

**Ecological Survey
at
Waun Fachelich and Dowrog South
St David's, Pembrokeshire**



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Contents

Section		Page number
1.	Site Description	3
2	Desk Exercise	4
3.	Survey Details	5
4	Rare Plant Survey	6
4.1	Introduction	6
4.2	Survey Methodology	6
4.3	Results	7
4.3.1	Slender Yellow Centaury	8
4.3.2	Wavy St. John's-wort	9
4.3.3	Three-lobed Water Crowfoot	10
4.3.4	Chaffweed and Allseed	12
4.3.5	Lesser Tussock Sedge	13
4.3.6	Lesser Water Plantain	14
4.3.7	Meadow Thistle / Heath Dog Violet	15
4.3.8	Other Notable Species	16
4.4	Invasive Non-native Plant Species	16
4.5	References	17
5.	Fungi and Lichens	18
6	Breeding Bird Survey	19
6.1	Survey Methodology	19
6.2	Results	19
6.3	Bird Conservation Assessment	22
6.4	References	23
7.	Wintering Birds	24
8.	Mammals	25
9.	Reptiles and Amphibians	26
9.1	Aims and Objectives	26
9.2	Survey Results	26
9.3	Reptile Population Assessment	27
9.4	Discussion and Recommendations	28
10.	Invertebrates	30
10.1	Aims and Objectives	30
10.2	Survey Details	30
10.3	Results	30
10.3.1	Overview of Invertebrate Records	30
10.3.2	Key Species and Habitat Requirements	33
10.3.3	Potential for Other Notable Species	34
11.	Management	35
11.1	Recent Management	35
11.2	Future Management Recommendations	36

1. Site Description

The surveyed land comprises two areas of common land owned by the National Trust – the small areas of Dowrog Common to the south of the A487, and the northern half of Waun Fachelich. The Dowrog Common unit is bisected by the entrance track to Lower Harglodd, and both sections lie on level ground at around 50m above sea level. Drainage water collects here before flowing south in a small stream which joins the Dwr Cleifion. Waun Fachelich lies to the north of St David's airfield, and comprises heathland over shallow peaty soils and clay at around 56m above sea level.

The Dowrog areas are part of Dowrog Common SSSI, a Wildlife Tust of South and West Wales reserve, whilst Waun Fachelich is part of St David's Airfield Heaths SSSI. Both SSSIs form part of the North-west Pembrokeshire Commons SAC.



Aerial photo of site

2. Desk Exercise

A search of the WWBIC returned no records for Dowrog south, but a few records for Waun Fachelich. These are as follows:

- Sam Bosanquet noted some mosses here as part of CCW Phase II survey, and his own recording: *Campylium protensum*, *Sphagnum compactum*, *Racomitrium affine*, *Hedwigia stellata*, *Oxyrrhynchium speciosum* and *Calliergon giganteum*. Although none of these are sufficiently uncommon for inclusion in the Pembrokeshire Rare Bryophyte Register (Sutton, in prep), there are relatively few county records of the latter two species. The *Oxyrrhynchium* was described as present under willow at the edge of the fen (and was found in such a location on the northern edge of the common during the current survey), whilst the *Calliergon* was described as rare in one location in the fen channel in the southern part of the site. This was not located during the current survey, but a larger population in a fen hollow further to the east on Waun Llandruidion was re-recorded.
- A weasel near the northern corner is the only mammal record.
- An adder was recorded in the northern part of the site in 1990 by an unnamed observer.
- Common frog has been recorded.
- Most birds have been recorded at tetrad level; the only specific site record was of singing meadow pipits by Sam Langdon in 2019.
- Few plant records were returned – one record of three-lobed water crowfoot (*Ranunculus tripartitus*), and a record of lesser butterfly orchid (*Platanthera bifolia*) erroneously placed on the NT side of the fence.
- Surprisingly few invertebrate records were returned. David Redhead had recorded caterpillars of the Lackey Moth, Steve and Ann Coker had recorded hairy dragonfly (*Brachytron pratense*) in 2001, and this author had recorded small pearl-bordered fritillary (*Boloria selene*) in 2004.

A search of the Welsh Invertebrate Dataset, available via NBN but apparently not captured in WWBIC data, produced a record of the ground beetle *Brachycellus sharpi* from the centre of the common. This is a local species, usually associated with acid woodlands on peat, and it has a restricted world range.

Searches of the Pembrokeshire Rare Plant Register (Evans, 2010) yielded several records for Waun Fachelich. These are considered in Section 4.3. There are many records for Dowrog Common, but none for the southern part of the site.

The Pembrokeshire Rare Bryophyte Register (Sutton, in prep.) holds no records for the site, but two Nationally Scarce mosses (*Ephemerum crassinervium* ssp. *sessile* and *Drepanocladus sendtneri*) have been recorded from Waun Llandruidion, a short distance to the east. The latter appears to have disappeared recently as a result of neglect, and may now be extinct in the county.

Data from the county moth database (Robin Taylor, pers. comm.) gave an indication of records from Waun Fachelich. These included Haworth's Minor (*Celaena haworthii*), a

Section 7 species (of principle importance for conservation in Wales) that is relatively widespread in west Wales. Several other common, but declining, moth species are recorded from the area.

Both Waun Fachelich and Dowrog were mapped as part of CCW's Phase II Lowland Grassland Survey between 2000 and 2002. Maps and site descriptions were obtained from NRW prior to commencement of survey. The thorough reports describe and map the NVC communities, of which *Molinia caerulea* – *Cirsium dissectum* fen-meadow (M24) and *Ulex gallii* - *Agrostis curtisii* heath, *Erica tetralix* sub-community (H4c) are considered the most important here. Various notable plants were recorded, some invertebrates, and notes were made on recent management.

3. Survey Details

Survey of the following groups was carried out:

- Breeding birds / Wintering Birds
- Reptiles
- Bats
- Other Mammals
- Invertebrates
- Rare Plants



Sub-metre accuracy recording of rare plants using Geode GPS device

4. Rare Plant Survey

4.1 Introduction

The following species, included in the Pembrokeshire Rare Plant Register (Evans, 2017), had previously been recorded from the site:

- Slender Yellow Centaury (*Cicendia filiformis*)
- Meadow Thistle (*Cirsium dissectum*)
- Allseed (*Radiola linoides*)
- Three-lobed Water-Crowfoot (*Ranunculus tripartitus*)
- Ivy-leaved Water-Crowfoot (*Ranunculus hederaceus*)
- Heath Dog-Violet (*Viola canina*)

The current survey added the following species, recorded elsewhere on the SSSI but not on this management unit:

- Chaffweed (*Anagallis minima*)
- Wavy St. John's-wort (*Hypericum undulatum*)
- Lesser Water-Plantain (*Baldellia ranunculoides*)
- Lesser Tussock Sedge (*Carex diandra*)

In addition, the following two species have been recorded from the PCNPA managed part of Waun Fachelich a short distance to the south of the current survey area:

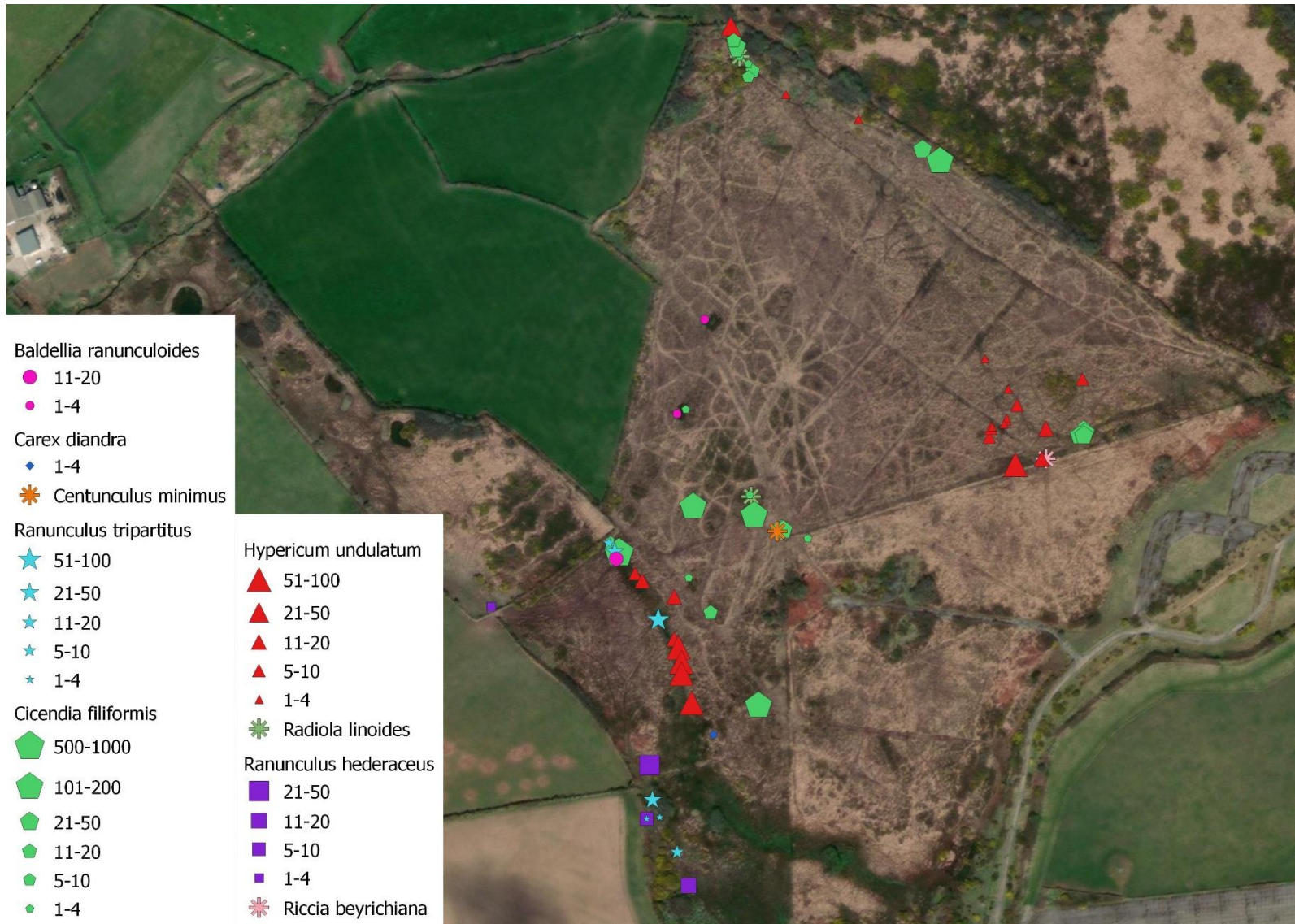
- Lesser Butterfly Orchid (*Platanthera bifolia*)
- Pale Dog-Violet (*Viola lactea*)

A search was also made of the Pembrokeshire Rare Bryophyte Register (Sutton, in prep.) to see if any notable bryophytes had been recorded from the site (none had).

4.2 Survey Methodology

Records of all of the above species were uploaded to a 'Viewranger' app on a smart-phone, to enable navigation to the previously recorded grid reference. New grid references were taken either using a smart-phone GPS, or a combination of Geode and QField to enable sub-1m accuracy grid references to be recorded.

4.3 Results



Map 4.1 Locations of Rare Plants Recorded on Waun Fachelich 2021-2022

4.3.1 Slender Yellow Centaury (*Cicendia filiformis*)



Typical Cicendia habitat on Waun Fachelich

This small but distinctive annual plant is a local speciality. It is Nationally Scarce, classed as Vulnerable on the UK Red-list, and is a Section 7 species 'of principle importance for conservation in Wales'. It is restricted to the south-western parts of Britain and Ireland, the Pembrokeshire populations are the only extant in Wales, and most of these are on the St David's commons. It is a specialist of sparsely vegetated areas of heathland, where reduced competition caused by winter flooding, grazing or other disturbance is essential.

Evans (2017) gives details of two populations, found in 2015 in pits created by PCNPA turf translocation 18 years previously. The current survey recorded sub-populations at 27 grid references, including 4 of the 7 pits. The largest sub-population, of over 500 plants, was found on disturbed clay at the edge of the fen channel, near the stepping stones on the western boundary. A total of over 1150 plants were counted, and the true figure is estimated to be 2000 or more. It is clearly thriving under recent management, and cattle-grazing, perhaps combined with occasional mechanical disturbance which exposes clay subsoil, is ideal. There is another large population further east on the SSSI at Waun Llechell, but these and the populations on Dowrog are among the few healthy ones remaining in the county.

4.3.2 Wavy St. John's-wort (*Hypericum undulatum*)



Hypericum undulatum – easily identified by distinctive red sepals when in flower

This Nationally Scarce plant of marshy grassland and fen vegetation has been recorded from at least 75 sites in the county. However, it is an oceanic species and known only from Pembrokeshire, Ceredigion, Merionydd and the south-west of England – it is apparently absent from Carmarthenshire despite there being plenty of suitable habitat.

Despite listing records from the Rhos Pasture on adjoining Lower Harglodd land, as well as a population between Waun Llechell and Waun Caerfachell further east, Evans (2017) curiously gives no records for Waun Fachelich. It is clearly well-established here though, and the current survey found it in 26 places, with a minimum count of 438 flowering plants and an estimated total perhaps nearer 1000. Current cattle grazing is serving it well.

4.3.3 Three-lobed Water-crowfoot (*Ranunculus tripartitus*)



The finely divided leaves of Ranunculus tripartitus

This winter-flowering buttercup of disturbed, winter-wet ground on nutrient-poor semi-natural habitats is another local speciality. It is Nationally Scarce, classed as Vulnerable on the UK Red-list, and is a Section 7 species 'of principle importance for conservation in Wales'. It is restricted to southern England and Western Wales, where populations have been declining through habitat loss of the abandonment of traditional grazing.

It was discovered on the common in 1998, and has regularly been present at three locations here since. Total numbers have usually been in the low hundreds.

The current survey found 158 plants in similar locations on Waun Fachelich. 6 plants were found by the former boardwalk across the fen channel on the western edge of the site, 35 a short distance to the east, and a further 61 plants further east again. These sub-populations had been avoided when machinery had crossed here during management work in October; it is hoped that the crossing point used alongside instead will encourage it to spread. Creation of minor scrapes in several places on the edge of the channel here may likewise encourage the species. Another cluster of sub-population near the southern site boundary at the eastern end of this channel numbered some 51 plants, spread across 4 discrete locations. Half of these were by a clump of willows where cattle may have congregated for shade or browse.



(top) The largest sub-population is on a livestock trail across the fen channel here; (bottom-right) a trampled path through wet *Molinia* supports around 20 plants at the eastern end of the channel; (bottom-right) 26 plants were counted around these willows

Ivy-leaved Crowfoot (*Ranunculus hederaceus*) has also been recorded from the fen channel in the southern part of the common. The current survey saw it in small quantity here, and a single plant was also in the gateway to Lower Harglodd. Although included in the Rare Plant Register on account of its restricted global distribution and the importance of Welsh / UK populations, it is still a widespread and common species in the county. It favours more nutrient rich wet habitats than its rarer relative, and an expanding population on Waun Fachelich would be of concern.

4.3.4 Chaffweed (*Centunculus minima*) and Allseed (*Radiola linoides*)



Chaffweed is frequent in one area of open ground

Allseed, classed as Near Threatened on the UK Red List, is a small annual plant of damp, acidic, infertile heaths and other habitats. It has a predominantly western distribution in Wales and the UK. It has been known from a couple of places on the PCNPA side of the common since 1976, and by 2015 it had begun to colonise the nearest de-turfed pit a short distance to the west (Evans, 2017). The current survey found it to be frequent at the edge of a turf-pit and in a bare area near the gateway between the two sections. A single plant was also found in a new location in trampled ground near the northern corner of the site.

Chaffweed is a somewhat similar plant, of similar habitats and distribution. It too is classed as Near Threatened on the UK Red List. Previously known from couple of places on the PCNPA side of the fence (Evans, 2016), it too has now colonised a bare patch by the gateway between the two sections.

As with the *Cicendia*, cattle-grazing and perhaps also occasional mechanical disturbance will be needed to maintain and expand populations of these two species.

4.3.5 Lesser Tussock Sedge (*Carex diandra*)



Carex diandra

This sedge, a tussock former as the name suggests, is classed as Near Threatened on the UK Red List. It is still frequent on Anglesey, but very rare elsewhere in Wales. It favours wet peat soils, particularly on pool margins. Evans (2017) lists three extant populations – on Trefeiddan Moor, Dowrog Pool (where it is abundant), and on nearby Waun Llandruidion / Waun Llechell.

The current survey found a single flowering tussock on the side of the fen channel that bisects the heathland in the southern part of the site. Maintenance of good water-quality in this channel and a cattle-grazing regime will be key to its conservation. Excavation of a shallow pool in the area of nutrient-enriched vegetation at the eastern end of this channel could benefit the species, provided the spoil is taken off-site.

4.3.6 Lesser Water Plantain (*Baldellia ranunculoides*)



Baldellia ranunculoides

This coriander-scented species is another classed as Near Threatened on the UK Red List. It is frequent in ponds on the St David's commons, but had previously only been recorded in one pond on Waun Fachelich, on the eastern side of the fence. The current survey found it in small quantity (five plants) in two of the pits dug by PCNPA in the 1990s, on the eastern side of the common. It is more frequent (18 plants) in the fen channel at the northern end on the eastern side.

4.3.7 Meadow Thistle (*Cirsium dissectum*) / Heath Dog-Violet (*Viola canina*)



Molinia vegetation in the south-east part of the site remains suitable for both species, but neither were seen.

A small population of the locally-scarce meadow thistle has been known from the *Molinia* fen-meadow in the north-eastern part of the site since 1981. It grew slowly from approximately 8x4m to a little over 12x4m with the aid of *Molinia* mowing in the location, although two further small patches found in 2001 a little way to the north-west had apparently disappeared by 2016.

The current survey was unable to locate meadow thistle at the recorded grid reference, or elsewhere in the surrounding area. There has been no significant change in the vegetation. It is possible that cattle grazing had removed flowering spikes, but the distinctive rosette leaves were also searched for without success.

Heath dog-violet is classed as Near Threatened on the UK Red List, and is known from the *Molinia* fen-meadow a short distance to the west of the meadow thistle. Like that species, it could not be located during the current survey, although as a spring-flowering plant it would have been less in evidence during summer visits.

4.3.8 Other Notable Species



Three additional noteworthy higher plant were recorded. **Slender Knapweed (*Centaurea debeauxii*)** is locally-frequent in the *Molinia*-dominated fen-meadow in the south-eastern part of the site, around SM78072602. This species, distinguished from lesser knapweed by the ray florets and the shape of the scales on the ‘hardhead’, has only been noted three times before in the county, but is widespread in south-east Wales. **Shore horsetail (*Equisetum x litorale*)** is a hybrid between field and water horsetail which is under-recorded but likely to be widespread in the county. Several patches were noted in the wet woodland in Dowrog south-west. A lax-flowered variety of **compact rush (*Juncus conglomeratus* var. *subbuliflorus*)** was also noted in the willow wood here – this appears to be rarely recorded in Wales, but the author has found it in wet woods in two places in the south of the county.

One bryophyte of interest was noted, **Purple Crystalwort (*Riccia beyrichiana*)**. There are scattered records of this uncommon liverwort on coastal and wet heaths in north-west Pembrokeshire, and the occurrence of a small patch on the firebreak by the eastern boundary fence is typical.

4.4 Invasive Non-Native Plant Species

The only invasive non-native plant species recorded were on Dowrog south-west, where stands of Japanese rose (*Rosa rugosa*) have formed a thicket then spread west along the roadside from the garden of the adjoining house. A few shoots of montbretia (*Crocsmia x crocosmiiflora*) were noted on the west side of the entrance road to Lower Harglodd. Both of these species are listed as invasive on Schedule 9 of the Environment Wales Act (2016), and it is illegal to plant or cause them to grow in the wild. The plant suckers freely, smothering native vegetation, although the potential spread of the rose here may be limited by its intolerance of wet ground. Repeat cutting would reduce its vigour; excavation and disposal of root balls may be impractical here.



Japanese Rose on the road verge of Dowrog south-west

4.5 References

Bosanquet, S.D.S. (2002). CCW Lowland Grassland Survey: St David's Airfield Heaths SSSI and Annexes. Unpublished CCW Report.

Cheffings, C.M. & Farrell, L. (eds), Dines, T.D., Jones, R.A., Leach, S.J., McKean, D.R., Pearman, D.A., Preston, C.D., Rumsey, F.J., Taylor, I. 2005. The Vascular Plant Red Data List for Great Britain. Species Status No. 7. JNCC.

Evans, S.B. (2017). Pembrokeshire Rare Plant Register. Unpublished Draft.

Smith, S.L.N. (2001). CCW Lowland Grassland Survey: Dowrog Common SSSI and Annexes. Unpublished CCW Report.

Sutton, M.D. (in prep). Pembrokeshire Rare Bryophyte Register. Unpublished Draft.

5. Fungi and Lichens

Aside from an unsuccessful search for the rare Willow Blister (*Cryptomyces maximus*) on grey willow in the wet woodland on Dowrog south-west, no specific fungal survey was carried out and very few ad hoc records were made.



Jelly ear on willow on Dowrog south-west

Willows on south Dowrog support an abundance of foliose lichens, with *Ramalina calicaris* – a western, coastal species - amongst a range of common species noted. Fungi here included the jelly ear (*Auricularia auricula-judae*), coral-spot fungus (*Nectria cf. cinnabarina*), a powdery mildew on meadowsweet leaves (*Erysiphe ulmariae*) and a white mould on marsh marigold leaves (*Ramularia calthae*).

6. Breeding Bird Survey

6.1 Survey Methodology

Two visits were made to the site in June 2021, the late start date to the contract limiting the number of visits. These started shortly after dawn and carried on for approximately 1 hour. A circular route was taken around each part of the site, walked slowly, with frequent stops to observe bird activity.

Following the visits, the records of birds made were collated to determine the approximate location and numbers of breeding pairs for each species. Maps were then produced to display the approximate locations for bird species of conservation concern (Eaton et al, 1995) across the site. Other birds observed within the survey area were not mapped, but are tabulated.

6.2 Results

The survey area comprised the two parts of Dowrog Common south of the main road, together with the western part of Waun Fachelich.

14 bird species were apparently breeding within the survey area; 4 of these were confirmed as breeding. The following 9 'Birds of Conservation Concern' were amongst those breeding or probably breeding:

- **Meadow Pipit** (*Anthus pratensis*). Approximately 5 pairs in heathland on Waun Fachelich, with food-carrying indicating breeding. A single bird disturbed from Dowrog south-east may also have represented breeding here.
- **Cuckoo** (*Cuculus canorus*). A singing male on Waun Fachelich, presumably representing breeding in the nests of the meadow pipits here.
- **Whitethroat** (*Sylvia communis*). Singing birds were noted in scrub in the centre of Dowrog south-west, and on the north-western boundary of Waun Fachelich.
- **Reed Bunting** (*Emberiza schoeniclus*). A female was apparently disturbed from a nest in tussocky ground at the edge of the fen channel in the southern end of Waun Fachelich. Birds flushed from both Dowrog south-west and south-east may have also have represented one or two breeding pairs.
- **Grasshopper Warbler** (*Locustella naevia*). A breeding pair quite close to the Lower Harglodd entrance road, where a bird was apparently flushed from a nest in a tussock. A bird was still present on territory here well into August. Waun Fachelich also held a territory near a clump of willow in the fen channel on the southern side.
- **Willow Warbler** (*Phylloscopus trochilus*). Singing birds were recorded in willow scrub on the boundaries of Dowrog south-west and Waun Fachelich.
- **Dunnock** (*Prunella modularis*). 2 singing birds noted in scrub on the southern boundary of Dowrog south-west, two on the northern boundary of Waun Fachelich, and one near the southern boundary.
- **Linnet** (*Carduelis cannabina*). 4 pairs on Waun Fachelich, including a cluster near the western boundary, presumably represented breeding birds, although traditional nest

sites in thick gorse are apparently restricted to the boundary itself. One pair in thick scrub in Dowrog south-west.

- **Skylark** (*Alauda arvensis*). 3 singing birds above Waun Fachelich, with males using some of the piles of cut heath as vantage points from which to begin their song-flights.

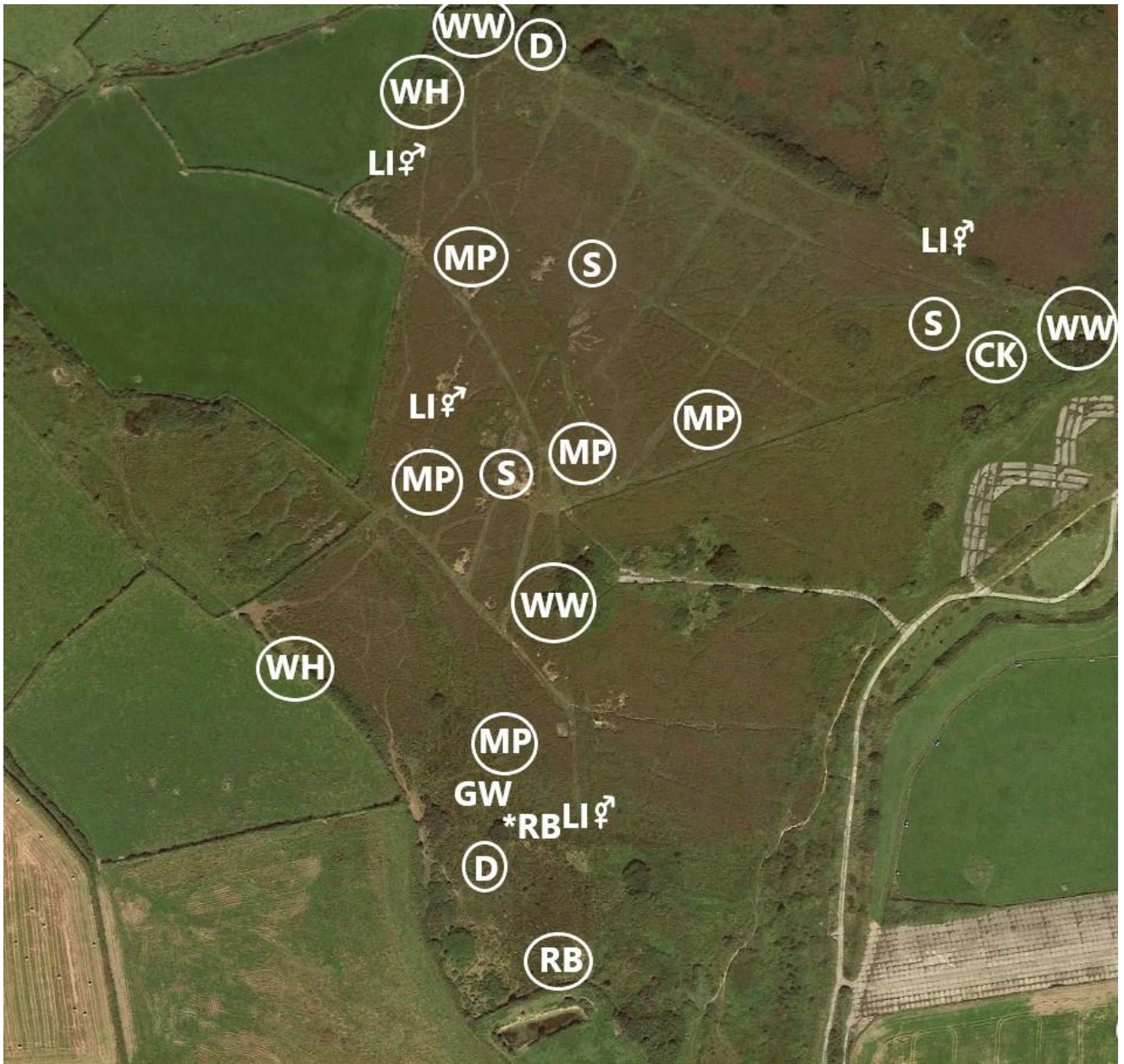
Two additional species of conservation concern were recorded foraging or on passage:

- **Kestrel** (*Falco tinnuculus*). A bird seen hunting on a couple of occasions over Waun Fachelich. This may have been nesting in a box visible on a barn at Harglodd Uchaf.
- **Lesser Redpoll** (*Acanthis cabaret*). Scarce as a breeding bird in the St David's area, as it is usually associated with conifer plantations, although parkland and orchards are sometimes used. A single presumed passage bird was heard in willows on Dowrog south-west on one occasion in June.

Minimum counts for the survey area have been based on the number of different singing birds recorded during the visits. Locations of territories for Birds of Conservation Concern are mapped in Map 4.1.

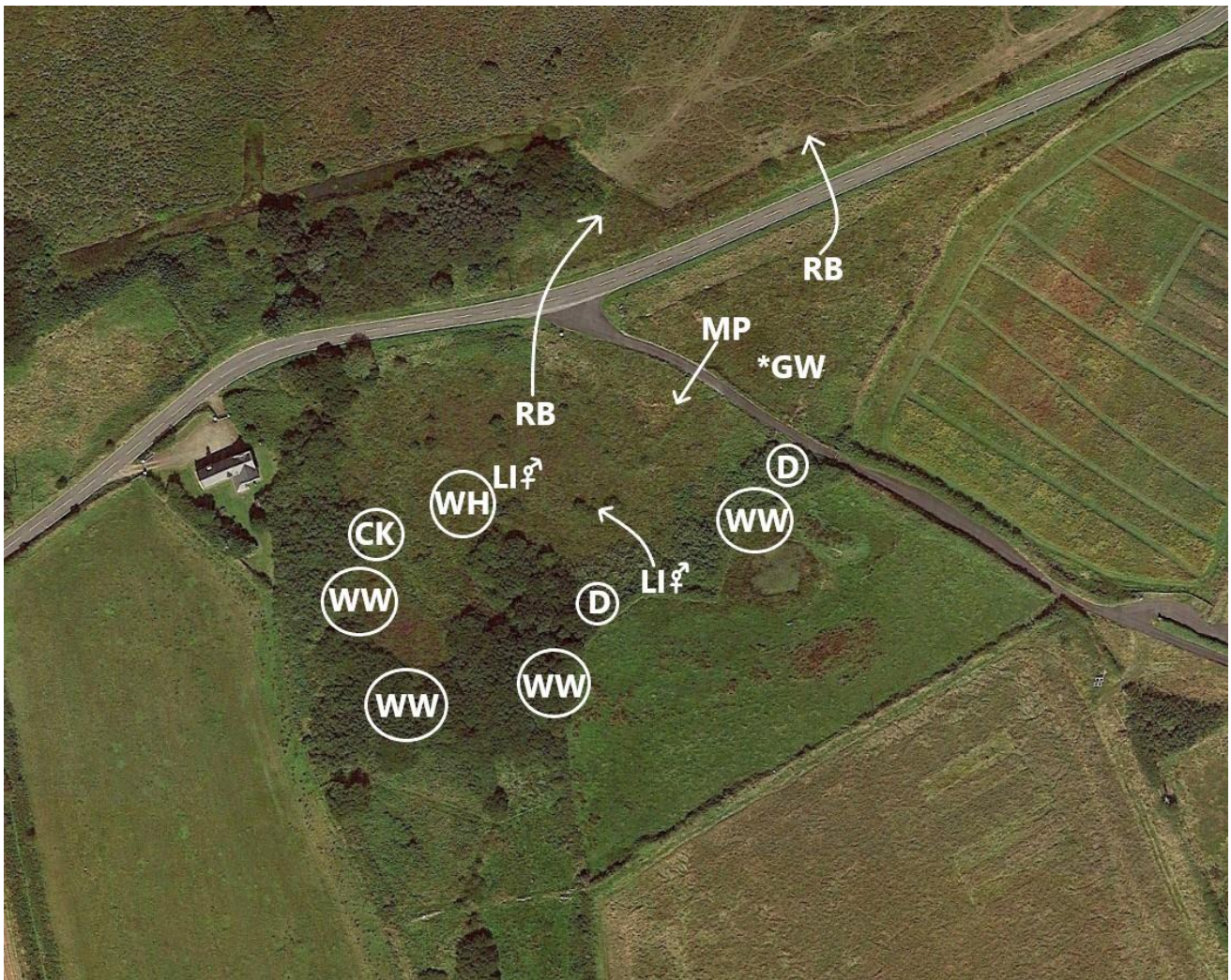
Table 6.1 Summary of Birds Seen within the Survey Area

Species	Map Code	Status within survey area	Number of Territories		Welsh Status ¹	UK Status ²
			Fachelich	Dowrog		
Grasshopper Warbler	GW	Breeding	1	1	Red	Red
Whitethroat	WH	Breeding	2	1	Red	
Stonechat	SC	Breeding		3		
Meadow Pipit	MP	Breeding	6	1	Amber	Amber
Willow Warbler	WW	Probable Breeding	2	4	Red	Amber
Wren	WR	Probable Breeding	1	1		
Dunnock	D	Probable Breeding	2	3		Amber
Goldfinch	GO	Probable Breeding		1		
Blackbird	B	Probable Breeding	1			
Lesser Whitethroat	LW	Probable Breeding	1			
Linnet	LI	Probable Breeding	4	2	Red	Red
Reed Bunting	RB	Probable Breeding	1	1	Amber	Amber
Skylark	S	Probable Breeding	3		Amber	Red
Cuckoo	CK	Probable Breeding	1	1	Red	Red
Chaffinch	CH	Possible Breeding	1			
Robin	R	Possible Breeding		1		
Kestrel	K	Foraging	n/a	n/a	Red	
Lesser Redpoll	LR	Passage	n/a	n/a	Amber	Red
Barn Swallow	SL	Passage	n/a	n/a		



Map 6.1 Birds of Conservation Concern – Activity on Waun Fachelich

Species codes are included in Table 6.1. Symbology follows standard Common Bird Census protocols, available [here](#). Where birds were seen or heard in a similar location on the second visit, these were assumed to relate to the same territory and have not been mapped.



Map 6.2 Birds of Conservation Concern – Activity on Dowrog South

6.3 Bird Conservation Assessment

Waun Fachelich holds a limited diversity of breeding species, but these include a number of typical heathland and wetland species. The number of skylark territories is low in comparison to that on the more extensive areas of meadow on the adjoining airfield, but higher than on adjoining land at Lower Harglodd. The healthy meadow pipit population apparently supports breeding cuckoo, a fast-declining species. Two declining birds associated with tussocky wetlands, grasshopper warbler and reed bunting, breed on both sites. Together with the few scrub nesting species around the site boundaries; the site as a whole can be considered of some local interest for the nine 'birds of conservation concern' which breed or may breed.

Succession to denser scrub or willow woodland, particularly on Dowrog south-west, would be likely to increase the numbers although perhaps not the diversity of breeding birds; the birds of conservation concern would be replaced by more ubiquitous species. Introduction of grazing and mowing management, conversely, is likely to decrease numbers, particularly if it impacts significantly on the current tussocky structure.

6.4 References

Eaton, M. et al (1995) Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. British Birds 108.

RSPB (2009) The Population Status of Birds in Wales.



Piles of mown vegetation are used by skylarks and meadow pipits as vantage points

7. Wintering Birds

Between December and February, a visit was made on one morning each month to assess the use of the site by wintering birds. Results are shown in the table below.

Table 5.1 Dowrog South Winter Survey Visits

Species	17 th December	11 th January	2 nd February
Snipe	1		
Woodpigeon		2	
Redwing	8		1
Blackbird	1		2
Song Thrush			1
Great Spotted Woodpecker	1		
Dunnock	1		1
Wren	1	1	3
Meadow Pipit	1	1	
Blue Tit	1		
Great Tit	1	2	
Goldcrest	1		
Linnet	3		
Chaffinch	11		2
Goldfinch	1		
Reed Bunting	4	1	
Jay	1		
Magpie		1	

Table 5.2 Waun Fachelich Winter Survey Visits

Species	17 th December	11 th January	2 nd February
Snipe	9	4	4
Kestrel	1		
Wren	4	3	1
Fieldfare	2		
Blackbird	2	1	1
Song Thrush		3	
Starling			(40 over)
Robin	1	1	1
Dunnock			1
Meadow Pipit	4	4	3
Linnet	1	1	
Reed Bunting	1		
Magpie	1	1	
Rook			(4 over)

The survey results show that use of both sites by wintering birds is limited. A few resident species, such as meadow pipit, wren and reed bunting remain on Waun Fachelich in small numbers. Snipe numbers were lower than expected, perhaps reflecting the mild winter and a lack of hard weather movements. A foraging kestrel was seen, but other expected raptors such as hen harrier, short-eared owl and merlin were not seen during survey visits. On Dowrog south, the south-eastern boundary was used briefly by chaffinches and linnets feeding in nearby fields. The willow woodland in the south-west held small numbers of tits, goldcrest and a great spotted woodpecker. The site is not of great significance for wintering birds.

8. Mammals

There are no buildings or trees on either site suitable for roosting bats. A post-dusk transect survey on Waun Fachelich for approximately one hour on 16th August recorded only foraging common pipistrelles (particularly in association with cattle feeding on the north-eastern side of the common), and a few commuting noctules. A pre-dawn bat survey transect on 17th August recorded only common pipistrelle (4 passes) and noctule bat (1 pass). The former was recorded commuting along the access road to Lower Harglodd, and foraging around willows near the north-western boundary.

Survey of other mammals was limited to searches of suitable habitat for field signs such as burrows, nests or droppings. This produced the following results:

- Fox scats were found on Waun Fachelich.
- No signs of otter were seen, but the site has the potential to be used for commuting or foraging, particularly perhaps the western boundary of Dowrog south-west which provides a corridor of streamside wet woodland linking Dowrog common to the wetland habitats on Lower Harglodd and then the Airfield Heaths.
- Nests of small mammals, probably common shrew and/or field vole, were found under two reptile survey sheets on the road verge on Dowrog south-east. Vole runs were noted through *Molinia* in Dowrog south-west. Several areas of rank *Molinia* on both parts of Dowrog south were searched for harvest mouse nests without success.

9. Reptiles and Amphibians

9.1 Aims and objectives

The aims and objectives of the reptile and amphibian survey were to:

- identify the presence of any reptile or amphibian species using the site
- advise of any implications their presence would have on proposed management

To undertake the reptile survey, artificial cover objects (ACO) were used. These increase the chances of observing otherwise elusive reptiles, which are attracted to these 'refuges' as they can bask on top or regulate their body temperature below the refuges, out of sight from predators. Amphibians also shelter below such refuges on occasion. Although standing water is present on the site, the late start to the survey contract meant that recommended survey techniques could not be used here.

14 ACOs comprising a mixture of black Onduline (bituminous roofing sheets) and corrugated metal sheets, each measuring 0.5m² to 1m², were laid on Dowrog south-west and south-east in early June 2021. They were then left to 'bed-in' for a significantly longer period than the 4 weeks recommended in survey guidelines (Froglife, 1999). No ACOs were laid on Waun Fachelich, as no significant management changes were proposed on this large site. Instead, two transects were walked around the site with the specific aim of locating basking reptiles.

The ACOs on Dowrog were laid in areas considered to hold suitable habitat for reptiles, although this was rather limited on Dowrog south-east in particular. The tall, tussocky vegetation here proved difficult to access or lay sheets in, and instead, survey effort was focussed on the northern margin near the road. Map 9.1 shows refuge locations.

On each visit, ACOs were approached slowly and observed from a distance using binoculars. This survey method was adopted to observe reptiles basking in the sun. Each ACO was then approached cautiously and turned over to survey for reptile species using the refuge to warm up or shelter underneath. A transect route was also walked slowly, to cover the areas of open ground and potential basking spots between ACOs and any pre-existing natural or artificial refugia. The transect route on Waun Fachelich generally followed the firebreak network, but aimed to link up potential basking spots on, for example, the edges of turf-pits, the piles of decomposing cut heath vegetation, and a pile of stone rubble in the northern corner.

9.2 Survey Results

Records from the five survey visits are summarised in Table 9.1. A plan showing the location of the reptiles recorded on the site is shown in Map 9.1.

Barred grass snake (*Natrix helvetica*) and common lizard (*Zootoca vivipara*) were both recorded on Dowrog south-west; the former under a ACO on the eastern side on two occasions, whilst the latter was seen once on the road verge during the transect. No reptiles

were recorded from Dowrog south-east, but the ACOs regularly held young common toads (*Bufo bufo*) with a maximum count of 5 under any one sheet.

Single common lizards and adder (*Vipera berus*) were the only reptiles seen during transects on Waun Fachelich, the former on the edge of a turf-pit on the western side, and the latter on a *Molinia* tussock on the eastern side. Frog spawn was seen at the south-eastern end of the fen channel in February.

Table 9.1: Summary of transect results for reptile species

Visit	Date	Weather	Dowrog SW	Dowrog SE	Waun Fachelich
1	10.8.21	15.6°C 80% cloud Beaufort 1			
2	17.8.21	17.2°C 0/8 cloud Beaufort 0	1 grass snake 1 common lizard		1 common lizard
3	26.8.21 (15.30)	17.6°C partial sea mist Beaufort 2			
4	4.9.21	14.5°C 70% cloud Beaufort 2			1 adder
5	20.9.21	Not recorded			

9.3 Reptile Population Assessment

Froglife (1999) provides means of evaluating reptile populations based on survey results using a density of 10 refuges per hectare. “Low”, “good” or “exceptional” populations are based on numbers of adult reptiles recorded by one surveyor in one visit (see Table 2).

Table 2: Reptile population assessment *Froglife* (1999)

Species	Low Population	Good Population	Exceptional Population
Grass snake	Less than 5	5-10	Greater than 10
Adder	Less than 5	5-10	Greater than 10
Slow worm	Less than 5	5-20	Greater than 20
Common lizard	Less than 5	5-20	Greater than 20

Figures in the table refer to the minimum number of adults seen by one surveyor in one day at a refuge density of up to 10 per hectare. The density of refuges used during this survey was approximately that suggested, allowing a comparison using the above table to be made.

The single grass snake counted on Dowrog south-west clearly places the population here as Low. The population of common lizards here is also Low. The reptile population size on Waun Fachelich cannot be ascertained from the survey data.

Map 9.1 Refuge Locations and Herptiles recorded on Dowrog South



9.4 Discussion and Recommendations

August - September is an optimal survey period for reptiles. Survey visits were all carried out in suitable weather conditions, and the recommended density of refugia (10 per 1ha of suitable habitat at the site) was met in two of the three fields with suitable habitat. Therefore, the results are considered to provide an accurate account of the status of reptiles on the site.

The Wildlife and Countryside Act 1981, as amended, states that it is an offence to deliberately harm or kill any reptile. Management of the site in the knowledge that reptiles are present consequently requires a strategy to reasonably protect them. A precautionary approach will need to be taken to meet best practice and ensure observance of regulations.

Mechanical scrub and grassland control with a flail-mower is proposed prior to boundary fencing on Dowrog Field. The proposed work will potentially impact on the barred grass snake and common lizard population here. As such, clearance work should take place during the winter hibernation period, or when day time temperatures are between 16-24°C, ie. when reptiles and amphibians are alert and mobile and can move out of an area subject to disturbance. Any ongoing management, through either grazing or mowing, has the potential to reduce the suitability of the vegetation structure here for grass snakes and their prey.

9.5 Summary and Conclusions

A good population of barred grass snakes is present on Dowrog Field, whilst low populations of this species, together with common lizard and adders are variously present elsewhere on the site. Development of a strategy to avoid killing or injuring them during any management work should be required. Particular care should be taken during the implementation of any mechanical grassland or heathland control. Work should be undertaken at a time when reptiles are suitably active and mobile and more likely to be able to avoid being harmed, or during the winter months when they are hibernating.

9.6 References

Froglife (1999). Reptile survey, an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife advice sheet 10,

Sewell D, Griffiths RA, Beebee TJC, Foster J and Wilkinson JW (2013) Survey Protocols for the British Herpetofauna. ARG / Universities of Kent and Sussex



Barred grass snake under ACO, Dowrog south-west

10. Invertebrates

10.1 Aims and objectives

The aims and objectives of this survey were to:

- Identify key habitat elements for invertebrates on the site
- Characterise the invertebrate assemblage, focussing on key groups
- Assess whether any notable or protected species are present or likely to be present

10.2 Survey Details

Transect surveys were carried out over two-hour periods on the late mornings and afternoons of August 10th and 26th 2021. A few incidental records were also made during the rapid assessment and reptile survey work before this date. The surveys were conducted during warm, still and sunny conditions - it is at this time that most insects, particularly bees and wasps, are most active.

The principal focus of the transect surveys were to characterise the use of the site by aculeate hymenoptera ('aculeates'), ie. social bees/wasps and solitary bees/wasps. Other readily-identified invertebrates were noted in the field and a limited number of specimens were collected for subsequent identification. The latter included flies (Diptera), 'true bugs' (Heteroptera), the former included butterflies and day-flying moths (Lepidoptera), and grasshoppers and crickets (Orthoptera).

The survey was carried out by sweep netting and direct searching in areas considered of value to aculeates. Sweep netting of low-growing vegetation was conducted using a 40cm diameter net. Direct searching was undertaken in combination with sweep netting and involved recording readily identifiable insects on flower-heads, in flight etc. Floristically-rich areas were searched so as to record any flower-visiting aculeates.

10.3 Results

10.3.1 Overview of Invertebrate Records

Habitat quality for invertebrates is moderately high on Waun Fachelich, although the flat terrain limits the micro-topography. Some key habitat elements for invertebrates (Dobson and Fairclough, 2021) are almost lacking as a result, such as bare earth and still air. However, other key elements such as open water, wet substrates, rotational management and ecoclines are reasonably well represented

Habitat quality for invertebrates is perhaps moderate on Dowrog south. The lack of recent management has resulted in a coarse, tussocky structure with no bare ground or open water features. The area of willow woodland does, however, introduce a minor element of dead wood habitat and humid still air, and connectivity to other wetland sites is good.

Only two species of bee were recorded, a low number, reflective of the limited nature of the survey effort and the scarcity of bare ground. One of these was a species with few local records, bull-headed furrow bee (*Lasioglossum zonulum*), which was nectaring on wild angelica in the fen channel in Waun Fachelich.

A few common butterfly species were recorded in low numbers. Only a small sample of common hoverfly species was recorded, most of these nectaring on either wild angelica or purple loostrife in the fen channel on Waun Fachelich. These included the furry dronefly (*Eristalis intricaria*), a bumble-bee mimic often associated with swampy wetlands, and the yellow-barred peat hoverfly (*Sericomya silentis*), a conspicuous large species of western peatlands. Recording of dragonflies and damselflies was limited to a single emperor (*Anax imperator*); there are no permanent ponds on the site. A past record of hairy dragonfly (*Brachytron pratense*) may relate to a breeding population nearby.

A full list of species recorded is given in Table 10.1 below.



(left) These turf pits on Waun Fachelich provide a small amount of bare ground, but are flooded in winter – marsh damsel bug was noted here; (right) interface between wetland and woodland on Dowrog south-west

Table 10.1 Invertebrates Recorded at Waun Fachelich and Dowrog South 2021

Species	English Name	Sex / Stage	Dowrog South	Waun Fachelich
Dragonflies				
<i>Anax imperator</i>	Emperor	Adult	26-Aug	
Moths				
<i>Bactra lancealana</i>	Rush Marble	Adult	26-Aug	
Butterflies				
<i>Vanessa cardui</i>	Painted Lady	Adult	26-Aug	
<i>Aglais io</i>	Peacock	Adult	26-Aug	
<i>Aglais urticae</i>	Small Tortoiseshell	Adult	26-Aug	
<i>Pyronia tithonus</i>	Gatekeeper	Adult		10-Aug
<i>Thymelicus sylvestris</i>	Small Skipper	Adult		10-Aug
Flies				
<i>Elgiva sollicita</i>	Brown S-Veined Snail-killing Fly	Adult		10-Aug
<i>Chrysops viduatus</i>	Square-spot Deerfly	Adult		10-Aug
<i>Chrysops relictus</i>	Twin-lobed Deerfly	Adult	26-Aug	
<i>Eristalis intricaria</i>	Furry Dronefly	Adult		10-Aug
<i>Sericomya silentis</i>	Yellow-barred Peat Hoverfly	Adult		11-Oct
<i>Haemotopa pluvialis</i>	Cleg	Adult		10-Aug
Bugs				
<i>Nabis limbatus</i>	Marsh Damsel Bug	Adult	26-Aug	10-Aug
<i>Aelia acuminata</i>	Bishops Mitre	Adult	26-Aug	
Spiders				
<i>Heliophanus flavipes</i>	a jumping spider	Adult		10-Aug
<i>Araneus diadematus</i>	Garden Orb Spider	Adult	26-Aug	10-Aug
Bees				
<i>Lasioglossum zonulum</i>	Bull-headed furrow-bee	Female		10-Aug
<i>Bombus pascuorum</i>	Common Carder-bee	worker		10-Aug
Snails				
<i>Cepaea nemoralis</i>	White-banded Snail	Adult	26-Aug	
<i>Anisus leucostoma</i>	White-lipped Ramshorn	Adult		10-Aug



Hoverflies on Waun Fachelich included (left) *Sericomya silentis*; (right) *Eristalis intricaria*

10.3.2 Key Species and Habitat Requirements

The following accounts focus on the species of particular conservation concern recorded during the survey.

Brown S-Veined Snail-killing Fly (*Elgiva solicita*)

Snail-killing, or Sciomyzid flies are so named because their larvae are predators or parasitoids of snails. They are valuable indicators of wetland quality, and good sites can have over 25 species. This medium-sized brownish species is rather local, and had not previously been recorded in west-Wales. It favours fens and good quality ditches, and the larvae attack lunged aquatic snails, such as the white-lipped ramshorn snail found in temporary pools and wet mud on the site. A single adult was recorded from the fen channel in the southern part of Waun Fachelich.



(left) *Elgiva solicita* (photo by Tom Murray); (right) fen channel on Waun Fachelich

10.3.3 Potential for Other Notable Species

Marsh fritillary (*Euphydryas aurinia*)

This butterfly, subject of much conservation attention, is now rare or extinct in the St David's area. A few plants of devil's bit scabious were noted in the *Molinia* pasture in the north-eastern part of Waun Fachelich, and some areas of the vegetation here are approaching the necessary structure of short tussocks and lawn areas. However, further restoration of rank areas through summer cattle-grazing would be required, together with a chance colonisation event which may be unlikely in the absence of any currently known local populations.

Moss Carder Bee (*Bombus muscorum*)

Of the three scarcer ginger-brown carder bees (shrill, brown and moss), moss carder is perhaps the most likely to occur here. There are records from the St David's area, and it prefers damp, tall, flower-rich habitats such as those present on the southern part of Waun Fachelich.

Haworth's Minor (*Celaena haworthii*)

The author has trapped this moorland species, whose larvae feed on common cotton grass, on Waun Fachelich in the past. It is a Section 7 species, albeit still widespread in Wales. Although cotton grass was not noted on the Rhos Pasture, there is potential for the plant and the moth to colonise this field or the new wet areas on the Roft in due course. Other common, but declining, Section 7 moth species such as small square-spot and latticed heath are also likely to be here.

10.4 References

Dobson J., Fairclough, J. (2021) *Rapid Assessments of the Potential Value of Invertebrate Habitats*. CIEEM In Practice, June 2021.

11. Management

11.1 Recent Management



Pit created by PCNPA turf-translocation

Little information is discernible from aerial photography. A photograph from 1969 is not of sufficient resolution to determine the degree of grazing or other management, although the areas of heath and *Molinia* pasture on the northern part of Waun Fachelich are clearly distinct from each other. Dowrog south appears to be similar to the main body of the common, suggesting that it was still grazed at that time. This part of the site was unmanaged by the time of CCW's NVC survey of Dowrog in 2001, and the vegetation was described as rank and impoverished. The marshy grassland here was dominated by *Molinia caerulea* – *Potentilla erecta* mire, *Anthoxanthum odoratum* sub-community (M25b) in 2001, it has since developed into the coarser *Angelica sylvestris* sub-community (M25c) in the absence of management. Some areas are best referred to a species-poor variant of M25, as the typical wetland herbs such as meadowsweet, wild angelica and hemp agrimony are rather sparse. The small areas mapped as *Juncus effusus* / *acutiflorus* – *Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community (M23a) in 2001 are now scarcely in evidence, with *Molinia* having become more dominant. However, small areas dominated by mixtures of sharp-flowered rush, meadowsweet, water horsetail, marsh cinquefoil and common cotton-grass are still present

in the wettest areas. An area of blackthorn and other scrub has been cleared from the south-west part of Dowrog near the access track in recent years. The regrowth here suggests it will return to scrub in the near future.

Although grazing has lapsed on Dowrog south in recent decades, cattle grazing re-started on Waun Fachelich in 1999 when Stanley Beynon mob-stocked the common in summer. Grazing in the 2000s was with Aberdeen Angus cattle from Haydn Vaughan at Llanungar fawr. Welsh mountain ponies had been grazed prior to that, and they continued to play a role by grazing after the cattle came off in late summer. By this time, burning as a management tool was seen as less necessary or desirable – patches had been burnt annually in the northern two-thirds in the early 1990s, then bi-annually in the late 90s. The southern third was not burned. Mowing of firebreaks was continued to guard against accidental burns. More random strips were also mown on occasions, for example around the meadow thistle plants in the *Molinia* pasture. More recently, Welsh black cattle from Lower Harglodd have been used to graze the common in summer. A recently-purchased Ryetec flail-mower collector was used in early November 2021 to collect heathland brash for seeding a heathland creation project on adjoining Lower Harglodd land – allowing the existing firebreak network to be widened and extended in the southern part of the site. A 17-ton tracked excavator was simultaneously used to scrape soil from selected parts of these new firebreaks, to supply a further seed source to the new area, but also to create new exposures of seasonally-inundated bare soil. Small areas alongside the fen channel were also scraped to encourage the expansion of rare plant populations including three-lobed water-crowfoot. No new ponds or scrapes had been dug on Waun Fachelich since PCNPA translocated turves from a series of pits here to a location on the edge of the airfield in 1999. These were left with very straight, regular, steep edges but this author, whilst working for CCW, supervised the re-shaping of the edges of several of them with an excavator. Around the same time, he also supervised local school children in the digging of a couple of small scrapes at the edge of the fen channel.

11.2 Future Management Recommendations

Dowrog South

In the absence of mowing or grazing, even the wetter areas currently dominated by rushes or meadowsweet will succeed to bramble or willow scrub. It is possible that periodic light summer grazing could actually encourage this process by targeting the more palatable wetland plants and avoiding scrub. It would seem most appropriate to continue to focus grazing management on the main body of the common, whilst leaving these two small isolated areas of common unmanaged. The coarse structure of the marshy grassland vegetation here is at least suited to some species of conservation concern such as grasshopper warbler, and a future expansion of the willow woodland from the edge of the site will be of benefit to a range of birds, invertebrates, fungi and lower plants. Should mowing or grazing management be desired, this would be best focussed on the south-eastern part of the site where tall *Molinia* tussocks could be converted to shorter, more species-rich marshy grassland.

Complete removal of Japanese rose would require the co-operation of the adjoining property owner at Llysgennydd to the north-west. The ability of the bush to spread may be limited by the wet conditions away from the dry roadside bank. The spread of montbretia near the access road to Lower Harglodd should ideally be controlled before it becomes abundant across this cleared scrub area.

There may be some potential for a small shallow pond to be dug within an area of rank *Molinia* on the south-eastern part of the site, but the area of swampy vegetation with bog-bean in the lowest, wettest area near the access road here should be avoided. This site should not be a priority for pond creation, as areas where margins would be kept open by livestock will develop a much richer assemblage of plants and insects. Suitable spoil disposal options off the common would also be required. In the absence of grazing or other management, any such pond would quickly become dominated by swamp vegetation.

Waun Fachelich

The grazing by Welsh black cattle in 2021 was effective, particularly at opening out areas of *Molinia* on the northern and eastern parts of the site. This level and timing of grazing would seem to be an appropriate management regime. It could be coupled to some limited mower-collecting in ranker areas of heath, but such mowing should be prioritised on areas more in need of restoration management, such as the heaths further east on Waun Llandruidion or Waun Sebon. Firebreaks should continue to be maintained if cattle-grazing and trampling prove insufficient to maintain a network. Winter burns for management purposes should no longer be used, but accidental burns remain a threat.

The south-eastern end of the fen channel, running on to the PCNPA section, is enriched by past inputs from soil movements associated with the airfield creation. The wet area here support a grass swamp of limited ecological interest, and it could make a suitable location for a new clean-water clay pond. The soft sediment would require removal off-site, but could be used as an organic soil conditioner on an agriculturally-improved field on Lower Harglodd.



Enriched swamp at south-eastern end of fen channel on Waun Fachelich (left); newly scraped areas in the southern part of Waun Fachelich, autumn 2021.