Roxhill (Junction 15) Ltd

Northampton Gateway, Northampton

Phase II Grassland Survey

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1.0 INTRODUCTION

1.1 As part of the Phase 1 Habitat Survey associated with the Northampton Gateway project, a separate survey of the grassland associated with Hyde Farm, Roade was undertaken to inform the wider Ecological Appraisal for the proposed Roade Bypass. This report provides the details of this survey.

2.0 METHODOLOGY

Initial Walkover

2.1 The survey method initially followed the Phase 1 Survey technique as recommended by Natural England[1] and as reported in Appendix 5.1. This involved a systematic walk over a series of grassland fields associated with Hyde Farm, Blisworth Road and another area of grassland to the east within different ownership. The purpose of the survey was to classify the grassland types and provide an initial assessment of their ecological value. The survey was undertaken on 1st September 2016 by Nick Law (FPCR-Senior Ecologist), and experienced botanist.

2.2 Immediately prior to survey, past and current management of the fields was discussed with the landowner and this information has been incorporated within this report.

Phase II Survey

NVC Grassland Survey

2.1 Following the above, where potentially species rich grassland was observed a Phase II survey was completed for three fields (Fields 1, 2 & 3 (Appendix 5.1: Figure 3)). Survey work was undertaken on the 30th June 2017. Weather conditions were favourable for detailed vegetation surveys.

2.2 Sampling of vegetation types was carried out as recommended in the National Vegetation Classification: Users' handbook and was used to describe vegetation types present as described in British Plant Communities vol. 3 (grassland and montane communities).

2.3 The survey areas were initially walked to identify and map areas of apparently homogenous vegetation known as polygons and a complete botanical list including frequency value was recorded for all areas concerned. Unless easily defined by visual means, each area was then sampled by recording quadrats of dimensions 2m x 2m, this being the standard size for grasslands and open vegetation. Where the selected open vegetation stands did not fit the regular 2m x 2m quadrat an irregular and contiguous extent of $4m^2$ was sampled. Within each quadrat, all vascular plant species were recorded and an index of their relative cover abundance was estimated using the DOMIN scale (where 1 = few individuals, 2= several individuals, 3 + several individuals scattered throughout, 4 = 4-10%, 5 = 11-25%, 6 = 26-33%, 7 = 34-50%, 8 = 51-75%, 9 = 76-90% and 10 = 91-100%).

2.4 The classification of the vegetation types has been made by producing NVC floristic tables and comparing them to those within British Plant Communities vol. 3, which was aided by the use of the programme TABLEFIT.

[1] JNCC. (1990). *Handbook for Phase 1 habitat survey – a technique for environmental audit.* Peterborough: JNCC

3.0 RESULTS

Field 1

Results

Background

3.1 The grassland in this area, which is effectively the northeast corner of Field 2, has resulted via natural regeneration from a former arable field. This process took place through the former 'arable set-aside scheme', which resulted in the land being taken out of production sometime during the 1990s. Subsequent management has been extensive (e.g. without the use of fertilisers or herbicides), and within an agri-environment scheme. Management of this area, and the rest of the field (Field 2), has been as traditional hay meadow, with the hay cut after the middle of July, followed by aftermath grazing (Photograph 1 (Sept 2016)).

Picture 1: Field 1 - looking northeast

General description

3.2 Several herbs were in abundance within this stand of neutral grassland, particularly common knapweed *Centaurea nigra*, common bird's-foot-trefoil *Lotus corniculatus,* ribwort plantain *Plantago lanceolata,* red clover *Trifolium pratense* and meadow buttercup *Ranunculus acris.* The majority of the grass component was formed by several species, all of which were either abundant or frequent within the stand; these were tall fescue *Schedonorus arundinaceus,* common bent *Agrostis capillaris,* cock's-foot *Dactylis glomerata,* crested dog's-tail *Cynosurus cristatus,* Yorkshire-fog *Holcus lanatus* and creeping bent *Agrostis stolonifera.*

3.3 Ruderal species were occasional within the sward with small patches of nettle *Urtica dioica*, ragworts *Senecia jacobaea & S. ericifolius* and docks *Rumex spp* present.

3.4 One area, marked by local abundance of compact rush *Juncus conglomeratus,* appeared to lay damp.

3.5 Small quantities of seedling ash *Fraxinus excelsior,* hawthorn *Crataegus monogyna* and field rose *Rosa arvensis* were noted, indicating that in the absence of mowing scrub development would most likely occur rapidly.

Field survey data

3.6 The results of the Phase II survey are presented in Table 1 below:

Table 1: Field 1 Survey data

Common Name	Scientific Name	Q1	Q2	Q3	Q4	Q5	
Yorkshire-fog	*Holcus lanatus*	4	4	3	8	4	V (3-8)
Common Knapweed	*Centaurea nigra*	1	3	7	4	4	V (1-7)
Sweet Vernal Grass	*Anthoxanthum odoratum*	3	4	4	3	5	V (3-5)
Timothy-grass	*Phleum pratense*	6	4	2	-	3	IV (2-6)
Red Clover	*Trifolium pratense*	3	2	6	-	3	IV (2-6)
Common Bent	*Agrostis capillaris*	4	5	4	-	4	IV (4-5)
Ribwort Plantain	*Plantago lanceolata*	1	-	3	3	1	IV (1-3)
Red Fescue	*Festuca rubra*	-	4	1	-	3	III (1-4)
Common Bird's-foot-trefoil	*Lotus corniculatus*	3	2	3	-	-	III (2-3)
Tall Fescue	*Schedonorus arundinaceus*	2	2	-	3	-	III (2-3)
False Oat-grass	*Arrhenatherum elatius*	3	1	3	-	-	III (1-3)
Meadow Fescue	*Festuca pratensis*	-	1	2	-	3	III (1-3)
Smooth Tare	*Vicia tetrasperma*	2	2	-	-	2	III (2)
Lesser Trefoil	*Trifolium dubium*	1	-	-	1	1	III (1)
Creeping Bent	*Agrostis stolonifera*	-	1	-	4	-	II (1-4)
Hoary Ragwort	*Senecio erucifolius*	-	-	1	4	-	II (1-4)
Perennial Rye-grass	*Lolium perenne*	3	2	-	-	-	II (2-3)
Common Vetch	*Vicia sativa*	1	-	-	-	1	II (1)
Agrimony	*Agrimonia eupatoria*	-	-	2	-	-	I (2)
Field Horsetail	*Equisetum arvense*	-	-	-	2	-	I (2)
Yellow-rattle	*Rhinanthus minor*	-	-	2	-	-	I (2)
White Clover	*Trifolium repens*	-	-	2	-	-	I (2)
Glaucous Sedge	*Carex flacca*	-	-	-	1	-	I (1)
Hawthorn	*Crataegus monogyna*	-	-	1	-	-	I (1)
Creeping Buttercup	*Ranunculus repens*	-	-	-	-	1	I (1)
Curled Dock	*Rumex crispus*	-	-	-	1	-	I (1)
Common Ragwort	*Senecio jacobaea*	-	-	-	-	1	I (1)
Common Nettle	*Urtica dioica*	1	-	-	-	-	I (1)
Compact Rush	*Juncus conglomeratus*	N/A	N/A	N/A	N/A	N/A	present

Common Name	Scientific Name	Q1	Q2	Q3	Q4	Q5	
Tufted Vetch	*Vicia cracca*	N/A	N/A	N/A	N/A	N/A	present

3.7 The community was a poor match, both using professional judgement and when aided by computer analysis, for any published unimproved grassland NVC community. This may possibly be as result of its relatively recent but natural colonisation since the cessation of arable management of the field and or disturbance that has led to the localised compaction of some areas and development of areas of waterlogged ground. Some key species that could be expected were absent such as crested dog's-tail and ruderal species were also much more in evidence than the other areas sampled. Nevertheless, the sampled area is indicative of neutral grassland, relatively flower-rich and is of some appreciable nature conservation value.

Field 2

Results

Background

3.8 Whilst the management of the main part of the field has been the same as that for Field 1, the origins of the grassland are very different. The grassland here, and in the adjoining Field 3 to the west, was created in 2002 on a former arable field by sowing seed harvested from Dr. Miriam Rothschild's Sudburgh Meadow (Photograph 2).

Picture 2: Field 2 - looking northwest

3.9 With perhaps the exception of the most westerly end, the species composition appeared to be unusually uniform across the field with the usual variations that are always present in any stand of vegetation across a large area.

3.10 With an abundance of common knapweed, common bird's-foot-trefoil, ribwort plantain, meadow buttercup and red clover, aspects of the sward had strong similarities with Field 1. However, the

presence of several forbs which were not noted in Field 1 gave the impression of a more species-rich sward. Examples of these additional species are; lady's bedstraw *Galium verum,* cat's-ear *Hypochaeris radicata* and rough hawkbit *Leontodon hispidus.*

Field survey data

3.11 The results of the Phase II survey are presented in Table 2 below:

Table 1: Field 2 Survey data

Common Name	Scientific Name	Q1	Q2	Q3	Q4	G5	Q6	Q7	Q8	Q9	Q10	
Common Bird's-foot-trefoil	*Lotus corniculatus*	4/5	6	5	8	4	5	5	2	4	9	V (2-9)
White Clover	*Trifolium repens*	7	5	5	4	3	4	4	5	6	4	V (3-7)
Common Knapweed	*Centaurea nigra*	6	4	7	4	5	4	2	4	4	4	V (2-7)
Yorkshire Fog	*Holcus lanatus*	7	6	5	6	4	3	4	3	4	2	V (2-7)
Sweet Vernal Grass	*Anthoxanthum odoratum*	4	5	5	5	4	3	4	3	3	3	V (3-5)
Crested Dog's-Tail	*Cynosurus cristatus*	5	5	4	4	2	3	3	3	3	-	V (2-5)
Red Clover	*Trifolium pratense*	4	3	5	4	4	5	3	2	-	4	V (2-5)
Perennial Rye-grass	*Lolium perenne*	4	5	4	4	3	1	3	2	5	3/4	V (1-5)
Meadow Fescue	*Festuca pratensis*	1	3	3	2	2	3	1	2	1	4	V (1-4)
Common Bent	*Agrostis capillaris*	4	6	-	4	7	3	4	4	4	-	IV (3-7)
Meadow Buttercup	*Ranunculus acris*	4	-	4	4	3	2	1	3	-	3	IV (1-4)
Yellow Oat-grass	*Trisetum flavescens*	1	1	-	2	1	3	3	2	-	2	IV (1-3)
Ribwort Plantain	*Plantago lanceolata*	-	-	1	-	1	4	3	-	-	2	III (1-4)
Oxeye Daisy	*Leucanthemum vulgare*	-	2	-	-	1	1	2	-	-	3	III (1-3)
Meadow Barley	*Hordeum secalinum*	2	-	-	1	-	-	-	-	3	3	II (1-3)
Selfheal	*Prunella vulgaris*	-	-	1	1	-	2	-	-	-	2	II (1-2)
a hybrid fescue	*Festuca x Lolium*	-	-	1	-	-	1	-	-	-	1	II (1)
Cat's-ear	*Hypochaeris radicata*	-	1	1	-	-	-	1	-	-	-	II (1)
Common Sorrel	*Rumex acetosa*	-	1	1	-	-	-	1	-	1	-	II (1)
Tall Fescue	*Schedonorus arundinaceus*	1	-	-	-	1	-	-	-	-	1	II (1)
Meadow Vetchling	*Lathyrus pratensis*	5	-	-	-	-	-	-	-	-	-	I (5)
Yellow-rattle	*Rhinanthus minor*	-	-	-	-	-	4	1	-	-	-	I (1-4)
Field Bindweed	*Convolvulus arvensis*	2	-	-	-	-	-	-	-	-	-	I (2)
False Oat-grass	*Arrhenatherum elatius*	-	1	-	-	-	-	-	-	-	-	I (1)
Cock's-foot	*Dactylis glomerata*	1	-	-	-	-	-	-	-	-	-	I (1)
Lady's Bedstraw	*Galium verum*	-	-	-	-	-	-	-	1	-	1	I (1)

Common Name	Scientific Name	Q1	Q2	Q3	Q4	G5	Q6	Q7	Q8	Q9	Q10	
Rough Hawkbit	*Leontodon hispidus*	-	-	-	-	-	1	-	-	-	-	I (1)
Dandelion	*Taraxacum officinale*	-	-	-	-	-	1	1	-	-	-	I (1)
Common Vetch	*Vicia sativa*	1	-	-	-	-	-	-	-	1	-	I (1)

3.12 Appearances suggested that the community present had some affinities to the MG5 NVC community; a typical community of unimproved hay meadows on circumneutral soils but also to some extent to the MG6 community; a much more common grassland type of generally lesser interest. Within the NVC key for mesotrophic grasslands a key point occurs at couplet 19. Here a decision is needed between the following two options:

"Generally species-rich swards with an abundance of herbaceous Dicotyledons including Lotus corniculatus and some of Leontodon hispidus, Ranunculus bulbosus, Leucanthemum vulgare, Primula veris, Rumex acetosa, Trifolium pratense and with frequent and sometimes abundant Anthoxanthum odoratum and Agrostis capillaris,

or;

Generally species-poor grass dominated swards with constant and usually abundant Lolium perenne and a few of the above species".

3.13 *Lotus corniculatus* is the key species here which defines the MG5 *Cynosurus cristatus-Centaurea nigra* grassland and this was a constant species within the sample quadrats. With the exception of *Rumex acetosa, Ranunculus bulbosus* and *Primula veris,* the other listed species are present within the field. *Lolium perenne* is constant within the sampled stand but with a consistently low cover and the sward would not be described as being species-poor. So, whilst the recorded vegetation would seem to suggest that the user should follow the first couplet of the key (which leads to the MG5 communities) this is not a clear direction. If the second part of the couplet is followed this leads to the MG6 communities. So whilst a direction towards MG5 is favoured this is not clear. This is not uncommon and the problem is highlighted by the authors of the key:

"There is a complete gradation between rich, unimproved stands of the Centaureo-Cynosuretum and the very species poor swards of the Lolium leys which have been ploughed and re-seeded, fertilised and drained. The above list of Dicotyledons is a generally satisfactory means of separating the Centareo-Cynosuretum from richer stands of the Lolio-Cynosuretum but, in many cases, the best that can be hoped for is to place a stand at particular points along a line of continuous variation".

3.14 The community is most likely to be somewhere on the transition between the MG5 and MG6 communities, although would appear to be closer to the MG5 community. This is supported by computer analysis that indicate a reasonable match to the MG5 community; with a similarity coefficient of 64%and a less good math to the NVC MG6 community; with a similarity coefficient of 56%.

Field 3

Results

Background

3.15 The origins and management of this field are the same as those for Field 2.

3.16 Despite sharing the same origins, and having received the same management, the impression gained during the survey was that the overall species abundance and frequency was lower than in Field 2. The assemblage was however broadly comparable.

Picture 2: Field 3 looking northwest

Field survey data

3.17 The results of the Phase II survey are presented in Table 3 below:

Table 3: Field 3 Survey data

Common Name	Scientific Name	Q1	Q2	Q3	Q4	Q5	
Common Knapweed	Centaurea nigra	7	6	4	3	4	V (3-7)
White Clover	*Trifolium repens*	4	3	5	7	7	V (3-7)
Meadow Fescue	*Festuca pratensis*	4	3	5	3	6	V (3-6)
Common Bent	*Agrostis capillaris*	4	5	4	5	3	V (3-5)
Yorkshire-fog	Holcus lanatus	3	3	3	5	4	V (3-5)
Meadow Buttercup	Ranunculus acris	3	4	3	2	3	V (2-4)
Sweet Vernal Grass	Anthoxanthum odoratum	3	3	3	3	3	V (3)
Crested Dog's-tail	*Cynosurus cristatus*	3	2	2	3	3	V (2-3)
Perennial Rye-grass	*Lolium perenne*	-	-	2	3	4	III (2-4)

Common Name	Scientific Name	Q1	Q2	Q3	Q4	Q5	
Lady's Bedstraw	*Galium verum*	1	4	3	-	-	III (1-4)
Meadow Barley	Hordeum secalinum	3	-	3	-	2	III (2-3)
Meadow Fescue	*Festuca pratensis*	2	1	-	-	1	III (1-2)
False Oat-grass	*Arrhenatherum elatius*	-	-	2	1	-	II (1-2)
Common Vetch	*Vicia sativa*	-	1	1	-	-	II (1)
Common Mouse-ear	*Cerastium fontanum*	-	1	-	-	-	I (1)
Cowslip	*Primula veris*	-	-	1	-	-	I (1)
Common Sorrel	*Rumex acetosa*	-	-	-	1	-	I (1)
Tall Fescue	*Schedonorus arundinaceus*	-	-	1	-	-	I (1)
Yellow Oat-grass	*Trisetum flavescens*	-	1	-	-	-	I (1)
Burnet-saxifrage	*Pimpinella saxifraga*	-	-	-	-	-	Present
Meadow Vetchling	*Lathyrus pratensis*	-	-	-	-	-	Present

3.18 While the general appearance was similar to that of field 2 the community was conspicuously lacking *Lotus corniculatus*, which, as noted above, is a key defining species of MG5 grassland. Other species conspicuously lacking included *Leontodon hispidus, Ranunculus bulbosus, Leucanthemum vulgare* and *Trifolium pratense*, although it is quite possible that they occur within the field but a lower density than could be expected. Again it is concluded that the community sits somewhere in the transition between MG5 and MG6. Further analysis would support this assertion, with analysis using TABLEFIT indicating a similarity coefficient of 58% to the MG6a and 6B communities; suggesting that this field site closer to the MG6 *Lolium perenne-Cynosurus cristatus* community.

4.0 EVALUATION

Lowland Meadow Habitat of Principal Importance

4.1 Fields 1, 2 & 3 were distinctively different from the other grasslands surveyed and supported a wider range of species indicative of neutral grasslands. The constancy and abundance of common knapweed and common bird's-foot-trefoil, and the frequency and abundance of other plants such as ribwort plantain and crested dog's-tail, indicate that the grassland communities have some affinity with the National Vegetation Classification (NVC) MG5 *Cynosurus cristatus-Centaurea nigra* type grassland, albeit this is not clear cut. This NVC community qualifies as Lowland Meadow and is listed as a Habitats of Principal Importance (HPI) as listed on Section 41 of the NERC Act 2006[2] which are defined by specific NVC communities[3].

[2] *The Natural Environment and Rural Communities Act 2006.* [Online]. London:HMSO Available at: http://www.legislation.gov.uk/ukpga/2006/16/contents [Accessed 18/11/2016]

Northamptonshire Wildlife Site Selection Guidelines

4.2 Further evaluation of Fields 1, 2 & 3 has been possible using the Wildlife Site Selection Criteria for Northamptonshire[4].

4.3 The Neutral Grassland criteria are formed by four sections. Two of these are concerned with the presence of NVC communities, the others involve the presence of grassland indicator species and threshold values, which if met would automatically qualify a site for the non-statutory Wildlife Site designation as indicated in Figure 1 of the guidelines:

c) Neutral grassland sites of more than 0.1 ha supporting populations of either:

i) Three or more strong neutral grassland indicator species.

ii) Eight or more neutral grassland indicator species in total.

d) Sites supporting populations of more than 50 grassland species.

4.4 How these three fields should be considered in terms of the selection guidelines is problematic for a third party assessment. This arises from the fact that although Fields 1 and 2 are effectively a single management unit, they are very different in terms of their origins; however, as there is no physical division between these areas, for the purpose of this assessment it is considered that they should be considered as a single unit. Whilst Fields 2 & 3 are of the same origin, and currently receive the same management, they are separated by a relatively young hedgerow (presumably planted as part of the agri-environment agreement). Therefore, for this assessment Field 3 has been considered as a separate unit.

4.5 Fields 1 & 2 collectively support nine of the neutral grassland indicator species listed within the guidelines, two of which are strong indicators. Consequently, as a single unit they exceed the threshold of eight indicator species. If Field 2 is considered in isolation it supports eight indicator species and would therefore meet the threshold. If Field 1 were considered in isolation it would not meet the threshold as it only supports five indicator species. Although exact interpretation of the selection guidelines falls within the remit of the organisations running the Wildlife Site system, and ultimately the Local Wildlife Sites Panel, it is likely that Fields 1 and 2 would be considered as an ecological unit. It is therefore considered that Fields 1 & 2 collectively meet the criteria nd are of County significance.

4.6 Field 3 only supports 7 indicator species, which is just below the threshold for qualification. However, given its position in a larger ecological unit it is also considered to be of County significance as part of the wider grassland area.

[3] BRIG. Maddock, A. [Ed.]. *UK Biodiversity Action Plan Priority Habitat Descriptions (Updated Dec 2011)*. [online]. Available at: http://jncc.defra.gov.uk/PDF/UKBAP_PriorityHabitatDesc-Rev2011.pdf [Accessed 18/11/2016].

[4] Northamptonshire Biodiversity Partnership Local Wildlife Sites Panel. (2014). *Wildlife Site Selection Criteria – Northamptonshire 2007 – Last updated 05/02/2014.* [online]. Available at: http://www.wildlifebcn.org/sites/default/files/wildlife_site_selection_criteria_northants_2014.pdf [Accessed 18/11/2016].