BSG ecology

Bayfield Chepstow

NVC survey

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Contents

1   Introduction

1.1   The Site consists of parts of three fields off Wallwern Wood Road, Bayfields, Chepstow at National Grid Reference ST 521 940.

1.2   BSG ecology undertook an extended Phase 1 habitat survey and data search of the Site in May 2017. The data search revealed that the northernmost field within the Site forms part of Crossway Green 2 Site of Importance to Nature Conservation (SINC) designated by Monmouthshire County Council (MCC).

1.3   BSG Ecology was commissioned to undertake further botanical survey of this field to help identify the key areas of interest within the SINC site and provide information to help inform avoidance, mitigation and compensation measures that might be required as a result of development within this area of the Site. To meet this aim an NVC survey of the northernmost field was carried out to determine and describe the grassland plant communities that are present.

1.4   The other fields within the Site were found to have been substantially improved and of limited botanical interest during the extended phase 1 survey and so were not included in this assessment.

SINC description

1.5   The SINC site covers an area of ancient woodland that is immediately adjacent to, but outside, the development Site boundary. This report only covers the grassland portion of the SINC.

1.6   The SINC citation contains limited information on the grassland interest:

1.7   *"The species rich grassland lies on the lower slopes of an MG6 field, it is damp and sedge rich. Species include glaucous sedge, carnation sedge, bird's foot trefoil, cowslip, black knapweed and Lathyrus pratensis. The site is one of several which has been identified in the locality through the LDP process and forms part of an important ecological network including National and International sites".*

1.8   The eastern edge of this SINC was previously used as a site compound for a nearby new-build development in 2015 (Google Earth images) and much of it is bare ground or tarmac-covered. Remnant pasture grassland remains along the north, west and south edges of the compound, along with a stretch of watercourse. Away from the remnant vegetation, watercourse and tarmac surfaces this area has characteristics of the Section 7 habitat[1] "Open Mosaic Grassland" but would fail to qualify as such based on the extent of such habitat (which is less than 0.25 ha) – see Maddock (Ed.) 2008.

Description of development

1.9   The proposed access road to the development will pass through the northernmost field. The final layout will take into account the outcome of this survey and other constraints such as underground services.

Evidence of Technical Competence and Experience

1.10   Niall Lusby BSc MCIEEM undertook the field work and prepared this report. Niall has been a professional ecologist for over ten years and specialises in botanical survey but also has extensive experienced of protected species and habitat survey.

1.11   The report was technically reviewed by Dr Tom Flynn, Senior Ecologist at BSG Ecology. He has eight years of experience as a professional ecologist, and is an experienced botanist and vegetation surveyor

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[1] See Sections 6 and 7, Environment (Wales) Act, 2016.

1.1 James Gillespie BSc PGDip MCIEEM undertook a final review of this report. He has been a professional ecologist since 1990 and has a wide range of field skills including botanical survey.

1.2 A summary of each BSG staff member's experience and competence as professional ecologist is provided at http://www.bsg-ecology.com/index.php/people/

2   Methods

Field survey

2.1   The northernmost field was initially walked by the surveyor to identify and map homogenous stands of vegetation with the aid of aerial photographs. In order to collect quantitative botanical data, quadrats (measuring 2 m x 2 m for grassland) were then marked out in each of homogenous stand of vegetation that had been identified.

2.2   Five quadrats from each typical stand of vegetation were then taken. Five is the minimum number of quadrats required to allow calculation of inter-stand frequency classes which is an important step in determining the NVC community present. All plant species present within quadrats were recorded, along with estimates of their cover values. Cover values were recorded using percentage cover. Quadrat locations were recorded using a handheld GPS receiver.

2.3   The identification of plant communities is a two-stage process with broad communities identified in the field, and more definitive identifications of community and sub-community occurring later, after data analysis.

2.4   The patches of remnant grassland in the eastern-most compartment (north of the covered reservoir) were not subject to NVC survey.

Data analysis

2.5   Quadrat data were tabulated using Microsoft Excel and sorted into a floristic table where species are arranged by decreasing inter-quadrat frequency (as used in Rodwell *et al*, 1992). Data analysis involved three methods:

- The vegetation community identification keys in Rodwell *et al* (1992) were used to identify plant communities, based on the data in the floristic table.

- The floristic tables were compared (by inspection) with those of Rodwell *et al*. (1992).

- The data were entered into MAVIS (Modular Analysis of Vegetation Information System) software (CEH, 2016). Quadrats for each homogenous stand of vegetation were subject to a combined group analysis to determine similarity with published NVC datasets.

2.6   A written summary of each of the homogeneous stands of vegetation was also produced.

Limitations to methods

2.7   The survey was undertaken within the main botanical survey season for grassland (May to June) so it is considered that the species list recorded for each quadrat is likely to contain most of the species present. However it is possible that early or late species, or species not in flower, could have been missed.

3 Results and Interpretation

3.1 In this section of the report a description of the grassland portion of the SINC is provided, based on notes taken during the initial walkover. This is followed by a summary of the results from the NVC survey. The results are compared with the SINC citation notes.

3.2 Figure 1 shows the vegetation boundaries (see Section 6). Photographs of the field are provided in Section 7 of this report. Constancy tables are presented in Appendix 1.

Overview of Characteristics

3.3 The part of Greenways 2 SINC that falls within the proposed development Site is a small pasture field that slopes downward from the south to the north. The northern boundary of the field is formed of a ditch and hedgerow. The ditch contains flowing water and appears to have been cleared out recently based on the large expanse of bare earth in places along its banks and some minor disturbance suggestive of excavated materials alongside the ditch. The western edge of the field is formed by the ancient woodland portion of the SINC site. The southern edge is delineated by a hedgerow and the eastern boundary is formed by an underground reservoir covered in improved grassland. To the north of this is a former compound associated with the recent new-build development to the east. The field was assessed as supporting four main types of vegetation that are described below:

- Area A: The bottom of the slope (northern end) is marshy grassland with indications of wetter conditions with plants including dominant hard rush *Juncus inflexus* and greater bird's-foot trefoil *Lotus pedunculatus.* See Photograph 1 in Section 7. Bird's foot trefoil *Lotus corniculatus* was also present in this area but not recorded in any quadrats, common knapweed *Centaurea nigra* was present occasionally on the margins where the community transitioned into Area B.

- Area B: The upper part of the slope (southern end) is dominated by a grassland that is drier in character and shows more signs of improvement and nutrient enrichment from livestock (in the form of large stands of common nettle along the hedge-line). The sward structure is noticeably different due to the absence of hard rush. See Photograph 3 in Section 7. The dominant grass is rough meadow grass *Poa trivialis* with occasional meadow foxtail *Alopecurus pratensis*, crested dog's tail *Cynosuros cristatus* and occasional sweet vernal grass *Anthoxanthum odoratum*. A strip of grassland on the eastern edge of Area B adjacent to the reservoir is more improved in nature with higher proportion of *Lolium perenne* and *Trifolium repens*. A single quadrat was taken in this area but not analysed.

- Area C: The eastern part of the field. It lies to the north of an underground reservoir and has been subject to a soil strip in the recent past with tarmac and crushed aggregate laid down to form a hardstanding for a previous development. This area is largely bare, with a sparse covering of ephemeral species, as well as remnant grassland vegetation along its north, south and east boundaries. Photograph 6 in Section 7 shows two areas of tarmac hardstanding and some of the remnant permanent grassland near the gate.

- Area D: The southern edge of the field supports dense stands of ruderal species such as nettle *Urtica dioica*, spear thistle *Cirsium vulgare* and curled dock *Rumex crispus*, often forming large clumps. No quadrats were taken in these areas as they were species-poor and comprised agricultural weed species of limited conservation importance. See Photograph 5 in Section 7.

3.4 A total of ten quadrats were taken: five from the wetter ground in the north of the field, and five from the drier area in the south. No quadrats were taken in the ruderal, stripped or transitional areas between habitats to avoid edge effects.

Botanical Survey Quadrat Data

Northern, lower area with dominant rush

MAVIS Analysis

3.5   The ten highest matching coefficients for the group of five quadrats from the rush-dominated area at the northern (lower) section of the field were for four NVC communities and their sub-communities as shown below:

- NVC: MG9 (*Holcus lanatus – Deschampsia cespitosa* grassland) (44.19 %),

- NVC: MG9a (*Holcus lanatus – Deschampsia cespitosa* grassland, *Poa trivialis* sub-community) (41.93%)

- NVC: MG10b (*Holco-Juncetum effusi* rush-pasture, *Juncus inflexus* sub-community) (40.82%)

- NVC: MG10 (*Holcus lanatus-Juncus effusus* rush-pasture) (39.25%)

- NVC: MG9b (*Holcus lanatus – Deschampsia cespitosa* grassland, *Arrhenatherum elatius* sub-community) (38.37%)

- NVC: MG7c (*Lolium perenne-* leys and related grassland, *Lolium perenne-Alopecurus pratensis-Festuca pratensis* grassland sub-community) (36.70%)

- NVC: MG10c (*Holcus lanatus-Juncus effusus* rush-pasture, *Iris pseudacorus* sub-community) (36.51%)

- NVC: MG10a (*Holcus lanatus-Juncus effusus* rush-pasture) (35.26%)

- NVC: MG7d (*Lolium perenne* leys and related grassland, *Lolium perenne-Alopecurus pratensis* grassland sub-community) (33.18%)

- NVC: MG6a (*Lolium pernne-Cynosurus cristatus* grassland grassland) (32.97%)

3.6   At 44.19 % MG9 (*Holcus lanatus-Deschampsia cespitosa* grassland) had the highest matching coefficient but this is considered a very poor score. MG9a came second highest and MG9b fifth highest. As the scores for MG9 and MG10 were very closely matched the analysis does not strongly suggest any one community.

3.7   The next two highest matches are for MG10b *Holcus lanatus-Juncus effusus* rush-pasture which also came in as the seventh and eighth highest matches.

Rodwell *et al*, 1992 floristic tables and key to mesotrophic grassland

3.8   Based on the key to mesotrohic grasslands (Rodwell et al, 1992 this stand of vegetation best fits a MG10b grassland with a *Juncus inflexus* sub-community due to the absence of *Deschampsia cespitosa*.

3.9   However the key notes that in poorly draining ground this community can be difficult to separate from other grasslands, in particular the MG6 *Lolium pernne-Cynosurus cristatus* grassland.

3.10   Based on the floristic tables the constant present of *Juncus inflexus* and *Carex hirta* in the quadrats would suggest that this stand is MG10b.

Southern drier grassland

3.11   The ten highest matching coefficients for the group of five quadrats from the drier area of grassland were for five NVC communities and their sub-communities as shown below:

- NVC: MG9 (*Holcus lanatus – Deschampsia cespitosa* grassland) 51.56%

- NVC: MG7c (*Lolium perenne* leys and related grassland, *Lolium perenne-Alopecurus pratensis* grassland sub-community 51.28%

- NVC: MG9a (*Holcus lanatus – Deschampsia cespitosa* grassland, *Poa trivialis* sub-community) 51.20%

- NVC: MG6a (*Lolium perenne-Cynosurus cristata* grassland, typical sub-community) 50.23%

- NVC: MG9b (*Holcus lanatus – Deschampsia cespitosa* grassland, *Arrhenatherum elatius* sub-community) 49.68%

- NVC: MG10 (*Holcus lanatus-Juncus effusus* rush-pasture) 49.50%

- NVC: MG6 (*Lolium perenne-Cynosurus cristatus* grassland) 49.40%

- NVC: MG10b (*Holcus lanatus-Juncus effusum* rush-pasture, *Juncus inflexus* sub-community) 47.70%

- NVC: MG7 (*Lolium perenne* leys and related grassland) 47.10%

- NVC: MG6b (*Lolium pernne-Cynosurus cristatus* grassland , *Anthoxanthum odoratum* sub-community 44.87%

3.12   MG9 was the highest matching coefficient at 51.56% which is considered a poor score. MG7c came a close second at 51.28%.

3.13   Based on the key to mesotrophic grasslands (Rodwell et al, 1992) this stand of vegetation best fits an MG6 *Lolium perenne-Cynosurus cristatus* grassland with a typical sub-community.

3.14   Based on the floristic tables (Rodwell et al, 1992) the lack of constant frequency and cover of *Holcus lanatus* and the absence of *Deschampsia flexuosa* in the sward, this community is a poor fit with MG9. The lack of *Juncus* species makes this a poor fit with MG10 communities. The low constancy and cover of *Lolium perenne* makes its poor fit with MG7 communities. The high occurrence of *Lathyrus pratensis* is suggestive of MG6, the other species present and the levels of cover are suggestive of MG6 but not a strong fit to this community.

4 Conclusion

Northern, lower area with dominant rush

4.1 Based on the analysis undertaken, the rush-dominated sward at the base of the SINC is closest in character to the *Juncus inflexus* sub-community of MG10 grassland (MG10b). This community is a good fit based on the floral tables and the mesotrophic grassland key, but a poor fit based on the MAVIS analysis.

4.2 MG10b *Holco-Juncetum effusi* rush-pasture has a coefficient of 40.82% in the Mavis analysis. This score was not significantly lower than the highest score obtained, which was for the MG9 community. However, the MG9 community was ruled out for this vegetation due to the absence of *Deschampsia cespitosa*.

Southern drier grassland

4.3 Based on the analysis undertaken, the drier grassland at the higher southern end of the SINC is closest in character to the typical sub-community of MG6 *Lolio-Cynosuretum cristata* grassland (MG6a). This is based on the floristic tables and mesotrophic grassland key.

4.4 MG6 *Lolio-Cynosuretum cristata* grassland had a coefficient of 50.23% in the Mavis analysis which was the fourth best match. This score was not significantly lower than the higher scores obtained, which were for MG9/MG9c and MG7c. These communities were ruled out for this vegetation due to the absence of *Deschampsia cespitosa* and the low abundance/absence of *Lolium perenne*.

5 References

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6 Figures

(overleaf)

Figure 1: NVC community map

LEGEND

— Site boundary

— Blue line boundary

Site of Importance for Nature Conservation(Crossways Green 2 SINC)

Habitats

MG6a

MG10b

Neutral grassland

Tall ruderal vegetation

Mosaic of bare ground and ephemeral / short perennial vegetation

Tarmac / hardstanding

++++ Fence

Ⓐ NVC area

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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PROJECT TITLE
BAYFIELDS, CHEPSTOW

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Figure 1: NVC community map

DATE: 28.11.2018   CHECKED:JG   SCALE: 1:750
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7 Photographs

Photograph 1 – Rush dominated grassland at base of slope

Photograph 2 – Typical quadrat in rush dominated grassland

Photograph 3 – Drier grassland at top of slope

Photograph 4 – typical quadrat in drier grassland

Photograph 5 – ruderal patches at top of slope

Photograph 6 – Hardstanding areas within the eastern part of the site

Appendix 1: Constancy Tables

Area A – MG9b								
Species		Quadrat – % cover					Frequency	Percentage cover range
		1	2	3	4	5		
Hard rush	*Juncus inflexus*	85	80	60	50	50	V	50-85
Rough meadow grass	*Poa trivialis*	10	7	15	5	9	V	5-15
Hairy sedge	*Carex hirta*	2	2	1	4	4	V	1-4
Meadow foxtail	*Alopecurus pratensis*	1	6	2	3	6	V	1-6
Silverweed	*Potentilla anserina*	3	2	6	9	0	IV	2-9
Sweet vernal	*Anthoxanthum odoratum*	5	0	10	5	15	IV	5-15
Crested dog's-tail	*Cynosurus cristatus*	5	0	1	0	1	III	1-5
Creeping cinquefoil	*Potentilla reptans*	4	5	1	0	1	III	1-5
Meadow buttercup	*Ranunculus acris*	0	1	0	0	1	III	0-1
Common knapweed	*Centaurea nigra*	0	0	8	2	5	III	2-8
Greater bird's-foot trefoil	*Lotus palustre*	0	0	1	2	0	III	1-2
Creeping buttercup	*Ranunculus repens*	0	0	1	1	5	III	1-5
Ribwort plantain	*Plantago lanceolata*	0	0	1	0	2	II	0-2
Meadow fescue	*Schedonorus pratensis*	0	0	0	1	2	II	0-2
False fox sedge	*Carex otrubae*	0	0	5	15	0	II	5-15
cut-leaved geranium	*Geranium dissectum*	1	0	0	0	0	I	0-1
Meadow vetchling	*Lathyrus pratensis*	0	0	10	0	0	I	0-10
Red clover	*Trifolium pratense*	0	0	1	0	0	I	0-1
Glaucous sedge	*Carex flacca*	0	0	0	2	0	I	0-2
Cock's foot	*Dactylis glomerata*	0	0	0	0	1	I	0-1

Area b– MG6a								
Species		Quadrat – % cover					Frequency	Percentage cover range
		6	7	8	9	10		
Rough meadow grass	*Poa trivialis*	15	15	40	20	40	V	15-40
Creeping cinquefoil	*Potentilla reptans*	2	2	0	8	5	IV	2-8
Hairy sedge	*Carex hirta*	0	10	2	15	20	IV	2-20
Meadow vetchling	*Lathyrus pratensis*	10	12	4	20	10	IV	4-20
Ribwort plantain	*Plantago lanceolata*	20	5	2	2	0	IV	2-20
Yorkshire fog	*Holcus lanatus*	1	3	10	3	0	IV	1-10
Perennial rye grass	*Lolium perenne*	1	2	0	8	10	IV	1-8
Curled dock	*Rumex crispus*	0	1	1	1	2	IV	1-2
Crested dog's-tail	*Cynosurus cristatus*	5	5	0	5	0	III	0-5
Meadow buttercup	*Ranunculus acris*	2	2	1	0	0	III	1-2
Red clover	*Trifolium pratense*	10	4	0	10	0	III	4-10
meadow fescue	*Schedonorus pratensis*	10	15	0	10	0	III	10-15
Cock's foot	*Dactylis glomerata*	0	5	5	0	5	III	0-5
Silverweed	*Potentilla anserina*	0	0	5	2	0	II	2-5
Meadow foxtail	*Alopecurus pratensis*	0	0	30	0	20	II	20-30
Sweet vernal	*Anthoxanthum odoratum*	0	20	0	0	0	I	0-20
Common knapweed	*Centaurea nigra*	1	0	0	0	0	I	0-1
False fox sedge	*Carex otrubae*	8	0	0	0	0	I	0-8
White clover	*Trifolium repens*	0	0	0	0	3	I	0-3

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