A survey for the Water Beetles *Haliplus variegatus*, *Hydrochus ignicollis*, *Hydrovatus clypealis* and *Limnebius aluta* on selected Anglesey wetlands in 2024

NRW Evidence Report No. 874

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Fen at Cors Goch, near Llyn Cadarn supporting *Limnebius aluta*. August 2024

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Contents

List of figures

List of tables

Crynodeb gweithredol

Arolygwyd pum safle ffen ar Ynys Môn (Cors Bodeilio, Cors Goch, Cors y Farl, Llyn Padrig a Rhos y Gad) ym mis Awst 2024 i gadarnhau presenoldeb parhaus nodweddion cymhwyso Safle o Ddiddordeb Gwyddonol Arbennig (SoDdGA) ar ffurf pedair rhywogaeth chwilod – *Haliplus variegatus*, *Hydrochus ignicollis*, *Hydrovatus clypealis* a *Limnebius aluta*.

Ni ddaethpwyd o hyd i unrhyw unigolion *Haliplus variegatus* yn Rhos y Gad, er ei bod yn ymddangos bod diffyg cynefin addas o bosibl o ganlyniad i lai o reolaeth. Mae'n bosibl y bydd angen cynnal arolwg yn gynharach (ym mis Ebrill) neu'n hwyrach (ym mis Medi) yn y tymor er mwyn casglu rhagor o dystiolaeth ynghylch presenoldeb neu absenoldeb tebygol y chwilen hon.

Mae *Hydrochus ignicollis* yn parhau i fod yn bresennol yng Nghors Goch ond mae wedi'i chyfyngu i ardal fach iawn o'r safle. Mae angen ymchwilio ymhellach i ddeall y rhesymau y tu ôl i'r dosbarthiad cyfyngedig hwn.

Ni ddaethpwyd o hyd i unrhyw unigolion *Hydrovatus clypealis* yn Llyn Padrig. Mae'r safle'n dod yn fwyfwy daearol, gyda gorchudd prysgwydd trwm ac effeithiau tybiedig o ddefnydd tir amgylchynol ar ansawdd y dŵr. Mae cael mynediad i gynnal arolwg o gynefin addas ar gyfer y rhywogaeth wedi'i gyfyngu'n ddifrifol gan lefel y gorchudd prysgwydd. Argymhellir cynnal arolygon pellach i gasglu tystiolaeth ar bresenoldeb neu absenoldeb tebygol y chwilen o ystyried mai dyma'r unig leoliad yng Nghymru lle mae posibilrwydd o ddod o hyd iddi ar hyn o bryd.

Ymddengys fod *Limnebius aluta* yn gyffredin ond yn fylchog ar draws Cors Goch, gyda nifer o unigolion wedi'u cofnodi yn eithafion dwyreiniol a gorllewinol y safle. Roedd y rhywogaeth hefyd yn bresennol yn Rhos y Gad, er mewn niferoedd isel. Fodd bynnag, ni ddaethpwyd o hyd iddo o fewn Cors Bodeilio na Chors y Farl, gyda chynefin addas o bosibl yn brin yn y ddau leoliad. Gallai nodi'r mathau o lystyfiant o ran y Dosbarthiad Llystyfiant Cenedlaethol yn lleoliadau Cors Goch helpu i dargedu arolygon pellach o gynefinoedd addas ar y safleoedd hyn.

Gwneir argymhellion rheoli i ddarparu cynefin mwy addas o fewn Cors y Farl, Llyn Padrig a Rhos y Gad, gan gynnwys torri llystyfiant a phrysgwydd, sefydlu cyfundrefnau pori sympathetig, a chreu pyllau dŵr tymhorol a phyllau bas.

Executive summary

Five Anglesey fen sites (Cors Bodeilio, Cors Goch, Cors y Farl, Llyn Padrig and Rhos y Gad) were surveyed in August 2024 to confirm the continued presence of four SSSI qualifying beetle species features - *Haliplus variegatus*, *Hydrochus ignicollis*, *Hydrovatus clypealis* and *Limnebius aluta*.

No individuals of *Haliplus variegatus* were found at Rhos y Gad although suitable habitat seemed to be lacking possibly as a result of reduced management. A survey earlier (April) or later (September) in the season may be required to further gather evidence on its likely presence or absence.

Hydrochus ignicollis continues to be present at Cors Goch but is restricted to a very small area of the site. Understanding the reasons behind this limited extent require further investigation.

No individuals of *Hydrovatus clypealis* were found at Llyn Padrig. The site is becoming increasingly terrestrialised with heavy scrub cover, with suspected impacts from surrounding land use on water quality. Access to survey suitable habitat for the species is severely restricted by the level of scrub cover. Further surveys are recommended to gather evidence on the likely presence or absence of the beetle given that this is its only contemporary Welsh locality.

Limnebius aluta appeared to be widespread but patchy across Cors Goch, with a number of individuals recorded in the eastern and western extremes of the site. The species was also present at Rhos y Gad, albeit in low numbers. However, it was not found on either Cors Bodeilio or Cors y Farl, with suitable habitat possibly lacking at both locations. Identifying the NVC vegetation types at the Cors Goch locations may help target further surveys of suitable habitat at these sites.

Management recommendations are made to provide more suitable habitat on Cors y Farl, Llyn Padrig and Rhos y Gad including cutting vegetation and scrub, establishing sympathetic grazing regimes and creating shallow scrapes and pools.

1. Introduction

1.1 *Haliplus variegatus*

A member of the crawling water beetle family Haliplidae, this water beetle feeds on stoneworts and is usually associated with shallow, stagnant, often base-enriched, water over soft peat or clay, including in lowland fens, coastal grazing levels and, in Ireland, cutover bogs and turloughs (Foster, 2010; Foster & Friday, 2011). Historically the species was more widespread with records from 74 hectads across England and Wales but there has been a substantial decline and since 1980 it is known from only 24 hectads (Foster *et al*., 2016). *Haliplus variegatus* is currently classified as Vulnerable (Foster, 2010). Adults can be found throughout the year, peaking in April and September.

In England, it is now largely restricted to relict lowland sites with clean water including the New Forest, Norfolk Broads, and the Lizard with scattered records elsewhere from Cambridgeshire, Herefordshire, Isle of Wight, Lincolnshire, Somerset, Suffolk and Sussex (Foster, 2010; Foster *et al*., 2016). In Wales, there are historic records from Denbighshire and Pembrokeshire, with more recent records from the Gwent Levels and Kenfig. However, contemporary records are restricted to Rhos y Gad on Anglesey and Cefn Bryn Common on Gower where it was recorded during a Dipterists Forum meeting based at Swansea in July 2009 (Table 1).

Haliplus variegatus is a qualifying feature on Cefn Bryn Common SSSI and Gwenfro & Rhos y Gad SSSI.

Table 1. Welsh records of *Haliplus variegatus*.

Site	Vice county	Grid reference	Date	Abundance
Caldicot Level, Rogiet	35	ST4687	07/10/1931	-
Gwent Levels, Peterstone	35	ST2880	26/08/1946	-
Gwent Levels	35	ST38	1976	-
Cefn Bryn Common	41	SS5191	10/07/2009	-
Kenfig	41	SS78	25/09/1946	-
St. David's	45	SM12	1900 - 1910	-
Afon Ceiriog, Pontfaen	50	SJ23	1897 - 1898	-
Rhos y Gad	52	SH510788	10/07/1999	1 male + 1 female
Rhos y Gad	52	SH510788	12/05/2000	-

1.2 *Hydrochus ignicollis*

A member of the water scavenger beetles family Hydrochidae, this water beetle occurs in stagnant, well-vegetated pools, often in association with mosses in the margins of sites that dry out (Foster *et al*., 2016). Adults feed on algae but the larval diet is unknown. The typical habitat in England and Wales is mesotrophic fen amongst mosses but in Ireland it is more associated with lake shore fens amongst reed or sedge litter (Foster *et al*., 2014).

The species is relatively widespread in Ireland but has a restricted distribution in Great Britain with records from 31 hectads in England and Wales with a small decline since 1980 being now found in 22 hectads (Foster *et al*., 2018). *Hydrochus ignicollis* is currently classified as Near Threatened (Foster, 2010). Adults have been recorded in most months, peaking in August (Foster *et al*., 2014).

In England the species is almost exclusively associated with ancient fenland such as the Breckland lithalsa fens, the Broads and Cambridgeshire fens and coastal levels in Kent and Sussex (Foster *et al*., 2018). Other post-1980 records exist in Somerset, Huntingdonshire, Lincolnshire and Northamptonshire with the latter three from more modern atypical habitats including a brickpit pond (Foster *et al*., 2018). It was first recorded recorded in Wales from Cors y Farl on Anglesey in July 1976 (Ismay *et al*., 1978), and subsequently found on two occasions (1997 and 2004) at the margin of Llyn Cadarn on Cors Goch (John Bratton, pers. comm.) (Table 2). A single female was recorded on Cors Bodeilio in June 2024 (John Bratton, pers. comm.).

Hydrochus ignicollis is a qualifying feature on Cors Goch SSSI.

Table 2. Welsh records of *Hydrochus ignicollis*.

Site	Grid reference	Date	Abundance
Cors Bodeilio	SH50437746	18/06/2024	1 female
Cors Goch, Llyn Cadarn	SH492810	12/07/1997	1 male
Cors Goch, Llyn Cadarn	SH49188105	19/05/2004	1 male
Cors y Farl	SH4977	06/07/1976	-

1.3 *Hydrovatus clypealis*

This predatory diving beetle (Dytiscidae) occurs in muddy lowland ponds and ditches usually with marginal vegetation (Foster *et al*., 2016). It has been found on alkaline mud as well as among rafts of Marsh St John's-wort *Hypericum elodes* on acidic peat (Foster *et al*., 2016). It has a mostly southern distribution in Great Britain and Ireland with most populations found along the English Channel coast from Cornwall to Kent including the Isle of Wight, but with outliers in Somerset, East Anglia and Anglesey (Foster *et al*., 2016). There are records from 48 hectads in Great Britain of which 28 are since 1980 (Foster *et al*., 2016). *Hydrovatus clypealis* is currently classified as Nationally Scarce and Least Concern (Foster 2010). Adults have been recorded from March to December, peaking in May and September (Foster & Friday 2011).

In Wales, there are historic records of *Hydrovatus clypealis* from Kidwelly (Price, 1960), Porthselau in Pembrokeshire (Balfour-Browne, 1947) and Oxwich (Foster & Friday, 2011). A record from St. Brides on the Gwent Levels in March 1992 is regarded as erroneous. The only Welsh locality with a contemporary record is Llyn Padrig on Anglesey where several adults were found in May 2002 (John Bratton, pers. comm.) (Table 3).

Hydrovatus clypealis is a qualifying feature on Llyn Padrig SSSI.

Table 3. Welsh records of *Hydrovatus clypealis*.

Site	Vice county	Grid reference	Date	Abundance
Oxwich	41	SS5088	27/04/1918	1 adult
Kidwelly	44	SN30	1959	several adults
Porthselau	45	SM7225	August 1946	several adults & larvae
Llyn Padrig	52	SH363726	13/05/2002	several adults

1.4 *Limnebius aluta*

This tiny water beetle measures less than 1.3mm in length and is a member of the moss beetles (Hydraenidae). It is restricted to relict lowland fen areas in England and Wales, living in the edges of pools and slow running ditches in association with mud, wet moss and litter beneath rich, emergent vegetation (Foster, 2010). It can also be found in shaded areas such as reedbeds and fen carr (Foster *et al*., 2020). It has been recorded from 37 hectads in England and Wales with 26 of those since 1980 (Foster *et al*., 2020). Whilst its small size means it may be under-recorded, it does seem to be genuinely confined to relict fens and is currently considered Near Threatened (Foster, 2010).

In England the majority of records are from Breckland palsa scar fens and Broadland ditches in East Anglia but with outliers in Wicken Fen, Cambridgeshire, at Catcott Heath on the Somerset Levels and Strensall Common in Yorkshire (Foster, 2010; Foster *et al*., 2020). In Wales the species is restricted to the Anglesey fens. Records from Glamorgan in the 19th and early 20th Century (Tomlin, 1913) are now known to have been erroneous, with voucher specimens re-identified as *Limnebius nitidus* (Bratton, 1998; Kirk-Spriggs & Foster, 1992). The first authentic Welsh record of *Limnebius aluta* was from Cors y Farl on Anglesey in 1997 (Bratton, 1998) and it has subsequently been found on Cors Bodeilio, Cors Goch (Harold & Thomas, 2004) and Rhos y Gad. It was also found on Malltraeth Marsh during a survey for the water beetle *Hydrochus brevis* (Bratton, 2003) and there are subsequent records in 2005 and 2006 (Table 4).

Limnebius aluta is a qualifying feature on Cors Bodeilio SSSI, Cors Goch SSSI, Cors y Farl SSSI, Gwenfro & Rhos y Gad SSSI, and Malltraeth Marsh/Cors Ddyga SSSI.

Table 4. Welsh records of *Limnebius aluta*.

Site	Grid reference	Date	Abundance
Bryn Farm, Rhos y Gad	SH510788	12/05/2000	-
Cors Bodeilio	SH499775	05/07/1998	1 adult
Cors y Farl	SH490779	27/07/1997	1 female
Cors Goch	SH492810	20/06/1999	-
Cors Goch	SH501816	17/05/2000	-
Cors Goch, Llyn Cadarn	SH49278112	03/07/2003	-
Cors Goch, Llyn Cadarn	SH49188105	19/05/2004	2 adults
Cors Goch, Llyn Cadarn	SH49228118	14/07/2004	1 adult
Cors Goch, Llyn Cadarn	SH492810	16/06/2010	1 adult

Site	Grid reference	Date	Abundance
Malltraeth Marsh	SH46167234	08/05/2003	4 adults
Malltraeth Marsh	SH461723	20/03/2005	25 adults
Malltraeth Marsh	SH461723	11/06/2006	1 adult

1.5 Survey objectives

Surveys in August 2024 will attempt to provide contemporary records of the four beetles for all previously-occupied sites on Anglesey (excluding Cors Ddyga/Malltraeth Marsh) and an assessment of current status. This will involve a survey of Rhos y Gad for *Haliplus variegatus,* a survey of Cors Goch for *Hydrochus ignicollis*, and a survey of Llyn Padrig for *Hydrovatus clypealis*. For *Limnebius aluta*, surveys of Cors Bodeilio, Cors Goch, Cors y Farl and Rhos y Gad are required. Initially, surveys will focus on known localities for the beetles on each site but these should be extended to encompass all suitable areas as time allows. Occupied areas will be mapped and photographed, and all records will be provided as an Excel spreadsheet. Any threats to the species or habitats should be noted.

2. Methods

Suitable habitat in each of the previous known locations of the aforementioned sites was surveyed during the period 26th to 30th August 2024. Where sufficient water depth allowed, a standard water net with a 1mm mesh was used to sample water among submerged and emergent vegetation. In places where there was insufficient water depth and/or sampling of short saturated surface vegetation such as mosses, a variety of small handheld plastic sieves and tea strainers were used. The latter was of particular importance for sampling *Limnebius aluta* which due to its very small size was able to easily pass through the 1mm pond net mesh and the mesh of all the sieves bar the tea strainer.

In addition to direct sampling of the water in and around vegetation using the nets and sieves, localised “puddling” was also used to flush beetles out. This essentially involves gently pushing vegetation below the water using a foot, net or sieve, to dislodge beetles from their hiding places and then using a net or sieve to collect the beetles as they either float to the surface or dart for cover. This proved a particularly useful technique in areas of “floaty fen” where the majority of the vegetation sat above the waterline.

Time spent sampling varied depending on the size of the site and extent of suitable looking habitat, as well as the area over which the original grid reference extended. Where previous grid references were detailed (8 or 10 figure), a maximum of around 60 minutes was spent sampling a specific location but where grid references were less precise (6 figures or less) a shorter, more roaming approach was taken to cover more ground. Where time allowed, other suitable looking habitat was sampled following the shorter, roaming approach.

Voucher samples were retained of target species from each site to confirm identifications. Identification of *Limnebius aluta* was verified using the key to the genus in Duff (2012) including dissected male material. Identification of *Hydrochus ignicollis* was verified using the key in Foster *et al*. (2014) including dissected male material.

3. Results

During the survey in August 2024, *Hydrochus ignicollis* was recorded at one station on Cors Goch, and *Limnebius aluta* was found at seven stations on Cors Goch and two stations on Rhos y Gad (Table 5). *Haliplus variegatus* was not recorded at Rhos y Gad and *Hydrovatus clypealis* was not found at Llyn Padrig.

Table 5. Records of *Hydrochus ignicollis* and *Limnebius aluta* in August 2024.

Species	Site	Grid reference	Date	Abundance
Hydrochus ignicollis	Cors Goch	SH4917781062	26/08/2024	4 adults
Limnebius aluta	Cors Goch	SH5018081665	26/08/2024	3 adults
Limnebius aluta	Cors Goch	SH4921981069	26/08/2024	5 adults
Limnebius aluta	Cors Goch	SH4995581351	26/08/2024	1 adult
Limnebius aluta	Cors Goch	SH5019981630	26/08/2024	1 adult
Limnebius aluta	Cors Goch	SH5003581452	30/08/2024	1 adult
Limnebius aluta	Cors Goch	SH5001481471	30/08/2024	3 adults
Limnebius aluta	Cors Goch	SH5002781442	30/08/2024	2 adults
Limnebius aluta	Rhos y Gad	SH5103578928	28/08/2024	1 adult
Limnebius aluta	Rhos y Gad	SH5103178929	28/08/2024	1 adult

3.1 Rhos y Gad

Rhos y Gad is part of the 44ha Gwenfro & Rhos y Gad SSSI, two distinct wetland areas selected primarily for their examples of rich fen habitat (Figure 1). This SSSI forms part of the wider Anglesey Fens SAC. Both sections are linked hydrologically and supplied with base-rich water and support a range of rich fen and meadow plant communities. The Rhos y Gad section of the SSSI is split into two southern fields (Units 6 & 7) and two northern fields (Unit 8) separated by a stone track running to Rhos-y-Gad farm. All units are privately owned by two landowners, with one owning Units 7 and 8 and the other owning Unit 6.

The site was visited with Corinna Van Cayzeele (NRW) in dull weather on 28th August 2024. The two fields making up Unit 8 were heavily grazed and largely dry on the day of the visit bar for a small pool in the south-eastern corner which was damp at the bottom. Unit 7 (the northern of the two southern fields) was also largely dry and looked unsuitable habitat therefore the focus of the survey was concentrated on Unit 6 at the far southern end (Figure 2). It was in this southern unit that the previous records of *Haliplus variegatus* and *Limnebius aluta* had been found in 1999 and 2000 (see Tables 1 and 4 respectively).

In each case, the grid reference given was a 1ha area demarcated by the green square in Figure 2.

On the day of the visit, the vegetation of the unit was dominated by a range of stands of dense graminoid species including *Juncus subnodulosus* and *Carex* sp. (Figure 3). There was a small stand of dense *Cladium mariscus* near the centre of the unit (visible above the NW corner of the green box in Figure 2) surrounded to the east and south by an area of more open, *Carex*-dominated "floaty fen" (Figure 4). There were also small stands of *Schoenus nigricans* including an area in the far southern tip of the unit. There were small amounts of short *Salix* scrub beginning to encroach in places including around the edges of the "floaty fen" (Figures 3 and 4).

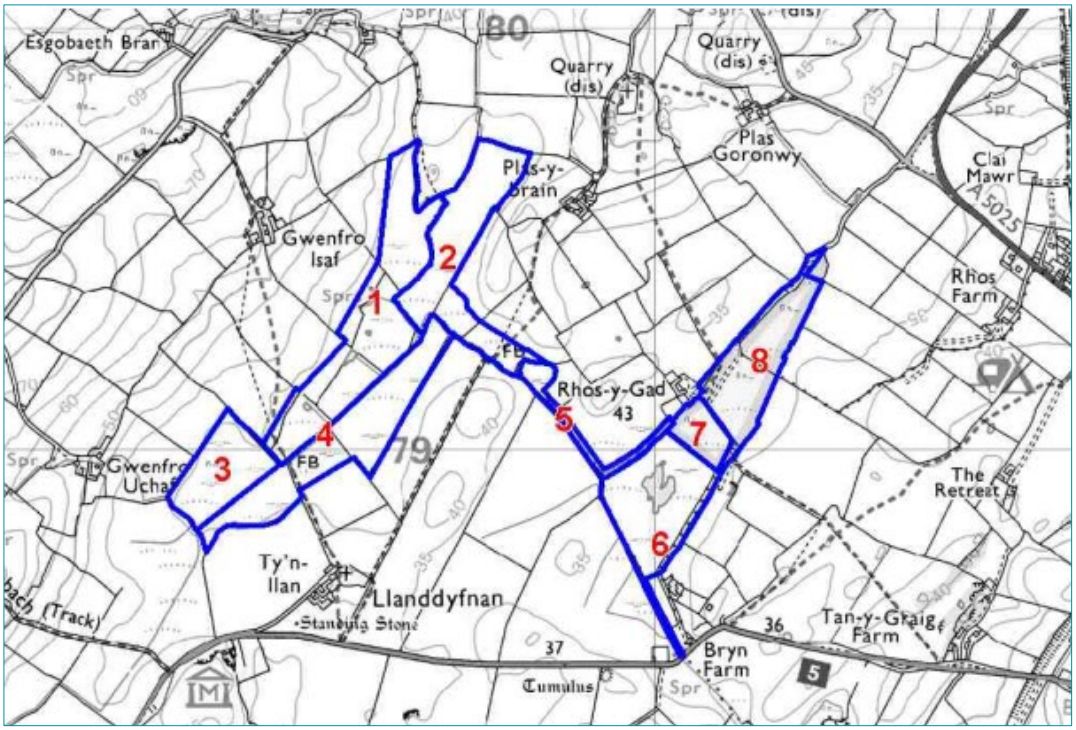

Figure 1. Location and extent of Gwenfro & Rhos y Gad SSSI. Rhos y Gad covers the eastern units of 6, 7 and 8.

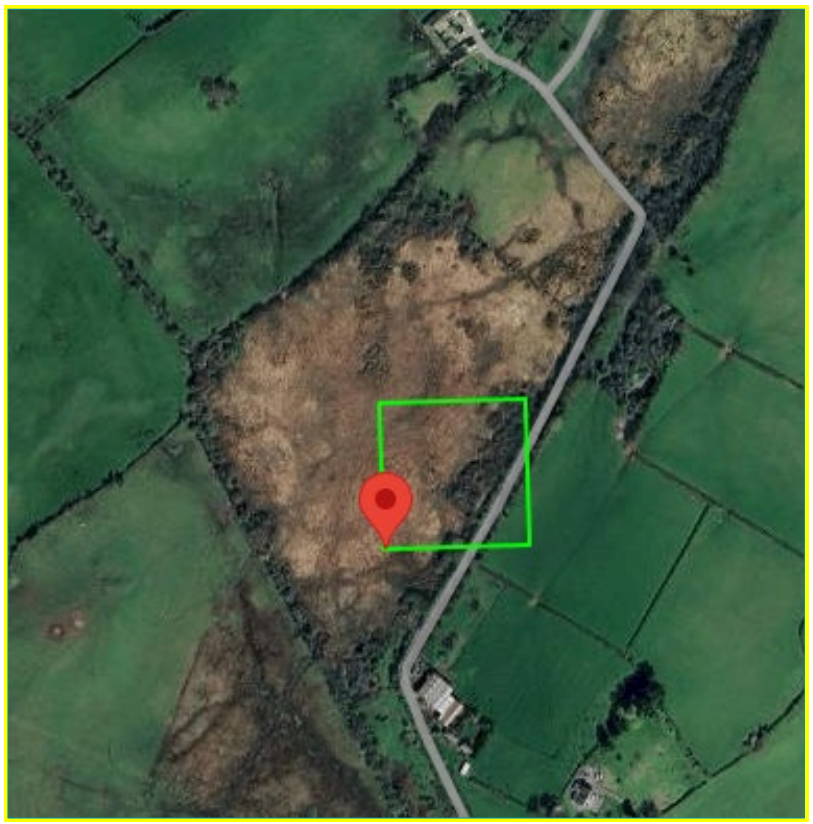

Figure 2. Previous location of *Haliplus variegatus* (1999 & 2000) and *Limnebius aluta* (2000) at Rhos y Gad (green square, 100m).

Water levels on the site were at or just above the surface but this was very difficult to access because of the dense stands of collapsed graminoids, in particular the stands of *Juncus*. A quick search failed to find any evidence of shallow pools or areas of open standing water with stoneworts, the expected habitat of *Haliplus variegatus*. The only exception was small amounts of surface water dispersed among the bases of *Schoenus nigricans* tussocks in the far southern corner of the unit, some of which held very small amounts of stonewort plants. These little flooded areas were only a few centimetres deep and probably amounted to no more than a few square metres in total. Some were possibly associated with old wheels ruts (e.g. SH51004 78786; Figure 5). Despite extensive sampling with small plastic sieves, no *Haliplus* or *Limnebius* were recovered.

Attention then moved to the area of “floaty fen” in the centre. Two *Limnebius aluta* individuals (one male & one female) were found in close proximity to each other by puddling in this area at SH51035 78928 and SH51031 78929. The vegetation was largely dominated by *Carex* sp. and *Menyanthes trifoliata* above a carpet of mosses (Figure 6). The location of these new records in relation to the previous record is shown in Figure 7.

Figure 3. View looking north of the generally dense *Carex*- and *Juncus*-dominated vegetation down the eastern side of Rhos y Gad.

Figure 4. View across the *Carex*-dominated “floaty fen” with small stand of *Cladium* visible in the background.

Figure 5. Example of the small amounts of surface water found away from the wetter "floaty fen" area in the centre. This particular spot appeared to be the result of wheel rutting between *Schoenus* tussocks.

Figure 6. Puddling spot in the "floaty fen" at SH51035 78928 where single *Limnebius aluta* individual was recorded (see Figure 4 for general view of the area).

Figure 7. Location of earlier *Haliplus variegatus* (1999 & 2000) and *Limnebius aluta* (2000) records (green square, 100m) and the 2024 records of *Limnebius aluta* (blue dots).

3.2 Cors Bodeilio

Cors Bodeilio SSSI covers 54ha and is part of the wider Anglesey Fens SAC (Figure 8). Large parts of it are managed as a National Nature Reserve by Natural Resources Wales including extensive grazing by Welsh Mountain ponies. The SSSI is designated for its important calcareous valley mire which has promoted the development of a range of rich fen vegetation communities overlying fen peat.

Limnebius aluta was previously recorded in Unit 1 in 1998 in a 1ha area demarcated by the green square in Figure 9. This area was visited briefly on the morning of 27th August 2024 with Mike Howe and Bethan Beech (NRW) in driving rain. It was largely dominated by tall *Cladium mariscus* with relatively little water underfoot bar small pockets in what looked to be pony poach marks. There was little vegetation below the tall *Cladium* except small patches of moss. An area of shorter vegetation with *Carex* sp., *Juncus subnodulosus* and *Schoenus nigricans* around SH49977752 contained more patches of water and mosses. Finally, in and beyond the NE corner of this 1ha area around SH50007757 was a more extensive area dominated by *Schoenus nigricans* tussocks between which there was standing water and patches of *Utricaria* sp. All these areas were sampled using small sieves and/or a pond net but no *Limnebius* were recorded. Due to the very wet conditions, no photos were taken of any of the sampled areas.

A second brief visit was made on the afternoon of 29th August 2024 in drier conditions. This time surveys were concentrated in and around the various pools, drains and fen areas in Unit 3 in the NE corner of the site. Again, no *Limnebius* were recorded.

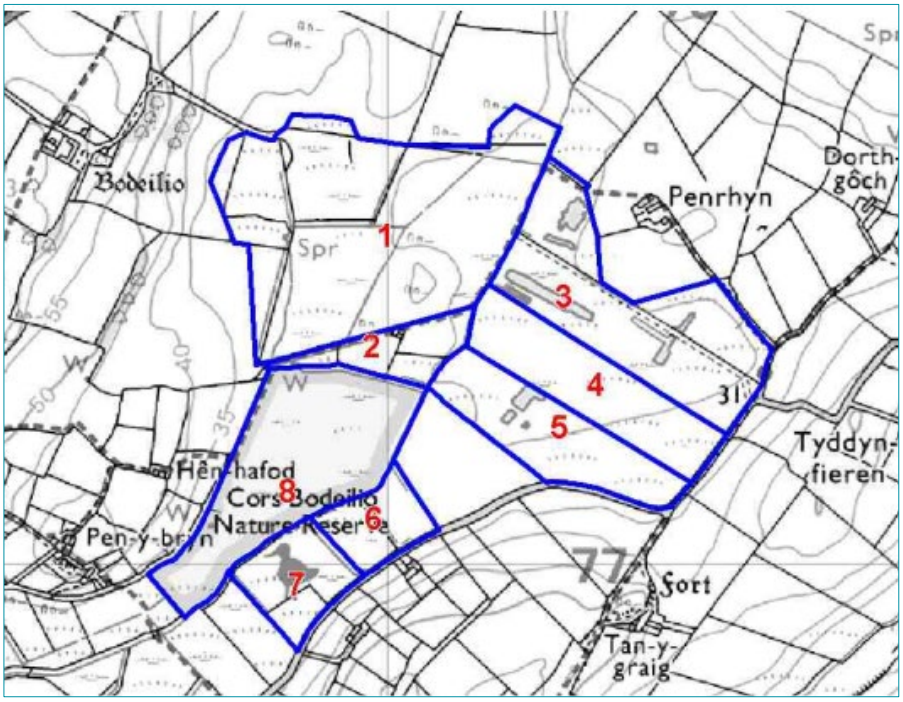

Figure 8. Location and extent of Cors Bodeilio SSSI.

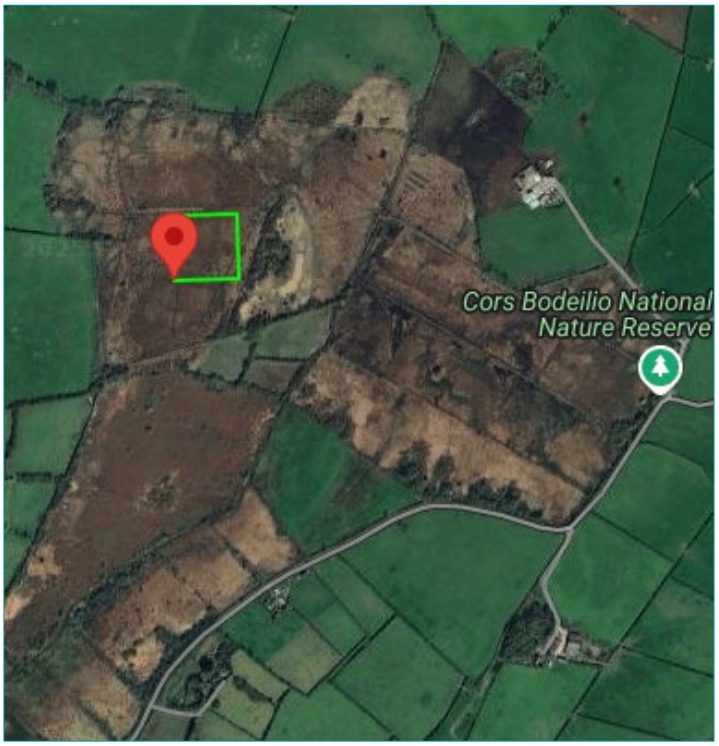

Figure 9. Previous location of *Limnebius aluta* (1998) at Cors Bodeilio (green square, 100m).

3.3 Llyn Padrig

Llyn Padrig is a 27ha mesotrophic basin mire and remnant lake that has developed in a natural waterlogged hollow (Figure 10). The small lake is now largely surrounded by willow, alder and birch scrub but there are also areas of open swamp and poor-fen communities present. The site is surrounded on all sides by a combination of intensive dairy-farming and arable.

Hydrovatus clypealis was previously recorded in a 1ha area demarcated by the green square in Figure 11. The site was visited with Mike Howe (NRW) on the morning of 30th August 2024 in good weather. Access points to the site are severely limited. An initial attempt to access the open edge of the lake in the NE corner via the large field adjacent to Tal-y-llyn church was disrupted by a large herd of rather too inquisitive dairy cows! The scrub either side of this opening was also impossible to penetrate easily. However, a stile was then discovered along the fence line separating the SSSI from the field immediately south which led to a path through an area of wet woodland and soft ground to the open fen area where *Hydrovatus* had previously been recorded (Figure 12).

This area of open fen is less than 1ha in size and becoming increasingly encroached by willow, birch and alder scrub. The vegetation was dominated by a thick layer of dry *Sphagnum* which presumably normally forms a floating layer in wetter winter conditions. Any water was inaccessible below the thick vegetated layer although a small window perhaps no more than 10m wide in the fringing scrub allowed access to the water's edge (Figure 13). The water's edge was steep sided and fringed by a very narrow layer of emergent *Typha* and other overhanging vegetation. The water itself was green and turbid. Working this fringe with a pond net failed to find any signs of *Hydrovatus*. Picking a way along the edge of the lake to the south through the scrub revealed occasional silty, leaf litter filled, shallow pools under the scrub. Again, working these with a small sieve produced no *Hydrovatus.* The other large area of open fen and swamp further south proved equally unproductive with no surface water.

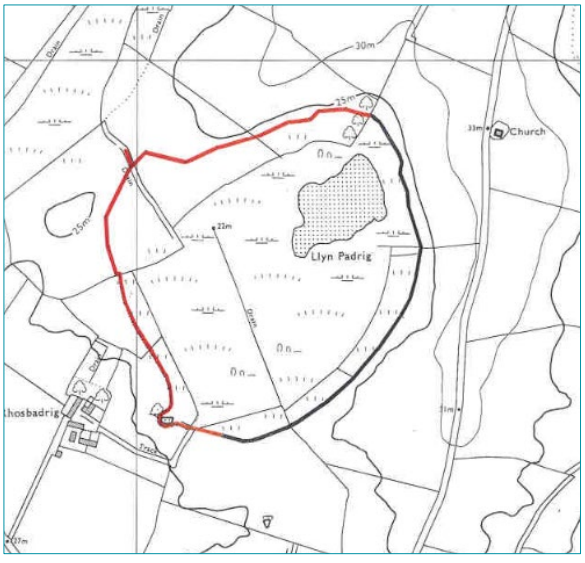

Figure 10. Location and extent of Llyn Padrig SSSI.

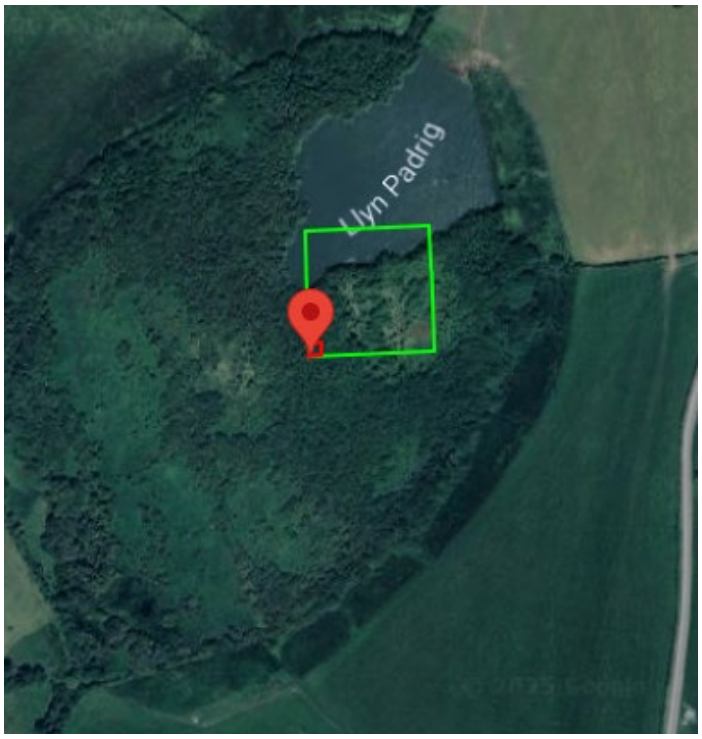

Figure 11. Previous location of *Hydrovatus clypealis* (2002) at Llyn Padrig (green square, 100m) showing small area of open fen among scrub.


Figure 12. Location of open fen with fringing and encroaching trees and scrub at location demarcated by green square in Figure 11.

Figure 13. Narrow opening in the fringing scrub on the lake shore at location demarcated by green square in Figure 11. This opening was only around 10m wide and bounded either side by dense scrub. It was the only access to the lake edge away from the dairy cow field.

3.4 Cors y Farl

Cors y Farl SSSI is a small (15ha) calcareous mire east of the village of Talwrn. It has a central stand of *Cladium mariscus* and fringing areas of spring-fed mire (Figure 14). It is privately owned and managed by the adjacent Plas Llanddyfnan estate. This SSSI also forms part of the wider Anglesey Fens SAC.

The site was visited on the morning of 29th August 2024 in good weather. *Limnebius aluta* was previously recorded in the 1ha area demarcated by the green square in Figure 15. It was not possible to visit this area due to the impenetrability of the central stand of tall, dense, *Cladium*. Surveys on the day were therefore restricted to the more accessible fen communities down the eastern edge and in the NW corner. The NE corner was fairly wet and floaty with some good areas of semi-submerged mosses below the open *Carex* layer but no *Limnebius* were recorded. Heading further south along this eastern edge revealed a wet fringe of mostly *Juncus*-dominated vegetation of varying width with patches of semi-submerged mosses that again failed to yield any *Limnebius* (Figure 16).

Attempts to access the western edge of the site via the bridge across the ditch in the south of the site were foiled by dense encroaching *Cladium*. The NW corner was accessible via a gateway along the access road to Plas Llanddyfnan. The vegetation in this corner was generally dominated by a stand of collapsed *Juncus* with invading *Phragmites* and *Cladium* which was impossible to sample due to the density of vegetation (Figure 17). Closer to the main *Cladium* stand in this corner, the vegetation gave way in parts to a shorter more open *Carex*-dominated vegetation (again with invading *Phragmites* and *Cladium*) with patches of semi-submerged mosses, and some *Utricaria* sp. and *Chara* sp. (Figure 18). Unfortunately, no *Limnebius* were recorded in any of these areas.

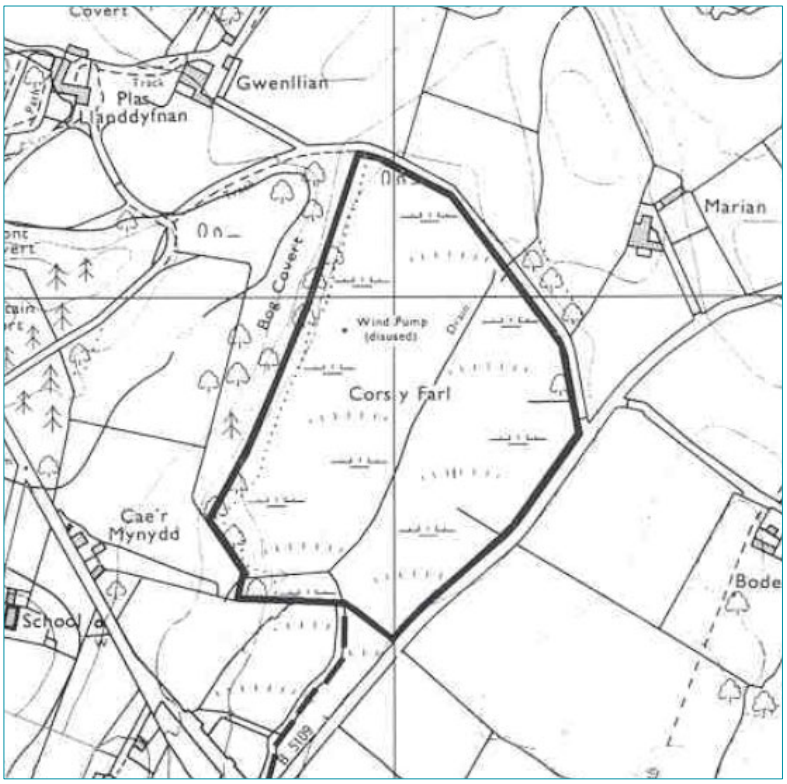

Figure 14. Location and extent of Cors y Farl SSSI.

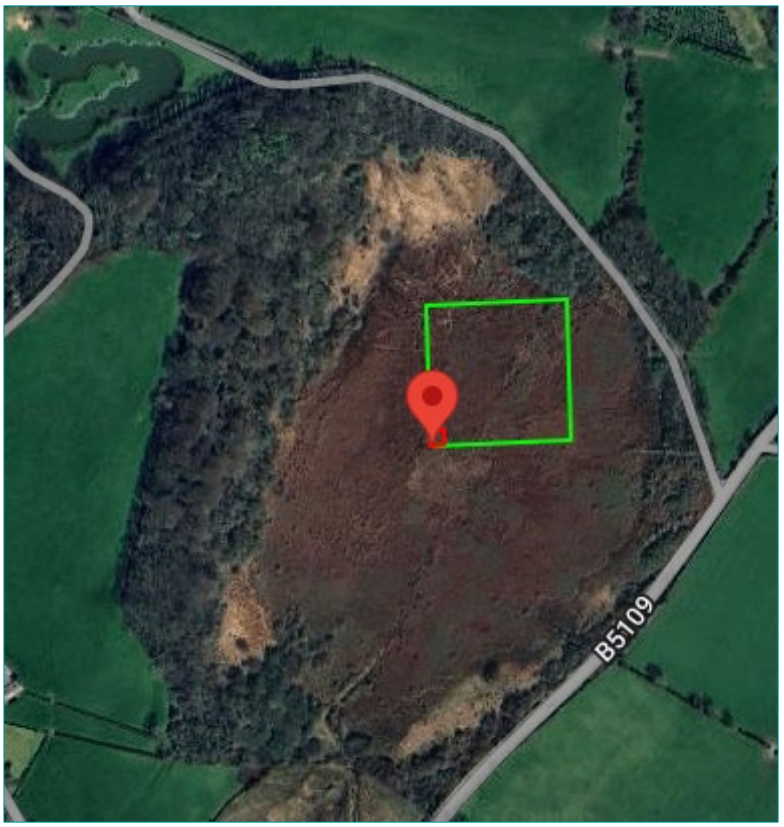

Figure 15. Previous location of *Limnebius aluta* (1997) at Cors y Farl (green square, 100m).

Figure 16. Eastern fen area looking south with edge of dense *Cladium* bed visible in top right corner.

Figure 17. *Juncus*-dominated fen with encroaching *Phragmites*, and to lesser extent *Cladium*, in far NW corner.

Figure 18. *Carex*-dominated stand with encroaching *Phragmites* and *Cladium* in NW corner with more open structure, and with standing water and semi-submerged mosses below.

3.5 Cors Goch

Cors Goch SSSI is a 54ha valley mire that has developed in a hollow in the Carboniferous limestone (Figure 19). A complex geology interspersed with sandstone means that among the base-rich fen are stands of acidic heath and limestone grassland. The fen is divided into an eastern and western basin by a rock promontory with the eastern basin generally wetter and the western basin somewhat drier but with a similar variety of fen communities. The western basin also contains a lake (Llyn Cadarn). Higher areas in the fen have more acidic vegetation including *Sphagnum mosses*. Large parts of the site are managed by the North Wales Wildlife Trust. Management includes the use of a mixed herd of hardy cattle. Previous records of *Limnebius aluta* were found in the far eastern and far western ends of the SSSI, with the latter clustered around Llyn Cadarn (Figures 20 & 21), whilst records of *Hydrochus ignicollis* were restricted to just the margins of Llyn Cadarn in the western end (Figure 22).

The site was initially visited on 26th August 2024 with Mike Howe (NRW) and again on the afternoon of 30th August 2024. Surveys focussed primarily around the previous known locations but additional points between the two ends were sampled on route. Four individuals of *Hydrochus ignicollis* were located along a roughly 10m stretch of the water-logged southern fringes of Llyn Cadarn on the 26th in among open *Carex*-dominated fen with a patchy mossy ground layer centred around SH49177 81062 (Figures 22 to 24). This is almost the exact same spot they were last recorded in 2004 suggesting the species either has incredibly specific needs only found in this location or is a very poor disperser. The north side of Llyn Cadarn was visited on 30th but had quite a different feel to it being more *Juncus*-dominated, drier and with less of a moss layer to it and no tall fringing *Typha*

or *Phragmites* to the lake itself (Figure 25). No *Hydrochus* were recorded here. No other individuals of *Hydrochus* were recorded elsewhere on site despite sampling at multiple points.

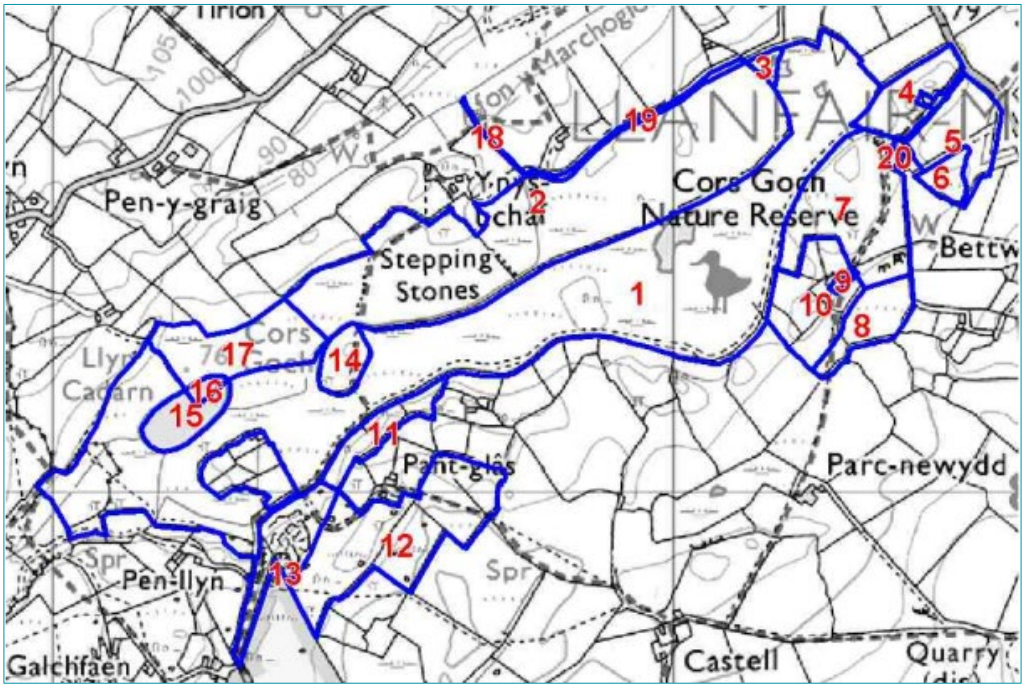

Figure 19. The location and extent of Cors Goch SSSI.

Limnebius aluta was successfully recorded on both visits with a total of 16 individuals seen across 7 locations with 5 individuals at one location in the west and 11 individuals at 6 locations in the east (Figures 20 & 21). The five individuals in the west were associated with a small area of floaty fen on the southern edge of Llyn Cadarn slightly further to the east than the *Hydrochus* location (Figure 26 & 27). The vegetation was largely sat above the water line and had a thick mossy layer and variety of herbs. As with *Hydrochus*, no *Limnebius* were found on the drier, rush-dominated north shore. Towards the east of the site, locations were mostly wet fen of varying types but all with patches of semi-submerged mosses with a cluster of records around a smaller un-named pool (Figures 28 to 32). Areas were also searched between the eastern and western extremes of the site but without success.

Figure 20. Location of *Limnebius aluta* records in eastern end of Cors Goch. The green square (100m) with central green dot demarcates the earlier 2000 record with the other green dots marking locations in 2024, including cluster around the small lake.

Figure 21. Location of *Limnebius aluta* records in western end of Cors Goch around Llyn Cadarn. The green squares (100m and 10m) with central green dots demarcate the earlier records from 1999 to 2010, while the other green dot marks the single location recorded in 2024.

Figure 22. Location of *Hydrochus ignicollis* records in western end of Cors Goch around Llyn Cadarn. The red squares (100m and 10m) with central red dots demarcate the earlier records from 1997 to 2004 while the other red dot marks the single location recorded in 2024.


Figure 23. *Carex*-dominated wet fen on southern edge of Llyn Cadarn centred around SH49177 81062 where four *Hydrochus ignicollis* individuals were recorded.

Figure 24. Closer view of the *Carex*-dominated wet fen on southern edge of Llyn Cadarn centred around SH49177 81062 where four *Hydrochus ignicollis* individuals were recorded.

Figure 25. Northern shore of Llyn Cadarn showing drier, more *Juncus*-dominated vegetation with little in the way of mosses and no fringing emergents on the lake edge. No individuals of *Hydrochus ignicollis* or *Limnebius aluta* were found here.

Figure 26. Looking towards the small area of “floaty fen” at SH49219 81069 on the southern edge of Llyn Cadarn where five *Limnebius aluta* individuals were recorded.

Figure 27. Closer view of the small area of “floaty fen” at SH49219 81069 on the southern edge of Llyn Cadarn where five *Limnebius aluta* individuals were recorded, showing mossy layer and herbs below *Carex* canopy.

Figure 28. Wet fen along edge of small *Phragmites* stand at SH50180 81665 where three individuals of *Limnebius aluta* were recorded in a small pocket of semi-submerged moss.

Figure 29. Closer view of the small pocket of semi-submerged moss among wet fen at SH50180 81665 where three individuals of *Limnebius aluta* were recorded.

Figure 30. Wet fen with taller *Carex*, *Cladium* and patchy semi-submerged mosses at SH49955 81351 where a single *Limnebius aluta* individual was recorded.

Figure 31. Tall wet *Carex* fen with *Phragmites* and semi-submerged mosses at SH50199 81630 where a single *Limnebius aluta* individual was recorded.

Figure 32. Tall wet fen with semi-submerged mosses around small pool at SH50014 81471 where three individuals of *Limnebius aluta* were recorded. A total of six individuals were recorded at three locations in the NE corner of this small lake.

4. Discussion

4.1 Rhos y Gad threats and recommendations

There was little evidence of any recent vegetation management on Unit 6 with much of the vegetation dense and rank (particularly the drier areas) and showing early signs of scrub encroachment. The relatively young age of some of this invading scrub suggests perhaps this lack of management is a relatively recent phenomenon. Comparing Google Earth images from 2006 (Figure 33) and 2023 (Figure 34) does suggest that scrub cover has increased slightly but vegetation changes are less easy to discern due to the images appearing to originate from spring 2006 and winter 2023.

Figure 33. Google Earth imagery of Rhos y Gad dated (spring?) 2006.

Figure 34. Google Earth imagery of Rhos y Gad dated (winter?) 2023.

The site gets very wet in the winter, particularly the central “floaty fen” area, and the cattle rarely venture into it (landowner, pers. comm.). The “floaty fen” area itself seemed in relatively good condition, possibly because it remains wet for large parts of the year, but the surrounding vegetation would probably benefit from some grazing or mechanical cutting to help reduce sward density and produce a more open structure. If grazing is difficult then opening up areas using machinery such as Softrak might be an option.
The apparent lack of shallow water features with stoneworts is a concern for *Haliplus variegatus*. The presence of some stoneworts among vegetated wheel ruts suggests that creating some shallow scrapes or pools might be beneficial. It is possible that natural variations in terrain mean some of these shallow water features already exist but due to lack of management are currently obscured and inaccessible due to dense vegetation cover.

The precise location and context of the previous records of *Limnebius aluta* and *Haliplus variegatus* on the site are unknown as the records only specify a 1ha area and abundances were only provided for the latter in 1999. It is possible that they both relate to the “floaty fen” area which overlaps the grid reference in part although no *Haliplus* were recorded during sampling of this using a pond net or sieves. Whilst both species have been recorded year-round, *Haliplus variegatus* is said to have peaks in adult activity in April and September and so it is possible that the survey in late August coincided with a relative low point in activity with most adults still pupating. Additional surveys in April or September would therefore be worth considering to help confirm the continued presence or otherwise of the species on the site. The affinity of *Limnebius aluta* with the “floaty fen” area seems to accord with its presence at Cors Goch where it was associated with the wettest areas of fen vegetation, albeit these were the specific habitats being targeted. The lack of the species at the previous location in Cors Bodeilio which was in the most part drier in comparison would also seem to support this notion. Provided the “floaty fen” remains sufficiently wet throughout the year, I see no reason why *Limnebius aluta* should not continue to persist at Rhos y Gad.

4.2 Cors Bodeilio threats and recommendations

The location where *Limnebius aluta* had been previously recorded at Cors Bodeilio seemed quite different to the locations the species was found in at Cors Goch and Rhos y Gad, where it was associated with mosses among “floaty fen” or wet fen. The water level at the Cors Bodeilio location was generally at or just below ground level in comparison despite significant rainfall on Anglesey in the weeks before the survey. As with Rhos y Gad, the precise location and context of the earlier record of *Limnebius aluta* at Cors Bodeilio is lacking and so it is hard to understand what, if anything, might have changed in the intervening period. It is worth noting that the NNR has suffered badly during recent drought conditions (Mike Howe, pers. comm.) which may have further exacerbated any change in conditions since its original discovery.

It can also be associated with slow moving ditches and so it is possible that the original location was the ditch that runs north-south through Unit 1 although this wasn’t sampled during the visit. The site is large and it is possible that the species exists elsewhere and given its size could be easily overlooked. However, given the similarity in size and how relatively abundant and widespread the species was at Cors Goch (albeit patchily), a lack of records suggests it may have been lost at Cors Bodeilio or else it now just occurs in small pockets of suitable habitat. Further surveys would be required to confirm this. One option would be to identify the specific NVC community types that the species was recorded in at Rhos y Gad and Cors Goch and see whether comparable communities in similar condition exist at Cors Bodeilio.

4.3 Llyn Padrig threats and recommendations

The site was generally very dry underfoot with surface water restricted to shallow, muddy, leaf-litter filled puddles beneath the willow and alder carr close to the lake shore. The open areas of fen were S*phagnum* dominated but very dry with no evidence of pools or surface water and were being heavily encroached in places by willow, alder and birch scrub. There was a thick *Sphagnum* layer but the water was well below the surface and barely visible when dug down, suggesting lake levels at this time of year are too low. The lake itself was a green turbid colour and largely surrounded on all sides by dense inaccessible scrub. Access to the water’s edge was severely restricted with a c.130m section along the northern boundary open to an improved pasture field holding around a hundred dairy cattle. This section of shoreline was heavily poached in places with cattle entering the shallow water to drink.

An online image of the site from the Cambridge University Collection of Aerial Photography (CUCAP) dated 1960 appears to show the early stages of scrubbing up with a much greater extent of open fen habitats, with scrub cover perhaps only covering around 30% of site compared to over 50% today. Most of the lake edge also looked accessible with perhaps only a small section showing evidence of scrub cover. Comparison with aerials from Google Earth from 2006 (Figure 35) and 2023 (Figure 36) show that the open fen areas have become increasingly encroached by scrub, particularly the area where *Hydrovatus clypealis* was previously recorded. The precise location and context of the original find of the species in 2002 at Llyn Padrig are unknown. The species is associated

with the edge of pools over soft mud and floating mats of vegetation. No pools are visible in the open fen on either the 1960 or 2006 aerials which may suggest the species was actually recorded from the edge of the main lake itself. While this was sampled during the current survey, no *Hydrovatus* were recorded although access to the water's edge was severely limited by the scrub and unruly cows to a tiny 10m section. Further sampling of the lake edge, particularly the accessible area along the edge of the dairy field, is therefore recommended albeit when the cows are not present. However, the heavy poaching in this area may make it less suitable habitat anyway if there is no emergent or floating vegetation cover.

The role that changes in water quality might be playing on the suitability of the site for *Hydrovatus clypealis* is unknown. The intensive dairy operation and arable fields that surround the site are probably contributing factors to the condition of the water on the day although how important that is to the species are not known as little information about its precise needs are published.

Figure 35. Google Earth imagery of Llyn Padrig dated (spring?) 2006. The 2002 record of *Hydrovatus clypealis* came from a 1ha area overlapping the pale open fen region in the top right of the image.

Figure 36. Google Earth imagery of Llyn Padrig dated (winter?) 2023. Note the increase in scrub cover in the open fen area in the top right of the image compared to the same area in Figure 35.

4.4 Cors y Farl threats and recommendations

The majority of Cors y Farl is dominated by a dense *Cladium* bed that was impossible to penetrate. The fen communities around the edges were wet and "floaty" in places but generally dominated by *Juncus* albeit with pockets of more *Carex*-dominated vegetation and pockets of a mossy ground layer. The *Juncus* dominated areas were often quite tall and rank and collapsed on themselves, especially so in the NW corner (Figure 17).

The precise location and context of the original 1997 record of *Limnebius aluta* at Cors y Farl is unknown with only a 1ha area given. A Google Earth image from 2006 suggests this area was mostly dominated by *Cladium* albeit it with a small area of brighter green vegetation alongside the northern end of the ditch that runs north-south down the centre of the site and possibly a central area of different vegetation too (Figure 37). The bright green northern area appears to be lost in a corresponding image from 2023 (Figure 38) although it is taken at a different time of year. On the day of the survey, it wasn't possible to access this area or the central zone due to the density of *Cladium* and scrub.

Some of the *Carex*-dominated vegetation in the NW corner of the site looked similar to the wet fen and "floaty fen" habitats where *Limnebius aluta* was recorded at Cors Goch and Rhos y Gad during the 2024 surveys suggesting suitable habitat probably does still exist here. As with Cors Bodeilio, comparing the NVC vegetation types across the three sites may help to target future surveys more precisely. It is less clear how important the *Juncus*-dominated areas are for the species but mechanically cutting or grazing these areas to help open them up would probably be beneficial anyway.

Figure 37. Google Earth image of Cors y Farl dated (spring?) 2006. The original 1997 record of *Limnebius aluta* covered an area of 1ha encompassing the relatively bright green area at the top of the ditch line that runs roughly north-south down the centre of the site.

Figure 38. Google Earth image of Cors y Farl dated (winter?) 2023. The brighter green area depicted in Figure 37 appears to have disappeared in this later image, possibly replaced by encroaching *Cladium*. There still appears however to be a paler central zone suggesting a different vegetation type exists there although this was not accessible at the time of the 2024 survey.

4.5 Cors Goch threats and recommendations

The site looked in great condition with a variety of vegetation structure and fen types and grazing cattle present. Both water beetle species seemed to be doing well here, albeit *Hydrochus ignicollis* being restricted to a very small area around Llyn Cadarn. It would be useful to understand if the hydrology, water chemistry and/or vegetation are in any way particularly unique in this location to explain why *Hydrochus* is not more widespread across the site. This single location also makes the species at risk to changes in management and this must be borne in mind in any future management decisions. One interesting observation is that there is a drainage line running into the lake from the south that seems to coincide precisely with the records from 2004 and 2024 suggesting this may be having some influence and may explain why the beetle is only found here and not elsewhere. This could merit further investigation.

There appeared to be a healthy, widespread but patchy population of *Limnebius aluta* particularly in the wetter areas of fen and where there was a higher cover of mosses. Sampling of some areas between the western and eastern extremes of the site were carried out but no individuals were recorded. There were differences in the moss species associated with some of these central areas which may have influenced their suitability for

Limnebius. Getting a better understanding of the NVC vegetation communities that the species occurred in during the 2024 survey may help to ascertain the amount of suitable habitat available at this and other sites.

5. Conclusions

A survey for four species of water beetles on Anglesey wetlands in August 2024 produced the following results:

- *Haliplus variegatus* was not found at Rhos y Gad, one of its two contemporary Welsh localities, where it was recorded in 1999 and 2000;
- *Hydrochus ignicollis* was recorded on Cors Goch but not found on Cors y Farl;
- *Hydrovatus clypealis* was not found at Llyn Padrig, its only contemporary Welsh locality where it was previously recorded in 2002;
- *Limnebius aluta* was found at Cors Goch and Rhos y Gad but not on Cors Bodeilio and Cors y Farl.

At Rhos y Gad:

- Establish a more sympathetic grazing regime to open up the sward and check the growth of recently-invading scrub;
- Use machinery to cut dense vegetation;
- Create shallow scrapes and pools to encourage growth of stoneworts for *Haliplus variegatus*.

At Llyn Padrig:

- Provide more open fen condition by controlling invading scrub;
- Create scrapes and pools to provide shallow, open water conditions.

At Cors y Farl:

- Use machinery to open up dense vegetation and increase sward heterogeneity;
- Establish a sympathetic grazing regime.

Further surveys are required to determine if populations of the four water beetle species, and particularly *Haliplus variegatus* and *Hydrovatus clypealis*, still occur on previously-occupied Anglesey wetlands.

6. Acknowledgements

I would like to thank Dr. Mike Howe (NRW Lead Specialist Advisor, Terrestrial & Freshwater Invertebrates) and Corinna Van Cayzeele (NRW Environment Team,

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Data Archive Appendix

The data archive contains:

[A] The final report in Microsoft Word and Adobe PDF formats.

~~[B] A full set of maps produced in JPEG format~~.

~~[C] A series of GIS layers on which the maps in the report are based with a series of word documents detailing the data processing and structure of the GIS layers~~.

~~[D] A set of raster files in ESRI and ASCII grid formats~~.

~~[E] A database named [name] in Microsoft Access 2000 format with metadata described in a Microsoft Word document [name.doc]~~.

~~[F] A full set of images produced in [jpg/tiff] format~~.

[G] Species records held in Welsh Invertebrate Database (WID).

Metadata for this project is publicly accessible through Natural Resources Wales' Data Discovery Service https://metadata.naturalresources.wales/geonetwork/srv (English version) and https://metadata.cyfoethnaturiol.cymru/geonetwork/cym/ (Welsh Version). The metadata is held as record no. **NRW_DS161341**.