of locations white beak sedge *Rhynchospora alba* is found in acid flushes together with marsh clubmoss *Lycopodiella inundata*. Dioecious sedge *Carex dioica* and common yellow sedge *C. demissa* characterise the sub-montane calcareous flushes, along with small herbs such as butterwort *Pinguicula vulgaris* and fairy flax *Linum catharticum* and various brown mosses such as *Campylium stellatum* and *Scorpidium scorpidioides*. The montane calcareous flushes include such rare species as three-flowered rush *Juncus triglumis*, alpine meadow rue *Thalictrum alpinum* and purple saxifrage *Saxifraga oppositifolia* together with the moss *Blindia acuta*. The small-scale spring and rill communities, which predominate where there is a constant flow of

water, contain a diverse range of species including red fescue *Festuca rubra*, starry saxifrage *Saxifraga stellaris*, mossy saxifrage *Saxifraga hypnoides*, round-leaved crowfoot *Ranunculus omiophyllus*, blinks *Montia fontana*, mounds of the grey-green liverwort *Anthelia julacea*, and the mosses *Cratoneuron commutatum*, *Philonotis fontana*, and *Sphagnum auriculatum*.

The history of glaciation, in conjunction with the harsh winter conditions on the site has created large areas of cliff and scree, providing unique habitats for colonisation by a wide range of species. On the open scree, the vegetation is characterised by wavy hair grass and the parsley fern *Cryptogramma crispa*. Ferns are common in crevices of the cliff faces and species include green spleenwort *Asplenium trichomanes-ramosum*, maidenhair spleenwort *A. trichomanes*, wall-rue *A. ruta-muraria* and brittle bladder-fern *Cystopteris fragilis*. The ledges on the cliff faces provide important refuges for tall-herb vegetation which contain such species as roseroot *Sedum rosea*, Welsh poppy *Meconopsis cambrica*, wild angelica *Angelica sylvestris*, globeflower *Trollius europaeus*, great wood-rush *Luzula sylvatica*, bilberry and water avens *Geum rivale*.

Around the lower slopes and in some of the more sheltered valleys, small areas of broadleaved woodland remain, with sessile oak *Quercus petraea*, ash *Fraxinus excelsior*, rowan *Sorbus aucuparia* and downy birch *Betula pubescens*. Where grazing is restricted, these trees have associated ground flora containing such species as wood anemone *Anemone nemorosa*, wood sorrel *Oxalis acetosella*, and *Dicranum majus*, a moss typical of wet mountain woodlands. Wooded boulder screes and cliffs in the more base rich areas provide a substrate for notable lichens and bryophytes such as *Lobaria*, *Pseudocypbellaria* and *Sticta* and the moss *Antitrichia curtispindula*.

Within the site there are a large number of lakes which vary considerably in terms of their size, altitude and bathymetry (depth). They include some of the deepest lakes in Wales. The lakes and basins were originally formed through glacial activity in the mountains, although some of the lakes have been adapted for be used as reservoirs and for hydro-electric power schemes. They form an important feature of the landscape within the upland block. Most of the lakes within the site are oligotrophic with very low levels of nutrients. The impact of acid atmospheric depositions has been studied at several of these standing waters and some are known to have acidified. However, at Llyn Idwal the buffering capacity of the lake and catchment soils is sufficient to neutralize acid inputs. This lake is therefore one of the few examples of an upland, nutrient-poor lake in a high rainfall area in Britain which has not acidified.

The lakes support a number of submerged and floating plant species such as water lobelia *Lobelia dortmanna*, bog pondweed, shore-weed *Littorella uniflora*, intermediate water-starwort *Callitriche hamulata*, spring quillwort *Isoetes echinospora* and bulbous rush *Juncus bulbosus*. Other species known to occur in and around some of the lakes include water horsetail *Equisetum fluviatile*, floating bur-reed *Sparganium angustifolium*, bogbean *Menyanthes trifoliata*, alternate water-milfoil *Myriophyllum alterniflorum*, along with a range of freshwater algae suited to low-nutrient conditions. The emergent vegetation is less well developed but can include species such as common reed *Phragmites australis*, bottle sedge and soft rush *Juncus effusus*. A number of rare and scarce aquatic species also occur within the lakes. These include floating water-plantain *Luronium natans*, six-stamened water-wort *Elatine hexandra*, pillwort *Pilularia globulifera* and awlwort *Subularia aquatica*. Llyn Anafon is well known for its Potamogeton hybrids, *P. x gessnacensis* and *P. x griffithii*, whilst Ffynnon Loer supports populations of the tarn lecanora lichen *Lecanora achariana*. The site also supports a small number of species of stoneworts, which are a type of green alga. The most notable of these is the rare and threatened slender

stonewort *Nitella gracilis* which is known from only a very few sites in Wales.

The lakes and watercourses in the site provide important habitat for fish, invertebrates, birds and mammals including water voles *Arvicola terrestris* and otters *Lutra lutra*. The streams are predominantly fast-flowing, cool, oligotrophic and well-oxygenated with coarse substrates dominated by gravels, cobbles and boulders. They typically contain few macrophytes, with the exception of bryophytes such as *Fontinalis spp*, along with alternate water-milfoil, bog pondweed and bulbous rush in the slower-flowing sections, and depend principally on allochthonous inputs from riparian vegetation, terrestrial invertebrates and woody debris for production. They contain important spawning sites and nursery habitat for salmon *Salmo salar* and sewin *Salmo trutta trutta*, especially in the upper reaches of the Afon Seiont and Afon Ogwen. The latter was heavily dredged in the 1960s but has since been subject to a restoration project which has resulted in a dramatic increase in salmonid numbers. Non-migratory populations of brown trout *Salmo trutta fario* are present in many of the lakes and watercourses, notably the Afon Llugwy, though some populations, for example in Llyn Idwal are the result of introductions. Many of the streams are adversely affected by siltation due to overgrazing, and acid rain.

The site supports several vascular plant species which are considered to be vulnerable or endangered in the British Isles. These include the Snowdon lily *Lloydia serotina*, floating water-plantain, tufted saxifrage *Saxifraga cespitosa*, the Killarney fern *Trichomanes speciosum*, alpine woodsia *Woodsia alpina* and oblong woodsia *W. ilvensis*. Some of these species are restricted to only a few locations within the site, such as the cliff ledges in Cwm Idwal. In addition to these, a large number of rare and scarce vascular plants are also found on the site. The site supports the best and in some cases the only populations of many uncommon vascular plants including holly fern *Polystichum lonchitis*, mountain avens, alpine saw-wort *Saussurea alpina*, alpine meadow-grass *Poa alpina*, glaucous meadow-grass *P. glauca*, alpine mouse-eared chickweed *Cerastium alpinum*, arctic mouse-eared chickweed *C. arcticum*, alpine bistort *Persicaria vivipara* and alpine saxifrage *Saxifraga nivalis*.

This site also supports large numbers of bryophytes and lichens. Of these, two species are considered to be particularly in need of protection. These are the tarn lecanora lichen *Lecanora achariana* and the slender green feather-moss *Hamatocaulis vernicosus*. The moss *Seligeria brevifolia* also occurs on the site which is the only known location for this species in Wales. Other rare and scarce lower plants include the silky swan-neck moss *Campylopus setifolius*, and the lichens *Gyalideopsis scotica*, *Protothelenella sphinctrinoides* and *Collema glebulentum*. The areas around Snowdon and Elidir Fach are also important for a range of fungi which grow in association with dwarf willow. These include species such as *Entoloma bloxamii* and *Hygrocybe spadicea*.

The diverse range of habitats on the site supports a wide range of breeding birds. Included among these are significant populations of chough *Pyrrhonorax pyrrhonorax*, peregrine *Falco peregrinus*, raven *Corvus corax* and twite *Acanthis flavirostris*. Other upland and moorland species breeding on the site include ring ouzel *Turdus torquatus*, red grouse *Lagopus lagopus scotica*, snipe *Gallinago gallinago*, merlin *Falco columbarius*, whinchat *Saxicola rupetra*, stonechat *S. torquata* and wheatear *Oenanthe oenanthe*. Associated with the lakes and watercourses are species such as the grey wagtail *Motacilla cinerea*, dipper *Cinclus cinclus*, common sandpiper *Tringa hypoleucos* and great crested grebe *Podiceps cristatus*.

This site supports a rich invertebrate assemblage many of which are relict populations, a legacy of Britain's post-glacial fauna. Of particular note is the endangered rainbow leaf beetle *Chrysolina cerealis* which is restricted to only this site in Britain. and the nationally scarce ashworth's rustic moth *Xestia ashworthii* which is restricted to North Wales. Other significant species include the upland spider *Micaria alpina* and the ground beetle *Nebria nivalis*, both of which are known only from a few sites in Wales. Other restricted species are found within the water bodies on the site, and of particular note in this context is the nationally scarce pea mussel *Pisidium conventus*, an arctic species at the southern limit of its distribution in Britain. In addition, there are large numbers of notable invertebrates from several different taxonomic groups, including the Lepidoptera (butterflies and moths), Coleoptera (beetles), Diptera (flies) and Araneae (spiders and mites).

Remarks:

1. This site supports vegetation assignable to the following habitat types listed in Annex 1 of the EC Habitat Directive (Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora):
 - Plants in crevices in base-rich rocks
 - Tall herb communities
 - Clear-water lakes with aquatic vegetation and poor to moderate nutrient levels
 - Montane acid grasslands
 - Plants in crevices in acid rocks
 - Acidic scree
 - High-altitude plant communities associated with areas of water seepage
 - Blanket bog
 - Hard-water springs depositing lime
 - Species-rich grassland with mat-grass in upland areas
 - Calcium-rich springwater-fed fens
 - Alpine and subalpine heaths
 - Alpine and subalpine calcareous grasslands
 - Depressions on peat substrates
 - Dry heaths
 - Wet heathland with cross-leaved heath
 - Western acidic oakwoods
2. Slender green feather-moss and floating water-plantain are listed on Annex IIa of the EC Habitats Directive.
3. The majority of this site forms the Eryri / Snowdonia Special Areas of Conservation.
4. Chough, peregrine and merlin are listed on Annex 1 of the E.C. Birds' Directive 1979, and Schedule 1 of the Wildlife and Countryside Act, 1981 (as amended).
5. The rainbow leaf beetle is listed on Schedule 5 of the Wildlife and Countryside Act, and is a Red Data Book 1 species. The upland spider *Micaria alpina* is a Red Data Book 3 species.
6. The following plant species are listed on Schedule 8 of the Wildlife and Countryside Act: Snowdon lily, floating water plantain, Killarney fern, tufted saxifrage, alpine woodsia,

oblong woodsia, tarn lecanora and slender green feather-moss.

7. Cwm Idwal, Cwm Glas Crafnant and parts of Yr Wyddfa have been declared as National Nature Reserves and are managed by CCW. Llyn Idwal is designated as a RAMSAR site.
8. Blanket bog, upland calcareous grassland, upland heathland and upland oak woodlands are all UK Biodiversity Action Plan habitats.
9. Floating water-plantain, Killarney fern, eyebrights, slender green feather-moss, marsh clubmoss, pillwort, oblong woodsia, date-coloured waxcap fungus, silky swan-neck moss slender stonewort, the lichen *Gyalidiopsis scotica*, the rainbow leaf beetle, the Ashworth's rustic, the Weaver's wave, skylark, water vole, otter and brown hare are all UK Biodiversity Action Plan species.
10. The site falls predominantly within the Snowdonia National Park.

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