VEGETATION SURVEY OF LAND AT MILL OF PLUNTON, DUMFRIES & GALLOWAY, IN JUNE 2022



Ben and Alison Averis

6A Castle Moffat Cottages, Garvald, Haddington, East Lothian, EH41 4LW
Tel: 07767 058 322 (Ben) / 07387 970 667 (Alison)
E-mail: ben.averis@gmail.com / alisonaveris@gmail.com Website: www.benandalisonaveris.co.uk

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1 INTRODUCTION

This survey was commissioned by Future Forest Company Ltd to produce a vegetation map of an area of land at Mill of Plunton, Dumfries & Galloway, to inform future decisions on management of this site. The site measures 91 hectares in area and its approximate centre is at Ordnance Survey grid reference NX 62510 51214, about 5.5 kilometres west of Kirkcudbright. It is on level to gently undulating land 50-100 metres above sea level.

The bedrock is sedimentary Wacke of Silurian age, partly overlain with glacial deposits and alluvium (http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html).

Much of the site is currently grazed by cattle.

2 SURVEY METHODS

The fieldwork for this survey was carried out by Ben and Alison Averis on 29th June 2022.

The habitats were mapped using the National Vegetation Classification (NVC; Rodwell 1991 *et seq*). Many of the mapped vegetation units (polygons) contain complex mosaics of two or more vegetation types; each of these polygons is labelled with the vegetation types present and an estimated percentage cover value for each type.

Notes were taken on the structure and species composition of each vegetation type, so that a description could subsequently be made of each type at this site as a whole.

Some vegetation was classifiable to NVC community level only because it did not show a clear fit with any particular NVC sub-community. Some other vegetation does not fit well into any NVC community or even into an intermediate between two NVC sub-communities, so it was labelled with a non-NVC code.

The vegetation polygons were numbered in a series from 1 to 226, and the data written into a spreadsheet containing one sheet for NVC and additional sheets for equivalent Phase One (JNCC 2010), EUNIS (European Nature Information System; https://www.eea.europa.eu/data-and-maps/data/eunis-habitat-classification-1) and UKHab (UK Habitat Classification; https://ukhab.org/) types.

A list was made of all plant species found in the survey, and notes were also made on the locations where we found plant species of special interest.

Nomenclature in this report follows Stace (2019) for vascular plants, Blockeel *et al*. (2021) for bryophytes and Smith *et al.* (2009) for lichens.

3 DESCRIPTIONS OF VEGETATION AND HABITAT TYPES

All vegetation and habitat types recorded in this survey are listed in Table 1 and described below. Photographs of many vegetation types are in Appendix 1. The vegetation map is in Appendix 2 and the polygon data are in Appendix 3. The maps and polygon/target note data have been digitised by Manta Ecology (http://mantaecology.co.uk/) who have presented the GIS files to Future Forest Company separately.

Table 1: list of vegetation and habitat types found by Ben and Alison Averis in this survey of land at Mill of Plunton, Dumfries & Galloway, on 29th June 2022

W2a *Salix cinerea-Betula pubescens-Phragmites australis* woodland, *Alnus glutinosa-Filipendula ulmaria* sub-community
W3 *Salix pentandra-Carex rostrata* woodland
W7a *Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland, *Urtica dioica* sub-community
W9a *Fraxinus excelsior-Sorbus aucuparia-Mercurialis perennis* woodland, Typical sub-community
W10 *Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland
W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland
W21 *Crataegus monogyna-Hedera helix* scrub
W22 *Prunus spinosa-Pteridium aquilinum* scrub
W23 *Ulex europaeus-Rubus fruticosus* agg scrub
W24 *Rubus fruticosus* agg-*Holcus lanatus* underscrub
W25a *Pteridium aquilinum-Rubus fruticosus* agg underscrub, *Hyacinthoides non-scripta* sub-community
M5 *Carex rostrata-Sphagnum squarrosum* mire
M22a *Juncus subnodulosus-Cirsium palustre* fen-meadow, Typical sub-community
M23a *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community
M23b *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community
M28a *Iris pseudacorus-Filipendula ulmaria* mire, *Juncus* spp sub-community
M28 Ocroc = M278 dominated by *Oenanthe crocata*
MG1 *Arrhenatherum elatius* coarse grassland
MG5c *Cynosurus cristatus-Centaurea nigra* meadow and pasture, *Danthonia decumbens* sub-community
MG6 *Lolium perenne-Cynosurus cristatus* pasture
MG7 *Lolium perenne* leys and related grasslands
MG9a *Holcus lanatus-Deschampsia cespitosa* grassland, *Poa trivialis* sub-community
MG10a *Holcus lanatus-Juncus effusus* rush-pasture, Typical sub-community
MG10b *Holcus lanatus-Juncus effusus* rush-pasture, *Juncus inflexus* sub-community
MG12 *Festuca arundinacea* coarse grassland
MG13 *Agrostis stolonifera-Alopecurus geniculatus* grassland
CG10a *Festuca ovina-Agrostis capillaris-Thymus polytrichus* grassland, *Trifolium repens-Luzula campestris* sub-community
U1e *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland, *Galium saxatile-Potentilla erecta* sub-community
U4b *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, *Holcus lanatus-Trifolium repens* sub-community (including U4b-c with affinities with U4c *Lathyrus montanus-Stachys betonica* sub-community)
U20a *Pteridium aquilinum-Galium saxatile* community, *Anthoxanthum odoratum* sub-community
S3 *Carex paniculata* swamp
S4b *Phragmites australis* reedbed, *Galium palustre* sub-community
S19 *Eleocharis palustris* swamp
S22 *Glyceria fluitans* swamp
S28 *Phalaris arundinacea* fen
OV24 *Urtica dioica* - *Galium aparine* community
OV25 *Urtica dioica* - *Cirsium arvense* community
MX Small sedge mire
MGX = *Holcus lanatus/Festuca rubra/Anthoxanthum odoratum/Agrostis stolonifera* grassland
Hlan = *Holcus lanatus* grassland
Rock
Stones
Bare ground
H&G = House and Garden
Built-up
Road

Table 2 below shows the equivalent Phase One, EUNIS and UKHab types for each of the NVC communities (and additional non-NVC habitats) found at this site.

Table 2: NVC types and equivalent Phase One, EUNIS and UKHab types found by Ben and Alison Averis in this survey at Mill of Plunton, Dumfries & Galloway, on 29th June 2022

NVC type *	Phase 1 habitat type	EUNIS	UKHab
W2a	A1.1.1 Semi-nat. broadleaved woodland	F9.211	w1d
W3	A1.1.1 Semi-nat. broadleaved woodland	G1.4	w1d
W7a	A1.1.1 Semi-nat. broadleaved woodland	G1.2	w1d5
W9a	A1.1.1 Semi-nat. broadleaved woodland	G1.A21	w1b
W10	A1.1.1 Semi-nat. broadleaved woodland	G1.91	w1f
W11	A1.1.1 Semi-nat. broadleaved woodla	G1.91	w1e
W21	A2.1 Dense/continuous scrub	F3.11	h3f
W22	A2.1 Dense/continuous scrub	F3.111	h3a
W23	A2.1 Dense/continuous scrub	F3.15	h3e
W23Br	A2.1 Dense/continuous scrub	F3.14	h3e
W24	C3.2 Non-ruderal tall herb/fern	F3.131	h3d
W25a	C1.1 Bracken	E5.31	g1c
M5	E2.1 Acid-neutral flush	D2.33	f2a
M22a	B5 Marsh/marshy grassland	E3.4	f2a
M23a	B5 Marsh/marshy grassland	E3.41	f2a
M23b	B5 Marsh/marshy grassland	E3.42	f2a
M28	B5 Marsh/marshy grassland	E5.42	f2a
M28 Ocroc	B5 Marsh/marshy grassland	E5.42	f2a
MG1	B2.1 unimproved neutral grassland	E2.2	g3c
MG5	B2.1 unimproved neutral grassland	E2.11	g3a5
MG6	B4 improved grassland	E2.6	g4
MG7	B4 improved grassland	E2.6	g4
MG9	B2.1 Unimproved neutral grassland	E3.4	g3c7
MG10	B5 Marsh/marshy grassland	E3.4	g3c8
MG12	B2.1 Unimproved neutral grassland	E3.4	g3c2
MG13	B5 Marsh/marshy grassland	E3.4	g3c
CG10	B3.1 Unimproved calcareous grassland	E1.26	g2a
U1	B1.1 Unimproved acid grassland	E1.92	g1a
U2	B1.1 Unimproved acid grassland	E1.73	g1b
U4b	B1.2 Semi-improved acid grassland	E1.72	g1a
U4b-c	B1.1 Unimproved acid grassland	E1.72	g1a
U20a	C1.1 Bracken	E5.31	g1c
S3	F1 Swamp	D5.2	f2f
S4	F1 Swamp	C3.2	f2f
S19	F1 Swamp	C3.2	f2f
S22	E3 Fen	C3.2	f2f
S28	F1 Swamp	D5.1	f2f
OV24	C3.1 Ruderal tall herb vegetation	E5.1	u1a
OV25	C3.1 Ruderal tall herb vegetation	E5.1	u1a
MX	E2.1 Acid-neutral flush	D4.15	f2a
MGX	B2.2 Semi-improved neutral grassland	E2.1	g3c
Hlan	B2.2 Semi-improved neutral grassland	E2.1	g3c
Rock	I1 natural rock exposure	H3	s1a
Stones	J3	J	s1a
Bare ground	J4 bare ground	J	u1c
H&G	J3 Built-up areas	J	u1b
Built-up	J3 Built-up areas	J	u1b
Road	J3 Built-up areas	J	u1b

* = Including some other vegetation types and habitats that are not covered by the NVC.

NVC/habitat descriptions

W2a *Salix cinerea-Betula pubescens-Phragmites australis* woodland, *Alnus glutinosa-Filipendula ulmaria* sub-community

This is scrubby woodland of *Salix cinerea.* Under the willows is a tall sward of *Phragmites australis* growing abundantly in a lower layer of *Equisetum fluviatile, Caltha palustris, Mentha aquatica, Chrysosplenium oppositifolium, Cardamine flexuosa, Angelica sylvestris, Deschampsia cespitosa, Epilobium palustre, Athyrium filix-femina, Holcus lanatus, Poa trivialis, Urtica dioica, Galium aparine, Berula erecta* and the mosses *Brachythecium rivulare* and *Rhizomnium punctatum*. This woodland occupies wet, level ground at the SW end of the SW-NW-orientated end of the wetland area in the NE of the site (polygon 41).

W3 *Salix pentandra-Carex rostrata* woodland

This is a small patch of woodland with a *Salix cinerea* canopy over a swampy ground layer with abundant *Equisetum fluviatile* and *Menyanthes trifoliata* and smaller amounts of *Ranunculus flammula* and *Sparganium erectum*. This stand of W3 is on level, very wet ground at the NW edge of the site (polygon 70).

W7a *Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland, *Urtica dioica* sub-community

This is wet woodland with a canopy of *Alnus glutinosa, Fraxinus excelsior, Acer pseudoplatanus, Salix cinerea* and *Corylus avellana*. The lush ground layer includes *Oenanthe crocata, Iris pseudacorus, Urtica dioica, Galium aparine, Rubus fruticosus, Arrhenatherum elatius, Poa trivialis, Holcus lanatus* and *Silene dioica*. W7a occurs here mainly on level to sloping ground along the Pulwhirrin Burn in the N of the site, but there are also small patches of W7 (rather similar but classified to NVC community level only) in the S of the site.

W9a *Fraxinus excelsior-Sorbus aucuparia-Mercurialis perennis* woodland, Typical sub-community

This woodland, found on sloping ground near the Pulwhirrin Burn in the N of the site, has a canopy of *Alnus glutinosa, Fraxinus excelsior, Acer pseudoplatanus, Salix cinerea* and *Corylus avellana* over a ground layer of *Mercurialis perennis, Dryopteris dilatata, D. filix-mas, Hyacinthoides non-scripta, Geranium robertianum, Silene dioica, Epilobium montanum, Rubus idaeus, Rumex sanguineus, Meconopsis cambrica, Poa trivialis* and the mosses *Thuidium tamariscinum* and *Kindbergia praelonga*. This flora indicative of at least mild base-enrichment.

W10 *Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland

This is woodland on well-drained neutral soils to the SE of the farm steading, with a mixed canopy including *Acer pseudoplatanus, Crataegus* monogyna and *Larix decidua* and with a tall understorey of *Arrhenatherum elatius, Dactylis glomerata, Holcus lanatus* and a few other species including *Rubus fruticosus, Urtica dioica* and *Galium aparine.*

W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland

This woodland of well-drained neutral to mildly acid soils was found in two places in this survey. On sloping ground SE of the Pulwhirrin Burn in the N of the site it has a canopy

consisting mainly of *Corylus avellana* (hence the label W11Hz to denote this hazel dominance) but also including some *Fraxinus excelsior, Salix cinerea* and *Ilex aquifolium*, over a ground layer of *Holcus mollis, Oxalis acetosella* (these two species notably abundant here), *Hyacinthoides non-scripta, Veronica chamaedrys, Dryopteris dilatata, D. filix-mas, Rubus idaeus, R. fruticosus, Lonicera periclymenum, Viola riviniana, Geum urbanum, Meconopsis cambrica, Poa trivialis, Hedera helix, Ceratocapnos claviculatus* and the mosses *Thuidium tamariscinum* (abundant), *Kindbergia praelonga, Mnium hornum, Plagiomnium undulatum* and *Eurhynchium striatum*. At the sub-community level this has affinities with W11a *Dryopteris dilatata* sub-community and W11b *Blechnum spicant* sub-community. On a rocky knoll in the S of the site is another patch of W11 with a canopy of *Quercus robur, Corylus avellana* and *Salix caprea*, and a sward of *Arrhenatherum elatius, Dactylis glomerata, Anthoxanthum odoratum, Poa trivialis, Holcus mollis* and a little *Brachypodium sylvaticum* dotted with *Dryopteris dilatata, D. filix-mas, Oxalis acetosella, Stellaria holostea, Hyacinthoides non-scripta, Viola riviniana, Galium aparine, Circaea lutetiana, Rubus fruticosus, Stachys sylvatica, Digitalis purpurea, Moerhingia trinervia* and *Teucrium scorodonia*, and with a thin underlay of the mosses *Kindbergia praelonga, Mnium hornum* and *Hypnum cupressiforme.*

W21 *Crataegus monogyna-Hedera helix* scrub

This is scrub with a canopy of *Crataegus mono*gyna interspersed with some *Prunus spinosa, Ulex europaeus, Sambucus nigra* (and very locally *Fraxinus excelsior*, where mapped as intermediate between W8 and W21). The ground layer is generally quite tall and includes *Arrhenatherum elatius, Holcus lanatus, Rubus fruticosus, Rumex acetosa, Dryopteris dilatata, D. filix-mas, Festuca rubra, Cynosurus cristatus, Anthoxanthum odoratum, Rosa spinossisima* and the mosses *Rhytidiadelphus squarrosus* and *Pseudoscleropodium purum*. W21 is widespread and common at this site, occurring as small to medium-sized patches on well-drained (and mainly sloping) ground.

W22 *Prunus spinosa-Pteridium aquilinum* scrub

This is similar to the W21 scrub just described, but with *Prunus spinosa* as the main canopy species. W22 occurs on similarly well-drained soils to those with W21 and is widespread here, though less extensively than W21.

W23 *Ulex europaeus-Rubus fruticosus* agg scrub

This is gorse scrub with a dense and prickly canopy of *Ulex europaeus* over a ground layer broadly similar to that of the W21 scrub described above. W23 is widespread and very common here, with many small patches (and some larger ones) on well-drained soils, mainly on slopes and knolls. Some examples have broom *Cytisus scoparius* as the main shrubs and are labelled W23Br.

W24 *Rubus fruticosus* agg-*Holcus lanatus* underscrub

This is vegetation in which *Rubus fruticosus* is abundant to dominant, accompanied by other species such as *Arrhenatherum elatius* and *Holcus lanatus.* W24 is widespread and common at this site. Patches of it are mostly small and are mainly in association with W21, W22 or W23 scrub on well-drained ground.

W25a *Pteridium aquilinum-Rubus fruticosus* agg underscrub, *Hyacinthoides non-scripta* sub-community

This vegetation consists of a sward of bracken *Pteridium aquilinum* over a shorter layer of *Holcus lanatus, H. mollis, Festuca rubra, Arrhenatherum elatius, Deschampsia cespitosa, Rubus fruticosus, Dryopteris dilatata, Lotus pedunculatus, Centaurea nigra, Rumex acetosa, Geranium robertianum, Galium aparine, Stellaria graminea* and suckers of *Prunus spinosa*. Patches of W25a occur on well-drained and mostly sloping ground, and are scattered widely through this site.

M5 *Carex rostrata-Sphagnum squarrosum* mire

There is a patch of this type of vegetation among the mosaics of scrub and grassland to the south of the steading. It has a green underlayer of *Sphagnum squarrosum* pricked through by a thin sward of *Carex rostrata, Juncus effusus, J. acutiflorus, Menyanthes trifoliata, Comarum palustre, Silene flos-cuculi, Epilobium palustre* and *Equisetum fluviatile.*

M22a *Juncus subnodulosus-Cirsium palustre* fen-meadow, Typical sub-community

The southern species *Juncus subnodulosus* occurs here among other wetland communities, most notably with *Carex paniculata* swamp S3 in the central southern part of the site. Associated species include *Juncus acutiflorus, J. effusus, J. conglomeratus, Equisetum fluviatile, Menyanthes trifoliata, Silene flos-cuculi, Ranunculus flammula* and the mosses *Calliergonella cuspidata* and *Calliergon giganteum.*

M23a *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community

This is vegetation with a sward of the rush *Juncus acutiflorus* interleaved with an assemblage of other species including the grasses *Holcus lanatus, Anthoxanthum odoratum, Festuca rubra and Agrostis stolonifera*, the sedges *Carex nigra and C. flacca*, the herbs *Ranunculus acris, R. repens, Filipendula ulmaria, Angelica sylvestris, Valeriana officinalis, Lotus pedunculatus, Silene flos-cuculi, Oenanthe crocata, Galium palustre, Crepis paludosa, Caltha palustris, Epilobium palustre, Lathyrus pratensis, Dactylorhiza fuchsia, D. purpurella, Rumex acetosa, Carum verticillatum* and *Vicia cracca*, the horsetail *Equisetum fluviatile* and the moss *Calliergonella cuspidata*. *Juncus effusus* can occur in small quantity. M23a is scattered quite widely at this site, occurring on damp to wet level to gently sloping ground. The flora is indicative of more or less neutral soils.

M23b *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community

This is similar to the above-described M23a but with *Juncus effusus* as the main rush. It is also widespread at this site, occurring more commonly than M23a here.

M28a *Iris pseudacorus-Filipendula ulmaria* mire, *Juncus* spp sub-community

Small patches of *Iris pseudacorus* mire occur in the southern half of the study area. They form mosaics with rush mires and wet grasslands, and include *Juncus effusus, J. acutiflorus, Holcus lanatus, Cirsium palustre, Ranunculus acris, Filipendula ulmaria* and *Oenanthe crocata.*

M28 Ocroc = M278 dominated by *Oenanthe crocata*

This is a form of M28 in which *Oenanthe crocata* is dominant. The tall masses of this species are accompanied by a sparser assemblage of other species in which *Phalaris arundinacea, Urtica dioica* and *Galium aparine* are abundant along with variable amounts of *Valeriana officinalis, Rumex acetosa, Ranunculus repens, Cirsium palustre, Silene dioica, Rubus fruticosus, Holcus lanatus, Juncus effusus* and *Arrhenatherum elatius*. This vegetation was found on wet, more or less level ground in two places close to the Pulwhirrin Burn in the north of the site.

MG1 *Arrhenatherum elatius* coarse grassland

This is coarse, minimally-grazed neutral grassland with a sward of *Arrhenatherum elatius* accompanied by *Dactylis glomerata, Poa trivialis, Festuca rubra, Holcus lanatus, Phleum pratense,* and other species including *Cirsium arvense, Urtica dioica, Galium aparine, Rumex crispus* and *Centaurea nigra*. Patches of MG1 are scattered quite widely through this site, on well-drained soils on level to moderately sloping ground. It is generally species-poor and belonging within the MG1a *Festuca rubra* sub-community or with some elements of the MG1b *Urtica dioica* sub-community.

MG5c *Cynosurus cristatus-Centaurea nigra* meadow and pasture, *Danthonia decumbens* sub-community

This is short to medium height herb-rich neutral grassland in which grass swards of *Cynosurus cristatus, Agrostis capillaris, Festuca rubra, F. ovina, Anthoxanthum odoratum, Holcus lanatus* and *Dactylis glomerata* are dotted with herbs including *Hypochaeris radicata, Prunella vulgaris, Achillea millefolium, Ranunculus acris, Centaurea nigra, Lotus corniculatus, Cerastium fontanum, Trifolium repens, Scorzoneroides autumnalis, Conopodium majus, Veronica chamaedrys, Galium verum, Stellaria graminea* and *Plantago lanceolata*. Mosses are not particularly abundant or diverse but *Rhytidiadelphus squarrosus* is common and other species include *Thuidium tamariscinum*. *Lolium perenne* occurs sparingly in some examples, but less plentifully than in the agriculturally improved MG6 and MG7 communities. MG5c is widespread here, on well-drained level to sloping ground. On one slope in the NE of the site is a small area of grassland similar to MG5c but also containing much *Rumex acetosella* and therefore classed as intermediate between MG5c and U1: an unexpected type of NVC intermediate. Along the north-western edge of the fields in the SW of the study area (polygons 124, 126 and 128) is a superb spread of damp MG5, with really abundant *Carum verticillatum* growing with *Holcus lanatus, Agrostis capillaris, Anthoxanthum odoratum, Poa pratensis, P. trivialis, Deschampsia cespitosa, Cynosurus cristatus, Carex flacca, Ranunculus acris, Lotus pedunculatus, Dactylorhiza fuchsii, Plantago lanceolata, Pedicularis sylvatica, Prunella vulgaris, Potentilla erecta, Filipendula ulmaria, Cirsium palustre, Succisa pratensis* and *Lathyrus pratensis.*

MG6 *Lolium perenne-Cynosurus cristatus* pasture

This is agriculturally improved grassland with grass swards made up mostly of *Lolium perenne, Cynosurus cristatus* and *Holcus lanatus*. Other species include *Trifolium repens, Ranunculus repens, Cerastium fontanum, Cirsium arvense* and *Phleum pratense*. The vegetation is quite species-poor. MG6 is widespread and extensive at this site. Some was classed as the MG6a Typical sub-community; the remainder was classed to NVC community level only.

MG7 *Lolium perenne* leys and related grasslands

This agriculturally improved grassland is quite similar to the MG6 just described but is of a more anthropogenic nature: strongly dominated by *Lolium perenne* and correspondingly more species-poor. *Trifolium repens* and *Poa trivialis* are generally plentiful, and *Holcus lanatus* is occasional. MG7 is locally extensive in two fields in the NE of the site.

MG9a *Holcus lanatus-Deschampsia cespitosa* grassland, *Poa trivialis* sub-community

This damp neutral grassland is recognisable by the dense sward of *Deschampsia cespitosa*. Accompanying species include *Holcus lanatus, Rumex acetosa, Poa trivialis* and *Ranunculus repens*. MG9 was found in three polygons in the SW part of the site.

MG10a *Holcus lanatus-Juncus effusus* rush-pasture, Typical sub-community

Patches of MG10 are scattered quite widely on damp ground in the central and SW parts of the site. They have a tall sward of *Juncus effusus* and *Holcus lanatus* growing with species such as *Ranunculus repens, Trifolium repens* and *Rumex acetosa*.

MG10b *Holcus lanatus-Juncus effusus* rush-pasture, *Juncus inflexus* sub-community

This is similar to the MG10a just described but also includes tussocks of *Juncus inflexus*. MG10b was found on damp ground in one area (polygon 209) in the central part of the site, in a mosaic with M23 rushy wetland and MG6 improved grassland.

MG12 *Festuca arundinacea* coarse grassland

This tall neutral grassland contains abundant tall tussocks of *Festuca arundinacea* growing among mixtures of *Holcus lanatus, Dactylis glomerata, Poa trivialis, Anthoxanthum odoratum, Filipendula ulmaria, Rumex acetosa, Galium palustre, Potentilla anserina, Cerastium fontanum, Stellaria graminea, Lotus pedunculatus, Vicia cracca, Cirsium palustre, Centaurea nigra, Equisetum arvense* and *Juncus acutiflorus*. It is rather like a damp and relatively herb-rich form of MG1 but with *F. arundinacea* instead of *Arrhenatherum elatius*. A small area of MG12 occupies part of a grassy glade among scrub in the central part of the site.

MG13 *Agrostis stolonifera-Alopecurus geniculatus* grassland

This is short grassland in a damp shallow depression among agriculturally-improved grassland in the NE of the site. The habitat here appears likely to be seasonally flooded. *Alopecurus geniculatus* is very abundant, growing with varied amounts of *Glyceria fluitans, Poa trivialis, P. annua, Ranunculus repens, Trifolium repens, Persicaria maculata, Eleocharis palustris, Stellaria media, Veronica serpyllifolia, Capsella bursa-pastoris, Juncus bufonius, Rorippa palustris, Gnaphalium uliginosum, Urtica dioica* and *Myosotis laxa*. Broadly similar vegetation in a smaller depression a few hundred metres further south contains more *G. fluitans* and is classed as intermediate between MG13 and S22 *G. fluitans* swamp (and is also floristically close to the S22c *Alopecurus geniculatus* sub-community of S22).

CG10a *Festuca ovina-Agrostis capillaris-Thymus polytrichus* grassland, *Trifolium repens-Luzula campestris* sub-community

This is short, grazed grassland in which *Thymus polytrichus* is abundant among swards of *Festuca ovina, Anthoxanthum odoratum, Agrostis capillaris, Aira praecox* and *Koeleria macrantha*. The vegetation is herb-rich with species including *Lotus corniculatus, Pilosella officinarum, Hypochaeris radicata, Achillea millefolium, Trifolium repens, Potentilla erecta, Galium saxatile, G. verum, Centaurea nigra, Cerastium fontanum, Rumex acetosella* and *R. acetosella*. Mosses are common and include *Rhytidiadelphus squarrosus, Hypnum lacunosum, Ctenidium molluscum* and *Polytrichum juniperinum*. A little *Genista tinctoria* was found in CG10a (and also in nearby U4 acid grassland) in one place in the SW half of the site (polygon 119). CG10a is uncommon at this site. Small extents of it were found on well-drained sloping ground among larger areas of MG6 agriculturally improved grassland.

U1e *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland, *Galium saxatile-Potentilla erecta* sub-community

This acid grassland occurs on thin soils on rocky knolls within the fields in the central part of the site. Evidently subject to seasonal drought, it has a thin sward of *Festuca ovina, Aira praecox, Agrostis capillaris, Avenella flexuosa, Rumex acetosella, Potentilla erecta* and *Galium saxatile*.

U4b *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, *Holcus lanatus-Trifolium repens* sub-community

This is short, grazed grassland with swards of *Agrostis capillaris, Anthoxanthum odoratum, Festuca ovina, F. rubra, Holcus lanatus, Cynosurus cristatus* and *Avenella flexuosa* dotted with *Galium saxatile, Potentilla erecta, Viola riviniana, Stellaria graminea, Rumex acetosa, Conopodium majus, Veronica chamaedrys, Succisa pratensis, Luzula multiflora, Achillea millefolium* and *Trifolium repens*. The last two species, together with *Holcus lanatus*, place the vegetation into this sub-community and are indicative of at least mild nutrient enrichment, perhaps from some past agricultural treatment or from dung and urine from domestic livestock. U4b is therefore generally regarded as a form of semi-improved acid grassland. Other species in the U4b here include the mosses *Rhytidiadelphus squarrosus, Pseudoscleropodium purum* and *Hylocomium splendens*. Locally there are other vascular species including *Danthonia decumbens, Pilosella officinarum, Genista tinctoria* (in polygon 119), *Trifolium medium, Lotus corniculatus* and *Lathyrus linifolius*. The last two species indicate an affinity with the U4c *Lathyrus montanus-Stachys betonica* sub-community, which is why the U4 in three polygons was classed as intermediate between U4b and U4c.

U20a *Pteridium aquilinum-Galium saxatile* community, *Anthoxanthum odoratum* sub-community

Although most of the bracken vegetation in the study area belongs to the *Pteridium-Rubus* community W25, a stand in polygon 173, forming a mosaic with acid grassland, is a better fit for U20. Under the bracken is a sward of *Agrostis capillaris, Festuca ovina, Holcus lanatus, Anthoxanthum odoratum, Potentilla erecta* and *Galium saxatile*, interwoven with *Rhytidiadelphus squarrosus* and *Pseudoscleropodium purum.*

S3 *Carex paniculata* swamp

One of the more uncommon types of vegetation in the study area, S3 occurs with M22, M23 and MX in polygon 166 . The conspicuous tall green tussocks of *Carex paniculata* grow in a matrix of *Carex diandra, C. rostrata, Juncus effusus, J. acutiflorus, Equisetum fluviatile, Silene flos-cuculi, Ranunculus acris, R. flammula, Menyanthes trifoliata, Galium palustre* and *Comarum palustre*. There is a thin layer of the moss *Calliergonella cuspidata,* and *Calliergon giganteum* grows here too.

S4b *Phragmites australis* reedbed, *Galium palustre* sub-community

This swamp/fen vegetation, dominated by the unmistakeable tall stems of *Phragmites australis*, forms a narrow fringe (polygon 219) along the SW edge of the W2 willow woodland in the wet depression in the NE of the site. Growing with the *Phragmites* here are *Equisetum fluviatile, Urtica dioica, Galium palustre, G. aparine, Carex paniculata, Vicia cracca, Juncus effusus, J. acutiflorus, Centaurea nigra, Potentilla anserina, Lathyrus pratensis, Ranunculus acris, Stellaria graminea, Silene flos-cuculi, Angelica sylvestris, Cirsium arvense* and *Rumex acetosa*.

S19 *Eleocharis palustris* swamp

This kind of swamp vegetation, found in a small wet depression near the northern edge of the site (polygon 10) contains abundant *Eleocharis palustris, Juncus articulatus* and *Agrostis stolonifera*, frequent to abundant *Sparganium erectum* and smaller amounts of *Ranunculus flammula* and *Galium palustre*. This flora is indicative of more or less neutral soils. The S19 occurs here in close association with M23b rushy wetland and S22 *Glyceria fluitans* swamp.

S22 *Glyceria fluitans* swamp

This vegetation is distinctive because of the abundance or dominance of *Glyceria fluitans*. Other species here include *Agrostis stolonifera, Sparganium erectum, Eleocharis palustris, Ranunculus flammula* and *Galium palustre*. Small patches of S22 occur in wet depressions in a few widely scattered locations at this site.

S28 *Phalaris arundinacea* fen

This vegetation is easily recognized because of the dominance of *Phalaris arundinacea*. Among the tall stems of this grass is a sparse flora including *Juncus effusus, J. acutiflorus* and *Filipendula ulmaria*. Patches of S28 occur on wet, level ground in a few places at this site: polygons 98, 158 and 161.

OV24 *Urtica dioica - Galium aparine* community

This is a sward of *Urtica dioica* and *Galium aparine.* It was found alongside a shallow stream in the SW of the site, in mosaic with mesotrophic and neutral grasslands.

OV25 *Urtica dioica - Cirsium arvense* community

This weedy, species-poor vegetation is made up mainly of dense stands of *Urtica dioica* and *Cirsium arvense*. Patches of it are scattered widely through the site, mainly in close association with MG6 improved grassland and W23 gorse scrub.

MX Small sedge mire

This type of neutral sedge mire occurs in a few places, mostly as small patches in mosaics with M23 rushy wetland. At the NW edge of the site polygon 69 is an area of very wet, species-rich MX containing abundant *Carex lepidocarpa, Menyanthes trifoliata* (both very abundant here), *C. diandra, Filipendula ulmaria, Silene flos-cuculi, Ranunculus flammula, Hydrocotyle vulgaris, Galiuim palustre, Cardamine pratensis, Cirsium palustre, Lotus pedunculatus, Comarum palustre, Dactylorhiza purpurella, Juncus acutiflorus, J. effusus, Equisetum fluviatile, Holcus lanatus, Salix aurita, S. cinerea* (these two willows only <30 cm in height) and the mosses *Calliergonella cuspidata* and *Cratoneuron filicinum*. There are also some fine examples in the mixed mires along the southern edge of the study area, with *Carex nigra, C. echinata, C. panicea, Briza media, Holcus lanatus, Anthoxanthum odoratum, Cynosurus cristatus, Silene flos-cuculi, Succisa pratensis, Ranunculus acris, R. flammula, Filipendula ulmaria, Potentilla erecta, P. anserina, Dactylorhiza purpurella, Lotus pedunculatus, Cirsium palustre, Stellaria uliginosa* and *Hydrocotyle vulgaris.*

MGX = *Holcus lanatus/Festuca rubra/Anthoxanthum odoratum/Agrostis stolonifera* grassland

This semi-improved neutral grassland, found in polygon 35 at the NE edge of the site, has a lush sward of *Holcus lanatus* (the most abundant species here), *Festuca rubra, Anthoxanthum odoratum* and *Agrostis stolonifera*. It lacks the *Lolium perenne* of the nearby MG6/7 improved grasslands to the north and the *Arrhenatherum/Dactylis* of the MG1 to the south.

Hlan = *Holcus lanatus* grassland

This code was used for pure swards of *Holcus lanatus*, a mesotrophic grassland not represented in the NVC scheme.

Rock

Rock outcrops form part of polygon 184 – a small knoll in the central-SW part of the site. Around these rock outcrops are W23 gorse scrub and U4/CG10 grasslands.

Stones

This is a pile of stones, probably cleared from the adjacent fields, in association with M23a rushy wetland in one polygon (125) in the SW of the site.

Bare ground

This is an area of bare gravel, rock and soil among the fields in the SW of the site, apparently where silage bales have been stacked. The vegetation consists of attenuated forms of the surrounding MG6 improved grassland, W23 gorse scrub and the OV25 nettle/thistle community.

H&G = House and Garden

This refers to the small house and its adjacent garden just to the west of the main road in the northern part of the site.

Built-up

This is the Mill of Plunton farm and adjacent farmyard in the northern part of the site.

Road

This is the main road in the N/NE of the site and the minor road leading from it to Mill of Plunton farm.

4 EVALUATION OF BOTANICAL INTEREST

The most notable plant communities found in this survey are as follows:

W2 *Salix cinerea-Betula pubescens-Phragmites australis* woodland
W3 *Salix pentandra-Carex rostrata* woodland
W7 *Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland
W9 *Fraxinus excelsior-Sorbus aucuparia-Mercurialis perennis* woodland
W10 *Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland
W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland
M5 *Carex rostrata-Sphagnum squarrosum* mire
M22 *Juncus subnodulosus-Cirsium palustre* fen-meadow
M23 *Juncus effusus/acutiflorus-Galium palustre* rush-pasture
M28 *Iris pseudacorus-Filipendula ulmaria* mire
MG5 *Cynosurus cristatus-Centaurea nigra* meadow and pasture
MG10b *Holcus lanatus-Juncus effusus* rush-pasture, *Juncus inflexus* sub-community
MG12 *Festuca arundinacea* coarse grassland
MG13 *Agrostis stolonifera-Alopecurus geniculatus* grassland
CG10 *Festuca ovina-Agrostis capillaris-Thymus polytrichus* grassland
U1 *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland
U4b-c *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland
S3 *Carex paniculata* swamp
S4 *Phragmites australis* reedbed
S19 *Eleocharis palustris* swamp
S22 *Glyceria fluitans* swamp
S28 *Phalaris arundinacea* fen
MX Small sedge mire

A total of 198 vascular plant species, 30 mosses and 3 liverworts was found in this survey (see species list in Appendix 4). This indicates a rich vascular flora. The most notable species seen during the survey are:

Vascular plants:
Apium nodiflorum
Berula erecta
Briza media
Carex diandra
Carex lepidocarpa
Carex paniculata
Carum verticillatum
Ceratocapnos claviculatus
Comarum palustre
Dactylorhiza purpurella
Genista tinctoria
Juncus subnodulosus
Menyanthes trifoliata

Mosses:
Cryphaea heteromalla

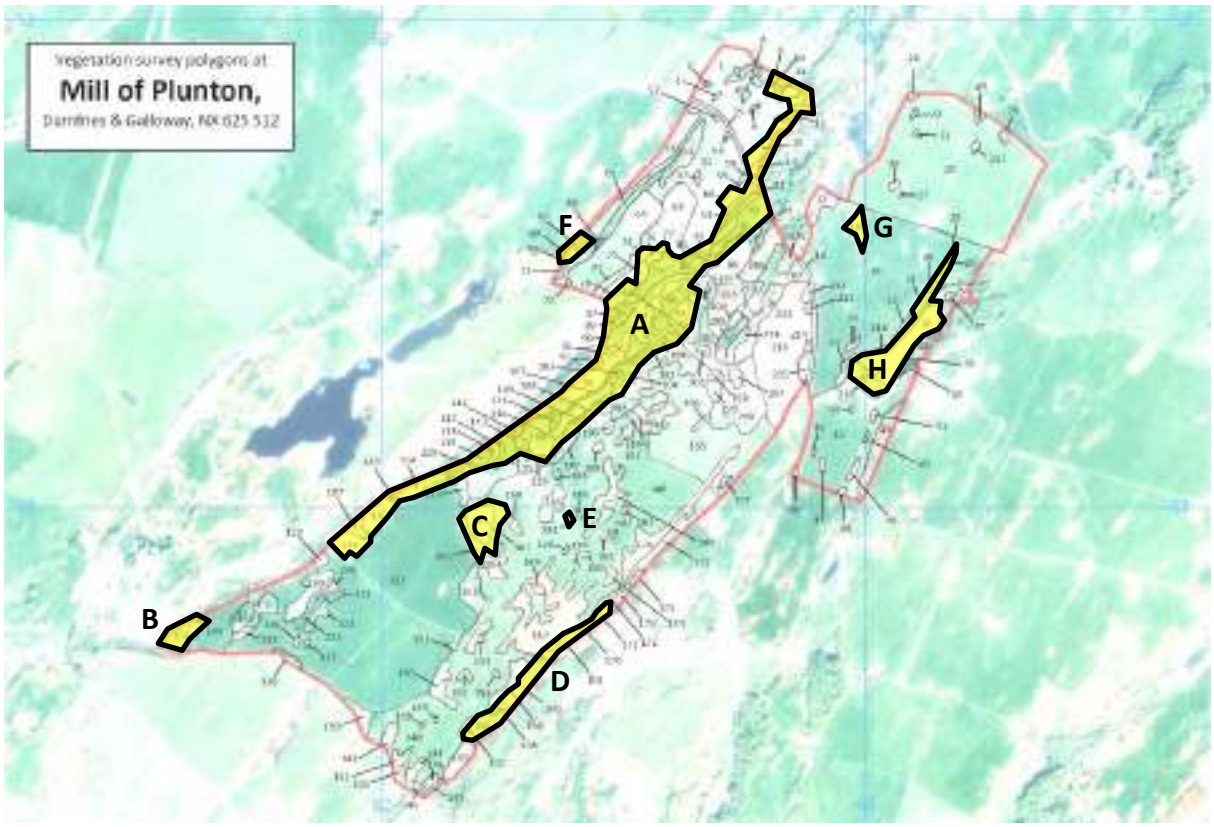
None of these are classed as Nationally Rare or Nationally Scarce, but *Genista tinctoria* and *Juncus subnodulosus* are mainly southern in Britain and this site is in the northernmost part of their British range. *Apium nodiflorum* and *Berula erecta* are also commonest in the southern half of Britain and are scarce in Scotland. *Carex diandra* is uncommon and mainly northern in Britain. *Carum verticillatum* has a western distribution, with most British records being from the SW Highlands, Ayrshire, Dumfries & Galloway, the southern half of Wales and western Devon. Target notes for the locations where these and some other species of interest were found are given in Table 3 below.

Table 3: Target notes for locations where plant species of particular interest list were found by Ben and Alison Averis in this survey of land at Mill of Plunton, Dumfries & Galloway, on 29th June 2022

Code no.	100 km sq.	Easting	Northing	Details
T01	NX	61930	50930	*Carum verticillatum* common in MG5c grassland.
T02	NX	61990	50980	*Carum verticillatum* common in MG5c grassland.
T03	NX	62080	51050	*Carum verticillatum* common in MG5c grassland.
T04	NX	62200	50980	Wetland with species including *Carex paniculata, C. diandra, C. rostrata, Menyanthes trifoliata* and *Comarum palustre*.
T05	NX	62209	50926	Rushy wetland (M22) with abundant *Juncus subnodulosus*.
T06	NX	62211	51106	*Genista tinctoria* in small quantity in U4b-c and CG10a grassland on low knolls.
T07	NX	62310	50660	*Juncus subnodulosus* scattered in M23 rushy wetland in this general area along SE edge of site. MX sedge mire around and to NE of here has species including *Briza media, Dactylorhiza purpurella* and *Hydrocotyle vulgaris*.
T08	NX	62390	51520	Mire with abundant *Carex lepidocarpa* and *Menyanthes trifoliata*, and other species including *C. diandra, Silene flos-cuculi, Hydrocotyle vulgaris, Comarum palustre, Dactylorhiza purpurella* and *Equisetum fluviatile*.
T09	NX	62460	51250	*Apium nodiflorum* along a good length of stream here, in both directions (WSW and ENE) from this location.
T10	NX	62533	51409	*Ceratocapnos claviculatus* locally common at edges of scrub around here.
T11	NX	62561	51466	Moss *Cryphaea heteromalla* on hazel.
T12	NX	62568	51347	Moss *Cryphaea heteromalla* in good quantity on ash and elders.
T13	NX	62578	51482	*Ceratocapnos claviculatus* in hazel woodland.
T14	NX	62611	51443	Good patch (1m x 1m) of *Genista tinctoria*, flowering abundantly, at E edge of MG1 glade.
T15	NX	62625	51520	*Ceratocapnos claviculatus* at edge of W23 scrub. Moss *Cryphaea heteromalla* on nearby ash.
T16	NX	63104	51350	*Carum verticillatum* in M23a rushy vegetation. *Berula erecta* in ditch.

Species-poor agriculturally improved or semi-improved grassland of low botanical interest is widespread and extensive here, but smaller areas of higher biodiversity and botanical interest are scattered widely through the site. The main areas of higher botanical interest are shown in the map below. They are mainly areas with species-rich grassland (CG10, MG5, MG13 and U4b-c), herb-rich rush and sedge mire (M22, M23, M28 and MX), swamp (S3, S4, S19 and S22) and native woodland (W2, W3, W7 and W9).

Map showing areas of highest botanical interest at Mill of Plunton, Dumfries & Galloway:



Management for botanical interest

We are aware that new woodland creation is among the options being considered by The Future Forest Company at this site. This appears acceptable in the MG6 and MG7 improved grasslands where current botanical interest is sufficiently low that we do not have concerns about the effects of tree planting or reduction in (or temporary removal of) grazing. Perhaps the best areas for this are the large area of MG6 in the SW (polygon 123) and of MG6/7 in the NE (polygons 19, 20 and 42). These areas have significant unbroken extents of species-poor agriculturally improved grassland of low botanical/ecological interest. There are large extents of MG6 elsewhere too, but these are dotted with small patches of other vegetation that is not so artificial and species-poor: for example W23 gorse scrub and U1, U4 and CG10 grassland. Tree planting in the agriculturally-improved grasslands would of course mean a reduction in land available for livestock grazing, so decisions about the balance of agriculture and woodland creations would need to be made.

We do not recommend tree planting in the areas coloured yellow in the map above, because in these places planting and associated reduction/removal of grazing could threaten the existing high botanical interest and biodiversity. Furthermore the largest of these areas (A) already contains a good extent of native woodland and scrub. Areas B, C, D, F, G and H are mainly wetland, including some wet woodland. Area E is small but includes CG10 calcareous grassland (which needs to be grazed in order to persist here).

The strip of damp herb-rich meadow with *Carum verticillatum* at the SW end of area A in the above map is a superb example of a scarce and declining type of vegetation of great value for biodiversity. This does need to be grazed (or at least mown annually) to maintain its value for nature conservation, so should neither be planted nor fenced to exclude grazing.

The wetlands and mires would be best left to natural regeneration: they are likely to develop into open willow scrub which would add structural diversity without losing the floristic diversity of the ground vegetation.

Native tree and shrub species that we consider suitable for planting in the MG6/7 grasslands at this site are:

Betula pendula
Betula pubescens
Corylus avellana
Crataegus monogyna
Ilex aquifolium
Populus tremula
Prunus avium
Prunus spinosa
Quercus robur
Quercus petraea
Salix caprea
Sorbus aucuparia

As new woodlands established on former improved grasslands are likely to take a long time to develop a proper woodland ground flora (if, indeed, it ever happens), it would also be worth giving thought to introducing appropriate species along with the trees (https://www.nature.scot/doc/naturescot-research-report-1211-establishing-woodland-plants-broadleaved-woods-interim-best-practice).

5 ACKNOWLEDGEMENTS

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6 REFERENCES

Blockeel, T.L., Bell, N.E., Hill, M.O., Hodgetts, N.G., Long, D.G., Pilkington, S.L. & Rothero, G.P. (2021). A new checklist of the bryophytes of Britain and Ireland, 2020, *Journal of Bryology,* **42,** 1-116.

Geology of Britain online viewer: http://mapapps.bgs.ac.uk/geologyofbritain3d/

Joint Nature Conservation Committee (2010). *Handbook for Phase One habitat survey – a technique for environmental audit.* Available as a pdf file downloadable from the internet at http://www.jncc.gov.uk/page-2468

Rodwell, J.S. (Ed.) (1991 *et seq.*). *British Plant Communities.* 5 volumes: *Vol. 1 (1991) - Woodlands and Scrub; Vol. 2 (1991) - Mires and Heaths; Vol. 3 (1992) - Grasslands and montane communities; Vol. 4 (1995) - Aquatic communities, swamps and tall-herb fens; Vol. 5 (2000) - Maritime Cliffs, Sand Dunes, Saltmarshes and Other Vegetation.* Cambridge University Press, Cambridge.

Smith, C.W., Aptroot, A., Coppins, B.J., Fletcher, A., Gilbert, O.L., James, P.W. & Wolseley, P.A. (Eds.) (2009). *The Lichens of Great Britain and Ireland.* The British Lichen Society.

Stace, C.A. (2019). *New Flora of the British Isles. 4th Edition.* Cambridge University Press.

Strachan, I.M. (2017). *Manual of terrestrial EUNIS habitats in Scotland. Version 2.* Scottish Natural Heritage commissioned report 76. Available online at: https://www.nature.scot/doc/naturescot-commissioned-report-766-manual-terrestrial-eunis-habitats-scotland

Appendix 1 – Photographs

Photograph 1 – W2 woodland in NE of site.

Photograph 2 – W9 woodland in central-N part of site

Photograph 3 – W11 hazel woodland in central-N part of site.

Photograph 4 – MG1 coarse neutral grassland in central part of site.

Photograph 5 – MG5 grassland in central part of site.

Photograph 6 – MG5 grassland in SW part of site.

Photograph 7 – MG12 coarse grassland in central part of site.

Photograph 8 – MG13 grassland with abundant *Alopecurus geniculatus* in periodically flooded part of field in NE of site.

Photograph 9 – U4b-c herb-rich acid grassland in central-SW part of site.

Photograph 10 – M23a *Juncus acutiflorus* rushy wetland in NE of site.

Photograph 11 – M23b *Juncus effusus* rushy vegetation in SW of site.

Photograph 12 – M28 wetland (form dominated by *Oenanthe crocata*) in N of site.

Photograph 13 – MX species-rich neutral sedge mire at NW edge of site.

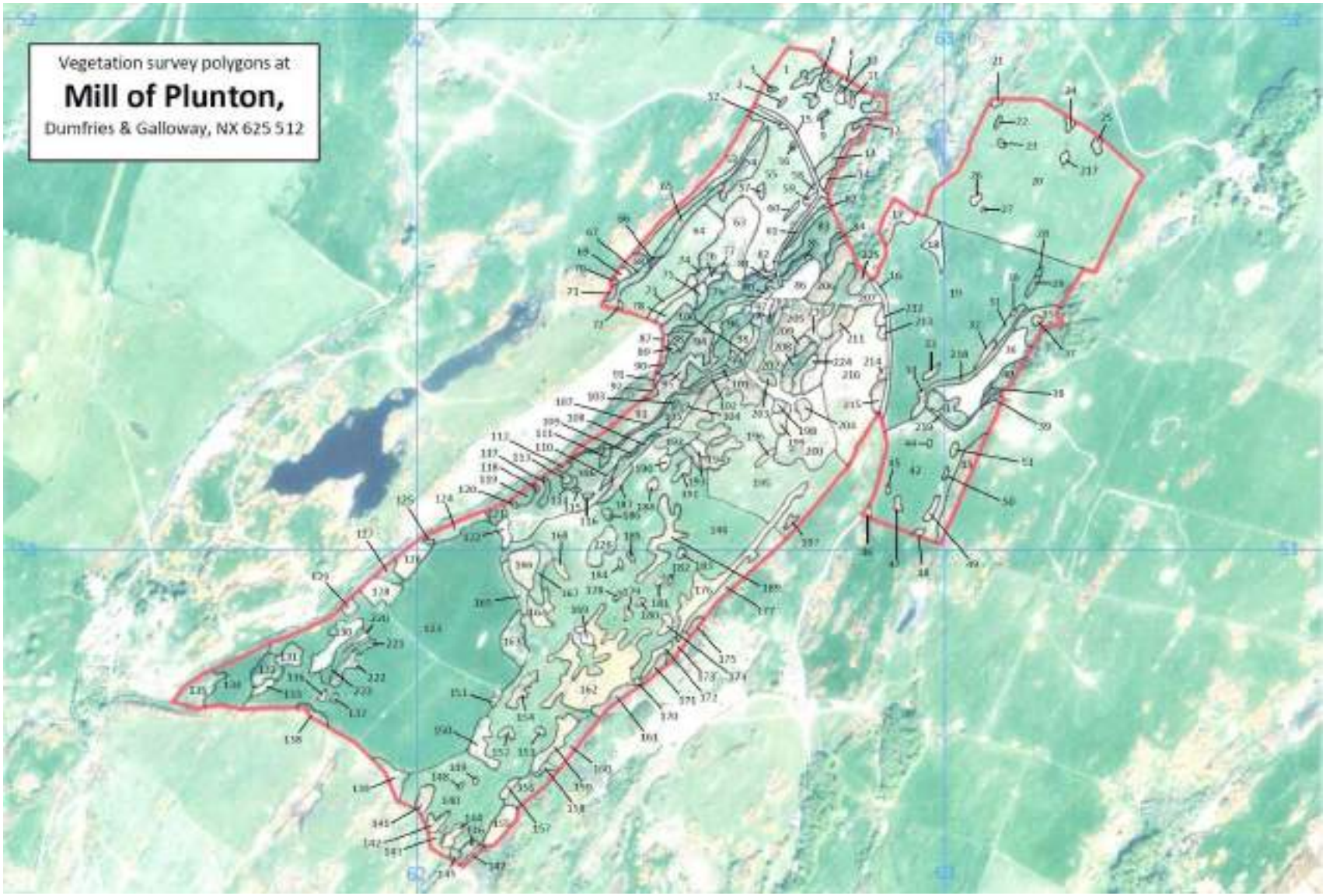
Photograph 14 – S3 *Carex paniculata* swamp in SW part of site.

Photographs 15-16 – *Genista tinctoria* at grassland/scrub boundary in central part of site.

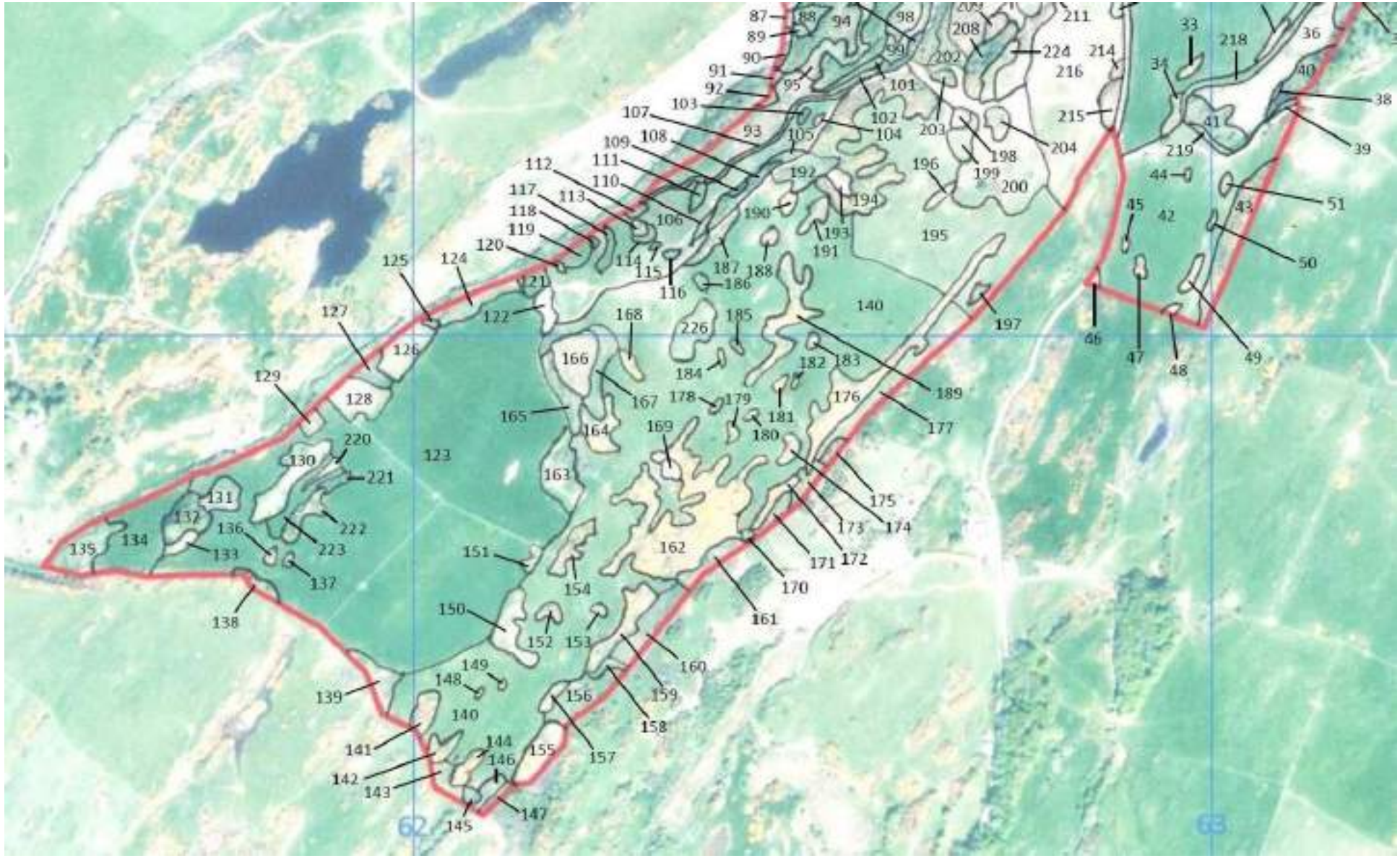
Photograph 17 – moss *Cryphaea heteromalla* on elder in central part of site.

Photograph 18 – abundant *Carum verticillatum* in MG5 in SW part of site.

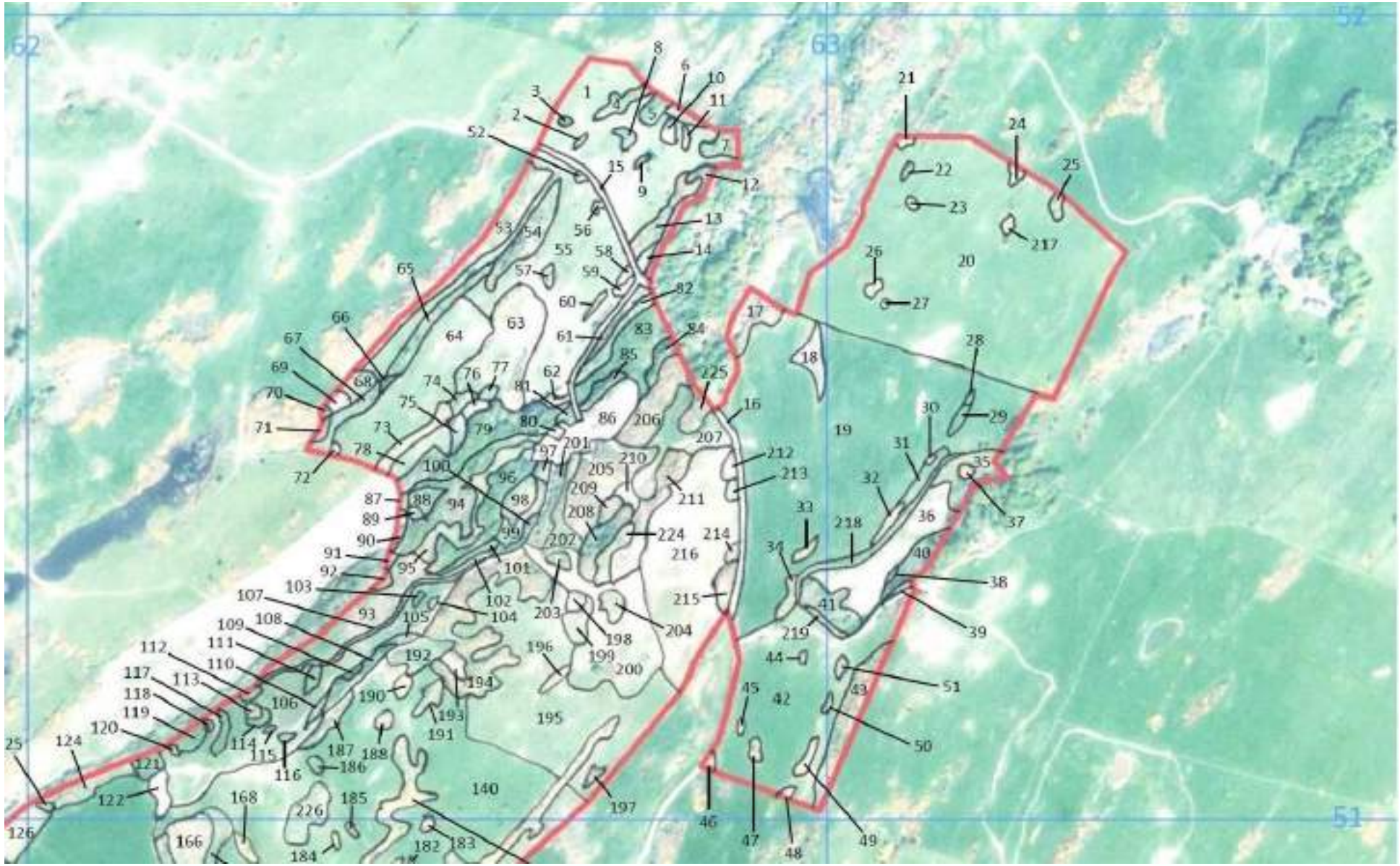
Appendix 2. Vegetation polygon map of Mill of Plunton, Dumfries & Galloway. Surveyed by Ben and Alison Averis on 29th June 2022.



Enlarged vegetation polygon map of Mill of Plunton (SW half), Dumfries & Galloway. Surveyed by Ben and Alison Averis on 29th June 2022.



Enlarged vegetation polygon map of Mill of Plunton (NE half), Dumfries & Galloway. Surveyed by Ben and Alison Averis on 29th June 2022.



Appendix 3 – NVC polygon data recorded by Ben and Alison Averis at Mill of Plunton, N Lanarkshire, on 29th June 2022 (Phase One, EUNIS and UKHab data are in a separate spreadsheet)

Polygon	NVC 1	% 1	NVC 2	% 2	NVC 3	% 3	NVC 4	% 4	NVC 5	% 5	NVC 6	% 6
1	MG6	100										
2	W23	100										
3	W21	100										
4	W21	100										
5	W21	100										
6	W21	70	W23	30								
7	W21	100										
8	W21	100										
9	U4b	100										
10	M23b	60	S19	30	S22	10						
11	W23Br	100										
12	W7a	100										
13	W21	50	W23	50								
14	MG6	100										
15	Road	100										
16	Road	100										
17	W23	100										
18	MG13	100										
19	MG6	60	MG7	40								
20	MG7	100										
21	W23	100										
22	W23	100										
23	W23	100										
24	W23	100										
25	W23	100										
26	W23	100										
27	W23	100										
28	MG5c-U1	100										
29	MG5c	100										
30	W23	100										
31	MG5c	100										
32	W23	100										

Polygon	NVC 1	% 1	NVC 2	% 2	NVC 3	% 3	NVC 4	% 4	NVC 5	% 5	NVC 6	% 6
33	W23	100										
34	W23	60	W21	20	W24	20						
35	MGX	100										
36	M23a	100										
37	W23	100										
38	W21	100										
39	W8-W21	100										
40	MG1	100										
41	W2	100										
42	MG6	100										
43	W23	80	W24	20								
44	W23	100										
45	W23	100										
46	W23	100										
47	W23	100										
48	W23	100										
49	W23	60	W24	40								
50	W23	100										
51	MG13-S22	100										
52	W23	100										
53	W23	80	MG5c	10	MG6	10						
54	W23	80	MG5c	10	MG6	10						
55	MG6	95	W23	3	W25	2						
56	W23	100										
57	W23	100										
58	W23	100										
59	H&G	100										
60	MG5c	100										
61	MG1	100										
62	MG10	100										
63	W23	80	MG5c	10	MG6	9	OV25	1				
64	MG6	95	MG5c	5								
65	MG6	100										
66	W21-W23	100										
67	U4b	100										

Polygon	NVC 1	% 1	NVC 2	% 2	NVC 3	% 3	NVC 4	% 4	NVC 5	% 5	NVC 6	% 6
68	M23b	100										
69	MX	100										
70	W3	100										
71	M23b	100										
72	W23	100										
73	W23	100										
74	W7	100										
75	M23b	100										
76	MG6	100										
77	M23b	100										
78	MG6	100										
79	W11Hz	70	W7a	20	W9a	10						
80	MG1	50	MG6	50								
81	MG1	100										
82	W7a	100										
83	M28 Ocroc	100										
84	W7a	100										
85	W7a	100										
86	Built-up	100										
87	M28 Ocroc	100										
88	MG1	100										
89	MG12	100										
90	W7a	100										
91	W25a	100										
92	W21	50	W23	50								
93	M23b	60	MG6	40								
94	W21	60	W22	20	W23	20						
95	MG1	100										
96	W21	60	W22	20	W23	20						
97	MG1	100										
98	S28	100										
99	M23b	100										
100	W9-W10	100										
101	MG5c	100										
102	MG1	100										

Polygon	NVC 1	% 1	NVC 2	% 2	NVC 3	% 3	NVC 4	% 4	NVC 5	% 5	NVC 6	% 6
103	MG5c	55	U4b	45								
104	W21	100										
105	U4b	100										
106	MG6	100										
107	MG10	100										
108	W21	75	W23	25								
109	U4b-c	100										
110	U4b	100										
111	MG5c	35	U4b-c	35	MG6	30						
112	MG9	100										
113	W23	100										
114	U4b	50	MG6	50								
115	MG10a	100										
116	W21	100										
117	M23b	100										
118	W23	100										
119	MG6	60	U4b-c	39	CG10a	1						
120	W23	100										
121	MG1	100										
122	Bare ground	40	MG6	20	W23	20	OV25	20				
123	MG6a	100										
124	MG5c	100										
125	M23a	90	Stones	10								
126	MG5c	100										
127	M23a	50	MG1	45	M28a	5						
128	MG5c	100										
129	MG9a	50	MG10a	50								
130	W25a	60	MG6a	20	W22	10	W21	5	W23	5		
131	W25a	100										
132	W11	50	W22	25	W23	25						
133	W25a	100										
134	MG6a	98	MG10a	2								
135	S22	50	M23a	49	M28a	1						
136	W23	45	W24	45	W22	10						
137	W23	45	W24	45	W22	10						

Polygon	NVC 1	% 1	NVC 2	% 2	NVC 3	% 3	NVC 4	% 4	NVC 5	% 5	NVC 6	% 6
138	W25a	85	W21	15								
139	M23b	100										
140	MG6a	98	U4b	1	U1e	0.5	CG10a	0.5				
141	W23	98	W22	2								
142	W23	98	W22	2								
143	MG10a	100										
144	W23	98	W22	2								
145	W7	100										
146	M23b	100										
147	U4b	100										
148	W23	100										
149	W23	100										
150	W23	50	W25a	50								
151	W23	100										
152	W23	100										
153	W23	100										
154	W23	100										
155	W23	50	W24	50								
156	M23b	90	U4b	10								
157	W25a	95	W21	5								
158	S28	95	OV25	5								
159	W25a	70	W25a	15	W22	10	W21	5				
160	M23a	33	M23b	33	MX	33	W7	1				
161	MX	49	M23a	25	M23b	24	S28	2				
162	W23	85	W25a	10	W24	5						
163	W22	98	W25a	2								
164	W23	50	W24	50								
165	M23b	100										
166	MX	30	S3	30	M23a	15	M23b	15	M22	10		
167	MG10a	100										
168	W23	100										
169	Dry pond	100										
170	U4b	100										
171	MG10a	35	M23b	35	Hlan	30						
172	W23	85	W25a	10	W24	5						

Polygon	NVC 1	% 1	NVC 2	% 2	NVC 3	% 3	NVC 4	% 4	NVC 5	% 5	NVC 6	% 6
173	U20a	50	U4b	50								
174	W23	100										
175	W21	40	W23	30	W24	30						
176	W23	79	W24	10	W25a	10	W21	1				
177	MG9a	46	M23b	46	U4b	5	S22	3				
178	W23	100										
179	W23	100										
180	W23	100										
181	W23	100										
182	W23	100										
183	W23	100										
184	W23	25	U4b	25	CG10a	25	Rock	25				
185	W23	85	W21	15								
186	U4b	50	W23	50								
187	U4b	50	W23	50								
188	W23	50	W24	50								
189	W23	85	W22	15								
190	W23	50	W24	50								
191	W23	100										
192	MG6a	100										
193	M5	50	M23a	25	M23b	25						
194	W23	81	W24	10	W25a	5	W22	2	W21	1	MG1	1
195	MG6a	99	U4b	0.5	U1e	0.5						
196	W23	100										
197	W23	25	W24	25	U4b	25	MG6a	25				
198	MG6a	100										
199	W23	50	OV25	50								
200	MG6a	98	U4b	1	U1e	1						
201	W23	33	W24	33	W10	33	MG1a	1				
202	W21	25	W23	25	W24	25	W25a	25				
203	W21	40	W23	30	W24	30						
204	OV25	100										
205	W21	33	W22	33	W24	32	W23	2				
206	W10	25	W23	25	W24	25	W25a	25				
207	MG6a	100										

Polygon	NVC 1	% 1	NVC 2	% 2	NVC 3	% 3	NVC 4	% 4	NVC 5	% 5	NVC 6	% 6
208	W23	40	W24	30	W21	30						
209	M23b	32	MG6a	32	MG10b	31	M23a	5				
210	U4b	50	MG6a	49	CG10a	1						
211	W21	25	W23	25	W24	25	W25a	25				
212	M23b	50	MG10a	50								
213	W23	50	W24	50								
214	W21	25	W22	25	W23	25	W24	25				
215	M23b	100										
216	MG6a	97	U4b	2	CG10a	1						
217	W23	100										
218	MG1	100										
219	S4b	75	M23a	25								
220	M23b	25	MG10a	25	OV24	25	S22	25				
221	MG1a	100										
222	W22	25	W23	25	MG1a	25	W24	15	W21	10		
223	MG6a	80	MG10a	20								
224	MG6a	50	OV25	50								
225	W23	100										
226	MG6a	50	OV25	50								

Appendix 4 – List of plant species found by Ben and Alison Averis in vegetation survey at Mill of Plunton, Dumfries & Galloway, on 29th June 2022

Species	Quantity	Phyt
Vascular plants		
Acer pseudoplatanus	2	i
Achillea millefolium	3	55
Agrostis capillaris	4	54
Agrostis stolonifera	3	66
Aira praecox	2	82
Alnus glutinosa	2	74
Alopecurus geniculatus	2	53
Alopecurus pratensis	2	54
Angelica sylvestris	2	54
Anisantha sterilis	1	83
Anthoxanthum odoratum	4	64
Aphanes arvensis	1	73
Apium nodiflorum	1	84
Arctium minus	1	75
Arrhenatherum elatius	4	73
Athyrium filix-femina	1	56
Bellis perennis	2	73
Berula erecta	1	73
Brachypodium sylvaticum	1	73
Briza media	2	73
Callitriche stagnalis	1	73
Caltha palustris	2	36
Campanula rotundifolia	1	56
Capsella bursa-pastoris	1	64
Cardamine flexuosa	2	73
Cardamine pratensis	2	36
Carex diandra	2	56
Carex echinata	1	53
Carex flacca	2	83
Carex nigra	1	54
Carex ovalis	2	54

Species	Quantity	Phyt
Carex panicea	1	53
Carex paniculata	2	73
Carex rostrata	2	56
Carum verticillatum	2	81
Centaurea nigra	3	72
Cerastium fontanum	3	54
Cerastium glomeratum	2	83
Ceratocapnos claviculata	2	71
Chrysosplenium oppositifolium	1	72
Circaea lutetiana	1	73
Cirsium arvense	3	75
Cirsium palustre	3	54
Cirsium vulgare	2	74
Conopodium majus	2	71
Corylus avellana	2	73
Crataegus monogyna	3	73
Crepis capillaris	1	73
Crepis paludosa	1	53
Cynosurus cristatus	4	73
Cytisus scoparius	2	73
Dactylis glomerata	3	84
Dactylorhiza fuchsii	2	74
Dactylorhiza purpurella	2	41
Deschampsia cespitosa	3	36
Deschampsia flexuosa	3	53
Digitalis purpurea	2	82
Dryopteris affinis	2	73
Dryopteris dilatata	3	73
Dryopteris filix-mas	2	76
Eleocharis palustris	2	65
Epilobium montanum	2	73
Epilobium palustre	2	56

Species	Quantity	Phyt
Equisetum arvense	2	36
Equisetum fluviatile	2	56
Erophila verna	1	84
Fagus sylvatica	1	73
Festuca arundinacea	2	84
Festuca ovina	2	55
Festuca rubra	3	36
Filipendula ulmaria	2	55
Fraxinus excelsior	2	73
Galium aparine	3	73
Galium palustre	3	54
Galium saxatile	3	72
Galium verum	3	55
Genista tinctoria	1	73
Geranium molle	1	83
Geranium robertianum	2	73
Geum urbanum	1	74
Glyceria fluitans	2	73
Gnaphalium uliginosum	1	55
Hedera helix	2	83
Heracleum sphondylium	2	55
Hieracium agg.	2	36
Holcus lanatus	4	83
Holcus mollis	2	73
Hyacinthoides non-scripta	2	71
Hydrocotyle vulgaris	2	82
Hypochaeris radicata	3	83
Ilex aquifolium	2	82
Iris pseudacorus	2	83
Juncus acutiflorus	2	73
Juncus articulatus	1	84
Juncus bufonius	1	66

Species	Quantity	Phyt
Juncus conglomeratus	2	73
Juncus effusus	4	83
Juncus inflexus	1	84
Juncus subnodulosus	2	83
Koeleria macrantha	1	76
Lapsana communis	1	73
Larix decidua	1	i
Lathyrus linifolius montanus	2	73
Lathyrus pratensis	3	54
Leontodon autumnalis	3	53
Ligustrum vulgare	1	73
Lolium perenne	4	83
Lonicera periclymenum	1	82
Lotus corniculatus	3	85
Lotus pedunculatus	3	73
Luzula multiflora	2	36
Lychnis flos-cuculi	2	74
Malus domestica	1	73
Matricaria discoidea	2	i
Mecanopsis cambrica	2	51
Mentha aquatica	1	73
Menyanthes trifoliata	1	56
Mercurialis perennis	2	73
Moehringia trinervia	1	73
Myosotis arvensis	1	54
Myosotis laxa	1	56
Oenanthe crocata	2	82
Oxalis acetosella	2	55
Pedicularis sylvatica	1	73
Persicaria maculosa	1	75
Phalaris arundinacea	2	56
Phleum bertolonii	2	83
Phragmites australis	2	66
Pilosella officinarum	3	73

Species	Quantity	Phyt
Pimpenella saxifraga	1	74
Pinus sylvestris	1	45
Plantago lanceolata	3	84
Plantago major	2	65
Poa annua	3	64
Poa pratensis	2	66
Poa trivialis	4	64
Polypodium vulgare	1	53
Potentilla anserina	2	56
Potentilla erecta	3	54
Potentilla palustris	2	56
Prunella vulgaris	2	66
Prunus avium	2	73
Prunus spinosa	3	73
Pteridium aquilinum	2	76
Quercus robur	2	73
Ranunculus acris	4	35
Ranunculus bulbosus	1	83
Ranunculus flammula	1	73
Ranunculus hederaceus	1	82
Ranunculus repens	4	55
Rhinanthus minor	1	53
Rorippa nasturtium-aquaticum	2	84
Rorippa palustris	1	56
Rosa canina	2	73
Rosa pimpenellifolia	1	75
Rubus fruticosus	3	83
Rubus idaeus	1	56
Rumex acetosa	3	54
Rumex acetosella	3	64
Rumex crispus	2	84
Rumex obtusifolius	2	73
Rumex sanguineus	1	73
Sagina procumbens	2	54

Species	Quantity	Phyt
Salix aurita	1	53
Salix caprea	1	55
Salix cinerea	2	54
Sambucus nigra	3	73
Sedum anglicum	1	71
Senecio jacobea	2	74
Silene dioica	2	53
Solanum dulcamara	2	85
Sparganium erectum	2	76
Stachys sylvatica	2	74
Stellaria graminea	3	54
Stellaria holostea	2	74
Stellaria media	2	65
Stellaria uliginosa	1	73
Succisa pratensis	2	74
Taraxacum officinale agg.	2	66
Teucrium scorodonia	1	82
Thymus polytrichus	2	53
Trifolium dubium	2	73
Trifolium medium	1	54
Trifolium pratense	2	74
Trifolium repens	4	54
Tussilago farfara	1	54
Ulex europaeus	4	71
Ulmus glabra	1	73
Urtica dioica	3	54
Valeriana officinalis	2	55
Verbascum thapsus	1	74
Veronica beccabunga	1	74
Veronica chamaedrys	2	54
Veronica officinalis	1	53
Veronica serpyllifolia	2	56
Vicia cracca	2	55
Vicia sativa	1	83

Species	Quantity	Phyt
Viola riviniana	1	73
Mosses		
Brachythecium rivulare	2	56
Brachythecium rutabulum	2	73
Bryum capillare	1	56
Calliergon cordifolium	2	56
Calliergonella cuspidata	3	76
Cryphea heteromalla	2	92
Ctenidium molluscum	1	53
Dicranum scoparium	1	36
Eurhynchium striatum	2	73
Homalothecium sericeum	2	84

Species	Quantity	Phyt
Hylocomium splendens	2	36
Hypnum andoi	2	72
Hypnum cupressiforme	2	66
Hypnum lacunosum	1	66
Hypnum resupinatum	1	72
Isothecium myosuroides	1	52
Kindbergia praelonga	3	73
Mnium hornum	2	73
Orthotrichum affine	2	53
Plagiomnium undulatum	2	73
Pleurozium schreberi	1	56
Polytrichastrum formosum	1	56
Pseudoscleropodium purum	2	73

Species	Quantity	Phyt
Rhizomnium punctatum	1	56
Rhytidiadelphus squarrosus	4	53
Sphagnum squarrosum	1	36
Thuidium recognitum	2	76
Ulota bruchii	1	73
Ulota phyllantha	1	51
Zygodon viridissimus	1	73
Liverworts		
Frullania dilatata	2	85
Metzgeria violacea	2	72
Pellia epiphylla	1	56

Mill of Plunton

Great-crested newt, Otter & Water Vole

2022

2 Blakelaw Farm cottages, Kelso TD5 8PB
T: 01573 430302

E: melanie.ingledew@btconnect.com
www.findlayecologyservices.co.uk

Report prepared by Dr. Mel Findlay

Issue	**Approved**	**Issued**
Draft	Roger Ingledew	10 05 22
Final draft		11 05 22
Final		12 05 22

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EXECUTIVE SUMMARY

Protected species surveys were undertaken at the Mill of Plunton site in Dumfries and Galloway, which is a potential site for tree planting. Water samples were taken from four ponds and sent for laboratory analysis to detect the presence of great-crested newt. Presence was detected at one pond. Great crested newts are therefore confirmed as a protected species on site that will need careful management and a license may be required to plant the site. Otter field signs were present on the burns, ditches and in a wetland area. Precautionary measures will be necessary to avoid damage to any otter resting sites during planting, but it is thought that otters will not be adversely affected by planting of the site. Water vole were not found on site, and precautionary checks are advised prior to planting. A badger sett was also found incidental to these surveys; a full badger survey was not part of the aims of this report.

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1. INTRODUCTION

The suitability of the Mill of Plunton site for a tree planting scheme is being assessed. The following surveys were commissioned by The Future Forest Company to identify any occupancy of the site by protected species, specifically great-crested newt, otter and water-vole.

The site is approximately 5km west of Kirkcudbright in Dumfries and Galloway and comprises a rolling landscape of low parallel ridges with adjacent hollows supporting pasture with areas of scrub and stone walls. Watercourses run down to the coast at the same orientation as the ridges, with ditches draining many of the hollows, and ponds are scattered through the hollows.

2. LEGISLATIVE BACKGROUND

The legislation that protects the species on site is summarised in Table 1. Licenses can be obtained for all protected species which derogate actions that would normally be unlawful.

Table 1. Legislation governing protected species on the site

Species	Legislation	Summary of offences
Great-crested Newt & Otter	The Habitats Directive - Conservation (Natural Habitats &.c) Regulations[1]1994, accepted as Scottish law post-Brexit by The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019	• capture, injure, kill or harass • disturb in any place it uses for shelter or protection • disturb while it is rearing or otherwise caring for its young • obstruct access to a place it uses for shelter or protection, or otherwise deny the animal use of that place • disturb in a manner or in circumstances likely to significantly affect the local distribution or abundance of the species • disturb in a manner or in circumstances likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young • damage or destroy a breeding site or resting place of such an animal (whether or not deliberately or recklessly) • keep, transport, sell or exchange, or offer for sale or exchange any animal (or any part or derivative of one) obtained after 10 June 1994
Water-vole	Wildlife and Countryside Act, 1981[2], as amended Schedule 5	• damage, destroy or obstruct access to any structure or place that water voles use for shelter or protection • disturb a water vole while it is using any such place of shelter or protection
All	Wildlife and Natural Environment (Scotland) Act 2011[3] i.e. WANE Act	This act changes the licensing system for protected species; and strengthens protection of badgers.
Badger	Protection of Badgers Act 1992[4], as amended*	• willfully take, injure or kill a badger • cruelty to a badger • intentional or reckless interference with a badger sett • sale or possession of a badger • marking or ringing of a badger Interfering with a badger sett includes: • damaging or destroying a sett or any part of it • obstructing access to a sett • disturbing a badger while it is in a sett

[1] Conservation (Natural Habitats, &c.) Regulations 1994
[2] Wildlife and Countryside Act (1981)
[3] Wildlife and Natural Environment (Scotland) Act 2011
[4] Protection of Badgers Act 1992

Species	Legislation	Summary of offences
		• causing or allowing a dog to enter a badger sett

3. METHODS

3.1 Great Crested Newt

3.1.1 Desk-top

National Biodiversity Network was interrogated, and it had two records of great crested newt on the site, both from April 1999:
Corsewood A: NX621506
Corsewood B: NX 623508
The search also located ten further sites for GCN to the south-west of the site.

3.1.2 Fieldwork

Samples for environmental DNA (eDNA) were taken in accordance with standard protocol supplied with the sampling kit by Surescreen Scientific at the two former sites for GCN (Corsewood Drum ponds A and B). Other ponds were searched for under guidance from Lindsay McKinlay, Ecologist for Future Forest Company. The following areas of surface water were sampled on 20th April 2022.

Table 2 Locations of ponds sampled and dry pond not sampled (see Fig 1)

Old name	**2022 Name**	**OS Ref (NX)**	**Sampled**
Corsewood Drum A	MOP A	62104 50621	Yes
NA	MOP B	61973 50549	Yes
NA	MOP C	62195 50974	Yes
Corsewood Drum B	MOP D	6230 5080	Not sampled, completely dry.

Figure 1 Locations of ponds sampled

3.2 Otter

Water-courses were surveyed to approximately 50m of the site boundary which was considered proportionate for a tree planting scheme. Field signs of otter were searched for including scent marks (spraints), footprints, slides and prey remains. However, the focus was on finding and identifying any resting sites that would be legally protected.

3.3 Water vole

Water courses and ponds within the boundary were searched for signs of water vole including burrows, latrines, droppings, footprints and larders, as described in Dean et al 2021[5].

3.4 Survey conditions

Survey conditions were good for water vole and eDNA sampling. There was some difficulty accessing the Pulwhirrin Burn in places as it was sided by dense scrub, and these dense scrubby areas could not be walked through to search for otter resting sites.

[5] Dean, M. (2021) Water Vole Field Signs and Habitat Assessment. A Practical guide to Water Vole Surveys. Pelagic Publishing.

4. RESULTS

4.1 Great-crested newt

MOPA (Corsewood Drum A) had a positive eDNA result. The laboratory methodology undertakes 12 repeats the test from each sample. The MOPA sample yielded 12 positive replicates. All the other samples were negative.

Old name	2022 Name	OS Ref (NX)	Summary
Corsewood Drum A	MOPA	62104 50621	Central reserve of water remaining with some areas deeper than at first appears. Two Myosotis leaves folded over, strongly suggesting GCN eggs. 
NA	MOPB	61973 55049	Large swampy area with reasonable depth in places and likely to be deper earlier in the year. 
NA	MOPC	62195 50974	Area of swamp dominated by rushes and greater tussock sedge. Central area negotiable in wellies, but likely to be deeper earlier in season.

			
Corsewood	MOP	6230	Not sampled, completely dry.
Drum B	D	5080	

In addition to the ponds, several areas of ditches were ponded but these generally had a dense covering of aquatic vegetation (mostly fool's water-cress and/or flote grass). eDNA is not applicable method in such habitats as it cannot be assumed it is *in situ* and there is potential that it has drifted in from out with the site.

4.2 Otter

Numerous signs of otter were found over the site, along the Pulwhirrin Burn but also on several ditches and in an area of fen, see Table 3 Figures 2 and 3. No places of otter rest were found.

Table 3 Location and description of otter field-evidence found

Eastings	Northings	Label on Figure	Field note
262898	551813	P1	Otter prints, poorly registered
262886	551807	S2	Old spraint on rock
262862	551800	S3	Several old spraints on gravel
262582	551493	P2	Adult otter prints in mud, Photo 1
262589	551485	S4	Spraint, left bank
262599	551484	S5	Spraint on rock mid stream
262625	551478	S6	Spraint on rock mid stream
262480	551416	S7	Several spraints on rock mid stream
262477	551357	S8	Small ledge with several spraints, photo 2
262229	551142	S9	Several old spraints on grass
262015	551036	S10	Spraint on bedrock
262210	550962	S11	Spraint on clear otter runs in greater tussock sedge
261672	550819	S12	Spraint a few metres from right bank
262354	550687	S13	Spraint on grass, single
262246	550607	S14	Large fecal deposit from otter. By dense scrub.

Photo 1 Set of otter tracks in soft mud

Photo 2 Small ledge with several otter spraints

Figure 2 Otter field evidence in the north of the site

Figure 3 Otter evidence in the south of the site

4.3 Water vole

The site has several ditches with ponded water and lush vegetation in the channel and on the banks, see Photo 3. No signs of water vole were found.

Photo 3 Some ditches were on a shallow gradient and had lush aquatic vegetation suggesting suitability for water vole

4.4 Other observations

Common lizard was observed at NX 61859 50666.

A badger sett was found just outside the boundary, Figure 4 and numerous runs and foraging signs were present into the site to the south of the sett in the open field together. The badgers are negotiating the adjacent stone wall via a small gap at its base. A strong badger track was present together with dropped bedding, Photo 4.

Figure 4 Location of active badger sett and two large latrine sites

Photo 4 Badger track through gap in stone wall, with dropped bedding, immediately to south of sett

5. SUMMARY AND RECOMMENDATIONS

5.1 Great crested newt

This species is present on the site and is breeding in pond MOPA and is likely to be breeding elsewhere on the site in some years including MOPD (historically present) which could not be sampled. Some sections of slow flowing ditches may be suitable in some years, although on the survey date these appeared too shallow for displaying male GCN which require a reasonable depth. The terrestrial habitat around the two main ponds (MOPA & MOPD) was good, with areas of dense gorse scrub which would potentially provide daytime refuges and hibernating habitat.

The new planting scheme can be designed around the ponds if important aspects of the GCN ecology, and the legislation are considered, as follows:

Maintenance of ponds

Currently, the ponds receive very little leaf litter and have an open aspect. Significant increase in shading or leaf litter input into the ponds should be avoided. Additionally, the ponds are likely to be replenished by rainfall and/or ground water and this hydrology should be maintained so that drying of the ponds can happen in dry years (to avoid colonisation by fish), but in some years the ponds retain water throughout the larval development period. Any impacts from drainage on the ponds therefore needs to be considered. An area around the pond should remain unplanted and this should be cognisant of the local topography and aspect (e.g. trees could be closer to the pond on the northern side as shading would be less than on the southern side).

Terrestrial Habitat

It is recommended that any planting scheme retains the gorse areas close to the ponds (within 50m) and doesn't replace these with new planting or manage via other means as these areas are likely to be used as refuges.

Avoidance of harm during planting

GCN will be present in terrestrial habitats during March-Nov depending upon temperature. In the hibernation period they will be below ground in small mammal burrows, rubble, roots and possibly using stone walls and debris piles. It is unknown at this stage if any additional infrastructure, such as tracks will be included in the proposal. Consideration should be given to the best season for planting and maintenance of the trees.

It is likely that a derogation license and mitigation plan will be necessary to plant up some areas of this site. It is recommended that the GCN specialist at Nature Scot (John McKinnel) is consulted early in the planning of this site so that the need for further surveys can be identified and appropriate mitigation be agreed prior to a derogation licence application.

5.2 Otter

Signs of otter were distributed over the site as expected. Otter activity will be centred on the watercourses, but otters are terrestrial mammals and rest in terrestrial habitats. It is not feasible to locate all resting sites in the site as some may only be used once or twice a year, but there were no indications of frequent resting in any parts of the site. The landscape and the calm water-courses and waterbodies in this locality imply suitability for breeding, and cubs may be present on site from time to time. It is therefore recommended that the existing scrub areas adjacent to water courses are retained wherever possible, and if there is any scrub removal, that contractors are trained in signs of otter (and other mammals) so that they can check, each day, for signs of otter and call in an ecologist if concerned. All contractors should have a toolbox talk so that they stop and call in an ecologist if they disturb an otter during the works.

The planting of this site is unlikely to have a negative impact on the habitat of the otter locally, and in the long term, is likely to provide an increase in refuge areas and resting sites.

5.3 Water Vole

No water voles were detected. Due to the potentially suitable habitat on site, a pre-planting check is recommended.

TCMS

Mill of Plunton

Bird Survey
August 2022

Report prepared by Duncan Stevenson

Tinto Countryside Management Solutions
www.tintocountrysidemanagementsolutions.com
Mobile: 07483 896790 Email: info@tintocountrysidemanagementsolutions.com

SUMMARY

At the start of 2022 Tinto Countryside Management Solutions, (TCMS) was approached by Lindsay Mackinlay, (UK Biodiversity Manager) at The Future Forest Company, (FFC) to conduct a breeding bird survey at its Mill of Plunton, (MoP) property between Kirkcudbright and Gatehouse of Fleet.

The study area covered roughly 91ha, with the three surveys being undertaken relating to this area and immediate adjacent ground.

A total of twenty-six breeding species and eleven non-breeding species were recorded at MoP.
One wader species was recorded along with a range of other bird species, including a few that merit conservation concern including yellowhammer and linnet.

Table of Contents

1. Introduction

1.1 Site Description

Location: Between Kirkcudbright and Gatehouse of Fleet, Dumfries & Galloway

Lying at approximately 50m to 80m and centred on Grid reference – NX 62510 51214

Currently a lowland livestock farm on distinctive gentle rolling landscape. Much of the area is improved grassland, however, there are significant areas of gorse and other scrub, marshy grassland and small ponds, as well as streamside/ditch areas.

The property also includes a range of farm buildings and good lengths of drystone field boundaries.

Map 1. Mill of Plunton property location.

1.2 Aims of Survey

The aim was to survey the site in order to obtain accurate baseline information on its breeding bird assemblage, including assessing the nature conservation importance of bird species and communities at the property, in terms of both species' rarity and diversity, in a Scottish, UK and international context. Also, to obtain accurate baseline information on the sites breeding bird assemblage and investigate any bird data available from the local Biological Records Centre within 1km of the site boundary.

Make recommendations for the conservation management and monitoring of any important bird communities and/or individual species of conservation importance.

All species were noted, including highlighting those that are red & amber listed birds of conservation concern (BoCC5) [1].

2. Method

2.1 Biological Records

TCMS interrogated the NBN Atlas Scotland to provide background information on bird records within Mill of Plunton (1km Buffer).

FFC has made several attempts to obtain data from SWSEIC (Southwest Scotland Environmental Information Centre) but for reasons unknown, have not had much communication back from the local records centre and consequently no data has been received to date.

TCMS also checked the Barn Owl Trust mapping website but found no records, although there are records within a 2km buffer.

2.2 Field Survey

2.2.1 Breeding Birds including Waders

The survey method followed was an adaptation of the Brown & Shepherd (1993) [2].
All species displaying territorial, or breeding behaviour were recorded (e.g., in song, carrying food or nesting material, with young, alarm calling) were recorded on a field-map then digitized using QGIS©

Results are recorded in both table 1 and Appendix 1

[1] BTO/RSPB (2022) Birds of conservation concern 5: The red list for birds.

[2] Brown, A. F. and Shepherd, K. B. (1993) A method for censusing upland breeding wader populations.

Timings

Three visits were undertaken for breeding birds. Surveys were undertaken between April through to late-June 2022, with approximately 3-4 weeks between visits and generally in good conditions; see **Table 1**.

Table 1. *Survey dates and weather conditions for breeding bird surveys*

Survey	Date	Start	End	Visibility	Temp (°C)	Wind (Beaufort)	Conditions
1	23/4/2022	09.00	13.00	Excellent	9-15	3-5	Dry with sunny spells (c20% cloud)
2	24/5/2022	08.30	14.00	Good	9-14	2-4	Overcast with occasional light showers (c70%) cloud)
3	22/6/2022	08.00	13.30	Good	14-20	2-4	Overcast and dry (c60% cloud)

2.3 Designated Sites

NatureScot GIS datasets were interrogated for any protected sites with bird interest within a 2 km radius of the site. Mill of Plunton is not included in a protected site, and no designations are within the 2km radius.

However, the property falls within the Galloway and Southern Ayrshire Biosphere and there are patches of woodland listed on the Ancient Woodland Inventory within the 2km radius; see map in **Appendix 2**

Table 2. **Summary of the Galloway& Ayrshire UNESCO Biosphere**

Site	Proximity to boundary	Summary of designated biodiversity
Galloway & Southern Ayrshire UNESCO Biosphere	Property included in the Biosphere	There are no rules or regulations associated with Galloway and Southern Ayrshire being a UNESCO Biosphere. Rather, it is an opportunity to connect more closely with the land that surrounds us. Being a Biosphere means creating opportunities for people to get involved: we do this 'with' others, not 'to' them. The Biosphere is driven by collaboration and led by a Partnership Board and Trustees – people who live and work in the region. And we are a unique organisation in how we operate: bringing diverse, multi-sector groups together

		to work in partnerships for a sustainable future.

3. Results

Results relate to the FFC Mill of Plunton property area, either within that area or close by.

Thirty-seven bird species were recorded (Appendix 1) with twenty-six of those species confirmed or suspected as breeding; see **Appendix 1**

Species included in this section relate to them being included in either the red or amber BoCC5 lists.

3.1 Black Grouse

No leks were identified and no black grouse were recorded, when carrying out desk research and during the field breeding bird surveys.

It was also noted that there are no historical black grouse leks within a 1km radius of the site.

3.2 Waders

One farmland wader species were identified.

- Curlew – were observed on the first visit and thought to be passing through the site and to be non-breeders.

Table 3. Wader Registrations

Refer to Appendix 2 and Appendix 3

Species			**Field Description /Compartment Number**	**Number of birds**
Scientific name	**Common name**	**BTO Code**		
Vanellus	Lapwing	L.	No records	0
Gallinago	Snipe	SN	No records	0
Numenius arquata	Curlew	CU	In field compartment 16	2 birds
Haematopus ostralegus	Oystercatcher	OC	No records	0
Tringa totanus	Redshank	RK	No records	0

3.3 Passerines

- Skylark - up to two individuals were noted displaying predominately in compartment 3 of the property. Based on this assessment this species is considered not to be significantly more abundant than would be expected on other farmland of this type. **One territory confirmed within the property in compartment 3. See summary map Appendix 3**
- Meadow Pipit – up to one individual was noted displaying in compartment 3 of the property. Based on this assessment this species is considered not to be significantly more abundant than would be expected on other farmland of this type. **One territory**

confirmed within the property in compartment 3. See summary map Appendix 3

- Reed Bunting – up to two individuals were noted displaying/singing in compartments 4 and 9. **One territory confirmed within the property in compartment 4. See summary map Appendix 3**
- Linnet – Up to six individuals were noted displaying/singing in compartments 1, 4, 6 and 14. Also around eight linnets recorded as part of a larger finch flock in compartment 3, feeding on grass seed during third site visit. **Two territories confirmed within the property in compartments 1 and 6. See summary map Appendix 3**
- Sedge warbler – Up to four individuals singing in compartments, 1, 4, 9, 15 and 19. **Four territories confirmed within the property in compartments 1,4,9 and 19. See summary map Appendix 3**
- Lesser redpoll – Up to three birds displaying/singing in compartment 4 and 3. Also around six lesser redpolls recorded as part of a larger finch flock in compartment 3, feeding on grass seed during third site visit.
- Willow warbler – up to eight individuals were noted displaying/singing in compartments 1, 4, 8, 9,10, 13 and 19. **Six territories confirmed within the property in compartments 4,8,9,10,13 and 19. See summary map Appendix 3**
- Chiffchaff – up to two individuals were noted singing in compartment 13 and within the mature woodland just off the property to the northwest of compartment18.
- Song thrush – one individual noted singing within compartment 17.
- Yellowhammer– one individual noted alarm calling in the most westerly mature tree field boundary.
- Whitethroat – Up to three individuals singing in compartments 1, 4, 9 and 19. **Two territories confirmed within the property in compartments 9 and 19. See summary map Appendix 3**
- Blackcap – up to three individuals noted singing in compartments 14 and 4.

3.4 Raptors

- Buzzard - Individual birds were recorded hunting throughout the property.
- Red kite – Up to two individuals recorded hunting over all the property.
- Kestrel – Up to one bird recorded hunting over compartment 8.

3.5 Other birds

- Herring Gull – recorded flying over the property in a westerly direction. Believed to be using the disused quarry off the property to bathe in the fresh water.
- Rook - one bird recorded feeding in the field adjacent to Shaw's Plantation.
- Swift – several birds noted feeding over the open grassland areas of compartment 7.
- House martin – Up to five individuals recorded feeding over the lochan, (just off the property) to the west of compartment 2 and compartment 7.
- Swallow – Up to thirteen noted feeding around the property with several nests within the farm buildings.

- Feral pigeon – Up to eight noted feeding around the farm buildings and nesting within.

3.6 Schedule 1 species

No Schedule 1 species under the Wildlife and Countryside Act 1981, as amended in Scotland, were recorded.

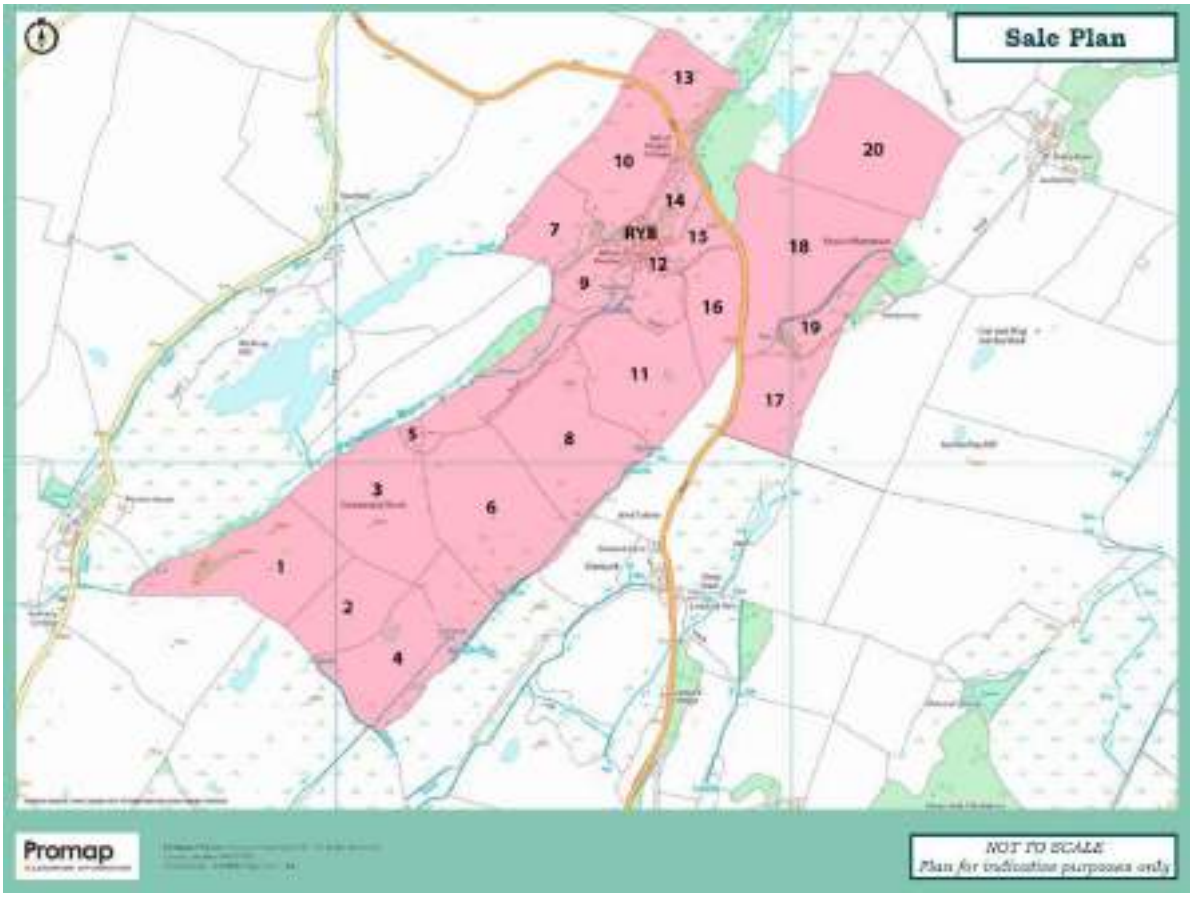
• Barn owl – would have expected to have seen signs of Barn owls using the variety of farm buildings at MoP but no signs, (pellets or nest) were identified. Probably due to historical ongoing disturbance and/or numerous feral pigeons using the buildings.

Records of barn owl with a 2km buffer of the property as Barn Owl Trust mapping website.

3.7 Other wildlife

- Roe Deer – Up to three individuals recorded in compartments 1, 5, 7 and 19.
- Brown Hare – one recorded on third visit in compartment 2.
- Rabbit - Numerous in south - western edge of compartment 6
- Stoat – One individual recorded hunting along north-eastern edge of compartment 10.
- Several species of butterflies; Green Veined White, Meadow Brown, Ringlet and Orange Tip.

Map 2. Mill of Plunton property boundary with field numbers.



4. Discussion

Most species recorded were considered to be common species with stable UK populations (i.e., green listed) though there were a few breeding species shown in Appendix 1, that merit conservation consideration as they are either listed as Birds of Conservation Concern[4] (BoCC5; red or amber listed) and/or listed on the Scottish Biodiversity List[5].

Red listed open ground birds include skylark and curlew. Habitat for skylark and curlew would be lost if the whole of the site is afforested. However, skylark are likely to persist in unplanted areas and planted areas while the trees are young.

Although curlew was recorded on the property, (believed to be passing through) it is felt that the current habitat, (improved grass with numerous clumps of scrub and occasional mature trees) throughout most of the property is not ideal for breeding curlew.

The mix of habitats at Mill of Plunton attracts numerous species of birds of which sixteen are either listed in the red or amber BoCC5 lists.

Significant areas of gorse and other scrub throughout the property are certainly important for a wide range of bird species, including BoCC red and amber species, such as linnet, yellowhammer and whitethroat.

Marshy grassland, (mainly in compartment 9 and 19) and the numerous ponds throughout the property suit both sedge warbler and reed bunting. The ponds vary in condition and ability to hold onto standing water.

The numerous farm buildings are used by swallow and feral pigeon to nest and raise young and there are certainly opportunities to attract other species such as barn owl, swift and house martin.

5. Recommendations

As mentioned previously the large areas of gorse and other scrub on the property are significant for breeding red and amber bird species. Therefore, retaining elements of this is recommended to support these important species going forward.

The marshy grassland within the property is a valuable habitat for birds and any tree planting within or immediately around the mire is not recommended.

Maintaining mature and dying broadleaf trees would be valuable for breeding birds including starling and great spotted woodpecker.

Having a mix of conifer and broadleaved species will benefit a wider range of bird species including red listed species like mistle and song-thrush along with spotted flycatcher.

5.1 Farm buildings

To ensure the long-term conservation of the barn owls, swallows, house martin and swifts on the site.

- Incorporate barn owl nest boxes plus suitable structures for nesting swallows, house martin and swifts in the farm buildings and farmhouse, (depending on their future use?).
- Contractors/workers to be briefed on the legislation* as it relates to barn owls and breeding swallows in the farm buildings and future works.
- Contractors must cease work immediately if they find barn owl in their work area and seek advice from a professional ecologist prior to the re-commencement of works.

* = A special level of protection is afforded to Barn Owls (and certain other species of bird) under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). In summary, barn owls are protected against intentional or reckless disturbance whilst building a nest or whilst at, on or near a nest containing eggs or dependent young.

Appendix 1 - Summary of all bird registrations

*Birds identified at Mill of Plunton proposed woodland creation site (number of registrations of all bird species with confirmed or suspected breeding species within the property or immediately adjacent in **bold**).*

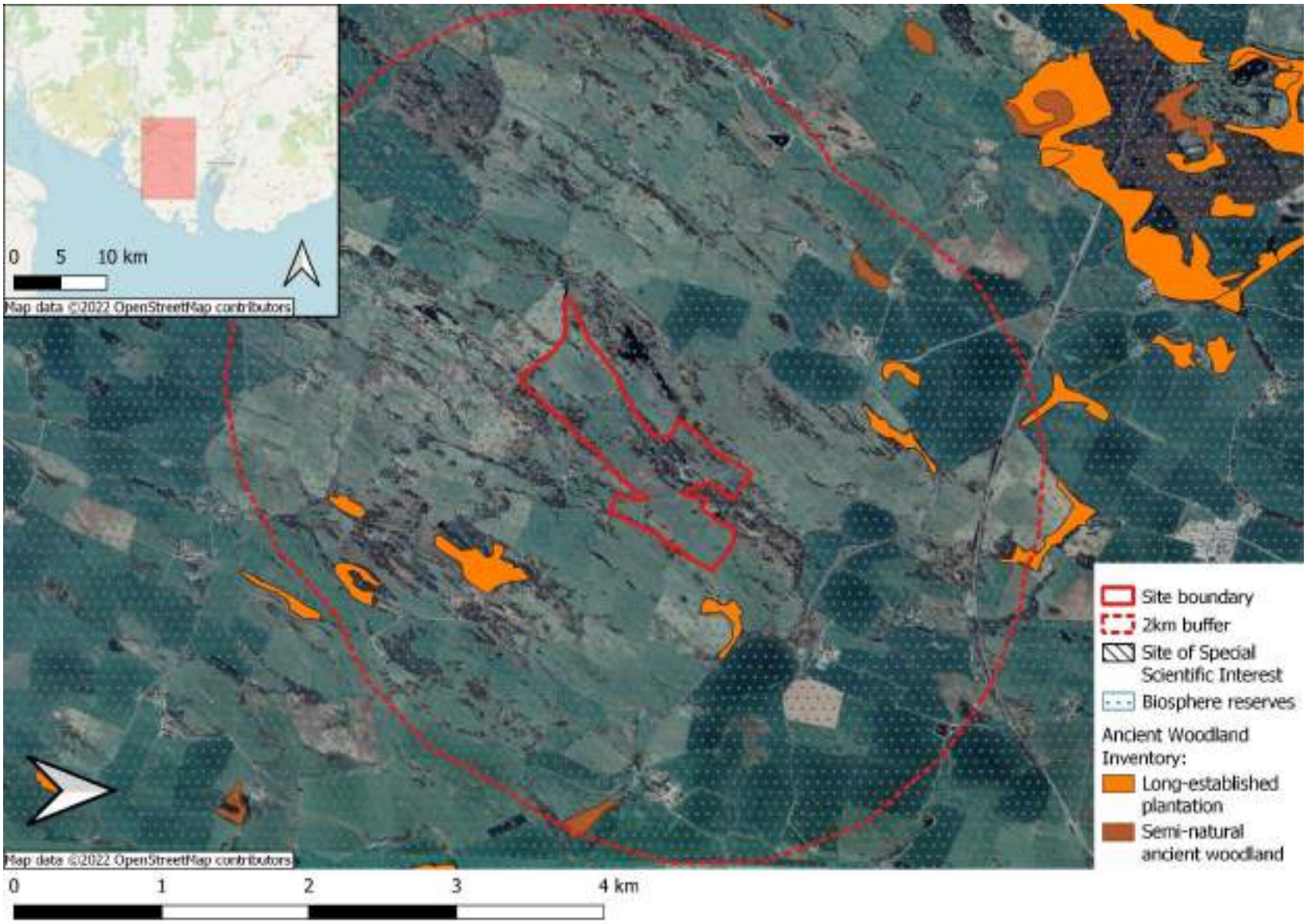
BTO Species Code	Species		Survey Timing and registrations			Conservation and Protection Status *(JNCC/BTO)*[3 – 4]		
	Scientific name	**Common name**	**April 23rd 2022**	**May 25th 2022**	**June 22nd 2022**	**Birds of Conservation Concern5**	**Scottish Biodiversity List species.**	**D&G LBAP**
PH	*Phasianus colchicus*	Pheasant	1	1		Green		
H.	*Ardea cinera*	Grey Heron		1	2	Green		
WP	***Columba palumbus***	**Woodpigeon**		4	5	Green		
FP	***Columba livia ''domestica''***	**Feral Pigeon**	6	5	4	Green		
BZ	*Buteo buteo*	Buzzard	1	1	1	Green		
KT	*Milvus milvus*	Red Kite	2	2	1	Green	✓	✓
K.	*Falco tinnunculus*	Kestrel		1		Amber	✓	✓
CU	*Numenius arquata*	Curlew	2			Red	✓	✓
HG	*Larus argentatus*	Herring Gull	5		2	Red	✓	✓
JD	***Corvus monedula***	**Jackdaw**	3	2		Green		
C.	***Corvus corone***	**Carrion crow**	8	4	5	Green		
RO	*Corvus frugilegus*	Rook			1	Amber		
S.	***Alauda arvensis***	**Skylark**	1	2	2	Red	✓	✓
GT	***Parus major***	**Great Tit**	1	1		Green		
BT	***Cyanistes caeruleus***	**Blue Tit**	1	2	1	Green		
MG	***Pica pica***	**Magpie**	1	2	1	Green		
ST	***Turdus philomelos***	**Song Thrush**	1	1		Amber	✓	✓
B.	***Turdus merula***	**Blackbird**	1	2	2	Green		
WR	***Troglodytes***	**Wren**	5	7	4	Green		
SL	***Hirundo rustica***	**Barn Swallow**		9	10	Green		
HM	*Delichon urbicum*	House Martin		5		Red		
SI	*Apus apus*	Common Swift		3		Red	✓	✓
GS	*Dendrocopos major*	Great Spotted Woodpecker			1	Green		

BC	***Sylvia atrcapilla***	**Blackcap**	1	2		Green		
WH	***Sylvia communis***	**Common whitethroat**		3	3	Amber		
SW	***Acrocephalus schoenobaenus***	**Sedge warbler**		5	5	Amber		
CC	***Phylloscopus collybita***	**Chiffchaff**		2	2	Green		
WW	***Phylloscopus trochilus***	**Willow warbler**	5	8	9	Amber		
MP	***Anthus pratensis***	**Meadow pipit**	2	2	3	Amber		
R.	***Erithacus rubecula***	**Robin**			1	Green		
CH	***Fringilla coelebs***	**Chaffinch**	**3**	**6**	6	Green		
LI	***Carduelis cannabina***	**Linnet**	**3**	**3**	11	Red	✓	✓
LR	***Acanthis cabaret***	**Lesser Redpoll**		**3**	7	Red	✓	
GO	***Carduelis citrinella***	**Goldfinch**		4	12	Green		
BF	***Pyrrhula pyrulla***	**Bullfinch**		2		Amber		
RB	***Emberiza schoeniclus***	**Reed Bunting**	1	1	2	Amber	✓	✓
Y.	**Emberiza citrinella**	**Yellow Hammer**		4	3	Red	✓	✓

Most species recorded were considered to be common species with stable UK populations (i.e., green listed) though there were a few breeding species shown in the above table, that merit conservation consideration as they are either listed as Birds of Conservation Concern[3] (BoCC5; red or amber listed) and/or listed on the Scottish Biodiversity List[4].

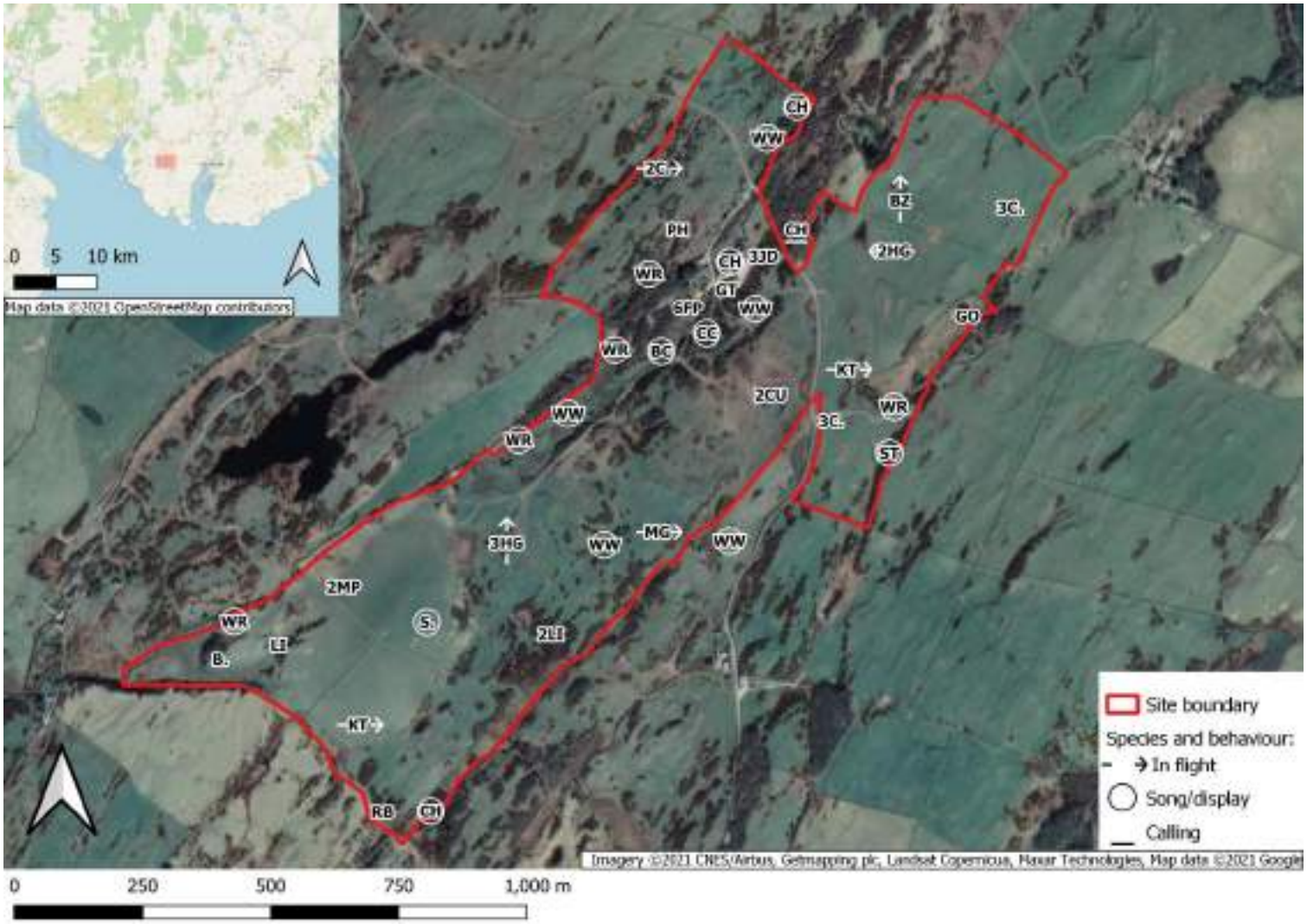
[4] *https://registry.nbnatlas.org/public/show/dr583 (accessed 15/08/2022)*
[3]*https://www.rspb.org.uk/globalassets/downloads/bocc5/bocc-5-a5-4pp-09-11-2021.pdf (accessed 15/08/2022)*

Appendix 2 - Environmental Designation Map

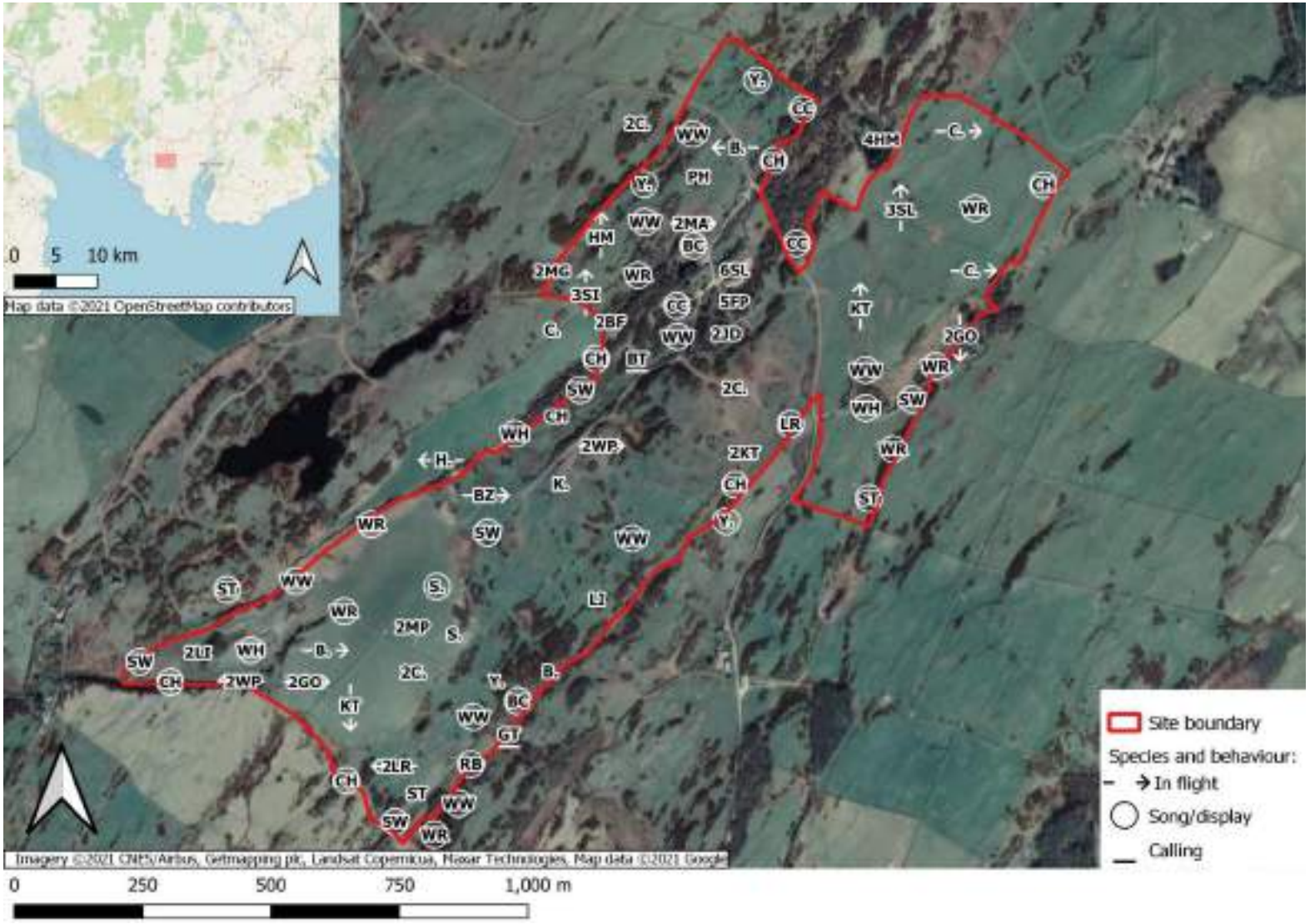


Appendix 3 - Bird Survey Maps (Codes listed in Appendix 1)

Visit 1 23/04/2022



Visit 2 24/05/2022



Visit 3 22/06/2022

Appendix 4 - Images

Typical mix of scrub/gorse within improved grassland. Good habitat for passerines including linnet and yellowhammer

Some of the farm buildings being used for nesting by feral pigeon and swallow

Looking northeast through compartment 9 and marshy grassland. Good habitat for reed buntings

Looking west in compartment 3. Skylark and meadow pipit recorded here

Looking northeast along ditch in compartment 4. Sedge warbler and reed bunting recorded here.

Looking east on northern edge of compartment 18, showing generally improved grassland.

Looking northeast in compartment 14. Blackcap and willow warblers recorded here.

Within mature woodland towards the northwest of farm buildings.