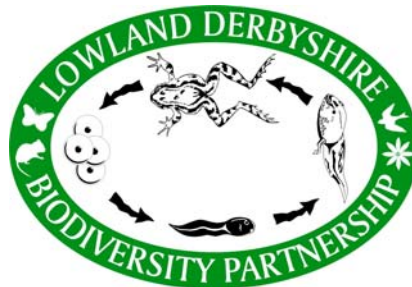


LOWLAND DERBYSHIRE LOCAL BIODIVERSITY ACTION PLAN

WETLAND HABITATS IN LOWLAND DERBYSHIRE



Prepared by the Lowland Derbyshire Biodiversity Partnership



Last Updated September 2005

This document provides the background information for the following wetland Habitat Action Plans:

- **Rivers and Streams**
- **Standing Open Water including Lakes, Ponds and Canals**
- **Swamps, Mires, Fens and Reedbeds**
- **Floodplain Grazing Marsh**

Wetland Habitats in Lowland Derbyshire

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1. Introduction

Wetlands are of great importance; around 3,500 of the UK's invertebrate species live in fresh water and up to half of these live in ponds. There are a number of priority habitats listed in the UK Biodiversity Action Plan. The following are present within Lowland Derbyshire; Aquifer fed naturally fluctuating water bodies, eutrophic standing waters, fens, mesotrophic lakes and reedbeds.

In Lowland Derbyshire we have four wetland habitat action plans which cover the main priority habitats present in the area:

- Standing open waters including lakes, ponds and canals
- Rivers and streams
- Swamps, mires, fens and reedbeds
- Floodplain grazing marsh

This document provides the background information for the habitats action plans.

1.1 Landscape Character

The Countryside Commission (now Countryside Agency) in partnership with English Nature has produced the 'Map of England', a map that depicts the natural and cultural dimensions of the landscape. At the national scale this work has defined English Nature's Natural Areas and the Countryside Agency's 181 Landscape Character Areas.

There are ten national Landscape Character Areas within Derbyshire. Derbyshire County Council has undertaken a detailed landscape character assessment for the county outside the Peak District National Park, which has further subdivided these ten broad character areas into thirty nine distinct Landscape Character Types (LCT). These have subsequently been described in 'The Landscape Character of Derbyshire'¹.

As part of the assessment, the document has identified for each of the Landscape Character Types the habitats that naturally occur in these areas and the potential for protection and expansion of these habitats.

The Landscape Character Assessment (Table 1)¹ has identified where wetland habitats would be most appropriate in maintaining landscape character and local distinctiveness. It has categorised part of most of English Nature's Character Areas as 'Riverside Meadows'. In the Derwent Peak Fringe and Lower Derwent area Needwood and South Derbyshire Claylands and Trent Valley Washlands these are characterised by being in a flat broad flood plain with meandering rivers. The grassland is low intensity permanent pasture with localised patches of rushes in damp hollows with scattered. Adjacent to the rivers are scattered, locally dense willow and alder trees. In the Coalfield area the rivers are narrower meandering along floodplains of variable width lined by trees. The remnant riverside vegetation includes wetland and some unimproved grassland and the pastures are dominated by dairy farming. The Riverside Meadows in the Melbourne Parklands Character Area are defined as being in flat floodplains containing meandering rivers and streams and are of traditional pasture which has now changed to intensive mixed farming. The Riverside Meadows in the Mease and Sense Lowlands are in flat floodplains with tight meandering rivers. The pasture is moderate intensity permanent pasture.

This information can be used by a variety of interest groups including developers, planners, foresters and wildlife groups when considering the appropriateness of particular developments, planting and habitat creation schemes in a specific area.

¹ Derbyshire County Council (2003) *The Landscape Character of Derbyshire*.

Table 1 Wetland habitats characteristic and appropriate within each Landscape Character Type

P Primary habitat – prominent and key characteristic S Secondary habitat – variable and local characteristic
 L Locally significant, containing rare species

Natural area	Character Area	Landscape Character Type	Floodplain Grazing marsh	Rush pasture	Reedbeds	Lowland Fen meadows	Standing open waters and canals	Rivers and Streams (river corridors)
Derbyshire Peak Fringe and Lower Derwent	Derbyshire Peak Fringe and Lower Derwent	Enclosed Moorland		P				S
		Wooded Slopes and Valleys		P	S		S	P
		Wooded Farmlands		S	S	S	P	P
		Gritstone Heaths & Commons						
		Settled Farmlands		S		S	S	
		Riverside Meadows	P	P	P	P	P	P
Coal Measures	Notts, Derbyshire & Yorkshire Coalfield	Wooded Hills & Valleys			S		S	P
		Coalfield Village Farmlands		S	S		P	P
		Estate Farmlands					S	P
		Wooded Farmlands		S	S		P	P
		Coalfield Estatelands		S	S	L	P	P
		Riverside Meadows	P	P	P	P	P	P
		Plateau Estate Farmlands						S
Southern Magnesian Limestone	Southern Magnesian Limestone	Limestone Farmlands				L	S	P
		Limestone Gorges	P	S	S	L	S	P
Needwood & South Derbyshire Claylands	Needwood & South Derbyshire Claylands	Settled Farmlands		S	L	S	P	P
		Settled Plateau Farmlands		S			S	
		Sandstone Slopes & Heaths				L		
		Estate Farmlands			S	L		S
		Riverside Meadow						
Trent Valley and Rises	Trent Valley Washlands	Lowland Village Farmlands					S	S
		Wet Pasture Meadows	P	P		P	P	
		Riverside Meadows	P	P	P	P	P	P
Trent Valley and Rises	Melbourne Parklands	Estate Farmlands					S	S
		Wooded Estatelands		S		S	P	P
		Sandstone Slopes & Heaths					S	S
		Riverside Meadows	P	P	P	P	P	P
Coal Measures	Leicestershire & Derbyshire Coalfield	Coalfield Village Farmlands		S	S		P	P
Trent Valley and Rises	Mease & Sence Lowlands	Village Estate Farmlands					S	P
		Riverside Meadows	P	P	P	P	P	P

1.2 National Vegetation Classification

The National Vegetation Classification (NVC ²) is a nationally recognised method for classifying habitat type according to the plant species within the habitat. Table 2 shows the NVC habitat types which have been recognised within the Lowland Derbyshire area

Table 2: Wetland NVC habitat types within Lowland Derbyshire

Wetland type	National Vegetation Classifications occurring in Lowland Derbyshire
Swamp	S3 Greater tussock-sedge (<i>Carex paniculata</i>) – <i>Caricetum paniculatae</i> swamp S4 Common Reed (<i>Phragmites australis</i>) swamp and reedbed S5 Reed Sweet Grass (<i>Glyceria maxima</i>) swamp S6 Greater pond sedge (<i>Carex riparia</i>) swamp S7 Lesser pond sedge (<i>Carex acutiformis</i>) swamp S8 Common Club-rush (<i>Scirpus lacustris ssp lacustris</i>) swamp S10 Water horsetail (<i>Equisetum fluviatile</i>) swamp S12 Common reedmace (<i>Typha latifolia</i>) swamp S14 Branched bur-reed (<i>Sparganium erectum</i>) swamp S15 Sweet Flag (<i>Acorus calamus</i>) – <i>Acoretum calami</i> swamp S16 Arrowhead (<i>Sagittaria sagittifolia</i>) swamp S17 Cyperus sedge (<i>Carex pseudocyperus</i>) swamp S18 False-fox sedge (<i>Carex otrubae</i>) – <i>Caricetum otrubae</i> swamp S19 Common spike-rush (<i>Eleocharis palustris</i>) swamp S20 Grey club-rush (<i>Scirpus tabernaemontani</i>) swamp S22 Floating sweet-grass (<i>Glyceria fluitans</i>) swamp S23 Other water-margin vegetation S25 Common reed (<i>Phragmites australis</i>) – Hemp-agrimony (<i>Eupatorium cannabinum</i>) tall-herb fen. S26 Common reed (<i>Phragmites australis</i>) – Common nettle (<i>Urtica dioica</i>) tall herb fen S28 Reed Canary grass (<i>Phalaris arundinacea</i>) tall herb fen
Mires and fens	M6 Star Sedge (<i>Carex echinata</i>) - <i>Sphagnum recurvum/auriculatum</i> mire M10 Dioecious sedge (<i>Carex dioica</i>) – Common Butterwort (<i>Pinguicula vulgaris</i>) mire M22 Blunt-flowered rush (<i>Juncus subnodulosus</i>) – marsh thistle (<i>Cirsium palustre</i>) fen-meadow M23 Rush (<i>Juncus effuses / articulatus</i>) - Marsh bedstraw (<i>Galium palustre</i>) mire M25 Purple moor-grass (<i>Molinia caerulea</i>) – Tormentil (<i>Potentilla erecta</i>) M27 Meadowsweet (<i>Fillipendula ulmaria</i>) – Anglelica (<i>Angelica sylvestris</i>) mire
Standing open water	A5 Rigid hornwort (<i>Certophyllum demersum</i>) community A8 Yellow water-lily (<i>Nuphar lutea</i>) community A8c White Water-lily (<i>Nymphaea alba</i>) sub-community A9 Broad-leaved pondweed (<i>Potamogeton natans</i>) community A10 Amphibious bistort (<i>Polygonum amphibium</i>) A11 Fennal Pondwed (<i>Potamogeton pectinatus</i>) – Spiked water-milfoil (<i>Myriophyllum spicatum</i>) community A15 Canadian pondweed (<i>Elodea canadensis</i>) community A19 Common Water-crowfoot (<i>Ranunculus aquatilis</i>) community A20 Pond water-crowfoot (<i>Ranunculus peltatus</i>) community.
Floodplain grazing marsh	MG4 Meadow foxtail (<i>Alopecurus pratensis</i>) – Great burnet (<i>Sanguisorba officinalis</i>) grassland MG 8 Crested Dog's-tail (<i>Cynosurus cristatus</i>) – Marsh marigold (<i>Caltha palustris</i>) grassland MG 9 Yorkshire fog (<i>Holcus lanatus</i>) - Tufted hair-grass (<i>Deschampsia cespitosa</i>) grassland MG10 Yorkshire fog (<i>Holcus lanatus</i>) – Soft rush (<i>Juncus effusus</i>) rush pasture MG11 Red Fescue (<i>Festuca rubra</i>) – Creeping bent (<i>Agrostis stolonifera</i>) – Silverweed (<i>Potentilla anserina</i>) grassland MG13 Creeping bent (<i>Agrostis stolonifera</i>) – Marsh foxtail (<i>Alopecurus geniculatus</i>) grassland

1.3 Associated Wetland Species

There are many species associated with wetland habitats, some of which are priority Biodiversity action plan species. Appendix 1-3 lists priority and locally important species associated with wetland habitats.

² Rodwell, J.S., Ed (1995) *British Plant Communities Volume 4 – Aquatic communities, swamps and tall-herb fens*. Cambridge University Press

2. Rivers

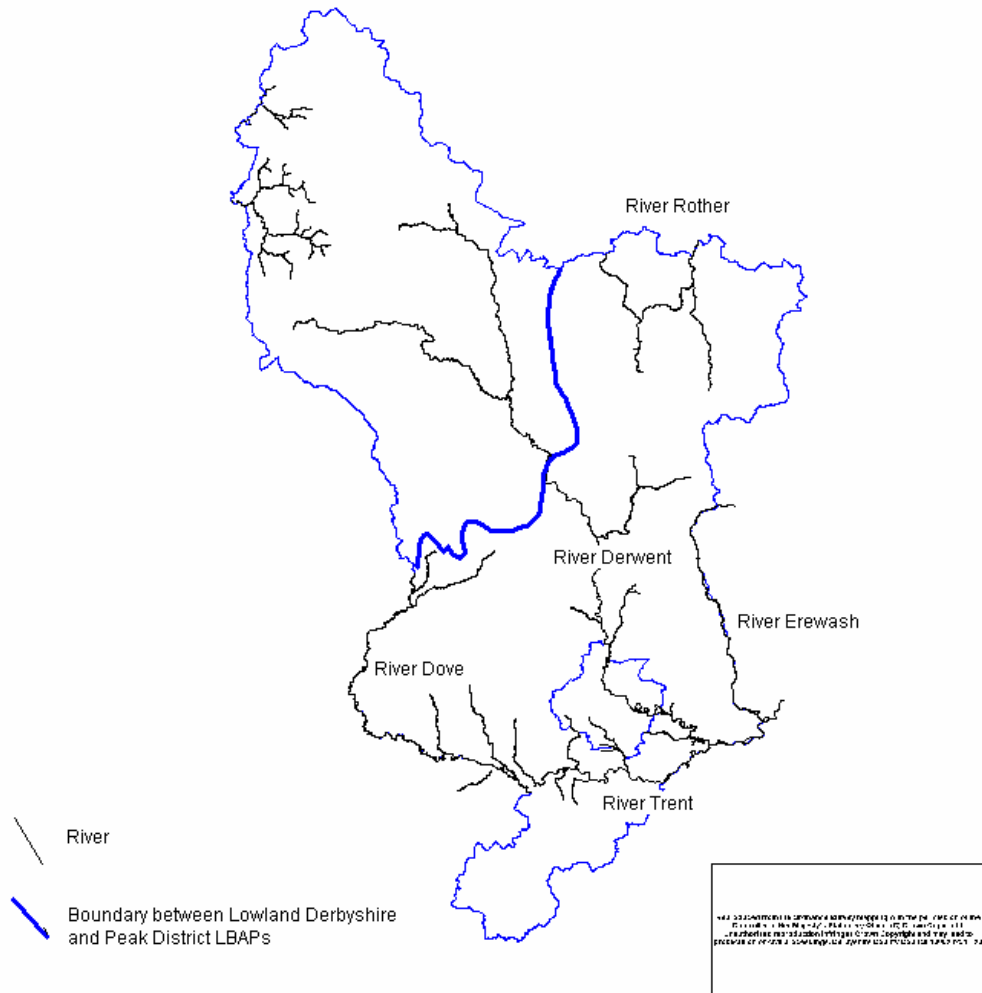
2.1 Introduction.

Rivers and streams and their floodplains form wetland corridors through our countryside. They have the potential to provide habitats for large numbers of priority species including otters, water vole and white-clawed crayfish. The best watercourses are those that exhibit the natural channel features typical of lowland watercourses. These include a variety of flow patterns (riffles, runs, glides, pools and marginal deadwater), a variety of channel features and exposed riverine sediment (ERS) which includes side bars, point bars, silt deposits and islands. ERS is an extremely important habitat, particularly for specialist invertebrates, as well as some bird and fish species and its presence is an indicator of rivers with natural channel features. In the past ERS such as channel bars were routinely removed from rivers such as the Dove, the long-term effect of this is unknown.

2.2 Rivers and streams in Lowland Derbyshire

Lowland Derbyshire lies almost entirely in the catchment of the River Trent. (Figure 1).

Figure 1: Derbyshire’s main rivers



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Several rivers located in the North of the County (including the Doe Lea, Rother and Hipper) drain North into the River Don, which reaches the Humber Estuary via the tidal Ouse. The River Poulter, on the magnesian limestone is within the Meden catchment.

After rising in north Staffordshire the Trent flows south and east before joining with the Tame and flowing northwest. Between its confluences with the Rivers Dove and Erewash the Trent passes north and westerly through southern Derbyshire. Following this the River Trent heads north towards the Humber Estuary via Nottingham, Newark and Gainsborough. In addition, there are several major tributaries of the Trent are located in Lowland Derbyshire; these include the Rivers Derwent, Dove, Erewash, Amber, Meden and a small section of the river Mease.

A significant number of rivers and streams have been severely modified by re-sectioning, straightening or deepening and diverting. Since the Second World War this was mainly carried out for agricultural land drainage, but was carried out prior to this for historical reasons within urban areas. In addition, some schemes were carried out to alleviate flooding or when constructing new roads and other development. In most cases in-stream habitat diversity has been virtually eliminated. Many rivers have become divorced from their natural floodplain, and wetland habitats such as wet grassland, wet woodland, fens and reed beds.

Water quality was once the major limiting factor, influencing biodiversity in the county rivers. Urban rivers and the River Trent especially have improved significantly in recent decades but diffuse pollution particularly from agriculture remains a serious problem in more rural rivers and streams. The Environment Agency carries out monitoring of watercourses throughout the county as part of the General Quality Assessment scheme (GQA). This is the Agency's national method for classifying water quality in rivers. GQA is assessed in four separate ways: chemistry, biology, nutrients and aesthetics. Sites are monitored monthly and annual results are based on the previous three years results combined. Chemical quality of rivers are recorded on a scale of A – F (Very good to Bad). This data is available from the Environment Agency web site (www.environment-agency.gov.uk).

Watercourses are amongst the most important wildlife corridors within the intensively farmed local landscapes and within many urban areas. They are also key sites for recreation and the focus of much human activity.

3. Standing open water

3.1 Introduction

The term standing open water refers to natural systems such as lakes, meres and pools, as well as man-made waters such as reservoirs, canals, ponds and gravel pits. It includes the open water zone which may contain submerged, free-floating or floating-leaved vegetation and water fringe vegetation. It also includes adjacent wetland habitats with contiguous water levels that are less than 0.25 ha. Ditches with open water for at least the majority of the year should also be included. Small areas of open water in a predominantly terrestrial habitat such as bog pools or temporary pools on heaths should be included in the appropriate terrestrial habitat.

For the purposes of this document, a pond is defined as any waterbody between 1 square metre and 2 hectares in area, which holds water for 4 months of the year or more. A lake is any waterbody of more than 2 hectares. Canals are included here as standing open water, although many have a slight flow caused by the use of locks. Most canals were built between 1750 and 1800.

Any area of open water can be important for biodiversity. Its biodiversity value, however, is dependent upon a number of factors including level of disturbance and the species that are present in, on and around the waterbody.

3.2 Standing open water in Lowland Derbyshire

Figures 2 and 3 show pond density and lake distribution in Lowland Derbyshire.

Figure 2: Pond density In Lowland Derbyshire

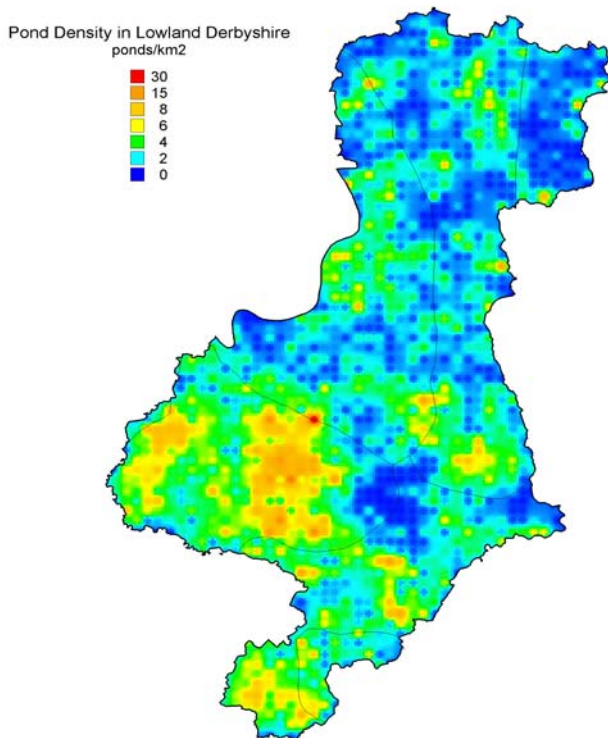
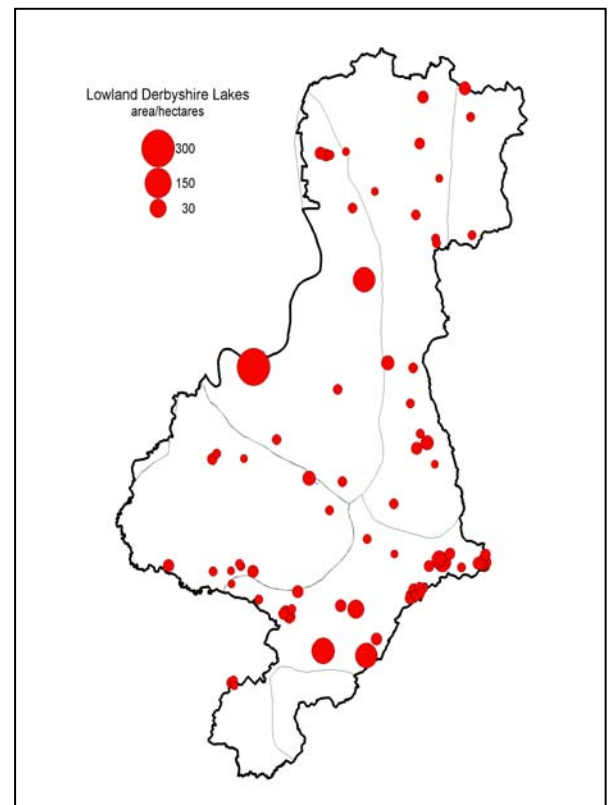


Figure 3: Lake distribution in Lowland Derbyshire



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Derbyshire Peak Fringe and Lower Derwent

The standing water habitat in this natural area includes several large reservoirs including Carsington, Ogston and Linacre. There are also a number of ornamental lakes within the area including Allestree Park, and Stubbing Court. Ponds are relatively few and far between and are usually used for fishing or drinking ponds for grazing animals. The Cromford Canal, a disused canal, is very shallow in places and includes swamp and substantial marginal vegetation.

Coal Measures

There are a number of reservoirs within this Natural Area, some are associated with the mining industry such as a Mapperley and Williamthorpe. Ornamental lakes exist at Locko Park, Queens Park in Chesterfield and at Hardwick Park. The development of the railways and the canal system has resulted in a number of borrow pits. These can be found along the Erewash Canal and nearby railway and the Chesterfield Canal. Subsidence flashes occur beside the Erewash at Aldercarr and Brinsley. In the south and central part of the area there are relatively few field ponds but there are some ponds within woodlands. The Erewash Canal was restored from a derelict state in the 1970's and flows between Langley Mill and the River Trent at Trent Lock. The area also includes in-filled sections of the Cromford, Nutbrook and Derby Canal.

Southern Magnesian Limestone

Most standing water exists as large lakes which were mostly mill ponds or as canal feeders and are now usually managed for fishing. Field ponds are rare due to the free draining geology.

Needwood and South Derbyshire Claylands

There are a small number of gravel pits within this Natural Area although most of them were left in water following extraction two or more decades ago, including Hilton Pits SSSI. The main feature of this area is the number of estate lakes, both small and large, at Osmaston Park, Meynell Langley, Kedleston Park, Sudbury Hall and Markeaton Park in Derby.

Trent Valley and Rises

There are a number of borrow pits in the Long Eaton area that were dug at the time of the construction of the railways. In addition several pits were dug during the construction of parts of the A50 during the 1990's. Gravel extraction has led to the creation of a number of large lakes, some temporary in nature during extraction. Lakes within completed restoration schemes include Swarkestone Lake, Eggington Gravel pits and St Chads LNR at Church Wilne. Two large reservoirs, Foremark and Staunton Harold, were constructed in the last forty years. The Trent and Mersey Canal, which in Derbyshire flows between Burton on Trent and the River Trent at Shardlow, has remained as a working canal.

4 Lowland swamp, mires, fens and reedbeds

4.1 Introduction

Swamps, mires, fens, and reedbeds are wetland habitats which together with wet woodland form a group that are often, but not always associated with running and standing water. These different habitat types are to some extent transitional but an attempt can be made to draw some distinctions between them.

Swamps have a water table at or above the surface of the vegetation for most of the year. They tend to be composed of bulky sedges like lesser pond sedge, grasses such as reed sweet grass and common reed and species like branched bur-reed, common Reedmace and water horsetail. Typical associate herbs include water mint, marsh bedstraw, greater bird's-foot-trefoil, marsh marigold, lesser spearwort and wild angelica. A large number of swamp community types have been described within the National Vegetation Classification.

Mires can be found both in the uplands and in lowland valley bottoms. They are often associated with peat deposits and in these circumstance are often referred to as bogs. In the uplands bog habitats are often ombrotrophic which means they rely on solutes in precipitation and wind blown dust for their nutrition. In effect they are rain and dust fed. The two main types of bog are blanket bog and raised bog. Typical species are cotton grasses, heathers, cowberry, cranberry, sedges like star and carnation sedge, sundew and the sphagnum mosses. Lowland mire is exceptionally rare but does occur in a handful of sites usually associated with small springs on valley sides and valley bottoms, and contain a variety of rushes and small sedges such as star sedge with a base of moss dominated by Sphagnum. In lowland valleys where ground is often waterlogged but grazing takes place a type of vegetation known as fen meadow mire can develop characterised by rushes, short sedges and herbs such as water avens, ragged robin, meadowsweet and marsh marigold.

Fens however, are minerotrophic mires where groundwater, as well as precipitation and dust etc, contributes nutrients and water. Being more nutrient rich lowland fens tend to support taller, denser vegetation characterised by common reed, hemp-agrimony, meadowsweet, reed canary grass, wild angelica, great willowherb and common valerian. The NVC recognises a number of community types several of which occur within the area. Fen vegetation has declined in the UK and in Derbyshire. Britain is considered to have a high proportion of the remaining fen in Europe.

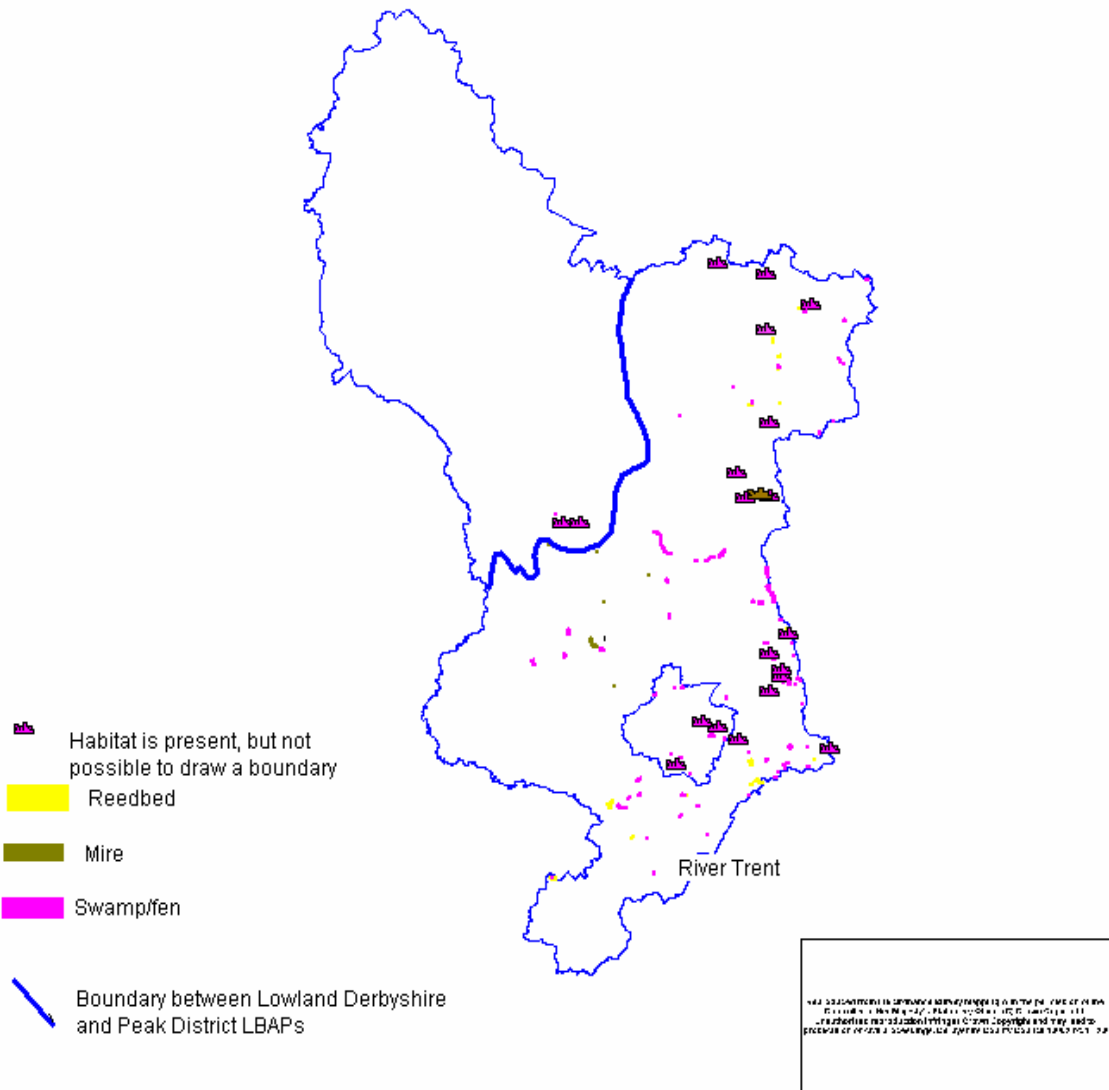
Reedbeds are a special type of swamp dominated by stands of the common reed *Phragmites australis*. They are described within the National Vegetation Classification under the community type S4 *Phragmites australis*. The water table must be above ground level for most of the year to maintain the habitat. Reedbeds consist mainly of dense small areas of reed they may incorporate areas of open water and ditches and sometimes small areas of wet grassland and carr.

Derbyshire's lowland mires, fens and swamps support over 150 native plant species including several that are relatively rare or uncommon for example lesser skullcap, butterwort, marsh cinquefoil, tawny sedge, marsh pennywort, marsh arrow-grass, greater tussock sedge and fen bedstraw. These habitats are also important for birds like reed bunting, sedge warbler and snipe and support a number of rare and scarce invertebrates.

4.2 Swamps, mires, fens and reedbeds in Lowland Derbyshire

Reedbeds, swamps and tall-herb fens are scattered throughout lowland Derbyshire (Figure 4), but most are located within the Trent Valley and the Coal Measures, especially within the catchments of the Erewash, Rother and Doe Lea. In many locations these habitats occur at the edges of ponds, lakes and rivers, but they are also associated with subsidence flashes, storage lagoons and old canals.

Figure 4: Swamps, mires, fens and reedbeds in lowland Derbyshire.



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Swamps dominated by sedges tend to be very localised and can be found in the Needwood and South Derbyshire Claylands alongside watercourses such as the Brailsford Brook and by the Derwent near Belper and in a few locations elsewhere. Marginal stands of swamp occur at various points along the Cromford Canal.

The extent of lowland mires and fen-meadows in the LBAP area is small and scattered. They occur as small valley mires within the Mercaston Marsh and Muggington Bottom SSSI which lies over a narrow band of peat on the

border between the Needwood and South Derbyshire Claylands and Derbyshire Peak Fringe Natural Areas. Fen meadow and rush-pasture mires occur in association with unimproved pastures and meadows especially in the Peak Fringe where they can significantly add to the overall diversity of sites. These mires usually occur towards the bottom of valley sides and alongside streams. More acidic mires occur in association with remnant areas of heath, for example at Wessington Green and Caroline Marsh at Tansley.

Small mires are also found in the Southern Magnesian Limestone Natural Area associated with calcareous flushes and springs. Several of these are of sufficient interest to be Sites of Special Scientific Interest and still provide a home to many rare plant species.

Most reedbeds are found in either the Trent valley associated with gravel pits or in the former coalfield associated with mining subsidence and all tend to be relatively small. The largest area of reedbed is 7ha and is found at Elvaston Quarry pit. There are examples of single species dominated swamps associated with the River Trent and the Trent Valley and Rises Natural area. There are larger examples of swamps within the Erewash valley such as Golden Brook storage lagoon and Pewit Carr.

Many swamp and mire habitats were affected by the growth of Derby and to a lesser extent Chesterfield. Land drainage affected extensive tracts of land from the 1650s onwards and Derbyshire was probably no exception. Recent evidence for losses has been recorded within the Derbyshire Wildlife Sites system though this has not been quantified. In addition many of the sites identified within the audit are thought to be in a poor state and in some cases may no longer support viable habitats. Many sites are no longer managed within agricultural holdings and have been fenced resulting in willow and alder invasion and the dominance of coarser grasses and bulky species such as sedges, umbellifers and willowherbs. Wetland habitats have developed naturally in the subsidence associated with the coalfield areas. Wetland habitats, including some areas of swamp and reedbed have been created as part of large restoration schemes along the Trent valley. Some flood alleviation schemes such as the Erewash Flood alleviation scheme incorporates areas of swamp and reedbed which are primarily an engineering tool but also managed for nature conservation. The concept of sustainable urban drainage is now being considered with large housing and industrial developments. Swamps reedbeds, mires and fens are threatened by development adjacent to these habitats is a threat as it may affect hydrology e.g. rate of run-off, quality of water etc and a lack of sympathetic management.

5 Floodplain grazing marsh

5.1 Introduction

Floodplain is a term referring to seasonally waterlogged low-lying grassland where the drainage is poor or impeded. They often include small ditches and ponds as well as areas dominated by rushes. They are often agriculturally improved and can be botanically poor. Typical management may be grazing or cutting of hay or silage. Sites may contain seasonal water-filled hollows and permanent ponds with emergent swamp communities, but not extensive areas of tall fen species like reeds; although they may abut with fen and reed swamp communities.

The UK Biodiversity Action Plan states that the exact extent of floodplain 'grazing marsh' in the UK is not known but it is possible that there may be a total of 300,000 ha. In England and Wales the remaining wet grassland is approximately 220,000ha³ from a historic resource of 1.2 million ha. England holds the largest proportion with an estimate in 1994 of 200,000 ha. However, only a small proportion of this grassland is semi-natural supporting a high diversity of native plant species (5,000 ha in England, an estimated 10,000 ha in the UK).

Floodplain grasslands may be botanically poor often dominated by Yorkshire Fog and tufted hair-grass equating to the National Vegetation Classification (NVC) MG9 or Yorkshire Fog and soft rush equating to the NVC MG10. Floodplain grasslands are important for a number of breeding waders such as snipe and lapwing. They are also important for invertebrates, amphibians and reptiles as well as mammals such as water voles.

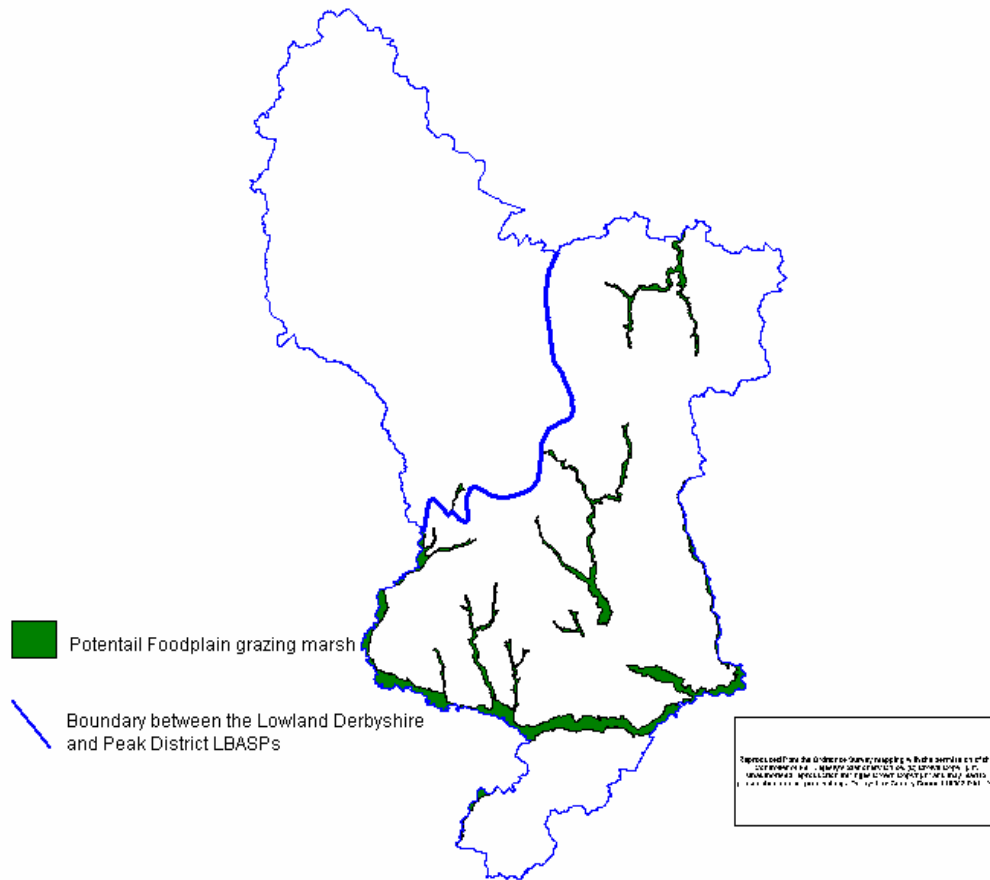
5.2 Floodplain grazing marsh in Lowland Derbyshire

We do not know the amount of floodplain grazing marsh there is in lowland Derbyshire, the best guide we have is the land which has been identified in 'The Landscape Character of Derbyshire'⁴ which geographically has the potential to form floodplain grazing marsh.

³ Benstead, P et al. (1997) *The Wet Grassland Guide*. RSPB, EN, & ITE

⁴ Derbyshire County Council (2003) *The Landscape Character of Derbyshire*.

Figure 5: Potential floodplain grazing marsh in Lowland Derbyshire (taken from the Riverside Meadows character type in the Landscape Character of Derbyshire).



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Derbyshire Peak Fringe and Lower Derwent

The Derwent Valley dominates the Natural Area, flowing southwards in a relatively flat bottomed narrow valley. Between Milford and Ambergate there are a number of wet meadows on both sides of the river, although most are no longer particularly species-rich they are important for waders. Further north, between the Peak District and Chesterfield, there are several small valley systems with wet meadows, some of which have not been drained or improved. In addition there are pastures developed on the normally free draining shales/gritstone where clays have impeded drainage and wet, rushy fields have developed. There are also areas around the operational and disused reservoirs in this area, including Ogston and Linacre, which continue to survive, providing the water levels do not drop significantly and over long periods.

Coal Measures

The river valleys of the Rother, Doe Lea and the Erewash still retain some areas of wet grassland and although much of it is not particularly species-rich. It is important for birds, both as residents and on passage, along the north-south migration routes. There are exceptions however, with some notable species-rich wet grassland beside the Erewash. One of the main causes of wet grassland was mining subsidence, often creating areas with standing water, known locally as flashes. These occurred particularly in the Doe Lea and Rother Valleys and were very important for birds and insects. Other examples include the series of wet meadows at Hilcote/South Normanton, but these were changed significantly with the creation of fishponds. In the north of the Natural Area the Moss Valley SSSI, contains important wet grasslands. In this Natural Area, land adjacent to used and remaindered, canals such as the Erewash, Cromford, Nutbrook and Chesterfield is sometimes wet. There are good examples of wet grasslands/marshes in such locations, but they are not always managed appropriately and are progressing to carr. As

with the other river valleys there has been a lowering of water levels as land drainage and flood protection works, carried out in the 1960's, 1970's and early 1980's proceeded and this has dried out some wet meadows.

Southern Magnesian Limestone

There are a few areas of wet grassland developed on the limestone, where drainage is impeded and seepages occur including areas within two SSSIs, Ginny Spring and Hollinhill and Markland Grips; in the latter, mining subsidence is the cause.

Needwood and South Derbyshire Claylands

A number of wet meadows still survive along some of the small brooks in this Natural Area. However, there are examples where, due to their proximity to mills, now converted to dwellings with their gardens landscaped, the integrity of the wet grassland has been lost. The northern part of this Natural Area is one of the richest in the LBAP area for lowland wet meadows away from large river systems, but they are small and increasingly fragmented and as drainage and lowering of the water tables proceeds, have become more threatened. Mercaston Marsh and Mugginton Bottoms SSSI, on the border between this and Derbyshire Peak Fringes and Lower Derwent Natural Area, shows the range of habitats within a mosaic, which formerly would have been more widespread in the several similar small valley systems within this Area.

Trent Valley and Rises

As with the other river valleys, the water table levels appear to have declined over the last twenty years and floodplain meadows, including those in nature reserves, are becoming drier and losing specific interest; regular summer and winter floods of the 1970's and early 1980's are much less frequent now. Many grasslands have been altered by the use of fertiliser or slurry as they have become more accessible for more of the year, but if wet they still hold and provide for wetland species such as snipe, redshank etc. and also some invertebrates, particularly if the necessary micro-habitats and diversity (e.g. ditches and pools) are present. Isolated wet meadows occur beside the Trent and Mersey Canal, although as elsewhere they suffer from a lack of management. One such series were entered into Countryside Stewardship and are now being managed.

Appendix 1: Species for which rivers and streams are a key habitat in Lowland Derbyshire

PRIORITY SPECIES

Mammals

Otter	<i>Lutra lutra</i>
Water vole	<i>Arvicola terrestris</i>
Pipistrelle bat	<i>Pipistrellus pipistrellus</i>

Invertebrates

White-clawed crayfish	<i>Austropotamobius pallipes</i>
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Birds

Reed bunting (breeding)	<i>Emberiza schoeniclus</i>
Bittern (not breeding)	<i>Botaurus stellaris</i>

Vascular Plants

Grass-wrack pondweed	<i>Potamogeton compressus</i>
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LOCALLY IMPORTANT SPECIES

An important feature of Local BAPs is the selection of locally important, threatened, declining or rare species which add local distinctiveness. Using Endangered Wildlife in Derbyshire (Elkington and Willmot 1996) and with the help of county recorders the following species have been selected for this category.

Mammals

Water shrew	<i>Neomys fodiens</i>
Daubenton's bat	<i>Myotis daubentonii</i>
Noctule bat	<i>Nyctalus noctula</i>
Wiskered bat	<i>Myotis mystacinus</i>
Natterer's bat	<i>Myotis nattereri</i>
Leisler's bat	<i>Nyctalus leisleri</i>
Brant's bat	<i>Myotis brandtii</i>

Water bugs

<i>Aquarius najas</i>
<i>Aphelocheirus aestivalis</i>
<i>Micronecta poweri</i>

Molluscs

<i>Theodoxus fluviatilis</i>

Invertebrates

Water Beetles

<i>Brychius elevatus</i>
<i>Haliplus laminatus</i>
<i>Stictonectes lepidus</i>
<i>Scarodytes halensis</i>
<i>Agabus biguttatus</i>
<i>Gyrinus urinator</i>
<i>Helophorus arvernensis</i>
<i>Ochthebius bicolon</i>
<i>Hydraena rufipes</i>
<i>Riolus cupreus</i>
<i>Riolus subviolaceus</i>

Plants

Common Club-rush	<i>Schoenoplectus lacustris</i>
Grey Club-rush	<i>Schoenoplectus tabernaemoutani</i>
Yellow water-lily	<i>Nuphar lutea</i>
Water-crowfoots	<i>Ranunculus spp.</i>
Water-cress	<i>Rorippa nasturtium-aquaticum</i>
Wood Club-rush	<i>Scirpus sylvaticus</i>
Bladder sedge	<i>Carex vesicaria</i>
Whorl-grass	<i>Catabrosa aquatica</i>
Hemlock Water-dropwort	<i>Oenanthe crocata</i>
Pendulous sedge	<i>Carex pendula</i>

Appendix 2 Species for which ponds, lakes and canals are a key habitat in Lowland Derbyshire

PRIORITY SPECIES

Mammals

Otter	<i>Lutra lutra</i>
Water vole	<i>Arvicola terrestris</i>
Pipstrelle bat	<i>Pipistellus pipistrellus</i>

Birds

Reed bunting (breeding)	<i>Emberiza schoeniclus</i>
Bittern (not breeding)	<i>Botaurus stellaris</i>

Amphibians

Great crested-newt	<i>Triturus cristatus</i>
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Invertebrates

White-clawed crayfish	<i>Austropotamobius pallipes</i>
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Vascular Plants

Grass-wrack pondweed	<i>Potamogeton compressus</i>
Pennyroyal	<i>Mentha pulegium</i>

Non-vascular plants

Beaked Beardless-moss	<i>Weissia rostellata</i>
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LOCALLY IMPORTANT SPECIES

An important feature of Local BAPs is the selection of locally important, threatened, declining or rare species which add local distinctiveness. Using Endangered Wildlife in Derbyshire (Elkington and Willmot 1996) and with the help of county recorders the following species have been selected for this category.

Mammals

Water shrew	<i>Neomys fodiens</i>
Daubenton's bat	<i>Myotis daubentonii</i>
Noctule bat	<i>Nyctalus noctula</i>
Wiskered bat	<i>Myotis mystacinus</i>
Natterer's bat	<i>Myotis nattereri</i>
Leisler's bat	<i>Nyctalus leisleri</i>
Brant's bat	<i>Myotis brandtii</i>

Reptiles

Grass snake	<i>Natrix natrix</i>
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Invertebrates

Molluscs

<i>Theodoxus fluviatilis</i>	Canals
<i>Viviparus contectus</i>	Canals
<i>Viviparus viviparus</i>	Canals
<i>Bythinia leachii</i>	Canals
<i>Gyraulus laevis</i>	Canals
<i>Pisidium supinum</i>	Canals
<i>Pisidium hibernicum</i>	Canals
<i>Pisidium moitessierianum</i>	Canals
<i>Aplexa hypnorum</i>	Sometimes in seasonal ponds

Water bugs

<i>Mesovelai furcata</i>
<i>Gerris argentatus</i>
<i>Micronecta poweri</i>
<i>Corixa dentipes</i>
<i>Sigara scotti</i>

Water beetles

<i>Haliphus heydeni</i>
<i>Haliphus laminatus</i>
<i>Noterus crassicornis</i>
<i>Hygrotus quinquelineatus</i>
<i>Hydroporus neglectus</i>
<i>Hydroporus obscurus</i>
<i>Stictonectes lepidus</i>
<i>Porhydrus lineatus</i>
<i>Scarodytes halensis</i>
<i>Agabus unguicularis</i>
<i>Illybius aenescens</i>
<i>Illybius guttiger</i>
<i>Illybius subaeneus</i>
<i>Rhantus grapii</i>
<i>Dytiscus circumcinctus</i>
<i>Dytiscus circumflexus</i>
<i>Hydrochus elongates</i>
<i>Helophorus dorsalis</i>
<i>Helohorous longitarsis</i>
<i>Helophorus nanus</i>
<i>Helocharus punctatus</i>
<i>Enochrus coarctatus</i>
<i>Berosus signaticollis</i>
<i>Ochthebius bicolon</i>
<i>Ochthebius nanus</i>
<i>Hydraena testacea</i>
<i>Donacia crassipes</i>
<i>Donacia marginata</i>
<i>Plateumaris rustica</i>

Plants

Pondweeds	<i>Potamogetons spp</i>	Trifid Bur-marigold	<i>Bidens tripartite</i>
Milfoils	<i>Myriophyllum spp</i>	Flowering rush	<i>Butomus umbellatus</i>
Water Horsetail	<i>Equisetum fluviatile</i>	Arrowhead	<i>Sagittaria sagittifolia</i>
White water-lily	<i>Nymphaea alba</i>	Narrow-leaved water-plantain	<i>Alisma lanceolatum</i>
Rigid hornwort	<i>Ceratophyllum demersum</i>	Horned pondweed	<i>Zannichellia palustris</i>
Fan-leaved Water-crowfoot	<i>Ranunculus circinatus</i>	Greater Duckweed	<i>Spirodela polyrhiza</i>
Water dock	<i>Rumex hydrolaphum</i>	Ivy-leaved duckweed	<i>Lemna trisulca</i>
Water violet	<i>Hottonia palustris</i>	Orange foxtail	<i>Alopecurus aequalis</i>
Marsh woundwort	<i>Stachys palustris</i>	Lesser bulrush	<i>Typha angustifolia</i>
Marsh speedwell	<i>Veronica scutellata</i>		
Blue Water-speedwell	<i>Veronica anagallis-aquatica</i>		
Pink Water-speedwell	<i>Veronica catenata</i>		
Nodding bur-marigold	<i>Bidens cernua</i>		

Appendix 3: Species for which lowland swamps, reedbeds, mires and fens are a key habitat in Lowland Derbyshire

PRIORITY SPECIES

Mammals

Otter	<i>Lutra lutra</i>
Water vole	<i>Arvicola terrestris</i>

Amphibians

Great crested newt	<i>Triturus cristatus</i>
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Birds

Reed bunting (Breeding)	<i>Emberiza schoeniclus</i>
Bittern (not breeding)	<i>Botaurus stellaris</i>

LOCALLY IMPORTANT SPECIES

An important feature of Local BAPs is the selection of locally important, threatened, declining or rare species which add local distinctiveness. Using Endangered Wildlife in Derbyshire (Elkington and Willmot 1996) and with the help of county recorders the following species have been selected for this category.

Mammals

Water shrew	<i>Neomys fodiens</i>
Harvest mouse	<i>Micromys minutus</i>
Daubenton's bat	<i>Myotis daubentonii</i>
Noctule bat	<i>Nyctalus noctula</i>
Wiskered bat	<i>Myotis mystacinus</i>
Natterer's bat	<i>Myotis nattereri</i>
Leisler's bat	<i>Nyctalus leisleri</i>
Brant's bat	<i>Myotis brandtii</i>

Reptiles

Grass snake	<i>Natrix natrix</i>
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Birds

Snipe	<i>Gallinago gallinago</i>
Lapwing	<i>Vanellus vanellus</i>
Reed warbler	<i>Acrocephalus scirpaceus</i>
Sedge warbler	<i>Acrocephalus schoenobaenus</i>
Teal	<i>Anas crecca</i>

Invertebrates

Molluscs

<i>Aplexa hypnorum</i>
<i>Ashfordia granulata</i>
<i>Vertigo antivertigo</i>
<i>Leiostryla anglica</i>

Water beetles

<i>Noterus crassicornis</i>
<i>Hydroporus neglectus</i>
<i>Hydroporus obscurus</i>
<i>Porhydrus lineatus</i>
<i>Agabus unguicularis</i>
<i>Ilybius aenescens</i>
<i>Ilybius guttiger</i>
<i>Rhantus grapii</i>
<i>Dytiscus circumcinctus</i>
<i>Dytiscus semisulcatus</i>
<i>Gyrinus distinctus</i>
<i>Gyrinus paykulli</i>

Water beetles (continued)

<i>Hydrochus elomgatus</i>
<i>Helophorus nanus</i>
<i>Helochares punctatus</i>
<i>Enochrus coarctatus</i>
<i>Hydraena britteni</i>
<i>Hydraena testacea</i>

Water bugs

<i>Gerris argentatus</i>

Plants

Orange Foxtail	<i>Alopecurus aequalis</i>
Lesser marshwort	<i>Apium inundatum</i>
Slender tufted sedge	<i>Carex acuta</i>
Dioecious sedge	<i>Carex dioica</i>
Brown sedge	<i>Carex disticha</i>
Tawny sedge	<i>Carex hostiana</i>
Cyperus sedge	<i>Carex pseudocyperus</i>
Long-stalked yellow sedge	<i>Carex viridula ssp. brachyrryncha</i>
Few-flowered spike-rush	<i>Eleocharis palustris</i>
Marsh Helleborine	<i>Epipactis palustris</i>
Broad-leaved cottongrass	<i>Eriophorum Latifolium</i>
Fen bedstraw	<i>Galium uliginosum</i>
Marsh pennywort	<i>Hydrocotyl vulgaris</i>
Bristle club-rush	<i>Isolepis setacea</i>
Bogbean	<i>Menyanthe trifoliata</i>
Water Dropworts	<i>Oenanthe spp.</i>
Lousewort	<i>Pedicularis sylvatica</i>
Marsh cinquefoil	<i>Potentilla palustris</i>
Golden dock	<i>Rumex maritimus</i>
Grey Club-rush	<i>Scheonoplectus tabernaemontanii</i>
Unbranched bur-reed	<i>Sparganium emersum</i>
Marsh stitchwort	<i>Stellaria palustris</i>
Lesser skullcap	<i>Scutellaria minor</i>
Marsh arrowgrass	<i>Triglochin palustris</i>
Lesser bulrush	<i>Typha angustifolia</i>
Marsh speedwell	<i>Veronica scutellata</i>