Variation in Plant Community in Manor Woods Valley

Impacts of management and underlying landscaping on the Wildflower Meadow and Rabbit Field Grasslands

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1. Abstract

Surveying plant species communities in differently located and managed neutral grasslands within the Manor Woods Valley LNR confirms good quality of diversity, and variation based on management.

2. Introduction

Manor Woods Valley LNR has several areas of grassland with different management histories and variation in prior land use. The cutting regime (manged by Bristol City Council (BCC)) is broadly different for each area, and as such the plant communities in each area are expected to vary.

The large (2.67ha) Wildflower Meadow has seen several changes in use and profile since the 1950s when it was used as playing fields (MVWG, 2020), in the 1960's it was turned into a household waste landfill site, before being used as a spoil heap for the excavations of the interceptor tunnel in the culverting of the Malago in the 1970s(MVWG, 2020)(MWVG, 2019). Landfill and spoil completely changed the landform of the area and the wildflowers naturally occurred because of a "sympathetic cutting regime" in the 1990s (MWVG, 2019). Since the 2000's it has been managed as a hay meadow with an annual hay crop being taken once yearly.

The much smaller (0.12ha) Rabbit Field was also a landfill site; of unknown origin. However this area did not receive any of the arisings from the culverting work of the 1970s. BCC stopped management of the area in the 1990s and consequently it became overgrown with brambles which remain dominant around this grassland. In 2017 much of the bramble was cleared and has continued to be cut back on an annual basis, creating the clearing in which the grassland of the Rabbit Field is present today (MWVG, 2021).

In light of neutral grassland being a rare and threatened habitat within the UK (Bayliss *et.al.*, 2003) this survey report seeks to shed light on whether the landscape, prior and current management have impacted on the plant communities in these two areas, and to suggest future management to enhance the biodiversity of the site.

2. Methodology

2.1 Sampling Methodology

Despite the difference in scale of the 2 areas, 10 random plots across each were sampled to enable direct comparison via the use of Non-Metric Multi-Dimensional Scaling (NMDS), 20 plots in each may have been preferred (JNCC 2004), however weather windows were restrictive in this instance. The plots were selected at random by subjective choice (Rodwell, 2006) to be representative of the whole.

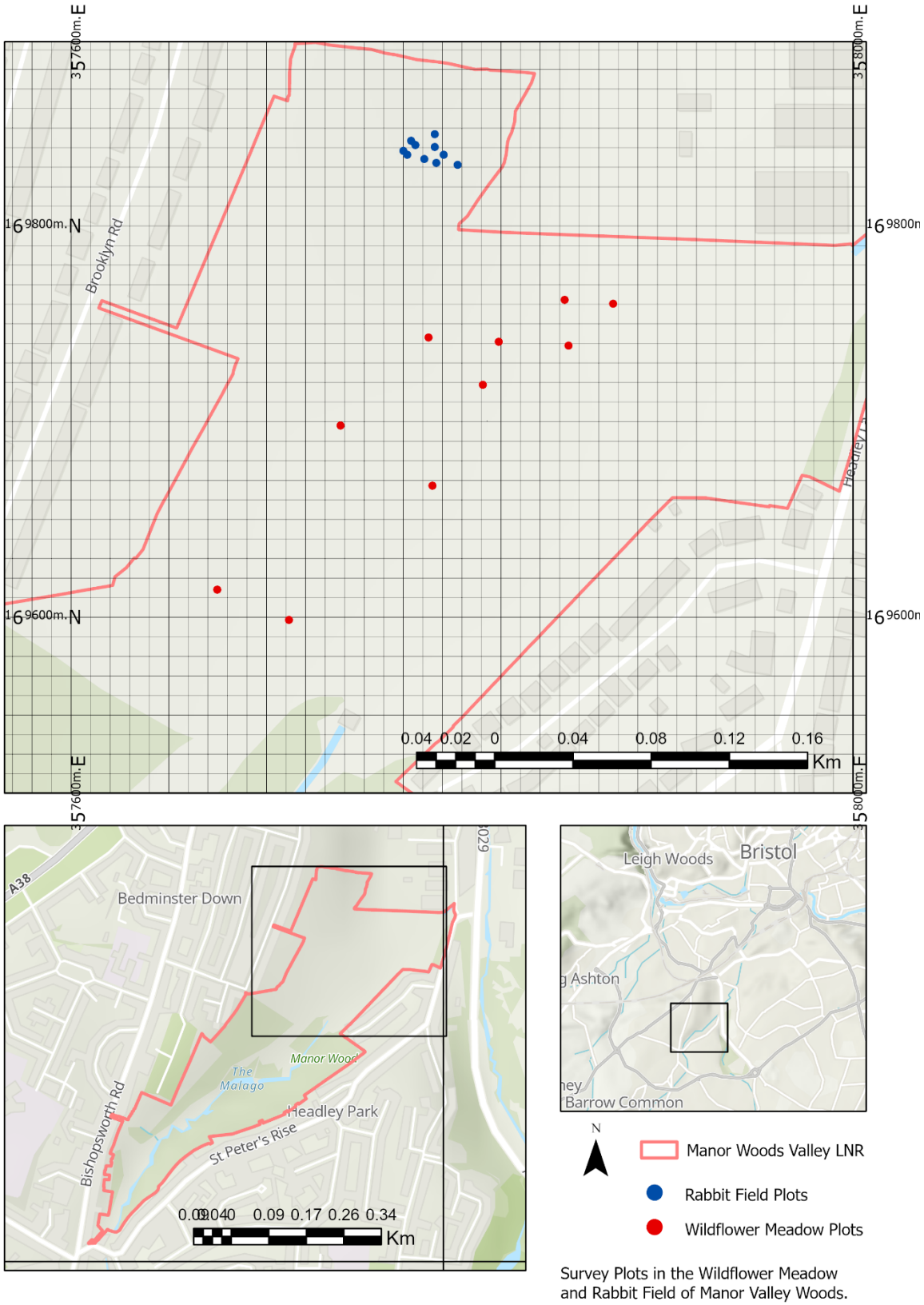


Figure 1: Manor Woods Valley LNR Map with Survey Plot Locations. (Natural England 2, 2023)

Surveying was completed over 4 days from the 13th - 16th July 2023 before the Wildflower Meadow was cut for Hay. Each plot was surveyed using a 50cmx50cm quadrat. Each plant species within the quadrat was identified and counted. The location in the form of a 10-digit grid reference and the altitude were recorded via the mobile app OS Locate (OS, 2023) for each plot. A Soil sample was taken from approx. 3-4cm below the surface (for minimum disruption to the site and plants as requested by BCC) within each plot with a small trowel and taken away in a labelled sample pot.

Once all 20 soil samples were collected a field lab was set up to test their pH using a calibrated HANNA HI98190 pH/ORP meter and the Slurry Method (HANNA Instruments, 2023). That is, each sample was mixed 1 part soil to 2 parts deionised water and left to stand for 15 minutes. The sample was then shaken to re-mix it before the meter probe was submerged in the slurry, the measurement was taken once the reading stabilised. Between each sample the probe was cleaned by swilling it in 2 separate pots of deionised water, was rinsed under deionised water, and then a test reading was taken in a control pot of deionised water.

2.2 Analysis Methodology

Two Comma Separated Variables (CSV) documents, one for the species community data and one for the plot habitat data were compiled (Appendix 7.1 and 7.3). Within R studio (R Core Team, 2021) the community was processed using metaMDS with the Vegan Package to perform a Non-Metric Multi-Dimensional Scaling (NMDS). That is, the software ranked the community species and ran several iterations to compute the best fit of 2 orthogonal planes of highest variance through the multidimensional cloud of ranked community data points. From this the program produced a 2D plot visualisation. The stress of the metaMDS was checked before the next stage.

The Habitat data was then processed with the envfit script to complete the Multivariate Analysis (MVA) and the Habitat data could then be scrutinised via the program outputs and by layering into the 2D plot with the ordisurf and ordihull commands.

3. Results and Discussion

The stress of the community data was 0.1284483, falling below the vital 0.2 to signify a quality fit of the new NMDS axes.

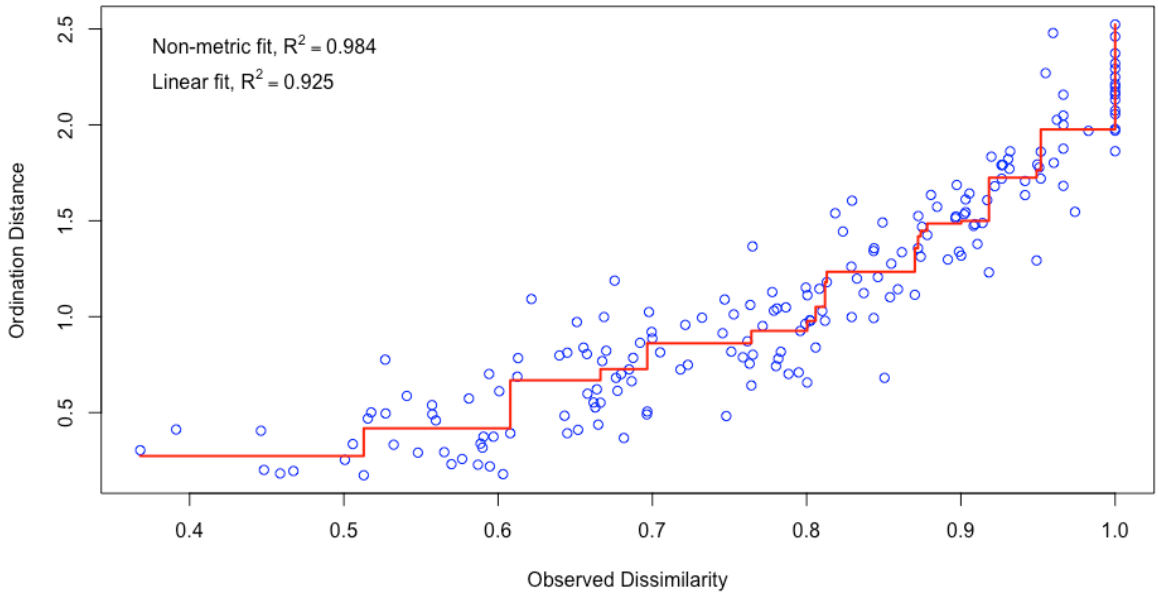


Figure 2: Stress plot showing close clustering and relatively low stress.

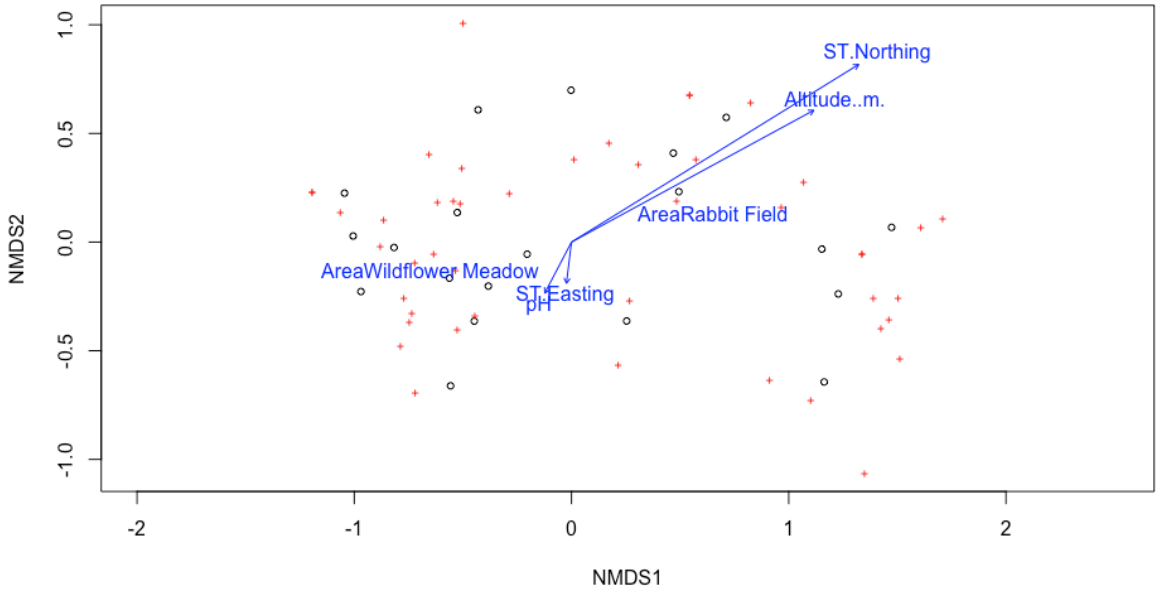


Figure 3: Plot of Community and Species with relative significance of Habitat variables.

```
***VECTORS

                NMDS1    NMDS2     r2 Pr(>r)
ST.Easting   -0.12169 -0.99257 0.0095  0.920
ST.Northing   0.85064  0.52575 0.6282  0.002 **
Altitude..m.  0.87857  0.47761 0.4192  0.013 *
pH           -0.46422 -0.88572 0.0183  0.843
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
Permutation: free
Number of permutations: 999

***FACTORS:

Centroids:
                        NMDS1   NMDS2
AreaRabbit Field       0.6515  0.1312
AreaWildflower Meadow -0.6515 -0.1312

Goodness of fit:
        r2 Pr(>r)
Area 0.575  0.001 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
Permutation: free
Number of permutations: 999
```

Figure 4: envfit output on Habitat variable significance.

Within the vector (continuous) variables, the most significant was the Northing of the plot, with a p value of 0.002 (Figure 4), this variable accounted for 62.8% of variation in the community. The second most significant vector variable was the Altitude with a p value of 0.013, and a 41.9% impact on the community.

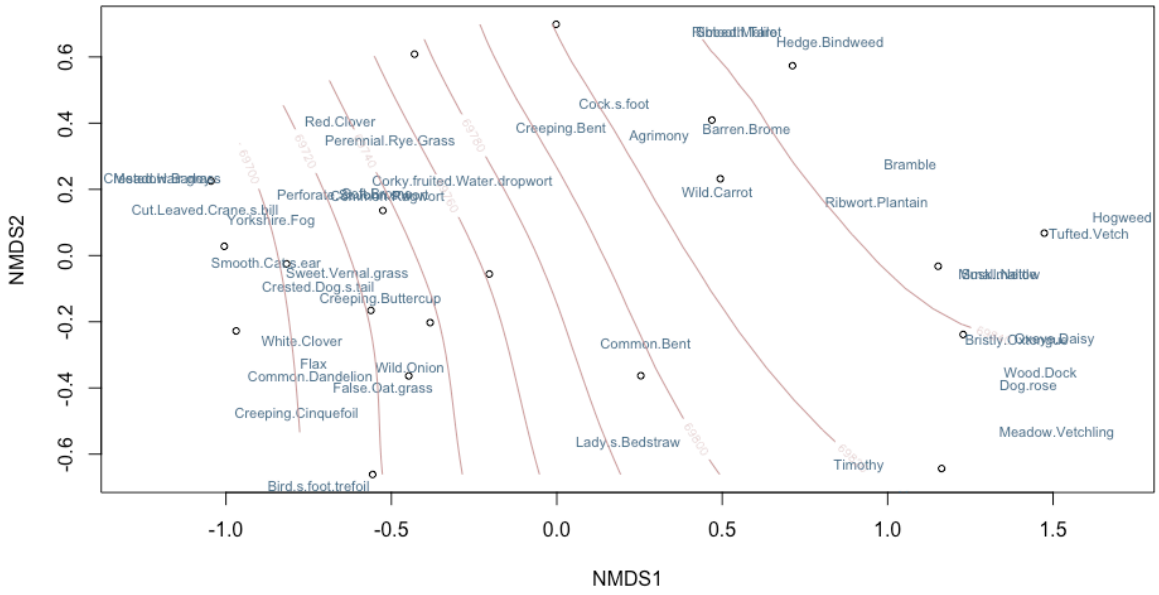


Figure 5: Northing in relation to community variation.

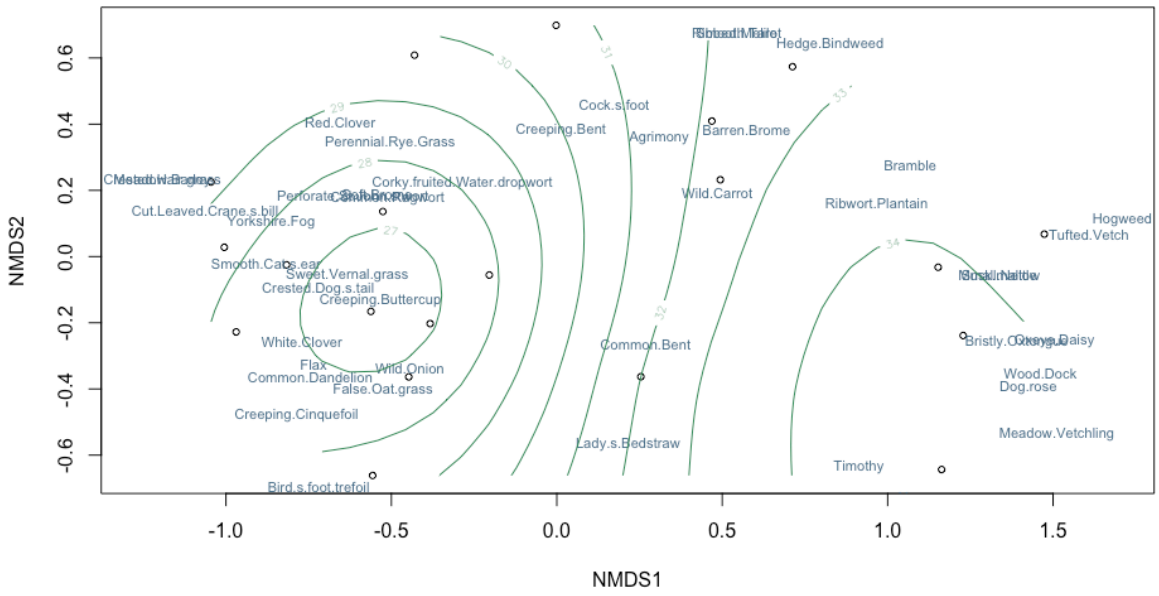


Figure 6: Altitude in relation to community variation.

The best variable for explaining the community variation, as expected is the location (a Factor (discreet) variable), with the Area having a p value of 0.001; this is illustrated by the 2 distinct hulls in the plot in Figure 7. The Area explained less variation in community (56.5%) then the Northing. However, since all of the Rabbit Field plots exist north of all of the Wildflower meadow plots, the Northing can be regarded as analogous to the Area.

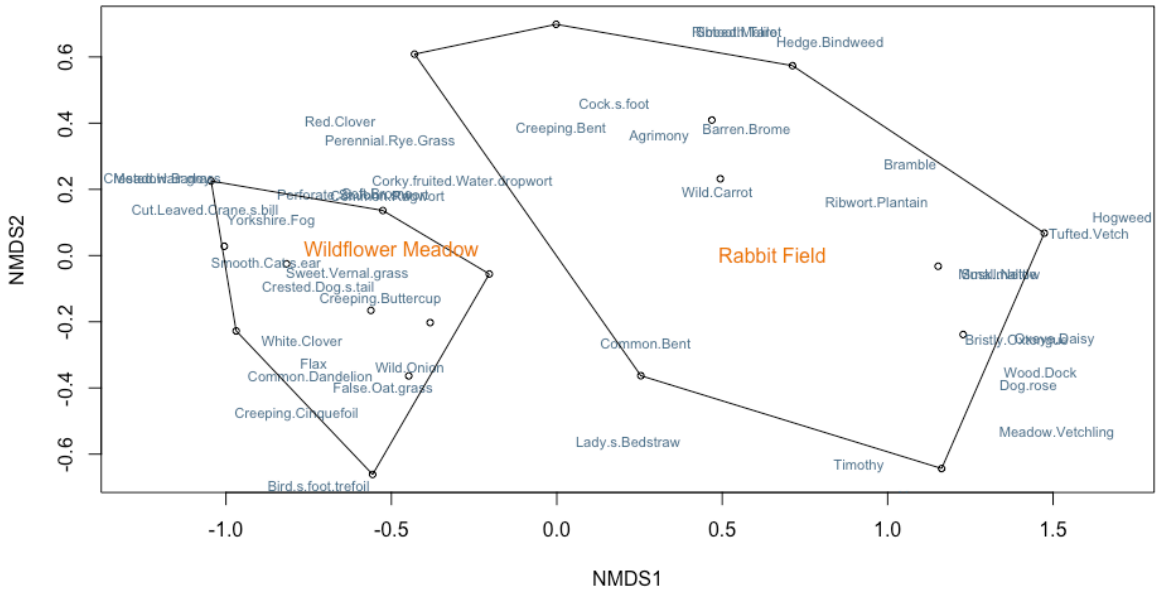


Figure 7: Area in relation to community variation.

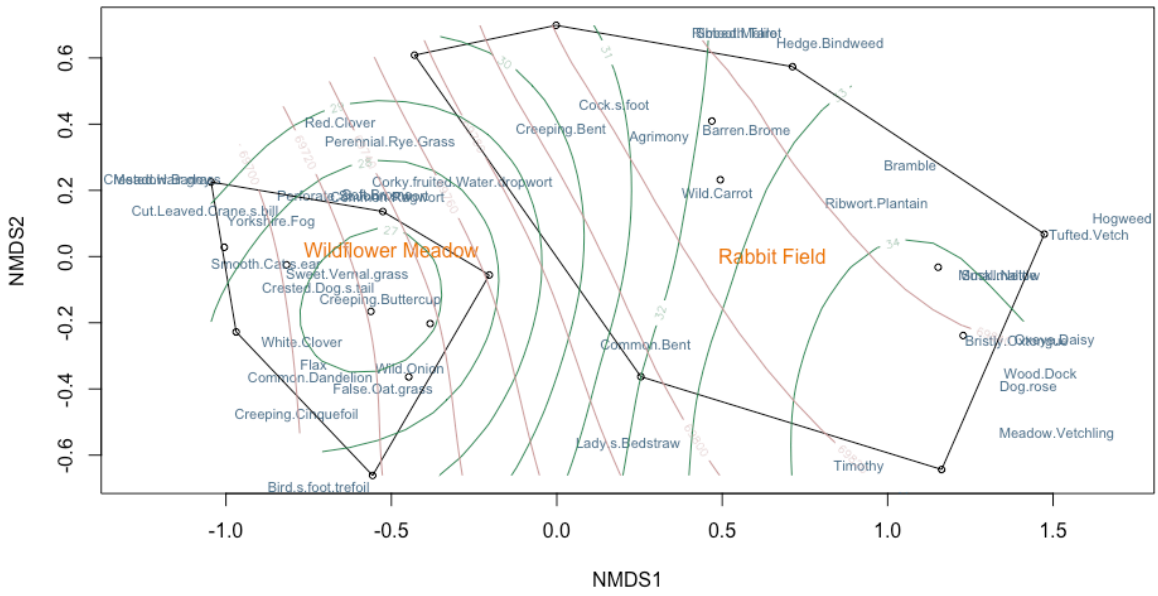


Figure 8: Overlapping and coinciding variation causality of Area, Northing and Altitude.

Since Altitude within each Area varies on an east to west axis it is surprising that the Easting (Appendix 7.6) of the plot has such little significance (p=0.92) and explains so little of the variation (0.95%) when altitude explains so much (41.9%). However again, the plots in the Rabbit Field are all generally at a higher altitude than the Wildflower Meadow, so the causality of the variation seams more likely due to the difference in management of the Areas.

A more accurate GPS device with finer calibrations would have given higher quality data and more precise location and altitude readings to analyse.

The soil pH had a mean of 5.625 (Standard Deviation (SD)=0.123) putting soil across the site in the Neutral Grassland Category (JNCC, 2019) in line with the inventory in the Manor Woods Valley Groups Management Plan (MWVG, 2019).

The mean pH in the Wildflower Meadow was higher at 5.65 (SD=0.143) than the Rabbit Field with a mean pH of 5.6 (SD=0.105). Since the control readings had a SD of 0.179 about a mean of 6.345, and a Standard Error (SE) of 0.179106 the accuracy of the readings is less than desirable. However, as all the soil readings fell below the control readings we can assume the mild acidic nature of the soil is correct.

Variation within the pH is very small and as such, with a p value of 0.843 it only accounts for 1.8% of the community variation. This lack of impact can be seen in the NMDS plot of pH (Appendix 7.6) with each variation bar representing the mean pH of the soil samples.

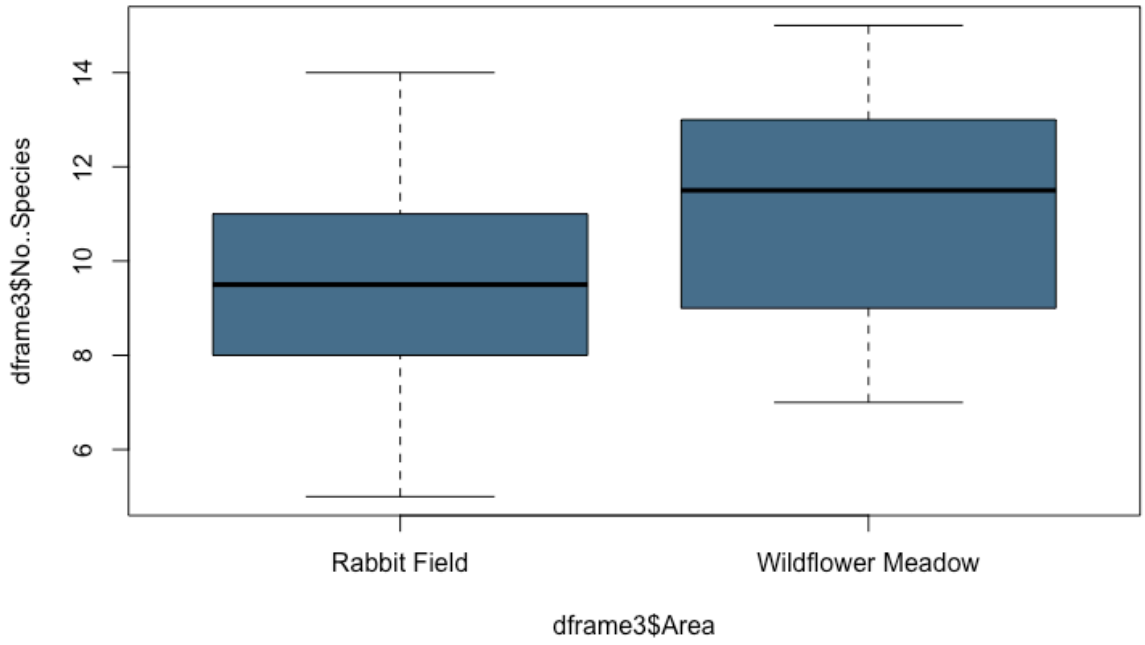


Figure 9: Relative number of species per survey plot within the Rabbit Field and Wildflower Meadow.

Although there were fewer species overall (27) in the Wildflower meadow compared to the Rabbit field (33), the number of species per plot was higher. As well as this the positive indicator species in the Meadow were also higher in number.

The presence of perennial rye grass across the 2 sites (more predominantly in the Wildflower meadow than the Rabbit field where it was only present in 2 plots (albeit in high numbers)) is a key indicator that nutrient levels in the soil may be high, a poor sign in neutral grassland (Price, 2021) (JNCC, 2004). However, this could also be due to the proximity of the Wildflower Meadow to the amenity Grassland which it abuts. The high numbers of false-oat grass and the Prescence of Cock's foot, again mostly in the Wildflower Meadow also suggest undermanagement of the grassland, also indicating a potential for low species diversity (Price, 2021).

Although Common Knapweed was only picked up in one quadrat, by inspection there were a number of patches of this positive indicator species (JNCC, 2004). Likewise Common Birds-foot trefoil, although only picked up in 5 plots, was notably prescent across the Wildflower Meadow by visual inspection, this “preferential taxa” indicating the quality of the grassland. It's lack of sighting in the Rabbit field is notable by contrast.

The small presence of red clover, another desirable herb (Costley, 2015) is a hopeful sign, as are the dense patches of lady’s bedstraw, an old meadow indicator species (Costley, 2015), which is a positive to observe in such abundance on this reserve. The presence of local specialities such as the Corky-Fruited Water-Dropwort Umbellifer is also a positive indication, as is the diversity of the species found within these two grassland areas (JNCC, 2019).

It is notable that many of the species observed in the Rabbit Field, but not observed in the Wildflower Meadow, when referred to in the Collins Wildflower Guide (Streeter *et.al.*, 2018) were indicative of scrub, rough grassland, and in many instances also waste ground, highlighting the very different nature of the communities in this area. Indeed this area had been a waste land for some time between BCC ceasing management and the more recent cutting away of the scrub to re-open up the grassland area.

4. Conclusion

Analysis and interrogation of the data collected gives a clear conclusion that the communities of the Wildflower Meadow and the Rabbit Field are different, despite some similarity. With the Area being the most significant variable in explaining this variation, it can be concluded that the historic use and previous and current management of those 2 areas explain these differences and variations.

5. Recommendations for Further Work

Although internationally Grasslands have seen less destruction than other habitats, some regions have seen greater losses (Sodhi and Ehrlich, 2011). Within the UK we lost around 97% of wildflower meadow from the 1930s to 1984 (State of Nature, Hayhow *et.al.*, 2019). As such it is vital to protect and maintain the remaining pockets, and return any undermanaged grasslands back to their former glory to support the wider ecosystem, especially habitat specialists of this fragmented and threatened habitat (Bayliss *et.al.*, 2003).

Undertaking of community analysis across all of the Grassland areas within the Manor Woods Valley, as well as completing a National Vegetation Classification survey to determine the exact nature of the neutral grasslands would give wider, more detailed insight into the reserve and better guide the best methods of further management, and how the grasslands relate to each other in the wider ecological network of the valley, and its wider surroundings.

Initial guidance would be to continue the hay meadow management and single annual cut of the Wildflower Meadow, as this is shown to have beneficial effect on a Plant Life reserve in Herefordshire (Costley, 2015). Although livestock were used for grazing the aftermath, and are potential vectors for species dispersal, this would not be a recommended strategy for this site due to the nature of the LNR’s high use as a dog walking area, and children’s playing area for the local community. Adding to this the increase in human management of grasslands via livestock grazing that has increased carbon emissions (Chang *et.al.*, 2021) it is recommended that the hay cut is taken by hand.

The partial reclamation of the Rabbit field from bramble and scrub has enabled it to regenerate as a grassland, and the annual cutting back of the brambles and scrub should be maintained to prevent

the natural plant succession process that has led to the loss of many lowland grasslands throughout the UK (JNCC 2019).

6. References and Bibliography

MWVG (2020) *Manor Woods Valley – the wildflower meadows*. [online] Available from: https://manorwoodsvalley.files.wordpress.com/2020/11/the-meadows-of-manor-woods-valley-a-brief-guide.pdf [Accessed 11 July 2023]

MWVG (2019) *Manor Woods Valley, Bishopsworth, Management Plan* [online]. Available from: https://manorwoodsvalley.files.wordpress.com/2019/11/mwv-management-plan-v3-0.pdf [Accessed 30 June 2023]

MWVG (2021) *Grassland.* [online] Available from: https://manorwoodsvalley.files.wordpress.com/2021/07/manor-woods-valley-grassland.pdf [Accessed 11 July 2023]

OS (2023) *OS Locate App: Check your location, even with no mobile signal.* Available from: https://shop.ordnancesurvey.co.uk/apps/os-locate/ [Accessed 11 July 2023]

HANNA Instruments (2023) *How To Test PH In Soil: The Complete Guide.* Available from: https://www.hannainstruments.co.uk/blog/post/37-how-to-test-ph-in-soil-the-complete-guide [Accessed 11 July 2023]

Price, D. (2021*) A Field Guide to Grasses, Sedges and Rushes.* Version 13. The Species Recovery Trust

JNCC (2004) *Common Standards Monitoring Guidance for Lowland Grassland Habitats.* [online] Available from: https://data.jncc.gov.uk/data/15a03fed-f306-4f01-9139-4933e814b9ec/CSM-LowlandGrasslandHabitats-2004.pdf [Accessed 6 July 2023]

Rodwell, J. S. (2006) *National Vegetation Classification: Users' handbook.* JNCC [online] Available from: https://data.jncc.gov.uk/data/a407ebfc-2859-49cf-9710-1bde9c8e28c7/JNCC-NVC-UsersHandbook-2006.pdf [Accessed 6 July 2023]

R Core Team (2021). R: A language and environment for statistical computing. [computer program]. Available from: https://www.R-project.org/ [Accessed 18 July 2023]

JNCC (2019) *Guidelines for the Selection of Biological SSSIs: Part 2: Detailed Guidelines for Habitats and Species Groups: Chapter 3 Lowland Grasslands.* Available from: https://data.jncc.gov.uk/data/cf50f420-1b38-4253-89f8-1cb7ba010f27/SSSI-Guidelines-3-LowlandGrasslands-2019.pdf [Accessed 17 July 2023]

Streeter, D., Hart-Davies, C., Hardcastle, A. Cole, F. and Harper, L. (2018) *Collins Wild Flower Guide*. 2nd Edition. London: William Collins.

Natural England 1 (2023) *Magic.* Available from: https://magic.defra.gov.uk/MagicMap.aspx [Accessed 5 July 2023]

Natural England 2 (2023) *Natural England Open Data Geoportal. Local Nature Reserve Geodata.* Available from: https://naturalengland-defra.opendata.arcgis.com/datasets/local-nature-reserves-england/explore?location=52.694808%2C-1.948537%2C7.98 [Accessed on 19 July 2023]

Rose, F. and O'Reilly, C. (2006) *The Wild Flower Key.* 2nd Edition. London: Frederick Warne.

Sodhi, N. S. and Ehrlich, P. R. (2011) *Conservation Biology For All.* Oxford University Press.

Hayhow, D.B., Eaton, M.A., Stanbury, A.J., Burns, F., Kirby, W.B., Bailey, N., Beckmann, B., Bedford, J., Boersch-Supan, P.H., Coomber, F. and Dennis, E.B. (2019). *State of nature 2019.* [online] Available from: https://nora.nerc.ac.uk/id/eprint/525772/1/N525772CR.pdf [Accessed 20 July 2023]

J. Costley (2015) Meadow management increased plant species diversity in a species-poor, neutral grassland in Herefordshire, UK. *Conservation Evidence*, *12*, pp.40-42. [online]. Avilable from: https://conservationevidencejournal.com/reference/pdf/5502 [Accessed 17 July 2023]

Bayliss, J., Helyar, A., Lee, J.T. and Thompson, S. (2003). A multi-criteria targeting approach to neutral grassland conservation. *Journal of Environmental Management.* 67(2), pp.145-160. [online] Available from:https://www.sciencedirect.com/science/article/pii/S0301479702002025?casa_token=QaZnqHb2Ct0AAAAA:EbmMWXM3rFCkcQLlQD7lsDrJ6nsbsavoXd1NE3rJn-228i60LJfkDsfqoEYK4n_DzEP9J-Y [Accessed 18 July 2023]

Chang, J., Ciais, P., Gasser, T., Smith, P., Herrero, M., Havlík, P., Obersteiner, M., Guenet, B., Goll, D.S., Li, W. and Naipal, V. (2021) Climate warming from managed grasslands cancels the cooling effect of carbon sinks in sparsely grazed and natural grasslands. *Nature Communications*, *12*(1), p.118. [online] Available from: https://www.nature.com/articles/s41467-020-20406-7.pdf [Accessed 18 July 2023]

7. Appendix

7.1 Community Data

Plot	Corky-Fruited Water-dropwort	Cut-Leaved Crane's-bill	Meadow Barley	Perennial Rye Grass	Soft Brome	Crested Dog's-tail	Crested Hair-grass	White Clover	Smooth Cat's-ear	Wild Carrot	False Oat-grass	Lady's Bedstraw	Common Dandelion	Bird's-foot-trefoil	Common Bent	Cock's Foot	Creeping Buttercup	Creeping Cinquefoil	Common Ragwort	Wild Onion	Flax	Perforate St John's-wort	Sweet Vernal-grass	Yorkshire Fog	Agrimony	Red Clover	Timothy	Bristly Oxtongue	Common Knapweed	Yarrow	Meadow Vetchling	Bramble	Wood Dock	Hogweed	Tufted Vetch	Ox-eye Daisy	Hedge Bindweed	Small Nettle	Musk-mallow	Creeping Bent	Ribwort Plantain	Dog-rose	Barren Brome	Smooth Tare	Ribbed Melilot	Blackthorn
WFM1	45	1	13	11	25	5	4	26	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WFM2	12	0	0	6	0	13	0	18	0	3	13	54	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WFM3	0	0	0	15	0	2	0	3	1	5	17	0	0	0	43	7	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WFM4	4	0	0	0	0	2	0	6	0	0	31	0	0	55	7	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WFM5	12	0	0	5	0	16	0	13	0	3	5	0	1	0	7	3	3	0	3	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WFM6	0	0	0	15	15	9	0	12	1	0	13	0	1	0	0	0	6	0	0	3	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WFM7	1	0	0	20	18	10	0	20	0	1	28	0	0	3	7	3	0	10	1	0	5	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WFM8	2	0	0	32	22	2	0	5	0	0	7	0	0	2	5	7	0	2	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WFM9	14	2	0	3	6	7	0	18	0	0	21	0	1	0	0	1	1	2	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WFM10	7	0	13	3	10	18	4	7	1	0	11	0	0	26	0	0	1	1	0	0	0	0	0	2	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RF1	0	0	0	0	0	0	0	0	0	1	0	18	0	0	5	0	0	0	0	0	0	0	0	0	0	0	10	3	10	9	11	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0
RF2	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	6	0	9	4	4	1	7	1	4	0	0	0	0	0	0	0	0	0	0	0
RF3	0	0	0	0	0	0	0	0	0	3	0	0	0	13	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	2	0	3	3	0	1	0	3	3	1	0	0	0	0	0	0	0
RF4	20	0	0	0	0	0	0	0	0	9	20	28	0	0	18	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3	0	0	0	0	0	0	4	0	0	0	0	0	0	0
RF5	0	0	0	0	0	0	0	0	0	7	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	1	2	0	0	4	0	0	0	0	3	2	0	0	0	0
RF6	2	0	0	0	11	0	0	0	0	14	0	0	0	0	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	16	0	0	0
RF7	36	0	0	48	0	0	0	0	0	0	1	1	0	0	1	3	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0	0	0	0	0	4	0	0	1	0	0	0	0	0	0
RF8	14	0	0	3	3	0	0	0	0	9	0	0	0	0	3	17	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	2	0	0	0	0	3	0	0	1	8	0	0	1	1	0
RF9	2	0	0	0	0	0	0	0	0	11	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0
RF10	14	0	0	33	2	10	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	5

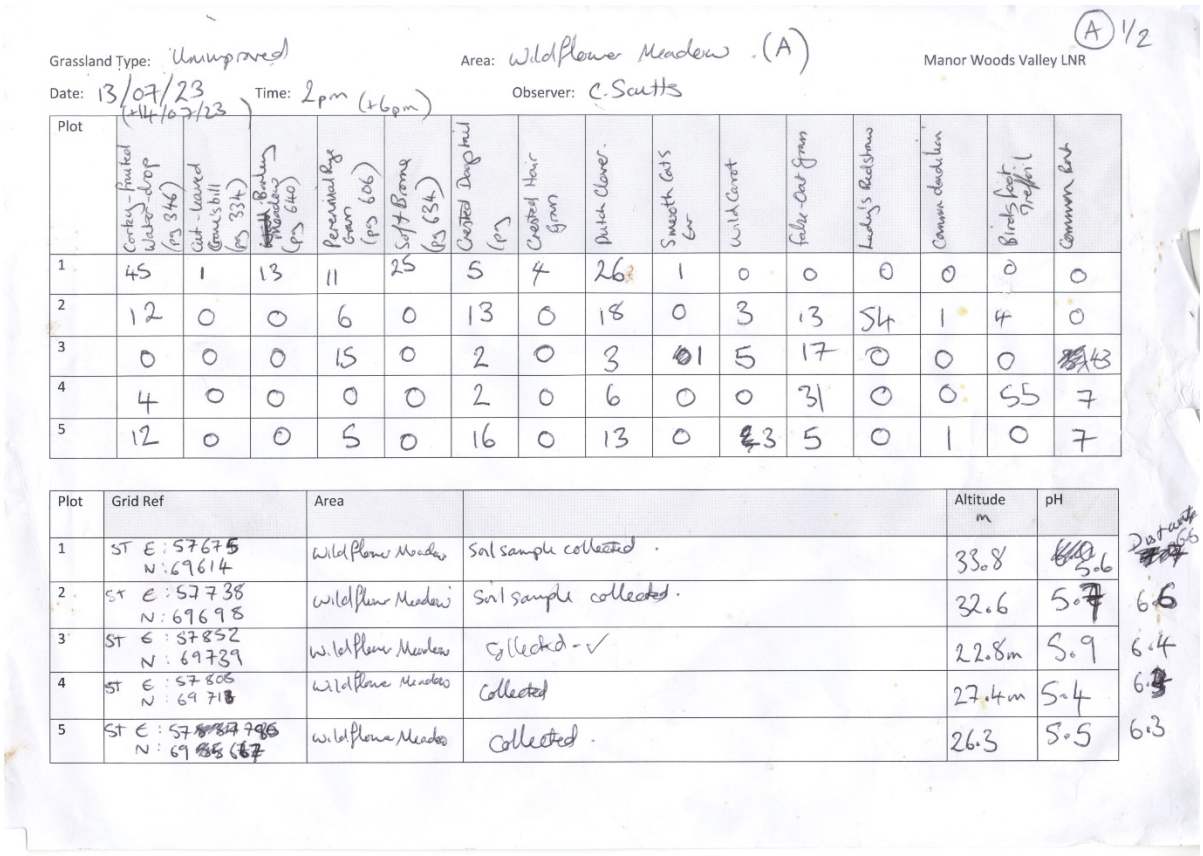
7.2 Habitat Data

Plot	Grid Ref	Area	Altitude n	pH	Control pH
1	ST 57675 69614	Wildflower Meadow	33.8	5.6	6.5
2	ST 57738 69698	Wildflower Meadow	32.6	5.7	6.6
3	ST 57852 69739	Wildflower Meadow	22.8	5.9	6.4
4	ST 57808 69718	Wildflower Meadow	27.4	5.4	6.3
5	ST 57785 69667	Wildflower Meadow	26.3	5.5	6.3
6	ST 57877 69760	Wildflower Meadow	22.2	5.6	6.4
7	ST 57851 69761	Wildflower Meadow	23.1	5.8	6.5
8	ST 57819 69741	Wildflower Meadow	24.2	5.7	6.5
9	ST 57783 69742	Wildflower Meadow	29.4	5.6	6.5
10	ST 57712 69598	Wildflower Meadow	28.1	5.7	6.6
1	ST 57771 69836	Rabbit Field	33.8	5.6	6.3
2	ST 57770 69839	Rabbit Field	34.9	5.5	6.2
3	ST 57774 69843	Rabbit Field	34.5	5.5	6.4
4	ST 57777 69842	Rabbit Field	33.6	5.7	6.1
5	ST 57781 69834	Rabbit Field	34	5.8	6.5
6	ST 57786 69848	Rabbit Field	36.4	5.6	6.4
7	ST 57786 69840	Rabbit Field	32.6	5.6	6.2
8	ST 57791 69837	Rabbit Field	31.5	5.7	6.1
9	ST 57788 69831	Rabbit Field	31.2	5.5	6.1
10	ST 57797 69831	Rabbit Field	30.4	5.5	6

7.3 Habitat data formatted for MVA

ST Easting	ST Northir	Area	Altitude (r	pH
57675	69614	Wildflowe	33.8	5.6
57738	69698	Wildflowe	32.6	5.7
57852	69739	Wildflowe	22.8	5.9
57808	69718	Wildflowe	27.4	5.4
57785	69667	Wildflowe	26.3	5.5
57877	69760	Wildflowe	22.2	5.6
57851	69761	Wildflowe	23.1	5.8
57819	69741	Wildflowe	24.2	5.7
57783	69742	Wildflowe	29.4	5.6
57712	69598	Wildflowe	28.1	5.7
57771	69836	Rabbit Fie	33.8	5.6
57770	69839	Rabbit Fie	34.9	5.5
57774	69843	Rabbit Fie	34.5	5.5
57777	69842	Rabbit Fie	33.6	5.7
57781	69834	Rabbit Fie	34	5.8
57786	69848	Rabbit Fie	36.4	5.6
57786	69840	Rabbit Fie	32.6	5.6
57791	69837	Rabbit Fie	31.5	5.7
57788	69831	Rabbit Fie	31.2	5.5
57797	69831	Rabbit Fie	30.4	5.5

7.4 Field Data Collection Forms



Grassland Type: Unimproved Area: Wildflower Meadow (A) Manor Woods Valley LNR (A) 1/2

Date: 13/07/23 (+14/07/23) Time: 2pm (+6pm) Observer: C. Scutts

Plot	Corky-fruited Water-dropwort (ps 346)	Cut-leaved Cranesbill (ps 334)	Knapweed (ps 640)	Perennial Rye Grass (ps 606)	Soft Brome (ps 634)	Crested Dogstail (ps)	Crested Hair Grass	Dutch Clover	Smooth Oat Grass	Wild Carrot	False Oat Grass	Lady's Bedstraw	Common Knapweed	Birds Foot Trefoil	Common Ent
1	45	1	13	11	25	5	4	26	1	0	0	0	0	0	0
2	12	0	0	6	0	13	0	18	0	3	13	54	1	4	0
3	0	0	0	15	0	2	0	3	01	5	17	0	0	0	43
4	4	0	0	0	0	2	0	6	0	0	31	0	0	55	7
5	12	0	0	5	0	16	0	13	0	3	5	0	1	0	7

Plot	Grid Ref	Area		Altitude m	pH	
1	ST E: 57675 N: 69614	Wildflower Meadow	Soil sample collected.	33.8	5.6	Dot-and-dash 6.6
2	ST E: 57738 N: 69698	Wildflower Meadow	Soil sample collected.	32.6	5.7	6.6
3	ST E: 57852 N: 69739	Wildflower Meadow	Collected - ✓	22.8m	5.9	6.4
4	ST E: 57808 N: 69718	Wildflower Meadow	Collected	27.4m	5.4	6.3
5	ST E: 57 N: 69	Wildflower Meadow	Collected.	26.3	5.5	6.3

Grassland Type: Unimproved　　Area: Wildflower Meadow (A)　　Manor Woods Valley LNR　　(A) 2/2

Date: 14/07/23　　Time:　　Observer: C. Scutts

Plot	Cock's Foot	Creeping Buttercup	Creeping Cinquefoil	Common Ragwort	Wild Onion	Fairy Flax									
1	0	0	0	0	0	0									
2	0	0	0	0	0	0									
3	7	4	0	0	0	0									
4	0	0	7	0	0	0									
5	3	3	0	3	1	4									

Plot	Grid Ref	Area		Altitude	pH
1					
2					
3					
4					
5					

Grassland Type: Unimproved.　　Area: WFM　　Manor Woods Valley LNR　　(A) 3 3/4

Date: 15/07/23　　Time: 6pm　　Observer: C. Scutts

Plot	Corky-fruited Water-dropwort	Cut-leaved Crane's-Bill	Meadow Barley	Perennial Rye Grass	Soft Brome	Crested Dog's-tail	Crested Hair-grass	Dutch Clover	Smooth Cat's-ear	Wild Carrot	False-Oat Grass	Lady's Bedstraw	Common Dandelion	Bird's-foot Trefoil	Common Bent
6	0	0	0	15	15	9	0	12	1	0	13	0	1	0	0
7	1	0	0	20	18	10	0	20	0	1	28	0	0	3	7
8	2	0	0	32	22	2	0	5	0	0	7	0	0	2	5
9	14	2	0	3	6	7	0	16	0	0	21	0	1	0	0
10	7	0	13	3	10	18	4	7	1	0	11	0	0	26	0

Plot	Grid Ref	Area	Soil Sample · Collected	Altitude	pH	Dist. water before
1 6	ST E: 57 878 N: 69 760	WFM	✓	22.2m	5.6	6.4
2 7	ST E: 57 851 N: 69761	WFM	✓	23.1m	5.8	6.5
3 8	ST E: 57 819 N: 69 742	WFM	✓	24.2	5.7	6.5
4 9	ST E: 57 783 N: 69 742	WFM	✓	29.4	5.6	6.5
5 10	ST E: 57 712 N: 69 594	WFM	✓	28.1	5.7	6.6

Grassland Type: Unimproved Area: WFM Manor Woods Valley LNR A1 4/4

Date: Time: Observer: C. Scutts.

Plot	Cock's foot	Creeping Buttercup	Creeping Cinquefoil	Common Ragwort	Wild Carrot	Ribwort Plantain	Perforated St John's wort	Sweet Vernal grass	Yorkshire fog	Yarrow	Red Clover	Meadow Foxtail			
1 6	0	0	6	0	0	3	10	8	0	0	0	0			
2 7	3	0	10	1	0	5	0	3	0	0	0	0			
3 8	7	0	2	0	0	0	0	#1	2	1	0	0			
4 9	1	1	2	0	0	0	0	#	#1	0	3	0			
5 10	0	#1	1	0	0	0	0	0	2	0	1	2			

Plot	Grid Ref	Area		Altitude	pH
1 6					
2 7					
3 8					
4 9					
5 10					

Grassland Type: Unimproved Area: Rabbit Field plots 1-5 1/2

Date: 16/07/23 Time: Observer: C. Scutts. Manor Woods Valley LNR

Plot	Bristly Oxtongue	Hoary Ragwort	Common Knapweed	Meadow Grass	Yarrow	Wild Carrot	Meadow Vetchling	Bramble	Wood Dock	Hogweed	Common Bent	Tufted Vetch	Oxeye Daisy	(Hedge) Bindweed	Small Nettle
1	3	18	10	#10	9	1	#11	1	3	0	5	6	0	0	0
2	6	1	0	1	0	0	9	#4	4	1	3	7	1	4	0
3	#5	0	0	0	2	3	0	3	3	0	13	#1	0	3	3
4	0	28	0	0	#1	#9	0	0	0	0	18	0	0	0	0
5	11	0	0	0	0	7	0	1	2	0	10	0	4	0	0

Plot	Grid Ref	Area	Soil Sample Collected?	Altitude	pH
1	ST E: 57771 N: 69836	RF	✓	33.8	5.6
2	ST E: 57770 N: 69839	RF	✓	34.9	5.5
3	ST E: ~~57772~~ 57774 N: 69843	RF	✓	34.5	5.5
4	ST E: 57772 N: 69842	RF	✓	33.6	5.7
5	ST E: 57781 N: 69834	RF	✓	34	5.8

Dist 6.3 6.2 6.4 6.1 6.5

plots 1-5 2/2

Grassland Type: | Area: | Manor Woods Valley LNR

Date: | Time: | Observer:

Plot	Agrimony	Musk Mallow	~~Sweet~~ ~~Soft~~ Creeping Bent	Corky fruited Water Drop	False Oat grass	Ribwort Plantain	Dog Rose								
1	0	0	0	0	0	0	0								
2	0	0	0	0	0	0	0								
3	5	1	0	0	0	0	0								
4	2	0	4	20	2	0	0								
5	0	0	0	0	0	3	2								

Plot	Grid Ref	Area		Altitude	pH
1					
2					
3					
4					
5					

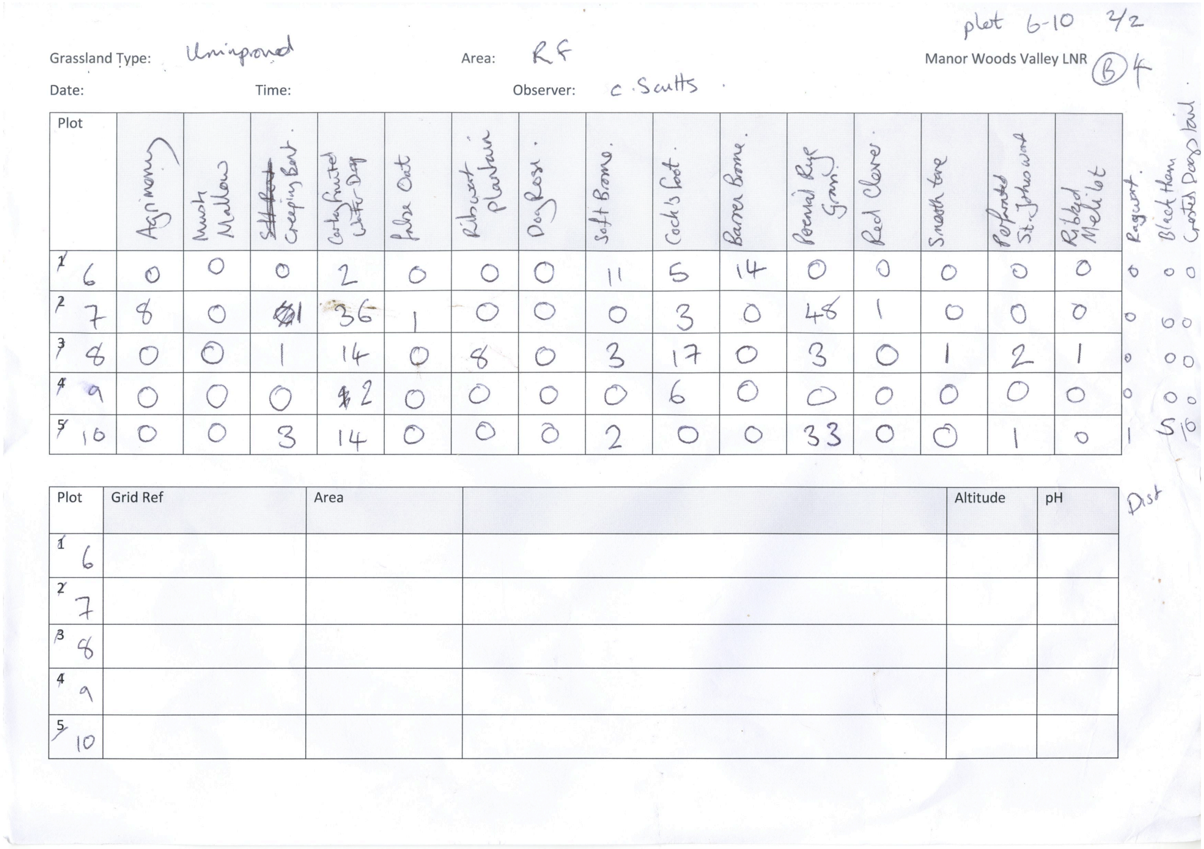
plots 6-10 1/2

Grassland Type: Unimproved | Area: RF | Manor Woods Valley LNR (B) 3

Date: | Time: | Observer: C. Scutts.

Plot	Bristly oxtongue	Lady's Bedstraw	C. Knapweed	Timothy	Yarrow	Wild Carrot	Meadow Vetchling	Bramble	Wood Dock	Hogweed	C. Bent	Tufted Vetch	Oxeye Daisies	(Hedge) Bindweed	Small Nettle
6	0	0	0	0	0	14	0	1	0	0	1	0	0	0	0
7	0	1	0	0	0	0	0	0	0	0	1	0	0	4	0
8	1	0	0	0	0	9	0	2	0	0	3	0	0	3	0
9	0	0	0	0	0	11	0	2	0	0	0	0	0	1	0
10	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0

Plot	Grid Ref	Area		Altitude	pH	Dist water before
6	ST: E: 57786 N: 69848	RF	✓	36.4	5.6	6.4
7	ST E: 57786 N: 69840	RF	✓	32.6	5.6	6.2
8	ST E: 57791 N: 69837	RF	✓	31.5	5.7	6.1
9	ST E: 57788 N: 69831	RF	✓	31.2	5.6	6.2
10	ST E: 57797 N: 69831	RF	✓	30.4	5.5	6.0



plot 6-10 4/2

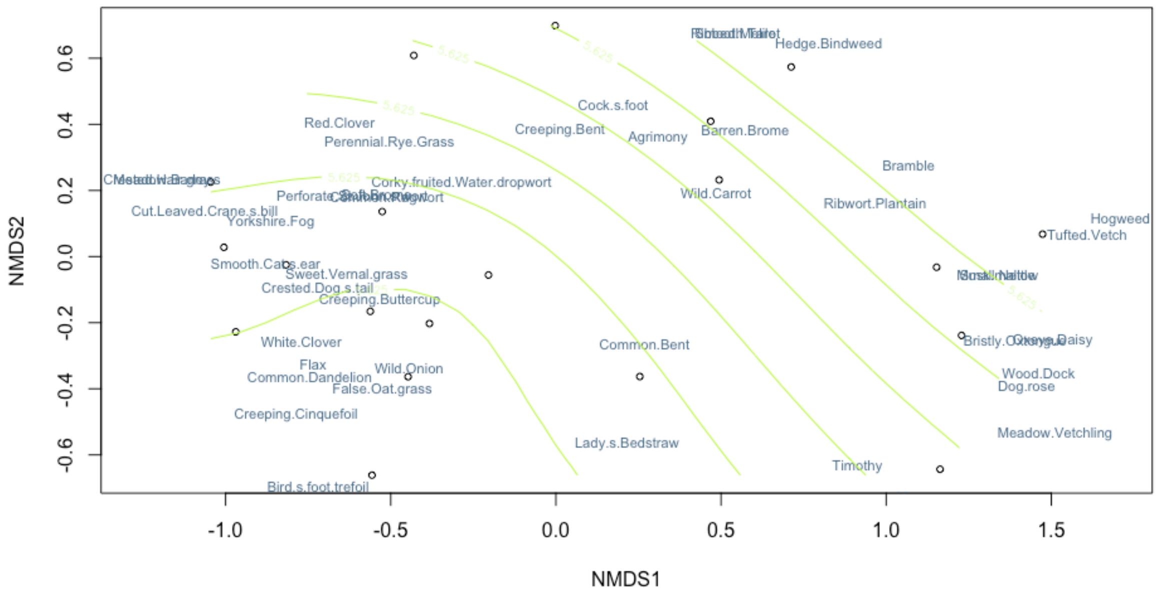
Grassland Type: Unimproved Area: RF Manor Woods Valley LNR (B) 4

Date: Time: Observer: C. Scutts

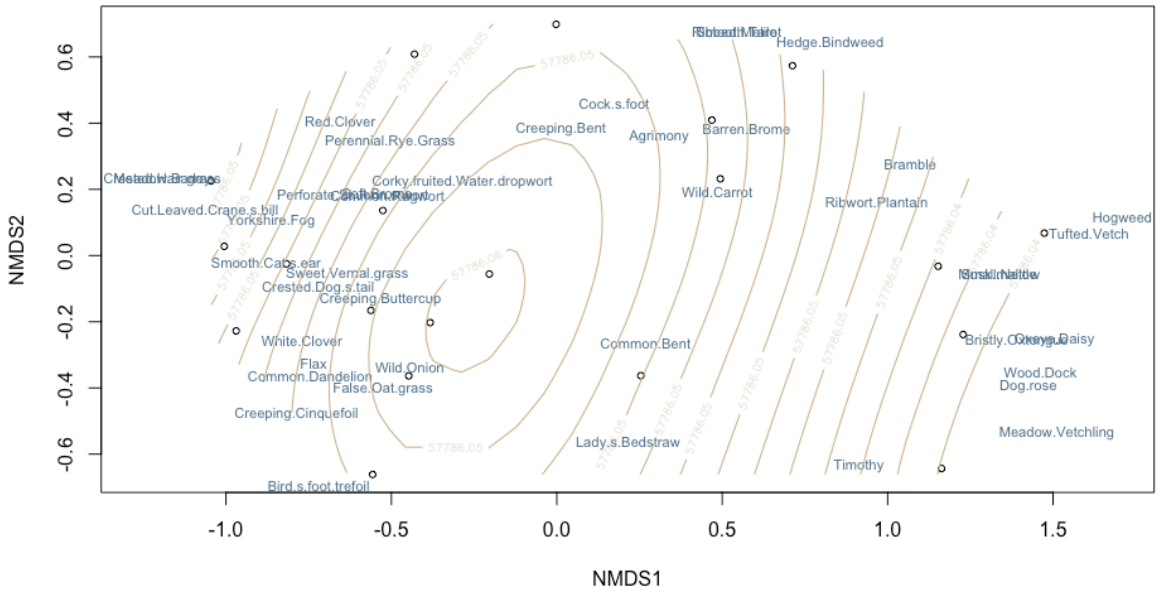
Plot	Agrimony	Marsh Mallow	~~Soft Brome~~ Creeping Bent	Corky fruited Water Drop	False Oat	Ribwort Plantain	Dog Rose	Soft Brome	Cock's foot	Barren Brome	Perennial Rye Grass	Red Clover	Smooth tare	Perforated St John's wort	Ribbed Melilot	Ragwort	Black Hawk	Crested Dog's tail
~~1~~ 6	0	0	0	2	0	0	0	11	5	14	0	0	0	0	0	0	0	0
~~2~~ 7	8	0	41	36	1	0	0	0	3	0	48	1	0	0	0	0	0	0
~~3~~ 8	0	0	1	14	0	8	0	3	17	0	3	0	1	2	1	0	0	0
~~4~~ 9	0	0	0	2	0	0	0	0	6	0	0	0	0	0	0	0	0	0
~~5~~ 10	0	0	3	14	0	0	0	2	0	0	33	0	0	1	0	1	5	10

Plot	Grid Ref	Area		Altitude	pH	Dist
~~1~~ 6						
~~2~~ 7						
~~3~~ 8						
~~4~~ 9						
~~5~~ 10						

7.5 pH ordisurf plot



7.6 Easting ordisurf plot



7.7 Risk Assessment

GENERAL RISK ASSESSMENT FORM

Ref:

University of the West of England

Describe the activity being assessed:	**Assessed by:** Jim Vafidis	**Endorsed by:** Tom Carter
Off-campus postgraduate practical activity. The activity will take place at Manor Woods Valley in Bishopsworth, South Bristol for one postgraduate student during daylight hours. The student will undertake a plant survey involving the use of a quadrat where species of plant will be identified and recorded. Soil sampling and pH testing will also be undertaken. The planned activity will take around 8 hours. HAS safe systems of work will be adhered to at all times, with particular attention paid to SS0W11 Incidental Exposure to Hazardous Microorganisms (https://intranet.uwe.ac.uk/sites/hlshas/Pages/Biological-Safety.aspx)		
Who might be harmed: 1 Student Cat Scutts **How many exposed to risk:**	**Date of Assessment:** 11/07/23	**Review date(s):** 11/07/24

Hazards Identified ***(state the potential harm)***	**Existing Control Measures**	**S**	**L**	**Risk Level**	**Additional Control Measures**	**S**	**L**	**Risk Level**	**By whom and by when**	**Date completed**

Weather – **exposure to wet and windy weather,** leading to illness or hypothermia. **Weather** – **exposure to warm and sunny weather** leading to sunburn, dehydration or hyperthermia.	Activity to take place in July when the weather is most likely to be warm and dry, but it may be cold, wet and windy, or it may be hot and sunny.	3	2	6	Avoid working in poor weather conditions by planning work in conjunction with weather forecast. If very poor working conditions are forecasted (e.g., an amber or red weather warning), the planned activity will be postponed for another day/cancelled. Work must not be conducted in the event of an amber or red weather warning. Student to check weather forecast and any weather warnings on the day of the activity before departure. Student to assess weather on arrival and continue to assess weather throughout the activity. If weather deteriorates, student will consider briefly taking shelter somewhere on site or ending the activity. Student will bring and wear appropriate clothing dependent on the expected weather on the day. If weather is warm and/or sunny, student will wear light clothing that covers arms and legs (for protection from the sun). Student is advised to apply sun cream to exposed skin and have a sunhat and sunglasses to hand. If weather is cool/wet warm clothes and waterproofs should be worn	3	1	3	Student before the activity and during the activity. Student before the activity Jim Vafidis (module leader) before the activity Jim Vafidis before the	

Working in remote areas. Not being able to summon help if needed.	Student will be working in a public nature reserve and will not be working in remote areas. Student is advised to carry a charged mobile phone with them at all times. Mobile coverage at this site is unknown. Though the site is surrounded by residential properties on most of the boundarys. Signal is expected to be ok.	4	1	4		4	1	4	student, On the day of the activity Jim Vafidis, before the activity	
Working in areas without toilet facilities or shelter.	Reserve is the closest LNR to home and not too long a walk away. No running water, toilet or hand washing facilities on site. Will impede comfort and hygiene during the day.	3	1	3	Work out where the closest available public toilet facilities are. (Possibly Bishopsworth Library depending on day/time, possibly Headly Park Church, or Headly Park Community Centre, or the Maytree Pub) Possibility to split the surveying into multiple shorter trips to reduce the amount of time without access to facilities.	1	1	1	Student, before the activity.	
Slips/trips/falls when walking to the field sites leading to minor cuts and abrasions; broken limbs; sprained ankles.	Student is advised to wear appropriate footwear, i.e., sturdy walking boots with good ankle support. Student is advised to take care and to watch footing whilst walking during the activity particularly where the ground may be wet or slippery.	3	1	3		3	1	3	Jim Vafidis, before the activity	

Contraction of Lyme's disease from a tick bite.	Tick bites are more common in Spring/ Summer months, than in Autumn/Winter months. Student is advised that working in the field carries the risk of picking up ticks. Student is advised to wear long trousers tucked into their socks so that ticks cannot attach or climb up the leg. Ideally light-coloured clothing so that ticks are visible.	3	1	3	Check for ticks on your body after you have been out in the field. If ticks are found, remove as soon as possible with a tick-removing tool. These can be/will be part of the first-aid kit. Already in first aid kit. Student to take kit with her. If you develop any of the following symptoms: Headache, Extreme Fatigue, a typical bull's eye rash, spreading outwards not necessarily in the area of the bite - seek medical advice and mention you have experienced a tick bite.	3	1	3	Student during and after the activity. student, if concerned	
Bites or adverse reactions caused by plants and animals e.g. contact with nettles, dogs, wild mammals, birds, biting/ stinging insects etc, leading to rashes, physical injury.	Student is advised to: 1) Avoid coming into extensive contact with plants, and wear long trousers & sleeves when working in long grass. 2) Avoid close proximity with insect nests (e.g. ant, bee, wasp). 3) not provoke or approach wildlife (e.g. wild mammals, birds or reptiles), ensure minimal disturbance of habitats and avoid contact with pets.	3	2	6	In the event of a minor sting/cut/bite, participants to consider seeking medical attention, depending on severity. In the event of a moderate sting/cut/bite (such as a large cut or an animal bite), student to seek emergency medical attention (call 111 or 999).	3	1	3	student, throughout activities.	

Bites or injury caused by dogs being walked on the reserve. (no restriction of dog walking on reserve and popular site for for walking)	Untrained Dogs may be walked off lead and may interfere with the survey or behave aggressivly leading to bite injury.	3	1	3	Student to remain alert and calm and not provoke any dogs who approach.	3	1	3	Student, throughout activity	
Contact with plants/animals leading to allergic reaction or anaphylactic shock.	Student does not have any known allergies relating relating to this activity other than mild hayfever.	5	1	5	Anti-histemines carried incase of hayfever flare up. Bite/sting cream to be carried in First aid kit,	2	1	2	student, throughout activities.	
Coming into contact with moving road traffic or off-road vehicles leading to physical injury	No activities will take place close to the road side.	5	1	5	Be aware of traffic. Do not cross roads on blind bends or near hill crests. If any roads are to be crossed, use designated crossing points where possible. Stay vigilant for off-road vehicles (e.g. 4x4s, golf buggy, lawnmower), ensure you are visible to any in the nearby proximity, and avoid getting close to them when moving.	5	1	5	Student, throughout activities.	

Incidental ingestion of dirty water, dirt or faeces when eating leading to infection and severe illness. Agents that can cause GI tract infections are common in the environment, particularly where animal excrement is present. Other infectious agents in the environment such as *Salmonella*, *E. coli* O157, *Campylobacter* and other infectious agents	Student has been informed before the activity about the risk of contracting an infection through incidental ingestion or inhalation of contaminated matter during fieldwork. Student will be advised to maintain normal hygiene practices such as washing hands thoroughly with soap and running water before any lunch or refreshment breaks (See above re. Toilet Facilities) Student is advised to avoid contact with animal excrement wherever possible and washing of hands (with running water and soap) as soon as possible if contact occurs. HAS safe systems of work will be adhered to at all times, with particular attention paid to SS0W11 Incidental Exposure to Hazardous Microorganisms (https://intranet.uwe.ac.uk/sites/hlshas/Pages/Biological-Safety.aspx)	4	1	4	Hand spray and hand wipes to be taken and used by student if no access to running water and soap can be found. Hands will be thoroughly washed with soap and water at the first opportunity after the activity.	4	1	4	Jim Vafidis, Before the activity Student throughout activity.	

				Student to inform friends/family of location and expected time of survey and will check in on return and possibl						

RISK MATRIX: (To generate the risk level).

Very likely 5	**5**	**10**	**15**	**20**	**25**
Likely 4	**4**	**8**	**12**	**16**	**20**
Possible 3	**3**	**6**	**9**	**12**	**15**
Unlikely 2	**2**	**4**	**6**	**8**	**10**
Extremely unlikely 1	**1**	**2**	**3**	**4**	**5**
Likelihood (L) ↑ → **Severity (S)**	**Minor injury – No first aid treatment required 1**	**Minor injury – Requires First Aid Treatment 2**	**Injury - requires GP treatment or Hospital attendance 3**	**Major Injury 4**	**Fatality 5**

ACTION LEVEL: (To identify what action needs to be taken).

POINTS:	RISK LEVEL:	ACTION:
1 – 2	NEGLIGIBLE	No further action is necessary.
3 – 5	TOLERABLE	Where possible, reduce the risk further
6 - 12	MODERATE	Additional control measures are required
15 – 16	HIGH	Immediate action is necessary
20 - 25	INTOLERABLE	Stop the activity/ do not start the activity