Derbyshire
Wildlife Trust

Darley and Nutwood Local Nature Reserve

Management Plan 2013 - 2017

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Protecting wildlife, ***Restoring*** landscapes, ***Inspiring*** people

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Acknowledgements.

As this represents an update of the original Management Plan and much of the content of that plan has been retained the acknowledgements of the first plan are retained as follows.

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After the original plan was produced a Management Group for the site was established and the author would like to thank the Group for their input into this revision and, most importantly, their enthusiasm to engage with this most important site in Derby City.

1 INTRODUCTION

The original plan for this site was drafted in 2003 and following various revisions with a final document dated July 2007 providing the first Management Plan for the site to cover the period 2007-11. This revised, or perhaps better described as updated, plan aims to provide the focus and direction of management of the site for nature conservation and public access for the next 5 year period, 2013-17.

The original plan contained a wealth of background information for the site, from historical aspects through to survey work undertaken to inform the plan provided ecological baseline information. This information remains relevant and the original Management Plan forms an essential reference document for information about the site. A complete re-write of the plan could potentially exclude much of this information but still provide a Management Plan fit for purpose, leaving this data and information as an archived document. However, as with any archived document, the passage of time can result in difficulties in locating and accessing archived material. After taking this into consideration the author has taken the view that updating the original plan would enable the original plan to continue to form this valuable resource and continue to provide a one stop resource of information about the site and its history and past management.

The original plan ran to 62 pages and was therefore a lengthy document. On the basis that there is a need to retain most of the information in the original plan the updated plan will inevitably be an even lengthier document. There may therefore be a requirement for a separate summary plan.

2 GENERAL INFORMATION

2.1 Location and access

The site is located to the north of Derby City as shown in Map 1 overleaf. The central OS grid reference is SK355388.

Although there are no formal Public Rights of Way in terms of public footpaths or bridleways over the area the site is fully accessible as informal public access with pedestrian access to the north off South Avenue via the A6 and to the south from an unclassified track via the old toll road which crosses the River Derwent. This southern entrance provides the only route for vehicular access onto the land for management work or emergency access.

2.2 Summary description

Extending to approximately 10 ha this Derby City Council owned site comprises several small areas of varied habitat around a main area of rough grassland with developing scrub; this larger area marks the location of the former refuse site, Darley Tip.

To the west a steep bank supports an area of broadleaved semi-natural woodland, Nut Wood, with the southern end containing plantation woodland planted as remedial works following a landslip. At the base of the wooded slope there is an area of swamp fed by a small watercourse flowing from the north boundary. The east edge of this wetland habitat is marked by developing scrub which separates it from the main habitat, rough grassland. Additional habitat diversity within this grassland is provided by areas of impeded drainage, where shallow depressions form ephemeral ponds, also stands of dense bramble and scrub, both scattered and dense, occur throughout. Around the edges scrub tends to be denser and there are areas of naturally regenerating broaleaved, mainly alder, woodland.

To the east the River Derwent forms an impressive boundary to the site with its associated tall herb riparian habitat. The fenced north boundary separates the site from close grazed horse pasture. At the time of writing this boundary is the subject of a dispute following a claim that the adjacent landowner removed the original boundary fence and then reinstated it in a different location. This boundary is regularly breached by livestock from the adjacent land. A chain link fence forms the southern boundary.

Across the area of the old refuse tip there are a series of manholes and in the south east corner an associated methane gas burner. Methane emissions from the old landfill continue to be monitored by the City Council's waste management department.

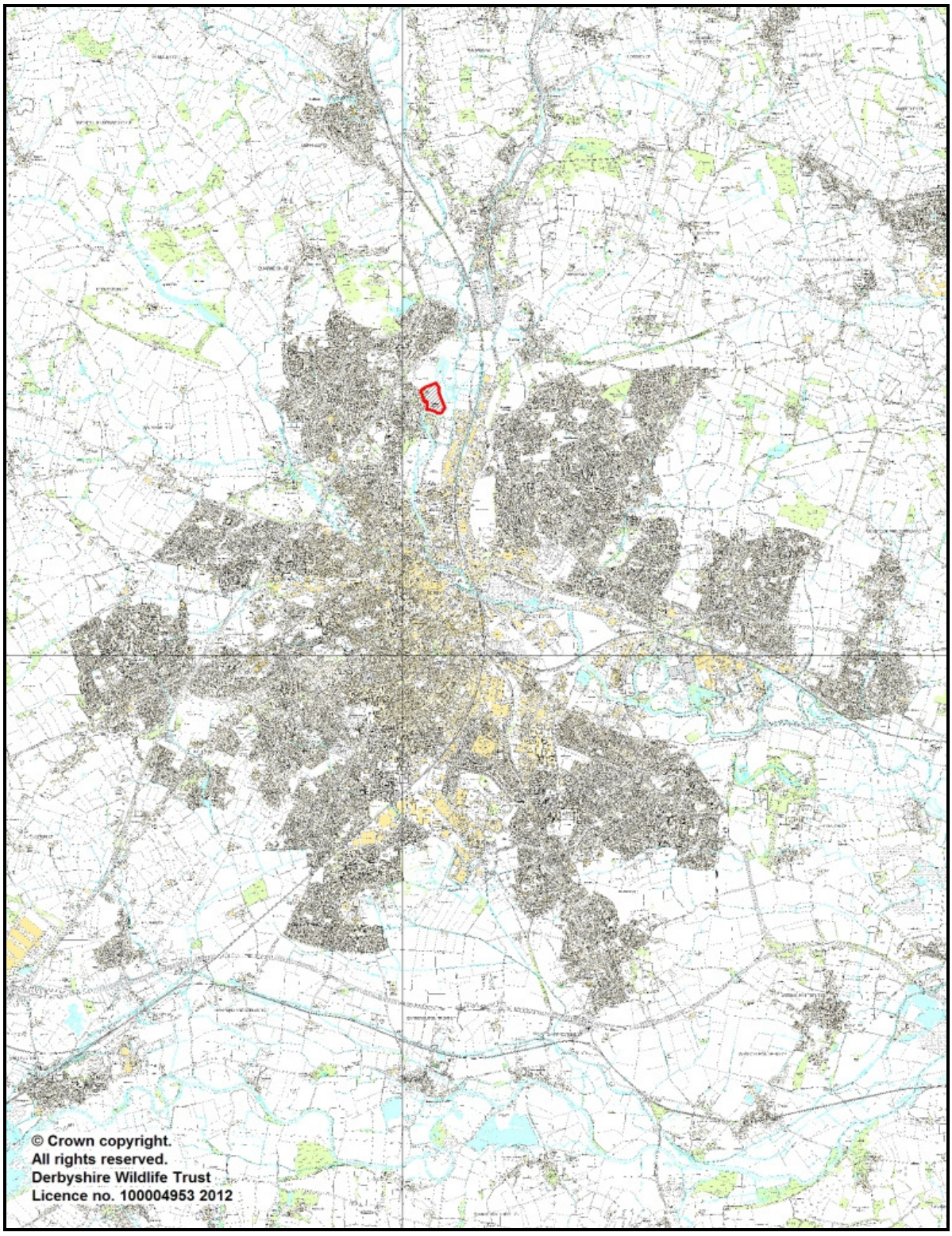
Since approval of the first management plan the site has been managed for nature conservation objectives with management coordinated and overseen by a Management Group which in itself is a sub-group of the Darley Abbey Society.

2.3 Geology

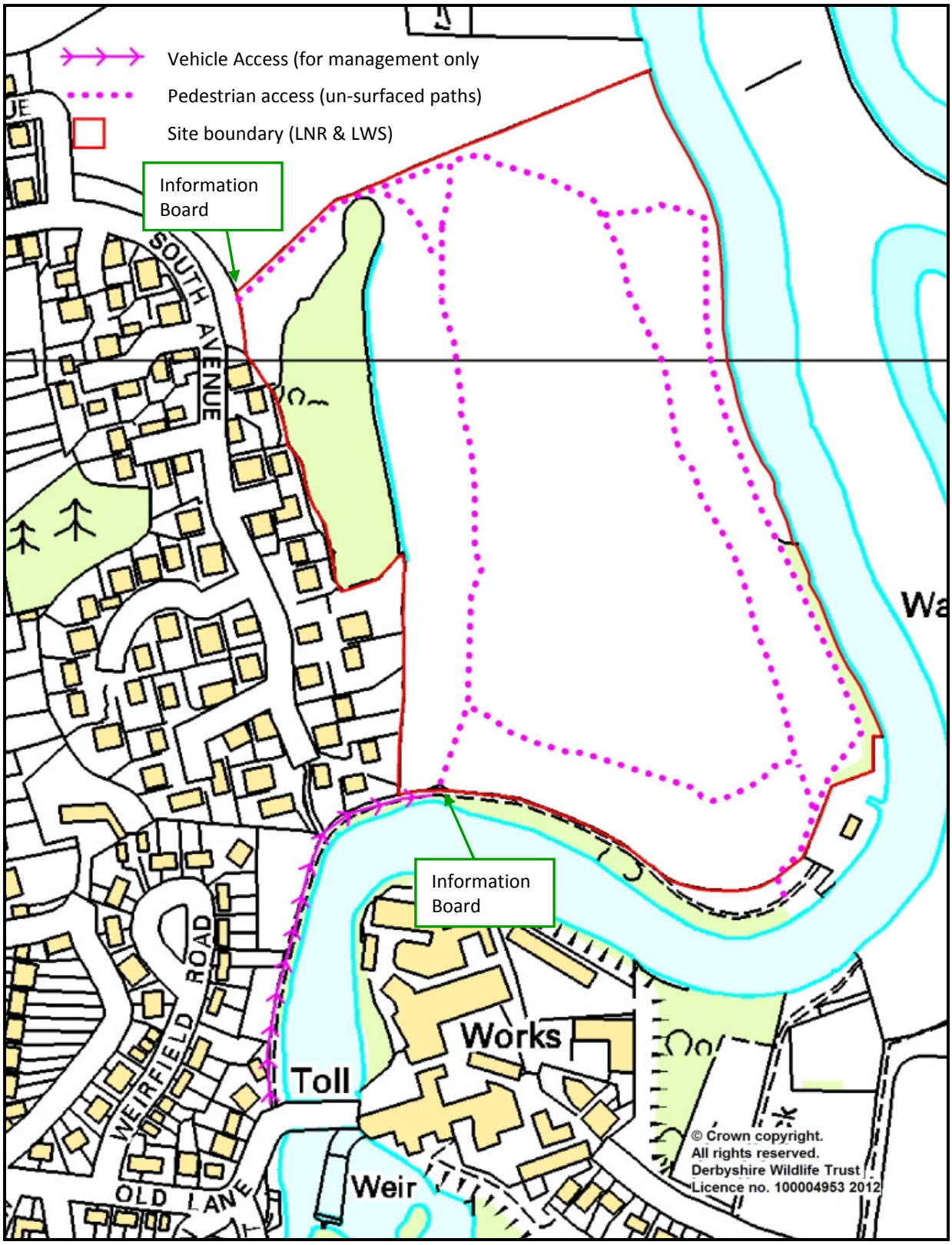
The main area of the site is situated within the River Derwent floodplain and although now comprising largely of made up ground following landfill operations the underlying soils will be alluvium and flood plain deposits.

The steep slope on which Nut Wood is located marks the east edge of a succession of Carboniferous Millstone Grit with overlaying Permo Triassic Pebble Beds and Waterstones. The Pebble Beds comprise soft yellow brown sandstone with pebbly bands. The Millstone Grit comprises shaley grey to dark grey mudstone weathering to sticky clay which becomes unstable on steep slopes resulting in landslips[1].

Map 1. Location



Map 2. Site boundary and access



2.4 Site History

2.4.1 General

The OS first edition series of maps dated 1887[2] show woodland occupying approximately the same area as it does now, with a small watercourse forming the east boundary. The remainder of the site comprised open fields with the south section marshy ground which was divided from the rest of the fields by a ditch.

Although the woodland area has been continuous from 1887 to the present time there has been significant changes in land use on the main area of the site between the woodland and the River Derwent; this is shown by reference to a series of OS maps. The period 1914 to 1947 shows no perceptible change apart from some pre-1938 residential development to the north west of the area. The 1965 map shows some form of excavation works in the marsh area to the south, with banks and cart tracks, interestingly this disturbed area is marked as heathland or rough grassland. A decade later the 1975 map shows the whole of the site, with the exception of Nut Wood, to be a refuse tip. Whether the 1965 excavations were extended and followed by landfill is unknown but by 1988 the site had been filled and covered over.

Little appears to have changed since 1988 with the exception of the installation of pipes and a gas burner to deal with methane emissions from the former tip. Nut Wood unfortunately suffered major disturbance in 1991 when approximately $^1/_3$ of the woodland was destroyed and subsequently replanted during remedial works associated with a major landslip which threatened newly built housing.

2.4.2 Ownership and Management

Nut Wood was formerly owned by Beazer Homes Ltd and following the completion of the landslip stabilisation works in 1991 ownership was passed to Derby City Council by a Section 106 Agreement. Currently the Commercial Services Department have responsibility for management of the wood.

The former tip area has been under the ownership of Derby City Council for an unknown period of time. The Waste Management Department of the council currently has responsibility for management of this area.

A foul sewer passes through the site entering the from the north boundary, tracking east of the swamp and then turning west to cross the stream and leave the site south of the swamp area.

Darley Abbey Royal British Legion Angling Club currently has fishing rights along the Derwent. It is not known if these are owned by the club or leased from Derby City Council.

2.4.3 Conservation status of the site

2.4.3.1 Designations

In 1987 following a successful Phase I Habitat Survey[3] of the county additional surveying was initiated by Derbyshire Wildlife Trust via the Derby City Wildlife Project. The final report for this initiative,

published in 1990, resulted in the identification of 93 sites of wildlife importance, (now known as Local Wildlife Sites [LWS]), within the City. As with the wider county survey these were graded according to their importance. Of these less than 10 sites were given the highest Grade 1 rating and included Nut Wood[4]; entitled DE005 Nut Wood. The grassland area was also designated a Wildlife Site, DE019 Darley Tip, although this was afforded a lower Grade 2 status. It should be noted that the grading system no longer operates and there is no separation of the importance of individual sites by grading.

In January 2008 the site was formally declared a Local Nature Reserve (LNR)

The site falls within the boundary of one of the City's "green wedges"; these are designated areas of open land within the City of Derby Local Plan linking the countryside with urban areas[5].

Nut Wood is covered by Tree Preservation Order (TPO) No. 17

The steep escarpment on which the woodland is located is a Regionally Important Geological Site (RIGS).

The Darley Tip area is included within the boundary of the Derwent Valley and Mills World Heritage Site which was inscribed on the World Heritage List during December 2001[6].

2.4.3.2 Biological records

The former Derbyshire Biological Records centre held many hundreds of records for the two 1km squares in which the site falls but at the time of writing the original plan none were identified specifically to the site [N Moyes, pers. com]. The first known biological records for the site are therefore those contained within the Derbyshire Wildlife Trust site files. These records are included in the site composite species list provided in the Appendices.

i) Darley Tip

The first records consist of a few casual records for plant and bird species made during a brief site visit by a C Pickering in August 1987.

In 1988 a detailed survey was undertaken by P Raynes, K Futter and M Bailey as part of the Derby City Wildlife Project. Their survey sheet contains records for 84 species of vascular plant, with common spotted-orchid of particular note for a City site.

A small species list of plants and birds was compiled by N Moyes during a brief site visit in July 1993.

In 2001 members of the Derbyshire Flora Group visited the site and compiled a species list of 116 vascular plants.

Detailed survey work undertaken for the original plan resulted in many additional records for this part of the site and since the production of that plan there have been many additional records covering an wide range of taxa.

ii) Nut Wood

As with Darley Tip the first records relate to the Derby City Wildlife Project Survey of 1988 with a species list of 90 vascular plants, this high number of species for a relatively small area reflecting the mosaic of wetland and woodland habitats present. Amongst these records there are several species which can be considered indicative of ancient woodland in the Midlands[7], yellow archangel, wood millet and bluebell. The survey notes also include records for various bird species along with a few invertebrate records.

The site file also contains a detailed field sketch for the wood but sadly this is both undated and with no indication as to the identity of the recorder. However, this has a particular value as it is clearly a record of the wood prior to the partial destruction resulting from the landslip works.

During the deliberations regarding these works J Fisher in 1990 produced a similar species list[8] to the 1988 survey, which, given the relatively short interval between surveys, is what would be expected. Of particular interest regarding this survey is the fact that vegetation communities were recorded using recognised methodology, namely the Peterkin classification of woodland types and the National Vegetation Classification (NVC) system. This concluded that the woodland had some correlation with the Peterkin Woodland Type 3A pedunculate oak – hazel – ash woodland. The wetland area at the base of the escarpment was considered to include the NVC swamp communities[9] S7 lesser pond-sedge swamp with small areas of S12 common reedmace swamp and S6 greater pond-sedge swamp.

Survey work in 2003, to inform the original plan, provided an updated plant species list and assessment of the vegetation communities present along with additional records for other taxonomic groups.

iii) Overall site

Since publication of the original management plan there have been various surveys and ad-hoc recording across the whole site with coverage of a wide range of taxonomic groups. Specific surveys have included earthworms, small mammals, butterflies, fungi and bryophytes. During 2012 specific efforts were undertaken to update the flowering plants list for the site (excluding grasses, sedges, rushes).

2.4.4 Other recorded documentation

The site files held by Derbyshire Wildlife Trust contain detailed information on all matters relating to the landslip engineering work and various other matters concerning the site, including some photographic slides taken at the time of the landslip problems.

Since the formation of the Management Group increase in the site by the local community has resulted in the collection of various photographs from the site which are held by individual members of the group.

3 CURRENT CONSERVATION STATUS AND MANAGEMENT

3.1 Designations

Both Nut Wood and Darley Tip still retain their original designations as Local Wildlife Sites. Although originally two sites these are now considered as a single unit within this plan and the overall site is represented by a single Local Wildlife Site designation – DE005 Nutwood & Darley Abbey Wildlife Site

As previously mentioned, the site is now a declared Local Nature Reserve, named as Darley & Nutwood Local Nature Reserve.

3.2 Wildlife habitats and communities

A grassland/scrub mosaic occupies the majority of the site but the woodland, wetland and riparian habitats which are also present are all important both in the context of Derby City and within the county. The location of these broad habitat types is shown on Map 3.with NVC communities and key species shown on Map 5.

To facilitate description and proposed management of the site the original management plan split the site into various compartments. With the exception of a few minor boundary changes and additional sub-compartments, this revised plan has been able to follow the same system and retain some continuity with the original plan. The compartments are shown on Map 4; these are described now. More detailed species information is provided in the Appendices which also contain the 2003 survey quadrat data for some of the areas.

3.2.1 Woodland

3.2.1.1 Nut Wood

Compartment 1a.

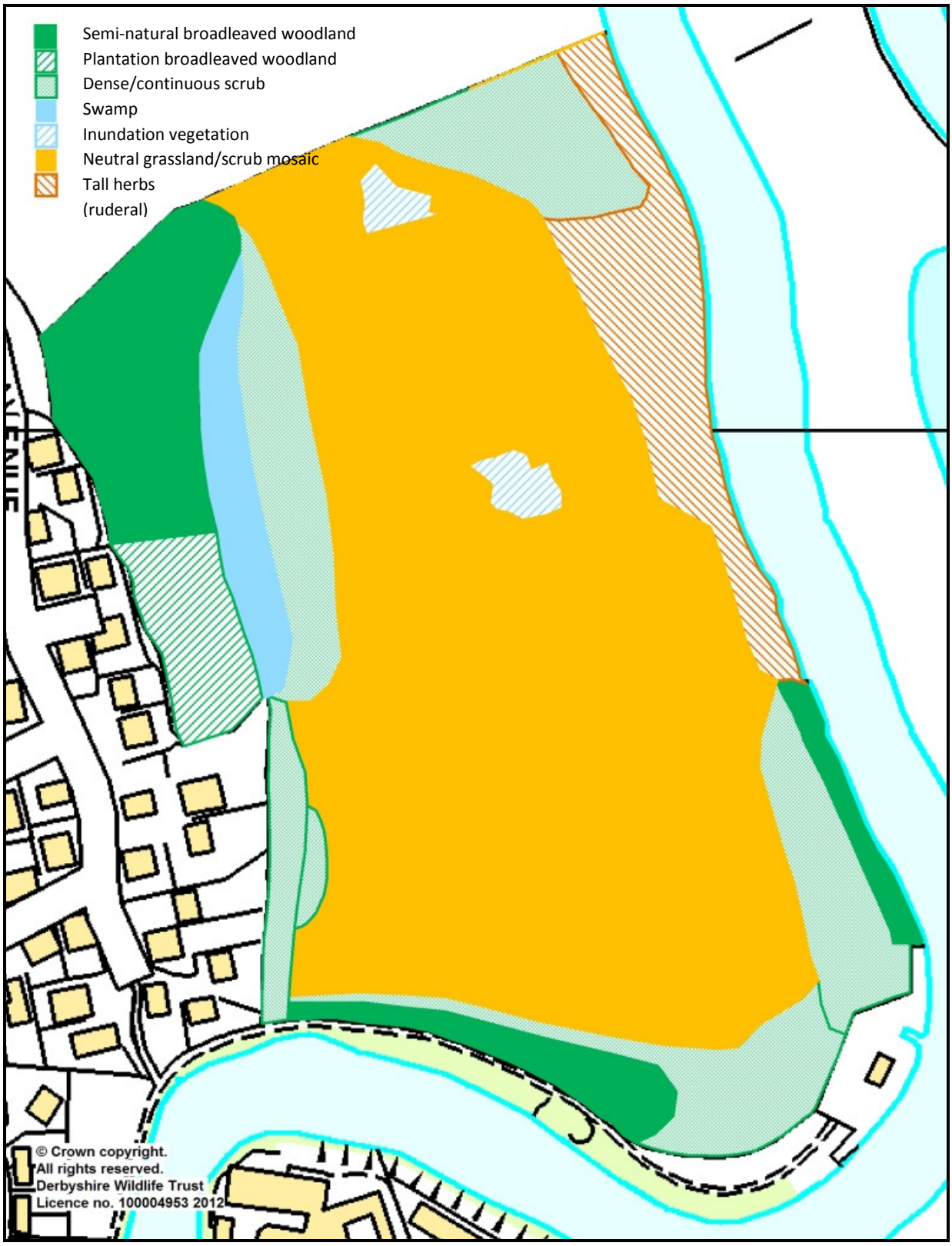
This comprises a very steep east facing wooded escarpment with swamp at the base. Towards the south a now remnant chestnut paling fence marks the boundary of the area of woodland, (Compartment 1b), which was destroyed in 1991 during engineering work to stabilise a major landslip. Along the top of the slope a semi-mature and largely outgrown hawthorn hedge marks the boundary of the old wood.

Old hazel coppice stools form the main component of the canopy with a few mature pedunculate oak, ash and field maple scattered throughout but mainly on the edges. Shrub species other than hazel comprise a mixture of non-native species including cherry laurel and rhododendron. Native shrub species present include elder, holly, hawthorn and more rarely wild privet and rose. The ground vegetation, although not particularly species rich, is of particular note with the presence of several species which are indicative of ancient woodland; bluebell which is abundant to the north and small areas of wood millet and yellow archangel throughout. A limited but typical bryophyte flora is present with the common mosses *Mnium hornum* (Swan's-neck Thyme-moss), *Kindbergia praelonga* (Common Feather-moss), *Plagiomnium undulatum* (Hart's-tongue Thyme-moss) and *Brachythecium rutabulum* (Rough-stalked Feather-moss) the main species along with typical

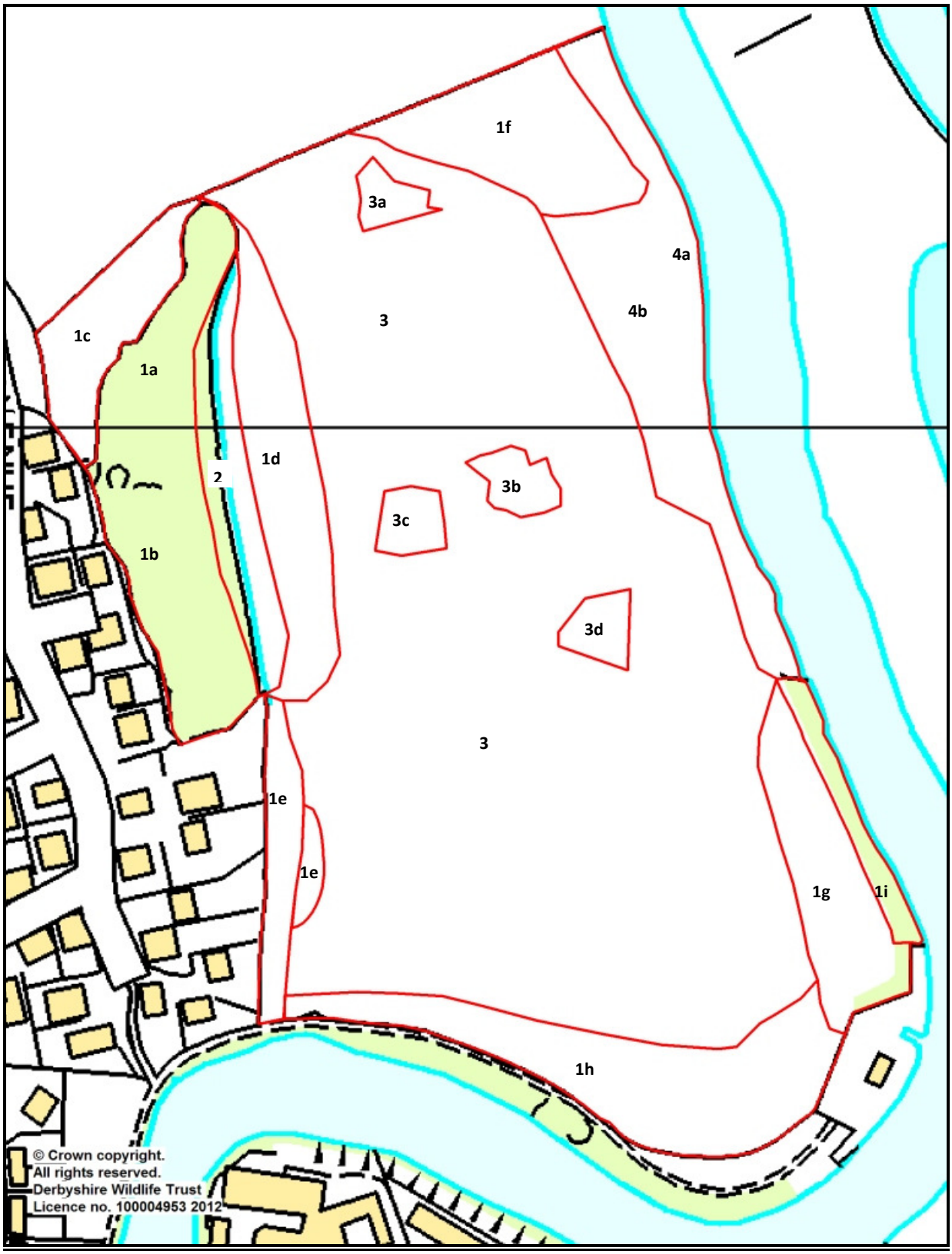
epiphytes such as *Orthotrichum affine* (Wood Bristle-moss) and *Orthotrichum diaphanum* (White-tipped Bristle-moss). Survey work in 2003 has assessed this area to be representative of the NVC community[10], W8 ash – field maple – dog's mercury woodland.

At the top of the slope towards the centre of the area there is a badger sett which has been active from a least 2003 until the present time.

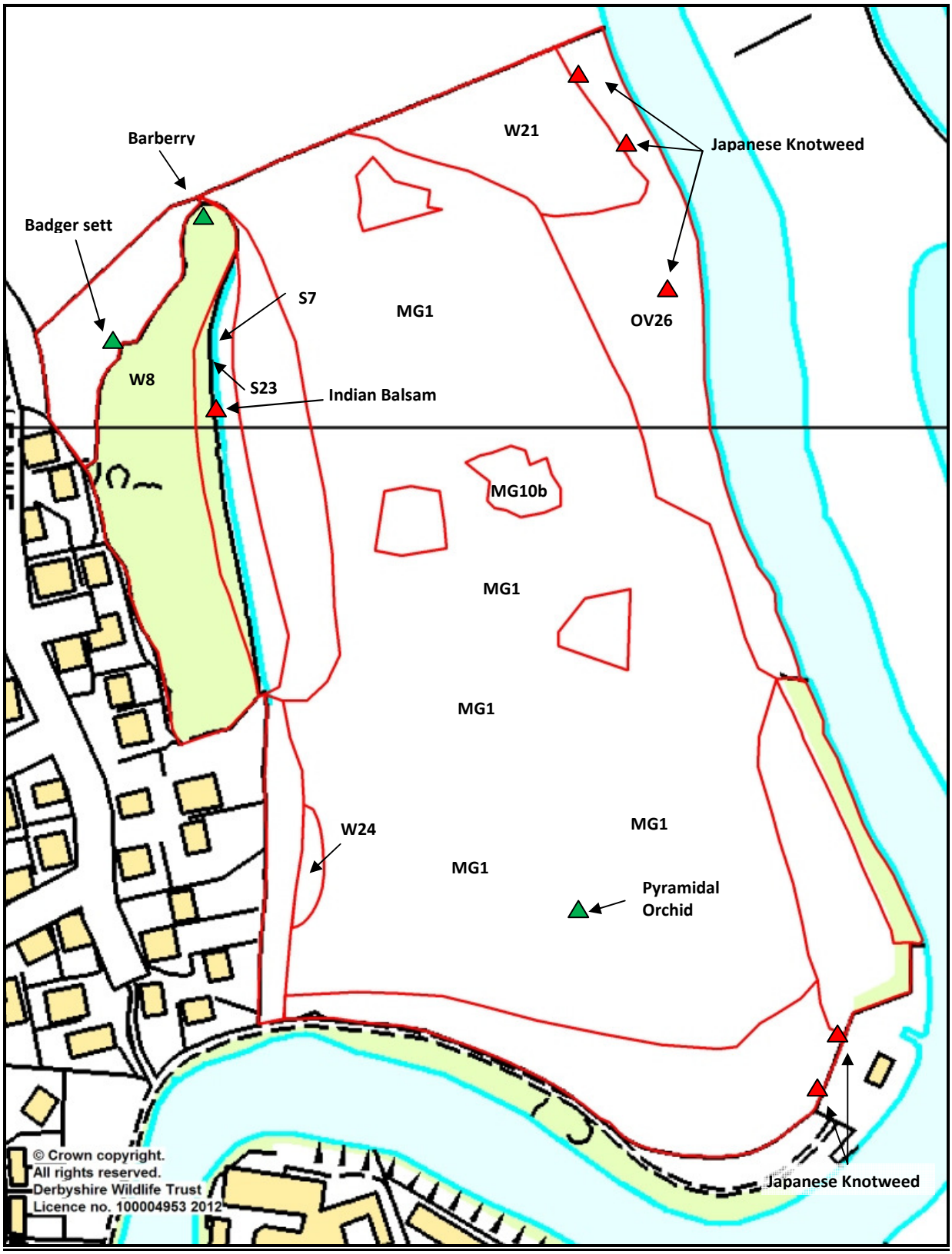
Map 3. Main Habitats



Map 4. Compartments



Map 5. NVC communities and key species



W8 Ash-Field Maple-Dog's Mercury woodland
W21 Hawthorn-Ivy scrub
W24 Bramble-Yorkshire-fog underscrub
S7 Lesser Pond-sedge swamp
S23 Other water margin vegetation
OV26 Great Willowherb community
MG1 False Oat-grass grassland
MG10b Yorkshire-fog –Soft-rush rush pasture Hard Rush sub-community

Compartment 1b.

Situated at the southern end of the wood a remnant chestnut paling fence, marks the area which has been heavily engineered to counter landslip problems.This plantation woodland is now 20 years old and this area represents the area of greatest change since the first plan was produced. In 2003 the then 10 year old plantation formed a dense and almost impenetrable block of vegetation. By 2011 tree growth has been such that a high canopy has shaded out lower vegetation and the wood is effectively self-thinning. Access through the area is now un-hindered.

The canopy is mainly Ash, Birch and Oak with a somewhat sparse understory of Hazel, Holly and Elder.

The field layer is typical of plantation woodland, generally sparse but with some scattered red campion, male-fern and wood avens.

By the fencing hart's-tongue fern is of note as is a single mature pedunculate oak which managed to survive the earthworks.

3.2.1.2 Developing scrub and other woodland.

Compartment 1c.

This forms the northern edge to the woodland and comprises an informal track leading from South Avenue eastwards down onto the main area of the overall site. To the right of the track guelder-rose, blackthorn and hawthorn provide a good shrub edge to the woodland. In 2003 a small grassy clearing with abundant giant horsetail and many other plant species indicative of damp soils including colt's-foot, hard rush, soft rush and meadowsweet was noted here though this has largely become scrubbed up since. Along the path a variety of tall herbs are to be found including upright hedge-parsley, tall melilot and rough grasses such as false oat-grass and cock's-foot with vetches scrambling throughout.

Compartment 1d.

This comprises a transitional area between the marsh and drier grassland to the east. The dominant stand of lesser pond-sedge grades to scrub with hawthorn often abundant, with frequent crack willow and osier. Rarer shrubs and trees here are grey poplar, blackthorn, pear, broom and a few sycamore. Of note in 2003 were an abundance of ash seedlings.

The north and drier half of this area has abundant false oat-grass throughout with field horsetail locally abundant whereas the south section sees wetter conditions with lesser pond-sedge and reed canary-grass becoming more obvious. In this damper area there appears to be no clear gradation from the wet to dry area with the vegetation very much a mosaic of types.

Compartment 1e.

Here willows dominate the small stream with osier the main species but with taller crack willow towards the north. Much of the stand of crack willow appears to be either diseased or now over-mature. Along the east edge there is an area of dominant bramble, NVC W24 bramble – yorkshire-fog underscrub, typically marking the transition between the adjacent MG1 false oat-grass grassland NVC community[11] and taller scrub.

Compartment 1f.

This comprises dense hawthorn scrub which is developing to form the NVC community W21 hawthorn – ivy scrub. Many bushes are now up to 3m tall. Rough, often marshy grassland, forms the field layer beneath the shrubs and in the open areas. In the wetter areas meadowsweet, field horsetail and lesser pond-sedge are all fairly frequent but throughout a dense stand of creeping thistle is the most noticeable feature. As the land shelves down to the river floodplain the highly invasive, non-native Japanese knotweed remains established in three places despite previous efforts to control the population.

Compartments 1g & 1h.

Cpt.1g comprises developing hawthorn scrub and alder woodland. In Cpt.1h alder development is considerably more advanced than in 1g. In both of these areas the alder is naturally regenerating from the adjacent riverside trees. The boundary of 1h has been extended from the previous management plan

Compartment 1i.

See 3.2.4

3.2.2 Wetland: Nut Wood swamp

Compartment 2.

This area is situated beneath the wooded slope. It is likely that seepages from the bank have some role to play in the hydrology as there is evidence that a spring runs down the slope but in 2003 this was dry and during subsequent years it has been noted that this is often the case. The main source of water is from a pipe at the north end. On entering the site the water flows through a narrow and shallow channel across the swamp area in a southerly direction.

Within this area there are a range of vegetation mosaics representing different NVC communities. Characteristic of the main flow area is abundant and often dominant water forget-me-not, with great yellow-cress appearing relatively frequently and with occasional reed sweet-grass; open water is sparse with a shallow flow through the vegetation. This community is distinct and possibly best considered as S23 ‘other water-margin vegetation’. Areas away from the main channel are frequently dominated by S7 lesser pond-sedge swamp.

There is a sharp division between the wetland and base of the drier woodland slope but to the east there is more of a gradation to drier conditions. In these drier areas tall herbs such as great willowherb and common nettle become dominant, with rough meadow-grass and common marsh-bedstraw frequent associates along with hedge bindweed which scrambles amongst the taller herbs. This vegetation correlates well with the NVC OV26 'great willowherb' community.

A range of other swamp/marsh herbs are scattered throughout; of these Indian balsam is the most frequent, becoming abundant to dominant later in the season despite several attempts to manage to control the population by pulling plants.. Marsh horsetail is generally frequent and gypsywort and meadowsweet both locally frequent along with small areas of common reedmace. More local are *y*ellow iris and water chickweed. In the central area there is a large stand of red-osier dogwood.

The edges are characterised by willows, mainly crack willow as tall trees but also grey willow and less frequently osier; elder is also present here. Several mature crack willow appear to showing signs of senescence or are dying back because of disease.

3.2.3 Grassland

Compartment 3

Forming the most extensive habitat on the site this comprises rough neutral grassland with scattered hawthorn scrub. Survey in 2003 showed this vegetation to have a good correlation with the NVC community MG1 false oat-grass grassland. The original description in the 2003 plan remains valid for this part of the site as follows.

False oat-grass dominates the sward with rough meadow-grass and yorkshire-fog the only other constant grasses. Scattered throughout are a range of tall herbs but of these creeping thistle is by far the most constant and abundant, others tend to vary locally in their frequency and abundance and include teasel, horse-radish, mugwort, rosebay willowherb and common ragwort. On the east side of the central area where the land slopes to the river dame's-violet and hoary cress are locally abundant and form a distinctive variation from the main area. The finer herbs are equally varied in their distribution and abundance but vetch species form an important part of the vegetation composition with tufted vetch and meadow vetchling constant and bush vetch and hairy tare encountered occasionally. Aside from the aforementioned species oxeye daisy is the only other constant herb reflecting the sometimes open and disturbed nature of the sward and common knapweed appears reasonably frequently. During late summer frequent hoary ragwort becomes noticeable, following the earlier flowering common ragwort, and odd plants of Canadian goldenrod add to the late season colour. By far the most notable species amongst the rarer herbs are bee orchid and pyramidal orchid.

Bee orchid was first recorded in 2003 and typical of its nature, is variable from year to year in both its location and abundance but it is recorded regularly with over 30 spikes noted in 2008.

Pyramidal orchid was first recorded from the site in 2012 with approximately 40 flowering spikes occurring in the single location.

Ant hills of the common species *Formica lemani* occur throughout.

The 2003 quadrats were re-surveyed in 2008 and again in 2012 (see appendices). From this survey data the main changes that seem to have taken place in the composition of the vegetation over the 9 years has been a reduction in the abundance of False Oat-grass but this still remains a constant species, and a large decline in the abundance and frequency of the grasses Rough Meadow-grass and Yorkshire-fog. Species which have increased are the coarse grasses Cock's-foot and Common Couch and the finer grass Red Fescue. Particularly noticeable has been the increased abundance of legumes Meadow Vetchling, Hairy Tare, and Tall Melilot. Meadow Vetchling and Hairy Tare are well adapted to climb and grow through coarse grassland. Although other species have ebbed and flowed in their frequency and abundance over the survey period none have undergone similar large changes as the aforementioned species.

Additional diversity is provided by areas of impeded drainage. In many places this is picked out by subtle changes in species composition with the appearance of wetland plants such as tufted hair-grass, lesser pond-sedge, soft-rush, hard rush, compact rush, hairy sedge, water figwort and more rarely the terrestrial form of amphibious bistort and spiked sedge . Two larger areas towards the north are more distinctive and are considered as separate sub-compartments 3a and 3b.

Compartments 3a & 3b

Grey willow and osier mark the damper area Cpt. 3a with lesser pond-sedge, hard rush and mint (indeterminate sp.). The largest wetter area is 3b, which like 3a, is marked by grey willow bushes. Hard rush is the dominant species with the constants wood dock, creeping buttercup, meadow vetchling, tufted vetch and tall herbs of creeping thistle and great willowherb. Within the area common spike-rush is locally abundant as is glaucous sedge. Species more uncommonly found include common reedmace, gypsywort and brooklime. The common moss *Calliergonella cuspidata* is abundant throughout and locally there is a good stand of the wetland moss *Drepanocladus aduncus*. Analysis of quadrat data suggests a reasonable correlation with the NVC, MG10 yorkshire-fog - soft-rush rush-pasture; hard rush sub-community.

3.2.4 Riparian habitat.

This includes three distinct habitats, riparian woodland, tall-herb marginal vegetation and tall-herb ruderal vegetation.

Compartment 1i.

Mature alder several metres back from the riverbank form a dense canopy with a few shrubs of hawthorn, elder and grey willow making up a rather sparse under-shrub layer. The ground vegetation in this wooded area has abundant ramsons and wood avens. Closer to the river butterbur is locally dominant with common nettle and false oat-grass filling the few available niches amongst the butterbur.

Compartment 4a.

Upstream the tree canopy thins and the riverbank becomes less shaded resulting in a greater diversity of species. Tall herbs continue to dominate with the ever invasive Indian balsam frequent

but common nettle and creeping thistle are the most abundant species. More typical riverside plants such as welted thistle, hemp-agrimony, meadowsweet, and water figwort are all present but in no abundance.

Compartment 4b.

Species diversity is impoverished in this floodplain area which is dominated by tall ruderals which form an almost impenetrable 1.5m high mass of vegetation. Creeping thistle, common nettle and great willowherb are all co-dominates with frequent hogweed, common couch, false oat-grass, hedge woundwort and more locally marsh woundwort. Hedge bindweed then scrambles through these tall herbs. This vegetation correlates well with the NVC OV26 'great willowherb' community.

3.3 Recorded species.

Locations of notable species are shown on Map 5 and a complete species list is provided in the appendices, (7.2).

3.3.1 Flora

The various surveys which have been conducted have resulted in a vascular plant species list of 241 species formed by 8 species of fern and horsetail, 38 species of tree and shrub, 25 grass species, 7 species of sedge, 6 species of rush and 157 species of herbs. Considering current available records[12] species of particular note include, in no particular order:

i) Bluebell. Although found frequently throughout the county and usually abundant where it occurs, there are few sites in the City which are 'bluebell woods'.

ii) Bee orchid. Although not uncommon in the county this is a relatively uncommon species within Derby City.

iii) Barberry. There are few records for this shrub in the county. The true status of this species origin is not clear; all records are mapped as native in the New Atlas of the British & Irish Flora although it is known to have been cultivated in mediaeval times and also used as a hedging plant[13] .

iv) Red-osier dogwood. There are very few records in the county for this shrub which is non-native and normally planted rather than having become naturalised.

v) Grey poplar & Balm-of-gilead. These non-natives are not commonly recorded but probably indicative of under-recording rather than rarity, as for iii) they tend to be planted rather than naturalised.

vi) *Rubus lindleianus* & *Rubus armeniacus.* There are only a small number of records for these brambles in the county. *Rubus* is however a critical genus and there are few recorders, like R Smith who made these records, able to record to species level.

vii) Pyramidal Orchid: Discovery of a population of approximately 40 flowering spikes during 2012 by Peter Hill make this possibly the most interesting plant on the reserve. In Derbyshire this is a rare

plant which is mainly encountered in the White Peak and Magnesian Limestone areas, only occurring as isolated populations elsewhere.

None of the plants recorded from the reserve have a conservation status and therefore do not appear on the Red Data List of Derbyshire's Vascular Plants[14]

3.3.2 Lower plants

3.3.2.1 Bryophytes

A specialist bryophyte survey was undertaken in 2011 by the author resulting in a species list for the reserve totalling 36 species formed by 6 liverworts and 30 mosses. This reasonably diverse bryophyte flora reflects the variety of habitats present on the site. Mature woodland contains typical common woodland species like *Mnium hornum* Swan's-neck Thyme-moss and *Plagiomnium undulatum* Hart's-tongue Thyme-moss . Areas of damper woodland, particularly willows supporting a good range of epiphytic species like the liverworts *Metzgeria furcata* Forked Veilwort, and *Frullania dilatata* Dilated Scalewort and mosses like *Orthotrichum lyellii* Lyell's Bristle-moss and *Cryphaea heteromalla* Lateral Cryphaea which like many epiphytic bryophytes are now making a remarkable recovery with improved air quality. By the river, the characteristic riparian mosses *Leskea polycarpa* Many-fruited Leskea and *Syntrichia latifolia* Water Screw-moss were present. More ruderal species occurred on exposed rubble and concrete structures.

3.3.2.2 Fungi

A specialist fungi foray was undertaken in the autumn of 2012. This resulted in a species list of 40 fungi.

The recorder provided the following comments on the species recorded;

"*Particularly interesting species were Upright coral, White laced shank and Brown domecap seemingly peculiar to this site. It was good to find Willow bracket in such frequency"*

It is not believed that any of the recorded species have a conservation status.

3.3.3 Vertebrates

3.3.3.1 Birds

Since the first management plan was produced there has been considerable interest in recording birds on the reserve from local enthusiasts. This has resulted in the species list for birds recorded from the site increasing from 34 to 52 species. The website for the Nutwood and Darley Abbey LNR indicates a considerably larger species list for the site but does include some species which have not yet been recorded from the site. The 52 species considered by this plan have been recorded from within the site and excludes species seen flying overhead etc.

Nearly half of these species are listed on either the Red or Amber lists of the Birds of Conservation Concern (BOCC)[15]

TAXON	COMMON NAME	BOCC Listing
Alauda arvensis	Sky Lark	Red
Locustella naevia	Common Grasshopper Warbler	Red
Motacilla flava	Yellow Wagtail	Red
Perdix perdix	Grey Partridge	Red
Poecile montana	Willow Tit	Red
Turdus iliacus	Redwing	Red
Turdus philomelos	Song Thrush	Red
Turdus pilaris	Fieldfare	Red
Vanellus vanellus	Northern Lapwing	Red
Alcedo atthis	Common Kingfisher	Amber
Anas platyrhynchos	Mallard	Amber
Anthus pratensis	Meadow Pipit	Amber
Apus apus	Common Swift	Amber
Aythya ferina	Common Pochard	Amber
Emberiza schoeniclus	Common Reed Bunting	Amber
Falco tinnunculus	Common Kestrel	Amber
Gallinago gallinago	Common Snipe	Amber
Numenius arquata	Eurasian Curlew	Amber
Phylloscopus trochilus	Willow Warbler	Amber
Picus viridis	European Green Woodpecker	Amber
Prunella modularis	Dunnock	Amber
Pyrrhula pyrrhula	Eurasian Bullfinch	Amber
Turdus viscivorus	Mistle Thrush	Amber

3.3.3.2 Mammals

Since the first management plan was produced there has been a specific mammal survey undertaken on the site by Derbyshire Mammal group and various ad-hoc records. This meant that the species list for mammals recorded from the site has increased from 3 to 9

3.3.4 Invertebrates

When the original management plan was first produced there were relatively few invertebrate records from the reserve. Whilst there has been some progress regarding additional recording on the reserve knowledge of the importance of the site for its invertebrate populations is still limited.

In 2006 a list of 11 plant gall causers was compiled by a local expert.

In 2009 a local naturalist Alan Jones began to record butterflies on the reserve using a standardised survey methodology. This has increased the butterfly list for the reserve to 20 species.

These two groups currently remain the best recorded invertebrate groups for the reserve with other groups represented by a few ad-hoc records.

3.4 The importance of the habitats and species

3.4.1 Naturalness of the habitats

OS maps show that Nut Wood has been continuous woodland since 1887 and the presence of species indicative of ancient woodland increase the possibility of it being a site of former Ancient Semi-natural Woodland (ASNW). In the absence of available earlier documentation a degree of speculation has to be accepted with this suggestion; although most ASNW is now documented within the English Nature Ancient Woodland Inventory this has only accounted for woods over 2 ha in size[16]; Nut Wood is much smaller than this. It perhaps therefore a reasonable assumption that the wood is at least secondary Semi-Natural Woodland, that is to say it has developed naturally sometime during the most recent centuries. Like most of this woodland type Nut Wood will have been managed in the past, the old hazel coppice stools and indeed its name, give strong indications of past management as hazel coppice, probably with a few oak standards.

Early biological records (1988) show that Nut Wood contained many non-native species, with barberry, cherry laurel, rhododendron and sycamore all recorded. All of these species are still present in 2003. Whether these are planted or naturalised is unknown, with the exception perhaps of barberry they are however all ecologically 'out of place' in this woodland.

The swamp habitat beneath Nut Wood is likely to be of a more recent origin. The first edition (1887) OS map clearly shows the wood with a drain running parallel to the base of the slope. Other areas nearby are identified as marsh so if a wet area existed at this date it is likely to have been mapped. The 1965 map shows major changes in land use elsewhere on the site but still only shows a drain along the east boundary of the wood. Similar maps, dated 1975 and 1987, do show the drain possibly as a larger feature whilst charting the use of the land to the east first as a refuse tip then open field after filling. Modern maps still show the feature as a simple drain. This is somewhat perplexing when trying to establish the origins of this habitat. The adjacent landfill may have resulted in an increase in ground level and altered local hydrological processes. Whether this created the swamp or increased an existing area is speculative. What can be determined with certainty is that the water course has been in existence for over 120 years. The area of high water table surrounding the stream may be more recent with the characteristic swamp vegetation establishing by natural processes.

As has already been described the main area of the site has been subjected to major disturbance and the rough grassland is of relatively recent origin. The hawthorn scrub development is occurring by natural regeneration and is a characteristic stage of the succession vegetation which occurs on unmanaged disturbed ground.

The riparian habitat along the Derwent is typical of the major rivers in the Midlands with abundant tall ruderal species and mature alder fringe woodland.

3.4.2 Legal protection

Two species present on the site are afforded specific legal protection:

Bluebell are listed on Schedule 8 of the Wildlife and Countryside Act 1981 as amended and protected under Section 13 (part 2) of the act which prohibits the selling, offering for sale, possessing or transporting for the purpose of sale, any plant (live or dead, part or derivative) on Schedule 8[17]

Badgers and their setts are protected under the Protection of Badgers Act 1992.[18]

3.4.3 Species rarity

None of the species recorded from the site are rare in a national context; they are not listed on the published Red Data lists.

At a county level none of the recorded plant species are listed as having a local conservation status, that is to say they are not included on the Derbyshire Red Data List of Derbyshire's Vascular Plants.

However, as already highlighted several species are uncommon in the context of Derby City.

The County Red Data Book[19] is now considered to be too out of date to be able to provide guidance on the rarity of other species in the county.

3.4.4 Conservation priorities

3.4.4.1 National

Reference has been made in 3.4.1 of the possibility of Nutwood being remnant Ancient Semi-natural Woodland. If this were the case then its conservation would be a priority at national level.

All bluebell woods are of both national and international importance with 20% of the world's bluebell population estimated to be in Britain. Their conservation is therefore of international and national importance.

Nine species of bird which have been recorded on the site are included on the Red List of the Birds of Conservation Concern 3 and are therefore a conservation priority at national level.

3.4.4.2 Local

Within the site boundary there is a diversity of habitat type several of which are rare within the City, particularly the semi-natural woodland and swamp. Although the MG1 false oat-grass grassland community which covers a large area of the site is relatively common in the county much of this amounts to small areas on roadsides, industrial ground and other disturbed habitats. At Nutwood & Darley Abbey LNR the large area this habitat occupies makes it all the more important from both its ability to support larger populations of individual species and also a greater scope for appropriate management to encourage sward development towards a more floristically species rich sward. There has been a considerable loss of semi-natural grassland both within the county[20] and nationally over the past few decades, this has necessitated an increasing emphasis on the importance of conserving remaining areas of grassland habitat and developing species rich grassland.

There are very few examples of semi-natural woodland within the City, particularly woods which still support a remnant ancient woodland ground flora. Although previous declines in woodland cover in the county are now being countered by new woodland planting initiatives these new woodlands are not expected to attain the biological diversity of existing semi-natural woodland for a considerable period of time, possibly hundreds of years. This type of habitat is therefore a priority for conservation and a priority action within the local Biodiversity Action Plan[21]. Similarly areas of swamp habitat are very uncommon within the City.

The Derby City Greenprint (Mini BAP) lists broadleaf woodland, hedgerows, wet grassland, rivers and streams and veteran trees as priority habitats with bluebell and song thrush as flagship species (D Court, pers. com.). Management of the site which contains these habitats and species is therefore of particular local importance and will make a valuable contribution to the Greenprint's objectives.

3.4.5 The ecological position of the site in the local and wider landscape

The River Derwent which forms the east boundary is an important wildlife corridor in the county and through the city forming one of the City's "green wedges". Important species such as water vole and otter have all been recorded in the past along the Derwent in the vicinity of the city[22]. Many bird species have strong links with riparian habitat. The site therefore provides opportunities as suitable habitat for a variety of mobile species associated with the river and wider floodplain area.

4 PUBLIC INTEREST

Since the original Management Plan was written a very active Management Group has been established and the site has been declared a Local Nature Reserve. The Management Group hold 2 public meetings a year organise various management work parties and have a dedicated website for the reserve.

This has resulted in considerable local interest in the site. The paths are regularly walked by local residents and there is good local participation in the management of the reserve.

These activities have helped to promote recording on the site with local amateur naturalists becoming engaged with regular recording of birds and plants and the site has attracted specialist recorders with groups such as plant galls, fungi and bryophytes having all been covered during the past 9 years.

Public interest in the site has clearly increased since the formation of the Management Group.

5 FUTURE POTENTIAL, ECOLOGICAL AND SOCIAL

5.1 Fragility of current status and desired state

Using repeatable survey methodology the Countryside Survey has recorded significant changes in the British Vegetation since 1978[23] and provided suggestions as to the causes, or 'drivers', of this change[24]. The original plan considered that the site would not be immune to these processes and that many of the 'drivers', such as eutrophication and acidification, were unlikely to be influenced by management at a local or site specific level. This remains the case. Therefore these factors can be expected to continue to affect vegetation on the site in the long-term and are probably outside of any form of management control.

If there were no active management on the site natural processes would continue to operate and the site would change. In some areas, such as the development of alder woodland, this change is likely to be desirable but in most cases it is likely to result in a loss of species diversity of both flora and fauna, which is undesirable. The main threat is the continued scrub development on the main grassland area.

5.1.1 Nut Wood

There are many factors which currently impact on the ecological quality of lowland woodland in the county, of these a lack of active management, invasive non-native species, felling and re-stocking with non-native conifers and unsympathetic use for activities like paintball or war games are key issues which can threaten woodland habitat.

Historically the wood is presumed to have been managed as coppice, if this assumption is correct it's relatively small size would most likely have meant that it was either cut as a single block, on perhaps a 10-15 year cycle, or possibly divided into a small number of rotationally cut coupes. This management would have resulted in the development of a ground flora typical of lowland coppice woodlands; an abundance of flowering plants would appear for the first few years following cutting only to gradually decline as the re-growth became increasingly dense. These would then flourish again when cutting next occurred. Over a long period of time the vegetation and fauna would have adapted to this cycle of management resulting in species rich woodland. With the cessation of coppice management the un-cut stools have matured and there are few replacements for the remaining mature oak. Invasive non-native species are established, namely; sycamore, rhododendron and cherry laurel. Their method of arrival amongst the native flora is unknown but many will have invariably been planted at some stage, due to their establishment there has possibly been a decline in species richness within the wood from excessive shading of ground flora. Without any management input it is possible that these species may become more abundant.

Because of the gradient and previous landslip problems the wood has to be considered to be at risk of further landslips. In the event of such a catastrophic occurrence the flora and fauna is likely to respond well to the new opportunities provided by increased light levels and bare ground; landslips are of course a natural phenomenon. However, if there are populations of invasive non-native

species present these will be also be able to capitalise on such opportunities and may prove to be more successful than the desired native species.

The disturbed area of the wood will have lost most of its ecological importance but since the original management plan was written this replanted area has exhibited good growth and now the trees are sufficiently tall to effectively self-thin themselves. In these more typical woodland conditions there are signs of a secondary woodland ground flora developing. Left to its own devices there is every indication that this area of new planting will soon be exhibiting good signs of semi-natural regeneration.

The original plan suggested that the desired state for Nut Wood was for it to be managed as hazel coppice with oak standards. In reality, this is unlikely to happen, the steep nature of the escarpment that the wood sits on makes management operations potentially very dangerous and outside of the scope of local volunteers.

The original plan identified non-native species as being a potential threat to the woodland. Again, the removal of sycamore from the wood would require specialist forestry contractors. This species is now so widespread in lowland woodlands that for many sites removal is no longer feasible, or desirable as removal from some woods would effectively mean a clear fell of the wood. Rhododendron and cherry laurel do not appear to have expanded over the past 9 years in the wood as was considered likely when the original plan was written.

Taking these points into consideration it is considered that this revised plan would now suggest a different desired state for Nut Wood. Ideally rhododendron and cherry laurel should be removed but sycamore should probably be tolerated as part of the canopy. Aside from these points the desired state would be for the woodland to remain largely un-managed allowing natural woodland processes to continue to shape the woodland structure and composition.

<u>Woodland desired state.</u>

- ***For Nut Wood to continue as semi-natural broadleaved woodland free of invasive non-native species***

5.1.2 Nut Wood swamp

Hydrological forces continue to have the greatest effect on this habitat and there is unlikely to be any scope for management to manipulate these, even if it were desirable to do so. If water flow or water table levels alter permanently there will be corresponding changes in the floral and faunal composition of this habitat.

Comparison of the 2003 survey work undertaken to inform the original management plan with previous biological records from the swamp highlighted changes in the vegetation composition over a decade. Whilst the swamp community S7 lesser pond-sedge swamp still formed an important component previous surveys had not recorded water forget-me-not or reed sweet-grass, whilst the latter was still relatively rare in the swamp, water forget-me-not was abundant. It would also seem that nitrogen loving species such as nettle and great willowherb, which were recorded at a low

frequency 10 – 15 years ago, were more abundant in 2003. This change was considered to most likely be indicating increased eutrophication, (nutrient enrichment). This situation remains largely unchanged and as before, as there is no control over water quality entering the site and some of the problem will be derived from atmospheric nitrogen deposition there is unlikely to be any management that could be implemented to reverse this trend.

The original plan raised concern regarding the ever increasing abundance of the non-native Indian balsam and the effects of its competitive growth habit on native flora in aquatic habitats. The plan also highlighted the fact that as there will be a continuous supply of seed brought by the inflowing water total eradication of this species from the swamp area was probably un-realistic, but management could reduce population levels by annual control. This has proved to be the case with volunteers spending many hours pulling Indian balsam during various work parties. This has reduced the population temporarily but not eradicated this species.

The original plan considered red-osier dogwood, another non-native species, to be a potential threat to the swamp habitat and considered that either a reduction in population levels or eradication of this species would be desirable. However, with the passage of time between the original and this revised plan, there appears to have been no increase in the area of this species. Its removal or reduction is there fore no longer considered to be a priority management objective.

The scrub and semi-woodland cover on the east side is recent, (it is not shown on any maps). This might pose a threat to the swamp from increased shading and leaf litter.

Many of the crack willow are now splitting and appear to be dying, pollarding of these might increase their longevity and also allow more light into the wetland.

Overall it is considered that the desired state for this habitat should remain the same as in the original plan.

<u>Swamp desired state.</u>

- ***To allow natural processes to take their course but wherever possible reduce the effects of non-native invasive species.***

5.1.3 Grassland

The original plan indicated that comparison of aerial photography taken in 1999 with the situation on the ground in 2003 suggested that the scrub was developing rapidly and that this scrub development would, in the absence of any management, continue and act as a pre-cursor to climax high forest woodland. It was highlighted that this type of succession had been well documented and was predictable. The plan then discussed the various issues arising from scrub development on grassland habitat. This commentary remains valid for this revised plan and is retained below.

Whilst naturally regenerated woodland is an important habitat this would be at the expense of both open grassland habitat and any associated invertebrate populations, and eventually the scrub habitat itself which is important for many bird species and capable of supporting important invertebrate

assemblages[25]. The continued development of willow around the wet grassland areas (Cpts.3a & 3b), will dry and shade these areas and reduce their value as wetland mosaics amongst the drier grassland. There is therefore a clear desire to maintain a balance of these habitats in order to maximise biodiversity.

In the absence of management the rank grasses and ruderal species such as false oat-grass, Yorkshire fog and thistle will continue to dominate. The sward will maintain its tussocky structure with an increasing accumulation of litter, this will cause plant species diversity to be diminished; this process is also well documented and predictable. The removal of annual growth would encourage diversity within the sward and provide opportunities to increase structural diversity which can be very important for many invertebrates and bird species. With time such management, if applied appropriately, can be expected to result in a change in the grassland community. If management is extensive the trend should be towards MG5 crested dog's-tail – common knapweed grassland, a desirable species rich grassland. If too intensive the trend may be more to a MG6 perennial rye-grass – crested dog's-tail grassland, which is less species rich and less desirable.

Management to maintain a balance between the scrub and grassland habitat has been undertaken regularly via scrub removal and this management has also included coppicing the willows around the wet grassland areas (Cpts. 3a & 3b). However, with the exception of a couple of trial areas mown and raked by hand, there has been no large scale removal of the annual grassland growth and this remains a key issue for future management in order to achieve the desired state for a large part of the site.

Nothing has changed since the original plan to alter the desired state for the grassland.

<u>Grassland desired state.</u>

- ***For the main grassland area to be managed by removal of a reasonable amount of the annual growth***
- ***To maintain a balance between scrub and grassland habitat.***

5.1.4 Scrub and developing woodland

Nothing has changed since the original plan to alter the desired state for scrub habitat and therefore the wording of the original plan is retained below.

(See 5.1.3 as well). The scrub area maintained in balance with the grassland needs to be managed appropriately in order to maximise its potential for invertebrates. The important part of any scrub area is the edge adjacent to the grass. If areas of scrub are simply maintained as large blocks these will not provide the best benefits for invertebrates, management should therefore aim to create linear lengths, 1 to 2 bushes wide, in order to create maximum scrub edge.

As indicated in 5.1.3 above, there has been considerable management input to manage/control scrub in the main grassland area. This has involved general removal but also structured removal to great glades in areas of dense continuous scrub but also the creation of linear scrub strips.

In the long-term these strips may need coppicing to maintain a balance of different age structure and as these were created during the timeframe of the original plan there may be a need to re-coppice these areas within the time scale of this plan.

Scrub desired state

- ***To establish and maintain a balance between the area of scrub and grassland.***
- ***To maximise scrub edge by creating linear lengths of scrub 1 to 2 bushes wide.***

Alder woodland would add to the habitat diversity of the site therefore the two areas on the south and south – east boundaries should be allowed to continue to develop by natural regeneration.. As was the case with the original management plan, apart from fencing grazing animals out no management input should be needed within the timescale of this revised plan.

Developing woodland desired state.

- ***Continued development by natural regeneration free from grazing livestock***

5.1.5 Riparian habitat

The original desired state for this habitat remains valid for this revised plan. As such the original plan text is retained below.

Maintenance of the tall herb communities is desirable as this provides good habitat for many bird species and important mammals like otter and water vole. The existing habitat is fairly robust and not likely to need management input to maintain it. Care should however be taken to ensure that bankside vegetation is only cut sufficient for individual fishing pegs and never right along the bank. Light grazing is not likely to be particularly detrimental so there is little need to exclude livestock from this area.

Riparian habitat desired state

- ***Tall herb vegetation both in the floodplain area and along the river bank***

5.2 Potential for new habitat creation

The original plan suggested that there was little need or scope for additional habitat creation given the variety of habitats already present. There was some discussion regarding the creation of additional wetland habitat and about a possible project to construct an artificial sand martin nest site by the river and putting up nest boxes for a variety of bird species.

The Management Group has discussed the issue of pond creation on several occasions and there is a desire for a new pond to be created. However, the arguments presented in the original plan regarding the existence of a variety of wetland habitats already present on the site remain valid and on similar former landfill sites excavation of ponds has been very much constrained by the need to protect the integrity of the clay cap to the former landfill area.

As with the previous plan, it is not considered necessary for future management of the site to involve new habitat creation, the priority should be appropriate sympathetic management of the existing habitats and species.

Despite this, there should be flexibility, as demonstrated during 2012. Concern about the loss of Elm trees to disease, and the subsequent loss of larval food plant for the UK BAP Priority Species butterfly White-letter Hairstreak, resulted in a small scale project to plant disease resistant Elm trees in the County.

Because of the size and variety of habitats present at Darley and Nutwood LNR the management group were able to engage with the project and as a result several disease resistant elm have been planted at the southern end of the site in the developing woodland area (Cpt. 1h) and close to the reserve entrance off South Avenue (Cpt. 1c).

Small scale projects like this can be incorporated into the overall management of the site as and when opportunities arise so long as they have no impact on the main management objectives for the overall site.

5.3 Public involvement

5.3.1 Local community

A resounding success following the production of the original management plan has been the involvement of the local community, largely through the effective working of the Management Group.

The original plan highlighted the need for a management group and for that group to draw on a wide range of resources and expertise. This has been achieved with the group having representatives from interested local residents, local naturalists, Derby City Council and Derbyshire Wildlife Trust. The Wild Derby project has been fundamental in its support of the Management Group, in terms of general support, guidance, small scale funding and insurance cover. The recent withdrawal of funding for the Wild Derby Project as part of the City Council's budgetary constraints will invariably have an impact on the Management Group in the immediate future.

The Management Group meets formally twice a year (normally February and September) and holds at least two public meetings (one on site, one indoors) and organises various management activity days throughout the year. This level of activity represents a good balance in terms of volunteer time for the group members and the need to engage the wider local community. As such, the group should aim to maintain this level of activity.

The original management plan highlighted the need for the site to be accessible for all abilities and specifically mentioned problems with the access leading down from South Avenue. This has was taken on board by the Management Group and improvements were made with the installation of a short length of boardwalk and some steps. Although this access still remains steep an slippery at times an alternative, more level access is provided off the unclassified road a the southern end of the site and some surface repairs have been made to the path leading onto the site.

The paths are used so frequently that the pedestrian traffic tends to maintain them in a relatively open state. However, they do become muddy and slippery during wet periods.

5.3.2 Educational use and research

The original plan identified the potential value of the site as a resource for educational study from infant to undergraduate level. This potential has been realised during the period covered by the previous plan with a couple of individual students using the site for various projects and this use continues at the present time with the site being used during 2013 by Derby University Students for project work relating to invertebrates.

This potential value of the site remains the same and it is hoped that the current usage will stimulate further demand, particularly from Derby University.

5.3.3 The wider public

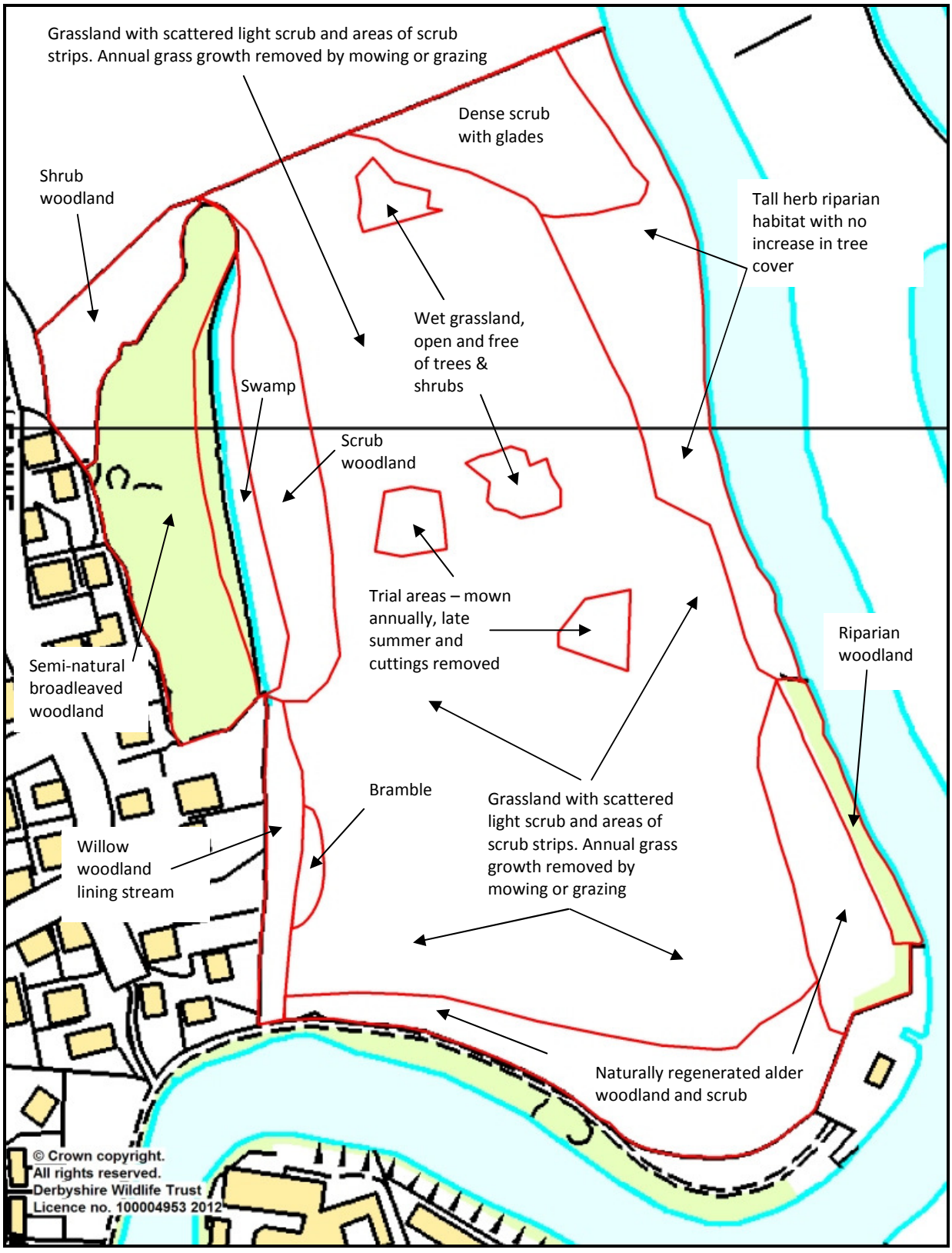
Although the term Local Nature Reserve implies involvement with the local community it is important to bear in mind that LNR's are for everyone to enjoy and active use by visitors to the City is to be equally encouraged.

The Management Group are achieving this principally via the dedicated website which gives a great insight into the reserve, its habitats and species, which is freely available to any user of the internet.

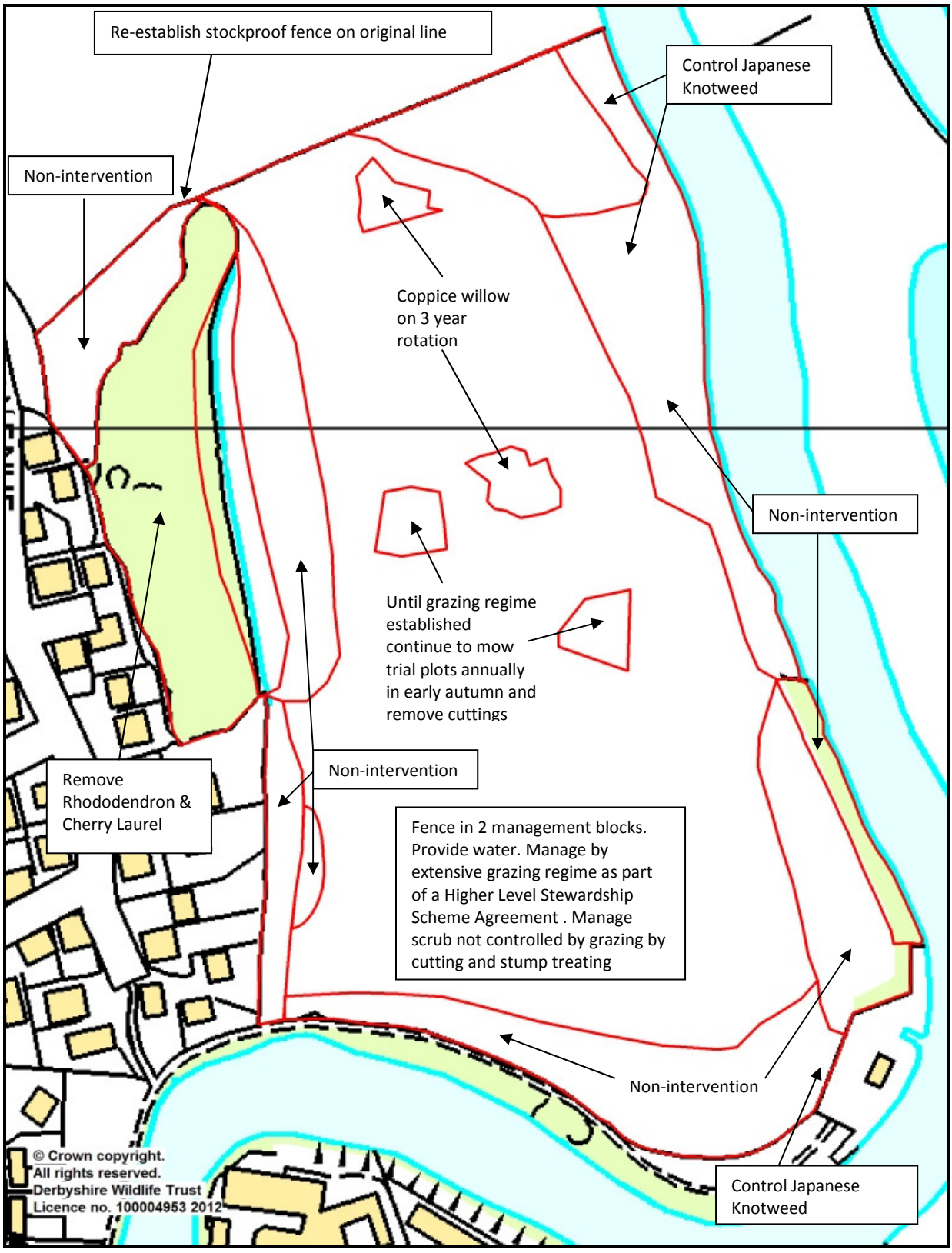
Public involvement desired state:

- ***Maintain the Management Advisory Group/continue to promote the LNR***
- ***Encourage biological recording on the reserve***
- ***Encourage continued use of the reserve for student project work***
- ***Maintain good access to the reserve***

Map 6 Desired State



Map 7. Outline Management



6 MANAGEMENT RECOMMENDATIONS

6.1 Recommended management

The following tables summarise recommendations for management actions needed to achieve the desired state for the site. They also provide a brief summary of the rationale and possible constraints on being able to adopt the recommended management. These problems are discussed in more detail in due course.

Desired state	Management Actions	Rationale	Constraints
Nut Wood: *i) For Nut Wood to continue as semi-natural broadleaved woodland free of invasive non-native species*	Remove non-native sycamore, rhododendron and cherry laurel.	These are not part of the native flora of the wood and threaten important ground flora.	Dangerous working environment and heavy work therefore contractors will be needed, cost implications. Problems of dealing with cut material if too much for habitat piles Public perception of the work
	Retain all deadwood	Deadwood provides a valuable micro-habitat for many invertebrates.	None. Just need to raise awareness.
ii) For the re-planted area and Cpt 1c of Nut Wood to continue develop as broadleaved woodland free of invasive non-native species	Periodically check for non-native shrubs. Remove by pulling/digging	This area is developing well since re-planting. Because of its close proximity to the undisturbed part of the wood there is a good opportunity for species to re-colonise but needs to be kept free of invasive species.	None. Just a small amount of volunteer time.
	Retain all deadwood	Deadwood provides a valuable micro-habitat for many invertebrates.	None. Just need to raise awareness.

Desired state	Management Actions	Rationale	Constraints On Achieving Objectives
Swamp: *To allow natural processes to take their course but wherever possible reduce the effects of non-native invasive species .*	Control Indian balsam by hand pulling before seed set.	This is a non-native invasive species which out-competes native flora. This is an annual so removing plants before they seed will reduce the population level.	An unpleasant and potentially dangerous place to work in. There will always be replenishment of seed from the incoming stream.
Grassland i) For *the main grassland area to be managed by removal of a reasonable amount of the annual growth*	Graze grassland extensively within an Environmental Stewardship Higher Level Scheme Agreement	This will encourage a more species rich sward with a greater degree of structural diversity increasing its value for invertebrates.	Finding a suitable grazier is likely to be a major constraint
	Fencing	Animals will need to be excluded from certain parts of the site and contained safely within the site.	Capital cost of fencing.
	Provision of water	Grazing animals will need a drinking supply.	
ii) To maintain a balance between scrub and grassland habitat.	(See also Scrub below) Periodically (every 3 years) coppice willows around Compartments 3a & 3b	This will help to prevent these areas from drying out.	Few. Achievable by volunteers. No capital outlay
Scrub: *i) To establish and maintain a balance between the area of scrub and grassland,*	Remove scrub leaving linear lengths of varying length and shape but no more than 2 bushes wide. If possible run some into areas of dense bramble	Grassland interest will be lost if previous scrub control is not continued in the absence of grazing. Scrub does have important value for birds and invertebrates. A balance is therefore needed.	Large area involved. Rate of scrub development greater than management. Requires contractor input and associated costs.
	Treat cut stumps.	Needed to prevent regeneration	Use of chemicals limits volunteer input.
	Stack cut material in habitat piles	Will create additional deadwood and nesting habitat.	

Desired state	Management Actions	Rationale	Constraints On Achieving Objectives
Developing woodland: *Continued development by natural regeneration free from grazing livestock*	Fence livestock out if grazing of the grassland becomes reality.	Grazing will inhibit natural regeneration	Capital cost of fencing. Maintenance of fencing thereafter.
Riparian habitat: *Tall herb vegetation both in the floodplain area and continuous along the river bank*	Keep free of invasive species; Japanese Knotweed and Indian Balsam .	Invasive species potentially reduce diversity by aggressive growth and dominance	Japanese Knotweed requires control by City Council. Control of Indian Balsam is impractical by the river due to seed dispersal by the river.
Public involvement: *i) Continue to promote the LNR*	Continue to hold public meetings and events	Provides direct face to face engagement with the public	Time that members of Management Group are able to commit
	Continue to maintain and develop the website	Provides an excellent way of disseminating information about the reserve	
	Maintain and update the reserve leaflet		Requires continued small scale funding to cover costs
ii) Biological recording	Continue to encourage visiting naturalists to record on the LNR	For the less well recorded groups there is a reliance on a limited number of people with the appropriate identification skills	
iii) Educational resource	Encourage continued use of the site by educational establishments particularly . Derby University)		

Desired state	Management Actions	Rationale	Constraints On Achieving Objectives
Informative Data - Biological recording: Informative data available to guide management of the site			
i) Continue existing long-term monitoring of key species /habitats	Encourage continuation of butterly monitoring transect Repeat 2003 grassland quadrat surveys every 2-4 years.	Long-term survey work using standardised and repeatable survey methodology provides best evidence of changes in species populations and vegetation composition	Requires long-term volunteer commitment. Need to ensure that all surveyors involved have same level of identification expertise. Initial training of volunteers needed
ii) Establish new long-term monitoring of key species/habitats	Begin long-term breeding bird survey using standardised BTO survey methodology Continue quadrat monitoring in grassland trial cutting plots	Current information on which species are breeding very patchy. Potential to manage site for key species if better informed Need to evaluate whether these are producing change	
General Site Tidiness i) Continue with annual clean up day	Annual litter pick	Keeping the site tidy encourages others to do so as well	Constrained only by volunteer resource
Site Access *i) Improved access from South Avenue*	Surface path leading down from South Avenue	Access very muddy and slippery in the winter. Not inviting and potentially hazardous	Large capital expenditure. Will require contractor to implement.
ii) Good signage and interpretation at site entrances	Continue to maintain and update interpretation material	Important to keep visitors informed to encourage responsible behaviour and enable full enjoyment of the reserve	May require capital for replacement costs

6.2 Constraints on achieving management recommendations

The original management plan suggested that the management required to reach the recommended desired state is likely to be problematical due to practical and financial reasons. This has to a certain extent proved to the case but some excellent management has been achieved using volunteers and small amounts of available funding.

The main issue facing the site is the ever continuing scrub development on the old tip area. This requires constant cutting and since the original plan was produced this has represented the main management item.

It is unlikely that the required management to reach the desired state for this part of the site can be achieved without significant external funding.

6.2.1 Designations

The Tree Preservation Order which covers Nut Wood means that any management work that involves felling is likely to need an appropriate consent from Derby City Council.

6.2.2 Management responsibilities

Whilst the volunteer Management Group has taken an important role in the management of the reserve ultimately responsibility for management of the site rests with the owner, Derby City Council.

6.2.3 Health & Safety Issues; the need to use contractors

The steepness of the bank on which Nut Wood is located presents a health & safety issue. Even when dry the gradient is such that it is difficult to maintain balance and stability, during late spring and early summer the dying down bluebell foliage creates a slippery surface on which it is almost impossible to stand steady on. In winter wet ground conditions are likely to make the slope very slippery. The wood is therefore not a suitable place for volunteer work.

6.2.4 Restrictions on mowing as a management technique

It is considered that this section of the original plan remains valid and is of particular importance so the original text has been retained below.

Although the tip area is level the surface is very rutted in places with scattered lumps of concrete and manhole covers for the methane extraction system, hidden in the rough grass. Ant hills are so abundant throughout the grassland area that it would be impossible not to destroy a significant proportion of them. Although *Formica lemani* are a species which tend to be able to find suitable niches as their habitat changes, (S Price pers.com), mowing is likely to detrimental to population levels. Retention of the existing population is desirable because of the association with green woodpecker on the site. Although grazing will also involve a degree of disturbance this would be less than mowing; grazing animals will tend to go around the ant hills whereas mowing machines will be indiscriminate.

The operation of large scale grassland machinery is therefore impractical and undesirable for ecological reasons; conversely the site is too large to make the use of hand operated machinery viable.

At the suggestion of the original plan two trial mowing areas have been established which are mown annually in late summer early autumn and the cuttings are removed. One of these areas was re-surveyed in 2008 and then again in 2012 but the survey data has not been fully evaluated to quantify any change in species composition and abundance in the trial areas compared to the rest of the site.

A consideration often overlooked is the cost implications and sustainability issues of mowing; mowing is labour intensive, expensive and uses a lot of energy. Grazing animals will do the same job with no ongoing charges if a grazier is used and derive their energy requirement from the material which needs to be cleared. Grazing is therefore a sustainable operation unlike mowing.

This leaves grazing as the preferred management option and this opinion was supported by ecologists who visited the site in 2007 as part of the Institute of Ecology and Environmental Management's (IEEM) annual conference. But this presents its own set of problems:

6.2.4.1 Fencing and water

The main grassland area will have to be fenced, ideally in 2 blocks to enable some control over grazing pressure. The fencing will need to allow full access around the perimeter of the grassland area and across the middle of the site for visitors.

There is no mains water supply to the land but there is a continuous flow of water feeding the swamp area and this could be utilised using self-operated drinkers or a drinking point incorporated within the fencing around the swamp area.

6.2.4.2 Finding suitable graziers

Finding someone prepared to graze the land will present considerable difficulties, particularly with the site's urban location. Sheep would not be suitable as dog-worrying problems would be too great and they are not best suited to a rough grassland habitat; cattle are much less intimidated by stray dogs and would be better suited to the rough grass and would control scrub development better. Recently there has been a major decline in livestock numbers, the recent Foot & Mouth disease outbreak contributing to this decline; there are now fewer livestock farmers. This is causing problems for managers of Nature Reserves and other important wildlife sites and many now have their own livestock to overcome the problem, locally Derbyshire Wildlife Trust have their own flock of sheep and small herd of cattle to assist with reserve management. Nationally the Grazing Animals Project (GAP)[26] is aiming to develop grazing projects to address these issues. The Darley Tip site has the advantage over many similar sites in that it is of reasonable size and therefore even with extensive grazing would be large enough to be incorporated into a local GAP. However, some 9 years on from when this text was originally written there has been no advancement of a GAP project in Derbyshire and therefore there is little optimism that one would be available in the near future.

6.2.5 Public perceptions

The possible implementation of grazing on the site has remained a contentious issue throughout the duration of the previous plan. At the time of writing this may now be a distinct possibility. In order to allay any concerns regarding this potential major change to the site there will be a need for the Management Group to use its good communication outlets (website and public meetings) to fully explain the rationale behind such management and to demonstrate how any proposed fencing would still allow good all round access to the site.

6.2.6 Potential sources of funding

The most realistic option for future funding for the main management of the site (e.g. management of the main grassland area) is likely to come from an Environmental Stewardship Higher Level Scheme Agreement.

At the time of writing this revised plan Derby City Council were actively investigating the possibility of entering multiple sites into an over-arching agreement. Darley and Nutwood LNR is included in those investigations.

In a climate of tight budgetary control options for other forms of funding to support the management of the reserve are less clear and there may be a need to be opportunistic as and when possible sources of funding become available.

6.3 General considerations

6.3.1 Obligations

- Ensure obligations of the Wildlife & Countryside Act 1981 (and amendments) are met by all involved with the site.
- Ensure all relevant Health & Safety at Work Act obligations are met
- Ensure all relevant Equality Act 2010 obligations are met
- Ensure all staff including volunteers are adequately trained and equipped
- Ensure all Derby City Council 'in house' procedures and practices are adhered to

6.3.2 Good ecological practice

Only plant native species of UK or preferably local provenance following the guidance contained in the Derbyshire Wildlife Trust publication, Habitat Creation Guide for Lowland Derbyshire[27].

Whilst management practices should only be altered if there is a good ecological reason for doing so they should not be rigidly adhered to if they are obviously detrimental. Conservation management is not an exact science but it should involve careful monitoring and responsive management when appropriate.

6.3.3 Invasive non-native species

The clump of dogwood in the swamp has been recorded as *Cornus sanguinea* (Dogwood) by previous surveyors, however this is *Cornus sericea* (Red-osier Dogwood) which unlike *C. sanguinea* is a non-native shrub which thrives in wet conditions. It is capable of spreading by suckering and currently the stand is reasonably large. An undated detailed map of the Nut Wood vegetation shows 'dogwood' as a small patch which at the time of writing the original plan seemed to suggest that this plant was spreading. However, inspection during 2011 as part of the preparation of this revision, revealed that there did not appear to have been any significant change in the extent of the population. This revised plan will therefore not recommend removal.

Japanese knotweed is well established on the east side of the site. This is a highly invasive non-native plant whose dense growth out competes native flora. It is listed under Schedule 9, Section 14 of the Wildlife and Countryside Act (1981). This makes it an offence to plant or otherwise cause the species to grow in the wild. In addition it is classed as controlled waste under the Environmental Protection Act 1990 which requires any Japanese knotweed material to be disposed of at a licensed landfill site in accordance with the Environmental Protection Act (Duty of Care) Regulations 1991[28]. Eradication of this species from the site is therefore highly desirable. Since the original plan was written Derby City Council have regularly sprayed the stands of Japanese Knotweed and have reduced their vigour but not yet achieved total removal. This should therefore continue to be a management priority.

6.4 Five year work schedule; 2013 - 2017

Year 1. 2013		
Management action	**Detail**	**Responsibilities**
Maintain functions of Management Advisory Group	2 public meetings management work parties maintain website encourage wildlife recording on site	Management Group – volunteer task
Scrub control on main grassland area	organise a minimum of 2 work sessions cutting and stump treating scrub	Management Group and Derby City Council – combination volunteer task and specialist contractor
Mowing trial grassland plots	Strim and rake 2 trial grassland plots	Management Group and Derby City Council – combination volunteer task and specialist contractor
Agri-environment agreement	Investigate feasibility of part of site being managed under an Environmental Stewardship Higher Level Scheme Agreement	Derby City Council
Japanese knotweed control	Continue control of Japanese Knotweed	Derby City Council – specialist task
Indian Balsam control	Hand pulling from swamp area (only if appropriate timing can be achieved and management can be sustained annually)	Management Group – volunteer task
Annual site tidy	Annual litter pick	Management Group – volunteer task
Resolve boundary issue	Ensure stockproof fence is restored on north boundary	Derby City Council

Year 2. 2014		
Management action	**Detail**	**Responsibilities**
Maintain functions of Management Advisory Group	2 public meetings management work parties maintain website encourage wildlife recording on site	Management Group – volunteer task
Scrub control on main grassland area (if grazing has not been introduced to site)	organise a minimum of 2 work sessions cutting and stump treating scrub	Management Group and Derby City Council – combination volunteer task and specialist contractor
Mowing trial grassland plots (if grazing has not been introduced to site)	Strim and rake 2 trial grassland plots	Management Group and Derby City Council – combination volunteer task and specialist contractor
Japanese knotweed control	Continue control of Japanese Knotweed	Derby City Council – specialist task
Indian Balsam control	Hand pulling from swamp area (only if appropriate timing can be achieved and management can be sustained annually)	Management Group – volunteer task
Annual site tidy	Annual litter pick	Management Group – volunteer task
Remove Rhododendron and Cherry Laurel from Nutwood	Cut and stump treat any shrubs within Nut Wood	Derby City Council – specialist contractor
Coppice willows around the two wetland areas in the main grassland area	Coppice	Management Group – volunteer task

Year 3. 2015		
Management action	**Detail**	**Responsibilities**
Maintain functions of Management Advisory Group	2 public meetings management work parties maintain website encourage wildlife recording on site	Management Group – volunteer task
Scrub control on main grassland area (if grazing has not been introduced to site)	organise a minimum of 2 work sessions cutting and stump treating scrub	Management Group and Derby City Council – combination volunteer task and specialist contractor
Mowing trial grassland plots (if grazing has not been introduced to site)	Strim and rake 2 trial grassland plots	Management Group and Derby City Council – combination volunteer task and specialist contractor
Japanese knotweed control	Continue control of Japanese Knotweed	Derby City Council – specialist task
Indian Balsam control	Hand pulling from swamp area (only if appropriate timing can be achieved and management can be sustained annually)	Management Group – volunteer task
Annual site tidy	Annual litter pick	Management Group – volunteer task

Year 4. 2016		
Management action	**Detail**	**Responsibilities**
Maintain functions of Management Advisory Group	2 public meetings management work parties maintain website encourage wildlife recording on site	Management Group – volunteer task
Scrub control on main grassland area (if grazing has not been introduced to site)	organise a minimum of 2 work sessions cutting and stump treating scrub	Management Group and Derby City Council – combination volunteer task and specialist contractor
Mowing trial grassland plots (if grazing has not been introduced to site)	Strim and rake 2 trial grassland plots	Management Group and Derby City Council – combination volunteer task and specialist contractor
Japanese knotweed control	Continue control of Japanese Knotweed	Derby City Council – specialist task
Indian Balsam control	Hand pulling from swamp area (only if appropriate timing can be achieved and management can be sustained annually)	Management Group – volunteer task
Annual site tidy	Annual litter pick	Management Group – volunteer task

Year 5. 2017		
Management action	**Detail**	**Responsibilities**
Maintain functions of Management Advisory Group	2 public meetings management work parties maintain website encourage wildlife recording on site	Management Group – volunteer task
Review and make provision for revised Management Plan for period 2018 - 22	Review of past management Revise current management plan	Derby City Council & Management Group
Scrub control on main grassland area (if grazing has not been introduced to site)	organise a minimum of 2 work sessions cutting and stump treating scrub	Management Group and Derby City Council – combination volunteer task and specialist contractor
Mowing trial grassland plots (if grazing has not been introduced to site)	Strim and rake 2 trial grassland plots	Management Group and Derby City Council – combination volunteer task and specialist contractor
Japanese knotweed control	Continue control of Japanese Knotweed	Derby City Council – specialist task
Indian Balsam control	Hand pulling from swamp area (only if appropriate timing can be achieved and management can be sustained annually)	Management Group – volunteer task
Annual site tidy	Annual litter pick	Management Group – volunteer task
Coppice willows around the two wetland areas in the main grassland area	Coppice	Management Group – volunteer task

7 APPENDICES.

7.1 Contact details

Darley and Nutwood Local Nature Reserve
http://darleyandnutwood.org.uk/

Derby City Council
The Council House
Corporation Street
DERBY DE1 2FS Tel: 01332 293111 E-mail: customerservices@derby.gov.uk

Derbyshire Wildlife Trust
East Mill
Bridgefoot
BELPER DE56 1XH Tel: 01773 881188 E-mail: enquiries@derbyshirewt.co.uk

7.2 Site species list

This composite species list for Nut Wood and Darley Abbey Tip has been compiled from records held on file by Derbyshire Wildlife Trust and all records received since the production of the original management plan

Scientific	Vernacular	Year of last record
Ferns & Horsetails (8 species)		
Dryopteris affinis agg.	Scaly Male-fern	2003
Dryopteris dilatata	Broad Buckler-fern	2011
Dryopteris filix-mas agg	Male-fern	2011
Phyllitis scolopendrium	Hart's-tongue	2011
Pteridium aquilinum	Bracken	
Equisetum arvense	Field Horsetail	2011
Equisetum palustre	Marsh Horsetail	2011
Equisetum telmateia	Great Horsetail	2011
Trees & Shrubs (38 species)		
Acer campestre	Field Maple	2011
Acer pseudoplatanus	Sycamore	2011
Aesculus hippocastanum	Horse-chestnut	2001
Alnus glutinosa	Alder	2011
Berberis vulgaris	Barberry	2011
Betula pendula	Silver Birch	2011
Betula pubescens	Downy Birch	2011
Cornus sanguinea	Dogwood	

Scientific	Vernacular	Year of last record
Cornus sericea	Red-osier Dogwood	2011
Corylus avellana	Hazel	2011
Crataegus monogyna	Hawthorn	2012
Cytisus scoparius	Broom	
Cytisus scoparius ssp. scoparius	Broom	2003
Fraxinus excelsior	Ash	2011
Ilex aquifolium	Holly	2011
Ligustrum vulgare	Wild Privet	2011
Malus domestica	Apple	2001
Populus alba	White Poplar	1990
Populus x canescens	Grey Poplar	2003
Populus x jackii	Balm - of - Gilead	2011
Prunus avium	Wild Cherry	
Prunus laurocerasus	Cherry Laurel	2011
Prunus spinosa	Blackthorn	2011
Quercus robur	Pedunculate Oak	2011
Rhododendron ponticum	Rhododendron	2003
Rosa canina	Dog-rose	2001
Rosa canina agg	Dog-rose	2011
Rubus idaeus	Raspberry	2011
Salix alba	White Willow	1990
Salix caprea	Goat Willow	2011
Salix cinerea ssp. oleifolia	Grey Willow	2011
Salix fragilis	Crack Willow	2011
Salix fragilis var. russelliana	Bedford Willow	2011
Salix viminalis	Osier	2011
Sambucus nigra	Elder	2011
Sorbus aucuparia	Rowan	1990
Ulmus sp.	an elm	2011
Viburnum opulus	Guelder-rose	2003
Grasses (25 species)		
Agrostis capillaris	Common Bent	2011
Agrostis stolonifera	Creeping Bent	2011
Alopecurus geniculatus	Marsh Foxtail	2011
Alopecurus pratensis	Meadow Foxtail	2011
Anthoxanthum odoratum	Sweet Vernal-grass	2011
Arrhenatherum elatius	False Oat-grass	2012
Bromus hordeacous	Soft-brome	2011
Cynosurus cristatus	Crested Dog's-tail	2011
Dactylis glomerata	Cock's-foot	2012
Deschampsia cespitosa	Tufted Hair-grass	2012
Deschampsia cespitosa ssp. cespitosa	Tufted Hair-grass	2003
Elymus caninus	Bearded Couch	2003
Elytrigia repens	Common Couch	2012
Festuca rubra	Red Fescue	2012
Festuca arundinacea	Tall Fescue	2011

Scientific	Vernacular	Year of last record
Glyceria maxima	Reed Sweet-grass	2011
Holcus lanatus	Yorkshire-fog	2012
Lolium perenne	Perennial Rye-grass	2011
Milium effusum	Wood Millet	2011
Phalaris arundinacea	Reed Canary-grass	2011
Phleum pratense	Timothy	2011
Poa annua	Annual Meadow-grass	2011
Poa pratensis	Smooth Meadow-grass	2001
Poa trivialis	Rough Meadow-grass	2012
Trisetum flavescens	Yellow Oat-grass	2003
Sedges (7 species)		
Carex acutiformis	Lesser Pond-sedge	2011
Carex flacca	Glaucous Sedge	2011
Carex hirta	Hairy Sedge	2011
Carex otrubae	False Fox-sedge	2011
Carex pendula	Pendulous Sedge	2001
Carex riparia	Greater Pond-sedge	2001
Carex spicata	Spiked Sedge	2012
Rushes (6 species)		
Eleocharis palustris	Common Spike-rush	2011
Juncus articulatus	Jointed Rush	1988
Juncus bufonius	Toad Rush	2001
Juncus conglomeratus	Compact Rush	2011
Juncus effusus	Soft-rush	2011
Juncus inflexus	Hard Rush	2012
Herbs (157 species)		
Achillea millefolium	Yarrow	2012
Adoxa moschatellina	Moschatel	1990
Aegopodium podagraria	Ground-elder	2012
Alliaria petiolata	Garlic Mustard	2012
Allium ursinum	Ramsons	2012
Anacamptis pyramidalis	Pyramidal Orchid	2012
Angelica sylvestris	Wild Angelica	2011
Anthriscus sylvestris	Cow Parsley	2012
Arctium sp.	a Burdock	2011
Armoracia rusticana	Horse-radish	2012
Artemesia absinthium	Wormwood	1990
Artemesia vulgaris	Mugwort	2011
Arum maculatum	Lords-and-Ladies	2012
Atriplex patula	Common Orache	2001
Barbarea vulgaris	Winter-cress	2012
Bellis perennis	Daisy	2012
Brassica napus ssp. *oleifera*	Oil-seed Rape	2012
Caltha palustris	Marsh marigold	2012

Scientific	Vernacular	Year of last record
Calystegia sepium	Hedge Bindweed	2001
Calystegia sepium ssp sepium	Hedge Bindweed	2011
Capsella bursa-pastoris	Shepherd's-purse	2001
Cardamine amara	Large Bitter-cress	2012
Cardamine flexuosa	Wavy Bitter-cress	2012
Cardamine hirsuta	Hairy Bitter-cress	2012
Cardamine pratensis	Cuckooflower	2012
Carduus crispus	Welted Thistle	2011
Centaurea nigra	Common Knapweed	2012
Cerastium fontanum	Common Mouse-ear	2012
Chamerion angustifolium	Rosebay Willowherb	2011
Chrysosplenium oppositfolium	Opposite-leaved Golden-saxifrage	2012
Circaea lutetiana	Enchanter's-nightshade	2011
Cirsium arvense	Creeping Thistle	2012
Cirsium vulgare	Spear Thistle	2012
Conium maculatum	Hemlock	2011
Conopodium majus	Pignut	1988
Convolvulus arvensis	Field Bindweed	1988
Coronopus didymus	Lesser Swinecress	2001
Corydalis solida	Bird-in-a-bush	2012
Crepis capillaris	Smooth Hawk's-beard	2011
Dactylorhiza fuchsii	Common Spotted-orchid	2012
Digitalis purpurea	Foxglove	2012
Dipsacus fullonum	Teasel	2012
Epilobium ciliatum	American Willowherb	2011
Epilobium hirsutum	Great Willowherb	2012
Epilobium montanum	Broad-leaved Willowherb	2001
Epilobium tetragonum	Square-stalked Willowherb	2012
Eupatorium cannabinum	Hemp-agrimony	2011
Fallopia japonica	Japanese Knotweed	2012
Filipendula ulmaria	Meadowsweet	2012
Fragaria vesca	Wild Strawberry	2012
Galium aparine	Cleavers	2012
Galium palustre	Common Marsh-bedstraw	2011
Geranium dissectum	Cut-leaved Crane's-bill	2012
Geranium pratense	Meadow Crane's-bill	2011
Geranium robertianum	Herb Robert	2012
Geum urbanum	Wood Avens	2012
Glechoma hederacea	Ground Ivy	2012
Hedera helix	Ivy	2011
Hedera helix ssp helix	Ivy	2011
Heracleum sphondylium	Hogweed	2012
Hesperis matronalis	Dame's-violet	2012
Hyacinthoides non-scripta	Bluebell	2012
Hypericum perforatum	Perforate St John's-wort	2011
Hypericum tetrapterum	Square-stalked St John's-wort	2001
Impatiens glandulifera	Indian Balsam	2011

Scientific	Vernacular	Year of last record
Iris pseudacorus	Yellow Iris	2012
Lamiastrum galeobdolon ssp. *argentatum*	Garden Archangel	2012
Lamiastrum galeobdolon ssp. montanum	Yellow Archangel	2012
Lamium album	White Dead-nettle	2012
Lamium purpureum	Red Dead-nettle	2012
Lathyrus pratensis	Meadow Vetchling	2012
Lemna minor	Common Duckweed	2011
Leontodon autumnalis	Autumn Hawkbit	2011
Lepidium draba ssp draba	Hoary Cress	2012
Leucanthemum vulgare	Oxeye Daisy	2012
Lotus corniculatus	Common Bird's-foot-trefoil	2012
Lotus pedunculatus	Greater Bird's-foot-trefoil	2001
Lycopus europaeus	Gypsywort	2011
Lysimachia vulgaris	Yellow Loosestrife	2011
Matricaria discoidea	Pineappleweed	2011
Matricaria recutita	Scented Mayweed	2001
Medicago lupulina	Black Medick	2012
Melilotus albus	White Melilot	2008
Melilotus altissimus	Tall Melilot	2012
Melilotus officinalis	Ribbed Melilot	1993
Mercurialis perennis	Dog's Mercury	2012
Myosotis arvensis	Field Forget-me-not	1988
Myosotis scorpioides	Water Forget-me-not	2012
Myosotis sylvatica	Wood Forget-me-not	2012
Myosoton aquaticum	Water Chickweed	2011
Myrrhis odorata	Sweet Cicely	2012
Odonites vernus sens. lat	Red Bartsia	2011
Ophrys apifera	Bee Orchid	2012
Papaver somniferum	Opium Poppy	2001
Pentaglottis sempervirens	Green Alkanet	2012
Persicaria amphibia	Amphibious Bistort	2011
Persicaria bistorta	Common Bistort	2012
Persicaria maculosa	Redshank	2001
Petasites hybridus	Butterbur	2012
Plantago lanceolata	Ribwort Plantain	2012
Plantago major	Greater Plantain	2011
Polygonum aviculare agg.	Knotgrass	2001
Potentilla anserina	Silverweed	2012
Potentilla reptans	Creeping Cinquefoil	2011
Prunella vulgaris	Selfheal	2011
Ranunculus acris	Meadow Buttercup	2012
Ranunculus bulbosus	Bulbous Buttercup	2012
Ranunculus ficaria	Lesser Celandine	2012
Ranunculus repens	Creeping Buttercup	2012
Reseda luteola	Weld	1988
Rorippa amphibia	Great Yellow-cress	2011
Rorippa nasturtium-aquaticum	Water-cress	1990

Scientific	Vernacular	Year of last record
Rubus armeniacus	a bramble	2001
Rubus fruticosus agg	Bramble	2011
Rubus lindleianus	a bramble	2001
Rubus warrenii	a bramble	2001
Rumex acetosa	Common Sorrel	2012
Rumex conglomeratus	Clustered Dock	2011
Rumex crispus	Curled Dock	2012
Rumex obtusifolias	Broad-leaved Dock	2011
Rumex sanguineus	Wood Dock	2011
Scrophularia auriculata	Water Figwort	2011
Senecio erucifolius	Hoary Ragwort	2012
Senecio jacobea	Common Ragwort	2012
Silene dioica	Red Campion	2012
Solanum dulcamara	Bittersweet	2012
Solidago canadensis	Canadian Goldenrod	2011
Sonchus asper	Prickly Sow-thistle	2011
Sonchus oleraceus	Smooth Sow-thistle	1990
Stachys palustris	Marsh Woundwort	2011
Stachys sylvatica	Hedge Woundwort	2011
Stellaria graminea	Lesser Stichwort	2012
Stellaria uliginosa	Bog Stichwort	2012
Symphoricarpos albus	Snowberry	2003
Symphytum officinale	Common Comfrey	2012
Symphytum x uplandicum	Russian Comfrey	2011
Tanacetum vulgare	Tansy	2011
Taraxacum officinale agg	Dandelion	2012
Torilis japonica	Upright Hedge-parsley	2012
Tragopogon pratensis ssp minor	Goat's-beard	2012
Trifolium dubium	Lesser Trefoil	2011
Trifolium medium	Zigzag Clover	2011
Trifolium pratense	Red Clover	2012
Trifolium repens	White Clover	2012
Tussilago farfara	Colt's-foot	2012
Typha latifolia	Common Reedmace	2011
Urtica dioica	Common Nettle	2012
Valeriana officinalis	Common Valerian	1988
Veronica beccabunga	Brooklime	2011
Veronica hederifolia ssp. *lucorum*	Ivy-leaved Speedwell	2012
Veronica serpyllifolia	Thyme-leaved Speedwell	2012
Vicia cracca	Tufted vetch	2012
Vicia hirsuta	Hairy Tare	2012
Vicia sativa subsp. segetalis	Common Vetch	2001
Vicia satvia	Common Vetch	2012
Vicia sepium	Bush Vetch	2012
Vinca major	Greater Periwinkle	1990

Scientific	Vernacular	Year of last record
Bryophytes (36 species)		
Liverworts (6 species)		
Frullania dilatata	Dilated Scalewort	2011
Lophocolea bidentata	Bifid Crestwort	2011
Metzgeria furcata	Forked Veilwort	2011
Metzgeria violacea	Blueish Veilwort	2011
Pellia endiviifolia	Endive Pellia	2011
Mosses (30 species)		
Amblystegium serpens	Creeping Feather-moss	2011
Aulacomnium androgynum	Bud-headed Groove-moss	2011
Barbula unguiculata	Bird's-claw Beard-moss	2011
Brachythecium rutabulum	Rough-stalked Feather-moss	2011
Bryum argenteum	Silver-moss	2011
Bryum capillare	Capillary Thread-moss	2011
Calliergonella cuspidata	Pointed Spear-moss	2011
Cryphaea heteromalla	Lateral Cryphaea	2011
Didymodon vinealis	Soft-tufted Beard-moss	2011
Drepanocladus aduncus	Kneiff's Hook-moss	2011
Eurhynchium striatum	Common Striated Feather-moss	2011
Fissidens taxifolius	Common Pocket-moss	2011
Grimmia pulvinata	Grey-cushioned Grimmia	2011
Hypnum cupressiforme var. cupressiforme	a moss	2011
Kindbergia praelonga	Common Feather-moss	2011
Leptodictyum riparium	Kneiff's Feather-moss	2011
Leskea polycarpa	Many-fruited Leskea	2011
Mnium hornum	Swan's-neck Thyme-moss	2011
Orthotrichum affine	Wood Bristle-moss	2011
Orthotrichum anomalum	Anomalous Bristle-moss	2011
Orthotrichum diaphanum	White-tipped Bristle-moss	2011
Orthotrichum lyellii	Lyell's Bristle-moss	2011
Plagiomnium undulatum	Hart's-tongue Thyme-moss	2011
Rhynchostegium confertum	Clustered Feather-moss	2011
Rhytidiadelphus squarrosus	Springy Turf-moss	2011
Schistidium crassipilum	Thickpoint Grimmia	2011
Syntrichia latifolia	Water Screw-moss	2011
Syntrichia ruralis var. ruralis	Great Hairy Screw-moss	2011
Tortula muralis	Wall Screw-moss	2011
Ulota crispa	Crisped Pincushion	2011
Ulota phyllantha	Frizzled Pincushion	2011
Fungi (41 species)		
Enteridium lycoperdon	a slime mould	2010
Agrocybe pediades	Common Fieldcap	2012
Armillaria mellea	Honey fungus	2012
Auricularia auricular-judae	Ear fungus	2012

Scientific	Vernacular	Year of last record
Biscogniauxia nummularia	Beech tarcrust	2012
Bjerkandra adusta	Smoky bracket	2012
Coprinus comatus	Shaggy parasol	2012
Coprinus micaceus	Glistening Ink cap	2012
Clitocybe phyllophila	Frosty funnel	2012
Crepidotus variabilis	Oysterling	2012
Crepidotus versutus	Oysterling	2012
Daedeleopsis confragosa	Blushing bracket	2012
Daldinea concentrica	Cramp ball	2012
Entoloma lampropus	Pink gill species	2012
Hebeloma crustulineforme	Poison Pie	2012
Hygrocybe virgineana	Snowy waxcap	2012
Hypholoma fasciculare	Sulphur tuft	2012
Hypochnicium vellerum	Resupinate	2012
Lacrymaria lacrymabunda	Weeping widow	2012
Lycoperdon pratense	Meadow puffball	2012
Lycoperdon pyriforme	Stump puffball	2012
Lyophyllum loricatum	Brown domecap	2012
Megacollybia platyphylla	White laced shank	2012
Mycena galericulata	Common bonnet	2012
Mycena oliveomarginata	Brown edged bonnet	2012
Mycena polygramma	Grooved bonnet	2012
Mycena rorida	Dripping bonnet	2012
Nectaria cinnabarina	Coral spot	2012
Phellenis ignarius	Willow bracket	2012
Pholiota alnicola	Alder scalycap	2012
Polyporus leptocephala	Blackfoot polypore	2012
Postia subcaesia	Blueing Bracket	2012
Psathyrella candolleana	Pale brittlestem	2012
Psathyrella microrhiza	Rootlet brittlestem	2012
Psilocybe merdaria		2012
Ramaria stricta	Upright coral	2012
Stereum hisutum	Hairy stereum	2012
Trametes gibbosa	Lumpy bracket	2012
Trametes versicolor	Turkeytail	2012
Tricholoma cingulatum	Girdled knight	2012
Xylaria hypoxylon	Candlesnuff	2012
Birds (52 species)		
Accipiter nisus	Eurasian Sparrowhawk	2007
Acrocephalus schoenobaenus	Sedge Warbler	2006
Aegithalos caudatus	Long-tailed Tit	2005
Alauda arvensis	Sky Lark	1989
Alcedo atthis	Common Kingfisher	2007
Anas platyrhynchos	Mallard	2007
Anthus pratensis	Meadow Pipit	2005

Scientific	Vernacular	Year of last record
Apus apus	Common Swift	2001
Ardea cinerea	Grey Heron	2007
Aythya ferina	Common Pochard	2006
Branta Canadensis	Canada Goose	1990
Buteo buteo	Common Buzzard	2006
Carduelis chloris	European Greenfinch	2007
Carduelis spinus	Eurasian Siskin	2008
Certhia familiaris	Eurasian Treecreeper	2007
Columba palumbus	Common Wood Pigeon	2011
Corvus corone	Carrion Crow	2006
Cyanistes caeruleus	Blue Tit	2007
Cygnus olor	Mute Swan	2007
Cygnus sp.	a Swan species	1989
Dendrocopos major	Great Spotted Woodpecker	2007
Emberiza schoeniclus	Common Reed Bunting	2007
Falco tinnunculus	Common Kestrel	2008
Fringilla coelebs	Chaffinch	2007
Gallinago gallinago	Common Snipe	2011
Garrulus glandarius	Eurasian Jay	2006
Locustella naevia	Common Grasshopper Warbler	2006
Motacilla flava	Yellow Wagtail	1987
Numenius arquata	Eurasian Curlew	1989
Parus major	Great Tit	2007
Perdix perdix	Grey Partridge	1993
Phalacrocorax carbo	Cormorant	2007
Phasianus colchicus	Common Pheasant	2007
Phylloscopus collybita	Common Chiffchaff	2008
Phylloscopus trochilus	Willow Warbler	2010
Pica pica	Eurasian Magpie	2011
Picus viridis	European Green Woodpecker	2008
Poecile montana	Willow Tit	2007
Prunella modularis	Dunnock	2007
Pyrrhula pyrrhula	Eurasian Bullfinch	2008
Regulus regulus	Goldcrest	2006
Sitta europaea	Eurasian Nuthatch	2007
Strix aluco	Tawny Owl	1989
Sylvia atricapilla	Eurasian Blackcap 2007	2010
Sylvia borin	Garden Warbler	2005
Sylvia communis	Common Whitethroat	2010
Troglodytes troglodytes	Winter Wren	2007
Turdus iliacus	Redwing	2007
Turdus merula	Common Blackbird	2007
Turdus philomelos	Song Thrush	2006
Turdus pilaris	Fieldfare	2007
Turdus viscivorus	Mistle Thrush	2006
Vanellus vanellus	Northern Lapwing	1989

Scientific	Vernacular	Year of last record
Butterflies (20 species)		
Aglais urticae	Small Tortoiseshell	2009
Anthocharis cardamines	Orange-tip	2008
Aphantopus hyperantus	Ringlet	2009
Celastrina argiolus	Holly Blue	2010
Coenonympha pamphilus	Small Heath	1989
Colias croceus	Clouded Yellow	2009
Gonepteryx rhamni	Brimstone	2008
Inachis io	Peacock	2010
Maniola jurtina	Meadow Brown	2009
Ochlodes faunus	Large Skipper	2008
Pararge aegeria	Speckled Wood	2009
Pieris brassicae	Large White	2009
Pieris napi	Green-veined White	2009
Pieris rapae	Small White	2009
Polygonia c-album	Comma	2009
Polyommatus icarus	Common Blue	2010
Pyronia tithonus	Gatekeeper	2009
Thymelicus sylvestris	Small Skipper	2006
Vanessa atalanta	Red Admiral	2009
Vanessa cardui	Painted Lady	2009
Moths (5 species)		
Chiasmia clathrata	Latticed Heath	2010
Scotopteryx chenopodiata	Shaded Broad-bar	2010
Zygaena filipendulae	Six-spot Burnet	2008
Zygaena sp.	a burnet moth	1989
Zygaena trifolii	Five-spot Burnet	2006
Bumblebees (2 species)		
Bombus lapidarius	Large Red Tailed Bumble Bee	2010
Bombus pascuorum	Common Carder Bee	2010
Hoverflies (1 species)		
Volucella inanis	a hoverfly	2010
Beetles (3 species)		
Coccinella septempunctata	7-spot Ladybird	1993
Harmonia axyridis	Harlequin Ladybird	2008
Psyllobora vigintiduopunctata	22-spot Ladybird	2010
Gall formers (11 species)		
Aceria pseudoplatinus	a plant gall	2006

Scientific	Vernacular	Year of last record
Cynips divisa	a plant gall	2006
Diplolepsis rosea	a plant gall	2006
Eriophyes inangulis	a plant gall	2006
Eriophyes laevis	a plant gall	2006
Pemphigus populinigrae	a plant gall	2006
Pemphigus spyrotheca	a plant gall	2006
Phyllocoptes goniothorax	a plant gall	2006
Pontania proxima	a plant gall	2006
Psyllopsis fraxini	a plant gall	2006
Urophora cardui	a plant gall	2006
Dragonflies and Damsleflies (3 species)		
Calopteryx splendens	Banded Demoiselle	2010
Enallagma cyathigerum	Common Blue Damselfly	1988
Lestes sponsa	Emerald Damselfly	2003
Ants (1 species)		
Formica lemani	an ant	2003
Mammals (9species)		
Meles meles	Badger (field signs)	2011
Oryctolagus cuniculus	Rabbit (field signs)	2011
Sciurus carolinensis	Grey Squirrel	2011
Myodes glareolus	Bank Vole	2008
Sorex araneus	Common Shrew	2008
Apodemus sylvaticus	Wood Mouse	2008
Microtus agrestis	Field Vole	2008
Vulpes vulpes	Fox	2008
Mustela erminea	Stoat	2009

7.3 Quadrat data and additional survey notes.

These biological records were all made by the author, (N Law), during field survey work associated with the production of the original management plan, June - August 2003. with repeat survey work undertaken in the main grassland area in 2008 and 2012. Abbreviations are as follows:

DOMIN scores: an assessment of % cover

DOMIN SCORE	% COVER
10	91-100
9	76-90
8	51-75
7	34-50
6	26-33
5	11-25
4	4-10
3	10+ individuals
2	4-10 individuals
1	1-3 individuals

DAFOR ratings: an assessment of abundance

DAFOR	ABUNDANCE
D	Dominant
A	Abundant
F	Frequent
O	Occasional
R	Rare
L- prefix	'Locally'

2a 2000

WOODLAND SURVEY SHEET.
COMPOSITION & STRUCTURE

County: Derby's Unitary: Derby City	Ref No. Cpt. 1a
Surveyor Nick Law	Site name Nut Wood
Date of survey 26/6/2003	Grid ref (centre of site) SK35343906

	Tx	Tp	Ts	Tc	Tn	Cx	Ct	Px	Pc	Sx	Sc	St	Js	Jp	Jv
Acer cam					R									R	
Acer pse												R	F	O	
Aescu hip															
Alnus glu															
Betul pen															
Betul pub															
Carp bet															
Casta ast															
Conifer sp															
Coryl ave				F									R		
Crata mon										O			O		
Crata oxy															
Euony eur															
Fagus syl															
Frang aln															
Fraxi exc					R										
Ilex aqu										O					
Junip com															
Larix sp															
Malu syl															
Picea sp															
Pinus syl															
Popul tre															
Prunu avi															
Prunu lau										R					
Prunu pad															
Prunu spi															
Querc cer															
Querc pet															
Querc rob					R										
Rham cat															
Rhodopon										F			O	O	
Salix alb															
Salix aur															
Salix cap												O			
Salix cin															
Salix fra															
Salix pen															
Salix vim															
Samb nig										F			F	F	
Sorbu ari															
Sorbu auc															
Sorbu tor															
Taxus bac															
Thely san															
Tilia cor															
Tilia eur															
Tilia pla															
Ulmus car															
Ulmus gla															
Ulmus pro															
Vibur lan															

D=dominant A=abundant F=frequent O=occasional R=rare

Steep bank falling to small stream and marsh area. At the north end *Hyacinthoides non-scripta* (A) under mature *Quercus robur* and *Acer campestre* with odd *Rhododendron ponticum*. Single shrub of *Berberis vulgaris*. Moving south *Hyacinthoides non-scripta* declines in abundance. *Rubus fruticosus agg* and *Prunus laurocerasus* appear. The south boundary is chestnut paling which prevents access to landslip area. Close to the fencing young *Acer pseudoplatanus* (L/F) at the top of the slope and *Salix caprea* at the base. Shrub layer has mature to over-mature stools of *Corylus avellana* and a small amount of *Sambucus nigra* . Fenced area replanted with *Corylus avellana, Fraxinus excelsior, Quercus robur, Viburnum opulus, and Rosa canina agg. Symphoricarpos albus* is also present here and the odd plant of *Hyacinthoides non-scripta*, *Silene dioica* and *Equisetum arvense* . Of note is one old *Q.robur.* and single plant of *Phyllitis scolopendrium*

Field layer:
Hyacinthoides non-scripta (A/D)
Dryopteris dilatata (F)
Milium effusum (O)
Lamiastrum galeobdolon ssp. montanum (O)
Dryopteris affinis agg. (R)
Silene dioica (O)
Arum maculatum (R)
Galium aparine (O)
Urtica dioica (O)
Circaea lutetiana (R)
Geum urbanum (R)
Mercurialis perennis (R)
Ground layer:
Eurynchium praelongum (F)
Mnium hornum (F)

Stand description Management and use History Nature of boundaries Grazing

Area of (ha):

Ancient semi-nat ASNW		Recent semi-nat OSNW	✓	Ancient replanted AWS		Recent plantn.	

Area occupied by each NVC type

0 – 0.5ha	0.5 – 2ha	2 – 10ha	10 – 20ha	20+ha
N/A	W8	N/A	N/A	N/A

Tree layer	Height (m)	Cover (%)	Shrub layer	Height (m)	Cover (%)
	30	5		15	80

	Tx	Tp	Ts	Tc	Tn	Cx	Ct	Px	Pc	Sx	Sc	St	Js	Jp	Jv
Clem vit															
Daph lau															
Heder hel		O													
Ligus vul	R														
Lonic per															
Maho aqu															
Myrica ga															
Ribes nig															
Ligus ova															

	Sx	Sc	St	Js	Jp	Jv
Ribes rub						
Ribes uva						
Rosa arv						
Rosa can						
Sarot sco						
Ulex eur						
Ulex gal						
Vibur opu						
Rubus ida	O					

Age class abundance (all species, using DAFOR system)

Over mature	Mature	Young trees	Sapl'	Seed'	Coppice
N/A	R	R	O	O	F

Tp Planted tree *Cx Coppice* *Sc Climber*
Tn Self-sown tree *Ct Regrowth from stump* *St Young tree*
Ts Standard in c-w-s *Px Pollard (2.5m+)* *Js Seedling*
Tc Grown from coppice *Pc Pollard (1-2.5m)* *Jp Sapling*
Tx Any other tree *Sx Shrub* *Jv Sucker*

Compartment 1d.

Grass/Swamp Edge

	D1	D2	D3	D4	D5	Frequency	DOMIN
Lathyrus pratensis	3	5	4	3	5	5	(3-5)
Poa trivialis	2	2	3	3	3	5	(2-3)
Vicia cracca	1	2	2	4	2	5	(1-4)
Cirsium vulgare	5	5	4	0	7	4	(4-7)
Arrhenatherum elatius	6	6	0	2	4	4	(2-6)
Holcus lanatus	0	1	5	4	4	4	(1-5)
Deschampsia cespitosa	1	1	4	4	0	4	(1-4)
Rumex crispus	3	0	1	2	3	4	(1-4)
Dipsacus fullonum	2	1	0	3	3	4	(1-3)
Agrostis stolonifera	0	0	8	5	5	3	(5-8)
Heracleum sphondylium	3	1	0	0	2	3	(1-3)
Potentilla reptans	7	5	0	0	0	2	(5-7)
Leucanthemum vulgare	0	1	0	0	8	2	(1-8)
Carex acutiformis	0	0	4	4	0	2	4
Dactylis glomerata	2	0	0	0	2	2	2
Taraxacum officinale agg	1	0	0	1	0	2	1
Crataegus monogyna (seedling)	0	0	1	0	1	2	1
Ranunculus repens	0	0	5	0	0	1	5
Centaurea nigra	0	4	0	0	0	1	4
Ranunculus acris	0	0	0	4	0	1	4
Juncus inflexus	0	0	0	4	0	1	4
Elytrigia repens	3	0	0	0	0	1	3
Festuca rubra	0	3	0	0	0	1	3
Trifolium repens	0	0	0	3	0	1	3
Achillea millefolium	0	2	0	0	0	1	2
Stachys sylvatica	0	0	0	1	0	1	1
Galium aparine	0	1	0	0	0	1	1
Artemesia vulgaris	1	0	0	0	0	1	1
Juncus effusus	0	0	0	1	0	1	1
Trifolium medium	1	0	0	0	0	1	1
Melilotus sp	0	0	0	1	0	1	1
Tussilago farfara	1	0	0	0	0	1	1
Lotus corniculatus	1	0	0	0	0	1	1
Epilobium sp	0	0	1	0	0	1	1
Vicia hirsuta	0	1	0	0	0	1	1
Carex hirta	0	1	0	0	0	1	1
Trifolium repens	0	0	1	0	0	1	1
Lolium perenne	0	0	1	0	0	1	1
Trifolium dubium	0	0	0	1	0	1	1
Cirsium vulgare	0	0	0	1	0	1	1

Location of quadrats
D1 (SK35403899)
D2 (SK35393892)

D3 (SK35403887)
D4 (SK35413884)
D5 (SK35403883)
Additional species
Aegopodium podagraria
Conium maculatum
Phalaris arundinacea
Silene dioica
Urtica dioica
Agrostis capillaris
Trifolium pratense
Plantago lanceolata
Cynosurus cristatus
Armoracia rusticana
Stellaria graminea
Filipendula ulmaria
Scrophularia auriculata
Hypericum perforatum
Alnus glutinosa
Lysimachia vulgaris (R)
Cytisus scoparius Ssp. scoparius (R)
Fraxinus excelsior(seedling)
Salix cinerea ssp. oleifolia
Acer pseudoplatanus
Rosa canina agg
Calystegia sepium
Prunus spinosa
Betula pubescens

Compartment 2

Swamp

	MQ1	MQ3	MQ6	Frequency	DOMIN
Myosotis scorpioides	9	7	8	3	7-9
Impatiens glandulifera	5	4	5	3	4-5
Epilobium ciliatum	0	3	0	3	3
Carex acutiformis	0	4	7	2	4-7
Epilobium hirsutum	0	5	4	2	4-5
Rorippa amphibia	2	4	0	2	2-4
Lycopus europaeus	4	4	0	2	4
Equisetum palustre	0	4	0	1	4
Typha latifolia	0	0	4	1	4
Galium palustre	0	3	0	1	3
Solanum dulcamara	0	1	0	1	1
Angelica sylvestris	0	1	0	1	1
Silene dioica	1	0	0	1	1
Cornus sanguinea	0	1	0	1	1
Rumex sp.	1	0	0	1	1
Salix fragilis	1	0	0	1	1
Filipendula ulmaria	1	0	0	1	1

Location of quadrats
MQ6 (SK35363903)

	MQ2	MQ4	MQ5	Frequency	DOMIN
Epilobium hirsutum	5	9	10	3	5-10
Impatiens glandulifera	7	5	4	3	4-7
Calystegia sepium	7	5	2	3	2-7
Galium palustre	5	3	5	3	3-5
Solanum dulcamara	1	1	1	3	1
Carex acutiformis	7	0	6	2	6-7
Equisetum palustre	7	2	0	2	2-7
Urtica dioica	5	4	0	2	4-5
Poa trivialis	5	3	0	2	3-5
Lycopus europaeus	4	0	1	2	1-4
Myosotis scorpioides	2	1	0	2	1-2
Galium aparine	3	3	0	2	3
Angelica sylvestris	3	0	0	1	3
Cardamine flexuosa	0	3	0	1	3
Calliergon cuspidatum	2	0	0	1	2
Epilobium ciliatum	1	0	0	1	1
Silene dioica	1	0	0	1	1
Cornus sericea	1	0	0	1	1

Location of quadrats
MQ4 (SK35363897)
MQ5 (SK35363899)

Compartment 3.

Open grassland area (2003)							
	Q1	Q2	Q3	Q4	Q5	Frequency	DOMIN
Cirsium arvense	5	4	4	4	4	5	(4-5)
Poa trivialis	3	4	3	2	2	5	(2-4)
Arrhenatherum elatius	5	7	8	7	7	5	5-8
Leucanthemum vulgare	4	0	1	3	2	4	(1-4)
Holcus lanatus	3	4	0	2	1	4	(1-4)
Vicia cracca	0	1	0	1	2	3	0-2
Lathyrus pratensis	4	6	0	2	0	3	(2-6)
Anthriscus sylvestris	0	1	3	5	0	3	(1-5)
Taraxacum officinale agg	0	1	0	4	4	3	(1-4)
Dactylis glomerata	0	0	1	0	1	2	0-1
Alopecurus pratensis	0	0	0	1	1	2	0-1
Festuca rubra	0	0	0	0	5	1	0-5
Artemesia vulgaris	0	0	0	2	0	1	0-2
Bromus hordeacous	0	0	0	0	2	1	0-2
Crataegus monogyna	0	0	0	1	0	1	0-1
Plantago lanceolata	0	0	0	0	1	1	0-1
Trifolium pratense	0	0	0	0	1	1	0-1
Senecio jacobea	0	0	0	0	1	1	0-1
Galium aparine	0	0	3	0	0	1	3
Rumex sanguineus	0	0	2	0	0	1	2
Elytrigia repens	1	0	0	0	0	1	1
Centaurea nigra	1	0	0	0	0	1	1
Vicia sepium	0	1	0	0	0	1	1
Vicia hirsuta	0	0	1	0	0	1	1
Location of quadrats							
Q1 (SK35463885)							
Q2 (SK35503891)							
Q3 (SK35503902)							
Q4 (SK35433909)							
Q5 (SK35413905)							

Open grassland area (01/08/2008)							
	Q1	Q2	Q3	Q4	Q5	Frequency	DOMIN
Arrhenatherum elatius	4	6	5	7	5	5	(4-7)
Cirsium arvense	5	3	4	4	4	5	(3-5)
Poa trivialis	3	5	4	2	3	5	(2-5)
Elytrigia repens	5	4	7	0	5	4	(4-7)
Lathyrus pratensis	5	5	4	0	4	4	(4-5)
Leucanthemum vulgare	3	1	3	4	0	4	(1-4)
Torilis japonica	0	1	3	3	2	4	(1-3)
Vicia cracca	3	0	3	1	1	4	(1-3)
Festuca rubra	0	4	0	3	6	3	(3-6)
Dactylis glomerata	0	3	3	0	3	3	(3)
Epilobium sp.	4	0	0	2	0	2	(2-4)
Vicia hirsuta	0	3	2	0	0	2	(2-3)
Rumex acetosa	2	0	0	0	1	2	(1-2)
Deschampsia cespitosa	1	0	0	0	2	2	(1-2)
Senecio erucifolius	0	0	1	0	1	2	(1)
Senecio jacobea	0	0	1	0	1	2	(1)
Medicago lupulina	0	0	0	1	1	2	(1)
Achillea millefolium	1	0	0	0	2	2	(2)
Galium aparine	0	0	2	2	0	2	(2)
Holcus lanatus	0	4	0	0	0	1	(1)
Rumex crispus	0	0	1	0	0	1	(1)
Centaurea nigra	1	0	0	0	0	1	(1)
Tragopogon pratensis ssp minor	0	0	0	0	1	1	(1)
Cirsium vulgare	0	0	0	1	0	1	(1)
Taraxacum officinale agg	0	0	0	0	2	1	(2)
Plantago lanceolata	0	0	0	0	2	1	(2)
Agrostis capillaris	3	0	0	0	0	1	(3)
Melilotus sp.	0	0	0	3	0	1	(3)
	4	6	5	7	5	5	(4-7)
Location of quadrats							
Q1 (SK3546038849)							
Q2 (SK3550638910)							
Q3 (SK3550139020)							
Q4 (SK3540839094)							
Q5 (SK3541039052)							

Open grassland area (20/07/2012)							
	Q1	Q2	Q3	Q4	Q5	Frequency	DOMIN
Lathyrus pratensis	9	6	8	6	9	5	(6-9)
Elytrigia repens	3	4	3	4	4	5	(3-4)
Arrhenatherum elatius	5	3	4	5	3	5	(2-3)
Dactylis glomerata	2	1	3	3	3	5	(1-3)
Vicia hirsuta	0	8	4	2	2	4	(2-8)
Cirsium arvense	3	2	3	2	0	4	(3-5)
Torilis japonica	0	1	2	3	4	4	(1-4)
Leucanthemum vulgare	0	1	3	4	0	3	(1-4)
Heracleum sphondylium	1	0	0	1	3	3	(1-3)
Vicia cracca	0	3	1	0	1	3	(1-3)
Rumex crispus	1	1	1	0	0	3	(1)
Festuca rubra	0	0	0	4	2	2	(3-6)
Galium aparine	0	0	3	0	2	2	(2-3)
Epilobium tetragonum	2	0	1	0	0	2	(2)
Dipsacus fullonum	0	1	0	1	0	2	(1)
Geranium dissectum	1	0	1	0	0	2	(1)
Rumex acetosa	1	0	0	0	1	2	(1)
Melilotus altissimus	0	0	0	5	0	1	(5)
Filipendula ulmaria	0	0	4	0	0	1	(4)
Juncus inflexus	0	0	0	4	0	1	(4)
Brachythecium rutabulum	3	0	0	0	0	1	(3)
Epilobium hirsutum	0	0	0	3	0	1	(3)
Holcus lanatus	3	0	0	0	0	1	(3)
Vicia sepium	0	3	0	0	0	1	(3)
Deschampsia cespitosa	2	0	0	0	0	1	(2)
Poa trivialis	0	0	0	2	0	1	(2)
Achillea millefolium	0	0	0	0	1	1	(1)
Cirsium vulgare	0	0	0	1	0	1	(1)
Medicago lupulina	0	0	0	0	1	1	(1)
Senecio erucifolius	1	0	0	0	0	1	(1)
Tragopogon pratensis ssp minor	0	0	0	1	0	1	(1)

Location of quadrats
Q1 (SK3546138856)
Q2 (SK3550538910)
Q3 (SK3550139020)
Q4 (SK3540839094)
Q5 (SK3541039051)

Compartment 3b.

Wet flush in open grassland area	WQ1	WQ2	WQ3	WQ4	WQ5	Frequency	DOMIN
Juncus inflexus	9	9	8	9	5	5	(5-9)
Rumex sanguineus	3	3	4	1	3	5	(1-4)
Ranunculus repens	4	2	1	1	3	5	1-4
Vicia cracca	1	1	1	0	1	4	0-1
Lathyrus pratensis	0	5	6	1	3	4	(1-6)
Cirsium arvense	0	4	2	4	1	4	(1-4)
Epilobium hirsutum	0	3	2	1	2	4	(1-3)
Elytrigia repens	0	3	0	5	5	3	(3-5)
Juncus effusus	1	0	2	3	0	3	(1-3)
Scrophularia auriculata	0	0	2	2	0	2	0-2
Eleocharis palustris	5	3	0	0	0	2	(3-5)
Carex flacca	0	0	0	2	6	2	(2-6)
Poa trivialis	0	3	0	0	3	2	3
Lycopus europaeus	0	0	0	4	0	1	0-4
Juncus conglomeratus	0	0	0	4	0	1	0-4
Galium aparine	0	0	0	2	0	1	0-2
Dipsacus fullonum	0	0	0	1	0	1	0-1
Urtica dioica	0	0	0	1	0	1	0-1
Vicia hirsuta	0	0	0	1	0	1	0-1
Crataegus monogyna	0	0	0	0	1	1	0-1
Plantago major	0	0	0	0	1	1	0-1
Alopecurus geniculatus	2	0	0	0	0	1	2
Veronica beccabunga	1	0	0	0	0	1	1
Location of quadrats							
WQ1 (SK35493895)							
WQ2 (SK35493895)							
WQ3 (SK35493895)							
WQ4 (SK35493895)							
WQ5 (SK35493895)							

Compartment 4a

Riparian habitat along Derwent	
Allium ursinum	LA
Geum urbanum	LA
Petasites hybridus	LD
Alnus glutinosa	F
Arrhenatherum elatius	F
Calystegia sepium ssp sepium	F
Crataegus monogyna	F
Elytrigia repens	F
Epilobium hirsutum	F
Holcus lanatus	F
Impatiens glandulifera	F
Ranunculus repens	F
Stachys sylvatica	F
Galium aparine	F -LA
Fallopia japonica	LF
Filipendula ulmaria	LF
Symphytum x uplandicum	O - LA
Conium maculatum	O-LF
Aegopodium podagraria	O
Alopecurus pratensis	O
Dactylis glomerata	O
Deschampsia cespitosa	O
Equisetum arvense	O
Fraxinus excelsior	O
Salix cinerea ssp. oleifolia	O
Sambucus nigra	O
Scrophularia auriculata	O
Silene dioica	O
Acer pseudoplatanus	R
Arctium sp.	R
Cherry	R
Hedera helix ssp helix	R
Lamium album	R

Compartment 4b

Tall ruderals on floodplain	R1	R2	
Cirsium arvense	9	7	
Elytrigia repens	4	0	
Urtica dioica	4	7	
Galium aparine	4	4	
Epilobium hirsutum	3	3	
Arrhenatherum elatius	3	4	
Lepidium draba ssp draba	1	0	
Calystegia sepium ssp sepium	2	0	
Heracleum sphondylium	1	2	
Chamerion angustifolium	0	2	
Holcus lanatus	0	2	
Scrophularia auriculata	0	1	
Artemesia vulgaris	0	1	
Alnus glutinosa	0	1	
Eupatorium cannabinum	0	1	
Filipendula ulmaria	0	3	
Lamium album	0	2	
Carduus crispus	0	1	
Allium ursinum	0	1	
Impatiens glandulifera	0	1	
Elymus caninus	0	1	
			Location of
Brassica sample	0	1	quadrats
Alopecurus pratensis	0	1	R1 (SK35543909)
Taraxacum officinale agg	0	1	R2 (SK35543910)

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