3. INFLUENCES ON BIODIVERSITY IN NOTTINGHAMSHIRE

3.1 Rocks, Landforms and Soils

3.1.1 Nottinghamshire consists of a series of plateaux running from north to south. These begin with relatively young rocks such as Lower Lias and Mercia Mudstone in the east, and get progressively older as they rise towards the west, culminating in the Coal Measures and the Magnesian Limestone ridge.

Map1: Geological Map of Nottinghamshire

3.1.2 From this basic structure, Nottinghamshire's present-day landforms have evolved through river action, sea level rise and fall, and glaciation. Areas of hard rock have persisted as higher land, in which valleys have been cut into softer stone. Overlying the solid geology in the south is material deposited by glaciers, forming the gently rolling South Nottinghamshire Wolds, while in the Trent Valley the river has distributed gravel and finer sediments. This variety of landform and geology means that there is a wide range of soil types in different areas of the County. Different species of both plants and animals show preferences for different soil types, so because Nottinghamshire has such a variety of soils, the diversity of species which the County can support is relatively high.

3.2 Climate

3.2.1 Nottinghamshire is a low-lying, landlocked county, sheltered from easterly winds and rain by the uplands of Derbyshire and Staffordshire. As a result, it has a relatively dry climate, with an annual temperature range more typical of the Continent[1]. The climate is relatively uniform throughout the County, although rainfall increases slightly with altitude from east to west. The species found in the County, therefore, are those typical of these climatic conditions.

3.2.2 Climate and weather patterns are believed to be changing as a result of global warming. Current predictions suggest that the global climate will experience a warming of between 1.5 and 4.5 °C by the end of the next century; in the UK winters may be wetter, springs earlier and summers drier[2]. These changes are likely to have significant effects on Nottinghamshire's biodiversity.

3.2.3 Changes will be influenced by how species respond to warmer summer temperatures and changing weather patterns, how successfully they compete with other species, and their ability to disperse and colonise more favourable areas. Species better adapted to the new conditions will dominate, and many species may be lost altogether from the County. Species that will tend to be disadvantaged include

moisture loving plants such as mosses, and those that favour cool, damp conditions such as the bluebell. However, some southern species may extend their range northward if suitable habitat can develop. Habitats likely to experience change include heathland, wetlands and arable land. Some may be lost, or may need to be re-located or re-created in order for them to survive. Simply conserving some habitats will entail considerable effort.

3.2.4 The extent and effects of climate change are very difficult to predict, and there will be a need to monitor any changes carefully so that appropriate action can be taken and the Local Biodiversity Action Plan altered accordingly. The main conservation aim is obviously to slow down the rate of climate change by increasing awareness of the effects of global warming and ensuring that greenhouse gas emissions are reduced.

3.3 The Historical Effects of Man

3.3.1 While climate and geology ultimately determine which plants and animals we see around us, human activities have altered the original distributions and habitat associations of species to such a degree that the modern landscape of Nottinghamshire is almost completely man-made[3].

3.3.2 About 6,000 years ago, when Neolithic farmers first began to have a significant impact on the countryside, Nottinghamshire, like most of Britain, was almost completely wooded. From this time onwards, however, the 'wildwood' was gradually eroded to make way for crops, grazing animals and settlements, with successive cultures having a greater and greater impact. By Norman times, the landscape would have consisted of small pockets of woodland surrounded by cultivated land, grazed pasture and heath. Grazed wood pasture predominated in Sherwood Forest.

3.3.3 In the late 18th century, the Enclosure Acts replaced subsistence, cooperative farming with commercial private enterprise, resulting in the planting of hundreds of miles of hawthorn hedge as the old 'open field' systems were converted to more efficient grids. This brought major changes to the landscape of the County, and was the beginning of the current trend towards agricultural intensification. As land drainage and farming practices developed throughout the 19th century, production increased, but with the associated loss of many wetlands, heaths and ancient grasslands, with their characteristic wildlife.

3.3.4 With the Industrial Revolution came new pressures on the countryside, which, while bringing economic benefits, have meant threats to the biodiversity of Nottinghamshire, which continue into the present day. This century has seen further loss of countryside to residential, industrial and transport developments, and increasing loss of wildlife from intensively managed farmland.

3.3.5 Because most of Nottinghamshire was originally wooded, many of the species found here today are characteristic of forest conditions. Where the original forest cover has been removed, species characteristic of habitats such as grassland, wetland and heath have colonized, which would previously have been restricted to natural gaps in the wildwood. A host of further species followed the spread of arable farming across Europe to become resident in the County.

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The fragments of ancient woodland which remain in Nottinghamshire support many rare and threatened species.

3.3.6 There are no areas remaining in Nottinghamshire free from the effects of man. Those which have been modified only to a limited extent are referred to by ecologists as 'semi-natural', and it is these which are of the greatest importance for biodiversity. The majority of semi-natural habitats have been subject to low intensity management over hundreds of years. Many species have become adapted to this traditional management, such as grassland cutting for hay, or woodland coppicing, and the methods must therefore be continued if they are to survive.

3.4 Nottinghamshire Today: Biogeographical Areas

3.4.1 The traditional approach to both biodiversity and landscape conservation has been based on systems of designated sites, such of Sites of Special Scientific Interest (SSSIs) and Mature Landscape Areas (MLAs). Although these have protected many important features that would otherwise have been lost, they have been insufficient to stop the widespread decline in biodiversity, and conserve the character of the countryside as a whole. In recognition of this, there is a growing emphasis at both national and local levels on a strategic approach to conservation in the whole of the countryside, not just protected areas.

3.4.2 The Countryside Commission's Countryside Character Programme has divided England into 'Countryside Character Areas' with distinctive landscape features, as the basis for a strategic approach to landscape conservation. Concurrently with this, English Nature has produced its own 'Natural Areas' map, with the emphasis on biodiversity and nature conservation. Each Natural Area is defined according to wildlife, natural features, land use and human history, and each has its own set of biodiversity conservation objectives. Natural Areas and Countryside Character Areas have now been combined into a single map, entitled 'The Character of England: Landscape, Wildlife and Natural Features'[4].

Map 2: Natural Areas in Nottinghamshire

3.4.3 The Natural Areas programme provides a strategic framework for the implementation of the UK Biodiversity Action Plan, by translating objectives and targets to a more local level. It also provides a means by which action can be co-ordinated across traditional administrative boundaries, which are not respected by wildlife. This Local Biodiversity Action Plan will therefore contribute to the delivery of objectives for each of our Natural Areas, in combination with neighbouring action plans[5-6].

3.4.4 In 1998, Nottinghamshire became the first County Council to produce its own character map, dividing the County into ten Regional Character Areas. Five of these correspond to national character areas, while five form subdivisions of the large area defined nationally as the 'Trent and Belvoir Vales'. Accompanying the County map are the 'Nottinghamshire Landscape Guidelines'[7], which provide detailed descriptions of the Regional Character Areas, and set out the actions needed to maintain and restore the distinctive character of each. The Guidelines will form the foundation for future landscape conservation work, guide planning policy and land use decisions, and act as a baseline for monitoring future change. Many of their recommendations relate directly to biodiversity conservation, since natural features and wildlife are an integral part of the landscape. Their implementation will therefore contribute to the achievement of Local Biodiversity Action Plan objectives, and vice versa.

Map 3: Nottinghamshire Regional Character Areas

3.4.5 In order to be consistent with the County Landscape Guidelines, the implementation of this plan will be guided by the strategic framework of the Nottinghamshire Regional Character Areas. In this way it is hoped that we can also meet our responsibilities under the Natural Areas programme. As the first stage in this process, Appendix C contains a list of the key Regional Character Areas and Natural Areas for each habitat and species action plan. In Appendix D a map relating Regional Character Areas to Districts enables those working at a district level to identify those action plans to which their contribution is particularly important.

References

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Note: Other Local Biodiversity Action Plans are in production for neighbouring areas.