Lowland Heathland / Acid Grassland Mosaic (HAG)

Habitat Action Plan

Doncaster Local Biodiversity Action Plan
January 2007

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1. Description

1.1 Lowland Heathland is characterised by the presence of dwarf shrubs such as heather (ling) (*Calluna vulgaris)*, bell heather (*Erica cinerea)* and cross leaved heath (*Erica tetralix)* and is generally found at altitudes below 300 metres AOD. Heathland often occurs as a mosaic with dry acidic grasslands and for this reason these habitats have been combined within this single Action Plan. Dry lichen and bryophyte-dominated heath, areas of wet heath, gorse (*Ulex spp.)* and broom *(Cytisus scoparius)* scrub, and birch (*Betula spp.)* and oak (*Quercus spp.)* woodland also form important components of the heathland mosaic.

1.2 There are three distinct types of Lowland Heathland present in the Doncaster Borough, these being

- Natural heathland which has formed on sandy, acid soils following historic woodland clearance,
- Heathlands that have formed following drainage and abandonment of peaty soils, and
- Heathlands, which have developed on the acid shales of colliery spoil heaps.

1.3 With the notable exception of the Humberhead Peatlands National Nature Reserve (NNR), the occurrence of dwarf-shrub heath is very restricted, with the heather elements often being sub-ordinate to acidic grassland. There are, however, small stands of National Vegetation Classification (NVC)[1] community types H9 *Calluna vulgaris – Deschampsia flexuosa* heath and H10 *Calluna vulgaris – Erica cinerea* heath.

[1] Rodwell, J.S. (1991), British Plant Communities (Volume 2) Mires and Heaths. Cambridge

1.4 Doncaster's acid grassland communities have strong affinities with the National Vegetation Classification (NVC) community types U1 *Festuca ovina – Agrostis capillaris – Rumex acetosella* grassland, U2 *Deschampsia flexuosa* grassland, U4 *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland and small elements of U5 *Nadus stricta – Galium saxatile* grassland. Stands of bracken with affinities to the U20 *Pteridium Aquilinum – Galium saxatile* community also forms a mosaic with woodland, grassland and heath communities.

1.5 Scrub elements tend to be dominated by W23 *Ulex europaeus – Rubus fruticosus* scrub community type; however, an unusual feature of the heathlands of southern-central Doncaster is the abundance of **dwarf gorse** (*Ulex minor).* This community has some affinity to the *H2 Calluna vulgaris – Ulex minor* heath scrub a community but this is currently described as being limited to areas of heath around Poole Harbour and the New Forest.

1.6 There are also historic and present day records of **sand sedge** (*Carex arenaria)*-dominated 'dune' heath. This community has affinities with the NVC sand dune community types SD 11 *Carex arenaria -Cornicularia aculeata* dune and SD 12 *Carex arenaria-Festuca ovina- Agrostis capillaris* dune grassland.

1.7 Lichen and bryophyte heaths are also an important component of the heathland vegetation of many Doncaster sites although more work is required to determine their affinities to NVC community types.

1.8 Characteristic acid grassland species include **bird's-foot** (*Ornithopus perpusillus)*, **wild pansy** *(Viola tricolour)*, heath bedstraw (*Galium saxatile)*, harebell (*Campanula rotundifolia)*, **early** and changing **forget-me-nots (*Myosotis ramosissima)*** and (*Myosotis discolour)*, heath rush (*Juncus squarrosus)*, mat grass (*Nardus stricta)*, wavy hair-grass (*Deschampsia flexuosa)*, **early hair-grass** (*Aira praecox),* silvery hair-grass (*Aira caryophyllea)*, **squirrel-tail and rat's-tail fescues** (*Vulpia bromoides)* and *(Vulpia myuros)*, purple moor grass (*Molinia caerulea)*, sheep's sorrel (*Rumex acetosella)*, tormentil (*Potentilla erecta)*, wood sage (*Teucrium scorodonia),* common stork's-bill (*Erodium cicutarium)*, sand spurrey (*Spergularia rubra)*, hare's-foot clover (*Trifolium arvense)*, parsley piert (*Aphanes arvensis)*, buck's-horn plantain (*Plantago coronopus)*, slender St John's wort (*Hypericum pulchrum)*, heath milkwort (*Polygala serpyllifolia)*, and lawns of cup lichen and dog lichen (*Cladonia* sp.) and (*Peltigera* sp.). Some damper sites also support Sphagnum mosses *(Sphagnum spp*.) and cotton grasses (*Eriophorum spp.)* but the gradual lowering of the local water table has greatly reduced the amount of wet heath habitat. Species such as hard fern (*Blechnum spicant)*, spring vetch (*Vicia sativa)*, **shepherd's cress** (*Teesdalia nudicaulis)*, **petty whin** (*Genista anglica)* and **heath cudweed** *(Gnaphalium sylvaticum)* are characteristic heathland plants which are now of very restricted occurrence in Doncaster. Both European (*Ulex europaeus)* and **dwarf gorse** *(U. minor)* occur as a scrub element of Doncaster heathlands and western gorse (*U. gallii)* has also been recorded from a few Doncaster Lowland Heathland sites. As its name suggests, western gorse is more typically found in western parts of the UK and this species is at its eastern-most limit in the Doncaster Borough.

1.9 Lowland Heathlands support a range of birds and insects, many of which are rare in Britain. Doncaster's heathlands are important for a number of characteristic fauna including **common lizard** (*Lacerta vivipara*), **adder** (*Vipera berus*), **nightjar** (*Caprimulgus europaeus*), **woodlark** (*Lullula arborea*) and invertebrates, specifically aculeate hymenoptera (mining bees and wasps). A number of Red Data Book and Notable Invertebrate species are also associated with dry and wet heaths. Heathland sites are also notable for the diversity and abundance of fungi.

2. National status

2.1 Lowland Heathland is a national priority for conservation because it is a rare and threatened habitat, the UK supporting about a fifth of the world total. In England only one sixth of the heathland present in 1800 now remains[2]. The largest areas of Lowland Heathland tend to be in the southern counties of England; however, important and unique heathland habitats are associated with the coversands of Lincolnshire and acid grassland/heathland mosaics of the North Nottinghamshire/South Yorkshire border. Acid grasslands are widespread in the upland areas of Britain but lowland acid grassland is much more limited in its extent and is estimated to cover an area less then 30,000 ha in the UK.[3]

[2] UK biodiversity steering group (1995). Biodiversity: The UK Steering Group Report. Volume 2: Action Plans.HMSO, London.

[3] UK biodiversity steering group (1995). Biodiversity: The UK Steering Group Report. Volume 2: Action Plans.HMSO, London.

3. Local status

3.1 Although examples of wet and dry heathland still survive in the Doncaster Borough, these are but fragments of once extensive areas that had developed in three distinct local geological areas.

3.2 In the far northwestern corner of the Borough are outcrops of Coal Measures (Carboniferous) sandstones on which heathland and acid grassland habitat have developed, as represented by the Site of Scientific Interest (SSI)[4] at Howell Wood (SSI 6.1).

3.3 Fragments of heathland habitat occur along the Triassic Sherwood Sandstone Ridge that runs north from Bawtry to Doncaster, and east from Doncaster to Hatfield. The former widespread status of heathland is indicated by historic place names referring to Lings and Commons. Several fragments of heathland survive at Doncaster Common (SSI 2.39a & 2.39b), also known as the Town Moor, Doncaster Low Pasture/Common (SSI 2.38), in the extensive gardens of Cantley Hall Park (SSI 4.39a), at Doncaster Warren (Golf Course) (SSI 2.48), Warren Wood (North) (SSI 2.47), Hurst Plantation, Savage Brooks and Marr Flatts Wood (SSI 4.32) and Rossington Bridge Area (SSI 2.49a). Sandall Beat Site of Special Scientific Interest (SSSI) is a late 18th and 19th century plantation established on the site of old fen and heathland. This heathland was originally contiguous with the heath and acid grassland on Doncaster Common and linked to the heathland habitats of Pot Hill (SSI 2.36a), Wheatley Golf Course (SSI 2.62), Shaw Wood (SSI 8.23) and Hagg Wood (SSI 2.33a), Hatfield Lings (SSI 9.36), Barnby Dun Station Wood (SSI 8.16) and Hollin Bridge Farm (SSI 9.39) Sites of Scientific Interest. Bawtry Forest is an extensive area of heathland which has been affected by afforestation but which still supports a diversity of key heathland species.

[4] DMBC, Re-survey of Sites of Scientific Interest in the Doncaster Metropolitan Borough 1996/97, Volumes 1-9

3.4 To the east of Doncaster are deposits of glaciofluvial – laustrine sands and gravels, most notably around Austerfield, Finningley, Blaxton, Hatfield Woodhouse and Hatfield Moors. Heathland habitats and their important associated faunal communities survive today on sites left after commercial sand and gravel extraction. Many former quarries are Sites of Scientific Interest, as at Blaxton Common (SSI 4.47a), Crow Wood, Great Wood and Spen Close Plantation (SSI 4.41), Finningley Big Wood and Gravel Pits (SSI 4.31a), Hurst Wood (SSI 4.31b), Finningley Sand Quarry and Austerfield Sandpits and Willow Holt (SSI 4.30), where operators have ensured the successful restoration or protection of existing features, thus retaining assets of national importance.

3.5 Important wet heathland habitats are represented in the Doncaster Borough at two other Sites of Special Scientific Interest namely, Hatfield Moors SSSI, and Thorne, Crowle and Goole Moors SSSI. These sites are also Special Areas of Conservation (SACs) and support internationally important assemblages of heathland species. The nightjar population present on the Moors means that these sites also qualify as a Special Protection Area (SPA). On Hatfield Moors, refugia of vegetation have survived as rather dry heathland and as birch woodland. Plants include the dwarf shrubs *Calluna vulgaris, Erica tetralix,* cotton-grass (*Eriophorum angustifolium* and *E. vaginatum),* cranberry *(Vaccinium oxycoccos)*, **bog-rosemary** *(Andromeda polifolia),* bog-myrtle *(Myrica gale)*, and the bog-mosses (*Sphagnum cuspidatum, S. recurvum, S. papillosum, S. subnitens and S. tenellum).*

3.6 Heathland habitat have also developed naturally on old colliery spoil heaps in many parts of South Yorkshire where parts of such sites have been purposefully left to natural colonization rather than being subject to more formal reclamation. The spoil heap in the Thorne/Stainforth Ashfields area, to the south of the Stainforth-Keadby Canal, has naturally developed acidic grassland and heather heathland. Lichen and bryophyte-rich vegetation is also found on some of the un-restored flanks of the spoil heaps of Hatfield Colliery which lie to the south.

4. Legal status

4.1 Sites identified as SSSIs and SSIs have a presumption against developments that would have an adverse effect on their conservation value.

4.2 Special Areas of Conservation and Special Protection Areas are afforded protection at a European level under the Habitat Directive as implemented by the Habitat Regulations (1994).

4.3 The Defra Environmental Impact Assessment Regulations apply to the conversion of uncultivated land or semi-natural areas for intensive agricultural purposes and therefore apply to heathland and acid grassland habitats.

5. Links to associated habitats & species

5.1 The Lowland Heathland / Acid Grassland Mosaic Habitat Action Plan is linked to the following Habitat Action Plans:

- Lowland Heathy Oak Woodland (LHW)
- Post Industrial and Brownfield Land (PIB)
- Lowland Raised Mire (LRM)
- Ancient and Species Rich Hedgerows (ASH)
- Arable Field Margins (AFM)
- Greenways (GW)
- Parkland, Wood Pasture and Veteran Trees (PWV)
- Urban Greenspace (UG)

5.2 **'A Species Audit of Doncaster Borough'** has been produced as part of the Doncaster Local Biodiversity Action Plan. Species highlighted in bold within the Habitat Action Plans are identified within Doncaster's Species Audit and are conservation priorities. The Audit identifies **138** species associated with Lowland Heathland / Acid Grassland Mosaic.

6. Current factors causing loss or decline

6.1 Fragmentation and loss caused by development, especially quarrying, expansion of built development, conversion to other land uses (mainly arable agriculture and forestry) or by agricultural intensification. Conversely, quarrying and restoration of sites provides excellent opportunities for limestone grassland creation, and can therefore contribute to habitat creation targets. Whilst quarrying does represent a potential threat, the reclamation of sites provides excellent opportunities for heathland and acid grassland creation, and can therefore contribute to habitat creation targets. Heathland is of low productivity so is often ‘improved’ by the use of fertiliser, lime application, herbicide application, ploughing and re-seeding. Past coniferous afforestation of heathland sites (as has occurred at Howell Wood (SSI 6.1) on the Coal Measures, and at numerous sites in the Humberhead Levels including Crow Wood, Great Wood and Spen Close Plantation (SSI 4.41), Black Carr Plantation (SSI 4.36), Bawtry Forest (SSI 4.54), Hurst Plantation, Savage Brooks and Marr Flatts Wood (SSI 4.32)) requires careful consideration for potential restoration projects. Extensive urban growth on the Sherwood Sandstone Ridge, along the A18 Thorne Road corridor and along the Old Great North Road (Bawtry Road) in the Cantley, Bessacarr and Rossington Bridge area has removed and degraded some of the heathland fragments within and outside protected sites.

6.2 Uncontrolled access and inappropriate recreational use can be a problem, although in some situations low-level use can be beneficial. Use by bikes, motorcycles and off-road vehicles can lead to excessive erosion of heathland/ acid grassland habitats, and littering, fires, pollution and vandalism causes disturbance to wildlife. This problem can be severe and has been an issue at the Hatfield Lings (SSI 9.36) site and also on parts of Blaxton Common (SSI 4.47a). Formal off-road motorbike tracks have been created at Holme Wood (SSI 8.30) and beside Crow Wood, Great Wood and Spen Close Plantation (SSI 4.41) at Finningley to try to alleviate this problem.

6.3 Areas of heathland habitat on the former Doncaster Airport site (now Lakeside) and around the racecourse have been lost to development and lack of appropriate management. Any further development in these areas needs to take account of the potential presence of heathland fragments.

6.4 The lowering of the water table and land drainage has caused the loss of wet heath habitats from a number of formerly wet sites.

6.5 General lowering of water tables caused by abstraction for drinking water, results in changes to drier habitat types. Future house building will need to provide sustainable solutions to supplying water, to reduce the impact on the main aquifers.

6.6 A lack of agreed ecological guidance on the management of roadside verges and salting of roads has led to loss of species diversity and changes in habitat type.

6.7 Heathlands require management in order to prevent them from becoming woodland. Conversely, overgrazing results in sites becoming dominated by grassland. There is a general lack of the grazing management that was historically an integral part of the management of Commons and heathland. This means that in many sites there is rapid transition to birch, willow and oak scrub. Lack of management can also be a problem on reclaimed mineral extraction sites in the longer term after the statutory aftercare period has ended. Where there are problems with maintenance during the statutory aftercare period, the Minerals Planning Authority can use enforcement powers to address this. Lack of management is also allowing encroachment of ruderals and scrub on areas of acidic grassland in the grounds of Bawtry Hall.

6.8 There are fewer mixed farms and therefore fewer grazing herds available. Modern breeds tend to be poorly suited to the poor grazing provided by unimproved grasslands.

7. Current local action

Research & Monitoring

7.1 Natural England (formerly English Nature) has compiled an inventory of the heathland sites South Yorkshire. Several Doncaster sites are included. Thorne and Hatfield Moors are examples of heathlands on peatland soils and Rossington Bridge, Hurst Plantation and the Lings at Hatfield are examples of heathland on the Sherwood Sandstone.

7.2 Funding from the Big Lottery's Transforming Your Space initiative has enabled the further development of the Biological Records Centre at Doncaster Museum. The biological data collected as part of the project, particularly botanical information for local sites, species and habitats has enhanced the modern dataset. Historical biological information has also been transferred to the database.

7.3 The borough has a diverse series of Sites of Scientific Interest (SSIs), illustrating the variety of species and habitats that are represented on sites throughout Doncaster. All SSIs were surveyed in 1996/1997 and again in 2004/2005, when additional candidate sites were also identified. Many known Lowland Heathland /Acid Grassland sites have been identified as SSIs or as candidate SSIs.

7.4 The Doncaster Naturalists' Society holds regular field meetings and has carried out detailed surveys of many heathland sites. The Society routinely submit biological records to the Local Record Centre at Doncaster Museum.

Safeguarding & Management

7.5 Funding from the Big Lottery's Transforming Your Space initiative has enabled the development of a range of biodiversity initiatives, including the resurvey of the Borough's SSI's, research projects, production of site management plans and the provision of resources (equipment, educational, activity and promotional materials) to help raise awareness and encourage participation in the management and enhancement of local biodiversity. A number of management plans have also been produced, including one for the Mosaic Trust site.

7.6 Internationally important heathland sites on the Humberhead Peatlands are protected by National Nature Reserve, SSSI, SAC and SPA status. Management of these habitats is under the direction of Natural England. Water level management plans are in place for the Humberhead Peatlands, which contribute to the maintenance of the wet heath areas within this SSSI.

7.7 An area of Lowland Heathland /Acid Grassland at Austerfield Sandpits and Willow Holt (SSI 4.30) is managed as a nature reserve by the Mosaic Trust. The Trust runs field courses and educational visits for children.

7.8 Sandall Beat Wood SSSI and LNR is in Local Authority ownership and Natural England is involved in advising DMBC on appropriate management measures. The local authority worked with the Environment Agency to increase water flows through the drainage system within Sandall Beat Wood, which has improved the irrigation of the site. Pot Hill (SSI 2.36a) is also a Local Authority-owned site with important areas of heathland habitat. Some local authority owned woodland within the Sandland Heaths and Farmland Natural Area have small pockets of heathland, such as Black Carr Plantation (SSI 4.36). There is potential for other DMBC owned plantation sites such as Insley Plantation (SSI 4.33) and Bawtry Road Plantations to have some clearance for heathland regeneration. Management plans have been prepared and implemented for Doncaster Low Pasture/Common (SSI 2.38) and Sandall Beat Wood.

7.9 Many other sites are in private ownership and their management is under the control of various commercial interests such as mineral extraction industries and forestry managers. Sympathetic management to provide a greater diversity of heathland habitats is being undertaken along electricity way leaves and in other parts of the Bawtry Estate. Many of the Sherwood Sandstone heathland sites are managed as golf courses and managers are generally keen to retain and manage areas of heath as part of the course.

7.10 The management of Doncaster Low Pasture/Common (SSI 2.38) has been undertaken by a specialist contractor to ensure sensitive management of this degraded site, and the removal of shading boundary trees is planned.

Communications & Publicity

7.11 The Local Authority provides interpretive leaflets, and runs practical management events aimed at involving local people in care of local sites.

7.12 The Ranger Service involves Barnsley youth Services in the management of Howell Wood. There are some initiatives that aim to increase the amount of heathland habitat and encourage appropriate management of existing sites.

Funding & Resources

7.13 The new Environmental Stewardship Scheme provides funding for the maintenance of field boundary features such as hedges (stock-proof boundaries may enable reinstatement of traditional grazing management). The higher-level scheme also targets the creation of new habitats on land adjacent to, buffering or linking SSSIs or UK BAP habitats. It also targets the maintenance and restoration of habitats in Sites of Importance for Nature Conservation, known locally as SSIs. Sites chosen under Environmental Stewardship for the creation of acid grassland or heath should ideally have a Phosphate Index of less than 2, unless subject to other environmental stresses.

Advisory

7.14 DMBC has introduced a programme of continuous professional development based on planning related issues, including 'Protected species' and 'Trees and Hedgerows'. The Environmental Planning Team has produced a suite of Supplementary Planning Documents, providing guidance on: Planning for Trees and Hedgerows, Nature, Sustainable Construction and Landscape Planning on Development Sites in Doncaster.

8. Objectives, targets & proposed actions

Please refer also to the Generic Actions in the LBAP Introduction & Overview document

Objective	Target	Ref	Action	Lead Partners	Costs	Category
1) To ensure the protection and maintenance of existing Lowland Heathland /Acid Grassland Mosaic Sites.	Continuous.	1.1	Prevent depletion of Heathland sites resulting from development and/ or the delivery of statutory functions by: 1) Having regard to the protection and enhancement of habitats when considering the allocation of sites, in line with the approach set out in PPS9 and the priorities set out in the LBAP. 2) Having regard to the assessment, retention and enhancement of habitat types when formulating and making Development Control Policies and decisions, in line with the approach set out in PPS9 and the priorities set out in the LBAP.	DMBC, Natural England (NE)	Staff costs	Advisory/ Safeguarding & Management

Objective	Target	Ref	Action	Lead Partners	Costs	Category
			3) Providing advice to Development Control and Developers on appropriate types of survey i.e. ecological and/or hydrological, the interpretation of survey results and methods of incorporating habitat retention and enhancement into development proposals (for both designated sites and non-designated features of biodiversity value, as identified in the LBAP. 4) Having regard to the priorities set out in the BAP in the interpretation of UDP/LDF policies (and any supporting SPGs/SPDs). 5) Providing technical advice on the severity, implications and nature of suspected breaches in planning control (either conditions or unauthorised development).			

Objective	Target	Ref	Action	Lead Partners	Costs	Category
			6) Awarding appropriate site protection through designation, based upon routine environmental monitoring and assessment. 7) Ensuring that all Partners and relevant landowners, service providers and operational contractors are informed of the existence and importance of Lowland Heathland/ Acid Grassland (both designated and non-designated sites).			
	Continuous.	1.2	Continue to collect and maintain up-to-date, standardised, biological data using the Museum's Local Record Centre. Promote and initiate appropriate management, monitoring and the exchange of environmental data, to ensure the maximum level of site protection is awarded and habitat condition is maintained.	DMBC, NE, Doncaster Naturalists' Society (DNS)	Staff costs and volunteer time. Other costs to be evaluated	Future Research & Monitoring

Objective	Target	Ref	Action	Lead Partners	Costs	Category
	By 2008.	1.3	Expand DMBC's Environmental Planning protected species protocol to include LBAP habitats and species.	DMBC	Staff costs	Advisory
2) To restore degraded sites and ensure appropriate management of Lowland	4 sites by 2010.	2.1	Develop and implement heathland management plans for sites in public ownership. Review existing plans to ensure compatibility with HAPs and SAPs.	DMBC	£1000 per plan = £4000	Safeguarding & Management

Objective	Target	Ref	Action	Lead Partners	Costs	Category
	4 sites by 2010.	2.2	Identify landowners of existing SSI Lowland Heathland/Acid Grassland Mosaics. Provide assistance to owners seeking funding and/or assistance for appropriate nature conservation and grassland/ heathland management operations, including: • Reintroduction of grazing management (where appropriate). • Removal of invasive scrub considered to be detrimental to the preservation of heathland or grassland species diversity. • Cessation or reduction of fertiliser, lime and herbicide input. • Manage way leaves and fire breaks and carry out selective thinning within pine plantations to reinstate heathland habitats. • Manage golf-course roughs, and semi-rough areas to favour the spread of heathland species.	DMBC, NE (ESS) Farming and Wildlife Advisory Group (FWAG), Private landowners. (in particular Golf Clubs)	£225 per site x 4 sites = £900 Management costs to be evaluated	Safeguarding & Management

Objective	Target	Ref	Action	Lead Partners	Costs	Category
	4 sites by 2010.	2.3	Identify all lowland heathland/acid grassland mosaic sites where Priority Species are present and implement appropriate specialist management schemes to benefit these species.	DMBC, NE (ESS) FWAG, Private landowners NE involved in management implementation once sites identified and brought forward for Environmental Stewardship	To be evaluated	Species Management & Protection
	Continuous.	2.4	Investigate the acquisition (where necessary, and feasible) of Lowland heathland/ acid grasslands of local significance, in order to ensure their future management for the benefit of biodiversity.	YWT, DMBC, local Trusts	£5000 per ha	Safeguarding & Management

Objective	Target	Ref	Action	Lead Partners	Costs	Category
	By 2010.	2.5	Extend Sandall Beat LNR to include Doncaster Common (Golf Course) and Doncaster Low Common SSIs. Develop and implement sympathetic management plan for heathland and acid grassland species. Review existing plans to ensure compatibility with HAPs and SAPs.	DMBC, Doncaster Racecourse, Town Moor Project	Initial capital works = £14,600 Annual costs = £17,540	Safeguarding & Management
	By 2008.	2.6	Develop and implement sympathetic heathland /grassland management for species-rich verges. Review existing plans/maintenance regimes to ensure compatibility with HAPs and SAPs.	DMBC, Highways Agency (HA)	£727 per annum	Safeguarding & Management

Objective	Target	Ref	Action	Lead Partners	Costs	Category
	2 SSI heathland sites by 2010.	2.7	1) Prevent disturbance to the wildlife of grasslands and heathlands by the control of recreational access and prevention of inappropriate and damaging activities. Produce action plans in conjunction with SY Police where necessary. 2) Investigate the use of suitable alternative, less sensitive sites, with responsible motor sports clubs. Contact responsible motor sport clubs, to raise awareness of the timing and sensitivity of activities in particular areas and to encourage policing by members.	DMBC, Motorsport Clubs, NE, SY Police, Private landowners	To be evaluated	Safeguarding & Management/ Advisory
	1 management plan by 2009.	2.8	Draw up Water level Management Plans for sites with wet heath habitat. Promote the need for more sustainable water abstraction policies.	DMBC, EA, YW, IDBs	£640	Safeguarding & Management

Objective	Target	Ref	Action	Lead Partners	Costs	Category
3) To create 2 ha Lowland Heathland/Acid Grassland linked to existing heathland grasslands, woodland and scrub habitats within the Coal Measures and Humberhead Levels Natural Areas.	2 sites planned with costs prepared by 2010.	3.1	Work with landowners /quarry companies to find sites where new lowland heathland/acid grasslands can be created (principally through arable reversion or restoration of sand extraction sites) without loss of other priority habitats. Prepare costed restoration proposals for 2 sites and identify grant aid opportunities. Promote reinstatement of heathland from scrub habitat in carefully selected sites.	DMBC, YWT, Private Landowners There are options for arable reversion to acid grassland and lowland heath under ESS	Staff costs	Advisory/ Habitat Creation & Restoration

Objective	Target	Ref	Action	Lead Partners	Costs	Category
	By 2008.	3.2	Prepare a list of sand and gravel quarries and un-restored colliery sites and establish ownership details and their current status in the Minerals Review process (i.e. active/ awaiting approval of restoration/ end use decided). Investigate and promote the creation of appropriate lowland heathland/acid grassland habitats in the restoration of these sites. Specify the use of seed from local sites and the use of plant plugs grown on from seed gathered from local heathland and acid grassland sites, where possible.	DMBC	Staff costs	Habitat Creation & Restoration

Objective	Target	Ref	Action	Lead Partners	Costs	Category
	2 ha by 2010.	3.3	Use new heathland/acid grassland to link existing woodland, grassland and scrub habitats. Use local provenance seed and plant plugs to augment diversity of species-poor previously restored minerals sites.	DMBC, FWAG, NE, Private landowners There are options for arable reversion to acid grassland and lowland heath under ESS	£4000 initial works per ha, plus £200 per annum 2 ha = £8000 capital works and £400 per year for maintenance	Safeguarding & Management/ Habitat Creation & Restoration
	Continuous.	3.4	Incorporate areas for heathland creation in new semi-urban and rural planting schemes in the sandy areas of the Humberhead Levels Natural Area. Promote the creation of acid grasslands (on nutrient poor substrates) in suitable low-maintenance areas.	DMBC	Staff costs	Advisory

Objective	Target	Ref	Action	Lead Partners	Costs	Category
	Continuous.	3.5	Research the establishment and running costs and operational requirements of a native seed project with existing nurseries to grow on seed gathered from local grasslands/ heathlands. Pursue opportunities to implement feasible initiatives.	DMBC, YWT, DNS, NE, British Trust for Conservation Volunteers (BTCV)	To be evaluated	Habitat Creation & Restoration / Species Management & Protection
4) Raise public awareness of the importance and special characteristics of Lowland Heathland/Acid Grassland Mosaics.	Continuous.	4.1	Continue to provide interpretive leaflets, organise walks, and run practical heathland/ grassland management events.	DMBC, NE, YWT, BTCV	To be evaluated	Communications & publicity
	1 per year.	4.2	Run species survey and identification workshops open to the general public.	DNS	£256	Communications & publicity
	1 leaflet by 2008	4.3	Provide an interpretive leaflet to explain the special value of Lowland Heathland/Acid Grassland and include a map showing the location of the more accessible sites.	DBMC, NE	£1000	Communications & publicity

Objective	Target	Ref	Action	Lead Partners	Costs	Category
	1 demonstration by 2008.	4.4	Promote good practice through the use of demonstration sites and workshops.	DMBC, NE, Linking the Environment And Farming (LEAF), YWT, BTCV	£2640	Advisory/ Communications & publicity
	By 2010.	4.5	Offer support for Undergraduate/ Post Graduate research project to carry out DNA analysis of Scots Pine from Hatfield Moors and compare with Caledonian and European populations.	DMBC, Yorkshire Naturalists' Union (YNU), Doncaster College, Local Universities (Nottingham/Sheffield)	£640	Future Research & Monitoring

9. Indicative Habitat distribution & Opportunities map

The distribution of Lowland Heathland / Acid Grassland Mosaic has been indicated by mapping species considered to be local indicators for this habitat, as selected by local experts. Certain species that may be considered to be typical indicators of the habitat have not been used, due to them being abundant throughout the Borough, or unrepresentative of a local habitat peculiarity.

The indicator species for this habitat are:
Calluna vulgaris, Erica cinerea, Erodium cicutarium, Galium saxatile, Ornithopus perpusillus

The species records have been compiled based on 1km grid squares of the Borough. The resulting score is based on how many of the different species are found within a particular square, reflecting a degree of match to the species assemblage, and not the number of records of a specific species.

To indicate how good a match each grid square is to the habitat a graduated colour has been applied, based on how many species are recorded in that square as a percentage of the highest number of matches. The higher percentage shows a better species match and therefore is a better indicator that the species assemblage exists, or could exist in that area. The percentages are split down as follows:

- 0% — No matches in a grid square – these are left blank
- 1-25% — 1 Species
- 26-50% — 2 Species
- 51-75% — 3 Species
- 76-100% — 4-5 Species

Lowland Heathland/Acid Grassland Mosaic