APPENDIX 1: DATA BASELINE

Digital Data Sets

Table 1.1: Information sources available for biodiversity audit

Organisation/Source	Dataset	Format
Wigan Council	OS data: - 1:50,000 base maps - 1:10,000 base maps - MasterMap Aerial Photos (2005 & 2006) Phase 1 Habitat Maps (Paper maps) Derelict Land Survey Employment Land Review Greenbelt Greenheart boundary Historic Parks Gardens and Cemeteries Land Availability Land Reclamation and Renewal Local Nature Reserves Open Space Study River centrelines and floodzones Safeguarded Land SBI boundaries SSSI Contours Council owned land Rights of Way	Rasters Shapefiles 225 Paper Phase 1 maps covering borough (Date: 1986)
Greater Manchester Ecology Unit	SBI boundaries Species records	Shapefiles
Communities and Local Government	Generalised Land Use Database (2005)	MasterMap toid list with GLUD classification
Natural England	Ancient Woodland Environmental Stewardship Schemes National Habitat Inventories Ramsar sites Special Areas for Conservation Special Protection Areas SSSIs Open Access Areas	Shapefiles
Forestry Commission	National Inventory of Woodlands and Trees	Shapefiles
Red Rose Forest	Woodland Resource Survey	Shapefiles
National Biodiversity Network	Species records	Excel lists
South Lancashire Bat Group	Bat species records	Excel lists
Greater Manchester Bird Recording Group	Sch1 & UKBAP species records (excluding Pennington Flash)	Excel lists
Greater Manchester Bird Recording Group - website	Pennington Flash species list	

Supporting Documents supplied by Wigan Council / Wigan Biodiversity Partnership

- Whelley Loop Line South Amphibian Survey Report(2003) – produced by Ecology Services Ltd for Wigan Council
- Whelley Loop Line South and Kirkless Canalside Amphibian Survey Report (2006) – produced by Ecology Services Ltd for Wigan Council
- Kirkless Canalside Amphibian Survey Report (2003) – produced by Ecology Services Ltd for Wigan Council
- Pickley Green Railway Great Crested Newt Mitigation Method Statement (2003) - produced by Ecology Services Ltd for Wigan Council
- Mosslands of Northwest 1 (Merseyside, Lancashire and Greater Manchester) State and extent of surviving acid mossland habitats (2004) by Dr Paul Thomas and Martin Walker

Constraints and Information Gaps

Limitations of the available data and mapping, in terms of their age and present accuracy, were noted during the review of information available.

Field survey for this audit has been limited and confined to potentially interesting habitats on areas of Council owned and/or publicly accessible lands where discrepancies were noted between Phase 1 maps, aerial photographs and/or land use inventory layers.

The classification of habitats is tackled, reconciling different definitions previously used and working towards clear descriptions of these habitat types and their importance in Wigan, together with the identification of key linkages between them.

The total number of ponds within Wigan is difficult to accurately estimate. Ponds are lost and created within Wigan at a rapid rate through the course of development or land management. Numerous ponds were found through analysis of bird's eye aerial photographs or known to TEP ecological surveyors or members of the Biodiversity Partnership that did not appear on the Mastermap layer provided. Known ponds were consequently added to the water layer to reflect such changes, for example at Three Sisters Wetland and at Gibfield Park SBI, both areas where recent land restoration and pond creation have occurred. It is anticipated that many garden ponds may also be undercounted in this water layer. However, it is expected that the greater majority of ponds within Wigan have been accounted for in this appraisal.

The exact extent of reedbed is difficult to accurately map in the absence of field survey. Reedbed is classified as such, in separation from standing water or swamp, if the vegetation comprises 60%, or more, of common reed. Aerial photography is not a reliable tool for this determination and Phase 1 habitat survey information is outdated and does not specifically separate reedbed from other swamp habitats. Extents of reedbed mapped and used for analysis in this audit have been derived from information provided by the Wigan Biodiversity Partnership and the Lancashire Wildlife Trust. As such, the data largely focuses on managed areas within designated sites. This may be partly responsible for the significant proportion of reedbed within Wigan being located within designated sites; it is possible that reedbed habitats outside of the designated areas (which are, in general, well-managed and recorded areas) have been under-recorded.

There were no significant information gaps for rivers, canals, streams and brooks. However, the occurrence of ditches within Wigan is likely to be under-recorded or at least out-dated. These are dynamic habitats created, modified and in-filled within timeframes too short to be accurately mapped on nationally available databases. Phase 1 habitat maps are too historic to accurately represent the current distribution of ditch lines and linear habitats identified on the Phase 1 survey data did not provide quantifications for these habitats at the time of the survey.

It is suspected that further areas of peat may survive in Wigan above those areas identified and mapped as part of this audit. Field survey is required to record the location of areas of currently unknown information. Additionally, changing definitions of fen habitat will likely require previously mapped areas to be reviewed.

There are significant information gaps for areas of priority grassland habitats within the borough. The Phase 1 maps are outdated and do not identify priority from non-priority grassland. In addition, some grassland habitats are priority habitats due to their associated invertebrate assemblages and further survey work would be required to identify such sites.

Heathland is a relatively limited resource within Wigan. The extent of heathland mapped has largely been derived from information within designated site citations and provided by the Wigan Biodiversity Partnership, with some limited field survey results. It is likely that additional small areas of heathland may exist within the borough.

The full extent of woodland within Wigan was not contained within any one dataset; however aerial photography was used to determine additional areas of woodland and scrub within the Borough. While it was not possible within the scope of this study to examine all woodland blocks, information contained within various data sources, supplemented with aerial photograph interpretation and information provided by Wigan Biodiversity Partnership has been used to indicate woodland type.

There are no significant information gaps identified for urban managed greenspace or private gardens. However, the category of urban managed greenspace in the context of a regional priority habitat type is poorly defined and highly widespread. Urban managed greenspace in this study is mapped according to land use types included within the broad description of the regional habitat action plan, but this habitat type is extremely widespread and its character and value for biodiversity is not precisely recorded. For example, private gardens cannot be any further categorised into those which are paved out or otherwise built over, those containing only simple lawn and those containing substantial structural and biological diversity; all private gardens are included in this habitat type. Although extensive across the Borough, the value of this habitat type to the biodiversity resource in Wigan is therefore quite variable.

In the same way that ditch systems are poorly mapped, hedgerows too are a problematic habitat type to accurately map and measure. Hedgerows and field margins have not previously been measured in any audit of Greater Manchester, although the Wigan Nature Conservation Strategy 1994 quotes a distance of 300km but does not identify how this figure was derived. Trends in hedgerow and field margin occurrence and distribution are not identifiable. No available land use layers contained hedgerow data and Phase 1 habitat survey data was considered too out of date to accurately represent the distribution of this habitat. It was not possible within the scope of this audit to manually digitise all hedgerows identified in aerial photographs. Measurable data for hedgerows is therefore not available.

APPENDIX 2: DESIGNATED SITES

Site Summary Tables

Table 2.1: Summary of statutory designated sites in Wigan

Site Name	Location	Status	Area[1]	Primary Reasons for Designation	Site Reference
Manchester Mosses	Lately Common	SAC	172.81 ha	Degraded raised bog (still capable of natural regeneration) – Annex I habitat and considered on of the best examples in the UK	UK0030200
Bryn Marsh & Ince Moss	Bryn Gates	SSSI	68.3 ha	Lowland raised bog Breeding birds	SD50/5
Abram Flashes	Abram	SSSI	39.62 ha	Breeding birds Lowland open water Wet grassland	SD60/4
Astley & Bedford Mosses	Lately Common	SSSI	92.2 ha	Lowland raised bog (the largest remaining fragment of Chat Moss)	SJ69/5
Highfield Moss	Lowton	SSSI	21.3 ha	Lowland raised bog Acid grassland	SJ69/3
Borsdane Wood	Hindley	LNR	37.39 ha (26.9 ha in Wigan)	Ancient broadleaved woodland with bryophyte and fungi communities and rich ground-flora. Also high invertebrate species richness	-
Wigan Flashes	Wigan	LNR	175.24 ha	Wetland flora, birds, bats and invertebrate assemblages	-
Orrell Water Park	Orrell	LNR		Birds and invertebrate assemblages	-
Low Hall Park	Hindley	LNR	7.8 ha	Odonata and water voles	-

[1] *Quoted areas of designated sites were found to vary between layers provided by the Council, layers downloaded from MAGIC or Natural England and Citations. Where discrepancies were identified, the citation was referred to unless the site was not contained entirely within Wigan, in which case GIS boundaries were used.*

Table 1.2: Summary of non-statutory designated sites in Wigan

Site Name	Location	Status	No. of Designating Features[2]	Area[3]	Site Reference
Haigh Plantations	Haigh, Aspull	SBI Grade A	10	86.9 ha	A47
Horrocks Flash	Ince-in-Makerfield	SBI Grade A	9	58.3 ha	A46
Westwood Flash	Poolstock	SBI Grade A	9	17.0 ha	A40
Pennington Flash	Leigh	SBI Grade A	9	137.9 ha	A78
Amberswood Common	Ince-in-Makerfield	SBI Grade B	8	87.8 ha	A50
Bryn Marsh	Ince-in-Makerfield	SBI Grade A	8	16.2 ha	A36
Orrell Water Park	Orrell	SBI Grade B	8	3.7 ha	A94
Forest Fold	Shevington	SBI Grade A	8	12.0 ha	A6
Ochre Flash	Ince-in-Makerfield	SBI Grade B	8	13.9 ha	A37
Turner's Flash	Ince-in-Makerfield	SBI Grade A	8	13.6 ha	A38
Winstanley Hall Woods	Pemberton	SBI Grade B	8	49.2 ha	A12
Borsdane Wood	Hindley - Aspull	SBI Grade A	7	26.9 ha	A61
Dean Wood	Upholland	SBI Grade A	7	12.9 ha	A5
Kirkless Lane	Higher Ince	SBI Grade A	7	14.7 ha	A52
Bispham Hall Woods & Billinge Plantation	Orrell	SBI Grade B	7	26.0 ha	A1
Ponds at Robin Hill Farm (West)	Shevington Moor	SBI Grade B	7	1.3 ha	A30
Red Rock Railway Cutting (South)	Haigh	SBI Grade C	7	4.5 ha	A48
Lawns Wood	Crooke, Shevington	SBI Grade B	6	5.1 ha	A25
John Pit Woods	Shevington	SBI Grade A	6	36.9 ha	A27
Scotman's Flash	Worsley Menses	SBI Grade A	6	38.7 ha	A31

[2] *Designating features are listed features of interest supported by the SBI including (but not exclusively) vegetation type, ferns, bryophytes, fungi, mammals, birds, amphibians, reptiles, Lepidoptera, Odonata, other invertebrates and geological.*

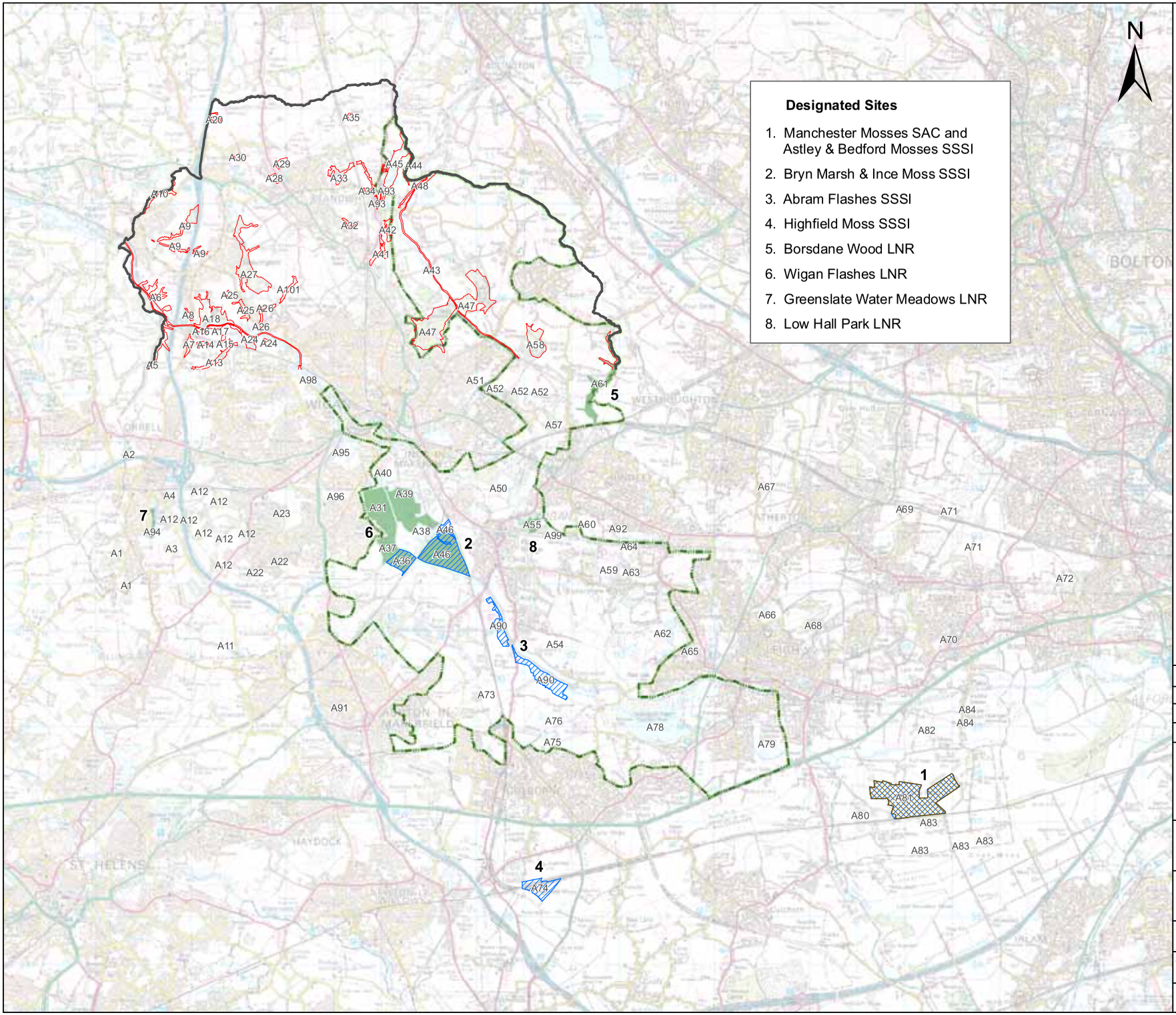
[3] *Quoted areas of designated sites were found to vary between layers provided by the Council, layers downloaded from MAGIC or Natural England and Citations. Where discrepancies were identified, the citation was referred to unless the site was not contained entirely within Wigan, in which case GIS boundaries were used.*

Site Name	Location	Status	No. of Designating Features[2]	Area[3]	Site Reference
Highfield Moss	Lowton, Golbourne	SBI Grade A	6	19.7 ha	A74
Ponds Near Lightshaw Lane	Golbourne	SBI Grade A	6	11.8 ha	A76
Barrowcroft Wood	Standish	SBI Grade B	6	8.2 ha	A33
Atherton & Bedford Woods	Atherton	SBI Grade B	6	24.7 ha	A68
Callico & Hullet Hole Woods	Shevington	SBI Grade B	6	14.8 ha	A9
Bibi's Sand Pit	Worthington, Standish	SBI Grade B	6	1.5 ha	A35
Hindley Deep Pits	Hindley	SBI Grade C	6	8.4 ha	A57
Hope Carr Nature Reserve	Leigh	SBI Grade A	6	39.3 ha	A79
Blundell's Woods	Highfield	SBI Grade C	6	4.6 ha	A23
Meadow Near Kirkless Hall	Ince	SBI Grade B	6	5.8 ha	A51
Lightshaw Lime Beds	Golbourne	SBI Grade A	5	8.7 ha	A75
Astley & Bedford Moss	Glazebury	SBI Grade A	5	102.6 ha	A81
Ponds North of Cleworth Hall (South)	Tyldesley	SBI Grade A	5	120.6 ha	A71
Ponds South of Langtree Lane	Standish	SBI Grade A	5	4.3 ha	A29
Arley Woods (West)	Red Rock, Standish	SBI Grade A	5	2.6 ha	A44
Wetland by M6	Shevington Moor	SBI Grade B	5	1.7 ha	A20
Barlows Farm	Bickershaw, Hindley	SBI Grade A	5	23.8 ha	A59
Wetlands, Grasslands & Scrub off Colliery Lane	Atherton	SBI Grade A	5	52.3 ha	A67
Pearson's Flash	Ince-in-Makerfield	SBI Grade A	5	20.2 ha	A39
Low Hall Park	Hindley	SBI Grade A	5	7.8 ha	A55
Bickershaw Colliery	Bickershaw	SBI Grade B	5	40.8 ha	A62
Wetland off Orchard Lane	Leigh	SBI Grade B	5	5.9 ha	A66
Crooke West Clay Pits	Crooke	SBI Grade B	5	1.6 ha	A15
Crooke	Crooke	SBI Grade B	5	9.4 ha	A24
Wetland & Scrub at Hindley Green	Hindley	SBI Grade B	5	7.5 ha	A63
Orrell Brick Works	Orrell	SBI Grade B	5	6.0 ha	A4

Site Name	Location	Status	No. of Designating Features[2]	Area[3]	Site Reference
Big Wood	Shevington	SBI Grade A	5	5.8 ha	A10
Porter's Wood	Kitt Green	SBI Grade B	5	7.8 ha	A13
Otters Croft, Crooke & Greaves Woods	Shevington	SBI Grade A	5	25.9 ha	A18
Woodshaw Colliery	Aspull	SBI Grade C	5	17.8 ha	A58
Disused Railway at Hindley Green	Hindley	SBI Grade C	5	6.3 ha	A64
Frodsham's Wood	Crooke	SBI Grade B	5	3.9 ha	A101
Follient Wood	Crooke, Shevington	SBI Grade B	5	3.3 ha	A26
Leeds Liverpool Canal - Adlington to Wigan (South)	Arley – Wigan	SBI Grade C	5	11.7 ha	A43
Reservoirs East of Leyland Park	Hindley	SBI Grade B	5	2.2 ha	A60
Abram Flashes	Abram	SBI Grade A	5	44.1 ha	A90
Culvert & Lodge at Standish	Standish	SBI Grade B	5	1.4 ha	A93
Leeds/Liverpool Canal – Appley Bridge to Wigan	Apley Bridge - Wigan	SBI Grade C	5	11.6 ha	A16
Glead Wood & Tan Pit Slip	Winstanley	SBI Grade C	5	8.5 ha	A22
Ackhurst Lane Sand Workings	Shevington	SBI Grade C	5	2.0 ha	A14
Fairhurst Lane	Standish	SBI Grade C	5	2.2 ha	A32
Whelley Loop	Boar's Head	SBI Grade C	5	5.3 ha	A41
Astley Hospital	Astley	SBI Grade C	5	2.9 ha	A70
Worthington Lakes	Standish	SBI Grade A	4	21.3 ha	A45
Barton Clough	Leyland Green	SBI Grade C	4	2.1 ha	A11
Pond at Primrose Hill	Shevington	SBI Grade B	4	2.8 ha	A28
Fairclough Wood	Standish	SBI Grade C	4	3.6 ha	A42
Ponds Near New Manchester (West)	Tyldesley	SBI Grade A	4	17.1 ha	A72
Gathurst Wood	Gathurst	SBI Grade B	4	3.5 ha	A7
Park Lane Colliery	Abrah	SBI Grade B	4	9.5 ha	A54
Chat Moss Remnants	Astley	SBI Grade A	4	35.0 ha	A83
Moss Wood	Orrell	SBI Grade C	4	5.9 ha	A3

Site Name	Location	Status	No. of Designating Features[2]	Area[3]	Site Reference
Martland's Wood	Shevington	SBI Grade C	4	1.7 ha	A8
Gathurst - Between Canal & River	Shevington	SBI Grade B	4	3.3 ha	A17
White Bridge Wood	Standish	SBI Grade B	4	4.5 ha	A34
Firs Park	Firs Lane, Leigh	SBI Grade C	4	2.0 ha	A65
Windybank Wood	Glazebury, Leigh	SBI Grade B	4	6.9 ha	A80
Smithy Brook	Worsley Mesnes	SBI Grade A	3	0.7 ha	A96
Martland Heath and Marshes	Wigan	SBI Grade B	3	6.7 ha	A98
Marsh at Lower Green	Astley Green	SBI Grade C	3	3.4 ha	A84
Edge Green	Edge Green	SBI Grade C	3	1.1 ha	A73
Skitters Wood	Ashton – in – Makerfield	SBI Grade C	3	6.8 ha	A91
Field by Scowcroft Farm	Hindley	SBI Grade B	2	1.1 ha	A92
Calico Meadow	Shevington	SBI Grade B	2	0.7 ha	A100
Abbey Lakes	Upholland	SBI Grade C	2	1.9 ha	A2
Marsh & Reedbeds at Shakerley	Shakerly, Atherton	SBI Grade C	2	0.6 ha	A69
Parson's Meadow	Poolstock	SBI Grade C	2	5.4 ha	A95
Platt Bridge Heath	Wigan	SBI Grade C	2	3.4 ha	A99
Tyldesley Sewage Works	Tyldesley	SBI Grade B	1	7.0 ha	A82

Site Location Plan



Data Sources:
Wigan Council
Greater Manchester Ecology Unit
Natural England

Rev	Description	Dwn	Appvd	Date

Genesis Centre
Birchwood Science Park
Warrington WA3 7BH
Tel 01925 844004
Fax 01925 844002
email tep@tep.uk.com

Project:
WIGAN BIODIVERSITY AUDIT

Title:
Designated Sites

Map No.
G1771.003

Scale:	Date:
1:75,000 @ A3	12/05/2009

Drawn:	Checked:	Approved:
AP	RH	FBH

APPENDIX 3: BIODIVERSITY HABITAT ACTION PLANS

Greater Manchester Habitat Action Plans

Reedbeds & Bittern

25% of the North West freshwater reedbeds are found in Greater Manchester

Ecology

Nationally the largest reedbeds are found in river floodplains and low lying coastal areas such as estuaries, but can occur wherever water levels seasonally fluctuate and/or are no more than a metre in depth, such as lake margins, ditches and slow flowing rivers. In Greater Manchester the largest reedbeds are associated with waterbodies created by mining subsidence known locally as Flashes.

Without management or regular flooding, dead reed builds up reducing the depth of water. This enables colonisation and succession, first by species such as greater willowherb, followed by willow scrub and finally woodland.

Factors including size, age, water quality and geographical distribution will lead to differences in the plant, animal and invertebrate communities found in reedbeds. For example, Bittern (*Botaurus stellaris*) require a matrix of reedbed in excess of 20ha to breed. Wintering Bitterns will often use smaller sites but move on in spring.

Characteristic birds of reedbeds in Greater Manchester include:

Reed Bunting	*Emberiza schoeniclus*
Water Rail	*Rallus aquaticus*
Reed Warbler	*Acrocephalus scirpaceus*
Bittern	*Botaurus stellaris*

Marsh Harrier (*Circus aeruginosus*) and Bearded Reedling (*Panurus biarmicus*) may also occur.

There are 700 invertebrate species in the UK associated with reedbed. Some 40 of these

are entirely dependent upon them, several of which occur in Greater Manchester.

Common reed is the dominant plant species associated with the priority habitat when it is good condition. Other species found include Reedmace, Lesser Reedmace, Yellow Iris, Sweet Flag, Branched Bur-reed and Duckweed. In drier areas stands undergoing the first stages of succession species, such as bittersweet, rushes, stinging nettle and marsh cinquefoil start to become increasingly common. Small areas of Carr woodland, usually of Willow and Alder, may also start to develop.

Bittern

The Bittern is confined almost entirely to wetlands dominated by reeds, where it feeds on fish, amphibians and other small water animals. The bird re-colonised the UK after extinction last century but has declined steadily as a breeding species in the last 30 years. The decline is due to direct habitat loss and habitat degradation through lack of appropriate management and eutrophication. In recent years there has been an increase in the number of Bitterns over-wintering in the UK and within the north west of England.

Notable species

Common Reed	*Phragmites australis*
Common Reedmace	*Thypha latifolia*
Lesser Reedmace	*Typha angustifolia*
Yellow Iris	*Iris pseudacorus*
Branched Bur-reed	*Sparganium erectum*
Bittersweet	*Solanum dulcamara*
Marsh Cinquefoil	*Potentilla palustris*
Bittern	*Botaurus stellaris*
Marsh Harrier	*Circus aeruginosus*
Grey Heron	*Ardea cinerea*
Water Rail	*Rallus aquaticus*
Reed Bunting	*Emberiza schoeniclus*
Reed Warbler	*Acrocephalus scirpaceus*
Bearded Reedling	*Panurus biarmicus*
Water Vole	*Arvicola terrestris*
Water Shrew	*Neomys fodiens*
Common Frog	*Rana temporaria*
Common Toad	*Bufo bufo*
Silky Wainscot	*Chilodes maritimus*
Green Brindled Crescent	*Allophyes oxyacanthae*
Bulrush Wainscot	*Nonagria typhae*
Brown-veined Wainscot	*Archanara dissoluta*
Obscure Wainscot	*Mythimna obsoleta*
Small Wainscot	*Chortodes pygmina*
Large Wainscot	*Rhizedra lutosa*
Small Rufous	*Coenobia rufa*

Priority Habitat Description

Reedbeds are wetlands dominated by stands of Common Reed (*Phragmites australis*) where the water table is at, or above ground

level for most of the year. They include areas of open water and ditches, and may be associated with small areas of wet grassland and carr woodland (wet, swampy woods dominated by Alder and Willow).

Current status and distribution

National

In the UK there are approximately 900 reedbed sites, with a total of 5000 ha. Of these 900 sites only 50 are larger than 20ha (UKBAP).

The Bittern is a declining breeding species. It is confined almost entirely to lowland marshes in Norfolk, Suffolk and Lancashire. The UK population in 2001 increased for the fourth year in a row to thirty males at a total of eighteen sites. This compares to a peak of seventy pairs in the late 1960's when it bred in eight counties. Numbers are boosted in winter by continental immigrants.

Greater Manchester

Although uncommon in the county, approximately 25% of recorded freshwater reedbed habitat in North West England lies in Greater Manchester, usually in man-made wetlands on former industrial sites.

Reedbed however covers 1% of Greater Manchester and many are small and fragmented. The most extensive reedbeds occur in the series of subsidence "flashes" in the Wigan area. The most significant of these are within Wigan Flashes Local Nature Reserve, part of which is designated as a SSSI. The site contains approximately 70 ha of reedbeds. Most reedbeds are designated as SBI's and managed as Local Nature Reserves.

IMPORTANT REEDBED SITES IN GREATER MANCHESTER

Wigan Flashes	LNR	Wigan
Pennington Flash		Leigh

Bitterns do not currently breed in Greater Manchester. Winter visitors are, however, regularly recorded in the Wigan Flashes. Numbers are uncertain due to the secretive nature of the bird. But they are considered to be a rare but increasing non-breeding visitor.

Legal

Reedbeds have no legal protection, except where it occurs in designated sites. However some species associated with this habitat are covered by a degree of legal protection including, Marsh Harrier and Bearded Reedling (Schedule 1, Wildlife and Countryside Act, 1981) and Water Vole (Schedule 5, Wildlife and Countryside Act, 1981). The Bittern is listed on Annex 1 of the EC Birds Directive and Appendix III of the Bern Convention. It is also protected in the

UK under Schedule 1 of the Wildlife and Countryside Act (1981) as amended.

Factors affecting the habitat and species

Lack of management, which accelerates seral succession that leads to overall deterioration of the quality of the reedbed.

Excessive water abstraction causing lowering of water levels within existing reedbeds.

Eutrophication caused by fertiliser run-off increases levels of nitrates and phosphates in the water. Whilst reeds can grow well in eutrophic water it can have significant impact on other wildlife, including the ability of the Bittern to feed.

Disturbance caused by recreational users of water bodies and dog walkers.

Water pollution caused by pesticides and heavy metals.

Small and fragmented reedbeds increase the vulnerability of animal species to local extinctions, although they can provide stepping-stones to other larger blocks.

Recent declines of Bittern have been caused by a reduction in the availability of reedbeds and other swamps and marshes. Much of this land has been lost to drainage, but the abandonment of traditional management and uses of reed areas has also caused degradation of suitable sites. Water pollution has also adversely affected fish populations in some reedbeds.

Current actions

Formal designation of sites as SSSI and SBI's.

Recent schemes in Wigan have been implemented to bring reedbeds into more positive management regimes. These schemes have allowed a total of 50 ha of reedbed to be brought into active management. Approximately 24ha of this is newly created reedbed (WLCT).

Increasing use of Sustainable Urban Drainage Systems (SUDS) where reedbeds are an integral element of design.

Ongoing reedbed planting, extension and management schemes at Amberswood, Bickershaw and Wigan Flashes.

Objectives and targets

Objective	Target	Quantity	Target Date
Maintain current extent	Designate all reedbeds that meet the Greater Manchester SBI selection guidelines and create appropriate management strategies for maximum conservation of species.	210ha	2015
Achieve favourable condition	75% of all reedbeds managed for conservation in favourable condition. Reedbed habitat that is above 20 ha should be managed with consideration for Bittern.	210 ha	2015
Create and expand habitat	Identify opportunities to create new reedbeds and expand existing stands, considering bittern in appropriate areas.	32 ha	2015
Determine the current distribution of Bittern in Greater Manchester	Collate existing records and establish baseline data through further surveys to produce a current distribution map.	-	2010

Proposed actions

1. Ensure that all relevant reedbeds and key Bittern sites are designated and have a current management plan that is being implemented. NE, GMEU, WT's, LA's, EA. 2010

2. All SSSI reedbeds to be in favourable condition and managed in accordance with Natural England recommendations. NE, EA WT's, LA's. 2015

3. Identify possible areas to expand or create new habitat, and find relevant funding streams and submit bids. WT's, EA, NE, GMBP, LA's. 2010

4. Assist landowners and managers in managing reedbeds sympathetically and promote long-term positive management for Bittern. This could involve carrying out reedbed management training days. NE, WWT, WT's, EA, LA's. 2009

5. Establishment of a breeding Bittern population in Greater Manchester. Manage large reedbeds in accordance with best practice. WT's, EA, RSPB. 2012

6. Increase reedbed area through the construction of Sustainable Urban Drainage Systems (SUDS). Monitor all relevant planning applications and suggest SUDS where appropriate. EA, LA's, GMEU. Ongoing

Lead partners

EA	Environment Agency
GMEU	Greater Manchester Ecology Unit
GMBP	Greater Manchester Biodiversity Project
LA's	Local Authorities
NE	Natural England
RSPB	Royal Society for the Protection of Birds
WLCT	Wigan Leisure and Culture Trust
WT's	Wildlife Trusts
WWT	Wildfowl and Wetlands Trust

Best practice guidelines

Unless reedbeds are managed they will eventually dry out and become colonised by other plant species, leaf litter will accumulate over time, and it will develop into scrub and woodland. The natural processes can be accelerated by drainage and water abstraction, as well as, isolation from watercourses. To slow down or reverse this process a number of management practices can be used such as, rotational reed cutting, controlled burning of the 'litter', or by water level management.

Diversity in reedbed structure often depends on water within the system and it is therefore very important to consider the hydrology before deciding on management strategies. Best practice is to vary water levels, with water around 30 cm deep over the bulk of the reedbed. This allows fish to access the water body and encourages invertebrates, such as Water Hoglouse that helps control the build up of material and prevents drying out. Different depths and flooding regimes are needed for different species and therefore this needs to be considered in the management plan.

Management for Bittern

A range of reed/fen communities (dependent on site conditions) is

desirable. This can be achieved through rotational cutting.

Development of reedbed fringe communities provides suitable feeding for Bittern, increasing the amount of reed/water interface with suitable ditches and pools.

© Steve Young

Prevention of seral scrub succession.

Monitoring water quality for invertebrate community and flora and fauna.

Ensure ice-free areas in severe winters.

Control of disturbance by humans, dogs and potential predatory species e.g. mink.

Further information on best practice management for reedbeds and bittern can be found here:

Reedbed Management for Bitterns – RSPB

Links to relevant BAP's

Grasslands
Water Voles
Great Crested Newt
Ponds and Lodges
Canals

References

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Acknowledgements

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Reedbeds & Bittern

Author

Mark Champion

Wigan Flashes Projects Manager

mark.championx@btinternet.com

Ponds & Lodges

A pond is a natural or man-made water body, 1m^2 to 2ha in area, that holds water for at least 4 months of the year

Ecology

Ponds occur in a variety of situations including abandoned industrial sites, marl pits, brickworks and flooded mineral workings, as a result of mining subsidence and quarrying, as well as in more natural locations in woodlands and on farms. Ponds in parks and gardens are also an important biodiversity resource particularly in urban and suburban areas.

When ponds are created they can be quickly colonised by plants and animals. The speed at which this happens, the number and type of species is strongly influenced by three key factors: how clean the water is, how varied the shape or design is, and how close it is to other freshwater habitats, to provide colonising material. There is often no need to introduce plants or animals. However, planting of native vegetation can discourage vandalism, and benefit species conservation by decreasing the chance of non-native species dominating.

Ponds go through the aging process, known as natural succession; they may become shallower and covered by vegetation, or shaded by mature trees. This process could take hundreds or thousands of years. All types and ages of ponds are potentially good wildlife habitats. Ponds that go through natural succession do not usually turn into dry land – they turn into temporary or seasonal ponds. Temporary ponds are an important and highly threatened habitat.

Lodges are man-made waterbodies, with most examples originating from the industrial revolution. These were created to hold water for industrial processes - notably in Greater Manchester for the textile industry. Lodges

Ponds & Lodges

differ in size but are generally associated with streams and rivers. In terms of biodiversity interest, there is little difference between lodges and ponds. Generally lodges are larger with more extensive areas of open water, with some areas of marginal vegetation within them with species such as common reed, great reedmace and reed canary grass.

A range of species are associated with ponds and lodges, including wetland plants, aquatic invertebrates, amphibians, mammals and birds. Bats roost in some of the culverts associated with lodges in addition to using ponds and lodges as important feeding areas. Some species are specific to ponds, or a type of pond, such as temporary or seasonal, and are easily lost if the pond is changed.

Ponds can also help to prevent flooding by storing surface water during periods of heavy rainfall. The water can then slowly soak into the ground or aquifers instead of rushing down streams or rivers and causing flooding. They can also help to clean up water from agricultural land. Water running off fields can by sent through a series of ponds, which remove the sediments and fertiliser, before it enters a stream or river.

Notable species include:

Common frog	*Rana temporaria*
Common toad	*Bufo bufo*
Smooth newt	*Triturus vulgaris*
Palmate newt	*Triturus helveticus*
Great crested newt	*Triturus cristatus*
Water vole	*Arvicola terrestris*
Bats	
Grass snake	*Natrix natrix*
Reed Bunting	*Emberiza schoeniclus*
Emperor dragonfly	*Anax imperator*
Broad-bodied chaser	*Libellula depressa*
Great diving beetle	*Dytiscus marginalis*
Diving beetles	*Ilybius guttiger*
	Dytiscus circumflexus
	Rhantus suturalis
Water beetle	*Agabus unguicularis*
Scavenger beetles	*Cercyon ustulatus*
	Cercyon convexiusculus
	Cercyon tristis
	Helochares punctatus
Marsh beetle	*Cyphon pubescens*
Shining ram's-horn	*Segmentina nitida*
Mud snail	*Lymnaea glabra*
Lesser marshwort	*Apium inundatum*
Ivy-leaved water crowfoot	*Ranunculus fluitans*
Galingale	*Cyperus longus*
Whorled water milfoil	*Myriophyllum verticillatum*
Great dock	*Rumex hydrolapathum*

In urban areas, new ponds can be part of Sustainable Urban Drainage Systems (SUDS) through the creation of detention basins, retention ponds or new wetlands. It

can be designed into new developments or retrofitted into existing sites. SUDS can capture water from roads, car parks and other surfaces, helping to reduce flood risk and prevent pollution of other water bodies.

(GMEU)

Priority habitat description

Ponds for the purpose of the UK BAP priority habitat classification are defined as permanent and seasonal standing water bodies from 1m² up to 2 ha in extent, which meet one or more of the following criteria:

Ponds that meet criteria under Annex 1 of the Habitats Directive.

Ponds with important species such as Red Data Book species, BAP species, species on Schedule 5 and 8 of the Wildlife and Countryside Act, Habitats Directive Annex II species, a Nationally Scarce wetland plant species, or three Nationally Scarce aquatic invertebrate species.

Ponds with exceptional species assemblages or large populations of key species such as amphibians and dragonflies, or exceptionally rich sites for plants or invertebrates (supporting 30 or more wetland plant species or 50 or more aquatic macroinvertebrate species).

Ponds of high ecological quality, as defined by Pond Conservation's Predictive System for Multimetrics (PSYM).

Other ponds important because of their age, rarity of type or landscape context.

In Greater Manchester all ponds and lodges are considered of value and this action plan therefore covers all such features not just those covered by the UK BAP definition.

Current status and distribution

National

There are an estimated 487,000 ponds in Great Britain (not including curtilege i.e. gardens etc) (Countryside Survey 2007). At the start of the 20th century, there were approximately 1.25 million ponds. This

means we have lost over three quarters of a million ponds in the last 100 years. Not only are there fewer ponds, but also the remaining ponds are more likely to be larger, deeper, and degraded by pollution, invasive species or inappropriate management. The Countryside Survey (2007) revealed an increase from 60% to 72%, of ecologically poor or very poor quality pond sites in England and Wales since 1996.

Greater Manchester

There is currently no data on the number of ponds in Greater Manchester. Ponds are found in all parts of Greater Manchester, and are thought to be relatively numerous for an urban area. There are particularly high densities of ponds on the western side of Greater Manchester, especially around Wigan and in Bury, Salford and Bolton, where the pond network is known as the Wigan Pondway. Important pondscapes are also found in Trafford, Manchester, Stockport and on the Oldham/Tameside border.

Lodges are a common feature associated with the mill towns of Lancashire and Greater Manchester. They are important to the biodiversity of the region as they make a significant contribution to nature conservation, particularly in areas where natural water bodies are less extensive. Lodges occur in all ten districts of Greater Manchester. Recently a rare plant - Floating water plantain (*Luronium natans*) was found in a Rochdale lodge.

Although there is a national plan focussing on Priority Ponds, it is important to remember that all ponds are valuable. Ponds are important for local wildlife, and are a vital part of an ecological network, allowing certain plants and animals to move around the landscape, to colonise new sites, and buffering sites against the loss of species. This network is particularly important for ensuring pond wildlife can survive climate change. Since pond numbers have dropped so low, the network is fragile, and in some areas it is broken; some ponds are isolated and the wildlife that lives in them is at risk of disappearing completely from the local area.

Sites Important for Ponds and Lodges in Greater Manchester:

Brookheys Covert	SSSI	Trafford
Compstall	SSSI	Stockport
Dunham Park	SSSI	Trafford
Cotteril Clough	SBI	Manchester
Cowlishaw Farm	SBI	Oldham
Heald Green	SBI	Stockport
Holden Clough	SBI	Tameside
Barracks Lodge	SBI	Bury
Doffcocker Lodge	LNR	Bolton
Culvert & Lodge at Standish	SBI	Wigan
Kirklees Brook	SBI	Bury
Manchester Airport	SBI	Manchester
Moses Gate	SBI	Bolton

Legal

Ponds are not directly protected by legislation (except for a small number of special pond types listed on Annex 1 of the Habitats Directive and not found in Greater Manchester). However, ponds that support protected species, such as great crested newts or water voles, do receive protection under species legislation (e.g. Wildlife and Countryside Act 1981, Conservation (Natural Habitats &c) Regulations 1994).

Ponds receive some protection through the planning process. 'Planning Policy Statement 9: Biodiversity and Geological Conservation' (PPS9) and the associated guidance require local authorities to conserve important natural habitats (including ponds) with policies that enhance and add to natural habitats, and aim to maintain networks by avoiding or repairing the fragmentation and isolation of natural habitats through policies in plans.

Regulation 37 of the Conservation (Natural Habitats, &c) Regulations 1994 ensures that planning policy considers certain landscape features that perform a stepping-stone function "(such as ponds or small woods)" which "are essential for the migration, dispersal and genetic exchange of wild species". Local Nature Reserves and Sites of Biological Importance, cover a proportion of Greater Manchester's ponds, providing some protection.

Factors affecting the habitat

Nationally, pond loss can be attributed to filling in, land drainage, and lowering of the water table. Infilling by natural succession on its own does not necessarily result in the loss of the pond; it results in a temporary pond, which is also an important habitat. Ponds may be filled in for a variety of reasons, including development, increasing land area for agricultural production, and health and safety concerns.

Pond degradation can be caused by pollution, inappropriate management, introduction of inappropriate native species, neglect (where management is required to maintain certain conditions for key species), deepening of temporary ponds, linking ponds to watercourses and loss or degradation of surrounding habitats. In, or near to, densely populated areas, duck feeding, introduction of fish, and introduction of invasive non-native plants are a significant threat. The sale of invasive non-native plants is commonplace and is thought to be a significant factor in their spread. Surface drainage from roads and other hard surfaces can also result in pollution, as well as, causing uncontrolled rise in water levels.

Although large numbers of ponds are created each year, the new ponds are not a like-for-like replacement of the high quality ponds that are lost. Some new ponds may be of limited value due to poor design and planning together with sometimes a lack of management in the first few years. They may also be created for other purposes e.g. angling.

Current actions

The UK Draft Habitat Action Plan for ponds of high ecological quality is led by Pond Conservation and the Environment Agency. To help deliver Target 4 (creation of high quality potential ponds), Pond Conservation is running the Million Ponds Project to provide encouragement, training and support to create 600,000 new ponds of high quality potential in the next 50 years. A Pond Creation Toolkit for wildlife friendly pond creation has already been produced and is available at www.pondconservation.org.uk.

Pond Conservation has set up the Important Areas for Ponds initiative (IAP) to identify networks of priority ponds – the most important ponds for biodiversity. Important Areas for Ponds are geographical areas which support significant numbers of high quality ponds. Within each Important Area, ponds are classified as either of national or European importance, according to the species or groups of species that they support. IAP reports have been carried out in Wales and South East England and will be extended to the rest of the UK, including Greater Manchester. This should help to protect ponds by focussing conservation effort.

(Pond Conservation)

There is currently a great deal of pond creation and management activity within Greater Manchester (in parks, gardens, farmland, conservation projects, and associated with development). There is also a large amount of information and advice freely available about ponds in books and via the Internet, although not all of it is accurate. The best sources are The Pond Book and organisations like Pond Conservation and the Wildlife Trusts that advise and campaign on pond issues, e.g. invasive species.

DEFRA has proposed to add many invasive non-native plants species to Schedule 9 of the Wildlife and Countryside Act, banning the

sale of these plants, and making it illegal to release them into the wild.

In Greater Manchester, there have been a range of surveys carried out (by the Pond Life Project and local authorities) to provide information on pond wildlife in the area, and some local authorities have put their information on GIS systems to make it more accessible. In some areas, policies have been incorporated into local planning documents to ensure ponds are considered throughout the planning process.

Ponds have also been created at Ince near Wigan for use in mine water treatment. This is another useful aspect of ponds.

Objectives and targets

Objective	Target	Quantity	Target Date
Establish the number of priority Ponds in Greater Manchester	Collect together data of known ponds and identify Priority Ponds.	-	2011
Maintain the number of Priority Ponds.	Maintain net number of Priority Ponds in Greater Manchester – no net loss of ponds through development, lack of management etc.	Unknown	2015
Establish Flagship Pond Sites	Identify and establish Flagship Pond sites and protect for conservation and educational value.	10	2015
Achieving condition and restoration	Improve sites that are in poor condition and where possible restore a subset of the best sites into favourable condition/ to potential Priority Pond status.	50 Sites	2015
Pond Creation	Create new ponds of high quality potential.	30 Ponds	2015

Proposed actions

Gather information about the existing pond resource in Greater Manchester, including number and quality of ponds, and identification of Important Areas for Ponds, to enable targeted conservation action and monitoring of changes to the pond resource. PC, GMBP, GMEU, LA's, WT's. 2011.

Ensure that existing legislation and local policy is fully implemented to protect ponds, and that appropriate polices are included in development plans, such as the Local Development Framework (LDF'S), to maintain and enhance the pond resource. GMEU, NE, EA, LA's, WT's. Ongoing

Provide information to planners, developers and ecological consultants on best practice pond conservation. PC, NE, EA, GMEU, GMBP. Ongoing

Put in place ways (designation, management plans etc) of maintaining the condition of the best ponds. PC, NE, EA. 2011

Encourage the use of Sustainable Urban Drainage Systems in new developments to protect wetlands from sources of poor quality water, and to create more habitats. EA, UU, LA's. Ongoing

Engage with developers to encourage protection of existing ponds and high quality habitat creation in new development sites. Where ponds are lost there should be a 2 for 1 replacement scheme adopted. EA, NE, LA's, GMEU. Ongoing

Create 5 new ponds per year with the potential to be high quality (unpolluted water supply, good design, good location). PC, LA's, WT's, GMBP. 2015

Work with anglers and fisheries managers to encourage sensitive management of ponds and discourage inappropriate fish introductions. PC, EA, NE, WT's, LA's. Ongoing

Engage with retailers, garden pond owners and fish enthusiasts to halt the release of non-native plants into ponds, and implement control measures on sites where there is a risk of such plants spreading to other sites. PC, LA's, EA, WT's. Ongoing

Work on sites with water quality issues, non-native species, inappropriate management etc to

improve the sites, leading to population increases of key species or increases in species diversity. PC, EA. LA's. WT's, NE. 2015

Raise awareness of the value of ponds and where people can get accurate information and advice about ponds. PC, GMBP, WT's, LA's. Ongoing

Lead Partners	
EA	Environment Agency
GMBP	Greater Manchester Biodiversity Project
GMEU	Greater Manchester Ecology Unit
LA's	Local Authorities
NE	Natural England
PC	Pond Conservation
UU	United Utilities
WT's	Wildlife Trusts

Best practice guidelines

Some good examples of pond & lodge management, creation and enhancement across Greater Manchester include:

Pond creation at Three Sisters in Ashton in Makerfield.

New retention ponds at Kingsway, Rochdale.

Creation of a pond on the roof of the Unicorn Grocery in Chorlton.

In addition Bury MBC commissioned a survey of all the ponds in the borough thereby establishing a baseline of information.

Further advice about ponds can be found here:

Pond Creation Toolkit

A number of fact sheets providing information about best practice are available to download from the Pond Conservation website.

Pond creation on aggregate sites

Advice for planners and developers, including pond creation for water voles.

Herpetological Conservation Trust

Advice on pond creation and management for amphibians and reptiles.

National Pond Monitoring Network

Guidance and forms for standard pond survey methods.

Impact of invasive species

Great Britain Non-native Species website. www.nonnativespecies.org

Centre for Ecology & Hydrology

Information sheets on the best methods of control for various invasive plants (Environment Agency).

Links to relevant BAP's

Black Redstart
Great Crested Newt
Reedbeds & Bittern
Water Vole

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See Pond Conservation website http://www.pondconservation.org.uk/ for information on the UK pond HAP, Important Areas for Ponds and the Million Ponds Project, plus advice and information on ponds in general.

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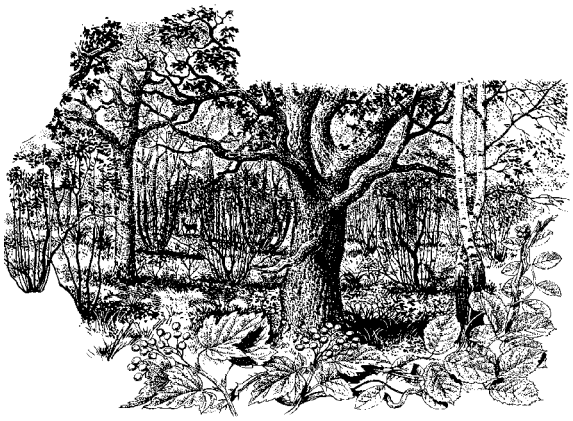
Author

Becca Cleaver
Million Ponds Project Northern Officer
beccacleaver@pondconservation.org.uk

Native Woodlands

Ancient woodlands are of great importance as they are likely to contain the widest variety of plants and invertebrates



Background to this plan

This plan has resulted from a review of two separate Habitat Action Plans included in the current Biodiversity Action Plan for Greater Manchester, published in 2003. These Action Plans were for:

Lowland Broadleaved Woodland

Upland Oak Woodland

This new Habitat Action Plan has incorporated both habitat types into one plan because, after review, it was considered that the threats and actions needed to conserve these woodland types were similar across Greater Manchester. The Plan also now includes wet woodland, which was not previously covered in the Greater Manchester Biodiversity Action Plan, as this is identified as one of the UK's biodiversity habitats.

Ecology / Priority Habitat Description

Lowland Broadleaved

Lowland mixed broadleaved woodland occurs on free draining soils, which corresponds to the following NVC vegetation types:

W8 Ash-maple - dogs mercury
W10 Oak-bracken-bramble woodland

Many of the woodlands within Greater Manchester do not fit easily into the NVC, as they have been modified through intervention, management and disturbance throughout the centuries. However, the majority of lowland broadleaved woodlands within the county tend to have more resemblance to W10.

The plants within the shrub and ground layer vary according to soil type but typical shrub species can include hawthorn, holly, elder, hazel and rowan amongst its species. bramble, bracken, creeping soft grass and bluebell tend to dominate the ground flora, along with other species such as honeysuckle, ferns, lesser celandine, wood anemone and red campion.

Woodlands classed as lowland broadleaved may also be: ancient semi-natural woodlands, semi-natural secondary woodlands or plantation woodlands, dependant upon their respective age or origin. However to be classified as a priority habitat they need to exhibit a predominately semi-natural ground flora (The GM SBI Selection Guidelines Table 1 lists suitable species).

Lowland acid oak woodland, which occurs on free draining sandy soils, is also included within this action plan. The canopy is again dominated by oak and birch with holly and rowan scattered amongst the shrub layer. The ground flora is dominated by wavy hair grass with other notable species including heather, bilberry, bracken, foxgloves and woodrushes.

Lowland woodlands may also qualify as a priority habitat in Greater Manchester if they include good populations of species such as purple hairstreak, butterfly, bats or birds such as, wood warbler, spotted flycatcher and willow tit. (The GM SBI Guidelines provide guidance on important bird assemblages and species).

Upland Oak

Two types of upland oak woodland are recognised by the National Vegetation Classification (NVC), however only one community type is found in Greater Manchester:

W11 Sessile oak-downy birch-wood sorrel woodland

The main understorey species within this type of upland wood are holly, rowan and hazel. However, as many woodlands have a long history of management, disturbance and modification, the canopy and shrub layer frequently do not correspond well with this NVC classification and there may be some trend towards other NVC woodland communities on the NVC spectrum.

Typical ground flora species in upland oak woodland include:

Wavy hair grass	*Deschampsia flexuosa*
Wood sorrel	*Oxalis acetosella*
Heather	*Calluna vulgaris*
Bilberry	*Vaccinium myrtillus*
Bracken	*Pteridium aquilinum*

Broad buckler fern	*Dryopteris dilatata*
Great woodrush	*Luzula sylvatica*
Hard Fern	*Blechnum spicant*

The ground layer may however vary locally due to the presence and intensity of grazing. Heavily grazed woodland will tend to show little natural regeneration and have a more restricted ground flora. Where occasional or seasonal grazing has occurred it can benefit the development of a diverse woodland habitat, with a mixture of species and ages in the tree canopy.

Gristlehurst Wood, Heywood (1)

Where the soil type is more alkaline, for example, along streambeds, plants such as ransoms, tufted hairgrass and dog's mercury may also be present. Ash and elm (wych elm) may also be locally abundant in these areas.

Upland oak woodlands may again be ancient secondary woodlands, which have naturally colonised open ground or plantation woodlands for amenity, recreation, landscaping, or long-term biodiversity improvements. The priority habitat is best identified by the presence of a semi-natural ground layer.

Breeding birds of conservation interest:

Redstart	*Phoenicurus phoenicurus*
Wood warbler	*Phylloscopus sibilatrix*
Pied flycatcher	*Ficedula hypoleuca*

Other species of conservation concern associated with upland oak are bats.

Wet Woodland

Wet woodland occurs on poorly drained, or seasonally wet soils, usually with alder, birch and willows as the predominant tree species.

The habitat is found on floodplains (rare in Greater Manchester), margins of open water, as successional habitat mosslands, along the streams and flushes within Clough woodland, and in peaty hollows. This wide range of soil types and hydrological states gives a wide range of NVC woodland

communities, which are often difficult to attribute to any one wet woodland stand.

In addition, the boundaries with drier types of woodland may be sharp or gradual and may (but not always) change with time through succession, are dependant on the hydrological conditions and the management of the wood and its surrounding land. Wet woods frequently occur in mosaic with other woodland key habitat types (e.g. with lowland broadleaved or upland oak woods) and with open key habitats such as mosslands. Management of individual sites needs to consider both sets of requirements.

Healey Dell, Rochdale (1)

Wet woodland is also important for invertebrates particularly on long established sites. Some of these invertebrates are biodiversity action plan species in their own right, for example the beetles *Melanopion minimun* and *Rhynchaenus testaceus*.

Small seepages may support craneflies such as, *Lipsothrix errans* and the endemic *Lipsothrix nervosa*. Dead wood within the sites can be frequent, and its association with water provides specialised habitats not found in dry woodland types - the fly *Lipsothrix nigristigma* for example, is associated with logjams in streams.

Current status and distribution

Within Greater Manchester there is approximately 781ha of ancient woodland (native woodland present since at least 1600AD), as identified by the Provisional Ancient Woodland Inventory (2007). However, the inventory only identified woodlands over 2ha in area. Much of the existing resource is smaller and fragmented, and would not have been identified by the survey. Some of the larger areas of woodland within the conurbation also incorporate some remaining ancient woodland, within a larger more recent block. There are currently no estimates for secondary woodland and plantation woodland that qualify as priority habitat.

Lowland Broadleaved

National

Lowland mixed deciduous woodland is a UKBAP priority habitat, which is similar though not identical to the GM lowland

broadleaved types. Generally, the UK has low woodland cover, which makes the remaining resource scarce. This is a result of the clearance of land for agriculture and development, which has left many fragmented pockets of woodland. Although estimates are not wholly reliable, it is believed that there are approx 250,000ha of lowland broadleaved woodland in the UK. Of note, however, is the estimate that the remaining area of ancient semi-natural woodland within this category has declined by 30-40% through clearance, over grazing and replanting with non- native species. This represents the most ecologically biodiverse woodland within this category and its loss will therefore have the greatest impact on this ecosystem.

Hawthorn Blossom (1)

Greater Manchester

Lowland broadleaved woodland is classified as a scarce habitat within Greater Manchester and is thought to cover approximately 2.5% of the land area of Greater Manchester.

All the districts of Greater Manchester contain lowland broadleaved woodland, although some districts such as Stockport and Tameside have a greater extent of the resource than other more sparsely wooded areas. The resource throughout Greater Manchester is characterised by relatively small woodlands often isolated from each other, although there are notable networks of woodlands along river corridors in Stockport and Bury.

Examples of good Broadleaved woodland:	
Gower Hey	*Tameside*
Elnup Wood in Shevington	*Wigan*
Etherow Country Park	*Stockport*
Marple & Torkington Woods	*Stockport*
Cotteril Clough	*Manchester*

Upland oak

National

Upland oak woodland is a nationally important habitat, which in Europe is restricted to the British Isles. The habitat is listed in Annex 1 of the EC Habitats and Species Directive and it is a priority habitat in the UK Biodiversity Action Plan. There are believed to be between 70,000 and

Native Woodlands

100,000ha of upland oak woodland in the UK, although there are no precise figures. The majority of this habitat and the largest woodland blocks are concentrated in Argyll, Lochaber, Cumbria, Gwynedd, Devon and Cornwall.

Although there are other habitats of a similar type in Europe, the British Isles are recognised as distinctive because of their extent and the unique communities, which they support.

Ringley Woods, SBI, Bolton (2)

Greater Manchester

Within Greater Manchester the total coverage of upland oak wood is unknown, and has experienced a long decline as woodlands have been clear felled, or have fallen into poor condition through over grazing and as a result of recreational pressures. The remaining areas of upland oak woodland are also fragmented, existing in small isolated blocks on the edge of urban areas often surrounded by plantation or secondary woodland.

The upland oak woodland within Greater Manchester is therefore generally characterised by being in unfavourable, but stable condition. A number of woodlands are being brought into management, which should assist in a move towards favourable status.

The following districts contain upland oak woodland:

- Bolton
- Bury
- Oldham
- Rochdale
- Stockport
- Tameside

Examples of good upland oak woodland:

Leavers Wood	SBI	*Oldham*
Tack Lee	SBI	*Heywood*
Gristlehurst Wood	SBI	*Heywood*
Saplin Wood	SBI	*Bury*

Wet woodland

National

There is no precise data on the total extent of wet woodland in the UK, but in the late 1980s the, then Nature Conservancy Council, estimated the total extent of wet woodland within ancient semi-natural

woodland to be about 25,000 - 30,000 ha. It is further estimated that there may be an additional 25,000 to 30,000 of wet woodland of more recent origin. Thus a crude estimate of the total wet woodland area in the UK may be as high as 50,000 - 70,000 ha.

Notable concentrations of wet woodland occur on fens in East Anglia, Shropshire and Cheshire, whilst hillside and plateau alder woods are more restricted to Wales, Cumbria and Western Scotland. Fragments of ancient floodplain forest are rare, and the best examples are in the New Forest and Northern Scotland. Bog woodlands of pine are confined to Scotland, but fragments of birch bog woodland occur more widely in scattered stands across the UK. Wet woodlands develop naturally on wetland sites as a part of the process of natural succession.

Greater Manchester

Although the area of wet woodland within Greater Manchester is not known, the habitat occurs in all of the districts of Greater Manchester. Wet birch woodland occurs in Wigan, Salford and Trafford.

Notable examples of wet woodland include:

Fletcher Moss	SBI	*Manchester*
Lawns Wood	SBI	*Wigan*
Naden Brook	SBI	*Rochdale*
Birchmoss Covert	SBI	*Trafford*

Factors affecting the habitat

Lowland broadleaved & upland oak

A number of factors have resulted in the loss of both lowland broadleaved and upland oak woodland in the UK. This has been the result of a number of issues including:

Overgrazing by livestock and deer

Clearance for development

Clearance for agriculture

New woodlands continue to be planted using non-locally native species and often with no longer-term management.

Constraints on the spread of woodland onto adjacent ground from agriculture, industrial or residential development, leading to greater uniformity of structure across the site.

Invasion of non-native species including sycamore, Japanese Knotweed, Himalayan Balsam, and Rhododendron.

Cessation of traditional management practices and neglect of woodlands.

A legacy of inappropriate practices such as felling to replant with conifers and formalisation as public parks.

Recreational activities including motorcycling, scrambling and dog walking.

Vandalism and anti-social behaviour, such as fires and fly tipping.

Climate change, potentially resulting in changes in the vegetation communities.

Wet woodland

This type of woodland is affected by similar factors that impact on other lowland and upland woodlands, though access related issues tend to be less of a problem simply because the woods are often very wet and inaccessible. Issues specific to this type of woodland include:

Clearance and conversion to other land-uses either directly or through adjacent development or agriculture affecting its drainage.

Lowering of water tables through drainage or water abstraction, resulting in change to drier woodland types.

Inappropriate grazing levels and poaching of the soil by sheep, cattle and deer leading to a change in the woodland structure, ground flora impoverishment and inhibiting regeneration.

Flood prevention measures, river control and canalisation, leading to loss of dynamic disturbance-succession systems and invertebrate communities, as well as possible reductions in the extent of individual sites.

Naden Brook (2)

Poor water quality arising from eutrophication, agricultural run-off, industrial effluents or rubbish

dumping leading to changes in the composition of the ground flora and invertebrate communities.

The river catchments in Greater Manchester acts as conduits for non-native species such as Himalayan balsam (*Impatiens glandulifera*), Japanese knotweed (*Fallopia japonica*) and giant hogweed (*Heracleum mantegazzianum*). They alter vegetation composition and lower conservation value. The management of these invasive species presents a challenge within many different environments.

Current actions

Within Greater Manchester, the area of native woodland is thought to be relatively stable, with any losses being small scale. However, much of the remaining woodland is not being actively managed.

Many of the existing woodlands within Greater Manchester are selected as Sites of Biological Importance and it is proposed under the newly revised SBI Selection Guidelines (July 2008) that any remaining sites, which support ancient semi-natural woodland are designated as SBI's across the conurbation.

The Greater Manchester Ecology Unit is consulted on any planning proposals, which affect designated SBI sites and are able to propose measures to ensure that areas of woodland are maintained where appropriate.

PPS9 Biodiversity and Geological Conservation identifies that planning decisions should prevent harm to biodiversity and that planning decisions should maintain, enhance, restore or add to biodiversity. In addition, The Natural Environment and Rural Communities Act (2006) also requires all public bodies including local authorities to have regard in exercising their functions to conserving biodiversity.

Many local planning authorities have policies relating to nature conservation, biodiversity, green space, trees and woodland. All of these provide a degree of protection for woodland. Unitary Development Plan's are currently in the process of being replaced by Local Development Frameworks. These new plans are expected to contain

similar policies regarding nature conservation and biodiversity.

Forestry Commission grant scheme. The Forestry Commission through the Woodland Grant Scheme England, has funding available for both woodland creation and woodland management, either through the woodland improvement grant which is a one off grant which can be used to bring woodland into management for biodiversity, or the woodland management grant which is an annual payment for the ongoing management of woodlands.

Plantation on Ancient Woodland Sites (PAWS) is also a priority for Forestry Commission funding. This endeavours to increase their ecological value by selective felling of the plantation woodland, and subsequently replanting with native species, or if appropriate facilitating natural regeneration. Restoration work has been undertaken at Erncroft Wood in Stockport.

Increased interest in and development of wood fuel burners may have a positive effect of bringing more woodland into management as low grade logs and timber may become a saleable resource. Market and supply chain development is in the early stages, but a number of the Greater Manchester local authorities are actively investigating this possibility.

A number of Greater Manchester districts have received accreditation from the UK Woodland Assurance Standard for the sustainable management of their woodlands.

Planting of approximately 50 ha of native upland oak woodland is planned through United Utilities' Strategic Catchments Access Management Plan (SCaMP) fund. Precise figures are still to be confirmed through Forestry Commission and UU, but there will be approximately 30ha at Castleshaw Reservoir in Oldham, 11ha at Watergrove, Rochdale and 9ha at Greenbooth / Naden, Rochdale.

Objectives and targets

Objective	Target	Quantity	Target Date
Maintain current extent	Maintain the extent of the existing Greater Manchester lowland broadleaved, upland oak and wet woodlands.	3500 ha	2015
Achieve favourable condition	Using appropriate management for each woodland type, restore the diversity of structure and species within the habitat to favourable condition.	2500 ha	2015
Expand woodland habitat	Identify suitable areas to expand the three woodland habitats, through natural regeneration or woodland planting.	480 ha	2015

Proposed actions

Disseminate information concerning the ecology of the three woodland types and best practice for habitat management. RRF, PEF, GMEU, GMBP, LA's. Ongoing

Engage with woodland owners to assist with management planning and grant funding applications, and assist them to work towards FSC woodland certification or other schemes where appropriate. RRF, PEF. Ongoing

Where appropriate, secure benefits through the planning system including habitat restoration, habitat management, new planting and expansion of extant sites. On appropriate sites secure a buffer zone around any new development to assist in retaining quality woodland habitat. GMEU, LA's. Ongoing

Produce an accurate portfolio of woodland sites across the conurbation and determine the condition of these sites. RRF, PEF, GMEU, LA's, LWT. 2010

Monitor condition of woodland to determine trends and ensure that management regimes are appropriate. RRF, PEF, UU, GMEU, LA's. Ongoing

Identify opportunities to expand the three woodland types and either plant new trees or manage the woodland to allow natural regeneration to occur. Utilise available grants from the Forestry Commission and schemes such as SCaMP to create new woodland. RRF, PEF, UU, LA's. Ongoing

Lead partners

BTCV	British Trust for Conservation volunteers
GMBP	Greater Manchester Biodiversity Project
GMEU	Greater Manchester Ecology Unit
LA's	Local Authorities
LWT	Lancashire, Greater Manchester & North Merseyside Wildlife Trust
PEF	Pennine Edge Forest
RRF	Red Rose Forest
UU	United Utilities

Best practice guidelines

There are two principle methods of creating new woodland:

1) Natural regeneration
2) Woodland planting

1) Natural regeneration

Lowland broadleaved & upland oak

Natural regeneration is generally used where existing semi-natural woodland is being extended onto land of low ecological value. This can be used to enable the woodland to spread naturally. It has a number of advantages over planting in that the new woodland will contain, in the long term a mix of plant and tree species similar to the original woodland, which will be appropriate to the location and soil type. It will also reduce issues relating to local provenance, or the introduction of non-locally native or inappropriate species.

There are a number of conditions, which are necessary to ensure that natural colonisation can take place:

The area for the woodland extension must be secured to ensure that grazing, or similar activity, will not severely limit the effectiveness of natural colonisation as seeds or the resulting new plants are a food source.

A supply of appropriate seeds must be present and many seeds

(particularly large tree seeds) do not travel large distances, and will only colonise new areas if immediately adjacent to the newly proposed area. Seed collection may assist this process.

Non-native / alien species will colonise an area and may need to be selectively removed.

Successful colonisation is also determined by the method of dispersal and the frequency of seeding. Hence species such as birch, which produce large quantities of small seed annually, are rapid colonisers, whereas acorns are produced in large quantities in mast year and rely on small mammals and birds for dispersal. Therefore, seed dispersal may need to be facilitated.

With any wind blown seed species, colonisation will be denser in the direction of the prevailing wind.

Ground conditions and previous land use will affect the colonisation of a new area. Dense grass swards are potentially more difficult for tree seeds to penetrate and may reduce the rate of colonisation. Conversely, bare earth will be colonised by a large variety of seeds, which may include wind blown species from a number of different sources.

General principles indicate that natural colonisation is more successful on sites which:

- Have poor soils
- Have suitable sites for germination
- Appropriate weed control may be needed
- Bracken is controlled where necessary
- Areas are protected from browsing
- Area is immediately adjacent to seed source trees
- Colonisation can be undertaken on a long time scale.

Wet woodland

As wet woodland is a complex mosaic of both tree species and invertebrates, natural regeneration is the most advisable form of habitat creation. This not only increases the potential for appropriate trees of local provenance to grow, but also ensures that the trees and plants, which grow naturally on the site are suitable for the precise site conditions. This method is most likely to be successful and to be colonised by invertebrates and flora where existing

woodland is being extended, or very close to existing woodland.

For natural regeneration of wet woodland to occur, the ground conditions also need to be suitable, such as a high water table, or in a river valley etc. Given the small and fragmented nature of many existing wet woodland sites, natural regeneration may rarely be a practical option.

It is important that invasive species such as Japanese knotweed or Himalayan balsam are removed from the site prior to the site being given over to wet woodland. Treatment may have to take place over a number of seasons to eradicate the plants, and minimise any potential re-growth.

Both alder and birch are commonly found in wet woodlands. Birch is a prolific producer of wind born seeds. Alder produces a good seed crop every two to three years.

2) Woodland Planting

Lowland broadleaved & upland oak

On many sites, and for large-scale woodland creation, woodland planting may be the more desirable option. It has the advantage of enabling large-scale proposals to be implemented quickly, and for the desired trees and shrubs to be grown. The disadvantage of this approach is that the tree or shrub species, which are planted, are more susceptible during the establishment period to drought and weed competition because the roots have been disturbed by the planting process: there is a greater risk that the trees will not be genetically appropriate and it will be more costly in the short term.

Any planted tree species need to be appropriate to the site and to be of local provenance.

Planting phased over a number of years can help ensure that the woodland contains species with a mix of ages to mimic natural woodland.

In some locations it may also be possible and appropriate to introduce additional nature conservation value to the site through planting of wildflower plugs or bulbs and the sowing of seeds. Great care needs to be taken with this approach to ensure that stock is of local provenance and is appropriate for the site.

In the early years, it is important to ensure that any grass sward, or weeds, are carefully managed to reduce or eliminate competition and

ensure that newly planted tree stock has the maximum chance of survival.

Suitable species for lowland broadleaved woodland planting in Greater Manchester include:

Ash	*Fraxinus excelsior*
Birch; silver and downy	*Betula spp*
Holly	*Ilex aquifolium*
Rowan	*Sorbus aucuparia*
Common Oak	*Quercus robur*
Hawthorn	*Crataegus monogyna*
Hazel	*Corylus avellana*
Crab apple	*Malus sylvestris*
Wych elm	*Ulmus glabra*
Goat willow	*Salix caprea*

Suitable species for upland oak planting include:

Birch; silver and downy
Holly
Rowan
Common & sessile oak
Hawthorn
Hazel

Wet Woodland

Where wet woodland is being created, planting must be undertaken by hand and not using machinery, as wet woodland soils are very fragile and prone to mechanical damage by large heavy machinery. Exact species for planting should be informed by the nearest available wet woodland/s to give an indication of the species and mixtures which may be suitable and of local provenance.

When wet woodlands are planted, they are impoverished compared to naturally regenerating or long established wet woodlands, as species are slow to colonise, particularly over long distances. However, establishing new wet woodland by planting can still represent an environmental gain, particularly where it is being established in an area of little biodiversity interest, or forming a natural buffer between intensive agriculture, streams or other watercourses, where the water table is high.

In establishing wet woodland it is important to ensure that there are no plans or proposals, which will affect the drainage of the woodland, as it is essential that the high water level be maintained in the long-term for the stability of the woodland. As part of the site preparation, it may be necessary to consider rewetting the woodland, through blocking small slow-flowing drains or ditches. However, if the drainage cannot be guaranteed, it may be inappropriate to establish wet woodland.

Several willow, species are common within wet woodland and are more commonly grown from cuttings. With the exception of goat willow, the setts will easily take if planted into suitable ground. It is important that willow from local stock is used to maintain local hybrids and genotypes and not introduce alien species into the gene pool.

Suitable species in Greater Manchester dependent on locality and habitat include:

Goat Willow	*Salix caprea*
Grey Willow	*Salix cinerea*
Common Osier	*Salix viminalis*
Eared Willow	*Salix aurita*
Crack Willow	*Salix fragilis*
Alder	*Alnus glutinosa*
Silver or Downy Birch	*Betula spp*
Guelder Rose	*Viburnum opulus*
Bird Cherry	*Prunus padus*
Alder Buckthorn	*Frangula alnus*

Management of woodland

Within Greater Manchester a lack of management (neglect) is a significant long-term threat to the resource of all types of woodland. Management of woodlands has declined as a result of a reduction in the skills base, lack of market for timber products and the costs of managing the woodlands. Recreational pressures, development pressures and inappropriate use often exacerbate this.

Many upland oak woodlands are subject to grazing either intentionally from upland sheep, or from expanding wild deer populations. It can have a detrimental effect upon the long-term structure of the woodland, by preventing natural regeneration and damaging fragile soil and root structures. It may also act to reduce the ground flora through direct grazing or poaching of soils.

Within a natural ecosystem, it is probable that wet woodlands (particularly on fen and mossland sites) would be a temporary succession habitat, which would evolve over time into drier woodland types. Conversely, naturally changing watercourses and drainage patterns would ensure that new wet woodlands were established, ensuring a constant stock of the habitat. Given current constraints, there are few locations where this natural system can now work effectively. Therefore, management aims to maintain the wet woodland in situ. Maintaining the water table and preventing the woodland from drying out is crucial to their continued existence.

The key principles of management should be:

Maintain semi-natural woodland types.

Management should be based on growing species both native to the site and appropriate to the local conditions of soils and hydrology, which occur on site.

Maintain or restore diversity of structure.

A full range of age classes is preferable to single aged woodland. Wet woodland is frequently single aged as it often established following a change in management, land use or drainage.

Maintain diversity of species and habitat, or increase them where appropriate.

A mixture of age classes and structure enhances habitat diversity. Open areas are also important such as, glades or rides within the woodland. Wet woodland is naturally a habitat of limited tree diversity, although there is some opportunity for diversification between both tree and shrub species.

Maintain a mature habitat.

Dead wood is an important element in woodland. Where appropriate dead or decaying standing and fallen timber should be retained.

Minimise rates of change.

Intervention should be gradual and not drastic as wildlife takes time to adjust. Phase work over a number of seasons in different compartments of the wood.

Use low-key restocking and management techniques.

Avoid the use of large machinery etc. that may damage soils, and intervene at a minimum to maintain a diverse and healthy woodland. Wet woodland, management should be undertaken by hand, as large scale mechanical interventions will damage the fragile soils and in consequence the habitat.

Management prescriptions for any area of wet woodland are determined by both the size and extent of the area within the wider woodland mosaic. Hence, a small area of wet woodland within larger dry woodland may be treated as a sub-compartment of the larger woodland block.

Impact of invasive species

Woodlands are subject to the invasion of a number of non-native species including Sycamore, Japanese Knotweed, Himalayan Balsam, and Rhododendron. These can alter

the vegetation composition and lower conservation value by restricting the growth of native species.

Further information about the control of invasive species can be found:

www.nonnativespecies.org Non-Native Species Secretariat

Himalayan Balsam Advice – Centre for Ecology and Hydrology

Japanese Knotweed Advice - Centre for Ecology and Hydrology

Managing and controlling invasive Rhododendron – Forestry Commission

Invasive species information and control measures – Environment Agency

Links to relevant BAP's

Bats
Native Black poplar
Willow tit

References

Forestry Commission (1994) The management of Semi-natural Woodlands 3. Lowland Mixed Broadleaved Woods

Forestry Commission (2003) The Management of Semi-natural Woodlands 5. Upland Oakwoods

Forestry Commission (1999) Using Natural Colonisation to Create or Expand New woodlands

Forestry Commission (1999) Creating New native Woodlands: Turning Ideas into Reality

Cumbria Upland Oak Woodland Biodiversity Action Plan

UK Biodiversity Action Plans

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Author

Emily Barker
Rochdale Borough Council
emily.barker@rochdale.gov.uk

Lowland MOSSLANDS

Lowland raised bog in the UK has fallen by 94% from 95,000 ha to 6,000 ha, and is now internationally threatened

Ecology

Greater Manchester's lowland mosslands, (also known as lowland raised bog), began to form c10, 000 years ago. It dates back to the last ice age when peat began to be laid down on marine, estuarine or fluvial deposits adjacent to estuaries, on river floodplains, or on the site of shallow glacial lakes. These wet, waterlogged areas were originally colonised by reeds and rushes. Due to the waterlogged anaerobic conditions, dead plant material could not be fully broken down and began to build up on the bottom of water bodies and this led to the formation of fen peat. Bog mosses (*Sphagnum* mosses) began to colonise. At this point, the *sphagnum* content of the underlying peat increased and the peat changed from fen to bog peat. As the peat accumulated, the surface of the bog was elevated above the surrounding land, forming a dome, hence the term - raised bog. Being elevated above the surrounding groundwater, raised bogs are fed purely from rainfall and this helps to maintain nutrient poor conditions within the bog system. The *Sphagnum* mosses also increase the acidity of the water. As a result, the characteristic vegetation found on mosslands is adapted to nutrient-poor, acidic conditions and plant species are therefore highly specialised in their requirements and many of these species can be found no-where else.

Mosslands can also support characteristic assemblages of uncommon invertebrates, including the large heath butterfly, once known as the Manchester Argus, but now extinct in the County. Mossland habitat is capable of supporting a range of important bird species, such as curlew. Recent survey

evidence has shown that the ditches in mossland habitats provide important breeding areas for Water Vole.

Peat cutting or drainage has modified the majority of Britain's raised bog and much has been converted to agriculture. There are no intact raised mosslands left within Greater Manchester, with the majority of them having been drained and fertilised to create farmland and some being worked for peat.

Typical regenerated cut over mossland

Priority habitat description

The mossland within Greater Manchester has been significantly altered and all the remnant sites are cutover examples of the habitat. The Manchester mosslands either support secondary semi-natural vegetation or are currently bare peat sites as a result of current extraction. Due to the rate of loss of the habitat and its increased rarity, all uncultivated examples that have the potential to be restored (whether they are vegetated or not) are to be considered as important and a key part of the regions critical environmental capital.

The aim of restoration is to meet the condition of favourable habitat. The best examples of lowland raised bog habitat can be defined using the following criteria:

Characteristic bog-moss species, notably *Sphagnum papillosum* and *Sphagnum magellanicum*, are abundant and cover at least 25% of the surface.

Sites where the hydrology of the mossland is maintained at an appropriate level for the growth of mossland vegetation.

Any site which supports one or more of the following species – even where the habitat quality appears poor:

Round leaved Sundew	*Drosera rotundifolia L.*
Cross-leaved heath	*Erica tetralix*
Bog myrtle	*Myrica Gale*
Bog asphodel	*Narthecium ossifragum*
Bog Rosemary	*Andromeda polifolia*
Cranberry	*Vaccinium oxycoccus*

Bog pools occur on the open bog surface

Lowland Mosslands

The NVC communities in Table 1 are characteristic of the habitat type and the presence of one or more of these communities should be taken as an indicator that the priority habitat type might be present. Species listed in tables 2 and 3 are characteristic of the habitat type but not exclusive to it.

Table 1: NVC Communities associated with lowland raised bog in Greater Manchester

BOGS WITH HIGH WATER TABLE

M17 Scirpus cespitosus - Eriophorum vaginatum blanket mire

M18 Erica tetralix - Sphagnum papillosum raised mire

BOG POOL COMMUNITIES

M1 Sphagnum auriculatum bog pool community

M2 Sphagnum cuspidatum/recurvum bog pool community

M3 Eriophorum angustifolium bog pool community

COMMUNITIES ON MODIFIED BOGS

M15 Scirpus cespitosus - Erica tetralix wet heath

M19 Calluna vulgaris - Eriophorum vaginatum blanket mire

M20 Eriophorum vaginatum blanket and raised mire

M16 Erica tetralix - Sphagnum compactum wet heath

M25 Molinia caerulea-Potentilla erecta mire

W4 Betula pubescens - Molinia caerulea woodland

H9 Calluna vulgaris - Deschampsia flexuosa heath

H12 Calluna vulgaris - Vaccinium myrtillus heath

Table 2: Vascular plants and bryophytes associated with lowland raised bog in Greater Manchester

Active raised bog has at least 25% sphagnum cover. Typical species include:

Bog moss	*Sphagnum papillosum*
	Sphagnum magellanicum
Common cotton-grass	*Eriophorum angustifolium*
Hair's-tail cotton-grass	*Eriophorum vaginatum*

Cross-leaved heath	*Erica tetralix*
Common butterwort	*Pinguicula vulgaris*
Cranberry	*Vaccinium oxycoccus*
Bog rosemary	*Andromeda polifolia*
Bog myrtle	*Myrica gale*
Bladderworts	*Urtricularia spp.*
Round-leaved sundew	*Drosera rotundifolia*
Bog asphodel	*Narthecium ossifragum*
Bog bean	*Menyanthes trifoliate*

Bogs that are drying out, or those where the surface has been cut over, support large areas of:

Purple moor-grass	*Molinia caerulea*
Heather	*Calluna vulgaris*
Bilberry	*Vaccinium myrtillus*
Crowberry	*Empetrum nigrum*
Downy birch	*Betula pubescens*

Table 3: Animal species associated with lowland raised bog in Greater Manchester

Birds

Curlew	*Numenius arquata*
Snipe	*Galinago galinago*

Invertebrates

Common hawker dragonfly	*Aeshna juncea*
Ruddy darter dragonfly	*Sympetrum sanguineum*
Black darter dragonfly	*Sympetrum danae*

Current status and distribution

Lowland raised bog is on Annex 1 of the EC Habitats and Species Directive and is listed in the UK BAP as a priority habitat. Mossland habitat is now internationally threatened. Mosslands once covered large areas of our region, but as elsewhere across Europe there has been a dramatic loss in the area of this habitat. Since c.1850, the area of lowland raised bog in the UK has fallen by 94% from 95,000 ha to 6,000 ha.

In England over the same period, there has been a massive 98.6% reduction of our mossland heritage, with only 500ha now remaining. The North West of England once supported a large proportion of England's lowland raised bog resource, yet even here there has been substantial losses with 99% of the mossland habitat within Lancashire, Greater Manchester and North Merseyside having been destroyed. The remaining fragments are in all cases damaged, and there are less than 100ha of wet mossland left.

Within Greater Manchester, the areas of Chat Moss, Carrington Moss, Ashton Moss and Clifton Moss originally supported huge expanses of mossland habitat. Many of these areas have been lost to agricultural improvement, peat extraction or development.

Lowland Mosslands

A recent survey of mossland habitat has recorded only 14 sites within Greater Manchester supporting deep peat deposits many of the sites being only a few hectares in size. Many of the larger remnants are currently under excavation with only a few being protected by statutory designations. Astley and Bedford Moss are protected, as part of the larger Manchester Mosslands Special Area of Conservation (SAC) and Red Moss in Bolton and Highfield Moss are Sites of Special Scientific Interest (SSSI).

Distribution of mosslands in Greater Manchester

In view of the rarity of intact habitat, degraded examples considered capable of restoration within 30 years are of high conservation priority. COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 (European Habitats Directive), considers that raised bog still capable of restoration are of European Importance. Both active and degraded examples are therefore considered to be priority habitats for conservation.

Mosslands are also considered to be important from both a historical and archaeological point of view. British mossland habitat began to form c10,000 years ago. Due to the preservative quality of peat, mosslands have an immense value as an archaeological and palaeoecological archive of the past ten millennia.

"Intact mossland habitat has a beneficial effect on global warming by locking up carbon within the peat" (Worrall 2008)

Recent research has shown intact mossland habitat to have a beneficial effect on global warming by locking up carbon within the peat. The UK's peatland store more carbon than the forests of the UK, France and Germany, equivalent to 35 years of total UK output of CO_2 (Worrall 2008). Functioning mossland habitat has an additional benefit of being able to sequester carbon, this is an on-going process, which keeps the carbon locked-up and 'sinks' more carbon each year (Worrall 2008). Mosslands also have a beneficial affect on water quality if managed appropriately, and reducing flood risk as they soak up water during heavy periods of rainfall

and gradually releases it over a period of time.

Factors affecting the habitat

The primary factors affecting lowland raised bogs in Greater Manchester are:

Development, including peat, sand and gravel extraction.

Three large peat extraction sites are currently in operation within Greater Manchester. These are at Chat Moss, Little Woolden Moss and Astley Moss East. Planning conditions imposed on the extraction site at Twelve Yards Road, required that 2 metres of peat will be retained on site and that peat extraction would cease in 2010. After use includes conservation.

A new proposal to extend the peat extraction for another 25 years and to take the peat down to 1 meter is currently being submitted. Parts of Astley Moss East will be lost to peat, sand and gravel extraction. The remainder of the site is to be re-wetted and restored to mossland habitat. The Little Woolden Moss application is to convert the land to agricultural use, with a loss of the whole peatland habitat.

The peat surface left by milling does not allow any bog species to survive on areas exploited for peat extraction.

Surface water drainage and groundwater abstraction causing lower water levels

The presence of land drains on adjacent farmland serves to maintain artificially low water tables next to the mossland sites. Water abstraction within the Chat Moss area may also affect and further reduce water levels. Both factors can have an adverse effect on the hydrological gradient between mossland habitat and adjacent lands. This reduces the ability of mossland habitat to maintain sufficient water levels, increases drying out and leads to an incremental loss of habitat through oxidation of the peat and natural succession to heathland and scrub woodland.

Attempts to counteract this and raise water levels on the mossland sites can be met with opposition from landowners and farmers on adjacent land because of

perceived potential effects on the drainage of their own land.

In the past, the loss of mossland habitat has largely been caused by drainage and the conversion to agriculture. Many of the agricultural lands surrounding the current fragmented mossland habitat still retain peat deposits. However, the process of farming the land and the use of heavy machinery has led to compaction and oxidation of the peat soils. Once the peat becomes oxidised it is vulnerable to wind blow and erosion.

Afforestation, scrub encroachment and lack of management

Many of the remaining mossland fragments are not in conservation management. The resource is often in private ownership and a lack of a suitable management regime results in the site drying out and the loss of characteristic bog species.

Locally, there is little pressure for afforestation on mossland habitat at present. Scrub encroachment due to a lack of appropriate management is however commonplace. The presence of large areas of scrub, exacerbate the drying out process and allows the development of wet woodland. If this process is allowed to continue, the peat becomes dry and oxidises, becoming unsuitable for restoration purposes.

Water quality – water pollution, air pollution, pesticide and nutrient enrichment

Bog vegetation requires nutrient poor and acidic conditions to flourish. Within the mosslands of Greater Manchester, the past exploitation of peatlands for extraction and agriculture has resulted in the disappearance of the peat domes and the construction of numerous deep drainage ditches and shallower in field drains. This not only allows water to escape the bog system but also allows nutrient rich waters to enter the habitat from adjacent land. Pollution, pesticides and fertiliser run off from both agricultural and industrial land reduces the viability of mosslands to be restored.

Air pollution may also have an adverse effect, although its effects are similar to reduced water levels and may therefore be underestimated. Mosslands are fed by rainfall, and high levels of sulphur, ammonia and nitrogen are still being recorded. Bisulphites have an inhibitory effect on some *Sphagnum* Mosses and high levels of nitrogen encourage the

spread of competitors such as purple moor grass. (JNCC)

Habitat isolation as a result of fragmentation of existing areas.

The last fragments of mossland habitat are becoming increasingly isolated and smaller. The remnant mosslands exist as stand alone islands, which characteristically stand higher than the surrounding land due to compaction of the peat deposits. The isolation of the mossland from the surrounding landscape leads to a deterioration in habitat quality. The increased hydrological gradient reduces the ability of the mossland habitat to retain sufficient water levels.

Twelve Yards Road *(GMEU)*

The characteristic species, which depend on mosslands, have themselves also become isolated and there are fewer habitats available. This increases the chance of local extinctions and the eventual loss of species from the region.

Historically, a range of different habitat types radiating out from the central core mossland area would have provided complimentary habitat. Such habitats would have included lag fen, marsh, open water, reedbeds and wet woodland. These associated habitats would have helped to maintain the wetness of the mossland and would have provided a protective buffer from adjacent land uses. These buffer habitats have in most cases now been lost, either to development are intensively drained agricultural lands.

A lack of appropriate characteristic species

The cutover nature of Manchester's mossland habitat has resulted in a reduction in the number of species available for colonisation of restored sites. A number of species such as the hummock forming *Sphagna* are necessary to obtain a sustainable and growing mossland habitat. The hummock formers such as *S. papillosum*, *S. capillifolium and S. magellanicum* tend to be in short supply within the region as a whole. Due to the mosses ability to retain water, mosslands supporting a greater

coverage of *Sphagna* are better able to maintain optimal water levels.

Global warming

The trend for hotter drier summers and the prediction for unpredictable weather patterns is cause for some concern. Bog vegetation grows best under a certain set of parameters. The ground should not be too dry nor should it be too wet. Optimal water levels for the growth of bog vegetation are at or just above ground level. Current options for re-wetting sites are to capture rainfall and maintain the levels at the desired height. This is dependant on summer rains replenishing the system. If these do not occur then the sites may well become too dry. Conversely the trend for heavy down pours of rain may also adversely affect the habitat as water levels may become too high very quickly.

Poor public perception

Despite mossland being a vital part of our region's heritage, they are hugely undervalued and suffer from poor public perception. Historically, there has been a lack of understanding, appreciation and interest in mossland habitat. Mosslands seem always to have been regarded as wasteland, areas either to be avoided or exploited. This has resulted in it being difficult to raise public opinion to safeguard and protect our mossland resource. Funding opportunities have also been restricted, as community interest is low.

Recreational pressures

There is little current recreation pressure on the mosslands of Greater Manchester. Much of the habitat is in private ownership and access to sites is limited. This may change if mosslands can be promoted as areas of valuable open green space. Mossland habitat and the species it supports are vulnerable to disturbance and will require protective measures.

Current actions

Policy

1. The importance of mossland habitat has been recognized within Bolton's, Salford's and Wigan's Unitary Development Plans, with specific policies protecting the mossland resource. The replacement of UDP's by the Local Development Framework is currently taking place across Local Planning Authorities. As part of this process, Salford has produced a Supplementary Planning Document for Biodiversity, specifically UK Priority Habitats, within which the importance of the mossland resource is highlighted. Both Bolton and Wigan have produced

mossland habitat action plans within their own local BAP's. The BAP process is supported with all 3 UDP's.

2. All planning applications that may have an adverse effect on mossland habitat and hydrology are now assessed fully. The approval to grant peat, sand and gravel extraction at Astley Moss East, although resulting in a loss of 1/3 of the site, has been used to bring into conservation management a large part of the site plus additional mossland habitat within the adjacent Botany Bay Wood.

3. Salford City Council and Wigan MBC have declared a number of air quality management areas, within which the air quality is measured and monitored.

4. Efforts to phase out the use of peat products by local authorities has had limited success. Of the 10 local authorities, only Salford and Manchester were able to able to say that they were peat free. The remainder implied that peat was still being used within local authority parks and that there was a resistance by Parks Departments to use peat free alternatives. Of the 10 local authorities within Greater Manchester only 4 (Manchester, Salford, Rochdale and Wigan) signed the Peatlands Protection Charter.

Site Safeguard

1. The recent revision of the Site of Biological Importance – selection guidelines has allowed the opportunity to strengthen the protection of remnant mossland habitat by including areas of lowland mossland on peat over 0.5m deep, which supports semi-natural vegetation on unmodified mossland soils as potential SBI's. Astley and Bedford Mosses is part of the Manchester Mossland Special Area of Conservation (SAC) receiving both British and European protection. Mossland habitat is listed in Annex 1 of the EC Habitats and Species Directive. COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 (European Habitats Directive), considers that raised bog still capable of supporting bog vegetation within 30 years should be considered as of European Importance.

2. A Mossland Group consisting of the Environment Agency, Natural England, the Lancashire Wildlife Trust, and the BAP Managers of Greater Manchester, Lancashire and Merseyside meet monthly to discuss and prioritise action on mossland sites. A report undertaken by one of the members of the group details the remaining 31-mossland sites within Greater Manchester, Lancashire and North Merseyside. The report describes the condition of the individual sites and the potential for restoration. The report identifies 14 sites within Greater Manchester that

support acid peat habitat and priority sites have been identified. As part of the Hydrological Plan for Astley and Bedford Moss, parcels of land surrounding the mossland sites that are considered as important for the restoration of the mossland habitat have been identified.

3. The Lancashire Wildlife Trust has been successful in funding 2 mossland officers, covering Lancashire, Greater Manchester and North Merseyside. It is envisaged that through landowner liaison, a landscape scale approach to mossland conservation can be delivered.

4. Work to provide suitable Nightjar habitat on Chat Moss has been limited. The restoration works undertaken by the Wildlife Trust on the 12ha mossland habitat at 12 Yards Road, may well contribute to the provision of some suitable habitat. However, large-scale habitat creation works will only be possible when the whole of the peat extraction site at 12 Yards Road ceases and the land comes available for appropriate management.

5. The Lancashire Wildlife Trust has included the acquisition of both mossland habitat and land adjacent to peatland areas as one of its main priorities and is included within its business plan. 4.3ha of land adjacent to the Astley Moss Reserve has already been purchased and further land is currently being identified.

6. The Environment Agency licences water abstraction and have developed Catchment Abstraction Management Strategies (CAMS) to help balance the needs of water-users, the environment, and aid the sustainable management of water resources on a catchment scale. Licences for abstractions are issued when the rate of abstraction is above 20m^3/day.

Under the licensing arrangements for abstraction, only impacts on designated sites are currently assessed. The Environment Agency also implement the Catchment Flood Management Plan (CFMP). This is a strategic planning tool through which the Agency seeks to work with other key decision-makers within a river catchment to identify and agree policies for sustainable flood risk management.

Land Management

1. Section 106 Agreements are attached to permissions to extract peat (Croxten's site) and peat, sand and gravels (Astley Moss East). The Astley Moss East agreement has guaranteed restoration works to be undertaken on 2/3 of the site. 16 ha of mossland adjacent to Botany Bay Wood will also be restored. Conditions attached to the Croxten's site are to provide recreational

opportunities including nature conservation, however, a proposal to extend the peat extraction for another 25 years and to take the peat down to 1 meter is currently being submitted.

Further negotiation will be required with landowners to ensure the maximum biodiversity gain. Currently the whole of the Little Woolden Moss is to be turned over to agriculture, with the loss of over 100ha of potential mossland/lagg fen habitat. The current assessment of the site is that there is between 0.5 to 1 meters of peat depth remaining.

2. A Management plan for the Lancashire Wildlife Trust Reserve at Astley Moss has been completed and the reserve has been entered into Environmental Stewardship. The Bedford Moss site is currently under the Reserves Enhancement Scheme, operated by Natural England. A further 10 ha at Astley Moss and 12 ha at 12 Yards Road (Croxten's site) are currently being restored, with a program of scrub removal, bunding and ditch blocking. The works undertaken on the Astley Moss reserve, have allowed Natural England to re-classify one of the compartments from Unfavourable Declining to Unfavourable Recovering.

Restoration works on Ince Moss, Wigan, have also been undertaken. Land lowering works adjacent to the moss, revealed 0.33 ha of underlying peat habitat. The new peat area has been bunded so that it is now isolated from outside hydrology and rewetted. The land lowering work at Ince Moss has also enhanced 4ha of reedbed, a complimentary habitat to mosslands.

3. Overall 28 ha of scrub/woodland have been cleared from the mossland sites, increasing the chances of successful restoration.

4. The Chat Moss Action Group has been formed, composed of stakeholders and environmental organisations. A vision document was commissioned by Red Rose Forest. The Vision document aims to secure a long-term vision for the mossland area and address the current fragmentation and decline of the landscape as a whole. The vision identifies operational zones so that a cohesive structure between the different land uses can be formed. Within the Vision, biodiversity and hydrological zones have been identified around the mossland sites to protect the hydrological integrity of the mossland habitat and provide complementary wetland habitat, enhancing the biodiversity of the area.

Salford City Council has commissioned a study within part of the Chat Moss area. The study aims to identify the necessary hydrological zone required to protect the interest of the mossland habitats.

Twelve Yards Road *(GMEU)*

5. A further mossland group, comprising, Natural England, the Environment Agency, the Lancashire Wildlife Trust and the 3 Biodiversity Managers from Manchester, Lancashire and Merseyside meets to discuss mossland management, acquisitions and the strategic long-term management of the mossland landscape across the 3 regions.

6. At Red Moss, the actions in the 2001 restoration plan have been completed. Of the 33ha within the restoration plan, approximately 80% of the land has now been re-wetted sufficiently for the growth of bog vegetation. Round-leaved Sundew has been recorded on the site for the first time since 1925. Sphag*num magellanicum* recorded in June 2007, was the first record for the vice county of South Lancashire.

Advisory

1. Red Moss has been used as an example of Best Practice. Within this mossland BAP review is a section on best practice guidance.

2. As part of the Wildlife Trust's mossland project, mossland talks have been undertaken in the schools within Wigan and surrounding Astley Moss, allowing a wider audience to be reached. The talks have promoted the importance of mossland habitat and their current vulnerability. This type of engagement has given the opportunity to promote the use of non-peat based products, thereby reducing the development pressures on the remaining mossland resource.

3. The funding and establishment of a mossland officer is central to the provision of advice to mossland owners and adjacent landowners. The Lancashire Wildlife Trust has been successful in funding 2 mossland officers for the next 2 years (March 2009-Apr 2011). It is envisaged that through landowner liaison, a landscape scale approach to mossland conservation can be delivered.

Research and Monitoring

1. A report was commissioned by the Environment Agency (Paul Thomas), detailing the State and extent of surviving acid mossland habitats within Lancashire, Greater Manchester and North Merseyside. The report describes and maps the condition of the individual sites and the potential for restoration. Restoration works on mossland habitats are inputted into BARS annually. As part of the Mossland Project, the Lancashire Wildlife Trust have been inputting into the BARS Countdown 2010 on biannual bases for the past 2 years.

2. Current research is building up new evidence on the role mosslands have in locking up carbon and thereby having a positive effect on climate change.

Communication and Publicity

Press releases and radio appearances have helped to publicise the importance of and threat to our mossland resource.

Objectives and targets

Objective	Target	Quantity	Target Date	Units
Maintaining extent	Maintain the extent of the existing Greater Manchester lowland raised mire resource.	167	2015	Ha
Maintaining extent	Ensure no further loss of peat deposits.	435	2015	Ha
Achieving Condition	Rehabilitate degraded bog habitat still capable of natural regeneration (in targeted areas) to bring most of the primary and secondary resource into or approaching favourable condition through appropriate management.	167	2020	Ha
Restore	Restore Lowland Raised Bog immediately on chosen areas of archaic peat to ensure a sustainable hydrological regime for adjacent extant habitat	100	2020	Ha

Proposed actions

1. Develop landscape approach to mossland conservation.

The Lancashire Wildlife Trust has now been able to fund 2 mossland officers for a 2-year period. The officers will lead the way forward in developing a landscape scale approach to mossland conservation. WT's, NE, GMBP, LA's. 2015

2. Ensure no future loss of our peatland resource through development and/or peat extraction.

No further peat extraction licences should be approved beyond the lifespan of the current extraction periods.

Review the designation of all deep peat sites, including bare peat habitats and designate as Sites of Biological Importance (SBI)

Liase with landowners of peat extraction sites and negotiate restoration of all peat extraction sites to mossland habitat. LA's, NE, EA, GMEU, WT's. 2011

3. Ensure that Water Abstraction adjacent to peatland sites have no adverse impact on the hydrology or the restoration of the habitat.

Plot all abstractions adjacent to peatland sites and investigate hydrological impacts.

Ensure that licences are granted to abstractions that do not impact on any area of important peatland habitat. Currently, only abstractions above 20m^3/day that may impact on designated mossland sites are currently licensed. Ensuring at the planning stage that developments needs for abstraction licenses are fully assessed could strengthen the protection of the water table. EA, SCC, WMBC, GMEU, LWT. Ongoing

4. Afforestation/scrub encroachments and the absence of targeted management for existing mossland habitat.

Target mossland sites and either bring the sites into the ownership of environmental organisations or aid landowners to bring the sites into appropriate management.

Management on mossland sites brought into conservation management will be aimed at controlling invading scrub/tree species, reducing water loss and controlling the water levels bringing the water table up to optimal levels for the growth of mossland vegetation. EA, NE, WT's, LA's, RRF, LBM. Ongoing

5. Habitat isolation as a result of fragmentation of existing areas, oxidation and compaction of peat deposits under agricultural management

Work closely with landowners adjacent to peatland areas to deliver a landscape scale mossland conservation vision. The development of mossland corridors will enable fragmented sites to be linked and reduce isolation. The development of complimentary wetland habitat adjacent to mossland sites will increase the sustainability of the core mossland habitat by aiding the retention of appropriate water levels. Working with landowners will ensure that operations undertaken on adjacent land will not damage the hydrological integrity of the mossland habitat. LA's, EA, NE, WT's, LBM, GMBP. 2015

6. Research the desirability of translocation of characteristic species into newly developed mossland sites

Many of the sphagnum species should be able to establish themselves naturally within the mossland areas. This should be monitored and the abundance of mosses assessed regularly. If then required donor sites should be sourced with the view to translocation of certain species if deemed necessary. WT's, LBM. Ongoing

7. Provide evidence and publicise Mosslands as an important Carbon Sink/ enhance public perception and opening up new avenues of funding for mossland conservation

The vital part peat deposits have in providing a carbon sink will be highlighted. The World's northern peatlands are its most important terrestrial carbon store; it is estimated that 20-30% of the global terrestrial carbon is held in 3% of its land area, i.e. in northern peatlands. Mosslands also have the ability to sequester carbon, if they are managed correctly. Wet mossland habitat that supports a good coverage of *Sphagnum* moss is therefore of significant environmental and economic importance. It is therefore vitally important to build up this new evidence base of the role mosslands have in locking up carbon thereby having a positive effect on climate change. The research will also enable new and initiative ways of funding the protection of the mossland resource. WT's, NE, LA's, EA, GMBP. Ongoing

8. Provide habitat within the mosslands suitable for breeding nightjar

Identify areas on the mossland where the raising of water levels would not be possible and encourage the development of drier habitats such as heathland to encourage the colonisation by Nightjar.

Within the mossland restoration areas, some sites will support higher drier habitat, which should also be managed for nightjar.

The former peat workings at Astley Moss East, Little Woolden Moss and Chat Moss should be targeted to restoring heathland habitat on the drier areas, which should then be brought into appropriate long-term management. WT's, LA's, GMBP, LBM. 2015

By working closely with landowners adjacent to peatland areas, a landscape scale mossland conservation vision can be delivered. The establishment of good quality heathland habitat, merging into wet heath and mire will greatly increase the amount of suitable habitat available for breeding Nightjar.

LEAD PARTNERS

EA	Environment Agency
GMBP	Greater Manchester Biodiversity Project
GMEU	Greater Manchester Ecology Unit
LA's	Local Authorities
LBM	Local Biodiversity Manager
NE	Natural England
RRF	Red Rose Forest
SCC	Salford City Council
WMBC	Wigan MBC
WT's	Wildlife Trusts

Best practice guidelines

Pristine mossland will require little or no management, but as there are no examples of pristine mossland habitat in the Northwest, it is vital that appropriate management is undertaken on the remaining mossland resource. The damage to our mossland resource has been caused mostly through peat extraction and/or conversion to agriculture. This has resulted in the loss of vegetation cover, a loss of the peat dome and a massive reduction in water levels due to the installation of ditches and drains. Re-vegetation can occurred, although many of the characteristic species may have been lost. The viability of the seeds of many of the bog species is greatly reduced after only a few years and is therefore difficult to re-establish. The management to restore mossland habitat needs to reverse the past damage. This usually involves raising the water table to a level suitable for the growth of bog species.

The main objective of mossland management is to achieve:

A range of mossland communities

Optimal water levels for mossland vegetation, especially sphagnum mosses, which will be suitable for a range of other associated species.

Prevention of serial scrub succession.

Development of mossland corridors.

Develop a range of small pools for aquatic plant species and Odonata etc.

Management of non-native weed species as required.

Control of disturbance and damage by human influence

It is critical to the successful restoration of mosslands to achieve the correct water levels. This is primarily achieved by the blocking of the drainage ditches.

Bund heightening to isolate peat compartments

Ditches can be blocked using a number of different materials, including peat plugs, plastic piling dams or marine ply dams. Usually a belt and braces approach is desirable and ply and plastic dams should be backed filled with peat to ensure a waterproof barrier. Advice should be sought from the Environment Agency, as consent may be required for any in channel structures.

The peat used to construct the dams should not be dry or too wet in consistency. If it were too dry, it would not provide a hydrological barrier. Too wet and it would be difficult to work with. Large vegetated turfs should also be avoided as these do not fit tightly together and provide access for water movement. Dams should be constructed so that water levels can rise to the best height to ensure the growth of bog vegetation, usually bringing the water levels to or just above the ground level.

In practice this is a matter of judgement, as mosslands are not an entirely flat environment. Some areas may become too wet, whilst others remain too dry. The position and number of dams will have to reflect this change in land levels. Collation of land level data will aid this process, providing information on the fall and rise of land throughout the site. Collation of waterflows will also be required to provide an accurate steer on the positioning of dams.

Bunding (raising land levels over a linear distance) works help to isolate the mossland from outside ground water influence and raise water levels. Again the land level and water flow data can be used to predict the best positioning of the bunds. The bunds have added advantage in that through the installation of pipes and right-angled bends, the level of water within the bunded areas

can be controlled. Water levels can therefore be manipulated and raised gradually as the colonisation process proceeds. The bund creation works also allows the creation of shallow scrape areas where bog vegetation can establish.

Plastic piling dams and peat plugs help raise the water table. Right-angled pipes can then be used to fine-tune the desired height.

When working peat to build bunds, the depth of the peat should first be assessed. Digging up too much peat may punch a hole in the peat mass and allow water to escape downwards. It is vital that enough ombrotrophic peat is present for successful restoration works. Surface vegetation should be skimmed off and the underlying peat used to create the bunds. Only the first 1-meter of peat should be removed. The skimmed surface vegetation should then be replaced after the peat has been removed. Mosslands have been shown to support populations of Water Vole and it may therefore be necessary to undertake vole surveys and mitigation works to ensure the protection of this species, if recorded.

Dipwells and staging boards can be installed to monitor water levels and how they respond to the restoration works. Fixed-point quadrates can be placed within the restoration area to assess the response of bog vegetation.

Impact of Invasive species

Particularly invasive species on mosslands are Downy Birch and Bracken. These can be managed through re-wetting of the mosslands, as well as, scrub clearance and herbicide spraying. Larger scrub and trees are removed from the mosslands, or used to block ditches, sometimes requiring specialised machinery to chip and remove.

Further information about control of invasive species can be found at:

Bracken control and management – Natural England

Bracken management in the uplands – RSPB

Bracken control, vegetation restoration and land management – Natural England

Links to relevant BAP's

Native Woodlands

Reedbeds & Bittern

Water voles

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Author

Martyn Walker
Conservation Officer for Greater Manchester
mwalker@lancswt.org.uk

Hedgerows

Estimates for the hedgerow extent in Greater Manchester is 3293 km, representing 0.6% of the total for England

Ecology

Hedgerows are an intrinsic part of the farmed landscape and provide shelter and food for many species of farmland birds, insects and mammals and also provide important corridors for wildlife movement across the landscape. The particular mix of shrub and tree species in a hedgerow, which reflects both the age of the hedgerow and local management customs, contributes to local landscape character distinctiveness.

Priority Habitat Description

Some hedgerows are protected under The Hedgerow Regulations 1997, some are Priority Habitats under the UK Biodiversity Action Plan and others are considered to be species rich. As a result of this there are several terms to describe different hedgerows and the different terminology used can be confusing. To try to alleviate this problem the following definitions are provided:

Important Hedgerows

Under the Hedgerow Regulations 1997 (http://www.opsi.gov.uk/si/si1997/19971160.htm) hedgerows are protected if they are classed as 'Important'. The legislation has several criteria for determining whether or not a hedgerow is Important. This includes the age of the hedge - if a hedgerow is over 30 years old it is classified as important.

Important hedgerows can also be classified in terms of their historical or archaeological merits, and also because of their wildlife value. This is related to the number of 'woody' species found in a hedge and other assemblages of mammals, plants, birds and invertebrate it supports. For example, a

hedgerow with 7 woody species would be classed as important, as would a hedgerow with 5 woody species and other features, such as, a ditch running along it, standard trees, gaps of less than 10% of the hedge length and a parallel hedge within 15m. Hedgerows supporting species, which are protected under the Wildlife and Countryside Act 1981 are also classed as Important. For more detailed information on the criteria the legislation should be consulted.

Priority Habitat and Favourable Condition

Under the UK Biodiversity Action Plan for Hedgerows (http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf), it describes this habitat as any boundary line of trees and shrubs over 20m long and less than 5m wide, where gaps are less than 20m wide. All hedgerows consisting predominantly (at least 80%) of woody species native to the UK, for example, hawthorn (*Crataegus monogyna*), holly (*Ilex aquifolium*), hazel (*Corylus avellana*) and dog rose (*Rosa canina agg*), are included within the priority habitat.

However within the Action Plan there are targets to gain or retain favourable condition of hedgerows. Favourable condition is measured by assessing 5 key attributes which are: the dimension of the hedge, the continuity, the height of the canopy base, the width of undisturbed ground cover at the base of the hedge and the presence or absence of introduced species.

Species Rich Hedgerows

Hedgerows are defined as species rich when the structural species making up a 30m segment include at least 5 (4 in Northern England) native woody species (Hedgerow Survey Handbook, DEFRA, 2007 http://www.defra.gov.uk/farm/environment/landscape/documents/hedgerow-survey-handbook.pdf). Climbing plants such as honeysuckle and brambles do not count towards this total, and currently there are no national criteria for incorporating the basal ground flora within this definition.

The Greater Manchester Hedgerows Action Plan has adopted the UK priority habitat description differing only in that they should consist of at least 80% cover of locally native species.

Key species include:

Tree Sparrow	*Passer montanus*
Grey Partridge	*Perdix perdix*
Barn Owl	*Tyto alba*
Song Thrush	*Turdus philomelos*
Yellow Hammer	*Emberiza citrinella*
Linnet	*Carduelis cannabina*
Great Crested Newt	*Triturus cristatus*
Brown Hare	*Lepus europaeus*
Bats	
Small mammals	

Current status and distribution

National

The 2007 UKBAP review has changed the name and expanded the scope of the priority habitat definition. The Ancient and/or species rich hedgerows BAP has been renamed *Hedgerows* and now covers all hedgerows that have 80% or more cover of any native trees or shrubs.

The Countryside Survey 2007 estimates that the extent of hedgerows in England is 402,000 km. It is estimated that 84% of agricultural hedgerows now qualify as a UK priority habitat.

Uptake statistics from the first 2 years of Environmental Stewardship across England show there are over 25,000 agreements, which include options for management of Hedgerows covering length of almost 200,000 km (figures based on options lists provided in Annex 1)

Local

The latest estimate for hedgerow extent in Greater Manchester is **3,293 km** this represents approximately 0.6% of the England total and 6.4% of the estimated extent for the North West region.

In Greater Manchester few hedgerows qualified as UK priority habitats under the ancient/species rich definition, two are known in Stockport and some in Trafford. However, even species-poor hedgerows provide important feeding, breeding and resting sites for a variety of birds, mammals and invertebrates.

Uptake statistics from the first 2 years of Environmental Stewardship in Greater Manchester show there are approximately 70 agreements, which include options for management of Hedgerows covering length of almost 247 km

Policy and legislation

Hedgerows are protected by the Hedgerows Regulations 1997. Under the regulations, it is against the law to remove or destroy certain hedgerows without permission from the local planning authority. However, very few hedgerows in Greater Manchester are protected under this.

EC Habitats and Species Directive require member states to encourage the management of hedges in their land use planning and development policies.

Under the Food and Environment Protection Act 1985 it is illegal to spray pesticides into hedge bases, unless there is a specific label recommendation, and illegal to use certain pesticides within 6m of watercourses and/or uncropped habitats.

Hedgerows

The Wildlife and Countryside Act 1981 (as amended) affords protection to some plant and animal species including birds. It is an offence to damage or destroy wild birds, their nests or egg. This is particularly relevant to field boundaries with regards to timing of cultivation, cutting or other management.

Under the Standards of Good Farming Practice land managers must not remove or destroy any hedges and must not trim hedgerows between 01 March and 31 July.

Factors affecting the habitat

Reduction in length of hedgerow through removal of field boundaries to create larger fields more suited to mechanised and intensive agriculture, and replacement of hedges by fences.

Poor hedgerow management either through neglect or excessively frequent or badly timed cutting. Hedgerows can sometimes be colonised by unsuitable species, which can lead to difficulties in management, resulting in the hedgerow becoming neglected.

Loss of hedgerow trees through senescence and felling, without encouraging replacements.

Ploughing/cultivation right up to the base of the field boundary.

Increased use and incorrect timing of the application of fertilisers, and the resulting run-off.

Spraying out hedge bases with herbicides and the increase use of herbicides and pesticides in general.

High stocking rates, which damage hedgerows.

Lack of understanding amongst general public and some land managers of appropriate management and concern over keeping field boundaries appearing 'tidy'.

Current actions

National

Under the Single Payment Scheme land managers are asked to demonstrate that they are maintaining their land in good agricultural and environmental condition. This is achieved through Cross Compliance, which provides a series of standards for environmental management on farms. There are two main elements, Statutory Management Requirements (SMRs) and Good agricultural and environmental condition (GAEC) standards.

Environmental Stewardship Higher Level Stewardship (HLS), Entry Level and Organic Entry Level Stewardship (ELS/OELS) include hedgerow management options.

In 2002 the UKBAP steering group published The Hedgerow Survey Handbook, a standard procedure for local surveys in the UK, a second edition was published in 2007.

The Farming and Wildlife Advisory Group offer advice regarding hedgerow maintenance. Advice for maintaining hedgerows for bird species is available on the Farm Hedges and their Management section of the RSPB website.

Local

Within Greater Manchester £25,000 was awarded from SITA for hedgerow surveys and management within Oldham. As part of this project 48 hedgerows were surveyed in 2006, 20 of which were considered species rich under the UK BAP criteria for the North, and 10 qualified as important under the 1997 Hedgerow Regulations. Approximately 400 metres were managed by under planting or coppicing as appropriate.

An extensive survey of Bolton's hedgerows was carried out in 2001, which highlighted important hedgerows, future priorities and management. The report can be viewed here - Bolton Hedgerow Survey 2001

Objectives and targets

Objective	Target	Quantity	Target Date
Maintain extent	Maintain current extent of hedgerows. This relates to all hedgerows consisting predominately of at least one native species.	2766 km	2015
	Maintain individual, isolated hedgerow trees. Identify isolated hedgerow trees and use appropriate management to protect them.	9637 trees	2015

Achieve favourable condition	Ensure that new hedgerow planting achieves the national average species richness. Increase the quality of the existing resource in terms of woody species-richness, where appropriate.	3.75 native woody species per 30m	2015
	Improve hedgerows that are in poor condition and bring them into favourable condition by restoring the structure and species diversity.	1,647 km	2015
	Establish the proportion of land managers that trim their hedgerows annually and aim to reduce this number. Reduce the number of hedgerows that are cut frequently.	Reduce by 40%, that are cut annually	2015
	Halt further decline in the condition of herbaceous hedgerow flora, and improve their condition. Maintain condition of the basal flora of hedgerows at or above the national average.	9.89 species	2015
Expansion	Increase the number of young trees by encouraging planting of specific hedgerow trees or identify saplings that can be left to grow into trees.	9900 trees	2015
	Increase the length of hedgerows.	20km	2015

Proposed actions

Site Safeguard

Seek to protect existing hedgerows through the Hedgerow Regulations and Cross Compliance (Medium Priority) LA's, NE. 2015

Consider designating important field boundary features as non-statutory wildlife sites (SBI). (Medium Priority) GMEU, LA's. 2015

Land Management

Encourage increased take-up of Environmental Stewardship options for management of hedgerows. (High Priority) NE, FWAG, GCT. Ongoing

Promote and encourage the planting and management of hedgerows where appropriate in ecological and landscape terms. (High Priority) NE, LA's. Ongoing

Advice

Promote favourable management of hedgerows by providing advice to landowners (High Priority) NE, FWAG, GCT, EA, RSPB. Ongoing

Future Research and Monitoring

Survey and map existing hedgerows and maintain information on GIS database. (High Priority) LA's, 2015

Develop coordinated system for reporting on delivery through Environmental Stewardship (High Priority) NE, LBM. 2015

Develop coordinated feedback from Local Planning Authorities enforcing the Hedgerow Regulations. (Medium Priority) GMEU, LA's, LBM. 2010

Communications and Publicity

Raise awareness amongst landowners and the public of the importance of field boundaries for wildlife. (Medium Priority) NE, EA, LA's. 2010

Resource Implications

The value under Environmental Stewardship of all options relevant to this plan is provided in Annex 1.

LEAD PARTNERS

EA	Environment Agency
FWAG	Farming and Wildlife Advisory Group
GCT	Game Conservancy Trust
GMEU	Greater Manchester Ecology Unit
LA's	Local Authorities
LBM	Local Biodiversity Manager
NE	Natural England

Best practice guidelines

Further information about hedgerow management can be found on the links below.

The Farming and Wildlife Advisory Group

Farm Hedges and Management (RSPB)

Natural England Guidance: Hedgerow Trees: answers to 18 common questions

Natural England Guidance: Hedge Cutting: answers to 18 common questions

Natural England Guidance: Hedgerow planting: answers to 18 common questions

Hedgelink – provides information about hedgerows, management and wildlife.

BTCV Hedging Handbook

Links to relevant BAP's

Farmland Birds

Great Crested Newt

Hares

References

Countryside Survey 2007

Hedgerow Survey Handbook 2nd Edition 2007

FWAG Technical Information Sheets: Hedgerow Management 2005

Authors

Rebecca Jackson-Pitt
Biodiversity Adviser, Natural England
Rebecca.Jackson-Pitt@naturalengland.org.uk

Emma Wilson
Nature Development Officer, Stockport
emma.wilson@stockport.gov.uk

Annex 1 – Environmental Stewardship Options relevant to Hedgerows in Greater Manchester (Extracted from Entry Level Stewardship Handbook, Organic Entry Level Stewardship Handbook and Higher Level Stewardship Handbook, Defra 2005)

Under ELS and OELS the landowner has to achieve a total of 30 points per ha for land entered into the agreement for which payment is made of £30 per ha per year. Thus one point equates to £1 per year. HLS payments are shown in pounds.

Entry Level and Organic Entry Level Stewardship Options

Code		Option	Units	Points	
ELS	OELS			ELS	OELS
EB1	OB1	Hedgerow management (on both sides of hedge)	100m	22	22
EB2	OB2	Hedgerow management (on one side of hedge)	100m	11	11
EB3	OB3	Enhanced hedgerow management	100m	42	42
EB8	OB8	Combined hedge and ditch management (incorporating OB1/EB1 hedge management)	100m	38	38
EB9	OB9	Combined hedge and ditch management (incorporating OB2/EB2 hedge management)	100m	26	26
EB10	OB10	Combined hedge and ditch management (incorporating OB3/EB3 hedge management)	100m	56	56

Higher Level Stewardship Options

Code	Option	Units	Payment
HB12	Maintenance of hedgerows of very high environmental value	100m	£27
HR	Hedgerow restoration including laying, coppicing and gapping up	m	£5
PH	Hedgerow planting – new hedges	m	£5

Grasslands

Grasslands are the most extensive semi-natural habitat type remaining in Greater Manchester.

Background

This plan for the conservation of important grassland habitats in Greater Manchester has resulted from a review of three separate Habitat Action Plans included in the current Biodiversity Action Plan for Greater Manchester, published in 2003. These Action Plans were for:

- Unimproved neutral grassland
- Acid grassland
- Marshy grassland

This new Habitat Action Plan has incorporated all these habitat types into one plan because, after review, it was considered that the threats and actions needed to conserve these grassland types were similar across Greater Manchester.

A fourth grassland category, **grassland of high ecological value on previously developed land**, has now been included in the plan because of the increased recognition of the value of this habitat type for biodiversity and because this grassland type is regarded as highly threatened.

Priority Habitat Descriptions

Species rich (unimproved) neutral grassland

Neutral grasslands are found on moist mineral soils with a pH of between 5 and 6.5. They do not normally occur on soils, which combine extremes of acidity or alkalinity with extremes of wetness or dryness.

Grasslands

The majority of the neutral grassland found in the UK is now species-poor "improved" grassland that has been modified by extensive use of fertilisers, reseeding and drainage. Therefore the most species-rich grasslands of the highest conservation value are often referred to as 'unimproved' grasslands.

Unimproved neutral grassland is often found in enclosed lowland landscapes managed either as pastures, which are grazed for all or part of the year, or meadows which are usually grazed for part of the year but are "shut up" (stock excluded) in late spring to allow the grass to grow prior to the mowing of a hay crop in early or mid summer.

In the UK National biodiversity action plan the habitat type is called 'lowland meadow' or 'upland hay meadow'. However, in Greater Manchester many areas of species-rich neutral grassland are found outside of agricultural landscapes, arising either because the grassland is a fragment of original grassland (pre-agricultural improvement) remaining after built development removed the surrounding land from agricultural use, or because improved top-soil layers have been removed or inverted to expose nutrient poor sub-soils which have then colonised naturally.

In Greater Manchester, the most extensive areas of non-agricultural species-rich neutral grassland are found along road verges. Recreational sites and churchyards are also common locations for this habitat type in Greater Manchester. The term 'meadow' is therefore regarded as misleading and in not used in this Plan, although it is recognised that the best sites are still to be found within the farmed landscape.

In Greater Manchester the majority of species-rich neutral grasslands will equate to NVC community MG5. However, the relative lack of high quality neutral grasslands in Greater Manchester means those sites that are 'recovering' from improvement or that receive low levels of agricultural input may qualify as the GM priority habitat type.

Some plant species that could be used as 'indicator species' for the habitat type are:

Dyers greenweed	*Genista tinctoria*
Adder's-tongue fern	*Ophioglossum*
Meadow saxifrage	*Saxifraga granulata*
Hay Rattle	*Rhinanthus minor*
Devil's-bit	*Succisa pratensis*
Betony	*Stachys officinalis*
Great Burnet	*Sanguisorba officinalis*
Greater burnet-Saxifrage	*Pimpinella major*
Birds Foot Trefoil	*Lotus corniculatus*
Cuckoo Flower	*Cardamine pratensis*
Oval Sedge	*Carex ovalis*

But the presence of single plant specimens, or low numbers of plants of a single species, should not necessarily be taken to define the grassland as the priority habitat type.

Species rich grasslands may also support particular fauna, such as certain ground nesting birds (e.g. skylark, grey partridge), invertebrates (common blue butterfly, large and small skipper) and mammals (field voles, brown hares).

Acid grassland

Acid grasslands usually occur on nutrient poor soils over acidic rocks such as sandstone, acid igneous rocks and superficial deposits, for instance sand and gravel. Acid grassland is found in both upland and lowland areas.

The GM habitat type covers both lowland dry acid grassland, a UKBAP priority habitat, which is largely restricted to land below 300m, and upland acid grassland. The broad habitat type can be defined using the NVC and include the communities:

U1	*Festuca ovina-Agrostis capillaries-Rumex acetosella* grassland
U2	*Deschampsia flexuosa* grassland
U4	*Fesuca ovina – Agrostis capillaries – gallium saxatile* grassland

Lowland (dry) acid grassland occurs on free draining soils and typically comprises plant communities characterised by wavy hair-grass, fescues and bent grasses, sheep's sorrel, devil's-bit scabious, heath bedstraw and tormentil. Lowland dry acid grassland commonly forms mosaics with other semi-natural habitats including lowland heathland (another UK Priority Habitat) increasing its biodiversity value through these associations.

Holcombe Moor, Bury

Large expanses of acid grassland, uniform in character, also occur in the uplands. These sites often support a limited range of plant species, a result of past management practices. Upland acid grasslands can arise following the loss of heathland or blanket bog communities through over-grazing or drainage. Although many types of upland acid grassland habitat can be inherently species-poor in terms of their flora, they can make a substantial contribution to the nature conservation interest of moorland,

supporting upland birds such as curlew, golden plover, twite, ring ouzel and skylark.

Typical plant species of upland acid grassland include:

Purple moor-grass	*Molinia caerulea*
Sheep's fescue	*Festuca ovina*
Wavy hair-grass	*Deschampsia flexuosa*
Common bent	*Agrostis capillaris*
Mat grass	*Nardus stricta*
Tormentil	*Potentilla erecta*
Heath bedstraw	*Galium saxatile*

Marshy grassland

Marshy grassland occurs on more or less level areas rather than on the banks of watercourses. It is generally found on permanently damp soils or land with impeded drainage.

In Greater Manchester marshy grasslands are often found outside of agricultural landscapes in areas that have fallen out of agricultural use or in areas where the ground has been greatly disturbed, for example on very compacted soils or on areas of restored or reinstated land (e.g. old tip and colliery sites). Marshy grasslands are sometimes used for light grazing, particularly in the uplands but in Greater Manchester more often than not they are unused and unmanaged.

For the purposes of this plan this habitat type covers upland and lowland marsh/marshy grassland including:

- Certain purple-moor grasslands, including the UKBAP priority habitat type 'purple moor grass and rush pastures'
- Grasslands with high proportions/diversity of rush, and sedge species
- Wet meadows and pastures supporting communities of species such as meadowsweet, marsh marigold or valerian species where herbs rather than grasses predominate.

Many areas of marshy grassland are relatively species poor and may not be said to properly constitute the priority habitat type. These species-poor examples are often dominated by stands of a few dominant species such as reed canary grass or soft rush. Marshy grassland can also sometimes be characterised by significant orchid communities, including marsh orchids.

Notable fauna includes valuable invertebrate communities such as, hoverflies, crane flies and soldier flies. Because they sometimes support large invertebrate communities marshy grassland can be valuable feeding habitats for bats.

Grasslands of high ecological value on areas of previously developed land

This habitat category is included as a priority habitat for conservation because it is a habitat that is known to support important populations of invertebrates (including beetles, bees and spiders), often in unique assemblages.

Most grasslands of high ecological value on previously developed land are **primary successions**, and as such are unusual in the British landscape. They usually occur on urban Brownfield sites, which can be found across Greater Manchester, and are severely threatened by the pressure to redevelop such sites for built developments.

The broad habitat type includes some very early successional stage plant communities ('pioneer' communities) on skeletal substrates, but most will comprise open grasslands with many varied flowering plants and herbs, areas of bare ground and often a little scrub, which can persist for decades with limited management on substrates whose edaphic conditions severely limit plant growth and lead to arrested successions.

Examples are substrates with extreme pH, whether alkaline (e.g. lime) or acid (e.g. colliery spoils), substrates deficient in nitrogen (e.g. Pulverised Fuel Ash) or in available phosphate (e.g. calcareous quarry spoil), or water-deficient (e.g. dry gravel and sand pits).

Grasslands fitting this priority type cannot be properly defined using botanical criteria alone. For formal selection as the priority habitat type, surveys of invertebrates will likely be required.

Colliery Spoil

Current status and distribution

Species rich (unimproved) neutral grassland

It is estimated that there is some 250 ha of species-rich unimproved neutral grassland remaining in Greater Manchester (not all of this will meet the definition of the priority habitat type). The majority of the species-rich examples lie within designated Sites of Biological Importance in Trafford, Oldham, Stockport, Tameside, Bury and Manchester.

Unimproved upland hay meadows and lowland meadows are listed on Annex I of the EC Habitats and Species Directive and are both UK Priority habitats.

Acid grassland

Given current data sources it is not readily possible to distinguish between upland and lowland acid grassland distributions. Overall there are known to be 4,600ha of acid grassland in Greater Manchester. This mostly comprises upland acid grassland in Oldham and Rochdale. Lowland acid grassland is increasingly rare and examples of this habitat type more than 0.2ha in extent should be regarded as important.

Marshy grassland

There are estimated to be 266 ha of marshy grassland in greater Manchester, but most of this figure represents marshy grassland in upland areas of Rochdale. In other lowland areas the resource is very fragmented and occurs generally in small fragments (less than 0.5ha). Currently there is no legal protection for this habitat type, except where it occurs within designated sites.

Grasslands of high ecological value on areas of previously developed land

There is direct comparison with the UK Priority Habitat 'Open Mosaic Habitats on Previously Developed Land'. Current extent within Greater Manchester is unknown at present.

Nob End, Bolton

Factors affecting the habitat

It is important to recognise the threats to grasslands if actions for conservation are to be properly informed and targeted. In Greater Manchester the main causes of decline and species impoverishment of grasslands are considered to be:

Pressure from built development. This pressure can be direct in terms of habitat that is built over, and indirect from:

- Intensification of management of grassland adjacent or close to new development
- Abandonment of grassland formerly in agricultural management

- Changes to hydrology caused by changes in drainage regimes
- Fragmentation of remaining grassland
- Disturbance and vandalism, created by urban fringe pressures

Grassland 'improvement' caused by intensification of agricultural management, or changes in agricultural practice.

Changes to agricultural management, particularly the abandonment of small-scale livestock farming leading to either no management (particularly true of upland grassland in Greater Manchester) or changes in land use, particularly replacement of managed grazing with unmanaged horse grazing or abandonment of grazing altogether.

Invasive species are a major problem, particularly Himalayan Balsam on marshy grassland.

Poorly considered tree planting and landscaping schemes.

Unmanaged grasslands are often seen as 'untidy' habitats in urban and suburban areas and there is a tendency to 'tidy' them by introducing more intensive management (generally mowing or planting single-species stands such as daffodils).

National Planning Policy encouraging the re-use of previously developed land and avoidance of building on 'greenfield' sites. Whilst this policy can sometimes lead to losses of important grassland that has established on previously developed land other grassland types, and particularly species-rich neutral grassland, can be protected from inappropriate development by the operation of this policy.

Advances in research into how best to restore or recreate species-rich grasslands.

Development

There is a great deal of built development on-going and planned for Greater Manchester. Although this presents some threats to valuable grassland habitats it also presents opportunities for levering funds into grassland conservation and for creating new species-rich grasslands.

Water abstraction can affect wet grasslands causing sites to dry out.

Current actions

1. Selection of the most ecologically valuable areas of grassland as Sites of Biological Importance (SBI's) in Greater Manchester.

This is the most effective method of protecting grassland sites from the threat arising from built development. All ten-district authorities of Greater Manchester have policies in action plans protecting SBI's. Although many areas of species-rich grassland have been selected as SBI's, the criteria for selecting SBI's in Greater Manchester have recently been comprehensively updated to ensure that the best examples of species-rich grassland can be selected as SBI's.

Elton Goyt SBI, Bury

2. Provision of grassland management advice to landowners and managers.

Even grassland sites that have been given a degree of protection through the SBI system will need to be properly managed if they are to retain their biodiversity value. Although there is now a wealth of information available concerning best practice management and creation of grasslands for biodiversity, Greater Manchester has no mechanism in place for disseminating this information to land managers.

3. Provision of policy incentives for grassland owners, managers and developers to conserve, improve and recreate species-rich grassland.

Certain districts of Greater Manchester already give credit to developers aiming to create sustainable developments. For example, Manchester City Council favours developments that achieve high ratings for sustainability. Maintaining, restoring and creating biodiverse habitats contributes to the sustainability of a development, and diverse grasslands can be created as part of built developments relatively easily.

4. Provide financial incentives for grassland owners, managers and developers to conserve, improve and recreate species-rich grassland.

Financial incentives are available for landowners and managers through the Environmental Stewardship schemes operated by Natural England. However, urban areas are sometimes given less attention than rural areas by Environmental

Stewardship Officers, despite there being many valuable habitats in urban areas.

5. Encourage landscape designers and developers to develop new areas of species-rich grassland.

Work undertaken by the wildflower charity Landlife has been invaluable in creating demonstration wildflower grasslands in urban areas similar to areas of greater Manchester.

Objectives and targets

All target dates are 2015. Targets have been arrived at by analysis of habitat survey data held by the Greater Manchester Ecology Unit and by knowledge of precedent for habitat improvement projects in Greater Manchester.

Habitat type	Target type	GM target (ha)
Species rich neutral grassland	Maintain current extent of priority habitat	250
	Maintain current extent of priority habitat in favourable condition	250
	Restore semi-improved neutral grassland to meet priority habitat type definition	20
	Create new species-rich grassland	10
Acid grassland	Maintain current extent of priority habitat	310
	Maintain current extent of priority habitat in favourable condition	310
	Restore degraded acid grassland to meet priority habitat type definition	25

Marshy grassland	Maintain current extent of priority habitat	266
	Maintain current extent of priority habitat in favourable condition	266
	Restore degraded marshy grassland	35
	Create new areas of marshy grassland	20
Grasslands of high ecological value on previously developed land	Maintain current extent of priority habitat	Awaits audit
	Maintain current extent of priority habitat	Awaits audit
	Restore degraded grassland of high ecological value on previously developed land	3
	Create new areas of high ecological value on previously developed land	4

Proposed actions

Using the updated definitions in this plan and the new SBI selection guidelines, carry out new field surveys to identify the most ecologically valuable grasslands sites and select them as SBI's. GMEU. 2010

Collate existing information and prepare new information concerning best practice management, restoration and creation of species-rich grassland for inclusion in this plan. Appoint a Project Officer to work with landowners, land managers and developers to disseminate best practice advice and guidance for grassland management. It would be useful to identify sites where best practice management of grasslands for biodiversity is being implemented to offer as demonstration areas. GMEU, GMBP, WT's, NE, DEFRA, UU. 2010

Update guidance to developers on incorporating biodiverse grasslands into new developments and update nature conservation policies in land-use management plans to give protection to species-rich grasslands. GMEU, GMBP, LA's, FWAG, NE, UU. 2011

Have Higher Level Environmental Stewardship Officers target agreements on species-rich grassland conservation measures in Greater Manchester. NE, FWAG, GMBP, LA's. 2015

For wet/marshy grassland promote strategic, integrated flood defence planning in catchments and ensure that biodiversity targets are incorporated into flood defence planning. EA. Ongoing

Lead Partners

DEFRA	Department for Environment Food & Rural Affairs
EA	Environment Agency
FWAG	Farming and Wildlife Advisory Group
GMEU	Greater Manchester Ecology Unit
GMBP	Greater Manchester Biodiversity Project
LA's	Local Authorities
NE	Natural England
UU	United utilities
WT's	Wildlife Trusts

Best practice guidelines

How to manage and restore important grasslands – some pointers and case studies.

Species rich unimproved neutral and acid grassland

For existing good areas, continue the current or recent management regime (its working). For some sites on very poor soils or with rabbit grazing this may mean doing nothing except control scrub.

For degraded areas on unimproved or semi-improved soils, try introducing a mowing regime. Mowing once in early spring and again once or twice in late summer should be sufficient. Arisings will need to be removed.

Change an existing grazing regime or introduce an appropriate grazing regime

If species rich grassland is to be introduced on degraded or nutrient-improved areas more drastic management options may need to be considered, including inversion ploughing, top soil stripping and re-seeding.

For advice on techniques Landlife, the national wildflower charity based at Court Hey Park on Merseyside, have prepared a number of best practice publications on species-rich grassland creation. At their base at Court Hey Park there are a number of demonstration plots. Landlife can be contacted at www.landlife.org.uk.

SPECIES CONSIDERED APPROPRIATE FOR INCLUDING IN NEUTRAL GRASSLAND SOWING IN GREATER MANCHESTER

HERBS

Yarrow	*Achillea millefolium*
Common knapweed	*Centaurea nigra*
Common cat's-ear	*Hypochoeris radicata*
Meadow vetchling	*Lathyrus pratensis*
Autumnal hawkbit	*Leontodon autumnalis*
Rough hawkbit	*Leontodon hispidus*
Ox-eye daisy	*Leucanthemum vulgare*
Common bird's-foot trefoil	*Lotus corniculatus*
Ribwort plantain	*Plantago lanceolata*
Selfheal	*Prunella vulgaris*
Meadow buttercup	*Ranunculus acris*
Common sorrel	*Rumex acetosa*

GRASSES

Common bent	*Agrostis capillaris*
Creeping bent	*Agrostis stolonifera*
Sweet vernal grass	*Anthoxanthum odoratum*
Crested dog's-tail	*Cynosurus cristatus*
Red fescue	*Festuca rubra*
Smooth meadow grass	*Poa pratensis*
Rough meadow grass	*Poa trivalis*

Herb species should only make up 20% of the seed mix; the remaining 80% should be appropriate grass species.

Native species should always be used, from UK sources and ideally from the North West.

Agricultural varieties and cultivars of legumes should be avoided.

Sow on low fertility soil or sub-soil.

Marshy grassland

The keys to wet grassland conservation are **keeping the area wet** and **preventing succession to scrub.** Because these management techniques can sometimes be difficult to sustain in the long term the options for creating new areas of wet grassland should be considered, particularly in relation to Sustainable Urban Drainage Schemes (SUDS).

Further information about wet grasslands can be found here:

'European Wet grassland – Guidelines for Management and Restoration (RSPB 1999)

Wet Grassland Information – RSPB

Species rich grassland on post-industrial sites

Since these sites are very difficult to recreate (they have normally arisen through neglect or serendipity and can often be on unique,

difficult to recreate substrate types) conservation of these areas will likely depend on protection and management of existing important areas. Management will probably rely on control of scrub encroachment. Because these sites can often support good invertebrate biodiversity advice on management for invertebrates can be obtained from Buglife.

CASE STUDY

Nob End SSSI/ Local Nature Reserve

Nob End in Bolton is a SSSI and was designated a Local Nature Reserve (LNR) in 2000. Bolton Countryside Service manages the Nature Reserve. The site is situated in the southeast of Bolton within an urban fringe area along the River Irwell, covering an area of 8.8 hectares. Nob End is a unique site for wildlife, as its substrate comprises regenerated industrial waste with extremely high ph alkali deposits from the Leblanc process, which has created a unique environment rich in flora, such as Bloomrape and many types of Orchid, Twayblade, Blue fleabane and Carline thistle. The current management aims are to maintain and enhance the important grassland habitats including, scrub clearance and the removal of invasive species. The site is also important to the local people for informal recreation.

Links to relevant BAP's

Bats
Brown Hare
Farmland Birds
Great Crested Newt
Lowland Mosslands
Ponds & Lodges
Twite
Uplands

References

European Wet Grasslands; guidelines for management and restoration RSPB 1999

Wildflowers Work; a guide to creating and managing wildflower landscapes Landlife (National Wildflower Charity)

Habitat Creation and Repair Penny Anderson and Oliver Gilbert Oxford University Press 1998

All of a Buzz in the Thames Gateway; a Buglife project on the assessment of the invertebrate value of brownfield sites www.buglife.org.uk

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Principal Author

Derek Richardson
Principal Ecologist, Greater Manchester Ecology Unit
Derek.Richardson@tameside.gov.uk

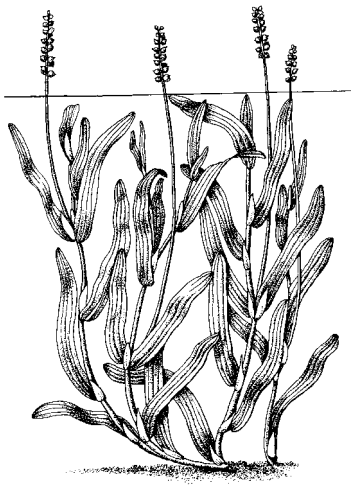
CANALS

DEFINITION

Canals are inland waterways constructed to meet the transport needs of the Industrial Revolution in the 18th and 19th centuries. At the time when canals were built, they were of a similar importance and influence to our modern day motorways. Today, many aspects of canals such as water filled channels, cuttings, embankments and bridges have an important role to play in the conservation of both biodiversity and landscapes. Many canals differ from natural watercourses because of their range of habitats, as well as their controlled levels and slow flows, although not all canals are now in use for boat traffic. The canal corridor forms a linear mosaic of habitats including woodland and scrub offsides, hedgerows, flower rich towpath verges and diverse emergent 'reed' fringes. The corridor helps link habitats fragmented by urbanisation and uniquely forms a wetland corridor between river catchments.

NOTABLE SPECIES

Floating water plantain
Grasswrack pondweed
Frogbit
Whorled water milfoil
Fringed water lily
American pondweed
Flat stalked pondweed
Hair-like pondweed
Long stalked pondweed
Black spleenwort
Rusty back fern
Water soldier
Greater duckweed
Kingfisher
Bats
Water vole
Freshwater sponge
White clawed crayfish



CURRENT STATUS AND IMPORTANCE

International

The Rochdale Canal has been designated as a candidate Special Area of Conservation (cSAC) due to the occurrence of internationally significant populations of floating water plantain *Luronium natans.*

National

There are approximately 4000 miles of canals in the UK.

In UK Biodiversity Action Plan terms, canals are included within the broad habitat of Standing Open Waters and Canals; within this category they are recognised as an individual habitat type.

CANALS

There are presently three canals of national importance in Greater Manchester; Hollinwood Branch Canal SSSI, Huddersfield Narrow Canal SSSI and Rochdale Canal SSSI. All three are part of a national network of designated areas.

Continued overleaf

Identification of Species Interest of Greater Manchester's Canals

	Rochdale	Huddersfield Narrow	Hollinwood Branch	Peak Forest	Ashton	Manchester Bolton & Bury	Leeds Liverpool	Bridgewater	Fairbottom Branch
	cSAC, SSSI, SBI(A)	SSSI, SBI(A)	SSSI, SBI(A)	SBI(A)	SBI(A)	SBI(A)	SBI(C)	SBI(B & C)	SBI(B)
Floating Water plantain	•<	•<	•<	•<	•<			•<	•<
Grasswrack pondweed	•<	•<			•<				
Tortula freibergii (a moss)								•<	
Frogbit			•<			•<			
Fringed water lily	•<								
Alternate-leaved Water milfoil	•<								
American pondweed	•<								
Flat stalked pondweed		•<							
Hair-like pondweed		•<	•<		•<			•<	
Long stalked pondweed		•<	•<						
Red pondweed	•<		•?					•<	
Slender pondweed (*P. berchtoldii*)	•<		•<		•<				
Rigid hornwort			•<						•<
Water soldier	•<		•<			•<			
Water violet	•<	•<			•<				
Kingfisher		•<			•?		•<		
Bats	•<	•<	•<	•<	•<	•<	•<	•<	•<
Water vole	•<								
White clawed crayfish	•<	•<							
Freshwater sponge	•<	•<				•<			

CANALS

Greater Manchester Resource and Distribution

Thanks to its industrial heritage, Greater Manchester has a rich resource of canals. There are ten canals in total. These range from actively used canals such as the Leeds/Liverpool and the Ashton Canal to currently disused examples such as the Huddersfield Narrow Canal (now restored and navigable) and the Rochdale Canal. There are proposals to reopen the majority of canals for navigation and active restoration is in progress.

Legal

The following sites receive a degree of protection as SSSIs:

Hollinwood Branch Canal SSSI
Huddersfield Narrow Canal SSSI.
Rochdale Canal SSSI

The Rochdale Canal is also a candidate SAC as designated under the Conservation (Natural Habitats, etc.) Regulations 1994.

The native White-clawed Crayfish *Austropotmobius pallipes* is protected under The Conservation (Natural Habitats &c.) Regulations 1994 and The Wildlife & Countryside Act 1981 (as amended).

Nationally the water vole is given a degree of protection in British law under the Wildlife and Countryside Act of 1981. The protection relates to intentional activities that damage or destroy water vole habitat, or obstruct access to any place that the species uses for shelter or protection. The legislation also covers intentional disturbance of water voles whilst they are using their habitats.

Floating water plantain is listed on Annexes II & IV of the EC Habitat Directive and Appendix I of the Bern Convention. In Britain it is protected under Schedule 4 of the Conservation (Natural Habitats, etc.) Regulations 1994 and Schedule 8 of the Wildlife and Countryside Act 1981 (as amended).

The EC Water Framework Directive (2000) encompasses canals and other still waters. This aims to prevent further deterioration of waterbodies and protect such ecosystems. The Environment Agency plans to commence implementing the Directive from 2003 onwards. The initial deadline for meeting the Environmental Objectives is the end of 2016.

CURRENT FACTORS AFFECTING THE HABITAT

International

The presence of internationally important species such as floating water plantain and the potential designation of Rochdale Canal as a SAC.

National

Positive factors	Negative factors
Restoration and reconnection of the canal system throughout England, Wales and Scotland.	Large scale developments such as marinas.
Development of conservation guidelines by British Waterways and the Environment Agency.	Development of plant succession where lack of disturbance is a factor; this has led to the loss of open water and associated species in some localities.
Presence of nationally important protected species such as bats.	Growth and management of native invasive species such as Greater reedmace.
Commitments made by bodies such as British Waterways and the Environment Agency with regard to conservation of BAP species that may utilise canals e.g. freshwater crayfish and water vole.	Boating use leading to damage to aquatic and emergent vegetation through wash. Impacts upon other aquatic life and water quality through fuel oil and effluent from boats.
	Fluctuation of water levels from maintenance activities and boat usage (improper use of locks leading to the dewatering of pounds).
	Pollution from adjacent agricultural and industrial sources.
	Angling usage, leading to introduction of fish species, artificially high densities of fish and clearance of bankside vegetation. Local eutrophication is also a problem.
	Management of towpath habitats such as mowing of vegetation.
	Developments adjacent to Canal sites where precautions to protect the site are not taken

Greater Manchester

In addition to the above factors affecting canals, those listed below are particularly relevant to the Greater Manchester area. The negative factors are those that are thought to contribute to the decline of biodiversity interest associated with canals. The positive factors are those measures that may already be assisting in biodiversity conservation:

CANALS

Positive factors	Negative factors
All British Waterways' work is subject to an Environmental Code of Practice Appraisal designed to highlight the broad range of environmental issues associated with British Waterways' work. Examples of how this has helped maintain conservation interest of the canal corridor include the assessment of bank protection schemes resulting in the use of soft engineering solutions with coir rolls and native UK provenance planting instead of sheet piles. This was undertaken on the Huddersfield Narrow Canal near Division Bridge and throughout restoration work on the Rochdale Canal.	Most of the factors in the national list are relevant for Greater Manchester, in particular: The work and proposals to reopen a number of the canals to navigation pose a major threat to their wildlife interest unless the work is undertaken sympathetically. A number of colonies of freshwater sponge have already been lost due to such work. The aquatic vegetation in the heavily used Leeds Liverpool Canal is much less diverse than that in the canals currently largely unused although parts of the Rochdale Canal exhibits a less diverse flora where it is dominated by floating water plantain.
Impacts as a result of the activities of local canal societies, e.g. Manchester, Bolton and Bury Canal Society: small-scale management of vegetation, increased awareness through interpretation (guided walks, boat trips, publishing of guides).	Natural vegetation succession can result in a loss of scarce plant populations.
All restoration works considered to have "likely significant effect" on the Rochdale Canal are subject to Appropriate Assessments and English Nature assent as required under EU and UK legislation. British Waterways, English Nature and GMEU worked in partnership to deliver this work on the Rochdale Canal restoration.	Canal dredging creates problems of spoil disposal that can impact on adjacent waterside habitats. Dredging can also result in the loss of aquatic vegetation and invertebrates.
In addition to British Waterways' Environmental Code of Practice Appraisal process, all development work affecting floating water plantain requires a DEFRA licence. British Waterways has developed standard impact avoidance measures and translocation methods and has a licence from DEFRA that ensures that issues concerning floating water plantain and other species are addressed during operational activities.	Recreational pressures such as fishing can cause damage to marginal vegetation.
Any other activities (monitoring, research, etc) affecting the species is subject to a license from English Nature.	Invasion by non-native species such as *Crassula helmsii* and Himalayan balsam can swamp aquatic plants or result in the decrease of diversity of marginal vegetation.
	Development of the M60 motorway; this has affected the Hollinwood Branch Canal SSSI in particular.

LONG TERM TRENDS AND POTENTIAL THREATS

Water shortages on the Huddersfield Narrow Canal have been identified in a recent report by Dr Chris Newbold to be one of the largest issues to address to maintain and enhance current biodiversity. British Waterways is undertaking repairs to the feeder from Diggle Reservoir to enable increased flow from this traditionally used feeder.

CURRENT ACTION

International

- Designation of SACs as part of the Natura 2000 series of sites. The Rochdale Canal is a candidate SAC because of the presence of internationally significant populations of floating water plantain. The SSSI/cSAC is in favourable condition.

- All work considered to result in "likely significant effect" on the Rochdale Canal is subject to Appropriate Assessment.

- The Environment Agency as competent authority are currently in the process of reviewing every licence, authorisation, consent and activity permitted by them and will be appropriately assessing any activities determined to have the potential to adversely affect the Rochdale Canal.

National

- English Nature is in the process of developing detailed conservation objectives and assessment guidelines for all SSSIs. These guidelines will enable more accurate monitoring of the condition of SSSIs, including habitats such as canals.

- British Waterways has a corporate commitment to Biodiversity Action Planning. This is reflected in its role as lead Partner in the writing of the UK BAP for both floating water plantain and Grasswrack Pondweed.

- British Waterways' document "*A Framework for waterway wildlife strategies*" highlights the key habitats and species of biodiversity interest within the waterway network. This document together with the accompanying "*Biodiversity Manual*" sets out British Waterway's national biodiversity framework. Following on from this initiative waterway management teams will develop biodiversity action plans and incorporate biodiversity considerations into the management of canals and associated habitats.

Greater Manchester

Research Relevant to British Waterways policy.

The Rochdale canal monitoring of key aquatic species programme is up and running and involves an annual survey of each kilometre of the Rochdale canal or each lock pound where less than 1 km. Water quality data is being collected at eleven sites along the canal in order to establish and monitor the requirements of key aquatic species in relation to water quality.

CANALS

British Waterways Locally

- All British Waterways' work is subject to an Environmental Code of Practice Appraisal designed to highlight the broad range of environmental issues associated with British Waterways' work. Where major engineering works are planned each scheme has an assessment made of the ecological impacts. Methods of avoiding or minimising and ameliorating adverse impacts are identified and specified in the contract documentation.

- A waterway BAP is being prepared in Greater Manchester to highlight the special interest features along the canal and provide management regimes to ensure that the conservation interest is maintained and furthered. This is already underway on the Huddersfield Narrow Canal with grass cutting regimes agreed with English Nature that aim to maintain the diversity of the towpath bank and boundary verges.

- An Ecologist is employed by British Waterways who considers impacts on restoration of the canal in Greater Manchester.

- The possibilities of restoring the Manchester, Bolton & Bury Canal are currently being investigated.

- British Waterways has agreed grass cutting regimes with English Nature for the SSSI section of the Huddersfield Narrow Canal. This involves regular cutting at one mower width either side of the trodden surface with a clear cut from the boundary to the wash wall in late summer. This allows a clear safe path with verges for wild flowers with an annual clear cut preventing encroachment of scrub. This method is being adopted elsewhere on the SPR Waterway.

OBJECTIVES

National

There is presently no national BAP for canals, however, British Waterways has published and launched "*British Waterways and Biodiversity: A framework for waterway wildlife strategies*" covering the varied habitats and species associated with waterway corridors, as well as British Waterways' wider estate including tunnel spoil heaps, reservoirs and reservoir feeders.

Greater Manchester

In Greater Manchester local aspirations have been translated into the following broad objectives:

Objective	Targets
Maintain current canal habitat and prevent further losses and fragmentation	No further loss of canal habitat. Introduce appropriate management regimes and prepare management plans for all canal sites by 2010.
Achieve favourable condition for canals	Favourable condition to be achieved at 25% of total resource by 2010 (sites to be identified by survey).
Increase the extent of canal habitats, without reducing the area of other valuable habitats and species	Identify the potential for increase in extent by end of 2005 (potential sites to be determined by survey).

Indicators of habitat quality

In general, this habitat will be in favourable condition when:

- •< Key areas of canal habitat are maintained
- •< There is continued presence of canal habitats at all known sites
- •< The habitats are composed of desirable canal communities
- •< The contribution made by canals to wildlife corridors in Greater Manchester and the wider landscape is maintained
- •< Undesirable species are reduced to an acceptable level
- •< Human activities are managed to a sustainable level.

More specific objectives and targets will eventually be set on a site-by-site or case-by-case basis.

PROPOSED ACTIONS

Action	Lead Body	Timetable for Action
1. Policy		
Ensure the importance of canals is recognised and site protection policies are included in appropriate plans and strategies e.g. UDPs, Community Strategies, nature conservation strategies, supplementary planning guidance.	**EN/GMEU/ LAs/BW**	**2006**
Produce/update Supplementary Planning Guidance notes for canals	**BW/EN/GMEU /LAs**	**Ongoing**
Ensure all planning applications are adequately assessed in relation to their impact on canals: that loss or damage is avoided and that opportunities are taken for enhancement.	**LAs/GMEU/ BW/EN**	**Ongoing**
Ensure that UDPs take full account of the UK Biodiversity Action Plan, A Biodiversity Audit for North West England and the Greater Manchester Biodiversity Action Plan.	**LAs/EN/ GMEU**	**2006**
2. Site Safeguard		
Ensure regular review of canal SSSIs	**EN/BW**	**Ongoing**
Ensure regular review of canal SBIs	**GMEU**	**Ongoing**
Give full consideration to designation of canals within LNR series	**GMEU/LAs/ EN**	**2007**
Ensure that all the best examples of canals are protected by recognised designations	**EN/GMEU/ LAs/WTs**	**2007**
Contribute to the implementation of relevant species action plans for rare and declining species associated with canals.	**All BAP partners**	**Ongoing**

Action	Lead Body	Timetable for Action
3. Land Management		
Promote and encourage positive management of canals with landowners, occupiers and voluntary conservation bodies through the development of long-term conservation management plans.	**All BAP Partners**	**Ongoing**
Contribute to the development and implementation of relevant action plans for rare and declining species associated with canals.	**All BAP Partners**	**Ongoing**
Undertake management to control undesirable species e.g. to bring species to within acceptable limits	**BW/LAs**	**Ongoing**
Complete or update existing conservation management plans to promote long-term positive management of canals with land owners/occupiers and voluntary conservation bodies.	**All BAP Partners**	**Ongoing** (25% of key sites to have management agreements by 2010)
4. Advisory		
Develop and promote best practice for canal management. Ensure guidelines widely available and accessible to interested parties.	**BW/EN/GM Biodiversity Project**	**2006**
Develop and promote training on the conservation and management of canals. Training to be targeted at those involved in canal management.	**BW/EN**	**Ongoing**
Establish demonstration sites to show good practice in canal conservation and management.	**BW/EN Identified by Biodiversity Project**	**2008**
Provide advice to those involved in canal management on appropriate management regimes for canal habitats.	**All BAP partners**	**Ongoing**
5. Future Research and Monitoring		
1. Identify gaps in knowledge of this habitat. 2. If necessary undertake survey of canals in the county using standardised and repeatable methodology.	**Relevant GMBAP Working Group** **All BAP Partners**	**2004** **Start 2004**
Establish and maintain a register of information gathered about canals within Greater Manchester.	**GMEU/ Bolton Museum/ Oldham Museum**	**2004**
Define standard and repeatable methods of establishing the condition of canals and consider the effectiveness of conservation management. Use knowledge to supplement register, management plans, etc.	**EN/Relevant GMBAP Working Group**	**2005**

Action	Lead Body	Timetable for Action
Contribute to increasing information on UK canals by submitting information from GM canal register to National Biodiversity Network web based catalogue of survey information. Such information should also be widely available locally.	**Biodiversity Project Officer**	**When established**
Encourage the dissemination and use of ongoing research results, and commission further research where necessary, to improve understanding of the ecology of canals. Key research topics will include the presence and distribution of key species, vegetation responses to different management approaches and the ecology and management requirements of invertebrate communities and species.	**BW/EN/ Relevant GMBAP Working Group**	**Ongoing**
Develop and implement appropriate surveillance and monitoring programmes to assess progress towards achieving action plan targets.	**Biodiversity Steering Group**	**2004**
Submit details of relevant conservation achievements to the national biodiversity reporting system, BARS, to meet requested deadlines.	**Biodiversity Project Officer**	**2003 onwards**
Develop links with universities and encourage research on canals and associated flora and fauna	**Relevant GMBAP Working Group/ Academic Institutions**	**2003 onwards**
6. Communication and Publicity		
Produce information aimed at capturing the interest and co-operation of local residents in conserving canals.	**All BAP partners**	**Ongoing**
Make information available through a range of media e.g. Internet, booklets, GM BAP, and at a number of locations	**All BAP partners**	**Ongoing**
Encourage public involvement in conservation initiatives and promote access to demonstration sites.	**All BAP partners**	**Ongoing**
Publicise existing sites demonstrating good practice in the management and conservation of canals ensuring information is widely available to landowners/managers.	**All BAP partners**	**Ongoing**

CANALS

Abbreviations:

BW	British Waterways
EA	Environment Agency
EN	English Nature
GMEU	Greater Manchester Ecology Unit
LA	Local Authorities
LNR	Local Nature Reserve
SBI	Sites of Biological Importance
SSSI	Site of Special Scientific Interest
WTs	Wildlife Trusts

RESOURCE IMPLICATIONS

UK BAP

Unknown

Greater Manchester BAP

There will be considerable costs involved in undertaking survey and monitoring to provide up-to-date information on canals. However, some work is already underway which will contribute to the knowledge of canals in Greater Manchester.

- Ongoing costs incurred through restoration (e.g. ecological works involved in the Huddersfield Narrow Canal Restoration) are thought to have cost approximately £100,000.

- Costs resulting from additional ecological commitments. Eg: British Waterways allocates three weeks of bank staff time to ecological works for each canal.

Other costs are likely to be incurred through:

- Establishment and maintenance of canal register.
- Promotion of positive management.
- Establishment of monitoring programmes.
- Publicity and awareness raising.
- Staff and volunteer time.

Possible Sources of Funding

Wildlife Enhancement Scheme for SSSIs
The Waterways Trust small grants scheme

HABITAT ACTION PLANS

LINKS WITH OTHER ACTION PLANS

UK BAP

- There is a UK BAP for water vole, floating water plantain, grasswrack pondweed, white-clawed crayfish various bat species including Pipistrelle bat.

- British Waterways has launched a corporate BAP.

Greater Manchester BAP

Floating water plantain, Water vole, Bats

Proposed for 2nd Tranche: Grasswrack pondweed

Other BAPS

Bolton BAP:	Canals, Water Vole
British Waterways Local Waterway BAPs:	Huddersfield Narrow East, Rochdale Canal East, Floating-water plantain, grasswrack pondweed, Water vole, White-clawed crayfish
North Merseyside BAP:	Canals, Water Vole
Oldham BAP:	Water Vole

CONFLICTS WITH OTHER ACTION PLANS

Actions proposed under the canal action plan could have potentially adverse affects on the following habitats action plans in Greater Manchester:

- Swamp/tall herb fen (in remaindered/dewatered canals)
- Wet woodland (in remaindered/dewatered canals)

CONTACTS FOR CANALS BAP GROUP

Organisation	Contact	Tel. number
GMEU	Teresa Hughes	0161 342 2928
Stockport Urban and Countryside Service	Roger English	0161 474 4552
English Nature	Rebecca Jackson	01942 820342
Bolton Institute of Higher Education	Pat Waring	01204 903150
Oldham Pond Warden Co-ordinator	Alan Price	01457 810828
British Waterways	Jason Leach	0161 819 5847
Environment Agency	Mark Wiseman	01925 840000

PROPOSED REVIEW OF PLAN

The Biodiversity Action Plan for canals will be reviewed in 2008, and thereafter every five years.

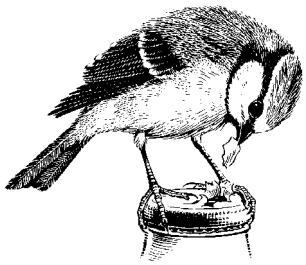
REFERENCES

- British Waterways (undated) "*A Framework for waterway wildlife strategies*"
- GMEU (2000) "*Greater Manchester Biodiversity Action Plan: Volume 1 - Biodiversity Audit.*" Greater Manchester Ecology Unit
- Waring, P. (2001) "*Bolton BAP - Canals Habitat Action Plan*". Bolton MBC
- South Pennine Ring website. Available: www.southpenninering.co.uk

URBAN

MANAGED GREENSPACE

DEFINITION



This category includes amenity grassland (i.e. intensively managed and regularly mown grassland), private gardens, allotments, town parks of many types, planted shrubberies, playing fields, golf courses, grounds of buildings, churchyards and cemeteries. These areas are all managed to some degree for their particular purpose, however, they can still be important reservoirs for wildlife in urban settings. In addition, they provide green breaks in development and contribute to the health and well-being of local people. Their proximity to schools and housing make them an ideal resource for learning about the natural world.

In addition to the grassland that dominates these sites, remnants of a diverse range of semi-natural habitats including woods, scrub or ponds are often found within their boundaries or next to them. These may have been in existence for many years - providing well-established continuity of biodiversity. They can also act as sanctuaries for biodiversity as outside of the managed areas they often receive relatively little human interference.

NOTABLE SPECIES

Song thrush
Bullfinch
Goldfinch
Greenfinch
Treecreeper
Nuthatch
House martin
House sparrow
Swift
Common frog
Common toad
Smooth newt
Great crested newt
Hedgehog
Fox
Badger
Pipistrelle
Holly blue

URBAN – MANAGED GREENSPACE

CURRENT STATUS AND IMPORTANCE

International

Managed greenspace is found in most of the world's towns and cities and as in the UK, offers an important refuge for many plants and animals, enhancing the lives of those who live there. The extent of managed greenspace in the world today is therefore important to global biodiversity.

National

The Biodiversity Audit for North West England notes this habitat can be found in any urban area in the UK, including north west England. Regionally important examples are present in Greater Manchester.

BAP Priority habitats and species are often found within the boundaries of managed greenspace sites including lowland dry acid grassland, lowland mixed broadleaved woodland, lowland heathland, great crested newts and water voles.

Several national initiatives and their incorporation into legislation are attaching greater importance to improving human quality of life in urban situations through providing quality urban greenspaces and incorporating considerations for biodiversity.

Greater Manchester Resource and Distribution

Amenity grassland and grassland that has been 'improved' by the addition of fertilisers, do not make as significant a contribution to biodiversity as less managed grassland. The intensity of management often precludes the growth of many plant species and is dominated by cultivars of perennial rye-grass and common broadleaved species such as white clover, daisy, broadleaved plantain or dandelion. Nevertheless, these grasslands can still have high biomass of soil fauna (e.g. earthworms and leatherjackets), and may be used as roosting sites for birds such as gulls or lapwings and may be part of the feeding territory of badgers and amphibians. The greatest value of amenity grassland, therefore, lies both in its existing value to limited but often high populations of a range of species, and in its potential to make a greater contribution to biodiversity through altering management regimes.

Gardens and allotments can support a diverse range of wildlife, depending on their management, structure and planted species. Gardens can support a host of common bird species (including blackbird, robin, blue tit, great tit, song thrush, house martin, tawny owl) and many people already make an effort to provide food or breeding sites for birds. Common butterflies such as the red admiral and peacock thrive in gardens, and moths also take advantage of the nectar supplies on offer. Garden ponds can also support amphibians including the great crested newt, provided they are not stocked with fish. Mammals such as hedgehogs, foxes and badgers often utilise urban greenspaces, especially gardens, as part of their feeding territories.

HABITAT ACTION PLANS

There are approximately 11,000ha of amenity grassland in Greater Manchester, nearly 8.5% of the County. This includes many town parks, playing fields and golf courses. The actual area of gardens, allotments and other forms of managed greenspace is unknown but constitutes a significant area of the County. Managed greenspaces occur in all ten districts of Greater Manchester. The City of Manchester has nearly 20% of the total area of amenity grassland.

Legal

- Protection is afforded to landscape features described by Regulation 37 of The Conservation (Natural Habitats, &c) Regulations 1994 that *"are essential for the migration, dispersal and genetic exchange of wild species" "by virtue of their linear and continuous structure" or their function as stepping stones*. Managed greenspace can play an integral and important role in maintaining ecological networks amongst developed areas through their role in safeguarding open space and through safeguarding remnants of semi-natural habitat which act as stepping-stones.

- Some protection is given to urban habitats where these are notified as Sites of Special Scientific Interest (SSSI) or declared as Local Nature Reserves (LNR). However, for the majority of urban wildlife areas the protection comes from outside the conservation legislation, notably planning policies in Unitary Development Plans (UDP). Few areas of managed greenspace are likely to be designated as Sites of Biological Importance (SBI). However, there are examples where semi-natural habitats have been encapsulated within managed greenspace and their contribution to biodiversity has been recognised by their identification as SBIs.

- Some allotments, 'statutory allotments', are protected by various Acts and the permission of the Secretary of State is required before their disposal.

- Some sites may be common land, subject to specific legislation.

- Some species are given special protection under Wildlife and Countryside Act 1981 (as amended) and other legislation. The Act also prohibits the introduction of certain alien or invasive species including ragwort, Japanese knotweed and giant hogweed.

- Individual tree specimens may be subject to Tree Preservation Orders, though TPOs can also imposed on groups of trees. Trees in conservation areas are also protected.

- The Hedgerow Regulations 1997 afford protection to hedgerows that qualify as "Important" under the criteria listed within this legislation.

URBAN – MANAGED GREENSPACE

CURRENT FACTORS AFFECTING THE HABITAT

International

Increasing urbanisation may lead to increasing abundance of these habitats, increased population pressures on existing sites or increased demand for greater provision of public greenspace.

National

- Simplification of park management and reclamation or redevelopment of disused land to a uniform landuse.
- Development encroachment onto parks, playing fields, old cemeteries, long abandoned sites and large established suburban gardens.
- Infill housing causing a loss of open space and fragmentation of ecological corridors.
- Uninformed management of greenspaces such as clearing of shrubs, filling in ponds (due to safety concerns) and levelling land with hillocks and hollows making them less attractive to wildlife.
- Ignorance of the value of the greenspace resource to biodiversity
- Use of inappropriate materials (peat, 'unsustainable' timber, waterworn limestone)
- Inbalance of hard/soft landscaping
- Size – tendency towards new housing allocating smaller areas to gardens.
- Inappropriate choice of boundary design, creating barriers
- Impact of domestic pets on native biodiversity

Greater Manchester

In addition to the above factors affecting managed greenspace, those listed below are particularly relevant to the Greater Manchester area.

Vast areas of amenity grassland in the county could offer opportunities to increase their value for wildlife. Reductions in mowing can allow plants to flower and set seed. The most significant factors affecting managed greenspace are listed below. The negative factors listed below are those that are thought to contribute to the decline in quality of managed greenspace. Factors thought to contribute to the enhancement of biodiversity of managed greenspaces are listed under the "positive" heading.

Positive factors	Negative factors
National recognition that managed greenspace can be and should be managed to enhance the quality of such spaces, and that quality greenspaces and biodiversity are linked to improving human quality of life and well-being.	Payment arrangements of local authority maintenance workers where they are paid on the basis of the area of grassland they cut. This encourages an indiscriminate approach to grass cutting with little margin for incorporating varied mowing practices.
Golf course management has advocated the reduction in the use of chemicals in recent years as it is often unnecessary and can incur significant costs for relatively little benefit to the course.	General perception that urban greenspaces should be "tidied" or "gardened" promoting over intensive management and mowing regimes.
Remnant semi-natural habitats being actively managed as part of site management.	Loss of urban greenspace to development.
Recognition that parks, gardens and allotments are often the most accessible areas where the majority of the public gain contact with wildlife.	Nutrient enrichment of grasslands and other habitats through leaving grass cuttings (arisings) where they are cut or disposing of them in semi-natural habitats nearby.
Many people provide supplementary food for birds and mammals that can be of vital importance in harsh winters	Use of fertilisers and pesticides, particularly in areas where this is not necessary, ie neighbouring semi-natural habitats.
	Lack of awareness of the value of a variety of semi-natural habitats within managed greenspace areas and how to incorporate their management for biodiversity into current parks and greens management practices. This can reduce costs, improve the aesthetics of urban greenspace and provide greater opportunities for a wider range of biodiversity to exist in urban areas.
	Tree planting considered over the value of other habitats such as unimproved or semi-improved grasslands.
	Neglect of management leading to sites not being valued by the community.

LONG TERM TRENDS AND POTENTIAL THREATS

- < Climate change – impact of invasive non-native species, longer mowing periods causing disturbance

- < Growing interest in increasing biodiversity in grounds maintenance and in wildlife gardening

URBAN – MANAGED GREENSPACE

CURRENT ACTIONS

International

Unknown.

National

- Planning Policy Guidance 17: "*Planning for Open Space, Sport and Recreation"* requires local authorities to take account of access to open spaces and areas for recreation within the planning framework. In addition to formal recreational areas, "*areas of open space that particularly benefit wildlife and biodiversity*" are also included. This demonstrates the value of urban greenspace but also the importance of such areas to benefit biodiversity.

- Planning Policy Guidance 9: Nature Conservation requires local authorities to "*conserve non-statutory sites together with countryside features which provide wildlife corridors, links or stepping stones, from one habitat to another*". Urban greenspace provides a large proportion of land which can be useful in maintaining such connections.

- DTLR publication "*Greenspaces, Better Places*" encourages the consideration of developing diverse greenspaces and networks and enhancing existing greenspace to benefit the biodiversity, community and promote urban renewal.

- Policy emphasis on linking human well-being and quality of life to biodiversity particularly in urban situations. (Local Government Act 2000, Community Strategies).

- Attempts at incorporating of Accessible Natural Greenspace Standards (ANGSt) into national policy and advice.

- A number of schemes can be used to enhance the wildlife interest of urban areas. Community Action for Wildlife provides assistance to local community groups in England wish to manage urban areas for their wildlife potential.

- Current interest in planning for sustainable cities and for low cost management of existing open spaces could help to maintain or improve local biodiversity.

- Urban habitats also have considerable potential for local people to take part in enjoyable activities, which benefit nature conservation and enable them to take action for the local environment.

- These areas also form an important education resource informing people of wildlife interests, natural processes and conservation management. The framework provided by Local Agenda 21 and Community Strategies is appropriate and important.

Greater Manchester

- Managed greenspace makes up a large proportion of ecological networks designated as "green corridors" or "wildlife corridors" within the planning framework in accordance with PPG9.

- Some Local Authorities are actively promoting management of managed greenspace to benefit biodiversity incorporating management of a range of habitats and staff training.

- The Local Authorities' Countryside Services regularly encourage communities and schools to become involved in a range of activities and events highlighting the value of local urban greenspace.

- Many sites are managed in conjunction with local site action groups or 'Friends of..' groups consisting of members of the local community interested in enhancing their managed greenspace.

OBJECTIVES

National

The Broad Habitat statement "Urban" contains the following objective:

Maintain the existing diversity and extent of wildlife in all urban areas, expanding the range and distribution of rare and common species and enabling this resource to be utilised as an educational tool.

In addition, objectives for consideration of managed greenspace in urban situations are included in the following:

- English Nature's recommendations that an urban resident should have: access by foot to a natural greenspace of at least 2 ha within 280 m; at least one 20 ha site within 2 km; at least one 100 ha site within 5 km; and at least one 500 ha site within 10 km. English Nature's definition of Natural Greenspace is that it must be naturally colonised. Also this leads to 8%+ of land area being put over to natural greenspace

- National Playing Fields Association 2.4 hectares per thousand population

- Accessible Natural Greenspace Standards (ANGSt).

URBAN – MANAGED GREENSPACE

Greater Manchester

In Greater Manchester, national targets and local aspirations have been translated into the following broad objectives:

Objective	Targets
Maintain current amount of managed greenspace and prevent further losses and fragmentation.	No further loss of managed greenspace. Establish up-to-date baseline through survey.
Promote appropriate management practices to enhance or increase managed greenspace's contribution to biodiversity.	Introduce appropriate management regimes for 50% of managed urban greenspace of over 5 ha by 2006, integrating biodiversity management fully into other uses and functions of the site. For areas under 5 ha produce site type specific strategy documents to identify appropriate management practices for the integration of biodiversity into other uses and functions by 2006. Integrate appropriate survey and monitoring programmes into all management plans and strategy documents by 2006.
Increase the amount of managed greenspace being managed to enhance or increase biodiversity, without reducing the area of other valuable habitats and species.	Identify the potential for increase in extent by end of 2006 (potential sites to be determined by survey).

PROPOSED ACTIONS

Action	Lead Body	Timetable for Action
1. Policy		
Ensure importance of managed greenspace is recognised and site protection policies are included in appropriate plans and strategies. Eg: UDPs, Community Strategies, nature conservation strategies, supplementary planning guidance, Red Rose Forest Strategy, Pennine Edge Forest, Forestry Commission strategies.	**EN/GMEU/ LA's/RRF/ PEF**	**Ongoing**

Action	Lead Body	Timetable for Action
Ensure all planning applications are adequately assessed in relation to their impact on managed greenspace: that loss or damage is avoided and that opportunities are taken for enhancement and habitat creation.	**LA's/GMEU/ WT's**	**Ongoing**
Local Authorities to make a commitment to produce and implement management plans for areas over 5 ha in their control, strategy documents for areas under 5 ha, and greenspace strategies incorporating biodiversity considerations. 50% of managed urban greenspace of over 5 ha to have management plans by 2005. Sites under 5 ha to have site type specific strategy documents by 2005.	**LAs**	**2005**
All local authorities to have greenspace strategies (similar to Countryside Agency Green Scape Strategies) including cross boundary agreements and policies to ensure the protection of managed greenspace.	**LAs**	**2006**
2. Site Safeguard		
Identify key sites using agreed definition for urban managed greenspace.	**Relevant GMBAP Working Group/LA's/WT's**	**2004**
Identify and secure areas for potential expansion of urban managed greenspace (to reduce isolation and fragmentation of sites)	**All BAP partners**	**2006**
Contribute to the implementation of relevant species action plans for rare and declining species associated with managed greenspace (eg: song thrush).	**All BAP Partners**	**Ongoing**
Develop a strategic approach to the management of urban managed greenspace to maintain and enhance its value to biodiversity particularly its role in a green network across administrative boundaries.	**LAs**	**2005**

Action	Lead Body	Timetable for Action
3. Land Management		
Promote and encourage positive management of managed greenspace with landowners, occupiers, managers and voluntary conservation bodies through the development of long-term conservation management plans or agreements.	**All BAP Partners**	**2005**
Complete or update existing conservation management plans to promote long-term positive management of managed greenspace with landowners/occupiers/ managers and voluntary conservation bodies.	**All BAP Partners**	**Ongoing** (50% of managed urban greenspace of over 5 ha to have management plans by 2005). (Sites under 5 ha to have site type specific strategy documents by 2005).
Identify issues such as pesticide reduction, pollution reduction, planting of native species, low intensity management practices, increasing habitat diversity through management and creation.	**EN/LAs/**	**Ongoing**
4. Advisory		
Develop and promote best practice for urban greenspace management, particularly integrating conservation management into routine practices including the production of guidance notes on management. Ensure guidelines widely available and accessible to interested parties.	**EN/LAs/WTs GM Biodiversity Project**	**2006**
Establish demonstration sites to show good conservation and management practice for managed greenspace.	**LAs/WTs Identified by GM Biodiversity Project**	**2008**

Action	Lead Body	Timetable for Action
Provide advice to owners/occupiers of managed greenspace on appropriate management regimes and biodiversity friendly management practices of managed greenspace.	**EN/GMEU/ LAs/WTs**	**Ongoing**
5. Future Research and Monitoring		
1. Identify gaps in knowledge of this range of habitats. 2. If necessary undertake survey of managed greenspace in the county using standardised and repeatable methodology for each habitat type, ie: gardens and allotments, amenity grassland-parks, golf courses, cemeteries.	**Relevant GMBAP Working Group** **All BAP Partners**	**2004** **Start 2004**
Establish and maintain a register of managed greenspace sites within Greater Manchester including details of condition and presence of important species.	**GMEU/ Bolton Museum/ Oldham Museum**	**2004**
Define standard and repeatable methods of establishing the condition of managed greenspace and consider the effectiveness of conservation management. Use knowledge to supplement register, management plans, etc.	**Relevant GMBAP Working Group**	**2005**
Contribute to increasing information on UK managed greenspace by submitting information from GM register to National Biodiversity Network web based catalogue of survey information. Such information should also be widely available locally.	**Biodiversity Project Officer**	**When established**
Submit details of relevant conservation achievements to the national biodiversity reporting system, BARS, to meet requested deadlines.	**Biodiversity Project Officer**	**2003 onwards**
Develop and implement appropriate surveillance and monitoring programmes to assess progress towards action plan targets.	**Biodiversity Steering Group**	**2004**
Produce distribution map of different types of managed greenspace across Greater Manchester.	**All BAP partners**	**2004**

Action	Lead Body	Timetable for Action
Develop links with universities and encourage research on urban managed greenspace and associated flora and fauna.	**Academic Institutions/ Relevant GMBAP Working Group**	**2003 onwards**
Integrate appropriate survey and monitoring programmes into all management plans and strategy documents.	**LAs/WTs**	**2005**
Promote the principle of "survey first, manage second".	**GMEU/LAs/ WTs**	**Ongoing**
6. Communication and Publicity		
Seek opportunities to raise the profile of the importance of managed greenspace to biodiversity in the media and improve public awareness of its wildlife and conservation value.	**All BAP partners**	**Ongoing**
Encourage public involvement in conservation initiatives and promote access to demonstration sites.	**All BAP partners**	**Ongoing**
Publicise existing sites demonstrating good practice in the management of managed greenspace for biodiversity ensuring information widely available to landowners/managers.	**All BAP partners**	**Ongoing**

Abbreviations

EN	English Nature
FC	Forestry Commission
GMEU	Greater Manchester Ecology Unit
LAs	Local Authorities
LNR	Local Nature Reserve
PEF	Pennine Edge Forest
RRF	Red Rose Forest
SBI	Site of Biological Importance
SSSI	Site of Special Scientific Interest
WTs	Wildlife Trusts

RESOURCE IMPLICATIONS

UK BAP

Unknown

Greater Manchester BAP

There will be considerable costs involved in undertaking survey and monitoring to provide up-to-date information on the distribution of managed greenspace, although some surveys may be undertaken by volunteers. In addition, the following activities will also incur costs:

- Establishment and maintenance of a central register
- Promotion of positive management
- Establishment of monitoring programme
- Publicity and awareness raising
- Staff and volunteer time

Possible Sources of Funding

Core budget fund/maintenance budgets from local authorities

LINKS WITH OTHER ACTION PLANS

UK BAP

Managed greenspaces are included in the Broad Habitat Statement "Urban" in the UK Steering Group Report.

Greater Manchester BAP

Great Crested Newts, Bats, Song Thrush, Grassland

Proposed for 2nd tranche of GMBAP: Boundary features, Problem species

Other BAPs

Bolton BAP:	Semi-improved grassland, Unimproved neutral grassland, Lowland dry acid grassland, Hedgerows, Bats, Great Crested Newt, Bluebell
North Merseyside BAP:	Urban trees, Urban grasslands, Urban birds, Great crested newts, bats, song thrush, bluebell
Lancashire BAP:	Urban Habitats
Oldham BAP:	Great crested newts

URBAN – MANAGED GREENSPACE

CONFLICTS WITH OTHER ACTION PLANS

The expansion and management of urban managed greenspace could have a potentially adverse affect on the following habitats and species action plans in Greater Manchester.

- Woodland
- Grassland

CONTACTS FOR URBAN BAP GROUP:

Organisation	Contact	Tel Number
GMEU	Anne GreatRex	0161 342 3597
Wigan Council	Roz Park	01942 404232
Stockport MBC	Roger English	0161 4744552
English Nature	Rebecca Jackson	01942 820342
Manchester Metropolitan University	Phil Wheater	0161 247 1589
United Utilities	Brian Tollitt	01925 235841
The Bolton Wildlife Project	Kim Patterson	01204 361847
Manchester University	Prof. John Handley	0161 275 6891
The Countryside Agency	Daniel Moores	
Groundwork Tameside	Robert Williams /Ben Williams	0161 303 1336

PROPOSED REVIEW OF PLAN

The Biodiversity Action Plan for Urban Managed Greenspace will be reviewed in 2008, and thereafter every five years.

REFERENCES

- Barker, G. "*Green Networks*"
- DETR "*Urban White Paper*"
- DTLR (2002) "*Green Spaces, Better Places*"
- Gilbert, O "*Ecology of Urban Habitats*"
- DTLR (2002) "*Improving Urban Parks, Play Areas and Greenspaces*"
- HDRA "*Organic Grounds Maintenance*"
- Rogers "*Towards an Urban Renaissance*"
- Wheater, CP "*Urban Habitats*"

•< Boniface, T. unpublished. (2002) "*The potential contribution of golf courses to the conservation of biodiversity in Bolton*"

Wigan Habitat Action Plans

Mossland

Mosslands, where extensive, support a distinctive flora. In Wigan this includes Sphagnum papillosum and cranberry. Due to the preserving qualities of peat, mosslands have an immense value as an archive of the past. It takes thousands of years to form a fully functioning mossland community.

Current status

Mossland, also known as lowland raised bog, is a UK Priority Habitat and is internationally threatened. Mosslands once covered large areas of our region, but as elsewhere across Europe there has been a dramatic loss of this habitat. Raised bog still capable of restoration is of European Importance under the European Habitats Directive.

Since 1850, the area of mossland in the UK has fallen from 95,000 hectares to 6,000 hectares. Regionally, 99% of mossland habitat within Lancashire, including Wigan has been destroyed. What remains is fragmented, and mostly damaged by unsympathetic management. Wigan has less than 100 hectares of mossland spread over five sites. These remaining sites are still under threat. Characteristic and important mossland species are still being lost due to a variety of factors.

Characteristic wildlife

Wigan's mosslands are notable for the characteristic plants that have adapted to this low fertility, high moisture, acidic habitat. These include sphagnum moss species, cotton grasses, cross-leaved heath and cranberry. Drying out of the mossland has led to some areas becoming dominated by purple moor grass.

High quality wet mosslands contain a range of other species which include sundews, bog asphodel bog rosemary, bog myrtle and further species of sphagnum, including many of the hummock forming species, which are all found in the northwest but not currently in Wigan

Key Species

The following rare or threatened species are associated with mosslands in Wigan. Species were selected on the basis that they are UK BAP Priority Species (P), Species of Conservation Concern (C) or notable species recorded in Wigan.

Water vole	*Arvicola terrestris*	P
Nightjar	*Caprimulugus europeaus*	P
Barn owl	*Tyto alba*	P
Long-eared owl	*Asio otus*	P
Skylark	*Alauda arvensis*	P
Tree pipit	*Anthus trivialis*	C
Snipe	*Gallinago gallinago*	C
Curlew	*Numenius arquata*	C
Common lizard	*Lacerta vivipara*	
Black darter	*Sympetrum danae*	
Large heath butterfly	*Coenonympha tullai*	P

Current Issues

Development pressures including peat extraction.
Surface and groundwater abstraction causing lowering of water levels.
Water quality – pollution, pesticide and nutrient enrichment.
Habitat isolation as a result of fragmentation.
Absence of management for existing mossland habitat.
Recreational pressures.
Agricultural expansion and intensification.
Scrub encroachment.

Best Management Practice

Pristine mossland needs little management. The majority of mossland in the North West needs to reverse past damage which usually involves raising the water table.

The key objectives of mossland management are to achieve:

A diverse range of mossland communities
Optimal conditions for mossland vegetation, especially sphagnum mosses.
Prevention of scrub succession.
Development of monitoring systems for associated flora and fauna.
a range of small pools for aquatic species diversity
Management of non-native weed species.
Control of disturbance and damage by human activity.

Current Action

Recent schemes in Wigan have allowed a total of 50 ha of mossland to be brought into active management.
A working group will oversee the development and implementation of the Mossland BAP. This partnership includes: Natural England, Greater Manchester Ecology Unit,

Lancashire Wildlife Trust, RSPB, Wigan Council and Wigan Leisure and Culture Trust

Related Action Plans

UKBAPs:

Reedbed
Wet woodland

GMBAPs:

Wet woodlands
Ponds
Lowland heath
Acid grassland
Marshy grassland
Water vole

Wigan BAPs:

Wet Woodland
Water Vole

Objectives, actions and targets

Strategic Objective: Protect, develop and monitor mosslands in Wigan		
Operational objective	Action Required	Timescale
1. Determine the current distribution and quality of mossland in Wigan	Collect and collate records of mossland and produce distribution map to establish accurate baseline	2008
	Assess all mossland using standardised and repeatable methodology	2008
	Establish a database accessible by all relevant partners	Ongoing
2. Protect existing mossland	Recognise and protect mossland through policies in plans and strategies e.g. UDP, LDF, SPD, Mossland strategy, Biodiversity Strategy Nature Conservation Strategy	Ongoing
	Assess all relevant planning applications for their impact on mossland	Ongoing
	Encourage sustainable water abstraction policies	Ongoing
	Safeguard all mossland sites through designation as SAC, SSSI, LNR, SBI.	2008
	Produce management plans for all SSSI and SBI Mossland	2009
	Land acquisition policy to include purchase of existing mossland and buffer zones suitable for improvement.	Ongoing
3. Investigate opportunities for restoration of mossland	Identify areas for potential restoration of quality mossland habitat, and associated wetlands	2009
	Encourage landowners/managers to participate in appropriate management and habitat creation schemes.	Ongoing
4. Monitor mossland resource	Develop monitoring procedure	2008
	Monitor mossland quality and quantity	Ongoing
	Monitor water quality	Ongoing
	Develop links with universities and encourage research on mossland and associated habitats	Ongoing

Management Objective: Create and maintain mosslands in Wigan		
Operational objective	Action Required	Timescale
1. Protect existing mossland	Implement management plans for SSSI and SBI mosslands	2009
	Protect mossland from disturbance through management	Ongoing
	Protect adjacent land from developments which may affect mossland habitat	Ongoing
	Control invasive species to maintain high quality mossland	Ongoing
	Comply with the peatlands charter	Ongoing
2. Develop mossland on extraction sites	Investigate opportunities for mossland restoration initiatives	2009
	Investigate opportunities to increase area of mossland where depth of peat allows	2008
3. Manage existing Mossland	Investigate opportunities for mossland management/maintenance	Ongoing
	Identify funding for development and management/maintenance of mossland	Ongoing
	Develop good practice examples in current mossland management	Ongoing
	Investigate translocation of species to improve mossland diversity.	2009
4. Promote conservation value of Mossland	Raise the profile of mossland and improve community awareness of its wildlife value	Ongoing
	Encourage community involvement in conservation of and access to mossland sites	Ongoing
	Promote examples of good practice in mossland management	Ongoing
	Flood alleviation	Ongoing

Reedbed

Reedbeds, where extensive, support a distinctive fauna. In Wigan this includes bittern, reed warbler, water rail and several species of moth including the silky wainscot and obscure wainscot.

This BAP should be considered together with the Bittern BAP as the two are intrinsically linked.

Current status

Reedbeds are wetlands dominated by stands of common reed (*Phragmites australis*). They include areas of open water and ditches and are associated with wet grassland and carr woodland (wet, swampy woods dominated by alder and willow). Nationally there are approximately 5000ha of freshwater reedbed, made up of around 900 sites. Only 50 of these sites are greater than 20 ha.

Reedbed habitat in Wigan has always been relatively scarce and fragmented. However, within north west England approximately 25% of the freshwater reedbed habitat recorded occurs in Wigan. Only Leighton Moss in Lancashire has a larger area of reedbed. Parts of the Wigan Flashes are designated as a Site of Special Scientific Interest and presently contain approximately 50 ha of reedbeds. Most of the significant reedbeds in Wigan are designated as Sites of Biological Importance and most are managed as nature reserves.

Characteristic wildlife

Reedbeds, unless managed, are short lived in nature – reeds colonise open water, over time leaf litter builds up and the reedbed dries up and is colonised by alder and willow. Reedbeds are maintained by reed cutting, by controlled burning of the 'litter' and by maintaining high water levels. Other tall fen communities are important alongside the reedbeds and especially include reedmace (*Typha sp.*) fen.

The diversity in reedbed structure often depends on water within the system. Water levels are best if they vary, but should be around 30 cm deep over the bulk of the reedbed as this allows fish access to the waterbody. This also encourages invertebrates such as Pond louse (*Asellus aquaticus*) which helps to control the build up of material and prevent the reedbed drying out.

A variety of factors including size, age, water quality and geographical distribution will lead to differences in the plant, animal and invertebrate communities found in

reedbed. In Britain, species such as bittern require a matrix of reedbed in excess of 20 hectares in which to breed. Wintering bitterns will often use smaller sites but move on in spring.

In Wigan characteristic birds of reedbeds include reed bunting, water rail, reed warbler, bittern and occasional marsh harriers and bearded tits also occur.

In the UK there are 700 invertebrate species associated with reedbed, of which 40 are entirely dependent upon reedbed. Of these 40 species several are found in Wigan, silky wainscot moth, The crescent, bulrush wainscot, brown-veined wainscot, obscure wainscot, large wainscot, small wainscot and small rufous.

Amphibians use well-vegetated water bodies within the reedbed. Ample food and good cover mean that common frogs and toads can occur at high densities, they generally require small areas of open water such as pools and ditches. The eggs of fogs and toads are a food source for many animals. Smooth, palmate and great-crested newts can also be found in reedbeds but they tend to be associated with well-vegetated ditches.

Water voles and water shrews can also be found in the ditches that run through and round the body of the reedbed.

Although common reed is the main species associated with reedbeds, there are always other plants to be found. Reedmace, Lesser reedmace, yellow iris and sweet flag, bur-reed and rushes are often found where reed is less dominant. In drier stands bittersweet and marsh cinquefoil occur and, where succession has progressed, scrub species such as willow and alder become frequent.

Key Species

The following rare or threatened species are associated with reedbeds in Wigan. Species were selected on the basis that they are UK BAP Priority Species (P) or Species of Conservation Concern (C).

Water vole	*Arvicola terrestris*	P
Bittern	*Botaurus stellaris*	P
Reed bunting	*Emberiza schoeniclus*	P
Reed warbler	*Acrocephalus scirpaceus*	C
Water shrew	*Neomys fodiens*	C
Water rail	*Rallus aquaticus*	C
Silky wainscot moth	*Chilodes maritimus*	

Current Issues

Surface and groundwater abstraction causing lowering of water levels within existing reedbeds.
Water quality – water pollution, pesticide and heavy metal pollution.
Population isolation as a result of fragmentation of existing areas.
Development pressures.
Absence of targeted management for existing reedbed habitat.
Recreational pressures.

Best Management Practice

Without management reedbeds will naturally dry out and turn to woodland in the medium to long term. Operations such as reed cutting, scrub control and water level management will slow down or reverse this process.

The main objective of reedbed management is to achieve:

A range of reed/fen communities (dependent on site conditions) is desirable – achieved through rotational cutting.
Development of reedbed fringe communities, which are suitable for a range of associated species, increasing the amount of reed/water interface with suitable ditches and pools.
Prevention of seral scrub succession.
Development of water quality monitoring for invertebrate communities and flora and fauna.
Development of pocket reedbeds.
Management of non-native weed species as required.
Control of disturbance and damage by human influence.

Current Action

Recent schemes in Wigan have been implemented to bring reedbeds into more positive management regimes. These schemes have allowed a total of 50 ha of reedbed to be brought into active management. Approximately 24ha of this is newly created reedbed.

A working group will oversee the development and implementation of the BAP. This partnership is formed by: English Nature, Greater Manchester Ecology Unit, Lancashire Wildlife Trust, RSPB, Wigan Council and Wigan Leisure and Culture Trust

Related Action Plans

<u>UKBAPs:</u>

Reedbed
Bittern

<u>GMBAPs:</u>

Bittern

<u>Wigan BAPs:</u>

Bittern
Wet Woodland
Water Vole

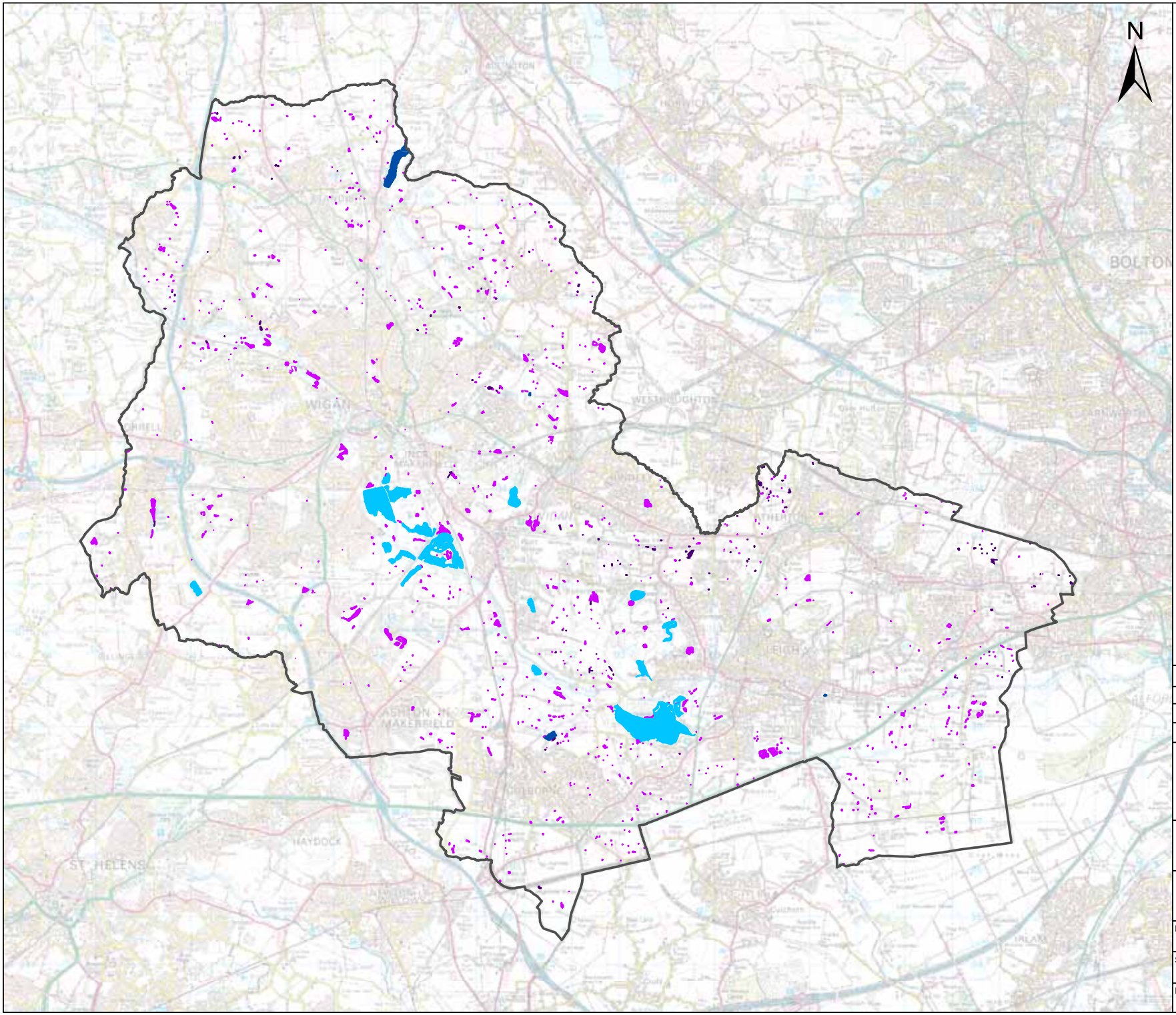
Objectives, actions and targets

Strategic Objective: Protect, develop and monitor reedbeds in Wigan		
Operational objective	Action Required	Timescale
1. Determine the current distribution and quality of reedbed in Wigan	Collect and collate records of reedbed and produce distribution map to establish accurate baseline	2006
	Assess all reedbed using standardised and repeatable methodology	2006
	Establish a database accessible by all relevant partners	2006
2. Protect existing reedbed	Recognise and protect reedbed through policies in plans and strategies e.g. UDP, SPG, Nature Conservation Strategy	Ongoing
	Assess all relevant planning applications for their impact on reedbed	Continuous process
	Encourage appropriate water abstraction policies	Continuous process
	Safeguard all reedbed sites through designation as SBI, LNR, SSSI or SPA	2007
	Designate Hey Brook as a SSSI	2008
	Produce management plans for all SSSI and SBI reedbeds	2007
3. Investigate opportunities for creation of new reedbed	Identify areas for potential expansion of reedbed habitat	2007
	Encourage landowners/managers to participate in appropriate schemes to fund management and habitat creation	Ongoing
4. Monitor reedbed resource	Develop monitoring procedure	2006
	Monitor reedbed quality and quantity	Ongoing
	Monitor water quality	Ongoing
	Develop links with universities and encourage research on reedbed and associated habitats	Annual review

Management Objective: Create and maintain reedbeds in Wigan

Operational objective	Action Required	Timescale
1. Protect existing reedbed	Implement management plans for SSSI and SBI reedbeds Protect reedbeds from disturbance through management Control invasive species to maintain high quality reedbeds	2008 Continuous process Review annually
2. Develop new reedbed	Investigate opportunities for reedbed creation initiatives	2008
3. Manage existing and newly created reedbed	Investigate opportunities for reedbed management/maintenance Identify funding for development and management/maintenance of reedbed Develop good practice examples in current reedbed management	2008 Ongoing Review annually
4. Promote conservation value of reedbeds	Raise the profile of reedbed and improve community awareness of its wildlife value Encourage community involvement in conservation of and access to reedbed sites Promote examples of good practice in reedbed management	Review annually Annual reedbed event Ongoing

APPENDIX 4: PRIORITY HABITATS IN WIGAN



Wigan Borough boundary

Lake & Reservoir Habitat (>2ha)

- Lake - Potential UK Priority Habitat
- Reservoir - Potential UK Priority Habitat

Pond Habitat (<2ha)

- UK and Greater Manchester Priority Habitat
- Potential UK and Greater Manchester Priority Habitat

Rev	Description	Dwn	Appvd	Date

TEP
Genesis Centre
Birchwood Science Park
Warrington WA3 7BH
Tel 01925 844004
Fax 01925 844002
email tep@tep.uk.com

Project:
WIGAN BIODIVERSITY AUDIT

Title:
Standing Water Habitats

Map No.
G1771.004

Scale:	Date:
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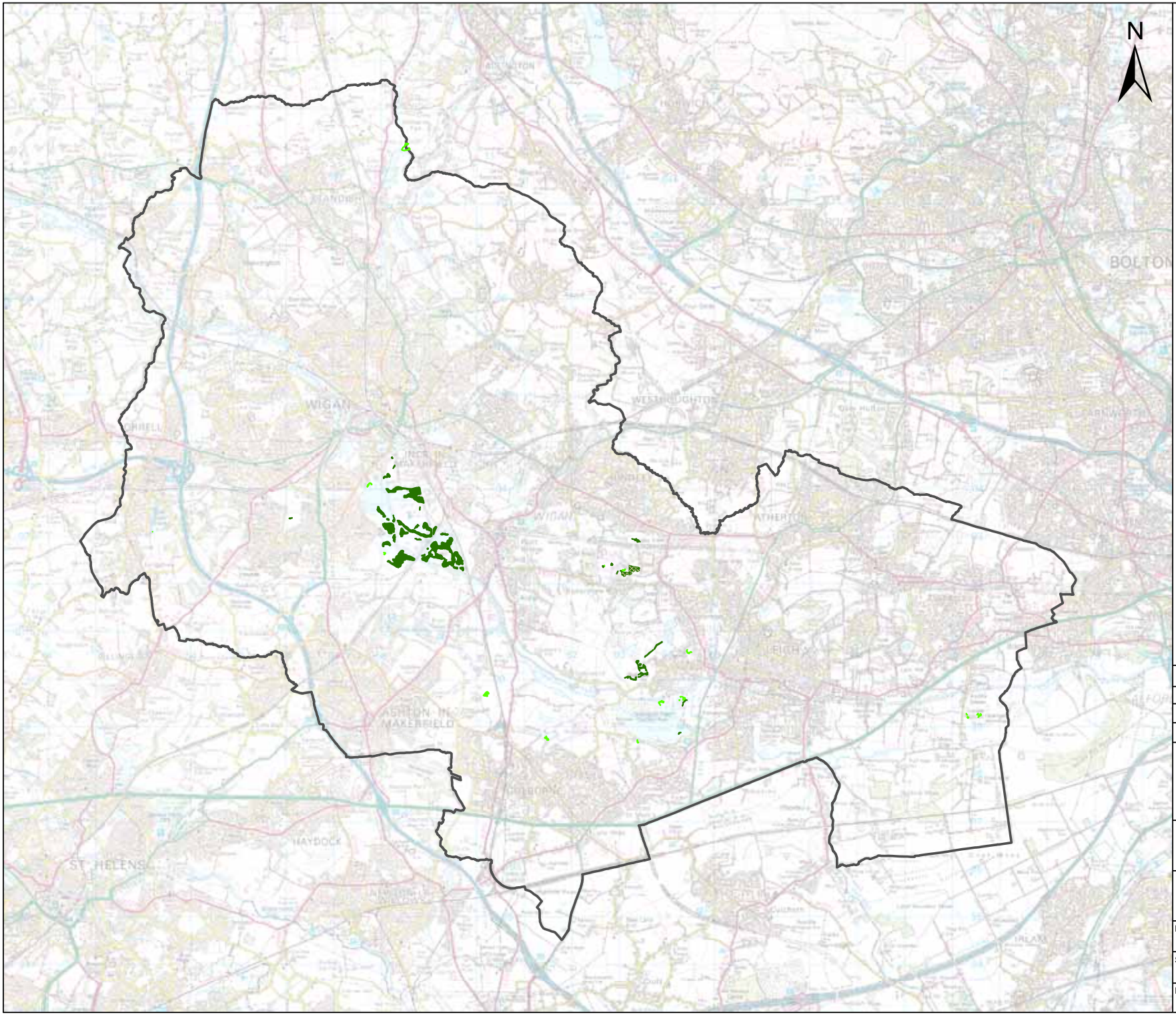
Drawn:	Checked:	Approved:
AP	RH	FBH



Wigan Borough boundary

Reedbed Habitat

- UK, Greater Manchester and Wigan Priority Habitat
- Mosaic of habitats including UK, Greater Manchester and Wigan Priority Habitat
- Potential UK, Greater Manchester and Wigan Priority Habitat

Rev	Description	Dwn	Appvd	Date

TEP
Genesis Centre
Birchwood Science Park
Warrington WA3 7BH
Tel 01925 844004
Fax 01925 844002
email tep@tep.uk.com

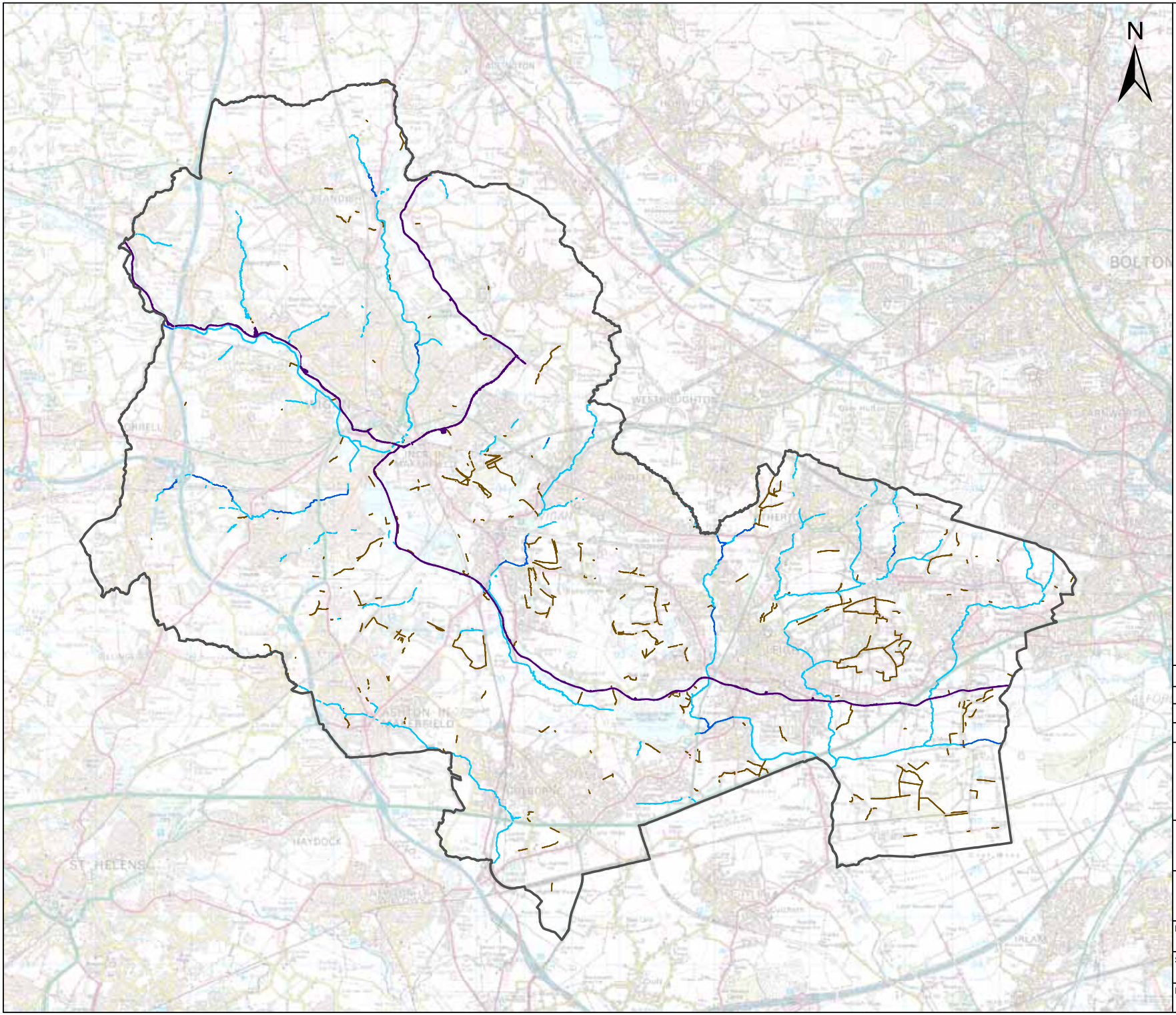
Project:
WIGAN BIODIVERSITY AUDIT

Title:
Reedbed Habitat

Map No.
G1771.005

Scale:	Date:
1:75,000 @ A3	12/05/2009

Drawn:	Checked:	Approved:
AP	RH	FBH



Rev	Description	Dwn	Appvd	Date

TEP
Genesis Centre
Birchwood Science Park
Warrington WA3 7BH
Tel 01925 844004
Fax 01925 844002
email tep@tep.uk.com

Project:
WIGAN BIODIVERSITY AUDIT

Title:
Water Corridor Habitats

Map No.
G1771.006

Scale:	Date:
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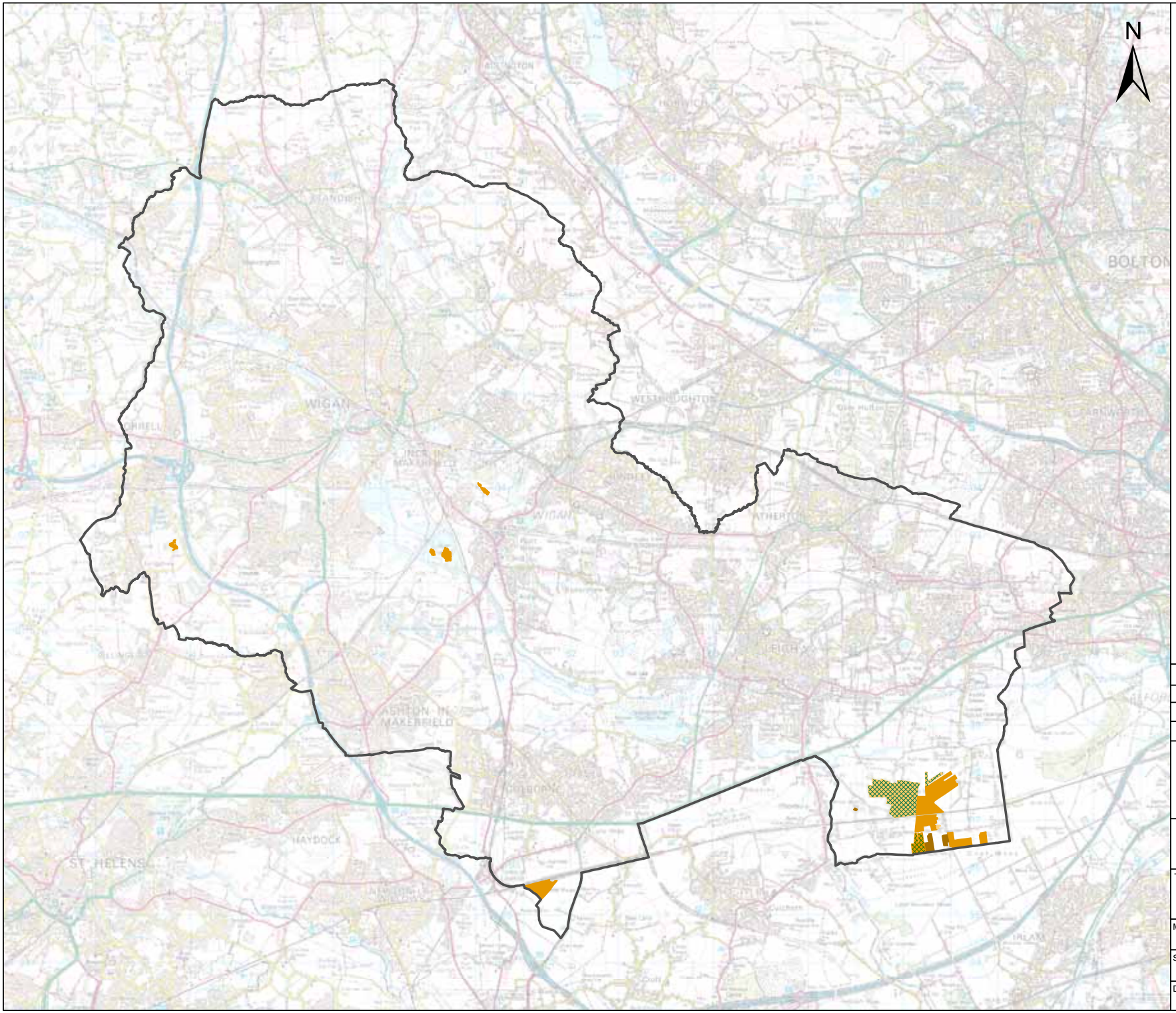
Drawn:	Checked:	Approved:
AP	RH	FBH



Wigan Borough boundary

Lowland Mossland Habitat

- UK, Greater Manchester and Wigan Priority Habitat
- Mosaic of habitats including UK, Greater Manchester and Wigan Priority Habitat
- Potential UK, Greater Manchester and Wigan Priority Habitat
- Mosaic of habitats including potential UK, Greater Manchester and Wigan Priority Habitat
- Remnant habitat unlikely to meet current priority criteria

Rev	Description	Dwn	Appvd	Date

TEP
Genesis Centre
Birchwood Science Park
Warrington WA3 7BH
Tel 01925 844004
Fax 01925 844002
email tep@tep.uk.com

Project:
WIGAN BIODIVERSITY AUDIT

Title:
Lowland Mossland Habitats

Map No.
G1771.007

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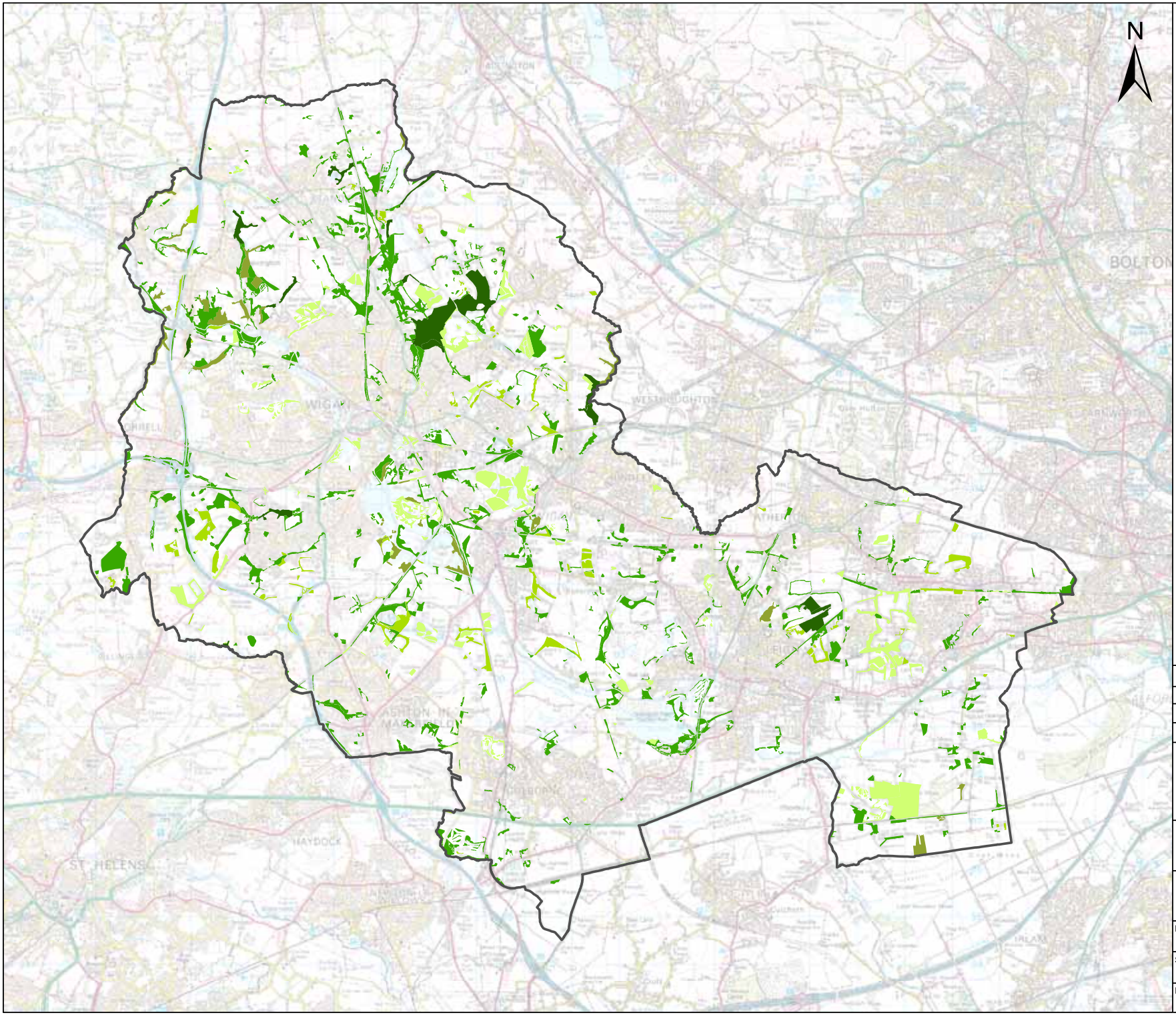
AP	RH	FBH



Wigan Borough boundary

Priority Woodland Habitats

- Wet Woodland
- Lowland Mixed Deciduous Woodland

Potential Priority Woodland Habitats

- Broadleaved Woodland (and associated scrub)

Unlikely Priority Woodland Habitats

- Mixed Woodland (and associated scrub)

Other Woodland Habitats

- Coniferous Woodland, Young Broadleaved and Coniferous Plantation and Other Scrub Habitats

Rev	Description	Dwn	Appvd	Date

TEP
Genesis Centre
Birchwood Science Park
Warrington WA3 7BH
Tel 01925 844004
Fax 01925 844002
email tep@tep.uk.com

Project:
WIGAN BIODIVERSITY AUDIT

Title:
Woodland and Scrub Habitats

Map No.
G1771.008

Scale:	Date:
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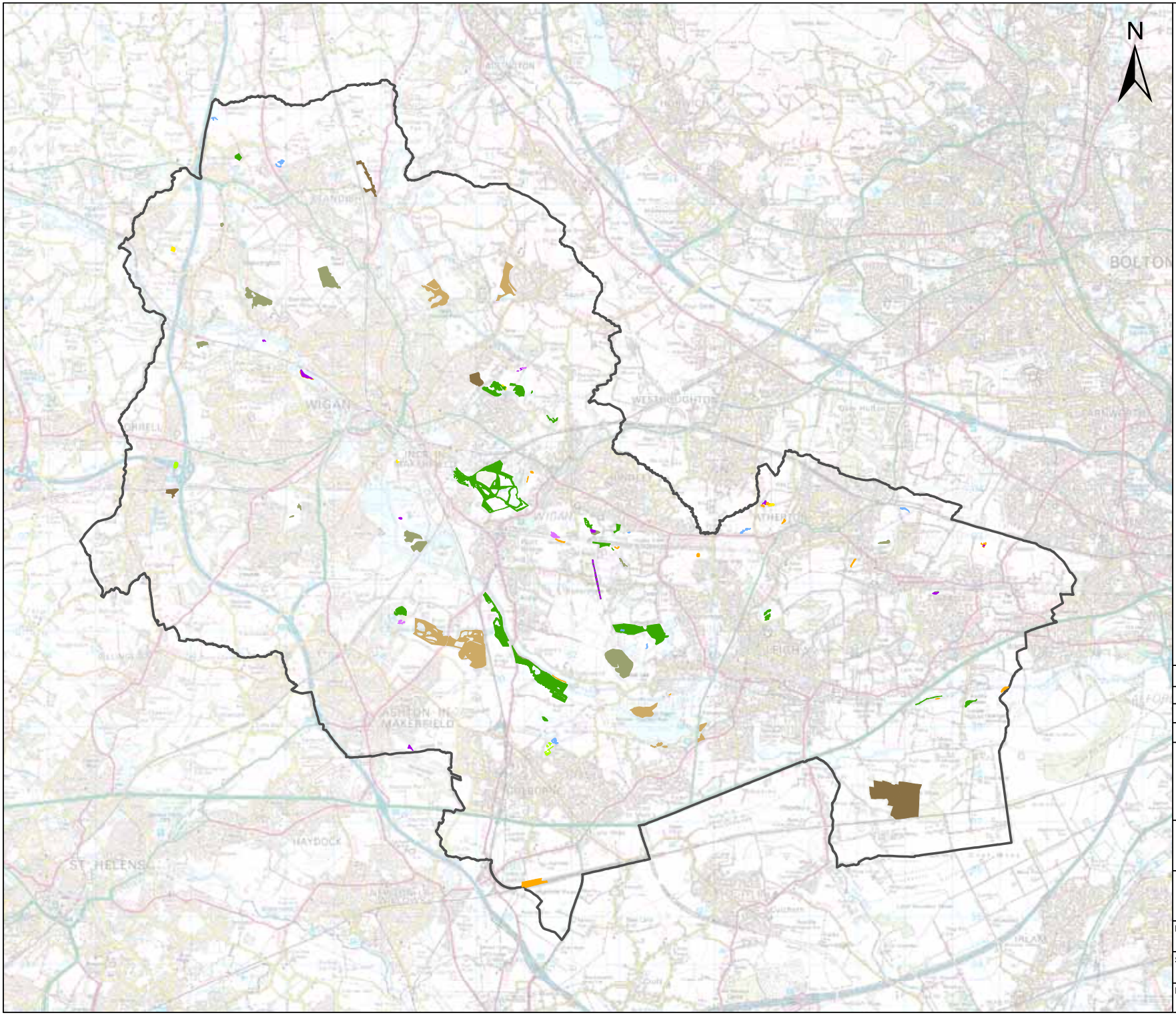
AP	RH	FBH



Wigan Borough boundary

Grassland and Heathland Habitats

- Lowland Heathland
- Lowland Heathland and Acid Grassland Mosaic
- Lowland Heathland and Woodland Mosaic
- Acid Grassland
- Hay Meadow and Neutral Grassland
- Calcareous Grassland
- Marshy Grassland and Marsh
- Open Habitat Mosaic and Interesting Grassland on Previously Developed Land
- Grassland Mosaics
- Grassland and Non-Grassland Mosaics
- Other Potentially Interesting Grassland

Rev	Description	Dwn	Appvd	Date

TEP
Genesis Centre
Birchwood Science Park
Warrington WA3 7BH
Tel 01925 844004
Fax 01925 844002
email tep@tep.uk.com

Project:
WIGAN BIODIVERSITY AUDIT

Title:
Grassland and Heathland Habitats

Map No.
G1771.009

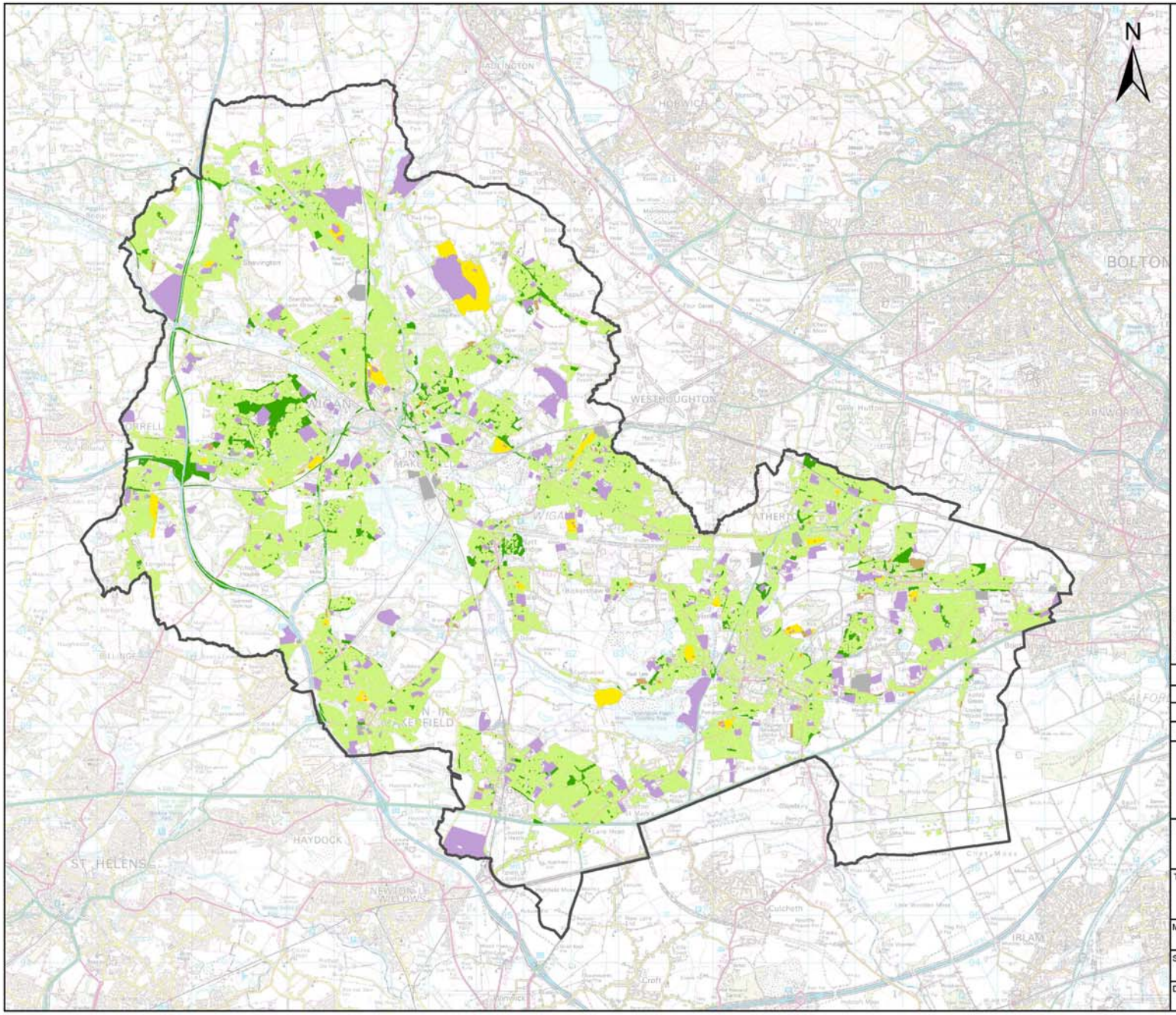
Scale: 1:75,000 @ A3

Date: 12/05/2009

Drawn: AP

Checked: RH

Approved: FBH



Rev	Description	Dwn	Appvd	Date

TEP
Genesis Centre
Birchwood Science Park
Warrington WA3 7BH
Tel 01925 844004
Fax 01925 844002
email tep@tep.uk.com

Project:
WIGAN BIODIVERSITY AUDIT

Title:
Urban Managed Greenspace

Map No.		
G1771.010		
Scale: 1:75,000 @ A3		Date: 12/05/2009
Drawn: AP	Checked: RH	Approved: FBH

APPENDIX 5: KEY SPECIES IN WIGAN

List and occurrence in Wigan of species recorded in key species groups

Species	Conservation Status[1]	Associated Habitat Type in Wigan[2,3]	Frequency occurrence in Wigan (no. grid squares out of 237)[4]
AMPHIBIANS			
Great crested newt	Bern Convention 1982 Habitats Directive 1992 Habitat Regulations 2010 Wildlife & Countryside Act 1981 UK Biodiversity Action Plan Greater Manchester BAP Wigan BAP	Standing water; Reedbed; Bog; Grasslands; Heath; Woodland and scrub; Ecologically rich field systems.	at least 31 (13%)
Common toad	WCA (partial protection) UKBAP	Standing water; Reedbed; Bog; Grasslands; Heath; Woodland and scrub; Managed Greenspace and gardens; Ecologically rich field systems.	unknown
BATS			
Brown long-eared bat	Bern Bonn Habitats Directive Habitat Regulations WCA UKBAP GMBAP (Bats)	Grasslands; Heath; Ecologically rich field systems; Woodland and scrub; Managed Greenspace and gardens	at least 20 3%

[1] *Bird conservation status taken from BTO Bird Facts (http://www.bto.org/birdfacts/indexa_all.htm) - asterisks indicate that listing is restricted in some way, either to a particular populations or race, or to a particular part of the schedule*

[2] *Primary habitats for bat species sourced from Bat Conservation Trust species fact sheets (http://www.bats.org.uk/pages/uk_bat_species.html) and applied to the important habitats within Wigan*

[3] *Primary habitat preferences for bird species taken from BTO Bird Facts (http://www.bto.org/birdfacts/indexa_all.htm) and applied to the important habitats within Wigan*

[4] *Frequency occurrence is the total number of grid squares containing a record for the species, but this may not accurately reflect species occurrence or distribution in the Borough as the review is based upon records and not actual survey across the Borough – absence of a record does not imply absence of a species*

Species	Conservation Status[1]	Associated Habitat Type in Wigan[2,3]	Frequency occurrence in Wigan (no. grid squares out of 237)[4]
Common pipistrelle bat	Bern Bonn Habitats Directive Habitat Regulations WCA GMBAP (Bats)	Standing water; Reedbed; Bog; Grasslands; Heath; Woodland and scrub; Managed Greenspace and gardens; Ecologically rich field systems	at least 115 49%
Soprano pipistrelle bat	Bern Bonn Habitats Directive Habitat Regulations WCA UKBAP GMBAP (Bats)	Standing water; Reedbed; Bog; Grasslands; Heath; Woodland and scrub; Managed Greenspace and gardens; Ecologically rich field systems	at least 27 11%
Daubenton's bat	Bern Bonn Habitats Directive Habitat Regulations WCA GMBAP (Bats)	Standing water; Reedbed; Water corridor	at least 20 8%
Leisler's bat	Bern Bonn Habitats Directive Habitat Regulations WCA GMBAP (Bats)	Woodland & scrub; Managed Greenspace & gardens	at least 25 11%
Whiskered/ Brandt's bat	Bern Bonn Habitats Directive Habitat Regulations WCA GMBAP (Bats)	Standing water; Reedbed ; Woodland & scrub; Water corridor	at least 6 3%
Natterer's bat	Bern Bonn Habitats Directive Habitat Regulations WCA GMBAP (Bats)	Woodland & scrub; Managed Greenspace & gardens; Agricultural (field systems); Standing water; Water corridor	at least 2 1%
Noctule bat	Bern Bonn Habitats Directive Habitat Regulations WCA UKBAP GMBAP (Bats)	Standing water; Reedbed; Woodland & scrub; Managed Greenspace & gardens	at least 42 18%

Species	Conservation Status[1]	Associated Habitat Type in Wigan[2,3]	Frequency occurrence in Wigan (no. grid squares out of 237)[4]
Leisler's bat	Bern Bonn Habitats Directive Habitat Regulations WCA GMBAP (Bats)	Woodland & scrub; Managed Greenspace & gardens	at least 3 1%
Serotine	Bern Bonn Habitats Directive Habitat Regulations WCA GMBAP (Bats)	Agricultural (field systems); Managed Greenspace & gardens; Woodland & scrub	at least 2 1%
BIRDS			
Arctic Skua[$]	Bern UKBAP	*(assumed passage only)* *Grasslands;* *Standing water*	at least 4 2%
Avocet[$]	WCA Wild Birds Directive Bern Bonn African-Eurasian Waterbird Agreement Red data category – amber	*(assumed passage only)* *Standing water;* *Reedbed*	at least 4 2%
Barn Owl	Bern CITES WCA GMBAP (Farmland Birds) Red data category – amber	Ecologically rich field systems; Managed Greenspace and gardens; Water corridors	at least 43 18%
Bearded Tit[$]	WCA Bern Red data category – amber	Reedbed	at least 4 2%
Bittern	Bern Bonn AEWA WBD WCA UKBAP GMBAP Wigan BAP Red data category – red	Standing water; Reedbed; Bog	at least 11 5%

[$] *Bird species denoted with a $ symbol have been recorded only at Pennington Flash*

Species	Conservation Status[1]	Associated Habitat Type in Wigan[2,3]	Frequency occurrence in Wigan (no. grid squares out of 237)[4]
Black Redstart[$]	Bern Bonn WCA GMBAP Red data category – amber	Urban	at least 4 2%
Black Tern[$]	Bern Bonn WBD AEWA WCA	Grasslands; Standing water	at least 4 2%
Black-necked Grebe	WCA Red data category – amber	Standing water; Reedbed	at least 9 4%
Black-tailed Godwit	Bern Bonn WBD AEWA WCA UKBAP Red data category – red	Grasslands; Standing water; Reedbed	at least 9 4%
Black-throated Diver[$]	Bern Bonn WBD AEWA WCA UKBAP Red data category – amber	Standing water; Reedbed	at least 4 2%
Brambling	Bern WCA	Woodland & scrub	at least 18 8%
Bullfinch	WCA UKBAP GMBAP (Farmland Birds) Red data category – red	Woodland & scrub; Ecologically rich field systems	at least 71 30%
Cetti's Warbler	Bern Bonn WCA	Reedbed; Standing water	at least 2 1%
Common Crossbill	Bern WCA	Woodland & scrub	at least 6 3%

[$] *Bird species denoted with a $ symbol have been recorded only at Pennington Flash*

Species	Conservation Status[1]	Associated Habitat Type in Wigan[2,3]	Frequency occurrence in Wigan (no. grid squares out of 237)[4]
Common Scoter	Bern Bonn WBD AEWA WCA UKBAP Red data category – red	Standing water	at least 7 3%
Corn bunting	Bern UKBAP GMBAP (Farmland Birds) Red data category – red	Grasslands; Ecologically rich field systems	at least 10 4%
Cuckoo	Bern UKBAP Red data category – red	Woodland & scrub	at least 30 13%
Curlew	Bern Bonn WBD AEWA UKBAP Red data category – amber	Reedbed; Grasslands	at least 25 11%
Dunnock (Hedge accentor)	Bern WCA UKBAP Red data category – amber	Woodland & scrub; Ecologically rich field systems; Managed Greenspace & gardens	at least 46 19%
Fieldfare	Bern Bonn WBD WCA Red data category – red	Woodland & scrub	at least 48 20%
Firecrest	Bern Bonn WCA Red data category – amber	Woodland & scrub	at least 10 4%
Garganey	Bern Bonn WBD AEWA WCA Red data category – amber	Standing water; Reedbed; Grasslands	at least 10 4%

Species	Conservation Status[1]	Associated Habitat Type in Wigan[2,3]	Frequency occurrence in Wigan (no. grid squares out of 237)[4]
Grasshopper warbler	Bern Bonn Red data category – red	Standing water; Reedbed; Grasslands; Heath; Woodland & scrub	at least 43 18%
Great Northern Diver[$]	Bern Bonn WCA Red data category – amber	Standing water; Water corridor	at least 4 2%
Green Sandpiper	Bern Bonn WCA AEWA Red data category – amber	Standing water; Reedbed; Grasslands	at least 11 5%
Greenshank	Bern Bonn WBD AEWA WCA	Standing water; Reedbed; Grasslands	at least 3 1%
Grey partridge	Bern WBD UKBAP GMBAP (Farmland Birds) Red data category - red	Ecologically rich field systems; Grasslands; Heath	at least 66 28%
Hen Harrier	Bern Bonn WBD CITES WCA Red data category - red	Grasslands; Ecologically rich field systems	at least 5 2%
Herring Gull	WBD UKBAP Red data category - red	Standing water	at least 17 7%
Hobby	Bern Bonn CITES WCA	Grasslands; Ecologically rich field systems	at least 16 7%
Honey-buzzard	Bern Bonn WBD CITES WCA Red data category – amber	Woodland & scrub	at least 1 <1%

[$] *Bird species denoted with a $ symbol have been recorded only at Pennington Flash*

Species	Conservation Status[1]	Associated Habitat Type in Wigan[2,3]	Frequency occurrence in Wigan (no. grid squares out of 237)[4]
House sparrow	UKBAP Red data category – red	Managed Greenspace & gardens	at least 54 23%
Kentish Plover[$]	WCA	*(assumed historic records – most likely extinct from the District)* *Standing water;* *Water corridor*	at least 4 2%
Kingfisher	Bern WBD WCA Red data category – amber	Water corridor	at least 50 21%
Lapwing	Bern Bonn WBD AEWA UKBAP GMBAP (Farmland Birds) Red data category – red	Ecologically rich field systems; Grasslands; Heath; Standing water; Reedbed	at least 69 29%
Leach's Storm-petrel[$]	Bern WBD WCA Red data category – amber	*(assumed passage only)* *Standing water*	at least 4 2%
Lesser Redpoll	Bern UKBAP Red data category – red	Woodland & scrub	at least 40 17%
Lesser Spotted Woodpecker	Bern UKBAP Red data category – red	Woodland & scrub	at least 8 3%
Linnet	Bern WCA UKBAP GMBAP (Farmland Birds) Red data category – red	Ecologically rich field systems Grasslands; Heath; Managed Greenspace & gardens	at least 44 19%
Little Gull[$]	WCA Bern Red data category – amber	*(assumed passage only)* *Standing water;* *Grasslands*	at least 4 2%
Little Ringed Plover	Bern Bonn WCA AEWA	Standing water; Grasslands	at least 21 9%

[$] *Bird species denoted with a $ symbol have been recorded only at Pennington Flash*

[$] *Bird species denoted with a $ symbol have been recorded only at Pennington Flash*

Species	Conservation Status[1]	Associated Habitat Type in Wigan[2,3]	Frequency occurrence in Wigan (no. grid squares out of 237)[4]
Little Tern[$]	Bern Bonn WBD AEWA WCA Red data category – amber	Standing water; Water corridor	at least 4 2%
Long-tailed Duck[$]	Bern Bonn WBD AEWA WCA	Standing open water	at least 4 2%
Marsh Harrier	Bern Bonn CITES WCA Red data category – amber	Reedbed; Grasslands	at least 8 3%
Marsh Tit[$]	Bern UKBAP Red data category – red	Woodland & scrub; Managed Greenspace and gardens	at least 4 2%
Mediterranean Gull	Bern Bonn WBD AEWA WCA Red data category – amber	Standing water; Reedbed	at least 5 2%
Merlin	Bern Bonn WBD CITES WCA Red data category – amber	Heath; Grasslands; Woodland & scrub	at least 15 6%
Nightjar	Bern WBD GMBAP (Mosslands) Red data category – red	Heath; Grasslands Mosslands	at least 2 1%
Osprey[$]	Bern Bonn WBD CITES WCA Red data category – amber	Standing water; Water corridor	at least 4 2%
Peregrine Falcon	Bern Bonn WBD CITES WCA	Grasslands; Urban	at least 26 11%

[$] *Bird species denoted with a $ symbol have been recorded only at Pennington Flash*

Species	Conservation Status[1]	Associated Habitat Type in Wigan[2,3]	Frequency occurrence in Wigan (no. grid squares out of 237)[4]
Quail	Bern Bonn WBD WCA Red data category – amber	Ecologically rich field systems	at least 4 1%
Red-throated Diver[$]	Bern Bonn WBD WCA AEWA Red data category – amber	Standing water	at least 4 2%
Redwing	Bern Bonn WBD WCA Red data category – red	Woodland & scrub	at least 60 25%
Reed bunting	Bern Appendix 3 WCA Sch 3 Red data category – red UKBAP GMBAP (Farmland Birds)	Standing water; Reedbed; Ecologically rich field systems	at least 63 27%
Ring Ouzel	Bern Bonn UKBAP Red data category – red	Grasslands; Heath	at least 9 4%
Roseate Tern[$]	Bern Bonn WBD WCA AEWA UKBAP Red data category – red	Standing water	at least 4 2%
Ruff	Bern Bonn WBD WCA AEWA Red data category – red	Standing water; Grasslands	at least 5 2%
Scaup	Bern Bonn WBD WCA AEWA Red data category – red	Standing water	at least 7 3%

[$] *Bird species denoted with a $ symbol have been recorded only at Pennington Flash*

Species	Conservation Status[1]	Associated Habitat Type in Wigan[2,3]	Frequency occurrence in Wigan (no. grid squares out of 237)[4]
Skylark	Bern WBD UKBAP GMBAP (Farmland Birds) Red data category - red	Ecologically rich field systems Grasslands	at least 59 25%
Slavonian Grebe[$]	Bern Bonn WBD WCA AEWA Red data category – amber	Standing water; Reedbed; Water corridor	at least 4 2%
Snow Bunting[$]	Bern WCA Red data category – amber	Grasslands	at least 4 2%
Song thrush	Bern Bonn WBD WCA UKBAP GMBAP (Farmland Birds) Red data category - red	Managed Greenspace & gardens; Woodland & scrub; Ecologically rich field systems	at least 65 27%
Spotted Crake[$]	Bern Bonn WBD WCA AEWA Red data category – amber	Reedbed; Grasslands	at least 4 2%
Spotted Flycatcher	Bern Bonn UKBAP Red data category – red	Woodland & scrub; Managed Greenspace and gardens	at least 11 5%
Starling	WBD WCA GMBAP (Farmland Birds) Red data category - red	Ecologically rich field systems; Managed Greenspace & gardens; Standing water & reed; Woodland & scrub	at least 72 30%
Temminck's Stint[$]	Bern Bonn WCA AEWA Red data category – red	Grasslands	at least 4 2%
Tree Pipit	Bern UKBAP Red data category – red	Woodland & scrub	at least 10 4%

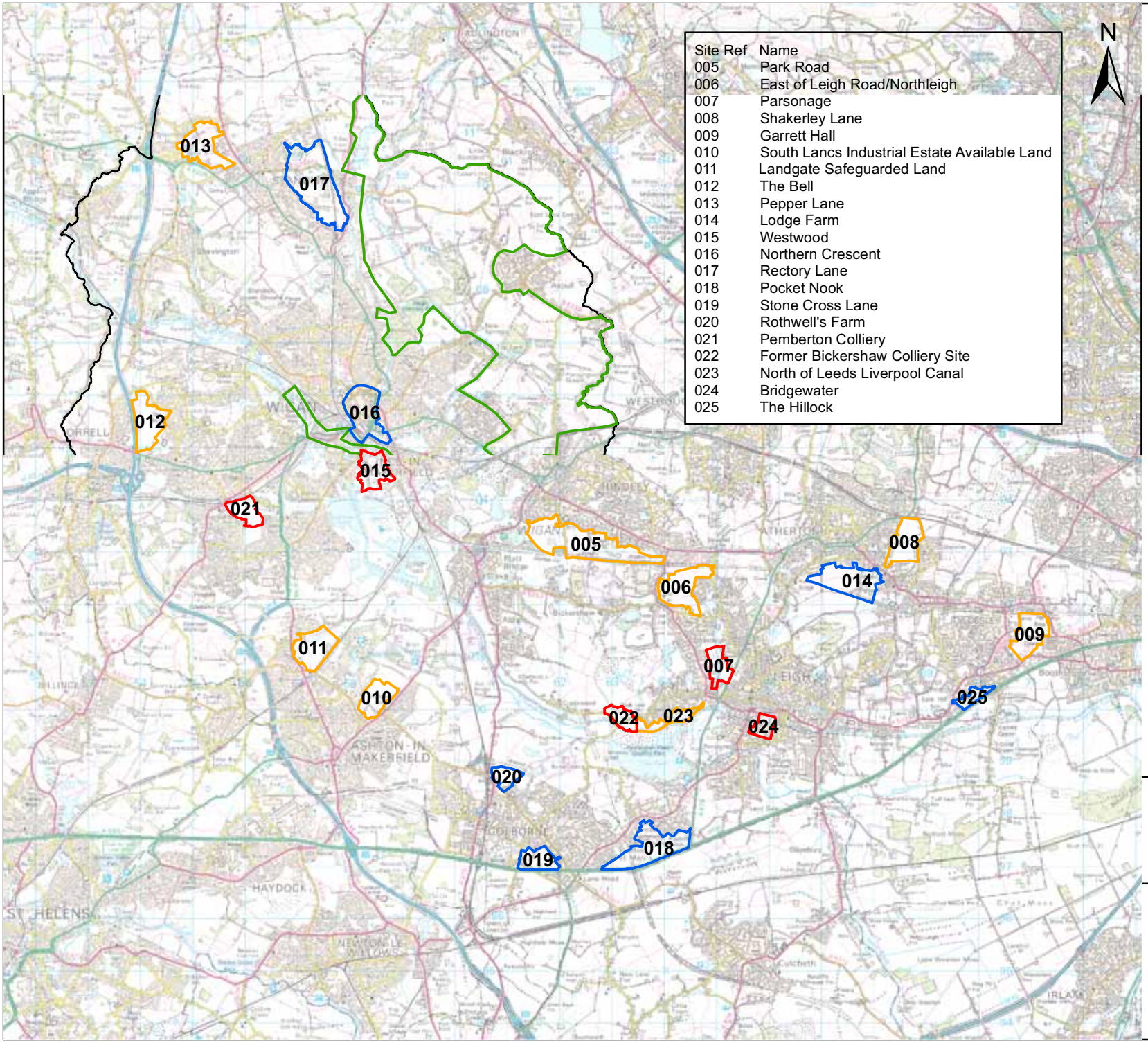
[$] *Bird species denoted with a $ symbol have been recorded only at Pennington Flash*

Species	Conservation Status[1]	Associated Habitat Type in Wigan[2,3]	Frequency occurrence in Wigan (no. grid squares out of 237)[4]
Tree sparrow	Bern UKBAP GMBAP (Farmland Birds) Red data category – red	Ecologically rich field systems; Woodland & scrub	at least 26 11%
Tundra (Bewick's) Swan[$]	Bern Bonn WBD WCA AEWA UKBAP Red data category - amber	Standing water; Water corridor	at least 4 2%
Turtle Dove[$]	Bern Bonn WBD UKBAP Red data category – red	Woodland & scrub; Managed Greenspace and gardens	at least 4 2%
Twite[$]	Bern WCA UKBAP GMBAP Red data category – red	Grasslands; Heath	at least 4 2%
Velvet Scoter[$]	Bern Bonn WBD WCA AEWA Red data category – amber	Standing water	at least 4 2%
Whimbrel	Bern Bonn WBD WCA AEWA Red data category – red	Grasslands; Heath	at least 13 5%
Whooper Swan	Bern Bonn WBD WCA AEWA Red data category – amber	Standing water; Water corridor	at least 10 4%
Willow tit	Bern UKBAP GMBAP Red data category – red	Woodland & scrub; Standing water & reed; Bog	at least 61 26%

[$] *Bird species denoted with a $ symbol have been recorded only at Pennington Flash*

Species	Conservation Status[1]	Associated Habitat Type in Wigan[2,3]	Frequency occurrence in Wigan (no. grid squares out of 237)[4]
Wood Lark	Bern WBD WCA UKBAP Red data category – amber	Woodland & scrub; Grasslands	at least 1 <0%
Wood Sandpiper[$]	Bern Bonn WBD WCA AEWA Red data category – amber	Standing water; Water corridor Grasslands	at least 4 2%
Wood Warbler	Bern Bonn UKBAP Red data category – red	Woodland & scrub	at least 6 3%
Yellowhammer	Bern WCA UKBAP GMBAP (Farmland Birds) Red data category – red	Ecologically rich field systems; Grassland; Heath 9	at least 14 6%
Yellow wagtail	Bern UKBAP GMBAP (Farmland Birds) Red data category – red	Ecologically rich field systems; Grassland; Heath	at least 59 25%

APPENDIX 6: STRATEGIC SITES



Site Ref	Name
005	Park Road
006	East of Leigh Road/Northleigh
007	Parsonage
008	Shakerley Lane
009	Garrett Hall
010	South Lancs Industrial Estate Available Land
011	Landgate Safeguarded Land
012	The Bell
013	Pepper Lane
014	Lodge Farm
015	Westwood
016	Northern Crescent
017	Rectory Lane
018	Pocket Nook
019	Stone Cross Lane
020	Rothwell's Farm
021	Pemberton Colliery
022	Former Bickershaw Colliery Site
023	North of Leeds Liverpool Canal
024	Bridgewater
025	The Hillock

Emerging Preferred Option Strategic Site Locations

- Wigan Borough Boundary
- Greenheart Boundary
- Existing Key Strategic Site
- Candidate Key Strategic Site
- Other Site/Safeguarded Land

Data Sources: Wigan Council

TEP

Wigan Council

G1771.001

Site name:	Park Road (TEP Site Ref 005)		
Site location:	Hindley	**Central Grid Ref:**	SD624031
Site area:	113 ha		

General description:
Safeguarded land, predominantly within Council ownership. Roughly linear site located adjacent to southern edge of Hindley conurbation. Site contains a small amount of residential development, farm buildings and fields, playing fields and Leyland Park, pockets of woodland, field ponds and reservoirs, watercourses in the form of brooks and open drains and also disused land such as former colliery workings.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citations Site survey within accessible land Remote assessment, viewed from accessible land

Biodiversity Interest:		
Designated areas:	Two SBIs within site. Three SBIs adjacent to site.	
SBI	Name:	Reservoirs East of Leyland Park – A60
	Grade:	B
	Area:	2.2ha
	Main classification feature(s):	Vegetation mosaic, invertebrates, bryophytes, amphibians
	Proportion within site:	100%
SBI	Name:	Field by Scowcroft Farm – A92
	Grade:	B
	Area:	1.1ha
	Main classification feature(s):	Vegetation mosaic, butterflies & moths
	Proportion within site:	100%

Priority habitats:

present	probable	potential
standing water managed greenspace important grassland (acid) water corridor reedbed heathland hedgerow		woodland important grasslands

Priority species:

present	probable	potential
great crested newt common toad lapwing yellow wagtail bats	water vole dunnock starling song thrush skylark house sparrow	grass snake willow tit bullfinch corn bunting grey partridge linnet reed bunting tree sparrow yellowhammer brown hare

Statutorily protected species:

present	probable	potential
great crested newt bats	water vole	grass snake

Other :

- SBI citations indicate probable high invertebrate diversity across the site. Likely habitats to support invertebrate assemblages will be grassland mosaic, hedgerow networks, woodland and woodland edge, reedbed, pond and swamp and watercourses, including ditches.
- At least 10 bird species have been recorded in grid squares containing this site, suggesting a good species assemblage.
- The dismantled railway corridor (SBI – A64) may provide important wildlife linkages across the south of the site.

General appraisal for Strategic Site:

Designated sites:

- Two Sites of Biological Importance entirely within site, three immediately adjacent to site and further sites in close proximity.
- SBIs within site should be retained *in situ*
- SBIs within site and adjacent to site should be protected and buffered - through open space provision or landscaping. Less preferable, but if SBIs are to backed by gardens, appropriate conditions should be secured through planning consents to ensure suitable fencing is provided to prevent tipping, pet escape and encroachment within the SBI.
- SBIs within, adjacent and in close proximity (<1km) should be provided with linkages using appropriate green infrastructure - habitats within linkages should emulate those within the SBIs, in this case primarily grassland, marsh, scrub and open water.

Priority habitats:

- Ponds, managed greenspace (parks and gardens) and hedgerows are generally widespread across Wigan. Net loss should be avoided. Surveys for protected species and to confirm important hedgerows would be required.
- Acid grassland, heathland, woodland and reedbed are generally not extensive within Wigan. These habitats, due to their maturity or complexity should, where possible, be retained and protected *in situ* and provided with appropriate linkages to similar habitats and/or the wider landscape.
- Where *in situ* retention or no net loss of habitats is not achievable within the site, offsetting will be required. Suitable areas, such as restoration or enhancement within SBIs or restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.
- This site lies adjacent to the Greenheart and should promote green infrastructure and development densities suitable to assimilate into the Greenheart fringe.

Priority species (likely to include some statutorily protected species):

- Great crested newt and common toad confirmed within the site, with additional concentrations of great crested newt ponds known to the south and east of the site.
- Habitats suitable for roosting, foraging and commuting bats. Bats (common and soprano pipistrelles and noctules) have been recorded from grid squares containing the site.
- Water vole confirmed in close proximity to site, to south and west. Habitats within the site are suitable for water vole and are connected with offsite habitats known to support water vole.
- Habitats may be suitable to support significant numbers of farmland bird species, including ground nesting and passerine species.

General appraisal for Strategic Site:

- The site contains a variety of scrub, woodland, reedbed, grassland, pond and ditch habitats within the site. Combined with the known presence of amphibians and fish in several waterbodies, these habitats may be suitable to support reptiles, particularly grass snake.
- Brown hare recorded (NBN 1996) towards western end of site. Habitats within site have potential to maintain local populations, if still present.
- The habitats within the site, such as woodland, woodland edge, hedgerow networks and scrub/grassland mosaics may support willow tit.
- Surveys for protected and priority species should accompany any planning applications. Habitats supporting protected and priority species should be retained in situ, where possible. Retained habitats should be appropriately linked to the wider landscape.
- No net loss of protected or priority species should be permitted. Where habitats supporting these species cannot be retained *in situ*, compensation should be provided which should seek to provide net gain for these species.

Biodiversity Enhancement Opportunity:

- An area of Council owned grassland directly to the west, adjoining SBI A99, was recorded as acid grassland, becoming neutrified. This area could be restored and enhanced as part of an offsetting package.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002

Site name:	East of Leigh Road / Northleigh (TEP Site Ref 006)		
Site location:	Hindley	**Central Grid Ref:**	SD573001
Site area:	52 ha		

General description:
The eastern extents of the site are Safeguarded land, while the majority of the site is allocated in the Wigan Replacement UDP April 2006 for reclamation and renewal. Roughly circular site located between the southern tip of the Hindley conurbation and northern extent of Leigh. Site is dominated by grassland with hedges, woodland and scattered trees, scrub, ponds, watercourses. Some scattered disused buildings and building foundations are located in the southwest of the site. The northeast corner comprises a capped colliery mound. The south of the site has been established as informal pony paddocks and pony grazing is evident across other grassland areas central to the site. Footpaths cross the site, some of which are hard surfaced.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citations Site survey within accessible land Remote assessment, viewed from accessible land

Biodiversity Interest:		
Designated areas:	No SBIs within site. One SBI to immediate northwest of site (Disused Railway at Hindley Green – A64).	
Priority habitats:		
present standing water hedgerow heathland managed greenspace important grassland (acid)	probable reedbed	potential important grasslands woodland
Priority species:		
present great crested newt common toad bats water vole dunnock grasshopper warbler bullfinch lapwing reed bunting starling skylark song thrush	probable	potential grass snake willow tit

Statutorily protected species:

present	probable	potential
great crested newt water vole bats		grass snake

Other :

- The disused railway corridor in the northwest extent and extending east-west to the north of the site, which contains ponds, woodland, grassland and scrub, would function as an important wildlife corridor and linkage.

- At least two of the ponds would appear to have local angling interest, although this may not be formalised with an angling club, society or association.

- Japanese knotweed is present in significant infestations in the southwest of the site and smaller infestations are present in east of the site.

General appraisal for Strategic Site:

Designated sites:

- No Sites of Biological Importance within site, but one site (Disused Railway at Hindley Green – A64) is located a short distance to the north west of the site, connected to the site by the disused rail corridor.
- The disused rail corridor is a key linkage, the function of which should be retained within an appropriate green infrastructure – habitats within the linkage, if the existing habitats cannot be retained *in situ*, should emulate those within the rail corridor currently, in this case primarily scrub woodland, open water and grassland.

Priority habitats:

- Ponds and hedgerows are generally widespread across Wigan. Net loss should be avoided. Surveys for protected species and to confirm important hedgerows would be required. Linkage between ponds within the site and ponds to the east and west should be retained.
- Acid grassland, woodland and reedbed are generally not extensive within Wigan. These habitats, due to their maturity or complexity should, where possible, be retained and protected *in situ* and provided with appropriate linkages within the green infrastructure of the site.
- Where *in situ* retention or no net loss of habitats is not achievable within the site, offsetting will be required. Suitable areas, such as restoration or enhancement within SBIs or restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.
- This site lies within the Greenheart and should promote green infrastructure and development densities suitable to assimilate the site into the Greenheart fringe.
- The majority of the site was recorded as neutral grassland in the 1986 Phase 1 survey. However, it is unlikely to match the Priority habitat criteria for species-rich unimproved grassland. Areas which were visited did not appear to be species-rich. However, some pockets of diversity may remain.

Priority species (likely to include some statutorily protected species):

- Great crested newt and common toad within the site, with additional concentrations of great crested newt ponds known to the north (Dangerous Corner), east (Pickley Green), west/southwest (Bickershaw) and northwest (Hindley Green) of the site. The site is an important linkage between these surrounding populations; linkage should be retained within the site.

General appraisal for Strategic Site:

- Habitats suitable for roosting (trees, but building roosts within the site are unlikely), foraging and commuting bats; of particular importance for commuting will be the disused railway corridor. Bats (pipistrelle species) have been recorded from grid squares containing the site.
- Water vole within the site and to the west of the site; suitable habitats include the ditch lines and the waterbodies.
- Good bird species diversity at the site, including several passerine and ground nesting priority species.
- The site contains a variety of scrub, woodland, reedbed, grassland, pond and ditch habitats within the site. Combined with the known presence of amphibians and fish in several waterbodies, these habitats may be suitable to support reptiles, particularly grass snake.
- Surveys for protected and priority species should accompany any planning applications. Habitats supporting protected and priority species should be retained *in situ*, where possible. Retained habitats should be appropriately linked to the wider landscape.
- No net loss of protected or priority species should be permitted. Where habitats supporting these species cannot be retained *in situ*, compensation should be provided which should seek to provide net gain for these species.

Biodiversity Enhancement Opportunity:

- Linkages should be retained across the site, particularly east-west to maintain the current function of the railway corridor, and northeast-southwest to maintain connectivity between great crested newt populations.
- Where additional habitat loss beyond that which can be provided within linkages result in net loss, offsetting should be provided.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Parsonage (TEP Site Ref 007)		
Site location:	Leigh	**Central Grid Ref:**	SD650008
Site area:	24 ha		

General description:
Site lies roughly central to Leigh, encompassing the banks of Westleigh Brook. The site comprises rank grassland, scrub, tall herb, scattered trees and woodland, bare ground and ephemeral growth. The land in the south on both sides of the brook is located over the former Parsonage Colliery (recorded on the Phase 1 habitat maps). The land further north, to the west of the brook, is located over former mine workings and colliery mound. The land within the site, with the exception of the Westleigh Brook corridor, is typical of derelict urban scrub-grassland mosaics establishing on formerly developed land. Footpaths follow the brook and cross the site and numerous desire lines are evident from aerial photographs.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citations

Biodiversity Interest:		
Designated areas:	One SBI to west of site – Firs Park Grade C – A65	
	One SBI to south of site – Pennington Flash Grade A – A78	
Priority habitats:		
<u>present</u> water corridor (Westleigh Brook) managed greenspace	<u>probable</u>	<u>potential</u> important grasslands woodland
Priority species:		
<u>present</u> bats great crested newt	<u>probable</u> common toad water vole	<u>potential</u> lapwing song thrush dunnock skylark
Statutorily protected species:		
<u>present</u> great crested newt bats	<u>probable</u> water vole	<u>potential</u> Kingfisher
Other :		

- Plantation, tall herb and scrub along the west boundary form a wildlife corridor to land in the north.
- The habitats along Westleigh Brook, including tall grass, scrub and scattered trees, form a wildlife corridor connecting the site to the Greenheart in the south and more open countryside to the north of Leigh.
- The diverse structure and current condition of habitats present on formerly developed land might result in good invertebrate interest such as butterflies and Odonata, although no priority species currently recorded in the area.

General appraisal for Strategic Site:

Designated sites:

- Firs Park SBI located to east of site.
- Pennington Flash SBI – A78 - located to south of site, connect to site by Westleigh Brook.

Priority habitats:

- Westleigh Brook supports water vole to the south and north of the site; this qualifies the brook as a priority habitat under the new rivers priority habitat type in the absence of any other qualifying feature.
- A small area of woodland canopy is present on the north boundary of the site. Woodland canopy is also establishing in the east of the site. Due to its relative maturity woodland habitat should, where possible, be retained and protected *in situ* and provided with appropriate linkages to similar habitats and/or the wider landscape.
- The corridor of Westleigh Brook is identified as a flood risk corridor, incorporating a smaller central area at category 3 (high risk). Sustainable drainage design within the site should aim to enhance the brook corridor, for example by creating ponds or retention basins and/or swales.
- The site links several areas of managed greenspace, including amenity grassland and playing pitches. Linkage to these areas should be retained.
- Survey of the derelict land areas, particularly east of Westleigh Brook, is required to verify the presence of priority habitats such as acid grassland and/or open mosaic on previously developed land.
- No ponds are apparently present, but great crested newt is recorded on the west boundary and just off the west boundary – habitats within the site may support terrestrial animals.

Priority species (likely to include some statutorily protected species):

- Water vole present on Westleigh Brook, to north and west.
- Great crested newt are present just within the west boundary and just outside the west boundary of the site; suitable foraging and refuge habitats are present across the site, particularly along the west boundary and along the central corridor of Westleigh Brook.
- Bats (common and soprano pipistrelles and noctules) have been recorded from grid squares containing the site.
- Surveys for protected and priority species (notably great crested newt and other amphibians, water vole and breeding birds) should accompany any planning applications.
- Habitats supporting protected and priority species should be retained in situ, where possible. Retained habitats should be appropriately linked to the wider landscape.
- No net loss of protected or priority species should be permitted. Where habitats supporting these species cannot be retained *in situ*, compensation should be provided which should seek to provide net gain for these species.

Statutorily protected species (those which are not also priority species):

- Kingfisher may be found along Westleigh Brook; the SBI citation for Pennington Flash notes kingfisher feeding on Westleigh Brook.

Biodiversity Enhancement Opportunity:

- Water vole habitats should be retained in situ to maintain habitat extent and range for the species. Small scale habitat compensation could be provided within the brook corridor to offset habitat loss elsewhere within the site.
- If further habitat offsetting is required, for example, for amphibians or bird species, suitable areas might include Pennington Flash or Bickershaw Colliery.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002

Site name:	Shakerley Lane (TEP Site Ref 008)		
Site location:	Tyldesley	**Central Grid Ref:**	SD686031
Site area:	42 ha		

General description:
Safeguarded land. Former colliery mound topped with woodland/scrub canopy and with exposed southern face in south of site. Remainder of site predominantly rural with occasional hedges and extensive tall grass sward. Possible grazing within the north of site, where hedgerows occur. Extensive footpath and desire line access across the site.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citations Site survey within accessible land Remote assessment, viewed from accessible land

Biodiversity Interest:		
Designated areas:	No SBIs within site. One SBI to immediate northeast of site (Marsh and Reedbeds at Shakerley – A69).	
Priority habitats:		
<u>present</u> hedgerow important grasslands managed greenspace water corridor (Hindsford Brook)	<u>probable</u> rivers	<u>potential</u> pond woodland
Priority species:		
<u>present</u> bats	<u>probable</u> dunnock house sparrow lapwing skylark song thrush starling water vole	<u>potential</u> bullfinch corn bunting grey partridge linnet reed bunting tree sparrow yellowhammer
Statutorily protected species:		
<u>present</u> bats	<u>probable</u> water vole	<u>potential</u>
Other :		

- The railway corridor to the north of the site, running east-west to the north of the site, may function as an important wildlife corridor and linkage.
- Hindsford Brook, even if it may not qualify as priority habitat, provides an important linkage north-south on the east side of the site and connectivity with the landscape to the east.
- The long grassland swards present on site, with occasional scrub or acid characteristics in east and south may provide opportunity for good invertebrate diversity.

General appraisal for Strategic Site:

Designated sites:

- No Sites of Biological Importance within site, but one site (Marsh and Reedbeds at Shakerley – A69) is located a short distance to the north west of the site.
- Connectivity with Hindsford Brook linkage should be maintained.

Priority habitats:

- Hedgerows are generally widespread across Wigan. Net loss should be avoided; replacement hedgerows should contribute to an integrated network. Surveys for protected species and to confirm important hedgerows would be required.
- Hindsford Brook requires assessment to determine whether it fulfils criteria for new rivers priority habitat. Regardless, the brook corridor provides greatest diversity of habitats and structure within the site and will function as good wildlife corridor. The brook should be retained and, where possible, the brook corridor enhanced.
- Acid grassland and woodland are generally not extensive within Wigan. These habitats, due to their complexity or maturity should, where possible, be retained and protected *in situ* and provided with appropriate linkages within the green infrastructure of the new site.
- Where *in situ* retention or no net loss of habitats is not achievable within the site, offsetting will be required. Suitable areas, such as restoration or enhancement within SBIs or restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.

Priority species (likely to include some statutorily protected species):

- Bats (pipistrelle species) have been recorded from grid squares containing the site.
- Water vole on brook just to south of site; it is likely water vole is present along brook extent within site, if suitable conditions are present (this would qualify brook as priority habitat in absence of other qualifying features);
- Grassland habitats present with occasional hedgerow and woodland scrub create suitable habitats for ground nesting species and some passerines including possible BAP species such as grey partridge, song thrush, bullfinch, dunnock or lapwing. May provide important winter feeding habitat.

Biodiversity Enhancement Opportunity:

- Linkages should be retained along the corridor of the brook and along the north boundary of the site, parallel to the railway corridor. These linkages should provide habitat enhancement to compensate for any loss of biodiversity interest within the site.
- Where additional biodiversity loss beyond that which might be provided within recommended linkages results in net loss within the site, offsetting should be provided.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Garrett Hall (TEP Site Ref 009)		
Site location:	Tyldesley	**Central Grid Ref:**	SD 709014
Site area:	42 ha		

General description:
Northern half of site is safeguarded land. Located in the eastern fringe of Tyldesley where it context with Worseley, the site is predominantly enclosed by residential and industrial development. Site is bisected east-west by a watercourse, seemingly engineered in places with straight canalised sections containing steep banks and weirs. Site is predominantly agricultural with a clearly structured field system.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citation

Biodiversity Interest:		
Designated areas:	No SBIs within site or within immediate proximity or influence of site.	
Priority habitats:		
present hedgerow managed greenspace pond water corridor	probable	potential
Priority species:		
present great crested newt bats	probable common toad house sparrow lapwing skylark song thrush starling water vole dunnock	potential bullfinch corn bunting grey partridge linnet reed bunting tree sparrow yellowhammer
Statutorily protected species:		
present great crested newt bats	probable water vole	potential
Other :		
■ The railway corridor to the north of the site, running east-west to the north of the site, and the watercourse crossing the site centrally, also east-west, provide the only opportunities for connectivity to the countryside in the north.		

General appraisal for Strategic Site:

Designated sites:

- No Sites of Biological Importance within or near the site. However, two SBIs (Ponds North of Cleworth Hall (South) – A71 & Ponds Near New Manchester (East) – A72) are located just over 500m from site. Both SBIs have great crested newt as a prime designating feature.

Priority habitats:

- Hedgerows are generally widespread across Wigan. Net loss should be avoided; replacement hedgerows should contribute to an integrated network. Surveys for protected species and to confirm important hedgerows would be required.
- The brook, being apparently canalised in sections, is unlikely to qualify (unless water vole or other priority species is recorded along its extent). Regardless, the brook corridor provides greatest diversity of habitats and structure within the site and may function as good wildlife corridor within a generally isolated site. The brook should be retained and, where possible, the brook corridor enhanced.
- The brook has been identified as a floodrisk corridor, incorporating category 3 (high risk). Sustainable drainage design within the site should aim to enhance the watercourse corridor, for example with retention basins and/or swales.
- Offsite priority habitats, such as the woodland blocks, should be considered within development; creating greenspace in the north would buffer the woodland habitats to the northwest and north and improve linkages between these habitats and the wider countryside. Managed greenspace is also present to the northwest in the form of churchyards/cemeteries. Creating a greenlink in the north will maintain sustainable access to these areas.

Priority species (likely to include some statutorily protected species):

- Great crested newt present in the site, south of the watercourse. Great crested newt records also to the east in the Grade A SBI Ponds Near New Manchester (East) – A72 - and significant records in the north in the Grade A SBI Ponds North of Cleworth Hall (South) – A71.
- Bats (pipistrelle species) have been recorded from grid squares containing the site.
- Common toad likely to be present.
- Water vole has potential to occur along watercourse and, possibly, at ponds if they possess suitable characteristics;
- The agricultural landscape of grassland and hedgerows provides opportunities for farmland bird species such as possible BAP species including grey partridge, song thrush, bullfinch, dunnock or lapwing. May provide important winter feeding habitat.

Biodiversity Enhancement Opportunity:

- Linkages should be retained along the north boundary by the rail corridor and along corridor of the brook.
- There is not likely to be a requirement for offsetting net loss of priority habitats at this site. However, a single great crested newt record indicates a potentially isolated population. If survey indicates this is a single pond population, and retention and enhancement within the site is not possible, a population translocation may be required to suitable offsite habitats, with additional pond creation. Potential receptor opportunities would include extending the SBI Ponds North of Cleworth Hall (South) – A71 to directly link with the SBI Ponds Near New Manchester (East) – A72, both which is within the general range of the population on site.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	South Lancs Industrial Estate Available Land (TEP Site Ref 010)		
Site location:	Ashton-in-Makerfield	**Central Grid Ref:**	SD584002
Site area:	33 ha		

General description:

The site is nestled into the northern edge of the Ashton-in-Makerfield conurbation. Currently agricultural Greenfield, the site comprises a strong field system, although field boundary features such as hedgerows or drains are sparse. Scattered field ponds, isolated hedgerows in the north and a small area of plantation woodland in the east (located over a former reservoir) are present. Fields are generally arable with no apparent margins.

Method of appraisal:

Phase 1 maps vs aerial photograph interpretation
Additional GIS data analysis
SBI citations
Site survey within accessible land
Remote assessment, viewed from accessible land

Biodiversity Interest:

Designated areas:	No SBIs within site or within proximity or influence of site.	
Priority habitats:		
present hedgerow standing water managed greenspace	probable	potential
Priority species:		
present bats	probable	potential common toad great crested newt song thrush dunnock yellowhammer lapwing skylark
Statutorily protected species:		
present bats	probable	potential great crested newts

Other :

- The plantation, although not qualifying as a priority habitat, would likely support priority species such as song thrush and may provide foraging or refuge habitat for amphibians, if present within the farm ponds. The plantation and occasional scattered trees in the north of the site may provide some roost opportunities for bats. Foraging for bats is likely to be restricted to those species more able to utilise open spaces, such as common pipistrelle and noctule bats.

General appraisal for Strategic Site:

Designated sites:

- No Sites of Biological Importance within the site or within proximity or influence of the site.

Priority habitats:

- Occasional hedgerows occur in the north of the site.
- Field ponds may qualify as priority habitats; further survey is required.
- The site does not provide significant connectivity or linkages across the area.
- The northern extent overlaps with the Greenheart and lies adjacent to land registered in Entry Level Environmental Stewardship Scheme. Development should promote greenspace and should place lower density developments at the northern end of the site, to buffer the Greenheart and more gently assimilate the development into the rural landscape to the north.

Priority species (likely to include some statutorily protected species):

- Bats (common pipistrelles and an unidentified species) have been recorded from grid squares containing the site.
- The agricultural landscape may support farmland bird species, although the very limited hedgerows may reduce the likelihood for passerine species.
- The plantation, limited hedgerows and scattered trees may provide bird nest, bat roost and foraging opportunities.
- There is limited connectivity across the site; no significant corridors or linkages exist.

Biodiversity Enhancement Opportunity:

- There is not likely to be a requirement for offsetting net loss of priority habitats at this site.
- However, pond survey will be required to confirm presence/absence of great crested newt and common toad. If ponds and linkages between ponds and the countryside to the north cannot be maintained, offsetting should be provided to ensure no net loss of the pond resource within the area.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Landgate (TEP Site Ref 011)		
Site location:	Landgate	**Central Grid Ref:**	SD573011
Site area:	46 ha		

General description:
Safeguarded site mainly within Wigan Greenheart that is predominantly agricultural land, located south of the settlement of Landgate and east of Bryn. A rail line runs along the southern boundary of the site, with a dismantled rail line passing through the site to the east. There are small areas of woodland, several large waterbodies with angling interest, amenity greenspace in a band along the northern section of the site and outdoors sports facilities to the south. Landgate Farm is located in the northwest corner of the site. Most of the agricultural land to the east of the site is registered under the Entry Level Environmental Stewardship Scheme.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citations Remote assessment, viewed from accessible land

Biodiversity Interest:		
Designated areas:	No SBIs within site. The Wigan Flashes complex of SBIs is located approximately 1km to the northeast of the site. The Wigan Flashes is both a Local Nature Reserve and Site of Special Scientific Interest.	
Priority habitats:		
present managed greenspace standing water	probable	potential woodland important grassland
Priority species:		
present bats	probable common toad dunnock song thrush house sparrow	potential great crested newt bullfinch skylark lapwing tree sparrow corn bunting grey partridge linnet water vole brown hare
Statutorily protected species:		
present bats	probable	potential great crested newt water vole

Other :

- Early Phase 1 data indicated an area of acid grassland with scrub located along the disused rail line. This area was not accessible and survey and would be required to verify.

General appraisal for Strategic Site:

Designated sites:

- None present

Priority habitats:

- Ponds and managed greenspace are generally widespread across Wigan. Net loss should be avoided. Surveys for protected species would be required.
- Ponds and lodges may qualify as Priority Habitat. Further survey required.
- Acid grassland and woodland are generally not extensive within Wigan. Further survey required to identify if priority habitat still exists on site. If present, these habitats, due to their complexity or maturity should, where possible, be retained and protected *in situ* and provided with appropriate linkages to similar habitats and/or the wider landscape.
- Where in situ retention or no net loss of habitats is not achievable within the site, offsetting will be required. Suitable areas, such as restoration or enhancement within SBIs or restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.

Priority species (likely to include some statutorily protected species)::

- Habitats suitable for roosting, foraging and commuting bats. Bats (pipistrelle species) have been recorded from grid squares containing the site.
- Great crested newt recorded approximately 600m to the northwest of the site. Wetland habitats may provide suitable habitat for great crested newt and common toad.
- Habitats within the site may be suitable for water vole.
- Brown hare recorded on agricultural land near the Wigan Flashes to the northeast of the site in 1995 and 2007. Agricultural land links the record area to the site which may provide suitable habitat to support local populations.
- Surveys for protected and priority species should accompany any planning applications. Habitats supporting protected and priority species should be retained in situ, where possible. Retained habitats should be appropriately linked to the wider landscape.
- No net loss of protected or priority species should be permitted. Where habitats supporting these species cannot be retained *in situ*, compensation should be provided which should seek to provide net gain for these species.

Biodiversity Enhancement Opportunity:

- There is not likely to be a requirement for offsetting net loss of priority habitats at this site.
- However, survey will be required to confirm presence/absence of protected and priority species, particularly amphibians. If significant species interest is identified which cannot be retained *in situ*, offsetting will be required.
- If ponds and linkages between ponds and the countryside to the north cannot be maintained, offsetting should be provided to ensure no net loss of the pond resource within the area.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	The Bell (TEP Site Ref 012)		
Site location:	Orrell	**Central Grid Ref:**	SD541054
Site area:	47 ha		

General description:
The site lies adjacent to the M6 with Orrell to the west and Pemberton to the east. The site consists predominantly of agricultural land with associated hedges and drainage channels. There are also 2 ponds on the site. A public right of way crosses the northern section of the site and links the residential areas of Orrell and Pemberton via a subway under the motorway. The arable areas to the north and south of the site are currently registered under the Entry Level Environmental Stewardship Scheme.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citations

Biodiversity Interest:		
Designated areas:	No designated areas occur within or adjacent to the site, however there are several SBIs within 1km of the site containing significant areas of priority woodland habitat.	
Priority habitats:		
present standing water managed greenspace	probable hedgerow	potential arable field margins woodland
Priority species:		
present bats	probable dunnock house sparrow lapwing skylark song thrush starling	potential bullfinch corn bunting grey partridge linnet reed bunting tree sparrow yellowhammer great crested newt common toad
Statutorily protected species:		
present bats	probable	potential great crested newt
Other :		
No other biodiversity interest of note identified at this stage.		

General appraisal for Strategic Site:

Designated sites:

- None present

Priority habitats:

- Ponds and hedgerows are generally widespread across Wigan. Net loss should be avoided; replacement hedgerows should contribute to an integrated network. Surveys for protected species and to confirm important hedgerows would be required.
- Where *in situ* retention or no net loss of habitats is not achievable within the site, offsetting will be required. Suitable areas, such as restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.

Priority species (likely to include some statutorily protected species):

- Habitats suitable for roosting, foraging and commuting bats. Bats (pipistrelles species) have been recorded from grid squares containing the site.
- Habitats may be suitable to support significant numbers of farmland bird species, including ground nesting and passerine species.
- Surveys for protected and priority species should accompany any planning applications. Habitats supporting protected and priority species should be retained *in situ*, where possible. Retained habitats should be appropriately linked to the wider landscape.
- No net loss of protected or priority species should be permitted. Where habitats supporting these species cannot be retained *in situ*, compensation should be provided which should seek to provide net gain for these species.

Biodiversity Enhancement Opportunity:

- There is not likely to be a requirement for offsetting net loss of priority habitats at this site. However, if future survey indicates significant bird or amphibian interest, offsetting for species may be required.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Pepper Lane (TEP Site Ref 013)		
Site location:	Standish	**Central Grid Ref:**	SD 10768 52107
Site area:	50 ha		

General description:
Safeguarded land, partially within Council ownership. The site is surrounded by low density residential housing, with Shevington Moor to the west and Standish to the southeast. The site largely consists of agricultural land with several farms. There are some small areas of woodland, consisting of coniferous plantation to the west of the site and mixed plantation to the centre of the site. There are also several ponds and managed greenspace linked to Standish High School which lies to the east of the site.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citations Site survey within accessible land Remote assessment, viewed from accessible land

Biodiversity Interest:			
Designated areas:		One SBI within site. An SBI adjacent to site and another near to the east.	
SBI	Name:	Ponds at Robin Hill Farm West – A30	
	Grade:	B	
	Area:	1.3 ha	
	Main classification feature(s):	Vegetation mosaic, amphibians, invertebrates	
	Proportion within site:	100%	
Priority habitats:			
<u>present</u> managed greenspace standing water		<u>probable</u> hedgerow	<u>potential</u> woodland important grassland arable field margins
Priority species:			
<u>present</u> bats		<u>probable</u> great crested newt common toad house sparrow lapwing skylark song thrush starling water vole	<u>potential</u> corn bunting grey partridge reed bunting tree sparrow yellowhammer bullfinch linnet
Statutorily protected species:			
<u>present</u> bats		<u>probable</u> great crested newt water vole	<u>potential</u>

Other :

- SBI citations indicate probable high invertebrate diversity across the site. Likely habitats to support invertebrate assemblages will be marshy grassland, hedgerow networks, woodland and woodland edge, pond and marginal vegetation.

General appraisal for Strategic Site:

Designated sites:

- One Site of Biological Importance entirely within site, one immediately adjacent to site and a further site in close proximity.
- SBI within site should be retained in situ
- SBIs within site and adjacent to site should be protected and buffered - through open space provision or landscaping. Less preferable, but if SBIs are to be backed by gardens, appropriate conditions should be secured through planning consents to ensure suitable fencing is provided to prevent tipping, pet escape and encroachment within the SBI.
- SBIs within, adjacent and in close proximity (<1km) should be provided with linkages using appropriate green infrastructure, particularly addressing potential Great Crested Newt populations within these SBIs. Habitats within linkages should emulate those within the SBIs, in this case primarily grassland, marsh, scrub and open water.

Priority habitats:

- Ponds, managed greenspace and hedgerows are generally widespread across Wigan. Net loss should be avoided. Surveys for protected species and to confirm important hedgerows would be required.
- Ponds may qualify as Priority Habitat. Further survey required.
- Where *in situ* retention or no net loss of habitats is not achievable within the site, offsetting will be required. Suitable areas, such as restoration or enhancement within SBIs or restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.

Priority species (likely to include some statutorily protected species):

- Great crested newt and common toad recorded on the site in the 1980s, with additional concentrations of great crested newt recorded in ponds to the south and east of the site. Other ponds within the site boundary provide potential habitat for great crested newts and connectivity should be maintained between ponds on site and beyond.
- Habitats suitable for roosting, foraging and commuting bats. Bats (common and soprano pipistrelles) have been recorded from grid squares containing the site.
- Water vole confirmed in close proximity to the east of the site. Habitats within the site may be suitable for water vole.
- Habitats may be suitable to support significant numbers of farmland bird species, including ground nesting and passerine species.
- The site contains a variety of scrub, woodland, grassland and pond habitats. Combined with the potential presence of amphibians, these habitats may be suitable to support reptiles, particularly grass snake.
- Surveys for protected and priority species should accompany any planning applications. Habitats supporting protected and priority species should be retained in situ, where possible. Retained habitats should be appropriately linked to the wider landscape.

No net loss of protected or priority species should be permitted. Where habitats supporting these species cannot be retained *in situ*, compensation should be provided which should seek to provide net gain for these species.

Biodiversity Enhancement Opportunity:

- There is not likely to be a requirement for offsetting net loss of priority habitats at this site. However, old great crested newt records indicate populations may still be present. If survey indicates this is a single pond population, and retention and enhancement within the site is not possible, a population translocation may be required to suitable offsite habitats, with additional pond creation. Potential receptor opportunities would include extending the SBI Ponds North of Cleworth Hall (South) – A71 to directly link with the SBI Ponds Near New Manchester (East) – A72, both which is within the general range of the population on site.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration) refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Lodge Farm (TEP Site Ref 014)		
Site location:	Hindsford	**Central Grid Ref:**	SD 674 025
Site area:	60 ha		

General description:
Land to the east and north is partially owned by Wigan Council. The site mainly consists of agricultural land (both arable and pastoral), grassland (including acid grassland), woodland, hedgerows, scrub, farm buildings and managed greenspace. It is surrounded by residential housing to the north, east and west, and by agricultural land to the south. A stream transects the east of the site, running from north to south.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citations Site survey within accessible land Remote assessment, viewed from accessible land

Biodiversity Interest:			
Designated areas:	One SBI located near to the site to the south, another to the northwest (see below).		
SBI	Name:	Ponds at Robin Hill Farm West – A30	
	Grade:	B	
	Area:	1.3 ha	
	Main classification feature(s):	Vegetation mosaic, amphibians, invertebrates	
	Proportion within site:	100%	
Priority habitats:			
<u>present</u> hedgerow important grassland water corridor managed greenspace	<u>probable</u> arable field margins	<u>potential</u> woodland	
Priority species:			
<u>present</u> bats	<u>probable</u> water vole great crested newt common toad farmland birds	<u>potential</u> brown hare	
Statutorily protected species:			
<u>present</u> bats	<u>probable</u> water vole great crested newt	<u>potential</u>	

Other :

- Water voles, bullfinch and song thrush have been recorded within Atherton and Bedford Woods SBI, to the south of the site. The SBI Wetlands, Grasslands and Scrub off Colliery Lane, situated within 1km to the northwest of the site, is known to support populations of great crested newt.
- Strips of woodland which follow the route of a dismantled railway form a wildlife corridor to the southeast of the site. Chanters Brook provides another wildlife corridor running from north to south through the site.

General appraisal for Strategic Site:

Designated sites:

- No SBIs are immediately adjacent to the site, and are therefore unlikely to be significantly affected by development. However, the nearest is roughly 500m to the south, and is buffered by agricultural fields.

Priority habitats:

- Hedgerows, streams, arable field margins and managed greenspace are generally widespread across Wigan, however net loss should be avoided. Surveys for protected species and to confirm important hedgerows would be required.
- Acid grassland is present on tipped colliery waste which forms the steep bank of Chanters Brook. This habitat, along with PHT woodland (if present) is generally not extensive within Wigan, and should be retained and protected in situ and provided with appropriate linkages.
- Where in situ retention or no net loss of habitats is unachievable within the site, offsetting will be required. Suitable areas, such as restoration or enhancement within SBIs or restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.

Priority species (likely to include some statutorily protected species):

- Great crested newt and water voles have been recorded within 500m of the site to the southeast. Water voles have also been recorded at several other locations within I km, to the east and the southwest of the site.
- Habitats suitable for roosting, foraging and commuting bats. Bats (common pipistrelles) have been recorded from grid squares containing the site.
- Habitats may be suitable to support significant numbers of farmland bird species, including ground nesting and passerine species. Woodland BAP bird species may also be present, as both song thrush and bullfinch were recorded within Atherton and Bedford Woods to the south of the site.
- Habitats within site have potential to maintain local populations of brown hare, though none have been recorded within the locality of the site.
- Surveys for protected and priority species should accompany any planning applications. Habitats supporting protected and priority species should be retained in situ, where possible. Retained habitats should be appropriately linked to the wider landscape.
- No net loss of protected or priority species should be permitted. Where habitats supporting these species cannot be retained *in situ*, compensation should be provided which should seek to provide net gain for these species.

Biodiversity Enhancement Opportunity:

- Linkages should be retained along corridor of the brook and along the southeast boundary by the dismantled railway green corridor.
- If future survey indicates significant species interest, offsetting for species may be required. Potential areas to target offsetting include management of SBIs to the north and south of the site for their water vole and great crested newt interest.
- If it is not possible to retain acid grassland or other priority habitats present on site, offsetting will be required. Potential opportunities to target offsetting include small areas of acid grassland and heathland habitat near to the site. However, these patches were surveyed remotely (as they do not lie within council-owned land), and restoration work would therefore require landowner permission. Other opportunities for enhancement include habitat management within nearby SBIs and the Greenheart.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration) refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Westwood (TEP Site Ref 015)		
Site location:	Ince-in-Makerfield	**Central Grid Ref:**	SD584045
Site area:	34 ha		

General description:
The site is located in an area between the Wigan Flashes the Leeds Liverpool Canal within Wigan Greenheart. The Leigh branch of the canal passes through the northern section of the site and Westwood Flash SBI is adjacent to the west. The residential area of Ince-in-Makerfield lies to the east of the site, separated by the rail line. The site is predominantly council owned and contains two office building, with associated infrastructure in the northern section, a substation, a residential building to the south of the site, areas of woodland, scrub, grassland, waterbodies and reedbed. There is an area of pulverised fuel ash in the south western corner of the site.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis Site survey within accessible land Remote assessment, viewed from accessible land SBI citations

Biodiversity Interest:		
Designated areas:	One SBI adjacent to the site (A40 Westwood Flash). Further SBIs within Wigan Flashes complex to the south of the site. The Wigan Flashes are also a Local Nature Reserve and Site of Special Scientific Interest.	
Priority habitats:		
present reedbed water corridor (canal) water corridor standing water managed greenspace	probable	potential woodland important grasslands
Priority species:		
present bats	probable great crested newt common toad water vole	potential grass snake willow tit reed bunting
Statutorily protected species:		
present bats	probable great crested newt water vole	potential grass snake

Other :

- The canal will function as a primary linkage across Wigan. It connects numerous biodiversity sites including SBIs and two SSSIs (Bryn Marsh & Ince Moss SSSI and Abram Flashes SSSI). The canal itself is designated as a SBI along part of its reach (to the north west of the Wigan).
- Adjacent rail corridor and wetland habitats may potentially support grass snake.
- Significant populations of marsh, broadleaved and dune helleborine and large numbers of common spotted and marsh orchids and hybrids and have been recorded within the scrub colonised areas of pulverised fuel ash on the adjacent Westwood Flashes SBI.
- Areas of acid grassland identified on the early phase 1 maps are currently more neutral, but have potential for restoration.
- A small area of potentially species-rich grassland was recorded at grid-reference SD 58335 04578, which supported the remains of two types of orchid
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration) refer to the Greenheart appraisal and Drawing G1771.002

General appraisal for Strategic Site:

Designated sites:

- Westwood Flash SBI (A40) is adjacent to the site. SSSI, LNR and SBIs within Wigan Flashes complex to the south of the site.

Priority habitats:

- The Leeds-Liverpool Canal runs through the site to the north, part of an extensive designated greenlink across Wigan and a priority habitat type. The canal corridor should be protected and enhanced to improve its biodiversity and amenity interest.
- Ponds are generally widespread across Wigan but net loss should be avoided. Ponds may qualify as priority habitat. Further survey is required.
- Species rich neutral grassland, woodland and reedbed are generally not extensive within Wigan. These habitats, due to maturity or complexity should be retained and protected in situ and provided with appropriate linkages. The small area of reedbed found during survey will add to the resource of this priority habitat found within the adjacent SBIs in the Wigan Flashes complex.

Priority species (likely to include some statutorily protected species):

- Habitats suitable for roosting, foraging and commuting bats. Bats (soprano and common pipistrelle, Daubenton's bat, Leisler's bat and noctule) have been recorded from the grid square containing the site. A Daubenton's roost has been recorded north of Scotman's Flash, not far from the site.
- Great crested newts have been recorded within the adjacent SBI in the wet channel located on the boundary of this site. The pond within the site potentially provides suitable habitat.
- Birds recorded in the adjacent SBI include breeding Reed Bunting and probable breeding Willow Tit. The site has potential to support these species and additional priority bird species such as song thrush etc.
- Water voles are recorded within 500m of the site. Water vole has potential to occur along the canal, however the banks appear to be unsuitable for burrowing on the site. Reedbeds may provide potential feeding habitats.
- The site and surrounding area contains a variety of scrub, woodland, reedbed, grassland, pond and rail corridors. Combined with the known presence of amphibians and fish in the adjacent SBIs, these habitats may be suitable to support reptiles, particularly grass snake.

Biodiversity Enhancement Opportunity:

- The best opportunities for offsetting are likely to lie to the south of the site. A large area of council-owned grassland lies between Pearson's Flash and Turner's Flash (the north of which has been planted with trees). This area to the south of the plantation was recorded as largely acid grassland in the 1986 Phase 1 survey. It has since become neutrified, so that the majority is no longer Priority Habitat. However, a small patch of heathland remains at grid reference SD 58396 03376. There is therefore an opportunity to restore the areas which were once acid, and try to encourage the spread of heathland.
- To the south of Turner's Flash lies an area of open grassland mosaic on previously developed land, which may fit the Priority Habitat definition, but is under private ownership. It is, however, accessible by a Council-owned path. Again, a good opportunity may exist to manage this large area of colliery spoil-tipped land for its potential wildlife and biodiversity value.
- Immediately south of the development area is a green corridor of scrub following the path of a dismantled railway, which links to the grassland at Worsley Mesnes (another potential area for offsetting; see document 1771.024 Emerging key findings form - Pemberton Colliery 021). South of this corridor is a small area of neutral grassland within the boundary of Pearson's Flash SBI. Both of these areas are Council owned, and could potentially be enhanced for their wildlife value.
- To the east of the development site lies an area of grassland (grid reference SD 59084 05143) which was recorded as acid in 1986, but has now become largely neutral, with only a very small patch of acid species found from survey. Although this area is relatively isolated, it is Council-owned, and could potentially be restored to acid.
- Another possibility is that materials from the mounds of Pulverised Fuel Ash could be recovered from the development site to another suitable site to encourage the creation of calcareous habitats.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration) refer to the Greenheart appraisal and Drawing G1771.002

Site name:	Northern Crescent (TEP Site Ref 016)		
Site location:	Wigan	**Central Grid Ref:**	SD 583 058
Site area:	60 ha		

General description:

Town centre location, consisting of retail buildings and associated infrastructure, light industry to the south of the site, managed greenspace and pocket woodland. Rail lines run through the south of the site and Wigan Wallgate and Wigan North Western stations are within the boundary. Four SBIs lie within 1km of the site, one of them, Westwood Flash, being within 500m of the south of the site.

Method of appraisal:

Phase 1 maps vs aerial photograph interpretation
Additional GIS data analysis

Biodiversity Interest:

Designated areas:	Due to its urban location, there are no designated sites in close proximity; however, SBIs are located less than 1km to the north and south of the site.

Priority habitats:

present	probable	potential
managed greenspace water corridor		hedgerow woodland

Priority species:

present	probable	potential
bats		house sparrow starling water vole

Statutorily protected species:

present	probable	potential
bats		water vole

Other :

- Although the trees within the town centre setting do not qualify as woodland priority habitat, they provide an important part of urban greenspace and provide roosting opportunities for some bird species and support insect assemblages.

General appraisal for LDF site:

Designated sites:

- SBIs near to site should be protected and buffered - through open space provision or landscaping.

General appraisal for LDF site:

Priority habitats:

- There is at least one hedgerow within the site boundary. As it is associated with urban rather than rural landscape, it may be less likely to be dominated by 80% native woody species, which is a requirement for PHT hedgerow habitat.
- Managed greenspace and hedgerows are generally widespread across Wigan, however net loss should be avoided. Surveys for protected species and to confirm important hedgerows would be required.
- The site does not provide significant connectivity or linkages across the area.
- Where in situ retention or no net loss of habitats is unachievable within the site, offsetting will be required. Suitable areas, such as restoration or enhancement within SBIs or restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.

Priority species (likely to include some statutorily protected species):

- Habitats suitable for roosting, foraging and commuting bats are likely to be present, including buildings and trees. Two records of pipistrelle bats exist within 500m of the site. Whiskered/Brandt's and Daubenton's bats have also been recorded in grid squares containing the site.
- Habitats may be suitable to support BAP bird species. For example, starlings and house sparrows are known to roost in cavities in residential properties, and may species nest in trees.
- Surveys for protected and priority species should accompany any planning applications. Habitats supporting protected and priority species should be retained in situ, where possible. Retained habitats should be appropriately linked to the wider landscape.
- No net loss of protected or priority species should be permitted. Where habitats supporting these species cannot be retained *in situ*, compensation should be provided which should seek to provide net gain for these species.

Biodiversity Enhancement Opportunity:

- There is not likely to be a requirement for offsetting net loss of priority habitats at this site.
- However, any BAP habitats or species recorded in future surveys should be protected during development. Offsetting should be provided to ensure no net loss of species and resources within the area. Areas which could be targeted for offsetting might include nearby SBIs. Also, the provision of nest boxes for roosting bats and breeding birds could be incorporated within development plans.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration) refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Rectory Lane (TEP Site Ref 017)		
Site location:	Standish	**Central Grid Ref:**	SD 572 100
Site area:	111 ha		

General description:
Safeguarded land, partially within Council ownership. The residential area of Standish surrounds much of the site, with the Bradley Hall Trading Estate to the north. The site contains agricultural land, Standish Court Golf Club, woodland belts, a number of ponds, drains, a stream and areas of managed greenspace with public footpaths. A railway line runs north-south through the site.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citations Site survey within accessible land Remote assessment, viewed from accessible land

Biodiversity Interest:		
Designated areas:	Two SBIs within site (see below for details). Two SBIs adjacent to site (White Bridge Wood A34 and Whelley Loop A41).	
SBI	Name:	Fairhurst Lane – A32
	Grade:	C
	Area:	2.2ha
	Main classification feature(s):	Woodland and wetland habitats
	Proportion within site:	100%
SBI	Name:	Barrowcroft Wood – A33
	Grade:	B
	Area:	8.2ha
	Main classification feature(s):	Vegetation mosaic, amphibians, bryophytes,
		invertebrates
	Proportion within site:	98%

Priority habitats:

present	probable	potential
standing water managed greenspace ancient woodland hedgerow	important grasslands	water corridor

Priority species:

present	probable	potential
great crested newt common toad bats	reed bunting farmland birds badger brown hare water vole	otter

Statutorily protected species:

present	probable	potential
great crested newt bats	water vole	otter grass snake

Other :

- The SBI citation for Barrowcroft Wood indicates probable high invertebrate and bryophyte diversity, particularly associated with the wetland and woodland habitats
- The railway line which transects the site, running north-south, provides a wildlife corridor linking the site to the wider countryside.

General appraisal for LDF site:

Designated sites:

- Two Sites of Biological Importance entirely within site, two immediately adjacent to site and further sites in close proximity.
- SBIs within site should be retained in situ.
- SBIs within site and adjacent to site should be protected and buffered - through open space provision or landscaping. SBIs should not be backed by gardens. However, if this is unavoidable, appropriate conditions should be secured through planning consents to ensure suitable fencing is provided to prevent tipping, pet escape and encroachment within the SBI.
- SBIs within, adjacent and in close proximity (<1km) should be provided with linkages using appropriate green infrastructure - habitats within linkages should emulate those within the SBIs, in this case primarily grassland, marsh, scrub and open water.

Priority habitats:

- Ponds, streams, managed greenspace (parks and gardens) and hedgerows are generally widespread across Wigan. Net loss should be avoided. Surveys for protected species and to confirm important hedgerows would be required.
- Acid grassland, Neutral grassland and Ancient woodland are described within the citation for the Barrowcroft Wood SBI. These habitats, along with PHT Unimproved neutral grassland and other PHT woodland (if present) are generally not extensive within Wigan, and due to maturity or complexity should be retained and protected in situ and provided with appropriate linkages.
- Where in situ retention or no net loss of habitats is unachievable within the site, offsetting will be required. Suitable areas, such as restoration or enhancement within SBIs or restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.

Priority species (likely to include some statutorily protected species):

- Great crested newt (1995) has been recorded within the site, from SBI Barrowcroft Wood.
- Habitats suitable for roosting, foraging and commuting bats are present. Bats (common and soprano pipistrelle, Daubenton's bat, brown long-eared bat and noctule) have also been recorded in grid squares containing the site.
- Water vole (2008), badger (1995), brown hare (2006) and pipistrelle bat (2000) species have been recorded in close proximity to the west of the site. Habitats within the site are likely to be suitable for these species.
- Reed bunting has been noted in the citation for Faithurst Lane SBI, within the southern half of the site, though no detailed recording has been carried out.
- Habitats may be suitable to support significant numbers of farmland bird species, including ground nesting and passerine species.

General appraisal for LDF site:

- The site contains a variety of woodland, grassland, scrub, pond and ditch habitats within the site. Combined with the known presence of amphibians on site, these habitats may be suitable to support reptiles, particularly grass snake. Common toad may also be present, although unrecorded within the site.
- Surveys for protected and priority species should accompany any planning applications. Habitats supporting protected and priority species should be retained in situ, where possible. Retained habitats should be appropriately linked to the wider landscape.
- No net loss of protected or priority species should be permitted. Where habitats supporting these species cannot be retained *in situ*, compensation should be provided which should seek to provide net gain for these species.

Biodiversity Enhancement Opportunity:

- Linkages should be retained along the green corridor associated with the railway track.
- If future survey indicates significant bird, mammal or amphibian interest, offsetting for species may be required. Potential areas to target offsetting include management of SBIs surrounding the site for their BAP species interest, for example Worthington Lakes, which is known to support four species of bat and water vole.
- If it is not possible to retain acid grassland, neutral grassland (if present) or other priority habitats present on site, offsetting will be required. Opportunities for offsetting include potential for restoration of acid and neutral grassland to the east of the site, as well as a small area of heathland, all situated on council owned land within the boundary of the greenheart. Other opportunities for enhancement include habitat management within the many SBIs surrounding the site.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration) refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Pocket Nook (TEP Site Ref 018)		
Site location:	Lowton	**Central Grid Ref:**	SJ 638 973
Site area:	68 ha		

General description:
Safeguarded land, located close to the Borough boundary with the town of Lowton to the north and the A580 to the south. The site consists predominantly of agricultural land with some farm buildings and an area of managed greenspace associated with Lowton High School to the northeast. There are a number of ponds and Carr Brook runs through the centre of the site.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citations

Biodiversity Interest:

Designated areas:	Pennington Flash SBI is located less than 1km north of the site.

Priority habitats:

<u>present</u>	<u>probable</u>	<u>potential</u>
hedgerow managed greenspace water corridor (Carr Brook) standing water		arable field margins

Priority species:

<u>present</u>	<u>probable</u>	<u>potential</u>
bats	farmland birds great crested newts common toad	brown hare water vole

Statutorily protected species:

<u>present</u>	<u>probable</u>	<u>potential</u>
bats	great crested newts	water vole

Other :

- The SBI to the north of the site supports populations of great crested newt and water voles and supports an important assemblage of birds including breeding reed bunting and lapwing. Pipistrelles and noctules have been recorded in flight within the SBI.

- The Carr Brook watercourse crossing the site centrally, running east-west, and the verge of the East Lancashire road to the south of the site, also east-west, provide connectivity to the wider countryside. However this busy road will also act as a barrier to access to land to the south of the site.

General appraisal for LDF site:

Designated sites:

- No Sites of Biological Importance lie within the site. Pennington Flash SBI to the north is unlikely to be significantly influenced by development the site, as residential housing and an industrial estate is situated between the SBI and the site.

Priority habitats:

- Ponds, rivers, arable field margins, managed greenspace (parks and gardens) and hedgerows are generally widespread across Wigan. Net loss should be avoided. Surveys for protected species and to confirm important hedgerows would be required.
- PHT woodland (if present) is generally not extensive within Wigan, and due to maturity or complexity should be retained and protected in situ and provided with appropriate linkages.
- Where in situ retention or no net loss of habitats is unachievable within the site, offsetting will be required. Suitable areas, such as restoration or enhancement within SBIs or restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.

Priority species (likely to include some statutorily protected species):

- Great crested newt has been recorded within 500m of the site. This species and water voles have been recorded in the SBI to the north of the site. Habitats within site have potential to maintain local populations.
- Habitats may be suitable for roosting, foraging and commuting bats. Pipistrelles and noctules have been recorded in flight within the SBI to the north of the site.
- Habitats on site may be suitable for brown hare and common toad.
- Habitats may be suitable to support significant numbers of farmland bird species, including ground nesting and passerine species. Linnet, reed bunting, yellowhammer and willow tit have all been recorded within heathland roughly 2km to the southeast of the site. Lapwing and reed bunting have also been recorded within the SBI to the north.
- Surveys for protected and priority species should accompany any planning applications. Habitats supporting protected and priority species should be retained in situ, where possible. Retained habitats should be appropriately linked to the wider landscape.
- No net loss of protected or priority species should be permitted. Where habitats supporting these species cannot be retained *in situ*, compensation should be provided which should seek to provide net gain for these species.

Biodiversity Enhancement Opportunity:

- Linkages should be retained along corridor of the brook and along the south boundary by the verge of the East Lancashire road.
- There is not likely to be a requirement for offsetting net loss of priority habitats at this site. However, if future survey indicates significant bird, mammal or amphibian interest, offsetting for species may be required. Potential areas to target offsetting include Lowton Highfield Moss to the southwest, which supports BAP bird species, and Pennington Flash SBI, which supports great crested newt and water vole. Additionally, grassland which had previously been mapped as unimproved neutral in the Phase 1 Habitat Survey is located to the north and south of Pennington Flash SBI, and could be managed for wildlife.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration) refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Stone Cross Lane (TEP Site Ref 019)		
Site location:	Lowton	**Central Grid Ref:**	SJ 615 971
Site area:	27 ha		

General description:

Safeguarded land, consisting of agricultural land, ponds, residential properties and farm buildings, with a small patch of managed greenspace to the southwest, and patchy woodland to the southeast. The site is bordered by Stone Cross Park (industrial site) to the west, residential areas to the north, east and south east, and agricultural land to the south west. The A580 East Lancashire Road forms the southern boundary of the site.

Method of appraisal:

Phase 1 maps vs aerial photograph interpretation
Additional GIS data analysis
SBI citations
Site survey within accessible land
Remote assessment, viewed from accessible land

Biodiversity Interest:

Designated areas:	One SSSI and SBI, Highfield Moss, is located 1.km to the south of the site. A second SBI, Lightshaw Limebeds, lies approximately 1km to the north.

Priority habitats:

present	probable	potential
hedgerow standing water managed greenspace	arable field margins	woodland

Priority species:

present	probable	potential
bats	farmland birds common toad	brown hare great crested newt water vole common toad

Statutorily protected species:

present	probable	potential
bats		water vole great crested newt

Other :

- Farmland birds, including linnet, willow tit, reed bunting and yellowhammer, have been recorded to the south of the site, at Highfield Moss SBI. The SBI to the north supports populations of great crested newt, common toad and water vole.
- There are no obvious green corridors providing linkages with the wider countryside.

General appraisal for LDF site:

Designated sites:

- There are no SBIs or other designated areas within the immediate vicinity of the site, the closest being roughly 1km away.

Priority habitats:

- Hedgerows are generally widespread across Wigan, however net loss should be avoided. Surveys for protected species and to confirm important hedgerows would be required.
- Several ponds are present within the site.
- A small area of managed greenspace is present to the southeast of the site
- Arable field margins and native woodland BAP habitats may also be present within the site. PHT woodland (if present) is generally not extensive within Wigan, and due to maturity or complexity should be retained and protected in situ and provided with appropriate linkages.
- Where in situ retention or no net loss of habitats is unachievable within the site, offsetting will be required. Suitable areas, such as restoration or enhancement within nearby SBIs or restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.

Priority species (likely to include some statutorily protected species):

- Great crested newt, common toad and water voles have been recorded in the SBI roughly 1km to the north of the site. Pond habitat which may well be suitable for these species are present on site.
- Habitats (including woodland and buildings) are present which are likely to be suitable for roosting, foraging and commuting bats. Common pipistrelle and noctule have been recorded from the grid squares containing the site.
- Farmland habitats may be suitable to support significant numbers of farmland bird species, including ground nesting and passerine species, which are known to be present in the SBI to the south.
- Habitats within the site have potential to maintain local populations of brown hare.
- Surveys for protected and priority species should accompany any planning applications. Habitats supporting protected and priority species should be retained in situ, where possible. Retained habitats should be appropriately linked to the wider landscape.
- No net loss of protected or priority species should be permitted. Where habitats supporting these species cannot be retained *in situ*, compensation should be provided which should seek to provide net gain for these species.

Biodiversity Enhancement Opportunity:

- If significant amphibian, bird, bat or water vole interest is identified through survey, enhancement offsite may be required to maintain net biodiversity interest in the area. Possible sites for additional enhancement would likely be within the two nearby SBI sites, or within the Greenheart.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Rothwell's Farm (TEP Site Ref 020)		
Site location:	Golborne	**Central Grid Ref:**	SJ 609 987
Site area:	17 ha		

General description:
The site mainly consists of privately owned agricultural land (both arable and pastoral) hedgerows, farm buildings and associated garden. It is surrounded by residential housing, a school and associated managed greenspace to the south and east, a reservoir and woodland to the east (Lightshaw Limebeds SBI), agricultural land to the north, and a railway line, factory and park to the west. A dismantled railway running along the northern border of the site forms a green corridor connecting the site to the SBI to the east.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citations

Biodiversity Interest:		
Designated areas:	Two SBIs are located within 500m of the site to the east (Ponds Near Lightshaw Lane and Lightshaw Limebeds), and another two within1km to the north (Abram Flashes and Edge Green).	
Priority habitats:		
present hedgerow managed greenspace	probable	potential arable field margins
Priority species:		
present bats	probable farmland birds	potential reptiles
Statutorily protected species:		
present bats	probable barn owl	potential reptiles

Other :

- Lightshaw Limebeds SBI, which lies immediately to the east of the site, supports populations of song thrush, and skylark has been recorded at Ponds Near Lightshaw Lane SBI. Lapwing has been recorded within Abram Flashes SBI to the north.
- At least 14 bird species have been recorded in grid squares containing this site, suggesting a good species assemblage.
- A dismantled railway running along the northern border of the site forms a green corridor connecting the site to Lightshaw Limebeds SBI.

General appraisal for LDF site:

Designated sites:

- Lightshaw Limebeds SBI lies immediately adjacent to the site (roughly 50m to the east), and may therefore be significantly affected by development. Ponds Near Lightshaw Lane SBI lies approximately 300m to the northeast.
- SBIs adjacent to site should be protected and buffered - through open space provision or landscaping. Less preferable, but if SBIs are to be backed by gardens, appropriate conditions should be secured through planning consents to ensure suitable fencing is provided to prevent tipping, pet escape and encroachment within the SBI.

Priority habitats:

- Hedgerows and arable field margins are generally widespread across Wigan, however net loss should be avoided. Surveys to confirm important hedgerows would be required.
- Where in situ retention or no net loss of habitats is unachievable within the site, offsetting will be required. Suitable areas, such as restoration or enhancement within SBIs or restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.

Priority species (likely to include some statutorily protected species):

- Brown hares and barn owls have been recorded within 1km to the north of the site, and the site provides potential farmland habitat for these species.
- Habitats suitable for roosting, foraging and commuting bats and birds are also present. Pipistrelle and noctule bats have been recorded from the grid squares containing the site. Lightshaw Limebeds SBI to the east supports populations of song thrush, and skylark has been recorded at Ponds Near Lightshaw Lane SBI. Lapwing has been recorded within Abram Flashes SBI to the north.
- Although both water vole and great crested newt have been recorded within 500m of the site, no waterbodies or watercourses appear to be present on site to provide suitable habitat for these species.
- The dismantled railway corridor may provide potential habitat for reptile species.
- Surveys for protected and priority species should accompany any planning applications. Habitats supporting protected and priority species should be retained *in situ*, where possible. Retained habitats should be appropriately linked to the wider landscape.
- No net loss of protected or priority species should be permitted. Where habitats supporting these species cannot be retained *in situ*, compensation should be provided which should seek to provide net gain for these species.

Biodiversity Enhancement Opportunity:

- There is not likely to be a requirement for offsetting net loss of priority habitats at this site. However, if future survey indicates significant bird or bat interest, offsetting for species may be required. Potential areas to target offsetting include local SBIs, which support a range of bird species. Bat and bird boxes may also be incorporated into designs for new developments.
- SBIs in close proximity (<1km) could be provided with linkages using appropriate green infrastructure - habitats within linkages should emulate those within the SBIs.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Pemberton Colliery (TEP Site Ref 021)		
Site location:	Pemberton	**Central Grid Ref:**	SD560037
Site area:	24 ha		

General description:

Former colliery site lying between the developments of Highfield to the west and Goose Green to the east. The site is bordered by a rail line to the north and Smithy Brook runs along the southern boundary. The site has steep slopes to the eastern side and consists predominantly of grassland with some areas of scrub/woodland to the north and south. A number of informal paths cross the site.

Method of appraisal:

Phase 1 maps vs aerial photograph interpretation
Additional GIS data analysis
Site survey within accessible land
Remote assessment, viewed from accessible land
SBI citations

Biodiversity Interest:

Designated areas:	One SBI adjacent to the site (A23 Blundell's Woods).

Priority habitats:		
present important grassland (acid) woodland water corridor (Smithy Brook)	probable	potential important grasslands
Priority species:		
present water vole bats	probable	potential song thrush bullfinch hedgehog
Statutorily protected species:		
present water vole bats	probable	potential

Other :

- The mix of grassland habitats suggests the site may support interesting assemblages of invertebrates.
- Song thrush, bullfinch and hedgehog are recorded within nearby SBIs, and the site contains habitat with the potential to support these species.

General appraisal for LDF site:

Designated sites:

- Blundell's Woods SBI is adjacent to the southwest corner of the site. Scrub extends from the woodland area along the southern edge of the site, with Smithy Brook running through this area. This area is also a floodzone area and forms part of an almost continuous green link from the SBIs at Winstanley Hall through to the Wigan Flashes and Amberswood Common. This link should be maintained.

General appraisal for LDF site:

Priority habitats:

- Acid grassland and marshy grassland are generally not extensive within Wigan. These habitats, due to their complexity should, where possible, be retained and protected *in situ* and provided with appropriate linkages to similar habitats and/or the wider landscape.
- The area which is most likely to be of biodiversity interest is the grassland on the small hill to the south east of the site, and potentially the areas of marsh, rather than the flatter area of grassland in the north half of the site. The south and west-facing sides support acid grassland.
- Where *in situ* retention or no net loss of habitats is not achievable within the site, offsetting will be required. Suitable areas, such as restoration or enhancement within SBIs or restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.
- The Smithy Brook corridor should be protected and enhanced to improve its biodiversity interest and maintain the link between SBIs to the east and west.

Priority species (likely to include some statutorily protected species):

- Pipistrelle and noctule bats have been recorded from the grid squares containing the site.
- Water voles are recorded along Smithy Brook to the east and west of the site. A stretch of the brook less than 500m to the east of the site is designated as an SBI due to its high density of water voles, with records of 1 pair per 12m, one of the highest densities in Wigan and Greater Manchester.
- The area of scrub and trees along the southern section of the site may provide suitable habitat for a number of species such as song thrush, bullfinch and hedgehog and bat roost and foraging opportunities.

Biodiversity Enhancement Opportunity:

- Directly to the east of the site at Worsley Mesnes (grid ref SD57053 03837), there is a area of grassland which was recoded as unimproved neutral with tall herb in the Phase 1 survey (a brief site visit did not reveal any Priority habitat grassland). It lies between a playing field and recreation ground. Smithy Brook SBI runs through this site, which was found to support a high density of water voles in a 2004 survey. Patches of woodland and scrub are also present, and paths run through the area. Management of this area for wildlife may provide an opportunity for offsetting. Immediately to the north, another strip of grassland follows the path of a dismantled railway track (not visited in this survey). This was also recorded as neutral in the 1986 Phase 1 survey, and is likely to form an important wildlife corridor, connecting with the Wigan Flashes.
- South of the development site is an area of Council-owned grassland which was also recorded as neutral in the Phase 1 survey, although site survey only revealed a very small patch of species-rich grassland on a slope on the northern border (likely to be on an area of colliery spoil). Fairy flax was recorded in this area. The majority of the site consisted of seemingly species-poor neutral grasslands. Reedbeds have been recently installed to the north as a water filter system.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Former Bickershaw Colliery (TEP Site Ref 022)		
Site location:	Leigh	**Central Grid Ref:**	SJ632998
Site area:	18 ha		

General description:

The site is located at the western tip of Leigh as the township extends along the canal. It consists of derelict grassland and scrub habitats on former industrial development land off Plank Lane. Numerous tracks and paths are identified on the aerials as remaining either as bare ground or hard standing; many desire lines criss-cross the site.

Method of appraisal:

Phase 1 maps vs aerial photograph interpretation
Additional GIS data analysis
SBI citations
Remote assessment, viewed from accessible land

Biodiversity Interest:

Designated areas:	One SBI to north of site - Bickershaw Colliery Grade B SBI – A62 One SBI to south of site - Pennington Flash Grade A SBI – A78 is south of canal

Priority habitats:

present	probable	potential
reedbed managed greenspace water corridor (canal)		woodland important grasslands

Priority species:

present	probable	potential
bats	song thrush dunnock bullfinch	water vole common toad great crested newt

Statutorily protected species:

present	probable	potential
bats	bullfinch	water vole great crested newt kingfisher

Other :

- The Leeds-Liverpool Canal is allocated as a green corridor.
- The canal will function as a primary linkage across Wigan. It connects numerous biodiversity sites including SBIs and two SSSIs (Bryn Marsh & Ince Moss SSSI and Abram Flashes SSSI). The canal itself is designated as a SBI along part of its reach (to the north west of the Wigan).
- At least 73 bird species have been recorded in grid squares containing this site. Although the majority of records will originate from the flashes, the records suggest an excellent species assemblage in the local area.

General appraisal for Strategic Site:

Designated sites:

- Two Sites of Biological Importance recorded to the north (Bickershaw Colliery Grade B SBI – A62) and south (Pennington Flash Grade A SBI – A78) of the site.

Priority habitats:

- A small area of managed greenspace (amenity grassland) present in northwest of site.
- Reedbeds are present within the drains on the north boundary of the site, connecting to the extensive wetland habitats within the Bickershaw Colliery SBI just to the north.
- The former colliery use in the area raises the possibility of some acid grassland or open mosaic habitats developing over previously developed land; further survey is required to accurately identify the presence of priority habitats.
- The Leeds-Liverpool Canal borders the site to the south, part of an extensive designated greenlink across Wigan and a priority habitat type. The canal corridor should be protected and enhanced to improve its biodiversity and amenity interest.
- The canal provides important linkage to numerous SBIs within Wigan and also the two SSSIs in Wigan. The canal corridor should be enhanced through the promotion of appropriate green infrastructure providing a buffer to the canal.

Priority species (likely to include some statutorily protected species):

- Water vole has potential to occur along the canal;
- The site is directly connected to Bickershaw Colliery and land to the west of Bickershaw Colliery, where significant numbers of great crested newt records are found.
- The open grassland and scrub provides opportunities for bird species known to occur in Bickershaw Colliery or Pennington Flash, such as song thrush, bullfinch and dunnock.
- The canal may be important for commuting and foraging bat species, particularly Daubenton's and Soprano Pipistrelle bats. Noctule has been recorded from grid squares containing the site.
- Standing water on site may be suitable for amphibian species, including great crested newt and common toad, although no records for great crested newts were identified within 500m of the site.

Statutorily protected species (those which are not also priority species):

- The canal and brook to the east (Westleigh Brook) may support kingfisher.

Biodiversity Enhancement Opportunity:

- Linkages should be retained along the canal.
- There is not likely to be a requirement for offsetting net loss of priority habitats at this site. However, if significant amphibian or bird interest is identified through survey, enhancement offsite may be required to maintain net biodiversity interest in the area. Possible sites for additional enhancement would likely be the Bickershaw Colliery SBI to the north, or land west of Bickershaw Colliery.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration) refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	North of Leeds Liverpool Canal (TEP Site Ref 023)		
Site location:	Leigh	**Central Grid Ref:**	SJ640997
Site area:	19 ha		

General description:

The site is roughly linear, being enclosed between the Leeds-Liverpool Canal on its south boundary and the western arm of the Leigh conurbation on its north boundary. The site appears to be typical derelict grassland, with patches of woodland and areas of tall herb/scrub developing. Numerous paths and desire lines criss-cross the site. The western extent of the site, at Plank Lane, appears to be former colliery with woodland scrub developing.

Method of appraisal:

Phase 1 maps vs aerial photograph interpretation
Additional GIS data analysis
SBI citations
Site survey within accessible land
Remote assessment, viewed from accessible land

Biodiversity Interest:

Designated areas:	No SBIs within site. Pennington Flash Grade A SBI – A78 is to south (south of canal) and Bickershaw Colliery Grade B SBI – A62 is to north.

Priority habitats:

present	probable	potential
managed greenspace water corridor (canal) standing water		important grassland woodland

Priority species:

present	probable	potential
bats	song thrush dunnock bullfinch	water vole great crested newt common toad

Statutorily protected species:

present	probable	potential
bats		water vole great crested newt kingfisher

Other :

- SBI citations indicate high breeding and wintering bird interest in addition to high invertebrate interest, although many species recorded are not priority species.
- The Leeds-Liverpool Canal is allocated as a green corridor.
- The canal will function as a primary linkage across Wigan. It connects numerous biodiversity sites including SBIs and two SSSIs (Bryn Marsh & Ince Moss SSSI and Abram Flashes SSSI). The canal itself is designated as a SBI along part of its reach (to the north west of the Wigan).
- At least 73 bird species have been recorded in grid squares containing this site. Although the majority of records will originate from the flashes, the records suggest an excellent species assemblage in the local area.

General appraisal for Strategic Site:

Designated sites:

- Two Sites of Biological Importance recorded to the north and south of the site.

Priority habitats:

- A small area of managed greenspace (amenity grassland) present in northwest of site.
- Early Phase 1 data indicate marshy grassland present in west of site, but GIS data and aerial photographs show this largely covered by woodland canopy, although some areas of more open grass sward persist.
- The former colliery use in the area raises the possibility of some acid grassland or open mosaic habitats developing over previously developed land; further survey is required to accurately identify the presence of priority habitats.
- The Leeds-Liverpool Canal borders the site to the south, part of an extensive designated greenlink across Wigan and a priority habitat type. The canal corridor should be protected and enhanced to improve its biodiversity and amenity interest.
- The central extent of the site is identified as a floodrisk corridor, incorporating category 3 (high risk). Sustainable drainage design within the site should aim to enhance the canal corridor, for example by creating ponds or retention basins and/or swales.

Priority species (likely to include some statutorily protected species):

- Water vole has potential to occur along the canal;
- Standing water on site may be suitable for amphibian species, including great crested newt and common toad, although no records for great crested newts were identified within 500m of the site.
- The open grassland and scrub provides opportunities for bird species known to occur in Bickershaw Colliery or Pennington Flash, such as song thrush, bullfinch and dunnock.
- The canal may be important for commuting and foraging bat species, particularly Daubenton's and soprano pipistrelle bats. both species have been recorded from grid squares containing the site, in addition to common pipistrelle, Natterer's, brown long-eared and noctule bats.

Protected species (those which are not also priority species):

- The canal and brook to the east (Westleigh Brook) may support kingfisher.

Biodiversity Enhancement Opportunity:

- Linkages should be retained along the canal.
- There is not likely to be a requirement for offsetting net loss of priority habitats at this site. However, if significant bird interest is identified through survey, enhancement offsite may be required to maintain net biodiversity interest in the area. Possible sites for additional enhancement would likely be the Bickershaw Colliery SBI to the north, or land west of Bickershaw Colliery.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Bridgewater (TEP Site Ref 024)		
Site location:	Leigh	**Central Grid Ref:**	SJ659996
Site area:	15 ha		

General description:

The site is located in the southern half of Leigh. It is largely developed with industrial units, comprising extensive buildings and hard standing with landscaping virtually absent from their environs. The Leeds-Liverpool Canal bisects the site and on its eastern end within the site possesses mature tree canopy along the northern bank. A small plot of land contiguous with this line of trees appears to remain undeveloped and comprises predominantly grassland and tree canopy.

Method of appraisal:

Phase 1 maps vs aerial photograph interpretation
Additional GIS data analysis
SBI citations

Biodiversity Interest:

Designated areas:	One SBI to west of site – Pennington Flash Grade A SBI – A78	
Priority habitats:		
present water corridor (canal)	probable	potential woodland
Priority and protected species:		
present bats	probable water vole	potential
Statutorily protected species:		
present bats	probable water vole	potential kingfisher

Other :

- The Leeds-Liverpool Canal is allocated as a green corridor.
- The canal will function as a primary linkage across Wigan. It connects numerous biodiversity sites including SBIs and two SSSIs (Bryn Marsh & Ince Moss SSSI and Abram Flashes SSSI). The canal itself is designated as a SBI along part of its reach (to the north west of the Wigan).

General appraisal for Strategic Site:

Designated sites:

- One SBI to west of site - Pennington Flash Grade A SBI – A78, connected to site by the Leeds-Liverpool Canal.

General appraisal for Strategic Site:

Priority habitats:

- The Leeds-Liverpool Canal separates the north and south parts of the site. It is likely to be heavily trafficked in this section; a docking area is present of the north bank.
- The canal provides important linkage to numerous SBIs within Wigan and also the two SSSIs in Wigan. The canal corridor should be enhanced through the promotion of appropriate green infrastructure providing a buffer to the canal.
- Mature broadleaved tree canopy is present along the north bank, around the north and west banks of the docking area and in the small plot of land to the north of the canal.

Priority species (likely to include some statutorily protected species):

- Water vole is recorded within 500m of the site and has potential to occur along the canal, although in the section passing through the site the banks appear highly artificial. Redevelopment of the site should consider naturalising the canal banks, or providing enhancement through the provision of coir rolls or willow breaks to create linkage for water voles and other riverine species along this highly urban stretch of the canal;
- The small plot of grassland and trees within the site may support nesting birds such as song thrush, but are unlikely to support significant numbers.
- The canal may be important for commuting and foraging bat species, particularly Daubenton's and Soprano Pipistrelle bats. Daubenton's and common pipistrelle bats have been recorded in grid squares containing the site.

Statutorily protected species (those which are not also priority species):

- The canal may support kingfisher; despite being highly artificial and urban in this section, the presence of overhanging trees provides potential foraging perches.

Biodiversity Enhancement Opportunity:

- Linkages should be retained and enhanced along the canal corridor by encouraging appropriate green infrastructure.
- There is not likely to be a requirement for offsetting net loss of priority habitats at this site.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	The Hillock (TEP Site Ref 025)		
Site location:	Astley	**Central Grid Ref:**	SD 698 002
Site area:	13.6 ha		

General description:
The site consists of agricultural land (arable and grassland), farm buildings, a pond, several paths, woodland and a stream. The site is bordered by the A580 to the south, residential areas to the north, east and south west, farmland to the south and east, and a school and associated managed greenspace to the west.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citations

Biodiversity Interest:		
Designated areas:	Three SBIs:, Astley Hospital, located within 300m of the site to the north, Tyldesley Sewage Works and Marsh at Lower Green, both within 1km to the south of the site.	
Priority habitats:		
present hedgerow water corridor standing water managed greenspace	probable	potential woodland arable field margins
Priority and protected species:		
present bats	probable great crested newt common toad	potential brown hare water vole farmland birds
Statutorily protected species:		
present bats	probable great crested newt	potential water vole

Other :

- Astley Hospital SBI to the north of the site is not known to support populations of BAP species, but is designated on the basis of its interest for vegetation, invertebrates and birds, and contains an orchard Priority Habitat type. Marsh at Lower Green SBI to the south of the site is known to support great crested newts common toad and reed bunting. Tyldesley Sewage Works SBI to the south of the site supports populations of reed bunting.
- Astley Brook watercourse crosses the site centrally, running northwest- southeast, and the verge of the East Lancashire road to the south of the site, also northwest-southeast, providing connectivity to the wider countryside. However this busy road will also act as a barrier to access to land to the south and east of the site.
- At least 17 bird species have been recorded in grid squares containing this site., suggesting a good species assemblage in the local area.

General appraisal for Strategic Site:

Designated sites:

- The SBI near to the site is buffered by residential housing, and is therefore unlikely to be significantly affected by development.

Priority habitats:

- Hedgerows, ponds, rivers and arable field margins are generally widespread across Wigan, however net loss should be avoided. Surveys for protected species and to confirm important hedgerows would be required.
- PHT woodland (if present) is generally not extensive within Wigan, and due to maturity or complexity should be retained and protected in situ and provided with appropriate linkages.
- Where in situ retention or no net loss of habitats is unachievable within the site, offsetting will be required. Suitable areas, such as restoration or enhancement within SBIs or restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for the site.

Priority species (likely to include some statutorily protected species):

- Habitats suitable for roosting, foraging and commuting bats are present. Common and soprano pipistrelles are present in the grid squares containing the site.
- Habitats may be suitable to support significant numbers of farmland bird species, including ground nesting and passerine species.
- Great crested newt has been recorded within 500m (1998) south of the site. Habitats within the site have potential to maintain local populations, if still present.
- Habitats may be suitable to support brown hare, common toad and water vole, though these species have not been recorded within 1km of the site.
- Surveys for protected and priority species should accompany any planning applications. Habitats supporting protected and priority species should be retained in situ, where possible. Retained habitats should be appropriately linked to the wider landscape.
- No net loss of protected or priority species should be permitted. Where habitats supporting these species cannot be retained *in situ*, compensation should be provided which should seek to provide net gain for these species.

Biodiversity Enhancement Opportunity:

- Linkages should be retained along corridor of the brook and along the southeast boundary by the verge of the East Lancashire road.
- There is not likely to be a requirement for offsetting net loss of priority habitats at this site. However, if future survey indicates significant bird, mammal or amphibian interest, offsetting for species may be required. Potential areas to target offsetting include the Marsh at Lower Green SBI to the south of the site, which is known to support great crested newts common toad and reed bunting, and Tyldesley Sewage Works which supports reed buntings and other bird populations. There are also several areas which had been recorded as PHT acid grassland to the south of the site, near to the working colliery, which could be managed to enhance remnants of this habitat. However, these do not lie within council-owned land, and would therefore require landowner permission. Other opportunities for enhancement include habitat management within SBIs, such as Astley Hospital and others nearby, and the Greenheart.
- For more information regarding areas of opportunity for biodiversity enhancement (and restoration), refer to the Greenheart appraisal and Drawing G1771.002.

Site name:	Greenheart		
Site location:	Central Wigan	**Central Grid Ref:**	SD610031
Site area:	5535 ha		

General description:
Large area of predominantly greenbelt land running the length of central Wigan. The site is mainly comprised of agricultural land, with two LNRs, two SSSIs and thirty SBIs (including the Wigan Flashes) spread across the Greenheart. There are also several residential developments, farm buildings and fields, playing fields, golf courses, parks, cemeteries, woodlands, marshes, bogs, swamps, fields, ponds, watercourses, open drains and disused land such as former colliery workings.

Method of appraisal:
Phase 1 maps vs aerial photograph interpretation Additional GIS data analysis SBI citations Site survey within accessible land Remote assessment, viewed from accessible land

Biodiversity Interest:		
Designated areas:	Two SSSIs, two LNRs and thirty SBIs within site.	
SSSI	Name:	Abram Flashes SSSI
	Condition:	Unfavourable/ no change (southern section)
		Favourable (northern section)
	Area:	41ha
	Proportion within site:	100%
SSSI	Name:	Bryn Marsh and Ince Moss SSSI
	Condition:	Favourable
	Area:	70.61ha
	Proportion within site:	100%
LNR	Name:	Wigan Flashes LNR
	Area:	176ha
	Proportion within site:	100%
LNR	Name:	Borsdane Wood LNR
	Area:	24ha
	Proportion within site:	100%
SBI	Name:	A36 Bryn Marsh
	Grade:	A
	Area:	16.24ha
	Main classification feature(s):	Vegetation mosaic, ferns, bryophytes, birds, Lepidoptera, Odonata, other invertebrates, fish
	Proportion within site:	100%
SBI	Name:	A46 Horrocks Flash
	Grade:	A
	Area:	58.25ha
	Main classification feature(s):	Vegetation mosaic, bryophytes, mammals, birds, fish amphibians, Lepidoptera, Odonata, other invertebrates
	Proportion within site:	100%

SBI	Name:	A31 Scotsman's Flash
	Grade:	A
	Area:	38.68ha
	Main classification feature(s):	Vegetation mosaic, mammals, birds, Lepidoptera, Odonata, other invertebrates
	Proportion within site:	100%
SBI	Name:	A37 Ochre flash
	Grade:	B
	Area:	13.95ha
	Main classification feature(s):	Vegetation mosaic, mammals, birds, amphibians, Lepidoptera, Odonata, other invertebrates, fish
	Proportion within site:	100%
SBI	Name:	A38 Turner's Flash
	Grade:	B
	Area:	13.57ha
	Main classification feature(s):	Vegetation mosaic, bryophytes, birds, amphibians, Lepidoptera, Odonata, other invertebrates, fish
	Proportion within site:	100%
SBI	Name:	A39 Pearson's Flash
	Grade:	A
	Area:	20.19ha
	Main classification feature(s):	Vegetation mosaic, birds, Lepidoptera, Odonata, other invertebrates, fish
	Proportion within site:	100%
SBI	Name:	A40 Westwood Flash
	Grade:	A
	Area:	17.0ha
	Main classification feature(s):	Vegetation mosaic, frens, bryophytes, fungi, birds, amphibians, Lepidoptera, Odonata, other invertebrates
	Proportion within site:	100%
SBI	Name:	A42 Fairclough Wood
	Grade:	C
	Area:	3.63ha
	Main classification feature(s):	Vegetation mosaic, bryophytes, ferns, mammals
	Proportion within site:	10%
SBI	Name:	A43 Leeds Liverpool Canal - Adlington to Wigan
	Grade:	C
	Area:	11.65
	Main classification feature(s):	Vegetation mosaic, mammals, birds, Lepidopterans, other invertebrates
	Proportion within site:	100%
SBI	Name:	A44 Arley Woods (West)
	Grade:	A
	Area:	2.58ha
	Main classification feature(s):	Vegetation mosaic, ferns, bryophytes, mammals, birds
	Proportion within site:	80%

SBI	Name:	A45 Worthington Lakes
	Grade:	A
	Area:	21.33ha
	Main classification feature(s):	Vegetation mosaic, bryophytes, mammals, birds
	Proportion within site:	90%
SBI	Name:	A48 Red Rock Railway Cutting (South)
	Grade:	C
	Area:	4.54ha
	Main classification feature(s):	Vegetation mosaic, ferns, bryophytes, fungi, mammals, birds, Lepidoptera
	Proportion within site:	100%
SBI	Name:	A47 Haigh Plantations
	Grade:	A
	Area:	86.85ha
	Main classification feature(s):	Vegetation mosaic, ferns, bryophytes, fungi, mammals, birds, amphibians, Lepidoptera, other invertebrates, geological
	Proportion within site:	95%
SBI	Name:	A50 Amberswood Common
	Grade:	B
	Area:	87.76ha
	Main classification feature(s):	Vegetation mosaic, ferns, bryophytes, mammals, birds, amphibians, Lepidoptera, Odonata
	Proportion within site:	100%
SBI	Name:	A52 Kirkless Lane
	Grade:	A
	Area:	14.7ha
	Main classification feature(s):	Vegetation mosaic, ferns, bryophytes, birds, amphibians, Lepidoptera, Odonata
	Proportion within site:	100%
SBI	Name:	A54 Park Lane Colliery
	Grade:	B
	Area:	9.48ha
	Main classification feature(s):	Vegetation mosaic, bryophytes, birds, Lepidoptera
	Proportion within site:	!00%
SBI	Name:	A55 Low Hall Park
	Grade:	A
	Area:	7.83ha
	Main classification feature(s):	Vegetation mosaic, mammals, birds, Lepidoptera, Odonata
	Proportion within site:	100%
SBI	Name:	A57 Hindley Deep Pits
	Grade:	C
	Area:	8.41ha
	Main classification feature(s):	Vegetation mosaic, bryophytes, birds, amphibians, Lepidoptera, Odonata
	Proportion within site:	100%

SBI	Name:	A58 Woodshaw Colliery
	Grade:	C
	Area:	17.82ha
	Main classification feature(s):	Vegetation mosaic, ferns, bryophytes, fungi, birds
	Proportion within site:	100%
SBI	Name:	A60 Reservoirs East of Leyland Park
	Grade:	B
	Area:	2.15ha
	Main classification feature(s):	Vegetation mosaic, bryophytes, amphibians, Odonata, other invertebrates
	Proportion within site:	100%
SBI	Name:	A61 Borsdane Wood (West)
	Grade:	A
	Area:	26.87ha
	Main classification feature(s):	Vegetation mosaic, bryophytes, fungi, mammals, birds, Lepidoptera, other invertebrates
	Proportion within site:	100%
SBI	Name:	A62 Bickershaw Colliery
	Grade:	B
	Area:	40.83ha
	Main classification feature(s):	Vegetation mosaic, birds, amphibians, Lepidoptera, Odonata
	Proportion within site:	100%
SBI	Name:	A63 Wetland and Scrub at Hindley Green
	Grade:	B
	Area:	7.48ha
	Main classification feature(s):	Vegetation mosaic, birds, amphibians, Lepidoptera, Odonata
	Proportion within site:	100%
SBI	Name:	A64 Disused Railway at Hindley Green
	Grade:	C
	Area:	6.29%
	Main classification feature(s):	Vegetation mosaic, bryophytes, birds, amphibians, Lepidoptera
	Proportion within site:	100%
SBI	Name:	A59 Barlow's Farm
	Grade:	A
	Area:	23.81ha
	Main classification feature(s):	Vegetation mosaic, bryophytes, birds, amphibians, Lepidoptera, other invertebrates
	Proportion within site:	100%
SBI	Name:	A73 Edge Green
	Grade:	C
	Area:	1.06ha
	Main classification feature(s):	Vegetation mosaic, bryophytes, birds
	Proportion within site:	100%

SBI	Name:	A76 Ponds Near Lightshaw Lane
	Grade:	A
	Area:	11.83ha
	Main classification feature(s):	Vegetation mosaic, birds, amphibians, Lepidoptera, Odonata, other invertebrates
	Proportion within site:	100%
SBI	Name:	A90 Abram Flashes
	Grade:	A
	Area:	44.05ha
	Main classification feature(s):	Vegetation mosaic, mammals, birds, Lepidoptera, other invertebrates
	Proportion within site:	100%
SBI	Name:	A93 Culvert & Lodge at Standish
	Grade:	B
	Area:	1.39ha
	Main classification feature(s):	Vegetation mosaic, ferns, mammals, birds, other invertebrates
	Proportion within site:	5%
SBI	Name:	A99 Platt Bridge Heath
	Grade:	C
	Area:	3.36ha
	Main classification feature(s):	Vegetation mosaic, bryophytes
	Proportion within site:	100%

Priority habitats:

present	probable	potential
hedgerow water corridor (rivers, streams and canals) standing water (ponds & lake) heathland important grasslands (acid, calcareous & marshy) managed greenspace woodland wet woodland reedbeds arable margins mossland (lowland raised bog)	important grasslands (species rish neutral & open mosaic)	lowland fen

Priority species:

present	probable	potential
water vole brown hare common toad great crested newt brown long-eared bat noctule bat soprano pipistrelle bat hedgehog house sparrow bullfinch yellowhammer grasswrack pondweed bittern		reptiles native black poplar

Priority species:		
black-tailed godwit dunnock willow tit grasshopper warbler skylark reedbunting song thrush grey partridge lapwing		
Statutorily protected species:		
<u>present</u> great crested newt water vole barn owl kingfisher badger bats	<u>probable</u>	<u>potential</u> reptiles

Other :

- Invertebrates were a main classification feature for the majority of SBIs; only the following SBI citations did **not** indicate a level of importance for invertebrate populations: A42 Fairclough Woods, A44 Arley Woods, A45 Worthington Lakes, A58 Woodshaw Colliery, A73 Edge Green and A99 Platt Bridge Heath. Likely habitats to support invertebrate assemblages will be grassland mosaic, hedgerow networks, woodland and woodland edge, reedbed, pond and swamp and watercourses, including ditches.
- A number of sections of railway transect the site, many of them now dismantled, which provide useful green corridors for wildlife. One section of dismantled railway runs horizontally to the west of the Greenheart, connecting the northern borders of Amberswoood Common SBI with Scotsman's Flash SBI. Another runs east, passing Platt Bridge Heath SBI, and forming the Disused Railway at Hindley Green SBI, which connects large areas of grassland at Hindley Green and Dangerous Corner. Another dismantled section runs south to Bickershaw Colliery. Colliery
- Various watercourses run though the Greenheart, notably the Leeds - Liverpool Canal. This runs the vertical length of the northern half, and then skirts the western border where it joins Wigan Flashes. It runs past Scotsman's Flash to transect the southern half of the Greenheart, reaching Pennington Flash in the southeast.

General appraisal for Greenheart:

Designated sites:

- This area of Wigan contains two Local Nature Reserves, two Sites of Special Scientific Interest and thirty Sites of Biological Importance.

Priority habitats:

- Hedgerows are generally widespread across Wigan. Net loss should be avoided; replacement hedgerows should contribute to an integrated network. Surveys for protected species and to confirm important hedgerows would be required.
- Extensive areas of reedbed are clustered around the locality of the Wigan Flashes and in Bickershaw Colliery SBI, and scattered throughout the Greenheart.

General appraisal for Greenheart:

- Several rivers, canals, brooks and other watercourses are located within the Greenheart boundary, including those with feed into the Leeds - Liverpool Canal. Similarly, ponds are numerous and widespread. Several of these may qualify as priority habitat, especially those where water vole and other priority species are recorded.
- Several small and relatively isolated areas of Lowland acid grassland and, to a lesser extent, Lowland heathland have developed on sites of colliery spoil within the boundary of the Greenheart. These patches include areas to the north and east of Barlow's Farm SBI, to the north of the border of Kirkless Lane SBI, along the dismantled railway south of Forshaw's Tip (accessed by public footpath), to the north of the commons land at Dangerous Corner, to the east of Leyland Park, along the Leeds-Liverpool Canal east of the Dover Bridge (likely, although no permission to access track), a small area of heathland lying between Turner's Flash and Pearson's Flash, as well as land within several SBIs such as Platt Bridge Heath, Woodshaw and Bickershaw Collieries.
- Small areas of calcareous grassland have colonised the burnt furnace slag present within Kirkless Lane SBI, and are also known to be present at Horrocks Flash.
- Managed greenspace and Arable margins occur throughout the Greenheart.
- Wet woodland is known to occur in various SBIs including Low Hall Park and Horrocks Flash, the latter produced by mining subsidence.
- Lowland mixed deciduous woodland occurs within many SBIs, such as the Fairclough Wood ancient woodland, and throughout the Greenheart.
- Remnant peatland is present within SBIs such as Bryn Marsh, where it is dominated by cottongrass and Sphagnum, and at Horrocks Flash, where it supports purple moorgrass and several orchid species.
- Open mosaic habitats on previously developed land is likely to occur at the ex-colliery directly south of Turner's Flash, however permission to survey has not yet been granted. However, publicly-used pathways lead to the site. This habitat may also occur at Bickershaw Colliery.
- Marshy grassland, which may constitute the priority habitat type, occurs as Bickershaw Colliery and Park Lane, supporting a range of species including common orchid and southern marsh orchid.
- "Species-rich neutral grassland" has been recorded within the citations for several SBIs such as Park Lane, although it is uncertain as to whether these areas will match the criteria for the priority habitat.

It is uncertain as to whether priority habitat lowland fen is present within Greater Manchester. An area within Abram Flashes has been recorded as Lowland fen within the National Habitat Inventory, a Natural England dataset. No mention of fen has been made in the SBI citation, although a citation for the SSSI mentions tall herb fen, dominated by meadowsweet and great willowherb. Fen is generally associated with river courses and peatland. Apart from the presence of the Leeds-Liverpool Canal, Hay Brook appears to remain in a natural form from aerial photos, and could therefore be subject to flooding.

Priority species (likely to include some statutorily protected species):

- Several water vole records are clustered around the centre of the Greenheart, including at Amberswood Common and Turner's and Pearson's Flashes. Other records exist at Borsdane Wood, Wothington Lakes, Bickershaw Colliery, Platt Bridge, Freezeland Farm, along Hockery Brook south of Hindley Deep Pits, Abram Flashes, Lightshaw Lime Beds and several to the east of Pennington Flash.
- Great crested newt records are located around the Bickershaw Colliery site, within Haigh Country Park, to the west of Hindley Hall, and around Kirkless Lane.

General appraisal for Greenheart:

- The Flashes are also known to support a number of breeding bird BAP species, including yellowhammer, bittern, black-tailed godwit, dunnock, willow tit, grasshopper warbler, bullfinch and house sparrow.
- Skylark, reedbunting, and song thrush have been recorded at various SBIs including Amberswood Common and Bickershaw.
- Grey partridge and lapwing were also recorded in a recent breeding bird survey at Bickershaw.
- Common toad has been recorded within various SBIs including Kirklees Lane, Bryn Marsh, Horrocks Flash and Hindley Deep Pitts.
- Hedgehog has been recorded at Amberswood Common SBI.
- Recent bat records are scattered sparsely across the Greenheart, with several present at Hope Carr Nature reserve and around Ince Moss, as well as Platt Bridge and Bradshaw Hall farm.
- Grasswrack pondweed is recorded along the Leeds Liverpool Canal where it intersects with Red Rock Lane.
- It is possible that grass snake, slow worm and common lizard are present within the Greenheart. As these species were not classified as BAP species until very recently, their presence may not be highlighted in all reference material. Relatively little data is currently available on reptile species distribution in the Wigan area. As other species records become available, additional priority species may be identified within the Greenheart.
- Native black poplar may be present within woodland habitats

Statutorily protected species (not listed above):

- Recent Badger records are found on the northern border of the greenheart around Worthington Lakes.
- Kingfisher has been recorded within Horrocks Flash and along the northern-most stretch of the Leeds Liverpool Canal within the Greenheart boundary.
- Barn owl was sighted at Hope Carr Nature Reserve, and pellets were found recently at Lightshaw Hall

Biodiversity Enhancement Opportunity Areas (refer also to Drawing G1771.002):

- Where *in situ* retention or no net loss of habitats is unachievable within safeguarded land sites, offsetting will be required. Suitable areas, such as restoration, enhancement or new habitat creation within the Greenheart, should be identified in advance of development applications for these sites.
- Biodiversity Enhancement Opportunity Areas (BEOAs) within the Greenheart where such restoration work could be focused include:
- **Area A** – The area of heathland/acid/neutral grassland mosaic to the north of Kirkless Lane (now threatened by scrub encroachment and neutrification). Also, relatively large areas of council-owned grassland exist are present around the Recycling centre and associated landfill site, which had previously been mapped as acid grassland but have since become more neutral in character. Some of the landfill site has already been planted with broadleaved trees. These areas lie close to Kirkless SBI;
- **Area B** - The area of open mosaic habitat which occurs at the ex-colliery directly south of Turner's Flash, which is considered likely to meet the Priority habitat definition. However, permission to survey the land is still required. Management of this area could potentially improve its value for wildlife further. Also, the area of council-owned grassland (previously acid grassland) to the north of Turner's flash has potential for management. A small area of heathland is present at grid reference SD58396 03376. If acid grassland is restored at this site, the spread of heathland could also be encouraged.

- **Area C** - The area of council-owned landfill to the east of Amberswood Common (sparse Purple Moor grass has been recorded here, though the grassland is largely species-poor neutral). Also, the area of council-owned neutral grassland to the east of this landfill, which is next to an old colliery site, and was recorded as acid in the 1986 Phase 1 survey. It still retains some areas of acid grassland and marshy habitat, although parts are being developed into football pitches;
- **Area D** - Council-owned grassland within the area of Bickershaw Colliery. This may form the Priority habitat open grassland mosaic on previously developed land, and could potentially be managed as habitat for wildlife. Also, to the south of this site lies a large area of council-owned grassland which was once a site for spoil tipping, but shows some level of diversity in patches;
- **Area E** - Along the Leeds Liverpool Canal east of the Dover Bridge there is likely to be acid grassland on colliery spoil (although permission to access the track that runs along the canal is required). Remote survey with binoculars indicated that acid grassland was present, but may be suffering from neutrification/ scrub encroachment.
- **Area F** - Heathland along the dismantled railtrack (and public footpath) south of Forshaws Tip, which is at risk of being shaded by trees. Also, the large area of colliery spoil tipped land to the north and east of Barlow Farm, some of which retains acid grassland and small patches of heather. However, these are all on privately-owned land.
- **Area G** - Ashton Heathland is currently being restored by the Ashton Heath Residential Group, an associate group of BCTV. However, there has been some difficulty in re-establishing Ling heather, and this process may be benefited by help from the council. Areas of council owned neutral grassland (un-surveyed but mapped as neutral in the 1986 Phase 1 survey) lie to the north of this heathland, which could also potentially be managed to improve species diversity.
- **Area H** - To the west of Bickershaw and directly east of Park Lane Colliery is an area of bare ground on private land near to a disused shaft, which may be interesting but un-surveyed due to access issues. Potential areas of marshy grassland lie to the east, again un-surveyed.
- Commons land to the east of Leigh Road (see above - East of Leigh Road TEP ref 006) has been highlighted as potential land for redevelopment. A small section of this to the north is council-owned, and holds potential for restoration of acid grassland on areas of colliery spoil if offsetting of other development is required.
- Council-owned areas around and to the south of Westwood Park Gardens (east of Westwood Flash SBI) are due to be developed, however, there may be some potential for restoration within and around the developed areas, to be incorporated within the planning design. Another possibility is that materials could be recovered from the mounds of Pulverised Fuel Ash and used elsewhere, to encourage the creation of calcareous habitats (see above - Westwood TEP ref 015).