CROUCH END OPEN SPACE

Conservation Management Plan

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Protecting London's **Wildlife** for the future
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1 Introduction

1.1 Background

London Wildlife Trust (hereafter referred to as 'the Trust') was commissioned by Crouch End Open Space ("CREOS") to provide a conservation management plan for CREOS Woodland Walks ("CREOS WW"). CREOS WW is situated in Crouch End, London Borough of Haringey (National Grid Reference: TQ 291 885), running from Queen's Wood at its western extremity, along the northern border of Shepherd's Hill Allotments and north to the edge of Highgate Wood School and Crouch End Playing Fields. The site broadly covers an area of 3.4 hectares (ha).

The site has had a varied history of ownership, management and local interest dating back over 1,100 years. The Haringey Biodiversity Action Plan 2009[1] was examined to assess the importance of the site in terms of the presence of borough priority habitats and species.

CREOS WW is an important green corridor as an extension to Queen's and Highgate woods, connecting both woodlands to Crouch End playing fields and the many gardens which back onto the site. At the broader landscape scale, the amalgamated area of these sites forms an important 'stepping stone' across North London between the regionally important green spaces of Hampstead Heath (to the south-west) and Alexandra Park (to the north-east).

The information that has been provided is in accordance with the Chartered Institute of Ecology & Environmental Management code of professional conduct (CIEEM)[2]. This report was written by Mike Waller, a conservation ecologist, who is a member of CIEEM and with several years' experience working in ecological assessment. Mathew Frith, director of conservation, who is a full member of CIEEM, has reviewed this document for quality assurance purposes.

This report is split into four parts. The desktop study, site assessment and evaluation make up the first three parts. The fourth part comprises a proposed management plan for the site.

1.1.1 Desktop study

This section includes relevant species and site designation information selected from a data search requested from Greenspace Information for Greater London (GiGL). Relevant information from the Haringey Biodiversity Action Plan is also outlined.

1.1.2 Site Assessment

This section includes details of the habitat assessment.

1.1.3 Evaluation

This section provides an evaluation of the ecological value of the site based on the results of the desk study and site assessment. Recommendations are given based on the ecological value of the site, and the potential for the site to support protected or noteworthy species.

1.1.4 Conservation Management Plan

Based on the ecological value of the site and its features, a summary of the management tasks will be classified into three parts: Conserve, enhance, and recreate, depending on the ecological feature or part of the site. This section includes a summary of the aims and

[1] Haringey Biodiversity Action Plan 2009
[2] CIEEM Code of Professional conduct (2017)

objectives of the conservation management plan and the proposed management tasks to achieve them.

1.1.5 Limitations

It should be noted that, whilst every effort has been made to provide a clear line of approach to completing suggested management tasks, there may well be a requirement to amend objectives and tasks as appropriate. Furthermore, the habitat survey undertaken is only a preliminary overview; it should not be viewed as a comprehensive assessment of the species and habitats present.

2 Desktop study

2.1 GiGL data search

One data search was sought and undertaken by Greenspace Information for Greater London (GiGL). Ecological data was obtained to a radius of 1km. Data obtained was on proximity of Statutory Sites and Local Nature Reserves, Sites of Importance for Nature Conservation (SINCs), Important Geological/Geomorphological Sites, species records including protected species, species of conservation concern and invasive species, habitat records and general open space data.

The ecological data search report reference is 1850 and was prepared on 6th November 2018.

The tables below show the statutory and non-statutory sites (Table 1) that are found nearby and the relevant protected, Biodiversity Action Plan (BAP) and species of conservation concern (Table 2) located within the respective data search area that could be present on site.

Table 1. Statutory and Non-statutory sites

Site	***Statutory sites***	***Non-statutory (SINC) sites***
Crouch End Open Space	Alexandra Palace & Park LNR	M116 Parkland Walk, Queen's Wood and Highgate Wood
		HgBI06 Alexandra Park
		HgBI09 Crouch End Playing Fields Complex
	Parkland Walk LNR	HgBII06 Grove Lodge, Muswell Hill
		HgL06 Southwood Lane Wood
		HgL13 The Priory Park
	Queens Wood LNR	HgL19K Alexandra Park Allotments
		HgL19M Shepherds Hill Allotments
		HgL23 Shepherd's Hill Garden

Table 2. Relevant protected and species of conservation concern

Key

Fungi and lichens
Plants
Beetles
Butterflies and moths
Amphibians
Birds
Mammals

Common name	***Scientific name***	***Designation***
a fungi	*Ceriporiopsis gilvescens*	Local Spp of Cons Conc
a fungi	*Hydnellum*	BAP Priority London Local Spp of Cons Conc
zoned rosette	*Podoscypha multizonata*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
a lichen	*Cladonia chlorophaea*	Nationally rare Nationally Scarce
a lichen	*Cladonia rei*	RL_LowerRisk Nationally Rare
a lichen	*Lecania cyrtella*	RL_DataDeficient Nationally Rare
hard fern	*Blechnum spicant*	Local Spp of Cons Conc
thin-spiked wood sedge	*Carex strigosa*	Local Spp of Cons Conc
bluebell	*Hyacinthoides non-scripta*	W&CA Sch8 Local Spp of Cons Conc
two-spotted oak-borer	*Agrilus biguttatus*	Nationally Notable A Local Spp of Cons Conc
hawthorn jewel beetle	*Agrilus sinuatus*	Nationally Notable A Local Spp of Cons Conc
cardinal click beetle	*Ampedus cardinalis*	BAP Priority London Local Spp of Cons Conc
a beetle	*Dorcatoma substriata*	Nationally Notable A Local Spp of Cons Conc
flax flea beetle	*Longitarsus parvulus*	Nationally Notable A Local Spp of Cons Conc
stag beetle	*Lucanus cervus*	Hab&Spp Dir Anx 2np NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc Nationally Notable B
a beetle	*Phalacrus brunnipes*	Nationally Notable A
a beetle	*Taphrorychus bicolor*	Nationally Notable A Local Spp of Cons Conc
silver-washed fritillary	*Argynnis paphia*	Local Spp of Cons Conc
white-letter hairstreak	*Satyrium w-album*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc RL_LowerRisk
grey dagger	*Acronicta psi*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
mouse moth	*Amphipyra tragopoginis*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
mottled rustic	*Caradrina morpheus*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
small square-spot	*Diarsia rubi*	NERC Act Section 41 BAP Priority National

Common name	***Scientific name***	***Designation***
		BAP Priority London Local Spp of Cons Conc
small phoenix	*Ecliptopera silaceata*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
spinach	*Eulithis mellinata*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
garden dart	*Euxoa nigricans*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
white-line dart	*Euxoa nigrofusca*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
small emerald	*Hemistola chrysoprasaria*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
the rustic	*Hoplodrina blanda*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
shoulder-striped wainscot	*Leucania comma*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
lunar yellow underwing	*Noctua orbona*	NERC Act Section 41 BAP Priority National
powdered quaker	*Orthosia gracilis*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
mullein wave	*Scopula marginepunctata*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
white ermine	*Spilosoma lubricipeda*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
buff ermine	*Spilarctia luteum*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
blood-vein	*Timandra comae*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
oak-hook tip	*Watsonalla binaria*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
common toad	*Bufo bufo*	NERC Act Section 41

Common name	***Scientific name***	***Designation***
		BAP Priority National BAP Priority London Local Spp of Cons Conc
common frog	*Rana temporaria*	Hab&Spp Dir Anx 5 Local Spp of Cons Conc
lesser spotted woodpecker	*Dendrocopos minor*	W&CA Sch1 BAP Priority London Local Spp of Cons Conc Bird-Red
spotted flycatcher	*Muscicapa striata*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc Bird-Red
song thrush	*Turdus philomelos*	BAP Priority London Local Spp of Cons Conc Bird-Red
West European hedgehog	*Erinaceus europaeus*	NERC Act Section 41 BAP Priority National BAP Priority London Local Spp of Cons Conc
Daubenton's bat	*Myotis daubentonii*	Cons Regs 2010 Sch2 Hab&Spp Dir Anx 4 W&CA Sch5 Sec 9.4b W&CA Sch5 Sec 9.4c BAP Priority London Local Spp of Cons Conc
Natterer's bat	*Myotis nattereri*	Cons Regs 2010 Sch2 Hab&Spp Dir Anx 4 W&CA Sch5 Sec 9.4b W&CA Sch5 Sec 9.4c BAP Priority London Local Spp of Cons Conc
lesser noctule	*Nyctalus leisleri*	Cons Regs 2010 Sch2 Hab&Spp Dir Anx 4 W&CA Sch5 Sec 9.4b W&CA Sch5 Sec 9.4c BAP Priority London Local Spp of Cons Conc
brown long-eared bat	*Plecotus auritus*	Cons Regs 2010 Sch2 Hab&Spp Dir Anx 4 NERC Act Section 41 BAP Priority National BAP Priority London W&CA Sch5 Sec 9.4b W&CA Sch5 Sec 9.4c Local Spp of Cons Conc
noctule bat	*Nyctalus noctula*	Cons Regs 2010 Sch2 Hab&Spp Dir Anx 4 NERC Act Section 41 BAP Priority National W&CA Sch5 Sec 9.4b W&CA Sch5 Sec 9.4c BAP Priority London Local Spp of Cons Conc
pipistrelle	*Pipistrellus pipistrellus*	Cons Regs 2010 Sch2 Hab&Spp Dir Anx 4 W&CA Sch5 Sec 9.4b

Common name	***Scientific name***	***Designation***
		W&CA Sch5 Sec 9.4c BAP Priority London Local Spp of Cons Conc
soprano pipistrelle	*Pipistrellus pygmaeus*	Cons Regs 2010 Sch2 Hab&Spp Dir Anx 4 NERC Act Section 41 BAP Priority National W&CA Sch5 Sec 9.4b W&CA Sch5 Sec 9.4c BAP Priority London Local Spp of Cons Conc

2.1.1 Interpretation of data search records

The data search highlighted a very broad range of notable beetles (many were omitted because the list was excessively long) and moths. Most of the listed species are associated with mature woodlands, particularly in the case of the beetle species which are specifically associated with veteran trees and dead wood. This is not unsurprising as CREOS adjoins some of the finest tracts of ancient woodland in Greater London – Queen's and Highgate woods. It is possible that some of these species may well be present at CREOS in the more mature sections of woodland and quite possibly in association with the veteran boundary oaks. There are similarly good range of bat species of which lesser noctule bat is perhaps the most interesting as this species is typically only found in mature woodlands.

2.2 Haringey Biodiversity Action Plan

The Haringey Biodiversity Action Plan 2009 outlines a Woodland Habitat Action Plan containing four targets. The following targets may be partially fulfilled by the work recommended in this report:

Woodland target 2: To increase public benefit, understanding and community involvement in Haringey's Woodlands by 2012.

ACTION: Maintain a programme of practical conservation work days in Haringey's woodlands (24 per annum).

Woodland target 3: Promote knowledge of best practice in woodland management and increase the area of woodland that is managed appropriately by the end of 2015.

ACTION: Produce and implement 3 new management plans for Haringey Woodlands

The timeframe for the fulfilment of these targets has now passed although they may still remain as an updated Haringey Biodiversity Action has yet to be produced.

3 Site Assessment

The site was visited on 17th May 2018 to record existing habitats and features of ecological value and undertake an assessment of the potential presence of protected species and notifiable species. The methodology broadly followed Extended Phase 1 Habitat survey process. The timing of the survey is deemed optimal for characterising the species and habitats present.

3.1 Habitats

The site consists primarily of mature broadleaved woodland with some younger stands. A small meadow area is located in the centre of the site which hosts a range of common neutral grassland species. Elsewhere there are stands of bramble scrub and tall herb vegetation along the edges of the woodland sections in several areas.

3.1.1 Broad-leaved woodland

The woodland areas consist of a mixture of native and non-native mature and semi-mature trees. The most common species included sycamore *Acer pseudoplatanus*, pedunculate oak *Quercus robur*, hazel *Corylus avellana*, hornbeam *Carpinus betulus*, horse chestnut *Aesculus hippocastanum*, birch *Betula pendula*, white willow *Salix alba*, ash *Fraxinus excelsior*, cherry *Prunus* sp. and elder *Sambucus nigra*. Areas of the woodland understorey near the western entrance is overgrown with dense bramble scrub and ivy. Further along the woodland walk in the central part of the site, the non-native invasive species cherry laurel *Prunus laurocerasus* has spread and covers a significant portion of the understorey. Nonetheless, more open areas host native woodland flora including some 'Ancient Woodland Indicator' (AWI) plant species[3] such as wood anemone *Anemone nemorosa*, bluebell *Hyacinthoides non-scripta*, wild garlic *Allium ursinum* and wood sedge *Carex sylvatica*. Examples of large veteran boundary oaks are found in the eastern part of the site which are thought to be c.160 years old.

[3] https://pad.basingstoke.gov.uk/documents/4753/01/02/76/01027625.PDF

3.1.2 Semi-improved neutral grassland

An area of rough semi-improved neutral grassland known as the 'Meadow' is located in the central part of the site. This meadow is generally rather damp for most of the year due to the clay substrate meaning water typically pools at the surface. Conversely, the ground is prone to desiccate and crack heavily during prolonged periods of drought (like that of 2018) as the clay contracts.

The sward height is moderately high and is cut once in late summer. Species present include abundant meadow buttercup *Ranunculus* acris, creeping buttercup *Ranunculus repens* and cock's-foot *Dactylis glomerata* alongside other common grassland species. A handful of snake's-head fritillary *Fritillaria meleagris* are known to occur although these are likely a deliberate introduction or garden escape.

The adjacent playing field is of lower ecological quality because it is managed intensively with regular mowing. The playing field is not within the curtilage of CREOS but the land owners are open to the prospect of some ecological enhancements in the western corner.

3.1.3 Tall herbs and scrub

Dense bramble thickets admixed with tall herbs are scattered along the edges of the woodland areas throughout the site, particularly along the edges of the school playing fields. This habitat can be viewed as a natural ecotone between the grassland and woodland habitats. Species here include typical woodland edge species such as common nettle *Urtica dioica*, cleavers *Galium aparine*, cow parsley *Anthriscus sylvestris*, herb bennett *Geum urbanum*, hogweed *Heracleum sphondylium* and enchanter's nightshade *Circaea lutetiana.*

3.1.4 Standing water (ponds)

One pond and a spring are located on the site. The pond is located in the south-western corner of the school playing field whist the spring is located near the border with the Shepherd's Hill Allotments. A pond was probably present in the Meadow but has since dried up. Both wet areas are small with limited aquatic/semi-aquatic vegetation but are valuable sources of water and greatly enhance the ecological value of the site. These two wet areas host yellow flag *Iris pseudacorus* and two also have large clumps of pendulous sedge *Carex pendula*.

3.1.5 Dead wood

Significant quantities of dead wood are scattered throughout the site, particularly along path edges where libs have been used to delineate boundaries. There are also some examples of larger sections of dead trunk and standing dead wood. This habitat is a declining and all-too-often removed feature of woodlands which is of vital importance for some rarer invertebrates, particularly wood-boring beetles.

4 Evaluation

The majority of the site is broad-leaved woodland which is a London BAP Priority Habitat. Broad-leaved woodland is a relatively uncommon and valued habitat in London and Haringey. Currently, the woodland has good structure with a mixture of tree ages and species. Because of this the woodland areas provide a good habitat for a range of breeding birds, mammals and invertebrates. However, some areas are very dense and would benefit from selective thinning and coppicing to allow more light to reach the woodland floor. Although perhaps counter-intuitive, opening up a dark woodland area can bring woodland plants out of dormancy and assist the development of a more diverse field layer. In the short-term this can appear destructive but is a standard conservation practise in order to establish the right balance of light and shade at the canopy, shrub and field layer.

The meadow area (semi-improved neutral grassland habitat) has a low species diversity but has great potential to be improved through more sympathetic management and the introduction of native wildflower species suitable for a damp meadow habitat which could be plug planted to maximise diversity. Similarly, the western corner of the playing field has been identified as an area which could be transformed into a native wildflower meadow area. Currently this area is of low species diversity and quality due to the high frequency mowing.

The pond and spring areas are very small and heavily disturbed meaning they are in poor condition. Although some effort to protect the pond has been undertaken, the influence of dogs entering pond severely limits the ability of aquatic plant species to adequately colonise and creates constant turbidity. This makes the pond unsuitable for amphibians at present. However, the spring area could be improved by opening up the canopy to allow greater light to reach the woodland floor and encourage semi-aquatic plants to colonise.

Areas of tall herbs and bramble scrub present on site offer value for wildlife in the form of refuge as a natural transitionary habitat between open grassland and woodland. The taller wildflowers in this woodland edge setting are often favoured by butterflies such as speckled wood and small tortoiseshell. The value of this habitat could be improved further by introducing ‘scalloped’ edges to break up the linear shape and develop a more natural ecotone structure and range of sward heights.

The retention of dead wood on site is high and this should be continued via the development of log and brash piles following clearance activities such as thinning and/or coppicing (see above).

5 Conservation Management Plan

The information gathered as part of the desk study, habitat survey, species assessment and evaluation have underpinned the aims and tasks proposed in this ecological management plan.

This management plan provides management objectives for the five habitats present on site; broad-leaved woodland, semi-improved neutral grassland, tall herbs and scrub, standing water and dead wood with a focus on the broad-leaved woodland which comprises the majority of the site.

Each management objective is assigned a priority level by means of a traffic light colouring system as follows:

High priority 

Medium priority 

Low priority 

A map is included in order to provide a visible representation of where management practises are recommended to be focused.

BROAD-LEAVED WOODLAND

Aim	Tasks	Priority	Location (see map)	Notes/timing	Lead Organisation
To enhance woodland habitat structure and wildlife value whilst maintaining public access and aesthetic value.	Selectively 'thin' trees and saplings above and around glades to allow light to penetrate to the woodland floor (including sycamore trees competing with mature 'boundary' oaks).		Target area 1	Undertake between November-February.	Experienced woodland manager
	Use brash from clearance to create dead hedging around glade/path edges to protect woodland flora.		Glade north of target area 3	Undertake between November-February.	CREOS volunteers
	Fell and remove cherry laurel swamping woodland areas.		Target area 2	Undertake between November-February Do not burn cut wood but retained in brash piles in appropriate locations.	Experienced woodland manager
	Treat any Japanese knotweed by means of chemical injection.		N/A	Spring and summer when plants are visible above ground	Contractor
	Thin trees in new coppice area to open up canopy in preparation for hazel whip planting.		Target area 3	Undertake between November-January	Experienced woodland manager
	Undertake planting of new hazel whips in new coppice area and existing coppice area on eastern side of meadow.		Target areas 3 & 7	Plant hazel whips in late winter (January and February)	CREOS volunteers
	Cut hazels to ground level once they reach 2m in height. Cut each area on rotation every two years.		Target areas 3 & 7	Undertake between November-January	CREOS volunteers

SEMI-IMPROVED NEUTRAL GRASSLAND

Aim	Task	Priority	Location (see map)	Notes/timing	Lead organisation
To improve the vegetational diversity of the meadow area for pollinators and aesthetic value.	Damp grassland wildflower species plug planted in a test area or area with least footfall at meadow edges (see Appendix 2).		Meadow area (target area 6)	Plug planting should be carried out in March.	CREOS volunteers (may be a good activity for school children)
	Harrow ground and seed area in western corner with native neutral meadow mix (see Appendix 2).		Target area 4	Undertake in March.	CREOS volunteers
	Maintain existing meadow and newly seeded area through two annual cuts in September and March.		Meadow area (target area 6) and target area 4	Cut vegetation (arisings) should be removed to lower nutrient level.	Contractor

STANDING WATER (PONDS/SPRINGS)

Aim	Task	Priority	Location (see map)	Notes/timing	Lead organisation
To enhance the pond areas whilst keeping them protected from excessive disturbance.	Introduce protective barriers (low dead hedging) around the spring area and pond beside the playing fields to discourage excessive disturbance.		Spring on northern border of Shepherd's Hill Allotments and pond beside playing fields	Can be carried out at any time.	CREOS volunteers
	Introduce planting with semi-aquatics or damp grassland species to improve ecological quality (appropriate species: purple loosestrife *Lythrum salicaria* and ragged robin *Lychnis flos-cuculi*).		Meadow damp area	Planting to be carried out in May.	CREOS volunteers

TALL HERBS/SCRUB

Aim	Task	Priority	Location (see map)	Notes/timing	Lead organisation
To enhance tall herb vegetation at woodland edges with the aim of improving the species and structural diversity.	Develop scalloped edges to tall herbs and scrub at field and car park margins.		Playing field and car park edges (target areas 5 & 8).	Undertake in spring and autumn before and after main flowering period.	CREOS volunteers
	Develop hedgerows for spring flowers and autumn fruit.		Perimeter of meadow (target area 7) and perimeter of car park (target area 8).	Carry out planting between November and December	CREOS volunteers

DEAD WOOD

Aim	Task	Priority	Location	Notes/timing	Lead organisation
To expand and increase the dead wood provision across the site.	Any dead wood created from thinning or wind fall to be retained for the creation of log piles half sunk into the ground.		Any sheltered locations within the woodland.	This has already been done in several places – loggeries should be created in new locations.	CREOS volunteers

Acknowledgements

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- Andy Overall
- CREOS Committee members
- Daniel Hackett
- David Bevan
- Ed Milner
- Glenys Law
- Huma Pearce

The Trust would particularly like to thank **Alice Shaell** for her tireless efforts and sheer determination to pull this entire project together. Her single-minded vision has brought about the positive conservation change CREOS WW has needed for some time.

Appendix 1: Map and management target notes

Conservation Management Plan map

Management Target notes

Target number	*Management practise*
1	**Thinning** Some trees are selectively removed to open up the canopy and allow greater light penetration to the woodland floor (see Appendix 3). To be carried out during the autumn and winter months when birds have finished breeding.
2	**Cherry laurel clearance and thinning** Cherry laurel is a non-native invasive species which has the potential to swamp woodlands and lower light penetration to the woodland floor. Do not burn and cut vegetation as it is poisonous. To be carried out during the autumn and winter months when birds have finished breeding.
3	**Coppice development** Selectively fell some weaker trees along the side to open up the canopy. Plant hazel saplings (c.25) on both sides of the ride. Allow each to grow to around 2 metres in height then cut each path side group alternately annually.
4	**Wildflower seeding** Appropriate neutral grassland wildflower seeding to be carried in the unused western corner of the playing fields using native species (see Appendix 2). Carry out a late summer/autumn cut (September) and spring (March) and remove arisings.
5	**Scalloped edges and plug planting** Cut in scalloped edges to tall herb/scrub edges to improve succession of growth and eliminate hard lines. Tall grass areas to be cut and plug planted with damp grassland wildflower species.
6	**Sympathetic grassland cutting and plug planting** Continue to carry out a late summer/autumn cut (September) and spring (March) of the meadow and remove arisings. Plug plant suitable damp grassland wildflower species in a suitable test area to maximise vegetation diversity (see Appendix 2).
7	**Hedgerow planting** Develop a boundary hedgerow around the northern and eastern perimeter of the meadow to provide nectar and berries for pollinating insects and birds (see Appendix 3).
8	**Hedgerow planting** Develop a boundary hedgerow around the perimeter of the car park to provide nectar and berries for pollinating insects and birds (see Appendix 3).

Appendix 2: Meadow creation and enhancement

Relaxed mowing and seeding

Meadows can be created through the relaxation of mowing on existing grasslands. These are typically amenity or improved grassland types (like that of the playing field) and through the simple process of reducing the amount of times they are cut to that typical for wildlife grassland conservation (once or twice a year; see below) then it will likely over a few years develop towards a semi-improved grassland. This simple process will increase the specific grassland value for invertebrates, birds and other wildlife including small mammals, reptiles and amphibians. These existing grasslands can be enhanced further by the sowing of additional wildflower seed of a much more varied species composition after the autumn cut. To do this it is suggested that the existing grassland is harrowed before sowing to reduce the amount of dead grass material and open up the grassland sward a little to allow more seed germination. It is then cut again the following (late) March removing severed vegetation (arisings) after 1-2 days of being left in situ to ensure grass competition is reduced. Without this harrowing and spring cut the wildflower seed will have a much lower germination rate.

In the creation of a perennial wildflower meadow, some seed can take up to two years to produce flowering plants so it is not uncommon to sow a new wildflower meadow with a mix of annual and perennial seed, giving an immediate burst of colour in the first year of annuals and some perennials with a gradual decline in annuals and increase in perennials. After a few years (typically less than five) the annuals would have disappeared with just the occasional one coming back from dormant seed in the soil when conditions are adequate.

Plug planting

Plug planting is a swifter, more targeted and reliable method of introducing wildflowers into an existing grassland or meadow. Since the meadow area at CREOS WW is already managed in an ecologically sensitive way, there is no requirement to harrow the ground and ‘start from scratch’ as would be the case if a low quality amenity grassland was being enhanced. Plug planting should be carried out in March just as the air and ground temperate begins to increase.

Below is a carefully selected list of wildflower species suitable for seasonally wet soils. This list is based on the vegetation of traditional floodplain and water meadows. Soils in wet meadows may flood for short periods in winter, but are usually well drained in summer.

- **yarrow** *Achillea millefolium*
- **betony** *Stachys officinalis*
- **common knapweed** *Centaurea nigra*
- **hemp-agrimony** *Eupatorium cannabinum* (best positioned at meadow edge)
- **meadowsweet** *Filipendula ulmaria* (best positioned at meadow edge)
- **lady's bedstraw** *Galium verum*
- **meadow crane’s-bill** *Geranium pratense*
- **meadow vetchling** *Lathyrus pratensis*
- **oxeye daisy** *Leucanthemum vulgare*
- **greater bird’s-foot trefoil** *Lotus pedunculatus*
- **ribwort plantain** *Plantago lanceolata*
- **cowslip** *Primula veris*
- **selfheal** *Prunella vulgaris*

- **yellow rattle** *Rhinanthus minor* (an important hemi-parasitic constituent of meadows which weakens grasses and improves conditions for other wildflowers)
- **common sorrel** *Rumex acetosa*
- **great burnet** *Sanguisorba officinalis*
- **ragged robin** *Silene flos-cuculi*
- **devil's-bit scabious** *Succisa pratensis*

Suitable mixes and lists of appropriate species to introduce can be found here:

https://wildseed.co.uk/mixtures/view/5

https://www.wildflowers.uk/sunny-site-c2x16864292

Meadow maintenance

All grasslands and perennial meadows typically require long-term management by cutting. The reasons for this are to simulate grazing by animals which are the principal controllers of vegetation succession. If these interventions are not made, gradually over time, grass species become more dominant followed by taller herbs. If the process continues then these can give way to scrub and trees.

To maintain wildlife valuable grasslands and perennial meadows then no more than two cuts should be made in any one year with at least one cut made during the late summer/early autumn (September-October). A second cut can be made in late March. This second cut is particularly important for nutrient rich and/or clay type substrates. All cuttings should be removed after being left in situ for 1-2 days (to allow invertebrates to leave them) as otherwise they enrich the soils, reduce wildflower growth and encourage ranker grasses and taller herbs to appear. Cuts should ensure that at least 10cm of vegetation height remains in the grassland or perennial meadow.

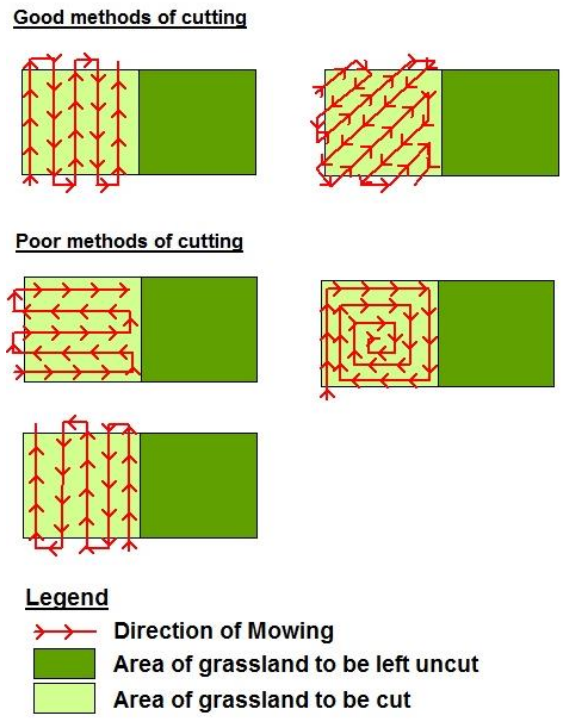


Figure 1. Examples of good and poor mowing methods for grasslands or meadows. The overall direction of mowing should force any fauna towards the longer uncut grassland area.

When cutting grasslands, it is best undertaken in a way that allows invertebrates to move out of them into neighbouring areas that are not subject to cutting. See Figure 1. above for examples.

Meadow monitoring

New seedlings and plug plants should be monitored during the spring growth period to assess their developing condition which should inform the suitability of the conditions. For example, particular attention should be afforded to assessing the vigour of the plant growth, whether any growth abnormalities are visible (yellowing leaves, asymmetrical leaf deployment) or

whether some species are more dominant over others. It is quite natural that the conditions of the chosen planting area will be more preferable to some species than others and therefore the process should be approached with an expectation of trial and error.

For plug plants, it is recommended that initially no more than ten species are ‘tested’ and monitoring in the chosen planting location, ensuring that the location of each species is recorded. The following year, a second batch of species should be introduced and the same process followed. After four years, it should become apparent which species are most suited to the conditions of the chosen area.

Appendix 3: Woodland management and enhancement

Improved woodland management

Much of the woodland in CREOS is not managed in a wildlife-friendly way which has led to closed canopies with little to no ground flora and mostly even-aged trees in some areas. There are a range of positive management and enhancement practises which could and should be implemented to improve their ecological quality.

Thinning

Thinning is a process by which trees are selectively removed in order to open up the canopy and allow greater light penetration to the woodland floor. This mimics and speeds up the natural process of woodland maturity by which tree density and number reduces over time.

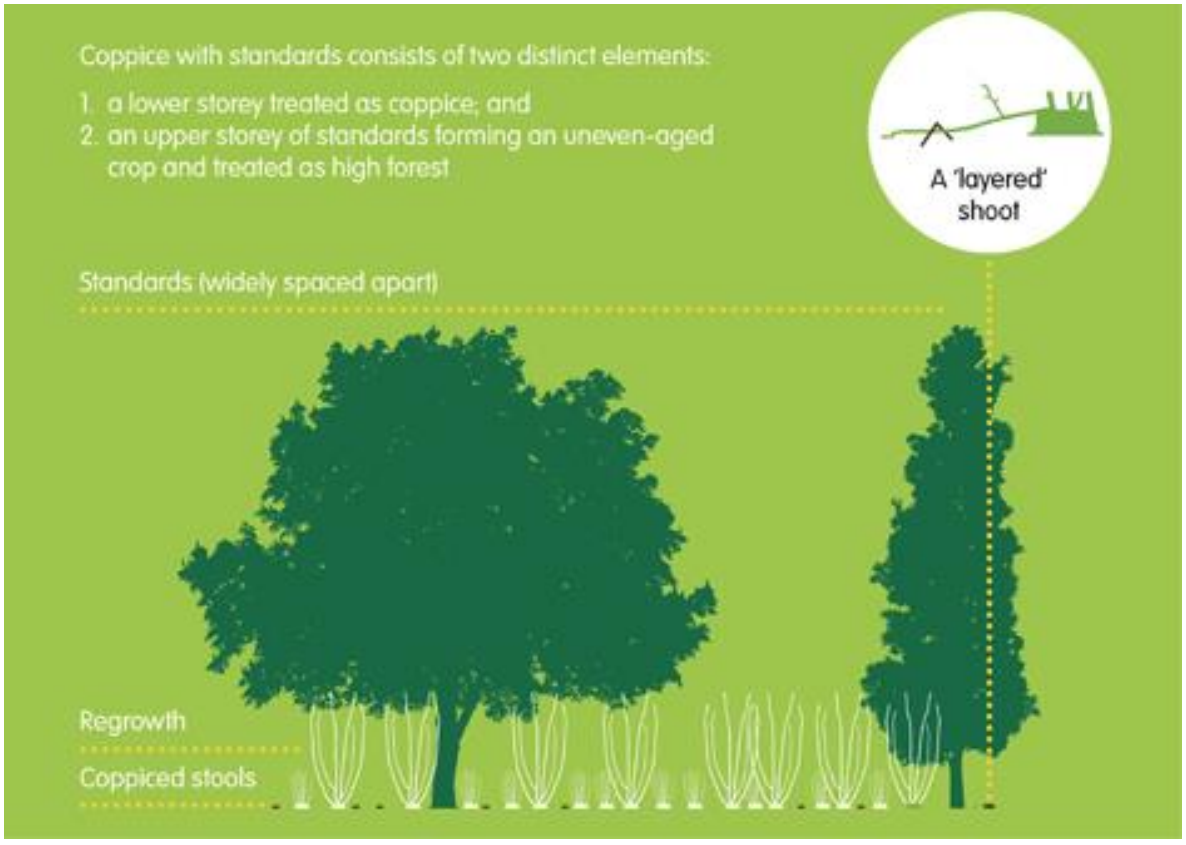
Forestry Commission diagram of tree thinning (https://www.forestry.gov.uk/forestry/beeh-a8zfvj)

For woodlands 15-30 years of age, thinning should be undertaken every 5-10 years although this depends on the composition of the woodland. For woodland comprising mostly of faster growing secondary species (birch and sycamore), thinning should be undertaken more frequently. Conversely, for woodlands comprising mostly of slower growing species such as oak and hornbeam, thinning should be undertaken less frequently.

Thinning can be taken a step further by creating small glades which provide vital habitats for invertebrate (especially butterflies) and plant species which require the critical balance of light, shade and warmth they provide.

Coppicing

Coppicing is woodland management process by which certain native understorey shrub species are harvested on rotation every 2-15 years (depending on the size of the area). Traditionally, this was carried out to develop 'stools' (very straight stems which sprout from the cut stump) which were used widely for the production of fencing, tool handles, furniture etc. In terms of conservation, coppicing has the positive effect of creating favourable light levels by allowing greater light penetration to the woodland floor for the benefit of woodland flora. Typically, the most vegetationally diverse woodland systems include some areas of coppicing which is essentially a stand in for the effect of large herbivore browsers which are no longer present in the British Isles such as straight-tusked elephant and aurochs (wild cattle).



Forestry Commission diagram of coppicing (https://www.forestry.gov.uk/forestry/beeh-a8zf8x)

Widely spaced 'standards' are retained above the coppiced shrubs to provide additional structural diversity although traditionally this was to simultaneously develop a valuable timber crop from species such as oak, ash and sweet chestnut.

Dead wood piles and loggeries

Dead wood is a declining habitat which supports a specific community of species which rely on decaying wood as food and a structure in which to breed. Dead wood also provides a refuge and hunting ground for small mammals, reptiles and amphibians, and shelter for over-wintering and hibernating wildlife. A simple pile of logs can very quickly become a flourishing wildlife community.

Dead wood is essential for the larvae of wood-boring beetles, such as stag beetle *Lucanus cervus* but also supports many fungi, which help break down the woody material. Different species of fungi live on different species of wood and thus it is preferable to use wood from a variety of tree species where possible.

Where trees are removed or pruned across the park, all dead wood should be retained and placed within chosen areas of woodland. Depending on the aesthetic constraints, these can be placed as neat log piles or simply left in a heap – both create important habitats for wildlife which rely on dead wood or require cover and shelter.

Logs can also be used to create loggeries which should be half sunk into the ground to create good habitat for stag beetle (see below).

Bird and bat boxes

Bird boxes can be an aesthetically pleasing enhancement features which can help to support local breeding birds.

Hole type bird boxes are the most typical box type and usually consist of wood or other material with a circular hole located in the front of the box. In urban areas these boxes are utilised by typical tree hole nesting species such as blue and great tits. Larger ones with bigger holes can be used by starling, jackdaw, and woodpeckers. These boxes are best placed on trees located between 3 and 15m above ground level with the hole facing south, southeast or east to avoid the prevailing wind but maximise the amount of light falling on the box to keep nestlings warm.

Open front bird boxes are similar to hole type next boxes but have a complete open front to the box. These types of box are most typically used by robin, blackbird, dunnock and wren. They are best placed in shrubs with dense vegetation between 3 and 5m above ground level facing south, southeast or east.

Bat boxes come in a wide variety of shapes, sizes and styles but are broadly similar to bird boxes but with entrance holes and slits at the base.

Bat boxes are best located in trees with a 3m free falling space below them and a clear area in front.

Appendix 4: Hedgerow planting

Hedgerows are best for wildlife if they are allowed to develop to a minimum height of two metres and a width of at least one and a half metres. Hedges of smaller sizes than this will still be of value to invertebrates but typically lose value for birds as they are too open for providing sheltered nesting sites. Hedgerows are best composed of mixed four or more species rather than a monoculture, as this adds to the diversity of nectar, berries and foliage cover on offer to invertebrates, birds and small mammals.

Planting methodology

Hedgerows are best planted in autumn or winter, ideally before January so the roots have more time to establish a network of feeder roots. However, if planting into clay soils it may be best to wait until the beginning of March as heavy frosts can cause frost heave and expose roots. Also, there is a risk that roots will rot in poorly draining soil if planted early. Never plant during freezing weather or if the ground is waterlogged. Ideally plant on a still, moist day, to minimise root drying and stress to the plants.

The cheapest and most easily acquired plants are those that come with bare roots, commonly known as ‘whips’. Typically they are available in late autumn in three sizes: 30-45cm, 45-60cm and 60-90cm. 45-60cm whips are recommended for largescale planting schemes since they establish most successfully. However, some species such as holly are usually only available as more expensive container-grown or cell-grown plants.

It is important to prepare the ground before you plant by clearing the planting area of excessive competing vegetation such as bramble and lightly break up the soil surface with a spade. Plant whips in double staggered rows about 40cm apart from one another and four per metre. This

will develop a good dense hedgerow of greater value to wildlife. Simply slot-plant each whip by driving a spade into the ground and carefully slotting the whip in behind the spade. Ensure that the roots of each whip are protected from direct sunlight and wrapped in a bag to avoid drying out.

Light, regular, trimming of the hedgerow in its early years will encourage dense, bushy growth and is recommended.

Appendix 5: Plant species list

Scientific name	***Common name***	***Species abundance in each habitat*** *(DAFOR Scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare)*			***Notes***
		Broad-leaved woodland	***Semi-improved neutral grassland***	***Tall herbs***	
Acer campestre	field maple	O			
Acer pseudoplatanus	sycamore	F			
Achillea millefolium	yarrow		O		
Aegopodium podagraria	ground elder	O			
Aesculus hippocastanum	horse-chestnut	O			
Agrostis stolonifera	creeping bent		O		
Alliaria petiolata	garlic mustard	O			
Allium ursinum	wild garlic	R			planted
Allium triquetrum	three-cornered garlic	R			
Anemone nemorosa	wood anemone	R			
Anthriscus sylvestris	cow parsley	F		O	
Bellis perennis	daisy		F		
Betula pendula	silver birch	F			
Calystegia sepium	hedge bindweed			O	

Scientific name	***Common name***	***Species abundance in each habitat*** *(DAFOR Scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare)*			***Notes***
		Broad-leaved woodland	***Semi-improved neutral grassland***	***Tall herbs***	
Carex pendula	pendulous sedge	O			
Carex sylvatica	wood sedge	O			
Carpinus betulus	European hornbeam	F			
Cerastium fontanum	common mouse-ear		O		
Circaea lutetiana	enchanter's nightshade	F			
Cirsium arvense	creeping thistle			O	
Corylus avellana	hazel	O			
Crataegus monogyna	hawthorn	O			
Dactylis glomerata	cock's-foot		F		
Euonymus europaeus	spindle	R			
Fagus sylvatica	beech	R			
Ficaria verna	lesser celandine	F			
Frangula alnus	alder buckthorn	R			
Fraxinus excelsior	ash	O			

Scientific name	***Common name***	***Species abundance in each habitat*** *(DAFOR Scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare)*			***Notes***
		Broad-leaved woodland	***Semi-improved neutral grassland***	***Tall herbs***	
Galium aparine	cleavers			O	
Geranium molle	dove's-foot crane's-bill			O	
Geranium robertianum	herb Robert	O			
Geum urbanum	wood avens	F			
Hedera colchica	Persian ivy	O			
Hedera helix	ivy	A			
Heracleum sphondylium	hogweed			O	
Holcus lanatus	Yorkshire-fog		F		
Hyacinthoides hispanica	Spanish bluebell	O			
Hyacinthoides non-scripta	bluebell	R			
Ilex aquifolium	holly	F			
Iris foetidissima	stinking iris	R			
Iris pseudacorus	yellow flag		R		
Lolium perenne	perennial rye-grass		D		

Scientific name	***Common name***	***Species abundance in each habitat*** *(DAFOR Scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare)*			***Notes***
		Broad-leaved woodland	***Semi-improved neutral grassland***	***Tall herbs***	
Melica uniflora	wood melick	R			
Myosotis sylvatica	wood forget-me-not	R			
Pentaglottis sempervirens	green alkanet	O			
Plantago major	greater plantain		F		
Poa annua	annual meadow-grass		F		
Prunella vulgaris	selfheal		O		
Prunus laurocerasus	cherry laurel	O			
Prunus sp.	cherry species	O			
Quercus robur	pedunculate oak	F			
Ranunculus acris	meadow buttercup		F		
Ranunculus repens	creeping buttercup		F		
Rubus fruticosus agg	bramble species group	O		F	
Rumex acetosa	common sorrel		O		
Rumex obtusifolius	broad-leaved dock			O	

Scientific name	***Common name***	***Species abundance in each habitat*** *(DAFOR Scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare)*			***Notes***
		Broad-leaved woodland	***Semi-improved neutral grassland***	***Tall herbs***	
Rumex sanguineus	wood dock	O		O	
Salix caprea	goat willow	R			
Salix fragilis	crack willow	O			
Sambucus nigra	elder	O			
Silene dioica	red campion			O	
Sorbus aucuparia	rowan	R			
Stachys sylvatica	hedge woundwort			O	
Stellaria media	common chickweed			O	
Symphoricarpos albus	snowberry	R			
Taraxacum sp.	dandelion species		F		
Taxus baccata	yew	R			
Tilia x europaea	lime	R			
Trifolium repens	white clover		O		
Urtica dioica	common nettle	O			

Company and report information

The recommendations set out within the report broadly reflect London Wildlife Trust's core principles and objectives.

The information in this document is, to the best knowledge of the author and London Wildlife Trust correct at time of writing.

London Wildlife Trust does not take any responsibility for future decisions about the site that is the subject of this assessment.

Staff capability

All ecologists are members of the Chartered Institute of Ecology & Environmental Management (CIEEM), and follow the CIEEM code of professional conduct when undertaking ecological work.

Table 1. Staff details

Name and contact details	Role in team
Mike Waller BSc Grad CIEEM Tel: 020 7803 4290 mwaller@wildlondon.org.uk	*Conservation Ecologist* Report production.
Mathew Frith BSc MCIEEM mfrith@wildlondon.org.uk	*Director of Development* Quality control.