Cyfoeth Naturiol Cymru
Natural Resources Wales

Sands of LIFE – Fixed-point vegetation monitoring - pre-intervention

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JBA Consulting

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Mae'r adroddiad hwn yn cyflwyno'r monitro botanegol manwl ar gyfer prosiect Twyni Byw. Mae llinell sylfaen fotanegol wedi'i sefydlu mewn wyth safle cyn ymyriadau prosiect gyda'r nod o wella cyflwr llystyfiant y twyni. Dosberthir yr ymyriadau yn un o ddau gategori; ymyriadau llac a rheoli ychwanegiad cwningod.

Sefydlwyd y llinell sylfaen ar gyfer cyfansoddiad botanegol gan ddefnyddio cyfres o leiniau nythu o fewn ardaloedd ymyrraeth neu reoli. Yn yr ardaloedd hyn cofnodwyd yr holl blanhigion fasgwlaidd, bryoffytau, cen ac algâu.

Cwblhawyd cyfanswm o dri deg wyth cwadrat dros yr wyth safle. Roedd y llystyfiant a ddarganfuwyd yn nodweddiadol ymhlith y mathau llystyfiant sefydlog mwy sefydlog ar y safleoedd hyn, a'r flaenoriaeth i'r prosiect oedd adfer llystyfiant olynol cynnar ac ardaloedd o dywod mwy symudol.

Daethpwyd ar draws dwy rywogaeth brin yn ystod y monitro, y ddau yn fryoffytau. Cofnodwyd mwsogl 'Fir Tamarisk' mewn dau blot yn Nhywyn Aberffraw. Cofnodwyd mwsogl 'Chalk Hook' mewn un llain yn Cynffig. Trafodir goblygiadau'r canfyddiadau hyn.

Mae'r data'n darparu llinell sylfaen ar gyfer cymharu newidiadau botanegol yn dilyn ymyriadau'r prosiect.

Executive Summary

This report presents the detailed botanical monitoring for the Sands of LIFE project. A botanical baseline has been established at eight sites prior to project interventions aimed at improving the condition of the dune vegetation. Interventions are classified into one of two categories, slack interventions and rabbit management interventions.

The baseline for botanical composition was established using a series of nested plots within discrete intervention or control areas. Within these areas all vascular plants, bryophytes, lichens and algae were recorded.

A total of thirty-eight quadrats were completed over the eight sites. The vegetation covered was typically among the more stable, fixed vegetation types on these sites, the priority for the project being to restore early-successional vegetation and areas of more mobile sand.

Two rare species were encountered during the monitoring, both bryophytes. Fir Tamarisk-moss was recorded in two plots at Tywyn Aberffraw. Chalk Hook-moss was recorded in one plot at Kenfig. Implications of these findings are discussed.

The data provides a baseline against which botanical changes can be compared following project interventions.

Introduction

Sands of LIFE Project

Sands of LIFE is a major conservation project to rejuvenate 2,400 hectares of sand dunes across Wales. The project aims to recreate movement in the dunes and revitalise habitats which are home to some of our rarest wildlife. Sands of LIFE will reprofile the dunes and create bare sand, allowing the sand to move again, lower the surface of dried-out dune slacks to recreate shallow pools and wet habitat, promote sustainable grazing by livestock and rabbits and remove scrub and invasive non-native species. The project covers 10 sites across four Special Areas of Conservation. These are: Tywyn Aberffraw; Newborough; Morfa Dinlle; Morfa Harlech; Morfa Dyffryn; Laugharne-Pendine Burrows; Pembrey Burrows; Whiteford Burrows; Kenfig and Merthyr Mawr. The project runs from September 2018 to December 2022.

Purpose of the fixed-point vegetation monitoring

The fixed-point monitoring is required to assess vegetation composition and structure in dune slack and rabbit intervention areas in permanently marked relocatable plots, before and after intervention has been applied. The aim will be to assess the impact and success of the intervention techniques. The methods have been successfully employed for monitoring intervention work at Kenfig.

Project sites with fixed-point vegetation monitoring

Fixed point monitoring was put in place for all sites where slack interventions or rabbit interventions were planned. The intention was to provide detailed records of botanical changes in the areas of intervention and an adjacent control site.

Table 0-1. Sites included and reasons for including fixed-point quadrats

SoLIFE project site	Slack intervention	Rabbit intervention	Total no. of quadrats at each site
Tywyn Aberffraw	✓	✓	**5**
Newborough	✓	✓	**8**
Morfa Dinlle	×	✓	**3**
Morfa Harlech	✓	×	**2**
Whiteford Burrows	×	✓	**3**
Pembrey Burrows	✓	✓	**7**
Kenfig	✓	✓	**6**
Merthyr Mawr	✓	✓	**6**
Total	-	-	**40**

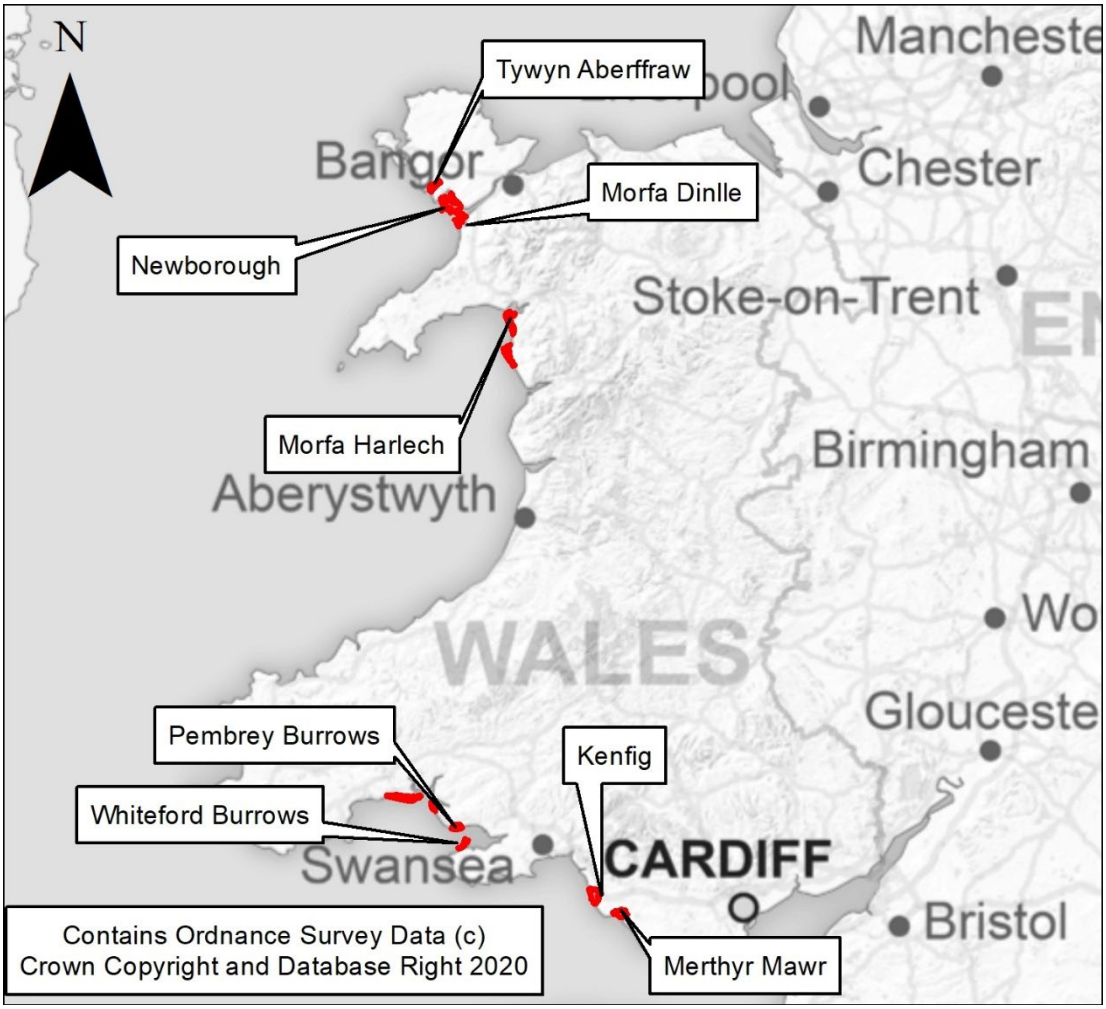

Figure 0.1. Location of project sites where fixed-point vegetation quadrats were completed.

Tywyn Aberffraw

Tywyn Aberffraw is a 3km long hindshore dune system which meets the sea along its south-west boundary (Ashall *et al*., 1991a). It is bordered by the Afon Ffraw to the north, Llyn Coron to the east and grazing land to the south.

Newborough

Newborough is effectively a single dune system which is divided into Newborough Forest and Newborough Warren. Newborough Forest is large plantation on an area of blown sand. The forest was planted in the second half of the 20th Century, primarily in the immediate post-war years. Newborough Warren is immediately south-east of the forest and is an area of dunes that were not planted. Together they comprise the sixth largest dune system in the UK and are made up of a spit and a hindshore dune system (Ashall *et al*. 1991b).

Morfa Dinlle

Morfa Dinlle is a spit dune system formed over a shingle ridge at the southern side of the Menai Strait. The dunes are 'perched' and therefore very dry (Duckworth *et al*. 1991).

Morfa Harlech

Morfa Harlech is a cuspate foreland dune system which is actively accreting (Ashall *et al*. 1991c). Much of the fixed dune system is grazed and there are areas of forestry plantation. The southern portion of the site is a golf course (Royal St. David's Golf Club).

Pembrey Burrows

Pembrey Burrows is part of a larger dune system which is situated around the eastern end of Carmarthen Bay. The dune system is a large hindshore system behind a barrier beach (Dargie, 1989). Pembrey Burrowssits at the eastern point of the system, at the northern part of the mouth of the Afon Llwchwr/River Loughor estuary It is an area of sand which has accreted within the last 70 years.

Whiteford Burrows

Whiteford Burrows is a spit dune system forming a large barrier beach (Dargie 1989). It is on the southern side of the mouth of the Afon Llwchwr/River Loughor estuary.

Kenfig

Kenfig is a hindshore dune system with two main dune ridges separated by numerous parabolic slacks (Jones & Etherington 1988), which support a diverse range of characteristic communities and species including Fen orchid (*Liparis loeselii*). Over recent decades the site has become very fixed.

Merthyr Mawr

Merthyr Mawr is a hindshore and climbing dune system that was once part of an extensive dune complex linked with Kenfig (Jones 1990). The climbing part of the dune system sits on top of a limestone plateau.

Methods

Vegetation monitoring followed a standard protocol already in use to monitor vegetation changes on sand dune sites in Wales. The protocol involves recording in a set of nested quadrats centred around a 50cm by 50cm quadrat, with further recording in the surrounding 1m x 1m, 2m x 2m and 5m x 5m area (see Figure 0.2). The surveys were completed in June and July 2019 by the report authors supported by Jon Harrison, Jenny Pullen and Laura Whale of JBA Consulting. Two quadrats were completed in August 2020 by Steven Heathcote.

Nested Plot Layout

The nested plots were set out around a central point. This point was marked, either by installing a permanent marker (control locations; Figure 0.1) or by temporarily placing a ranging pole at the centre. This location was then recorded on GPS, with location averaged until the precision was under 2m. Two tapes were set out; one running along a north-south diagonal passing through the centre of the plot and a second running east-west passing through the centre of the plot. The first 50cm x 50cm sample was marked with a rope quadrat with its long diagonal running from the centre of the plot to the north. All the species rooted within the sample were recorded and each assigned a percent cover.

Figure 0.1. Example of the permanent marker placed in the centre of all control quadrats

The rope quadrat was then expanded to the 1m x 1m position using corners set at points 71cm distant from the mid-point in the plot. The % cover of all species including additional species was again recorded. The quadrat was then adjusted to the 2m x 2m and then the 5m x 5m sample, recording presence of additional species not encountered in the smaller quadrats. Finally, the whole survey area was searched and any additional species recorded. This survey area was defined by the boundary of the SoLIFE intervention polygons, but where these crossed a significant habitat boundary no survey was made of the new habitat. The final boundaries are shown in a series of figures fromFigure 0.1 to Figure 0.3. An estimate was made of

the abundance of all species for the whole survey area using the DAFOR scale (Section 0). The limits of the search were largely defined by pre-determined polygons, but in some field sites the boundaries were reduced to avoid moving into different habitat types. A schematic of the layout is shown in Figure 0.2 and this layout is referred to as 'type A'.

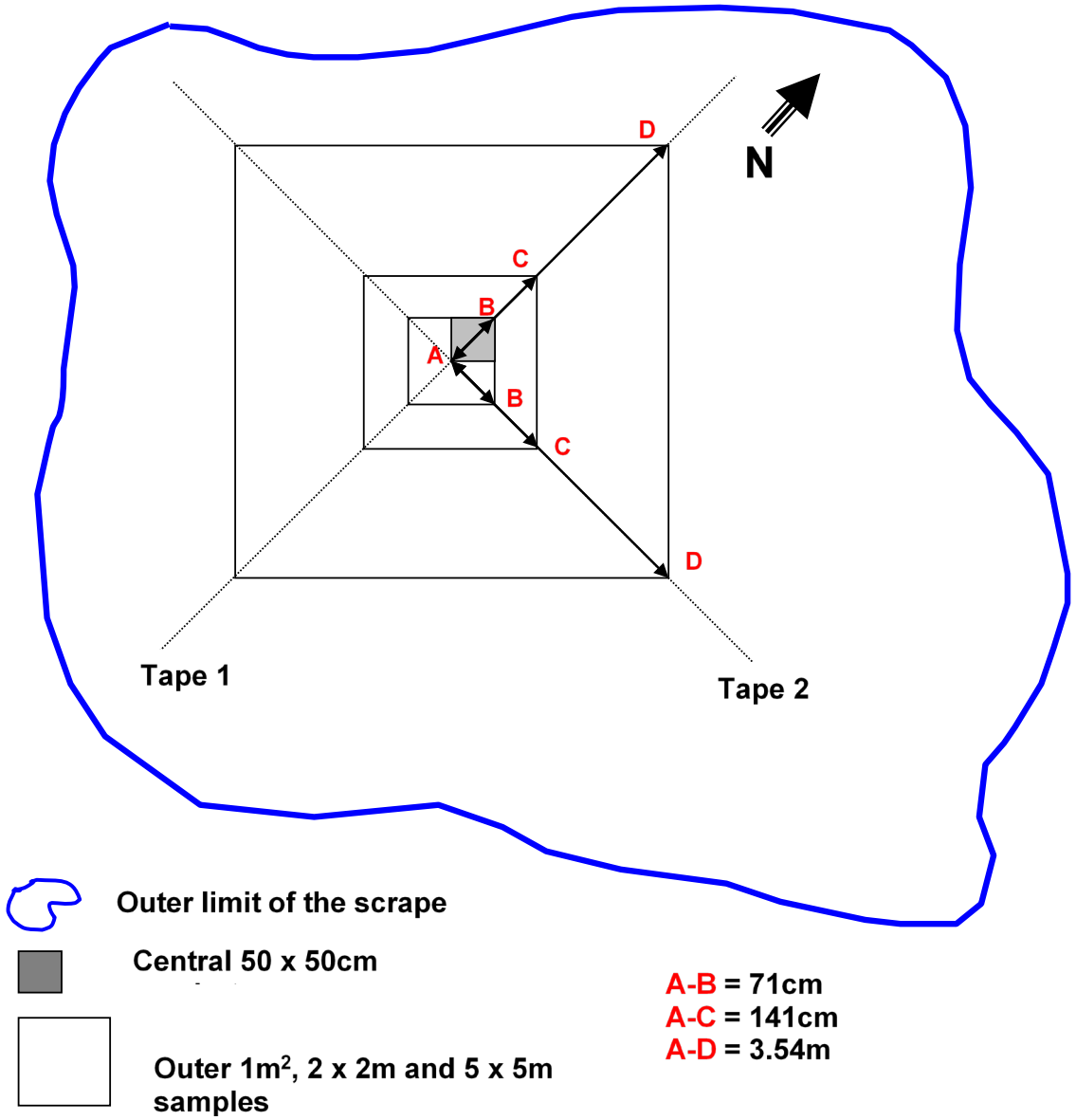

Figure 0.2. Schematic of the layout of nested quadrats (prepared by NRW)

Deviations from the standard layout

In a few sites there were minor deviations from the standard layout. At Morfa Harlech two plots were set up using the central marker as the centre for both the 50cm and 1m quadrat. This was because dense bracken and bramble made changing the position of the rope quadrat very difficult, so movement was minimised. In such coarse vegetation the composition does not vary at such small scales anyway, but the small alteration can be repeated for the next surveys so the results will remain consistent. At Pembrey Burrows, Whiteford Burrows, Kenfig and Merthyr Mawr all quadrats completed in 2019 were laid out from the SW corner (where the permanent

marker was placed) as shown in Figure 0.3, and this layout is referred to as ‘type B’. This was done as recorder preference. These amendments make no material difference to the data recorded but are important for the set-up of repeat quadrats in future.

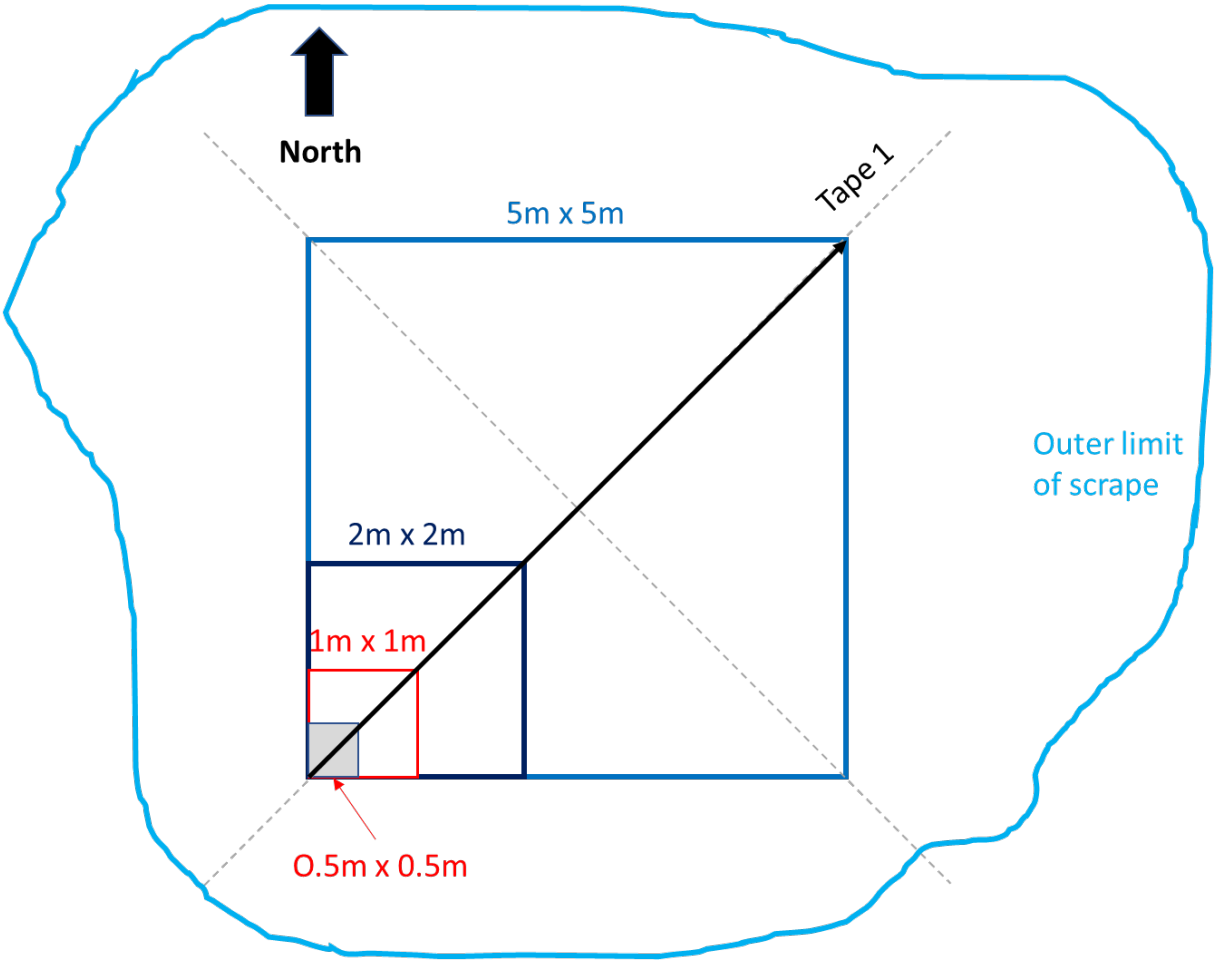

Figure 0.3 Non Standard Quadrat Layout

Metadata

For each of the quadrat locations the following attributes were also recorded; location description, date, recorder names, photograph numbers, soil type, hydrological information, topographical information, vegetation structure and cover description, vegetation condition, grazing, invasive species and percentage cover of bare sand.

Rules for nested plot recording

The following rules were followed when recording nested plots:

1. Only species rooted within the plot were included.
2. Only living plants or still rooted annuals were included.
3. The percentage cover for the vascular plant layer and the bryophyte layer were recorded separately but for each layer the percentage cover of all species and pseudo-species was estimated as seen from vertically above the sample, without disturbing the vegetation surface, so the total vegetation cover plus bare ground was never over 100% for any layer. This convention was used (as opposed to combining layers into a single projected layer of 100%)

as the bryophyte layer is an important component of many slacks but is significantly obscured by the vascular plant layer above it. If there is only a single layer recorded, the frequency of bryophytes will not be representative of the vegetation and consequently a misleading record of the vegetation would be created.

4. Sward height was estimated as a range, ignoring inflorescences.
5. All vascular plants, bryophytes and lichens falling within the quadrat were recorded. If identification was not possible in the field, a 'pseudo-species' name was created, and samples were taken for identification. These were initially identified by the author but, where necessary, they were sent to other members of the field team for confirmation.

The DAFOR scale

Although well established and widely used, the DAFOR scale is not precisely defined. For the purposes of the SoLIFE project the following definition in Table 0-1 was used.

Table 0-1. Definition of DAFOR scale used in this survey

Code	Definition
D - Dominant	over 50% cover across the bulk (more than 50%) of the sward.
A - Abundant	between 10% and 50% cover across the bulk of the sward.
F - Frequent	Would be present in at least 50% of 1m square samples but does not make more than 10% cover across the bulk of the sward.
O - Occasional	present in between 20% and 50% of 1m square samples.
R - Rare	present in less than 20% of 1m square samples.

Where a species occurred at very different frequencies or covers in different parts of the survey area, two DAFOR ratings were used, the first giving the overall averaged value and the second representing the local frequency/abundance and being prefixed by the letter L. Hence "R-LA" would denote a plant that was rare but locally abundant. In addition the prefix 'V' is used as shorthand for 'very', which is applied in a few cases typically where plants are very rare (VR).

Botanical Nomenclature

Botanical nomenclature follows Stace (2019) for vascular plants, Hill *et al*. (2008) for bryophytes and the British Lichen Society (2019) for lichens. The vegetation names are based on the five volumes of British Plant Communities (Rodwell, 1991a, 1991b, 1992, 1995, 2000).

Results

The surveys completed in 2019 represent the baseline data collection in advance of the proposed interventions. The results section therefore comprises a brief summary of each quadrat location, and detailed results are provided in Appendices 6 to 13.

NVC communities encountered

The NVC communities recorded in the plots typically represent vegetation towards the fixed, stable end of communities on the site. This is consistent with the project's aims to increase sand mobility and restore early-successional vegetation. A brief summary of the NVC communities identified in the plots is given below:

SD7 *Ammophila arenaria-Festuca rubra* semi-fixed dune community (2 plots). These are semi-fixed dune grasslands which still have a hint of sand mobility and Marram *Ammophila arenaria* and Red Fescue *Festuca rubra* can both be abundant but in fairly open swards. One quadrat each were recorded of the bryophyte-rich sub-community **SD7b *Hypnum cupressiforme* sub-community,** and the **SD7c *Ononis repens* sub-community** characterised by constant Restharrow *Ononis repens*.

SD8 *Festuca rubra-Galium verum* fixed dune grassland (6 plots). This is one of the most common fixed dune vegetation types found throughout the survey sites. Two plots were assigned to **SD8a typical sub-community**, which is species-poor, and here characterised by an abundance of coarse herbs and in particular Dewberry *Rubus caesius*. One plot was assigned to the calcifugous sub-community **SD8b *Luzula campestris* sub-community**, and one to **SD8c *Tortula ruralis* ssp. *ruraliformis* sub-community**. The mesotrophic sub-community **SD8d *Bellis perennis-Ranunculus acris* sub-community** was identified for one plot, which probably represents some groundwater influence, allowing a more mesotrophic sward to persist, which is uncommon in Welsh dune grasslands referable to SD8. One unusual plot was recorded at Morfa Dinlle with a very open grass sward and abundant bryophyte and lichen cover. This is assigned to an undescribed form of SD8 noted here as the 'lichen variant' due to the prominence and diversity of lichens.

SD12a *Carex arenaria-Festuca ovina-Agrostis capillaris* dune grassland, *Anthoxanthum odoratum* sub-community and SD12b *Holcus lanatus* sub-community (2 plots). These are fixed and leach grassland communities, both recorded and Morfa Dinlle. They are characterised by the presence of calcifuge grasses, particularly where Sheep's Fescue *Festuca ovina* replaces Red Fescue. They typically have a range of calcifuge herbs such as Sheep's Sorrel *Rumex acetosella.*

SD15 *Salix repens-Calliergon cuspidatum* dune-slack community (5 plots) These are the wettest dune slacks which hold water to a significant depth in winter and are characterised by a relatively dense canopy of Creeping Willow *Salix repens* over a deep layer of Pointed Spear-moss *Calliergonella cuspidata*. One plot was assigned to **SD15a *Carex nigra* sub-community** which is characterised by Common Sedge *Carex nigra* and a few of the less competitive tall-herb fen associates. Three plots were assigned to the more species-rich **SD15b *Equisetum variegatum* sub-community** and one plot did not have sufficient preferentials to be assigned to any sub-community.

SD16 *Salix repens-Holcus lanatus* dune-slack community (13 plots). This is a group of drier slacks with a grassy appearance which are typical of long-established slacks. All four published sub-communities were identified along with one plot with could not be assigned to a sub-community. Two plots were recorded in the **SD16a *Ononis repens* sub-community** which has affinities to SD8 dry grassland with a higher incidence of tree saplings. Four plots were assigned to the **SD16b *Rubus caesius* sub-community,** another drier community with constant Dewberry and frequently tree saplings. Four more were assigned to the most species-rich sub-community, **SD16c *Prunella vulgaris-Equisetum variegatum* sub-community.** Two plots were assigned to the **SD16d *Agrostis stolonifera* sub-community,** which is characterised by Common Bent *Agrostis stolonifera* replacing Red Fescue as the most common grass.

SD17d *Potentilla anserina-Carex nigra* dune-slack community, *Hydrocotyle vulgaris-Ranunculus flammula* sub-community (1 plot). This slack vegetation is typical of base-poor sands and waters and is characterised by an increased representation of calcifuge species.

Woodland and scrub (4 plots). One plot was located within a slack with an open cover of Grey Willow *Salix cinerea* which was assigned to **W1 *Salix cinerea-Galium palustre* woodland**. One plot was considered to represent **W24 *Rubus fruticosus-Holcus lanatus* underscrub** and two were assigned to **W25 *Pteridium aquilinum-Rubus fruticosus* underscrub.**

OV27e *Epilobium angustifolium* community, *Ammophila arenaria* sub-community (1 plot). One plot was assigned to OV27e, a community which occurs where Rosebay Willowherb *Chamenaerion angustifolium* invades dune grasslands.

Not assigned (2 plots). Two plots could not easily be assigned to any published NVC community.

Plot Summaries

Tywyn Aberffraw

A total of five quadrats were completed at Tywyn Aberffraw (Appendix 6; Figure 0.1) to monitor both slack and rabbit interventions. They are summarised in Table 0-1.

Table 0-1. Summary of plots completed at Tywyn Aberffraw

Plot	Purpose	NVC	Appendix	Figure
AB01	Slack intervention	SD16d	0	8-2
AB02	Slack control	SD15	0	8-2
AB03	Rabbit intervention	SD16b	0	8-2
AB04	Rabbit intervention	SD7b	0	8-3
AB05	Rabbit control	SD16d	0	8-2

Notable species

The rare and declining bryophyte Fir Tamarisk-moss *Abietinella abietina* var. *abietina* was recorded in AB01 and AB03. The species was present in the 2m quadrat and rare overall in AB01. It was present only in the south-west sandy corner of AB03 and, again, rare overall.

Newborough

A total of eight quadrats were completed at Newborough, two in the forest and six on the warren (Appendix 7; Figure 0.1), to monitor both slack and rabbit interventions. They are summarised in Table 0-2.

Table 0-2. Summary of plots completed at Newborough

Plot	Purpose	NVC	Appendix	Figure
NF01	Slack intervention	SD16c	0	9-5
NF02	Slack control	SD16c	0	9-5
NW01	Slack intervention	SD16c	0	9-6
NW02	Slack intervention	SD16	**Error! Reference source not found.**	9-6
NW03	Slack control	SD16c	0	9-7
NW04	Rabbit intervention	OV27e	0	9-7
NW05	Rabbit intervention	SD7b	0	9-7
NW06	Rabbit control	SD8b *Salix repens* var.	0	9-7

Notable species

No notable species were recorded in any of the quadrats.

Morfa Dinlle

A total of three quadrats were completed at Morfa Dinlle (Appendix 8;Figure 8.1) to monitor both slack and rabbit interventions. They are summarised in Table 0-3.

Table 0-3. Summary of plots completed at Morfa Dinlle

Plot	Purpose	NVC	Appendix	Figure
DI01	Rabbit Intervention	SD12a	0	16-9
DI02	Rabbit Intervention	SD12b	0	16-9
DI03	Rabbit Control	SD8 lichen var.	0	16-9

Notable species

No notable species were recorded in any of the quadrats.

Morfa Harlech

A total of two quadrats were completed at Morfa Harlech (Appendix 9; Figure 0.1) to monitor both slack and rabbit interventions. They are summarised in Table 0-4.

Table 0-4. Summary of plots completed at Morfa Harlech

Plot	Purpose	NVC	Appendix	Figure
HA01	Slack intervention	W25	0	16-11
HA02	Slack control	W1	0	16-11

Notable species

No notable species were recorded in any of the quadrats.

Pembrey Burrows

A total of six quadrats were completed at Pembrey Burrows (Appendix 10;Figure 0.1) to monitor both slack and rabbit interventions. They are summarised in Table 0-5.

Table 0-5. Summary of plots completed at Pembrey Burrows

Plot	Purpose	NVC	Appendix	Figure
PC01	Slack intervention	NA	0	16-13
PC02	Slack intervention	SD8c	0	16-14
PC03	Slack control	SD16a	0	16-14
PC04	Rabbit intervention	SD8d	0	16-14
PC05	Rabbit intervention	SD7c	0	16-13
PC06	Rabbit control	SD7c	0	16-14
PC07	Slack intervention	SD8a	12.7	16-13

Notable species

No notable species were recorded in any of the quadrats

Whiteford Burrows

A total of three quadrats were completed at Whiteford Burrows (Appendix 11; Figure 11.1) to monitor both slack and rabbit interventions. They are summarised in Table 0-6.

Table 0-6. Summary of plots completed at Whiteford Burrows

Plot	Purpose	NVC	Appendix	Figure
WB01	Rabbit intervention	SD15b	0	16-16
WB02	Rabbit intervention	SD15b	0	16-16
WB03	Rabbit control	SD16a	0	16-17

Notable species

No notable species were recorded in any of the quadrats

Kenfig

A total of five quadrats were completed at Kenfig (Appendix 12; Figure 0.1) to monitor both slack and rabbit interventions. They are summarised in Table 0-7.

Table 0-7. Summary of plots completed at Kenfig

Plot	Purpose	NVC	Appendix	Figure
KE01	Slack intervention	SD17d	0	16-19
KE02	Slack intervention	SD15a	0	16-20
KE03	Slack intervention	SD15b	0	16-19
KE04	Rabbit intervention	W24	0	16-21
KE05	Rabbit control	W25b	0	16-21
KE06	Slack control	SD15c	14.6	16-19

Notable species

The rare and declining bryophyte Chalk Hook-moss *Drepanocladus sendtneri* was recorded in KE02. The species was not recorded in any of the quadrats but was present in the wider area. Based on the results of the projects' bryophyte survey (Callaghan, unpublished) it is also present in the wider area of KE01 slack intervention area. In KE01 the very similar *Drepanocladus aduncus* was recorded in the quadrats and *Drepanocladus sendtneri* can only be detected by microscopic examination of these populations which are often mixed, and therefore easily overlooked. The species is one of the SSSI features for Kenfig SSSI and the implications of its presence are discussed in Callaghan (2020).

Merthyr Mawr

A total of six quadrats were completed at Merthyr Mawr (Appendix 13; Figure 0.1) to monitor both slack and rabbit interventions. They are summarised in Table 0-8.

Table 0-8. Summary of plots completed at Merthyr Mawr

Plot	Purpose	NVC	Appendix	Figure
MM01	Slack intervention	SD16b	0	16-23
MM02	Slack intervention	SD16b	0	16-23
MM03	Slack Control	SD16b	0	16-23
MM04	Rabbit intervention	NA	0	16-24
MM05	Rabbit intervention	SD8a	0	16-24
MM06	Rabbit control	SD8a	0	16-24

Notable species

No notable species were recorded in any of the quadrats.

Discussion

Baseline information

The fixed-point quadrats are a proven method of monitoring vegetation change at specific points. The quadrats completed here will be compared to post-intervention data collected in 2022 and will provide an indication of the impact of the project's interventions.

Rare and Notable Plant Species

Fir Tamarisk-moss *Abietinella abietina* var *abietina* was recorded in two of the plots in the Horseshoe Slack at Tywyn Aberffraw. This pleurocarpous moss is rare in Wales and will be listed as 'Near Threatened' on the latest revision of the Red List of British bryophytes (Callaghan, unpublished). The population in quadrat AB01 was recorded during targeted bryophyte surveys and **relocating the intervention is advised** (Callaghan, unpublished). The additional records for quadrat AB03 were a few additional plants in an open, sandy corner of this quadrat. Although only a small part of the population, it will be worthwhile **setting up a protection area** for this to ensure it is not impacted during the rabbit supplementation work.

Chalk Hook-moss *Drepanocladus sendtneri* was recorded in one of the slack intervention areas at Kenfig. This species is Nationally Scarce (Pescott, 2016) and one of the SSSI features for the site. Advice on protecting this species during work in these slacks is given in Callaghan (2020).

Modifications to Monitoring

The monitoring scheme has been designed to assess the impact of the project's interventions and no modifications are suggested at this point. The location of one intervention quadrat will need revising in 2020 if a comprehensive set of data is to be assembled, as discussed below.

Tywyn Aberffraw slack intervention plot

The Tywyn Aberffraw slack intervention plot included an area of *Abietinella abietina,* which is part of the largest remaining Welsh population. The bryophyte survey (Callaghan 2020), therefore, advised relocating this plot. Consequently, the slack intervention plot should not be part of an intervention area and a new intervention plot is advised to provide the baseline for the intervention site. The monitoring plot would be interesting to maintain in order to monitor changes in abundance of *Abietinella abietina*, particularly where interventions may take place nearby altering the conditions in the slack.

References

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Appendices

The following appendices present the details results for each of the fixed-point quadrats in a set of standard tables, with sites ordered from north to south.

Appendix: Tywyn Aberffraw

Slack intervention area 1 (AB01)

Location name: AB01: Tywyn Aberffraw Slack Intervention 1
Purpose: Slack intervention
Date: 18/09/2019
Recorders: Steven Heathcote, Jennifer Pullen, Laura Whale
NVC: SD16d
OSGR: SH3678569392
Precision: 1.8m
Description: This is a low ridge within the slack, and consequently supports drier vegetation. The rare species *Abietinella abietina* is present.

Notes:

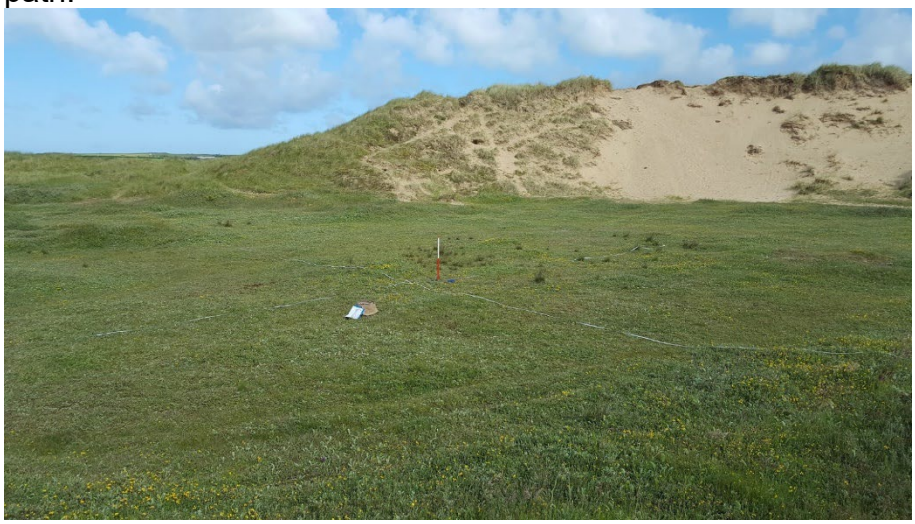
- **NVC Diagnosis**: The tightly grazed, grassy sward with an open Salix repens cover places this in SD16. Despite a high score for SD15 the vegetation is too open and the Calliergonella does not form a dense layer. (Tablefit of 1mx1m quadrat: SD15 82%; SD15d 69%; SD15c 68%; SD16d 68%; SD17b 63%)
- **Damage**: No evidence of damage.
- **Disturbance**: There is a small area of rabbit-scraping on the ridge which has created low(<10cm) mounds of raised sand where some SD19 vegetation has developed.
- **Invasive Species**: No invasive species are present in the survey area.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	50	50	-	-	-
Lichens	0	0	-	-	-
Litter	1	1	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Poa pratensis s.s.	-	-	-	-	D
Salix repens	75	65	Y	Y	A
Calliergonella cuspidata	50	50	Y	Y	A
Hydrocotyle vulgaris	25	30	Y	Y	A
Lotus corniculatus	10	20	Y	Y	A
Potentilla anserina	5	10	Y	Y	F
Carex flacca	1	5	Y	Y	F
Agrostis stolonifera	1	1	Y	Y	F
Trifolium repens	2	1	Y	Y	F
Equisetum variegatum	1	1	Y	Y	F
Lysimachia tenella	0.1	1	Y	Y	F
Lolium perenne	-	-	Y	Y	F
Holcus lanatus	-	3	Y	Y	O
Danthonia decumbens	3	2	Y	Y	O
Rhytidiadelphus triquetrus	-	2	Y	Y	O
Carex arenaria	1	1	Y	Y	O
Equisetum palustre	1	1	Y	Y	O
Pseudoscleropodium purum	-	-	-	Y	O
Agrostis capillaris	-	-	-	Y	O
Festuca rubra	-	-	-	Y	O
Ranunculus repens	-	-	-	-	O
Polygala vulgaris	0.1	0.1	Y	Y	R
Bellis perennis	-	-	-	Y	R
Carex nigra	-	-	-	Y	R
Epilobium palustre	-	-	-	Y	R
Dactylorhiza purpurella	-	-	-	Y	R
Phleum bertolonii	-	-	-	Y	R
Plantago lanceolata	-	-	-	Y	R
Dactylorhiza incarnata	-	-	-	-	R
Linum catharticum	-	-	-	-	R
Abietinella abietina* var. *abietina	-	-	-	Y	R
Tortula ruralis ssp. *ruraliformis*	-	-	-	-	R
Cynosurus cristatus	-	-	-	-	R
Trifolium dubium	-	-	-	-	R
Filipendula ulmaria	-	-	-	-	R
Anthoxanthum odoratum	-	-	-	-	R
Euphrasia sp.	-	-	-	-	R*
Phleum arenarium	-	-	-	-	R*
Catapodium rigidum	-	-	-	-	R*
Cerastium diffusum	-	-	-	-	R*
Carex caryophyllea	-	-	-	-	R*
Ammophila arenaria	-	-	-	-	R*
Rubus caesius	-	-	-	-	R*
Jacobaea vulgaris	-	-	-	-	R*
Briza media	-	-	-	-	R*

**Species restricted to area of open bare sand*

Slack control (AB02)

Location Name: AB02: Tywyn Aberffraw Slack Control
Purpose: Slack control
Date: 20/06/2019
Recorders: Steven Heathcote
NVC: SD15
OSGR: SH3678069339
Easting: 566433
Northing: 337696
Precision: 1.6
Markers: Yellow box
Description: Area of low ground including a small number of raised mounds (<50cm). Limits defined by taller mounds over 50cm. Excludes low-lying trampled path.



Notes:

- **NVC Diagnosis**: The vegetation has a canopy of Salix repens and a deep moss layer of Calliergonella cuspidata so is clearly referable to SD15. It has preferentials for both SD15c and SD15d so is not assigned to a sub-community. Low raised mounds have vegetation transitional to SD16. (Tablefit: SD15 72%; SD15c 66%; SD17b 65%; SD16d 64%)
- **Damage**: None
- **Disturbance:** A well-trampled path is present running through the plot and this supports a more open vegetation community referable to SD14.
- **Grazing:** The vegetation is well-grazed in this area, both by livestock and rabbits and intensity appears moderate to high.
- **Invasive Species:** None recorded

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	80	80	-	-	-
Lichens	0	0	-	-	-
Litter	1	1	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Calliergonella cuspidata	80	80	Y	Y	A
Salix repens	40	35	Y	Y	A
Lotus corniculatus	5	10	Y	Y	A
Agrostis stolonifera	5	3	Y	Y	A
Carex flacca	5	5	Y	Y	F
Hydrocotyle vulgaris	5	5	Y	Y	F
Potentilla anserina	5	4	Y	Y	F
Ranunculus flammula	2	1	Y	Y	F
Lysimachia tenella	0.1	0.1	Y	Y	F
Trifolium repens	1	0.1	Y	Y	F
Galium palustre	-	-	Y	Y	O
Juncus articulatus	-	-	Y	Y	O
Carex arenaria	-	1	Y	Y	O
Rubus caesius	-	1	Y	Y	O
Schoenus nigricans	-	1	Y	Y	O
Epipactis palustris	1	0.1	Y	Y	O
Equisetum palustre	0.1	0.1	Y	Y	O
Equisetum variegatum	0.1	0.1	Y	Y	O
Festuca rubra	0.1	0.1	Y	Y	O
Bellis perennis	-	-	-	Y	R
Carex nigra	-	-	-	Y	R
Dactylorhiza incarnata	-	-	-	Y	R
Dactylorhiza purpurella	-	-	Y	Y	R
Filipendula ulmaria	-	-	-	-	R
Holcus lanatus	-	-	-	Y	R
Leontodon saxatilis	-	-	-	Y	R
Phleum pratense	-	-	-	-	R
Potentilla reptans	-	-	-	Y	R
Ranunculus acris	-	-	-	Y	R
Trifolium dubium	-	-	-	-	R
Eleocharis quinqueflora	-	-	-	M	R-LD
Campylium stellatum	-	-	-	M	R
Bryum pseudotriquetrum	-	-	-	M	R
Carex viridula	-	-	-	M	R

M = species found only in low-lying channels on SE corner with *Eleocharis quinqueflora* dominant over an open habitat

Rabbit intervention area 1 (AB03)

Location Name: AB03: Tywyn Aberffraw Rabbit Intervention Area 1
Purpose: Rabbit intervention
Date: 20/06/2019
Recorders: Steven Heathcote
NVC: SH3675469340
Easting: 566433
Northing: 337696
Precision: 2
Markers: No
Description: Gently sloping bank at edge of Horseshoe slack with a cover of *Salix repens* and *Rubus caesius* over moss. The rare species *Abietinella abietina* is present in the more open sandy vegetation in the south-east corner of the plot.
Notes:

- **NVC Diagnosis:** This is the dry margin of the slack and the cover of the *Salix repens* and *Hydrocotyle vulgaris* place it as a slack. The rest of the vegetation is very dry (e.g. presence of *Ammophila*) so it fits best in the driest sub-community SD16b, but in truth is a long way through the transition to a form of dry scrub. (Tablefit: SD16b 63%; SD16 50%; SD15d 47%; SD16a 36%; SD15 35%)
- **Damage:** No evidence of damage.
- **Disturbance:** Disturbed path runs through plot which has created open, sandy area.
- **Grazing:** Although the area is grazed, the abundance of *Rubus caesius* suggests this particular area is not favoured for grazing.
- **Invasive Species:** No non-natives are present. *Rubus caesius* could be considered to be invading although is normally present at low cover in SD16b.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0			
Bryophytes	95	95			
Lichens	0	0			
Litter	1	1			
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Rhytidiadelphus triquetrus	85	90	Y	Y	D
Salix repens	25	25	Y	Y	A
Rubus caesius	40	50	Y	Y	A
Holcus lanatus	2	1	Y	Y	F
Hydrocotyle vulgaris	1	5	Y	Y	F
Calliergonella cuspidata	-	-	-	Y	O-LA
Carex flacca	-	0.1	Y	Y	O
Festuca rubra	0.1	1	Y	Y	O
Plantago lanceolata	-	1	Y	Y	O
Pseudoscleropodium purum	10	5	Y	Y	O
Agrostis capillaris	-	-	Y	Y	O
Centaurea nigra	-	-	-	-	O
Lotus corniculatus	-	-	Y	Y	O
Equisetum palustre	-	0.1	Y	Y	R
Poa pratensis	-	0.1	Y	Y	R
Anthoxanthum odoratum	-	-	-	Y	R
Arrhenatherum elatius	-	-	-	Y	R
Bellis perennis	-	-	-	Y	R
Briza media	-	-	-	Y (SL)	R
Carex arenaria	-	-	Y	Y	R
Danthonia decumbens	-	-	-	Y	R
Galium verum	-	-	Y	Y	R
Heracleum sphondylium	-	-	-	Y	R
Luzula campestris	-	-	-	Y	R
Potentilla anserina	-	-	-	Y	R
Rubus fruticosus agg.	-	-	-	-	R
Salix caprea	-	-	-	-	R
Ammophila arenaria	-	-	-	Y	R
Agrostis stolonifera	-	-	-	-	O
Jacobaea vulgaris	-	-	-	-	R*
Tortella flavovirens	-	-	-	-	R*
Carlina vulgaris	-	-	-	-	R*
Ononis repens	-	-	-	-	R*
Abietinella abietina* var. *abietina	-	-	-	-	R*
Brachythecium albicans	-	-	-	-	R*
Danthonia decumbens	-	-	-	-	R*
Prunella vulgaris	-	-	-	-	R*

*Only present in SW corner which transitions to open sandy area

Rabbit intervention area 2 (AB04)

Location Name: AB04: Tywyn Aberffraw Rabbit Intervention 2
Purpose: Rabbit intervention
Date: 20/06/2019
Recorders: Steven Heathcote, Jennifer Pullen, Laura Whale
NVC: SD7b
OSGR: SH3554368561
Easting: 566433
Northing: 337696
Precision: 1.7
Markers: No
Description: Slope of dune including trampled footpath area but excludes steep sides to east and west and avoids dense marram to SW

Notes:

- **NVC Diagnosis:** The vegetation is referable to SD7b, but would fit better the defunct SD7d not included in the final NVC. (Tablefit: 'SD7d' 38%; SD8b 33%; SD7 26%; SD16a 25%; SD7b 24%).
- **Damage:** The area is heavily trampled.
- **Disturbance:** The trampling and unstable dune slopes create disturbance, along with some rabbit activity.
- **Grazing:** The area is grazed by livestock.
- **Invasive species:** No invasive species were recorded.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	60	70	-	-	-
Lichens	0	0	-	-	-
Litter	2	2	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Homalothecium sericeum	60	70	Y	Y	A
Pilosella officinarum	5	8	Y	Y	F
Galium verum	5	3	Y	Y	F
Plantago lanceolata	5	3	Y	Y	F
Lotus corniculatus	3	2	Y	Y	F
Ononis repens	2	2	Y	Y	F
Festuca rubra	2	1	Y	Y	F
Thymus polytrichus	1	1	Y	Y	F
Ammophila arenaria	3	5	Y	Y	O
Rhinanthus minor	2	4	Y	Y	O
Senecio vulgaris	0.1	3	Y	Y	O
Poa humilis	1	2	Y	Y	O
Trifolium arvense	1	2	Y	Y	O
Carex flacca	-	1	Y	Y	O
Holcus lanatus	1	1	Y	Y	O
Trifolium dubium	1	1	Y	Y	O
Anthyllis vulneraria	0.1	0.1	Y	Y	O
Luzula campestris	-	0.1	Y	Y	O
Viola tricolor	-	0.1	Y	Y	O
Euphrasia sp.	-	-	Y	Y	O
Hypochaeris radicata	2	2	Y	Y	R
Anacamptis pyramidalis	-	-	-	-	R
Anthoxanthum odoratum	-	-	-	Y	R
Arenaria serpyllifolia	-	-	-	Y	R
Bellis perennis	-	-	-	Y	R
Briza media	-	-	Y	Y	R
Dactylis glomerata	-	-	-	-	R
Geranium molle	-	-	-	Y	R
Ophrys apifera	-	-	-	Y	R
Polygala vulgaris	-	-	-	Y	R
Ranunculus bulbosus	-	-	Y	Y	R
Rubus caesius	-	-	-	-	R
Taraxacum agg.	-	-	-	Y	R
Trifolium campestre	-	-	-	Y	R

Horseshoe Slack: Rabbit Control (AB05)

Location Name: AB05: Aberffraw Rabbit Control
Purpose: Rabbit control
Date: 18/06/2019
Recorders: Steven Heathcote
NVC: SD16d
OSGR: SH3674769301
Easting: 279612
Northing: 180408
Precision: 2.2
Markers: Yellow square
Description: An area of Horseshoe Slack with typical vegetation

Notes:

- **NVC Diagnosis:** The dry grassy slack is clearly referable to SD16 and the present of *Agrostis stolonifera* in equal or greater abundance than *Festuca rubra* places it towards SD16d. (Tablefit: SD15 69%; SD16d 67%; SD14d 65%; SD17b 65%; SD14 65%).
- **Damage:** No damage
- **Disturbance:** Very light disturbance from rabbit activity.
- **Grazing:** Grazed by rabbits and livestock.
- **Invasive Species:** No invasive species present.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	<1	-	-	-
Bryophytes	60	50	-	-	-
Lichens	0	0	-	-	-
Litter	2	1	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Salix repens	50	45	Y	Y	A
Calliergonella cuspidata	40	30	Y	Y	A
Lotus corniculatus	30	25	Y	Y	A
Hydrocotyle vulgaris	40	50	Y	Y	F
Potentilla anserina	10	15	Y	Y	F
Agrostis stolonifera	3	5	Y	Y	F
Festuca rubra	5	5	Y	Y	F
Carex flacca	2	3	Y	Y	F
Equisetum variegatum	2	2	Y	Y	F
Drepanocladus aduncus	-	-	-	Y	O
Campylium stellatum	-	5	Y	Y	O
Homalothecium lutescens	20	5	Y	Y	O
Holcus lanatus	5	4	Y	Y	O
Lysimachia tenella	-	3	Y	Y	O
Danthonia decumbens	3	3	Y	Y	O
Briza media	-	1	Y	Y	O
Trifolium repens	-	1	Y	Y	O
Anthoxanthum odoratum	-	-	Y	Y	R
Bellis perennis	-	-	-	Y	R
Bryum pseudotriquetrum	-	-	Y	Y	R
Carex nigra	-	-	-	Y	R
Cynosurus cristatus	-	-	-	Y	R
Equisetum palustre	-	-	-	-	R
Euphrasia sp.	-	-	-	-	R
Hypericum tetrapterum	-	-	-	-	R
Phleum bertolonii	-	-	-	Y	R
Poa pratensis s.s.	-	-	-	-	R
Prunella vulgaris	-	-	Y	Y	R
Pseudoscleropodium purum	-	-	-	Y	R
Ranunculus repens	-	-	-	-	R
Rhytidiadelphus triquetrus	-	-	-	Y	R
Rubus caesius	-	-	-	Y	R
Veronica officinalis	-	-	-	-	R
Molinia caerulea	-	-	-	Y	VR

Figure 0.1. Tywyn Aberffraw – overview.
Figure 0.2. Tywyn Aberffraw – Slack detail.
Figure 0.3. Tywyn Aberffraw – Front dunes.

Appendix: Newborough

Gull Slack intervention (NF01)

Location Name: NF01: Newborough Forest Gull Slack Intervention
Purpose: Slack intervention
Date: 19/06/2019
Recorders: Steven Heathcote, Jennifer Pullen, Laura Whale
NVC: SD16c
OSGR: SH3888864677
Precision: 3
Markers: No
Description: Area of dry creeping willow vegetation. Limits marked by areas of scrub and dry grassland without willow

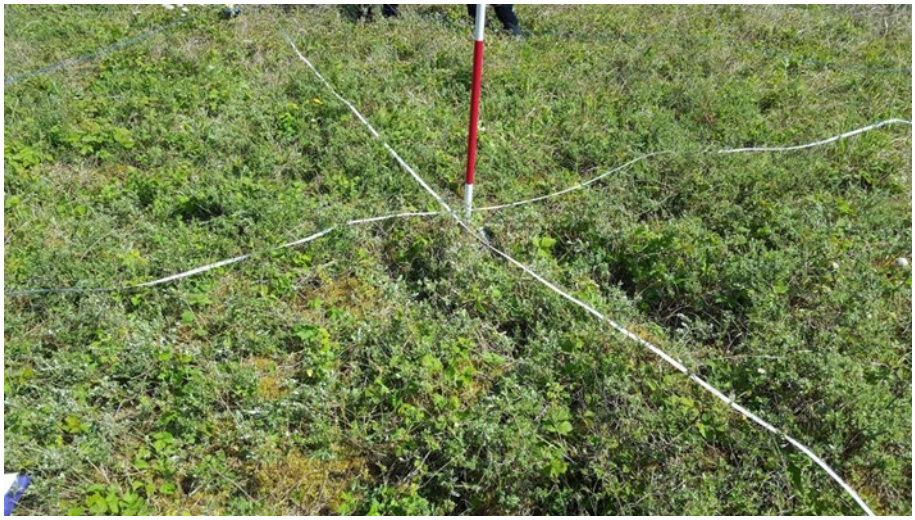
Notes:

- **NVC Diagnosis:** The vegetation is easily referred to SD16b, being a dry, grassy slack with significant invasion of *Rubus caesius*. The dense bryophyte cover creates an impression of SD15 but the vegetation is too dry to be referred to here. (Tablefit: SD15a 46%; SD15d 44%; SD15 41%; SD15b 38%; SD16b 37%)
- **Damage:** There is no evidence of damage in this plot
- **Disturbance:** There is some disturbance along a well-used footpath that runs across the slack.
- **Grazing:** There is very localised grazing by rabbits but this has little effect on the vegetation overall.
- **Invasive Species:** There are no non-natives. The *Rubus caesius* is a natural part of the vegetation but is becoming invasive and *Chamerion angustifolium is also present and could potentially become invasive over time.*

-	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Bare ground	0	0	-	-	-
Bryophytes	90	90	-	-	-
Lichens	0	0	-	-	-
Litter	1	0.1	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Rubus caesius	35	35	Y	Y	A
Salix repens	30	35	Y	Y	A
*Pseudoscleropodium purum**	90	90	Y	Y	A
Festuca rubra	-	-	Y	Y	F
Dactylis glomerata	-	-	-	Y	O
Holcus lanatus	-	-	-	Y	O
Plantago lanceolata	-	-	-	Y	O
Poa pratensis agg.	-	-	-	Y	O
Calliergonella cuspidata	-	5	Y	Y	O
Carex nigra	3	5	Y	Y	O
Viola riviniana	1	5	Y	Y	O
Lathyrus pratensis	3	3	Y	Y	O
Neottia ovata	-	1	Y	Y	O
Ranunculus repens	1	1	Y	Y	O
Anthoxanthum odoratum	-	-	-	-	R
Centaurea nigra	-	-	-	-	R
Chamerion angustifolium	-	-	-	-	R
Dactylorhiza fuchsii	-	-	-	-	R
Dactylorhiza purpurella	-	-	-	Y	R
Galium aparine	-	-	-	-	R
Heracleum sphondylium	-	-	-	-	R
Hieracium sp.	-	-	-	-	R
Leucanthemum vulgare	-	-	-	Y	R
Potentilla anserina	-	-	-	Y	R
Pyrola rotundifolia	-	-	-	-	R
Rhytidiadelphus triquetrus	-	-	Y	Y	R
Veronica chamaedrys	-	-	-	Y	R
Ervilla hirsuta	-	-	Y	Y	R
Achillea millefolium	1	0.1	Y	Y	R
Ammophila arenaria	0.1	0.1	Y	Y	VR

Gull Slack control (NF02)

Location Name: NF02: Newborough Forest: Gull Slack Control
Purpose: Slack control
Date: 19/06/2019
Recorders: Steven Heathcote, Jennifer Pullen, Laura Whale
NVC: SD16c
OSGR: SH3888664787
Precision: 1.7
Markers: Yellow square
Description: Area of creeping willow between tall scrub.



Notes:

- **NVC Diagnosis:** The vegetation is referred to SD16c due to the presence of *Prunella vulgaris* and *Pyrola rotundifolia* but the invading *Rubus caesius* and *Salix cinerea* seedlings create affinities to SD16b. (Tablefit: SD16b 64%; SD16 57%; SD16c 49%; SD16a 49%; SD15d 45%).
- **Damage:** There are no signs of damage.
- **Disturbance:** The limits of the plot used here exclude areas of trampling. There are no other signs of disturbance.
- **Grazing:** The area is not grazed, although rabbits would potentially have access and may very occasionally graze here.
- **Invasive Species:** No non-natives. The *Rubus caesius* and *Salix cinerea* could be considered to be invading more open slack vegetation and adjacent areas show that unchecked the parcel will turn into Willow scrub.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	75	80	-	-	-
Lichens	0	0	-	-	-
Litter	5	3	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Salix repens	40	40	Y	Y	A
Pseudoscleropodium purum	75	80	Y	Y	A
Rubus caesius	10	20	Y	Y	A
Calliergonella cuspidata	-	-	Y	Y	A
Holcus lanatus	10	5	Y	Y	F
Carex flacca	3	5	Y	Y	F
Viola riviniana	5	5	Y	Y	F
Trifolium repens	2	2	Y	Y	F
Filipendula vulgaris	5	8	Y	Y	F
Carex arenaria	3	3	Y	Y	O
Luzula campestris	5	3	Y	Y	O
Poa pratensis agg.	2	1	Y	Y	O
Ranunculus repens	0.1	0.1	Y	Y	O
Prunella vulgaris	1	2	Y	Y	O
Lotus corniculatus	-	1	Y	Y	O
Festuca rubra	-	-	-	-	O
Anacamptis pyramidalis	0.1	0.1	Y	Y	R
Pyrola rotundifolia	0.1	0.1	Y	Y	R
Hydrocotyle vulgaris	1	0.1	Y	Y	R
Euphrasia sp.	0.1	0.1	Y	Y	R
Salix cinerea	-	2	Y	Y	R
Carex nigra	-	0.1	Y	Y	R
Schedonorus pratensis	-	-	Y	Y	R
Vicia sativa	-	-	Y	Y	R
Galium verum	-	-	Y	Y	R
Lotus pedunculatus	-	-	Y	Y	R
Lathyrus pratensis	-	-	-	Y	R
Equisetum arvense	-	-	-	Y	R
Dactylorhiza purpurella	-	-	-	-	R
Centaurea nigra	-	-	-	-	R
Ranunculus acris	-	-	-	-	R
Neottia ovata	-	-	-	-	R

Slack intervention 1 (NW01)

Location Name: NW01: Newborough Warren Intervention 1
Purpose: Slack intervention
Date: 19/06/2019
Recorders: Steven Heathcote
NVC: SD16c
OSGR: SH4185162594
Precision: 2.7
Markers: No
Description: Very dry slack bottom between low ride to east and dune to west. Rosebay Willowherb area to north excluded.

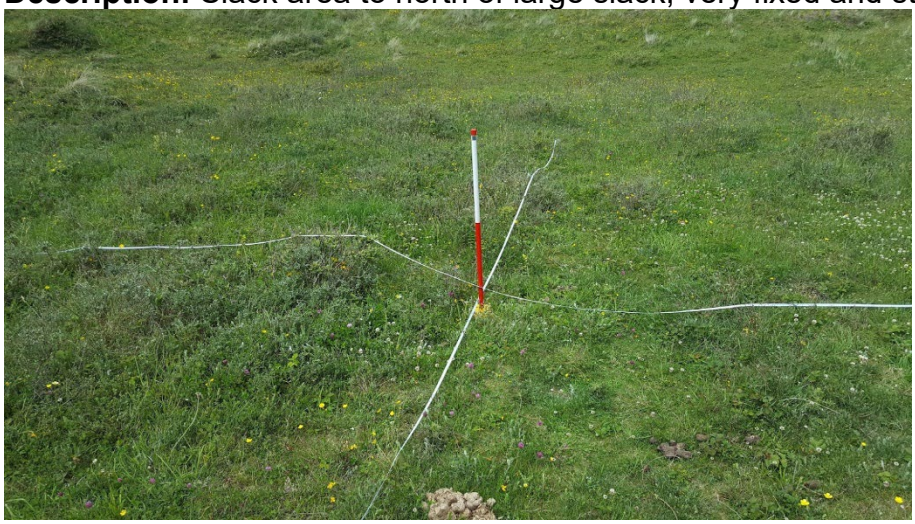
Notes:

- **NVC Diagnosis:** This sample is in a dry, grassy part of the slack and is clearly referable to SD16. The vegetation has mesotrophic elements and no strong preferentials for any of the sub-communities so is not assigned to sub-community level. (Tablefit: SD16 61%; SD16a 53%; SD16b 52%; SD16c 52%; MG5 49%).
- **Damage:** There are no signs of damage.
- **Disturbance:** There is an infrequently-used footpath through part of the slack but most disturbance is from grazing livestock.
- **Grazing:** Horses and cattle graze the slack. Rabbits may also graze here but impacts are not obvious.
- **Invasive Species:** No non-native species. The *Chamaenerion angustifolium* is potentially invasive and is already encroaching into this area of vegetation.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	1	0.1	-	-	-
Bryophytes	10	10	-	-	-
Lichens	0	0	-	-	-
Litter	0	0	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Salix repens	60	50	Y	Y	A
Festuca rubra	5	10	Y	Y	A
Poa humilis	10	5	Y	Y	A
Carex flacca	3	5	Y	Y	A
Pseudoscleropodium purum	10	8	Y	Y	F
Lotus corniculatus	5	5	Y	Y	F
Hypochaeris radicata	5	5	Y	Y	F
Daucus carota ssp. *gummifera*	5	5	Y	Y	F
Trifolium repens	5	3	Y	Y	F
Trifolium pratense	2	3	Y	Y	F
Holcus lanatus	-	2	Y	Y	F
Scorzoneroides autumnalis	1	2	Y	Y	F
Plantago lanceolata	1	2	Y	Y	F
Agrostis capillaris	-	1	Y	Y	F
Rubus caesius	-	-	Y	Y	F
Dactylis glomerata	2	2	Y	Y	O
Luzula campestris	0.1	1	Y	Y	O
Angelica sylvestris	1	1	Y	Y	O
Prunella vulgaris	1	1	Y	Y	O
Leucanthemum vulgare	-	1	Y	Y	O
Selaginella selaginoides	0.1	1	Y	Y	O
Rhinanthus minor	-	0.1	Y	Y	O
Ranunculus acris	1	0.1	Y	Y	O
Polygala vulgaris	0.1	0.1	Y	Y	O
Cerastium fontanum	-	0.1	Y	Y	O
Brachythecium mildeanum	1	0.1	Y	Y	O
Anthoxanthum odoratum	-	-	Y	Y	O
Veronica chamaedrys	-	-	-	Y	O
Viola tricolor ssp. *curtisii*	-	-	-	Y	O
Salix cinerea	-	-	-	Y	O
Bromus hordeaceus	-	0.1	Y	Y	R
Crataegus monogyna	-	-	-	Y	R
Festuca ovina	-	-	Y	Y	R
Potentilla anserina	-	-	Y	Y	R
Taraxacum agg.	-	-	Y	Y	R
Linum catharticum	-	-	Y	Y	R
Jacobaea vulgaris	-	-	Y	Y	R
Trifolium hybridum	-	-	-	Y	R
Chamerion angustifolium	-	-	-	Y	R
Cirsium vulgare	-	-	-	Y	R
Trifolium dubium	-	-	-	Y	R
Crepis vesicaria	-	-	-	Y	R
Anthyllis vulneraria	-	-	-	-	R
Arenaria serpyllifolia	-	-	-	-	R
Anacamptis pyramidalis	-	-	-	-	R

Slack intervention 2 (NW02)

Location Name: NW02: Newborough Warren Slack Intervention 2
Purpose: Slack intervention
Date: 19/06/2019
Recorders: Steven Heathcote
NVC: SD16
OSGR: SH4177362699
Precision: 1.3m
Markers: No
Description: Slack area to north of large slack, very fixed and stable



Notes:

- **NVC Diagnosis:** This is a dry grassy part of the slack complex with *Rubus caesius* referable to SD16. The abundance of *Rubus caesius* and dry nature places this in SD16b. (Tablefit: SD16b 68%; SD16c 64%; SD16 61%; SD15d 51%; SD16a 47%).
- **Damage:** There are no signs of damage.
- **Disturbance:** There is a small amount of disturbance from grazing animals.
- **Grazing:** Grazed by horses and cattle, and also by rabbits but there are few signs of significant rabbit activity in this part of the slack.
- **Invasive Species:** No non-native species. *Rubus caesius* is kept in check by the grazing.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK(DAFOR)
Bare ground	0	(dung 5)	-	-	-
Bryophytes	25	20	-	-	-
Lichens	0	0	-	-	-
Litter	5	5	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK(DAFOR)**
Pseudoscleropodium purum	25	20	Y	Y	A
Festuca rubra	10	10	Y	Y	A
Carex flacca	10	5	Y	Y	A
Salix repens	40	40	Y	Y	F
Rubus caesius	20	15	Y	Y	F
Holcus lanatus	1	10	Y	Y	F
Dactylis glomerata	5	5	Y	Y	F
Poa humilis	5	3	Y	Y	F
Lotus corniculatus	2	2	Y	Y	F
Trifolium repens	4	5	Y	Y	O
Agrostis capillaris	-	2	Y	Y	O
Calliergonella cuspidata	-	2	Y	Y	O
Filipendula ulmaria	1	1	Y	Y	O
Rhinanthus minor	1	1	Y	Y	O
Trifolium pratense	-	1	Y	Y	O
Ranunculus acris	-	1	Y	Y	O
Plantago lanceolata	-	1	Y	Y	O
Kindbergia praelonga	-	1	Y	Y	O
Equisetum variegatum	0.1	0.1	Y	Y	O
Prunella vulgaris	1	0.1	Y	Y	O
Daucus carota ssp. *carota*	-	0.1	Y	Y	O
Lotus pedunculatus	-	0.1	Y	Y	O
Mentha aquatica	-	0.1	Y	Y	O
Salix cinerea	-	-	Y	-	O
Luzula campestris	-	0.1	Y	Y	R
Epipactis palustris	0.1	0.1	Y	Y	R
Hypericum tetrapterum	0.1	0.1	Y	Y	R
Cirsium arvense	-	0.1	Y	Y	R
Anthoxanthum odoratum	-	-	-	Y	R
Schedonorus pratensis	-	-	-	-	R
Arrhenatherum elatius	-	-	-	-	R
Pyrola rotundifolia	-	-	Y	Y	R
Dactylorhiza purpurella	-	-	-	Y	R
Centaurea nigra	-	-	-	Y	R
Scorzoneroides autumnalis	-	-	-	Y	R
Vicia sativa	-	-	-	Y	R
Taraxacum agg.	-	-	-	Y	R
Angelica sylvestris	-	-	-	Y	R
Plagiomnium affine	-	-	-	Y	R
Sonchus arvensis	-	-	-	Y	R
Lathyrus pratensis	-	-	-	Y	R
Rhytidiadelphus squarrosus	-	-	-	Y	R
Leucanthemum vulgare	-	-	-	-	R
Jacobaea vulgaris	-	-	-	-	R
Cerastium fontanum	-	-	-	-	R
Veronica chamaedrys	-	-	-	-	R
Linum catharticum	-	-	-	-	R
Polygala vulgaris	-	-	-	-	R
Viola tricolor ssp. *curtisii*	-	-	-	-	R
Achillea millefolium	-	-	-	-	R

Slack control (NW03)

Location Name: NW03: Newborough Warren: Slack Control
Purpose: Control
Date: 19/06/2019
Recorders: Steven Heathcote
NVC: SD16c
OSGR: SH4166262903
Precision: 1.7
Markers: Yellow square
Description: Pony grazed slack. Covers raised area of SD16. Excludes lower-lying SD14 with wetter vegetation and a high density of Marsh Helleborine.

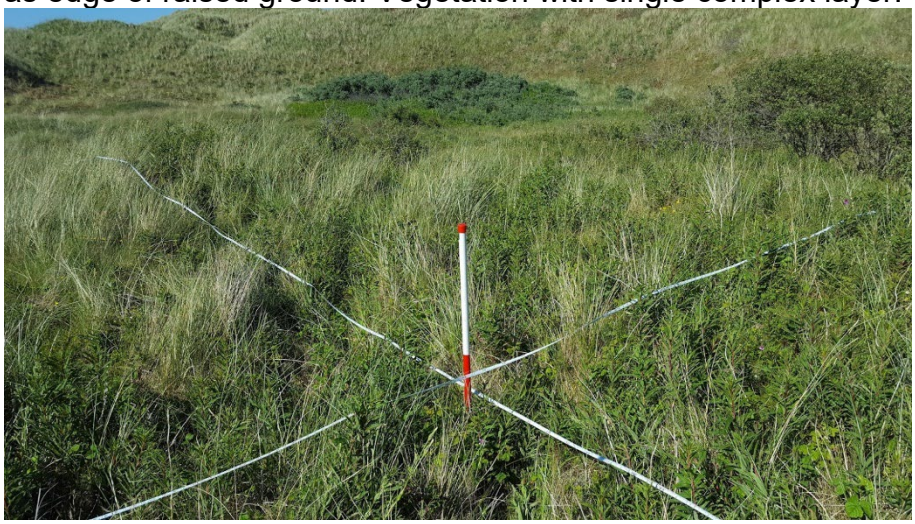
Notes:

- **NVC Diagnosis:** This area of slack is referred to SD16, being at the drier, grassy end of slack vegetation, although there are elements of SD14, which is present in the lower areas of slack nearby. The presence of *Prunella vulgaris* and *Equistum variegatum* place this in the sub-community SD16c. (Tablefit: SD16 57; SD16c 56; SD14d 53; SD15d 52; SD16a 52).
- **Damage:** There are no signs of damage.
- **Disturbance:** The vegetation is lightly disturbed by grazing animals.
- **Grazing:** The area is grazed by horses and cattle.
- **Invasive Species:** No invasive species are present.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	60	65	-	-	-
Lichens	0	0	-	-	-
Litter	1	2	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Salix repens	40	50	Y	Y	A
Pseudoscleropodium purum	30	25	Y	Y	A
Holcus lanatus	3	5	Y	Y	A
Carex flacca	5	5	Y	Y	A
Festuca rubra	5	3	Y	Y	A
Calliergonella cuspidata	15	20	Y	Y	F
Homalothecium lutescens	15	20	Y	Y	F
Lotus corniculatus	3	5	Y	Y	F
Scorzoneroides autumnalis	5	5	Y	Y	F
Prunella vulgaris	5	3	Y	Y	F
Poa pratensis	3	2	Y	Y	F
Galium verum	1	1	Y	Y	F
Taraxacum agg.	3	2	Y	Y	O
Carex arenaria	-	1	Y	Y	O
Viola riviniana	0.1	1	Y	Y	O
Trifolium repens	-	1	Y	Y	O
Ranunculus bulbosus	1	0.1	Y	Y	O
Equisetum variegatum	0.1	0.1	Y	Y	O
Linum catharticum	-	0.1	Y	Y	O
Rubus caesius	-	-	Y	Y	O
Pyrola rotundifolia	-	-	Y	Y	O
Polygala vulgaris	-	-	Y	Y	O
Plantago lanceolata	-	-	Y	Y	O
Anthyllis vulneraria	-	-	-	Y	O
Leucanthemum vulgare	-	-	-	-	R-LF
Rhytidiadelphus squarrosus	-	2	Y	Y	R
Mentha aquatica	-	0.1	Y	Y	R
Luzula campestris	-	-	Y	Y	R
Danthonia decumbens	-	-	-	Y	R
Agrostis capillaris	-	-	-	-	R
Ranunculus acris	-	-	-	Y	R
Leontodon hispidus	-	-	-	Y	R
Lythrum salicaria	-	-	-	Y	R
Jacobaea vulgaris	-	-	-	Y	R
Trifolium pratense	-	-	-	Y	R
Hylocomium splendens	-	-	-	Y	R
Epipactis palustris	-	-	-	Y	R
Dactylorhiza purpurella	-	-	-	-	R
Cerastium fontanum	-	-	-	-	R
Euphrasia sp.	-	-	-	-	R
Potentilla anserina	-	-	-	-	R
Rhinanthus minor	-	-	-	-	R
Dactylorhiza incarnata	-	-	-	-	R

Rabbit intervention 1 (NW04)

Location Name: NW04: Newborough Warren: Rabbit Intervention Area 3
Purpose: Rabbit intervention
Date: 19/06/2019
Recorders: Steven Heathcote, Jennifer Pullen, Laura Whale
NVC: OV27e
OSGR: SH4146862922
Precision: 1.7
Markers: No
Description: Rough vegetation on raised mounds within the slack. Plot limits taken as edge of raised ground. Vegetation with single complex layer.



Notes:

- **NVC Diagnosis:** The vegetation is clearly referable to OV27e. It appears to be derived from invasion of SD7c by *Chamaenerion angustifolium*. (Tablefit: OV27e 68%; SD7 57%; SD7c 56%; SD6e 46%; SD7d 46%).
- **Damage:** No evidence of damage.
- **Disturbance:** There is some disturbance by rabbits.
- **Grazing:** The area is not grazed.
- **Invasive Species:** No non-native species are present. The *Chamaenerion angustifolium* is clearly invading the semi-fixed dune grassland.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	1	2	-	-	-
Lichens	0	0	-	-	-
Litter	5	5	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Chamerion angustifolium	50	30	Y	Y	A
Festuca rubra	40	30	Y	Y	A
Rubus caesius	5	20	Y	Y	F
Ammophila arenaria	10	10	Y	Y	F
Ononis repens	1	2	Y	Y	F
Kindbergia praelonga	-	1	Y	Y	F
Holcus lanatus	-	1	Y	Y	O
Taraxacum agg.	-	0.1	Y	Y	O
Ranunculus acris	-	-	-	Y	O
Lotus corniculatus	-	-	-	Y	O
Hypochaeris radicata	-	-	-	Y	O
Arrhenatherum elatius	-	-	-	Y	O
Angelica sylvestris	-	1	Y	Y	R
Amblystegium serpens	1	1	Y	Y	R
Anacamptis pyramidalis	-	0.1	Y	Y	R
Tragopogon pratensis	-	-	Y	Y	R
Poa trivialis	-	-	-	Y	R
Luzula campestris	-	-	-	Y	R
Crataegus monogyna	-	-	-	-	R
Equisetum arvense	-	-	-	-	R
Plantago lanceolata	-	-	-	-	R
Anthyllis vulneraria	-	-	-	-	R
Viola tricolor ssp. *curtisii*	-	-	-	-	R
Leontodon saxatilis	-	-	-	-	R
Heracleum sphondylium	-	-	-	-	R
Fraxinus excelsior	-	-	-	-	R
Rhinanthus minor	-	-	-	-	R

Rabbit intervention 2 (NW05)

Location Name: NW05: Newborough Warren: rabbit intervention 4
Purpose: Rabbit intervention
Date: 19/06/2019
Recorders: Steven Heathcote, Jennifer Pullen, Laura Whale
NVC: SD7b
OSGR: SH4151563058
Precision: 2.2
Markers: Labelled on wooden fence post
Description: Narrow strip of land between fence and steep dune slope. Areas inside fence are grazed and represent a different NVC community.

Notes:

- **NVC Description:** The vegetation is referable to SD7b, although it fits well with the original 'SD7d' which was omitted from the final NVC. (Tablefit: 'SD7d' 65%; SD7 61%; SD19 58%; SD7b 58%; SD7c 51%)
- **Damage:** No damage.
- **Disturbance:** The vegetation is close to a fenceline and is therefore more heavily trampled than other areas of vegetation. The area is also perched above an eroding face of sand and bits of vegetation may periodically be eroded away.
- **Grazing:** The vegetation is grazed by horses, cattle and rabbits.
- **Invasive Species:** No invasive species are present.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0			
Bryophytes	75	70			
Lichens	1	1			
Litter	10	5			
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Hypnum cupressiforme var. lacunosum	75	65	Y	Y	A
Festuca rubra	3	30	Y	Y	A
Bromus hordeaceus	3	5	Y	Y	F
Thymus polytrichus	10	5	Y	Y	F
Pseudoscleropodium purum	-	-	Y	Y	O
Ammophila arenaria	5	10	Y	Y	O
Homalothecium lutescens	-	5	Y	Y	O
Hypochaeris radicata	-	2	Y	Y	O
Ononis repens	5	2	Y	Y	O
Pilosella officinarum	-	1	Y	Y	O
Poa humilis	-	1	Y	Y	O
Rubus caesius	-	1	Y	Y	O
Viola tricolor ssp. *curtisii*	1	1	Y	Y	O
Aira praecox	1	0.1	Y	Y	O
Arenaria serpyllifolia	1	0.1	Y	Y	O
Anacamptis pyramidalis	-	-	Y	Y	R
Crepis vesicaria	-	-	Y	Y	R
Galium verum	-	-	-	Y	R
Holcus lanatus	-	-	-	Y	R
Phleum arenarium	-	-	-	Y	R
Ranunculus repens	-	-	Y	Y	R
Rhinanthus minor	-	-	Y	Y	R
Polygala vulgaris	0.1	1	Y	Y	R
Anthoxanthum odoratum	0.1	0.1	Y	Y	R
Cerastium diffusum	0.1	0.1	Y	Y	R
Cladonia sp.	0.1	0.1	Y	Y	R
Jasione montana	1	0.1	Y	Y	R
Koeleria macrantha	-	0.1	Y	Y	R
Leontodon saxatilis	0.1	0.1	Y	Y	R
Peltigera neckeri	1	0.1	Y	Y	R
Jacobaea vulgaris	1	0.1	Y	Y	R
Taraxacum agg.	-	0.1	Y	Y	R
Veronica officinalis	0.1	0.1	Y	Y	R

Rabbit control (NW06)

Location Name: NW05: Newborough Warren Rabbit Control
Purpose: Rabbit control
Date: 19/06/2019
Recorders: Steven Heathcote, Jennifer Pullen, Laura Whale
NVC: SD8b *Salix repens* var.
OSGR: SH4138463203
Precision: 2.4
Markers: Yellow box
Description: Undulating terrain with summer grazing. Boundary of survey area based on polygon supplied by NRW but does not have clear limits on the ground.

Notes:

- **NVC Diagnosis:** Stands of this vegetation type are common on Newborough Warren and would be easily referable to SD8b except for the constant and sometimes abundant *Salix repens*. The topography suggests this is simply *S. repens* invading other vegetation rather than a long-dry slack. The vegetation is therefore assigned to 'SD8b *Salix repens* var.' (Tablefit: SD16b 55%; SD16 52%; SD16a 51%; CG6 51%; SD8b 50%).
- **Damage:** No damage.
- **Disturbance:** Disturbed only by grazing animals.
- **Grazing:** Grazed by horses and cattle.
- **Invasive Species:** No invasive species are present.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	25	30	-	-	-
Lichens	0	0	-	-	-
Litter	1	1			
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Festuca rubra	40	30	Y	Y	A
Agrostis capillaris	25	10	Y	Y	A
Salix repens	20	50	Y	Y	F
Holcus lanatus	5	3	Y	Y	F
Poa humilis	3	2	Y	Y	F
Pseudoscleropodium purum	25	30	Y	Y	F
Ammophila arenaria	1	2	Y	Y	O
Rhinanthus minor	1	1	Y	Y	O
Taraxacum agg.	1	1	Y	Y	O
Ononis repens	2	1	Y	Y	O
Lotus corniculatus	1	0.1	Y	Y	O
Luzula campestris	1	1	Y	Y	O
Trifolium repens	3	1	Y	Y	O
Galium verum	1	1	Y	Y	O
Thymus polytrichus	1	1	Y	Y	O
Potentilla reptans	0.1	2	Y	Y	O
Veronica chamaedrys	-	1	Y	Y	O
Ranunculus bulbosus	-	1	Y	Y	O
Hypochaeris radicata	-	0.1	Y	Y	O
Rubus caesius	-	1	Y	Y	O
Jacobaea vulgaris	-	-	Y	Y	O
Cerastium fontanum	-	-	Y	Y	O
Homalothecium lutescens	-	-	Y	Y	O
Anthyllis vulneraria	-	-	Y	Y	O
Carex flacca	-	-	Y	Y	O
Leontodon saxatilis	0.1	0.1	Y	Y	R
Plantago lanceolata	-	1	Y	Y	R
Trifolium campestre	-	-	Y	Y	R
Crepis vesicaria	-	-	Y	Y	R
Bromus hordeaceus	-	-	Y	Y	R
Pilosella officinarum	-	-	Y	Y	R
Veronica arvensis	-	-	Y	Y	R
Anthoxanthum odoratum	-	-	Y	Y	R
Brachythecium albicans	-	-	Y	Y	R
Viola tricolor	-	-	-	Y	R
Centaurea nigra	-	-	-	Y	R
Heracleum sphondylium	-	-	-	Y	R
Tragopogon pratensis	-	-	-	Y	R
Leucanthemum vulgare	-	-	-	Y	R
Polygala vulgaris	-	-	-	Y	R
Trifolium pratense	-	-	-	Y	R
Veronica officinalis	-	-	-	Y	R
Anacamptis pyramidalis	-	-	-	-	R
Festuca ovina	-	-	-	-	R
Euphrasia sp.	-	-	-	-	R

Appendix: Morfa Dinlle

Rabbit supplementation area 1 (DI01)

Location Name: DI01: Morfa Dinlle Rabbit Intervention 1
Purpose: Rabbit intervention
Date: 18/07/2019
Recorders: Steven Heathcote, Mairi Gillis
NVC: SD12a
OSGR: SH4373160683
Lat: 53.120358
Long: -4.3366012
Precision: 1.8
Markers: Yellow square in centre of nested quadrat
Description: Obvious track in intervention area excluded. DAFOR only done to where the *Ammophila arenaria* becomes abundant at the base of the dunes.

Notes:

- **NVC Diagnosis:** The vegetation falls into the leached, fixed dune category and fits comfortably in SD12, despite affinities with CG10 and U1. The vegetation is grassier than is typical for SD12a, but the presence of an abundant bryophyte layer and the absence of SD12b preferentials means that the vegetation is referred to SD12a. (Tablefit: GC10 67%; SD12b 67%; U1d 66%; GC10b 59%; SD12 57%)
- **Damage:** There is an obvious track, presumably used by farm vehicles, and this was excluded from the species list.
- **Disturbance:** There is little evidence of disturbance beyond the track listed above and that caused by grazing.
- **Grazing:** The plot is grazed by both livestock and rabbits.
- **Invasive Species:** No non-native species are present.

-	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Bare ground	0	0	-	-	-
Bryophytes	30	30	-	-	-
Lichens	0	0	-	-	-
Litter	10	20	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Festuca ovina	40	35	Y	Y	A
Hylocomium splendens	20	25	Y	Y	F
Agrostis capillaris	25	20	Y	Y	F
Carex nigra	10	10	Y	Y	F
Galium verum	1	5	Y	Y	F
Lotus corniculatus	1	3	Y	Y	F
Dicranum scoparium	10	2	Y	Y	F
Rhytidiadelphus triquetrus	1	2	Y	Y	F
Thymus polytrichus	0.1	0.1	Y	Y	F
Carex arenaria	5	1	Y	Y	O
Festuca rubra	0.1	1	Y	Y	O
Anthoxanthum odoratum	-	1	Y	Y	O
Viola riviniana	1	0.1	Y	Y	O
Pseudoscleropodium purum	-	0.1	Y	Y	O
Holcus lanatus	-	-	Y	Y	O
Ammophila arenaria	-	-	Y	Y	O
Luzula campestris	-	-	-	-	O
Crepis capillaris	-	-	-	Y	O
Cerastium fontanum	-	-	-	Y	O
Poa humilis	2	1	Y	Y	R
Viola tricolor	-	-	-	-	R
Trifolium repens	-	-	-	Y	R
Scorzoneroides autumnalis	-	-	-	-	R
Taraxacum agg.	-	-	-	Y	R
Veronica officinalis	-	-	-	Y	R
Pilosella officinarum	-	-	-	Y	R
Trifolium dubium	-	-	-	Y	R
Hypochaeris radicata	-	-	-	Y	R
Anacamptis pyramidalis	-	-	-	-	R
Veronica chamaedrys	-	-	-	-	R
Erodium cicutarium	-	-	-	-	R

Rabbit intervention area 2 (DI02)

Location Name: DI02: Morfa Dinlle Rabbit Intervention 2
Purpose: Rabbit Intervention
Date: 18/07/2019
Recorders: Steven Heathcote, Mairi Gillis, Dave Lamacraft
NVC: SD12b
OSGR: SH4364060577
Lat: 53.119379
Long: -4.3379081
Precision: 1.8
Markers: Yellow square in centre of nested quadrat
Description: Used base of dunes as limit for DAFOR on east side and stayed within 10m tape lines on other sides.

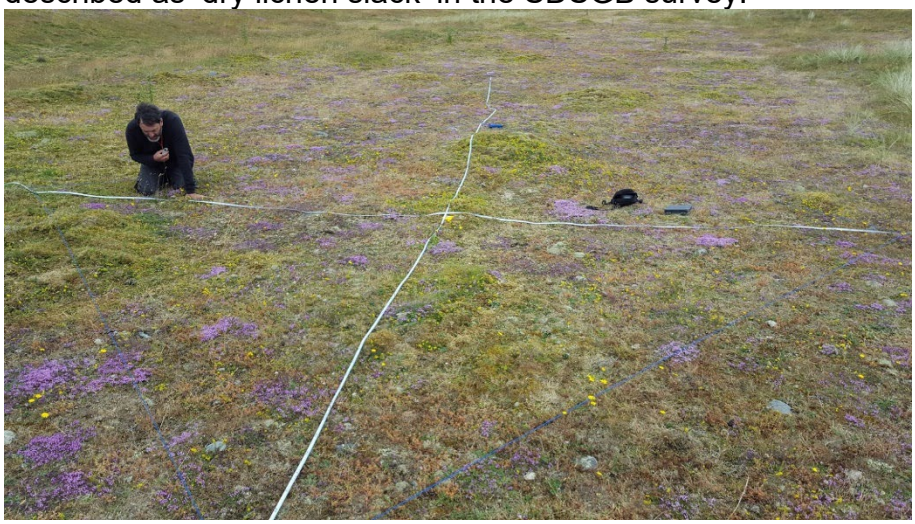
Notes:

- **NVC Diagnosis:** The sample is referred to SD12b, although in a wider context the vegetation forms a mosaic referable to both SD12a and SD12b in patches. SD12b is preferred here as *Anthoxanthum* and *Luzula* are not constant and the sward is grassy and slightly more mesotrophic than other areas within the stand. (Tablefit: SD12b 60%; CG10 59%; SD12 54%; CG10b 51%; U1 50%).
- **Damage:** No signs of damage present.
- **Disturbance:** No disturbance.
- **Grazing:** Grazed by livestock and rabbits at moderate intensive. No bare areas due to grazing.
- **Invasive Species:** None present.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	60	70	-	-	-
Lichens	6	2	-	-	-
Litter	1	3	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Hypnum cupressiforme var. lacunosum	50	30	Y	Y	A
Hylocomium splendens	5	30	Y	Y	A
Rhytidiadelphus squarrosus	5	2	Y	Y	A
Festuca rubra	1	1	Y	Y	A
Agrostis capillaris	10	10	Y	Y	F
Carex arenaria	4	5	Y	Y	F
Galium verum	5	5	Y	Y	F
Pseudoscleropodium purum	0.1	5	Y	Y	F
Thymus polytrichus	5	3	Y	Y	F
Festuca ovina	15	30	Y	Y	O
Schedonorus arundicaceus	1	3	Y	Y	O
Rhytidiadelphus triquetrus	0.1	3	Y	Y	O
Cerastium fontanum	3	2	Y	Y	O
Cladonia rangiformis	5	2	Y	Y	O
Viola tricolor	2	1	Y	Y	O
Trifolium repens	1	1	Y	Y	O
Pilosella officinarum	0.1	1	Y	Y	O
Cladonia ciliata	1	0.1	Y	Y	O
Holcus lanatus	-	-	-	Y	O
Anthoxanthum odoratum	-	-	-	-	O
Dicranum scoparium	-	-	Y	Y	O
Taraxacum agg.	1	1	Y	Y	R
Aira praecox	0.1	0.1	Y	Y	R
Scorzoneroides autumnalis	0.1	0.1	Y	Y	R
Trifolium dubium	-	0.1	Y	Y	R
Polytrichum piliferum	0.1	0.1	Y	Y	R
Peltigera rufescens	0.1	0.1	Y	Y	R
Ammophila arenaria	-	-	-	-	R
Ophioglossum vulgatum	-	-	Y	Y	R
Linum catharticum	-	-	Y	Y	R
Cirsium vulgare	-	-	-	Y	R
Erodium cicutarium	-	-	-	Y	R
Ononis repens	-	-	-	Y	R
Crepis capillaris	-	-	-	-	R
Peltigera canina	-	-	Y	Y	R
Peltigera membranacea	-	-	-	Y	R

Rabbit supplementation control (DI03)

Location Name: DI03: Morfa Dinlle Rabbit Control
Purpose: Rabbit Control
Date: 18/07/2019
Recorders: Steven Heathcote, Mairi Gillis, Dave Lamacraft
NVC: SD8 lichen var.
OSGR: SH4379760686
Lat: 53.120404
Long: -4.3356174
Precision: 1.2
Markers: Yellow square in centre of nested quadrat
Description: Rabbits and other animals grazing area. Limits of polygon taken where *Ammophila arenaria* became more abundant. Appears to be part of the area described as 'dry lichen slack' in the SDSGB survey.



Notes:

- **NVC Diagnosis:** The vegetation is referred to SD8, and clearly has strong affinities with this NVC community, and the very open lichen-rich sward clearly matches most closely to the more acidic sub-community SD8b, but also differs sufficiently that the vegetation cannott be easily referred to this community. The vegetation is therefore assigned to an undescribed version of SD8 (SD8 lichen var.). (Tablefit: CG7 27; SD8b 26; SD7b 24; CG11a 23; CG10a 23).
- **Damage:** No signs of damage
- **Disturbance:** Small patches of disturbance due to rabbits which create niches for bryophytes and lichens.
- **Grazing:** Appears to be intensively grazed, particularly by rabbits, but also by livestock. There is a short, tight sward which in part relates to grazing, but probably also the free-draining substrate.
- **Invasive Species:** None present.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	1	-	-	-
Bryophytes	80	60	-	-	-
Lichens	3	10	-	-	-
Litter	1	1	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Cladonia ciliata var. tenuis	-	1	Y	Y	F
Cladonia rangiformis	1	5	Y	Y	F
Euphrasia sp.	1	1	Y	Y	F
Festuca rubra	0.1	0.1	Y	Y	F
Galium verum	5	5	Y	Y	F
Hylocomium splendens	50	30	Y	Y	F
Pilosella officinarum	1	5	Y	Y	F
Agrostis capillaris	1	2	Y	Y	O
Aira caryophyllea	0.1	0.1	Y	Y	O
Lysimachia arvensis	-	3	Y	Y	O
Anthoxanthum odoratum	-	0.1	Y	Y	O
Arenaria serpyllifolia	-	-	-	Y	O
Campylopus introflexus	-	-	Y	Y	O
Carex arenaria	-	-	-	Y	O
Cephaloziella divaricata	-	0.1	Y	Y	O
Cladonia foliacea	0.1	0.1	Y	Y	O
Cladonia furcata	-	2	Y	Y	O
Climacium dendroides	-	1	Y	Y	O
Dicranum scoparium	-	1	Y	Y	O
Dung	-	3	Y	Y	O
Erodium cicutarium	-	-	Y	Y	O
Festuca ovina	-	-	-	Y	O
Frullania tamarisci	0.1	0.1	Y	Y	O
Hypnum cupressiforme var. lacunosum	-	10	Y	Y	O
Leontodon saxatilis	1	2	Y	Y	O
Linum catharticum	-	1	Y	Y	O
Lotus corniculatus	-	1	Y	Y	O
Ononis repens	1	3	Y	Y	O
Peltigera canina	1	1	Y	Y	O
Peltigera neckeri	-	-	Y	Y	O
Peltigera rufescens	1	0.1	Y	Y	O
Phleum pratense	-	2	Y	Y	O
Polytrichum juniperinum	-	1	Y	Y	O
Rhytidiadelphus squarrosus	5	1	Y	Y	O
Rhytidiadelphus triquetrus	35	15	Y	Y	O
Sagina procumbens	-	-	-	Y	O
Syntrichia ruralis ssp. ruraliformis	-	-	Y	Y	O
Thymus polytrichus	3	10	Y	Y	O
Trichostomum brachydontium	-	-	Y	Y	O
Trifolium dubium	-	-	-	Y	O
Trifolium repens	1	2	Y	Y	O
Aira praecox	-	0.1	Y	Y	R
Ammophila arenaria	-	-	-	-	R
Barbilophozia floerkei	-	0.1	Y	Y	R
Bryum algovicum var. rutheanum	-	0.1	Y	Y	R
Centaurium erythraea	-	-	-	Y	R
Cerastium fontanum	-	2	Y	Y	R

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Certaria aculeata	-	-	Y	Y	R
Cirsium vulgare	-	5	Y	Y	R
Cladonia diversa	-	-	-	Y	R
Cladonia portentosa	-	-	-	Y	R
Cladonia squamosa var. *subsquamosa*	-	-	Y	Y	R
Cladonia subulata	-	-	Y	Y	R
Logfia minima	-	-	-	Y	R
Fissidens adianthoides	-	0.1	Y	Y	R
Homalothecium lutescens	-	1	Y	Y	R
Hypochaeris radicata	-	-	-	Y	R
Hypogymnea fisolees	-	-	-	-	R
Plagiomnium rostratum	-	0.1	Y	Y	R
Plantago coronopus	-	-	-	Y	R
Polygala vulgaris	-	0.1	Y	Y	R
Polytrichum piliferum	-	0.1	Y	Y	R
Scorzoneroides autumnalis	-	-	-	-	R
Sonchus oleraceus	-	-	-	-	R
Taraxacum agg.	-	0.1	Y	Y	R
Trifolium campestre	-	-	Y	Y	R

Figure 8.1. Morfa Dinlle – overview.
Figure 8.2. Morfa Dinlle – plot detail.

Appendix: Morfa Harlech
Slack intervention (HA01)

Location Name: HA01: Harlech Slack intervention
Purpose: Slack intervention
Date: 13/06/2019
Recorders: Steven Heathcote, Mairi Gillis, Cat Jones
NVC: W25
OSGR: SH5747031132
Precision: 2
Markers: No
Descriptions: Mature slack with brambly bracken and large grey willows. New, small scrape on south side excluded.

Notes

- **NVC Diagnosis:** The vegetation is referable to W25 scrub, there are no clear preferentials for any sub-community. (Tablefit: W25 48%; W10 48%; W10c 47%; W10a 46%; W25b 43%).
- **Damage:** No damage.
- **Disturbance:** No signs of disturbance.
- **Grazing:** Ungrazed.
- **Invasive Species:** No non-native species present.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	2	2	-	-	-
Bryophytes	5	5	-	-	-
Lichens	0	0	-	-	-
Litter	1	1	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Pteridium aquilinum	25	20	Y	Y	A
Rubus fruticosus agg.	30	50	Y	Y	A
Arrhenatherum elatius	3	3	Y	Y	F
Salix cinerea	-	-	-	Y	F
Urtica dioica	-	-	-	Y	F
Achillea millefolium	-	1	Y	Y	O
Amblystegium serpens	2	1	Y	Y	O
Calystegia sepium	-	-	Y	Y	O
Dactylis glomerata	-	-	-	Y	O
Equisetum arvense	-	3	Y	Y	O
Festuca rubra	-	-	-	Y	O
Hedera helix	20	20	Y	Y	O
Kindbergia praelonga	2	4	Y	Y	O
Lonicera periclymenum	-	1	Y	Y	O
Poa trivialis	-	-	-	Y	O
Rosa spinosissima	5	20	Y	Y	O
Salix repens	-	-	-	Y	O
Silene dioica	10	10	Y	Y	O
Veronica chamaedrys	-	-	Y	Y	O
Chamerion angustifolium	-	-	-	-	R
Dryopteris filix-mas	-	-	-	-	R
Juncus effusus	-	-	-	-	R
Lathyrus pratensis	-	-	-	-	R
Lotus pedunculatus	-	-	-	-	R
Ulex europaeus	-	-	-	-	R

Slack control (HA02)

Location Name: HA02: Harlech Slack Control
Purpose: Slack control
Date: 13/06/2019
Recorders: Steven Heathcote, Mairi Gillis, Cat Jones
NVC: W1
OSGR: SH5737631075
Precision: 1.8
Markers: Yellow square
Descriptions: Mature slack with grey willow scrub over tall, leggy creeping willow and remnant SD16 species

Notes

- **NVC Diagnosis:** The parcel as a whole comprises open W1 woodland. However, the quadrats are situtated in an area without over-canopy and the vegetation has affinities to SD15. (Tablefit: SD15a 49%; SD15 45%; SD15b 42%; SD15d 41%; SD16b 35%).
- **Damage:** There is no evidence of damage.
- **Disturbance:** There is no evidence of disturbance.
- **Grazing:** There is no evidence of grazing, except perhaps occasionally by rabbits
- **Invasive Species:** There is a conifer on the slack margin, but not within the slack.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	80	80	-	-	-
Lichens	0	0	-	-	-
Litter	3	3	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Pseudoscleropodium purum	70	75	Y	Y	A
Rosa spinosissima	5	10	Y	Y	F
Rubus caesius	20	20	Y	Y	F
Salix cinerea	2	0.1	Y	Y	F
Salix repens	15	25	Y	Y	F
Arrhenatherum elatius	-	-	-	Y	O
Calliergonella cuspidata	10	5	Y	Y	O
Carex arenaria	-	-	-	Y	O
Galium palustre	-	0.1	Y	Y	O
Holcus lanatus	-	-	-	Y	O
Hydrocotyle vulgaris	-	2	Y	Y	O
Juncus acutus	-	-	-	Y	O
Juncus effusus	2	5	Y	Y	O
Lotus corniculatus	-	-	-	Y	O
Prunella vulgaris	-	-	-	Y	O
Ranunculus repens	-	-	-	Y	O
Rhytidiadelphus squarrosus	5	2	Y	Y	O
Crataegus monogyna	-	-	-	Y	R
Rhytidiadelphus triquetrus	-	-	Y	Y	R

Figure 0.1. Morfa Harlech – overview.
Figure 0.2. Morfa Harlech – plot detail.

Appendix: Pembrey Burrows
Slack intervention area 1 (PC01)

Location Name: PC01: Pembrey Burrows Dune slack intervention Area 1
Purpose: Slack intervention
Date: 18/06/2019
Recorders: Kieran Sheehan, Mairi Gillis, Barry Stewart
NVC: Not assigned
OSGR: SS4134199355
Precision: 0.5m
Markers: Unmarked
Descriptions: Old tarmac car park overtaken by plant species.

Notes

- **NVC Diagnosis:** Not referable to any NVC community. There are elements of SD8c in the colonising vegetation, through the abundant pleurocarpous mosses with constant *Rubus caesius* and frequent *Festuca rubra*. The community constants *Lotus corniculatus, Galium verum, Plantago lanceolata* and *Trifolium repens* are all present at moderate frequency if not constant. *Sedum acre* and *Anthyllis vulneraria* are preferential for SD8c and both are also present if not constant. So the vegetation is loosely referable to a form of SD8c, but is still some way from fitting comfortably with this.
- **Damage:** No damage evident.
- **Disturbance:** No disturbance. Car park has been left undisturbed and, therefore, has promoted colonisation by higher plant and moss species.
- **Grazing:** No grazing evident.
- **Invasive Species:** *Rubus caesius* and *Pastinaca sativa* colonising areas of the car park. No non-natives present.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	95	80	-	-	-
Bryophytes	5	20	-	-	-
Lichens	0.1	0.1	-	-	-
Litter	0	0	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Collema fuscovirens	0.1	0.1	Y	Y	R
Homalothecium lutescens	1	15	Y	Y	A
Orthotrichum cupulatum	3	3	Y	Y	O
Syntrichia ruraliformis	1	5	Y	Y	O
Sedum acre	1	10	Y	Y	F
Rubus caesius	-	5	Y	Y	A
Plantago lanceolata	-	2	Y	Y	O
Hypochaeris radicata	-	3	Y	Y	F
Pastinaca sativa	-	2	Y	Y	A
Pilosella officinarum	-	2	Y	Y	O
Trifolium pratense	-	-	Y	Y	R
Trifolium repens	-	-	Y	Y	O
Oenothera glazioviana	-	-	Y	Y	F
Vicia sativa ssp. nigra	-	-	Y	Y	O
Taraxacum agg.	-	-	Y	Y	R
Jacobaea vulgaris	-	-	Y	Y	O
Linum catharticum	-	-	Y	Y	F
Arenaria serpyllifolia	-	-	Y	Y	R
Lotus corniculatus	-	-	-	Y	O
Anthyllis vulneraria	-	-	-	Y	O
Sonchus asper	-	-	-	Y	O
Erodium cicutarium	-	-	-	Y	R
Ranunculus repens	-	-	-	Y	R
Medicago lupulina	-	-	-	Y	R
Crepis vesicaria	-	-	-	Y	O
Holcus lanatus	-	-	-	Y	O
Sonchus arvensis	-	-	-	Y	O
Vicia cracca	-	-	-	Y	R
Trifolium campestre	-	-	-	Y	O
Geranium dissectum	-	-	-	Y	R
Geranium molle	-	-	-	Y	F
Festuca rubra	-	-	-	Y	F
Dactylis glomerata	-	-	-	Y	O
Rosa spinosissima	-	-	-	Y	O
Galium aparine	-	-	-	Y	O
Veronica polita	-	-	-	Y	R
Pseudoscleropodium purum	-	-	-	Y	R
Myosotis arvensis	-	-	-	Y	O
Arrhenatherum elatius	-	-	-	Y	F
Brassica napus	-	-	-	Y	O
Hirschfeldia incana	-	-	-	Y	A
Hypericum perforatum	-	-	-	Y	O
Cerastium fontanum	-	-	-	Y	O
Epilobium montanum	-	-	-	-	R
Daucus carota	-	-	-	-	R
Crepis capillaris	-	-	-	-	O
Galium verum	-	-	-	-	O
Carex arenaria	-	-	-	-	R
Elymus repens	-	-	-	-	R

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Carex flacca	-	-	-	-	R
Tragopogon pratensis	-	-	-	-	O
Salix cinerea	-	-	-	-	R
Ranunculus acris	-	-	-	-	R
Cynoglossum officinale	-	-	-	-	R
Anthoxanthum odoratum	-	-	-	-	R
Poa humilis	-	-	-	-	R
Sonchus oleraceus	-	-	-	-	O
Rumex crispus	-	-	-	-	O
Ononis repens	-	-	-	-	O
Chamerion angustifolium	-	-	-	-	O
Ervilla hirsuta	-	-	-	-	R
Leontodon saxatilis	-	-	-	-	R
Cirsium arvense	-	-	-	-	R
Rubus fruticosus agg.	-	-	-	-	O
Leontodon hispidus	-	-	-	-	O
Clematis vitalba	-	-	-	-	R
Hippophae rhamnoides	-	-	-	-	O
Hieracium sp.	-	-	-	-	R
Carlina vulgaris	-	-	-	-	R
Euphrasia sp.	-	-	-	-	O
Veronica arvensis	-	-	-	-	O
Geranium robertianum	-	-	-	-	O
Geranium columbinum	-	-	-	-	F
Saxifraga tridactylites	-	-	-	-	R
Urtica dioica	-	-	-	-	R
Epilobium parviflorum	-	-	-	-	R
Elymus athericus	-	-	-	-	R
Ranunculus bulbosus	-	-	-	-	R
Torilis japonica	-	-	-	-	R
Eupatorium cannabinum	-	-	-	-	R
Salix sp.	-	-	-	-	O
Ammophila arenaria	-	-	-	-	R
Saponaria officinalis	-	-	-	-	R
Solanum dulcamara	-	-	-	-	R
Achillea millefolium	-	-	-	-	R
Sagina procumbens	-	-	-	-	R
Poa annua	-	-	-	-	R
Heracleum sphondylium	-	-	-	-	R
Brachypodium sylvaticum	-	-	-	-	R
Anacamptis pyramidalis	-	-	-	-	R
Elymus junceiformis	-	-	-	-	O
Raphanus raphanistrum	-	-	-	-	R
Anthriscus sylvestris	-	-	-	-	R
Agrostis stolonifera	-	-	-	-	R
Plantago coronopus	-	-	-	-	R
Cirsium vulgare	-	-	-	-	R
Ornithopus perpusillus	-	-	-	-	R
Schistidium crassipilum	-	-	-	-	O
Anisantha sterilis	-	-	-	-	O
Arabis hirsuta	-	-	-	-	R

Slack intervention area 2 (PC02)

Location Name: PC02: Pembrey Burrows Dune Slack Intervention Area 2
Purpose: Slack intervention
Date: 18/06/2019
Recorders: Kieran Sheehan, Mairi Gillis, Barry Stewart
NVC: SD8c
OSGR: SS4235699217
Precision: 0.8m
Markers: Unmarked
Descriptions: Grazed dry dune slack community with abundant *Festuca rubra* and frequent/occasional *Lotus corniculatus*, *Hypochaeris radicata*, *Carex arenaria* and *Ononis repens*.
Notes

- **NVC Diagnosis:** Dry dune slack with *Festuca rubra* dominant and occasional *Avenula pubescens.* The sward has affinities with calcareous grass, fixed dune grassland referable to SD8, and very dry dune slacks (SD16b) and the invasion of *Hippophae* is driving the vegetation towards SD18a. In truth the vegetation is likely a form of SD8c, derived from SD16 through drying. The subsequent change, to dune scrub is not complete and the coarser species intolerant of grazing that typify SD18a have not been able to colonise, so the vegetation is maintained as SD8c despite the presence of *Hippophae* (Tablefit: CG6 52%; CG6b 40%; SD18a 37%; SD7 30%; SM16d 29%).
- **Damage:** No evident damage.
- **Disturbance:** No disturbance.
- **Grazing:** Cattle grazing.
- **Invasive Species:** Small amounts of *Hippophae rhamnoides* and frequent *Rubus caesius* are potential native species invading. Both are being controlled to some extent by grazing.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	60	75	-	-	-
Lichens	0	0.1	-	-	-
Litter	0	0	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Festuca rubra	95	80	Y	Y	A
Anthyllis vulneraria	3	5	Y	Y	F
Rubus caesius	30	20	Y	Y	F
Hypochaeris radicata	1	3	Y	Y	F
Hippophae rhamnoides	0.1	8	Y	Y	F
Pseudoscleropodium purum	60	70	Y	Y	A
Bryum capillare	2	1	Y	Y	R
Taraxacum agg.	2	3	Y	Y	O
Pilosella officinarum	1	0.1	Y	Y	O
Leontodon saxatilis	1	1	Y	Y	O
Trifolium repens	2	1	Y	Y	O
Hieracium sabaudum agg.	1	1	Y	Y	R
Avenula pubescens	1	1	Y	Y	O
Arenaria serpyllifolia	1	3	Y	Y	F
Holcus lanatus	1	1	Y	Y	O
Trifolium campestre	-	1	Y	Y	O
Jacobaea vulgaris	-	1	Y	Y	F
Hypnum cupressiforme var. lacunosum	-	3	Y	Y	F
Homalothecium lutescens	-	5	Y	Y	F
Syntrichia ruralis ssp. *ruraliformis*	-	0.1	Y	Y	O
Barbula unguiculata	-	0.1	Y	Y	R
Barbula convoluta	-	0.1	Y	Y	R
Brachythecium albicans	-	0.1	Y	Y	R
Lotus corniculatus	-	2	Y	Y	F
Cladonia foliacea	-	1	Y	Y	R
Polygala vulgaris	-	1	Y	Y	O
Ranunculus bulbosus	-	1	Y	Y	O
Carex arenaria	-	1	Y	Y	O
Viola tricolor ssp. curtisii	-	-	Y	Y	O
Ononis repens	-	-	Y	Y	O
Ammophila arenaria	-	-	Y	Y	F
Crepis capillaris	-	-	Y	Y	R
Veronica arvensis	-	-	Y	Y	O
Peltigera rufescens	-	-	Y	Y	R
Kindbergia praelonga	-	-	Y	Y	O
Cerastium fontanum	-	-	Y	Y	F
Oenothera sp.	-	-	-	Y	O
Anacamptis pyramidalis	-	-	-	Y	O
Galium verum	-	-	-	Y	O
Bryum algovicum	-	-	-	Y	O
Plagiomnium affine	-	-	-	Y	R
Sonchus asper	-	-	-	Y	O
Bromus hordeaceus	-	-	-	Y	O
Geranium dissectum	-	-	-	-	R
Geranium molle	-	-	-	-	R
Plantago lanceolata	-	-	-	-	R
Pastinaca sativa ssp. sylvestris	-	-	-	-	R
Salix cinerea	-	-	-	-	O
Trifolium dubium	-	-	-	-	R

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Cirsium vulgare	-	-	-	-	R
Euphrasia sp.	-	-	-	-	O
Geranium columbinum	-	-	-	-	R
Carlina vulgaris	-	-	-	-	R
Plantago major	-	-	-	-	R
Ranunculus repens	-	-	-	-	R
Trifolium arvense	-	-	-	-	R
Tragopogon pratensis	-	-	-	-	R
Solanum dulcamara	-	-	-	-	R
Poa trivialis	-	-	-	-	R
Cirsium arvense	-	-	-	-	R
Salix repens	-	-	-	-	R
Linum catharticum	-	-	-	-	F
Agrostis stolonifera	-	-	-	-	F

Slack control (PC03)

Location Name: PC03: Pembrey Burrows Dune Slack Control
Purpose: Slack control
Date: 18/06/2019
Recorders: Kieran Sheehan, Mairi Gillis, Barry Stewart
NVC: SD16a
OSGR: SS4222999183
Precision: 0.5m
Markers: Yellow square
Descriptions: Grazed dry mature dune slack in depression with abundant *Hypnum cupressiforme* var. *lacunosum* and frequent *Ononis repens, Lotus corniculatus, Carex arenaria and Hypochaeris radicata.*

Notes

- **NVC Diagnosis:** Very mossy dune slack lacking *Salix sp.. Rubus caesius* and *Lotus corniculatus* occurring most frequently with fewer grasses. Slack loosely refers to SD16a without *Salix sp.* (Tablefit: SD16a 31%; SD19 29%; SD7d 26%; CG1f 24%; SD16 22%).
- **Damage:** No damage.
- **Disturbance:** No disturbance.
- **Grazing:** Known cattle grazing.
- **Invasive Species:** *Rubus caesius* starting to encroach on slack.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0			
Bryophytes	90	90			
Lichens	0	0			
Litter	0	0			
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Rubus caesius	10	8	Y	Y	F
Lotus corniculatus	15	15	Y	Y	F
Avenula pubescens	1	0.1	Y	Y	O
Pilosella officinarum	1	2	Y	Y	F
Hypochaeris radicata	5	8	Y	Y	F
Hypnum cupressiforme var. lacunosum	90	90	Y	Y	A
Viola tricolor ssp. curtisii	2	2	Y	Y	F
Festuca rubra	3	3	Y	Y	F
Ranunculus bulbosus	2	2	Y	Y	O
Bromus hordeaceus	3	2	Y	Y	O
Crepis capillaris	1	1	Y	Y	R
Polygala vulgaris	1	0.1	Y	Y	O
Carex arenaria	3	2	Y	Y	O
Anthyllis vulneraria	1	2	Y	Y	O
Arenaria serpyllifolia	1	1	Y	Y	O
Catapodium rigidum	1	1	Y	Y	R
Taraxacum agg.	-	1	Y	Y	R
Ammophila arenaria	-	3	Y	Y	F
Anacamptis pyramidalis	-	-	Y	Y	R
Euphrasia sp.	-	-	Y	Y	O
Veronica arvensis	-	-	Y	Y	O
Holcus lanatus	-	-	Y	Y	F
Fissidens dubius	-	-	Y	Y	R
Ononis repens	-	-	Y	Y	F
Jacobaea vulgaris	-	-	-	Y	O
Galium verum	-	-	-	Y	O
Homalothecium lutescens	-	-	-	Y	F
Sedum acre	-	-	-	Y	O
Trifolium campestre	-	-	-	Y	O
Pseudoscleropodium purum	-	-	-	Y	O
Erigeron acer	-	-	-	-	R
Centaurium erythraea	-	-	-	-	R
Cladonia pocillum	-	-	-	-	O
Sonchus oleraceus	-	-	-	-	R
Bryum algovicum	-	-	-	-	R
Tortella flavovirens	-	-	-	-	R
Barbula convoluta var. convoluta	-	-	-	-	O
Brachythecium albicans	-	-	-	-	O
Oenothera sp.	-	-	-	-	R
Hippophae rhamnoides	-	-	-	-	O
Peltigera rufescens	-	-	-	-	O
Cladonia furcata	-	-	-	-	R
Vicia sativa ssp. nigra	-	-	-	-	O
Geranium molle	-	-	-	-	R
Cerastium semidecandrum	-	-	-	-	O
Syntrichia ruraliformis	-	-	-	-	O
Leontodon saxatilis	-	-	-	-	O
Barbula unguiculata	-	-	-	-	R
Phleum arenarium	-	-	-	-	O

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Vulpia fasciculata	-	-	-	-	O
Honckenya peploides	-	-	-	-	R
Trifolium pratense	-	-	-	-	R
Valerianella locusta	-	-	-	-	R
Cladonia rangiformis	-	-	-	-	R
Plantago lanceolata	-	-	-	-	O

Rabbit intervention area 1 (PC04)

Location Name: PC04: Pembrey Burrows Rabbit Intervention Area 1
Purpose: Rabbit intervention
Date: 21/06/2019
Recorders: Kieran Sheehan, Mairi Gillis, Catherine Porter
NVC: SD8d
OSGR: SS4243499363
Precision: 1.8m
Markers: Unmarked
Descriptions: Grazed fixed dune vegetation community with abundant *Festuca rubra* and constant species including *Anthyllis vulneraria, Ononis repens, Hypochaeris radicata* and *Ammophila arenaria*. No *Tortula ruraliformis* present.

Notes

- **NVC Diagnosis:** Grasses were dominated by *Festuca rubra* with *Ammophila arenaria* present and lacking *Poa pratensis,* which may point towards it being SD8c. However there is clearly a higher water table which allows slack species such as *Equisetum variegatum* and a range of more mesophytic herbs to persist making the vegetation more referable to SD8d. (Tablefit: SD8 67%; SD8d 65%; SD8a 62%; MC9c 60%; SD8e 54%).
- **Damage:** Quadrat partially damaged by inquisitive cattle. Areas of rabbit digging and cattle poaching.
- **Disturbance:** Disturbance by grazing and rabbit digging.
- **Grazing:** Area is grazed by cattle.
- **Invasive Species:** No invasive species present.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	50	30	-	-	-
Lichens	0	0	-	-	-
Litter	15	20	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Avenula pubescens	3	3	Y	Y	O
Plantago lanceolata	25	30	Y	Y	R
Trifolium repens	10	10	Y	Y	O
Ononis repens	70	75	Y	Y	F
Rubus caesius	5	10	Y	Y	F
Linum catharticum	2	20	Y	Y	R
Galium verum	2	5	Y	Y	O
Jacobaea vulgaris	0.1	0.1	Y	Y	F
Trifolium campestre	2	1	Y	Y	O
Leontodon autumnalis	1	1	Y	Y	R
Polygala vulgaris	0.1	3	Y	Y	R
Lotus corniculatus	10	10	Y	Y	F
Ranunculus acris	0.1	0.1	Y	Y	R
Festuca rubra	80	80	Y	Y	A
Holcus lanatus	2	5	Y	Y	F
Hypochaeris radicata	3	5	Y	Y	F
Pilosella officinarum	1	5	Y	Y	R
Carex arenaria	1	1	Y	Y	R
Hypnum cupressiforme var. lacunosum	30	30	Y	Y	O
Pseudoscleropodium purum	20	5	Y	Y	O
Viola tricolor ssp. curtisii	1	2	Y	Y	O
Syntrichia ruraliformis	0.1	0.1	Y	Y	O
Anthyllis vulneraria	-	3	Y	Y	F
Equisetum variegatum	-	1	Y	Y	R
Homalothecium lutescens	-	1	Y	Y	O
Trifolium pratense	-	0.1	Y	Y	R
Lolium perenne	-	0.1	Y	Y	R
Arenaria serpyllifolia	-	-	Y	Y	F
Botrychium lunaria	-	-	Y	Y	R
Euphrasia sp.	-	-	Y	Y	R
Thymus polytrichus	-	-	-	Y	O
Viola canina	-	-	-	Y	R
Cerastium fontanum	-	-	-	Y	R
Sedum acre	-	-	-	Y	O
Poa humilis	-	-	-	Y	O
Cladonia furcata ssp. *subrangiformis*	-	-	-	Y	R
Peltigera canina	-	-	-	Y	R
Oenothera sp.	-	-	-	Y	F
Centaurium erythraea	-	-	-	Y	R
Taraxacum agg.	-	-	-	-	O
Hypnum cupressiforme var. lacunosum	-	-	-	-	F
Ammophila arenaria	-	-	-	-	F
Trifolium dubium	-	-	-	-	R
Leontodon saxatilis	-	-	-	-	O
Catapodium rigidum	-	-	-	-	R
Geranium molle	-	-	-	-	O
Vulpia fasciculata	-	-	-	-	O

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Phleum arenarium	-	-	-	-	R
Sonchus asper	-	-	-	-	R
Cerastium diffusum	-	-	-	-	O
Brachythecium albicans	-	-	-	-	R
Crepis capillaris	-	-	-	-	R
Hirschfeldia incana	-	-	-	-	R
Hippophae rhamnoides	-	-	-	-	R
Cirsium vulgare	-	-	-	-	R
Bromus hordeaceus	-	-	-	-	F
Anacamptis pyramidalis	-	-	-	-	R
Tragopogon pratensis	-	-	-	-	R
Vicia sativa	-	-	-	-	R
Rosa spinosissima	-	-	-	-	R
Sisymbrium officinale	-	-	-	-	R
Galium aparine	-	-	-	-	R
Veronica arvensis	-	-	-	-	R
Cerastium semidecandrum	-	-	-	-	O
Leontodon hispidus	-	-	-	-	R
Ranunculus bulbosus	-	-	-	-	R
Thuidium tamariscinum	-	-	-	-	R
Carlina vulgaris	-	-	-	-	R

Rabbit intervention area 5 (PC05)

Location Name: PC05: Pembrey Burrows Rabbit Intervention Area 5
Purpose: Rabbit intervention
Date: 18/06/2019
Recorders: Kieran Sheehan, Mairi Gillis
NVC: SD7c
OSGR: SS4161499353
Precision: 0.9m
Markers: Unmarked
Descriptions: Grazed SD7 community with abundant *Ononis repens* and *Festuca rubra*.

Notes

- **NVC Diagnosis:** Vegetation is referable to SD7c. *Festuca rubra* and *Ononis repens* dominate the sward with frequent *Ammophila arenaria* and *Hypochaeris radicata.* The high level of *O. repens* means that it has a stronger affinity towards SD7c as opposed to SD7d (Tablefit: SD7d 38%; SD7c 34%; MC9 32%; MC11b 31%; SD7 30%).
- **Damage:** No damage.
- **Disturbance:** Small amount of rabbit digging within area.
- **Grazing:** Rabbit grazing present in some areas.
- **Invasive Species:** No invasive species present.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	95	90	-	-	-
Lichens	0	0	-	-	-
Litter	0.1	0.1	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Orobanche minor	0.1	0.1	Y	Y	R
Ononis repens	50	50	Y	Y	A
Holcus lanatus	0.1	0.1	Y	Y	O
Rubus caesius	15	5	Y	Y	A
Plantago lanceolata	75	65	Y	Y	A
Erodium cicutarium	5	5	Y	Y	O
Hypochaeris radicata	5	20	Y	Y	F
Vicia sativa ssp. nigra	3	3	Y	Y	R
Arenaria serpyllifolia	20	30	Y	Y	F
Festuca rubra	30	25	Y	Y	A
Polygala vulgaris	2	2	Y	Y	O
Homalothecium lutescens	95	90	Y	Y	A
Taraxacum agg.	2	0.1	Y	Y	F
Bromus mollis	0.1	4	Y	Y	F
Leontodon autumnalis	2	2	Y	Y	F
Veronica polita	0.1	0.1	Y	Y	R
Pastinaca sativa	1	4	Y	Y	O
Sonchus asper	0.1	0.1	Y	Y	R
Cerastium fontanum	0.1	0.1	Y	Y	O
Ranunculus acris	0.1	0.1	Y	Y	R
Anthyllis vulneraria	-	2	Y	Y	F
Galium verum	-	2	Y	Y	F
Alopecurus pratensis	-	0.1	Y	Y	O
Ranunculus repens	-	0.1	Y	Y	R
Sedum acre	-	-	Y	Y	O
Ammophila arenaria	-	-	Y	Y	F
Jacobaea vulgaris	-	-	Y	Y	O
Rosa spinosissima	-	-	Y	Y	R
Geranium molle	-	-	Y	Y	R
Pseudoscleropodium purum	-	-	Y	Y	O
Syntrichia ruraliformis			Y	Y	F
Thymus pulegioides	-	-	-	Y	O
Pilosella officinarum	-	-	-	Y	R
Lotus corniculatus	-	-	-	Y	O
Cladonia pocillum	-	-	-	Y	R
Hippophae rhamnoides	-	-	-	Y	R
Viola tricolor	-	-	-	Y	R
Cladonia furcata	-	-	-	Y	R
Anacamptis pyramidalis	-	-	-	-	O
Aruncus dioicus	-	-	-	-	R
Vulpia fasciculata	-	-	-	-	R
Oenothera glazioviana	-	-	-	-	R
Raphanus raphanistrum	-	-	-	-	O
Reseda lutea	-	-	-	-	O
Trisetum flavescens	-	-	-	-	F
Cynoglossum officinale	-	-	-	-	R
Geranium dissectum	-	-	-	-	R
Helictotrichon pubescens	-	-	-	-	O

Rabbit control (PC06)

Location Name: PC06: Pembrey Burrows Rabbit Control
Purpose: Rabbit control
Date: 18/06/2019
Recorders: Kieran Sheehan, Mairi Gillis, Barry Stewart
NVC: SD7c
OSGR: SS4221999226
Precision: 0.9m
Markers: Yellow square
Descriptions: Grazed *Ammophila arenaria* and *Festuca rubra* community with frequent *Ononis repens.*

Notes

- **NVC Diagnosis:** Area is very grassy being dominated by abundant *Ammophila arenaria* and dominant *Festuca rubra* in the underlayer. *Hypochaeris radicata* and *Ononis repens* make up majority of the floral sward. Some *Lotus corniculatus* and *Galium verum* are present, however not enough to assign NVC to SD8. More species-rich than SD6e (Tablefit: SD7d 65%; SD7 57%; SD7c 57%; MC11b 48%; SD7a 41%).
- **Damage:** No damage.
- **Disturbance:** No disturbance.
- **Grazing:** No apparent grazing suggested by existing tall sward height.
- **Invasive Species:** No invasive species present. The non-native *Aruncus dioicus* is present but is not invasive.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	20	15	-	-	-
Lichens	0	0	-	-	-
Litter	0	0	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Festuca rubra	100	100	Y	Y	D
Ononis repens	25	25	Y	Y	F
Anthyllis vulneraria	5	5	Y	Y	F
Hypochaeris radicata	5	5	Y	Y	F
Vicia sativa ssp. nigra	3	2	Y	Y	O
Rosa spinosissima	1	0.1	Y	Y	O
Pilosella officinarum	3	10	Y	Y	F
Pseudoscleropodium purum	10	10	Y	Y	F
Brachythecium sp.	1	0.1	Y	Y	R
Hypnum cupressiforme var. lacunosum	10	10	Y	Y	A
Ammophila arenaria	3	5	Y	Y	A
Ervilla hirsuta	-	0.1	Y	Y	O
Polygala vulgaris	-	0.1	Y	Y	O
Hieracium sp.	-	-	Y	Y	O
Galium verum	-	-	Y	Y	O
Lotus corniculatus	-	-	Y	Y	F
Avenula pubescens	-	-	Y	Y	F
Carex arenaria	-	-	Y	Y	F
Euphrasia cf. tetraquetra	-	-	Y	Y	O
Linum catharticum	-	-	Y	Y	O
Luzula campestris	-	-	Y	Y	O
Ranunculus bulbosus	-	-	Y	Y	O
Taraxacum sect. Ruderalia	-	-	Y	Y	R
Holcus lanatus	-	-	Y	Y	F
Rubus caesius	-	-	-	Y	F
Linaria vulgaris	-	-	-	Y	O
Trifolium campestre	-	-	-	Y	O
Jacobaea vulgaris	-	-	-	Y	R
Plantago lanceolata	-	-	-	-	O
Aruncus dioicus	-	-	-	-	R
Oenothera sp.	-	-	-	-	R
Polypodium interjectum	-	-	-	-	O
Carlina vulgaris	-	-	-	-	R
Cirsium vulgare	-	-	-	-	R
Honckenya peploides	-	-	-	-	R
Viola tricolor ssp. curtisii	-	-	-	-	O
Arenaria serpyllifolia	-	-	-	-	O
Cerastium fontanum	-	-	-	-	O
Bryum capillare	-	-	-	-	R
Poa humilis	-	-	-	-	O
Anacamptis pyramidalis	-	-	-	-	R
Pastinaca sativa	-	-	-	-	R
Trifolium pratense	-	-	-	-	R
Leontodon saxatilis	-	-	-	-	R

Slack intervention 3 (PC07)

Location Name: PC07 Pembrey Coast: Dune Slack Intervention Area 3
Purpose: Slack intervention
Date: 11/08/2020
Recorders: SJH
NVC: SD8a
Precision: 0.185
Markers: No
Descriptions: An area of dry dune grassland adjacent to a scrape completed in the winter of 2019/2020.

Notes

- **NVC Diagnosis:** An area of dry dune grassland with a rank appearance. The constant presence of Arrhenatherum means the vegetation is on its way to SD9, but its low frequency means that SD8a is the preferred diagnosis. (Tablefit: SD8a 45%; SD8e 44%; SD8 44%; MC9 43%; SD8d 41%).
- **Damage:** Some evidence of vehicle tracking over the ground, presumably during the winter work to create the new scrape.
- **Disturbance:** Some evidence of vehicle tracking over the ground, presumably during winter work to create the new scrape.
- **Grazing:** Rabbit Grazing is present but not having a significant impact.
- **Invasive Species:** None

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	1	5	-	-	-
Bryophytes	0	0	-	-	-
Lichens	0	0	-	-	-
Litter	0	0	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Rubus caesius	20	15	Y	Y	-
Rosa spinosissima	0.1	1	Y	Y	F-LA
Holcus lanatus	335	25	Y	Y	F
Festuca rubra	2	10	Y	Y	A
Poa pratensis	5	5	Y	Y	F
Arrhenatherum elatius	3	5	Y	Y	F
Schedonorus arundicaceus	15	10	Y	Y	F
Carex arenaria	1	1	Y	Y	F
Plantago lanceolata	15	15	Y	Y	F
Galium verum	5	10	Y	Y	A
Viola riviniana	1	0.1	Y	Y	R
Ononis repens	0.1	3	Y	Y	F
Vicia sativa ssp. *nigra*	1	1	Y	Y	F
Lotus corniculatus	0.1	0.1	Y	Y	O
Daucus carota ssp. *carota*	1	0.1	Y	Y	O
Cirsium vulgare	-	-	Y	Y	R
Jacobaea vulgaris		3	Y	Y	F
Vicia sepium	1	0.1	Y	Y	O
Hypochaeris radicata	-	-	Y	Y	O
Ranunculus bulbosus	1	0.1	Y	Y	R
Polygala vulgaris		0.1	Y	Y	R
Trifolium repens	-	3	Y	Y	F
Oenothera sp.	-	1	Y	Y	O
Anthyllis vulneraria	-	1	Y	Y	O
Taraxacum sect. *Ruderalia*	-	1	Y	Y	O
Medicago lupulina	-	3	Y	Y	O
Bellis perennis	-	-	Y	Y	R
Centaurium erythraea	-	-	Y	Y	R
Euphrasia sp.	-	-	-	Y	R
Pastinaca sativa	-	-	-	Y	O
Agrimonia eupatoria	-	-	-	Y	R
Vicia hirsuta	-	-	-	Y	R
Linum catharticum	-	-	-	Y	O
Cerastium fontanum	-	-	-	Y	R
Tragopogon pratensis	-	-	-	-	R
Ammophila arenaria	-	-	-	-	R
Sonchus asper	-	-	-	-	R
Hieracium sp.	-	-	-	-	R
Sonchus oleraceus	-	-	-	-	R
Chenopodium album	-	-	-	-	R

Figure 0.1. Pembrey Burrows – overview.
Figure 0.2. Pembrey Burrows – plot detail (1).
Figure 0.3. Pembrey Burrows – plot detail (2).

Appendix: Whiteford Burrows
Rabbit intervention area 1 (WB01)

Location Name: WB01: Whiteford Burrows Rabbit Intervention Area 1
Purpose: Rabbit intervention
Date: 19/06/2019
Recorders: Kieran Sheehan, Mairi Gillis, Catherine Porter
NVC: SD15b
OSGR: SS4442494974
Precision: 1.5m
Markers: Unmarked
Descriptions: Dune slack vegetation with large stand of *Salix sp.* and saplings invading edges of slack vegetation.

Notes

- **NVC Diagnosis:** Dry dune slack referable to SD15. A high abundance of *Calliergonella cuspidata* with *Agrostis stolonifera*, *Carex arenaria* and *Galium palustre* frequent, places it in SD15b community (Tablefit: SD15 78%; SD15b 71%; SD17b 71; SD17 69%; SD15d 64%).
- **Damage:** No damage present.
- **Disturbance:** Minimal disturbance present from rabbit grazing.
- **Grazing:** Rabbit grazing evident from low-lying nibbled individuals.
- **Invasive Species:** No non-native invasive species present. *Salix* is invading and in the absence of grazing by large herbivores (or very intensive rabbit grazing) the slack is likely to scrub over.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	92	91	-	-	-
Lichens	0	0	-	-	-
Litter	0	0	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Salix repens	70	60	Y	Y	A
Hydrocotyle vulgaris	70	60	Y	Y	A
Rubus caesius	50	60	Y	Y	A
Potentilla anserina	25	15	Y	Y	A
Trifolium repens	2	25	Y	Y	F
Filipendula ulmaria	0.1	1	Y	Y	A
Holcus lanatus	20	20	Y	Y	A
Carex flacca	25	20	Y	Y	F
Agrostis stolonifera	50	40	Y	Y	F
Deschampsia cespitosa	1	0.1	Y	Y	R
Lolium perenne	1	1	Y	Y	R
Carex arenaria	5	3	Y	Y	O
Poa trivialis	0.1	0.1	Y	Y	A
Equisetum incarna	1	2	Y	Y	F
Helictotrichon pubescens	0.1	0.1	Y	Y	O
Calliergonella cuspidata	90	90	Y	Y	D
Brachythecium albicans	2	1	Y	Y	O
Prunus spinosa	-	5	Y	Y	A
Lotus corniculatus	-	1	Y	Y	O
Galium palustre	-	0.1	Y	Y	F
Ranunculus bulbosus	-	0.1	Y	Y	O
Anthoxanthum odoratum	-	-	Y	Y	F
Mentha aquatica	-	-	Y	Y	O
Pulicaria dysenterica	-	-	Y	Y	F
Festuca rubra	-	-	Y	Y	A
Hypericum tetrapterum	-	-	Y	Y	O
Epilobium parviflorum	-	-	Y	Y	R
Epilobium brunnescens	-	-	Y	Y	R
Lychnis flos-cuculi	-	-	Y	Y	O
Juncus inflexus	-	-	-	Y	F
Ranunculus flammula	-	-	-	Y	R
Plantago lanceolata	-	-	-	Y	F
Trifolium dubium	-	-	-	Y	O
Cirsium vulgare	-	-	-	Y	F
Briza media	-	-	-	Y	O
Crataegus monogyna	-	-	-	Y	F
Hypochaeris radicata	-	-	-	Y	R
Lycopus europaeus	-	-	-	Y	O
Juncus articulatus	-	-	-	Y	O
Trifolium campestre	-	-	-	-	O
Cerastium fontanum	-	-	-	-	F
Equisetum arvense	-	-	-	-	O
Geranium robertianum	-	-	-	-	O
Rumex acetosella	-	-	-	-	R
Cirsium palustre	-	-	-	-	O
Veronica chamaedrys	-	-	-	-	F
Rhinanthus minor	-	-	-	-	O
Anacamptis pyramidalis	-	-	-	-	R
Jacobaea vulgaris	-	-	-	-	R

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Trifolium arvense	-	-	-	-	R
Carex otrubae	-	-	-	-	R
Trifolium pratense	-	-	-	-	O
Cynosurus cristatus	-	-	-	-	O
Dactylorhiza praetermissa	-	-	-	-	O
Listera ovata	-	-	-	-	R
Arrhenatherum elatius	-	-	-	-	O
Carex nigra	-	-	-	-	O
Angelica sylvestris	-	-	-	-	R
Rosa spinosissima	-	-	-	-	F
Veronica persica	-	-	-	-	R
Orobanche minor	-	-	-	-	R
Leontodon autumnalis	-	-	-	-	R
Sonchus asper	-	-	-	-	O
Galium aparine	-	-	-	-	R
Samolus valerandi	-	-	-	-	R
Myosotis arvensis	-	-	-	-	R
Clematis vitalba	-	-	-	-	R
Pseudoscleropodium purum	-	-	-	-	R
Rubus fruticosus	-	-	-	-	O
Geranium dissectum	-	-	-	-	R
Epilobium hirsutum	-	-	-	-	R
Echium vulgare	-	-	-	-	R
Salix cinerea	-	-	-	-	A
Centaurium littorale	-	-	-	-	R
Cruciata laevipes	-	-	-	-	O
Chamerion angustifolium	-	-	-	-	O
Bromus hordeaceus	-	-	-	-	O
Linum catharticum	-	-	-	-	R
Geranium molle	-	-	-	-	R
Poa annua	-	-	-	-	R
Galium verum	-	-	-	-	O
Euphrasia sp.	-	-	-	-	O
Ononis repens	-	-	-	-	O
Arenaria serpyllifolia	-	-	-	-	R
Sedum acre	-	-	-	-	R
Homalothecium lutescens	-	-	-	-	R

Rabbit intervention area 2 (WB02)

Location Name: WB02: Whiteford Burrows Rabbit Intervention Area 2
Purpose: Rabbit intervention
Date: 19/06/2019
Recorders: Kieran Sheehan, Mairi Gillis, Barry Stewart
NVC: SD15b
OSGR: SS4473796305
Precision: 0.6m
Markers: Unmarked
Descriptions: Species-rich slack community within fenced area. Slack vegetation outwith the fenced area over-run with *Rubus caesius*. High dunes surrounding the area. Plot identified as within the slack vegetation.

Notes

- **NVC Diagnosis:** Highly species-rich dry slack with wetter slack vegetation. Appears to be transitioning between a wetter slack and a drier slack. The affinities SD15b are evident from the abundance of *Calliergonella cuspidata* but the presence of a grassy layer gives affinities to SD16 (Tablefit: SD15 75%; SD15b 74%; SD17b 69%; SD14 67%; SD15c 65%).
- **Damage:** No damage
- **Disturbance:** Very minimal amounts of disturbance from rabbit digging.
- **Grazing:** Grazing evident on abundant immature *Salix repens* individuals.
- **Invasive Species:** Area outwith the fenced species-rich slack has been blanketed by *Rubus caesius.*

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	92	91	-	-	-
Lichens	0	0	-	-	-
Litter	0	0	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Lotus corniculatus	80	60	Y	Y	F
Potentilla anserina	50	40	Y	Y	F
Rubus caesius	25	45	Y	Y	F
Hydrocotyle vulgaris	80	80	Y	Y	A
Salix repens	30	30	Y	Y	A
Trifolium repens	20	20	Y	Y	F
Calliergonella cuspidata	90	90	Y	Y	A
Galium palustre	1	0.1	Y	Y	O
Equisetum variegatum	2	2	Y	Y	O
Epipactis palustris	25	25	Y	Y	F
Carex flacca	10	5	Y	Y	F
Agrostis stolonifera	5	5	Y	Y	O
Plantago lanceolata	-	10	Y	Y	O
Prunella vulgaris	-	2	Y	Y	O
Brachythecium albicans	-	3	Y	Y	R
Trifolium pratense	-	3	Y	Y	O
Ranunculus acris	-	-	Y	Y	R
Brachythecium mildeanum	-	-	-	Y	O
Lolium perenne	-	-	-	Y	R
Bromus hordeaceus	-	-	-	Y	O
Danthonia decumbens	-	-	-	Y	O
Dactylorhiza incarnata ssp. *coccinea*	-	-	-	Y	O
Pyrola rotundifolia	-	-	-	-	R
Barbula convoluta	-	-	-	-	R
Polygala vulgaris	-	-	-	-	R
Ranunculus flammula	-	-	-	-	R
Filipendula ulmaria	-	-	-	-	O
Mentha aquatica	-	-	-	-	O
Dactylorhiza praetermissa	-	-	-	-	O
Cardamine pratensis	-	-	-	-	R
Trifolium campestre	-	-	-	-	R
Anthoxanthum odoratum	-	-	-	-	R
Holcus lanatus	-	-	-	-	R
Jacobaea vulgaris	-	-	-	-	R
Poa trivialis	-	-	-	-	O
Cynosurus cristatus	-	-	-	-	R
Juncus maritimus	-	-	-	-	R
Euphrasia sp.	-	-	-	-	O
Lysimachia tenella	-	-	-	-	F
Drepanocladus aduncus	-	-	-	-	O
Campylium stellatum	-	-	-	-	O
Fissidens adianthoides	-	-	-	-	O
Molinia caerulea	-	-	-	-	R
Samolus valerandi	-	-	-	-	R
Bryum pseudotriquetrum	-	-	-	-	O
Blackstonia perfoliata	-	-	-	-	R
Pilosella officinarum	-	-	-	-	O
Anthyllis vulneraria	-	-	-	-	R
Ranunculus bulbosus	-	-	-	-	R

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Linum catharticum	-	-	-	-	R
Hypericum tetrapterum	-	-	-	-	R
Leontodon saxatilis	-	-	-	-	O

Rabbit control (WB03)

Location Name: WB03: Whiteford Burrows Rabbit Control
Purpose: Rabbit control
Date: 19/06/2019
Recorders: Kieran Sheehan, Mairi Gillis, Catherine Porter
NVC: SD16a with mature *Salix sp.*
OSGR: SS4440695100
Precision: 1.2m
Markers: Yellow square
Descriptions: Species-poor dry slack community with main stand of *Salix aurita* and *Salix repens* in canopy layer.

Notes

- **NVC Diagnosis:** Area is referable to a drier community of SD16a in the understorey with the presence of grasses and frequent mature *Salix aurita* and *Salix repens* in the canopy. (Tablefit: W22b 24%; W24 19%; W22 18%; MG7e 17%; W22a 17%)
- **Damage:** No damage
- **Disturbance:** No disturbance identified.
- **Grazing:** None evident.
- **Invasive Species:** *Rubus caesius* has overtaken a lot of the area.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	30	40	-	-	-
Bryophytes	0	0	-	-	-
Lichens	0	0	-	-	-
Litter	0	0	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Calystegia sepium	5	5	Y	Y	R
Rubus caesius	80	70	Y	Y	A
Galium aparine	1	5	Y	Y	O
Carex arenaria	2	2	Y	Y	A
Lolium perenne	4	4	Y	Y	O
Holcus lanatus	1	3	Y	Y	O
Festuca rubra	5	3	Y	Y	F
Taraxacum officinale	1	0.1	Y	Y	O
Hedera helix	5	2	Y	Y	R
Cirsium palustre	1	0.1	Y	Y	R
Poa trivialis	5	3	Y	Y	F
Prunus spinosa	-	1	Y	Y	O
Geranium robertianum	-	1	Y	Y	R
Veronica chamaedrys	-	1	Y	Y	O
Ranunculus acris	-	-	Y	Y	O
Kindbergia praelonga	-	-	Y	Y	R
Lithospermum officinale	-	-	Y	Y	O
Agrimonia eupatoria	-	-	-	Y	O
Salix aurita	-	-	-	Y	A
Chamerion angustifolium	-	-	-	Y	F
Potentilla anserina	-	-	-	Y	O
Equisetum sylvaticum	-	-	-	Y	R
Lotus corniculatus	-	-	-	-	O
Galium verum	-	-	-	-	F
Iris foetidissima	-	-	-	-	O
Euphrasia sp.	-	-	-	-	O
Polygala vulgaris	-	-	-	-	R
Rosa spinosissima	-	-	-	-	O
Hypochaeris radicata	-	-	-	-	O
Avenula pubescens	-	-	-	-	F
Anthoxanthum odoratum	-	-	-	-	O
Ononis repens	-	-	-	-	R
Plantago lanceolata	-	-	-	-	F
Thymus pulegioides	-	-	-	-	O
Trifolium pratense	-	-	-	-	R
Trifolium repens	-	-	-	-	R
Salix repens	-	-	-	-	F
Rhinanthus minor	-	-	-	-	O
Anacamptis pyramidalis	-	-	-	-	R
Clematis vitalba	-	-	-	-	O
Briza media	-	-	-	-	O
Trifolium campestre	-	-	-	-	O
Ammophila arenaria	-	-	-	-	O
Cerastium fontanum	-	-	-	-	O
Rumex obtusifolius	-	-	-	-	R
Torilis japonica	-	-	-	-	R
Dactylis glomerata	-	-	-	-	R
Homalothecium lutescens	-	-	-	-	R

Figure 11.1. Whiteford Burrows – overview.
Figure 11.2. Whiteford Burrows – plot detail (1).
Figure 11.3. Whiteford Burrows – plot detail (2).

Appendix: Kenfig
Slack intervention 1 (KE01)

Location Name: KE01: Kenfig Slack Intervention 1
Purpose: Slack intervention
Date: 18/07/2019
Recorders: Kieran Sheehan, Barry Stewart
NVC: SD17d
OSGR: SS7918582779
Lat: 51.53095388
Long: -3.74312017
Precision: 1.0
Markers: No
Descriptions: Cattle dung + grazing

Notes

- **NVC Diagnosis:** The vegetation is clearly referable to SD17d with the community constants present and *Ranunculus flammula and Hydrocotyle vulgaris* preferential for SD17d. (Tablefit: SD17d 81%; SD15 77%; SD17 71%; SD15a 59%; M22d 58%).
- **Damage:** No obvious damage.
- **Disturbance:** There are a number of footpaths throughout the area which are causing minor disturbance to the vegetation
- **Grazing:** Cattle grazing, dung present.
- **Invasive Species:** None, although if grazing were to stop it is likely that *Phragmites* would become invasive.

-	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Bare ground	5	5	-	-	-
Bryophytes	95	95	-	-	-
Lichens	0	0	-	-	-
Litter	5	5	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Carex nigra	80	30	Y	Y	O
Phragmites australis	10	5	Y	Y	O
Agrostis stolonifera	15	50	Y	Y	A
Mentha aquatica	10	30	Y	Y	A
Salix repens	15	5	Y	Y	F
Hydrocotyle vulgaris	75	60	Y	Y	A
Ranunculus flammula	2	1	Y	Y	F
Juncus subnodulosus	30	40	Y	Y	A
Calliergonella cuspidata	90	90	Y	Y	D
Drepanocladus aduncus	15	10	Y	Y	A
Oxyrrhynchium hians	-	-	Y	Y	O
Schoenoplectus tabernaemontani	-	-	Y	Y	F
Eleocharis palustris	-	-	Y	Y	O
Galium palustre	-	-	Y	Y	R
Eleocharis uniglumis	-	-	Y	Y	O
Samolus valerandi	-	-	-	Y	O
Juncus articulatus	-	-	-	Y	O
Potentilla anserina	-	-	-	Y	O
Campylium stellatum	-	-	-	Y	O
Salix caprea	-	-	-	Y	R
Eleocharis quinqueflora	-	-	-	Y	O
Salix cinerea	-	-	-	Y	R
Carex flacca	-	-	-	Y	R
Juncus maritimus	-	-	-	Y	R
Vicia cracca	-	-	-	Y	R
Trifolium pratense	-	-	-	Y	R
Chara sp.	-	-	-	Y	F
Oenanthe fluviatilis	-	-	-	Y	R
Bolboschoenus maritimus	-	-	-	Y	O
Baldellia ranunculoides	-	-	-	Y	R

Slack intervention 2 (KE02)

Location Name: KE02: Kenfig Intervention 2
Purpose: Slack intervention
Date: 18/07/2019
Recorders: Kieran Sheehan, Jon Harrison
NVC: SD15a
OSGR: SS7956182335
Lat: 51.5270427
Long: -3.73754628
Precision: 1
Markers: No
Descriptions: The rare species *Drepanocladus sendtneri* is present in the slack but outside the quadrat area.

Notes

- **NVC Diagnosis:** The high cover of *Salix repens* and *Calliergonella cuspidata* clearly place this in SD15. For sub-communities there are preferentials for both SD15a and SD15d but SD15a is preferred, in part due to the presence of *Drepanocladus sendtneri*. *Calamagrostis epigejos* is not known from SD15 but performs something of the role of *Phragmites*. (Tablefit: SD15 78%; SD15a 70%; SD15d 66%; SD15b 56%; SD15c 49%).
- **Damage:** No obvious damage.
- **Disturbance:** There are a number of footpaths and cattle tracks throughout the slack which are causing small-scale disturbance.
- **Grazing:** Cattle grazing, dung present.
- **Invasive Species:** No non-native species. It is not clear to what extent the native *Calamagrostis epigejos* is invading the slack vegetation, but it can become overwhelmingly dominant in some situations and, in a slack such as this, it is potentially a threat to important species.

-	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Bare Ground	0	0	-	-	-
Bryophytes	100	100	-	-	-
Lichens	0	0	-	-	-
Litter	0	0	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Salix repens	70	70	Y	Y	A
Calamagrostis epigejos	10	30	Y	Y	F
Rubus caesius	3	4	Y	Y	F
Epilobium palustre	1	1	Y	Y	O
Hydrocotyle vulgaris	40	30	Y	Y	A
Calliergonella cuspidata	95	90	Y	Y	A
Drepanocladus aduncus	5	10	Y	Y	F
Equisetum palustre	1	1	Y	Y	O
Carex nigra	-	-	Y	Y	O
Molinia caerulea	-	-	-	Y	F
Drepanocladus sendtneri	-	-	-	-	F
Scutellaria galericulata	-	-	-	-	R
Ranunculus flammula	-	-	-	-	O
Potentilla anserina	-	-	-	-	O
Filipendula ulmaria	-	-	-	-	R
Trifolium pratense	-	-	-	-	R
Lathryus pratensis	-	-	-	-	R
Eleocharis uniglumis	-	-	-	-	O
Mentha aquatica	-	-	-	-	O
Carex flacca	-	-	-	-	R
Cirsium dissectum	-	-	-	-	F
Juncus articulatus	-	-	-	-	O
Lycopus europaeus	-	-	-	-	R
Juncus acutus	-	-	-	-	R
Juncus inflexus	-	-	-	-	R
Betula pubescens	-	-	-	-	O
Holcus lanatus	-	-	-	-	O
Crataegus monogyna	-	-	-	-	R
Betula pendula	-	-	-	-	O

Slack intervention (KE03)

Location Name: KE03: Kenfig Slack Control 1
Purpose: Slack intervention (intended as a control but incorrectly placed in an intervention area) with a new control completed later (KE06).
Date: 18/07/2019
Recorders: Kieran Sheehan, Barry Stewart
NVC: SD15b
OSGR: SS7914582810
Lat: 51.5312262
Long: -3.74369977
Precision: 1
Markers: Yes
Descriptions: Cow dung and grazing

Notes

- **NVC Diagnosis:** The vegetation is clearly referable to SD15 with constant and abundant *Salix repens* and *Calliergonella cuspidata.* The constant presence of *Equisteum variegatum* means SD15b is the preferred sub-community although abundant *Calamagrostis epigejos* is not known from any SD15 communities. (Tablefit: SD15 88%; SD15b 76%; SD15a 73%; SD15c 66%; SD17d 59%).
- **Damage:** No obvious signs of damage.
- **Disturbance:** Some moderate disturbance by cattle
- **Grazing:** Cattle grazed the area, and their dung is present in the quadrats.
- **Invasive Species:** No non-native species. It is not clear to what extent the native *Calamagrostis epigejos* is invading the slack vegetation, but it can become overwhelmingly dominant in some situations.

-	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Bare Ground	0	0	-	Y	-
Bryophytes	95	95	-	-	-
Lichens	0	0	-	-	-
Litter	0	0	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Salix repens	30	50	Y	Y	A
Calamagrostis epigejos	30	15	Y	Y	A
Agrostis stolonifera	20	15	Y	Y	F
Juncus subnodulosus	5	5	Y	Y	A
Equisetum variegatum	5	5	Y	Y	A
Rubus caesius	5	10	Y	Y	F
Hydrocotyle vulgaris	50	40	Y	Y	A
Calliergonella cuspidata	95	95	Y	Y	D
Galium palustre	1	1	Y	Y	R
Drepanocladus aduncus	-	-	Y	Y	F
Eleocharis palustris	-	-	Y	Y	O
Phragmites australis	-	-	Y	Y	R
Mentha aquatica	-	-	-	Y	F
Filipendula ulmaria	-	-	-	Y	R
Juncus articulatus	-	-	-	Y	R
Lotus corniculatus	-	-	-	Y	R
Taraxacum sect. *Ruderalia*	-	-	-	Y	R
Lathyrus pratensis	-	-	-	Y	R
Trifolium pratense	-	-	-	-	R
Salix cinerea	-	-	-	-	O
Plantago lanceolata	-	-	-	-	R
Epilobium palustre	-	-	-	-	R

Rabbit intervention 1 (KE04)

Location Name: KE04: Kenfig Point 5
Purpose: Rabbit intervention
Date: 18/07/2019
Recorders: Barry Stewart, Jon Harrison
NVC: W25a
OSGR: SS7957080570
Lat: 51.5111822
Long: -3.73681382
Precision: 1
Markers: No
Descriptions: A stand of Bracken.

Notes

- **NVC Diagnosis:** The stand of bracken lacks the calcifuge species typical of U20 so is referred to W25. The frequency of saplings means it is best considered a slightly species-poor form of W25a (Tablefit: U20c 40%; W25 34%; W25b 34%; U20 32%; U20b 31%).
- **Damage:** No signs of damage.
- **Disturbance:** None, large number of footpaths in surrounding area
- **Grazing:** None obvious. Surrounding area rabbit grazed but the dense vegetation prevents, or severely limits, the incursion of rabbits into this area.
- **Invasive Species:** No non-native species.

-	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Bare Ground	**-**	-	-	-	-
Bryophytes	**-**	-	-	-	-
Lichens	**-**	-	-	-	-
Litter	80	90	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Pteridium aquilinum	70	70	Y	Y	A
Rosa spinosissima	50	50	Y	Y	A
Rubus caesius	25	15	Y	Y	F
Pseudoscleropodium purum	10	10	Y	Y	F
Lonicera periclymenum	-	1	Y	Y	O
Arrhenatherum elatius	-	1	Y	Y	F
Sanguisorba minor	-	-	Y	Y	O
Galium verum	-	-	Y	Y	O
Homalothecium lutescens	-	-	Y	Y	F
Jacobaea erucifolia	-	-	Y	Y	F
Kindbergia praelonga	-	-	-	Y	O
Malus domestica	-	-	-	-	F
Chamerion angustifolium	-	-	-	-	O
Agrimonia procera	-	-	-	-	O
Ononis repens	-	-	-	-	F
Holcus lanatus	-	-	-	-	O
Lolium perenne	-	-	-	-	O
Cynosurus cristatus	-	-	-	-	O
Anthoxanthum odoratum	-	-	-	-	O
Festuca rubra	-	-	-	-	O
Salix repens	-	-	-	-	O
Crataegus monogyna	-	-	-	-	O
Daucus carota	-	-	-	-	F
Epilobium montanum	-	-	-	-	F
Leontodon hispidus	-	-	-	-	R

Rabbit control (KE05)

Location Name: KE05: Kenfig rabbit control
Purpose: Rabbit control
Date:18/07/2019
Recorders: Barry Stewart, Jon Harrison
NVC: W25b
OSGR: SS7961280408
Lat: 51.5097398
Long: -3.73615589
Precision: 1
Markers: Yes (yellow square)
Descriptions: A closed-canopy stand of Bracken.

Notes

- **NVC Diagnosis:** This stand is comprised of a closed canopy of Bracken, but lacking most calcifuge species is clearly referable to W25 and the lack of scrub and present of *Teucrium* means W25b is the preferred sub-community. (Tablefit: U20c 45%; W25 41%; W25b 38%; W25a 37%; U20b 33%).
- **Damage:** None
- **Disturbance:** None, large number of footpaths in surrounding area but the dense Bracken is untouched.
- **Grazing:** None but the surrounding areas area rabbit grazed.
- **Invasive Species:** No non-natives. *Pteridium aquilinum* has clearly invaded the preceding vegetation leaving few remnants.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare Ground	0	0	-	-	-
Bryophytes	2	2	-	-	-
Lichens	0	0	-	-	-
Litter	60	70	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Pteridium aquilinum	100	100	Y	Y	D
Arrhenatherum elatius	2	2	Y	Y	F
Hypericum ×desetangsii	3	3	Y	Y	O
Rosa spinosissima	2	2	Y	Y	O
Rubus caesius	3	5	Y	Y	F
Glechoma hederacea	3	5	Y	Y	F
Pseudoscleropodium purum	3	5	Y	Y	F
Clinopodium vulgare	2	3	Y	Y	F
Agrimonia procera	-	3	Y	Y	O
Festuca rubra	-	2	Y	Y	R
Heracleum sphondylium	-	-	Y	Y	R
Brachythecium rutabulum	-	-	Y	Y	O
Galium aparine	-	-	-	Y	O
Torilis japonica	-	-	-	Y	O
Eupatorium cannabinum	-	-	-	Y	R
Hypericum perforatum	-	-	-	Y	R
Epilobium ciliatum	-	-	-	Y	R
Myosotis arvensis	-	-	-	Y	R
Kindbergia praelonga	-	-	-	Y	O
Geranium robertianum	-	-	-	Y	R
Elymus repens	-	-	-	-	O
Teucrium scorodonia	-	-	-	-	R
Convolvulus arvensis	-	-	-	-	R
Urtica dioica	-	-	-	-	R
Ligustrum vulgare	-	-	-	-	R
Crataegus monogyna	-	-	-	-	R
Lonicera periclymenum	-	-	-	-	R

Slack control (KE06)

Location Name: KE06: Kenfig Slack Control 2
Purpose: Slack control
Date: 12/08/2020
Recorders: SJH
NVC: SD15c
OSGR: SS7914382751
Lat: 51.5306905
Long: -3.74371166
Precision: 0.18m
Markers: No
Descriptions: Shallow end of horseshoe shaped slack, plot located 1m from red (invertebrate) marker. The area is mossy with a low canopy of Salix repens which slopes gently into deeper areas to the east.

Notes

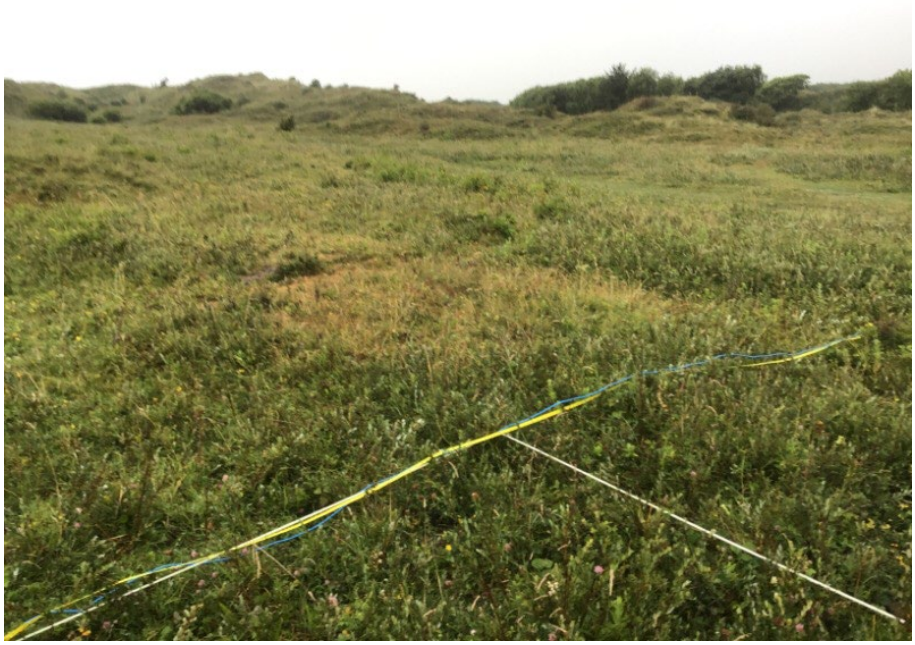
- **NVC Diagnosis:** The vegetation is clearly referable to SD15 with constant and abundant *Salix repens* and *Calliergonella cuspidata.* The constant presence of *Equisteum variegatum* and *Carex flacca* and the absence of *Rubus caesius* mean that SD15c is the best fit. To the east *Carex nigra* becomes increasingly frequent and the vegetation transitions to SD15b (Tablefit: SD15 74%; SD15c 66%; SD15b 63%; SD16d 59%; SD14a 59%).
- **Damage:** No obvious signs of damage.
- **Disturbance:** Some moderate disturbance by cattle.
- **Grazing:** Cattle grazed the area and their dung is present in the quadrat.
- **Invasive Species:** No non-native species. It is not clear to what extent the native *Calamagrostis epigios* is invading the slack vegetation, but it can become overwhelmingly dominant in some situations although this does not appear to be the case here.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare Ground	0	0	-	-	-
Bryophytes	95	95	-	-	-
Lichens	0	0	-	-	-
Litter	0	0	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Salix repens	30	50	Y	Y	A
Calamagrostis epigejos	30	15	Y	Y	A
Agrostis stolonifera	20	15	Y	Y	F
Juncus subnodulosus	5	5	Y	Y	A
Equisetum variegatum	5	5	Y	Y	A
Rubus caesius	5	10	Y	Y	F
Hydrocotyle vulgaris	50	40	Y	Y	A
Calliergonella cuspidata	95	95	Y	Y	D
Galium palustre	1	1	Y	Y	R
Drepanocladus aduncus	-	-	Y	Y	F
Eleocharis palustris	-	-	Y	Y	O
Phragmites australis	-	-	Y	Y	R
Mentha aquatica	-	-	-	Y	F
Filipendula ulmaria	-	-	-	Y	R
Juncus articulatus	-	-	-	Y	R
Lotus corniculatus	-	-	-	Y	R
Taraxacum sect. *Ruderalia*	-	-	-	Y	R
Lathyrus pratensis	-	-	-	Y	R
Trifolium pratense	-	-	-	-	R
Salix cinerea	-	-	-	-	O
Plantago lanceolata	-	-	-	-	R
Epilobium palustre	-	-	-	-	R

Figure 0.1. Kenfig – overview.
Figure 0.2. Kenfig – plot detail (1).
Figure 0.3. Kenfig – plot detail (2).
Figure 0.4. Kenfig – plot detail (3).

Appendix: Methyr Mawr
Slack intervention 1 (MM01)

Location Name: MM01: Merthyr Mawr Intervention 1
Purpose: Intervention
Date: 19/07/2019
Recorders: Kieran Sheehan, Jon Harrison
NVC: SD16b
OSGR: SS8625876608
Lat: 51.4769663
Long: -3.63919082
Precision: 0.8
Markers: No
Descriptions: Dune slack as shown on polygon



Notes

- **NVC Diagnosis:** The slack appears grassy and the cover of interesting bryophytes is low, which along with constant and abundant *Rubus caesius* gives SD16b as the preferred community. (Tablefit: SD14d 65%; SD15 64%; SD15d 57%; SD16b 57%; SD16 53%).
- **Damage:** No signs of damage.
- **Disturbance:** The slack is on a walking route through the dunes which is creating some moderate disturbance.
- **Grazing:** Evidence of cattle grazing on the walk in so likely to graze this slack.
- **Invasive Species:** None

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	90	90	-	-	-
Lichens	0	0	-	-	-
Litter	<1	<1	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Salix repens	40	60	Y	Y	D
Rubus caesius	40	20	Y	Y	A
Ranunculus bulbosus	10	2	Y	Y	R
Mentha aquatica	1	1	Y	Y	O
Hydrocotyle vulgaris	80	70	Y	Y	F
Trifolium pratense	3	20	Y	Y	F
Lotus corniculatus	4	10	Y	Y	F
Hypochaeris radicata	1	1	Y	Y	R
Plantago lanceolata	5	3	Y	Y	O
Carex arenaria	3	10	Y	Y	F
Ranunculus acris	5	5	Y	Y	O
Holcus lanatus	40	35	Y	Y	F
Carex nigra	6	6	Y	Y	F
Festuca rubra	10	10	Y	Y	F
Scozonoroides autumnalis	3	1	Y	Y	R
Pseudoscleropodium purum	50	50	Y	Y	A
Drepanocladus aduncus	10	10	Y	Y	A
Epipactis palustris	-	5	Y	Y	O
Trifolium dubium	-	5	Y	Y	O
Rosa spinosissima	-	5	Y	Y	A
Agrimonia eupatoria	-	2	Y	Y	O
Carex flacca	-	2	Y	Y	O
Trifolium repens	-	1	Y	Y	A
Taraxacum agg.	-	1	Y	Y	R
Calliergonella cuspidata	50	60	Y	Y	A
Potentilla anserina	-	-	Y	Y	O
Centaurium erythrea	-	-	-	Y	O
Rhinanthus minor	-	-	-	Y	O
Prunella vulgaris	-	-	-	Y	O
Betula pubescens	-	-	-	Y	O
Trifolium fragiferum	-	-	-	Y	R
Leontodon hispidus	-	-	-	Y	O
Equisetum variegatum	-	-	-	Y	O
Dactylorhiza praetermissa	-	-	-	Y	O
Filipendula ulmaria	-	-	-	Y	R
Epilobium hirsutum	-	-	-	Y	R
Euphrasia sp.	-	-	-	Y	O
Ononis repens	-	-	-	Y	O
Agrostis stolonifera	-	-	-	Y	R
Eupatoria cannabinum	-	-	-	Y	R
Angelica sylvestris	-	-	-	Y	R
Thymus polytrichus	-	-	-	Y	R

Slack intervention 2 (MM02)

Location Name: MM02: Merthyr Mawr quadrat 2
Purpose: Intervention
Date: 19/07/2019
Recorders: Kieran Sheehan, Jon Harrison
NVC: SD16b
OSGR: SS8618476615
Lat: 51.477005
Long: -3.6402622
Precision: 1.0
Markers: No
Descriptions:

Notes

- **NVC Diagnosis:** A dry grassy slack clearly referable to SD16b. (Tablefit: SD16b 74%; SD16 59%; SD16a 57%; SD15d 53%; SD16c 46%).
- **Damage:** No evidence of damage.
- **Disturbance:** Small numbers of walkers causing very minor disturbance.
- **Grazing:** Evidence of cattle grazing on the walk in. Some rabbit grazing in the local area.

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	-	-
Bryophytes	90	90	-	-	-
Lichens	0	0	-	-	-
Litter	<1	<1	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Salix repens	40	60	Y	Y	D
Rubus caesius	40	20	Y	Y	A
Ranunculus bulbosus	10	2	Y	Y	R
Mentha aquatica	1	1	Y	Y	O
Hydrocotyle vulgaris	80	70	Y	Y	F
Trifolium pratense	3	20	Y	Y	F
Lotus corniculatus	4	10	Y	Y	F
Hypochaeris radicata	1	1	Y	Y	R
Plantago lanceolata	5	3	Y	Y	O
Carex arenaria	3	10	Y	Y	F
Ranunculus acris	5	5	Y	Y	O
Holcus lanatus	40	35	Y	Y	F
Carex nigra	6	6	Y	Y	F
Festuca rubra	10	10	Y	Y	F
Scorzoneroides autumnalis	3	1	Y	Y	R
Pseudoscleropodium purum	50	50	Y	Y	A
Drepanocladus aduncus	10	10	Y	Y	A
Epipactis palustris	-	5	Y	Y	O
Trifolium dubium	-	5	Y	Y	O
Rosa spinosissima	-	5	Y	Y	A
Agrimonia eupatoria	-	2	Y	Y	O
Carex flacca	-	2	Y	Y	O
Trifolium repens	-	1	Y	Y	A
Taraxacum agg.	-	1	Y	Y	R
Calliergonella cuspidate	50	60	Y	Y	A
Potentilla anserina	-	-	Y	Y	O
Centaurium erythraea	-	-	-	Y	O
Rhinanthus minor	-	-	-	Y	O
Prunella vulgaris	-	-	-	Y	O
Betula pubescens	-	-	-	Y	O
Trifolium fragiferum	-	-	-	Y	R
Leontodon hispidus	-	-	-	Y	O
Equisetum variegatum	-	-	-	Y	O
Dactylorhiza praetermissa	-	-	-	Y	O
Filipendula ulmaria	-	-	-	Y	R
Epilobium hirsutum	-	-	-	Y	R
Euphrasia sp.	-	-	-	Y	O
Ononis repens	-	-	-	Y	O
Agrostis stolonifera	-	-	-	Y	R
Eupatoria cannabinum	-	-	-	Y	R
Angelica sylvestris	-	-	-	Y	R
Thymus polytrichus	-	-	-	Y	R

Slack control (MM03)

Location Name: MM03: Merthyr Mawr Control 1
Purpose: Slack control
Date: 19/07/2019
Recorders: Kieran Sheehan, Jon Harrison
NVC: SD16b
OSGR: SS8637376654
Lat: 51.47739961
Long: -3.63755483
Precision: 1.0
Markers: Yes
Descriptions:

Notes

- **NVC Diagnosis:** The grassy slack is referable to SD16. The sub-community is somewhat intermediate with preferentials for SD16a and SD16b but the abundance of *Rubus caesius* is sufficient to make SD16b the best option. (Tablefit: SD16a 52%; SD16b 47%; SD16 47%; CG7a 37%; U1d 35%).
- **Damage:** None
- **Disturbance:** Some moderate disturbance from walkers.
- **Grazing:** The area is rabbit grazed. Evidence of cattle grazing on the walk in but few signs of recent grazing in this quadrat.
- **Invasive Species:** None, although the abundance of *Rubus caesius* suggests it may be overtaking the slack vegetation, behaving as a native invasive.

-	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Bare ground	0	0	-	-	-
Bryophytes	50	50	-	-	-
Lichens	0	0	-	-	-
Litter	<1	<1	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Rubus caesius	40	25	Y	Y	A
Ononis repens	25	25	Y	Y	A
Holcus lanatus	5	5	Y	Y	O
Jacobaea vulgaris	2	1	Y	Y	O
Carex arenaria	5	5	Y	Y	F
Salix repens	20	25	Y	Y	A
Carex flacca	5	2	Y	Y	O
Rosa spinosissima	2	1	Y	Y	O
Hypochaeris radicata	2	1	Y	Y	R
Lotus corniculatus	2	3	Y	Y	O
Festuca ovina	30	30	Y	Y	A
Pseudoscleropodium purum	50	60	Y	Y	A
Thymus polytrichus	1	1	Y	Y	R
Trifolium repens	1	1	Y	Y	O
Scorzoneroides autumnalis	1	1	Y	Y	R
Mentha aquatica	-	1	Y	Y	R
Drepanocladus aduncus	-	1	Y	Y	O
Crepis capillaris	-	1	Y	Y	R
Homalothecium lutescens	-	1	Y	Y	R
Veronica chamaedrys	-	-	Y	Y	R
Festuca rubra	-	-	-	Y	R
Cirsium arvense	-	-	-	-	R
Linum catharticum	-	-	-	-	R
Oenothera sp.	-	-	-	-	R

Rabbit intervention area 1 (MM04)

Location Name: MM04: Merthyr Mawr rabbit intervention Q1
Purpose: Rabbit intervention
Date: 19/07/2019
Recorders: Kieran Sheehan, Jon Harrison
NVC: Unplaced
OSGR: SS8598476504
Lat: 51.4759711
Long: -3.64311666
Precision: 1.0
Markers: No
Descriptions: Fixed grassland with *Rubus.*

Notes

- **NVC Diagnosis:** The vegetation is not easy to place into an NVC category, looking superficially like a bramble stand. However, it could perhaps be seen as a very extreme form of SD16b but *Drepanocladus* is the only real hint of slack vegetation. It is left unplaced with respect to NVC communities. (Tablefit: SD16b 24%; SD16 21%; SD16a 19%; SD19 14%; SD10 13%).
- **Damage:** None
- **Disturbance:** Some moderate disturbance from walkers.
- **Grazing:** Evidence of cattle grazing in surrounding area and the area is rabbit grazed.
- **Invasive Species:** None

-	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Bare ground	0	4	-	-	-
Bryophytes	95	95	-	-	-
Lichens	3	3	-	-	-
Litter	<1	<1	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Rubus caesius	60	70	Y	Y	A
Ononis repens	20	10	Y	Y	F
Homalothecium lutescens	95	95	Y	Y	D
Carex arenaria	5	2	Y	Y	O
Crepis sp.	2	4	Y	Y	O
Erodium cicutarium	1	1	Y	Y	R
Holcus lanatus	1	1	Y	Y	O
Peltigera sp.	3	3	Y	Y	O
Sedum acre	-	2	Y	Y	F
Drepanocladus aduncus	-	1	Y	Y	R
Carex flacca	-	1	Y	Y	R
Synthrichia ruraliformis	-	-	Y	Y	A
Bryum sp.	-	-	Y	Y	R
Luzula campestris	-	-	Y	Y	R
Festuca rubra	-	-	-	-	R
Jacobaea vulgaris	-	-	-	-	O
Pseudoscleropodium purum	-	-	-	-	O
Ammophila arenaria	10	20	Y	Y	F

Rabbit intervention area 2 (MM05)

Location Name: MM05: Merthyr Mawr Rabbit 3
Purpose: Rabbit intervention
Date: 19/07/2019
Recorders: Kieran Sheehan, Jon Harrison
NVC: SD8a
OSGR: SS8590076543
Lat: 51.4763041
Long: -3.64433669
Precision: 1.0
Markers: No
Descriptions:

Notes

- **NVC Diagnosis:** Another stand dominated by *Rubus caesius* but the prominence of *Festuca* and *Ammophila* mean this sits more comfortably in SD8a. (Tablefit: SD7c 58%; SD7d 53%; SD7 52%; SD19 47%; SD6e 38%).
- **Damage:** None
- **Disturbance:** Some moderate disturbance from walkers.
- **Grazing:** Evidence of cattle grazing in surrounding area. The area is also rabbit grazed.
- **Invasive Species:** None

-	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Bare ground	**0**	0	-	-	-
Bryophytes	**-**	-	-	-	-
Lichens	**-**	-	-	-	-
Litter	0	0	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Rubus caesius	40	50	Y	Y	D
Rosa spinosissima	15	20	Y	Y	A
Ammophila arenaria	5	3	Y	Y	F
Festuca rubra	20	15	Y	Y	A
Ononis repens	20	10	Y	Y	F
Carex arenaria	2	3	Y	Y	F
Oenothera sp.	-	2	Y	Y	O
Kindbergia praelonga	-	2	Y	Y	R
Holcus lanatus	-	-	Y	Y	O
Hypochaeris radicata	-	-	Y	Y	R
Teucrium scorodonia	-	-	Y	Y	O
Clinopodium vulgare	-	-	Y	Y	O
Galium verum	-	-	-	Y	F
Poa humilis	-	-	-	Y	R
Rumex acetosa	-	-	-	Y	R
Carex nigra	-	-	-	-	O
Agrimonia eupatoria	-	-	-	-	R
Chamerion angustifolium	-	-	-	-	R

Rabbit control (MM06)

Location Name: MM06: Merthyr Mawr Control
Purpose: Rabbit control
Date: 19/07/2019
Recorders: Kieran Sheehan, Jon Harrison
NVC: SD8a
OSGR: SS8580676583
Precision: 1.0
Markers: Yes
Descriptions: Less grass in north-east corner

Notes

- **NVC Diagnosis:** Another stand dominated by *Rubus caesius* but the prominence of *Festuca, Ammophila and Rosa* mean this sits more comfortably in SD8a. (Tablefit: SD7c 64%; SD7 63%; SD7d 59%; SD19 46%; SD7a 43%).
- **Damage:** None
- **Disturbance:** Well-used footpaths throughout the area creating localised disturbance.
- **Grazing:** Evidence of cattle grazing in surrounding area. The area is also rabbit grazed.
- **Invasive Species:** None

-	50cm (% cover)	1m (% cover)	2m	5m	SLACK (DAFOR)
Bare ground	0	0	-	Y	-
Bryophytes	2	2	-	-	-
Lichens	0	0	-	-	-
Litter	<1	<1	-	-	-
Species	**50cm (% cover)**	**1m (% cover)**	**2m**	**5m**	**SLACK (DAFOR)**
Rubus caesius	30	40	Y	Y	D
Rosa spinosissima	20	30	Y	Y	D
Festuca rubra	30	10	Y	Y	A
Ammophila arenaria	10	5	Y	Y	F
Ononis repens	15	15	Y	Y	F
Carex arenaria	3	3	Y	Y	F
Kindbergia praelonga	2	2	Y	Y	O
Hypochaeris radicata	-	2	Y	Y	O
Homalothecium lutescens	-	-	Y	Y	A
Poa trivialis	-	-	Y	Y	R
Hypnum cupressiforme	-	-	-	Y	O
Clinopodium vulgare	-	-	-	Y	O
Holcus lanatus	-	-	-	Y	R
Crepis capillaris	-	-	-	Y	O
Syntrichia ruraliformis	-	-	-	Y	A
Centaurium erythraea	-	-	-	Y	R
Jacobaea vulgaris	-	-	-	Y	R
Iris foetidissima	-	-	-	Y	R

Figure 0.1. Merthyr Mawr – overview.
Figure 0.2. Merthyr Mawr – plot detail (1).
Figure 0.3. Merthyr Mawr – plot detail (2).

Data Archive Appendix

Data outputs associated with this project are archived in Sands of LIFE (SoLIFE) DMS folders (D1 Physical Monitoring) on server–based storage at Natural Resources Wales.

The data archive contains:

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

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

[C] A excel sheet of summarised vegetation quadrats for all intervention areas.

[D] A GIS geodatabase containing two layers which show the location of the Fixed Point Quadrats and polygons of the plot boundaries.

Metadata for this project is publicly accessible through Natural Resources Wales' Library Catalogue https://libcat.naturalresources.wales (English Version) and https://catllyfr.cyfoethnaturiol.cymru (Welsh Version) by searching 'Dataset Titles'. The metadata is held as record no. NRW_DS125392.

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