

**DARLEY AND NUTWOOD
LOCAL NATURE RESERVE**

**MANAGEMENT PLAN
2018 - 2027**

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Stage 1: Description

1.1 General Information

1.1.1 Location

The area covered by this management plan lies within Darley Abbey on the northern outskirts of Derby, grid reference (centre of site) SK 355388.

1.1.2 Summary Description

The approximately 10-hectare site lies at a height of around 50 metres above sea level. It is bounded by the river Derwent on the east and south, by housing to the west and by agricultural land to the north.

It consists of a variety of different habitats - a central area of grassland with dense and scattered scrub and small areas of inundation vegetation within it; a steep bank of semi-natural woodland; a swamp and small stream, scrub woodland, plantation woodland and tall ruderal/tall herb vegetation.

Derby's bedrock geology is Triassic rocks of mudstone, sandstone and siltstone. The natural geology of the main level area of the site is formed of superficial deposits of Alluvium from the Holocene period (11,700 years to present) comprising clay, silt, sand and gravel, and floodplain deposits, which are underlain by the Mercia Mudstone Group. However following landfill, the underlying material is artificially modified. The steep slope of Nut Wood is at the eastern edge of a band of Permo -Triassic pebble beds overlying Carboniferous millstone grit.

Historically, Nutwood (previously Nut Wood) has certainly occupied the same area since 1881 and possibly much earlier, given the terrain on such a steep slope, and is classed as ancient woodland. In the 1880's the northern part of the current meadow area was agricultural land and the southern part mostly marshy ground, the two areas being divided by an ownership and Parish boundary hedge and boundary stones and with an embankment against the river. By 1953 some of the southern part has trees planted on it.

In 1965 there were excavation works on the southern half of the site, possibly connected with the widespread flooding that occurred along the Derwent and over part of the level area of the site that year.

In 1975 the whole of the level area was a refuse tip, used by the Council until 1985 and filled and covered over by 1988. Pipes and a gas burner were then put in to manage the methane emissions.

In 1990 part of Nutwood was damaged by a landslip. Part of the wood had to be felled and it was then stabilised using a drainage blanket (a layer of crushed rock) and replanted with oak, ash and shrubs, all from local sources. The site was designated a Local Nature Reserve (LNR) in 2008.

Methane extraction continues to date.

One stone wall of the 'Temple' at the north end of Nutwood still stands. This is thought to be a Victorian summerhouse in the grounds of the former Darley House.

1.1.3 Land Tenure

Owner of the whole of the site: Derby City Council, The Council House, Corporation Street, Derby, DE1 2XJ.

The site is managed by a partnership under the leadership of Derby City Council, in conjunction with Darley and Nutwood LNR Management Group, Natural England, Friends of Darley Open Spaces and Derbyshire Wildlife Trust.

The Earl of Harrington's Angling Club has fishing rights along the adjacent length of the River Derwent.

1.1.4 Map Coverage

Ordnance Survey 1:50 000 Landranger Map Sheet 128

1:10 000 Sheets SK33 NW.

1.2 Environmental Information

1.2.1 Biological

1.2.1.1. Habitat Descriptions

The main habitat types are: a main area of grass/scrub mosaic; semi-natural and plantation woodland; wetland including swamp and inundation vegetation; scrub, and tall herb/tall ruderal. These are shown on Map 1, Compartments and Existing Habitats. More detailed descriptions of each habitat can be found in the Prescriptions section in Stage 3 under the relevant Compartment heading. The compartment, sub-compartment, habitat numbering and categories for the most part follows that of the previous (2013 to 2017) Management Plan. The habitat map shows that some changes have occurred over the past 5 years.

1.2.1.2 Flora and Fauna

The site supports more than 100 species of insect not including the 22 species of butterfly and 28 species of moth recorded.

The site has a comprehensive bird register amounting to over 100 species on record including many that are of conservation concern (see section 2.2).

Mammals recorded on site include wood mouse, bank vole, field vole, rabbit, brown hare, fox, badger, stoat and common shrew.

There are over 160 species of flowering plants listed on the Nature Reserve's website Flower Register.

1.2.2 Cultural

1.2.2.1 Land Use

The reserve is currently mostly used informally for walking and dog exercising. The site is very popular and many people walk their dogs there every day. Darley and Nutwood Management Group hold organised events and work parties throughout the year.

1.2.2.2 Public Interest

Although it has no designated rights of way, the public have free unrestricted access to the site at all times and there are both maintained and informal paths throughout. Access is at three points, two from the riverside road near the toll bridge in Darley Abbey and the other from a pedestrian gate on South Avenue.

An enthusiastic and knowledgeable Friends group, the Darley and Nutwood Management Group was formed in 2007 and is involved in the management of the site. The group holds 2 public meetings a year and encourages participation in conservation events. These have recently included volunteers undertaking conservation tasks such as Himalayan balsam control; litter picking and scrub clearance. Events of interest open to all have included a bush cricket hunt, a 'minibeast' hunt for children, spring bird walks, cubs, scouts, flower walks, an open site meeting and a fungal foray.

The Management group also has a regularly updated website for the reserve, helping to raise awareness and increase public interest and involvement.

The grazing project won a national innovation award at the Love Parks Awards Ceremony in 2016. The reserve has also won the Green Flag community award in 2016 and 2017 in recognition of the volunteer efforts.

Stage 2: Evaluation and Objectives

2.1 Conservation status of the site

The register of Local Wildlife Sites (LWS) is maintained by Derbyshire Wildlife Trust and is a record of areas of non-statutory designation that have no legal protection but are identified as important for nature conservation. It is also a Local Wildlife Site known as Nutwood and Darley Abbey Wildlife Site (DE005), making the reserve part of the 62 LWS in the city and one of the key sites in the Lowland Biodiversity Action Plan.

Nut Wood and the adjacent old landfill site at Darley Abbey now comprising Darley and Nutwood Local Nature Reserve (LNR) was designated as a Local Nature Reserve in January 2008, making it one of the 10 LNRs in Derby. This designation gives legal protection to the site from development and also extends its use to the public - LNRs should be publicly accessible where this would not disturb wildlife.

The reserve is also one of Derby's 'green wedges' - designated areas of undeveloped open land within the City providing an uninterrupted link to the countryside.

All the trees within Nut Wood are covered by Tree Preservation Order (TPO) No. 17.

The steep escarpment on which Nut Wood is located is a Regionally Important Geological Site (RIGS). This is a non-statutory geological designation.

The level area of the site is within the Derwent Valley and Mills World Heritage Site.

2.2 Evaluation of the features

The site covers an area of some 10 hectares, with a good variety of habitats within the site. Some of the habitats on site equate to UK BAP priority habitats, namely:

- Lowland mixed deciduous woodland
- Swamp
- Lowland meadow

The site is important for birds with over 100 species recorded on the reserve. Birds of Conservation Concern (BoCC) 2015 red list species found on the site are: willow tit, house sparrow, song thrush, starling, mistle thrush and grasshopper warbler. Those on the amber list include dunnock, bullfinch, meadow pipit, kestrel, snipe, stock dove and tawny owl.

Over 100 species of insect have been recorded including 7 species of bee, 3 Odonata (dragonfly and damselfly) species and 4 native ladybird species.

The site is important for Lepidoptera, with 22 species of butterfly and 28 species of moth recorded.

Badgers are present on the site but are not an endangered species - they are however among the most legally protected wild animals in the country. The UK has 25% of the global population of the Eurasian badger and every single sett helps protect the range of genetic variation within the UK population.

Notable species recorded near to, but not on the site are otters and water voles. Otters have been recorded on the river Derwent within 1 km of Darley and Nutwood, and are known to have a range of several kilometres of river. The European otter is the only native UK otter species and is a European protected species and is also fully protected under Schedule 5 of the Wildlife and Countryside Act 1981.

Water vole have been recorded on the River Derwent within a few hundred metres of the Reserve and is a UK BAP Priority species and protected under Schedule 5 of the Wildlife and Countryside Act 1981.

A Derbyshire Wildlife Trust survey carried out in 2003 recorded some 160 plant species, and a 2011 bryophyte survey resulted in the discovery of 36 species of moss and liverwort. No systematic plant survey has been carried out since 2003, however.

Significant plant species include:

- Bluebell, a UK Biodiversity Action Plan Species of Conservation Concern;
- Hoary plantain, a native perennial of neutral to basic grasslands, lost from much agricultural land lowlands due to the agricultural improvement.
- Bee orchid, described as 'occasional' in the county.
- Pyramidal Orchid, a rare native perennial of well-drained grassland that can also colonise quarries and wasteland.

2.3 Management Objectives

2.3.1 Objective: To maintain the existing habitats in favourable conservation status and enhance them where possible

See Map 1 Compartments and Existing Habitats for compartment numbering.

Woodland

This refers to all the separate woodland areas of Compartment 1, excluding the areas of scrub, namely:

1a Nut Wood, 1b The 25 year old plantation woodland, 1c coppiced northern edge of Nut Wood, 1g and 1h Alder woodland and 1i Mature dense riverside alders.

In all these areas, the aim is to allow the woodland to develop naturally, maintaining woodland without loss of area or number of trees but free of invasive non-native species. Mature trees and the ivy on them should be kept, leaving all fallen timber and standing dead wood *in situ* unless a safety hazard.

Scrub

Scrub refers to the areas of Compartment 1 with more of a scrub than woodland component:

1d Wetter scrub with crack willow and osier.

1e Osier and crack willow woodland area alongside stream.

1f Dense developing scrub north of Compartment 3.

Scrub, particularly as a mosaic in conjunction with tussocky grassland, is an important habitat for a range of wildlife including birds and invertebrates. The aim should be to keep a varied structure with different ages of scrub and open areas of tussocky grassland, tall ruderals and bramble. The best value scrub for wildlife also has sunny sheltered edges that retain warmth for insects, diverse vegetation heights and deadwood for fungi and invertebrates. Open areas within the scrub with tall herbs provide pollen, nectar and over-wintering sites for insects as well as seeds for birds. Scrub should not be allowed to spread into adjacent areas that are being managed for the grassland interest. Non-natives should be controlled.

Swamp

This refers to the Compartment 2 swamp that lies at the foot of Nut Wood slope. Since the spring that fed it dried up in 2012, the habitat has declined considerably.

The aim for this area should be to ensure it continues to support a swamp community without any drying out or loss of area. It should be kept open in nature with no encroachment of scrub or woodland and no non-native species.

Grassland

This refers to all the level area of the former landfill comprising Compartment 3. It is the most extensive habitat on the site.

The aim is to maintain this area as predominantly open grassland by grazing with cattle each year. The grazing regime should allow plants to flower and set seed, while giving cover for as long as possible for invertebrates and any small mammals. Continue to maintain known sites for bee orchid and pyramidal orchid.

An element of scrub should be retained and managed within grassland areas to create a balance of scrub and open areas, aiming for approximately 5% scrub cover overall. This should include a variety of scrub types including willow scrub in localised wetter areas.

Tall Herb

This refers to Compartment 4 and consists of tall vegetation with scattered trees along the river floodplain. This is mostly nettle, great willowherb, creeping thistle and Himalayan balsam

The objective is to maintain the current structure of a diverse mixture of tall grasses and tall flowering plants. The light autumn grazing should maintain the structure. Maintain scrub at below 20% cover. Monitor Himalayan balsam, but it is continually being washed downstream, so controlling it in this area is low priority, as it will not be effective.

2.3.2 Objective: Capital Projects for Habitat Creation

This objective can be considered as low priority as so much has already been achieved on the site's existing good variety of habitats. Two opportunities for

habitat creation, however, are: otter holt creation by the river bank and pond (permanent open water) creation.

Artificial Otter Holt creation

Otters have been recorded on the River Derwent within 1 km of Darley and Nutwood. Otters commonly use bankside tree roots, dense scrub and bankside timber debris to rest in and have a home range of up to 40 km of river and use several regular resting sites. However, in recent years otters have lost many of their resting sites through drainage schemes, river regulation and other development. There is an opportunity to create an artificial otter holt (underground den) within Compartment 4 adjacent to the river bank.

Open Water/Wetland creation

For the benefit of amphibians, it would be advantageous to create one pond on the site that would reliably hold water to the end of the amphibian breeding season, i.e. the end of August. This could either be achieved by enlarging one of the existing seasonal pond/wetland sites, or starting at a new location.

2.3.3 Objective: To encourage responsible use of the site

The site is very popular and regularly used by local dog walkers, which could cause potential conflict with conservation management and the needs of wildlife, if these needs are not well understood. The Darley and Nutwood Management group encourage active involvement in the reserve and the more involved the public is in the activities and hands-on management of the site, the better the conservation message can be delivered. The programme of informal events and learning activities should be continued. Access should be managed. All paths, fences, gates and 'desire lines' need to be maintained. Rubbish needs to be collected regularly to reduce this eyesore and potential health hazard and so it does not become acceptable through familiarity. Display boards at access points are useful in explaining management works and wildlife interest and are important in getting the message across. Damage, whether deliberate or accidental should be mended or replaced as soon as possible to demonstrate the caring attitude of the site managers and the majority of users of the site. Where necessary, passive mechanisms such as brashing piles or dead-hedging should be used to encourage or discourage activity in certain parts of the site like near the badger sett or orchid areas.

2.3.4 Objective: To carry out further survey, monitor key species and assess habitat condition

There is a large amount of data about species at Darley and Nutwood and there are centrally kept registers on the website that anyone can add their observations to. These are fungi, wildflowers, mammals, insects, birds, butterflies and moths. There are some gaps in the recent status of some species of fauna on the site, for example badgers and hedgehogs. New surveys for species that might have been missed due to their nocturnal habit e.g. glow worms could be carried out to cover gaps in knowledge. As glow-worms are neither protected nor a UK BAP Priority species there is no

national standard methodology for survey. See 3.1.4 for suggested survey methods.

It is also important to carry out regular monitoring of species and habitat condition to inform future management. Any new habitats such as the artificial otter holt should be monitored to determine its use and to assess it for repairs and aftercare.

2.4 Description of Optimal State for the site

The ideal condition of Darley and Nutwood would be a long term continuation of the valuable mosaic of habitats already present, with each habitat being maintained in the best condition for biodiversity.

The grassland would represent a large area of diverse habitat. It would have open areas of shorter growth supporting a variety of species including the several species of orchids and the HLS Indicators of Success. It would also have coarser, more tussocky vegetation providing valuable habitat for invertebrates. A good balance of grassland and scrub would be maintained - there would be a low level of scrub of around 5% overall, thus maximising the wildlife benefits of scrub and creating a balance between it and the species-rich grassland.

The scrub on site would contain a variety of native species of varying ages, providing good berry and nut production, protection for nesting birds and all year round habitat with flowers from early spring through to late summer and fruit all winter. Ideally it would be in the state most valuable to wildlife with sunny sheltered edges that retain warmth and open areas of tussocky grassland, tall ruderals and bramble important for invertebrates.

Nut Wood would continue as a semi-natural woodland with no invasive non-native species. It would be in a stable condition with natural regeneration sufficient to maintain its semi-natural character and support a ground flora indicative of ancient woodland.

The swamp would continue to support a variety of tall emergent vegetation including reedmace, lesser pond sedge, meadowsweet and angelica. It would be permanently wet and be free of non-natives.

There would also be a new pond capable of holding water at least seasonally to support breeding amphibians. A carefully-sited new otter holt would be available for the otters recorded on the Derwent. Himalayan balsam would be eradicated in all areas.

The ideal layout is shown on Map 2 the Desired State map.

Stage 3: Prescription

3.1 Project register and prescription

3.1.1 To maintain the existing habitats in favourable conservation status and enhance them where possible

Compartment 1

Description: This is a wooded compartment consisting of several distinct portions: **1a** Nut Wood itself is an area of steeply sloping woodland believed to be of ancient origin, with a canopy of ash and hazel, with pedunculate oak, sycamore, hawthorn and field maple.

The ground flora is fairly sparse and open, but does have indicators of ancient woodland including bluebell, yellow archangel, wood millet and dog's mercury with more widespread species such as red campion, wood avens, nettle and broad buckler fern. The non-native, invasive Himalayan balsam is also present. The wood is dead-hedged against the more open area 1c.

There is an active badger sett.

Compartment **1b** woodland is a more recently planted area following a landslip in 1990 that destroyed some of the original woodland. The canopy is mostly ash and silver birch, with some sycamore and pedunculate oak. The understorey is sparse and is mostly elder, holly and hazel with some guelder rose and dog rose. The ground flora includes red campion, nettle, wood avens and bluebell.

Compartment **1c** is the border of Nut Wood adjacent to the track from South Avenue. The area has been coppiced in order to provide a sight line for the path and extends roughly 10 metres from the path. A dead hedge/brushing pile lies between it and the rest of Nut Wood. Species include coppiced hazel stems, hawthorn and ash. The open edge supports tall herb including teasel, wood dock, creeping thistle and upright hedge-parsley.

Compartment **1d** is an area of mature scrub on the eastern slope of the swamp. It is partly dense hawthorn with bare soil beneath and also has some hazel and grey willow with crack willow at the northern end. There is a drier grassy area at the open eastern edge and tall herb at the lower, western edge, with lesser pond sedge, rosebay willowherb, Himalayan balsam, wood avens and bramble.

Compartment **1e** is an area of scrub, with crack willows near the stream and both dense and open hawthorn scrub with dense stands of young ash developing, with brambly glades and tall herb against the path and grassland. In wildlife terms it currently has a very good structure of open scrub, brambly glades and tall herb mosaic on the eastern edge. It looks to have increased slightly in area since it was last mapped for the previous management plan in 2013.

Compartment **1f** is an area of hawthorn shrubs up to 5 metres tall, which are dense in places and unfenced and open to grazing with the grassland of Compartment 3 and the tall herb of Compartment 4. It also contains field rose, bramble, with wild cherry and pedunculate oak. The denser parts have no field layer beneath, elsewhere there is ivy, sorrel, cow parsley, wood avens and cocksfoot, with frequent hawthorn seedlings. Damper areas have meadowsweet and lesser pond sedge. Japanese knotweed still persists

despite efforts to eradicate it. This compartment looks to have increased in area since the previous management plan was written in 2013. (see Map 1 Compartments and Existing Habitats)

Compartment **1g** is a fenced area of developing hawthorn scrub between the river banks and grassland compartment 3. The hawthorn is dense in places, with alder and some ash. The alder looks to be both growing and spreading rapidly and some trees are now bearing seed and colonising areas of the adjacent grassland. Saplings are dense in places. Alders also look to be self seeding from bank side trees. The ground flora looks to be rabbit-grazed in parts, and includes creeping thistle, teasel, red campion, seedlings of alder, and locally frequent Himalayan balsam. The compartment is 'dead-hedged' - there are piles of brashing 3 to 4 metres in from the fence in places.

Compartment **1h** is an area of scrub and woodland on the site's southern boundary and fenced from the main grassland area. The woodland canopy is ash and alder with an understorey of hawthorn, young ash, and a few planted disease-resistant elms. The woodland ground flora includes abundant ivy, with wood avens, wood dock, great willowherb, cow parsley and herb-Robert. More open areas against the fence line have creeping thistle, teasel, meadow cranesbill and ox-eye daisy. The adjacent grassland compartment now has dense alders to 2 metres tall with ash saplings growing amongst them, which look to be rapidly colonising from seed-bearing trees in Compartment 1h. Compartment **1i** is an area of dense mature alders between Compartment 1g and the river banks. Ground flora here is of ramsons, with butterbur locally abundant.

Compartment Objectives:

All areas:

- To maintain all the wooded areas with no reduction in area of woodland habitat. Dead trees and fallen timber to be retained, and there is sufficient natural regeneration to maintain a diversity of native trees in the canopy and understorey.
- Create and maintain a woodland edge structure wherever practicable.
- Maintain a balance of open scrub and bramble at wood and scrub edges and glades.
- To control non-native plant species where they adversely affect the conservation value.
- Maintain bat boxes, replacing as necessary.
- To comply with the HC7 Indicators of Success of the HLS Agreement.

Prescriptions:

- All areas: Retain all canopy trees, including leaving all the ivy on them, all fallen timber and standing dead wood, unless there is a safety issue or branches fall into watercourses, the swamp area or block paths. Stack any cut or fallen timber into piles as habitat stacks or use as dead hedging.
- Control Himalayan balsam in the western woodland blocks. This should be done, as is current practice, by hand-pulling (or strimming) the plants. Timing is important and the control work will need to be done before the plants are tall but have not flowered, which will be around June. Hand-pulling works well as the plants are shallow-rooted, but it

will need to be repeated wherever the plants re-appear, and may well need 2 or 3 repeats in a year to get rid of plants that have germinated in the cleared areas. For lasting results, the work might need to be done on a 3-weekly cycle and continue until September. There will be a large volume of pulled plants, and these should be left in piles to compost and if at all possible covered with a tarpaulin to prevent re-growth.

- Maintain any nest boxes in the woodland compartments by clearing them of debris every year in winter, preferably no later than early January, and if necessary protect from woodpecker and squirrel damage by reinforcing the entrance hole with a metal strip. Maintain all current and any new bat boxes - this will need to be done by a qualified and licensed bat worker.
- In **1a** and **1b** discontinue coppicing the hazel, the exception is the woodland edge against the swamp, which should be coppiced and the brashing removed to be stacked on a dry level area, such as the dead hedge protecting **1a** from disturbance.
- **1a** and **1b** Monitor for snowberry, rhododendron and cherry laurel in case of any re-growth. Cut and remove from site if these non-native species re-appear.
- **1a** and **1b** Monitor but retain regeneration of sycamore in case ash dieback reduces the ash cover in future.
- Maintain the dead hedge between woodland **1a** and **1c**, by adding to the pile as necessary, using whatever materials are available from management work on site.
- In **1c** continue to coppice an 8 metre band adjacent to the path on a short rotation (every 2 years) to keep the sightline open. Where it grades into Nutwood, allow the coppiced stems to re-grow to form a barrier of bramble and scrub.
- **1d** Edge management by scrub and bramble clearance to create scallops and maintain sightline of path as **1e**.
- **1e** scrub woodland should have the following management to maintain the good edge mosaic: Create a series of scallops down the eastern edge adjacent to the path by removing the scrub and knocking back the bramble. This should be done using hand tools and in November (when the berries and teasel seeds have gone). Keep the open areas open by taking out encroaching younger scrub and saplings as they develop. Clear the edges of the bramble patches. In the rest of the area thin the dense stands of young ash but leave the dense hawthorns as a non-intervention area. Continue to control the Himalayan balsam as needed. (Priority area for Himalayan balsam control - work here will have a real impact on the habitat available for native plants).
- **1f** Thin the scrub to create an open mosaic with tall grassland and tall herb. The young scrub here is closing and will need to be thinned to maintain grassy areas within it. There are some young oaks, which should be monitored and controlled when they become too large and create shade. Remove scrub to leave a cover of between 25% and 50%.

- Leave **1g** and **1h** as non-intervention areas to allow to develop into woodland apart from removing cone-bearing alders from the margins as they are seeding into the grassland. Monitor the effectiveness of this to inform future management.

Compartment 2

Description: The swamp forms a thin strip on wet low-lying ground between the foot of the wooded slope of Nut Wood and scrub compartment 1d. There looks to be a slow flow of water in a southerly direction through the swamp, although anecdotally and evidentially this would seem to have seriously declined, and the swamp dried out over the past few years. Tall emergent vegetation includes reedmace, lesser pond sedge, meadowsweet, angelica and Himalayan balsam, with bittersweet, bramble and broad buckler fern at the edges and with marsh bedstraw, creeping buttercup and wavy bittercress more centrally. The margins have elder and willow species, possibly encroaching on the swamp, with a large prolifically seeding sycamore at the southern end.

Compartment Objectives:

- The swamp needs to be kept open and free from trees colonising it and encroaching from the woodland edge. This is because the swamp should have some light on the surface for plant growth. Also rotting dead leaves add nutrients, especially tannins, to the water, which makes the water more acidic and less use to wildlife.
- Maintain the valuable edge mosaic against the woodland and scrub.
- Control Himalayan balsam in the swamp. This is very labour-intensive, but it is considered a high priority in this compartment and needs to continue in order to have a real impact.

Prescriptions:

The swamp has no specific prescriptions or indicators of success under the HLS Agreement, but the site has some possible funding through Project MUNIO, part of 'Our City Our River' (OCOR), a major flood alleviation and regeneration project for Derby. This is to be spent in the dormant season 2017/18, and is possibly ongoing for 2-3 years. The funding must be used in relation to woodland restoration and removal of invasive species. Any MUNIO funding could be used to finance some of the prescriptions for the swamp. Funding from the Water Environment Grant could also be applied for, as this grant is available for carrying out feasibility studies for activities to tackle environmental problems in water-dependent habitats.

- Employ a hydrologist to investigate the drying-out of the Compartment 2 swamp and propose remedial work.
- Follow up on their recommendations as a priority with any necessary remedial work such as excavation work or unblocking drains.
- Continue with the targeted task of Himalayan balsam control in the swamp, by hand-pulling the plants several times a year before they flower, and leaving in piles to rot down, covering them with a tarpaulin to prevent re-growth if possible.
- Remove the willow and ash saplings from the swamp.

- Around the wooded western edge coppice elder, willows, bramble and any other woody species of the swamp to allow more light to the wetland area. Work to be done in late Autumn/Winter. Remove and stack brashing away from wet area to rot down.
- On the eastern side of the swamp against scrub Compartment 1d maintain the edge mosaic by thinning some of the scrub and cutting back some of the bramble every year, using hand tools and to be undertaken in or after November. Remove and stack cuttings away from wet area to rot down.

Compartment 3

Description: This scrub-invaded grassland is the most extensive habitat on the site. It is open to the river banks, but otherwise fenced with sheep net and plain wire and provided with pasture pumps to supply water to allow grazing. Autumn grazing using hardy native breeds of cattle was started in 2016 and continued in 2017. It has become a mosaic of shorter rabbit-grazed grassland and taller areas of tall herb and scrub, with denser and larger areas of scrub in the northern part. The scrub is mostly hawthorn, but there is also blackthorn, bramble and recently a rapid increase in alder saplings. There are scattered mature alders, also semi-mature ash, individual hawthorns, rose, crab apple, crack willow and sprawling patches of bramble.

The south and central part has dense areas of tall herb including abundant teasel, creeping thistle and false oatgrass, locally abundant great willowherb, frequent couch, meadowsweet, broad-leaved dock, mugwort, and common ragwort, and locally frequent meadow vetchling and hard rush. The more species-rich areas are in a mosaic throughout, and have common bent, cocksfoot, red and white clover, tufted vetch, hairy tare, ox-eye daisy, common knapweed, bartsia, birdsfoot trefoil, tufted vetch and lesser trefoil. The most interesting areas of this grassland are localised and usually found where the grass is shorter. Some of these are specially and intensively managed as they support several species of orchid - twayblade, bee orchid, common spotted orchid, southern marsh orchid and pyramidal orchid have all been recorded, although numbers vary.

There are small exclosures within this compartment that have planted, thriving disease-resistant elms. There are also some wetter areas dominated by grey willows, the most distinctive are considered separate sub-compartments and are labelled 3a and 3b. Within these, as well as grey willow there is hard rush, gipsywort, creeping thistle, great willowherb and glaucous sedge. Taller wet areas in the north of compartment 3 outside 3a and 3b have soft rush, tufted hairgrass, false oat grass and occasional angelica.

At the southern and eastern edges adjacent to woodlands 1g and 1h, the grassland has dense alder to 2 metres high with ash saplings growing through it. There is also teasel, creeping buttercup, creeping thistle, bramble, great willowherb, Himalayan balsam and some piles of brash.

The corral entrance to this Compartment is currently poached and waterlogged making it unable to support any vegetation and in need of some remedial work to improve access.

Compartment Objectives:

- To retain the mosaic of habitats of scrub, open grassy glades and tall herb.
- To maintain and where possible enhance the flower-rich nature of the grassland through grassland management, appropriate grazing and scrub control.
- To maintain the small wetland areas within the grassland.
- To prevent further alder seedlings colonising the southern part of the compartment.
- To improve access in south-east corner.
- Carry out surveys for unrecorded species such as glow worm to inform future management.
- To manage the grassland to comply with HLS Indicators of success, specifically:
 - From year 3, the cover of invasive trees and shrubs of hawthorn, bramble, blackthorn, wild roses, willow and oak should be less than 5%.
 - To achieve the frequency of indicators of success species (see HLS species list)
 - To manage the sward by grazing, to achieve from year 1 a sward height of between 2cm and 10cm in October/November.

Prescriptions

Compartment 3 is an interesting and valuable mosaic grassland that will need fairly intensive management to maintain it, reflected by it being in category HK7: 'Restoration of species-rich semi-natural grassland' of the HLS. Future management should seek to keep a balance between the component habitats, as there is a danger that scrub and bramble will become more widespread and smother more interesting areas including the orchid patches.

- The HLS prescriptions require that the grassland is managed by grazing with cattle for at least 6 weeks between May and September. Late summer grazing is recommended in this situation. It is recommended around 12 to 15 cattle are grazed for 6 to 10 weeks, but this should be carefully monitored. Mid-August is the recommended start time for grazing, but this very much depends on the season and conditions. Cattle grazing could have an impact in helping keep the Himalayan balsam under control, if the grazing was earlier in the growing season, as the cattle seem to like to eat it. Currently however the cattle grazing is too late in the year to have any impact on Himalayan balsam, and other methods of control are needed.
- Scrub and bramble invasion should be monitored and continue to be controlled annually by hand cutting during the winter months and treating the cut stumps of the scrub with herbicide. The aim should be to keep these to an maximum average of 5% of the area. The detail of the cover of scrub should be 1% left on the southern area, 5% left in the more open areas of the middle, and up to 10% in the northern part bordering compartment 1f. Remove all isolated trees under 2 metres tall in the southern part of the site. Remove all hawthorns less than 2 metres tall, and the same for the willows on the edges of the wet areas to prevent a rapid increase. A variety of species should be left - cherry plum, rose, birch, etc with the clearance work concentrating on

removing the hawthorn. In some 10 to 12 occasions, cut scrub can be left under trees and on top of bramble patches for the bramble to grow through. All other brashing after this should be taken off the HLS area and put in the woodland or taken off site.

- As cattle-grazing and a single annual brush-cutting is not enough to control the alder saplings, and their rapid increase presents perhaps the largest threat to the diversity of the grassland, they should be spot-treated with a foliar glyphosate herbicide such as 'Roundup' in summer. This is likely to be most successful if the alder stems are left to grow tall and *not* brush-cut first. All the scattered alders that are cone-bearing in Compartment 3 should be removed in order to prevent further alder seedlings colonising the southern part of the compartment.
- The big blackthorn clump looks to be colonising open ground fairly rapidly and should be brush-cut for 2 to 3 metres around the edge every year to remove the younger growth and maintain its area with no increase. The bramble patches should be strimmed around the edges every year to prevent them taking over.
- The bee orchid areas might benefit from some soil disturbance - raking in mid-late September on a dry day would help in opening up areas for seed germination, if the cattle don't create enough bare ground by trampling.
- As for Compartment 1, control Himalayan balsam by hand-pulling it wherever it is seen. Timing is important and the control work will need to be done before the plants are tall but have not yet flowered, which will be around June and repeat wherever the plants re-appear, possibly 2 or 3 times a year for several years. The pulled plants from this compartment should be removed from the site.
- Re-site the trough by the Canoe Club entrance, or simply remove it, as there are 2 pasture pumps elsewhere to supply water for the livestock. The whole entrance should have the top 20 cm soil scraped off using a mini-digger, provided with a geotextile lining and 15 to 20 cm limestone chatter put down. The large tree stump just inside the site boundary and in the entrance should be ground out.
- Carry out regular checks of the cattle, the effects of the grazing, the fencing, gates, mineral licks and water supply.
- To inform future management, carry out further survey to ascertain if the grassland habitat here is used by species currently unrecorded, specifically glow worms.

Compartment 4

Description:

Continuous with Compartments 3 and 1f is the tall herb/tall ruderal Compartment 4, lying alongside the river banks. This is mostly dense nettle, great willowherb, bramble and creeping thistle with false oat grass, lesser pond sedge, meadowsweet, Himalayan balsam, hedge bindweed and wood avens. There is apple, sycamore, hawthorn and alder, both scattered throughout and lining the river bank. Some of the bramble is in dense clumps leading to the start of the next stage of natural development toward scrub.

Compartment Objectives:

- Maintain compartment 4 as an area of tall ruderal vegetation with scattered scrub and bramble with no increase in scrub, maintaining scattered scrub at below 20% cover.
- Management of Himalayan balsam here is seen as a very low priority given the limited resources available and the fact of it washing down river and self-setting every year.
- Graze along with Compartment 3 to help control scrub and Himalayan balsam and to maintain the condition and extent of tall ruderal habitat and to prevent succession to scrub woodland.

Prescriptions:

- This compartment is not covered by HLS. Scrub and bramble invasion should be monitored and controlled if necessary by hand-cutting during the winter months, treating the cut stumps of the scrub with herbicide. This may need to take place every 3 years or so in order to maintain scrub at below 20% cover. Brushing can be stacked on site.
- Continue the programme of late summer and autumn grazing to maintain the open grassland. Graze with around 12 to 15 cattle of hardy native breed that thrive on coarser vegetation, for about 6 to 10 weeks per year.
- Carry out regular checks of the cattle, water supplies and fencing.

3.1.2 Objective: Capital Projects for Habitat Creation

Otter holt There is an opportunity to create an artificial otter holt (underground den) within Compartment 4 adjacent to the river bank. It should be sited as close to the water's edge as possible but above highest winter flood level. The ideal undisturbed place would be at the extreme north-eastern tip of the site, where a corner can be fenced off. (See Ideal State map). Log pile holts are a quick and cost-effective way of providing places of shelter for otters and other animals. Other materials that can be used are stone, breezeblocks, concrete pipes and paving stones, with corrugated tin for the roof, which is then covered in soil. It must have 2 or 3 entrances. Several designs are available, the detail of the design will depend on funding available and can be discussed at a future date. Log holts could be in the region of £100 to £200 in costs, pipe and chamber perhaps double this.

It is important that an artificial holt is not disturbed, but, careful and infrequent checks should be made to monitor its use and carry out any aftercare. Holts may take anything from 3 months to 2 years to be used. It is worth putting spraint (otter droppings) in the holt to encourage otters to use it.

Consent will be needed from the Environment Agency before any work can take place.

It should be fenced with stockproof fencing with barbed wire and sheep net, to discourage dogs and look like the existing northern boundary fence. It might be possible to add this item to the HLS grant.

Pond It would be useful to create a small pond capable of holding water through the amphibian breeding season. This might be based on one of the natural wet hollows in the grassland of Compartment 3. There are limits to the amount of excavation that can be carried out here but a small hand-dug pond

may be possible. Removing the willows would help prevent a pond from drying out. Simply puddling the existing clay might be enough to make a new pond watertight, if not, a Bentonite liner should be used.

3.1.3 Objective: To encourage responsible use of the site.

The Darley and Nutwood Management group are knowledgeable and proactive and are key in promoting an understanding of the site's wildlife value. The group holds 2 public meetings a year and encourages participation in conservation events and tasks. The Friends group also has a regularly updated website for the reserve, helping to raise awareness and increase public interest and involvement.

The programme of informal events and learning activities should be continued. While encouraging public access onto the site the following should be addressed: access should be maintained, - all paths and desire lines need to be managed. Passive measures such as dead hedging or piles of brash can be used to discourage access to vulnerable areas such as the orchid areas or the badger sett. Display boards at access points are useful in explaining management and wildlife interest and are important in getting the message across. Temporary signs explaining that the cattle are on site and why have proved helpful and should be used each grazing period and removed promptly afterwards. Damage, whether accidental or caused by vandalism should be mended or replaced as soon as possible to demonstrate the caring attitude of the site managers and the majority of users of the site. Regular rubbish collection and appropriate positioning of bins, including dog waste bins, is important to maintain the area for public use, and so litter does not become tolerable through familiarity. The current practice of a regular 'spring clean' keeps the site fairly clear of litter.

Regular safety checks will be needed of trees, water bodies, access infrastructure, cattle water supplies, fences and paths with appropriate repair work carried out if necessary.

3.1.4 Objective: To carry out further survey, monitor key species and assess habitat condition

There is a large amount of data about species at Darley and Nutwood and there are centrally kept registers on the website to which anyone can add their observations. These are fungi, wildflowers, birds, mammals and insects. The orchids have been studied, counted and their surrounding habitat carefully managed for several years. There are particularly good records for several groups of insects including bush crickets, butterflies and moths - there have been butterfly transect studies of the nature reserve since 2009. However there are some gaps in the recent status of species of fauna on the site, such as badgers, hedgehogs and many groups of insects. Significant species should be chosen and mapped, as presence/absence is known for many, but not where they are, their abundance or their population trends. Birds are currently recorded, but not whether they are summer or winter visitors, resident, breeding or just flying over. More detailed recording would be useful in informing future management.

To cover gaps and increase the overall knowledge of species on site the following survey should be carried out:

Glow worm surveys in Compartment 3. As glow-worms are neither protected nor a UK BAP Priority species there is no national standard methodology for survey. The following is suggested as a survey methodology:

A slowly walked transect by a reasonably experienced ecologist should be carried out starting an hour after sunset (approx 22.30 hours in mid to late June) recording glowing females. A couple of surveys in June and again in July should be enough to identify presence, but *not* seeing glow worms is not enough to confirm absence, and the surveys should be done for 2 years. A GPS device can be used to plot the location of any adult females and larvae recorded. Small squares of biodegradable rice paper can be used to mark glowing females to avoid double counting. Survey nights will need to be flexible and nights with a bright or full moon and little cloud cover should be avoided. Glow-worm larvae have briefer and dimmer light emissions and should also be noted and recorded during the survey. The maximum efficient survey period is 2.5 hours.

It is also important to carry out regular monitoring of species and habitat condition to inform future management: Any new habitats such as the artificial otter holt should be monitored to determine its use and to assess it for repairs and aftercare. The presence of otters can be established by carrying out standard sign surveys. Signs include spraint, tracks, footprints and feeding signs. The site assessment can be carried out by anyone who can identify otter signs in the field. This can be done at any time of year, although probably easiest in spring. Derbyshire Wildlife Trust (DWT) should be informed if any new holt is successfully used, so their records can be updated. It would be beneficial to continue the orchid study and monitoring work to add to current knowledge and inform management.

3.2 Natural and man-induced trends

Natural trends:

If left completely unmanaged, colonisation by hawthorn, alder, blackthorn, ash and goat willow in grassland Compartment 3 would continue fairly rapidly. This would result in large areas of dense and dominant scrub, shading out all the smaller grassland species. The scrubbing up would continue and taller trees would grow through the shorter ones to eventually form a long term succession to broad-leaved woodland. The species composition of this may change through time, as some species with light seeds such as willow and birch would be early colonisers, followed by trees with heavier seeds less able to travel far, such as oak and hazel.

The swamp would rapidly silt up, accelerated by leaf fall and trees growing in it unchecked. It would probably naturally succeed to wet woodland.

The ancient woodland of Nutwood is likely to be fairly stable and change least, simply regenerating naturally from the species present when an opportunity presents itself.

The secondary woodland would also regenerate naturally wherever a gap is created by a fallen tree, etc.

Scrub woodlands would grow out to be tall and leggy, eventually succeeding to the climax community of mixed broadleaf woodland.

Paths would become overgrown by bramble and scrub.

Man-induced trends:

There are many threats to the wildlife of the country as a whole, some are man-made and include:

Climate change

Introduction of non-native species

Falling ground water levels

Problems caused by domestic pets

Due to climate change, Derby may have increased summer temperatures, milder winters, reduced summer rainfall and increased winter rainfall. There is strong evidence that climate change is already affecting biodiversity, but the effect on plant growth and animal life cannot yet be fully predicted. Migratory species seem particularly vulnerable, yet some resident species such as butterflies may actually benefit from warmer temperatures.

Himalayan balsam, an alien, introduced invasive species, is so efficient at spreading and grows so rapidly that it may pose a threat to biodiversity and, being an annual, to the stability of the riverbanks. It can out-compete native plants for space and light becoming dominant over large areas to the detriment of native species. Recent years have shown an increase in this species on site that looks set to continue, despite intensive management to control it.

Falling ground water levels is a national problem caused by increased water consumption and is likely to limit the ability to maintain the swamp particularly during the summer months. Water tables are already thought to have declined in the last 20 years causing wetland habitats to dry out and show loss of species.

Experiments have shown that dog-walking causes more than 40 per cent reduction in bird abundance and more than 35 per cent reduction in bird diversity in woodlands in general, even if the dogs are kept on a lead. Birds do not seem to be able to become accustomed to disturbance by dogs. Their reaction to dogs (parents flushed from eggs or young, alarm calls, etc) has an energy cost and this can be significant in winter. Most dogs, if not under close control, have an inherent tendency to seek out and chase wildlife, although they do not always kill it. Cats kill a huge number of birds every year countrywide, the most frequently caught species are house sparrows, bluetits, blackbirds and starlings. Despite the large numbers caught, however, it is not thought that cats have a significant impact on bird populations. It is not known how much of an issue dog-walking and predation by cats is on the reserve. Other use of the site including heavy trampling through the woods, littering, vandalism such as fires, etc. though unsightly, look to have little impact on the biodiversity of the site.

3.3 Management Constraints

3.3.1 Legal obligations:

The Wildlife and Countryside Act 1981 and subsequent amendments has relevant sections and must be consulted, for example there is an obligation not to disturb or damage protected species including birds in the nesting season, also badgers, bats and newts.

Under Section 9 schedule 14 It is illegal to plant or otherwise cause Himalayan balsam to grow wild in the UK. Under Common Law, civil action can be taken against neighbouring landowners where the spread of Himalayan balsam is considered a private or public nuisance. If transported off site, there is a duty of care for any part of the plant that can grow and any soils etc. containing propagules. Such material must be treated as controlled waste.

The European otter has been recorded on the River Derwent within 1 km of the site and is a European protected species. It is also fully protected under Schedule 5 of the Wildlife and Countryside Act 1981. It is illegal to capture, kill, disturb or injure otters, damage or destroy a breeding or resting place or obstruct access to their resting or sheltering places (deliberately or by not taking enough care).

Water vole have been recorded on the Derwent within a few hundred metres of the Reserve. Water vole is protected under Schedule 5 of the Wildlife and Countryside Act 1981 as well as the Natural Environment and Rural Communities (NERC) Act 2006. Local authorities and other public bodies have a legal duty to take their conservation into account.

Equality Act 2010. This replaces previous legislation and provisions under this Act will need to be addressed as regards signs, information media, access and volunteer and other opportunities.

Planning Permission This may be needed for operations considered as engineering works such as constructing a new pond or re-excavating the swamp.

Health and Safety Most of the legislation regarding health and safety is aimed at the workplace and volunteers are not covered. It is, however, good practice to comply and consider safety in training, using equipment, tools and first aid equipment. The Management of Health and Safety at Work Regulations 1992 introduced the need for a risk assessment. Groups should therefore always undertake a risk assessment, be given appropriate training and clear safety instructions and have a first-aid certificate holder present.

There are several Health and Safety considerations when working near water - Weil's disease must be considered in any work near water, as the bacteria which cause it can be present wherever rodents are found, specially near or in water. Weil's disease can be dangerous and in extreme cases can result in serious illness or death. The infection is contracted mainly through open cuts and abrasion in the skin. Make sure all cuts are covered with a waterproof plaster or waterproof clothing.

3.3.2 Consultations: The Environment Agency should be consulted on all works affecting a watercourse or within 50m of one.

Consent will be needed from the Environment Agency before any work on an artificial otter holt can take place so it is advisable that they are contacted early on in the process.

3.3.3 Cost:

Without Derwentwise and HLS funding much of the work would have proved prohibitively expensive, especially the cattle grazing management, as this initially required capital works for items such as fencing, water supply, access improvements and cattle handling facilities. There is now an ongoing requirement for funding for checking the cattle when on site, mending access infrastructure, paying groups for their labour, any new surveys, etc. Also the cost of employing the services of a hydrologist to investigate the swamp drying out problem plus any remedial work is likely to be pricey.

3.3.4 Disturbance: Continuous disturbance by the general public with dogs, whether on or off leads, is a constraint in considering some management issues. This applies particularly to shy and to ground-nesting species of birds as well as the usefulness of any new pond and its surrounding terrestrial habitat as an amphibian refuge, and any new otter holt, which would need to be completely undisturbed to be a success. The cattle grazing the site all need to be docile and tolerate loose dogs without getting stressed or overly self-protective.

3.3.5 Practical constraints:

The cattle grazing proposals may cause a few practical difficulties, as the project needs a relatively small number of cattle to be available for a short specified time, and they will need to be checked on a daily basis and moved off site as soon as required. There have been some complaints from dog walkers who have become alarmed by the presence of cattle and some instances where dogs off leads have caused a problem. It may be that the signage explaining the cattle are there and why, as well as familiarity will allow these issues to be reduced.

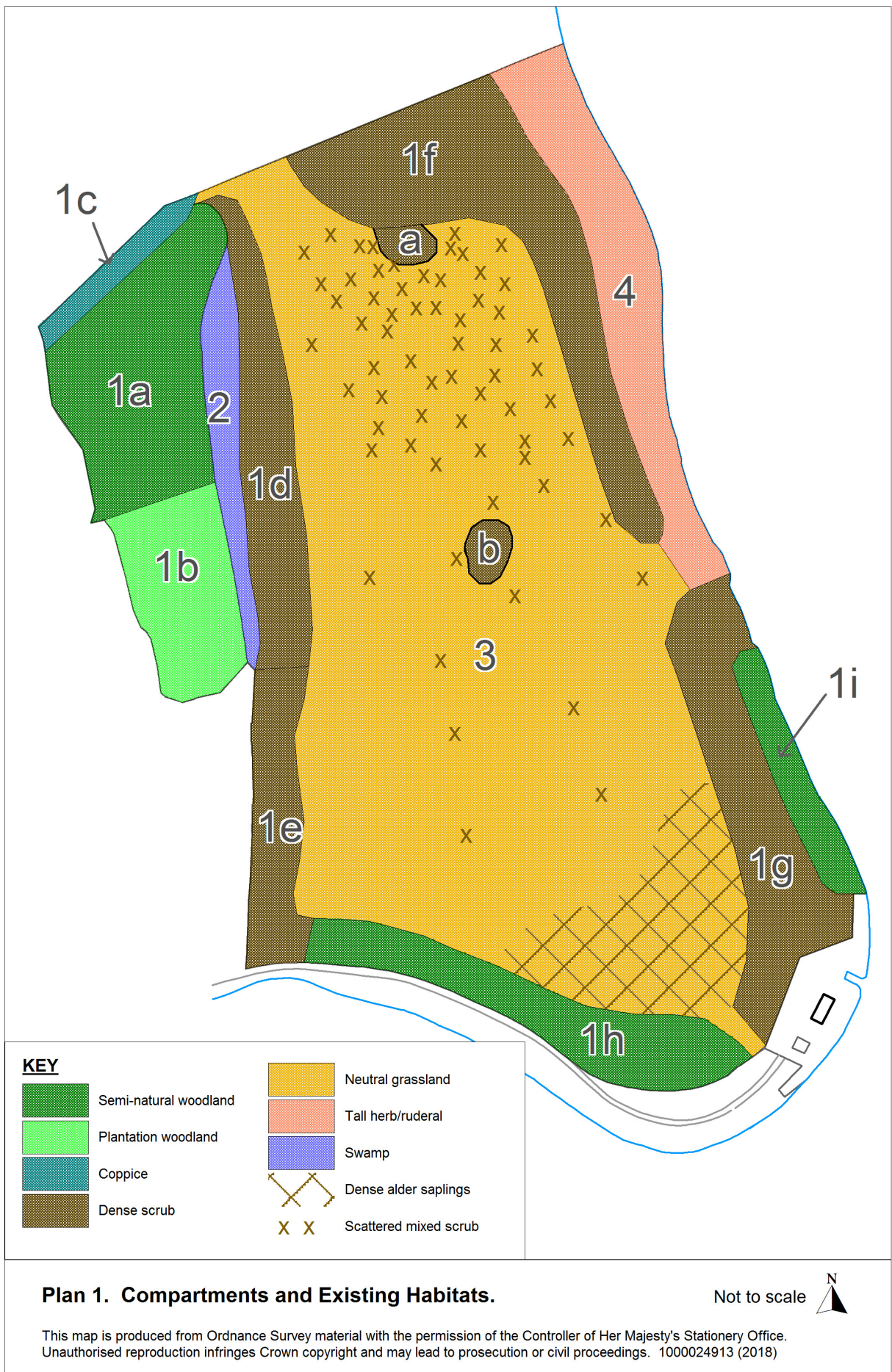
Work such as Himalayan balsam control and scrub clearance is very labour intensive and time specific. It may prove difficult to get the labour just when needed. Some of the work however, may be suitable for community groups and volunteers.

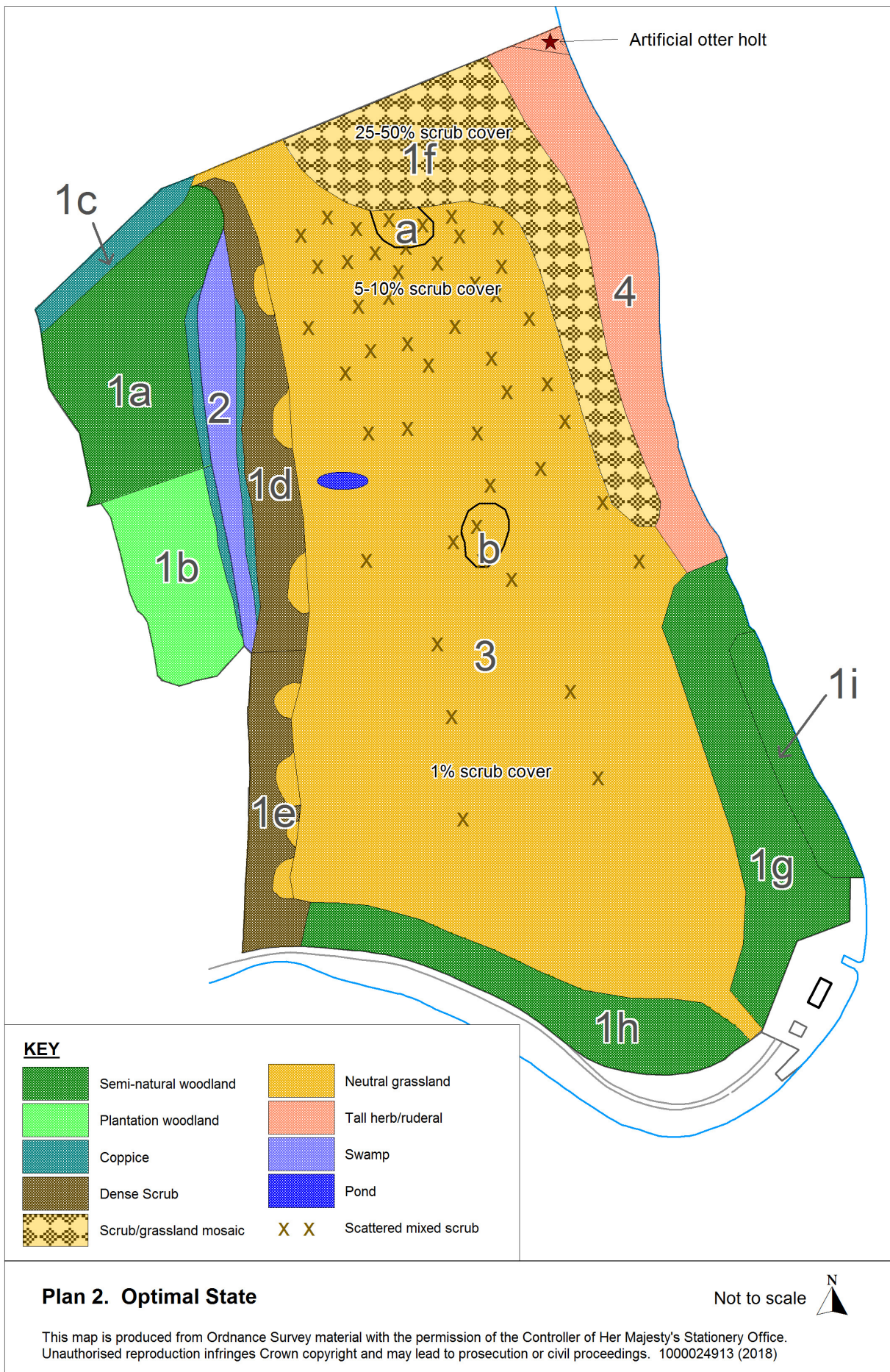
3.4 Management and Funding Opportunities.

The HLS agreement is a welcome source of funding for 10 years from September 2014. There is a possibility of funding through MUNIO, which would enable some of the woodland restoration and removal of invasive species work to be carried out.

There is also the possibility of funding through the Water Environment Grant (which must be applied for before 5 May 2018). This is available for carrying out feasibility studies for activities to tackle environmental problems or for restoring ecosystems in water-dependent habitats.

The future of Darley and Nutwood depends on long term commitment and funding, so it is hoped that both the Management Plan and HLS (or similar future scheme such as the current Higher Tier Countryside Stewardship) can be renewed after their expiry date.





4. Darley and Nutwood 10-YEAR WORK PROGRAMME. Years 1 to 5

Compartment	Management Prescription	Priority		Year 1	Year 2	Year 3	Year 4	Year 5
		Essential	Desirable					
Compartment 1a Nut Wood PRIORITY Himalayan balsam control area	Coppice along edge of swamp and remove brashing to dry area	●		✓		✓		✓
	Monitor for and remove as necessary non-native woody species		●	✓	✓	✓	✓	✓
	Add to the dead hedge as necessary		●	✓		✓		✓
	Hand pull Himalayan balsam in June with 2 or 3 repeats a year.	●		✓	✓	✓	✓	✓
	Check and maintain bat boxes - this will need to be done by a qualified and licensed bat worker.		●	✓	✓	✓	✓	✓
Compartment 1b PRIORITY Himalayan balsam control area	Coppice along edge of swamp and remove brashing to dry area	●		✓		✓		✓
	Hand pull Himalayan balsam in June with 2 or 3 repeats a year.	●		✓	✓	✓	✓	✓
	Check and maintain bat boxes - this will need to be done by a qualified and licensed bat worker.		●	✓	✓	✓	✓	✓
Compartment 1c PRIORITY Himalayan balsam control area	Brush cut the strip of vegetation against the path each autumn/winter and treat the cut stems of previously coppiced hazel trees to maintain the open sightline of the path.		●	✓	✓	✓	✓	✓
	Hand pull Himalayan balsam in June with 2 or 3 repeats a year.	●		✓	✓	✓	✓	✓
	Check and maintain bat boxes - this will need to be done by a qualified and licensed bat worker.		●	✓	✓	✓	✓	✓

Compartment	Management Prescription	Priority		Year 1	Year 2	Year 3	Year 4	Year 5
Compartment 1d	Edge management of scrub and bramble as 1e.	●		✓	✓	✓	✓	✓
Compartment 1e PRIORITY Himalayan balsam control area	Hand pull Himalayan balsam in June with 2 or 3 repeats a year, leaving cut plants in piles to rot down, covering them with a tarpaulin to prevent re-growth.	●		✓	✓	✓	✓	✓
	Using hand tools in November divide scrub into sections and thin scrub and knock back the bramble to make 'scallops' at the path edge of the scrub.	●		✓	✓	✓	✓	✓
	Keep the open areas open by taking out encroaching younger scrub and saplings. Clear the edges of the bramble patches.		●	✓	✓	✓	✓	✓
	Thin the dense stands of young ash.		●	✓		✓		✓
Compartment 1f	Remove scrub to leave a cover of between 25% and 50%.		●	✓	✓	✓	✓	✓
	Remove Japanese knotweed.	●		✓	✓	✓	✓	✓
Compartment 1g	Monitor alder regeneration in Compt. 3 and remove edge seed-bearing alders as advised by monitoring.	●		✓	✓	✓	✓	✓
Compartment 1h	Monitor alder regeneration in Compt. 3 and remove edge seed-bearing alders as advised by monitoring	●		✓	✓	✓	✓	✓

Compartment	Management Prescription	Priority		Year 1	Year 2	Year 3	Year 4	Year 5
Compartment 2 Swamp PRIORITY Himalayan balsam control area	Employ services of hydrologist to assess nature of drying out problem	●		✓				
	Carry out remedial work as recommended by hydrologist	●		✓				
	Continue Himalayan balsam control by hand-pulling the plants several times a year before they flower, and leaving in piles to rot down, covering them with a tarpaulin to prevent re-growth.	●		✓	✓	✓	✓	✓
	Remove the willow and ash saplings from the swamp.	●		✓	✓	✓	✓	✓
	Control bramble and scrub on the eastern side by thinning some of the scrub and cutting back some of the bramble every year, using hand tools and to be undertaken in or after November. Remove and stack cuttings away from wet area to rot down.		●	✓	✓	✓	✓	✓
	Coppice elder, willows, bramble and any other woody species around the wooded edges of the swamp. Work to be done in late Autumn/Winter. Remove brashing away from wet area to rot down.	●		✓	✓	✓	✓	✓

Compartment	Management Prescription	Priority		Year 1	Year 2	Year 3	Year 4	Year 5
Compartment 3 Grassland PRIORITY Himalayan balsam control area	Monitor and assess grassland, orchid areas, scrub and bramble cover .	●		✓	✓	✓	✓	✓
	Remove all isolated trees under 2 m tall in the southern part of the site		●	✓		✓		✓
	Remove all hawthorns less than 2 m tall, and the same for willows on the edges of the wet areas. Maintain at 5% scrub average in compartment.	●		✓	✓	✓	✓	✓
	The first 12 piles of cut scrub can be left under trees and on top of bramble. All other brashing after this should be taken off site.		●	✓	✓	✓	✓	✓
	Graze with 12 to 15 cattle from mid August for at least 6 weeks as guided by assessment of grassland.	●		✓	✓	✓	✓	✓
	Control Himalayan balsam by hand-pulling it wherever it is seen, before the plants are tall but have not yet flowered, which will be around June. The pulled plants from this compartment should be removed from the site.	●		✓	✓	✓	✓	✓
	Remove all alders that are mature enough to be cone-bearing	●		✓				✓
	Carry out regular checks of the cattle, the effects of the grazing, the fencing, gates, mineral licks and water supply.	●		✓	✓	✓	✓	✓
	Re-site or remove trough by the Canoe Club entrance. Scrape off top 20 cm soil with a mini-digger, line with geotextile, lay 15 to 20 cm limestone chatter. Grind out the large tree stump in entrance.		●	✓				

Compartment	Management Prescription	Priority		Year 1	Year 2	Year 3	Year 4	Year 5
Compartment 3 Grassland	Carry out night surveys for glow worm		●	✓				
	Brush-cut for 2 to 3 metres around the edge of large blackthorn patch and strim round bramble patches	●		✓	✓	✓	✓	✓
	Maintain orchid areas by any necessary mowing, ground disturbance	●		✓	✓	✓	✓	✓
	Spot-treated or weed wipe all alder saplings with a foliar glyphosate herbicide such as 'Roundup' in summer. Do not brush-cut alders first.	●		✓	✓	✓	✓	✓
	Erect and remove temporary signs explaining when cattle on site		●	✓	✓	✓	✓	✓
Compartment 4 Tall herb	Graze with 12 to 15 cattle from mid August for at least 6 weeks as guided by assessment of grassland.	●		✓	✓	✓	✓	✓
	Create new artificial otter holt in north east corner. Fence off from rest of site.		●	✓				
	Monitor scrub and bramble.	●		✓	✓	✓	✓	✓
	Control scrub and bramble if necessary by hand cutting during the winter months, treating the cut stumps of the scrub with herbicide. This may need to take place every 3 years or so in order to maintain scrub at below 20% cover. Brashing can be stacked on site.	●		✓				✓
	Carry out regular checks of the cattle, water supplies and fencing.	●		✓	✓	✓	✓	✓
	Monitor new otter holt	●		✓	✓	✓	✓	✓

Compartment	Management Prescription	Priority		Year 1	Year 2	Year 3	Year 4	Year 5
Whole Site	Check trees, check and maintain paths and access infrastructure, repair any damage. Collect litter.	●		✓	✓	✓	✓	✓
	Monitor species and habitat condition	●		✓	✓	✓	✓	✓
	Survey for under-recorded species		●	✓	✓	✓	✓	✓
	Continue programme of informal public events and learning activities		●	✓	✓	✓	✓	✓
	Continue to maintain and update Darley and Nutwood Friends' website		●	✓	✓	✓	✓	✓

4. Darley and Nutwood 10-YEAR WORK PROGRAMME. Years 6 to 10

Compartment	Management Prescription	Priority		Year 6	Year 7	Year 8	Year 9	Year 10
		Essential	Desirable					
Compartment 1a Nut Wood PRIORITY Himalayan balsam control area	Coppice along edge of swamp and remove brashing to dry area	●		✓		✓		✓
	Monitor for and remove as necessary non-native woody species		●	✓	✓	✓	✓	✓
	Add to the dead hedge as necessary		●		✓		✓	
	Hand pull Himalayan balsam in June with 2 or 3 repeats a year.	●		✓	✓	✓	✓	✓
	Check and maintain bat boxes - this will need to be done by a qualified and licensed bat worker.		●	✓	✓	✓	✓	✓
Compartment 1b PRIORITY Himalayan balsam control area	Coppice along edge of swamp and remove brashing to dry area	●			✓		✓	
	Hand pull Himalayan balsam in June with 2 or 3 repeats a year.	●		✓	✓	✓	✓	✓
	Check and maintain bat boxes - this will need to be done by a qualified and licensed bat worker.		●	✓	✓	✓	✓	✓
Compartment 1c PRIORITY Himalayan balsam control area	Brush cut the strip of vegetation against the path each autumn/winter and treat the cut stems of previously coppiced hazel trees to maintain the open sightline of the path.		●	✓	✓	✓	✓	✓
	Hand pull Himalayan balsam in June with 2 or 3 repeats a year.	●		✓	✓	✓	✓	✓
	Check and maintain bat boxes - this will need to be done by a qualified and licensed bat worker.		●	✓	✓	✓	✓	✓

Compartment	Management Prescription	Priority		Year 6	Year 7	Year 8	Year 9	Year 10
Compartment 1d	Edge management of scrub and bramble as 1e.	●		✓	✓	✓	✓	✓
Compartment 1e PRIORITY Himalayan balsam control area	Hand pull Himalayan balsam in June with 2 or 3 repeats a year, leaving cut plants in piles to rot down, covering them with a tarpaulin to prevent re-growth.	●		✓	✓	✓	✓	✓
	Using hand tools in November divide scrub into sections and thin scrub and knock back the bramble to make 'scallops' at the path edge of the scrub.	●		✓	✓	✓	✓	✓
	Keep the open areas open by taking out encroaching younger scrub and saplings. Clear the edges of the bramble patches.		●	✓	✓	✓	✓	✓
	Thin the dense stands of young ash.		●		✓		✓	
Compartment 1f	Remove scrub to leave a cover of between 25% and 50%.		●	✓	✓	✓	✓	✓
Compartment 1g	Monitor alder regeneration in Compt. 3 and remove edge seed-bearing alders as advised by monitoring.	●		✓	✓	✓	✓	✓
Compartment 1h	Monitor alder regeneration in Compt. 3 and remove edge seed-bearing alders as advised by monitoring.	●		✓	✓	✓	✓	✓

Compartment	Management Prescription	Priority		Year 6	Year 7	Year 8	Year 9	Year 10
Compartment 2 Swamp PRIORITY Himalayan balsam control area	Continue Himalayan balsam control by hand-pulling the plants several times a year before they flower, and leaving in piles to rot down, covering them with a tarpaulin to prevent re-growth.	●		✓	✓	✓	✓	✓
	Remove the willow and ash saplings from the swamp.	●		✓	✓	✓	✓	✓
	Control bramble and scrub on the eastern side by thinning some of the scrub and cutting back some of the bramble every year, using hand tools and to be undertaken in or after November. Remove and stack cuttings away from wet area to rot down.		●	✓	✓	✓	✓	✓
	Coppice elder, willows, bramble and any other woody species around the wooded edges of the swamp. Work to be done in late Autumn/Winter. Remove brashing away from wet area to rot down.	●		✓	✓	✓	✓	✓

Compartment	Management Prescription	Priority		Year 6	Year 7	Year 8	Year 9	Year 10
Compartment 3 Grassland PRIORITY Himalayan balsam control area	Monitor and assess grassland, orchid areas, scrub and bramble cover.	●		✓	✓	✓	✓	✓
	Remove all isolated trees under 2 m tall in the southern part of the site		●		✓		✓	
	Remove all hawthorns less than 2 metres tall, and the same for the willows on the edges of the wet areas.	●		✓	✓	✓	✓	✓
	Remove all hawthorns less than 2 metres tall, and the same for the willows on the edges of the wet areas.	●		✓	✓	✓	✓	✓
	The first 12 piles of cut scrub can be left under trees and on top of bramble. All other brashing after this should be taken off site.		●	✓	✓	✓	✓	✓
	Graze with 12 to 15 cattle from mid August for at least 6 weeks as guided by assessment of grassland.	●		✓	✓	✓	✓	✓
	Control Himalayan balsam by hand-pulling it wherever it is seen, before the plants are tall but have not yet flowered, which will be around June. The pulled plants from this compartment should be removed from the site.	●		✓	✓	✓	✓	✓
	Remove all alders that are mature enough to be cone-bearing	●		✓				✓
	Carry out regular checks of the cattle, the effects of the grazing, the fencing, gates, mineral licks and water supply.	●		✓	✓	✓	✓	✓

	Re-site or remove trough by the Canoe Club entrance. Scrape off top 20 cm soil with a mini-digger, line with geotextile, lay 15 to 20 cm limestone chatter. Grind out the large tree stump in entrance.		●	✓				
	Carry out night surveys for glow worm		●	✓				
	Brush-cut for 2 to 3 metres around the edge of large blackthorn patch and strim round bramble patches	●		✓	✓	✓	✓	✓
	Maintain orchid areas by any necessary mowing, ground disturbance	●		✓	✓	✓	✓	✓
	Spot-treated or weed wipe all alder saplings with a foliar glyphosate herbicide such as 'Roundup' in summer. Do not brush-cut alders first.	●		✓	✓	✓	✓	✓
	Erect and remove temporary signs explaining when cattle on site		●	✓	✓	✓	✓	✓
Compartment 4 Tall herb	Graze with 12 to 15 cattle from mid August for at least 6 weeks as guided by assessment of grassland.	●		✓	✓	✓	✓	✓
	Monitor scrub and bramble.	●		✓	✓	✓	✓	✓
	Control scrub and bramble if necessary by hand cutting during the winter months, treating the cut stumps of the scrub with herbicide. This may need to take place every 3 years or so in order to maintain scrub at below 20% cover. Brashing can be stacked on site.	●		✓				✓
	Carry out regular checks of the cattle, water supplies and fencing.	●		✓	✓	✓	✓	✓
	Monitor new otter holt	●		✓	✓	✓	✓	✓

Compartment	Management Prescription	Priority		Year 6	Year 7	Year 8	Year 9	Year 10
Whole Site	Check trees, check and maintain paths and access infrastructure, repair any damage. Collect litter.		●	✓	✓	✓	✓	✓
	Monitor species and habitat condition	●		✓	✓	✓	✓	✓
	Survey for under-recorded species		●	✓	✓	✓	✓	✓
	Continue programme of informal public events and learning activities		●	✓	✓	✓	✓	✓
	Continue to maintain and update Darley and Nutwood Friends' website		●	✓	✓	✓	✓	✓