



# GLAN-LLYNAU DUON



Small Pearl-bordered Fritillary feeding on Ragged Robin

## ECOLOGICAL SURVEYS

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## 1.0 INTRODUCTION

Yr Arch Eryri (The Ark Snowdonia) is a registered charity which has purchased Glan-Ilynuau duon, a small 50 acre farm a little south of Trawsfynydd in the Snowdonia National Park (SNP) (**Map 1**). The charity’s mission statement taken from their website is “to promote for the benefit of the public, the conservation protection and improvement of the physical and natural environment of the rural upland Rhinog area in North Wales by promoting biological diversity in particular, but not exclusively by acting as an umbrella body, making grants and carrying out conservation activities and research projects associated with the reestablishment and support of native flora and fauna in such ways as shall be thought fit”.



**Map 1: Glan-Ilynuau duon is bordered to the east by the Afon Eden.**

The farm is situated to the east of the Rhinogydd massif, centred at NGR SH703307. This is a holding that has been grazed by sheep for many many years, probably with a fairly light grazing density. It is bordered to the east by the Afon (River) Eden at an altitude of approximately 175 metres asl and rises to a high point to the west at 210 metres. Although there are internal stock-proof fences, the holding appears to have been run more-or-less as a single ranch-style unit.

**Gritten Ecology** has been commissioned to undertake an ecological survey of the farm holding and to make suggestions as to its future management which will increase its biodiversity interest. A preliminary walk-through survey was carried out with Charles Mador and partner on 1<sup>st</sup> May, followed by comprehensive ecological field surveys which were carried out on 29<sup>th</sup> May and 5<sup>th</sup> June 2020. Whilst the weather was entirely suitable for the latter two survey dates, a short hailstorm surprisingly occurred during the middle of the second survey!

## **2.0 FIRST IMPRESSIONS**

There is a large ruined barn (**Photo 1**) close to the western boundary at SH701307 which was probably used in the past to over-winter cattle. The holding is intersected by low defunct drystone walls (**Photo 2**), probably cattle walls, and netting fences suggesting it was much more intensively managed in the past. It is likely some of the drier ground on the holding (**Map 2**) would have been shut up to produce a hay crop to feed the cattle, and some of the wetter areas would also have been cut to provide bedding for them during the winter. Judging by the flora of these drier areas, it is likely farmyard manure derived from this barn would have been spread on some of these areas.



**Map 2: An aerial photograph of the property. The greener patches are areas of slightly higher ground where the drainage is less impeded and the ground drier.**

Several ruined stone buildings are located at the southern end of the holding at SH705307. It is likely these were the original farm buildings. An old rusty scythe blade was found in one of these buildings confirming that much of the area was probably cut by hand.

The whole 50 acres is very open in character and is almost devoid of trees. The boundary is in very good stock-proof condition and is formed of an impressive drystone wall to the west and partially to the north, with a well-made sheep netting fence to the north-east and south. The Afon Eden forms a stock-proof boundary to the east although a defunct netting fence runs parallel to the river for part of its length.

The rather run-down appearance of the holding suggests it was probably much more intensively managed in the past. There are many ditches intersecting the property which have now become blocked and the dominance of Purple Moor-grass (*Molinia caerulea*) in some of areas where the drainage is impeded (see **Map 3** and **Photo 3**) indicates a long history of regular burning.



**Photo 1: The ruined barn to the west of the holding.**



**Photo 2: A defunct drystone cattle wall in the middle of the holding.**

*M. caerulea* is the only British truly deciduous grass – its leaves senesce every year producing a mat of dead vegetation known as ffeg in Welsh. It is a traditional practice to burn this dead material in the late winter. Since this species has a very high silicon content, stock tend to find it unpalatable. However, burning off the dead material promotes the growth of fresh tender green leaves in the spring which cattle and sheep will eat to a limited extent. Unfortunately, the practice of regular burning virtually destroys all other species, so that *M. caerulea* tends to form virtual monocultures of extremely low biodiversity value. Such extensive farming practices tend to reduce biodiversity significantly.



**Photo 3: A large area of senescent Purple Moor-grass (foreground). The dominance of this species suggests a long history of annual burning.**

While it has been stated above that the property is virtually treeless, there are nevertheless a number of different, albeit stunted, tree species dotted throughout, mostly along old fence and wall lines. Species noted were Holly (*Ilex aquifolium*), Blackthorn (*Prunus spinosa*) which in places are found as odd linear features suggesting they were part of ancient hedgerows (**Photo 4**), Mountain Ash or Rowan (*Sorbus aucuparia*), which will produce prestigious amounts of seed, Hawthorn (*Crataegus monogyna*), also likely to be the remains of ancient hedgerows, the odd Downy Birch (*Betula pubescens*), Grey Willow (*Salix cinerea*) and of some interest, a few (Crab) Apples (*Malus pumila (domestica)*) (**Photo 2**) which are infertile and probably derived from discarded apple cores in the past.



**Photo 4: Possibly the remains of a Blackthorn hedgerow.**

### **3.0 SURVEY LIMITATIONS**

These surveys were carried out over a two-day period only. It is likely additional species would be found during further survey. In addition, surveying at one particularly time of year produces somewhat limited results. Further survey would be desirable, for example, for over-wintering birds. Nevertheless, the following results probably reflect the total number of species found here and certainly provide sufficient data on which to base future management suggestions to enhance the biodiversity on the site. It is considered that the following vegetation survey provides the most comprehensive information on the presence of all taxa.

### **4.0 VEGETATION**

#### **4.1 Legislative Context**

Under the Wildlife and Countryside Act 1981, it is an offence to intentionally pick, uproot or destroy any wild plant included in Schedule 8. Particular care must be taken if any plants (or habitats) listed under Section 42 of the NERC Act (2002) might be affected. This act was superseded by the Environment (Wales) Act 2016 and its Section 7 List of Species and Habitats of Principal Importance for Wales. The implications of this are that “Welsh Ministers” must take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list

published under this section of the Act. The list of habitats and species is currently exactly the same as the Section 42 (2002) list but this is under review.

## 4.2 Results

**Map 3** shows a vegetation map of the holding based on the aerial photograph (**Map 2**). The National Vegetation Classification (NVC) (Rodwell 1991, 1992) has been used to describe each of the plant habitats found during the survey. Flowering plant nomenclature is based on Rose (2006). (Forgive me, I have generally only used the Latin names for plants). Apart from the bryophytes found, the abundance of each plant species is also given based on the DAFOR scale:

D = Dominant  
A = Abundant  
F = Frequent  
O = Occasional  
R = Rare

The NVC approach to plant habitat classification (phytosociology) is based on the idea that plant communities can be ascribed to certain homogenous vegetation assemblages. On the most simplistic level for example, woodlands are separate from grasslands and so on. But within each of the broad classifications, communities have been further divided up to reflect the plant species composition of each community. These are based on which species can be defined as constants within that community. So that if the species composition of five quadrats are measured within each homogenous vegetation type, a species that is found in all five quadrats is defined as a constant. There are 38 mire (M) communities described in the UK and 21 acid grassland (U) communities. Many of these communities are further sub-divided into sub-communities but for the sake of simplicity, the communities noted in the present survey have only been ascribed to the broad community level. There is little to be gained at this stage in describing the vegetation down to sub-community level and certainly little to be gained in the discussion of future management.

Broadly speaking, there are two basic plant communities represented on this holding. The drier ground is made up of two acid grassland communities located on mineral soils and the wetter habitats are made up of three mire communities all sited over peat of varying degrees of thickness. As has already been mentioned above, much of the wetter ground is dominated by *Molinia caerulea*, a species which is abundant in two of the mire habitats which covers the majority of the land. Each of the habitats will be described in turn and the distribution of each is shown in **Map 3**.

A few words of caution. Plant communities rarely have strictly definable boundaries on the ground. Edges can and often blur. In addition, vegetation mapping can be enormously over-complicated by trying to describe every single stand of vegetation (community), however small. The following descriptions and **Map 3** must be treated as a fairly broad representation to describe the distribution of the plant communities to be found at Glan-llynau duon.





**Map 3: Aerial photograph showing the different vegetation communities.**

#### 4.2.1 M25

This is known as the **NVC M25: *Molinia caerulea*-*Potentilla erecta*** mire community and at Glan-llynau duon is dominated by Purple Moor-grass with very few other plant species present (**Photo 3**). As has already been mentioned, this is most likely due to years of annual burning. Apart from *M. caerulea* (D), other species noted in these mires were *Potentilla erecta* (O), *Anthoxanthum odoratum* (O),

*Cirsium palustre* (O), *Succisa pratensis* (R), *Trichophorum cespitosum* (R), *Juncus effusus* (F), *J. acutiflorus* (O), *Lotus pedunculatus* (R), *Galium palustre* (O), *Eriophorum vaginatum* (R), *Erica tetralix* (R), *Narthecium ossifragum* (R), *Polygala serpyllifolia* (R), *Dryopteris carthusiana* (R), *Luzula multiflora* (O), *Ranunculus acris* (O), vestigial *Calluna vulgaris* (R) and Heath Spotted-orchid (*Dactylorhiza maculata* (R) (**Photo 5**). A number of sedges are represented here too, namely, *Carex panicea*, *C. nigra* and *C. echinata*. Bryophytes noted were *Sphagnum capillifolium*, *S. palustre*, *Aulacomnium palustre*, *Polytrichum commune*, *P. strictum*, *Hylocomium splendens* and *Pleurozium schreberi*.



**Photo 5: Heath Spotted-orchids in dense Purple Moor-grass.**

Although for the purposes of future land management such (NVC) distinctions should be treated as somewhat academic, the presence of Harestail Cotton-grass (*Eriophorum vaginatum*) in this community does suggest affinities with **NVC M17: *Trichophorum cespitosum-Eriophorum vaginatum*** blanket mire, especially where the Cotton-grass is more prolific. The blur between these communities is almost certainly due to the long history of burning and the gradual in-filling of drainage ditches.

Another interesting and very attractive area which generally corresponds to **NVC: M25**, though probably a different sub-community, is the low-lying mire at the north-eastern corner of the holding immediately next to the river (**Photo 7 and 8**), here dominated by a stand of the aromatic Bog-myrtle (*Myrica gale*) (D). This area

may well have been cut for peat in the past. The following species were noted here, Cranberry (*Vaccinium oxycoccos*) (F) being the most interesting: *Eriophorum vaginatum* (F), the small insectivorous Sundew (*Drosera rotundifolia*) (R) (**Photo 9**), *Juncus squarrosus* (O), *Trichophorum cespitosum* (O), *Erica tetralix* (F), *Potentilla erecta* (O), *Carex echinata* (O), *Festuca ovina* (O), *Molinia caerulea* (F), *Polygala serpyllifolia* (R), *Narthecium ossifragum* (O), *Menyanthes trifoliata* (R), *Succisa pratensis* (R), *Luzula multiflora* (O), *Carex canescens* (R), *C. rostrata* (R), *Deschampsia flexuosa* (R), *D. cespitosa* (R), *Lychnis flos-cuculi* (R) (**Frontispiece**), *Anthoxanthum odoratum* (O), *Galium saxatile* (R), *G. palustre* (O), *Lotus pedunculatus* (O), *Ranunculus acris* (R), *Viola palustris*, (O), *Rumex acetosa* (O) and the mosses *Sphagnum papillosum*, *S. palustre*, *S. fallax*, *S. capillifolium*, *Polytrichum commune* and *Aulacomnium palustre*.

Of some significance is the presence of several saplings of Grey Willow (**Photo 10**) which have clearly seeded in from a nearby tree.



**Photo 7: The low-lying area next to the river at the northern end of the property dominated by aromatic Bog-myrtle, looking northwards.**



**Photo 8: The same area looking towards the west.**



**Photo 9: The insectivorous Round-leaved Sundew.**



**Photo 10: A Grey Willow sapling growing in the mire at the north-east corner of the site.**

#### **4.2.2 M15**

The area at the north-western corner of the holding, though superficially looking just like the **M25** community just described actually belongs to the **NVC M15: *Trichophorum cespitosum-Erica tetralix*** wet heath community. Despite the continued abundance of *M. caerulea* (A) in this corner (**Photo 11**), the presence of both Deergrass (*Trichophorum cespitosum*) (O) and Cross-leaved Heath (*Erica tetralix*) (F) suggests it has closer affinities with the **NVC M15** community. Other species noted here are *Anthoxanthum odoratum* (O), *Potentilla erecta* (O), *Narthecium ossifragum* (R), *Eriophorum vaginatum* (O), *Dactylorhiza maculata* (R) (**Photo 5**), *Polygala serpyllifolia* (R), *Juncus squarrosus* (O), *J. effusus* (O), *Vaccinium myrtillus* (O), *Festuca ovina* (F), *Calluna vulgaris* (R), *Carex echinata* (O) and the bryophytes *Sphagnum papillosum*, *S. capillifolium*, *Hypnum jutlandicum*, *Odontoschisma sphagni*, *Pleurozium schreberi*, *Rhytidiadelphus squarrosus*, *Aulacomnium palustre*, *Calliergonella cuspidata*, *Polytrichum strictum*, *Campylopus introflexus*, *C. atrovirens*, *C. flexuosus* and the lichen *Cladonia impexa*.

There are other patches of this vegetation of varying sizes in other parts of the holding.



**Photo 11: The area of M15 wet heath in the north-western corner of the holding.**

#### **4.2.3 M23**

This is a rather uninteresting wetland community dominated by Soft Rush (*Juncus effusus*) that is found extensively in the south-eastern corner of the farm next to the river (**Photo 12**) but is also found throughout the site in varying sized stands wherever the drainage is impeded. It is a species-poor community (**NVC M23: *Juncus effusus/acutiflorus-Galium palustre* rush-pasture**) and at Glanllynau duon has the following associates: *Rumex acetosa* (O), *Deschampsia cespitosa* (R), *Ranunculus acris* (O), *Lotus pedunculatus* (O), *Equisetum fluviatile* (R), *Cardamine pratensis* (R), *Luzula multiflora* (R), *Valeriana officinalis* (O), *Galium palustre* (O), *Scutellaria minor* (R), *Carex canescens* (R), *Juncus acutiflorus* (F), *Holcus lanatus* (O), *Cirsium palustre* (O), *Agrostis stolonifera* (R), *Anthoxanthum odoratum* (O) and the mosses *Sphagnum fallax* and *Rhytidiadelphus squarrosus*.



**Photo 12: The extensive Soft Rush dominated area at the south-eastern end of the site by the river.**

#### **4.2.4 U5**

The **NVC U5: *Nardus stricta-Festuca ovina*** acid grassland community is here represented by only two small areas found in the western side of the site (**Photo 13**). This community is generally found on free-draining mineral soils and has limited biodiversity value. Species noted here were *Festuca ovina* (A), *Nardus stricta* (O), *Juncus squarrosus* (F), *Anthoxanthum odoratum* (O), *Holcus lanatus* (R), *Galium saxatile* (F), *Luzula campestris* (R), *Juncus effusus* (F), *Potentilla erecta* (O), *Digitalis purpurea* (R) and the mosses *Hypnum jutlandicum* and *Racomitrium lanuginosum*. Of some historical interest is the presence of a few small bushes of Western Gorse (*Ulex gallii*). The presence of this species suggests this area may once have corresponded to **NVC H8 *Calluna vulgaris-Ulex gallii*** heath prior to extensive grazing pressure, and perhaps burning.



**Photo 13: The U5 acid grassland community is located on a slight hillock at the south-western corner of the site and is surrounded by extensive *Molinia caerulea* (M25).**

#### 4.2.5 U4

The green areas in **Map 3** are generally areas of slightly higher ground which correspond to **NVC U4: *Festuca ovina-Agrostis capillaris-Galium saxatile*** acid grassland (**Photo 14**). Although it has not been possible to confirm this, these areas, certainly the larger of them in the middle of the farm, may well have been rotavated and reseeded in the past, though the absence of *Lolium perenne* is *puzzling*. Glan-Ilynau duon is currently grazed with sheep and it is not surprising that grazing levels are more or less concentrated on these relatively more fertile areas. As was postulated at the beginning of this report, some of the larger **U4** areas may well have been cut for hay in the past.

Species noted in these **U4** acid grassland areas were *Agrostis capillaris* (A/F), *Festuca ovina* (O), *Anthoxanthum odoratum* (O), *Nardus stricta* (O), *Poa annua* (R), *P. trivialis* (R), *Holcus lanatus* (O), *Luzula campestris* (R), *Ranunculus bulbosus* (R), *R. acris* (O), *Potentilla erecta* (O), *Galium saxatile* (O), *Cerastium fontanum* (R), *Hypochoeris radicata* (R), *Achillea millefolium* (O), *Rumex acetosella* (O), *Trifolium repens* (R), *Juncus effusus* (O), *J. tenuis* (R), *Cirsium palustre* (O), *Plantago lanceolata* (R), *Carex panicea* (R), *C. binervis* (O), *C. pilulifera* (R), *C. pulicaris* (R),





**Photo 14: The greener, more fertile, areas correspond to U4 acid grassland.**

*C. ovalis* (R), *Pilosella officinarum* (R), *Veronica officinalis* (R), *Lotus corniculatus* (R), *Ficaria verna* (O), *Taraxacum officinale* agg. (R), *Cardamine pratensis* (O), *Conopodium majus* (O) and the ubiquitous moss *Rhytidiadelphus squarrosus*.

The presence of moles (*Talpa europaea*), which are confined to the **U4** areas, is a testament to the higher fertility of these swards.

The area of **U4** acid grassland to the far south-east of the farm (**Photo 15**), close to and undoubtedly associated with the original farm buildings, is by far the most fertile area of the holding. This is hardly surprising since this would have been the pastures receiving most management in the form of farmyard manure, liming etc. At the time of the second survey, many sheep were concentrated on this pasture. By and large, the species composition of this pasture is the same as described above but with a few additional species, namely, *Cynosurus cristatus* (O) and *Trifolium pratense* (R). It is clearly much grassier with a lower abundance of flowering plant (forb) species.



**Photo 15: The more fertile pasture at the far south-east of the farm.**

#### **4.2.6 Exposed rocks**

For completeness sake, it is worth a brief mention of the exposed bedrocks (**Photo 15** to the right) and erratic boulders that litter the site. These have their own unique flora consisting of English Stonecrop (*Sedum anglicum*) and *Rumex acetosella* with a range of bryophytes including *Dicranum scoparium*, *Polytrichum juniperinum*, *Racomitrium fasciculare* and *R. lanuginosum*. The interesting lichen *Lasallia pustulata* is also not uncommon.

#### **4.2.7 Other species**

It is worth mentioning that both the ruined barn and the original farm buildings are surrounded by patches of dense Nettles (*Urtica dioica*). Whilst of little floristic interest, Nettles do provide an important food source for the caterpillars of the Peacock butterfly (*Aglais io*). Indeed, several colonies of this species were noted on these Nettle patches. Nettles require a high nitrogen concentration to thrive and their presence outside these old buildings confirms they would have been used to overwinter cattle in the past. They are more recently likely to provide shelter for sheep which would also increase the dung (nitrogen) concentrations.

#### **4.2.8 The river and ditches**

For simplicity, these will be treated here as a single habitat. For, it is unnecessary here to differentiate between the many NVC swamp and aquatic

communities. Species associated with the ditches and river have more aquatic requirements and are often associated with this habitat as they are less prone to grazing pressure. (According to the map supplied the river is not strictly within the boundary of the farm, rather its west bank forms the boundary). Species noted were *Ranunculus flammula*, *Blechnum spicant*, *Rubus fruticosus*, *Phegopteris connectilis*, *Dryopteris filix-femina*, *D. carthusiana*, *Hypericum pulchrum*, *Mentha aquatica*, *Filipendula ulmaria*, *Viola palustris*, *Myosotis secunda*, *Salix cinerea*, *Phalaris arundinacea*, *Oenanthe crocata*, *Potamogeton natans*, *Equisetum fluviatile*, *Nuphar lutea* (**Photo 16**), *Caltha palustris*, *Veronica chamaedrys*, *Valeriana officinalis*, *Ajuga reptans*, *Potentilla palustris*, *Hydrocotyle vulgaris*, *Epilobium palustre*, *Alchemilla vulgaris* agg. and *Carex demissa*.



**Photo 16: Yellow Water-lilies on the Afon Eden is a sign of the slow-moving nature of the current here.**

#### **4.2.9 Conclusion**

The plant habitats that occur at Glan-llynau duon, namely acid grassland, wet lowland heath, Purple Moor-grass and rush pastures are all Habitats of Principal Importance listed under the Environment (Wales) Act 2016 and the Snowdonia National Park Authority's Biodiversity Action Plan (1997).

No Schedule 8 species were found during the surveys. However, *Luronium natans* is known to occur in the river a little north of Pont y Grible.

## **5.0 BADGERS (*Meles meles*)**

### **5.1 Legislative Context**

Badgers enjoy statutory protection under the Protection of Badgers Act 1992. Under this legislation, it is an offence to:

- willfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so,
- or to intentionally or recklessly interfere with a sett.

Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it. Under this legislation, a sett is defined as “any structure or place which displays signs indicating current use by a badger”. It is thus important to be able to distinguish between an old unoccupied sett and one in current usage.

In Wales, the Welsh Government (WG) provide licences for developments and construction activities which might disturb badgers but for developments listed under S.55(1) of the Town and Country Planning Act 1990, it is Natural Resources Wales (NRW) who have the appropriate powers. Developments and construction activities include:

- the use of heavy machinery (generally defined as tracked vehicles) within 30 metres of any entrance to an active sett,
- the use of lighter machinery (generally defined as wheeled vehicles), particularly for any digging operations, within 20 metres,
- light work such as hand digging or scrub clearance within 10 metres.

In practice, construction activities that require blasting with explosives will need to be licensed if more than 30 metres from an active sett. Thus, the need for a licence (and mitigation) will depend on the precise location and extent of any proposed development in relation to an active sett. In any event, it is probably best to consult both NRW and WG if there is any reasonable doubt about the possibility of disturbance to a sett.

### **5.2 Survey Methodology**

Badgers are nocturnal animals and are rarely seen during the day, generally emerging from their setts at dusk. Thus, survey techniques rely on being able to detect field signs of these surprisingly common animals. Setts are the most obvious feature and a surveyor will be able to determine whether setts are active or not and gain some understanding of the population size and its fecundity by the number of entrances being used and the nature of the spoil outside these sett entrances. Other field signs include latrines, runs and footprints, feeding scrapes and the presence of their characteristic hairs caught on barbed-wire fences and other obstructions. If runs were located, these were followed for some distance in an attempt to find the location of active setts.

The entire survey area was assessed for signs of badgers.

### 5.3 Results

No signs of badgers were noted anywhere within the study area.

## 6.0 BATS

### 6.1 Legislative Context

All species of bats have been listed on Annex IV of the EC Habitats & etc. Species Directive (1994). Bats are, therefore, 'European Protected Species'. The domestic UK legislation which underpins this Directive ensures that individual bats and their breeding sites (maternity roosts), nursery roosts and resting places (roosts) are protected. Many bat species are also listed under Section 7 of the Environment (Wales) Act (2016). Before undertaking any works that might either directly affect bats or their roosts, surveys have to be carried out to ascertain the degree, if any, of usage by bats. Should any signs of bats be found, a licence from NRW has to be applied for before works commence. Developers starting such works will be breaking the law if a licence has not been granted before works commence.

### 6.2 Survey Methodology

Bats are nocturnal and remain well-hidden during the day. They are generally inactive in the winter when they are hibernating. Different species prefer different roosting sites. In the present context, surveys were confined to the trees on the site. The following features of the trees were identified as providing possible roost sites: cavities, loose bark, fissures and the presence of Ivy (*Hedera helix*) cover. These trees were placed into any one of four categories according to their suitability as bat roosts:

None  
Low Potential  
Medium Potential  
High Potential

Trees were assessed from the ground using binoculars and a high-powered Clulite torch. It was considered unnecessary in the present context to undertake dusk or dawn bat detector surveys.

### 6.3 Results

All the trees surveyed from the ground were considered to have no (None) Potential for bats. The buildings were also looked at to see if there was any roosting potential for bats. An endoscope was used to examine gaps between stones. No bats were noted.

### 6.4 Recommendations

It is understood that there are proposals to refurbish the top barn. It is recommended that an emergence survey is carried out on this building before any

works are carried out on it. In any event, a full emergence survey would be a requirement to support a Planning Application to the LPA.

## **7.0 REPTILES**

### **7.1 Legislative Context**

Under the Wildlife and Countryside Act 1981, it is an offence to intentionally kill, injure or take any reptile included in Schedule 5. In the present context, this would include Adder (*Vipera berus*), Common Lizard (*Zootoca vivipara*), Slow-worm (*Anguis fragilis*) and Grass Snake (*Natrix helvetica*). The Countryside and Rights of Way Act (NERC) 2006 gives additional protection against “reckless” behaviour that might endanger the life of these reptiles. All four species are included on the Section 42 list and are now included on the Section 7 list of the Environment (Wales) Act (2016). It is now accepted practice, where there is a known and significant population of any of the above reptile species or the development is of such a scale, to exclude them from the site by appropriate fencing, capture and translocation.

### **7.2 Methodology**

It is most unusual to find reptiles during a survey, so survey was therefore based on simply assessing the suitability of the study area as reptile habitat.

### **7.3 Results**

No signs of reptiles were noted during the survey. However, it is most likely several different species of reptiles use the area since the habitat is considered to be entirely favourable for these species. There is a considerable amount of suitable cover in the form of tall vegetation and exposed bedrock areas make good basking habitat.

## **8.0 BIRDS**

### **8.1 Legislative Context**

Under the UK Wildlife and Countryside Act (1981), it is an offence to take, damage or destroy the nest of any wild bird while that nest is in use or being built, or to take or destroy an egg of any wild bird. Under the same legislation, it is an offence to intentionally or recklessly disturb any bird included in Schedule 1 while it is building a nest or is in, on or near a nest containing eggs or young, or disturb dependent young of such a bird. Many bird species are also listed under Section 7 of the Environment (Wales) Act (2016).

### **8.2 Survey Methodology**

A careful search was made throughout the survey area for nests and birds. Binoculars were used to facilitate identification. This was effectively a preliminary walk-over survey rather than following any standardised protocols.

### 8.3 Results

Birds noted during the surveys are shown in **Table 1**.

Species	Species	Location
Robin	<i>Erithacus rubecula</i>	Near house
Great Tit	<i>Parus major</i>	Near house
Blue Tit	<i>Cyanistes caeruleus</i>	Near house
Wheatear	<i>Oenanthe oenanthe</i>	Throughout
Wren	<i>Troglodytes troglodytes</i>	Throughout
Carrion Crow	<i>Corvus corone corone</i>	Flying over
Magpie	<i>Pica pica</i>	Flying over
Chaffinch	<i>Fringilla coelebs</i>	Near house
Dunnock	<i>Prunella modularis</i>	Near house
Raven	<i>Corvus corax</i>	Flying over
Stonechat	<i>Saxicola torquata</i>	Throughout
Meadow Pipit	<i>Anthus pratensis</i>	Throughout
Red Kite	<i>Milvus milvus</i>	Flying over
Buzzard	<i>Buteo buteo</i>	Flying over
House martin	<i>Delichon urbica</i>	Feeding over
Swallow	<i>Hirundo rustica</i>	Feeding over
Cuckoo	<i>Cuculus canorus</i>	Singing from tree
Pied Wagtail	<i>Motacilla alba</i>	Bottom ruins

**Table 1: Birds seen during the survey.**

These can be broadly divided into three separate groupings. A number of small birds were seen associated with the main house (Glan-llynau duon) which is quite heavily wooded. These species, which include Blue and Great Tits, Chaffinch, Robin and Dunnock are attracted to the rather domestic environment around the house and gardens. There are a number of small stunted trees close to the old farmhouse buildings and these species were seen here as well.

The second group are species which do not appear to be nesting on the property include Raven, Buzzard, Red Kite, Carrion Crow and Magpie, perhaps due to the paucity of suitable trees. However, at least one old nest was noted in one of the taller Rowan trees and this is most likely to be a Carrion Crow's nest. It is not known whether there is a Red Kite's nest close to the farm but no nest site was seen during the surveys. All these species almost certainly feed on carrion in the form of dead sheep. Swallows and House Martins were seen feeding on the wing over the study area in numbers.

Both Short-eared Owl (*Asio flammeus*) and Hen Harrier (*Circus cyaneus*) are both known to frequent the area but neither species were seen during the three survey dates.

The third group of birds are by far the commonest species found at Glanllynau duon. These are the ground-nesting species such as Wheatear, Meadow Pipit and Stonechat. The habitat here is ideal for these species and while no nests were found, it was clear there were several breeding pairs of each species scattered throughout the area. Wrens are also ubiquitous and will nest wherever a suitable hollow is available.

No birds were noted associated with the river but a number of duck species will frequent this habitat and also both Grey Wagtails (*Motacilla cinerea*) and Dipper (*Cinclus cinclus*).

The single Pied wagtail seen was by the old farmhouse buildings and is almost certainly breeding here.

It is most likely other species will occur on the farm.

## **8.0 OTTERS (*Lutra lutra*)**

### **8.1 Legislative Context**

The European Otter is fully protected in England and Wales under Sections 9.1 and 9.5 of Schedule 5 of the Wildlife and Countryside Act 1981 under which it is an offence to kill, injure or take an otter without a licence; to intentionally damage, destroy or obstruct a holt; or to disturb an otter in its resting place. It is also now included on the Environment (Wales) Act (2016) Section 7 List.

In addition, it is protected under the European Habitats & etc. Directive (92/43/EEC) since it falls under Annex 2a and 4a of the Bern Convention (Appendix III). Otters are, therefore, 'European Protected Species'. They also receive worldwide protection under CITES (Convention on International Trade of Endangered Species). Licences are required for checking known holts or for carrying out work that may disturb otters such as the management of trees that are known to be used as resting (lie-up) sites. In Wales, the licensing authority is NRW.

### **8.2 Survey Methodology**

Otters are very largely nocturnal animals and in practice are rarely seen during surveys. Instead, surveyors have to rely on characteristic field signs. The most common of these are their droppings, known as spraints. These have a very distinctive smell and appearance and are used to mark otter territories. They are, therefore, often deposited on prominent riparian features such as rocks, beneath bridges or on large tufts of tussocky vegetation. Careful examination of these spraints can often reveal the recent diet of these illusive animals since fish bones, scales etc. pass through the otter's gut relatively unaffected by digestive enzymes.



The texture and appearance of spraints can also be used to determine how recently they were deposited. The frequency of their distribution can also inform surveyors of the relative otter activity within a catchment. The characteristic smell of fresh spraints can often be detected some time before the spraints themselves are seen.

Other field signs are also important indicators of otter activity. These include prey remains, footprints and slides, holts and lie-up sites. Holts (breeding sites) and lie-up sites are usually marked by sprainting activity near their entrances.

In the context of the present survey, a careful search was made for spraints and other otter signs along all the ditches and streams, and the main river itself.

### **8.3 Results**

Two fresh spraints were noted on prominent rocks by the side of the river. It is unlikely otters will use the stretch of the river along the eastern boundary of Glanllynau duon for their holts or lie-up sites since there is generally inadequate cover. Otters almost certainly regularly patrol this stretch of the river which provides excellent feeding habitat for this species.

## **9.0 WATER VOLES (*Arvicola amphibius*)**

### **9.1 Legislative Context**

Water Voles are protected by law and are a conservation priority within the UK's Biodiversity Action Plan (BAP). Under the Wildlife and Countryside Act 1981 (as amended by Variation of Schedule 5) (England) Order 2008 it is an offence to intentionally or recklessly:

- damage, destroy or obstruct access to any structure or place that water voles use for protection or shelter,
- disturb a water vole whilst it occupies such a place.

This increased protection adds prohibitions against intentional killing, taking or injury, possession and sale. It should also be noted that Section 10 of the Act requires that "reasonable" steps are taken to avoid unnecessary damage to such structures or places.

Should it be considered that water voles might be disturbed by a development or construction activity, a licence will need to be obtained from NRW.

### **9.2 Survey Methodology**

It is understood that water voles have declined by as much as 90% in the UK over the past few decades. Up to the 1950s and early '60s, it was common to see water voles in daylight plopping into watercourses and swimming across the ditches, slow-moving streams, ponds and lakes that was their commonest habitat. Because of extensive land-drainage and the predation effects of American Mink (*Neovison vison*), particularly in lowland areas, it is now extremely uncommon to see water voles. Thus, this species is now more common in upland areas. As a result,

surveying for the presence of water voles has to be based on field signs rather than hoping to see the animals themselves. This involves a careful and detailed examination of the riparian and wetland habitats where they live and looking for the following signs: burrows, latrines, runs and larders.

A careful search was made of the riparian zone of the river and throughout the ditches, streams and wetlands closely associated with the river.

### 9.3 Results

Sadly, despite the ideal habitat and availability of many suitable plant food species, no signs of water voles were noted anywhere within the survey area. A few decades ago, they would have been found here but predation by American Mink has almost certainly destroyed them all.

### 10.0 OTHER SPECIES

It is worth mentioning that two butterfly species were noted in abundance mainly in the mire by the river dominated by Bog Myrtle. These were Small Pearl-bordered Fritillary (*Boloria selene*) (see **Frontispiece**), whose caterpillars feed on violets and Large Skipper (*Ochlodes Sylvanus*) (**Photo 17**) whose caterpillars feed on a variety of different grasses.



**Photo 17: A Large Skipper butterfly feeding on the nectar of a Heath Spotted-orchid.**

## 11.0 INVASIVE NON-NATIVE SPECIES (INNs)

Despite very careful search, fortunately no INNs were noted during the surveys. Species such as Japanese Knotweed (*Fallopia japonica*) are becoming increasingly common along the riparian zones of our waterways but, fortunately, no stands were found.

## 12.0 The COFNOD Local Records Centre search

This revealed only one record from the middle of the site of the moss *Sphagnum platyphyllum*. It is suspected this might be a mis-identification since the habitat for this species is unsuitable at Glan-Ilynau duon.

There are records from an electro-fishing survey of the adjacent Afon Eden carried out by the then Environment Agency in 2009 which include Atlantic Salmon (*Salmo salar*), Brown/Sea Trout (*S. trutta*) and Eel (*Anguilla anguilla*). There is a great deal of information too about the colony of Freshwater Pearl Mussels (*Margaritifera margaritifera*) that is found in the river adjacent to the site. This is a fascinating and long-lived species whose larvae attach to the gills of migratory Salmonids for several years before dropping to the bottom of the river where they develop into mussels. The colony here is the only one in Wales which is still recruiting (see **Section 13.0**).

Other records from the area outside of the Glan-Ilynau duon boundaries are of interest since they confirm the presence of species that might well occur on the site but weren't recorded during the surveys. These include Common Lizard, Polecat (*Mustela putorius*), Barn Owl (*Tyto alba*), Dipper, Curlew (*Numenius arquata*), Lapwing (*Vanellus vanellus*) and Hen Harrier. There are also records of both Otter and Kite nearby.

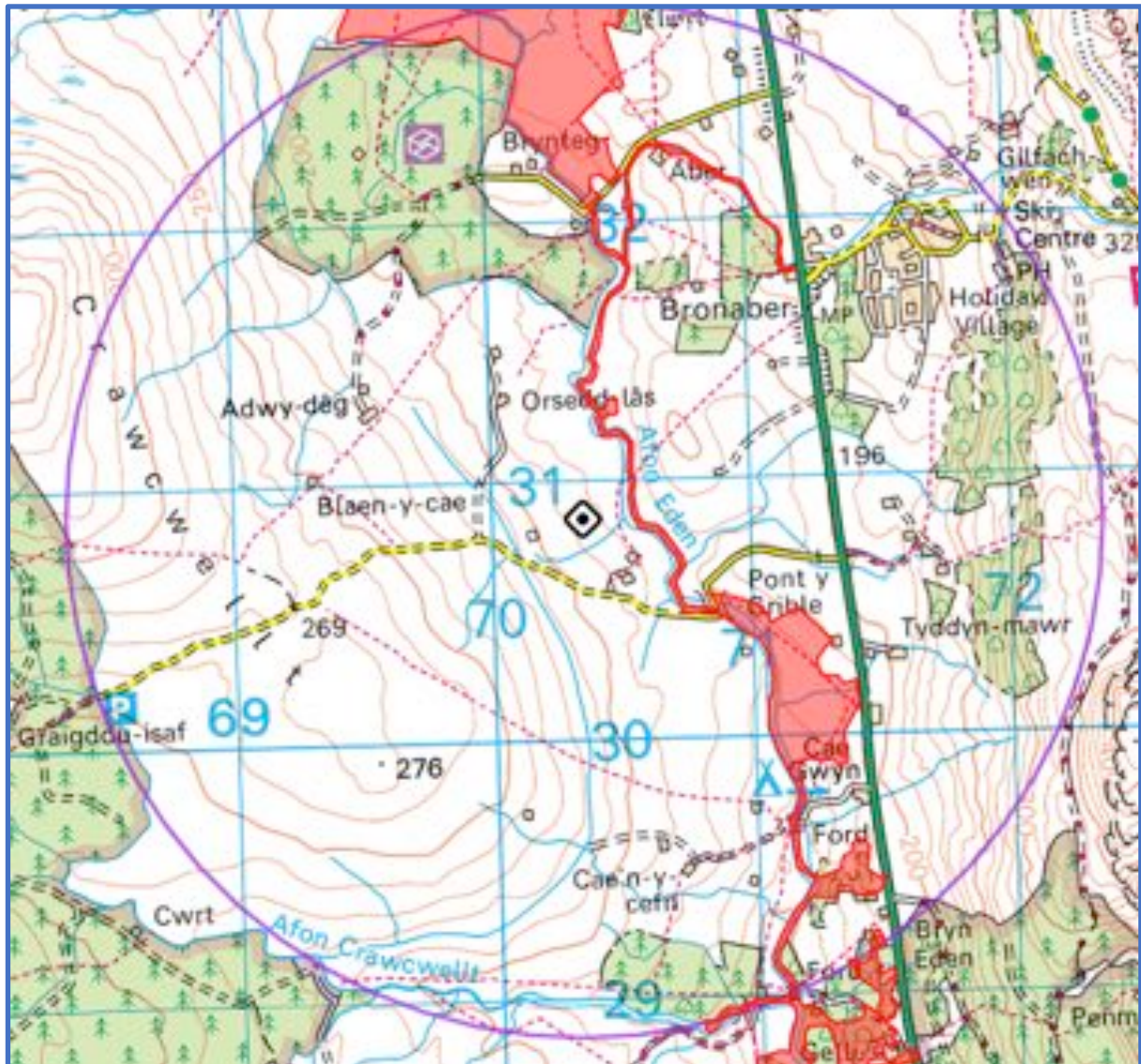
There are records of Water Vole about 1140 metres upstream on the Afon Eden from a 2014 survey. Whether this species is still present is doubtful but the habitat at Glan-Ilynau duon is entirely favourable.

Of some concern are records for both the two INNs Himalayan Balsam (*Impatiens glandulifera*) and *Rhododendron ponticum* nearby on the A470 at Glanaber.

## 13.0 THE AFON EDEN-CORS GOCH TRAWSFYNYDD SSSI/SAC

The boundary of this Special Area of Conservation (SAC) and its underpinning Site of Special Scientific Interest (SSSI) is shown in **Map 4** overleaf. This map shows that the SAC/SSSI designation includes the whole of the river

adjacent to Glan-Ilynuau duon. Since it makes interesting reading, the whole of the Natural Resources Wales (NRW, ex-CCW) Citation document is included below since it provides a) confirmation of the relevance of the present survey as well as b) information about other species and habitats in the area and in the SAC/SSSI.



**Map 4: The boundaries of the Afon Eden-Cors Goch Trawsfynydd SAC/SSSI are shown in red. (The black symbol marks the centre of the study area).**

**CYNGOR CEFN GWLAD CYMRU COUNTRYSIDE COUNCIL FOR WALES  
SITE OF SPECIAL SCIENTIFIC INTEREST CITATION**

GWYNEDD

Date of Notification: National Grid Reference: O.S. Maps:

Site Area:

AFON EDEN - CORS GOCH, TRAWSFYNYDD

2003, 2004

SH702349 to SH735223

1:50,000 Sheet number: 124

1:10,000 Sheet number: SH63 SE; SH72 SW/NW; SH73 SW

366.3 ha

Afon Eden - Cors Goch Trawsfynydd is of special interest for its biological features including mesotrophic river types, raised bog and associated peatland habitats, neutral and acid grasslands, broadleaved woodland, as well as a mixture of marshy grassland, flush and wet heath. The site supports a number of species of special interest including the freshwater pearl mussel *Margaritifera margaritifera*, floating water-plantain *Luronium natans*, Atlantic salmon *Salmo salar*, otter *Lutra lutra* and a lichen assemblage.

The SSSI includes the entire length of the Afon Eden from its source just south of Llyn Trawsfynydd. The site includes parts of its tributaries and 3 km of the Mawddach between its confluence with the Afon Eden and the Afon Wen. The lower 4 km of the Afon Wen, another tributary of the Mawddach is also included. The upper headwaters of the Afon Eden arise from and are fed by the extensive peatland of Cors Goch which lies immediately to the south of Llyn Trawsfynydd. The lower stretch of the river enters a steep-sided valley as it runs through Coed- y-Brenin forest before entering the Afon Mawddach just north of the village of Ganllwyd. The altitude ranges from 10-200 m.

The solid geology at this site is characterized by dominantly coarse-grained lithologies of Lower Palaeozoic (Cambrian) age. These rocks have been deformed into a major north-trending fold, the Dolwen Pericline, the axis of which is transected by the Afon Eden in its upper reaches. The bedrock in the vicinity of the river is overlain by a variety of unconsolidated superficial deposits including boulder clay (till), peat and river alluvium.

The Afon Eden is relatively unmodified and supports abundant and diverse aquatic, emergent and bank-side vegetation within a wide range of channel and riparian habitats. It is dominated by oligo-mesotrophic (poor to moderate nutrient status) communities but is noteworthy for having four different river types within a relatively short length of river. The major tributaries of the Eden are the Crawcwellt north and the Crawcwellt south which arise on the eastern slopes of the Rhinogydd. Both streams are fast flowing and very oligotrophic (nutrient poor) with river vegetation dominated by aquatic mosses such as *Fontinalis squamosa* and *Rhyncostegium riparioides* with boulders supporting mosses such as *Racomitrium aciculare* and characteristic acid-tolerant liverworts such as *Scapania undulata* and *Marsupella emarginata*. The side of the streams support flushes with *Breutelia chrysocoma* and *Campylopus atrovirens*. The upper reaches of the Afon Eden flow through the Cors Goch mire and are slow-flowing and mesotrophic (more nutrient rich). Aquatic species here include yellow water-lily *Nuphar lutea*, floating bur-reed *Sparganium angustifolium* and broad-leaved pondweed *Potamogeton natans* with bottle sedge *Carex rostrata* on the channel margins. *N. lutea* in particular is primarily a lowland species, and the Afon Eden is the second highest altitude river record in the UK. Below the Cors Goch mire the river remains slow-flowing but becomes deeper and wider and the vegetation includes the internationally rare floating water-plantain *Luronium natans* along with shoreweed *Littorella uniflora*, quillwort *Isoetes lacustris* and alternate water-milfoil *Myriophyllum alterniflorum*. On the river margins are species such as branched bur-reed *Sparganium erectum*, water horsetail *Equisetum*

*fluviatile* and reed canary-grass *Phalaris arundinacea*. The banks of the river support a species-rich flora including the globeflower *Trollius europaeus*, purple-loosestrife *Lythrum salicaria*, ivy-leaved bellflower *Wahlenbergia hederacea* and saw-wort *Serratula tinctoria*. A small silted-up ox-bow lake has formed in the middle reaches of the Eden and supports a hybrid sedge *Carex rostrata x vesicaria*. Below Pont-y-Gribble the gradient of the Afon Eden increases and it becomes more typically upland in character. The lower reaches of the Eden, along with the Afon Mawddach and the Afon Wen are more oligotrophic, being fast-flowing through steep sided gorges with waterfalls, rapids and boulder-strewn channels. There are few aquatic higher plant species in these sections and the lower plants are mainly bryophytes such as *Fontinalis antipyretica*, *F. squamosa* and *R. riparioides*. The drier river margins support liverworts such as *Scapania undulata* and *Marsupella emarginata* and mosses such as *Hyocomium armoricum*. Parts of the riverbanks are tree-lined, in the upper catchment mainly with grey willow *Salix cinerea* and eared willow *Salix aurita* and in the lower catchment with alder *Alnus glutinosa*, sessile oak *Quercus petraea*, birch *Betula spp* and rowan *Sorbus aucuparia*.

The Afon Eden is of European importance for its population of freshwater pearl mussel *Margaritifera margaritifera* which represents the last breeding population of this species in Wales. The mussels are concentrated in a 3 km stretch of the upper catchment. The freshwater pearl mussel is dependent on the salmonid (salmon and trout) populations because its larval stage is parasitic on their gills. Atlantic salmon *Salmo salar* spawn on the Afon Eden, Mawddach and Wen although the Eden is the most productive river having a greater prevalence of spawning gravels and juvenile salmon habitat combined with better water quality. Sea trout *Salmo trutta trutta* also spawn in the rivers and native brown trout *Salmo trutta fario* are abundant. Otters *Lutra lutra* are widespread throughout the catchment of the three rivers. Otters rely on woodland, scrub and tall bankside vegetation for cover and the roots of large trees at the river's edge are likely to be important for breeding holts. Water vole *Arvicola terrestris* has been recorded on the upper Afon Eden.

Cors Goch mire was formerly more extensive with the most northerly part having been flooded to create Llyn Trawsfynydd. Of particular significance within the mire complex are two ombrogenous (rain-fed) peatland units, which represent important examples of lowland raised bog close to the altitudinal limit of this habitat in Wales. Recent investigations have revealed that the larger of the two ombrogenous peatlands retains a sequence of peat deposits over 6 m thick and analyses of plant remains preserved within the peat indicate a pattern of development which has passed from alder carr woodland through a fen-bog transition to the present day rain-fed peatland. Bog vegetation appears to have been present at this site for at least 5,000 years, and the preserved sequence includes abundant remains of the classic peat-forming bog moss *Sphagnum austinii*. Both of the ombrogenous peatland units occur within a wider peatland landscape which includes significant areas of modified and unmodified blanket bog on peats of varying thickness as well as wet heath on shallower peats and valley mire along the course of the Eden and its tributaries. Each of these units are hydrologically linked and the occurrence of raised bog in this context represents the closest approach in Wales to a peatland type referred to as intermediate bog, namely bog with characteristics of both blanket and lowland raised bog.

The raised bog vegetation at the site includes cross-leaved heath *Erica tetralix*, deergrass *Scirpus cespitosus*, hare's-tail cottongrass *Eriophorum vaginatum* and bog asphodel *Narthecium ossifragum*, as well as more specialised elements indicative of high quality raised bog including bog-rosemary *Andromeda polifolia* and the attractive wine-red bog moss *Sphagnum magellanicum*. Other frequent bog moss species include *S. papillosum*, *S. capillifolium* and *S. tenellum*, but aquatic Sphagna are unusually sparse despite the localised abundance of shallow pools and hollows. White-beaked sedge *Rhynchospora alba* and cranberry *Vaccinium oxycoccus* add to the characteristic assemblage of raised bog species, and there are recent records for two ombrogenous bog mosses, the nationally scarce *Sphagnum austinii* and the regionally rare *S. fuscum*. Despite the evident quality of the vegetation of the raised bog areas, the presence of substantial areas of bare peat and the generally low cover of heather *Calluna vulgaris* both point to overgrazing and past burning as key factors in the site's recent history. Past management has also affected much of the surrounding peatland, with extensive peat cutting in particular having obscured the original form of the overall peatland unit. Purple moor-grass *Molinia caerulea* is ubiquitous and often abundant on gently sloping shallow blanket peats peripheral to the raised mire units and in places forms a very species-poor sward. Elsewhere, deergrass, hare's-tail cottongrass, common cottongrass *Eriophorum angustifolium* and occasional bog-myrtle *Myrica gale* contribute to a more diverse flora.

Flush and valley mire vegetation occurs widely throughout the Cors Goch mire wherever water seepage contributes to slight nutrient enrichment, and characteristic species include bottle sedge *Carex rostrata*, star sedge *Carex echinata*, bogbean *Menyanthes trifoliata*, sharp-flowered rush *Juncus acutiflorus* and the bog mosses *Sphagnum recurvum* and *S. palustre*. These areas also support the largest known lowland populations in Wales of the nationally scarce bog moss *Sphagnum affine*, while other notable species include oblong-leaved sundew *Drosera intermedia*, bog-sedge *Carex limosa*, water sedge *Carex aquatilis* and lesser bladderwort *Utricularia minor*. Areas of marginal lagg fen bordering the raised mires at this site are regarded as particularly significant in view of their widespread loss across the UK as a result of peripheral drainage and peat cutting.

Bryn Crwn is an area of unimproved herb-rich grassland lying above the general water table and the Cors Goch mire on a fluvio-glacial deposit called an esker. The predominant vegetation is neutral grassland with the main grasses being red fescue *Festuca rubra*, crested dog's-tail *Cynosurus cristatus*, common bent *Agrostis capillaris* and sweet vernal grass *Anthoxanthum odoratum*. The more frequent herbs include common knapweed *Centaurea nigra*, common bird's-foot-trefoil *Lotus corniculatus*, eyebright *Euphrasia officinalis* and red clover *Trifolium pratense*. Most of the lower slopes on the western flank of the esker, together with an area of flatter ground near the centre of the site, support the more nutrient-poor neutral grassland. This vegetation is distinguished by the presence of frequent tormentil *Potentilla erecta* and heath-grass *Danthonia decumbens*. Areas of more acidic grassland characterised by frequent heath bedstraw *Galium saxatile* and sheep's fescue *Festuca ovina* occur locally. Much of the acid grassland is species-rich and floristically similar to the neutral grassland. Some stands include bitter-vetch *Lathyrus linifolius*, devil's-bit scabious *Succisa pratensis* and mountain pansy *Viola lutea*. Notable grassland species include bitter wood-vetch *Vicia orobus*, adder's

tongue *Ophioglossum vulgatum*, mountain pansy, smooth lady's-mantle *Alchemilla glabra*, saw-wort *Serratula tinctoria* and pale sedge *Carex pallescens*.

South of Pont-y-Gribble on the eastern bank of the river is an area of wet grassland and associated mire and flush communities. The wet grassland is dominated by purple moor-grass but includes frequent sharp-flowered rush *Juncus acutiflorus*, and cross-leaved heath with only scattered *Sphagnum* cover. Herbs include tormentil, devil's-bit scabious and wild angelica *Angelica sylvestris*. Areas of acidic flushing have *Sphagnum*-dominated vegetation with a variety of grasses and sedges including carnation sedge *Carex panicea* and star sedge *Carex echinata*. Some flushes display a more base-rich influence, being dominated with sedges and mosses such as *Calliergon cuspidatum* and *Campylium stellatum* and flowering plants that include common butterwort *Pinguicula vulgaris*. Also within the site are areas of rush pasture, dry acidic grassland and wet heath. The uncommon globeflower *Trollius europaeus* is frequent along the river and the nationally rare liverwort *Scapania paludicola* is found in acid flushes.

The sessile oak *Quercus petraea* and downy birch *Betula pubescens* woodland supports a rich assemblage of lichens and characteristic ferns such as hard-fern *Blechnum spicant* and broad buckler-fern *Dryopteris dilatata*. Holly *Ilex aquifolium* and hazel *Corylus avellana* form the understorey and the field layer includes wavy hair-grass *Deschampsia flexuosa*, bilberry *Vaccinium myrtillus* and heather *Calluna vulgaris*. Characteristic mosses and liverworts include *Polytrichum formosum*, *Dicranum majus*, *Rhytidiadelphus loreus* and *Plagiochila spinulosa*. Rotting timber within the wood supports liverworts such as *Nowellia curvifolia*. The largest numbers of rare and scarce lichen species are found growing on sessile oak and include the nationally rare *Cladonia norvegica*, *Micarea hedlundii* and *Micarea xanthonica*. Other lichen species including the nationally rare *Micarea viridileprosa* are found on birch *Betula pubescens*, grey willow *Salix cinerea* and other broadleaved species. A number of nationally scarce lichens, for example *Bacidia trachona* and *Herteliana taylorii*, are found on rocks along the rivers and beneath the trees. The woodlands support large populations of flying insects that provide an important food source for bats, including the rare lesser horseshoe bat *Rhinolophus hipposideros*.

The Cors Goch mire supports a colony of the locally rare large heath butterfly *Coenonympha tullia* at one of its relatively few Welsh sites. The large heath butterfly occurs in lowland raised bogs, upland blanket bogs and damp acid moorland where the main larval food plants, hare's-tail cottongrass *Eriophorum vaginatum* and white beak-sedge *Rhynchospora alba* occurs. Wales contains the most southerly sites in Britain for this species.

Remarks:

1. The entire site is within the Snowdonia National Park.
2. Afon Eden - Cors Goch Trawsfynydd SSSI underpins both the Afon Eden Special Area of

Conservation and the Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionydd Oakwoods and Bat Sites Special Area of Conservation.

3. Floating water-plantain, freshwater pearl mussel, Atlantic salmon and otter are listed under

Annex II of the EC Habitats Directive (Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora) and qualify the site as part of the Afon Eden Special Area of Conservation.



4. The site supports a significant presence of two habitats listed in Annex 1 of the EC Habitats Directive namely, old sessile oak woods with *Ilex* and *Blechnum* and active raised bog.
5. The freshwater pearl mussel *Margaritifera margaritifera* is listed as Endangered (Category 1) on the IUCN Red List and is on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).
6. The otter *Lutra lutra* and floating water-plantain *Luronium natans* are listed on Schedule 5 and Schedule 8 respectively of the Wildlife and Countryside Act 1981 (as amended).

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## **14.0 THE FUTURE**

Since the reason to purchase Glan-Ilynau duon was to enhance its biodiversity, a few suggestions here for the future seem appropriate.

### **14.1 Grazing**

The farm has clearly been systematically grazed and burned for many years and, as a result, much of the habitat has deteriorated. As a fundamental and all-embracing aim, the removal of grazing should be treated as a priority. The boundary walls and fences are in very good condition and stock straying from adjoining farms are unlikely to be an issue.

In the complete absence of grazing, the entire site will revert to woodland but this may take many decades. Although Birch, Rowan, Sloe, Holly, Hawthorn and Grey Willow, already on the land albeit in very small numbers, will provide a ready seed source, the transition to woodland will be slow. However, as can be seen in **Photo 10**, Grey Willow is already colonising the Bog Myrtle-dominated mire at the north eastern corner. In a few decades this area especially will revert to Wet Woodland which is also a priority habitat in the SNPA's Biodiversity Action Plan (see SNPA website for details). This habitat is increasingly rare in the area and the creation of new such woodland would have excellent biodiversity outcomes.

The drier areas would also revert to woodland in the long term but in the short term might very well develop into a heath habitat. Western Gorse, Bilberry and Ling are found here albeit in vestigial quantities (see **Photo 18**) often preferentially grazed by sheep. Their presence suggests they would flourish in the absence of grazing, developing into heath habitat as part of the successional process towards woodland development.



**Photo 18: The vestigial remains of Heather (Ling) in one of the M25 areas. Removing grazing would allow plants like this to flourish in the short term.**

#### **14.2 Is a reversion to woodland over the entire site desirable?**

In an ideal world, the answer to this question must be a resounding ‘no’! The whole aim of the biodiversity approach is to increase the diversity of habitats as well as the species that occupy them. This, however, requires some intervention so that the varying successional processes that occur in woodland development can be arrested in places in order to allow different habitats to co-exist. Such intervention can take the form of grazing, burning or cutting. Clearly, such a manicuring approach is difficult on a large scale and will require human intervention. Naturalisation is not just a process of removing grazing and waiting for the results. Intervention is desirable and necessary.

For example, it might be considered desirable to maintain the integrity of the Bog Myrtle-dominated mire as it is by selectively removing any invading Willow. This area has by far the most attractive flora and some of the species found here might very well disappear if the area is allowed to revert to wet woodland. The development of wet woodland in the **NVC M25** and **M23** communities, on the other hand, is more desirable as these habitats have little plant species diversity.

### 14.3 Hay meadow creation

The most suitable form of intervention at Glan-Ilynau duon would be cutting. **Map 3** shows several quite large areas of acid grassland (**NVC U4**) which could be cut annually after the seed has set in order to encourage the development of traditional species-rich hay meadows (**NVC MG5: *Centaureo-Cynosuretum cristati*** grassland). It is recommended that the large area with the old ruin in the centre of the farm would be the most suitable for this approach but other acid grassland areas might also respond in the same way. The presence of *Ranunculus bulbosus* in some of the **U4** areas suggests these pastures might have retained some of their original flora in the underlying seed bank.

The recreation of species-rich hay meadows is complex and involves a process of nutrient stripping. This is achieved by cutting after July 15<sup>th</sup> every year and removing all arisings. Ideally, a hay crop should be produced rather than silage as this allows any seeds to re-enter the sward after the hay crop has dried on the ground. **Gritten Ecology** has a lot of experience of such meadow creation and would be happy to advise.

### 14.4 Bird habitat

The presence of barn owls in the area to the west is encouraging and it would be good to erect barn owl boxes in some of the ruined buildings to encourage this species to nest here.

Lapwings, which are a declining species in the area would benefit from shallow ponds/scrapes and these could be easily dug in some of the wetter areas besides the river.

### 14.4 The ruined buildings

Though not strictly ecological, it would be of interest to carefully clean out the old farm buildings to the south of the farm. These, on superficial examination, appear to be full of old farm machinery and it might be of interest to salvage some of these for their historical value.

### 14.5 Internal fences

Since it is recommended that all grazing is removed from the site, the internal fences could all be removed. Many of these are no longer stock-proof and have little value apart from as eyesores.

### 14.6 Freshwater Pearl Mussels

Though not strictly within the boundaries of the farm, the features of the adjacent SAC/SSSI, designated in part for the Pearl Mussel population, would be impacted upon by inappropriate land management in the riparian zones. There is a project currently in operation, The Welsh Government funded Sustainable Management Scheme Afon Eden Project. This scheme, which unfortunately finishes

at the end of August this year, is being managed by Sam Price ([Sam.Price@eryri.llyw.cymru](mailto:Sam.Price@eryri.llyw.cymru)) and it would be good to contact him to see if any funding or advice is available about riparian land management that would enhance the Pearl Mussel population.

In any event, it is clear from the NRW SAC Core Management Plan (attached separately) that it would be desirable to increase the cover of riparian Willow since this creates shade that is favoured by this species. Increasing riparian cover would also be desirable for otters too.

#### **14.7 INNs**

With the presence of a number of INNs not too far away, a watching brief should be maintained to ensure these undesirable species do not spread into the holding.

#### **14.8 Monitoring**

Whilst future management to increase the biodiversity interest of Glan-Ilynau duon is desirable for its own sake, a great deal of additional interest can be gained by monitoring and interpreting the impact of this management. This can be done in a variety of ways, the simplest being fixed-point photomonitoring. Another, more informative approach, is to undertake the monitoring of permanently marked quadrats in each of the different plant communities. This is a technical approach that requires specialist skills, not only in plant identification but also in the statistical analysis and interpretation of the results. I have contacts at the University of Wales at Bangor who might be interested in using the farm as a long-term research project for their Ecology students.

#### **15.0 REFERENCES**

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