

Chapter 4 Biodiversity, flora, fauna and soils

Biodiversity, Flora, Fauna and Soils Summary		
Key messages of policy		
<ul style="list-style-type: none"> Every public authority must, in exercising its functions, have regard to the purpose of conserving biodiversity (Natural Environment and Rural Communities Act 2006) improved public transport links to leisure and tourist destinations take into account all local Biodiversity Action Plans of relevance to the area carry out a Habitats Regulation Assessment (i.e. Special Protection Areas, Special Areas of Conservation) to identify if the plan will have a significant impact and, if so, what mitigating actions will be taken. 		
Environmental baseline		
Environmental description	Baseline condition	Future trend without LTP3
Condition of designated wildlife sites	Moderate	Improving – many factors relate to management of sites rather than transport impacts
Area of greenbelt	Nominal reduction in area over last 5 years	Continued trend likely
Transport network providing green corridors	No clear information, but network of green corridors has been increasing	Static
Wildlife disturbance	Moderate	Moderate as visitor pressure likely to be governed by external factors
Animal deaths on roads	No clear information on numbers. Key Derbyshire species of Otter and Barn Owl have been killed.	Continued trend likely
Noise impact on biodiversity	Noise levels increasing but estimated to be at most at a moderate level on County roads	Increased traffic may increase noise but not significantly
Air pollution	Pollution below recommended thresholds	Trend of improving air quality
Light pollution	Street lighting contributing to less 'dark' areas	Less light pollution due to energy saving
Water quality	Moderate but improving	Improving – many factors relate to agriculture
Regionally Important Geological Sites	No evidence to highlight any deterioration	No threats identified that would deteriorate
Soils	Soils generally not impacted upon, other than some peat erosion in Peak District	Unlikely to change significantly
Environmental issues and opportunities		
Description of issue	Implications/ opportunities for LTP3	
Condition of Designated Wildlife Sites	LTP3 should aim to continue to protect designated areas of biodiversity and geology. Opportunities to enhance and manage habitats should be taken.	
Severance of habitats and role of transport network in providing green corridors	LTP3 should aim to continue to protect and take opportunities to expand habitats alongside the County Councils transport network.	
Recreational disturbance	LTP3 should aim to continue to protect important species and habitats from any increase in recreational walking, cycling, motorcycling etc.	
Road casualties	LTP3 should aim to continue to protect important species from being killed on Derbyshire roads	
Light pollution	LTP3 should aim to consider reducing light pollution to improve habitats	
Soil erosion	LTP3 should aim to protect against any increase in soil erosion from any increase in recreational walking, cycling, motorcycling etc	
Construction and maintenance of County Council transport networks	LTP3 should aim to continue to protect habitats and species during construction and maintenance of the County Councils transport network	
Biodiversity acting as a tourist attraction of which many people travel by car to visit	LTP3 should seek to encourage more people to enjoy the natural environment through more sustainable travel	
General biodiversity issues	LTP3 should take opportunities to involve specialist biodiversity advisors	
Data gaps		
Description	Action	
Impact of transport on designated wildlife sites	Seek views as part of this Scoping Report	
Habitat fragmentation	Seek views as part of this Scoping Report	
Light pollution impacts on biodiversity	Seek views as part of this Scoping Report	
Draft objectives		
SEA 6 Encourage biodiversity and take measures to reduce habitat fragmentation		
SEA 7 Avoid damage to designated wildlife sites and protected species		
SEA 8 Support sustainable tourism		
SEA 9 Prevent damage to the landscape due to increases in recreational walking and cycling, motorcycling etc.		

4.1 Stage A1: Key messages of policy context analysis

4.1.1 Stage A1 of the SEA, see Annex 1, has identified the key relevant plans, programmes and environmental protection objectives relating to biodiversity, flora, fauna and soil. The key messages of policy context are:-

- Every public authority must, in exercising its functions, have regard to the purpose of **conserving biodiversity** (Natural Environment and Rural Communities Act 2006)
- **improved public transport** links to leisure and tourist destinations
- take into account all **local Biodiversity Action Plans** of relevance to the area
- carry out a **Habitats Regulation Assessment** (i.e. Special Protection Areas, Special Areas of Conservation) to identify if the plan will have a significant impact and, if so, what mitigating actions will be taken.

4.2 Stage A2: Environmental Baseline

Introduction

4.2.1 Derbyshire has a varied landscape from moorlands to limestone dales, meadows, river valleys, woodlands and wetlands. This rich landscape provides a similarly varied habitat for biodiversity, flora and fauna. Many of these sites support transport networks and associated traffic. In this section to examine the environmental baseline we have considered the following issues:-

- Designated sites
- Habitats and Species Plans
- Green infrastructure
- Wildlife disturbance and road casualties
- Noise, air and light pollution effects
- Contamination and water pollution effects
- Regionally important geological sites
- Soils
- Other management issues
- Biodiversity as a visitor attraction

Designated Sites

European sites

4.2.2 There are nine Special Areas of Conservation (SAC) and one Special Protection Area (SPA) in Derbyshire and a self-selected 15km surrounding buffer-zone. These are also being assessed as part of the Habitats Regulations Assessment (HRA) which is being undertaken alongside this SEA. SACs and SPAs are shown in Figures 4.1 and 4.2. A summary of the species and habitats protected by these sites is described in Table 4.1. The Derbyshire LTP3 Habitats Regulations Assessment Initial Screening, October 2009 describes these European sites in more detail; this can be found in Annex 2.

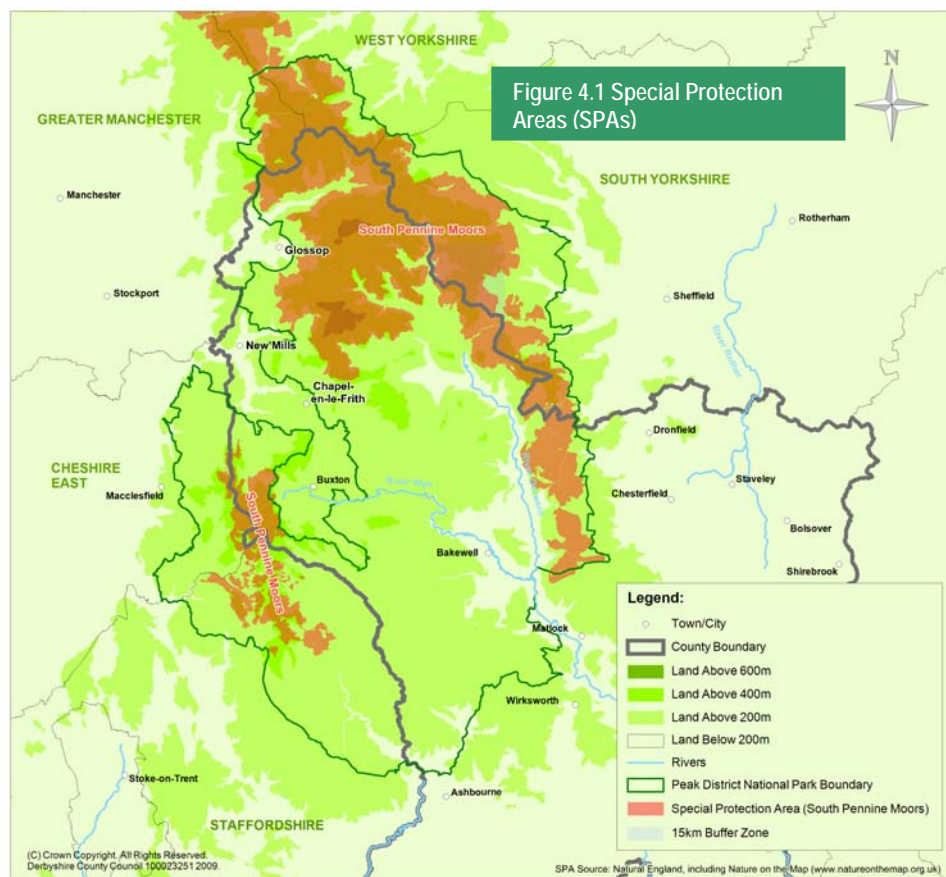
4.2.3 The summary from the pre-screening exercise, highlights the following potential significant effects which are considered later in this Chapter:-

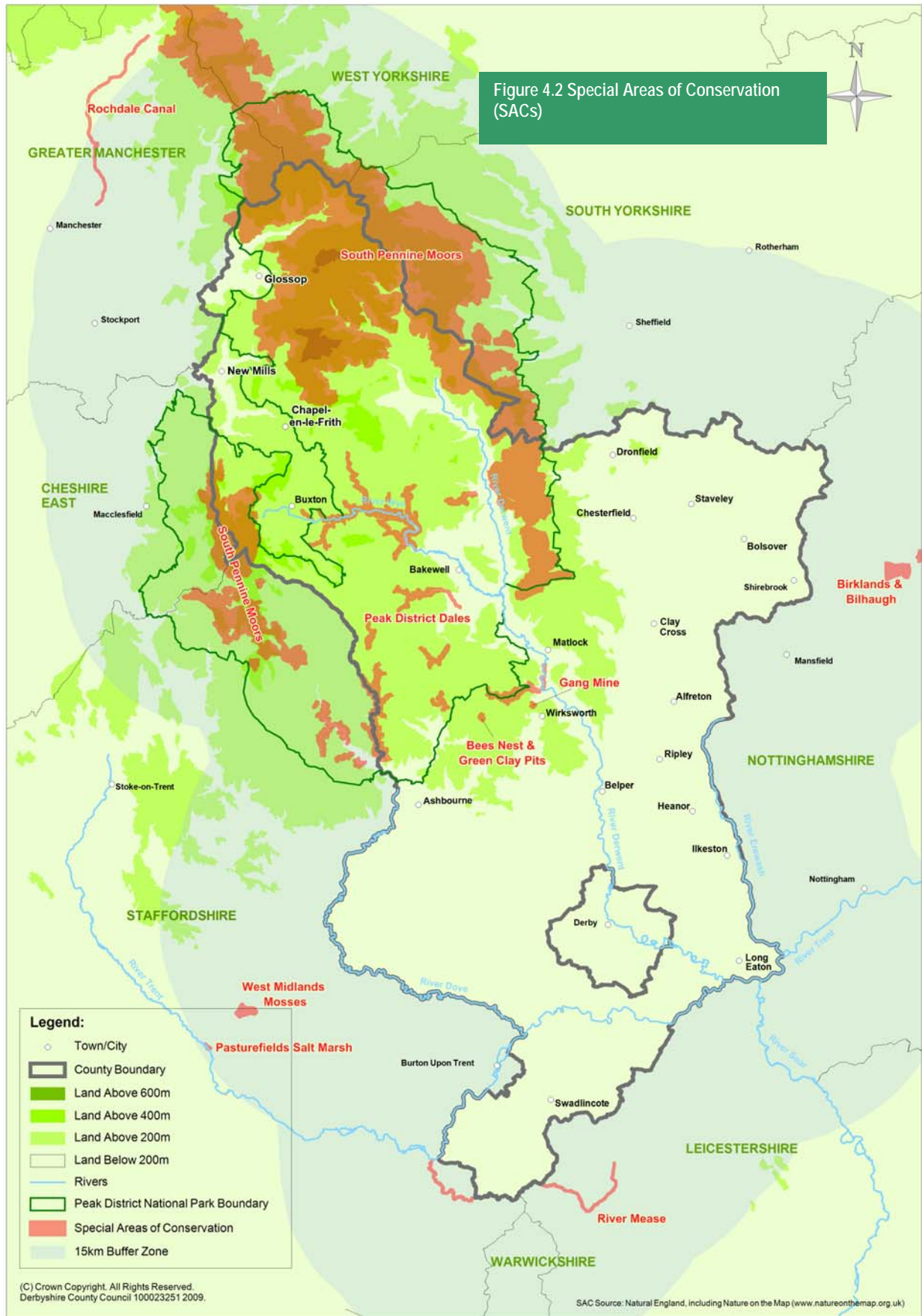
- disturbance due to visitor or tourism pressure
- air quality
- water quality

Table 4.1 Habitats and Species protected by SACs and SPAs in Derbyshire and Buffer Zone

Site Name	Summary of Reasons for Designation
Bees Nest & Green Clay Pits SAC	This site is considered to be one of the best areas in the United Kingdom for great crested newts . Semi-natural dry grasslands and scrubland facies: on calcareous substrates for which the area is considered to support a significant presence.
Birklands and Bilhaugh SAC	Selected for old acidophilous oak woods , noted for its rich invertebrate fauna.
Gang Mine SAC	Is an example of Calaminarian grasslands in an anthropogenic context in northern England. Natural limestone outcrops supporting species typical of calaminarian grasslands are rare and small. This has been chosen to provide an example of the habitat type on sedimentary rocks.
Pasture Fields Salt Marsh SAC	This is the only known site in the UK of a natural salt spring with inland saltmarsh meadow vegetation.
Peak District Dales SAC	Site has been selected for number of habitats and species. Habitats are mainly related to calcareous areas – semi-natural dry grasslands and scrubland facies: on calcareous substrates; Tillio-Acerion forests of slopes, screes and ravines ; European dry heaths; Calaminarian grasslands of the <i>Violetalia calaminariae</i> ; Alkaline fens; Calcareous and calcshist screes of the montane to alpine levels; Calcareous rocky slopes with chasmophytic vegetation. Species are related to those living in the River Dove – White-clawed Crayfish ; Brook Lamprey; and Bulhead.
River Mease SAC	Habitat is a watercourse of plain to montane levels with the <i>Ranunculon fluitans</i> and <i>Callitricho-Batrachion</i> vegetation. Species are Spined Loach for which the river is one of only four known outstanding localities in the UK; Bullhead ; White-clawed Crayfish; and Otter.
Rochdale Canal SAC	Has been selected for supporting a significant population of floating water-plantain in a botanically diverse water plant community.
South Pennine Moors SAC	Has been selected for a number of habitat types – European dry heaths; Blanket Bogs which are a priority feature and is the most south-easterly occurrence in Europe; Old Sessile oak woods with Ilex and Blechnum around the fringes of upland heath and bogs; Northern Atlantic wet heaths with <i>Erica tetralix</i> ; and Transition mires and quaking bogs.
South Pennine Moors SPA	Site is of importance for several upland breeding species, including birds of prey and waders. During the breeding season the site is of importance for Golden Plover, Merlin, Peregrine Falcon, Short-eared owl and Dunlin .
West Midlands Mosses SAC/RAMSAR	Contains three pools which are examples of natural dystrophic lakes and ponds in the lowlands of England and Wales. Also Transition mires and quaking bogs .

Key: **bold text** denotes the primary reason for selection of the site
 Source www.natureonthemap.org.uk and www.incc.gov.uk (Joint Nature Conservation Committee)





National Nature Reserves and SSSIs

- 4.2.4 In Derbyshire, there are 92 Sites of Special Scientific Interest (SSSIs), parts of four of these have been selected as National Nature Reserves (NNRs) which contain some of our most pristine habitats, our rarest species and most significant geology, see Figure 4.3. There are 223 NNRs nationally. Parts of the four County NNRs are within the vicinity of busy County roads of A515, A5012, A623, A6 and A514. Investigation of Natural England's SSSI data¹ suggests that none of these are being impacted to any significant degree by traffic. The Dark Peak SSSI data which includes Kinder Scout NNR does refer to air pollution, but doesn't specify the source of this. Damage by walkers is also mentioned in the Dark Peak SSSI data about two busy footpaths where erosion of peat is occurring, also see paragraph 4.2.49.
- 4.2.5 Figure 4.3 also shows the remaining SSSIs designated by Natural England because of the national importance for their biodiversity or geographical interest. Many SSSIs in Derbyshire have also been designated as SACs or SPAs, particularly within the Peak District National Park. In 2009, Natural England assessed that 17.14% of the total area of Derbyshire SSSIs is in a favourable condition, 71.19% favourable recovering condition and 11.67% in an unfavourable condition². The sites condition appears to have improved significantly since 2005³ where 56.9% of the sites areas were considered as unfavourable. Many of the reasons for unfavourable condition relate to the management of the sites, which in most cases is irrelevant to transport and the exhibited improvement is likely to continue with or without LTP3.
- 4.2.6 Eight SSSIs are located within close-proximity of some of the County's busiest roads (over 10,000 vehicles a day). The largest of these is the Dark Peak SSSI which is dissected by the A628 trunk road, for which the Highways Agency is responsible. We have examined Natural England's individual SSSI condition information⁴, including the reason for citation and views about management for the remaining seven sites located alongside County roads. No reference is made in the SSSI condition data to their sensitivity to transport, these are; Topley Pike and Deepdale; Poole's Cavern and Grinlow Wood; Matlock Woods; Masson Hill; Breadsall Cutting; and Duckmanton Railway. Most of these are more sensitive to inappropriate management, which is probably the single biggest driver in habitat decline, although this is rarely allowed to occur in SSSIs⁵.
- 4.2.7 Many SSSIs are dissected by rights of ways and greenways to some degree⁶. We have identified that disturbance of biodiversity sites by walkers and cyclists may be an issue as part of our Habitats Assessment. This is examined in more detail in paragraph 4.2.26.

Locally Designated Sites

- 4.2.8 Within Derbyshire there are wildlife sites of a more local interest. There are 41 Local Nature Reserves (LNRs) in Derbyshire⁷, see Figure 4.4. Six of these have been designated LNRs since the previous LTP was published. LNR is a statutory designation made under Section 21 of the National Parks and Access to the Countryside Act 1949 by principal local authorities. They are places with wildlife or geological features where people are also encouraged to experience, study or enjoy this interest⁸. Many of these are located within the vicinity of the County road network, although none are dissected. There is little data about the condition of LNRs and to whether the transport network has any impact.
- 4.2.9 There are also two designations that are non-statutory, but contain species and habitats of importance to the County, these are Local Wildlife Sites and Road Verge Reserves. Local Wildlife Sites (LWS) are sites that contain important habitats or support locally uncommon or rare species. In Derbyshire, outside of the Peak District National Park, there are in 1,144 LWS⁹, see Figure 4.4. They do not have legal protection and rely upon the good will of the landowners to manage them appropriately, although they are afforded some degree of protection through the planning process. Mapping shows that many LWS are located away from the transport network and although it appears that some are alongside roads we do not have any evidence to whether transport has an impact.

¹ Natural England SSSI Condition information March 2010

² www.naturalengland.org.uk 01 July SSSI Condition Summary for Derbyshire (note this includes one site in Derby City)

³ English Nature data quoted in Derby & Derbyshire Minerals and Waste Core Strategy SA/SEA Draft Scoping Report 2009

⁴ www.naturalengland.org.uk Condition of SSSI Units January 2010

⁵ Comment from DCC Ecologist, January 2010

⁶ Examination of Digitised Rights of Way network and SSSI mapping on DCCs Mapping system Dmaps

⁷ www.derbyshirebiodiversity.org.uk/sites/index.php?category=LNR

⁸ www.naturalengland.org.uk Information about Local Nature Reserves

⁹ Derbyshire Wildlife Trust website

Figure 4.3 Nationally and Regionally Designated Sites

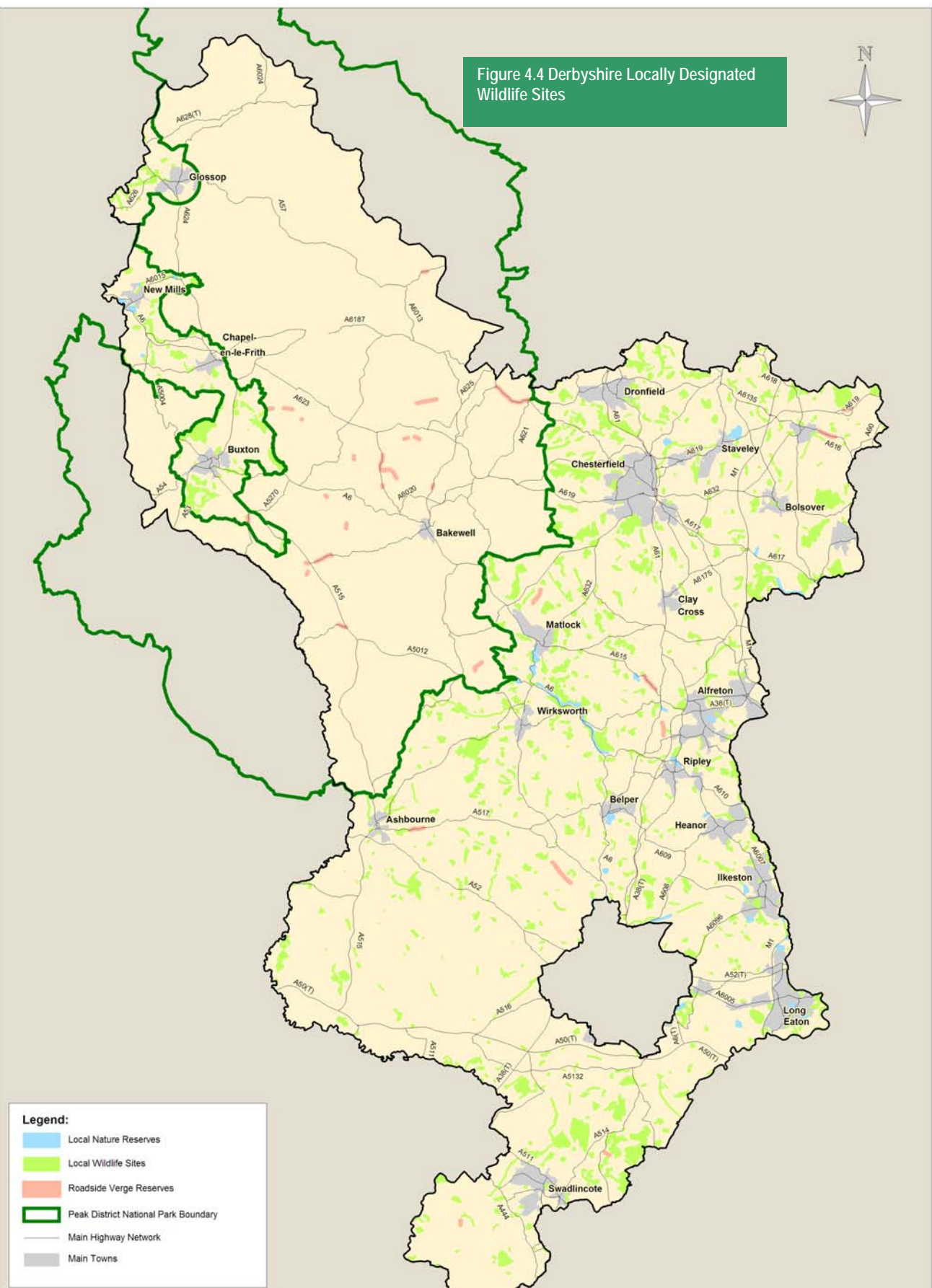


Derbyshire SSSIs

1	The Dark Peak	47	Fox Hole Cave
2	Ludworth Intake	48	Lathkill Dale
3	Rowlee Bridge	49	Leak Moors
4	Edale	50	Pleasley Vale Railway
5	Castleton	51	Teversal-Pleasley Railway
6	Dirtlow Rake & Pindale	52	Dovedale Wood
7	Moss Valley Meadows	53	Green Lane Pits
8	River Derwent, Hathersage	54	Fall Hill Quarry
9	Portway Mine	55	Long Dale, Hartington
10	Toddbrook Reservoir	56	Clough Woods
11	Lower Peaslows Farm Meadow	57	Cawdor Quarry
12	Bradwell Meadows	58	Wyns Tor
13	Bradwell Dale & Bagshaw Caw	59	Long Dale & Gratton Dale
14	Oxlow Rake	60	Ogston Reservoir
15	Moss Valley Woods	61	Masson Hill
16	Moss Valley	62	Panwich Moor
17	Combs Reservoir	63	Bonsall Leys
18	Yarncliff Wood, Padley	64	Matlock Woods
19	Abney & Bretton Cloughs	65	Via Gellia Woodlands
20	Ginny Spring, Whitwell Wood	66	Rose End Meadows
21	Lee Farm Meadow	67	Ballidon Dale
22	Crabtree Wood	68	Gang Mine
23	Tideslow Rake	69	Cromford Canal
24	Duchy Quarry	70	Colehill Quarries
25	Stoney Middleton Dale	71	Bage Mine
26	Waterswallows Quarry	72	Hipley Hill
27	Hollinhill & Markland Grips	73	Bees Nest & Green Clay Pits
28	Goyt Valley	74	Baileycroft Quarry
29	Creswell Crags	75	Kirkham's Silica Sandpit
30	Coombe Dale	76	Dale Quarry
31	Cresbrook Dale	77	Hamps & Manfold Valleys
32	Monks Dale	78	Shining Cliff Woods
33	Longstone Moor	79	Dove Valley & Biggin Dale
34	Pool's Cavern & Grin Low Wood	80	Ambergate & Ridgeway Quarries
35	Jumble Coppice	81	Hulland Moss
36	Topley Pike & Deep Dale	82	Mercaston Marsh & Muggington
37	Calton Hill	83	Morley Brick Pits
38	Wye Valley	84	Kedleston Park
39	Duckmanton Railway Cutting	85	Breadsall Railway Cutting
40	Doe Lea Stream Section	86	Attenborough Gravel Pits
41	Chatsworth Old Park	87	Hilton Gravel Pits
42	Harewood Grange Stream Sec	88	Dorington Park
43	Upper Lathkill	89	Ticknall Quarries
44	Eastern Peak District Moors	90	Calke Park
45	Chrome & Parkhouse Hills	91	Carver's Rocks
46	Hurdlow Meadows	92	Dimmisdale

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Figure 4.4 Derbyshire Locally Designated Wildlife Sites



Legend:

- Local Nature Reserves
- Local Wildlife Sites
- Roadside Verge Reserves
- Peak District National Park Boundary
- Main Highway Network
- Main Towns

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Derbyshire County Council 100023251 2009.

Road Verge Reserves

- 4.2.10 37 Road Verge Reserves (RVRs) have been identified throughout the County by the Derbyshire Road Verge Reserves Project¹⁰. Their condition is dependent to how they are managed. The Lowland Derbyshire Local Biodiversity Partnership (LBAP) highlights that not all are being managed sympathetically with 16 RVRs being managed sympathetically, which is 80% of the 2010 target for the Lowland Derbyshire LBAP area. Some key threats to road verges are set out in the National Forest LBAP. The LBAP area encompasses areas of Staffordshire and Leicestershire and therefore it is not clear whether these issues relate to Derbyshire or to the level of problem; those relating to transport are:-
- Re-seeding with inappropriate seed mixes
 - Trenching of main services, cable TV and drainage
 - Pollution from vehicles
 - Run-off and spray from salt
 - Frequency of mowing
 - Spread of urbanisation
 - Erection of signs/ street furniture
 - Lack of communication between groups
 - Parking and vehicle access

Green Belt

- 4.2.11 There are four wedges of designated green belts in Derbyshire. These generally aim to reduce coalescence between; Derby and Nottingham; Chesterfield and Sheffield; Buxton/ Glossop and Greater Manchester; and Swadlincote and Burton upon Trent. In March 2009¹¹ there was a total of 35,430 hectares of greenbelt with the largest areas (16,440 ha) between Derby and Nottingham and (12,610 ha) between Chesterfield and Sheffield. A 1% reduction in area has been observed when compared with 2004 green belt statistics, This reduction (390 hectares) has occurred in the Chesterfield/ Sheffield green belt, which totals 3% of that green belt. It is likely that incremental erosion of green belt will occur, but if previous trends are followed this should not be significant.

Designated Sites Summary

- 4.2.12 The key environmental baseline issue to be considered further in this Scoping Report in relation to designated sites is disturbance of biodiversity by walkers and cyclists.
- 4.2.13 In terms of traffic-related impacts there does not appear to be any particular significant baseline issues impacting upon designated sites. We accept that this is based upon a narrow analysis of seven SSSIs alongside some of Derbyshire's busy roads. Although this may be the case, later in this chapter we will still consider traffic-related impacts such as noise and air quality to further understand these issues. At this stage of the SEA it would be useful if consultees could consider any further information that may assist the impact of LTP3 on designated sites.
- 4.2.14 In terms of designated sites in Derbyshire, it appears that the most relevant are the Road Verge Reserves and their management which is within the gift of the County Council.

¹⁰ Partnership involving DCC, Highways Agency, Derbyshire Wildlife Trust and the Peak District National Park Authority

¹¹ Department of Communities and Local Government Green Belt Statistics

Habitats and Species Action Plans

4.2.15 Habitats and Species Action Plans provide a more detailed analysis of issues that affect the most important habitats and species in Derbyshire. These are produced under the Derbyshire Local Biodiversity Action Plans (LBAPs) which were designated following the UK's response to the Convention of Biological Diversity¹² signed in 1992. Derbyshire is covered by three LBAPs, as shown in Figure 4.5:-

- Peak District LBAP
- Lowland Derbyshire LBAP
- National Forest LBAP

4.2.16 In examining the habitat and species plans, a number of potential impacts have been identified. Other than their inclusion in these Action Plans, there is little to no additional evidence to the scale of problem, location or trends. Therefore we will examine these issues later in this chapter and refer to any data gaps or questions at that stage. The issues and the habitats/ species potentially affected are shown in Table 4.2 below.

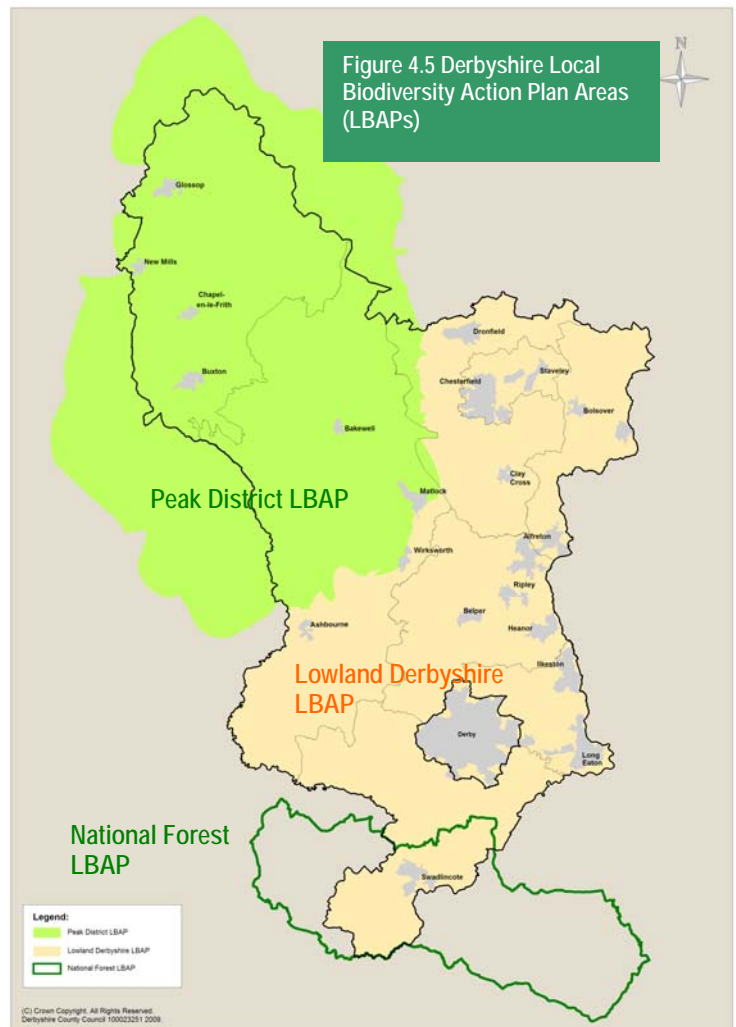


Table 4.2 Transport-related impacts identified in Habitat and Species Action Plans

Issue	Habitats & Species Affected		
	Lowland Derbyshire LBAP	Peak District LBAP	National Forest LBAP
Disturbance/ damage by motorbikes, mountain bikes	<ul style="list-style-type: none"> • Broad leaved woodland • Semi-natural grassland 	<ul style="list-style-type: none"> • Upland oak/ birch woods • Unimproved pastures • Rough grazing • Lead rakes 	
Damage through construction of walking and cycle routes e.g. river banks.	<ul style="list-style-type: none"> • Rivers and streams 	<ul style="list-style-type: none"> • River corridor habitats • Limestone dales 	
Disturbance and damage (of flora and fauna) by recreational walkers and dogs	<ul style="list-style-type: none"> • Semi-natural grassland • Rivers and streams • Heathland • Water Vole 	<ul style="list-style-type: none"> • River corridor habitats • Blanket bog • Heather moorland • Derbyshire feather-moss 	<ul style="list-style-type: none"> • Ancient semi-natural woodland • Lowland dry acid grassland • Bluebell • Otter • Water Vole
Erosion or compaction of soils by recreational activities e.g. walking, rock climbing and cycling		<ul style="list-style-type: none"> • River corridor habitats • Water Vole 	<ul style="list-style-type: none"> • Lowland heath • Water Vole
Major road or rail developments		<ul style="list-style-type: none"> • Blanket bog • Heather moorland 	
Increased mortality on roads			<ul style="list-style-type: none"> • Otter • Barn Owl
Early summer cutting of road verges		<ul style="list-style-type: none"> • Twite 	

¹² Convention was opened for signature at the 1992 United Nations Conference on Environment & Development (the Rio 'Earth Summit)

Car parking under trees causing compaction and requirement for lopping	• Wood pasture parkland and veteran trees		
Roadside trees being lopped, pollarded or inappropriately pruned	• Wood pasture parkland and veteran trees		

Note: road verge reserves has a Habitats Management Plan as part of the National Forest LBAP but this is considered separately in paragraph 4.2.10.

4.2.17 Various habitats raise the issue of air pollution as an issue, although it is not clear in many cases to the source of this. We consider air pollution later in this Chapter in paragraph 4.2.37.

4.2.18 The Peak District LBAP contains a summary of progress against targets relating to the habitats and species listed in Table 4.2 above, this is reproduced below in Table 4.3 for the relevant ones, although this does not specifically relate to the transport-related issues.

Table 4.3 Peak District LBAP Habitats and Species relevant to transport-related impacts

Habitats					
	Maintain Extent	Condition SSSI	Condition Non-SSSI	Restoration	Expansion
Woodlands					
Upland Oak/ Birchwoods					
Grasslands					
Limestone Dales					
Unimproved Pastures				N/A	
Rough Grazing				N/A	
Lead Rakes					
Wetlands					
Rivers and Streams					N/A
Moorlands					
Blanket Bog					N/A
Heather Moorland					
Species					
	Maintain Range	Extend Range	Maintain Population	Expand Population	
Water Vole					
Twite					
Derbyshire Feather-moss		N/A		N/A	

Source: Peak District LBAP Annual Report 2008/09

Key: The Table provides a graphical representation of how the BAP is progressing towards 2010 targets:-

- Bright Green = target met or exceeded
- Dark Green = on course to meet target
- Orange = some progress made but may not reach target
- Red = no progress or loss
- Grey = data insufficient

4.2.19 In terms of habitats this suggests that those with national designations are being protected to a greater extent than those without designation. Graphical representation of data does not appear to exist for the Lowland Derbyshire or National Forest LBAP. Examination of the National Forest LBAP shows that progress was slow towards targets for roadside verges and lowland heathland.

Habitats and Species Plans Summary

4.2.20 In summary, there are a number of specific impacts identified that can be examined in more detail later in this chapter:-

- Disturbance/ damage by motorbikes, mountain bikes
- Damage through construction of walking and cycle routes e.g. river banks.
- Disturbance and damage (of flora and fauna) by recreational walkers and dogs
- Erosion or compaction of soils by recreational activities e.g. walking, rock climbing and cycling
- Major road or rail developments
- Increased mortality on roads
- Early summer cutting of road verges (see Chapter 6)
- Car parking under trees causing compaction and requirement for lopping
- Roadside trees being lopped, pollarded or inappropriately pruned

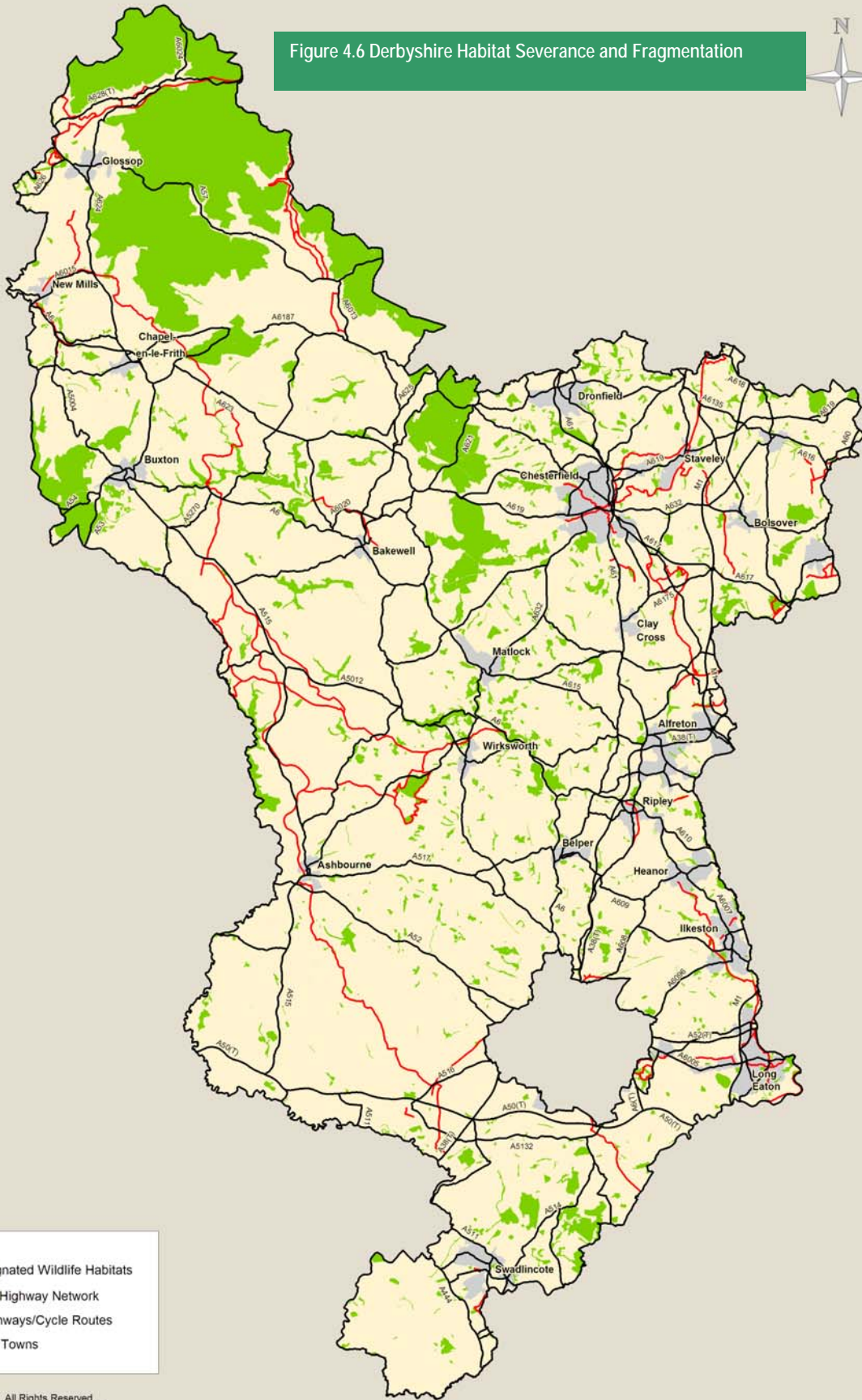
Green Infrastructure

- 4.2.21 The transport network provides a role in linking habitats through green corridors or what is termed as green infrastructure. Chapter 8 describes Derbyshire's transport asset, which includes many miles of roads with associated verges, multi user greenways, rights of way, canals etc. As described earlier, some of these already have wildlife designations to protect them e.g. road verge reserves, but this is usually on a site basis rather than for its role as a green corridor. Greenways and rights of way are a key element of green infrastructure in enabling people to access and enjoy green areas as well as providing habitats. Other than anecdotal evidence, see below, there is little evidence as to the condition of the corridors; which corridors are most important; the species they support; or whether there is any severance of habitats or green spaces. However, there does not appear to be any examples of where green corridors have been lost; alongside a trend of an increasing network of greenways, albeit some of these re-using disused railway lines that would have been providing green corridors in any case.
- 4.2.22 We expect that more information will become available as District and Borough Councils undertake green infrastructure studies and mapping as part of their Local Framework Developments. However, other than recognising the role that greenways and rights of way can play in providing green infrastructure and setting policies to protect further route development, it is unlikely that the road network will be considered as part of those green infrastructure studies.
- 4.2.23 We are only aware of one recent piece of evidence relating to key wildlife habitats where our existing transport network is contributing to severance. This has been highlighted by Natural England in January 2010, where three roads, in close-proximity over Ramsley Moor, near Beeley have effectively cut-off a triangular area of wet moorland. This was raised because it could be argued that one of the roads could be superfluous and that its removal would reunite the habitats. However, the cost of this is likely to be prohibitive, but it could remain as an aspiration. It does though highlight that there must be other locations where roads in close-proximity could be contributing to further severance. 11.3% of the area of all designated wildlife sites are located within 300m of Derbyshire's main road network.
- 4.2.24 In Figure 4.6 we have begun to examine habitat fragmentation by overlaying the road and cycle networks alongside designated sites. Whilst there is no evidence to the role the road or cycle networks provide in linking those habitats it does provide a means for consultees to consider as part of comments on this Scoping Report e.g. during LTP2 we have been contributing to tree planting in the National Forest alongside the A514 north of Swadlincote and Figure 4.6 shows a cluster of designated sites in this area which these initiatives will help reduce any fragmentation.

Green Infrastructure Summary

- 4.2.25 Through examination of designated sites it is clear that there is a wide range of habitats and species in Derbyshire. It is clear that the transport network can provide green corridors linking habitats. Although the mapping in Figure 4.2. begins to make an assessment of habitat fragmentation and severance, it is clear that little evidence is available to whether there are particular areas of Derbyshire that are suffering from fragmentation or which are the most important corridors for protection. However, there is a likelihood that the network of green corridors is increasing through the creation of new greenways. There does not appear to be any examples of loss of green corridors.

Figure 4.6 Derbyshire Habitat Severance and Fragmentation



Wildlife Disturbance and Road Casualties

Recreational Disturbance

- 4.2.26 As highlighted earlier in the analysis of wildlife designated sites, LBAPs and within the Habitats Regulations Pre-screening report, disturbance by recreational walking and cycling has been identified as a possible impact to biodiversity. LBAPs identified some of the key habitats and species that are likely to be impacted upon by disturbance, but do not provide detailed spatial evidence. Over 250km of off-road cycle routes have been constructed in the last ten years in Derbyshire and some have included measures to improve wildlife sites where these occur in combination e.g. recent work undertaken to design to avoid and enhance habitats within Breadsall SSSI¹³. There is no usage data for rights of way to identify busiest routes. The LBAPs also highlighted that motorised vehicles, such as motorcycles, being used in countryside locations as having an impact.

Peak District National Park

- 4.2.27 In terms of spatial impact, the Peak District National Park is likely to suffer most impact because; it draws most visitors in Derbyshire being host to over 22 million recreational visits per year¹⁴; the north western area of Derbyshire hosts the majority of public rights of way in the County¹⁵; and mapping earlier in this Chapter shows that the majority of designated wildlife sites are in this area.
- 4.2.28 The Peak District National Park LBAP has identified blanket bog, heather moorland and river corridor habitats as those most sensitive to disturbance by walkers and other recreational activities. Trampling should be considered alongside disturbance, as vegetation is sensitive to visitor pressures too.
- 4.2.29 Species that are susceptible to disturbance are likely to be ground nesting birds or birds that nest on river banks. Mammals such as water vole or mountain hares are also likely to suffer disturbance through being caused to flee. There does not appear to be any evidence to the impact of disturbance of mammals. A Report was produced by the Moors to the Future Partnership¹⁶ about an analysis of moorland breeding bird distribution and change in the Peak District, which considered recreational disturbance. This concluded that a number of species, particularly ground nesting waders such as Curlew, Golden Plover, Lapwing, and Snipe avoid areas of habitat close to footpaths. However, over a 1km area it was found that this did not appear to have an impact on overall density of population. Indeed, the study found that populations of wader species regarded as sensitive to visitor pressures are increasing in the Peak District. This suggests that visitor pressure is not currently a major drive of population change. In relation to SPA key species, the report notes that Golden Plover populations are stable and Merlin populations have increased since the early 1970s alongside considerable increases in recreational pressures. Mitigation measures such as paving busy routes such as the Pennine Way is helping to reduce the spatial impact. Usage of routes is likely to be anecdotal as we do not have any comprehensive usage data for rights of way. Since 2000 large areas of open access land have been designated by Natural England; as part of this only one site has required mitigation measures – Beeley Moor which requires dogs to be on leads through the nesting season.
- 4.2.30 In terms of blanket bogs and heather moorlands small wooded shrubs such as heather are susceptible to trampling because they are easily damaged. Most busy paths across moorlands are now being paved to reduce widening of walking routes which should reduce the likelihood of trampling, although most moors are open access land which will suffer some impact.

Other Derbyshire areas

- 4.2.31 We are unaware of any other evidence that relates to disturbance of wildlife by recreational walkers such as along river banks and the other species and habitats highlighted within LBAPs in Table 4.2 above. Disturbance by motorised vehicles/ motorcycles in countryside locations was also highlighted within habitat and species plans in Table 4.2. This was considered in the Derbyshire County Council published policy for the management of motorised vehicle use in the countryside 2005, which highlighted that verges and banks alongside routes were being damaged or disturbed which can hold assemblages of plants now rare elsewhere in the countryside and can support invertebrates, small mammals, amphibians and reptiles. No spatial context was contained within this.

¹³ DCC Countryside Section example of designing for biodiversity - for the Great Northern Greenway

¹⁴ Peak District National Park Recreation Strategy

¹⁵ See Chapter 8

¹⁶ A project to restore large parts of internationally important Peak District moors

Wildlife Road Casualties

- 4.2.32 Perhaps one of the most severe transport impacts on biodiversity (usually birds, mammals and flying insects), outside of climate change (considered in Chapter 6), is death of wildlife on our roads. Whilst there is little robust evidence as to the numbers of animals and birds being killed on Derbyshire's roads, when travelling around the County you can regularly see the resulting evidence. Analysis of LBAPs highlighted that two key Derbyshire species (Barn Owl and Otter) were known to have been killed on Derbyshire's roads. The Derbyshire Bird list¹⁷ identifies Barn Owl as being scarce in Derbyshire which means that there are less than ten birds or breeding pairs in the County, which would mean any road deaths would be a significant impact on population. However, it is unlikely that any mitigation measures could be installed to prevent any deaths. Derbyshire Wildlife Trust has identified two locations in Derbyshire where otters have been killed. Otter deaths on roads generally occur during times of flood where usual routes under bridges are impassable. The County Council is currently installing an otter ledge under a bridge at one site to prevent further deaths. In terms of otters, Derbyshire has a small but growing population which appear to be located to the south of Derbyshire around the River Trent and lower sections of River Dove and River Derwent.

Wildlife Disturbance and Road Casualties Summary

- 4.2.33 In conclusion, it is clear that disturbance can affect species and habitats at a localised level, but at a strategic level the impact lessens. We therefore suggest that recreational disturbance is an issue that is scoped out. We acknowledge that this is based to some degree on data gaps, but we are consulting through this SEA regarding any other evidence that may be available.
- 4.2.34 From the evidence it would appear that the species at most risk, because of low populations are Barn Owl and Otter. Barn Owl, as a flying creature, it is unlikely that any mitigation measures could be introduced to prevent deaths. As identified where Otter deaths have occurred the County Council has been reactive in making improvements. Improvements to bridges for Otters is likely to be considered at a detailed spatial level. Therefore in terms of a strategic issue we are scoping out animal deaths on roads.

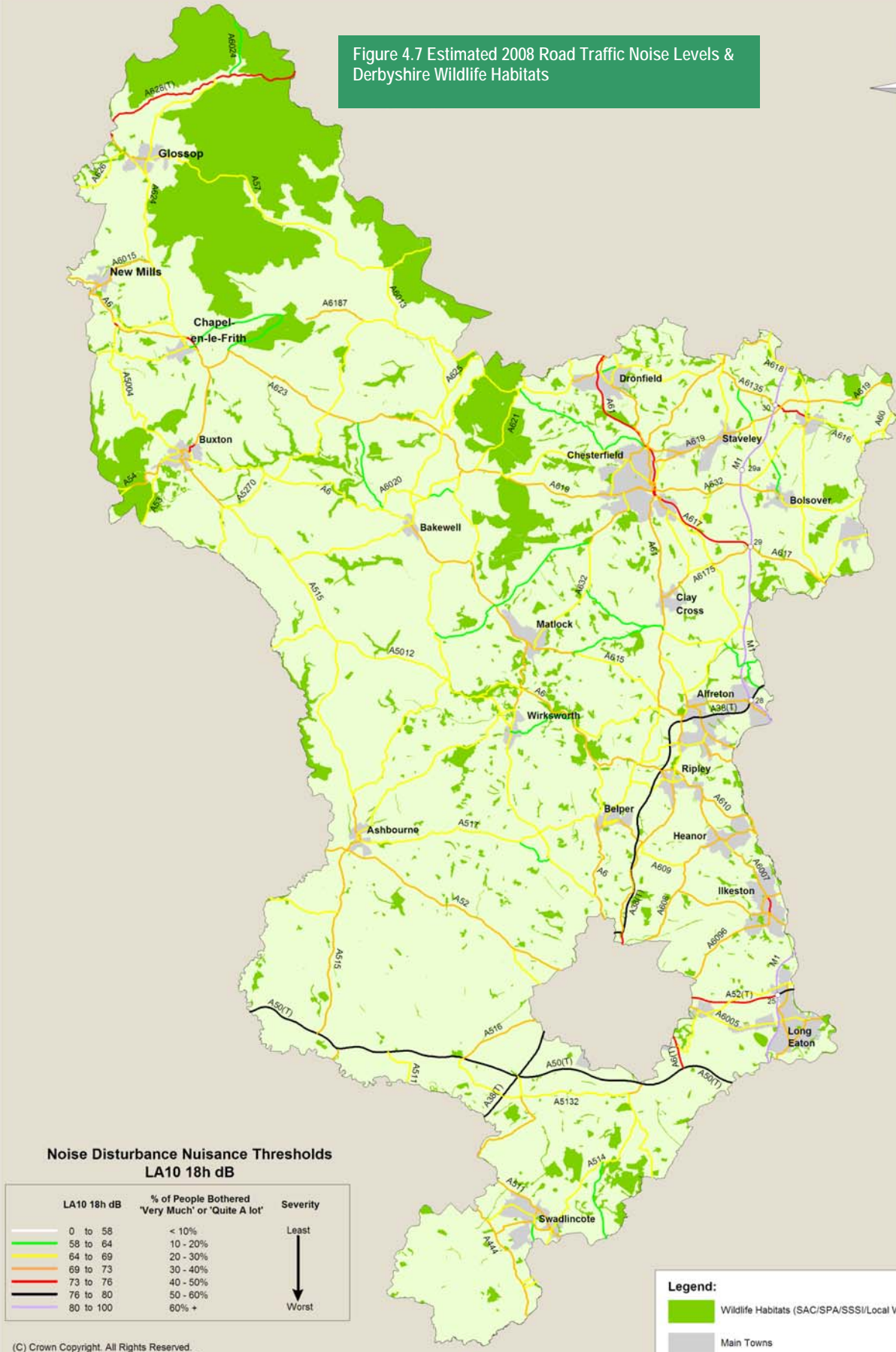
Noise, Air and Light Pollution effects

Noise

- 4.2.35 Although transport-related noise has not been identified as a potential impact in the earlier examination of wildlife sites and LBAPs, there is various evidence which suggests that traffic noise has an impact on fauna e.g. *The Ecology of Transportation: Managing Mobility for the Environment 2006 (John Davenport and Julia Davenport)* concluded that a large number of studies indicate that disturbance of vocal communication [of birds] could be an important mode of action causing negative effects on breeding bird densities along roads. There is no mapping of noise on Derbyshire's roads, although in time this will be available as DEFRA are undertaking an exercise to map noise along some of the key road routes. Therefore, to consider whether noise could be a problem to biodiversity, we have estimated noise levels using formulae contained within DEFRA Environmental Noise (England) Regulations 2006.
- 4.2.36 Figure 4.7 shows that the habitats, and therefore species within them, most likely to suffer from noise disturbance are alongside the trunk roads in the County (which are the responsibility of the Highways Agency). In terms of County controlled roads there are pockets of habitats alongside the A617, A61 and A616 which are estimated as having moderate levels of noise. We have projected estimates forward to 2026 which show that noise is unlikely to increase beyond moderate levels and therefore not impact significantly on habitats. We are proposing that noise relating to biodiversity is scoped out, but as there may be particular habitats or species that could be more sensitive to traffic noise we are consulting on this as part of this Scoping Report. Noise may be reduced further through technological advances such as noise reducing road surfacing or vehicle improvements.

¹⁷ Derbyshire Ornithological Society 2009

Figure 4.7 Estimated 2008 Road Traffic Noise Levels & Derbyshire Wildlife Habitats



**Noise Disturbance Nuisance Thresholds
LA10 18h dB**

LA10 18h dB	% of People Bothered 'Very Much' or 'Quite A lot'	Severity
0 to 58	< 10%	Least
58 to 64	10 - 20%	↓ Worst
64 to 69	20 - 30%	
69 to 73	30 - 40%	
73 to 76	40 - 50%	
76 to 80	50 - 60%	
80 to 100	60% +	Worst

Legend:

- Wildlife Habitats (SAC/SPA/SSSI/Local Wildlife Sites)
- Main Towns

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Air Pollution

- 4.2.37 Poor air quality is a commonly raised issue that could be affecting plants and wildlife. As described in Chapter 9, air quality monitoring in Derbyshire is a statutory duty to be conducted by district and borough authorities, to assess the levels of pollution in relation to health effects for people over stated time periods. Where levels of air pollution exceed National Objectives¹⁸ local borough and district authorities are required to declare Air Quality Management Areas (AQMAs), see Chapter 9. Local air quality monitoring is focussed on these areas, but additional national monitoring is also undertaken by the Government at monitoring sites known as the Automatic Urban and Rural Network (AURN). There are two AURN sites within Derbyshire to provide a proxy for air pollution in an urban (Chesterfield) and rural (Ladybower) location. We are not aware of any specific monitoring to assess the impact upon biodiversity.
- 4.2.38 The UK Air Quality Standards Regulations 2007 also include thresholds for protection of vegetation and ecosystems. Nitrogen Dioxide (NO₂) is relevant to traffic pollution, where a threshold of 30 µg m⁻³ is estimated to having an impact. As can be seen from Table 4.4 below, the annual averages for NO₂ are well below the thresholds and follow a general trend of improving air quality.

Table 4.4 Annual Averages of Nitrogen Dioxide

Year	Chesterfield	Ladybower
	NO ₂	NO ₂
2000	-	11.3 µg m ⁻³
2004	-	9.2 µg m ⁻³
2008	17.8 µg m ⁻³	7.7 µg m ⁻³

- 4.2.39 Local monitoring data for the District and Borough Authorities has also been assessed which indicate some locations approaching or exceeding the 30µg m⁻³ objective for biodiversity and vegetation. However, these locations are heavily trafficked/congested roads in towns, as such their urban nature may not provide an environment where biodiversity and/or vegetation is exposed for a full calendar year for which the objective applies.
- 4.2.40 We have also estimated levels of air pollutants caused by vehicle emissions for the road network in Derbyshire using the Design Manual for Roads and Bridges (DMRB) air quality screening model. However, the outputs did not provide any additional information to the more detailed monitoring conducted by the district and borough authorities, undertaken at AQMAs and/or AURN sites. Although this model uses a number of assumptions, it did allow us to project the data forward to the end of the Plan period to consider the potential impact of technological advances etc which confirmed that air quality would continue to improve, thereby reducing the potential impact further.
- 4.2.41 It would appear from the results that air quality in relation to biodiversity is an issue that can be scoped out of future assessments. We should acknowledge that there may be specific habitats and species that in the short-term, prior to technological advances, could be vulnerable to poor air quality. It is likely that these will be identified on a site by site basis through existing working relationships and considered at the scheme design stage.

Light Pollution

- 4.2.42 There is some evidence relating to the possible effects of artificial lighting on biodiversity such as; disorientation e.g. bats; attraction to light sources e.g. invertebrates; and changes to lifecycles and changes in behaviour e.g. birds affected by 'false dawn'¹⁹. The SEA for LTP2 identified mapping from work undertaken by the Countryside Agency and CPRE which show the levels of light pollution across the East Midlands, see Chapter 3. These still appear to be the most up-to-date maps available. Although a number of years old they do show a trend towards less and less really dark areas. The maps are not solely related to transport and traffic, nevertheless a considerable proportion of light emitted must be from street lighting.
- 4.2.43 We have not come across any specific issues relating to Derbyshire light pollution and its impact upon habitats or species. The usage of lit infrastructure, including a potential reduction in street lighting is being considered by the authority as part of a 'spend to save' study to reduce street

¹⁸ UK Air Quality Standards Regulations 2007

¹⁹ Comment from DCC Ecologist

lighting costs. It is unlikely therefore that lighting levels will increase in future and, dependant on initiatives selected, light pollution may be substantially reduced. Technological improvements in reducing glare should through replacing lighting units reduce impact over time.

Noise, air and light pollution summary

- 4.2.44 Examination of baseline data suggests that transport-related noise and air pollution are unlikely to be significant impacts upon biodiversity. The complex nature of habitats and species means that we are aware that some may be more sensitive to others. However at a strategic level we suggest that noise and air pollution are scoped out. Light pollution is a similar issue in that although much of the County is affected by less dark area it is unlikely that light pollution is a significant strategic impact upon biodiversity and could be scoped out. However, we are again aware that evidence may be available to question this and so it is pertinent to ask as part of this Scoping Report for any views on light pollution in relation to biodiversity.

Contamination and Water Pollution effects

Water Pollution

- 4.2.45 Water quality and pollution is considered in detail in Chapter 6. We have not discovered any baseline information or examples of traffic-related water pollution. During LTP2 we are only aware of one instance where highway run-off was damaging a SSSI, where water run-off was reported by Natural England into Hungerhill Swallet. A mitigation scheme is currently in the draft programme for 2010/11. Anecdotal evidence of water pollution, including salt run-off, was noted within the SEA of LTP2 in relation to the stream in the Via Gellia which may have been affecting Cromford Canal SSSI. Examination of the Cromford Canal Conservation Management Plan 2007 found no reference to water pollution from highway run-off.

Winter salting

- 4.2.46 There is anecdotal evidence that salt run-off affects road-side biodiversity generally, but it does not suggest a significant negative impact. Derby museum²⁰ hold information about salt tolerant plants such as Spear-leaved orache and Salt-marsh grass that has spread alongside major roads in Derbyshire following many years of road salting. It is unlikely that the salting network is unlikely to expand and therefore any impacts are likely to remain static or reduce as climate change predictions, suggest that annual temperatures will increase, meaning warmer winters and therefore a likelihood of a reduced need for salting.

Water pollution effects summary

- 4.2.47 It appears that water pollution is unlikely to affect biodiversity to a significant degree. Isolated examples may occur but these are being dealt with at a detailed site basis rather than being a strategic issue. We are therefore suggesting that water pollution in relation to biodiversity is scoped out.

Regionally Important Geological Sites (RIGs)

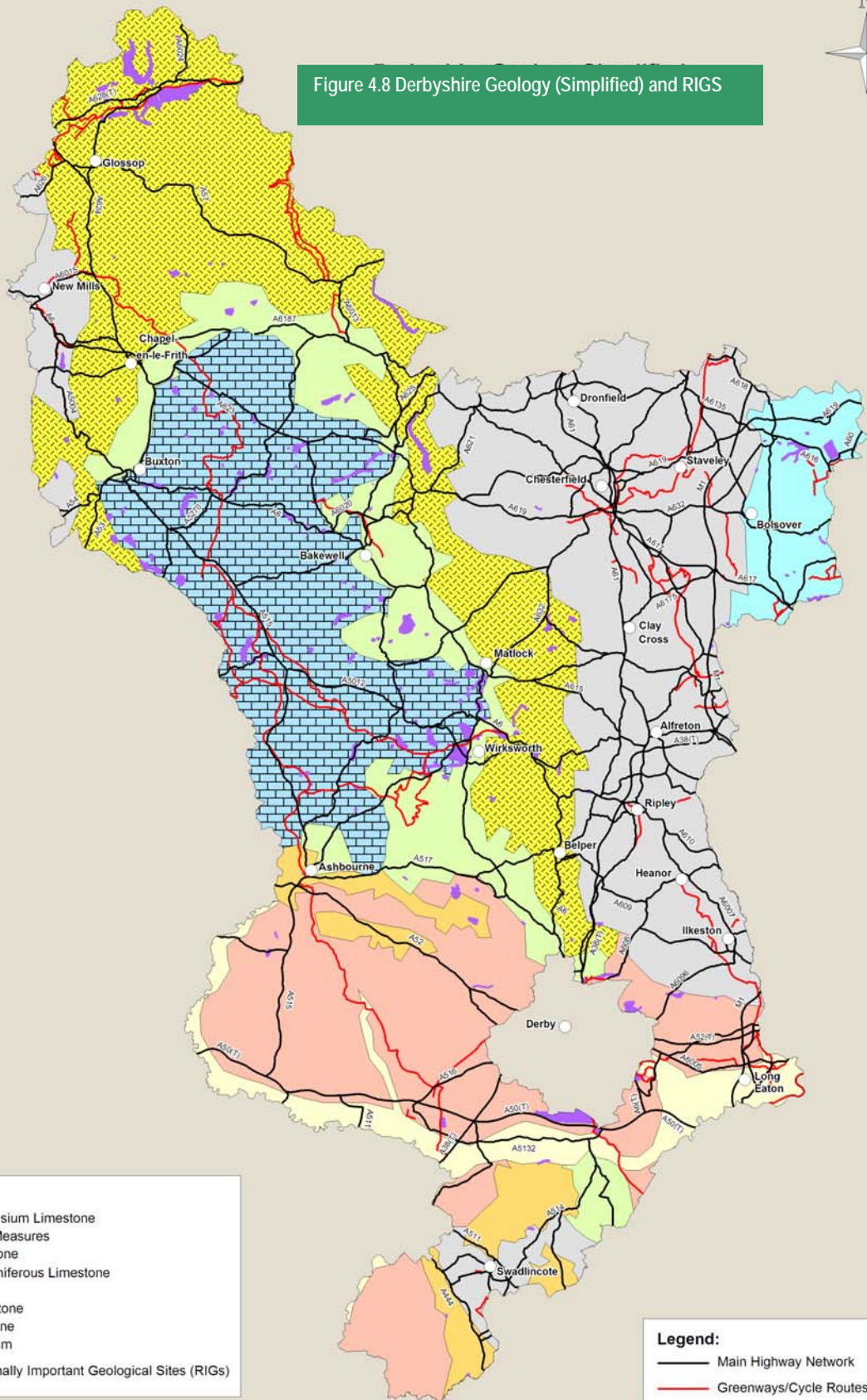
- 4.2.48 RIGs are designated by locally developed criteria and are currently the most important places for geology and geomorphology outside statutorily protected areas such as SSSIs. The designation of RIGs is one way of recognising and protecting important Earth science and landscape features for future generations to enjoy²¹. There are approximately 200 RIGs sites in Derbyshire²², including those within the Derbyshire part of the Peak District National Park, see Figure 4.8. We have mapped the Derbyshire RIGs alongside the road and cycle network and whilst it shows that a number are located close to these networks we are not aware of any evidence of adverse impacts upon RIGs. We therefore suggest that RIGs are scoped out of any further assessment.

²⁰ <http://www.derby.gov.uk/dccwebdev/museum/flora/>

²¹ Association of UK RIGs Group

²² Comment from DCC Ecologist

Figure 4.8 Derbyshire Geology (Simplified) and RIGS



Legend:

- Magnesium Limestone
- Coal Measures
- Mudstone
- Carboniferous Limestone
- Shale
- Sandstone
- Gritstone
- Alluvium
- Regionally Important Geological Sites (RIGs)

Legend:

- Main Highway Network
- Greenways/Cycle Routes

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Soils

- 4.2.49 Figure 4.8 highlights the diverse types of geology present across the County. This geology contributes to the marvellous landscapes that many people come to the County to enjoy but also the soil types across the County. The East Midlands Soil and Environmental Resource Review (EMSERR) 2006²³ examined the regions soils and their complex relationships with water and habitats. This analysis identified that Derbyshire soils are less vulnerable than the rest of the East Midlands, although there are pockets of highly vulnerable silty clays with a high water table to the east and south of Derby. These relate to the River Derwent catchments around Derby, which were highlighted to avoid future damage. The transport risk to this appears to be related to the construction stage of housing developments, rather than the operation of the existing highway network.
- 4.2.50 Other transport-related pressures and threats to soils identified in the Review was trampling causing localised erosion; soils being exposed as part of construction and run-off site; and soils being covered by impermeable surfacing. In terms of construction it is unlikely that the Plan will contain new large scale transport schemes and therefore this is likely to be minimal. Although the highway network is extensive and therefore clearly covers a significant area of soils, much of this has been in place for many years or centuries. Limited new road and parking infrastructure suggests that it is unlikely that significant areas of soils will be impacted by additional impermeable surfaces. Salinisation was identified as an additional threat to immediate roadside plant communities, this is examined in paragraph 4.2.46 above. Compaction of soils was identified as being a potential issue within the Lowland Derbyshire LBAP in relation to car parking under trees in parklands. We are not aware of any evidence to suggest that this is a significant issue for the transport network and more likely to be a localised issue on privately owned parklands.

Peat Soils

- 4.2.51 In addition to the EMSERR, LBAP habitat and species management plans identified that damage by walkers and cyclists to soils and habitats was a potential threat. The Derbyshire Rights of Way Improvement Plan mentions erosion as a particular issue for the Peak District National Park and in particular the Heather Moors and Blanket Bogs habitats. The main soil type is peat, which the EMSERR graded these as Grade 4 or 5 which means they are poor for cultivation. Peat soils are an important carbon reserve in the UK and it has been estimated that the Peak District Moorlands alone store between 16 and 20 million tons carbon. Should these soils be damaged through erosion or damage, they will emit large quantities of currently stored carbon into the atmosphere. In the Peak District, where fires have created areas of bare peat, erosion is resulting in up to 100 tonnes of carbon per km² being emitted every year.
- 4.2.52 The impact that a changing climate will have on peat soil is a complex subject area but one of the most important impacts are hydrological changes and variations in the position of the peat water table, which can affect the stability of peatland ecosystems. It is likely that increased precipitation in winters could cause increased surface run-off and erosion with associated drainage network implications such as sediment loading and water quality. Hotter, drier summers may allow peat soils to dry out, increasing erosion levels and changing the nutrient levels in the soil affecting upland ecosystems. In some locations elevated temperatures could increase microbial decomposition rates, with increased release of humic acids and water colouring with the associated water quality and treatment implications.
- 4.2.53 A specific project called the Moors for the Future Partnership has been developed to conserve and enhance Peak District moorlands. As part of this they are examining soil erosion along busy footpaths and taking measures to reduce this. Moors to the Future supplied the results of a survey they undertook. The data is not in a form that can be reproduced here, but it shows that localised erosion is occurring on the busy footpaths. However, measures are now being undertaken to tackle this. Therefore although soil erosion is an important issue, particularly for peat soils it does not appear to be a significant strategic issue. Moors to the Future are developing models to improve the understanding of climate change impacts on peat soils and providing advice on the management and conservation of these areas.

²³ Undertaken by East Midlands Regional Assembly

Soils Summary

- 4.2.54 The main issue relating to soils seems to be erosion of peat soils in the Peak District moorlands. This appears to be a localised issue that is being tackled by a local partnership. Whilst it will be important that LTP3 supports this work we do not consider it to be a strategic issue to take forward for further assessment and suggest that soils are scoped out.

Other Management Issues

- 4.2.55 Habitats and species plans identified a number of other transport related management issues which have not been covered elsewhere in this section:-
- **Damage of habitats through construction** – LBAPs highlight two habitats that are sensitive to damage through the construction of walking and cycling routes (rivers and streams and limestone dales). We are not aware of any evidence to where damage has occurred through the construction of footpaths or cycle routes, but we welcome any comments about this. Constructing transport interventions may cause some localised disturbance such as noise or dust or use of sites off the transport network. We are not aware of any particular instances where this has caused a problem.
 - **Major road or rail developments** – this Scoping Report does not include any proposals for major road developments as part of LTP3 because at this stage of LTP3 development there are no firm proposals. Major rail developments are outside the remit of the LTP.
 - **Early cutting of road verges** – the Peak District LBAP refers to this issue in relation to Twite. The LBAP identifies this as an impact, but not a significant impact. The LBAP also identifies the areas where Twite are more prevalent and these appear to be in the Peak District areas outside of Derbyshire in North Staffordshire and East Staffordshire. We are therefore scoping this out.
 - **Roadside trees being lopped, pollarded or inappropriately pruned** – this is referred to in the Lowland Derbyshire LBAP in relation to wood pasture parkland and veteran trees. There is no further evidence in support of this issue so it is difficult to examine the spatial or significance of this impact.

Biodiversity as a visitor attraction

- 4.2.56 In many of the preceding paragraphs we have examined the impact vehicles and the associated transport infrastructure can have on biodiversity. Although we are concluding that many of the impacts are below thresholds which would be considered significant it is clear that transport has some impact upon biodiversity. There is conflict in that Derbyshire's rich and varied natural environment, including its biodiversity, acts as a significant tourist draw, as also referred to in regard to recreational walking and cycling in paragraphs 4.2.26 above. Indeed one of Natural England's four strategic outcomes that they are working towards is the *enjoyment of the natural environment: more people enjoying, understanding and acting to improve, the natural environment, more often*.
- 4.2.57 As also referred to in the preceding paragraphs, it is clear that many of the designated sites are located within the Peak District National Park which is visited by many millions of people a year. Indeed the Peak District National Park Visitor Survey 2005 found that 85% of respondents had travelled to the National Park for the scenery. However the same survey highlights that around 85% of people had used a car to travel to the Park. 9% travelled on a coach, but only 2% used public transport, 3% walking and 1% cycling. The challenge will be to increase the number of people enjoying biodiversity without spoiling the habitats they have come to visit.
- 4.2.58 Figure 4.9 shows an extract from the Derbyshire Public Transport Network Map, which shows that there is relatively good access to the key tourist sites, such as Castleton, by public transport. The more rural habitats are more likely to be served less well. In addition to public transport there are many rights of way, cycle routes and bridleways that provide for more sustainable access to habitats. More details on the County's transport network is given in Chapter 8.



4.3 Stage A3 : Environmental Problems and Opportunities

4.3.1 In this section we summarise the key issues or challenges for LTP3 that we have identified through the SEA stages A1 and A2 which have identified the key messages of policy and an assessment of the environmental baseline. In this section we also identify the key opportunities for LTP3.

Key Issue/ Challenge	Implication/ Opportunity for LTP3
Condition of Designated Wildlife Sites:- <ul style="list-style-type: none"> • Special Areas of Conservation • Special Protection Area • Ramsar • National Nature Reserves • Sites of Special Scientific Interest • Local Nature Reserves • Local Wildlife Sites • Road Verge Reserves • Green Belt 	LTP3 should aim to continue to protect designated areas of biodiversity and geology. Opportunities to enhance and manage habitats alongside County Council transport networks should be taken.
Severance of habitats and role of transport network in providing green corridors	LTP3 should aim to continue to protect and take opportunities to expand habitats alongside the County Councils transport network.
Recreational disturbance	LTP3 should aim to continue to protect important species and habitats from any increase in recreational walking, cycling, motorcycling etc.
Road casualties	LTP3 should aim to continue to protect important species from being killed on Derbyshire's road network
Light pollution	LTP3 should aim to consider reducing light pollution to improve habitats
Soil erosion	LTP3 should aim to protect against any increase in soil erosion from any increase in recreational walking, cycling, motorcycling etc
Construction and maintenance of County Council transport networks	LTP3 should aim to continue to protect habitats and species during construction and maintenance of the County Councils transport network
Biodiversity acting as a tourist attraction of which many people travel by car to visit	LTP3 should seek to encourage more people to enjoy the natural environment through more sustainable travel
General biodiversity issues	LTP3 should take opportunities to involve specialist biodiversity advisors in its development and implementation

4.4 Stage A4 : Developing SEA Objectives

4.4.1 Emerging SEA objectives for biodiversity, flora, fauna and soils are as follows:

SEA 6 Encourage biodiversity and take measures to reduce habitat fragmentation

SEA 7 Avoid damage to designated wildlife sites and protected species

SEA 8 Support sustainable tourism

SEA 9 Prevent damage to the landscape due to increases in recreational walking and cycling, motorcycling etc.