

Worsbrough Country Park Biodiversity Management Plan 2021-2025





Who we are:

Baker Consultants is an ecology and sustainability consultancy. We work in terrestrial, freshwater and marine environments, providing a range of services to industry, government, developers, public services and utilities.

Baker Consultants comprises a highly experienced team of professional ecologists. We do wildlife surveys - but they are only the first steps in the process for most projects. We are also involved in ecological assessment, environmental law, biodiversity management and design planning.

We don't just work with wildlife, because we know that communication with clients, design teams and conservation bodies is the key to project success. Explaining the implications of survey data, and interpreting legislation, policy and best practice is one of our strengths. We help decisions to be made and actions taken, allowing constraints to be kept to a minimum and project risks to be managed.

Our approach is scientific, pragmatic and creative. Alongside tried and tested methods, we seek to innovate, introduce clients to new ways of thinking and always deliver sound commercial awareness. You will find us honest and approachable, but we're not afraid to be robust and challenging - or to ask difficult questions.

We do believe in nature conservation. But we also believe in good development, well delivered. We know that, with our input, projects and plans can provide benefits for both nature and people.

That's not the whole story.

For more information, look at our web site
www.bakerconsultants.co.uk, subscribe to our blog, or call
us on 01629 593958.

Client	Barnsley Metropolitan Borough Council
Project	Worsbrough Country Park
Report title	Biodiversity Management Plan 2021-2025
File reference	1400_02_bmp_mw.docx
Team leader	Mark Woods
Contact details	m.woods@bakerconsultants.co.uk

	Name	Position	Date
Author	Mark Woods	Principal Ecologist	9 August 2021
Reviewed	Carlos Abrahams	Technical Director	20 August 2021
Revised			

Baker Consultants Ltd
Cromford Station
Cromford Bridge
Matlock
Derbyshire DE4 5JJ
info@bakerconsultants.co.uk
www.bakerconsultants.co.uk
01629 593958

Company No. 6702156

© Baker Consultants



Disclosure and Limitation:

Baker Consultants has prepared this document for the sole use of the commissioning client in accordance with the agreed scope of works and Terms and Conditions under which our services were performed. The evidence and opinion provided is true and has been prepared in accordance with the guidance of our professional institution's Code of Professional Conduct. No other warranty is made as to the professional advice included in this document or any other services provided by us. This document may not be relied upon by any third party without the prior and express written agreement of Baker Consultants.

Unless otherwise stated in this document, the assessments made assume that the study site referred to will continue to be used for its current purpose without significant change. The assessment, recommendations and conclusions contained in this document may be based upon information provided by third parties and upon the assumption that the information is relevant, correct and complete. There has been no independent verification of information obtained from third parties, unless otherwise stated in the report.

Where field investigations have been carried out, these have been restricted to the agreed scope of works and carried out to a level of detail required to achieve the stated objectives of the services. Natural habitats and species distributions may change over time and further data should be sought following any significant delay from the publication of this document.

Report Contents

1	Introduction	1
2	Site Description	2
3	Evaluation	23
4	Objectives and Rationale	30
5	Outline Prescriptions	49
6	Annual Work Plans	59
7	Beyond 2025	80
	Appendix 1: Phase 1 Habitat Survey Plan	84
	Appendix 2: Management Compartments Plan	85

1 Introduction

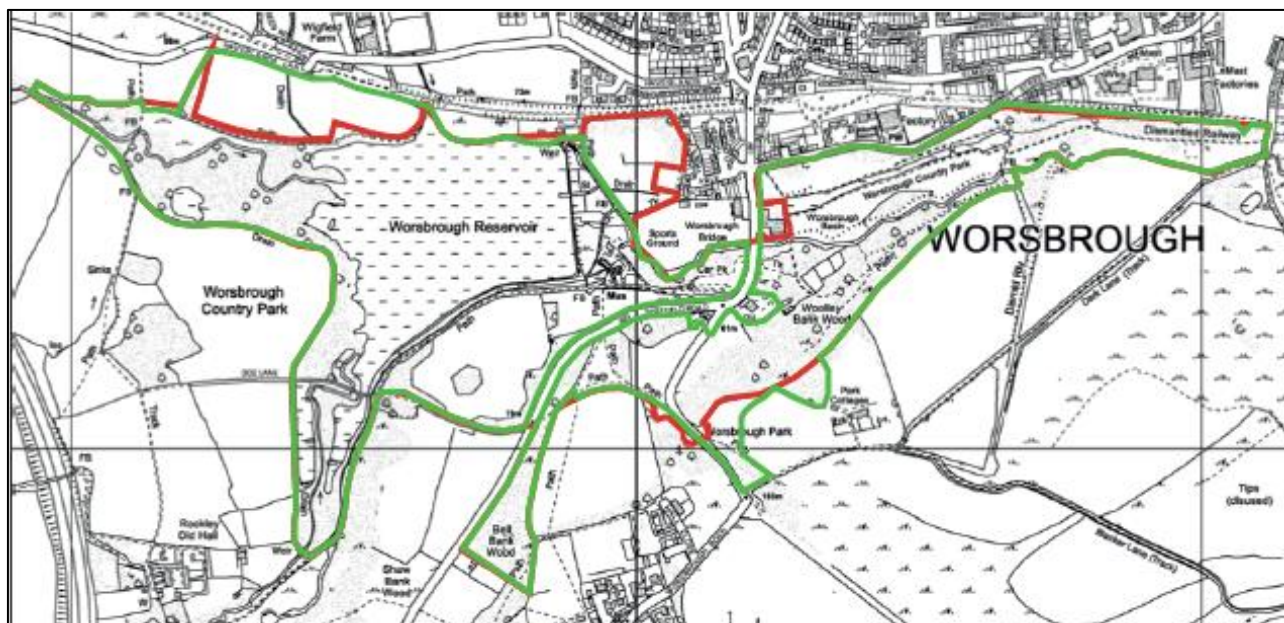
- 1.1.1 A Conservation Management Plan (CMP) for Worsbrough Mill and Country Park (WMCP) was produced in 2015 on behalf of Barnsley Metropolitan Borough Council (BMBC). The CMP was put together by a consortium of consultants, including Baker Consultants, DSA Landscape & Design and MOLA, who were commissioned by the Dearne Valley Landscape Partnership (DVLP).
- 1.1.2 The CMP was prepared to support the development of a new set of future management aims, objectives and actions, in order to supersede a previous 2011 to 2016 CMP¹. The document was prepared for use by the Arts and Heritage Service, maintenance contractors, the Visitor Services Team, the Friends of Worsbrough Mill and any other voluntary groups who wanted to be involved in the management of Worsbrough Mill Museum and Country Park. The CMP focused on three themes; Landscape, Biodiversity and Heritage. The time period for the 2016 to 2020 plan is now complete and a new Biodiversity Management Plan for the period 2021 to 2025 is required.
- 1.1.3 BMBC commissioned Baker Consultants to prepare a Biodiversity Management Plan for the 2021 to 2025 period, which will contain updated management objectives and actions. This document may refer to other disciplines such as Landscape and Heritage, but its primary purpose is to guide the management of the site to conserve biodiversity.

¹ Barnsley Metropolitan Borough Council (2011). *Worsbrough Mill Museum and Country Park: Land Management Plan*. Barnsley Metropolitan Borough Council.

2.1 Extent, Location and Ownership

- ## 2.2 Statutory and Non-statutory Designations

- ### Figure 1. Site Location



LNR Boundary = green line

Country Park Boundary (where it differs from the LNR) = red line

- 2.2.2 A significant area of 'The Park' is included within the Worsbrough Reservoir Local Wildlife Site (LWS), which covers an area of 37.08ha and extends from the Park's Sheffield Road Car Park in the east, following the boundary of the Park to the north and west, and extending beyond 'The Park' southwest to the M1 Motorway.
- 2.2.3 The Park was awarded 'Country Park' status on 9 February 2012 (Ref application: CPA20100086) by Natural England, which is valid for a period of three years. Re-application for accreditation is in progress. The Park was awarded Green Flag status in 2012, but the option for the Park to retain its status has been declined.
- 2.2.4 The site lies within the South Yorkshire Forest region. The South Yorkshire Forest is one of twelve Community Forests that were set up in 1991 to revitalise and regenerate greenspaces in locations close to some of the major English cities and towns.

2.3 Biological Description: Flora

- 2.3.1 The Park is located in part of the River Dove catchment and includes the Rockley Dike and Brough Green Brook, which flow into the Worsbrough Reservoir. The reservoir outflow is the start of the River Dove, which flows eastwards to its confluence with the River Dearne near Darfield. In addition to the reservoir, streams and river, a leat is located alongside the south boundary of the reservoir. The leat flows into a millpond that is located near to the southeast corner of the reservoir. The pond provides water to power the Worsborough Mill and outflows into the River Dove below the reservoir outfall.
- 2.3.2 The reservoir was originally constructed to provide water for the Worsbrough section of the Dearne and Dove Canal. A section of the canal is still present on the part of the Park that is located to the east of Sheffield Road. Water from the reservoir continues to flow into the remaining section of the canal by way of a drain that is open for a short section across a grassland field before being culverted below a sports ground and Sheffield Road. The outfall from the canal is culverted into a pipeline, which flows east to the River Dove.
- 2.3.3 The Rockley Dike, Brough Green Brook and the River Dove are flanked by mature wet woodlands. Within the park, mature semi-natural broadleaved woodlands are located on the northwest-facing slopes above the River Dove and the Sheffield Road. Additional broadleaved woodland stands are located on some areas of neighbouring land and to the south form a contiguous cover with the Park woodland. Blocks of plantation broadleaved woodland are scattered throughout the Park, particularly to the east of Sheffield Road. Most of the resource is semi-mature, but smaller, mature stands are present in the southwest corner of the Park
- 2.3.4 Five semi-improved and unimproved neutral grasslands are located to the north, south and east of the reservoir. The extent of agricultural improvement is variable, with the least improved being the most botanically diverse and the most improved being relatively species-poor. The grasslands are managed by mowing and aftermath grazing. There is an area of grassland on the north side of the canal that is species-poor and amenity-managed.

The grassland to the south and east of the canal is also species-poor and for the most part is managed by an annual cut.

- 2.3.5 The Park includes an extensive network of hedgerows, which surround grasslands, and in some cases defines the Park boundary. Although the hedgerows are, for the most part, dominated by hawthorn *Crataegus monogyna*, a wide range of other broadleaved native species are also present. A programme of laying and routine trimming has maintained the structural integrity of the hedgerows.
- 2.3.6 Detailed descriptions of each habitat type are provided below. For the most part they are a copy of the 2015 plan descriptions except where changes have occurred or new parcels of land have been included (see paragraph 2.2.1). Appendix 1 provides a Phase 1 Habitat Survey Plan, which shows the extent and location of habitat types within the park that are described below. The habitats are classified according to standard Phase 1 Habitat descriptions (JNCC, 2010)². For ease of reference, the habitats have been separated into management compartments. The location of each management compartment is provided on a plan at Appendix 2.
- 2.3.7 A desk study in 2015 returned 635 records of vascular plants consisting of 294 species; 108 bryophyte records consisting of 64 species, and 330 records of fungi consisting of 118 species. An updated desk study for 2015 to 2020 returned a further 2,614 records of vascular plants consisting of 293 species; 91 bryophyte records of 24 species; 219 records of fungi consisting of 103 species, and 34 records of 11 lichen species.

Compartment 1: Broadleaved Woodland

- 2.3.8 The Woolley Bank and Bell Bank Woods are broadleaved woodlands, located on a northwest-facing bluff that overlooks the River Dove and Sheffield Road. To the east, overlooking the River Dove, Woolley Bank Wood gradually narrows as the bluff diminishes in width and slope. To the west, the bluff becomes wider, but is interrupted by the Worsbrough Road. On the west side of Worsbrough Road, the woodland occupies a bluff with a more westerly aspect that overlooks the Sheffield Road, this gradually narrows and then widens again into a stand known as Bell Bank Wood. For the most part the woodlands are semi-natural with a constant presence of sessile oak *Quercus petraea*, ash *Fraxinus excelsior* and hawthorn. There are, however, non-native and naturalised broadleaved trees including sycamore *Acer pseudoplatanus*, beech *Fagus sylvatica* and sweet chestnut *Castanea sativa* that are present throughout the wood and in places are locally abundant.
- 2.3.9 The woodland is mature with a high forest structure that is 10m+ high, with a canopy cover of 80%. The understorey, shrub and field layers are well represented, for the most part, but wherever beech attains local dominance other layers are generally absent. Fallen and standing deadwood is no more than locally frequent throughout the woodland, despite the age of the mature trees.
- 2.3.10 The understorey and shrub layers occupy no more than 40% cover and consist of

²Joint Nature Conservation Committee (2010). *Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit*. JNCC, Peterborough.

regenerating trees (described above) and shrubs such as hazel *Corylus avellana*, hawthorn and elder *Sambucus nigra*, together with immature holly *Ilex aquifolium* and yew *Taxus baccata* trees. Bramble *Rubus fruticosus* agg. is the most abundant field layer species, but the number of dead spikes (2015) and new shoots (2021) suggests that bluebell *Hyacinthoides non-scripta* is abundant in the spring-time, and dog's mercury *Mercurialis perennis* and ramsons *Allium ursinum* are locally abundant. Bryophytes are poorly represented. Leaf-litter is locally abundant but variable because of steep topography and disturbance.

- 2.3.11 Alongside the river and in wet hollows, the sessile oak, ash and sycamore trees are partly replaced by crack willow *Salix x fragilis* and to a lesser extent by alder *Alnus glutinosa*, but field and shrub layer species are similar to the neighbouring stands on the slopes unless there is standing water in winter.

Photograph 1: Regeneration in Compartment 1 (Broadleaved Woodland)



Photograph 2: Himalayan balsam in the field layer of Compartment 2 (Plantation Broadleaved Woodland)



Compartment 2: Plantation Broadleaved Woodland

- 2.3.12 The woodland stand is located within Woolley Bank Wood, close to Worsbrough Road; the semi-natural woodland composition described for TN1 is largely replaced by a near-pure stand of sycamore of uniform height (10m+) and age, which suggests a plantation rather than semi-natural woodland. The field layer in this area is also different to that described in TN1, being relatively species-poor, with locally abundant Himalayan balsam *Impatiens glandulifera* and frequent common nettle *Urtica dioica*. The reasons for the change to the field layer are not obvious, because the soils do not appear to be significantly different to

the soils in neighbouring stands, but disturbance is likely to have enabled colonisation by the Himalayan balsam.

Compartment 3: Amenity-managed Grassland

- 2.3.13 The grassland to the north of the canal basin is species-poor, short and dominated by perennial rye-grass *Lolium perenne* and white clover *Trifolium repens*. Other species including ribwort plantain *Plantago lanceolata*, yarrow *Achillea millefolium*, creeping buttercup *Ranunculus repens* and dandelion *Taraxacum* agg. are rare. Alongside West Street and Sheffield Road the boundary of the grassland is defined by a mortared stonewall, which has missing and damaged sections. Patches of grassland in accessible locations (next to blocks of plantation broadleaved woodland) are unmanaged and in addition to the species described above, also contain grassland weeds such as common nettle, prickly sow-thistle *Sonchus asper*, creeping thistle *Cirsium arvense* and grasses such as cock's-foot *Dactylis glomerata*, false oat grass *Arrhenatherum elatius* and wall barley *Hordeum murinum*.

Compartment 4: Plantation Broadleaved Woodland

- 2.3.14 To the east of Sheffield Road there are eight blocks of semi-mature broadleaved plantation woodland (Compartments 4a – 4h), located either side of the canal basin, which are a mix of native and non-native species. The woodland blocks have a fairly uniform, but dense structure and the near continuous 6-8m high canopy suggests that they were probably all planted at the same time. The dense canopy is sufficient to either entirely suppress field-layer vegetation or to reduce it to a thin scattering of plants, but including climbing ivy *Hedera helix* and wood avens *Geum urbanum* that are shade tolerant.

Photograph 3: Amenity-managed
Grassland and part of a stand of Plantation
Broadleaved Woodland



- 2.3.15 A wide range of tree and shrub species have been planted within the blocks, but the composition varies between each of the blocks. The largest block of plantation woodland is located at the east end of the canal basin and abuts a section of dismantled railway, which serves as an access route for cyclists and pedestrians. Access into the woodland is possible and there is evidence of fire-raising and fly tipping associated with informal 'dens'. Smaller woodland blocks are largely impenetrable. Natural regeneration has occurred within the plantation, particularly willows *Salix* spp., hawthorn, blackthorn *Prunus spinosa* and sycamore and it is difficult to separate the plantation species from the native colonists.
- 2.3.16 Species in Compartment 4 include ash, sycamore, Norway maple *Acer platanoides*, field maple *Acer campestre*, white poplar *Populus alba*, hybrid black poplar *Populus x canadensis*, grey willow *Salix cinerea*, crack willow, white willow *Salix alba*, common osier *Salix viminalis*, common alder *Alnus glutinosa*, grey alder *Alnus incana*, sessile oak, rowan *Sorbus aucuparia*, oleaster *Eleaagnus* sp., guelder rose *Viburnum opulus*, dogwood *Cornus* spp., snowberry *Symphoricarpos albus* and hawthorn.

Compartment 5: Standing Water

- 2.3.17 At the west end, the Dearne and Dove Canal basin is approximately 20m wide and the banks are stone lined, with scattered patches of emergent marginal vegetation including reed-sweet grass *Glyceria maxima* and greater willowherb *Epilobium hirsutum*, and occasional immature willow *Salix* sp., and alder trees on the banks.
- 2.3.18 To the west, the stone-lined banks are either absent or obscured by marginal and/or overhanging vegetation and the channel narrows to a width of approximately 5m.
- 2.3.19 The north side of the channel is characterised by a dense cover of bramble, which overhangs

the banks of the channel. Between bramble patches, a variety of semi-mature trees including white willow, crack willow, hawthorn, ash and silver birch *Betula pendula* are present. Patches of tall-herbs including common nettle, greater willowherb and rosebay willowherb *Chamerion angustifolium* are also present on the edge of the bramble or below the tree canopies.

- 2.3.20 The south and east bank of the channel is characterised by strips of marginal vegetation containing abundant reed sweet-grass, locally abundant greater reedmace *Typha latifolia* and greater willowherb and scattered plants of gypsy-wort *Lycopus europaeus*. Fishing pegs, which are spaced at fairly regular intervals of 3-5m are located within the stands of marginal vegetation. The only submerged species observed was spiked water-milfoil *Myriophyllum spicatum*. During a site visit in January 2021 all of the bankside and marginal vegetation on the south side of the canal had been cut, leaving no vegetation cover.

Compartment 6: Running Water

- 2.3.21 Below the reservoir, the River Dove varies in width between 5m and 8m, with varying depths and flow rates that are influenced by the physical characteristics of the channel. Pool and riffle sequences, braided channels and canalised sections are present and substrates vary and include silts, gravel and large boulders. The banks of the river are often steep, and on bends there are 2-3m high mud cliffs. Some of the sections subject to heavy erosion have been modified (and stabilised) by the installation of gabions.
- 2.3.22 At the east end of the Country Park, the river channel is heavily modified into a 30m long canalised section that is characterised by 3-5m high concrete walls and stone-lined channel bed, which is likely to be associated with a former gunpowder manufacturer that was located further downstream of the Edmunds Road bridge (D. Keddy *pers. comm.* 2015). Immediately downstream of the canalised section, the steep banks upstream and downstream of the Edmunds Road Bridge are heavily eroded due to the destruction of the original bridge during the 2007 floods. A section of bank immediately upstream of the Edmunds Road bridge has been stabilised by the installation of gabions.
- 2.3.23 Most of the river is shaded by bankside trees and shrubs, which are near continuous along the entire section of the river. Shading and flow-rates are such that aquatic vegetation is not present and is unlikely to establish because of rapid flow-rates following periods of precipitation.

Photograph 4: The east end of the Dearne and Dove Canal Basin (Compartment 5)

Photograph 5: A section of the River Dove (Compartment 6) to the east of the A61 Trunk Road



Compartment 7: Improved Grassland

- 2.3.24 Two patches of grassland on the south side of the canal basin are species-poor and at the time of the 2015 survey (August) had been recently cut. The cuttings had been left in-situ and created a thick, near-continuous mat of dead cuttings. Below the cover of cuttings, the grassland has a near-continuous cover of thatch between grass stems. Species include perennial rye-grass, white clover, cock's-foot, dandelion, creeping buttercup and ribwort plantain. Strips of the grassland are maintained by frequent cutting to provide footpaths for informal recreation. An inspection in January 2021 confirmed that the grassland continues to be cut, but there was no significant thatch or bryophyte layer. There was, however, extensive localised damage caused by vehicle tyre ruts, flooding and to a lesser extent, pedestrian trampling.

Compartment 8: Semi-improved Neutral Grassland

- 2.3.25 The grassland is located between the east end of the reservoir and urban development with a sports ground to the south and a plantation woodland to the north which separates the site from a neighbouring section of dismantled railway. The east boundary consists of species-poor, but dense and scrubby hedgerows surrounding a bowling green and a section of plantation broadleaved woodland. The south and west boundaries are defined by a continuous post-and-rail fence that is in a poor state of repair. Immature ash trees are frequent along the length of the fence along with occasional patches of bramble and scattered, immature hawthorn and wild plum *Prunus domestica* shrubs.

Photograph 6: Semi-improved grassland (Compartment 8) with post and rail fence on boundary



Photograph 7: Semi-improved grassland (Compartment 9)



- 2.3.26 The grassland includes a section of a drain, which feeds water from the reservoir into the Dearne and Dove Canal (Compartment 5). The drain is shallow with a rapid flow that is, for the most part, shaded by overhanging hawthorn, ash and crack willow. Gaps in the canopy are characterised by patches of creeping bent-grass *Agrostis stolonifera* and Yorkshire fog *Holcus lanatus*, puddled and poached by the activity of cattle. A basking grass snake *Natrix natrix* was disturbed during the survey.
- 2.3.27 A former hedge boundary within the grassland is now reduced to a row of several mature ash, sessile oak and hawthorn trees, which are situated on the top of a 1m high bank of tall-herbs and grasses.
- 2.3.28 The grassland sward is fairly species-poor, short and 'tussocky' with locally frequent patches of cut hay presumably left behind during the baling process. The thatch layer is frequent, but bryophytes are not present. Species include Yorkshire fog, cock's-foot, dandelion, ribwort plantain, creeping buttercup, perennial rye-grass, white clover, red clover *Trifolium pratense*, creeping thistle *Cirsium arvense*, common bent-grass *Agrostis capillaris* and red fescue *Festuca rubra*. A site visit in January 2021 confirmed that there had been little change to the grassland habitat, but it was obvious that the sward was in good condition following a hay cut and a period of aftermath grazing.

Compartment 9: Semi-improved Neutral Grassland

- 2.3.29 Two fields located on the west side of Sheffield Road support a sward that was short at the

time of the survey with a sparse thatch layer and no obvious bryophytes. The grassland is cut for hay and aftermath grazed. Species include perennial rye-grass, white clover, black knapweed *Centaurea nigra*, creeping thistle, ribwort plantain, Yorkshire fog, yarrow *Achillea millefolium*, common sorrel *Rumex acetosa*, dandelion, pignut *Conopodium majus*, quaking grass *Briza media*, sweet vernal grass *Anthoxanthum odoratum*, germander speedwell *Veronica chamaedrys*, red fescue, common bent grass, meadow buttercup *Ranunculus acris* and creeping buttercup. The field to the east (9a) is much more species-rich than the field to the west (9b) and is less agriculturally improved.

- 2.3.30 There is a triangular section of the field at the east end, which was formerly a mix of rough grassland, tall ruderal herbs and scrub. In January 2021, scrub had been removed and the ruderal species such as docks *Rumex* spp. had been treated with a pesticide in advance of modifying the habitat to a traditional orchard (Jenny Palmer *pers. comm.* January 2021). The boundary of this area is defined by some scattered hawthorn shrubs (a relict hedgerow) and a near-veteran sycamore pollard that is a significant landscape feature.
- 2.3.31 The boundary alongside Sheffield Road is a mortared wall and, where the plantation woodland is absent, the sward is uncut for a width of 0.5-0.75m.

Compartment 10: Plantation Broadleaved Woodland

- 2.3.32 There are four individual plantation stands on the higher, drier ground to the south of the reservoir in association with two grassland fields (Compartment 9).
- 2.3.33 The woodlands are a mix of predominantly broadleaved species with a few European larch *Larix decidua*. The broadleaved trees and shrubs are a mix of native and non-native species, planted in 1970. Species include sessile oak, ash, beech, sweet chestnut, sycamore, silver birch, field maple, hawthorn, hazel, cherry laurel *Prunus laurocerasus*, dogwood, snowberry and holly.
- 2.3.34 The stands are very dense and field layer vegetation is sparse and, where present, consists of shade tolerant species such as climbing ivy and wood avens.

Compartment 11: Broadleaved Woodland

- 2.3.35 The mature, mixed broadleaved woodland is mostly located on steep north-facing slopes overlooking the River Dove. A smaller part of the woodland is located between the Sheffield Road and the south side of the Car Park / Worsbrough Mill access road. The woodland has a high forest structure with some very large sycamore and ash. Crack willow becomes dominant on the river margin. The understorey is well represented, but the field layer is not particularly diverse and lacks any of the typical ancient woodland indicator species other than dog's mercury.

Compartment 12: Broadleaved Woodland / Running Water / Swamp

- 2.3.36 The wet woodland located to the northwest of the reservoir is dominated by crack willow with some alder. The Brough Green Brook runs through the woodland, discharging into the northwest end of the reservoir and where there are gaps in the tree canopy, small areas of open reedbed are present.

- 2.3.37 The canopy of the woodland is discontinuous and provides approximately 70% cover, with gaps created where over-mature willows have collapsed or snagged on neighbouring trees. This has enabled regeneration from fallen logs or enabled new trees to establish in the gaps, and the overall vertical and lateral structure is complex with abundant fallen and standing deadwood.
- 2.3.38 The field layer is fairly diverse with bramble, dog's mercury, and rosebay willowherb in drier areas and reed canary grass *Phalaris arundinacea*, greater reedmace and reed sweet grass being locally abundant in wetter low-lying areas that are seasonally flooded. Stands of Himalayan balsam are locally abundant throughout the woodland stand, often in association with common nettle, which is occasional to locally frequent.

Compartment 13: Broadleaved Woodland / Running Water / Swamp

- 2.3.39 This woodland stand is of similar composition to the stand to the northwest (Compartment 12), but has more extensive areas of drier woodland on the slightly higher ground where sycamore, English elm *Ulmus procera*, sessile oak and hawthorn are prominent. Alongside the streams alder is more abundant than crack willow. Two streams, including Rockley Dike, run through the woodland in a south to north direction, both discharging into the Worsbrough Reservoir in the southwest corner. Some of the water from the east side stream is diverted into a drainage channel that runs parallel to the south bank of the reservoir (Compartment 14).

Photograph 8: Wet Woodland
(Compartment 13) in winter



Photograph 9: Wet woodland
(Compartment 13) with laid hedgerow
(Compartment 28)



- 2.3.40 The field layer is fairly diverse, but Himalayan balsam is again abundant throughout, particularly alongside the streams. Low-lying areas typically support reed canary-grass, but standing water was generally absent during the 2015 field survey.

Compartment 14: Dense Scrub / Running Water

- 2.3.41 A 1-2m wide, relatively shallow drain is located alongside the south edge of the reservoir discharging into a former mill pond (Compartment 15) close to the southeast corner of the reservoir. The slow flow in the drain is supplemented by a pipe outflow from the reservoir immediately upstream of the millpond. Vegetation in the drain is sparse and restricted to small areas where the canopy of the bankside scrub is absent or sparse. The banks of the drain support scrubby woodland, with abundant hawthorn and frequent crack willow and alder, which form a near continuous canopy.

Compartment 15 Standing Water

- 2.3.42 The millpond gradually widens to the east from the 2m wide drainage ditch described above (Compartment 14). The north and east banks are stone-lined, whilst the south bank supports near continuous, scrubby woodland, which is a mix of native and non-native species. Crack willow and bramble are abundant and overhang the margins of the pond. The aquatic vegetation consists of dense stands of Nuttall's pondweed *Elodea nuttallii*, with occasional broadleaved pondweed *Potamogeton natans* and greater reedmace.

Compartment 16: Semi-improved Neutral Grassland

- 2.3.43 The east-facing bank of the reservoir dam and a spur between the main spillways on the east bank of the reservoir supports species-poor semi-improved neutral grassland. Species include cock's-foot, Yorkshire fog, perennial rye-grass and creeping buttercup. More recent observations (Jenny Palmer *pers. comm.* January 2021) suggest that the sward may be more diverse, and early flowering species such as ox-eye daisy *Leucanthemum vulgare* may be absent in the late summer because of the mowing regime.

Compartment 17: Plantation Broadleaved Woodland

- 2.3.44 The plantation broadleaved woodland that occupies a strip alongside the north and part of the east boundary of the Compartment 8 grassland has a fairly uniform canopy that is approximately 8m high. The dense canopy has suppressed the field layer to a very sparse cover of shade tolerant species such as red campion and ground ivy *Glechoma hederacea*. Species are a mix of native and non-native species. Ash, sycamore and sessile oak are the most prominent canopy species, with shrubs including hawthorn, snowberry and guelder rose in the understorey.

Compartment 18: Species-poor Hedgerow with Trees

- 2.3.45 The 3m high, untrimmed, hedgerow with trees screens the outfall area of the reservoir from a footpath located alongside the hedgerow. The hedgerow is dominated by wild plum with ash, hawthorn and dogwood also present.

Compartment 19: Species-poor Hedgerow with Trees

- 2.3.46 The hawthorn-dominated hedgerow flanks a footpath next to the Worsbrough Mill

buildings and to the north, runs alongside the millpond outfall ditch. It had been recently laid prior to the 2021 site visits.

Compartment 20: Running Water / Broadleaved Woodland

- 2.3.47 The outfall from the millpond is a narrow and shallow channel that is shaded and largely devoid of aquatic vegetation. The banks of the channel support scrubby woodland with abundant crack willow and hawthorn.

Compartment 21: Plantation Broadleaved Woodland

- 2.3.48 To the east of the reservoir sluice, part of the spillway is surrounded by mature plantation broadleaved woodland that has a high forest structure and is dominated by mature sycamore with a bramble field layer and a sparse shrub layer of elder and hawthorn.

Compartment 22: Broadleaved Woodland

- 2.3.49 A small area of open woodland is located between a private residence and the footpath alongside the north bank of the reservoir. The canopy is sparse, because much of the wych elm *Ulmus glabra* is dead or dying. The field layer is dominated by common nettle.

Compartment 23 Species-poor Hedgerow with Trees

- 2.3.50 The hedgerows located alongside a footpath that flank the north boundary of the reservoir are dominated by hawthorn and range between 2.5 and 3m high. The south faces of the hedgerows have been trimmed to keep the footpaths clear of obstacles and all sections appear to have been recently laid. To the west, a verge is present between the hedgerow and the footpath, which is dominated by tall-herbs including common nettle.

Compartment 24: Species-poor Hedgerow with Trees / Standing Water / Scattered Scrub

- 2.3.51 A long section of hawthorn-dominated hedgerow defines the west boundary of the site and includes a variety of broadleaved shrubs such as elder, hazel and wych elm. Between the footpath and the hedgerow there is a drainage ditch with pools of standing water of various depths that supports a diverse assemblage of tall-herbs including greater willowherb, meadowsweet, and common nettle, together with scattered shrubs and trees including crack willow, wych elm, field rose *Rosa arvensis* and hazel.

Compartment 25: Standing Water

- 2.3.52 The 24 hectare Worsbrough Reservoir is heavily silted alongside the west bank. This has enabled dense stands of emergent vegetation such as common reed to develop, flanked by a dense fringe of crack willows. The east and south banks of the Worsborough Reservoir are stone-lined and devoid of emergent vegetation.
- 2.3.53 A boardwalk is located alongside part of the north bank, installed approximately 3-5m into the reservoir. The boardwalk is used for fishing and acts as a wave-break. The north bank can be separated into several distinct sections; the northeast corner is stone-lined and a drop-board sluice is present, connected to a spillway. A further, relatively short section of stone-lined bank is also present to the west, which adjoins a section of bank in the northwest

corner, fringed by mature crack willows, which shade the shoreline.

Photograph 10: Worsbrough Reservoir (Compartment 25) in winter



Photograph 11: Species-poor Hedgerow (Compartment 26) recently laid



- 2.3.54 Behind the boardwalk, the footpath is flanked by tall-herbs and scattered, coppiced crack willows, most of which are semi-mature. The tall-herb stands are replaced on the shoreline by a fringe of emergent vegetation, which is a mix of species including greater reedmace, lesser pond sedge *Carex acutiformis*, reed canary grass and yellow flag-iris *Iris pseudacorus*. Most of the emergent plants were introduced as plugs or planted into coir rolls (D. Keddy pers. comm. 2015).
- 2.3.55 The reservoir contains a diverse assemblage of fish including common carp *Cyprinus carpio*, which have been introduced in recent years. Other species include bream *Abramis brama*, pike *Esox esox*, roach *Rutilus rutilus*, chub *Leuciscus cephalus* and perch *Perca fluviatilis*.

Compartment 26: Species-poor Hedgerow

- 2.3.56 The north and northeast boundary of the two fields (Compartment 9) consists of a species-poor, hawthorn-dominated, untrimmed hedgerow that is approximately 2m high. It has been laid in recent years.

Compartment 27: Species-rich Hedgerow

- 2.3.57 A short section of mixed hedgerow is present on the south boundary of the Compartment 9 grassland, between two stands of plantation broadleaved woodland. The hedgerow is intact, approximately 1.7m high and was trimmed at the time of the January 2021 visit. Species include hawthorn, blackthorn, hazel and spindle *Euonymus europaeus*.

Compartment 28: Species-poor Hedgerow

- 2.3.58 The hawthorn-dominated hedgerow flanks the south side of a footpath close to the north boundary of the Park. It has been recently laid.

Compartment 29: Species-poor Hedgerow

- 2.3.59 The hawthorn-dominated hedgerow flanks part of a broadleaved woodland stand (Compartment 11) overlooking the River Dove and the access road to the Worsbrough Mill buildings. The hedgerow is trimmed to a height of 1.25m and 1m wide, has several gaps and is partly shaded by the woodland canopy.

Compartment 30: Species-poor Hedgerow

- 2.3.60 A new hawthorn hedgerow has been planted since 2016 on the west and south boundary of Compartment 8 (semi-improved grassland). The saplings are less than 1m tall, planted in a double row and unguarded.

Compartment 31: Semi-improved Neutral Grassland

- 2.3.61 Two meadows located to the north of the reservoir are cut for hay and are aftermath grazed by livestock from Wigfield Farm. The east grassland (31b) is less botanically diverse and has a more open, 'patchy' sward with abundant perennial rye-grass and frequent white clover and creeping buttercup. The grassland is generally sloping from north to south, but falls away more steeply in the southwest corner.

Photograph 12: Compartment 31 - Neutral
(foreground) and Improved grassland
(background) and species poor hedgerow
(Compartment 32)



- 2.3.62 The west field (31a) is much more botanically diverse with a range of herbs and grasses that are characteristic of wetter, less agriculturally improved grasslands on floodplains. Species such as amphibious bistort *Persicaria amphibia*, greater burnet *Sanguisorba major*, and meadow foxtail *Alopecurus pratensis* are typical of such conditions. The sward is less open than the east field and has a more varied structure. A large area of the southwest corner of the field was under water during the January 2021 site visit.

Compartment 32: Species-poor Hedgerow

- 2.3.63 A trimmed hawthorn hedgerow alongside a culverted stream separates two grassland fields (Compartment 31).

Compartment 33: Species-poor Hedgerow with Trees

- 2.3.64 An unmanaged hedgerow that forms the boundary between a triangular section of dry, and 'scrubby' broadleaved woodland and a willow biomass plantation. The 4m+ high hedgerow is dominated by hawthorn, with hazel and blackthorn.

Compartment 34: Species-poor Hedgerow with Trees

- 2.3.65 An unmanaged hedgerow that forms the boundary between a triangular section of dry, and 'scrubby' broadleaved woodland and semi-improved grassland (Compartment 31). The 4m+ high hedgerow is dominated by hawthorn, with blackthorn and hazel.

Compartment 35: Species-poor Hedgerow with Trees

- 2.3.66 A long section of 4m+ high hedgerow that spans two grassland fields (Compartment 31) across their northern boundaries. Hawthorn is dominant, with dog rose, ash and blackthorn.

Compartment 36: Traditional Orchard

- 2.3.67 See Compartment 9, paragraph 2.3.30. The preparation is on-going and the tree planting (apple *Malus domestica* and pear *Pyrus* agg.) is scheduled for 2021.

2.4 Biological Description: Fauna

- 2.4.1 A desk study returned hundreds of historical biological records for the Park and surrounding area. The records were provided by the Barnsley Biological Records Centre, Trevor Mayne (Biodiversity Officer for Barnsley Metropolitan Borough council), and a previous management plan for the Park, but they originate from a network of local recorders and professional ecologists. A summary of the faunal records is provided below.

Mammals

- 2.4.2 The 2015 desk study returned 174 records of mammals, which consisted of at least 22 species. At least 8 bat species have been recorded across the site and roosting bats have been recorded in association with the Park buildings and trees. For most of the species, recent records are provided, but water vole *Arvicola amphibius* has not been recorded since 2002 and the current status of the population is unknown.
- 2.4.3 An updated request for records between 2015 and 2020 returned records of five bat species including common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus*, noctule *Nyctalus noctula* and Daubenton's bat *Myotis daubentonii*. In addition, the desk study returned two records of badger *Meles meles*, a single record for otter *Lutra lutra* (a road-kill) and nine records of harvest mouse *Micromys minutus*.

Herptiles

- 2.4.4 The 2015 desk study returned 4 records of grass snake and 15 amphibian records consisting of four records of common toad *Bufo bufo*; five records of common frog *Rana temporaria*; two records of great crested newt *Triturus cristatus*; two records of smooth newt *Lissotriton vulgaris* and one record of palmate newt *Lissotriton helveticus*. During the 2015 field survey for the previous management plan, a grass snake was recorded alongside a drain in Compartment 8 at OS grid reference SE350 035.
- 2.4.5 An updated request for records between 2015 and 2020 returned one grass snake, one common toad and four common frog records.

Birds

- 2.4.6 The 2015 desk study returned 3,969 records of birds, which consisted of 152 species. The records include resident and migrant species. Approximately 61 species are associated with aquatic habitats, but a significant number of the species are likely to be migrants, or rare visitors and casual species. Many of the remaining species are associated with the mature (wet and dry) broadleaved woodlands. No additional species were recorded during the field surveys.

- 2.4.7 The update desk study returned a total of 409 bird records between 2015 and 2020, comprised of 40 species. These included 11 red and 27 amber bird species of conservation concern (BoCC³). Ten of the BoCC species are also Species of Principal Importance listed under the provisions of the Natural Environment and Rural Communities Act (NERC), 2006.

Fish

- 2.4.8 There are surprisingly few records of fish and none for the reservoir or the canal, despite both waters being fished on a routine basis. The desk study returned two records for the River Dove – for common carp *Cyprinus carpio* and sea trout *Salmo trutta*.

Invertebrates

- 2.4.9 The 2015 desk study returned records of 246 invertebrate species. Several taxonomic groups were particularly well-represented including 19 bugs *Hemiptera*, 44 butterflies and moths *Lepidoptera*, 30 true-flies *Diptera*, 26 wasps and bees *Hymenoptera*, 61 beetles *Coleoptera*, 12 spiders *Arachnida*, and 24 slugs and snails *Mollusca*.
- 2.4.10 Sustained survey effort between 2015 and 2020 has returned 350 records of at least 214 species⁴ which is summarised below:
- Flatworms: 1 record of 1 species;
 - Earthworms: 1 record of 1 species;
 - Molluscs: 23 records of 19 species;
 - Crustaceans: 4 records of 3 species;
 - Millipedes: 7 records of 7 species;
 - Mites / ticks: 11 records of at least 10 species;
 - Spiders: 14 records of at least 13 species;
 - Harvestmen: 2 records of 2 species;
 - True-flies: 76 records of 63 species;
 - True bugs: 27 records of 26 species;
 - Sawflies, wasps, bees and ants: 22 records of 18 species;
 - Caddis-flies: 1 record of 1 species;
 - May-flies: 1 record of 1 species;
 - Dragonflies: 12 records of 6 species;
 - Moths: 41 records of 23 species, and
 - Butterflies: 107 records of 20 species.

2.5 Physical Description

Hydrology

- 2.5.1 The Park is located within the River Dove catchment, which forms part of the larger River

³ Eaton, M.A., Brown, A.F., Noble, D.G., Musgrove, A.J., Hearn, R., Aebischer, N.J., Gibbons, D.W., Evans, A., and Gregory, R.D. (2009) Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds* 102, pp296–341.

⁴ Not all specimens were identifiable to species level

Dearne catchment. Worsbrough Reservoir is fed by Rockley Dike and Brough Green Brook, which both originate to the east of the M1 Motorway. A smaller stream that is located close to the Rockley Dike is canalised into a leat that runs parallel to the south shore of the reservoir. Close to the southeast corner of the reservoir, there is a pipe outfall, controlled by a valve that increases the water levels in the leat and millpond to ensure sufficient supplies to power Worsbrough Mill. The water from the mill enters the River Dove immediately below the reservoir spillway. There is an overflow in the mill pond, which discharges via an open drain into the River Dove below the reservoir spillway.

- 2.5.2 The reservoir discharges into the River Dove from a spillway on the east shore and a drop-board sluice in the northeast corner. Immediately below the reservoir, weirs control the water flow.
- 2.5.3 The Dearne and Dove Canal is fed by a drain, which originates within the dam. For a short section in Grassland Compartment 8, the drain forms an open stream. Beyond the field, the drain is culverted below a sports field and Park Road (A61 Trunk Road) and empties into the west end of the canal basin in the east part of the Park. At the west end of the canal basin, there is an outfall, which discharges via a pipeline into the River Dove.

Topography

- 2.5.4 The river valley is relatively flat above the reservoir dam, with the lowest points at the northwest corner on the Brough Green Brook at 63m above sea level (asl) and the south corner of Rockley Dyke at 68m asl. Below the reservoir the river valley is fairly flat and ranges from 58m to 55m asl. To the south of the River Dove and the reservoir, the north and northwest facing woodland slopes attain a maximum height of 121m asl at the south end of Bell Bank Wood.

Geology

- 2.5.5 The Park has a mixed geology with alluvial deposits associated with the water courses and the west end of the reservoir. The surrounding land is a mix of Coal Measures (Westphalian), Sandstones, Shales and Clays, with pronounced outcrops of Coal and Ironstone.

Soils

- 2.5.6 Soils local to the Park are categorised as Cambic Stagnoley, which are fine loams over thin layers of drift clay overlying Carboniferous Shales. To the east, the soils are loamy brown earths over Carboniferous Shales.

Climate

- 2.5.7 Average climate data was obtained from Sheffield, which is the nearest available meteorological station to the Park. The figures are based on the climate period 1981 to 2010.

- Temperature: Annual Maximum = 13.4°C, Annual Minimum = 6.6°C
- Days of Air Frost: 33.8
- Sunshine Hours: 1444.9
- Rainfall: 834.6mm

3 Evaluation

3.1 Introduction

- 3.1.1 The following evaluation is based on criteria defined in A Nature Conservation Review, Ratcliffe (1977)⁵.

3.2 Size

- 3.2.1 The Park is 62.5 hectares⁶ in total and the major habitats including the woodlands and reservoir are of sufficient size to be self-sustaining without intervention. The smaller habitats such as the grassland will require management to maintain their successional state and present size.

3.3 Diversity

- 3.3.1 The desk study confirmed that the site is of county importance for biodiversity and given the diversity of bird species, it is likely to be of regional importance. For each taxonomic group, a summary of the number of protected species and those species of conservation concern is provided below.

Mammals

- 3.3.2 None of the species are nationally rare, but nine species are protected under the Habitats Directive (EC Directive 92/43/EEC). Ten species are protected under the Wildlife & Countryside Act 1981, and ten species are listed under the provisions of NERC Act 2006. Badger is protected by the Badgers Act 1986, and all bats, hedgehog *Erinaceus europaeus*, harvest mouse, water vole and otter are Barnsley Local Biodiversity Action Plan (LBAP)⁷ species.

Herptiles

- 3.3.3 None of the amphibian or reptile species are nationally rare or scarce, but great crested newt is protected under the Habitats Directive. All of the species are afforded some protection under the Wildlife & Countryside Act 1981. Common toad, great crested newt and grass snake are Species of Principal Importance, and great crested newt is a Barnsley LBAP species.

Birds

- 3.3.4 The 2015 desk study records of 18 species listed under Annex 1 of the European Union Council Directive 79/409/EEC. 29 species are listed under Schedule 1 of the Wildlife and Countryside Act 1981. A total of 31 are Species of Principal Importance listed under the

⁵ Ratcliffe, D.A. (ed.). 1977. *A Nature Conservation Review*. Cambridge University Press, Cambridge.

⁶ The Local Nature Reserve is 62.49 hectares

⁷ <http://www.barnsleybiodiversity.org.uk/BarnsleyBAP.html>

provisions of NERC Act, 2006. There are 7 Barnsley LBAP species. The 2020 update returned records of 4 species listed under Annex 1 of the European Union Council Directive 79/409/EEC; 7 species listed under Schedule 1 of the Wildlife and Countryside Act 1981; 10 Species of Principal Importance listed under the provisions of NERC Act, 2006; and 11 red listed and 27 amber listed BoCC species. The updated desk study did not return any species not included on the 2015 lists.

Fish

- 3.3.5 Only two records of fish were returned from the desk study despite a long history of angling on the Worsbrough Reservoir and Dearne and Dove Canal. The common carp record for the River Dove is likely to be an escape from Worsbrough Reservoir. Discussion with anglers in 2015 revealed that the reservoir had been stocked with a number of common carp. Sea trout is a Species of Principal Importance listed under the provisions of NERC Act, 2006, and was also a Barnsley LBAP species.

Invertebrates

- 3.3.6 Before 2015 there were relatively few invertebrate records compared with other taxonomic groups and there were no records of rare or scarce species. There were, however, 4 moth and 1 butterfly species that are listed as Species of Principal Importance under the provisions of the NERC Act (2006).
- 3.3.7 The 2020 update returned 350 records of 214 species. White-letter hairstreak *Satyrrium w-album* butterfly and the latticed heath *Chiasmia clathrata* and shaded broad-bar *Scotopteryx chenopodiata* moths are Species of Principal Importance and Barnsley LBAP species.
- 3.3.8 Given the number of records it is obvious that the most surveyed group is Lepidoptera, with a total of 20 butterfly and 23 moth species. The diversity of butterflies and moths is a considered to be a reliable indicator as to the value of the site and although there are no nationally rare species, the site is obviously of significant invertebrate interest.

Vascular Plants

- 3.3.9 None of the plant species at the Park are rare or scarce, but Stroh *et al.* (2014)⁸ categorises Good King Henry *Blitum bonus-henricus* as 'Vulnerable' and a further five species are categorised as 'Near Threatened'. The Near Threatened species are quaking grass *Briza media*, wood sanicle *Sanicula europaea*, tormentil *Potentilla erecta*, common valerian *Valeriana officinalis*, corn mint *Mentha arvensis* and bitter vetch *Lathyrus linifolius*. The last record for the Good King Henry was 1997 and it was not observed during the 2015 field survey. Bluebell *Hyacinthoides non-scripta* is a Barnsley LBAP species (Carr and Parker, 2008)⁹.
- 3.3.10 A survey of the grasslands (Compartments 10 and 31) between 2016 and 2018 identified six

⁸ Stroh, P.A., Leach, S.J., August, T.A., Walker, K.J., Pearman, D.A., Rumsey, F.J., Harrower, C.A., Fay, M.F., Martin, J.P., Pankhurst, T., Preston, C.D. & Taylor, I. (2014). *A Vascular Plant Red List for England*. Botanical Society of Britain and Ireland, Bristol.

⁹ Carr, G & Parker, M. (2008). *Barnsley Biodiversity Action Plan* (2008 – 2012) Second Edition. Barnsley Biodiversity Trust.

species of ecological interest. Species that are either declining or uncommon in the Barnsley area include greater burnet *Sanguisorba officinalis*, amphibious bistort *Persicaria amphibia*, pignut *Conopodium majus*, meadow crane's-bill *Geranium pratense* and cowslip *Primula veris*.

- 3.3.11 Desk study records also included giant hogweed *Heracleum mantegazzianum* and Himalayan balsam *Impatiens glandulifera*, which are considered to be invasive species.

Bryophytes

- 3.3.12 The 2015 desk study returned 108 bryophyte records consisting of 64 species. The updated desk study returned 91 records of 24 species. None of the species are nationally rare / scarce, or Species of Principal Importance under the provisions of the Natural Environment and Rural Communities Act (NERC) 2006.

Fungi

- 3.3.13 There are two records for giant funnel-cap *Leucopaxillus giganteus*, which is classified as 'Vulnerable', IUCN (2003) ¹⁰. The 2011 – 2016 Land Management Plan for the Park identified 3 species including *Cyathus olla*, *Phellinus igniarius* and *Panellus serotinus* as being of regional importance.
- 3.3.14 The only notable fungal record from the 2021 desk study is the brawny bolete *Boletus torosus* (Compartment 1) growing in deciduous woodland. Brawny bolete is a Species of Principal Importance and Local Biodiversity Action Plan (2007) Species.

Lichens

- 3.3.15 None of the 11 lichen species (34 records) returned by the 2015 to 2020 desk study were protected or notable species.

3.4 Rarity

- 3.4.1 The desk did not return any records for nationally rare or scarce species, but Good King Henry and Giant Funnel Cap are classified as 'Vulnerable' due to population declines. In addition, the site supports touch-me-not balsam *Impatiens noli-tangere*, which is locally rare and there is also a high number of bird species that have shown significant UK population declines including willow tit *Poecile montanus* and lesser spotted woodpecker *Dryobates minor*. A total of 34 of the bird species are included on the Birds of Conservation Concern (BoCC) Red List and 65 of the bird species are included on BoCC Amber List (Eaton *et al.* 2009) ¹¹.

3.5 Fragility

- 3.5.1 Without intervention, the woodland habitats are relatively robust and apart from the

¹⁰ IUCN (2003). *Guidelines for the Application of IUCN Red List Criteria at Regional Levels: Version 3.0*. IUCN Species Survival Commission, IUCN, Gland, Switzerland and Cambridge.

¹¹ Ibid

abundance of Himalayan balsam, are in reasonable condition. There is potential for eutrophication from the water-courses when they flood during winter and in the long-term terrestrialisation will promote a change in the tree canopy species, but such processes are difficult to control and even with intervention there is no guarantee of success. It is, however, expected that the wet woodland, without intervention, will expand into the reservoir at the expense of open water.

- 3.5.2 There is a concern with regards to the condition of the grasslands because of the application of fertiliser to two of the fields and the potential for run-off from fertiliser into neighbouring unfertilised grassland and towards the reservoir. Previous management plans included the conservation of biodiversity as a primary function of the Country Park and this management plan continues to include objectives that promote biodiversity. The direct application of fertiliser and potential run-off into neighbouring areas will increase sward productivity at the expense of botanical diversity and the ecological interest will decline. Any loss of botanical diversity is likely to have an adverse impact on faunal groups that are associated with unimproved grasslands.
- 3.5.3 The aquatic habitats are fragile and vulnerable to decline. Environment Agency data¹² indicates that the River Dove has poor ecological potential, but Rockley Dike and Brough Green Brook upstream of the Worsbrough Reservoir are of 'moderate' and 'good' ecological potential respectively. This does not necessarily indicate that Worsbrough Reservoir is a cause for the condition of the River Dove, as factors downstream of the reservoir may be contributing to the decline in quality. It is, however, reasonable to assume that the condition of the reservoir has the potential to contribute to the ecological condition of the River Dove. The control of diffuse pollution such as eutrophication from surface water run-off from agricultural land is difficult to control, but factors such as overstocking of fish in the reservoir and interfering with the reservoir outfall levels into the river need to be managed.

3.6 Typicalness

- 3.6.1 The Park is located in the Coal Measures Natural Area¹³, which is located between North Leicestershire and the Yorkshire cities of Leeds and Bradford. The typical semi-natural terrestrial vegetation consists of oak-birch woodland (NVC W10: *Quercus robur* - *Pteridium aquilinum* - *Rubus fruticosus* woodland, Rodwell, 1991¹⁴) on drier soils, which is well represented in Woolley Bank Wood and Bell Bank Wood. The crack willow dominated woodlands (NVC W6b: *Alnus glutinosa* - *Urtica dioica* woodland, *Salix fragilis* sub-community) are typical for the nutrient-rich alluvial soils that are present alongside the rivers and streams in the park and the western shoreline of the reservoir.
- 3.6.2 The plantation woodlands are a mix of native and non-native trees and shrubs that are not typical of any semi-natural woodland habitats on the Coal Measures.
- 3.6.3 The improved and amenity grasslands are typical of agricultural and urban land. Two of the fields (Compartments 9a and 31a) are much less improved and have some affinity to the

¹² <http://maps.environment-agency.gov.uk/>

¹³ <http://www.naturalareas.naturalengland.org.uk/Science/natural/profiles/naProfile24.pdf>

¹⁴ Rodwell, J. (1991 *et seq*). *British Plant Communities Volumes 1 to 5*. Cambridge University Press, Cambridge.

unimproved, semi-natural Coal Measures grasslands (NVC MG5c: *Cynosurus cristatus* – *Centaurea nigra* grassland, *Danthonia decumbens* sub-community) that are very scarce throughout the area. Compartment 31a also has seasonally flooded areas that are similar in composition to NVC MG4: *Alopecurus pratensis* – *Sanguisorba officinalis* grassland, a once typical grassland type on the floodplains of lowland England.

- 3.6.4 The rivers and streams in the natural area are gradually recovering from a heavily polluted state following the decline of heavy industry and mining throughout the area. However, the rate and extent of recovery is potentially affected by diffuse pollution, eutrophication, abstraction and recreational pressures¹⁵ and the presence of non-native species such as signal crayfish *Pacifastacus leniusculus*.

3.7 Naturalness

- 3.7.1 The reservoir, improved grasslands and plantation woodlands are not representative of natural, or semi-natural habitats on Coal Measures. The Woolley Bank and Bell Bank Woods show many of the characteristics of semi-natural W10 woodlands, but past planting with a selection of non-native and non-indigenous species such as sycamore, sweet chestnut and beech reduce the naturalness of the woodlands. Past disturbance and localised colonisation by Himalayan balsam is also not typical. The crack willow and alder woodlands that flank the rivers and streams are semi-natural and typical for the soils and locality, but the abundance of Himalayan balsam, being a recent colonist of such habitats in the United Kingdom, is not natural.
- 3.7.2 Bank reinforcement (gabions and retaining walls), canalisation and weirs have reduced in-channel variation and created laminar flow conditions in sections of the rivers and streams of the Park, which can reduce the ecological interest of the waterway. Such features, however, are fairly localised in the Park and extensive sections are relatively undisturbed and unaffected by modification. Natural fluvial processes such as pool and riffle sequences, runs, braiding and shingle bars are all present on undisturbed sections of the waterways in the Park.
- 3.7.3 The reservoir is a heavily modified waterbody, but the western shoreline has mix of marginal habitats that are typical of semi-natural water-bodies. The millpond is heavily modified, but elements of the aquatic flora such as broadleaved pondweed *Potamogeton natans* are typical of lowland ponds.

3.8 Recorded History

- 3.8.1 The industrial history is described on the Park's website¹⁶ and of particular ecological interest is the origin of the reservoir and the canal. The historical account confirms that much of the land in the Park, with the exception of the semi-natural woodlands, was previously used for industrial purposes and the establishment of plantation woodlands and

¹⁵ Ibid

¹⁶ <http://www.worsbrough-mill.com/history>

grasslands is relatively new.

- 3.8.2 The number of biological records associated with the Park indicates a long history of recording and provides valuable data for monitoring trends and habitat condition. Since 2015, there have been targeted grassland, harvest mouse, amphibian, bird and invertebrate surveys within the Country Park, which continue to expand the knowledge of the site and help to inform management decisions.

3.9 Position in an Ecological / Geographical Unit

- 3.9.1 The Park is located within the River Dove catchment, which is characterised by a mix of semi-natural and brownfield habitats types that form a diverse and complex landscape extending to the south of Worsbrough and to the east of the M1 motorway. It is worth noting that much of the park is designated as a Local Wildlife Site (LWS) and the value of the site is enhanced by links to other LWS within the river catchment. For example, woodlands (semi-natural and plantation) are particularly well represented in the local area and the woodlands on the Barrow Colliery spoil tip to the southeast of the park along with the riparian woodland of the River Dove connect the Park woodlands with Wombwell Wood to the southeast.
- 3.9.2 The network of streams and rivers flowing to the east combine and contribute to the larger River Dearne catchment. The River Dove and system of dismantled railways and green lanes provide connection with the patches of countryside that are present between the urbanised areas.
- 3.9.3 Given the diversity of habitats and extensive cover of woodland and wetland habitats in the Park, which provide continuity with habitats to the west and east, it is considered that the Park is an important ecological unit that makes a significant contribution to the wider Dearne Valley catchment and Coal Measures Natural Area.

3.10 Potential Value

- 3.10.1 The ecological value of the semi-natural woodlands within the Park is confirmed by the diversity of species that they support and the presence of many species that are of significant conservation interest including willow tit and harvest mouse.
- 3.10.2 Reducing the potential for unwanted inputs of pollutants and nutrients across the wider catchment could enhance the ecological value of the waterways and wetlands in the Park. It is also important to ensure that the numbers of coarse fish in the Worsbrough Reservoir and Dearne and Dove Canal Basin do not cause ecological degradation of the waterbodies and the River Dove.
- 3.10.3 Sympathetic management of the grasslands and plantation woodlands within the Park will, contribute to the overall ecological interest. However, it is important to be realistic about the potential of less species-rich habitats to contribute to the ecological interest of the Park given the high levels of disturbance, relatively low botanical diversity and presence of non-native species.
- 3.10.4 The diversity of species and the on-site facilities provide a range of formal education and

training opportunities for a variety of user groups. It is acknowledged that the Park is already very well used for a range of activities that aim to promote awareness and knowledge of biodiversity, but discussion with present and former Park staff suggests that the number of school visits and activities had declined before 2015, in part because of travel costs. As such, it is considered that the potential value of the Park for education and training is under-utilised at the present time.

3.11 Intrinsic Appeal

- 3.11.1 The Park is a popular visitor attraction and provides facilities for a range of formal and informal recreation activities. The reservoir and woodlands make a significant contribution to the local landscape and the diversity of wildlife enhances the intrinsic appeal of the Park.
- 3.11.2 There has been sustained activity since 2015 to improve the infrastructure and new fences and a boardwalk have been installed to improve the visitor experience. The intrinsic appeal of the Park could be further enhanced by improvements to the infrastructure and interpretative materials, rather than significant modification of habitats.
- 3.11.3 There is a localised issue with trespass by motorcycles and quad-bikes that are accessing Bell Bank Wood and Woolley Bank Wood from the local road network and the neighbouring colliery spoil tip. The damage to tracks and woodland / grassland substrates, although localised, is significant and visitors and wildlife are also disturbed by the presence of the vehicles and the associated noise. This has an adverse impact on the intrinsic appeal of the site.

4 Objectives and Rationale

4.1 Introduction

- 4.1.1 The 2016-2020 Management Plan included two sets of objectives. The primary objectives for the Park related to the overriding vision for the future of the Park and were common to all of the different disciplines within the Worsbrough Mill and Country Park Management Plan including biodiversity, landscape, recreation and heritage. The operational (secondary) objectives were specific to the biodiversity element of the management plan. Following a review of management and feedback from stakeholders it is considered that the operational objectives described in the previous plan are still relevant and should be continued.
- 4.1.2 Much of the text in the previous plan that provided the justification for the selection of prescriptions remains relevant and, where necessary, is repeated in this plan.

4.2 Operational Objectives

- 4.2.1 The six operational objectives for this Biodiversity Management Plan:

Operational Objective 1: Manage habitats to achieve and maintain favourable ecological condition.

Operational Objective 2: Monitor target species to determine the conservation status of the Park.

Operational Objective 3: Promote biodiversity through education and recreational activities and events.

Operational Objective 4: Integrate the conservation of biodiversity into all relevant country park activities.

Operational Objective 5: Abide by all legal instruments, deeds and obligations.

Operational Objective 6: Manage and maintain administration.

4.3 Operational Objective 1: Manage habitats to achieve and maintain favourable ecological condition.

Dry Broadleaved Woodland

- 4.3.1 Much of the 2016 to 2020 Management Plan rationale argued for limited intervention in woodland management. This remains relevant and is repeated here to provide context. There is, however, the issue of ash die-back affecting the woodland resource, and although it is yet to significantly impact on the woodlands, it is very likely to become an issue during the life-time of this plan.
- 4.3.2 Bell Bank Wood and Woolley Bank Wood (Compartments 1, 2 and 11) conform to the

description of the Lowland Mixed Deciduous Woodland Habitat of Principal Importance, which is listed under the provisions of the NERC Act 2006 and the habitat also has an Action Plan in the Barnsley LBAP. The Barnsley LBAP also links the Habitat Action Plans (HAP) for Lowland Mixed Deciduous Woodland with the Species Action Plans (SAP) for bats and bluebell. On behalf of Barnsley Metropolitan Borough Council (BMBC), the South Yorkshire Forest (SYF) Partnership prepared a Forestry and Woodland Strategy¹⁷ to protect and enhance the biodiversity of woodlands, but to make use of the resource for timber, fuel and recreation wherever feasible and sustainable.

- 4.3.3 In 2008, SYF carried out an assessment of Woolley Bank Wood to investigate the available timber resource and the benefit of extracting non-native species such as sycamore and beech (extract from SYF woodland management report Nov. 2008, supplied by Trevor Mayne, 2015). The report identified opportunities to thin the woodland and to realise a potential income from the extracted timber. Thinning work was intended to promote the growth of native trees such as oak and ash and to control the regeneration of sycamore and beech. However, some thinning work that had been carried out in a sycamore-dominated part of the woodland (Compartment 2) had promoted the spread of Himalayan balsam, which was largely confined to the river corridor elsewhere in the woodland.
- 4.3.4 Field surveys confirmed the presence of a diverse assemblage of ancient woodland indicator species, including bluebell, which has a SAP. The desk study confirmed that the woodlands are an important resource for bats and birds. Given the importance of the woodlands in their extant condition and the potential for further spread of Himalayan balsam as a consequence of thinning, it is considered that intervention should only be carried out where and when necessary. The previous proposal to thin sycamore by ring barking is no longer appropriate, because the outcome of ash die-back disease is unpredictable and the presence of sycamore may be vital to maintain the continuity of a woodland canopy.
- 4.3.5 Ash die-back will significantly increase the volume of standing and fallen timber, which could be of short-term benefit for saproxylic invertebrates and fungi, but once die-back has occurred it is not feasible at this stage to predict what tree species will regenerate. Monitoring is vital to determine the ecological impact of the loss and if required, to inform mitigation measures.
- 4.3.6 Objective 3 encourages the use of the Country Park for education and recreation. Given that many of the ash trees are likely to die, there is an opportunity to harvest selected trees for educational purposes such as charcoal manufacture and green woodworking projects. Felling ash trees may also be necessary if there is a risk to public safety or the need to block desire lines created by unwanted vehicular access. Other tree species should also be treated similarly if they are a hazard or provide an opportunity to block access.
- 4.3.7 The field layer of Compartment 2 supports abundant Himalayan balsam, but the population is confined to a specific area. As such, it should be feasible to eradicate the species in this area by a sustained effort of mechanical control. Touch-me-not balsam is present in the woodlands and in vegetative form looks similar to Himalayan balsam. If control measures

¹⁷South Yorkshire Forest Partnership (undated). *Forestry and Woodland Strategy: Executive Summary*. Barnsley Metropolitan Borough Council.

are implemented, the populations of touch-me-not balsam should be clearly identified beforehand and excluded from management works.

Wet Broadleaved Woodland

- 4.3.8 There has been no significant change to the composition of the wet woodland resource for the duration of the 2016 to 2020 management plan so the following rationale is still appropriate.
- 4.3.9 The Worsbrough Reservoir woodlands and riparian woodland alongside the River Dove, leat and drains (Compartments 6, 8, 12, 13, 14 and 16) conform to the description of the Wet Woodland Habitat of Principal Importance, and the habitat also has an Action Plan in the Barnsley LBAP. The Barnsley LBAP also links the Habitat Action Plans (HAP) for Wet Woodland with the Species Action Plans (SAP) for bats, water vole, otter and great crested newt. The Worsbrough Reservoir woodlands are particularly important for willow tit, and previously for lesser spotted woodpecker¹⁸, both of which are significantly declining throughout the UK. The structural diversity, abundance of deadwood and relatively low levels of disturbance provide excellent habitat for willow tit and lesser spotted woodpecker, but are also suitable for a wide range of woodland birds and are also likely to provide foraging opportunities for bats.
- 4.3.10 Without intervention, crack willow will rapidly grow and once mature, will readily shed limbs, fall over and/or become snagged. This process will create gaps in the canopy and promote vegetative regeneration of the crack willow, but also allow colonisation by other trees and shrubs. Gaps in the canopy also enable the development of a dense field layer vegetation.
- 4.3.11 The wetter, low-lying areas of the woodland support fen and swamp wherever the canopy is open, and bare soils where the canopy is closed. The damp soils of higher ground are dominated by Himalayan balsam. However, despite the infestation of Himalayan balsam, recent botanical records indicate that the diversity of the woodland is still relatively high and the locally rare touch-me-not balsam is present. Many of the woodland species flower early in the summer and die back before the Himalayan balsam becomes prominent later in the summer. The balsam is, however, very likely to outcompete later flowering native species, such as common nettle *Urtica dioica*, meadowsweet *Filipendula ulmaria* and wild angelica *Angelica sylvestris*. Control of the Himalayan balsam is, therefore, desirable, but it should be recognised that removal of the balsam is very likely to result in the expansion of common nettle, which thrives in dappled shade on the damp, nutrient-rich soils and is typical of W6 woodland (Rodwell, 1991)¹⁹.
- 4.3.12 Control of Himalayan balsam is desirable, but difficult to achieve, and it will require a sustained effort. It is also important to ensure that control methods do not jeopardise the status of the touch-me-not balsam populations. If labour is available, then every effort should be made to control the Himalayan balsam. The alternative to physical control is manipulation of water levels in order to flood the woodland in spring when seedlings are present. This is unlikely to be achieved in the woodland surrounding the reservoir without

¹⁸ Geoff Carr (email 2021) confirmed that lesser spotted woodpecker has not been recorded in recent years.

¹⁹ Ibid

affecting water levels in the reservoir and it would require the construction of substantial water control devices on the Rockley Dike and Brough Green Brook. There does, however, appear to be some change to water levels within the woodland²⁰ and winter flooding may be increasing. The duration of flooding and extent will influence field layer vegetation and may reduce Himalayan balsam, if standing water is still present in the spring when seedlings are beginning to appear.

- 4.3.13 Since 2015 the number of willow tits has declined from what was considered to be a population at carrying capacity in the Worsbrough Reservoir woodland (Geoff Jackson *pers. comm.* 2015). The reason for the decline is, at present, unknown given that the habitat has not significantly changed. Without evidence, active intervention in the woodland, apart from the removal of Himalayan balsam and pruning and/or felling of trees alongside paths and tracks that are a risk to public safety, is not recommended. If monitoring of the willow tit indicates further population declines, management will need to be reviewed.
- 4.3.14 There is a population of harvest mouse on the site, which is a Species of Principal Importance. The population is located on the periphery of the wet woodland habitat. Impacts on the species will require due consideration if any changes to management are proposed.

Plantation Broadleaved Woodland

- 4.3.15 Since the last plan was written there has been no intervention and no discernible changes to the plantation woodland resource. As such, the previous assessment and rationale for management is still appropriate and is reproduced below.
- 4.3.16 The plantation broadleaved woodlands that are scattered throughout the Park are, for the most part, semi-mature and of limited ecological interest, because of the uniform structure, frequency of non-native species and sparse cover of field layer vegetation. Anti-social activities in woodlands 4f and 4g continue to cause localised damage and disturbance.
- 4.3.17 Smaller blocks of dense woodland (Compartments 4a, 4b, 4c, 4h, 10 and 21) provide potential nesting opportunities for birds and unless there is a risk to public safety, should be left undisturbed. Extension of Compartment 4c by planting of willow rods to the rear of the commercial buildings located next to the River Dove footbridge, would extend the woodland cover and improve the aesthetic appearance of the locality by rapidly screening the buildings, which are at present protected by razor wire and security fencing.
- 4.3.18 The remaining stands of woodland (Compartments 4d, 4e, 4f, 4g and 17) would benefit from intervention in order to enhance structural diversity, promote the growth of selected native species and facilitate the development of field layer vegetation.
- 4.3.19 Management of the woodlands would conform to the Forest and Woodland Strategy. The extraction of timber, which can be used for wood fuel, charcoal and greenwood products will be of benefit for biodiversity and also provide education and recreation opportunities

²⁰Geoff Carr (email *pers. comm.* 2021)

(see objective 3 for further details).

- 4.3.20 Some of the plantation blocks next to the Dove and Dearne Canal could, with appropriate modification and design, become natural play areas. Increasing visitor numbers to the location has the potential to reduce the levels of anti-social activity, but consideration of out-of-hours security will be required.

Traditional Orchards

- 4.3.21 Compartment 36 is a small triangle of rough grassland alongside the Sheffield Road and adjacent to Field D (Compartment 9). The grassland was of low agricultural value because of disturbance and partial shading which had resulted in a species-poor, 'patchy' sward with a high cover of weeds such as docks *Rumex* spp. Rather than restore the land for grazing, alternative habitats were considered. Given the close proximity to the visitor centre and the potential for making use of a local product, it was considered appropriate to establish a traditional orchard. Barnsley LBAP contains a HAP for traditional orchards and they are a Habitat of Principal Importance. The addition of traditional varieties of fruit trees with a relatively species-rich grassland field layer will increase habitat heterogeneity and provide a potential foraging opportunity for birds and invertebrates.
- 4.3.22 In January 2021, the field layer vegetation had been partly prepared in advance of planting, but weed control is still necessary to ensure that the proposed planting has limited competition for resources.

Hedgerows

- 4.3.23 Hedgerows are a Habitat of Principal Importance and have a HAP in the Barnsley LBAP. The network of hedgerows in the Park (Compartments 18, 23, 24, 26, 27, 28, 29, 32, 33, 34 and 35) are generally species-poor, but have a diverse range of structures determined by the extent of trimming and time-lapse since the hedgerow was last laid. Hedgerows alongside the footpaths are regularly trimmed to maintain open access, but intervention is generally limited to the minimum that is required to maintain the hedgerow in good condition.
- 4.3.24 The programme of hedge-laying, which has been carried out to Compartments 19, 26 (part), and 28, should continue to ensure that all hedgerows are maintained in optimum condition. Trimming should also be carried out, but annual trimming should be avoided unless there are access issues. Triennial or biennial cutting in late winter (Jan-Feb) is the most suitable method of promoting hedgerow health and associated biodiversity. Countryside Stewardship grants (option BN5) are available for hedge-laying work²¹.

Amenity Grassland

- 4.3.25 Away from the land around Worsbrough Mill, amenity-managed grassland is confined to the land alongside West Street and at the east end of the Park close to Edmunds Road. It is of limited ecological interest, but it provides an area for informal recreation, limited car parking for the Angling Club members and is the frontage for the Park. As such, it is considered that the cutting regime should be continued for aesthetic and practical reasons, rather than biodiversity. There is, however, an opportunity to enhance the area for biodiversity by relaxing the mowing regime around the blocks of plantation broadleaved woodland 4a, 4b, 4c and 4e.
- 4.3.26 A 3-5m wide strip of grassland on the edge of each plantation should be left uncut for a period of three years to allow tall, rough grassland to develop and create an ecotone²² that

²¹ <https://www.gov.uk/countryside-stewardship-grants/hedgerow-laying-bn5>

²² Ecotone - a region of transition between two biological communities.

will be of benefit for small mammals, invertebrates and birds. Localised relaxation of the existing mowing regime will reduce the costs associated with maintaining amenity-managed grassland.

Improved Grassland

- 4.3.27 There has been no change to the cutting regime for Compartment 7, which is an extensive area of improved grassland that is managed by a summer cut. The cuttings are left in-situ and this has encouraged the development of a dense thatch layer. Such management will not be of any benefit for biodiversity in the short to medium term, because the thatch layer is suppressing the opportunity for colonisation by herbs. Furthermore, decomposition of the thatch layer increases nutrient loads and favours competitive species. If competitive grasses such as cock's-foot and Yorkshire fog are left uncut, then there is likely to be a benefit for invertebrates such as the 'brown' butterflies, but the current cutting regime removes the crop too early to be of benefit.
- 4.3.28 Improved Grassland is included in the updated Barnsley Local Biodiversity Action Plan (2021) as a priority habitat, because it can be managed to benefit biodiversity²³. It is, however, considered that the existing management is not beneficial, because the diversity of the sward will not improve unless there is removal of the standing crop. Given that the cutting regime is of limited benefit for biodiversity and anti-social activity such as burning the cuttings and motor-cycling are occurring, there is little justification for continuing with the existing cutting regime. The mowing of 3m wide paths parallel to the south of the canal and north of the river needs to be continued to provide access for dog walkers and informal recreation. The remainder of the grassland should be left uncut and allowed to develop to scrub and then woodland. In the long-term this will significantly increase the extent of woodland cover within the park and connect the plantation broadleaved woodland blocks with the broadleaved woodland of the River Dove and Woolley Bank Wood.
- 4.3.29 Access issues are beyond the remit of this plan unless they are impacting on biodiversity objectives. The improved grassland narrows between blocks of plantation woodland (4f, 4g and 4h) towards the east end of the Country Park (Edmunds Lane). The grassland has been highly disturbed by motorcycles, quad-bikes and pedestrians and flooding has further degraded accessibility. In order to stop further erosion and nutrient input into the river, relaxation of the mowing regime will provide an opportunity for grass growth on the plantation margins, which will, to some extent, intercept run-off into the river.
- 4.3.30 This process of natural succession is likely to take a minimum of 20 years for woodland to develop, but the rough grassland / scrub mosaic will be of benefit to birds, small mammals and invertebrates that are associated with woodland edge, before being replaced by woodland species.

Semi-improved and Unimproved Grassland

- 4.3.31 The 2016-2020 Management Plan excluded Compartment 31 (referred to hereafter as Fields A and B) because of operational considerations, but both fields are now included within the

²³ <http://www.barnsleybiodiversity.org.uk/habitats.html>

plan. Since the completion of the 2016-2021 Management Plan grassland surveys have confirmed that Compartments 8 (Field E), 9 (Fields C and D) and 31 (Fields A and B) have some botanical interest, with fields A and D having more significant botanical interest than the previous management plan suggested.

- 4.3.32 For the 2016-2020 Management Plan, the proposed prescriptions followed those within the Barnsley College Grazing Tenancy Agreement (1997). The grazing agreement for Compartment 9 was intended to benefit an important population of the chimney sweeper moth *Odezia atrata*. The agreement required the grasslands to be cut for hay in late June / early July, followed by aftermath grazing in autumn. The Grazing Tenancy Agreement also stipulated a number of special conditions, which excluded the use of artificial fertilisers and herbicides. The condition of the sward in 2015 was assessed to be good because there was little evidence of a thatch layer and fine-leaved grasses were abundant. There were, however, concerns that livestock were introduced immediately after the hay cut rather than allowing a period of re-growth, which removed any development of cover for invertebrates.
- 4.3.33 For Compartment 8, management over the years has been variable, but the general recommendation was also a hay cut and aftermath grazing with sheep or cattle. It is understood from Wigfield Farm staff that the grassland has been grazed by cattle without any hay cut. The general condition of the grassland at the time of the 2021 field survey was considered to be satisfactory in terms of structure and sward condition, but the diversity of herbs was fairly limited.
- 4.3.34 Compartment 31 consists of two fields (Fields A and B) enclosed by hawthorn hedgerows. Management has been similar to that of Fields C and D, with a hay cut followed by aftermath grazing. The timing of the hay cut (June to early July) has not been optimal to maintain the botanical interest of the fields, which includes later flowering species such as greater burnet and amphibious bistort. In addition, Field B has been fertilised by an application of manure, which could also have an adverse impact on sward diversity.
- 4.3.35 Given the results of the 2016 botanical surveys, the update of the management plan provides an opportunity to review the grassland management and to select options, so as to achieve objective 1 of this plan, whilst being mindful of the requirements of Wigfield Farm (the grazing tenant). The fields are needed by Wigfield Farm to provide forage for a small herd of cattle that are mix of rare breeds including Highland and Belted Galloway cattle. The small size of the herd means that the potentially adverse effects of intensive grazing will not occur, but the botanical interest of the grasslands could be adversely affected by grazing at inappropriate times, hay cutting too early in the season before most flowers have set seed, and the application of fertiliser to maximise forage yield.
- 4.3.36 Lowland Neutral Grasslands are Habitats of Principal Importance and are included in the Barnsley Local Biodiversity Action Plan²⁴ as requiring protection, restoration and positive conservation management. A review of grassland options and discussion with Natural England has identified the opportunity to obtain financial support if the grasslands are managed in compliance with Countryside Stewardship Option GS7 'Restoration towards

²⁴ Ibid

species rich grassland'²⁵. This option allows for hay cutting and aftermath grazing, or grazing without cutting. The constraints on the grazier are the timing of the hay cut and the stocking density. Furthermore, applications of manure are unlikely to be permitted without evidence that soil fertility is sufficiently low to be affecting the quality of forage and the welfare of the livestock. Option GS7 also encourages other actions that are aimed at enhancing sward diversity, such as wildflower plug planting, over-sowing with wildflower seed or applying species-rich green hay.

- 4.3.37 At the time of writing, the eligibility for Countryside Stewardship funding has yet to be confirmed, but it is expected that the grasslands will be eligible for Medium Tier funding, which includes option GS7. Natural England will provide management recommendations for the grassland resource, but in the meantime, the prescriptions provided in this plan are interim and subject to negotiation between the grazier and management staff at Worsbrough Country Park. A successful application for Countryside Stewardship support will realise a set of prescriptions that will require compliance to obtain the funding support. An addendum to this plan will be needed to override the generic grassland prescriptions contained herein.
- 4.3.38 A further area of semi-improved grassland (Compartment 16) is present on the east-facing slope of the reservoir dam. For safety purposes, the dam embankment grassland has to be kept reasonably short and in the absence of no suitable alternative, be managed by cutting. It is understood that the grassland used to be managed by sheep grazing (which is specified in the Grazing Tenancy Agreement), but there were problems with animals escaping (D. Keddy, *pers.comm.* 2015) and grazing was subsequently stopped. Section 10(f) of the 2011 Inspection Report for the Worsbrough Reservoir recommended: "Cut the grass on the downstream face of the embankment at least twice a year. In view of the surface damage to the southern embankment downstream face upper section it would not be advisable to allow sheep to graze on the slopes" (Williams, 2011)²⁶. As such, any management other than cutting is not feasible. Unless the cuttings are raked and collected, there is unlikely to be any improvement in the ecological interest of the grassland. This is because germination of less competitive herbs and grasses will be suppressed by the dense thatch layer. In addition, more vigorous grasses will take advantage of elevated nutrient levels, caused by decaying cuttings, which will out-compete fine-leaved grasses and herbs. However, the addition of hay rattle *Rhinanthus minor* to the sward and modification of the cutting regime could be of benefit to botanical diversity and enable other plants to be sown.
- 4.3.39 Hay rattle is semi-parasitic on grasses and will significantly reduce vigour and biomass, creating gaps in the grassland sward to allow colonisation by other herbs. Reduction in biomass will also reduce the amount of foliage that has to be cut and raked. To enable hay rattle to thrive it will be necessary to avoid cutting until the plants have set seed each year, which is usually mid-late June. Cutting in late June, followed by a further cut in September will comply with the safety recommendations, but allow wildflowers to establish. Sowing seeds of selected early-flowering plants such as cowslip *Primula veris*, pignut *Conopodium*

²⁵ <https://www.gov.uk/countryside-stewardship-grants/restoration-towards-species-rich-grassland-gs7>

²⁶ Williams, P.J. (2011). *Annual Statement by Supervising Engineer Under Section 12(2) of the Reservoir Act 1975*. Unpublished report for Barnsley metropolitan District Council.

majus and common vetch *Vicia sativa*, collected by volunteers (and / or students) from local sources, would enhance botanical diversity and provide nectar sources for invertebrates without compromising the required cutting regime.

Running Water

- 4.3.40 The 2015 assessment of River Dove, Brough Green Brook and Rockley Dike is considered to be still relevant and is reproduced here because of the lack of any significant change to the watercourses between 2016 and 2020.
- 4.3.41 The River Dove, Brough Green Brook and Rockley Dike are Habitats of Principal Importance and have a HAP in the Barnsley LBAP²⁷. The Barnsley LBAP also links the HAP with the bats, water vole, otter and barn owl SAPs.
- 4.3.42 The River Dove, Rockley Dike and Brough Green Brook have 'poor', 'moderate' and 'good' ecological potential respectively. Investigation of the biological quality of the River Dove indicates that the macro-invertebrate quality is moderate, but fish and diatom quality is poor. The reason(s) for the 'poor' quality of the River Dove is not immediately apparent, because the physicochemical quality of the river and the headwaters is good, which suggests that the reservoir water quality is not having any significant impact on the ecological condition of the River Dove. In addition, fluvial processes in the headwaters and the river have created features of benefit for aquatic fauna such as pool and riffle sequences, runs, sand and shingle bars, and bankside cliffs. There is, however, potential for a decline in the macro-invertebrate quality, because of the presence of signal crayfish *Pacifastacus leniusculus* in the headwaters, which is a predator of invertebrates and fish eggs²⁸. Burrowing into the banks of the watercourses can also destabilise the substrate and cause localised erosion and undesirable topographical changes.
- 4.3.43 Improvement of fish and diatom quality in the River Dove will not be easy to achieve in the short term, given that the physicochemical water quality is unlikely to be the cause of the poor quality. It is, therefore, recommended that no further action is taken during the lifetime of this plan and a further review of the Environment Agency data is carried out when this plan is updated.
- 4.3.44 During the lifetime of this plan, it is recommended that any deadwood entering the headwaters or river should be left in-situ unless there is increased potential for flooding within or downstream of the Park. The quality of the macro-invertebrate assemblage will be influenced by the availability of particulate matter, much of which is derived from the input of deadwood.

Drains and Leats

- 4.3.45 The four small watercourses in the Park including a leat (Compartment 14); a short section of drain (in Compartment 8) that feeds the Dearne and Dove Canal; the overflow for the millpond (Compartment 20) and a canalised stream running alongside hedgerow (Compartment 32) are shallow, with silt substrates, and for the most part, are heavily shaded.
- 4.3.46 There is very little or no vegetation in Compartments 14, 20 and 32, because of shading. To promote the growth of aquatic vegetation in Compartment 14 will require the selective removal of the tree canopy. Whilst this would be beneficial, many of the trees are too large

²⁷Ibid

²⁸Non-native Species Secretariat Factsheet (undated): ID *Pacifastacus leniusculus* (Signal crayfish).pdf

to be pruned or felled by volunteers and will require pollarding by contractors. Pollarding will prolong the life of the trees and reduce the risk of trees falling onto adjacent footpaths. The order of pollarding will be determined by safety considerations with those trees in the most hazardous condition being prioritised for pollarding.

- 4.3.47 There is no merit in tree or shrub removal to promote the growth of aquatic vegetation in Compartments 20 and 32. Both streams have a fairly rapid flow-rate and scouring during flood conditions is likely to remove any aquatic vegetation that may get established when water levels are normal.
- 4.3.48 In Field E (Compartment 8) a short section of open drain is present, which channels water from the reservoir to the canal. The drain is partly shaded on the north side where the bank is steepest, but is marshy on the south side, because of disturbance by livestock. Marshy grassland is not present elsewhere in the Park so the existing grazing regime should be continued, to maintain the habitat in its existing state.
- 4.3.49 It will be necessary to maintain a flow of water in the leat and the canal feeder drain for operational reasons, so routine inspection is required along with prompt action if the channels are blocked.

Worsbrough Reservoir

- 4.3.50 The number of historical bird records suggests that the reservoir is of regional importance for birdlife, but anecdotal evidence (from Geoff Jackson and Damen Keddy, *pers. comms.* 2015) suggests that the abundance and diversity of water-birds in recent years may have declined. High water levels in the reservoir have reduced foraging opportunities for passage waders during spring and autumn, but low water levels during spring and autumn increase the risk of decline in swan mussel *Anodonta cygnea* populations, because of exposure and desiccation. The situation is further complicated if there are low water levels during early summer, because the nests of breeding waterfowl such as great crested grebe *Podiceps cristatus* become more vulnerable to predation if they are not surrounded by water. Changes in the composition of the fish community may have also affected the abundance of fish-eating birds such as cormorant *Phalacrocorax carbo* and terns *Sternus* spp., (Geoff Jackson, *pers. comm.* 2015). As with the previous plan, it is recommended that water levels are not manipulated between 2021 and 2025 unless there is evidence to justify changes.
- 4.3.51 The stone-lined water margins on the reservoir provide little opportunity for the development of emergent vegetation and the encroachment of trees on the western and part of the northern shoreline will continue to reduce the extent of marginal vegetation. It is, however, anticipated that further siltation of the reservoir will increase the opportunity for the patches of reed-bed on the fringes of the western shoreline to extend eastwards into the open water of the reservoir. The ecological interest of reed-beds is recognised by their inclusion in the Barnsley LBAP as a Local Priority Habitat²⁹. For priority habitats it is appropriate to target actions to promote their long-term conservation. Volunteers have been coppicing trees in a bay on the western shoreline of the reservoir to promote the growth of common reed and to maintain a suitable area for on-going bird ringing. The

²⁹Ibid

resulting growth of the reedbed has suppressed the growth of Himalayan balsam (Geoff Carr *pers. comm.*, 2021) and produced an extensive area of reed-bed, which would benefit from further expansion. Planting onto exposed mud is not an option because of the issues related to changing water levels so an alternative means of introducing common reed has to be considered.

- 4.3.52 Under normal circumstances, it would be favourable to manage all of the western and part of the northern shoreline to maintain and promote reed-bed habitat, but this is not considered to be practical in most areas. The substrate of shoreline, particularly where the watercourses outfall, consists of soft, deep silts that are a significant safety hazard. Given the impracticality of intervention on most of the western shoreline, it is considered that extending the marginal vegetation on the northern shoreline behind the boardwalk is a more feasible option. Felling of trees on the northern shore to reduce shade, combined with further planting of reed-bed vegetation will provide habitat for birds and fish-fry.

Dearne and Dove Canal

- 4.3.53 The short section of the canal is managed under a tenancy agreement by the Wombwell White Rose Angling Club (WWRAC). The club is responsible for maintaining the banks of the canal, removing rubbish and re-stocking the canal subject to agreement with the EA.
- 4.3.54 With the exception of the west end of the canal, angling is restricted to fishing pegs on the south bank. In 2015, the fishing peg platforms were observed to be in good condition and very little litter was present. It was anticipated that further clearance of marginal vegetation would not be carried out before 2021 because there was adequate open water to maintain the fishery. Inspection during January 2021 revealed that the entire south side of the canal bank and margin had been mown, leaving no cover for fauna associated with the canal banks and margin. Occasional mowing of sections of the bankside vegetation can be beneficial to promote vigorous re-growth but wholesale removal is highly unfavourable for fauna and is not justified for the purposes of angling, given the availability of permanent fishing pegs.
- 4.3.55 It is understood from BMBC staff that anglers are driving over the grassland to reach fishing pegs and leaving gates open to allow trespass by unauthorised vehicles. Access may be justified for disabled anglers, but there is no justification for able-bodied anglers to damage the terrestrial habitats surrounding the canal. Such behaviour is likely to be a breach of the tenancy agreement and the club should be made aware that the agreement may no longer be valid if such behaviour persists.
- 4.3.56 The north bank of the canal is tree-lined, which affords shelter in the winter and is likely to maintain areas that are free from ice, allowing access for foraging waterfowl. Maintaining the scrub and tree cover will also restrict access and disturbance to the bank. There may, however, be a need for intervention if any trees become a risk to public safety or overhang and shade the entire width of the canal. Given the size of the trees it will be necessary to make use of experienced personnel and/or contractors for safe felling and pruning.
- 4.3.57 If fish re-stocking is considered to be necessary it is a requirement for the Angling Club to

consult with the EA beforehand and comply with relevant regulations³⁰.

Worsbrough Mill Pond

- 4.3.58 Ponds are a Habitat of Principal Importance and a Barnsley LBAP Habitat³¹. Ponds support a range of species of significant ecological interest including amphibians and grass snake, which have been recorded within the park. Desk study records also indicate that the pond has a wide range of aquatic invertebrates. Given the diversity of fauna, it was considered in 2015 that the pond was in favourable condition, but shading on the south bank and the extent of the non-native Nuttall's pondweed *Elodea nuttallii* were potential issues.
- 4.3.59 Trees and shrubs on the south side have been selectively pruned to allow light across the pond surface on the east side of the footbridge. It was not feasible to assess the extent of aquatic vegetation because of the timing of the site visits in 2021. As such the recommendation that Nuttall's pondweed should be controlled, in order to maintain areas of open water, is still valid.

4.4 Operational Objective 2: Monitor target species to determine the conservation status of the Park

- 4.4.1 Management of key habitats will be sufficient to ensure the conservation of species within the Park, but the overall effectiveness of management needs to be assessed by monitoring. Monitoring of key species will provide the evidence that is required. Since 2015, it has become apparent that the grasslands are of greater botanical diversity than expected and there is an important population of harvest mouse on the periphery of the wet woodlands. Grassland plants, chimney sweeper moth and harvest mouse have been added to the list of species to be monitored.

Fish

- 4.4.2 The effect on birds (and other fauna) arising from the stocking of the reservoir with carp *Cyprinus* spp. by the Barnsley and District Amalgamated Angling Society (BADAAS) is unknown and would require investigation to determine the significance of any impact. It is understood that the re-stocking was carried out without support from the EA and it is likely that the decision to stock with carp rather than 'silver fish' was at least partly responsible for the lack of support. Research by Smith (2001) indicates "*a threshold in fish biomass between 150kg and 250kg per ha, above which a submerged macrophyte community can no longer exist.*" Whilst there is a strong correlation between loss of macrophytes and high fish numbers on other waterbodies, the impact of high numbers of waterfowl such as Canada geese *Branta canadensis* can also contribute to the loss of macrophytes. The loss of submerged macrophytes will reduce the food availability for water-birds that rely on plant material for all or part of the diet. High fish biomass also causes a reduction in zooplankton density, which can lead to an increased risk of algal blooms.
- 4.4.3 At this stage, without any firm data, it is not possible to correlate changes to bird counts

³⁰ <https://www.gov.uk/guidance/permission-to-move-live-fish-to-or-from-a-fishery>

³¹ Ibid

following the introduction of fish. However, further stocking of the reservoir must be avoided during the lifetime of this plan and records of bird diversity and abundance, together with fishing records (match weights), should be collected to investigate potential impacts. O'Hara and Steel (1998)³² provide details of how to assess fish stocks from angling catch data. With the help of BADAAS it should be possible to make an informed assessment of fish stocks and to regulate the fishery to optimise angling and biodiversity requirements.

Bats

- 4.4.4 All bats are protected under European law, seven species are of Principal Importance, and bats have a Barnsley LBAP action plan. Seven species have been recorded within or in close proximity to the Park and many are confirmed or likely to be roosting, but the number of records continues to be very limited, suggesting that bat surveys are not routinely carried out.
- 4.4.5 The Barnsley LBAP states that bats are specialist feeders that need abundant flying insects and sheltered feeding areas; they also require undisturbed roosting sites. Given the diversity of species and number of records, the Park is obviously an important site for bats. Most records, however, are 10 or more years old and the current status of bats within the Park is unknown. Targeted surveys to search for roosts, together with transects of feeding and foraging habitat will provide an indication as to the quality of the site.
- 4.4.6 The South Yorkshire Bat Group³³ should be invited to monitor the site, but such activities should be publicised so that members of the general public, the angling clubs and students at Barnsley College are encouraged to participate.

Birds

- 4.4.7 Annual bird surveys in the Barnsley area, and specifically at the Park, are carried out by the Barnsley Bird Study Group. The survey results, gathered by volunteer surveyors, some of whom are also part of the Barnsley Naturalist and Scientific Society (Geoff Jackson, pers.com. 2015), have been published in annual bird reports for the area for the past 30 years (Michael Guy *pers. comm.* 2015). The importance of the Park is confirmed by the number of records obtained from various sources, which indicates that a total of 152 species have been recorded on the site. Annual bird surveys have continued since 2015 and there has been radio tracking of willow tit to better understand distribution and behaviour of this species in the wet woodland. Kingfisher *Alcedo atthis* and great crested grebe would benefit from targeted monitoring because of their habitat requirements, strong association with the Park and to some extent, their aesthetic appeal with the wider general public. In addition, willow tit is on the red list of BOCC species and kingfisher is on the amber list.
- 4.4.8 Kingfisher, willow tit and great crested grebe breed on the site and each species has specific habitat and dietary requirements. As such, any decline in the condition of the habitats in the Park has the potential to have an adverse impact on the abundance of each species and their ability to successfully breed. If monitoring identifies any declines in the Park, it may

³² O'Hara, K and Steel, R. (1998). *The Use of Catch Statistics to Monitor Fishery Change, Coarse Fish Study: Technical Report W140*. Unpublished Report by SGS Environment for The Environment Agency.

³³ <https://sites.google.com/site/sybatgroup>

become necessary to identify specific management prescriptions to offset the declines.

- 4.4.9 It is anticipated that the existing surveyors will continue to survey the site and provide Barnsley Biological Records Centre with the records to enable annual assessment during the lifetime of this plan.

Herptiles

- 4.4.10 Amphibians and reptiles are easily recognised and familiar species to the general public and their sensitivity to habitat degradation, inappropriate management, pollution and disturbance makes them suitable for monitoring environmental change. As such, the presence of these species in the Park suggests that existing aquatic habitats such as the millpond, the leat, and the Dearne and Dove Canal Basin and associated terrestrial habitats are in favourable condition. Any decline in favourable habitat condition has the potential for an adverse impact on herptile diversity and abundance.
- 4.4.11 Routine monitoring of herptiles during the lifetime of this plan will help to identify any decline in the favourable condition status of aquatic and associated habitats. The South Yorkshire Amphibian and Reptile Group³⁴ and/or the Sorby Natural History Society should be invited to carry out routine surveys of the site, but as with bats, the general public and Barnsley College students should be given the opportunity to participate so that the work can be continued by local people beyond the lifetime of this plan.

Harvest Mouse

- 4.4.12 Targeted surveys since 2015 have confirmed the location of a harvest mouse population in the Park. Harvest mouse is a Species of Principal Importance and the Barnsley LBAP contains a SAP³⁵. Harvest mouse is in need of conservation action because of significant declines, particularly in lowland farmland habitats, where changes in agricultural practice have caused an adverse impact. Targeted actions to achieve a favourable conservation status in the Park may become necessary, but monitoring is required beforehand to fully determine the distribution and abundance of the species. An extended monitoring programme over the lifetime of this plan will provide the necessary evidence to support any conservation action that may be needed.

4.5 Operational Objective 3: Promote biodiversity through education and recreational activities and events.

- 4.5.1 The use of the park by visitors and the opportunities for recreation, education and commerce are being reviewed and there are likely to be operational changes arising from the review. However, many of the proposals contained in the 2016-2020 Conservation Plan are still relevant and should be implemented if resources are available. The rationale for achieving this object that was provided in the 2016-2020 plan remain unchanged, but should be more ambitious and place particular emphasis on activities that raise awareness

³⁴ <http://groups.arguk.org/NEWYorksARG>

³⁵ <http://www.barnsleybiodiversity.org.uk/harvestmouse.html>

of biodiversity.

- 4.5.2 Most of the Park is designated as Local Nature Reserve (LNR). LNRs are areas of land that are designated by Local Authorities as being important as a local natural heritage resource and for delivering environmental education opportunities, community enjoyment and appreciation of the countryside³⁶. Natural England sees LNRs as an important way to achieve the goal of maintaining England's rich natural heritage, and giving people access to places where they can enjoy that heritage (Natural England, 2010)³⁷. A wider programme of biodiversity activities including monitoring, surveying and habitat management should be delivered as activity days for experienced and skilled persons and training opportunities for people who want to acquire such skills. Training opportunities should be targeted at volunteers, schools, natural history societies and clubs, and apprenticeship schemes³⁸.
- 4.5.3 The Park has a Learning Centre next to Worsbrough Mill, which is scheduled to be replaced by better facilities. The Learning Centre provides the general public with regular biodiversity-related events and activities such as guided walks and pond dipping. Volunteers and volunteer groups help with practical management and the continuation of this effort is essential to maintaining the fabric and habitats within the park in favourable condition. Wherever feasible, efforts should be made to train volunteers and site users such as the Angling Club members to carry out management works that are of benefit to the Park and participants. Tasks such as hedge-laying, coppicing, pruning and small-scale construction work can all be done to a high standard by well-trained volunteers and site users, if they receive appropriate training. It is, however, essential to underpin volunteer activities by using contractors to carry out skilled tasks such as tree safety works in order to create a safe environment that demonstrates that the site is being cared for to a high standard.
- 4.5.4 Motivated and active volunteers are an essential component of a successful Country Park, but the size of the Park and the variety of habitats provides opportunities for commercial activities without having an adverse impact on biodiversity. For example, the management of the plantation woodlands can provide the raw materials for a wide range of activities and the wood itself can be a resource for exercise, play and countryside crafts.
- 4.5.5 Given the limited resources available to BMBC, any activities that have the potential to generate revenue for the maintenance of the park should be considered but be subject to an impact assessment, so that the wildlife interest of the Park is not compromised. BMBC will need to actively promote the opportunities, but the revenues from commercial activities will offset the promotional costs.

³⁶ <http://www.snh.org.uk/publications/on-line/advisorynotes/61/61.html>

³⁷ Natural England (2010). *Local Nature Reserves in England: a Guide to their Selection and Declaration*. Natural England, Peterborough.

³⁸ A range of Apprenticeship schemes are available for school leavers through to post graduates.

4.6 Operational Objective 4: Integrate the conservation of biodiversity into all relevant country park activities.

- 4.6.1 There is no change to this objective from the previous plan and the text from that plan is provided in full below.
- 4.6.2 Encouraging the development of a range of commercial activities within the site (see Objective 3) has the potential to have an adverse impact on biodiversity, if control mechanisms are inadequate. Those responsible for commercial activities will have an interest in protecting their assets and the assets such as biodiversity that attract people to the site. Effectively, such commercial interests will help to 'police' the site against anti-social activities, which should also reduce the potential for negative impacts on biodiversity.
- 4.6.3 Apart from those activities such as wildlife surveying and habitat management that obviously promote biodiversity, the impact of all other commercial activities will need to be assessed in advance of commencing such activities. If necessary, to identify and mitigate for any adverse impacts on biodiversity. Any activity that cannot fully mitigate adverse impacts on biodiversity will not be permitted.
- 4.6.4 The proposed reinstatement of the Green Flag Award Scheme³⁹ will provide a basis for achieving this objective because of the requirement to demonstrate that the site management is compliant with the required standards across a range of attributes including biodiversity.

4.7 Operational Objective 5: Abide by all legal instruments, deeds and obligations.

- 4.7.1 All activities that affect biodiversity within the Park will abide by British laws and local byelaws. Activities that are likely to conflict with the implementation of the Barnsley LBAP, the National Planning Policy Framework and the Barnsley Local Plan Policy BIO1 Biodiversity and Geodiversity will not be permitted unless there is an overriding need and/or no satisfactory alternative.
- 4.7.2 BADAAS will comply with the Worsbrough Reservoir Fishing Conveyance Agreement (1964). WWRAC will comply with the Lease of Fishing Rights for the Dearne and Dove Canal Basin (1993).
- 4.7.3 All stakeholders will comply with the requirements of the Countryside Stewardship scheme, if the pending application is successful. An addendum to this management plan will be required if there are changes to the proposed management prescriptions for the grassland resource.
- 4.7.4 BMBC will comply with the recommendations of the Inspection Engineer under the provisions of the Reservoirs Act (1975) as amended (see paragraph 4.3.38).

³⁹ <https://www.greenflagaward.org/>

4.8 Operational Objective 6: Manage and maintain administration.

- 4.8.1 Effective management of the Park will require an efficient administration that maintains records of species and practical activities. BMBC Parks Service Team are responsible for the management of LNRs in Barnsley. As such, it is appropriate that records and administrative materials related to site management activities and events are held and maintained by BMBC Parks Service.
- 4.8.2 Barnsley Biological Records Centre is the most appropriate organisation to manage biological records generated by biodiversity monitoring and surveys of the Park. Appropriate storage of such data will enable rapid retrieval for analysis, which will be essential for updating this plan.
- 4.8.3 This management plan should be updated in 2025 by a suitable qualified organisation, to ensure continuity of co-ordinated management on the site.

5 Outline Prescriptions

5.1 Operational Objective 1: Manage habitats to achieve and maintain favourable ecological condition.

Dry Broadleaved Woodland

- 5.1.1 Manage the woodland by limited intervention. Routine inspection by BMBC Parks Service will identify trees that are in a dangerous condition and represent a significant risk to site users. The BMBC Parks staff will also monitor the spread of ash die-back disease.
- 5.1.2 Prune or fell dangerous trees, as appropriate. Disperse smaller brash in the local area to reduce fire risk, but leave larger trunks and branches, wherever possible, in areas of dappled shade to rot down naturally. Experienced contractors will carry out the work, preferably in winter, but anytime if the risk to the public is significant.
- 5.1.3 Carry out selective felling of trees to provide materials for woodland crafts, but limit such intervention to a small number of trees in a given area.
- 5.1.4 Map desire lines created by illegal vehicular access and fell selected trees and shrubs across the desire lines. Wherever feasible, select sycamore and beech, but also select hawthorn and ash if there are no sycamore or beech.
- 5.1.5 Control Himalayan balsam in Compartment 2 by hand pulling in June each year (assuming that any touch-me-not balsam in close proximity has been identified and isolated). Identify a single location (in a stand of common nettle or bramble) for composting of uprooted materials. Repeat work annually until eradication is achieved.

Wet Broadleaved Woodland

- 5.1.6 Manage the woodland by limited intervention. BMBC Parks Service will identify trees that are in a dangerous condition and represent a significant risk to site users by routine inspection. Dangerous trees will be treated as described in paragraph 5.1.2.
- 5.1.7 Wherever safe access is available, Himalayan balsam will be controlled by hand pulling before seed set occurs, but no earlier than late June so that the potential for disturbance of nesting birds is minimised. See paragraph 5.1.5 for protection of touch-me-not balsam and disposal measures for pulled materials. Specific areas close to footpaths will be targeted, because total eradication is not considered to be feasible.

Plantation Broadleaved Woodland

- 5.1.8 Remove 30% of non-native trees in Compartments 4d, 4e, 4f, 4g and 17 by thinning. The largest proportion of the work will be carried out by contractors, but volunteers can contribute by removing some of the smaller trees and shrubs using hand-tools. Remove cut materials above 10cm diameter to the roadside for off-site disposal and sale. Chip all cut material below 10cm and remove from site (for sale) or spread thinly on the woodland floor.

- 5.1.9 During years two and three of this plan, annually select and ring-bark 2% of the non-native trees (away from the woodland edge).
- 5.1.10 During year three of this plan, cut 50 rods (200cm long x 3-4cm diameter at base) of shrub willow sourced from the local area and plant between the footpath and rear of industrial units off Park Road, Worsbrough at OS grid reference SE 3526 0339. The rods will be pushed into the ground to a depth of approximately 0.3m, and 1m apart.

Traditional Orchard ⁴⁰

- 5.1.11 Inspect and replace dead, dying or diseased trees and or a period of three years. Prune dead or diseased branches throughout the life-time of the plan. Repair or replace tree guards, supports and mulch mats for a period of three years.
- 5.1.12 After mid-August, mow the grassland and rake up cuttings throughout the lifetime of the plan.
- 5.1.13 Inspect the grassland in mid-May and apply a suitable herbicide if the cover of pernicious weeds is greater than 5% of the grassland area.

Hedgerows

- 5.1.14 Trim hedgerows alongside footpaths and tracks (Compartments 18, 19, 23, 26, 27, 28 and 29) once each year during winter. Remove cuttings to the nearest patch of woodland and dispose by spreading across the woodland floor.
- 5.1.15 Trim hedgerows (Compartments 24, 32) once every three years by mechanised cutting (tractor-mounted flail or disc cutter).
- 5.1.16 Apply for Countryside Stewardship grant (Option BN5) to obtain financial support to lay hedgerows (Compartments 18, 23, 26, 29, 34 and 35) during the lifetime of this plan. Where appropriate, protect newly laid hedgerows from livestock by the installation of a temporary electric fence within the field.
- 5.1.17 Inspect new hedgerow along Compartment 8 boundary. Replace losses and if required protect the plants from livestock by use of a temporary electric fence. Trim hedgerow if growth reaches a height of >2m in the lifetime of this plan.

Amenity Grassland

- 5.1.18 Continue amenity management of grassland Compartment 3, but create buffer zones (3-5m wide) around plantation woodland blocks 4a, 4b, 4c and 4e (east and west boundaries). Allow tall grassland to develop for one year and the following summer implement a triennial cutting rotation, so that 30% of the resource is cut each year during early Autumn. Collect cuttings and create compost piles (hidden from view) below the canopy of the adjacent plantation woodland blocks.

⁴⁰ It is assumed that the orchard will be planted before this plan is adopted and consequently, the prescriptions are for maintenance only.

Improved Grassland

- 5.1.19 Create 3m wide paths through the Compartment 7 grassland by routine mowing, but stop mowing the remaining grassland and manage it by non-intervention to promote woodland development. In the unlikely event that the grassland is colonised by pernicious weeds (common nettle, docks *Rumex* spp., thistles *Cirsium* spp., and common ragwort *Jacobaea vulgaris*) during the period of the plan, review the prescription and control by herbicide application.

Semi-improved Grassland

- 5.1.20 Apply for an Environmental Stewardship Grant (option GS7) to manage the semi-improved and unimproved grasslands (Compartments 8, 9 and 31). The final management regime is yet to be finalised and will depend on the terms of the stewardship agreement, but an indicative regime is proposed below.
- 5.1.21 Carry out a soil nutrient analysis of Fields A, B, C, D and E to inform detailed selection of GS7 management options.
- 5.1.22 Fields A (Compartment 31) and D (Compartment 9) will be cut for hay no earlier than the 15th July, with at least one cut in every four years after the third week in July. The cut will be followed by aftermath grazing at a stocking rate of 3-4 mature cows per hectare⁴¹. There will be no supplementary feeding or fertiliser input in these fields. Alternatively, both fields could be grazed from late June at a stocking rate of 2 mature cows per hectare over a 12 weeks period, with hay making and aftermath grazing being carried out at least once every four years
- 5.1.23 Fields B (Compartment 31), C (Compartment 9) and E (Compartment 8) will be grazed from mid-June by extensive cattle and/or sheep grazing. Low stocking rates over an extended summer period (for example, 2 cows per hectare over a 16 weeks period) are recommended.
- 5.1.24 Supplementary feeding, if required, must be agreed in advance and located in an area of low botanical diversity. Access to the supplementary feeding areas (if required) must not damage areas of botanical interest.
- 5.1.25 Input of manure onto Fields B, C and E will be permitted if the soil nutrient status is below acceptable limits. If permitted, an indicative application would be 20t/ha of well-rotted manure every 4 years with a buffer of 10-15m from the watercourses in Field E (Compartments 8) and Field B (Compartment 31).
- 5.1.26 Chain harrow Fields B, C and E in February if there is build-up of thatch material or the development of grass tussocks⁴². Harrowing of Fields A and D, if required will be carried out using a brush harrow.
- 5.1.27 To enhance the diversity of the grassland in Fields B, C and E there are three options: (i) collect seed from meadow herbs (Fields A and D) and hand sow directly into gaps in the

⁴¹ Assumes a rest for a period of 2-3 weeks before aftermath grazing and a grazing period of no more than ten weeks.

⁴² It is unlikely that chain harrowing will be required during the lifetime of this plan, because the thatch layer is negligible.

sward (in autumn or spring⁴³); (ii) collect seeds from meadow herbs (Fields A and D), germinate in pots and plant the plugs in spring or autumn into gaps in the sward, (iii) spread cut hay from Fields A and D across sparsely vegetated areas of Fields, B, C and E that are three times larger than the area of cut materials⁴⁴.

- 5.1.28 Cut the reservoir bank grassland (Compartment 16) grassland during late June and again in mid to late September. Rake cuttings, collect and compost at a designated location next to the block of plantation woodland at the base of the slope.
- 5.1.29 Subject to approval of the Supervising Engineer, purchase 10g of hay rattle seed from a local supplier and, during spring, rake the sward on the reservoir embankment grassland (Compartment 16) to create 25 – 30 small gaps, scattered across the grassland, and sow hay rattle seed. Also, sow the gaps with the wildflower seed collected from Fields A and D. Select flowers that have a fairly rapid flowering period and are able to withstand frequent mowing, for example meadow buttercup *Ranunculus acris*, red clover *Trifolium pratense* and yarrow *Achillea millefolium*.

Running Water

- 5.1.30 Manage the rivers and streams by limited intervention. Carry out routine inspection during periods of normal or low flow and if required, remove litter. Avoid removing any woody debris from the stream unless there is a risk of causing upstream flooding or blockages across the spillways of the reservoir. In the long term it would be desirable to control the populations of signal crayfish, but apart from trapping and physical removal, which is difficult in this catchment, there are no other suitable measures available.

Drains and Leats

- 5.1.31 Manage the drains and leat by limited intervention. Carry out routine inspection during periods of normal and low flow and, if required, remove litter. The trees and shrubs overhanging the leat (Compartment 14) millpond overflow (Compartment 20) and water supply to the Dove and Dearne Canal (in Compartment 8) need to be regularly pruned to maintain pedestrian access on the adjacent footpaths. Any channel blockages in the drains and leat will be cleared as soon as they are detected so that the structures are able to maintain water supply and drainage functions. Natural debris (vegetation) will be disposed of in the nearest stand of woodland where it can be hidden from view.
- 5.1.32 Several of the mature crack willows alongside the leat (Compartment 14) that have been previously coppiced or pollarded are in need of immediate treatment because they have the potential to become a hazard to visitors. Eventually all of the mature crack willows alongside the leat will require similar treatment. To minimise the risk to site visitors, implement a programme of routine coppicing or pollarding at intervals of no more than ten years.

⁴³ The sowing or planting time will be determined by the species. Appropriate information can be obtained from the <http://ecoflora.org.uk/>

⁴⁴ A 1m² area of hay will provide sufficient material to spread across 3m² on the receptor site.

Worsbrough Reservoir

- 5.1.33 The fishing club (BADAAS) will regularly inspect and remove litter and debris from the reservoir shorelines. BADAAS will also maintain, as required, the boardwalk on the northern shoreline of the reservoir.
- 5.1.34 Water levels in the reservoir will not be manipulated for biodiversity or to 'improve' the fishery. Apart from the operational considerations, the long-term impact of reducing water levels on biodiversity is not known so there will be no manipulation during the lifetime of this plan.
- 5.1.35 Carry out rotational coppicing of the northern shoreline willows. Implement a ten-year programme and fell 10% of the willows each year, beginning with the largest coppiced stems that are located close to the access track from Haverlands Lane.
- 5.1.36 Increase the area of reed-bed habitat on the western shoreline of the reservoir. There are two options that are considered to be viable. Collect five 0.5m² clumps⁴⁵ of common reed from the extant reed-bed, selecting areas where reed growth is most dense. Place clumps of reeds into hessian sacks or netting and anchor into position on the margins of the reservoir in shallow water (<0.3m). Alternatively, purchase common reed plugs and plant 10-15 into five hessian sacks, filled with mineral based soil and locate as stated above. Repeat annually for the duration of the plan.
- 5.1.37 Continue the programme of willow coppicing in the reed-bed habitat. Carry out annual removal of regrowth on coppiced willows during winter. Felling and/or uproot willows saplings. Place cut materials into adjacent wet woodland or supply 1-2 years old coppice rods to craft workers⁴⁶ and/or contractors⁴⁷ as required.
- 5.1.38 Monitor fish stocks by providing the Barnsley Biological Records Centre with details of weights and fish types caught at match fishing events, in order to estimate the diversity and biomass of fish stocks in the reservoir. BBRC and BMBC will analyse fish stocks after 2-3 years of data collection to estimate fish biomass.

Dove and Dearne Canal

- 5.1.39 The fishing club (WWRAC) will regularly inspect and remove litter and debris from the canal. WWRAC will also maintain and replace as required, the fishing platforms on the south bank of the canal.
- 5.1.40 WWRAC will report to BMBC any trees and shrubs that are overhanging the canal and shading the entire channel. These will be coppiced. The same treatment will be applied to dead, dying, fallen and part-fallen trees and shrubs that are a risk to public safety. Cut materials will be disposed off-site.
- 5.1.41 Emergent vegetation encroaching into the fishing pegs will be removed from the canal and

⁴⁵ The size of the clumps is based on the assumption that the reed will be obtained by hand digging rather than the use of an excavator

⁴⁶ Willow rods for green woodworking and craft works

⁴⁷ Hedge binders for the hedge-laying programme

bank, but the clearance work will be restricted to no more than 0.5m either side of the fishing peg. Vegetation that is removed from the canal should be left close to the canal for a minimum of 36 hours before disposal. The vegetation should be disposed to a designated compost heap location below the canopy (hidden from view) in one of the nearby plantation woodland blocks. (Compartments 4b, 4d, 4e and 4f).

Worsbrough Mill Pond

- 5.1.42 Maintain open water by selective removal of 25-40% of submerged macrophytes (Nuttall's pondweed) at the end of summer. Uprooted materials should be left on the bankside for 36-48 hours to allow invertebrates to return to the water. Thereafter, the vegetation should be removed to a designated location for composting.
- 5.1.43 Over the lifetime of the plan gradually remove all of the trees and shrubs on the south side of the pond and treat stumps with a suitable herbicide. Chip materials that are less than 10cm diameter and spread thinly in neighbouring woodland stands (for example Compartment 11). Dispose of larger timber off-site.
- 5.1.44 If bare ground is present when tree clearance is completed, consider sowing the bank with green hay obtained from the neighbouring grassland (Field D). Hay should be spread over an area three times larger than the area that was cut and gently trampled to encourage seed contact with the soil.

5.2 Operational Objective 2: Monitor target species to determine the conservation status of the Park.

Fish

- 5.2.1 Obtain fishing match weights from BADAAS over a two year period and obtain details of coarse fish species that are present in the reservoir. Provide BBRC with data and analyse (see O'Hara and Steel, 1998) to obtain stocking density estimates.
- 5.2.2 Use stocking density estimates to assess ecological impacts on the reservoir and use information to inform future management of the fishery and the reservoir⁴⁸.

Bats

- 5.2.3 Monitor roosting bats at Worsbrough Mill every three years by emergence surveys of the buildings. Two surveys during June and August in the first, and third years of the plan will update the existing roost records for the Park. The historical records indicate the presence of a bat roost in the Red Lion Public House, which was previously named the Button Mill Inn. If there is a sufficient number of surveyors, it is likely to be worthwhile expanding the roost surveys to include the public house, subject to the landlord's approval.
- 5.2.4 Monitor bat activity in the Park by transect surveys of woodland and open water habitats.

⁴⁸ The assessment offers an opportunity for targeted research (at under-graduate or masters level) by a Higher Education provider.

Given the size of the site, it will be necessary to separate the Park into several sectors and carry out concurrent surveys. Three activity surveys during June, July and August in the second and fourth year of the plan will update the existing records for the Park.

- 5.2.5 Analyse and collate survey data and submit to Barnsley Biological Records Centre.

Birds

- 5.2.6 Barnsley Bird Study Group, in association with the Barnsley Natural History and Scientific Society, will continue to survey breeding birds and target specific species to determine breeding status within the Park.
- 5.2.7 BBSG will analyse, collate and publish an annual report, which will be supplied to BMBC and BBRC. If monitoring indicates a change in status of any of the target species, management of the key habitats will be reviewed and if feasible, modified, to reverse the measured declines of the target species.
- 5.2.8 Notify the general public of how and where to submit records for sightings in the Park of key species such as lesser spotted woodpecker, kingfisher, willow tit and great crested grebe. Provide a noticeboard at Worsbrough Mill to enable the general public to record daily sightings of birds.

Herptiles

- 5.2.9 Monitor common frog and common toad by counting spawn clumps and strings in the millpond during spring each year during the lifetime of the plan.
- 5.2.10 To detect newt species, carry out four evening torch surveys of the millpond between April and June during the first, third and fifth years of the plan.
- 5.2.11 To detect grass snake, identify and place refugia mats (1m² mats of roofing felt, corrugated tin, or carpet) in suitable habitat one month before carrying out field surveys. During April or September/October carry out five to seven separate survey visits (before 11am) when weather conditions are suitable (> 10°C, light winds and no rain). Carry out surveys during the first, third and fifth years of this plan.
- 5.2.12 Collate and analyse annual data, submit records to BBRC.

Harvest Mouse

- 5.2.13 Carry out annual searches for harvest mouse nests in known locations and continue to search habitats which offer suitable conditions. Fields A (Compartment 31) and D (Compartment 9), the western shoreline reed-beds on Worsbrough Reservoir (Compartment 25), and any other patches of reed or tall herb within the wet woodlands (Compartments 12 and 13) that are accessible during summer months.
- 5.2.14 Collate and analyse annual data, submit records to BBRC.

5.3 Operational Objective 3: Promote biodiversity through education and recreational activities and events.

- 5.3.1 In addition to the survey activities that are already taking place such as pond dipping surveys, invite recorder groups to organise survey activities across the Park, particularly those that involve the general public. 'Bioblitz' events are usually well attended and successfully raise the profile of the site and encourage the general public to carry out biological recording. Events should include surveys of land on both sides of the Sheffield Road. All records generated by such events should be sent to the BBRC.
- 5.3.2 Invite recorder groups and/or individuals to link with and mentor students from Barnsley College (and linked Universities such as Hull, Leeds and Sheffield) in biological recording techniques. Collaborate with specialist natural history groups to make use of specialist survey equipment such as mammal traps, bat detectors and moth traps to obtain targeted biological records. All records generated by student and volunteer activities can be sent to the relevant recorders for verification. Recorders will collate data and send to BBRC.
- 5.3.3 Enhance bird surveying at Worsbrough Reservoir by removal of the existing bird hide and replacement with a screen at the same location⁴⁹. Pruning of the surrounding willow trees will enable better views across the reservoir and in particular, the western shoreline.
- 5.3.4 Use the Park for habitat management training and education. Training and education organisations in the public and private sector will be given the opportunity to take responsibility for any of the habitat management prescriptions described in Section 4 if it can be demonstrated that the work will be carried out to the appropriate standard and within the required deadlines. With relevant organisations and agencies, BMBC will seek to enter into agreements that are similar to the existing grazing tenancy agreement with Barnsley College.
- 5.3.5 There are apprenticeships available for Ecologists at various levels that can be organised through partnerships between educational establishments and employers. The Country Park has a range of opportunities and facilities to deliver an apprenticeship scheme, but this will require a more detailed feasibility study beyond the remit of this plan.
- 5.3.6 Investigate the feasibility of converting one or more of the plantation woodland compartments (4a, 4b, 4c) into a 'Natural Play' area that is biodiversity themed, to raise awareness of wildlife within the Country Park.
- 5.3.7 BMBC will promote and collaborate with commercial organisations to provide opportunities for outdoor activities such as woodcrafts (bodging, charcoal manufacture), wild food foraging, learning to fish, mountain biking and survival techniques, where it can be demonstrated that there will be no significant harm or disturbance to wildlife. Training providers will be offered, where appropriate, the use of the Learning Centre, and BMBC will consider proposals from the private sector for development of facilities, again, if there is a negligible risk of disturbance and harm to wildlife, or adverse impact on existing facilities

⁴⁹It is understood that a new screen has been constructed and installation is imminent.

and activities.

5.4 Operational Objective 4: Integrate the conservation of biodiversity into all relevant country park activities.

- 5.4.1 BMBC Planning Department will assess the impact to biodiversity arising from any development within the Park. BMBC will also assess the impact of any other proposed activities within the Park that have potential for an adverse impact on biodiversity. Where necessary, BMBC will consult with the BBRC staff and specialist local groups such as The Barnsley Natural History and Scientific Society to obtain an independent assessment.
- 5.4.2 If any proposed activities require planning permission, it will probably be necessary to commission an independent ecological appraisal and there will be a need to demonstrate a net gain for biodiversity.
- 5.4.3 Any activity that is unable to offset potential impacts by use of mitigation measures will not be permitted, unless there is an overriding need.

5.5 Operational Objective 5: Abide by all legal instruments, deeds and obligations.

- 5.5.1 All activities will comply with the relevant biodiversity legislation and policies. Activities that affect protected species, such as surveys, will be carried out under the supervision of a suitably qualified (licensed) task leader.
- 5.5.2 BMBC will act upon the recommendations of the Inspecting Engineer with regards to Worsbrough Reservoir, in accordance with the Reservoir Act (1975). If the recommendations are likely to have an adverse impact on biodiversity, it will be necessary to develop mitigation measures for biodiversity, so that the recommendations of the engineer are not compromised.
- 5.5.3 Organisations including the two Angling Clubs and Barnsley College will abide by the rules of their lease and/or tenancy agreements. BMBC reserve the right to take the appropriate action for any failure to comply with the agreement.

5.6 Operational Objective 6: Manage and maintain administration.

- 5.6.1 BMBC and BBRC will maintain administrative records for any activities, and events related to biodiversity. Details of any measures to mitigate for the potential impacts on biodiversity by site users will be held by BMBC. Commercial organisations will also maintain records of their own activities within the site to ensure that any adverse impacts on biodiversity can be traced.
- 5.6.2 BBRC will hold and make available for scientific and development purposes, all biological records related to the Park. BBRC will work with voluntary, educational and professional

organisations that aim to enhance the knowledge and understanding of the Park's biodiversity.

- 5.6.3 The management plan will be reviewed and updated towards the end of the lifetime of this plan.

6 Annual Work Plans

6.1 Introduction

- 6.1.1 A map that shows the prescriptions that are specific to particular locations within the Park accompanies each work plan. Actions that are general or not related to a specific location are not included on the plans.

6.2 Year 1 Work Plan

Title	Ref Code	Prescription	Season	Who
Operational Objective 1: Manage habitats to achieve and maintain favourable ecological condition.				
Manage Dry Woodland (Compartments 1 and 2)	O1.1	Carry out routine inspection	All year	BMBC
	O1.2	Prune / fell dangerous trees / shrubs	As required	Con
	O1.3	Selective felling of ash trees	Winter	Con
	O1.4	Block vehicular desire lines	Winter	Con
	O1.5	Control Himalayan balsam	Summer	Vol
Manage Wet Woodland (Compartments 12 and 13)	O1.6	Carry out routine inspection	All year	BMBC
	O1.7	Prune / fell dangerous trees / shrubs	As required	Con
	O1.8	Control Himalayan balsam	Summer	Vol
Manage Traditional Orchard (Compartment 36)	O1.9	Replace dead, dying diseased fruit trees	Winter (Jan – Feb)	BMBC
	O1.10	Replace damaged or missing tree protection, supports and mulch mats	Winter (Jan – Feb)	BMBC / Vol
	O1.11	Mow grassland and rake cuttings	Aug – Sep	BMBC / Vol
	O1.12	Control weeds by herbicide application	May	Con
Manage Plantation Woodlands (Compartments 4 and 17)	O1.13	Thin 30% of woodland (Compartments 4d and 4e)	Winter	Con / BMBC / Vol
	O1.15	Source and plant willow rods (Compartment 4c) to screen industrial estate	Winter	BMBC / Vol
Manage Hedgerows (Compartments 18, 19, 23, 24, 26, 27, 28, 29, 32, 33, 34, 35)	O1.16	Trim trackside hedgerows (Compartments 18, 19, 23, 26, 27, 28 and 29)	Winter	Vol / BC / BMBC
	O1.17	Trim Hedgerows (Compartments 24 and 32)	Winter	Vol / BC / BMBC
	O1.18	Apply for CS grant (Option BN5)	Spring	BMBC

Title	Ref Code	Prescription	Season	Who
	O1.19	Continue to lay hedgerows (Compartments 23 and 26)	Winter	BMBC / Vol / Con
	O1.20	Replace dead, dying diseased shrubs and trees (new hedgerow Compartment 8)	Winter (Dec)	BMBC / Vol
Manage Amenity Grassland (Compartment 3)	O1.21	Cut grassland	Summer	BMBC
	O1.22	Create 3-5m buffer zones (stop mowing) around plantation woodlands (Compartments 4a, 4b, 4c and 4e)	Summer	BMBC
Manage Improved Grassland (Compartment 7)	O1.23	Maintain paths by amenity-mowing (3m wide)	Summer	BMBC
	O1.24	Manage grassland by non-intervention	Winter / Summer	BMBC
Manage Semi-improved and unimproved Grassland (Compartments 8, 9, 16 and 31)	O1.25	Sample soils (All fields Compartments 8, 9, 31)	Anytime	BMBC
	O1.26	Apply for CS grant (Option GS7)	Spring	BMBC / BC
	O1.27	Hay cut and aftermath graze grasslands (Field A, Compartment 31 and Field D, Compartment 9)	Summer (July - Sept)	BC
	O1.28	Graze grasslands (Field B Compartment 31, Field C Compartment 9 and Field E Compartment 8)	Summer (Jun – Sept)	BC
	O1.29	Enhance botanical diversity (seed, plug, hay) of Fields B (Compartment 31), C (Compartment 9) and E (Compartment 8)	Spring (sow), Summer (Plug and hay)	BMBC / Vol
	O1.30	Cut grassland (Compartment 16) bi-annually and rake cuttings	Summer (Jun and Sept)	BMBC / Vol
	O1.31	Sow hay rattle seed (Compartment 16)	Spring	BMBC / Vol
	O1.32	Source and collect local wildflower seeds (store over winter)	Summer	SE / BRC / BC / Vol
Manage Running Water	O1.33	Carry out routine inspection of watercourses during normal or low flow conditions	All year	BMBC / Vol
	O1.34	Remove and dispose of rubbish	All year	BMBC / Vol
	O1.35	Clear woody material (if necessary)	All year	BMBC / Con

Title	Ref Code	Prescription	Season	Who
Manage drains and Leat (Compartments 14 and 20)	O1.36	Carry out routine inspection of watercourses during normal or low flow conditions	All year	BMBC / Vol
	O1.37	Remove and dispose of rubbish	All year	BMBC / Vol
	O1.38	Clear woody material (if necessary)	All year	BMBC / Con
	O1.39	Coppice / pollard bankside willows (Compartment 14)	Winter	Con
Manage Worsbrough Reservoir (Compartment 25)	O1.40	Patrol and clear litter from reservoir shoreline	All year	BADAAS
	O1.41	Implement rotational coppicing (10%) of northern shoreline willows	Winter	Con / BC / BADAAS
	O1.42	Expand reed-bed habitat on western shoreline	Autumn	BMBC / Vol
	O1.43	Control willow growth in reed-bed	Winter	BMBC / Vol
	O1.44	Monitor angling catch data	All year	BADAAS / BBRC
Manage the Dearne and Dove Canal (Compartment 5)	O1.45	Carry out routine inspection and remove litter and debris	All year	WWRAC
	O1.46	Coppice / prune trees and shrubs on the north bank	Winter	Con / WWRAC
	O1.47	Clear fishing pegs of encroaching vegetation	All year	WWRAC
Manage the Mill Pond (Compartment 15)	O1.48	Control submerged vegetation (25-40% annually)	August - September	Vol / BC
	O1.49	Remove south side trees and shrubs	Winter	Con / Vol
	O1.50	Apply green hay to south bank	July	BMBC / Vol
Operational Objective 2: Monitor target species to determine the conservation status of the Park.				
Monitor Fish	O2.1	See O1.41	All year	BADAAS / BBRC
Monitor Bats	O2.2	Carry out roost emergence surveys of the Worsbrough Mill buildings	June and August	SYBG / BC / Vol
	O2.3	Analyse and collate survey data	Sep to Dec	SYBG / BC
Monitor Birds	O2.4	Carry out breeding bird surveys	Mar - Jun	BBSG
	O2.5	Collate and analyse bird data, and prepare bird annual report	Dec	BBSG
	O2.6	Collate public sightings	All year	BBRC
	O2.7	Provide and maintain daily sightings board	All year	BC / Vol / BBSG
Monitor Herptiles	O2.8	Count frog and toad spawn	Spring	YARG / SNHS / BC / Vol
	O2.9	Count newts by torch survey	Apr - June	YARG / SNHS / BC / Vol

Title	Ref Code	Prescription	Season	Who
	O2.10	Survey grass snake by use of refugia mats	Spring or Autumn	YARG / SNHS / BC / Vol
	O2.11	Analyse and collate survey data	Winter	YARG / SNHS / BC
Monitor Harvest mouse	O2.12	Carry out harvest mouse nest search	Summer	BBRC / SNHS / Vol
	O2.13	Analyse and collate survey data	Winter	BBRC / SNHS / Vol
Operational Objective 3: Promote biodiversity through education and recreational activities and events.				
Promote Biological Surveys	O3.1	Maintain existing biological survey programme	All year	BMBC / BBRC etc.
	O3.2	Expand biological survey provision through formal and informal events and activities	All year	BBRC / BNSS / WYBG / NYARG etc.
	O3.3	Promote a programme of mentoring for biological surveys	All year	Vol / BC / BBRC / BNSS etc.
Enhance Survey Provision	O3.4	Replace bird hide with a bird screen	Summer	BMBC / Con
Promote Countryside Management / Ecology Skills	O3.5	Expand provision for habitat management education and training	All year	BMBC / BC / Vol / Comm
	O3.6	Expand provision for countryside activities education and training	All year	BMBC / BC / Vol / Comm
Operational Objective 4: Integrate the conservation of biodiversity into all relevant country park activities.				
Impact Assessment	O4.1	Assess impacts of development on biodiversity	As required	BMBC / BBRC / Con
	O4.2	Assess impacts of activities and events on biodiversity	As required	BMBC / BBRC
Operational Objective 5: Abide by all legal instruments, deeds and obligations.				
Protect Site	O5.1	Abide by relevant legislation	As required	All
	O5.2	Abide by lease and tenancy agreements	As required	BC / BADAAS / WWRAC
Operational Objective 6: Manage and maintain administration.				
Site Administration	O6.1	Maintain records of site management and activities	All year	BMBC
	O6.2	Collate and maintain biological records for the site	All year	BBRC

Key:

Ref Code Management Reference Code

BMBC Barnsley Metropolitan District Council Parks Service

Vol Volunteer Groups (for example: Worsbrough Green Fingered Wanderers / Voluntary Action Barnsley - Corporate volunteer parties)

Comm	Commercial Organisations
Con	Specialist Contractors
BC	Barnsley College
BBRC	Barnsley Biological records Centre
BADAAS	Barnsley and District Amalgamated Angling Society
WWRAC	Wombwell White Rose Angling Club
SYBG	South Yorkshire Bat Group
BBSG	Barnsley Bird Study Group (in association with Barnsley Naturalist and Scientific Society)
BNSS	Barnsley Naturalist and Scientific Society
NYARG	North, East, West Yorkshire Amphibian and Reptile Group
SNHS	Sorby Natural History Society
SE	Supervising Engineer (Reservoir)

6.3 Year Two Work Plan

Title	Ref Code	Prescription	Season	Who
Operational Objective 1: Manage habitats to achieve and maintain favourable ecological condition.				
Manage Dry Woodland (Compartments 1 and 2)	O1.1	Carry out routine inspection	All year	BMBC
	O1.2	Prune / fell dangerous trees / shrubs	As required	Con
	O1.3	Selective felling of ash trees	Winter	Con
	O1.4	Block vehicular desire lines	Winter	Con
	O1.5	Control Himalayan balsam	Summer	Vol
Manage Wet Woodland (Compartments 12 and 13)	O1.6	Carry out routine inspection	All year	BMBC
	O1.7	Prune / fell dangerous trees / shrubs	As required	Con
	O1.8	Control Himalayan balsam	Summer	Vol
Manage Traditional Orchard (Compartment 36)	O1.9	Replace dead, dying, diseased fruit trees	Winter (Jan – Feb)	BMBC
	O1.10	Replace damaged or missing tree protection, supports and mulch mats	Winter (Jan – Feb)	BMBC / Vol
	O1.11	Mow grassland and rake cuttings	Aug – Sep	BMBC / Vol
	O1.12	Control weeds by herbicide application	May	Con
Manage Plantation Woodlands (Compartments 4 and 17)	O1.13	Thin 30% of woodland (Compartments 4f and 4g)	Winter	Con / BMBC / Vol
	O1.14	Ring bark 2% of mature non-native trees (Compartments 4d and 4e)	Winter	BMBC / Vol
Manage Hedgerows (Compartments 18, 19, 23, 24, 26, 27, 28, 29, 32, 33, 34, 35)	O1.16	Trim trackside hedgerows (Compartments 18, 19, 23, 26, 27, 28 and 29)	Winter	Vol / BC / BMBC
	O1.19	Lay hedgerows (Compartments 23, 26 and 35)	Winter	BMBC / Vol / Con
	O1.20	Replace dead, dying diseased shrubs and trees (new hedgerow Compartment 8)	Winter (Dec)	BMBC / Vol
Manage Amenity Grassland (Compartment 3)	O1.21	Cut grassland (Compartment 3)	Summer	BMBC
	O1.22	No mowing in 3-5m buffer zones (stop mowing) around plantation woodlands (Compartments 4a, 4b, 4c and 4e)	Summer	BMBC
Manage Improved Grassland	O1.23	Maintain paths by amenity-mowing (3m wide)	Summer	BMBC

Title	Ref Code	Prescription	Season	Who
(Compartment 7)	O1.24	Manage grassland by non-intervention	Winter / Summer	BMBC
Manage Semi-improved and unimproved Grassland (Compartments 8, 9, 16 and 31)	O1.27	Hay cut and aftermath graze grasslands (Field A, Compartment 31 and Field D, Compartment 9)	Summer (July - Sept)	BC
	O1.28	Graze grasslands (Field B Compartment 31, Field C Compartment 9 and Field E Compartment 8)	Summer (Jun – Sept)	BC
	O1.29	Enhance botanical diversity (seed, plug, hay) of Fields B (Compartment 31), C (Compartment 9) and E (Compartment 8)	Spring (sow), Summer (Plug and hay)	BMBC / Vol
	O1.30	Cut grassland (Compartment 16) bi-annually and rake cuttings	Summer (Jun and Sept)	BMBC / Vol
	O1.32	Source and collect local wildflower seeds (store over winter)	Summer	SE / BRC / BC / Vol
Manage Running Water	O1.33	Carry out routine inspection of watercourses during normal or low flow conditions	All year	BMBC / Vol
	O1.34	Remove and dispose of rubbish	All year	BMBC / Vol
	O1.35	Clear woody material (if necessary)	All year	BMBC / Con
Manage drains and Leat (Compartments 14 and 20)	O1.36	Carry out routine inspection of watercourses during normal or low flow conditions	All year	BMBC / Vol
	O1.37	Remove and dispose of rubbish	All year	BMBC / Vol
	O1.38	Clear woody material (if necessary)	All year	BMBC / Con
	O1.39	Coppice / pollard bankside willows (Compartment 14)	Winter	Con
Manage Worsbrough Reservoir (Compartment 25)	O1.40	Patrol and clear litter from reservoir shoreline	All year	BADAAS
	O1.41	Implement rotational coppicing (10%) of northern shoreline willows	Winter	Con / BC / BADAAS
	O1.42	Expand reed-bed habitat on western shoreline	Autumn	BMBC / Vol
	O1.43	Control willow growth in reed-bed	Winter	BMBC / Vol
	O1.44	Monitor angling catch data	All year	BADAAS / BBRC
Manage the Dearne and Dove Canal (Compartment 5)	O1.45	Carry out routine inspection and remove litter and debris	All year	WWRAC
	O1.46	Coppice / prune trees and shrubs on the north bank	Winter	Con / WWRAC

Title	Ref Code	Prescription	Season	Who
	O1.47	Clear fishing pegs of encroaching vegetation	All year	WWRAC
Manage the Mill Pond (Compartment 15)	O1.48	Control submerged vegetation (25-40% annually)	August - September	Vol / BC
Operational Objective 2: Monitor target species to determine the conservation status of the Park.				
Monitor Fish	O2.1	See O1.41	All year	BADAAS / BBRC
Monitor Bats	O2.2	Carry out bat activity (transect) surveys across the Country Park	June and August	SYBG / BC / Vol
	O2.3	Analyse and collate survey data	Sep to Dec	SYBG / BC
Monitor Birds	O2.4	Carry out breeding bird surveys	Mar - Jun	BBSG
	O2.5	Collate and analyse bird data, and prepare bird annual report	Dec	BBSG
	O2.6	Collate public sightings	All year	BBRC
	O2.7	Provide and maintain daily sightings board	All year	BC / Vol / BBSG
Monitor Herptiles	O2.8	Count frog and toad spawn	Spring	SYARG / SNHS / BC / Vol
	O2.9	Count newts by torch survey	Apr - June	SYARG / SNHS / BC / Vol
	O2.11	Analyse and collate survey data	Winter	SYARG / SNHS / BC
Monitor Harvest mouse	O2.12	Carry out harvest mouse nest search	Summer	BBRC / SNHS / Vol
	O2.13	Analyse and collate survey data	Winter	BBRC / SNHS / Vol
Operational Objective 3: Promote biodiversity through education and recreational activities and events.				
Promote Biological Surveys	O3.1	Maintain existing biological survey programme	All year	BMBC / BBRC etc.
	O3.2	Expand biological survey provision through formal and informal events and activities	All year	BBRC / BNSS / WYBG / NYARG etc.
	O3.3	Promote a programme of mentoring for biological surveys	All year	Vol / BC / BBRC / BNSS etc.
Enhance Survey Provision	O3.4	Replace bird hide with a bird screen	Summer	BMBC / Con
Promote Countryside Management / Ecology Skills	O3.5	Expand provision for habitat management education and training	All year	BMBC / BC / Vol / Comm
	O3.6	Expand provision for countryside activities education and training	All year	BMBC / BC / Vol / Comm

Title	Ref Code	Prescription	Season	Who
Operational Objective 4: Integrate the conservation of biodiversity into all relevant country park activities.				
Impact Assessment	O4.1	Assess impacts of development on biodiversity	As required	BMBC / BBRC / Con
	O4.2	Assess impacts of activities and events on biodiversity	As required	BMBC / BBRC
Operational Objective 5: Abide by all legal instruments, deeds and obligations.				
Protect Site	O5.1	Abide by relevant legislation	As required	All
	O5.2	Abide by lease and tenancy agreements	As required	BC / BADAAS / WWRAC
Operational Objective 6: Manage and maintain administration.				
Site Administration	O6.1	Maintain records of site management and activities	All year	BMBC
	O6.2	Collate and maintain biological records for the site	All year	BBRC

Key:

Ref Code	Management Reference Code
BMBC	Barnsley Metropolitan District Council Parks Service
Vol	Volunteer Groups (for example: Worsborough Green Fingert Wanderers / Voluntary Action Barnsley - Corporate volunteer parties)
Comm	Commercial Organisations
Con	Specialist Contractors
BC	Barnsley College
BBRC	Barnsley Biological records Centre
BADAAS	Barnsley and District Amalgamated Angling Society
WWRAC	Wombwell White Rose Angling Club
SYBG	South Yorkshire Bat Group
BBSG	Barnsley Bird Study Group (in association with Barnsley Naturalist and Scientific Society)
BNSS	Barnsley Naturalist and Scientific Society
NYARG	North, East, West Yorkshire Amphibian and Reptile Group
SNHS	Sorby Natural History Society
SE	Supervising Engineer (Reservoir)

6.4 Year Three Work Plan

Title	Ref Code	Prescription	Season	Who
Operational Objective 1: Manage habitats to achieve and maintain favourable ecological condition.				
Manage Dry Woodland (Compartments 1 and 2)	O1.1	Carry out routine inspection	All year	BMBC
	O1.2	Prune / fell dangerous trees / shrubs	As required	Con
	O1.3	Selective felling of ash trees	Winter	Con
	O1.4	Block vehicular desire lines	Winter	Con
	O1.5	Control Himalayan balsam	Summer	Vol
Manage Wet Woodland (Compartments 12 and 13)	O1.6	Carry out routine inspection	All year	BMBC
	O1.7	Prune / fell dangerous trees / shrubs	As required	Con
	O1.8	Control Himalayan balsam	Summer	Vol
Manage Traditional Orchard (Compartment 36)	O1.9	Replace dead, dying diseased fruit trees	Winter (Jan – Feb)	BMBC
	O1.10	Replace damaged or missing tree protection, supports and mulch mats	Winter (Jan – Feb)	BMBC / Vol
	O1.11	Mow grassland and rake cuttings	Aug – Sep	BMBC / Vol
	O1.12	Control weeds by herbicide application	May	Con
Manage Plantation Woodlands (Compartment 17)	O1.13	Thin 30% of woodland (Compartments 4g and 17)	Winter	Con / BMBC / Vol
	O1.14	Ring bark 2% of mature non-native trees (Compartment 17)	Winter	BMBC / Vol
Manage Hedgerows (Compartments 18, 19, 23, 24, 26, 27, 28, 29, 32, 33, 34, 35)	O1.15	Trim trackside hedgerows (Compartments 18, 19, 23, 26, 27, 28 and 29)	Winter	Vol / BC / BMBC
	O1.16	Lay hedgerows (Compartments 23 and 35)	Winter	BMBC / Vol / Con
	O1.19	Replace dead, dying diseased shrubs and trees (new hedgerow Compartment 8)	Winter (Dec)	BMBC / Vol
Manage Amenity Grassland (Compartment 3)	O1.21	Cut grassland	Summer	BMBC
	O1.22	Leave 3-5m buffer zones (stop mowing) around plantation woodlands (Compartments 4a, 4b, 4c and 4e)	Summer	BMBC
Manage Improved Grassland	O1.23	Maintain paths by amenity-mowing (3m wide)	Summer	BMBC

Title	Ref Code	Prescription	Season	Who
(Compartment 7)	O1.24	Manage grassland by non-intervention	Winter / Summer	BMBC
Manage Semi-improved and unimproved Grassland (Compartments 8, 9, 16 and 31)	O1.27	Hay cut and aftermath graze grasslands (Field A, Compartment 31 and Field D, Compartment 9)	Summer (July - Sept)	BC
	O1.28	Graze grasslands (Field B Compartment 31, Field C Compartment 9 and Field E Compartment 8)	Summer (Jun – Sept)	BC
	O1.29	Enhance botanical diversity (seed, plug, hay) of Fields B (Compartment 31), C (Compartment 9) and E (Compartment 8)	Spring (sow), Summer (Plug and hay)	BMBC / Vol
	O1.30	Cut grassland (Compartment 16) bi-annually and rake cuttings	Summer (Jun and Sept)	BMBC / Vol
Manage Running Water	O1.33	Carry out routine inspection of watercourses during normal or low flow conditions	All year	BMBC / Vol
	O1.34	Remove and dispose of rubbish	All year	BMBC / Vol
	O1.35	Clear woody material (if necessary)	All year	BMBC / Con
Manage drains and Leat (Compartments 14 and 20)	O1.36	Carry out routine inspection of watercourses during normal or low flow conditions	All year	BMBC / Vol
	O1.37	Remove and dispose of rubbish	All year	BMBC / Vol
	O1.38	Clear woody material (if necessary)	All year	BMBC / Con
	O1.39	Coppice / pollard bankside willows (Compartment 14)	Winter	Con
Manage Worsbrough Reservoir (Compartment 25)	O1.40	Patrol and clear litter from reservoir shoreline	All year	BADAAS
	O1.41	Implement rotational coppicing (10%) of northern shoreline willows	Winter	Con / BC / BADAAS
	O1.42	Expand reed-bed habitat on western shoreline	Autumn	BMBC / Vol
	O1.43	Control willow growth in reed-bed	Winter	BMBC / Vol
	O1.44	Monitor angling catch data	All year	BADAAS / BBRC
Manage the Dearne and Dove Canal (Compartment 5)	O1.45	Carry out routine inspection and remove litter and debris	All year	WWRAC
	O1.46	Coppice / prune trees and shrubs on the north bank	Winter	Con / WWRAC
	O1.47	Clear fishing pegs of encroaching vegetation	All year	WWRAC

Title	Ref Code	Prescription	Season	Who
Manage the Mill Pond (Compartment 15)	O1.48	Control submerged vegetation (25-40% annually)	August - September	Vol / BC
Operational Objective 2: Monitor target species to determine the conservation status of the Park.				
Monitor Bats	O2.2	Carry out roost emergence surveys of the Worsbrough Mill buildings	June and August	SYBG / BC / Vol
	O2.3	Analyse and collate survey data	Sep to Dec	SYBG / BC
Monitor Birds	O2.4	Carry out breeding bird surveys	Mar - Jun	BBSG
	O2.5	Collate and analyse bird data, and prepare bird annual report	Dec	BBSG
	O2.6	Collate public sightings	All year	BBRC
	O2.7	Provide and maintain daily sightings board	All year	BC / Vol / BBSG
Monitor Herptiles	O2.8	Count frog and toad spawn	Spring	YARG / SNHS / BC / Vol
	O2.9	Count newts by torch survey	Apr - June	YARG / SNHS / BC / Vol
	O2.10	Survey grass snake by use of refugia mats	Spring or Autumn	YARG / SNHS / BC / Vol
	O2.11	Analyse and collate survey data	Winter	YARG / SNHS / BC
Monitor Harvest mouse	O2.12	Carry out harvest mouse nest search	Summer	BBRC / SNHS / Vol
	O2.13	Analyse and collate survey data	Winter	BBRC / SNHS / Vol
Operational Objective 3: Promote biodiversity through education and recreational activities and events.				
Promote Biological Surveys	O3.1	Maintain existing biological survey programme	All year	BMBC / BBRC etc.
	O3.2	Expand biological survey provision through formal and informal events and activities	All year	BBRC / BNSS / WYBG / NYARG etc.
	O3.3	Promote a programme of mentoring for biological surveys	All year	Vol / BC / BBRC / BNSS etc.
Promote Countryside Management / Ecology Skills	O3.5	Expand provision for habitat management education and training	All year	BMBC / BC / Vol / Comm
	O3.6	Expand provision for countryside activities education and training	All year	BMBC / BC / Vol / Comm
Operational Objective 4: Integrate the conservation of biodiversity into all relevant country park activities.				
Impact Assessment	O4.1	Assess impacts of development on biodiversity	As required	BMBC / BBRC / Con

Title	Ref Code	Prescription	Season	Who
	O4.2	Assess impacts of activities and events on biodiversity	As required	BMBC / BBRC
Operational Objective 5: Abide by all legal instruments, deeds and obligations.				
Protect Site	O5.1	Abide by relevant legislation	As required	All
	O5.2	Abide by lease and tenancy agreements	As required	BC / BADAAS / WWRAC
Operational Objective 6: Manage and maintain administration.				
Site Administration	O6.1	Maintain records of site management and activities	All year	BMBC
	O6.2	Collate and maintain biological records for the site	All year	BBRC

Key:

Ref Code	Management Reference Code
BMBC	Barnsley Metropolitan District Council Parks Service
Vol	Volunteer Groups (for example: Worsborough Green Fingert Wanderers / Voluntary Action Barnsley - Corporate volunteer parties)
Comm	Commercial Organisations
Con	Specialist Contractors
BC	Barnsley College
BBRC	Barnsley Biological records Centre
BADAAS	Barnsley and District Amalgamated Angling Society
WWRAC	Wombwell White Rose Angling Club
SYBG	South Yorkshire Bat Group
BBSG	Barnsley Bird Study Group (in association with Barnsley Naturalist and Scientific Society)
BNSS	Barnsley Naturalist and Scientific Society
NYARG	North, East, West Yorkshire Amphibian and Reptile Group
SNHS	Sorby Natural History Society
SE	Supervising Engineer (Reservoir)

6.5 Year Four Work Plan

Title	Ref Code	Prescription	Season	Who
Operational Objective 1: Manage habitats to achieve and maintain favourable ecological condition.				
Manage Dry Woodland (Compartments 1 and 2)	O1.1	Carry out routine inspection	All year	BMBC
	O1.2	Prune / fell dangerous trees / shrubs	As required	Con
	O1.3	Selective felling of ash trees	Winter	Con
	O1.4	Block vehicular desire lines	Winter	Con
Manage Wet Woodland (Compartments 12 and 13)	O1.6	Carry out routine inspection	All year	BMBC
	O1.7	Prune / fell dangerous trees / shrubs	As required	Con
	O1.8	Control Himalayan balsam	Summer	Vol
Manage Traditional Orchard (Compartment 36)	O1.11	Mow grassland and rake cuttings	Aug – Sep	BMBC / Vol
Manage Hedgerows (Compartments 18, 19, 23, 24, 26, 27, 28, 29, 32, 33, 34, 35)	O1.16	Trim trackside hedgerows (Compartments 18, 19, 23, 26, 27, 28 and 29)	Winter	Vol / BC / BMBC
	O1.17	Trim hedgerows (Compartments 24 and 32)	Winter	Vol / BC / BMBC
	O1.19	Lay hedgerows (Compartments 23 and 35)	Winter	BMBC / Vol / Con
Manage Amenity Grassland (Compartment 3)	O1.21	Cut grassland	Summer	BMBC
	O1.22	Leave 3-5m buffer zones (stop mowing) around plantation woodlands (Compartments 4a, 4b, 4c and 4e)	Summer	BMBC
Manage Improved Grassland (Compartment 7)	O1.23	Maintain paths by amenity-mowing (3m wide)	Summer	BMBC
	O1.24	Manage grassland by non-intervention	Winter / Summer	BMBC
Manage Semi-improved and unimproved Grassland (Compartments 8, 9, 16 and 31)	O1.27	Hay cut and aftermath graze grasslands (Field A, Compartment 31 and Field D, Compartment 9)	Summer (July - Sept)	BC
	O1.28	Graze grasslands (Field B Compartment 31, Field C Compartment 9 and Field E Compartment 8)	Summer (Jun – Sept)	BC
	O1.29	Enhance botanical diversity (seed, plug, hay) of Fields B (Compartment 31), C (Compartment 9) and E (Compartment 8)	Spring (sow), Summer (Plug and hay)	BMBC / Vol

Title	Ref Code	Prescription	Season	Who
	O1.30	Cut grassland (Compartment 16) bi-annually and rake cuttings	Summer (Jun and Sept)	BMBC / Vol
Manage Running Water	O1.33	Carry out routine inspection of watercourses during normal or low flow conditions	All year	BMBC / Vol
	O1.34	Remove and dispose of rubbish	All year	BMBC / Vol
	O1.35	Clear woody material (if necessary)	All year	BMBC / Con
Manage drains and Leat (Compartments 14 and 20)	O1.36	Carry out routine inspection of watercourses during normal or low flow conditions	All year	BMBC / Vol
	O1.37	Remove and dispose of rubbish	All year	BMBC / Vol
	O1.38	Clear woody material (if necessary)	All year	BMBC / Con
	O1.39	Coppice / pollard bankside willows (Compartment 14)	Winter	Con
Manage Worsbrough Reservoir (Compartment 25)	O1.40	Patrol and clear litter from reservoir shoreline	All year	BADAAS
	O1.41	Implement rotational coppicing (10%) of northern shoreline willows	Winter	Con / BC / BADAAS
	O1.42	Expand reed-bed habitat on western shoreline	Autumn	BMBC / Vol
	O1.43	Control willow growth in reed-bed	Winter	BMBC / Vol
Manage the Dearne and Dove Canal (Compartment 5)	O1.45	Carry out routine inspection and remove litter and debris	All year	WWRAC
	O1.46	Coppice / prune trees and shrubs on the north bank	Winter	Con / WWRAC
	O1.47	Clear fishing pegs of encroaching vegetation	All year	WWRAC
Manage the Mill Pond (Compartment 15)	O1.48	Control submerged vegetation (25-40% annually)	August - September	Vol / BC
Operational Objective 2: Monitor target species to determine the conservation status of the Park.				
Monitor Bats	O2.2	Carry out bat activity (transect) surveys of Worsbrough Country Park	June and August	SYBG / BC / Vol
	O2.3	Analyse and collate survey data	Sep to Dec	SYBG / BC
Monitor Birds	O2.4	Carry out breeding bird surveys	Mar - Jun	BBSG
	O2.5	Collate and analyse bird data, and prepare bird annual report	Dec	BBSG
	O2.6	Collate public sightings	All year	BBRC
	O2.7	Provide and maintain daily sightings board	All year	BC / Vol / BBSG

Title	Ref Code	Prescription	Season	Who
Monitor Herptiles	O2.8	Count frog and toad spawn	Spring	YARG / SNHS / BC / Vol
	O2.9	Count newts by torch survey	Apr - June	YARG / SNHS / BC / Vol
	O2.11	Analyse and collate survey data	Winter	YARG / SNHS / BC
Monitor Harvest mouse	O2.12	Carry out harvest mouse nest search	Summer	BBRC / SNHS / Vol
	O2.13	Analyse and collate survey data	Winter	BBRC / SNHS / Vol
Operational Objective 3: Promote biodiversity through education and recreational activities and events.				
Promote Biological Surveys	O3.1	Maintain existing biological survey programme	All year	BMBC / BBRC etc.
	O3.2	Expand biological survey provision through formal and informal events and activities	All year	BBRC / BNSS / WYBG / NYARG etc.
	O3.3	Promote a programme of mentoring for biological surveys	All year	Vol / BC / BBRC / BNSS etc.
Promote Countryside Management / Ecology Skills	O3.5	Expand provision for habitat management education and training	All year	BMBC / BC / Vol / Comm
	O3.6	Expand provision for countryside activities education and training	All year	BMBC / BC / Vol / Comm
Promote knowledge of native wildlife	O3.7	Design, create and manage a 'Natural Play Area' (Compartment 4) that is wildlife themed	All year	BMBC / Con
Operational Objective 4: Integrate the conservation of biodiversity into all relevant country park activities.				
Impact Assessment	O4.1	Assess impacts of development on biodiversity	As required	BMBC / BBRC / Con
	O4.2	Assess impacts of activities and events on biodiversity	As required	BMBC / BBRC
Operational Objective 5: Abide by all legal instruments, deeds and obligations.				
Protect Site	O5.1	Abide by relevant legislation	As required	All
	O5.2	Abide by lease and tenancy agreements	As required	BC / BADAAS / WWRAC
Operational Objective 6: Manage and maintain administration.				
Site Administration	O6.1	Maintain records of site management and activities	All year	BMBC
	O6.2	Collate and maintain biological records for the site	All year	BBRC

Key:

Ref Code	Management Reference Code
BMBC	Barnsley Metropolitan District Council Parks Service
Vol	Volunteer Groups (for example: Worsborough Green Fingert Wanderers / Voluntary Action Barnsley - Corporate volunteer parties)
Comm	Commercial Organisations
Con	Specialist Contractors
BC	Barnsley College
BBRC	Barnsley Biological records Centre
BADAAS	Barnsley and District Amalgamated Angling Society
WWRAC	Wombwell White Rose Angling Club
SYBG	South Yorkshire Bat Group
BBSG	Barnsley Bird Study Group (in association with Barnsley Naturalist and Scientific Society)
BNSS	Barnsley Naturalist and Scientific Society
NYARG	North, East, West Yorkshire Amphibian and Reptile Group
SNHS	Sorby Natural History Society
SE	Supervising Engineer (Reservoir)

6.6 Year Five Work Plan

Title	Ref Code	Prescription	Season	Who
Operational Objective 1: Manage habitats to achieve and maintain favourable ecological condition.				
Manage Dry Woodland (Compartments 1 and 2)	O1.1	Carry out routine inspection	All year	BMBC
	O1.2	Prune / fell dangerous trees / shrubs	As required	Con
	O1.3	Selective felling of ash trees	Winter	Con
	O1.4	Block vehicular desire lines	Winter	Con
Manage Wet Woodland (Compartments 12 and 13)	O1.6	Carry out routine inspection	All year	BMBC
	O1.7	Prune / fell dangerous trees / shrubs	As required	Con
	O1.8	Control Himalayan balsam	Summer	Vol
Manage Traditional Orchard (Compartment 36)	O1.11	Mow grassland and rake cuttings	Aug – Sep	BMBC / Vol
Manage Hedgerows (Compartments 18, 19, 23, 24, 26, 27, 28, 29, 32, 33, 34, 35)	O1.16	Trim trackside hedgerows (Compartments 18, 19, 23, 26, 27, 28 and 29)	Winter	Vol / BC / BMBC
	O1.19	Lay hedgerows (Compartments 34 and 35)	Winter	BMBC / Vol / Con
Manage Amenity Grassland (Compartment 3)	O1.21	Cut grassland	Summer	BMBC
	O1.22	Leave 3-5m buffer zones (stop mowing) around plantation woodlands (Compartments 4a, 4b, 4c and 4e)	Summer	BMBC
Manage Improved Grassland (Compartment 7)	O1.23	Maintain paths by amenity-mowing (3m wide)	Summer	BMBC
	O1.24	Manage grassland by non-intervention	Winter / Summer	BMBC
Manage Semi-improved and unimproved Grassland (Compartments 8, 9, 16 and 31)	O1.27	Hay cut and aftermath graze grasslands (Field A, Compartment 31 and Field D, Compartment 9)	Summer (July - Sept)	BC
	O1.28	Graze grasslands (Field B Compartment 31, Field C Compartment 9 and Field E Compartment 8)	Summer (Jun – Sept)	BC
	O1.30	Cut grassland (Compartment 16) bi-annually and rake cuttings	Summer (Jun and Sept)	BMBC / Vol
Manage Running Water	O1.33	Carry out routine inspection of watercourses during normal or low flow conditions	All year	BMBC / Vol

Title	Ref Code	Prescription	Season	Who
Manage drains and Leat (Compartments 14 and 20)	O1.34	Remove and dispose of rubbish	All year	BMBC / Vol
	O1.35	Clear woody material (if necessary)	All year	BMBC / Con
	O1.36	Carry out routine inspection of watercourses during normal or low flow conditions	All year	BMBC / Vol
	O1.37	Remove and dispose of rubbish	All year	BMBC / Vol
	O1.38	Clear woody material (if necessary)	All year	BMBC / Con
	O1.39	Coppice / pollard bankside willows (Compartment 14)	Winter	Con
Manage Worsbrough Reservoir (Compartment 25)	O1.40	Patrol and clear litter from reservoir shoreline	All year	BADAAS
	O1.41	Implement rotational coppicing (10%) of northern shoreline willows	Winter	Con / BC / BADAAS
	O1.42	Expand reed-bed habitat on western shoreline	Autumn	BMBC / Vol
	O1.43	Control willow growth in reed-bed	Winter	BMBC / Vol
Manage the Dearne and Dove Canal (Compartment 5)	O1.45	Carry out routine inspection and remove litter and debris	All year	WWRAC
	O1.46	Coppice / prune trees and shrubs on the north bank	Winter	Con / WWRAC
	O1.47	Clear fishing pegs of encroaching vegetation	All year	WWRAC
Manage the Mill Pond (Compartment 15)	O1.48	Control submerged vegetation (25-40% annually)	August - September	Vol / BC
Operational Objective 2: Monitor target species to determine the conservation status of the Park.				
Monitor Birds	O2.4	Carry out breeding bird surveys	Mar - Jun	BBSG
	O2.5	Collate and analyse bird data, and prepare bird annual report	Dec	BBSG
	O2.6	Collate public sightings	All year	BBRC
	O2.7	Provide and maintain daily sightings board	All year	BC / Vol / BBSG
Monitor Herptiles	O2.8	Count frog and toad spawn	Spring	YARG / SNHS / BC / Vol
	O2.9	Count newts by torch survey	Apr - June	YARG / SNHS / BC / Vol
	O2.10	Survey grass snake by use of refugia mats	Spring or Autumn	YARG / SNHS / BC / Vol
	O2.11	Analyse and collate survey data	Winter	YARG / SNHS / BC

Title	Ref Code	Prescription	Season	Who
Monitor Harvest mouse	O2.12	Carry out harvest mouse nest search	Summer	BBRC / SNHS / Vol
	O2.13	Analyse and collate survey data	Winter	BBRC / SNHS / Vol
Operational Objective 3: Promote biodiversity through education and recreational activities and events.				
Promote Biological Surveys	O3.1	Maintain existing biological survey programme	All year	BMBC / BBRC etc.
	O3.2	Expand biological survey provision through formal and informal events and activities	All year	BBRC / BNSS / WYBG / NYARG etc.
	O3.3	Promote a programme of mentoring for biological surveys	All year	Vol / BC / BBRC / BNSS etc.
Promote Countryside Management / Ecology Skills	O3.5	Expand provision for habitat management education and training	All year	BMBC / BC / Vol / Comm
	O3.6	Expand provision for countryside activities education and training	All year	BMBC / BC / Vol / Comm
Operational Objective 4: Integrate the conservation of biodiversity into all relevant country park activities.				
Impact Assessment	O4.1	Assess impacts of development on biodiversity	As required	BMBC / BBRC / Con
	O4.2	Assess impacts of activities and events on biodiversity	As required	BMBC / BBRC
Operational Objective 5: Abide by all legal instruments, deeds and obligations.				
Protect Site	O5.1	Abide by relevant legislation	As required	All
	O5.2	Abide by lease and tenancy agreements	As required	BC / BADAAS / WWRAC
Operational Objective 6: Manage and maintain administration.				
Site Administration	O6.1	Maintain records of site management and activities	All year	BMBC
	O6.2	Collate and maintain biological records for the site	All year	BBRC

Key:

Ref Code Management Reference Code

BMBC Barnsley Metropolitan District Council Parks Service

Vol Volunteer Groups (for example: Worsbrough Green Fingered Wanderers / Voluntary Action Barnsley - Corporate volunteer parties)

Comm Commercial Organisations

Con Specialist Contractors

BC Barnsley College

BBRC Barnsley Biological records Centre

BADAAS Barnsley and District Amalgamated Angling Society

WWRAC Wombwell White Rose Angling Club

SYBG	South Yorkshire Bat Group
BBSG	Barnsley Bird Study Group (in association with Barnsley Naturalist and Scientific Society)
BNSS	Barnsley Naturalist and Scientific Society
NYARG	North, East, West Yorkshire Amphibian and Reptile Group
SNHS	Sorby Natural History Society
SE	Supervising Engineer (Reservoir)

7 Beyond 2025

7.1 Introduction

- 7.1.1 Beyond the lifetime of this plan, it is anticipated that the majority of the short-term prescriptions will have been completed and the longer term prescriptions such as the grassland and hedgerow management will become routine practice. Much of what is proposed for the next five years is based on evidence from the wide variety of surveys and studies that have been implemented and that continue to be carried out at the site. There are, however, on-going initiatives and issues that will become apparent within the lifetime of this plan and will have a significant influence on any future plans.

7.2 Habitats

Dry Woodlands

- 7.2.1 Ash is a significant component of the canopy in Bell Bank Wood and Woolley Bank Wood and there is evidence that ash die-back disease is starting to affect trees in the local area. It is not feasible to determine the extent to which local trees will be affected and some trees may prove to be resistant to the disease. What appears to be more certain is the adverse impact on younger ash trees particularly those that have been planted.
- 7.2.2 Proposals to make use of the ash before it becomes infected and is beyond any commercial value must be balanced against a review of disease resistance. If some trees are resistant, the impact on the long-term botanical assemblage may prove to be less significant than the worst-case scenario of wholesale loss and replacement by tree species that are, potentially, of less ecological interest. Monitoring by trained persons is vital to track the progress of the disease.
- 7.2.3 Management decisions will need to consider safety and commercial considerations as well as the impacts on ecology. For example, wholesale removal of ash trees could have undesirable and long-term ecological impacts because of the levels of disturbance that would be involved in such actions.
- 7.2.4 It is unlikely that woodland management alone will be sufficient to remove the problem of unwanted vehicle access into the woodlands and even with a targeted effort, such management will probably be required beyond the lifetime of this plan. To tackle the problem will require sustained co-operation of the local community, routine collaboration between local landowners and managers and strong support from the police and BMBC. If the situation is not addressed, the woodlands will continue to be subject to further degradation and a loss of ecological interest.

Wet Woodland

- 7.2.5 The woodlands associated with the west and south side of Worsbrough Reservoir are included along with other woodlands in the local area as a candidate to be designated as a

Site of Special Scientific Interest (SSSI) to conserve the local willow tit population. Targeted action and protection is necessary to arrest further declines. Potential benefits from the designation include funded surveys and research and, if necessary, management to enhance the habitat, or to control access and recreational activities. It will also raise the profile of the park, because the site will be of national ecological importance.

- 7.2.6 The numbers of willow tit within the wet woodland may be in decline for reasons that are not understood. Geoff Carr (*pers. comm.* 2021) suggested that winter flooding may be problematic. Although the woodland relies on high water levels to arrest the process of terrestrialisation, the extent and duration of winter flooding is likely to determine the suitability of the habitat for willow tit and if it is too wet this could be contributing to the population decline. Other species such as lesser spotted woodpecker, which has not been seen in recent years, and harvest mouse could also be adversely affected. Targeted research is vital to arrest further population decline.

Plantation Woodlands

- 7.2.7 Further thinning (15 - 20 years later) will diversify the structure, further promote the development of field layer vegetation, and favour native tree and shrub species. The woodlands will be a focus for recreational activities such as natural play and crafts.

Hedgerows

- 7.2.8 Continuation of the existing trimming and laying work will maintain the hedgerows in favourable condition. Laying will be funded by the Countryside Stewardship agreement (Option BN5).

Improved Grassland

- 7.2.9 Minimal intervention will promote the colonisation by scrub and an eventual change to scrub and woodland. The eventual change to semi-natural woodland will increase woodland cover and continuation of habitat from the plantation woodlands to the semi-natural woodlands overlooking the River Dove.

Grasslands

- 7.2.10 The proposed grassland management prescriptions within this plan are compliant with the requirements of Countryside Stewardship Option GS7, but at this stage, the regime should be treated as indicative. The medium-term management prescriptions (10 years) for the grasslands will be decided by the terms and conditions of a Countryside Stewardship agreement. At this stage, it has yet to be confirmed whether the grasslands are eligible for medium or higher tier funding and the outcome of the application may have some influence on management. However, the general principles of management will not change and it is the 'fine-tuning' such as mowing dates and livestock grazing intensity that may be modified from what is proposed in this plan.
- 7.2.11 If there is any variation from the proposed prescriptions in this plan, an addendum should be written and appended to this plan. Any update of this plan (post-2025) will include the prescriptions of the Countryside Stewardship agreement.

Worsbrough Reservoir

- 7.2.12 The existing levels of fish stocks will be known and further stocking of the reservoir will only be carried out in agreement with all stakeholders to ensure that the fishery is sustainable and there is no impact on biodiversity.
- 7.2.13 Water levels will be controlled so that there is a benefit to migrant birds, without having any adverse impact on the fishery.

Dove and Dearne Canal

- 7.2.14 The canal margin will have a near continuous cover of emergent vegetation, which will significantly improve the ecological interest of the canal.
- 7.2.15 The areas surrounding the canal will be managed appropriately and vehicular access will be controlled. The area to the north of the canal (amenity-managed grassland) will become a focal point for recreational and educational activities.

7.3 Monitoring

- 7.3.1 Target species including grassland plants, bats, birds (willow tit), herptiles and harvest mouse will be monitored, in order to assess the ecological condition of habitats within the Park and to inform management decisions.
- 7.3.2 Proposals to expand monitoring based on scientific justifications will be considered, particularly studies that are long-term and have benefits beyond the park itself.

7.4 Promoting Biodiversity

- 7.4.1 The use of the Park for biological surveying will be expanded by the provision of a wide range of events and activities supported by key stakeholders such as Barnsley College, Barnsley Biological Records Centre and Barnsley Natural History and Scientific Society. A network of mentors will provide opportunities for students and volunteers to learn and/or improve wildlife identification skills.
- 7.4.2 Designation of part of the site as an SSSI will deliver opportunities for targeted research co-ordinated by, but not limited to, educational establishments.

7.5 Integrating Biodiversity

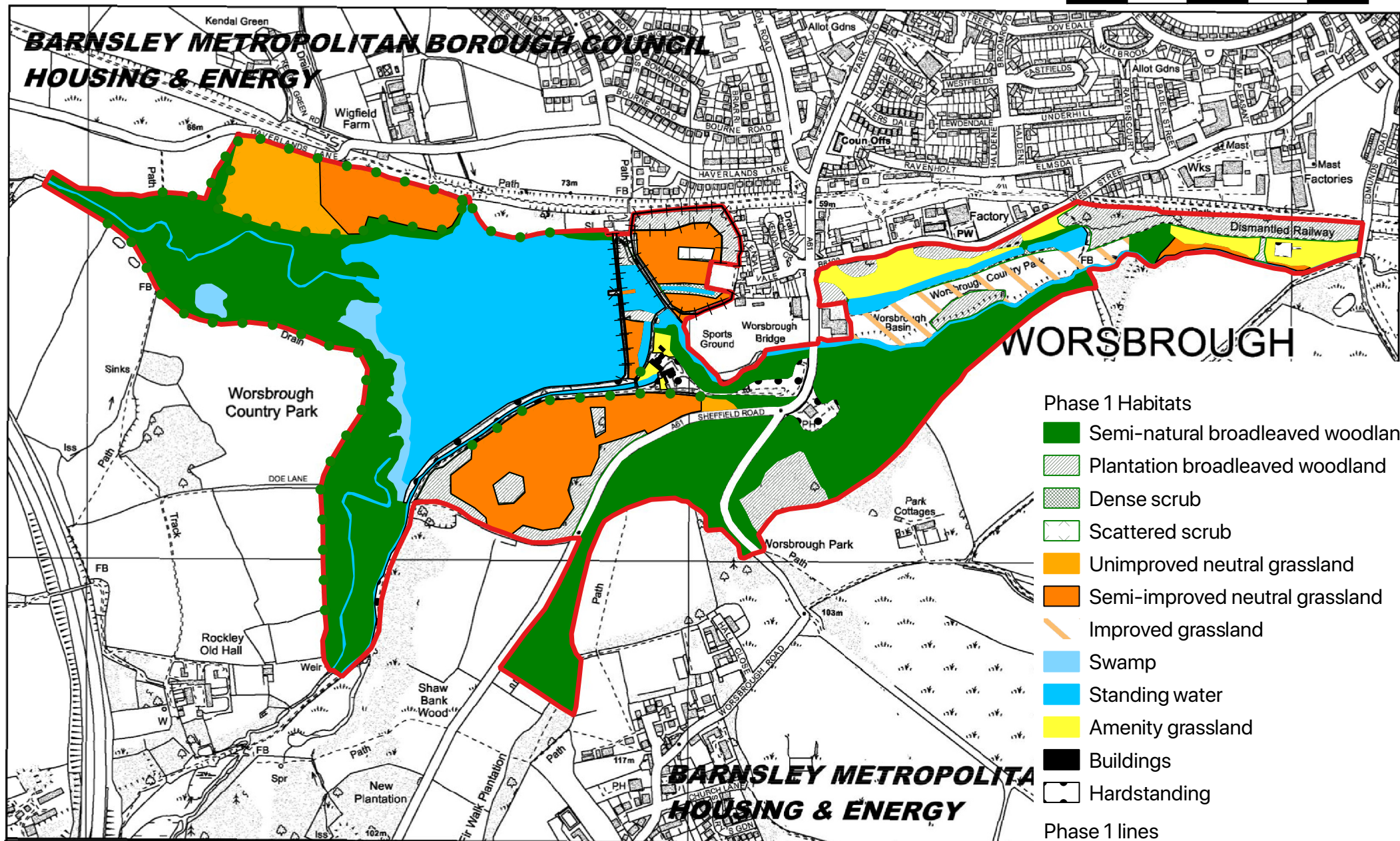
- 7.5.1 Expansion of countryside recreation activities will exploit the commercial potential of the Park without having an adverse impact on biodiversity. Such activities will increase the number of visitors using more remote parts of the Park and reduce the levels of anti-social activities through informal policing.
- 7.5.2 Selected habitats will provide opportunities to learn countryside management skills. Training and education in countryside skills will be provided by organisations from the public and private sector and will make a significant contribution to meeting biodiversity management targets for the Park. Such activities will be assessed and regulated by BMBC.

- 7.5.3 A steering committee that includes representatives from relevant user groups such as BMBC, DVLP, BBRC, Barnsley College, Angling Clubs, Barnsley Natural History and Scientific Society, National Health Service, and commercial outlets associated with Worsbrough Mill, will manage the site for the benefit of wildlife and site users.
- 7.5.4 Funding for wildlife related projects outside of the scope of Countryside Stewardship will be secured through Section 106 contributions from local developers who are unable to fulfil Biodiversity Net Gain obligations⁵⁰ on their own development site.

⁵⁰ National Planning Policy Framework (2019) and pending Environment Bill

Appendix 1: Phase 1 Habitat Survey Plan

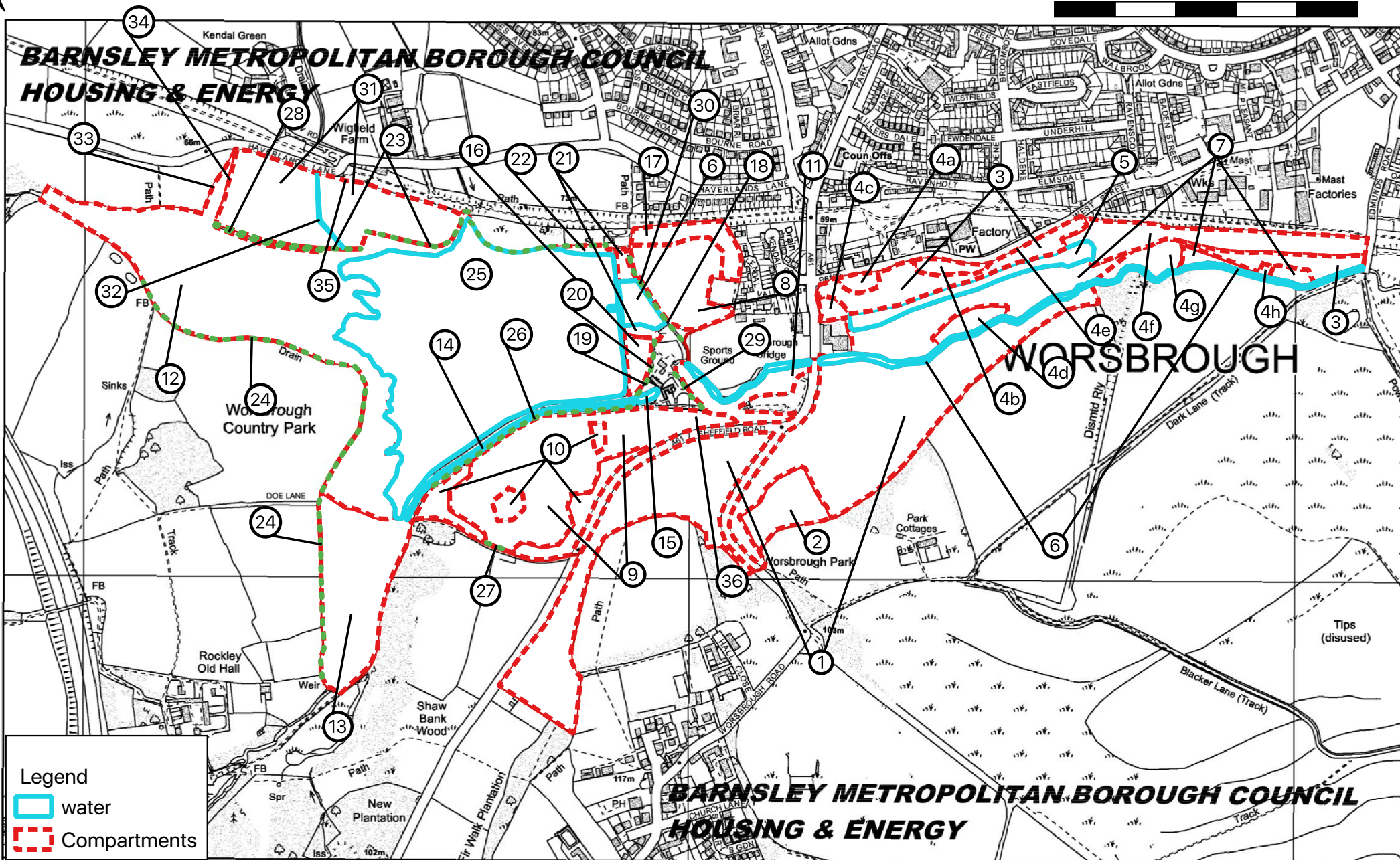
BARNESLEY METROPOLITAN BOROUGH COUNCIL HOUSING & ENERGY



Appendix 2: Management Compartments Plan



0 100 200 300 400 500 m



PLACE

Executive Director: Matt Gladstone
Barnsley MBC, PO Box 634, Barnsley S70 9GG
Tel: (01226) 787537



baker*consultants*