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Marsh Fritillary Rhos Glyn-yr-helyg landscape assessment 2019

Butterfly Conservation

NRW Evidence Report No. 442

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1. Crynodeb gweithredol

Mae britheg y gors *Euphydryas aurinia* yn Rhywogaeth a Warchodir gan Ewrop a restrir yn Atodiad II o Gyfarwyddeb Cynefinoedd a Rhywogaethau'r UE. Mae britheg y gors yn brin yng Ngheredigion ac mae wedi'i chyfyngu ar hyn o bryd i chwe thirwedd mewn ardaloedd canolog a deheuol, ar ôl iddi gael ei cholli o ogledd y sir, ac mae angen cymryd camau gweithredu brys er mwyn diogelu ei dyfodol. Mae'r porfeydd rhos yng Ngorsgoch o amgylch SoDdGA Rhos Glyn-yr-helyg yn cynnal un o'r metaboblogaethau o bwys mwyaf yng Ngheredigion.

Mae angen i fataboblogaethau o frithegion y gors gael rhwydwaith o safleoedd sydd â chysylltiadau da ac sy'n cynnal ardaloedd estynedig o gynefin addas o ansawdd uchel er mwyn sicrhau eu goroesiad i'r hirdymor. Mae gofyn am gynnal asesiadau cyfoes o'r tirweddau lle mae frithegion y gors yn byw er mwyn canfod faint o gynefin *Da* ac mewn *Cyflwr Addas* sy'n bodoli ymhob tirwedd, pa mor dda yw'r cysylltiadau rhwng y darnau hyn o dir, a lle y dylir gwneud ymdrech i wella ansawdd y cynefin er mwyn adeiladu metaboblogaethau cadarn. Bydd hyn yn helpu o safbwyt blaenoriaethu tirweddau ar gyfer gweithrediadau cadwraeth.

Cafodd yr arolwg hwn ei gomisiynu er mwyn mapio cyflwr cynefin frithegion y gors ar gyfer metaboblogaeth Rhos Glyn-yr-helyg a'i rhwydwaith o gynefinoedd cynhaliol, y cafodd ei asesu ddiwethaf yn 2009. Mae'n ardal o dirwedd sy'n gryno, gan ei bod wedi'i ffurio gan dri chylch yn unig sy'n gorgyffwrdd ac sy'n cwmpasu chwe sgwâr grid â radiws o 1 km yn unig, ac mae cyfanswm ei harwynebedd yn 141.35 hectar. Cafodd yr arolwg ei gynnal rhwng 11 a 24 Hydref 2019. Cafodd addasrwydd y cynefin ei gategoreiddio a'i fapio gan ddilyn dulliau safonol Cyfoeth Naturiol Cymru. Cafodd tir ei ddosbarthu'n chwe chategori yn ôl presenoldeb/helaethrwydd y planhigyn tamaid y cythraul *Succisa pratensis*, y mae'r larfau yn bwydo arno, a glaswellt y gweunydd *Molinia caerulea* (neu laswellt arall sy'n ffurio twmpathau), yn ogystal ag uchder a strwythur llystyfiant. Cafodd dull asesu cyflym (RAM) ei ddilyn lle nad oedd manylion tirfeddiant ar gael neu lle'r oedd yn amhosib cael mynediad i dir.

Cafwyd mynediad i 136.41 hectar o dir a gafodd ei arolygu, a chafodd arwynebedd o 4.94 hectar pellach ei arolygu gan ddefnyddio'r dull asesu cyflym. Cafodd arwynebedd o 18.94 hectar (sef 13.4% o'r dirwedd) ei gategoreiddio fel cynefin *Addas* neu â *Photensial (Bras)*, gan gynnwys 5.22 hectar o gynefin mewn *Cyflwr Da* a 7.89 hectar o gynefin *Addas (Wedi'i Orbori)*. Cafodd arwynebedd o 2.3 hectar pellach a oedd yn cynnwys cynefin addas ei asesu gan ddefnyddio'r dull asesu cyflym, gan roi cyfanswm o 21.24 hectar (sef 15% o'r dirwedd). Roedd 120.11 hectar (sef 85% o'r dirwedd) *Ddim yn Addas*.

Ceir 18.39 hectar o gynefin *Addas* ac â *Photensial (Bras)* o fewn y pedwar SoDdGA yn y dirwedd (sef Rhos Glyn-yr-helyg, Rhos Glwydwern, Caeau Ardwyn a Chors Gorsgoch), gan gynnwys 5.06 hectar o gynefin mewn *Cyflwr Da*, sy'n cynyddu cyfanswm y cynefin sy'n *Addas* ac â *Photensial (Bras)* i 20.69 hectar (sef 99% o'r cyfanswm cyfan) gan ddefnyddio data'r dull asesu cyflym.

Mae 21 hectar o gynefin *Addas* ac â *Photensial (Bras)* ymhell o dan y trothwy cyflwr ffafriol o 50 hectar y mae ei angen ar gyfer goroesiad britheg y gors i'r hirdymor. Gan fod mwyafrif y dirwedd ehangach *Ddim yn Addas*, mae angen gwneud ymdrech brys i gynyddu faint o gynefin *Addas* a geir o fewn y pedwar SoDdGA, efallai trwy newid y

trefniadau pori presennol o geffylau i wartheg, er mwyn ceisio diogelu goroesiad britheg y gors i'r hirdymor yn nhirwedd Rhos Glyn-yr-helyg os ydym am ei hatal rhag cael ei dileu.

Camau gweithredu allweddol sydd eu hangen

1. Sicrhau bod pob SoDdGA sy'n cynnal brithegion y gors yn cael ei reoli mewn ffordd ffafriol. Cynnal deialog dda rhwng perchnogion a Cyfoeth Naturiol Cymru. Sicrhau bod monitro'n cael ei gwblhau ac y darperir adborth, cyngor a chymorth.
2. Archwilio'r posiblwydd o ehangu ardal y cynefin *Addas* trwy gysylltu â thirfeddianwyr er mwyn cyflwyno trefniadau pori ffafriol ar dir sy'n gyfagos â safleoedd sy'n cynnal brithegion y gors.
3. Archwilio'r gwaith o gasglu, lluosogi a phlannu eginblanhigion lleol o damaid y cythraul mewn ardaloedd o gynefin *Addas (Gwasgaredig)* a thir cyfagos sy'n cynnal glaswellt y gweunydd ond nid tamaid y cythraul, e.e. RGH016j.
4. RGH004a – cysylltu â'r tirfeddianwr er mwyn sicrhau pori â da byw priodol, ac ar ddwysedd priodol. Ar hyn o bryd, mae'r tir yn cael ei bori gan ferlod, sy'n well ganddynt bori llethrau sychach ac sy'n arwain at orbori yn y lleoedd hynny, ac at ardaloedd gwlypach, sy'n anffafriol, yn dod yn fras. Mae posiblwydd clir y gellid dod â mwy o ardaloedd ar y safle hwn i gyflwr ffafriol er mwyn galluogi dosbarthu planhigion tamaid y cythraul dros ardal fwy.
5. RGH004b – cysylltu â'r tirfeddianwr er mwyn sicrhau pori â da byw priodol, ac ar ddwysedd priodol. Ar hyn o bryd, mae'r parsel hwn o dir yn cynnwys ychydig bach o gynefin *Addas (Wedi'i Orbori)*, ond gydag achosion aml o damaid y cythraul. Ar hyn o bryd, mae'n cael ei bori'n ddwys gan ferlod – byddai lleihau lefelau'r pori'n caniatáu i'r glastir adfer a galluogi mwy o ddosbarthiad ym mhlanhigion tamaid y cythraul.
6. RGH008d – cysylltu â'r tirfeddianwr er mwyn trefnu ailymweliad yn ystod tymor gwe larfaol brith y gors er mwyn cadarnhau bod bridio'n digwydd. Cysylltu â'r tirfeddianwr er mwyn penderfynu ar ddichonoldeb newid lefelau pori er mwyn gweithredu trefniadau pori sy'n fwy ffafriol.
7. RGH013i - dywedodd y perchenog iddo gael ei gynghori i beidio â rheoli'r cae hwn gan ei fod yn cynnwys tamaid y cythraul, ac roedd wedi dilyn y cyngor hwnnw. Canlyniad hyn yw bod y cae wedi dod yn rhy fras; ni welwyd tamaid y cythraul o gwbl yn ystod yr arolwg, ond roedd rhywfaint o laswellt y gweunydd yn bresennol. Mae'r cae hwn wedi'i leoli'n gyfagos union ag SoDdGA Rhos Glyn-yr-helyg; argymhellir cysylltu â'r tirfeddianwr er mwyn sefydlu dull mwy ffafriol o reoli er mwyn caniatáu unrhyw blanhigion neu hadau tamaid y cythraul sy'n weddill i ddod yn fwy sefydlog.
8. RGH014 – cysylltu â'r tirfeddianwr i adolygu'r trefniadau pori presennol a gweithredu dull o reoli sy'n fwy ffafriol, gan gynnwys defnyddio ffensys dros dro er mwyn sicrhau bod pori'n digwydd mewn ardaloedd *Addas (Wedi'u Tanbori)* ac â *Photensial (Bras)*. Cysylltu â'r tirfeddianwr er mwyn nodi gwaith tynnu prysgwedd mewn ardaloedd sydd wedi'u nodi, ar hyn o bryd, fel ddim yn addas oherwydd dwysedd y prysgwedd, er mwyn cynyddu arwynebedd cynefin addas. Cysylltu â'r tirfeddianwr cyfagos ynghylch dŵr ffo sy'n uchel mewn maethynnau ac sy'n effeithio ar dde-orllewin RGH014f.
9. RGH016b – cysylltu â'r tirfeddianwr i adolygu'r trefniadau pori presennol a gweithredu dull o reoli sy'n fwy ffafriol. Cafodd hwn ei nodi gan Ardeshir ac eraill (2011) fel tir sy'n cynnal ardaloedd o gynefin â *Photensial (Bras)* ac mewn *Cyflwr Da*, ond yn ystod yr arolwg hwn nodwyd mai ychydig o gynefin *Addas (Gwasgaredig)* yn unig y mae'n ei gynnal. Mae'n bosibl, os caiff ei ffensio, y gellid creu cynefin ychwanegol addas.
10. RGH017a - cysylltu â'r tirfeddianwr i nodi ardaloedd o brysgwydd y gellir ei dynnu a sicrhau nad yw ardaloedd coediog yn ehangu ac yn creu rhwystrau rhwng pocedi o gynefin *Cyflwr Da*.
11. RGH018 ac RGH020 – cysylltu â'r tirfeddianwr er mwyn sicrhau bod y dull o reoli'r tir trwy'r rhaglen Glastir yn cymryd gofynion brithegion y gors i ystyriaeth yn ogystal â'r gorudd melyn (*Parentucellia viscosa*), y mae'r safle wedi'i hysbysu amdano.
12. RGH021 – monitro'r safle er mwyn cadarnhau bod lefelau ac amseru'r trefniadau pori yn briodol.

2. Executive summary

The Marsh Fritillary *Euphydryas aurinia* is a European protected species, listed on Annex II of the EU Habitat and Species Directive. The Marsh Fritillary is scarce in Ceredigion and is currently restricted to six landscapes in central and southern areas, having been lost in the north of the county and urgent conservation action is needed to secure its future. The rhos pastures at Gorsgoch centred on Rhos Glyn-yr-helyg SSSI support one of the most significant metapopulations in Ceredigion.

Marsh Fritillary metapopulations need a network of well-connected sites supporting extensive areas of suitable habitat of good quality to ensure their long-term survival. Contemporary assessments of landscapes occupied by marsh fritillaries are required urgently to determine how much *Good* and *Suitable Condition* habitat exists within each landscape, how connected these patches are and where efforts should be made to improve habitat quality in order to build robust metapopulations. This will help prioritise landscapes for conservation action.

This survey was commissioned to map Marsh Fritillary habitat condition for the Rhos Glyn-yr-helyg metapopulation and its supporting habitat network, which was last assessed in 2009. It is a compact landscape area, formed only of three overlapping circles and covering just six 1km radius grid squares and totalling 141.35ha. The survey was carried out between 11th and 24th October 2019. The suitability of the habitat was categorised and mapped following standard NRW methods. Land was classed into six categories according to the presence/amount of both the larval foodplant Devil's-bit Scabious *Succisa pratensis* and Purple Moor-grass *Molinia caerulea* (or other tussock-forming grasses) as well as vegetation height and structure. A Rapid Assessment Method (RAM) was used where land ownership details were not available or land was physically impossible to access.

A total of 136.41ha of land was accessed and surveyed, with a further 4.94ha surveyed using the RAM. 18.94ha (13.4% of the landscape) was categorised as *Suitable* or *Potential Rank* habitat, including 5.22ha of *Good Condition* habitat and 7.89ha of *Suitable Overgrazed* habitat. A further 2.3ha Contains *Suitable* habitat was assessed using RAM, providing an overall total of 21.24ha (15% of the landscape). 120.11ha (85% of the landscape) was *Not Suitable*.

18.39ha of *Suitable* and *Potential Rank* habitat is found within the four SSSIs in the landscape (Rhos Glyn-yr-helyg, Rhos Glwydwern, Caeau Ardwyn and Cors Gorsgoch), including 5.06ha of *Good Condition* habitat, increasing to 20.69ha of *Suitable* and *Potential Rank* habitat (99% of the overall total) using RAM data.

21ha of *Suitable* and *Potential Rank* habitat falls well below the 50ha Favourable Condition threshold necessary for the long-term survival of the Marsh Fritillary. As the wider landscape is mostly *Not Suitable*, urgent efforts are required to maximise the amount of *Suitable* habitat within the four SSSIs, perhaps by changing current grazing regimes from horses to cattle, in an attempt to secure the long-term of Marsh Fritillary in the Rhos Glyn-yr-helyg landscape if we are to prevent its extirpation.

Key actions required

1. Ensure all SSSI land supporting Marsh Fritillary is in favourable management. Maintain good dialogue between owners and NRW. Ensure monitoring is undertaken and feedback, advice and support is provided.
2. Explore the possibility of expanding the area of *Suitable* habitat through liaison with landowners to introduce favourable grazing regimes on land neighbouring sites supporting Marsh Fritillary.
3. Explore the collection, propagation and planting of local provenance Devil's-bit Scabious plug plants into areas of *Suitable Sparse* habitat and neighbouring land that supports Purple Moor-grass but no Devil's-bit Scabious e.g. RGH016j.
4. RGH004a – liaison with landowner to secure grazing with appropriate stock, at a suitable density. The land is currently pony grazed with drier slopes favoured, leading to heavy grazing and wetter areas unfavoured, becoming rank. There is clearly potential on this site to bring more areas into favourable condition to enable greater distribution of Devil's-bit Scabious plants.
5. RGH004b – liaison with landowner to secure grazing with appropriate stock at a suitable density. This parcel of land currently contains a small patch of *Suitable Overgrazed*, but with frequent Devil's-bit Scabious. It is currently heavily pony grazed – a reduction in grazing levels would allow the sward to recover and enable a greater distribution of Devil's-bit Scabious plants.
6. RGH008d – liaison with landowner to enable revisit during Marsh Fritillary larval web season to confirm breeding. Liaison with landowner to determine the feasibility of altering grazing levels to implement more favourable grazing regime.
7. RGH013i – owner mentioned being previously advised not to manage this field as it contained Devil's-bit Scabious and had done as advised. This has led to the field becoming very rank; no Devil's-bit Scabious was seen during the survey, but some Purple Moor-grass was present. This field is located immediately adjacent to Rhos Glyn-yr-helyg SSSI; liaison with the landowner would be recommended to establish more favourable management to allow any remaining Devil's-bit Scabious plants or seeds to become more established.
8. RGH014 – liaison with landowner to review current grazing regime and implement more favourable management, including use of temporary fencing to focus grazing in *Suitable Undergrazed* and *Potential Rank* areas. Liaison with landowner to identify scrub removal in areas currently identified as not suitable due to density of scrub, to increase area of suitable habitat. Liaison with neighbouring landowner regarding nutrient-rich run-off affecting the south-west of RGH014f.
9. RGH016b – liaison with landowner to review current grazing regime and implement more favourable management. This land was identified by Ardeshir *et al.* (2011) as supporting areas of *Potential Rank* and *Good Condition* habitat, however during this survey identified as only supporting a small area of *Suitable Sparse*. It is possible that, if fenced, additional suitable habitat could be created.
10. RGH017a – liaise with landowner to identify areas of scrub for removal and ensure that wooded areas do not expand, creating barriers between pockets of *Good Condition* habitat.
11. RGH018 and RGH020 – liaison with landowner to ensure land management through Glastir takes into account the requirements of Marsh Fritillary as well as the Yellow Bartsia (*Parentucellia viscosa*) for which the site is notified.
12. RGH021 – monitor site to establish grazing levels and timing are appropriate.

3. Introduction

The Marsh Fritillary *Euphydryas aurinia* is classed as Vulnerable in the UK, is included on Annex II of the EU Habitats and Species Directive and is a feature of thirteen Special Areas of Conservation (SAC) in Wales and 37 SSSIs. In the UK, the butterfly has declined by 79% in its distribution between 1976 and 2014 and by 25% in abundance between 1976 and 2016. In Wales, there are currently 153 populations (based on records from the most recent 5-year period, 2014-2018) but just 8% (13 populations) of these are in the north of the country with many only just clinging on due to unfavourable land management.

Metapopulation modelling suggests that the Marsh Fritillary requires between 76 and 104ha of suitable habitat within a defined landscape for its long-term survival (Bulman *et al.*, 2007) although the current Natural Resources Wales (NRW) Marsh Fritillary landscape model (Fowles, 2004, 2005) regards 50ha of *Good and Suitable Condition* habitat, of which 10ha is in *Good Condition*, within a 2km radius as an appropriate target for achieving Favourable Condition. Contemporary assessments of landscapes occupied by marsh fritillaries are required urgently to determine how much *Good and Suitable Condition* habitat exists within each landscape, how connected these patches are and where efforts should be made to improve habitat quality and build robust metapopulations. This will help prioritise landscapes for conservation action.

There are currently 38 occupied landscapes in Wales, 14 of which have never been assessed for their habitat condition. Some have been assessed only in part and require completion whilst others were surveyed between 2002 and 2009 and should be repeated. There are just six occupied landscapes in south and central Ceredigion, having been lost from the northern part of the county. These are centred on Cors Caron, Rhosydd Bryn-maen, Rhos Llawr Cwrt, Rhos Talglas and Rhos Glyn-yr-helyg. The Rhos Glyn-yr-helyg landscape encompasses four SSSIs – Caeau Ardwyn, Cors Gorsgoch, Rhos Glwydwern and Rhos Glyn-yr-helyg – and was last surveyed in 2009 (Ardeshir *et al.*, 2011).

This survey was commissioned to map Marsh Fritillary habitat condition of the Rhos Glyn-yr-helyg metapopulation, centred around the Gorsgoch area of Ceredigion. Marsh Fritillary landscapes can be divided into the core landscape (the area within a 1km radius of recent marshy fritillary records encompassing the typical dispersal distance of a female Marshy Fritillary butterfly) and the surrounding functional landscape (the area within a 2km radius of recent Marsh Fritillary records which covers the average dispersal distance of a male). There are contemporary records of the butterfly from Rhos Glyn-yr-helyg SSSI and Rhos Glwydwern SSSly Wlad SSSI.

Figure 1 shows the land parcels (outlined in magenta) identified for field survey within the landscape area (based on the desk study “Marsh Fritillary Landscape Assessments in 2019” dated 30 July 2019 produced by R.G. Smith). The Rhos Glyn-yr-helyg metapopulation is centred around Rhos Glyn-yr-helyg SSSI. This is a compact landscape area, formed only of three overlapping circles and covering just six 1km radius grid squares and totalling roughly 130ha.

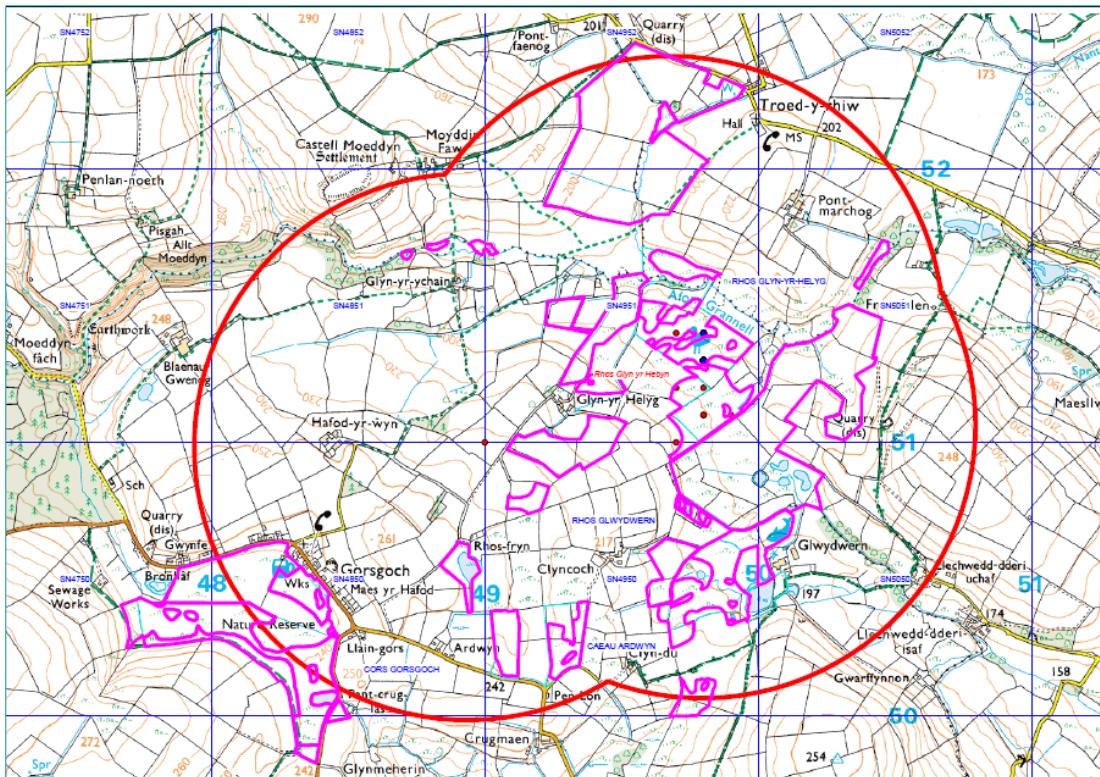


Figure 1. The Rhos Glyn-yr-helyg Landscape defined for survey (red line); land parcels identified for field survey edged in magenta.

This report assesses the current condition and management of the Rhos Glyn-yr-helyg landscape for the Marsh Fritillary and compares these findings with previous 2009 landscape assessment in order to highlight changes over time. It also identifies opportunities to improve the landscape for Marshy Fritillary with more sympathetic management.

4. Methods

4.1. Maps

NRW supplied Butterfly Conservation with 1:10000 scale OS tiles and aerial mapping (jpeg format) of the Rhos Glyn-yr-helyg area. These were used to generate field maps and in their subsequent digitisation.

4.2. Land ownership

NRW contacted the landowners of the four SSSIs within the landscape area to request access but were unable to contact one landowner (RGH073) which prevented access to that parcel of land. Butterfly Conservation was responsible for identifying and obtaining survey permission from owners and/or managers of all other parcels of land, before undertaking the surveys.

4.3. Field numbers

A unique ID code was assigned to each surveyed land parcel. The format used was RGHXXX - the letters identify the landscape (RGH for Rhos Glyn-yr-helyg); the digits to the landowner and the letter to the individual land parcel.

4.4. Surveys

The Rhos Glyn-yr-helyg landscape was surveyed by Butterfly Conservation's Conservation Officer for Wales. The surveys were carried out between 11th October and 24th October 2019. Each land parcel identified for mapping in the desk study was surveyed (if access was consented and where physically possible) and the suitability of the habitat categorised and mapped following standard NRW methods outlined in Fowles (2005).

Land was classed into six categories (Table 1) according to the presence/amount of the larval foodplant Devil's-bit Scabious *Succisa pratensis* and Purple Moor-grass *Molinia caerulea* (or other tussock-forming grasses) as well as vegetation height and structure.

Table 1. Marsh Fritillary Habitat Quality Mapping Codes.

Habitat code	Habitat classification
GC	<i>Good Condition</i>
SU	<i>Suitable Undergrazed</i>
SO	<i>Suitable Overgrazed</i>
SS	<i>Suitable Sparse</i>
PR	<i>Potential Rank</i>
NS	<i>Not Suitable</i>
NA	Not Accessed

In cases where it was not possible to obtain permission (e.g. where landowner could not be contacted), a Rapid Assessment Method was used. This approach is based on viewing sites from locations where the surveyor has legitimate rights of access e.g. roads, public rights of way or adjoining fields where access permission has already been obtained. Binoculars are used to identify the suitability of the field for Marsh Fritillary and place the field in a broad suitability category (Table 2). This helps estimate a total area for inaccessible land likely to support *Suitable* or *Potential* habitat.

Table 2. Marsh Fritillary Rapid Assessment categories.

Category	Description
Contains suitable (CS)	<i>Succisa</i> present, noted either in flower or vegetative growth. This could include overgrazed fields or scrubby fields.
Potential (P)	Fields which contain significant amounts of <i>Molinia</i> but no obvious <i>Succisa</i> (usually rank & neglected). It also includes recently mown fields.
No Access (NA)	Fields not viewable.
NOT suitable (NS)	Fields obviously grazed regularly by sheep (very short, dung and/or bits of fleece in field, on hedges or fences) or improved or complete scrub.

The mapping results have been supplied with this report as a MapInfo GIS file, and illustrated in Appendix 2. Habitat Condition Mapping. Site descriptions for each surveyed/assessed land parcel are included in Appendix 3. Land parcels locations are given in Appendix 1.

5. Results

5.1. Survey results

A total of 141.35 hectares (ha) of land were identified for survey (Table 3). This included additional land to that identified in magenta in Figure 1, where that land formed part of an identified land parcel. All land identified for survey was surveyed and habitat classified according to Fowles (2005); this included land that was not surveyed but which was obviously *Not Suitable* when viewed from adjacent land (where access permission had been granted) or from Public Roads. Of the total land identified for survey, 136.41ha were accessed and surveyed (96.5% of total land identified).

In total, seven parcels of land totalling 4.94ha (3.5% of total land identified) were not accessed but were assessed using the Rapid Field Assessment methodology. All but one land parcel were identified as *Not Suitable* (2.64ha) whilst one land parcel (the western field of Caeau Ardwyn SSSI) was identified as Contains Suitable (Rapid Field Assessment identified abundant *Succisa pratensis* in the area of field visible from the road).

Table 3. Land (ha) surveyed and assessed.

Status	Hectares
Total identified for survey	141.35
Surveyed	136.41
Rapid Assessment	4.94

All parcels of land were surveyed or accessed, and no permission was refused for any site for which access permission was sought.

5.2. Habitat condition

Within the 141.35ha of land identified, 18.94ha of land (13.4% of the total land identified) supported habitat categorised as *Suitable* (GC, SU, SO, SS) or *Potential Rank* for the Marsh Fritillary. Of this 5.22ha (28%) was in *Good Condition*. If the Contains Suitable Rapid Assessment category is included, this brings the total for *Suitable* habitat (including GC) to 21.24ha (15%). Most of the *Suitable* habitat was *Suitable Overgrazed* (7.89ha), with 5.22ha of *Good Condition* habitat present. *Suitable Undergrazed* and *Suitable Sparse* habitat were present in roughly equal amounts. Of the *Suitable* or *Potential Rank* habitat present in the landscape, 18.39ha was within the four SSSIs (Rhos Glwydwern, Rhos Glyn-yr-helyg, Caeau Ardwyn and Cors Gorsgoch); if the Contains Suitable Rapid Assessment category is included, 20.69ha lies within the four SSSIs (99% of the overall *Suitable* and *Potential Rank* habitat). Only 0.06ha of habitat categorised as GC fell outside the SSSIs. In total, 120.11ha (85%) of land was categorised as *Not Suitable* for Marsh Fritillary.

Table 4 gives details of the total areas of land for each habitat category for each SSSI and for non-SSSI (Other) sites.

Table 4. Habitat condition data for the Rhos Glyn-yr-helyg landscape (figures in hectares). * Figures for Rhos Glwydwern include land which forms part of the same land management unit but falls outside the SSSI boundary.

Habitat condition	Caeau Ardwyn	Rhos Glwydwern*	Rhos Glyn-yr-helyg	Cors Gorsgoch	Other Sites	Total
GC	0.16	2.22	1.97	0.81	0.06	5.22
SO	0.92	0.62	-	0.15	0.15	1.84
SS	0.14	0.45	0.44	0.20	0.09	1.32
SU	-	1.96	5.93	-	-	7.89
PR	-	1.30	0.78	0.34	0.25	2.67
Contains Suitable (CS)	2.30	-	-	-	-	2.30
NS	2.05	5.76	5.68	25.73	80.89	120.11
Not Accessed	-	-	-	-	-	-
Total	5.57	12.31	14.8	27.23	81.52	141.35

5.2.1. Good Condition

The area of land identified as *Good Condition* in the landscape area was 5.22ha (3.69% of the total land surveyed). Of this, 98.85% was located in the SSSIs surveyed, with Rhos Glwydwern SSSI supporting 2.22ha in compartment RGH17a and 1.97ha in Rhos Glyn-yr-helyg SSSI (the largest areas being located in compartments RGH14b and RGH14c, with patches in RGH14d and RGH14f). Within Cors Gorsgoch SSSI, all the GC habitat was located in the southerly section of compartment RGH004a. Three patches of GC habitat were identified in the eastern and southern fields of the eastern block of Caeau Ardwyn SSSI (compartments RGH018 and RGH020). Access permission was not obtained for the western block of Caeau Ardwyn SSSI, but Rapid Assessment from the road using binoculars revealed abundant flowering *Succisa pratensis* and therefore it is possible that the site supports additional areas of GC habitat.

Outside the SSSIs, a small patch of GC habitat (0.06ha) was recorded in compartment RGH008d. This was located in a horse-grazed field and had been temporarily fenced off (electric fenced) from the remainder of the grazing. The area of GC habitat formed an area of approximately 0.50ha of suitable habitat (which also included PR with *Succisa*) in ditches and SO with abundant *Succisa* left ungrazed amongst a very short sward.

5.2.2. Suitable Undergrazed, Suitable Overgrazed & Suitable Sparse (SU, SO, SS)

The three 'Suitable' categories (not including *Good Condition*) amounted to 11.05ha, 10.81ha of this was within the SSSIs (1.06ha in Caeau Ardwyn, 3.03ha in Rhos Glwydwern, 6.37 in Rhos Glyn-yr-helyg and 0.35 in Cors Gorsgoch).

Within Cors Gorsgoch, the majority of 'Suitable' habitat was located in small patches adjacent to areas of GC in compartment RGH004a. Caeau Ardwyn supported 0.92ha of SO in compartments RGH018 and RGH020, which was accounted for by the inclusion of previously-topped short sward. Within Rhos Glyn-yr-helyg SSSI, the largest category of 'Suitable' habitat was 5.93ha of SU, which made up the majority of compartments RGH014d, RGH014e and RGH014f and patches within compartments RGH014c and RGH014b.

The only two patches of ‘*Suitable*’ habitat located outside SSSIs were a small area in a mainly drier, sloping, cattle-grazed field to the east (RGH016b) and a patch in part of a horse-grazed field, in the centre of the surveyed area (RGH008d).

5.2.3. Potential Rank

Across the landscape, 2.67ha of *Potential Rank* habitat were recorded, 2.42ha within three of the four SSSIs (in compartment RGH017a at Rhos Glwydwern, compartment RGH014c, RH014d and RGH014f at Rhos Glyn-yr-helyg and RGH004a at Cors Gorsgoch). No PR habitat was recorded at Caeau Ardwyn (although only the eastern section of the SSSI was accessed) and no PR habitat was recorded in three of the six fields at Rhos Glyn-yr-helyg SSSI).

Only one non-SSSI compartment supported PR, RGH008d and this was only 0.25ha in size.

5.2.4. Not Suitable

85% (120.11ha) of all surveyed and assessed land was recorded as *Not Suitable*. This included all the land to the north of the area, a large block in the centre of the area (located between Rhos Glyn-yr-helyg SSSI and Rhos Glwydwern SSSI) and much of Cors Gorsgoch (25.735ha), mainly due to the hydrology of the site.

In total, 67.34% of the NS habitat was recorded on non-SSSI land. Land identified as NS included agriculturally-improved land, intensively grazed, species-poor, semi-improved grassland with *Juncus effusus* dominated areas, woodland and dense scrub.

5.2.5. Not Accessed

In total, seven parcels of land totalling 4.94 ha (3.5% of total land identified) were not accessed. Two of these were on Cors Gorsgoch SSSI; RGH002a was wooded according to NRW staff and RGH002b (contiguous with adjacent land and assessed using the Rapid Assessment methodology). All other NA sites were non-SSSI but assessed as NS using Rapid Assessment methodology from adjacent accessed sites (including agriculturally improved land, woodland and garden).

5.2.6. Rapid Assesment – Contains Suitable (CS)

Only one site (2.30ha in the western half of Caeau Ardwyn SSSI, RGH021) was identified as supporting CS habitat using the Rapid Assessment methodology. This methodology was used as NRW was not able to contact the landowner in the time-period during which the surveys were being undertaken. From the public highway, *Succisa* was clearly visible and flowering abundantly in some areas. A survey by Butterfly Conservation and staff from NRW and the Wildlife Trust of South and West Wales on 12th June 2018 noted that *Succisa* was present but not widespread or abundant, that the field was overgrazed at time of visit and recorded one adult Marsh Fritillary in the south of field (SN490501).

5.2.7. Larval webs

Although the survey was carried out late in the season, two occupied Marsh Fritillary larval webs were recorded, both at the base of vegetation. These were recorded in

Rhos Glwydwern SSSI in compartment RGH013g at SN4976850498 and at Rhos Glyn-yr-helyg SSSI in compartment RGH014c at SN4961651452.

6. Discussion

6.1. Habitat condition

Of the 141.35ha land surveyed, 18.94ha of land (13.4% of the total land identified) supported habitat categorised as *Suitable* (GC, SU, SO, SS) or *Potential Rank* for Marsh Fritillary. Of this, only 5.22ha (28%) was in *Good Condition*. If the Contains Suitable Rapid Assessment category is included, this brings the total for *Suitable* habitat (including GC) to 21.24ha (15%).

There was only a small area of *Good Condition* habitat in the landscape area at the time of survey (October 2019). Most of this was located at Rhos Glwydwern SSSI (2.22ha), with Rhos Glyn-yr-helyg supporting 1.97ha. The GC habitat was generally found to occur in mosaics, alongside other '*Suitable*' habitat (SO, SU and SS) and areas of PR habitat. Abundant *Succisa* and appropriately-grazed tussocky grassland were recorded in GC areas.

The majority of the '*Suitable*' habitat was *Suitable Undergrazed* (7.89ha) with grazing levels not appropriate to provide favourable condition habitat for Marsh Fritillary. At Rhos Glyn-yr-helyg, some areas appeared to have been ungrazed or grazed at too low a density. This had resulted in tall, often dense, vegetation that was becoming rank in places, but which still supported *Succisa* at densities to continue supporting the site's Marsh Fritillary population (e.g. 287 webs were recorded in compartment RGH014c by WTSWW on 15th August 2018).

In total, 120.11ha (85%) of land in the Landscape Area was categorised as *Not Suitable* for Marsh Fritillary, including large areas located in between sites currently occupied by the butterfly.

The Rhos Glyn-yr-helyg landscape was previously assessed in 2009 (Ardeshir *et al.*, 2011). Although exact comparisons are difficult, due to differences of survey timings and variations in the Landscape Boundary and areas surveyed, it is possible to compare general findings for the SSSIs surveyed. Table 5 summarises the 2009 Landscape Assessment. When compared to the 2019 survey data, it can be seen that at the time of survey, the total area of GC habitat has decreased whilst the area of SU habitat has increased.

Metapopulation modelling has suggested that Marsh Fritillary metapopulations require between 76 and 104ha of suitable habitat for their long-term survival (Bulman *et al.*, 2007), although Fowles (2004, 2005) regards 50ha of Available habitat (the total of *Good* and *Suitable* Condition habitat in the landscape) as an appropriate target to represent Favourable Condition. The 18.57ha of habitat in the landscape (*Suitable* habitat and Contains *Suitable* habitat) is well below this level. In addition, of the land surveyed only an additional 2.67ha of PR habitat was identified which, if brought under appropriate management, would still only total 21.24ha of land and still be too small an area of habitat for long-term survival of the butterfly in the area.

Table 5. Landscape assessment of the Rhos Glyn-yr-helyg metapopulation in 2009 (Ardeshir *et al.*, 2011).

Habitat condition	Caeau Ardwyn	Rhos Glwydwern	Rhos Glyn-yr-helyg	Total
GC	-	6.64	7.78	14.42
SO	-	0.37	0.92	1.29
SS	2.04	-	1.68	3.72
SU	0.41	1.09	1.13	2.63
PR	4.22	3.75	0.99	8.96
Totals	6.67	11.85	12.50	31.02

6.2. Grazing management

The prescribed management for Marsh Fritillary is light grazing, by cattle or ponies, to create a 10-25cm tussocky mosaic with frequent to abundant *Succisa pratensis*. This provides warm, sheltered pockets where the eggs and larvae have the greatest chance of survival, particularly on south and west-facing banks and slopes.

Grazing at each SSSI had resulted in mosaics of habitat conditions, ranging from drier areas which stock had favoured and resulted in SO habitat to ranker, wetter areas which stock had avoided, resulting in SU to PR habitat and the development of dense NS scrub. Grazing by ponies was being undertaken at Rhos Glwydwern, Rhos Glyn-yr-helyg and Caeau Ardwyn (eastern field). At Cors Gwsgoch, the drier areas of the site are pony-grazed (parts of the site are inaccessible to stock due to water levels), resulting in very short sward in areas. Scrub and carr are present at some levels at all sites except Caeau Ardwyn (although not all of this site was surveyed) and management was being undertaken at Rhos Glyn-yr-helyg by WTSWW. Topping also appeared to have taken place at Caeau Ardwyn.

While NRW has no direct control over grazing regimes on land outside its ownership, most of the *Suitable/Potential* habitat is on protected sites where there is potential to work with the landowners to modify the grazing levels.

7. Conclusions

Marsh Fritillary metapopulations require a large network of suitable sites to maintain their populations in the long term. Metapopulation modelling has suggested that metapopulations require between 76 and 104ha of suitable habitat for their long-term survival (Bulman *et al.*, 2007), although Fowles (2004, 2005) regards 50ha of Available habitat (the total of *Good* and *Suitable* Condition habitat in the landscape) as an appropriate target to represent Favourable Condition.

The Rhos Glyn-yr-helyg Marsh Fritillary metapopulation is centred around Rhos Glyn-yr-helyg SSSI. Currently there is only 18.57ha of suitable habitat in the landscape (*Suitable* habitat and Contains *Suitable* habitat). Even if the additional 2.67ha of PR habitat identified during the survey was brought under appropriate management, this would still only total 21.24ha of land, well below the area necessary for long-term survival.

The majority of *Suitable* habitat in the Landscape Area is within designated sites (99%) and therefore there is potential to work with the landowners to modify grazing levels and restore PR habitat.

Current grazing at the protected sites is dominated by ponies. Ponies have a habit of favouring areas, resulting in patches of overgrazing and areas of undergrazing. If grazing is absent or the pressure too low, grasses such as purple moor-grass form dense tussocks, reducing light and space needed for *Succisa* to grow and the Marsh Fritillary to egg-lay. Absence of grazing can also increase the risk of encroachment from scrub species such as gorse and willow. However, over-grazing can lead to heavily disturbed, poached areas with a sward too short and a lack of *Succisa*. Grazing key Marsh Fritillary areas with cattle may help to prevent targeted overgrazing, creating the tussocky mosaic ideal for the butterfly.

Whilst NRW has no direct control over grazing regimes on land outside its ownership, it may be beneficial to work with neighbouring landowners to ensure surrounding land management practices do not impact on important sites e.g. to prevent agricultural run-off leading to damaging nutrient enrichment.

To ensure the survival of the species in this area and to achieve Favourable Condition for the Marsh Fritillary, urgent work will be required to provide *Suitable* habitat for the butterfly to ensure its survival in this area of Ceredigion.

Key actions required

1. Ensure all SSSI land supporting Marsh Fritillary is in favourable management. Maintain good dialogue between owners and NRW. Ensure monitoring is undertaken and feedback, advice and support is provided.
2. Explore the possibility of expanding the area of *Suitable* habitat through liaison with landowners to introduce favourable grazing regimes on land neighbouring sites supporting Marsh Fritillary.
3. Explore the collection, propagation and planting of local provenance Devil's-bit Scabious plug plants into areas of *Suitable Sparse* habitat and neighbouring land that supports Purple Moor-grass but no Devil's-bit Scabious e.g. RGH016j.
4. RGH004a – liaison with landowner to secure grazing with appropriate stock, at a suitable density. The land is currently pony grazed with drier slopes favoured, leading to heavy grazing and wetter areas unfavoured, becoming rank. There is clearly potential on this site to bring more areas into favourable condition to enable greater distribution of Devil's-bit Scabious plants.
5. RGH004b – liaison with landowner to secure grazing with appropriate stock at a suitable density. This parcel of land currently contains a small patch of *Suitable Overgrazed*, but with frequent Devil's-bit Scabious. It is currently heavily pony grazed – a reduction in grazing levels would allow the sward to recover and enable a greater distribution of Devil's-bit Scabious plants.
6. RGH008d – liaison with landowner to enable revisit during Marsh Fritillary larval web season to confirm breeding. Liaison with landowner to determine the feasibility of altering grazing levels to implement more favourable grazing regime.
7. RGH013i – owner mentioned being previously advised not to manage this field as it contained Devil's-bit Scabious and had done as advised. This has led to the field becoming very rank; no Devil's-bit Scabious was seen during the survey, but some Purple Moor-grass was present. This field is located immediately adjacent to Rhos Glyn-yr-helyg SSSI; liaison with the landowner would be recommended to establish more favourable management to allow any remaining Devil's-bit Scabious plants or seeds to become more established.

8. RGH014 – liaison with landowner to review current grazing regime and implement more favourable management, including use of temporary fencing to focus grazing in *Suitable Undergrazed* and *Potential Rank* areas. Liaison with landowner to identify scrub removal in areas currently identified as not suitable due to density of scrub, to increase area of suitable habitat. Liaison with neighbouring landowner regarding nutrient-rich run-off affecting the south-west of RGH014f.
9. RGH016b – liaison with landowner to review current grazing regime and implement more favourable management. This land was identified by Ardeshir *et al.* (2011) as supporting areas of *Potential Rank* and *Good Condition* habitat, however during this survey identified as only supporting a small area of *Suitable Sparse*. It is possible that, if fenced, additional suitable habitat could be created.
10. RGH017a – liaise with landowner to identify areas of scrub for removal and ensure that wooded areas do not expand, creating barriers between pockets of *Good Condition* habitat.
11. RGH018 and RGH020 – liaison with landowner to ensure land management through Glastir takes into account the requirements of Marsh Fritillary as well as the Yellow Bartsia (*Parentucellia viscosa*) for which the site is notified.
12. RGH021 – monitor site to establish grazing levels and timing are appropriate.

8. Acknowledgements

All maps included in this report were produced from Ordnance Survey Data under licence to Natural Resources Wales: Ordnance Survey Licence Number 100019741. Crown Copyright and Database Right (2020). Mike Howe, Hannah Mitchell and Jon Turner of NRW provided invaluable assistance in the preparation and undertaking of the survey and the preparation of this report. To the landowners who consented survey access and enabled the successful completion of this important landscape assessment.

9. References

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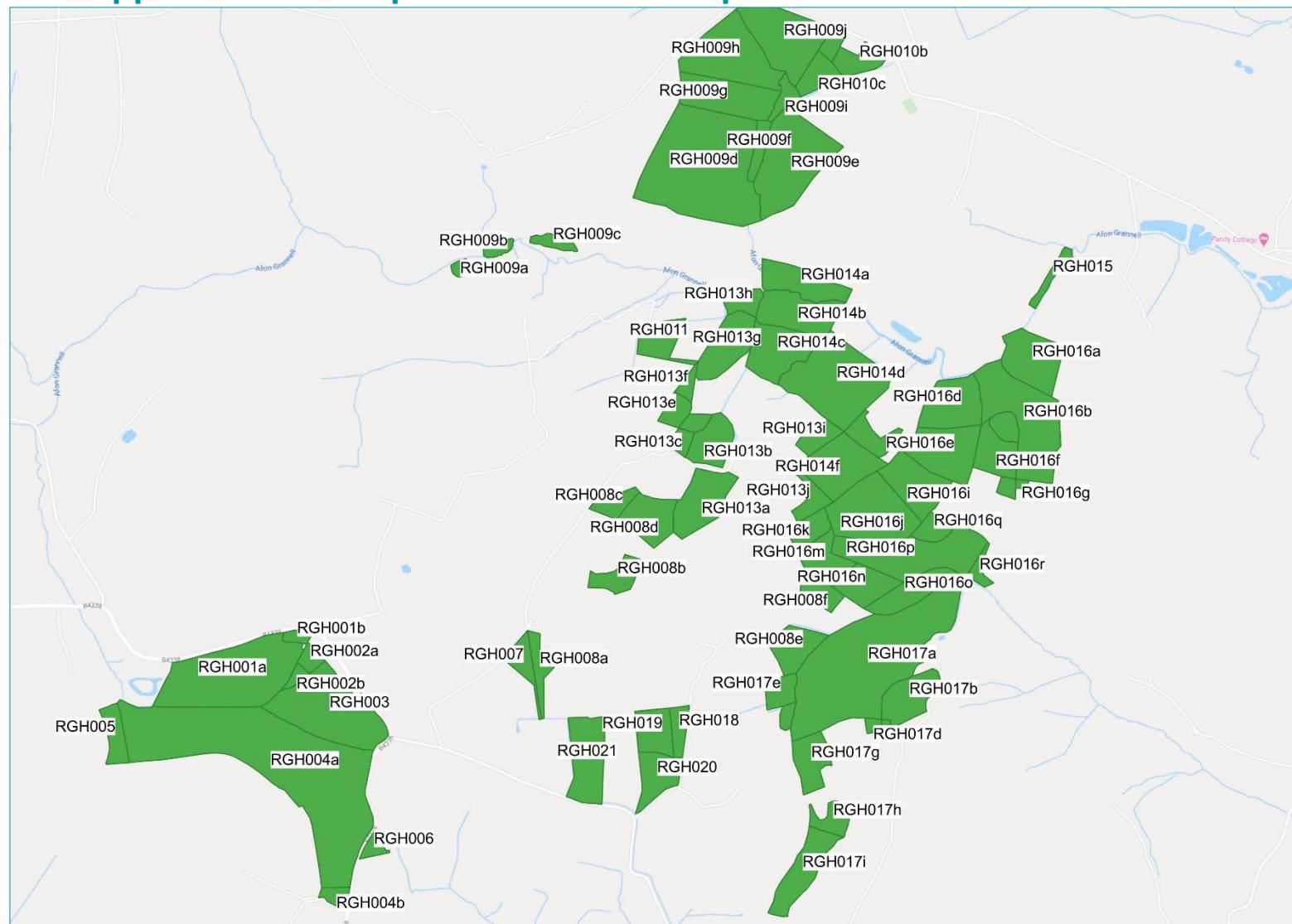
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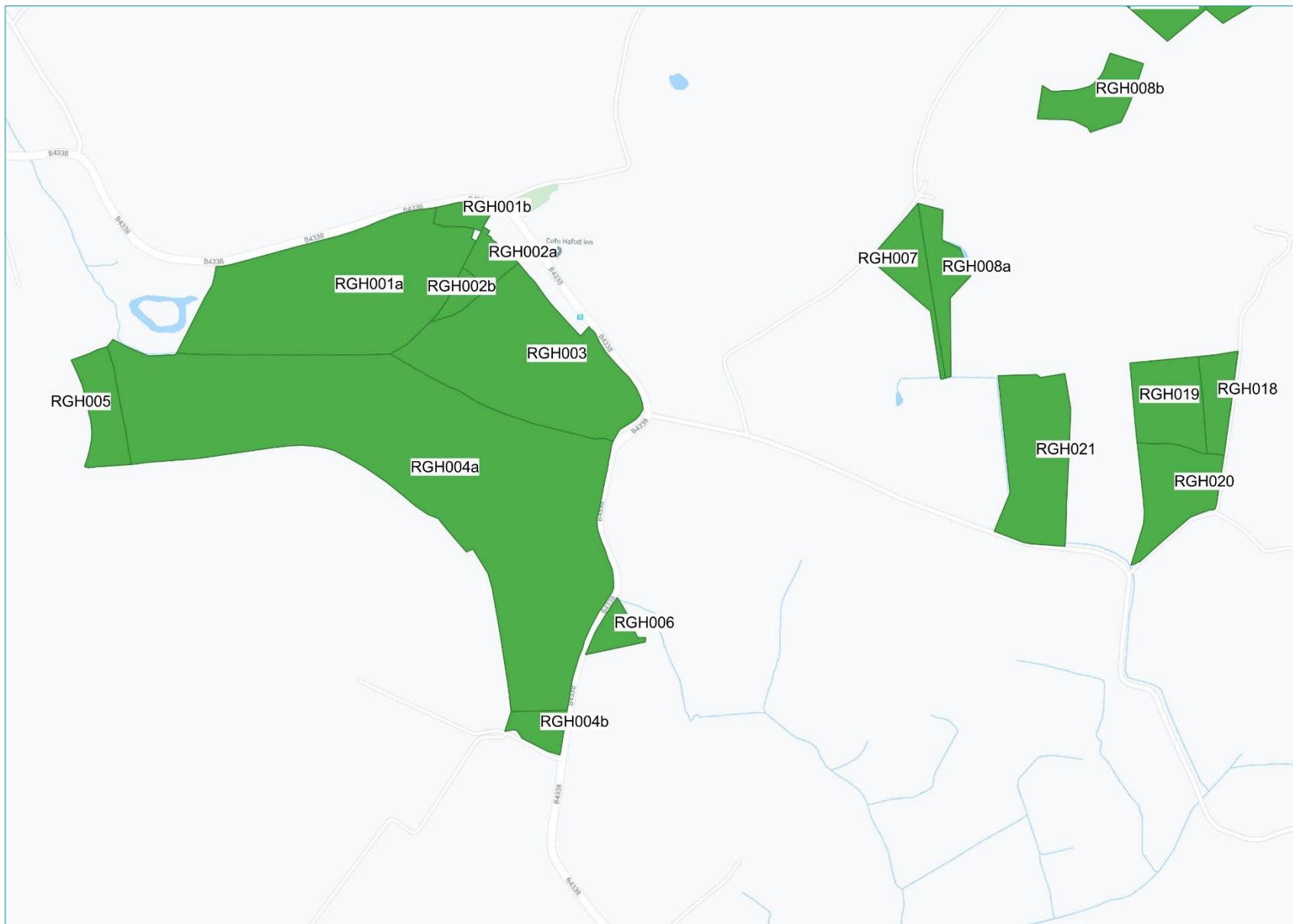
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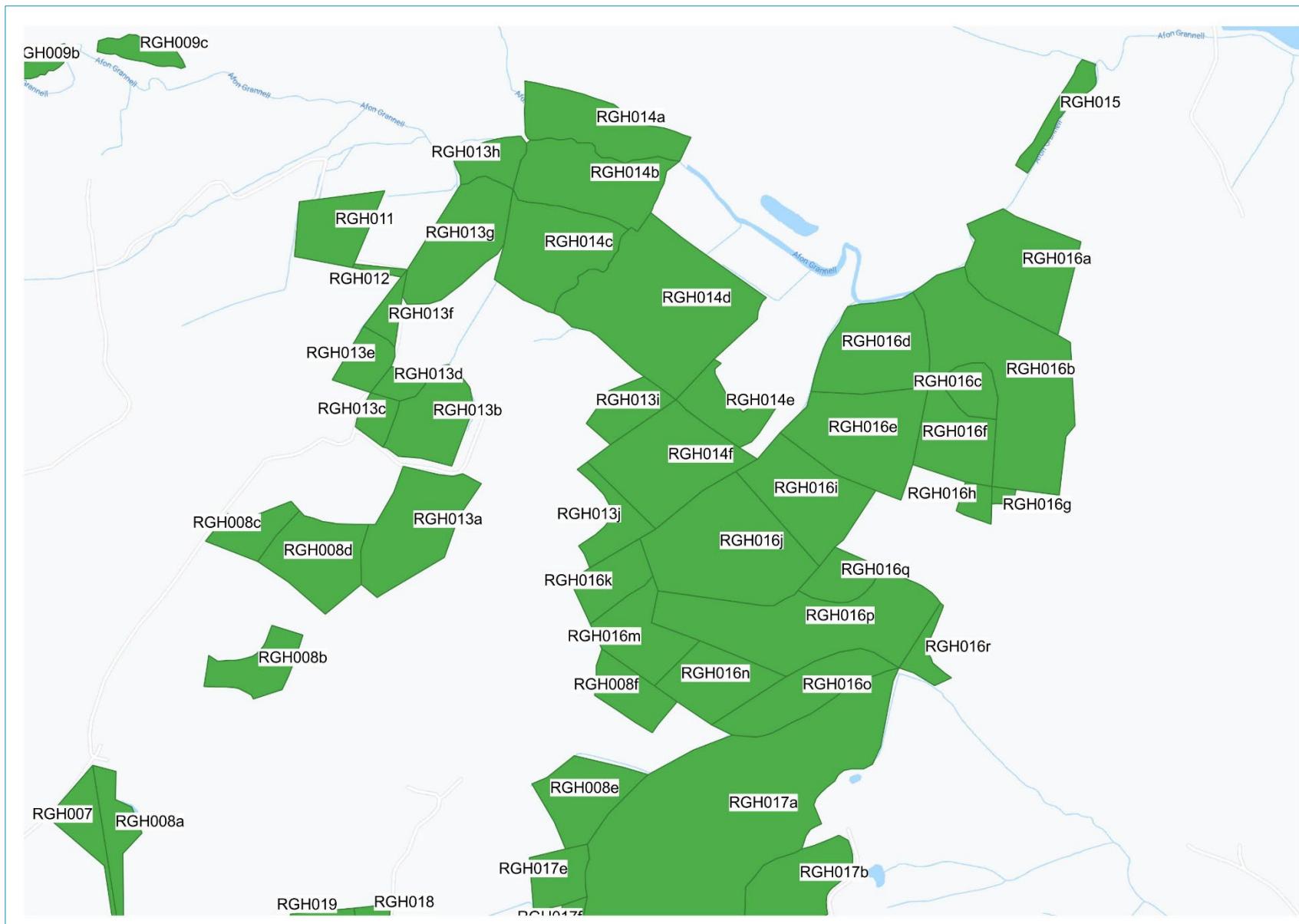
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10. Appendix 1. Land parcels location maps



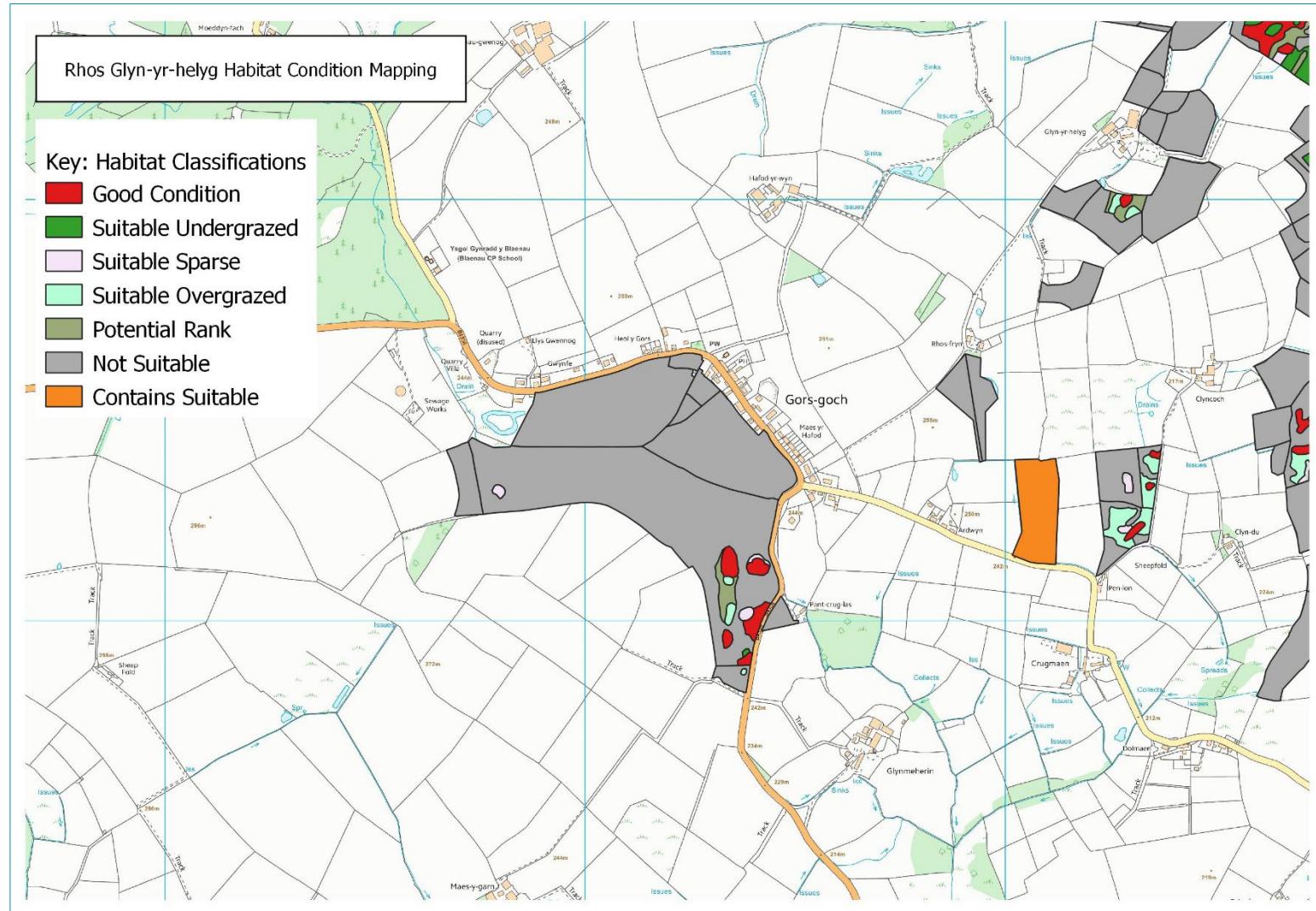




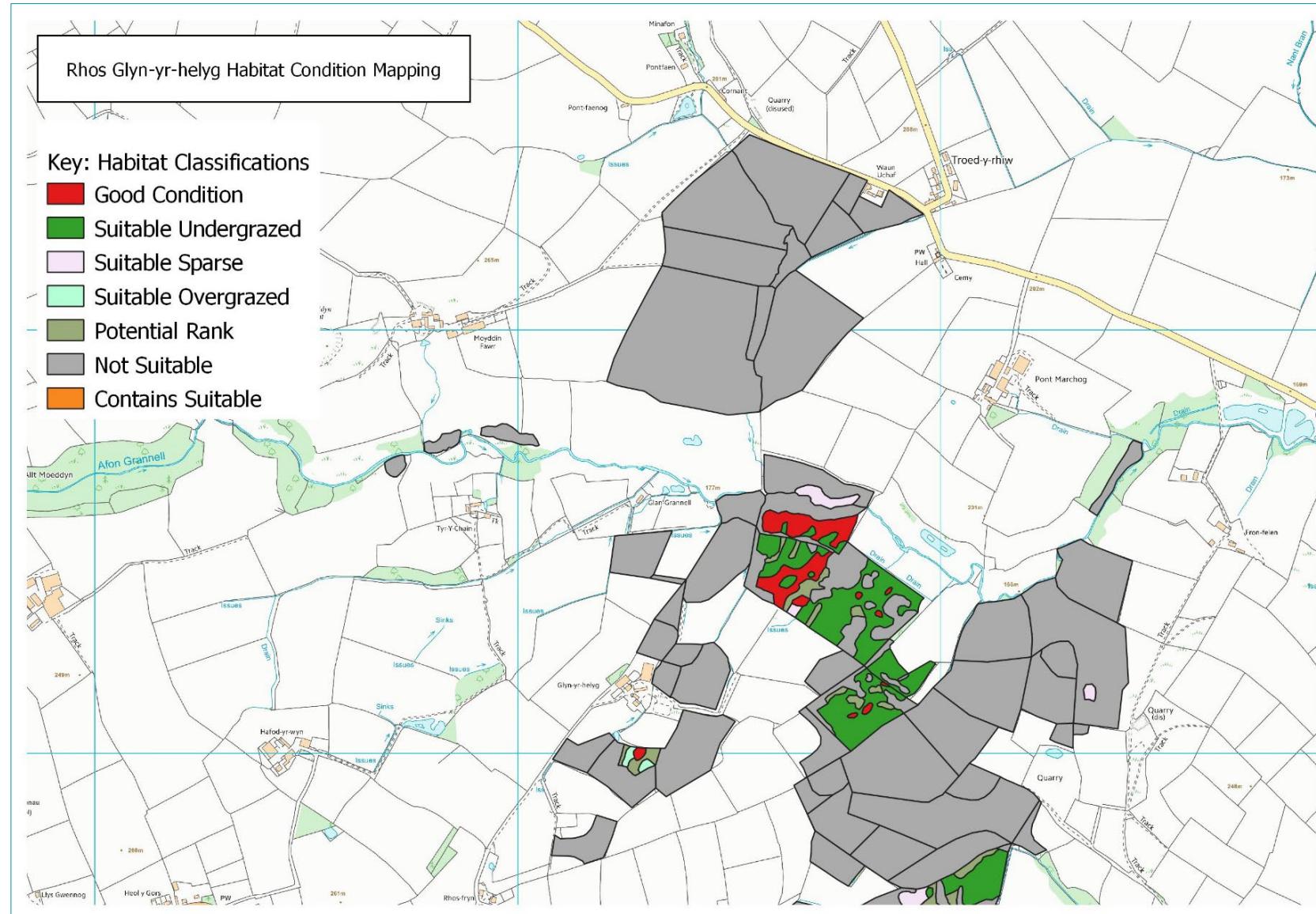


11. Appendix 2. Habitat condition mapping

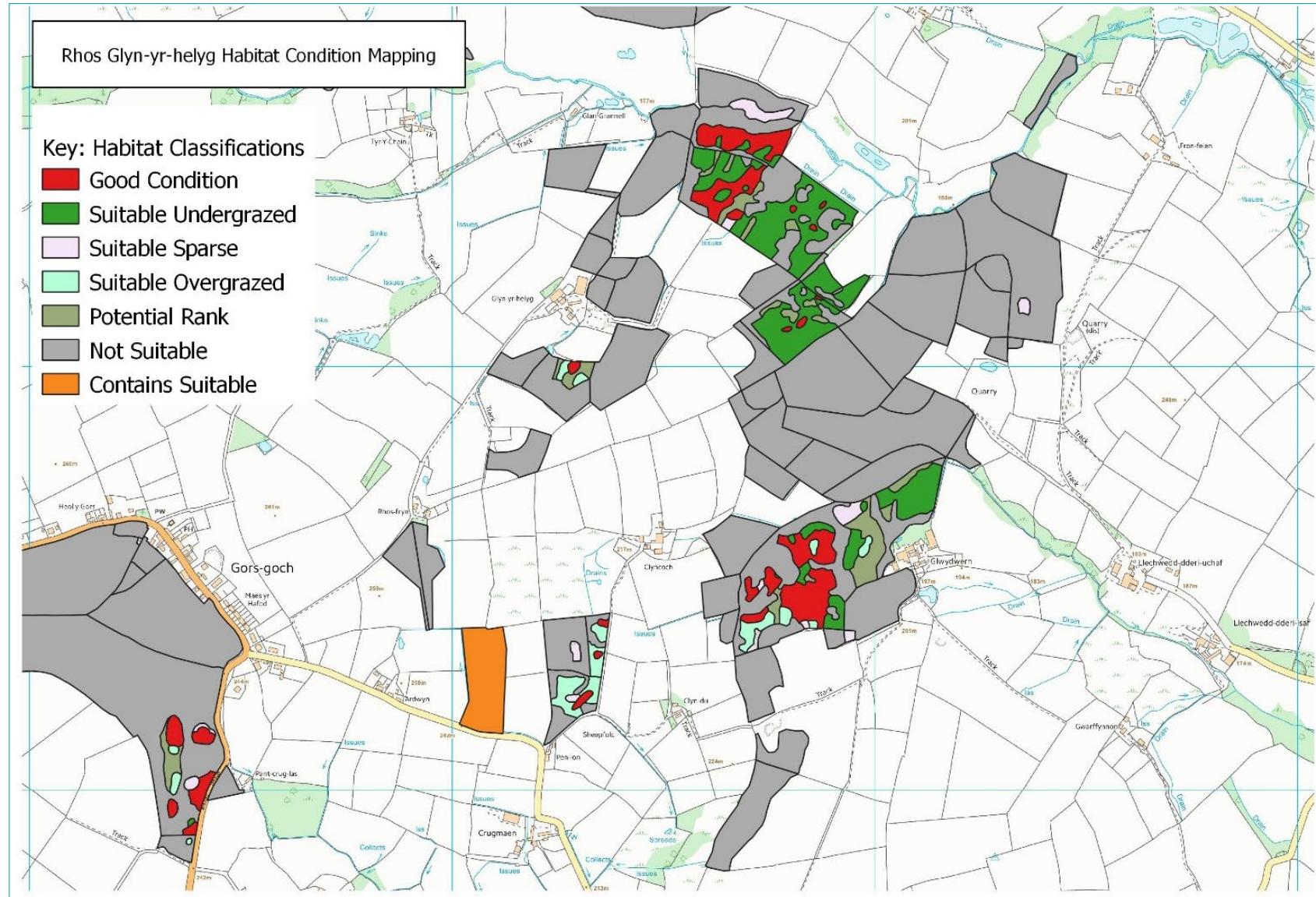
WEST



NORTH



SOUTH



12. Appendix 3. Target notes for compartments surveyed

Field no.	Description	Management	Survey date	Designation
RGH001a	<i>Not Suitable.</i> The site consists of lowland raised bog and fen with carr woodland and open water with drier short horse-grazed grassland on slopes. No <i>Succisa</i> seen. Some areas difficult to access due to wet nature of site.	Horse grazed in places Owner noted site getting wetter each year	21/10/2019	Cors Gorsgoch SSSI
RGH001b	<i>Not Suitable.</i> The site is a small heavily horse grazed enclosed field.	Horse grazed	21/10/2019	-
RGH002a	<i>Not Suitable.</i> Site wooded, according to NRW staff. Access permission not arranged.	None evident	NA	Cors Gorsgoch SSSI
RGH002b	<i>Not Suitable.</i> Access permission not arranged by NRW, but site and habitat contiguous with adjacent site which is lowland raised bog and fen with carr scrub. Site surveyed with binoculars and no <i>Succisa</i> could be seen.	None evident	21/10/2019	Cors Gorsgoch SSSI
RGH003	<i>Not Suitable.</i> Mosaic of dry horse grazed grassland, open water, bog, fen and scrub. No <i>Succisa</i> seen.	Horse grazed	21/10/2019	Cors Gorsgoch SSSI
RGH004a	Mosaic of lowland raised bog and fen with carr woodland, open water, <i>Molinia</i> , <i>Sphagnum spp.</i> and drier short heavily horse-grazed grassland. Some areas difficult to access due to wet nature of site. Site mainly NS but includes small areas of SS, drier areas which are SO, PR areas with <i>Succisa</i> and GC areas with abundant <i>Succisa</i> .	Horse grazed Ditch on northern boundary (in conjunction with NRW) Nutrient enrichment on southern boundary from cattle grazed fields to south	21/10/2019	Cors Gorsgoch SSSI
RGH004b	Mainly <i>Not Suitable.</i> Drier heavily horse grazed short grassland with no <i>Succisa</i> evident but small of patch SO with frequent <i>Succisa</i> .	Horse grazed	21/10/2019	Cors Gorsgoch SSSI

Field no.	Description	Management	Survey date	Designation
RGH005	<i>Not Suitable.</i> Part of larger SIG cattle grazed field with A <i>Juncus effuses</i> . Access permission not sought – surveyed with binoculars and from immediately adjacent land.	Intensively cattle grazed	NA	-
RGH006	<i>Not Suitable.</i> Access permission not sought, after visiting house and no-one at home. Site is garden with pond, animals and short mown turf.	Mown, gardened	NA	-
RGH007	<i>Not Suitable.</i> Access permission not sought as habitat contiguous with adjacent surveyed RGH006 (with permission).	Horse grazed Recreation use	NA	-
RGH008a	Dry SIG on slopes with dense <i>Juncus effuses</i> around amenity pond	Horse grazed	14/10/2019	-
RGH008b	<i>Not Suitable.</i> SIG in drier areas with dense patches of <i>Juncus effusus</i> . No <i>Succisa</i> present.	Topped and cattle grazed	14/10/2019	-
RGH008c	<i>Not Suitable.</i> Heavily horse grazed SIG with drainage ditches installed and tall ruderals.	Horse grazed Drainage ditches	14/10/2019	-
RGH008d	Horse grazed field separated into grazing units with electric fence. Southern half includes area of heavily grazed NS with areas of rank ruderals and no <i>Succisa</i> , wet PR ditches with tall herbs and some <i>Succisa</i> , drier short sward with abundant <i>Succisa</i> that has been left by the horses and an area with GC sward and abundant <i>Succisa</i> .	Horse grazed	14/10/2019	-
RGH008e	<i>Not Suitable.</i> Rank SIG with abundant ruderals which has had several large, deep ditches installed.	Horse grazed Ditched	14/10/2019	-
RGH008f	<i>Not Suitable.</i> Mainly wooded with areas of open water, sedges and rush. No <i>Succisa</i> present.	None evident	14/10/2019	-
RGH009a	<i>Not Suitable.</i> Area of dense <i>Juncus effusus</i> in wet flush at bottom of cattle grazed field with some scrub. No <i>Succisa</i> present.	Cattle grazed	24/10/2019	-

Field no.	Description	Management	Survey date	Designation
RGH009b	<i>Not Suitable</i> . Area of dense <i>Juncus effusus</i> in wet flush at bottom of steep cattle grazed field. No <i>Succisa</i> present.	Cattle grazed	24/10/2019	-
RGH009c	<i>Not Suitable</i> . Area of dense <i>Juncus effusus</i> in wet flush at bottom of steep cattle grazed field. No <i>Succisa</i> present.	Cattle grazed	24/10/2019	-
RGH009d	<i>Not Suitable</i> . Cattle grazed SIG with areas of <i>Juncus effusus</i> . No <i>Succisa/Molinia</i> present.	Cattle grazed Topped	24/10/2019	-
RGH009e	<i>Not Suitable</i> . Cattle grazed SIG with areas of <i>Juncus effusus</i> . No <i>Succisa/Molinia</i> present.	Cattle grazed Topped	24/10/2019	-
RGH009f	<i>Not Suitable</i> . Woodland.	None evident	24/10/2019	-
RGH009g	<i>Not Suitable</i> . Cattle grazed SIG with areas of <i>Juncus effusus</i> . No <i>Succisa/Molinia</i> present.	Cattle grazed Topped	24/10/2019	-
RGH009h	<i>Not Suitable</i> . Cattle grazed SIG with areas of <i>Juncus effusus</i> . No <i>Succisa/Molinia</i> present.	Cattle grazed Topped	24/10/2019	-
RGH009i	<i>Not Suitable</i> . Cattle grazed SIG with areas of <i>Juncus effusus</i> . No <i>Succisa/Molinia</i> present.	Cattle grazed Topped	24/10/2019	-
RGH009j	<i>Not Suitable</i> . Cattle grazed SIG with areas of <i>Juncus effusus</i> . No <i>Succisa/Molinia</i> present.	Cattle grazed Topped	24/10/2019	-
RGH010a	<i>Not Suitable</i> . Horse grazed paddock with some <i>Juncus effusus</i> . No <i>Succisa/Molinia</i> present.	Horse grazed	17/10/2019	-
RGH010b	<i>Not Suitable</i> . Horse grazed paddock with some <i>Juncus effusus</i> . No <i>Succisa/Molinia</i> present.	Horse grazed	17/10/2019	-
RGH010c	<i>Not Suitable</i> . Horse grazed paddock with some <i>Juncus effusus</i> and pond. No <i>Succisa/Molinia</i> present.	Horse grazed	17/10/2019	-
RGH011	<i>Not Suitable</i> . Partially successful reseeding SIG with <i>Juncus effusus</i> . No <i>Succisa/Molinia</i> present.	Agriculturally improved Topped	14/10/2019	-

Field no.	Description	Management	Survey date	Designation
RGH012	Area of <i>Not Suitable</i> scrub, bramble, rank vegetation (access permission not sought). Narrow disused farm track between hedged fields (blocked off at one end when ownership changed).	None evident	14/10/2019	-
RGH013a	<i>Not Suitable</i> . Dry improved grassland (reseeded) with <i>Juncus effusus</i> . No <i>Succisa/Molinia</i> present.	Cattle grazed	14/10/2019	-
RGH013b	<i>Not Suitable</i> . Dry SIG (partially successful reseeded) with <i>Juncus effusus</i> . No <i>Succisa/Molinia</i> present.	Topped	11/10/2019	-
RGH013c	<i>Not Suitable</i> . Paddock with very short horse grazed sward. No <i>Succisa</i> present.			-
RGH013d	<i>Not Suitable</i> . Wooded area with pond and dumped manure/bales. No suitable habitat.	Farm use	14/10/2019	-
RGH013e	<i>Not Suitable</i> . Very rank/overgrown field with nettles/thistles, which appears to be enriched from agricultural runoff from barn above.	None evident	14/10/2019	-
RGH013f	<i>Not Suitable</i> . SIG with areas of rank, tall vegetation and <i>Juncus effusus</i> . No <i>Succisa/Molinia</i> present.	None evident	14/10/2019	-
RGH013g	<i>Not Suitable</i> . Topped SIG with abundant <i>Juncus effusus</i> and area of rank tall vegetation/carr around stream. No <i>Succisa/Molinia</i> present.	Cattle grazed Topped	14/10/2019	-
RGH013h	<i>Not Suitable</i> . Topped SIG with <i>Juncus effusus</i> . No <i>Succisa/Molinia</i> present.	Cattle grazed Topped	14/10/2019	-
RGH013i	<i>Not Suitable</i> . Rank unmanaged field with tall ruderals and frequent <i>Deschampsia cespitosa</i> . Very little <i>Molinia</i> and no <i>Succisa</i> present.	None	14/10/2019	-
RGH13j	<i>Not Suitable</i> . Reseeded IG resulting in runoff onto adjacent land.	Reseeded	14/10/2019	-

Field no.	Description	Management	Survey date	Designation
RGH014a	Field supports area of <i>Not Suitable</i> tall rank vegetation which grades into scrub/carr to north of field. Area of field that is drier and has been grazed more by ponies resulting in good structured sward but only supports sparse <i>Succisa</i> SS.	Managed by WT (horse grazed)	11/10/2019	Rhos Glyn-yr-helyg SSSI
RGH014b	Majority of field GC with good structured sward of a suitable height and abundant <i>Succisa</i> (occasional scrub is scattered across field). Ditches with taller, ranker vegetation which have been avoided by ponies with sparse <i>Succisa</i> . Also <i>Not Suitable</i> wooded areas.	Managed by WT (horse grazed)	11/10/2019	Rhos Glyn-yr-helyg SSSI
RGH014c	NS areas which are wooded, dominated by dense scrub and gorse or tall, rank vegetation with no <i>Succisa</i> present.	Managed by WT (horse grazed)	11/10/2019	Rhos Glyn-yr-helyg SSSI
RGH014c	Mosaic of drier GC grassland with shorter sward height on higher ground (easier access for animals and being grazed more) with abundant <i>Succisa</i> wetter ditches with tall, rank vegetation and scattered <i>Succisa</i> ; areas of SU taller, ranker vegetation in lower depressions with occasional to locally frequent <i>Succisa</i> and wooded/scrub areas of <i>Not Suitable</i> . Occupied web found at 4961651452.	Managed by WT (cattle and horse grazed)	11/10/2019	Rhos Glyn-yr-helyg SSSI
RGH014d	Majority of this field supports taller, SU with <i>Succisa</i> occasional to locally frequent. In ranker, taller areas it is possible that there was more <i>Succisa</i> present that was more difficult to see. Small patches of GC support frequent to abundant <i>Succisa</i> ; areas of slightly shorter SS sward and areas of PR with scattered trees/developing gorse scrub over rank grassland with scattered <i>Succisa</i> and tall rank vegetation in wet ditch and NS dense scrub/woodland	Managed by WT (horse grazed)	11/10/2019	Rhos Glyn-yr-helyg SSSI

Field no.	Description	Management	Survey date	Designation
RGH014e	Majority of site is SU with abundant <i>Molinia</i> and frequent to locally abundant <i>Succisa</i> . NS areas including wooded boundary and field edge to west, old dry hedge bank and wet depression with no <i>Succisa</i> present.	Managed by WT (horse grazed)	11/10/2019	Rhos Glyn-yr-helyg SSSI
RGH014f	Majority of site is tall SU with occasional <i>Succisa</i> occurs throughout but in slightly shorter sward it is locally abundant. Small patches of GC shorter sward occur on slightly higher, drier ground with abundant <i>Succisa</i> , as do areas of tall to very tall PR vegetation with only scattered <i>Succisa</i> plants. NS areas including wooded boundary and field edge to west, areas of dense scrub and gorse and an area of grassland which bounds neighbouring field and appears to have been enriched by nutrient runoff.	Managed by WT (horse grazed)	11/10/2019	Rhos Glyn-yr-helyg SSSI
RGH015	<i>Not Suitable</i> dense alder/willow carr along stream.	None	14/10/2019	-
RGH016a	<i>Not Suitable</i> . Dry SIG on slope with heavily cattle grazed wet flushes dominated by rush and thistles.	Cattle grazed	24/10/2019	-
RGH016b	Mainly <i>Not Suitable</i> dry SIG on slope with heavily cattle grazed wet flushes dominated by rush and thistles with small remnant area of SS <i>Molinia</i> at bottom of field with scattered <i>Succisa</i> plants and Lousewort.	Cattle grazed	24/10/2019	-
RGH016c	<i>Not Suitable</i> . Pond with banked sides.	Bird feeders on pond	24/10/2019	-
RGH016d	<i>Not Suitable</i> . Short, dry heavily cattle and sheep grazed SIG on slopes with area of <i>Molinia</i> at bottom of slope, but no <i>Succisa</i> .	Cattle and sheep grazed	24/10/2019	-
RGH016e	<i>Not Suitable</i> short, dry cattle and sheep grazed SIG on slopes with areas of <i>Juncus</i> at bottom of slope. No <i>Succisa</i> .	Cattle and sheep grazed	24/10/2019	-
RGH016f	<i>Not Suitable</i> cattle and sheep grazed SIG with <i>Juncus</i> . No <i>Succisa</i> or <i>Molinia</i> .	Cattle and sheep grazed	24/10/2019	-

Field no.	Description	Management	Survey date	Designation
RGH016g	Area of <i>Not Suitable</i> dense <i>Juncus effusus</i> . No <i>Succisa</i> .	Cattle and sheep grazed	24/10/2019	-
RGH016h	<i>Not Suitable</i> cattle and sheep grazed SIG with <i>Juncus</i> . No <i>Succisa</i> or <i>Molinia</i> .	Cattle and sheep grazed	24/10/2019	-
RGH016i	<i>Not Suitable</i> cattle and sheep grazed SIG with areas of <i>Juncus</i> . No <i>Succisa</i> or <i>Molinia</i> .	Cattle and sheep grazed	24/10/2019	-
RGH016j	<i>Not Suitable</i> . Field supports mosaic of wetter <i>Molinia</i> and drier <i>Festuca</i> grassland and flushes with <i>Sphagnum</i> , heathers but no <i>Succisa</i> .	Previously ploughed in places according to owner Cattle and sheep grazed	24/10/2019	-
RGH016k	<i>Not Suitable</i> . Tussocky, rank grassland with abundant <i>Deschampsia cespitosa</i> .	Cattle grazed	24/10/2019	-
RGH016l	<i>Not Suitable</i> . Wooded area/dense scrub.	None evident	24/10/2019	-
RGH016m	<i>Not Suitable</i> . Grassland dominated by <i>Holcus lanatus</i> and <i>Deschampsia cespitosa</i> , <i>Juncus effusus</i> and wet flushes. No <i>Molinia</i> or <i>Succisa</i> present.	Cattle and sheep grazed	24/10/2019	-
RGH016n	<i>Not Suitable</i> . Dry semi-improved grassland on higher ridges with rank <i>Juncus</i> dominated wet flushes. No <i>Succisa</i> .	Cattle and sheep grazed	24/10/2019	-
RGH016o	<i>Not Suitable</i> . Dry semi-improved grassland on higher ridges with rank <i>Juncus</i> dominated wet flushes. No <i>Succisa</i> .	Cattle and sheep grazed	24/10/2019	-
RGH016p	<i>Not Suitable</i> . Large area of rank grassland with areas dominated by <i>Deschampsia cespitosa</i> , areas of scrub and large wildfowl ponds created by owners. No <i>Succisa</i> .	Cattle and sheep grazed	24/10/2019	-
RGH016q	<i>Not Suitable</i> . Area of rank grassland, scrub and wildfowl pond.	Cattle and sheep grazed	24/10/2019	-
RGH016r	<i>Not Suitable</i> . Corner of field dominated by <i>Juncus</i> flush. No <i>Succisa</i> or <i>Molinia</i> .	Cattle and sheep grazed	24/10/2019	-
RGH017a	<i>Not Suitable</i> . Areas of woodland, carr and dense scrub with no suitable habitat and area to north-west of farm buildings which have been enriched by runoff.	Pony grazed	23/10/2019	Rhos Glwydwern SSSI

Field no.	Description	Management	Survey date	Designation
RGH017a	Large compartment containing largest amounts of GC habitat in the survey area with good sward structure and locally frequent to abundant <i>Succisa</i> . Site also supports SO areas targeted for grazing, patches of SU (includes majority of most north-easterly area of the site which is not included within the SSSI), areas of SS and PR. An occupied web was found at 4976850498	Pony grazed	23/10/2019	Rhos Glwydwern SSSI
RGH017b	<i>Not Suitable</i> . Large pond and associated carr woodland.	None evident	23/10/2019	Rhos Glwydwern SSSI
RGH017c	Small area of SS <i>Molinia</i> by site entrance, which is poached in places, but supports sparse <i>Succisa</i> .	Pony grazed	23/10/2019	Rhos Glwydwern SSSI
RGH017d	<i>Not Suitable</i> . Small watering pond which adjoins adjacent field.	Cattle and sheep grazed	23/10/2019	Rhos Glwydwern SSSI
RGH017e	<i>Not Suitable</i> . Short sheep-grazed SIG with patches of <i>Juncus effusus</i> .	Sheep grazed	23/10/2019	-
RGH017f	<i>Not Suitable</i> . Short sheep-grazed SIG with patches of <i>Juncus effusus</i> .	Sheep grazed	23/10/2019	-
RGH017g	<i>Not Suitable</i> . Short sheep-grazed SIG with patches of <i>Juncus effusus</i> .	Sheep grazed	23/10/2019	-
RGH017h	<i>Not Suitable</i> . Short sheep and cattle grazed SIG, heavily poached in areas with <i>Juncus effusus</i> and rank vegetation by stream.	Cattle and sheep grazed	23/10/2019	-
RGH017i	<i>Not Suitable</i> . Area of carr woodland and tall-herb species-poor fen vegetation adjacent to stream.	None evident	23/10/2019	-

Field no.	Description	Management	Survey date	Designation
RGH018	The majority of this wet, heathy field appears to have been topped and grazed, therefore it has been categorized as SO. <i>Succisa</i> is present, ranging from O in the northern part of the field to LF in the drier southern part. Two patches of GC habitat with suitable sward height and F <i>Succisa</i> present along with <i>Not Suitable</i> wooded and taller, rank vegetation in wetter flushes.	Land in Glastir according to NRW. Site has been topped and grazed.	17/10/2019	Caeau Ardwyn SSSI
RGH019	<i>Not Suitable</i> . Majority of this marshy field does not support any <i>Succisa</i> except for a small area of SS higher and drier grassland which supports sparse <i>Succisa</i> .	Land in Glastir according to NRW. Site has been grazed.	17/10/2019	Caeau Ardwyn SSSI
RGH020	This field supports a mosaic of wet and drier grassland and heath but appears to have been topped resulting a mosaic of SO areas with F <i>Succisa</i> , areas of SS with good sward structure but sparse <i>Succisa</i> and a small area of GC grassland where sward structure is good and <i>Succisa</i> occurs frequently. There are also areas of unsuitable habitat including wooded and wet flush/stream.	Land in Glastir according to NRW. Site appears to have been topped and grazed.	17/10/2019	Caeau Ardwyn SSSI
RGH021	Contains Suitable. NRW staff were unable to contact the owner for this site so site was not accessed. The site borders a road and was surveyed with binoculars. Only the area nearest the road could be seen but this contained <i>Succisa</i> which could be seen in abundance in places.	Horse grazed according to NRW.	17/10/2019	Caeau Ardwyn SSSI

13. Data Archive Appendix

The data archive contains:

- [A] The final report in Microsoft Word and Adobe PDF formats.
- [B] Species records, which are held on the NRW Recorder 6 database.
- [C] GIS landscape assessment layer. This will be added to the Master layer which is currently maintained by Butterfly Conservation under grant-aid from Welsh Government.

Metadata for this project is publicly accessible through Natural Resources Wales' Library Catalogue <http://libcat.naturalresources.wales> or <http://catllyfr.cyfoethnaturiol.cymru> by searching 'Dataset Titles'. The metadata is held as record no 124756.