A Methodology to Identify 'Areas of Multiple Environmental Sensitivity' (AMES); (Historic environment, ecology and landscape)

1.0 Background and Introduction

In order to respond to a range of requests from various bodies and organisations Derbyshire County Council's Conservation and Design Section has developed a methodology for reviewing known environmental data within a landscape spatial framework. This approach has helped to inform the targeting of Environmental Stewardship Higher Level Scheme (HLS) funding, the identification of key strategic Green Infrastructure assets and the potential for housing growth within the Derby and Nottingham Housing Market Areas (HMA).

This approach was developed because of a need to improve the ability to manage and deliver the most appropriate environmental objectives in those geographic areas where environmental outcomes across all disciplines (landscape, ecology and the historic environment) are likely to be greatest as part of a sustainable approach.

The overall aims of this approach were;

- To adopt an holistic approach to identify those areas of landscape of 'multiple environmental sensitivity' relating to ecology, the historic landscape environment, and visual unity
- To develop a methodology that uses landscape characterisation as a spatial framework for the analysis of other environmental data allowing the outputs to nest within National and Regional Landscape Character initiatives[1]
- To establish an assessment framework that allows for the assessment of data across the whole of Derbyshire excluding the Peak District National Park in accordance with the principles of the European Landscape Convention
- To utilise a Geographic Information System (GIS) as a tool for analysing and collating known environmental datasets and spatially presenting the outputs

The assessment undertaken by the Conservation and Design Section as a response to these requests included:

- Utilising data collected as part of the Derbyshire Landscape Character Assessment
- The analysis of data produced as part of the Derbyshire Historic Landscape Character Assessment and held in the Historic Environment Record (HER), and

---

[1] National Landscape Character Areas as defined by Natural England (formerly Countryside Commission/Countryside Agency) and the East Midlands Regional Landscape Framework (2010), Natural England (East Midlands Region)

- The analysis and collation of various data sets relating to known habitat and species information

Note: The assessment relates to all known relevant data held by the Conservation and Design Section as of August 2010.

2.0 Methodology

In order to define sensitive areas of landscape it was necessary to identify a spatial framework within which to assess and analyse the environmental data held and managed by the C&D section. It was also important that the spatial unit was robust, meaningful and operated at an appropriate scale to deliver strategic guidance and yet respond to the underlying character of each Landscape Character Type and National Character Area (NCA).

It was decided that the most appropriate spatial unit for undertaking this exercise was the Land Description Unit (LDU); the fundamental building block of the Derbyshire Landscape Character Assessment. A detailed methodology for the definition of a LDU can be obtained from "*The Living Landscapes Project Landscape Characterisation Handbook: Level 2 (Version 4.1)*", Warnock S, 2002.

However in general terms LDUs are distinct and relatively homogenous units of land defined by a number of attributes relating to:

- Physiography – the relationship between geology and landform
- Ground Type – the relationship between geology and soils
- Landcover – a reflection of surface vegetation; both land use and tree cover
- Cultural pattern – an assessment of settlement pattern and farm type

Not only do LDUs provide a meaningful and structured spatial framework for the analysis of other environmental data, they also allow for full county coverage outside of the Peak District National Park. Furthermore all LDUs are digitally mapped and form part of a Geographic Information System (GIS) allowing for various datasets to be compared through a process of overlay and query mapping.

In general terms those landscapes of highest sensitivity to change will be areas where the landscape remains intact both visually and structurally, have strong historic and cultural identity, and contain many widespread semi-natural habitats with associated linkages appropriate to the character of the area.

Sections 2.1, 2.2 and 2.3 that follow, describe how each of these indicators was assessed. Sections 2.4 and 2.5 conclude the methodology, describing how the historic, ecological and visual indicators were brought together to produce a map of areas of multiple environmental sensitivity.

2.1 Ecological data

The County Ecologist is in receipt of various datasets relating to the biodiversity of the county many of which are now held electronically in a GIS. The main objective of this work was to identify those areas of greatest ecological sensitivity, by identifying and taking account of a range of habitats that contribute to biodiversity.

As a result, for Derbyshire the following spatial datasets were amalgamated to create one overlay of ecological data. This involved bringing together data relating to:

- Ancient woodlands (including woods under 2ha) and wet woodlands
- Historic wood pasture and parkland
- Standing open water
- Upland and lowland heath
- Swamp, Fen, Mire and Reedbed (some point data excluded)
- Blanket bog
- Semi-natural grassland (including calcareous and dry acid grassland)
- Traditional orchards
- Designated sites eg. SSSIs
- Locally designated wildlife sites

The amalgamation of the above datasets created a single 'ecological resource' layer, identifying all areas which had been identified as supporting habitats of notable ecological value, whether formally designated or not.

NB. Where datasets, such as ponds and reedbeds, overlapped with each other, or where habitat types were identified within designated sites then the combined dataset was designed so that the same area was only counted once.

This combined data was then analysed within the spatial framework of the LDU. This was achieved by calculating the total area coverage of ecological interest within each LDU and expressing this as a percentage.

Note: 5.72% was the median 'average' for the dataset – see below

2.2 Historic Environment data

The primary source of historic data used in this work is the Historic Landscape Character Assessment (HLCA) managed by the County Archaeologist. HLCA basically divides the landscape into a series of pre-defined categories based on historic map evidence. For the purpose of this exercise it was decided that those landscapes associated with ancient enclosure characterised by fossilised strip fields or irregular field patterns were the most important with respect to the historic landscape and the most sensitive to change. These landscapes have longer time depths, are often irreplaceable and present many features associated with ancient enclosure such as ancient woodlands, mixed species hedgerows and ridge and furrow.

In addition to areas of ancient landscape the view was taken that historic parkland is another heritage asset worthy of inclusion in this assessment. Parkland is particularly valued by people and again presents many features of the historic environment such as ancient trees and boundary features, which again are difficult to replace and need to be considered in strategic planning matters.

Finally data relating to Scheduled Monuments was extracted from the Historic Environment Record (HER) to take account of specific designated heritage assets; important features in the landscape and appropriate for protection.

As with the ecological data this information was combined to create a single overlay of historic environment data, again ensuring that duplicate areas were counted only once. This information was analysed within the spatial framework of the LDUs with total coverage expressed as a percentage.

Note: 34.73% was the median 'average' for the dataset – see below

2.3 Landscape Character data

Data relating to the current character of the landscape has the advantage of having been captured by LDU as part of a full and comprehensive field survey. Although this produced many datasets relating to the condition of the current landscape, it was decided that visual unity was most appropriate for measuring the overall visual 'intactness' of the landscape, particularly allied to the ecological and cultural datasets.

Using GIS the visual unity data was thematically mapped by the following categories:

- o Unified
- o Coherent
- o Interrupted
- o Incoherent

NB. LDUs classified as 'urban' have no data relating to visual unity.

2.4 Derivation of Areas of Multiple Environmental Sensitivity

Areas of Multiple Environmental Sensitivity were selected as the areas where two or more of the input indicators (historic, ecological or visual importance) were determined as significant. The indicator was classed as significant in the following ways:

Ecological and Historic Environment
It was decided that for each dataset, significant % coverage is that which is above the 'average' % coverage, i.e. areas which were above 'average' were considered to hold significant ecological interest. It was noted that the ecological data was particularly 'skewed' with a significant number of LDUs

being found to hold no, or very little identified ecological interest, with a smaller number of LDUs having a high percentage cover. Consequently, the 'mean' average was found to be particularly low, and it was therefore considered inappropriate to use the mean average in this assessment, as a large number of LDUs with a small percentage of coverage of ecological interest would have been identified as being significant. The median average was therefore used in the consideration of ecological data, such that the LDUs which were identified as significant were those which were in the top half of the ranked LDUs. The median was applied to the historic indicator for consistency, though the spread of percentages was more evenly distributed across its range, so the mean and median produced a similar result.

The cut-off points were therefore:

- Ecological % coverage >= 5.72%
- Historic Environment % coverage >= 34.73%

Visual Unity
Of the four Visual Unity categories, the two most important categories (again, the top half) were taken as significant. These are those LDUs classified as "Unified" or "Coherent".

2.5 Defining Areas of Multiple Environmental Sensitivity

Having selected the individual sensitivities, as outlined above, these were then brought together into 'Areas of Multiple Environmental Sensitivity', further subdivided into 'primary' and 'secondary' significance based on the following criteria:

- **Primary Significance** – where an LDU was recorded as significant for all three of the individual datasets
- **Secondary Significance** – where an LDU was recorded as significant in two of the individual datasets

Both of these scenarios are considered to be important with respect to their relative sensitivities and their consideration in strategic planning, and in upholding the principles of the European Landscape Convention. Those areas of 'Primary Significance' are considered to be the most sensitive areas of landscape, which are most likely to be negatively affected by change or development and will attract a strong focus on the **Protection** (Conservation) of their environmental assets. Those areas of 'Secondary Significance' are still considered to have environmental sensitivities but are potentially weaker in one area. These areas will attract a strong focus on the **Management** (Conservation and Enhancement) of these areas; that is maintaining those features of existing value but also addressing those in decline e.g. landscape restoration, habitat creation, etc. Areas of landscape that are not identified as being strategically sensitive through this assessment process will be the areas that might be less sensitive to change, or conversely those which would benefit from a strong forward looking **Planning** (Restoration/creation) strategy.

3.0 Findings

The resultant areas identified by the methodology concur with the professional opinion of the various specialists in the C&D Section. Excluding the Peak District National Park, 47% of the county was classified as being of 'Primary' or 'Secondary' significance with respect to the environmental data analysed in the assessment. Areas of 'Primary' significance alone constitute 16% of the same area.

The most sensitive areas, those classified as primary significance, are mainly associated with the Peak Fringe and Lower Derwent NCA. These occur as an almost continuous band from the Moss Valley in the north, through the Ashover Valley to Crich and Alderwasley in the south. There are additional areas within this NCA immediately east of Carsington Water around Kirk Ireton.

Other areas of environmental sensitivity also occur within the Needwood & South Derbyshire Claylands NCA. These areas are associated with the parklands of Kedleston Hall, Meynell Langley, Ednaston and Osmaston. Further areas of interest in this NCA are located on rising ground to the east of the Dove valley around Marston Montgomery.

Although the remainder of the county has few areas of primary significance, there is a small area around Repton and Bretby Park in the Melbourne Parklands NCA and around Calke Abbey and Ticknall. Other sensitive areas can be seen in the South West Peak/Dark Peak NCAs to the south and west of Chapel-en-le-Frith around the minor settlement of Tunstead Milton, and to the east and west of Whaley Bridge.

4.0 Summary and Conclusions

Overall, the methodology outlined above has allowed for different datasets to be analysed within a spatial framework to identify those areas of landscape that are considered to be most sensitive with respect to landscape character, biodiversity and the historic environment. At the same time this spatial framework nests within the Landscape Character Types identified in the Derbyshire Landscape Character Assessment and in turn these sit within the Regional Landscape Character Types and the National Character Areas.

Those areas of multiple environmental sensitivity, expressed as primary and secondary significance in the report, can then be used for a number of strategic purposes including the targeting of environmental grants and the allocation of large scale development. The strength of this approach is that the NCA can remain as the overarching delivery unit but there are clear links to the more detailed Derbyshire Landscape Character Assessment.

Furthermore the findings seem to support the aims of the Biodiversity Strategy for the East Midlands, which identifies Regional Spatial Priorities for Conserving and Enhancing the Region's biodiversity. Excluding the Peak
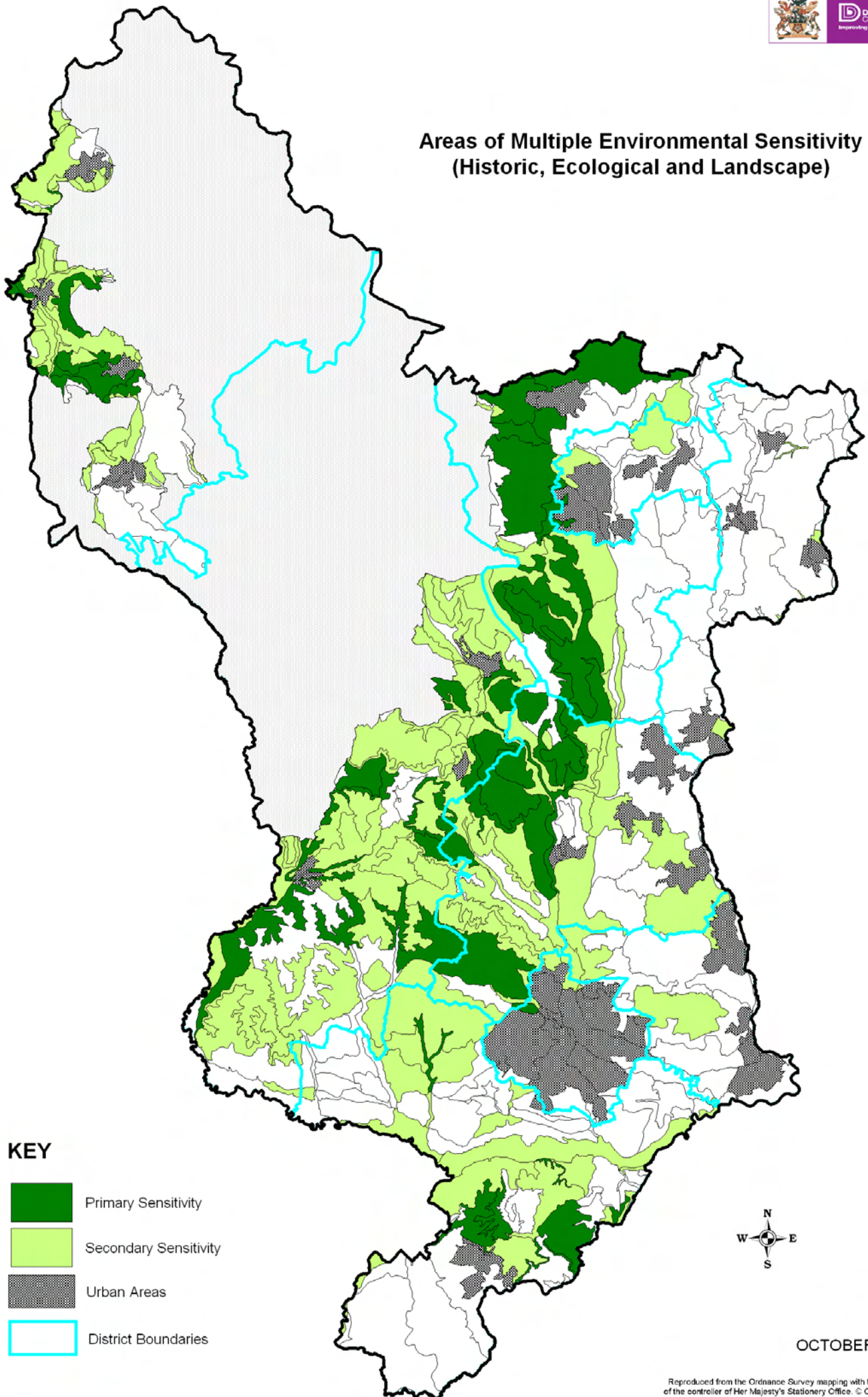
District National Park there is one Biodiversity Conservation Area within the county; the Derbyshire Peak Fringe and Lower Derwent and one Biodiversity Enhancement Area; the Coalfields. The findings clearly demonstrate that the Derbyshire Coalfield has very limited areas of environmental sensitivity, supporting an enhancement strategy and the Peak Fringe and Lower Derwent has extensive areas of sensitive landscape consequently supporting a conservation strategy.

It is also important to acknowledge that the methodology has some limitations;

a) the outputs may be slightly skewed by a lack of data; this is particularly true of the Needwood and South Derbyshire Claylands. Although this JCA has been identified as having some areas of multiple environmental sensitivities, the true value of this NCA may be underestimated as a consequence of there being limited ecological data for this area. This is primarily due to the general lack of development pressures in this landscape, leading to site assessments, and the more limited public access.

b) the outputs may be slightly skewed by the size of some LDUs, particularly true of the Southern Magnesian Limestone JCA where LDUs can be very large. In this situation the LDUs are too large to pick up the remaining very small areas of significant environmental value, where the conservation of these areas continues to be a key objective.

Areas of Multiple Environmental Sensitivity (Historic, Ecological and Landscape)

DERBYSHIRE
County Council
Improving life for local people

KEY

■ (dark green)	Primary Sensitivity
■ (light green)	Secondary Sensitivity
■ (grey)	Urban Areas
▢ (cyan outline)	District Boundaries

OCTOBER 2010