EXPLORING A PRODUCTIVE LANDSCAPE

From a long history
to a sustainable future
in the Eye Brook catchment

EXPLORING A PRODUCTIVE LANDSCAPE: the Eye Brook Catchment

Exploring a Productive Landscape

From a long history to a sustainable future in the Eye Brook catchment

Chris Stoate

with contributions from Eye Brook catchment community members:

Jim Auterson, Andrew Brown, Harry Clements, Freda Davis, Ken Farnsworth, Norman Farnsworth, Violet Fryer, Sheena Girvan, Jean Graythorpe, Ray Green, Paul Herrington, Jim Inchley, Phil Jarvis, Philip Johnson, Vivienne Kennedy, John Manby, Roger Marshall, Ena Meecham, Andy Miller, Ruth Munton, Joe Nourish, Mary Nourish, Gareth Owen, Edie Parker, Joe Roberts, Miriam Stoate, John Szczur, Richard Vause, Audrey Walker, Philip Walker, David Walker, Anne Wallis, John Wood, Peter Wright & Tony Wright.

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Cover photo: The lower Eye Brook catchment, with the village of Belton, and Eyebrook Reservoir in the distance.

Title page photo: The Upper Eye Brook catchment at Halstead.

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Research Background to the Project

A primary aim of this book is to stimulate discussion and positive action within the Eye Brook community and beyond. The intention is that both the approach that has been taken, and the lessons that have been learned from that approach, will have wide application to other catchments and the communities living within them.

This book arises out of a catchment community project carried out between 2006 and 2010. The project took a social learning approach to develop a shared understanding within the community of environmental issues at the catchment scale. The novelty of this approach is that it combines historical, local and scientific knowledge cultures in order to strengthen that understanding, and to enhance the sense of 'ownership', both of the learning process, and of the environmental problems and opportunities.

The project is timely. There is growing concern about the effects of climate change, the increasing human population, rising individual consumption, and declining resources such as oil and phosphate on our ability to sustain our society. Sustainable production of food and fuel are the greatest challenges facing our society today. While these issues are actively debated amongst academics and policy makers, and amongst environmental groups, engagement of the wider community as a whole, especially in issues associated with climate change adaptation and mitigation, is recognised as being a key requirement for a sustainable future. Active involvement of the 'third sector' in meeting the needs of society is also currently advocated more widely.

Issues associated with water have risen rapidly up the policy agenda and include security of water supply, improvement of water quality, and control of flooding. It is widely recognised that an integrated approach to catchment or river basin management, based on interdisciplinary research, is essential to understanding and addressing water management. There are few examples in the UK or abroad where such an approach is genuinely adopted in practice.

Welcome

First of all, a big 'thank you' to the many people from throughout the catchment and researchers from further afield who have contributed in any way to this book. About forty local people have contributed directly to the text and others have helped by contributing childhood memories, providing photographs, historical documents and other information, responding to surveys, or simply by expressing support for the project and its annual newsletter, The Eye. This book is for you, and for the other residents of the Eye Brook catchment who have not had the time, knowledge or inclination to contribute to the project but who are very much a part of the catchment community. Welcome also to readers from outside the Eye Brook catchment – the work of the project has wide relevance, and the ideas can be adapted to differing circumstances in other areas. The book is an account of the information available to us at the time, and an invitation to everyone living in the catchment, as well as associated researchers and policy makers, to develop it further by providing additional ideas and information about the past and for the future.

Eyebrook Reservoir from the north, with woodland, arable fields and grassland.

Foreword

This fascinating and thoroughly researched book provides a deep history of a group of parishes on the borders of Leicestershire and Rutland. It is based on research carried out over four years but draws on a much longer seam of first hand knowledge through the careful use of oral histories to provide a vivid insight into the life and work of the people living in the area. More than this, however, it shows how people used local resources and made and managed the many features of the landscape: hedges, woods, houses, and fields. The complicated relationships between people and the animals and crops they depended on are carefully examined.

The historical sources used are very varied and include old maps, estate documents and, perhaps most important, the landscape itself: the ancient woods, old lanes, the Eye Brook and the enclosure hedges and fences. This historical material is combined with the results of recent ecological survey work and research. For me some of the most interesting material was provided by the detailed oral histories which described, for example, how animals were taken to market in the early twentieth century; the great care in which individual trees and woodland rides were managed, and hand milking of cows. The book exemplifies the importance of historical knowledge in making contemporary land management decisions and concludes with an examination of the links between food production and wildlife conservation and how both may be sustained.

Charles Watkins
Professor of Rural Geography
University of Nottingham

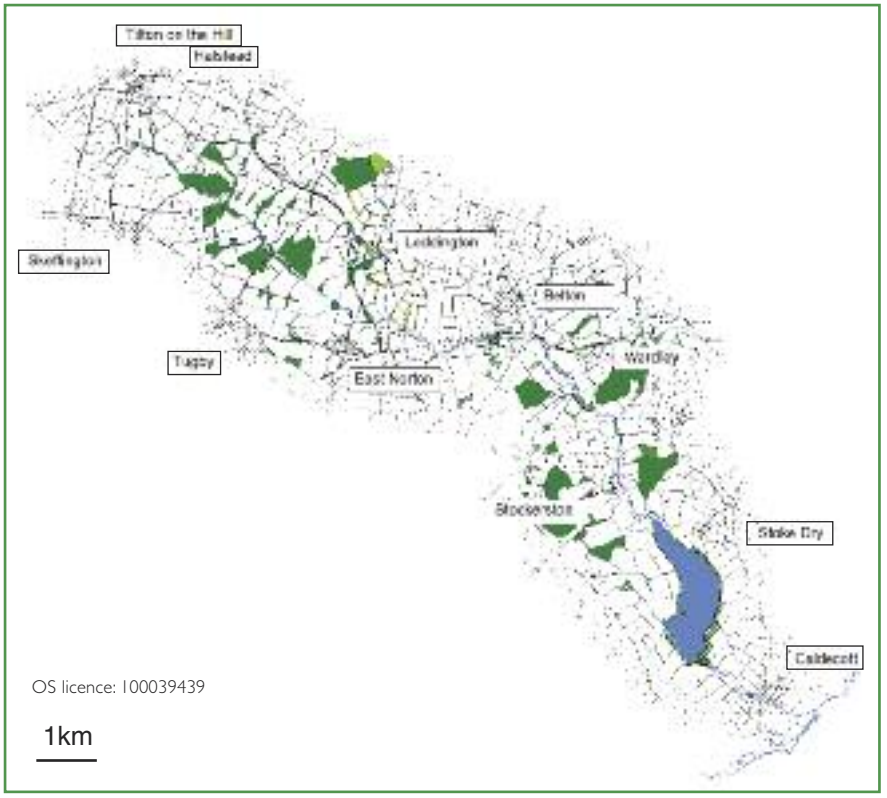
Introduction

Never have so many demands been made on the British countryside. It provides much of our food, all our water, and is increasingly expected to provide our fuel as well. Rural landscapes and the enormous diversity of wildlife associated with them, in water and on land, provide much of our recreation. Those landscapes have been shaped by the changing needs of countless generations of people over at least five thousand years. Now, a growing population, locally, nationally, and globally, places increasing pressure on this rich heritage and the strain is starting to show.

This book takes a fresh approach to understanding these pressures. We can learn from the long history of land management. Over a much shorter timescale, we can learn from those who have been managing the land during the course of long lives. We can also learn from scientific research into what is happening today. In the following chapters, these different types of knowledge are combined to improve our understanding of how the countryside works. The need to do so is great. Only 20% of British people live in the countryside, and of them, only a very small proportion is actively involved in its management. We have lost that direct link with the land on which we depend for so much.

The following chapters are about a small stream catchment in the heart of England, straddling the county boundaries of Leicestershire and Rutland. Few natural processes recognise political boundaries, and water is no exception. The stream is the Eye Brook, a tributary of the River Welland, which delivers its water into the Wash, the United Kingdom's largest estuary, its most important shellfish producing area, an important breeding site for many of the fish on which our coastal fisheries depend, and a key site for countless migratory wading birds. If the Eye Brook catchment is 'isolated', it is only in the sense that it is rural.

Most of the 67km^2 catchment is farmed, but the area also includes several large ancient semi-natural woods, and Eyebrook Reservoir, towards the bottom of the catchment has been an additional feature since 1940. Crops such as wheat and oilseed rape are produced, and livestock farms provide lamb and beef, as well as some milk. In fact, in many ways, the Eye Brook area is a microcosm of the wider countryside, at least in lowland England. It shares many of the issues that currently concern the rest of the country. It is, in effect, quite ordinary.



The Eye Brook catchment showing the villages, reservoir, fields and woods.

The word, 'eye' is derived from the Old English, 'ēa' which simply means 'river'. Until the 19th century, the stream was known as the 'Little Eye', to distinguish it from the River Eye, not that far away in the Trent river basin. The stream starts at Tilton on the Hill and enters the River Welland below Caldecott, passing on the way the villages of Tugby, Skeffington, Loddington, East Norton, Belton in Rutland, Allexton, Wardley, Stoke Dry, and Stockerston. The geology of the catchment is predominantly boulder clay with flint cobbles and pebbles left by the Ice Age of 400 thousand years ago. This covers Jurassic ironstone of 200 million years ago, and in places, hard grey marlstone and mudstone. The Eye Brook catchment has a low human population density, with one major road, the A47 running through it, and limited other facilities. These include one primary school, four pubs, a petrol station, a village shop, a farm shop and a butcher, as well as churches and villages halls.

In 2003, a small group of local people got together to consider what mattered to them about the area in which they lived, what were the potential threats to it, and what might be opportunities. The area was regarded as being an attractive place in which to live and work. There was a perception that visitors valued the countryside but not those living there and managing it! There was perceived to be a gap between rural and urban people, especially those living within the community, arising from the development of 'dormitory' villages in the catchment. The main products of the area such as food, water and timber provided relatively low economic returns. Perhaps an improved local identity would help market some of these products, or provide opportunities for tourism? There was recognition though that achieving economic, social and environmental benefits together, was potentially more rewarding than just economic ones, and that individual benefits could also provide public ones. There was broad recognition that there was a need to bring different people with different perspectives together to explore these issues.

It was to address these issues that the Eye Brook Community Heritage Project was formed in 2006 with support from the Heritage Lottery Fund. The project has been an exploration of new territory, but in a familiar local setting. This book provides an account of that exploration and contains information gathered by

Table 1. Events organised as part of the project

Date	Place	Speaker	Event
29.03.07	Belton	R Ovens & S Sleath	Evening talk: 'The Heritage of Rutland Water'
13.05.07	Launde	A Lear	Visit: Launde Big Wood
10.06.07	Loddington	C Stoate	Visit: the Allerton Project farm
27.06.07	Tilton	P Liddle	Visit: Robin a Tiptoe hill
06.02.08	Allexton	V Anthony	Evening talk: 'The History of Allexton'
19.04.08	Belton	A Walker	Tour of Belton: the 1881 Population Census
24.05.08	Eyebrook Reservoir	A Miller	Visit: Eyebrook Reservoir
11.06.08	Caldecott	P Liddle	Visit: site of medieval village of Snelston
25.02.09	Tugby	C Stoate	Evening talk: 'What has the Eye Brook Project achieved so far?'
14.03.09	Tugby	M Winterton	Visit: Management & wildlife of Tugby Wood
11.04.09	Tilton	P McCabe	Visit: Tilton sewage treatment works
20.05.09	Stockerston	J & M Nourish	Visit: Beaumont Chase Farm
30.01.10	Loddington	D Harper	Visit: Water insects of the Eye Brook
28.02.10	Loddington	D Walker	Visit: Hedge laying demonstration
24.04.10	Stockerston	C Jones & A Lear	Visit: Plants & history of Great Merrible Wood
18.05.10	Great Easton	P Johnson	Visit: Rectory Farm & Eyebrook Wild Bird Seeds

numerous members of the Eye Brook catchment community. The approach is based on the premise that an awareness of land use and its history strengthens local identity and enhances 'ownership' of the environmental problems and opportunities that we experience now, and in the future. To that end, sixteen local events on a range of subjects were held at sites throughout the catchment, and an annual newsletter, 'The Eye' (www.gwct.org.uk/research__surveys/ the_allerton_project) has been distributed to every household in the catchment. Village history societies at Belton, Caldecott and Tilton, the environmental group, 'Tilton Green', individual historians, naturalists, farmers, rural workers and others have all contributed their time, energy and knowledge.

Neolithic arrowhead from Holyoaks. Courtesy of Great Easton Fieldwork Group

Chapter one describes the evolution of the Eye Brook landscape and land use from the first human occupation in the Neolithic period about five thousand years ago. This is based on archaeological evidence, and for the past millennium, also on documentary evidence. There have been a lot of changes, not just to the landscape, but to the structure of society that was responsible for its management. People have had an enormous impact on the landscape in which we live, but that landscape has also shaped the nature of our society. This chapter dispels the myth that we live in a 'timeless' landscape and makes it clear that landscape evolves through time, according to our changing demands on it. Wildlife changes accordingly.

Home Farm, Oakham Road, Belton, *circa* 1900. © Vivienne Kennedy

For those few who work on the land today, the farm is often home for a lifetime. The best direct historic knowledge of the land rests with those elderly members of our community who can tell us about the area as it was, and as it was managed, in their childhoods. For us today, this is opportune timing as the most elderly members in the community were brought up in a time of massive transition, during the 1930s and '40s. Chapter two provides verbatim accounts of life before the widespread adoption of fossil fuels changed the way we all live. It is easy, and probably wrong, to view this time with a sense of nostalgia, but perhaps there are one or two lessons that we can learn for our approach to living today.

The central section of the Eye Brook catchment is the home of the Game & Wildlife Conservation Trust's 'Allerton Project', a nationally and internationally recognised research and demonstration farm. Since 1992, the project has been carrying out research into ways to continue producing food profitably while also protecting, and wherever possible strengthening other natural resources. Much of the research has extended beyond the farm's own boundaries to the catchment scale to include the Eye Brook and the land that drains into it. The research is carried out by project staff and by visiting researchers from other research organisations. Chapter three presents the results of this research, together with some additional studies carried out by other individuals and organisations. The chapter describes the main current land use types and the uses to which they are put. It explores the relationship between the land managed to produce our food, and the water in the stream which, once pumped from the River Welland into Rutland Water, provides drinking water for people elsewhere. The chapter provides an account of the wildlife of the area and its relationship with our current management of woods, farmland, streams and ponds.

Barley has sometimes been grown on the lighter land.

To the long-standing challenge of increasing population size, we can add climate change and declining supplies of non-renewable resources as additional challenges, not just for the future, but for us all today. Chapter four takes a look at the implications of these global issues for residents of the Eye Brook catchment. How do local people feel about options for future management of the catchment to meet the changing circumstances? Could we feed ourselves from our own local farmland? How practical is it to provide our own energy needs from local resources? Given the increasing demands on land, will there really be room for wildlife? Just how important is that wildlife anyway? These are all issues that are being hotly debated amongst academics and policy makers, nationally and globally.

This chapter brings the debate firmly down to earth and provides a local context.

Archaeologist Peter Liddle leads a tour of Robin a Tiptoe Hill.

This book is a combined effort. Many people have contributed to it. Those living in the catchment, or whose work is based there, are listed on the title page. The researchers involved in the work described in chapter three are too numerous to mention but include staff from the Game & Wildlife Conservation Trust and other research organisations comprising ADAS, Centre for Ecology and Hydrology, Royal Society for Protection of Birds, and Pond Conservation, as well as the Universities of Cranfield, Reading, Lancaster, Leicester, and Nottingham. The MSc students who have contributed directly to this book are Mark Amos (Imperial College University), Pippa King (University College London), Frances Davis (Lancaster University) and Rebecca Granatstein (Leeds University). Other contributors include Andy Lear (Leicestershire and Rutland Wildlife Trust), Clive & Elaine Jones, Ivan Pedley, Anthony Fletcher, Daryl Saunders, Mary Fuller, Peter Liddle (Leicestershire Community Archaeologist), Nicola Orchard (Natural England), Pete McCabe (Anglian Water) and members of the Leicestershire & Rutland Ornithological Society. If the Eye Brook catchment is, in any sense ordinary, it is the work of these people, combined with the contributions from local people, that has helped to make it different.

The combination of information from wide-ranging research disciplines is truly exceptional for a single area and complements the different but equally important local knowledge of people living in the catchment.

The aim of this book is to increase local people's shared awareness of the area and to understand how it works and how the management of it might adapt to changing circumstances in future. That includes future research. This is just the start. We hope that this shared learning process by the Eye Brook community can shape the future research agenda within the catchment, as well as developing plans for future management. That does not necessarily mean management at the catchment scale, but in individual villages, farms and households as well, because one message to come out of this exploration is that we all have a role to play in maintaining what we have inherited for future generations. We also hope that the approach we have taken so far will inspire similar projects elsewhere.

The lower catchment, with Wardley and Allexton woods and Eyebrook Reservoir in the distance.

Chapter 1. Eye Brook History

People have continually developed new means of exploiting the natural resources that the land provides. Wood has provided fuel and building materials for houses, fences and vehicles, and woodland as a whole has provided food in the form of fruit, nuts and meat, a foraging area for livestock, and an opportunity for recreational hunting. Wood fuel has been essential for household heating, for cooking and heating water, and for small scale industrial processes such as the smelting and working of iron. Wind and water have been harnessed to provide additional energy for processing food and pumping water. Water itself has been a vital resource, and producing food from the land, has ultimately occupied the largest proportion of the area. For most of our history, the power for food production has come from the people themselves and from animals harnessed to work the land. Very often, the management and use of one resource has been integrated with that of others. The evolving management and use of land, the exploitation of available natural resources, and the trade-offs between conflicting demands, are explored in this chapter.

From hunters to farmers

There must have been an occasion in the distant past when someone first scratched the soil and scattered a few seeds somewhere in the Eye Brook catchment. It was a defining moment that has been followed by more than five thousand years of farming. Of course we have no idea where that initial planting took place. It might now be in a garden or some anonymous spot in a field, or it might be overgrown by woodland, or under one of the many houses that have been built to accommodate the growing population since that time.

The first people to set foot in the area after the last Ice Age were nomadic hunter gatherers who had come across the land bridge between Britain and continental Europe about 12,000 years ago. They were mobile, following and hunting red deer and numerous smaller species, and gathering roots, seeds and fruit. There is some evidence to suggest that the heavy clay soils with which we are familiar were avoided by these early people who confined their activity mainly to the higher ground, especially ridges between river or stream catchments. Evidence of human activity about 10,000 years ago has been found on the ridge just south of Launde Park Wood, in the form of flint arrow heads, blades and scrapers that are identical to some that have been found in Belgium, Germany and Holland. The flints were dispersed around a fire which may have been used to soften birch resin to glue arrow heads to shafts. Scrapers deposited further from the fire would have been used for paring animal skins.

Further along the ridge at Ridlington there is extensive evidence of later, Mesolithic, hunter gatherer activity, but also Neolithic and Early Bronze Age flints and, from cropmark evidence, a burial mound. Neolithic flints have also been found between Belton and Wardley, and at Loddington. This area may have been one of the first in the catchment to have been truly 'settled' by people who were gradually shifting from a hunter gatherer existence to one relying more on crops and livestock to meet their year-round needs from a single site.

Late Bronze Age flint knife found at Loddington.

Pollen records suggest that the landscape remained predominantly wooded through the late Neolithic and Bronze Age periods (3,000 – 5,000 years ago), with open areas for grazing and small-scale cultivation. There is some evidence for human occupation of the Eye Brook catchment in this period. Bronze Age flints have been found at Holyoaks, an Early Bronze Age flint knife was recently found at Loddington, and Ridlington is the site of what may be a Late Bronze Age defended earthwork and double ditch field boundary systems dating from about 3,000 years ago. Larger, earlier forts are found elsewhere in the area, such as that at Burrough on the Hill. The land was clearly perceived as a resource worth defining and defending. At the base of the catchment, close to the confluence with the River Welland near Caldecott and Great Easton, there is also evidence of long human occupation from the early Neolithic.

From around 3,000 years ago, the pollen record reveals an increase in grassland and cereal cultivation. The development of bronze tools, and later, iron ones, no doubt made the job of clearing woodland a lot easier, and the rate of woodland clearance appears to have increased considerably, including formerly avoided soils such as boulder clay. Pastoralism predominated, with cattle and sheep being the main species, while barley, emmer and bread wheat were also grown. The Iron Age landscape was therefore characterised by a substantial increase in open grassland with some cultivation close to farmsteads. Cattle would have been kept for meat, but also for traction, providing an important source of energy that enabled larger areas to be managed than was previously the case. Trading outside the immediate area was well established by this time, with continental pottery being found in Leicester. Evidence from the important shrine at Hallaton, south of the catchment, shows that there were contacts with many other parts of Britain and the Roman Empire.

The Roman period

Late Iron Age or Early Roman quern found near Belton.
© Philip Walker

The appearance of imported items increased following the Roman occupation in AD 43, although this was confined, at least initially, to the main settlements, and there have been few finds of imported items in the Eye Brook catchment. Archaeological surveys have revealed low status settlements at Tilton, Loddington and Holyoaks. A recent survey at Loddington revealed two small Roman sites, presumably farmsteads, in a small area, suggesting dense Roman settlement in the area. A site at Skeffington has produced much low value coinage and steelyard weights, suggesting commercial activity of some sort but no sign of stone buildings. Evidence in the form of pot sherds and oyster shells suggest that Life Hill, just west of the Eye Brook headwaters, was also a Roman site. Villas are known to the south at Hallaton and near Caldecott which was also the site of a Roman camp and burial ground.

Woodland was important for pottery and iron smelting and there is some evidence to suggest that kilns (e.g. Launde) and iron workings were sited on woodland edges. One Roman iron smelting site near Belton, some distance from any known Roman settlement, contained part of a quern from Northern England and fragments of 2nd to 4th century pottery, as well as slag spread over an area of about 80 metres.

Evidence from the areas immediately to the south of the Eye Brook, around the Roman town at Medbourne (probably the economic and administrative centre of the area), and around the Langtons, suggests that several farmsteads and their associated arable land were abandoned during the 3rd and 4th centuries. The more marginal land may have reverted to pasture, or even to woodland.

The Anglo-Saxons

Anglo-Saxons arrived in England in the 5th century from tribes that were established in a region encompassing southern Denmark and northern France. International contact over long distances is apparent from items such as non-ferrous metal ornaments and even ivory and cowrie shells that would have come from the Middle or Far East, or Africa. Current evidence from the Eye Brook catchment suggests a dispersed settlement pattern with a relatively low population during the Anglo-Saxon period but further archaeological surveys may mean that this view is revised.

The evidence comprises a small cemetery at Keythorpe Hall, pottery at Holyoaks and in the grounds of Loddington Hall, and a spearhead from Tilton.

The medieval open field system

Major changes took place around the 8th century with the increased adoption of Christianity and a complete overhaul of rural community structure and land use. Most notably, isolated farmsteads and small settlements were abandoned in favour of nucleated settlements in the form of villages. This is when the open field system was introduced in which the land associated with villages was divided into large fields, each of which was divided into a number of 'furlongs'. These, in turn, were divided into a series of strips, each of which was allocated to a villager. These strips remain clearly visible in many pasture fields throughout the valley today in the form of ridge and furrow. This farming system, and the community social structure associated with it, was to persist for several hundred years and we can get an insight into how it worked from evidence gathered from throughout this period.

1947 aerial photograph of land near Tilton on the Hill showing ridge and furrow evidence of medieval cultivation. Hay stacks are also visible on this photograph.

From an original photograph held at the Record Office for Leicestershire, Leicester & Rutland

The strip system encouraged the sharing of oxen between villagers who would plough each strip in turn. Because of this communal open field system of cultivation there was therefore a need for synchronisation of cropping. Each village normally had three large fields and a three course crop rotation comprising two years in crops and one in fallow (where no crop was grown). There are no local records of specific crops for this period, but a survey of Belton in 1786, although very much later, revealed a rotation for an open field system comprising wheat, beans and then fallow, and this may have been fairly typical for the area for some considerable time. The 17th century map of Wardley shows the three fields of that parish very clearly. In many parishes the land farmed by the lord of the manor was interspersed with the strips of the other residents, but in others, of which Wardley was one, the lord's arable land was separate.

Detail from a map of Wardley *circa* 1635, showing a mix of open fields (West, Chapel and Nether) and woodland.

As the Wardley map reveals, there are also meadows which were a crucial part of the farming system, providing grazing and an annual crop of hay for oxen and other livestock. The 1786 survey of Belton suggests that there was also sometimes grass within the arable fields in the form of strips of short-term ley grass and headlands sown with grass which was cut for hay two years in three. In the third year, this grass would have been part of the fallow stage of the rotation which was grazed by livestock after harvest by common right of the members of the community, whether they were cottagers or the lord of the manor. The consequences of this communal grazing were that everyone's arable strips benefited from the dung from grazing animals.

Everard Digby had the lordships of Tilton and Stoke Dry and was High Ranger of Leighfield Forest for a while in the latter part of the 15th century. His will of 1508, provides an insight into the farming system of the time. It includes specifically eight of his best oxen, 12 cows, 64 ewes, a young black steer, and further cows, calves, oxen and sheep, two geldings, three mares for the plough, a further six plough horses, a plough with all the associated harness, carts, and a pair of unshod cart wheels. It seems that both oxen and horses were being used for traction at this time.

Common rights applied to the meadows for grazing, as well as to the arable land. There were restrictions on the numbers of livestock that could be grazed though. In 1592, Ridlington 'cottagers' could graze one cow and six sheep on the common pasture, while tenants could graze six cows and up to 34 sheep, and after harvest, four horses as well. 'Cottagers' were those with just a few acres, commonly about five, while tenants had more than half a yardland (one yardland was about 30 acres). Tenants also had better access to other resources – a full load of hawthorn branches from woodland for example, as opposed to just half a load for the cottager. However, all residents had access to as much dead wood as they could carry on their backs, two days per week. There were apparently few restrictions on access to the woods for geese and pigs. On the arable land, the poor were permitted to glean (collect spilt grain or beans by hand) once the crop had been harvested and removed from the field. Small pockets of land, sufficient to graze a cow or two, were also sometimes let to the poor, although this conferred no legal rights.

This photograph of oxen ploughing in Portugal in the 1960s provides a hint of a scene that might have been witnessed in the Eye Brook catchment in medieval times.

The Domesday Book of 1086 provides valuable information on the structure of rural communities, comprising lords, sokemen and villeins (tenants), bordars (cottagers) and slaves, of which the latter were within the control of the lord. Villeins were required to carry out work on the lord's land, and held only lifetime rights to their land, whereas sokemen were relatively free. As well as rent payable to the lord, villagers were expected to pay tithes to the church in the form of corn, hay, wood, lamb, wool and other products of the land equivalent to 10% of annual production.

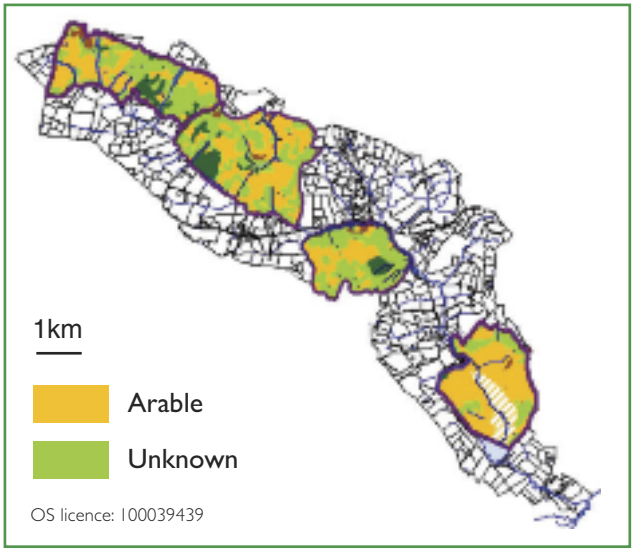
The Domesday Book recorded the taxable potential of each township, providing evidence of the population and the resources available to it, including common land, meadow, woodland, mills, and plough teams. Land area was measured in carucates, one carucate being regarded as the area that could be ploughed in one season by a team of eight oxen (approximately 120 acres). For example, the land at Stockerston was divided between that of Hugh of Grandmesnil and that of Countess Judith. In total there were 31 carucates of land, 68 acres of meadow, and woodland measuring five furlongs by two furlongs. There were 21 villagers, 34 freemen, five smallholders, and 4 slaves. The total number of ploughs was 31, of which four were 'in lordship', the remainder belonging to the villagers and freemen. At Loddington there were 12 carucates of land and 20 acres of meadow, plus an area of woodland. The population comprised nine freemen, seven villagers, and seven smallholders. There were fourteen and a half plough teams, one of them in lordship.

Table 2. Domesday records for some Eye Brook parishes

Parish	Land (carucate)	Meadow (acres)	Wood	Ploughs
Allexton	5¾	-	-	7
East Norton	9	-	-	13½
Halstead	2¾	1	1 x 1 furlong	est. 3
Great Easton	14	40	½ league x 4 furlongs	12
Loddington	12	20	½ league x 4 furlongs	14½
Holyoaks	3	-	4x3 furlongs	3
Ridlington	36	40	Present	4
Skeffington	12	-	2 x 2 furlongs	-
Stockerston	31	68	5 x 2 furlongs	31
Tilton on the Hill	6	12	5 acres	est. 8
Tugby	6	10	2 x 1 furlongs	-

One furlong = 200 metres, one league = 3 miles (4.8 km), and one carucate = 120 acres

Evidence of medieval cultivation is provided by records of former ridge and furrow, and 1940s aerial photos of the distribution of ridge and furrow can be used to map the minimum area of land under cultivation (Map 1.1). This reveals that most of the land area was in cultivation as, although the population was much lower than it is today, so also were crop yields and a large area of cropped land was needed to feed the population. Where ridge and furrow has been destroyed by more modern cultivation, widespread scatters of Saxon, Norman or medieval pottery fragments provide evidence of medieval cultivation. This is because broken pottery was disposed of in manure heaps that were subsequently spread on arable land. For example, pottery scatters around Loddington reveal that these fields were used for arable cropping from the 10th century to at least the 16th century. A very dense scatter on arable land south of Loddington suggests that the village was much more extensive in the 10th through to the 14th centuries than it subsequently became. The village is recorded in the 1130s as being the centre of a small hundred of 48 carucates including East Norton, Allexton, Tugby and Skeffington, but from about this time it became part of the new priory at Launde.



Map 1.1. The Eye Brook catchment showing the minimum cultivated area for four parishes in the medieval period.

Medieval woodland

Most of the woodland clearance in the Eye Brook area took place between 950 and 1350, with open fields managed for food production replacing forest and 'waste'. Despite this, during this time, woodland was a valuable resource and continued to perform an important function for local people, providing a number of essential resources for fuel, building and forage. Woodland was also the preserve of royalty and the nobility for hunting and this created a tension between local people and the king. Clearance of woodland, trespass and poaching were carried out despite often severe penalties.

Pottery sherds from Holyoaks, probably from a jug with green glaze and slip decoration. Stanion/Lyvedon Ware. 13th – 14th century. Courtesy of Great Easton Fieldwork Group.

Henry I took an interest in the woodland around Allexton when he had seen several hinds there and left a man, Pichard, to look after them. Pichard

Veteran boundary pollard oak in Great Merrible Wood.

Ancient coppiced ash stool in Great Merrible Wood.

appointed Hasculf of Allexton as Warden of the Forest and the role remained in the family for four generations. The fourth incumbent, Peter de Neville, acquired considerable notoriety following his appointment in 1249. He developed the Hall at Allexton into a fortilace, complete with moat and prison which he put to frequent use. He claimed land belonging to the Abbot of Owston, diverted the king's wine to his own use, ran up debts, and took advantage of forest law to extort and keep fines and imprison those charged with offences such as taking game or allowing animals to stray. He caused considerable damage to the woods by harvesting timber for his own purposes and for sale, and fuel wood for his own limekilns and charcoal production. His misdemeanours came to an abrupt end, some say along with him, in 1275. It is unlikely that many mourned his passing!

Areas of land set aside specifically as deer parks were numerous in the 1200 – 1350 period. Deer parks were as close to circular as possible and enclosed with a bank, ditch and fence, with internal dead hedges of hawthorn and blackthorn. They were used for the breeding and hunting of deer and were owned by the crown or nobility. One of the earliest, and the most notable in the Eye Brook area, was Ridlington Park which was established early in the 12th century and covered an area of at least 600 acres. Unusually for this area, there is no record of ridge and furrow in Ridlington Park, suggesting a lack of cultivation throughout the medieval period. As its name implies, Launde Park Wood is the site of another nearby deer park where the earth banks that defined the boundaries can still be seen.

As well as suffering from the earlier ravages of Peter de Neville, Ridlington continued to be plundered, with for example, the taking of deer and felling of lime trees by Thomas Parks recorded in1490, but there was still considerable woodland in the 1550s, comprising oak, maple, hazel and thorns. In the second half of the 16th century, Ridlington Park contained thirty three distinct woods, ranging in size from three to 75 acres, and totalling 1,060 acres. The royal hunting lodge of Leighfield

continued to be maintained for Queen Elizabeth but was rarely used by her. Charles I removed the royal protection of the forest in 1630 and the land was sold to individuals, marking the end of the hunting forest and this renewed vigour for the clearance of woodland for fields. In 1624, when the Duke of Buckingham granted College Farm, 'within the Forest or late Forest of Leefield', to George Boteler, the land was described as 'diverse' with 'sundry parcels of ground of coppices of wood and woodground'. There is no record of woodland at Ridlington beyond the middle of the 17th century.

Ridlington Deer Park today (viewed from the south).

Depopulation

The mid-13th century to mid-14th century was a period of relative prosperity. With crops and methods that were, by today's standards, very low yielding, there was a need for a large land area to provide for the population. Pressure on the land was high. Fortunes took a dramatic change for the worse in 1349 when the Black Death arrived from continental Europe, marking the start of several waves of plague that considerably reduced the population. Despite this, the pressure on woodland for fuel and building of houses and ships continued through subsequent centuries although the pressure for land clearance for farming was greatly reduced.

In 1665, the plague hit Skeffington and villagers fled to the woods and lived in temporary huts there until it was over. Some areas of woodland seem to have expanded during this period of depopulation, and many of the woods we think of today as being ancient, grow on ridge and furrow evidence of medieval cultivation. For example, a large area of Skeffington Wood contains ridge and furrow remains, but wood banks encircle an area without ridge and furrow, providing evidence that the medieval boundaries were very different to those of today. Wardley and Great Merrible woods also contain considerable evidence of ridge and furrow. Tilton Wood seems to have changed relatively little with a substantial earth bank still forming its northeast boundary, and no evidence of ridge and furrow. The earth

banks on Robin a Tiptoe hill could well have enclosed a small hill top wood at one time, although ridge and furrow evidence suggests that the whole hill was cultivated in the early medieval period.

The reduced size of the population reduced pressure on the land for arable crops, although the demand for wool for export remained strong. Some villages were reduced in size or were totally abandoned in the medieval period. The substantial contraction in the extent of Loddington is attributable to depopulation associated with plague. Holyoaks and Snelston to the north and southeast of Eyebrook Reservoir respectively, are the best examples of total abandonment in the area, although this was due to eviction as much as to plague. Holyoaks was deserted by the eviction of thirty families in 1496 when 250 acres of land were turned over to pasture for sheep production and seven houses were destroyed. By 1750 there were three houses remaining, and just one by 1796. Holyoaks continued to be represented by a single farm house until the 1980s, after which there has only been a barn. Snelston was declining in size in 1379 and only seven families remained by 1509. A 1700 map has the village marked simply as 'Snelston ruins'. Archaeological finds provide evidence of occupation from late Saxon to the early medieval period, but since then it has been occupied only by sheep.

The last remaining house in Holyoaks, with what appears to be a windmill in the background (1796).

Enclosure of farmland

From the 12th century, wool had been exported to Italy for the textile trade there, but this export expanded through the medieval period and became an extremely important source of income, both for farmers, and for the government through taxes. Many churches bear witness to this period of prosperity, as do local towns such as Stamford for which wool was a major industry. Taxes on wool increased from the late 14th century and there was a switch to producing wool for domestic textile production by the end of the 16th century. The change from a focus on arable crops to a focus on livestock production for wool and meat also stimulated one of the greatest changes to take place in the history of our farmed landscape. The open field system was abandoned in favour of privately owned enclosed parcels of land.

Enclosure of each parish was carried out by Act of Parliament over a two and a half century period. For example, Allexton was enclosed in 1555, and Caldecott not until 1799. The enclosure of Caldecott also affected Wardley and Stoke Dry, as it required the extinction of common rights to Beaumont Chase which were shared by the residents of these villages. The enclosure awards completely changed the landscape and farming systems. For example, the Enclosure Award for Belton in 1794 affected 919 acres of the 1024 acres of the parish, so almost 90% of the parish was redistributed by enclosure. In Belton, there was no dominant land owner and the largest allotment was of 150 acres while at the other end of the range, five allotments were of less than an acre. Eight people, including the vicar, had allotments of over 50 acres.

Table 3. Enclosure dates for Eye Brook parishes

Parish	Year of enclosure
Allexton	1555
Beaumont Chase	1799
Belton in Rutland	1794
Caldecott	1799
Great Easton	1810
East Norton	1633
Halstead	1579-1607
Loddington	1628-1630
Ridlington	1630s
Skeffington	c1600
Stoke Dry	1627
Stockerston	1570
Tilton on the Hill	1603-1607
Tugby	1784
Wardley	1635

Note that enclosure was not always of the whole parish in the periods given.

A smaller population reduced the demand for arable crops, and therefore arable land and consequently increased the value of pasture for livestock, encouraging the consolidation of parcels of land through the enclosure process. A move away from common fields enabled farmers to breed livestock more selectively and livestock breeds improved throughout this period. The second half of the 18th century also saw considerable improvements in the control of crop rotations, including the adoption of clover leys and turnips on former fallow land. For those who could afford it, enclosure therefore resulted in an improvement in the land and the farming systems adopted. Enclosure was an expensive process because of the legal fees that needed to be met, but also because it required the creation of ditches, the planting of hedges, and the erection of fences to protect those hedges. There was a substantial demand for fencing materials from nearby woodland, as well as for young hedge plants.

However, the prospects for those who could not afford to enclose land deteriorated. Many small farmers sold up, being unable to afford the cost of the legal process of enclosure, or that of creating hedges, fences and ditches, or being unable to make economic sense of their small areas. Tenants were forced out because of rising rent associated with land improvements. With an emphasis on enclosed livestock production there were fewer opportunities for employment and with the loss of labourers' land went the ability to produce their own food, and with that a loss of self-esteem. This was sometimes explicitly acknowledged when land was specifically set-aside for the poor at the time of enclosure. At Belton, the 'Poor's Land', known as 'Fair Ash Sale', comprised 34 acres and was designated as early as 1631 when neighbouring Leighfield Forest was enclosed for farming. Following enclosure of East Norton in 1633 twelve acres known as the 'Cow Pastures' were set aside for the poor.

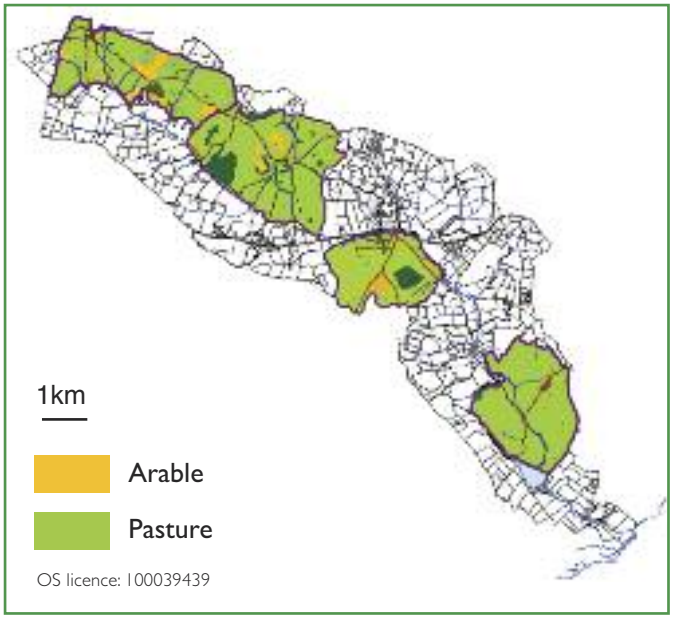
Between 1603 and 1607, 110 acres at Tilton were converted from tillage to pasture by Sir Everard Digby, and a further 160 acres by 16 various tenants, with the consequent loss of 25-27 people from the land. A further 20 to 40 people were displaced at neighbouring Halstead when 200 acres were converted from arable to pasture by three land owners.

Access to land was also important for those in non-farming professions. Multi-tasking was common-place and many people counted farming amongst their occupations. The 1616 will of Richard Freeston, a Belton baker provides evidence of his farming activities as it includes *"2 kyne viz. the browne cowe and the taggd cow, all the wool hides, the hovell where the kyne stand, the swyner, all the proffitts of my lande sown or to be sown, my aple woode, the woode at the gate, one redde heifer, a fillye and colte, a cheese presse*".

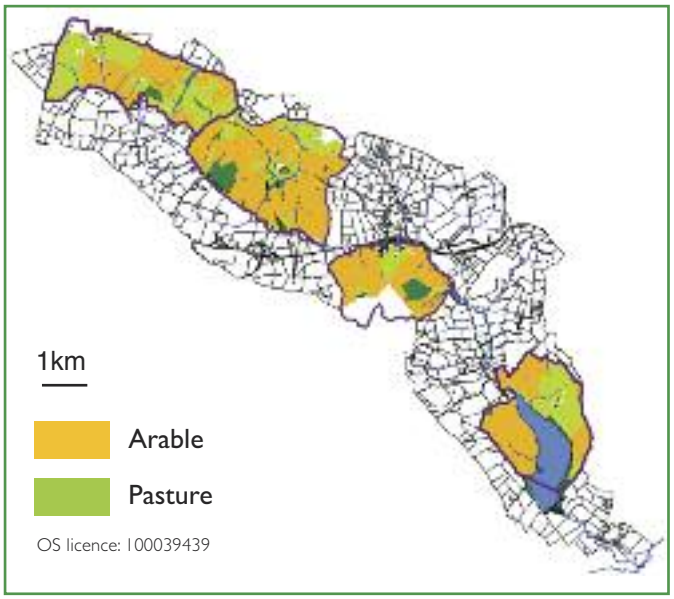
The mid 17th to mid 18th century was a period of depression for farming in this area with further loss of small farms and amalgamation of holdings into larger ones. The fortunes of farming over the next century or so fluctuated considerably between periods of growth, for example during the Napoleonic Wars and the First World War, and periods of depression such as the 1830s and '40s. During periods of growth, farmers responded by making further improvements to their land. Records for College Farm (between Loddington and Belton) show that five thousand drainage pipes were bought in 1893, a further thousand in 1897, and one thousand five hundred more in 1899. The 1881 population census for Belton lists a 'land drainer' as being resident in the village at that time, so the period appears to have been one in which the water-logged nature of the heavy clay soils was first being addressed.

'The path to Tilton' by John Fulleylove, 1876.

Glebe land owned by the church provided direct income to the church, while tithes represented a tax on agricultural production that had been levied since the 8th century. Tithes were divided into great tithes and small tithes. Great tithes comprised primarily corn, hay and wood and went to the church institution, whereas the small tithes comprised items such as wool and the annual increase in farm stock and were paid to the vicar. In the 1840s, these tithes were changed so that an annually revised payment was made to the church, based on the productivity of the land. The maps and records that were drawn up to accomplish this provide a valuable record of the landscape and farming in the mid-19th century (Map 1.2). It is clear from these that by the 19th century, there was very little arable land, marking a sharp contrast with land use during the medieval period (Map 1.1 on page 21). This low proportion of arable land is also in contrast with the situation today (Map 1.3).



Map 1.2.
The Eye Brook catchment showing the areas of arable cultivation and pasture for four parishes in the 19th century, based on tithe map data.



Map 1.3.
The Eye Brook catchment showing the areas of arable cultivation and pasture for four parishes in 2010, based on direct observation.

Wind and water power

Energy from wind and water continued to be harnessed throughout the Eye Brook catchment over many centuries. Water mills and windmills were important for converting agricultural crops into an appropriate form for either animal or human consumption. The Domesday Book recorded the number of mills in each township a thousand years ago. Water mills were present in Skeffington, Loddington, East Norton, Allexton, Stockerston, Holyoaks and Caldecott. Water mills at Skeffington and Loddington were valued at twelve and sixteen pence respectively, while those at East Norton, Allexton and Stockerston were valued at two shillings, and the mill at Holyoaks was valued at five shillings and four pence, reflecting their greater capacity associated with the better stream flow lower down the catchment. For certain tasks, water power would have been an important source of energy to supplement that derived from animals and the people themselves, and therefore a valued resource.

Detail from 1847 Tithe map of Loddington, showing Loddington Mill, its leat and pond.
Original held at the Record Office for Leicestershire, Leicester & Rutland

Belton has three mills recorded in 1650, of which one was a windmill and another may have been the water mill at Allexton. In May 1717, the Stamford Mercury records a 'fulling mill' (for processing wool) and associated equipment for sale at Allexton. The other water mill is thought to have been on a tributary west of the village where there are earthworks and remains of a duct made from hollow logs. There is also evidence of a mill pond which would have been essential on such a small stream. Such small mills were only used during winter when sufficient water was available.

The 19th century tithe maps reveal that Loddington and Allexton mills had long leats feeding water from the main stream into long thin ponds which provided a head of water for the water wheels. Loddington Mill was demolished a century ago, and its house eventually suffered the same fate, but Allexton Mill remains as a private house. The water mill at Caldecott was built in the late 1870s (with a large water wheel originally from Aylestone in Leicester) and continued in operation until 1910. A smaller stone and slate mill was demolished when the new mill was built.

The older mill was located 200 metres upstream where the sluice gates are today. Records from 1831 reveal that it had two pairs of stones and a bake house so that bread from the milled wheat could be sold on the premises. Caldecott also had a windmill, near the top of the hill, north of the village and close to the Uppingham road but no information is available on this mill. There is also evidence of a windmill at Holyoaks and at Wardley.

The water mill at Caldecott, drawn by JRH Prophet from an early 20th century photograph.

A windmill at Tilton, the highest point in the catchment, was located close to the Melton Road. As with other local mills, this was a 'post mill' in which the main wooden structure could be rotated on a central post to face the wind. This manual alignment of the mill with the wind was done using a tailpole at the rear of the mill. The main structure of the mill sat on a brick roundhouse which would have been used for storage. The four sails consisted of a wooden lattice covered by sailcloth or canvas which was furled when the mill was not in use. The mill is thought to have housed two pairs of mill stones, the resulting flour being bagged on the floor below. An extension to the mill appears to have been added at some stage to house a 'dresser' for removing bran in the production of white flour. The mill stopped operating in about 1910 and was dismantled in 1926.

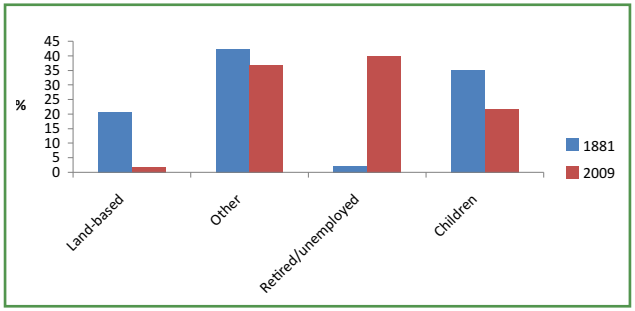
Still surviving at Halstead House Farm is the gearing for another 'wind engine' which was installed in the 1860s and which was used for rolling oats, chopping root crops and chaff, and grinding cereals for pigs, as well as flour production. The engine was also used for hoisting sacks and pumping water. The sails were destroyed in a gale in the 1890s but the main gearing continued to be used until the 1940s with other sources of power based on fossil fuels.

The windmill at Tilton.
Photo courtesy of Edward Davis

The 19th century

Population census data provide a valuable insight into the occupations of the time and how natural resources were being used locally. The 1881 census of Belton identified 361 residents in the parish, of whom 126 were children under 14, although five boys and two girls aged 12 and 13 were already employed as farm labourers and domestic servants. The miller is listed, as are butchers, bakers and a blacksmith. The majority of adult males were employed as farm labourers while the occupation of the majority of women was looking after their families or working as domestic servants. At the time the residents were clearly locally based at Belton and the surrounding villages, providing services to the community or trading in products that were largely locally sourced. There remained a strong link with the land, and the power for almost every domestic, agricultural and industrial activity still came from people themselves, supplemented by horses and some wind and water power. This contrasts strongly with the situation today when only 2% of residents are involved with farming, there is a smaller proportion of children, and a very much larger proportion of retired residents (Graph 1.1). Occupations today tend to be associated with travelling far beyond the village on a daily basis.

Graph 1.1: Employment in Belton in 1881 and 2009



One of the many 19th century agricultural workers in Belton was Henry Branston who was born in 1820, one of six children of whom two older sisters were subsequently to drown while playing in the Eye Brook. They were not the first or the last to do so. As an adult, Henry Branston's work consisted mainly of mowing, thatching and hedge cutting, with mowing bringing in a third of his income in 1855. In that year, he mowed a total of 55 acres, all presumably with a scythe, at four shillings per acre. He also listed sheep washing amongst his activities in his later years when sheep would be

1855 details of grass mowing for local farmers in Henry Branston's notebook.

washed in the Eye Brook next to 'The Wilson Arms' prior to the Leicester Wool Fair in early June. A clean washed fleece commanded a premium price. As well as working in Belton and adjacent parishes, Branston sometimes worked as far afield as Wing, Luffenham, Barrowden, Oakham and Uppingham.

Table 4. Occupations in Belton in 1881

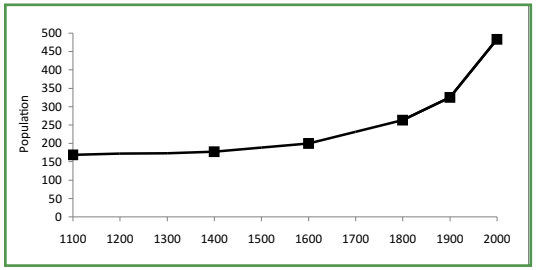
Agricultural and general labourers	47	Housekeepers	5
Farmers, graziers	13	Chimney sweep	1
Shepherds	4	Builders	3
Farm servants	6	Grocers, drapers, brewers	3
Woodman	1	Shop assistants	2
Land drainers	1	Inn keepers, ale merchants	2
Carrier, waggoner	2	Boot maker	1
Miller	1	Tailors, dressmakers, mantle makers	9
Blacksmith	1	Laundresses	2
Bakers	4	Nurse	1
Butchers	2	Plate layer's labourer	1
Coachmen, gardeners, grooms	4	School teachers	2
Domestic servants	19	Postmistress	1
Carpenters, wheel wrights	6	Clergy, minister	2
Income from property or interest	5	Retired, unemployed	5
Housewives	62	Receiving parish relief	3
Daughters with no employment	14	Children and scholars	126

19th century parish records sometimes refer to gamekeepers, providing evidence of formal shoots, and Allexton appears to have had a gamekeeper from at least the 1830s to the First World War. Such shoots are likely to have been on a small scale compared to those further east, but were clearly an established component of community culture. They would have depended on a combination of naturally occurring pheasants and partridges and additional birds reared under bantams for release into woods and fields.

Large estates became established during the 18th and 19th centuries as small farms sold up and were amalgamated into larger units. The estates and large houses were often held by families whose wealth was not made locally. For example, the Hotchkin family who occupied Allexton Hall in the mid 18th century made their fortune from their plantations in Jamaica. From 1902, Allexton Hall was the hunting lodge for George Pauling who was a railway company director.

Keythorpe Hall was built in 1843 for the Wilson family who came from Norfolk. The grounds immediately around the hall were laid out as parkland and plantations that provided the basis for fox hunting and for shooting. Farming at Keythorpe included the breeding of Leicester Longwool sheep for which prizes were won at agricultural shows.

Graph 1.2: Tilton & Halstead population (1100-2000)



Population census data, and estimates of population size for earlier centuries are available for Tilton and Halstead and reveal the enormous increase in population size in the 19th and 20th centuries (Graph 1.2). There is no evidence of the effects of plague in Tilton and the population seems to have been relatively stable for most of the millennium, with 50% of the increase occurring in the 20th century. This more recent increase reflects increases seen across the country and can be attributed to exploitation of resources from the Empire, increased industrialisation, and improvements in agricultural production. These developments were made possible by the discovery and increasingly widespread adoption of fossil fuels for transport, industry, and household use, as well as for farming.

Coal production in Nottinghamshire for domestic use across the region increased dramatically during the 19th century, replacing locally sourced wood. Transport of coal was a key driver for development of the railway system, which was itself fuelled

Belton hedge layer, Robert Smith, photographed in 1890. © Audrey Walker

by coal of course. The railway through the catchment, from Halstead (Tilton Station) to East Norton, was established in the 1870s as part of the national expansion of the rail network and served an important role for the transportation of goods such as grain, livestock and milk from local farms, as well as coal and ironstone. Horses were despatched to the Newmarket sales, cattle were imported from Ireland, and sheep came mainly from Cumberland, while milk went to Northampton, Rugby and London. The coal-fired railways therefore contributed to a change from localised agricultural communities with a diversity of products to the distribution of more specialised farming enterprises across the country. Coal also fuelled steam engines which were used to drive threshing machines, and sometimes also for ploughing.

Threshing at Great Easton (late 19th/early 20th century) © Phil Johnson

The railways also contributed to more industrial development which, in turn, influenced the nature of villages and village society. The development of an ironstone quarry at Halstead was only possible because of the trains that enabled the stone to be transported from Tilton Station to the Stanton ironworks at Ilkeston. There was limited use of passenger services, but the railways became popular with the fox hunts and many 'specials' were provided to carry horses, hounds and hunt servants and followers across southern England, including a large following from London.

Fox hunting was an important activity in the 18th and 19th centuries, motivating the establishment of fox coverts and other woods in the area, creating local employment for servants, inn keepers and grooms, as well as providing recreation for the wealthy. In 1838, Lord Suffield, Master of the Quorn Hunt, built stables for 42 horses, kennels for hounds, and nine cottages for hunt servants, just outside the Eye Brook catchment at Billesdon. The complex subsequently became the base for the Billesdon Hunt for 65 years and the farmland around was regarded as some of the finest hunting country available because of the almost continuous grassland and virtual absence of arable land.

The hunt also created a demand for fox head trophies and the father and son partnership of Thomas and Frank Potter operated as taxidermists in Billesdon in the late 19th and early 20th centuries. The Potters established a national reputation for their work and, as well as foxes and fox heads, worked on a wide range of other mammals, birds and fish. Many of these were mounted in glass-fronted cases with dried grasses and bracken collected locally. The Potters were also coopers, making buckets for the hunt horses, and dolly tubs and buckets for domestic use. They were also very proficient basket makers. Willow was harvested from an osier bed next to the Eye Brook in its upper reaches near Tilton and taken to Billesdon to be stripped and made into a wide range of baskets.

The south end of the railway tunnel at East Norton, 1958.
Photo courtesy of Haywood Bishop.

Along with well managed osier beds for basket making, woods across the area continued to be a valuable resource through the 19th and early 20th century. In the 19th century, the price of coppice wood and timber increased considerably, as did the price of bark for tanning. Oak was in short supply for ship building and cordwood was in great demand as pit props for the rapidly expanding coal mining industry. Of course, the woods were also an important wildlife habitat, just as they are today. Wardley Wood was the last in Rutland to support breeding red kites and late 19th century residents of neighbouring Beaumont Chase are reported to have had to protect their chickens from these birds.

There was considerable popular interest in wildlife in the late 19th and early 20th centuries and reports of birds and mammals at that time make interesting comparisons with those of today. As well as red kites, buzzards, hobbies and ravens had by then become extinct locally. The Reverend Hugh Parry of Tugby was an active egg collector in the 1880s and reported finding nests of corn bunting, nightingale and wood warbler near Tugby, woodcock in Stockerston Wood, and red-backed shrike close to the 'Ashlands' near Billesdon, although none of these species were common. Redstarts were reported to be nesting in small numbers in pollarded willow trees, as

were tree sparrows. Winter flocks of skylarks numbered several hundred and were observed to leave the area during severe weather. Otters were scarce, with one being killed on the Eye Brook between Loddington Reddish and Tugby Bushes in December 1888, and harvest mice were also noteworthy, including a nest found in corn at Billesdon in September of the same year. Brown trout were clearly established in the stream at that time, with an exceptionally large (5lb) fish being landed upstream from Allexton in 1886 for example.

The First World War marked a major change within rural communities such as that of the Eye Brook catchment. Many of the woods in the catchment were felled for timber and were subsequently replanted in the following decades. In some cases, this meant clearing the scrub that had established in the intervening years. As was the case with other large estates across the country, the Keythorpe Estate was broken up after the First World War and sold off, often to tenant farmers. These farmers down-sized from their rented farms in order to buy their own smaller farms, free of rent. For farmers throughout the catchment, and of course beyond, the decades following the First World War proved to be the lead up to a period of even greater change in the management and use of natural resources, following the Second World War. This is a period that some members of the Eye Brook community can still remember and is the subject of the next chapter.

Skating on Allexton lake in 1903.

Chapter 2. The Eye Brook community in transition – the 1930s and '40s

The 1930s and '40s is the earliest period for which we have first-hand experience of life in the Eye Brook catchment through the memories of people who grew up during this period. This chapter is drawn from interviews with fourteen of these people and provides a first-hand account of life at that time. Each quote is attributed to these contributors by their initials, and full names, and their locations are listed in Table 5. Some of the information relates to the 1950s and this is indicated after the contributor's initials.

The 1930s and '40s represent an incredibly important period. In part, this is because it coincides with the Second World War (1939-1945) and with all the major social changes that were associated with that. The war highlighted the country's dependence on imported food and other commodities and food security became a major issue, with a rapidly introduced national policy of agricultural improvement and intensification.

Table 5. Names and locations of interviewees

Initials in text	Name	Location
FD	Freda Davis	Robin a Tiptoe Farm, Tilton on the Hill
VF	Violet Fryer	Stockerston
KF	Ken Farnsworth	Manor Farm, Tilton on the Hill
NF	Norman Farnsworth	Manor Farm, Tilton on the Hill
JG	Jean Graythorpe	Great Easton
RG	Ray Green	Allexton
JI	Jim Inchley	Loddington Mill
VK	Vivienne Kennedy	Manor Farm, Tugby
RM	Ruth Munton	Belton in Rutland
EP	Edie Parker	Tilton on the Hill
JR	Joe Roberts	Stockerston
JW	John Wood	Robin a Tiptoe Farm, Tilton on the Hill
PW	Peter Wright	Wood Farm, Skeffington Wood
TW	Tony Wright	Beaumont Chase

The 1930s also saw the start of a period of increasing reliance on fossil fuels. Coal from the Nottingham coalfields had been used in the Eye Brook area for some time before, and fuelled the introduction of a railway through the catchment in the 1870s. The 1930s saw the addition and widespread adoption of oil and electricity (generated from coal). This had a big impact, both on local people's personal lives, and on the way land was managed.

Livestock farming

In the 1930s and '40s, sheep and cattle farms were considerably smaller than they are today and the breeds, especially for cattle, were generally less productive. The labour input was high, especially for hay making and milking, until labour-saving devices such as milking machines came along. Weed control was done using hand implements, and grassland was largely unimproved until fertilisers and the ryegrass hybrids that could benefit from them were introduced. The number of plant species present in grassland was higher than it is today, supporting more wildlife. In the early 1950s, grassland near Tugby Wood is known to have supported corncrakes, a species that subsequently became extinct in England.

Hay production was central to winter feeding and there was no silage and little imported feed. Milk and animals for slaughter were traded locally, and animals that required further fattening were sold through local markets to farmers from further afield. Wool was taken to Stamford to be graded and used for carpets or clothing.

Grass

It was all anthills, that hill. Oh, it was covered in them. You couldn't mow it with a machine. A hundred acre around Tiptoe, you couldn't take a machine on there. JW

There used to be some grey moles down there in the bottom field. We used to have a mole catcher come round. He used to go round when you were ploughing and get the worms and then he used to put the strychnine [on them]. *They did trap at one time. They were a different sort of traps to what they have today. They were a wooden barrel with a spring on it.* NF

Lambley Lodge, Leighfield, 1920s. The Hornsby family amongst hay cobs in 'Top Greens', looking southwest towards College Farm Lane. © Rosemary Richardson

You had to go round with a scythe and scythe down the thistles, and with this hassock hoe you would chop off the jack thistles. That grass with cowslips and buttercups and all that sort of thing - it wasn't nourishing for the sheep. KF

I used to fill my time, when Dad had gone out, with cutting thistles down in the summer, with a scythe. I used to go up the side of Tiptoe and look where there was a patch of biggish ones, because I used to go round in a circle and cut till you got to the middle and then set out again. It gradually got so that a number of farmers got a machine that they dragged behind a horse but Dad said that isn't as good as doing it by hand. He said you cut them lower. FD

I used a spade about that wide. You'd got something to walk with and you'd stick it under a thistle and you'd soon hook it out. I reckon it's better than spraying them. PW

As wages lifted, farmers would realise that they couldn't pay all this money. They'd got to keep all these animals but they'd got to feed them on less acres so you'd be using these hybrid grasses with fertiliser to keep all these animals on. KF

Walter Corby with his son John and hay rake in Hoggit Meadow, Littleworth Lane, Belton, 1933. © Vivienne Kennedy

Hay making

[Dad had] *a mowing machine behind the horse. He would be busy sharpening up the knives on the mower. The next thing was the hay rake. You didn't have to fall off, because if you did, and the horse went on, you got caught up in the rakes. The next thing was the swath turner, and that turned the hay. Then eventually, you got it back in rows again. Then you made it into what we called 'cocks' which were just little heaps, and then when* [the hay] *got drier, you drew these together and made it into cobs. Then you put a big chain round them, and harnessed the horse, and drew the cobs right to where the stack yard was. We children used to ride on top of the cobs.* RM

In that long meadow some nights when we were cobbing there'd be 14 folks in the field. NF

Me and father used to get the sweep thing on [the horse] *and we used to sweep* [the cobs] *down to the stack. He used to push one down with his horse, and then I used to bring another one.* TW

There was a pole. You used to set it up beside the stack. It had a wire on it, with a proper grab. Then when you brought a cob in you'd take your horse on and take it out, and then you'd swing it round onto the stack. NF

Bringing in the hay, Belton House, 1930/40s. © Audrey Walker

I used to put up a hay stack about 80 yards from where these badgers were and one night they set about my stack and I went round and these badgers were clawing the strings and taking the hay out all round the bottom of the stack, back to the sett. PW

You stacked the hay then for the winter and it got all solid. Then you had a cutting knife. It was a big thing. You used to sharpen it up, and it was hard work, and you'd cut pieces out of [the hay] *and fodder it to the beasts.* RM

Sheep

I think we had something like 170 ewes and you had a shepherd to look after them. Mostly farmers round here would have the mule, come down as breeding ewes in the autumn and they'd put a Suffolk tup on them and lambs were sold in the local market. Mr Button was more a fancy breeds man and they'd be Border Leicesters (white faced sheep), and he used a Border Leicester ram on them. They were alright if you sold them when they were quite young, but if you kept them longer they put on a lot of fat. KF

The Ringrose family and friends amongst hay cobs near Belton House, 1930/40s. © Audrey Walker

These store lambs would go up into Lincolnshire where they would fold them on roots. They used to grow turnips and that sort of thing. They used to make these willow hurdles and fold them in a certain area in the days before electric fences. There was a firm down in Billesdon that made baskets and that sort of thing but they also made these hurdles and sold them into Lincolnshire. That's where the osier beds came into being, down by the brook. KF

There was a sheep wash down there in the field. It was to wash the sheep to take the grease out. There used to be a tin across the brook that used to feed into it. NF

Cattle

We had Lincoln Red cattle. Mrs Parker at Rodhill Farm had Ruby Reds, Devon cattle. Mr Button had North Devons. He used to milk these cows and their milk was very rich with cream. [They] *wouldn't have an awful lot, about 6 or 7 litres I suppose, and Mrs Button would make the cream.* KF

The Wright family with hay cobs at Oxey Farm in the 1930s. © Vivienne Kennedy

They was all Lincoln Reds then. They was a good type, but of course, like everything else, they went out of fashion. We had 35. One bull, four or five cows and others were sucklers with calves. When they come big enough we took them off and put some more on. That's how they used to do it in them days. TW

You'd get the odd Shorthorn creeping in because people tended to move from the Lincoln Reds to something that was giving a drop more milk. You used to have to take your milk down to the station by horse and trap and they'd be all gathered down there at Lowesby station. When the milk train came you unloaded your churns into these railway wagons and bring your empties back. The milk went to London. KF

Round here we had the 'red' – they called them 'red' – brown shorthorn milking cows. They got so they were having one or two Friesians in with these shorthorn cows. The shorthorn cows gave quite rich milk. JG

The Corby family of Littleworth Lane, Belton, 1933, with a cart load of hay. © Vivienne Kennedy

Our Friesians originated from the Dutch. Hugh went out to Friesland in 1949. Then he bought cows from well-known breeders in this country. They used to come by train to East Norton, and we had to go to the station to get them. VK

[Cattle] *feed was rolled barley and grass, and a bit of hay. Then the feed changed altogether, with a lot more bought in stuff and that sort of thing.* TW

The fattening cattle always had linseed cake. We'd roll a certain amount of oats and mix the dairy cake with it. Sometimes when we'd harvested oats and beans it was always a job to get them dry and we'd feed the sheaves to them, taken out of the stack. KF

We would get up and have breakfast, and I would go out with my bucket and stool and perhaps milk two of the quietest cows and then go in and get changed and go to school. We cycled off down to Tilton station and come back and the same two cows were waiting to be milked when you got home. KF

Mary and Albert Halls and other workers, taking a break at Wardley in the 1920s. © Audrey Walker

There'd maybe be four or five [people] *milking. There'd be a 10 and a 12 and a 14 in the shed, hand milked before we had a milking machine. That was revolutionary. You only wanted one person to milk. All of it had to be carried over the yard to be put over the cooler.* NF

Tommy Orton ran the first milk round here [in Tilton]. *He had about 4 cows* [at] *Digby farm. His buildings were right down in the bottom corner of the field by the brook, probably because he could cool his milk down there. He hung the bucket on his handle bars and he came round the village with his bucket and ladle and the ladies came out from their houses and ladled their two pints of milk in. Tommy's milk didn't keep all that well because it wasn't very hygienic and he got round to delivering twice per day in the summer.* KF

There were no cars about. We walked all the beasts from Wigston Magna which is just outside of Leicester. All the way and we never seen a car. A push bike was the only

Albert and Mary Halls and other workers on the hay stack at Wardley in the 1920s. © Audrey Walker

way we could get about in them days. TW

I used to go and get the cows in for milking, down the main road (A47). The few people that were in cars would stop and have a chat with you. VK (1950s)

Markets

Sheep and cattle were usually traded locally, either in the town markets of Leicester and Melton Mowbray, or in the market that was occasionally held at Tilton which was also an important social event. In either case, farmers would walk their animals to market, although the trains were often then used to transport them to abattoirs or to other farms for further fattening.

Tilton market

Tilton sales were in the spring and the autumn mainly, and then they'd have one, say, every fortnight. Say, three sales in the spring and three in the autumn. I often walked up with the sheep. Parkers had a man who would go round to the farms and he'd buy them and then he'd send his drovers to drove them. FD

Every autumn they had a two day sale. One was sheep and one was cattle. Leicester auctioneers, Shakespeares used to do it. Folks used to drive their stock there on the road, sell them and drive them away again. PW

Mostly it was more cattle in the autumn, coming in off the grass. There was also a big sheep sale in the autumn when you hadn't got the fodder for them and it was better to sell them in the market, straight out of the fields. I can remember we always used the first pen as you went in on the left hand side, or Alan Holms had the pen, full of Lincoln Red cattle. When it was a big market, they had pens over on this [north] *side of the road. There would be the sheep pens behind where the shop is now. The cattle were ready for slaughter so it would have been dealers and butchers that used to buy them and they'd be moved on straight to the abattoir.* KF

Tilton livestock market (on the right) in 1934. The shed on the left of the road by the tree is the wheelwright's workshop. Photo courtesy of Edward Davis

We used to go to the grammar school in Harborough and we would come back on the train, get on our bicycles and cycle like hell up home, change and then get back on the bicycle and go up there and be ready to help Mr Clark (from Newark) who had bought these sheep. He would have the wagons all ready at Tilton station and we used to drive them down there and then they'd put them in the wagons and I guess they used to go off to Lincolnshire from there. We all had a shilling for doing that. KF

That was a big day for Tilton pub. And autumn, if it was mucky, which it often was, there was no concrete or anything down there as such. They paddled around in their boots and of course, the old codgers, they didn't go and scrape their boots off. They went straight into the pub and old man Mitchell, the alleyway where you went in the front door, he used to bed it down with straw to take the muck off their boots, and then clean the straw out. There was my old grandad, old Jim Ward, and old Oxey Wright. I can remember it now; used to frit us to death us kids. They were going to knock hell out of each other. They'd got the sticks up in the air and they'd only fell out over the price of a bundle of binders or something. Twenty minutes later they're in the pub with their arms round each other. That's the sort of characters you got in them days. PW

This shed was usually associated with people who came by horse and trap. They tied their horses there. People who came by trap were mostly from the outlying farms. A few came on horseback. They would get pretty well oiled during the day time and they would have to be lifted onto the horse and somebody would give the horse a pat on the back side and you'd hear them coming down the street singing and shouting. KF

Tilton sale poster for 1934.
Courtesy of Ken Farnsworth.

We used to take ours to Leicester and we used to walk them down to Thurnby, and then the next morning we'd get up about five and walk them from Thurnby to Leicester Cattle Market. The auctioneers always had fields around the towns you see, so you could move your cattle there. It wasn't a hard job because there were no traffic. You would walk at about four mile an hour. It wasn't long getting there. JW

The big markets

For Melton market we used to take sheep and put them in a field at the top of the hill. Charlie used to take quite a few sheep in and drop them in this paddock and he'd leave a note on the gate and their drovers would come up in the morning and walk them into Melton. FD

You used to drive cattle into Melton and Leicester and they used to be all down the town, in bunches, right down the street. They kept moving them up as they sold them. Then they used to load them on the railway. JW

The Wood family stacking hay at Robin a Tiptoe in the 1960s.
© John and Julie Wood

Arable farming

Most of the land was pasture in the 1930s, with a few crops grown to provide feed for livestock. During the war, the County War Agricultural Committee ('War Ag.') intervened to ensure pasture was ploughed up for crop production, either by the farmers themselves, of if those farmers were not equipped or inclined to do it, by others appointed by the War Ag. Soil fertility depended on the spreading of manure produced on the farm until the widespread use of artificial fertilisers (derived from fossil fuels) during this period. Weed control was by mechanical means (repeated hoeing) until the arrival of the first herbicides. Tractors were rapidly adopted during and immediately after the Second World War, although many Belton farmers didn't have tractors until 1948. The arrival of tractors marked the end of a long dependence on horses that were fuelled by locally produced grass and oats. An enormous amount of labour was required, especially at harvest (for cutting and stacking), and later in the year, for threshing.

One time you could look across those fields, and it was not growed up like it is now. You could see for miles then. My mum could see me coming. They used to keep the hedges well cut down. JR

Ploughing at Rectory Farm, Great Easton in the 1940s. © Phil Johnson

I couldn't see a field that was ploughed except Wrights at Oxey. They had a patch down the side of the road which they used to grow kale in for the cows. FD

Coldborough was the first field Holmes ploughed up and that was ploughed with steam engines. [I] *used to stand and watch them from the top of the lane there.* [They] *ploughed it crossways. You couldn't buy tractors in those days. Very, very few about. The War Ag. got most of them and you had to go to them to get your work done.* PW

When they ploughed a field [and] *they got to a corner like that, they used to send the chaps out with spades and dig that bit out. They'd dig it out and plant it right into the corner, and when it came to harvest time they'd go in with the scythe and scythe it.* PW

In the early days they emptied the night soil from Uppingham on those top fields. Billy Shelton said "They are the two best fields going. They'll grow anything". Of course, they would! TW

There was always a bit of muck spreading to do. When we cleaned the cows out we used to put it in a heap, outside the door for a start and then we'd come up with the horse and cart and fill the cart and tip it down the field. Then you'd got to spread it. It didn't seem hard work 'cos I was good and strong. FD

We used to grow ten or twelve acres of roots, swedes, cabbage for the cows. You had a job to pick them up, they were that big. We used to muck it very heavy. We used to grow kale but we grew more cabbage because it was easier to cart out to the farms. We grew a lot of oats. Potatoes. We were ordered what to do in war time you see. You had Ministry men come round and say we want this in this field and this in this field. JW

There was only one arable field at that time. It was 28 acres. It was actually four fields in a rotation. There'd be oats and beans that would be ground up for the stock and that sort of thing, wheat for the straw, oats for the cattle. Cabbages were for the winter feed. Then there were mangels. NF

Weed control

There were no controlling weeds in them days. [Harvest was] *all done with a binder and you took it up in sheaves about that thick and your arms were bloody red raw where the thistles had bit into you. Some places had more than others. There was hoeing in patches. You had a five inch hoe and the* [crop] *rows would be seven inch. Sometimes you used to have the thistles and sometimes you used to have the corn!* TW

You had the horse hoe to keep the weeds down. You wouldn't do it many times. There wasn't the weeds about as there is now. We used to binder it and bring the stacks down here [to the farm]. In those days, when you'd finished threshing at the end of the day my father used to get all the [weed] *seed and take it out and burn it.* NF

[For fallow,] *we used to rip* [the ground] *up mostly May time, sometimes earlier than that. Then we used to do nothing else but plough it, harrow it, whichever it was. Then we used to drill that with wheat. That used to go in early. Then we used to always have a good crop of wheat. In those days there was no artificial fertiliser.* RG

You had to steer this horse from treading on the crop. If the steerage went out of line it went into the row and you were hoeing off the mangles! You had to steer it straight as a die. Turning it on the headland, it jumped on your foot! The weeds got too bad on the third year [and] *you cultivated it as a fallow. You used to go out there and scuffle it. At the end of the season when it was ready for sowing it would be a nice fine loam.* KF

The first herbicides were quite good. Boots used to do them – MCPA and 2,4-D. We used to do a lot of spraying with that [DNOC] *stuff. Everything went yellow; all on your hands and everywhere, but that was the only one that did herrick (cleavers). We used to get plastered. You were supposed to wear gloves.* NF

Wheat harvest at Rectory Farm in the 1940s with Prisoners of War working with members of the Johnson family. © Phil Johnson

Harvest

My dad used to mow all around the field with a scythe. He wouldn't drive the tractor through the corn. Then you used to go in with the binder and there used to be one sitting on the tractor and one sitting on the binder. We used to do about ten or twelve acres in an afternoon you know. Cut it and stook it all up. Stooking wasn't a very nice job. You'd pick two sheaves up and go and stand them up and then go and pick two more because they were all over the place. We'd have six or seven [people working]. *We had to go along and pitch them onto the trailer, and then take them and make a stack, and then you used to thatch it.* JW

We had a fortnight off at hay time, then back to school, and then another fortnight off at harvest time carting the horse and cart in them days - stacking the corn up into ricks like, into corn stacks. PW

There were a lot of people who were good stackers and they used to thatch as well you see. You used to have a bundler behind the thrashing machine and he'd chuck these big bundles of straw out and then you'd chuck it in a heap and then you had to draw the straw together to get the thatch out of it. Then you had some pegs, hazel pegs. NF

John Wood on a Rutland built Allis-Chalmers Gleaner combine harvester at Robin a Tiptoe Farm in the 1960s. © John and Julie Wood

[Threshing] *were a dusty job. They always got to us in about June time when all the dust was in it. The threshing drum was down* [in] *Norfolk. They'd do the farms down there first, then come up here to Stopping Farm and Thurmaston. Then they used to do Houghton, Skeffington, and then they used to come to us.* JI

When you were threshing of course, there were all the rats coming out of the stack. You'd put wire all the way round the stack and get every dog in the neighbourhood. When you threshed, you always used to get some help come. Chaps used to come out of Tilton and have a day's threshing. That was a hard job. You'd have to stand on your stack, throw the sheaves over, and the chap on the top would cut it with a knife and drop it in. Then it used to rattle through and all the dust would come out at one end. Well, all sorts would come out at one end – a great mountain of [chaff]. JW

When we got onto thrashing and that sort of thing we'd go and help one another. We used to go down a lot to Loddington. We had perhaps 10 or 12 stacks in the [Big] *Park Field. We used to go stooking round the park and it'd take you all morning to go round the outside. There'd be eight or so of us.* NF

I'm sure in the past there was a lot more pride in the job. Labour was plentiful and cheaper I suppose. Where there were four or five people working on one farm, there's perhaps two now. Everything's got to be done quick. Now they want all the combining finished before the end of August and the combine packed away. Well, years ago, they'd only just be fetching it out [then]. *They'd be combining right up into October.* PW

When combines first came out, you sat there – no cabs then – and the dust would all come for you. JI

Tractors

Once we got them tractors, we used the tractors for everything. The horses went. JW

Tractors, they made it really, didn't they? There was a lot more work done on the farm with the tractors than with the old horses. TW

We built that tin shed to store the tractor in and the tractor driver had to carry his fuel from the farm on his shoulders. He had a little drop of petrol in one [can] *and paraffin in the other two cans. You had petrol to start it and if you switched it over too quick you had a lot of black smoke.* KF

Tractor power with John Wood at the wheel in the 1960s.
© John & Julie Wood

Food

A lot of food was produced at home, and most of the rest was produced locally. The household pig was often central to meat consumption and made use of waste from the kitchen. Most villages had a butcher, or at least someone who would make the annual visit to kill and butcher the household pig, and the nearest abattoir for cattle and sheep was in Uppingham. Milk from dairy or household cows was used to make butter, especially if there was a surplus. The seasonality of food production determined what was eaten when, although some was stored for use later in the year. Most people grew their own fruit (which was often bottled for the winter) and vegetables, and many kept poultry. Most villages had their own bakery.

Pigs

We used to have pigs. We had two a year at one time. Then we got down to one. Bit of good bacon and pork pies. Old Alfred Houghton would do the killing. He'd come and kill it one day, come and cut it up the next day for seven shillings and sixpence. [It was] *salted for three weeks. A week and a half you put it in the salt, then you'd turn it over and salt the other side. Then you'd fetch it out and clean it all down and hang it up for bacon. It were good bacon.* PW

Pigs had swill then. As kids we couldn't put any fish bones [in]. *You had to mind what you put in the swill tub. You weren't allowed to put rhubarb in. There was a big copper that Dad used to boil the potatoes for the pigs in.* VF

There was a chap at Belton and he used to come and kill it for us. Marlow, his name was. Dad used to cut it up. You have the leg of the carcass, and George used to shave it so that it was nicely rounded off and he'd have little bits of meat off each corner. The next day, we used to cut the meat up ready and season it. He used to get the saucepan, put the lard in, and so much water and salt, and then tip it into his flour, and make all the pastry. Mrs Williams and I used to get 2lb jam jars. You put the pastry on the top and worked it down the sides, getting it nice and round. Then you'd put it to set and tip it over and put the meat in it, and that's how we made a pork pie. You'd take a pork pie to three or four neighbours, and they would bring you one back. FD

Bread

The baker's cart outside cottages at Littleworth, Belton. © June Lawton

There was a man at Tilton – 'Gutteridges' it was. They used to be the baker and they also used to provide you with some 'sharps'. It was like the bran, but a bit better than bran. Then it gradually got so you could buy cow cake and he would deliver it in a little flat lorry. There was one chap who would get up in the morning and bake the bread. Then he would come round in the afternoon in a horse and trap, not a float, a trap and he would just go round the farms, delivering bread. His name was Bird. FD

Baker Bird used to deliver on horse and cart. He made it in the morning and delivered it after dinner and it was still red hot. If we were short of bread we used to have to go to the bread house. He used to hate it if you left the door open [when] *he was pulling the bread out. He used to tap the bottom of the tin and the bread used to fall out. We were so hungry when we got there... but we didn't dare ask. His bread was lovely.* EP

Dairy

We used to milk a house cow. And the chap that did the milking, he took the milk as well. There was just enough to keep the two of us going. TW

It used to be hard work. You used to have to turn the churn round and round and round, and sometimes it was just as if it wouldn't come because you had to have it at such a temperature. The colder it was, the better the butter came. RM

Poultry

Lillian Wood with cade lambs and hens at Robin a Tiptoe Farm in the 1950s. © John and Julie Wood

Mother had a lot of poultry and there was one person who used to come every week with a crate and go off with a dozen cockerels. She had incubators in the house and I remember helping mother turn the eggs. It was paraffin. You'd turn the eggs and you'd wet your fingers as you were doing it. There was a thing on the side that you filled with water. In the yard she'd have a chicken hut. There was a brooder. There was a copper thing with a wick and you had to trim the wick every day and the heat came out of tunnels in the top. That was mother's form of diversification. My mother kept us five children on what she made out of the chickens. KF

Mother used to pickle eggs. She used to use something called water glass. She had a big what I call a 'pippin'. It used to be full of eggs. When you came to get them out, this water glass had gone sort of white and scrunchy. The eggs went for cakes and puddings. RM

We had plenty of eggs 'cos we had hens. My dad used to grumble because they used to get in his garden. You could get a thing of corn off the baker, but my dad used to get it from when they thrashed [on] *the farm. We had to eat a hen occasionally which we hadn't want to. We didn't like that at all.* EP

Fruit and vegetables

We used to have a little bit of a field where we used to grow potatoes. Each of the workers had a strip of this land. That was mainly green vegetables and potatoes. We'd eat a lot of potatoes. You used to have to keep filled up in those days. We were never short of vegetables. EP

Bottling plums and other fruit was essential to prolong their availability into the winter.

When we used to come out from school we used to sit round the table with a lamp on it, an oil lamp, and Mum would have a great big iron pot and she'd have bones from the butchers – round bones with marrow. [She] *used to buy a shin bone and she'd stew this shin bone up on the side of the fire for ages and then she'd break the bone and strain it all through, and the next morning the pancheon was solid with jelly with a bit fat on the top. That jelly she used with the vegetables off the garden for our vegetable soup. Dad used to grow leeks, parsnips, peas, broad beans, kidney beans, potatoes, cauliflowers...* VF

Mum used to always get some plums from somewhere. We had got a tree or two up the orchard and we'd got six damson trees and they always got something and there were some good apple trees as well.

Then as now, blackberries were a popular wild fruit.

One was enormous and I used to climb up it and pick them. Mum made jam. She always was making jam. Rhubarb. That was the first thing you could make any jam of. The shelf in the [pantry] *was full of bottled fruit. She bottled plums and damsons. You didn't bother with the apples. They used to keep ever so well down in the cellar. They used to keep lovely, until after Christmas.* FD

She bottled gooseberries, strawberries, raspberries and that sort of thing. Oh yes, she did a lot of bottling. That is what we used to have pies made of in winter. RM

Wild foods

Rabbits were extremely numerous until myxomatosis arrived in 1953 and put a lot of people off eating them. They were a major crop pest, but also a valuable source of meat, income and recreation. Other food that was gathered from the fields included blackberries, wild plums, watercress and mushrooms.

Watercress was harvested from local streams.

Rabbits

On Sunday morning Charlie would be out with my father and go rabbiting with a ferret. Put a ferret down the rabbit hole, put the nets all round and catch so many and they used to take them to Melton market then on Tuesday. They used to come home with 30 or 40. Just up over the first fence there was this big warren, and one day my mother said to me "Freda, I've got nothing for our dinner except potatoes". So I got Dad's gun and went and shot one. I was about 15 or 16. FD

My grandad used to go and get rabbits. My dad had a field up Stockerston Road. He used to go shepherding you see, on his bicycle every morning and if it was Saturday or Sunday when I wasn't at school, I used to go running up the road to meet him. He didn't shoot rabbits but he'd got a stick with a knob on the end, and rabbits have what they call 'seats'. They're tufts of grass, and if you walk about in the field you'd see these tufts of grass where the rabbits would hide. Dad used to creep up very silently and hit them on the back of the neck with this stick. If we were there as little kiddies he'd say "Stay there and don't make a sound". He'd get six or seven of these rabbits. JG

Rabbit skins used to be threepence a piece and someone from Lyddington used to come round. They used to come round collecting mole skins. You'd get twopence or threepence for a mole skin. That land next to Dockey [Farm] *was alive with rabbits. We lived on rabbits, we did, honestly.* JR

We used to go up Tiptoe on a Sunday, 10 o'clock in the morning till 4 o'clock, and we put the ferrets in them warrens and stand back. You'd get 80 a day. You could go week after week and they'd still be there. A chap would come out from Leicester for them at about three shillings and sixpence a piece. A good days sport, a bit of pocket money and dinner as well. Every Sunday we used to go, until the first time Myxomatosis come. PW

Plants, fruit and mushrooms

Dad used to go down there and pick watercress and he said we weren't ever to pick any watercress because he said there's some of it that is poisonous. There's something that looks a lot like watercress but isn't. He would only go and pick it himself. FD

There used to be some wild black plums growing up that hedge in the field above Bringhurst School. We used to pick those. They were sweet. They had got black skins and green flesh but they were sweet. We used to eat those when we were playing around. JG

My dad used to go blackberrying and of course he would go mushrooming if he knew where they were. VF

Mushrooms would grow down in the bottom of the valley where it was damp. So walking down that hill from Stoke Dry, back up the hill to Great Easton, they'd walk down to where the little hump-backed bridge was and they'd find some on the way. I suppose they used to keep a lot of horses [there], *and horse manure makes mushrooms. We had a small mushroom factory in* [Great Easton]. *The big old house is still there, and in a room at the end they had these big vats, barrels or whatever they were. These women used to go for walks, so various people used to pick up bags of these mushrooms. Probably some of them were very old and black and maggoty, and they used to take them to be tipped in these vats. They'd gradually keep stirring them every day until this water would turn thick and black and syrupy and any maggots that were in the mushrooms, or any bits of grass or anything like that, would float to the top. So they continually used to keep skimming it. The syrup they used to collect to make mushroom ketchup.* JG

Shooting

Shooting of pheasants and other game doesn't seem to have been a major activity, even immediately before the war, but organised shoots were held at Allexton and Keythorpe, with pheasants being reared under bantams and released in the early autumn. Hunting, on the other hand, was an activity that had far reaching influences on the landscape, the planting and management of 'coverts', and on rural life.

I used to help with the shoot. When Mr Hoare was alive we used to have three or four shoots a year. That's all we used to have. We used to go in with Park Farm, and they used to join in with Allexton. Park Farm always used to be a Boxing Day shoot. If we got 20 brace we had had a good day. We used to rear a few the old fashioned way with the banties and chickens one way or another, and then at Allexton, on our home ground, we used to turn out about 150 there most years. RG (1950s)

Mum and Dad used to pluck no end of poultry and pheasants and things. None of the family took the plucking on, I can tell you. My two brothers wouldn't and I didn't – only for the odd one that we wanted. Well it wasn't worth it. When I think of my mum sat with a big bath, plucking these things... VF

When my dad moved to Tiptoe, [the hunt] *came to him and said "if you shoot a fox, you'll be out". You were frightened to death to shoot a fox. There were a lot of money in the hunt in them days. They were very wealthy people.* JW

Woodland

Woods were important for hunting and shooting, and were valued by children as a play ground. Woods were also a source of timber. Oak was cut for fence posts, and riven rails were made from ash. Hazel was cut for thatching pegs and stakes and binders for hedge laying. Other sticks were used to fuel stoves and for pea sticks and bean poles, and logs were used for open fires. Even the main mode of transport relied on timber from the woods, with planks for making and mending carts and timber for wheel-righting coming from local woodland.

We used to keep the rides clear, cutting them back so that you could drive through. We used to do that for the hunt and for the sake of the woods as you might say, to keep them tidy. Allexton Wood used to belong to the Fernie Hunt but then the Forestry Commission felled it and they took it over. RG (1950s)

Timber was out of Park Wood and used for the farm, fencing, gates and things. When we was kids we used to go and watch them sawing. He had two rails where this trolley thing went along. Then there was a big engine with big belts. We used to have to stand a long way away. We could see what he was doing though. VF

Father said your job will be to cut the poles down in Merrible and Bolt [Woods] *and cart them to Uppingham, a load each Saturday, and I used to run behind the old drey, most Saturdays. Me and my sister used to stop at* [Beaumont Chase] *to drink out of that trough.* JR

Harry Walker used to work in Skeffington Wood. Even the brash, he'd use to make bundles of faggots. He had a little old four legged thing and he laid these faggots on it with a bit of wire. Then he'd pull this lever down over the top to fasten the wire up, to get it tight. They went for pea sticks or for burning. They used to use them in bread ovens at one time. He never wasted a thing. He made stakes and binders, riven rails – everything went for a use. PW

He had some tree hoes. It was just like a push hoe but it was ever so sharp, with a hell of a long handle and he used to use these to go up the side of the oak trees, taking all the 'whiskers' off, and they'd look beautiful when he'd done them. PW

Cutting fence posts at Rectory Farm. Note the partially used hay stack in the background.

He'd go down in the morning and he'd be whistling all day long, always a sack bag, summer or winter, tied round his front. He would never use a saw - always an axe or bill hook. Everything he took out of that wood, he took out on an old horse and cart. He kept his horse on the bottom field of Holmes'. It was just a flat cart with four wheels and four corner posts. He used to fetch his old horse in every now and again and load

it up and take it out to the road for others to pick up. He made no mess at all in that wood. He could move around there and take everything out - brilliant really. PW

There was a tin shed and Jack Pepper kept his saw mill in there and an engine to drive it. They used to buy trees and saw them into planks. They were wheel wrights and would repair your shafts in your cart or [put] *new bottoms in your wagon. He'd go round and buy an oak here and there, locally. Then he'd store it there to dry out.* KF

I've heard old Jack Holmes say when him and old Walter Wright were young they used to get a bit competitive between them, you know, to see who could make a gate and hang it, all in one day. Take some doing wouldn't it? PW

We used to nip up to the woods at Easter time, and that was a treat really. Dad used to say "Come on, we'll have a nip up to the wood and you go getting bluebells and primroses". It was a lovely little time out. VF

Water

Household water was from wells and pumps which, for a lucky few, were located next to the house, but for most were a short walk away. Water had to be collected each day, or if baths were required or washing was to be done, several times during the day. In some cases, ingenious hydraulic rams used the power of the water flow from a stream or spring to pump the water up to the houses or to livestock drinking troughs. Rainwater was also collected from roofs and this 'soft' water was the best for washing clothes.

Pumps and wells

We had a pump... spring water... in the farmyard across a cobbled yard. We had to carry two buckets of water [each day]. *My dad used to, and then we did when we got bigger – across to the house and empty them in pancheons. They'd hold about a bucket and a half each and they stood under the shelf in the dairy so we got plenty of water all day if you fetched it in the morning. Two or three buckets a day. Only boiling kettles, you didn't use a terrific lot of water. It was a lovely spring... beautiful water to drink. We used to hold our heads under the pump and pump water into our mouths. It was lovely.* JG

My grandparents would go up to that spring once a day and bring back two buckets of water. JI

At the Bridge Foot, when they run short of water they used to have to fetch drinking water from along the Stockerston road and also they had a pump in the village in Allexton

where people used to fetch drinking water. But for washing, they used to catch rainwater. RG

[For the dairy cows,] *we had a big concrete trough with a pump and it was good exercise! We'd all take it in turns till we were out of breath. We pumped up gallons of water because the cows were standing around this big eight foot trough sucking the water up while we were pumping it in. We didn't mind this at all. It was hard work I suppose but we liked it.* JG

Hydraulic rams

The spring water ran down from there, down to the ram, and the brook water worked the ram and pumped the spring water home, all the way to Tilton. At the highest point on the farm there was a [water] *tower, and from there it fed those three cottages and all the farm buildings. There was a tell tale thing up on this tower and people had to keep an eye on it because if it went up, you knew that the ram had stopped. It was usually at the time of the tadpoles, and frogs would get in at the top end and get stuck in the valve and the whole thing stopped. We had to go down, unscrew the valve, get the frog out and put it all together again. They laid that in 1936 when the iron stone workers were on strike. That* [ram] *kept going to the 1950s.* KF

In the 1950s the water [for Wardley] *was supplied by a ram, down the fields. In the summer time the water* [supply] *used to get very low. It was pumped up to a big cast reservoir that stood up at the back of the houses. As time changed there were families in the village with washing machines and dish washers, and of course people used to run out of water at about 4 o'clock in the afternoon.* RG (1950s)

Washing clothes

We used to get the water in for washing on a Monday from the soft water tank in the scullery place. It was water off the slates. NF

We hadn't always got enough in the water butts. You couldn't always have all soft water [for washing]. EP

We used to have to carry the water for these cottages out of the well up to a wash house at the top, with a copper which was shared by two other neighbours. No taps anywhere. You imagine carting the water from there, right up to that old shed to fill your copper up and then you'd do your washing in the old tub, your dolly tub. Then you had to boil it; you had to fill the copper up again for water to boil it. Then of course you'd got all your rinsing water, so you can tell how many times you had to carry two buckets of

water. I've done that a few times. Washing was when you wanted to do it, and how the weather was. I mean if it was pouring with rain... VF

There was about six of us and we were all strewed across the road with these buckets for fetching water. I think it had been a time when there'd been no rain in the water butts. And we were stretched out across the road and a motor came down the hill. Well, it takes you a little while from being stretched out across the road to let a motor car by, and the man stopped his car and he said, "Why all the water?", quite sarcastically, and "You saw us coming". And my mother said, "It's Friday night, it's bath night". He said, "Friday night, bath night indeed. Every night should be bath night". She said, "Not if you live in the sort of house we do, with the water systems we've got". EP

Sewage

The Sewage Treatment Works at Belton was built in 1938, and another was built at Tilton in 1950. Both sites were managed by the county councils until the water companies were established in 1974. Both sewage treatment works are based on conventional biological filters, a design that has been operational since Victorian times. Solids are separated out by a bar screen which also diverts excess flow during storms to a separate storm tank. Water passes to a primary settlement tank and then to the biological filters where it trickles through a granite filter medium covered in micro-organisms that purify the water. Finally, water passes to a humus settlement tank where sludge settles out. For houses not on a mains sewer, septic tanks were gradually adopted from about the same time so that flush toilets became much more common throughout the catchment. This improved hygiene but inevitably increased the flow of waste water from houses to the stream. Prior to these innovations, toilets were rather more rudimentary.

We had the toilet outside in the shed. You had to come out of the door, around the path, in the middle of the night. It was a pan [and] *you had to dig a hole and bury it every week. We put it in the field.* FD

There were lots of cottages with pans. There was a cart that came round once a week and they emptied these pans into it. They used to come around about lunch time and the smell was violent. They used to call it the 'Violet Cart'. Some of those cottages used to have to bring the pans through the house! KF

The Stream

The stream and its tributaries were used for washing sheep, and as a source of water for steam engines as they travelled from one farm to another with the thresher. A sheep dip at College Farm, near Belton, was used by farmers from Allexton, Launde, and Wardley as well as those from Belton. The stream was also a focal point for children to play in and around. For some children and adults alike, it was also used for fishing. Eels, now apparently absent from the stream, were present in sufficient numbers to attract anglers, although brown trout were the main species of interest and the stream was managed for them. Some trout were released into the stream to supplement existing stocks from the 1950s.

Footbridge over the Eye Brook at the site of what is now Eyebrook Reservoir dam.
Photo courtesy of Chris Race.

We used to play in the brook and in the fields. We used to get four poles and Dad would run them in the ground for us and we used to get four or six corn sacks that he used to give us and we used to sew them together to make a tent. We would take sandwiches and a flask out and have picnics in the fields. I only fell in the brook once. JG

We fished [the stream] *right the way down from Dockey's, right the way down to Caldecott. Not many fished it. There were not much there. Eels - there was little holes where you knew you might get a bite and that sort of thing.* JR

There always was fishing [for] *eels – a lot of eels in that stream. People used to fish for eels, around the villages up above* [the reservoir]. *You used to see people sitting on the fishing stools.* JG

When I first started there was a lot of fish in the brook. The mayfly used to come out. We used to seem to have better weather in them days! We built several weirs down the stream and when we first used to do it the Water Board used to come up and clear all

the stuff that falls across, about every two years and then after so many years I'm afraid that got knocked on the head and we used to have to do that ourselves. We used to sort of have a weekend working and build the weirs up. RG (1950s)

We went from Finchley Bridge when we first started. Well then we started stocking it and they wanted to keep it more or less private so that they could keep an eye on it. They did used to get poachers, but chiefly it was children at holiday time. RG (1950s).

Eyebrook Reservoir

Eyebrook reservoir was built between 1937 and 1940 and the first water was drawn from it in December 1940. It was built to supply the Corby steel works by Stewarts and Lloyds which became British Steel and is now Corus Tubes (part of TATA Steel). The proposal to build the reservoir seems to have been met with interest locally, and very little opposition. 580 acres of land were bought, mainly from the Marquis of Exeter, with some from the church and private land owners. 460 acres were to become reservoir. An Act of Parliament was necessary to permit the reservoir to be built. Conditions of the Act were the provision of 700,000 gallons of 'compensation' water each day to maintain the stream flow, and the provision of water for Corby, Market Harborough, Kettering and Uppingham. German prisoners of war helped with the construction of the mains supply.

The reservoir had a mean depth of 5.3m, a maximum depth of 12m and an area of 1.644 km². In the early years there were frequent blue-green algal blooms. Excessive growth of Canadian pond weed took place in the 1940s in response to the high nutrient concentrations, and in the 1960s, fennel pondweed took over, requiring regularly cutting from a boat. Another initial problem was three-spined sticklebacks

The recently constructed reservoir in the 1940s, with Corby steelworks in the background.
Photo courtesy of Chris Race.

that were delivered from the reservoir to Corby residents through their taps! The mid-Northamptonshire Water Board took over the domestic water distribution system in 1948 and water continued to be supplied to the Station Lane Filter Station for this purpose until 1957, since when only the supply to the steel works has been maintained. The safe yield of water from the reservoir is 3.6 million gallons per day.

Stoke Dry Bridge in the 1930s, before the construction of Eyebrook Reservoir.
Photo courtesy of Chris Race.

In May 1943, the dam was used for low-level flying practice by Lancaster bombers of 617 Squadron, culminating in the successful destruction of the Mohne Dam in the industrial heartland of the Third Reich by what became known as 'the Dambusters'.

The foundations of Stoke Dry bridge revealed following drought in 1976.
Photo courtesy of Chris Race.

The reservoir was stocked with brown trout as soon as it was completed in 1940, and despite restricted access due to petrol restrictions, 21 Stewart & Lloyds employees caught a total of 25 fish in 1942. The reservoir trout fishery was opened to the public in 1952. Rainbow trout were stocked in small numbers from 1950, and in larger quantities from 1965. The reservoir had its own fish raising ponds in the 1960s and '70s.

Construction of the reservoir dam in the 1930s. Photo courtesy of Chris Race.

I used to go for walks with my grandparents to see how it was getting on. It was more interesting to them. We only thought of it as a walk really. They were watching it being built. It was obviously quite a big thing to them to see that the little brook was feeding quite a good sized reservoir, so you can understand why they went for walks to watch it being built. I think [local people] *liked it. It was mainly an agricultural village, and nobody objected, because it was making use of the water really wasn't it?* JG

Cutting excessive weed growth on Eyebrook Reservoir in the 1960s. Photo courtesy of Chris Race.

Somebody said when they dug it, it'll take two years to fill it, and it come two or three thunderstorms, all one night and it about filled it up. So the story goes. It's such a big catchment area. PW

Fuel

Coal was central to cooking and heating, but sticks were used as kindling and for bread ovens, and logs were used on open fires in many homes. Paraffin lamps and candles were used for lighting. This mixture of fossil fuel and locally sourced wood continued until the introduction of electricity and oil. Walking was the main means of getting about.

Horses were central to all farming activity and to travel over any distance. Heavy horses were used on the farm for hay making, ploughing, hoeing, harvesting and muck spreading, and lighter horses with a float for getting around the farm. Feed for these horses was in the form of grazed grass, hay and locally grown oats.

Household fuel

We used paraffin lamps. Mother had a nice little glass one. It had one burner in it. We used to go up and down the stairs with it. Sometime we used to have a candle to go to bed with. FD

We had coal and a lot of logs. When I were down the farm, they'd have a log fire every night. NF

Most of the time my mother had fires because you needed to 'cos you'd always got a lot of washing that wanted drying and airing. EP

There was a proper oven in the outhouse. When we killed the pig we used to make about 15 pork pies. My dad used to light it. He used to get twigs, no thicker than your finger, and bundle it up in a tight bundle, push it in, and set it on fire, and out would come all the smoke, and then it would go down to ashes so you'd open the door and rake all the ashes out, and put the pork pies in. It cooked them beautiful. FD

We had a little range cooker. We used to keep the fire in that all night. Then the red embers you could scrape up in the morning instead of relighting, and that would keep us warm. It was coal and wood. There was an oven on one side which was always warm, and a boiler on the other side that had about a couple of gallons of water and that was the hot water that you used to wash with. When you wanted a bath you had to have that hot water plus a big kettle as well. We hadn't got any electric boilers or anything like that. We had a big copper as well. You had to fill that on washing days. Then we used to fill it for baths as well if we wanted to. [For] *grown up baths you'd have to have the copper. This copper used to make enough hot water for all of us to have a*

bath because it was boiling hot and you had to put some cold to it. We hadn't got a proper bathroom then. We used to have a big tin bath. JG

My grandma came from Preston in Rutland, and she used to walk over [from Great Easton] *to Preston with the pram with the latest baby in the pram and the latest toddler sitting on the bottom of the pram, push them all the way to Preston, do her mum's washing, and while the washing was boiling in the copper like how they used to do it, she'd do all the cleaning up and then she'd have a snack for her dinner, and walk home. On the way she'd walk down into that deep valley and gather some sticks for lighting their fire like they used to do. She'd put a bit of string around the sticks to carry them on her back. They'd be doing useful jobs.* JG

We used to toddle off up to the old Tilton School which was about two miles. You often used to go off down the wood, fetching kindling sticks, making dens. Nobody bothered in them days. You were sort of welcome in the wood. PW

Horsepower

We used the float quite a bit for shepherding because we didn't have a Land Rover until 1955. It's a handy way of shepherding. PJ

You had a heavy horse that took the big cart, when you were carting manure and that, and then had a vanner that took the float, and you usually had one you could ride. We used to get in the float and go up with the horse and we'd play all morning in the fields while Dad worked. We did have some fun. RM

We always used to go round in a pony and a float, round the fields, feeding cattle and that. We used to winter them outside and feed them under the hedge. Two of us used to do it. You'd keep a good cob sort of horse for that purpose. There used to be a haystack in each field in them days – all loose hay then. We had four or five horses of one sort or another. TW

They used horses then to cut the hay. They used great big knives (scythes). Ever so dangerous they was you know. We used to have to wait to keep out the way till they'd got it onto the trolley. Then we could ride on the back. They never stopped us going on the farm because some farmers would have said "no, we're not having kids on the farm", but if we wanted to go with my dad, we used to go. We was lucky in a sense because [my mother] *knew where we were. We loved to be out. I think that was* [because] *we was always crowded in the house. It smelled so nice, the hay did. Just to sit on the back of this long flat cart, no sides on it, and then we used to have to throw ropes and tie it round. You'd sit on the end there and hold onto the rope.* EP

Ponies and traps at Great Easton in the 1930s.
© Phil Johnson

He used to be gone out of our house about half past six in the morning and he'd come back to have a bit of breakfast about nine. Then he wouldn't come in again until dinner time, and then he was back home at about six, but by then he'd have to feed all his horses and see they were alright. It was jolly hard work. He used to be ever so tired. When you'd ploughed a field, you'd walked some acres you know. It wasn't [so bad] *when you was doing the grass because you sat on the mower. When he was ploughing he used to have to walk behind.* EP

We had a waggoner and another stockman and they used to go out when it was say hay making time or harvest time and fetch in about seven horses. They'd fetch them in at about 6 o'clock in the morning, feed them, give them a bit of a groom and get them out into the fields with harness on, hitch onto the mower and they'd keep them out in the field from about 7 o'clock to about 10 o'clock. Then they'd bring them back and feed them again and then what horses weren't used in the early stint were taken out and hitched on for a second batch and they'd mow to about 1 o'clock or something like that. The first batch, if they hadn't finished mowing, would go out again at about 5 o'clock in the afternoon, after the men had had tea. KF

The land was that heavy that only one furrow was hard graft for a pair of horses, and it was hard graft for the man as well to hold the plough in an upright position. To plough an acre a day was probably the biggest amount they could plough. That field was about 25 acres so he'd be working there very close on a month. KF

Final Thoughts

The 1930s and '40s seems to have been a time when people, adults and children alike, made more out of less than we have today, and benefited from sourcing a wide range of their requirements locally, not least through stronger more integrated communities. Life was more physically demanding than it is today, but certainly no less enjoyable.

We didn't have half the things children do today. We were just as happy, or happier. You made your own fun. You were safe to go anywhere. VF

People mixed better then than they do now. Everybody knew everybody in the village. JI

They picked up their skills from their fore-fathers. There was always these old craftsmen who used to sit around. They hadn't got television to go and sit watching. They used to feed the horses and have a box to sit on and have their twist of tobacco and their pipe and they'd sit around and have jokes, and they'd also talk shop and lads would sit with them and learn the trade. That's what happened. KF

George Bedford, the East Norton blacksmith.
Courtesy of John Dyson/Alan Hubbard.

Then and now: Rectory Farm, Great Easton

By 1945, Rectory Farm at Great Easton consisted of four hundred acres. As a result of the requirements of the County War Agricultural Committee, the area of land sown to arable crops at Rectory Farm had increased to 50%. 7% was root crops, including sugar beet and potatoes for human consumption, and mangles, kale and swedes for animal feed. The remaining 43% was wheat, barley and oats, with the barley and oats being spring-sown. 50% of the land was in grass for grazing and hay. The farm employed eight full time staff and some part-time staff, including Land Girls and two Prisoners of War. One full time and three part time people were employed in the house and dairy.

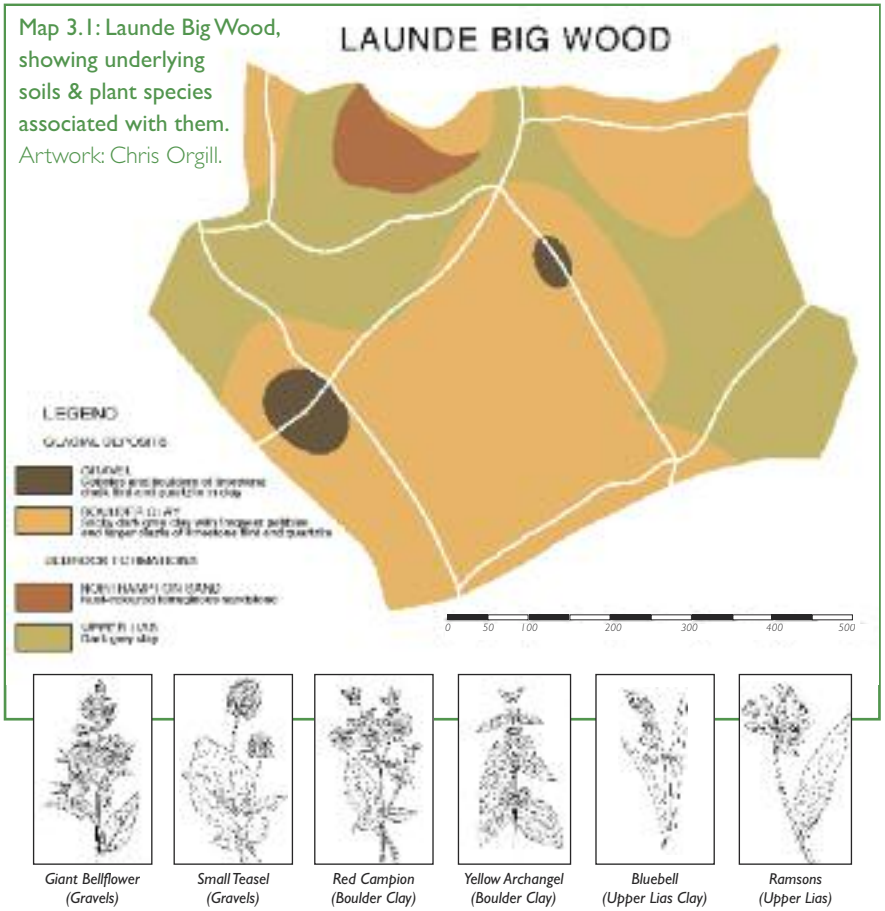
Percheron horses harvesting root crops at Rectory Farm, Great Easton in the 1930s. © Phil Johnson.

There were two new 20 horse power Fordson tractors on the farm but also still six Percheron cart horses for heavy work and a cob for pulling the farm float. The main change from horses to tractors took place between 1945 and 1950. Other livestock comprised 200 breeding Masham ewes, 100 Hereford beef cattle, 20 Shorthorn dairy cows and a small number of pigs and poultry.

Today the farm has more than doubled in size to 955 acres of which 93% is arable (mainly wheat, oilseed rape and field beans) and 7% is grass. There is a flock of 180 breeding ewes and 50 ewe lambs. One full time person runs the farm with part time family help and machinery comprises three tractors (150 – 200 horse power), a telescopic handler, a Land Rover and a Quad Bike.

Chapter 3. The Eye Brook catchment today

People have had a major impact on the local landscape since they first cultivated it about five thousand years ago. Until that time, soil type and occasional disturbance by animals or tree fall were the main influences on plants and associated animals. Few signs of what life might have been like before our arrival remain. Perhaps the best insight we can get is in our local woods, although even these have been substantially managed and changed over the centuries, as we have seen. Many of the 'ancient' woods in the catchment include areas of ridge and furrow and were therefore cultivated in medieval times. This sort of disturbance weakens the relationship between plants and underlying soils. Perhaps the best exception is Launde Big Wood where there is still a relationship between the underlying soils and the plants growing there. For example, Boulder Clay is associated with plants such as dog's mercury and yellow archangel, while giant bellflower and small teasel are characteristic of the Glacial Gravels. Bluebell and ramsons are associated more with patches of Upper Lias Clay (Map 3.1).



Map 3.1: Launde Big Wood, showing underlying soils & plant species associated with them. Artwork: Chris Orgill.

Woodland

The largest woods in the catchment are designated Sites of Special Scientific Interest (SSSIs) because they are the best examples of ash/maple/elm woodland in Leicestershire, and because of the plant communities associated with them. As well as ash, maple and some surviving elm, other tree species include pedunculate oak, birch and sycamore. Under-storey trees and shrubs include hazel, hawthorn, midland hawthorn, and in places, privet, dogwood, goat willow and guelder rose.

Widespread plants in these woods include dog's mercury, bluebell, primrose, wood anemone, wood forget-me-not and yellow archangel, with pockets of species such as giant bellflower, dog violet and wood millet. Rarer species include herb paris, greater butterfly orchid, violet helleborine and hard fern. The parasitic toothwort is also present, living on the roots of hazel, and can also be found in places along the banks of the stream. Most of these plants are adapted to long cycles of woodland growth and shading, interspersed with periods of more open woodland canopy in which they thrive as a result of the increase in light on the woodland floor. This process has been speeded up in previous centuries by active management, especially coppicing, which prolongs the period in which plants are able to grow.

Woodland plants (from top to bottom): wood anemone, dog violet, herb paris and toothwort.

Phil Winterton making riven rails from ash poles in Tugby Wood.

Today, the woods do not receive the same level of management as they did in the past. In most of the woods, coppicing and thinning are carried out largely for conservation reasons, and as part of habitat management for pheasant shooting. Allerton Project research in the large woods of the upper catchment has shown that reducing canopy cover by thinning results in higher numbers of songbirds, as thinning encourages development of a herb layer and shrubs. In particular, numbers of warblers were correlated with the amount of ground cover. The smaller woods are also managed in this way, although they tend to be relatively recently planted and so do not have the plant communities that are associated with ancient woodland.

Apart from woodland management specifically for conservation purposes and management of pheasant habitat, two other approaches to woodland management are carried out. At Tugby Wood, the owners continue the traditional productive management, producing riven rails for fencing and stakes and binders for hedge laying. This is now the only wood in the catchment where such traditional activity is carried out as part of the routine management. The Allerton Project headquarters at Loddington are heated by a wood fuel heating system and wood chips for this come from woodland on the farm. This is a modern high-tech and efficient way to heat the building that reduces carbon emissions as the use of fossil fuels is greatly reduced. Logs are also used as fuel in similar systems, combining a very traditional fuel with the latest technology to ensure its efficient use. Using locally sourced trees as fuel instead of oil means that carbon is 'imported' to the present day from just a few years ago, rather than from 300 million years ago. The harvesting of timber from the woods, whether at Loddington or other local sites, also helps to ensure that those woods are managed to benefit wildlife.

Oak post and riven ash rail fence being erected at Halstead by David Walker and Dave Barber.

Coppiced hazel with bluebells (inset).

There have also been more indirect effects of human activities on woodland species. Muntjac deer were introduced from Asia to Bedfordshire and Buckinghamshire in the late 19th century and have since spread throughout most of England. They have been present in the catchment area since the 1970s and the damage they cause to woodland plants has been noticed in recent years. They are not selective feeders and just as happily eat rare orchids as grass or bramble. Their damage to bluebells in the spring is particularly noticeable as they pick off the flower heads and buds as soon as they become available, as well as eating the leaves. Allerton Project research into this issue in local woods revealed that bluebells close to shrubs such as bramble are most at risk, probably because the shrubs provide good cover for muntjac. This is a conservation dilemma as the development of shrub cover is an inevitable consequence of thinning or coppicing the woods to benefit woodland plants! A similar dilemma arises from the fact that Eye Brook woods are wet for much of the year and August is often the best month to carry out management without causing damage to the soils and associated flora. However, restrictions imposed to protect bird nests at the end of the breeding season mean that management cannot start until early autumn.

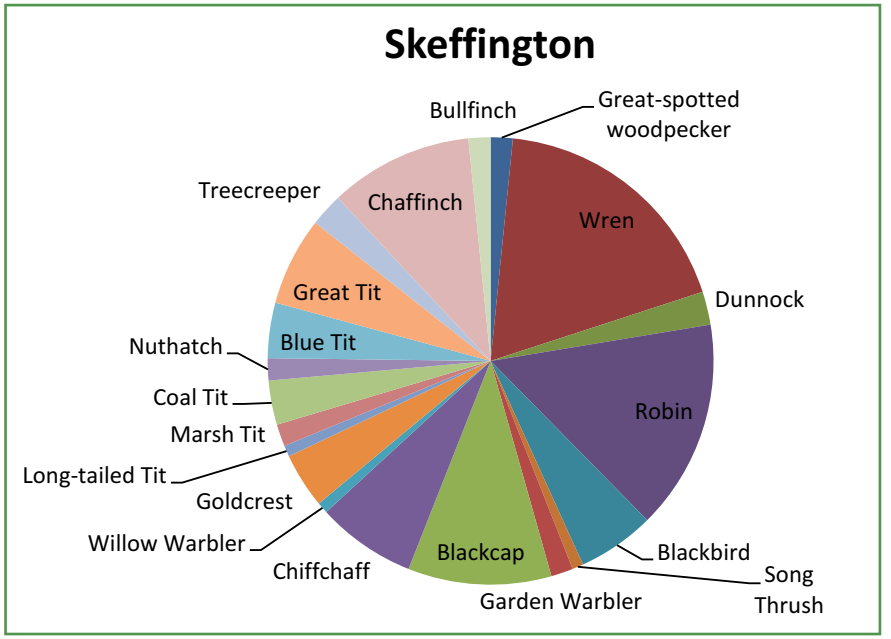
Controlling muntjac numbers may be the most effective way of reducing damage to woodland plants and regenerating trees. The problem is that farmers and stalkers are reluctant to control muntjac. In a survey of local farmers in 2004, 80% said that

they had muntjac on their farms, half thought that numbers had increased in the previous decade, but only 20% considered them to be a problem and were involved in their control. This is because muntjac cause little or no damage to commercial crops, and are skulking by nature and therefore difficult targets. They are also small, which means that the cost of processing the carcass for food is the same as for a larger deer species but the return in terms of meat is considerably lower.

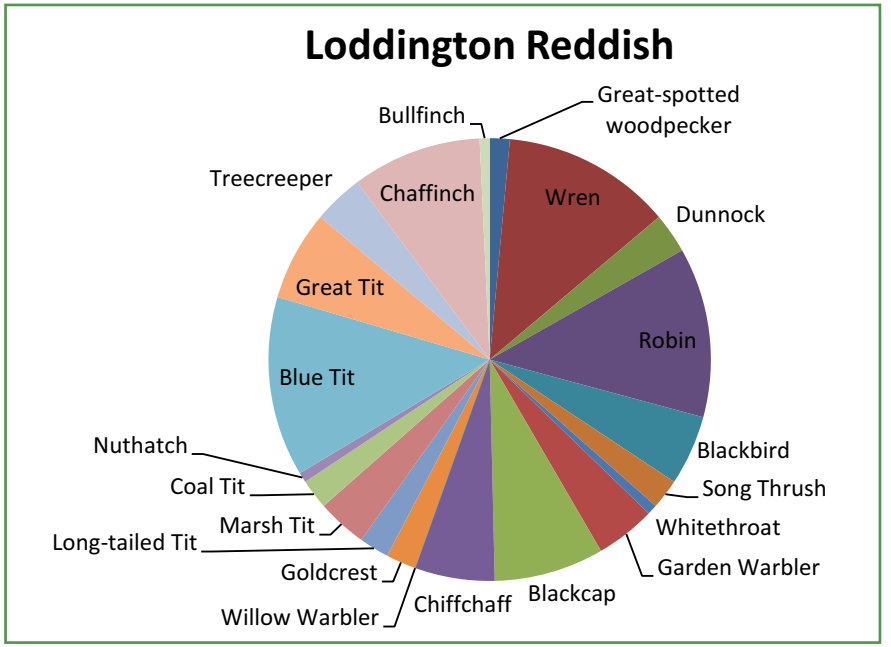
Larger deer species such as roe and fallow occur not far away in Rockingham Forest but are rarely seen along the Eye Brook. There are just occasional sightings at sites throughout the catchment and it is surprising that numbers of these two species have not yet increased.

Grey squirrels are another alien species to have invaded our woods. They were introduced to this country at about the same time and place as muntjac were and have spread across the country. Red squirrels were still being reported from gardens in Wardley in the late 1940s, and one was recorded in Stoke Dry Wood as late as 1960, but by then grey squirrel numbers were increasing. The reasons for the decline in red squirrels, and the role played by grey squirrels is still not fully understood, but direct competition seems the most likely explanation. Grey squirrels are also predators of songbird eggs and young and can cause considerable damage to trees. Wardley Wood was used as a study site for research into tree guards to protect mature trees from the ravages of grey squirrels. The plastic collar that was developed there was patented by Forest Research in 2005.

In 2007, songbirds in parts of Loddington Reddish and Skeffington Woods were surveyed using a standard 'territory mapping' method which records the locations and numbers of all breeding territories (Graphs 3.1). There was a good range of bird species in the two woods, including several species that are also found in gardens, and others that are more strongly associated with woodland. For example, both woods supported nuthatch, a species that has expanded its range across England in recent decades in response to climate change. This species has even been breeding in small farm woods at Loddington in recent years. Blackcap, a common migratory warbler in woodland, has also responded to milder winters, with an increasing number of individuals remaining in the area in winter, rather than following their usual migration to southern Europe and Africa. Nightingales occurred in Skeffington Wood until the 1970s, and previously occurred in other local woods such as Allexton, but as in the rest of the region, they are now absent. On the other hand, numbers of sparrowhawks, buzzards, red kites and ravens have increased locally.



Graphs 3.1: Breeding bird communities in Skeffington and Loddington Reddish woods (based on numbers of territories in 6 hectare blocks).



The disused railway line which runs through much of the upper catchment comprises a length of hawthorn and blackthorn scrub, with pockets of woodland, especially just north of the Eye Brook at East Norton where there is a steep embankment associated with the site of the viaduct. Characteristic woodland birds such as bullfinch, song thrush, treecreeper, willow tit and marsh tit can be found here, as well as species associated with scrub such as willow warbler, blackcap and garden warbler. The railway line forms a corridor that may enable woodland species to disperse from one wood to another in the catchment.

At Loddington (above) the disused railway line (foreground) links small farm woods with the larger ancient semi-natural woods in the catchment. It also supports pockets of grassland plant communities (below).

Grassland

The railway line also contains small pockets of grassland habitat, some of them kept short by rabbits and supporting interesting or scarce plant species such as musk mallow, wild carrot, red bartsia, and birdsfoot trefoil. Some of these may have colonised the railway line from adjacent grassland at a time before the conversion of grassland to arable after the Second World War. The unusual (and strangely named) Des Etang's St John's wort is a hybrid between two other species, both of which have now vanished. One of these, perforate St John's wort was present on the railway until recently, but the other, imperforate St John's wort, is likely to have last occurred in the adjacent meadows during the 19th century. The surviving hybrid provides evidence of the loss of meadows supporting a rich variety of plant species, a change that has taken place throughout the catchment and beyond.

Wild strawberry growing on the railway line at Loddington supported a colony of grizzled skipper butterflies until recently, but encroachment of scrub has shaded out this plant, and the butterfly associated with it. There remain about twenty more common butterfly species on the railway line, plus numerous other insects associated with the plants there, including at least nine species of bumblebee. The clinker on the surface provides a free-draining habitat that is rare in our region of clay soils and supports its own locally unique community of insects.

Other pockets of grassland with now scarce plant species survive at two sites next to Skeffington and Tugby Woods and are designated SSSIs because of the scarce plants that survive there. Plants include adder's tongue fern, spotted orchid, betony, cowslip, and in the damper patches, greater tussock sedge and flowering rush. These sites, and others with low inputs, continue to support plants such as yellow vetchling, bird's-foot-trefoil and stitchwort, and in places, harebell, tormentil, lady's bedstraw and greater burnet-saxifrage. Most of the other Eye Brook grassland has been reseeded at some stage with productive grasses such as perennial ryegrass and has subsequently been managed to varying degrees of intensity, including regular application of fertiliser and cutting or spraying of patches of stinging nettles, docks and creeping and spear thistles as they appear.

Adders tongue fern (above) and bugle (below) in local grassland.

Although grassland supports less wildlife than it did in the past, there are still species associated with ordinary pasture and the livestock that graze it. Grassland cut for hay making, especially late in the summer, allows flowering plant species to survive and set seed. Insects and worms living in animal dung, and in the soil, provide food for birds such as jackdaw, rook, starling and thrushes. In the second half of the winter, pasture is an important foraging habitat for migratory thrushes, fieldfare and redwing, while

in summer it is used by blackbirds and song thrushes. Research at Loddington suggests that nesting success of these latter two species increases with the proportion of pasture within foraging range of individual nests. Pasture is also important for hares, especially in late summer when arable crops are mature and unpalatable.

Livestock

Most of the sheep kept these days are 'mule' ewes that are crossed with Texel, Charolais or Suffolk rams to produce lambs with a carcass conformation that meets today's needs for lean meat. Texel and Charolais rams have become more popular in recent years as they are less likely to produce lambs with fatty carcasses than Suffolks. 'Mules' are a cross between a blue-faced Leicester ram and a ewe from the uplands such as Swaledale, so there are still links, albeit rather tenuous ones, with a local sheep breed. The original Leicester breed was developed in the late 18th century by Robert Bakewell.

Mule ewe with lambs.

Wet winters can result in soil compaction from livestock which in turn leads to increased surface runoff, less efficient fertiliser use and poor grass growth. Mechanically aerating the soil and reducing the number of sheep on the land helps to address this issue, but the more sheep that are housed, and the longer they are housed for, the more hay and other feed they need. Ewes are routinely housed during the second half of the winter and are fed on hay or silage produced on the farm or bought in, and some additional bought in concentrate feed. Lambing takes place from February to April. The earlier the lambing occurs, the longer the period in which growing lambs can graze grass and the earlier they reach a suitable weight for slaughter, but the higher the level of concentrate feed that needs to be bought in for pregnant and lactating ewes in late winter and early spring.

An increasing issue for livestock farmers is the availability of straw for winter bedding. As fertiliser prices have increased and there has been an improved awareness of the need to maintain arable soil structure, more straw has been incorporated into the soil, rather than being sold. There is, in any case, less straw about than there was in the past as newer cereal varieties are bred to have short stems. High straw costs and high winter feed costs restrict the length of time that sheep can be housed. Alternative late winter feed in the form of root crops such as kale and turnips is not a viable option on our clay soils because the fields get so wet when the feed is needed.

Hay making.

Local markets and abattoirs have closed and lambs are often transported long distances across the country for slaughter, often followed by transport of the carcasses over further long distances for sale to consumers. Uppingham market closed in the 1950s with only the Christmas fat stock show continuing to remind us of the importance of the market square in the past. Stamford and Oakham markets also closed and the sites were turned over to a supermarket, housing and car parking for the growing population, while Market Harborough and Melton markets have survived, with the latter providing the main means of selling livestock for Eye Brook farmers. The small local abattoir at Tugby closed in recent years. Increasing regulation has increased the running costs of such small-scale facilities so that they have become uneconomic. The nearest abattoirs are now at Loughborough and Melton Mowbray, with another one at South Kilworth. Some lamb is produced, processed and traded locally such as 'Launde Lamb' and through the Tugby butcher, Doughty.

Electronic tagging of all sheep is now a legal requirement to improve traceability and was prompted by the Foot and Mouth disease outbreak in 2001. Each animal can now be individually identified. Although this is an additional cost for the farmer, it does make it easier to track the performance of individual sheep in terms of weight gain and to help plan future flock management to improve production. Monitoring performance in this way can also help judge the productivity of individual fields across the farm. This is much more difficult for livestock farms than for arable ones where the output can be measured as crop yield. High performing grass fields

can be targeted for improving the viability of the flock, while poorly performing fields can be entered into Environmental Stewardship in order to improve their environmental value.

There are two dairies on the edge of the Eye Brook catchment. Neither of them sell direct to local consumers, but milk from other dairies in the region is available. Calves from the dairy herds are fattened for beef production, but there are also 'suckler herds' in the area, including a large herd of South Devon cattle, producing beef mainly from grazed grass.

Hedges that were planted for enclosing livestock have become neglected following the switch from pasture to arable use, and many were completely removed in the 1960s and '70s. Thankfully, the skills to manage hedges through traditional laying have not been lost and the numbers of hedges being laid has increased in recent years, in part as a result of payments through Environmental Stewardship schemes. Hedges now have a different role and are valued as landscape features and as habitats for wildlife, rather than, or as well as, a means of enclosing animals. Many hedges have been allowed to grow up so that they are taller than they were in the past. In fact the government's Environmental Stewardship scheme

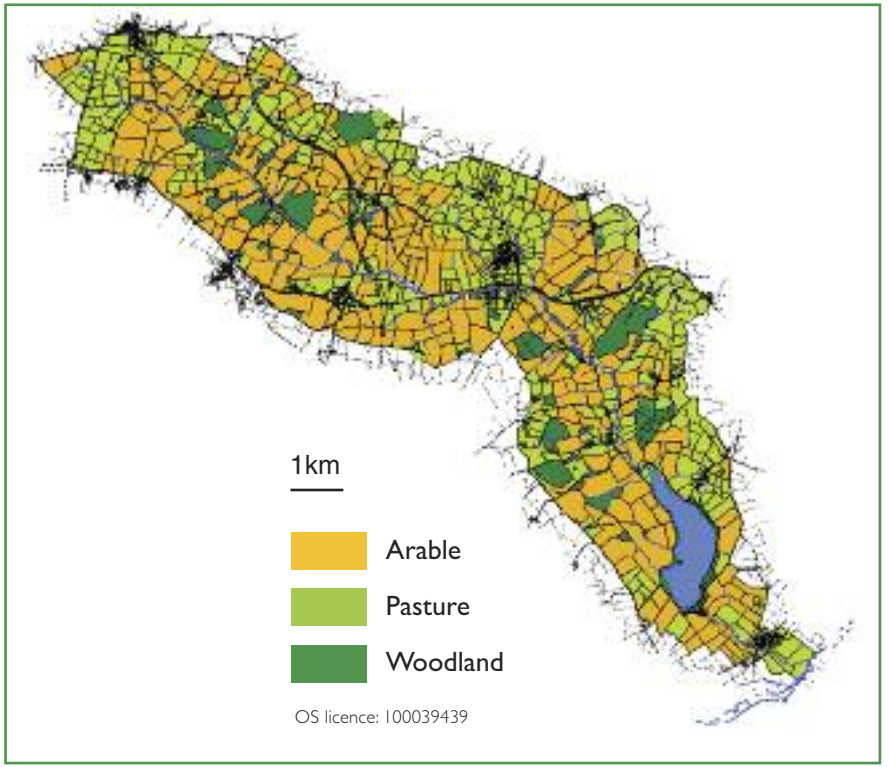
History in a hedge. A hawthorn hedge between arable fields showing the remains of post and rail fence and clear signs of recently increased height within an Environmental Stewardship scheme.

David Walker and Dave Barber hedge-laying.

encourages farmers to cut hedges less frequently and to maintain a minimum height of 2 metres. Many local hedges still contain evidence of the riven rail fences that protected them in the early years of their restoration after the Second World War, and of incremental increases in height more recently.

Arable land

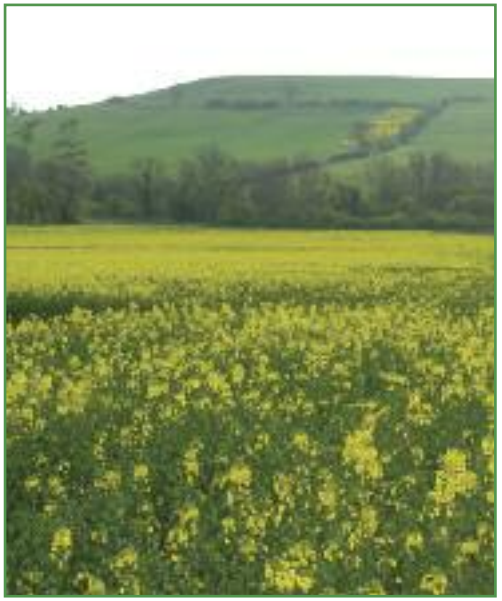
Arable land now forms a large proportion of the catchment area (Map 3.2). It is dominated by wheat, sown in the autumn and harvested in August for animal feed, biscuit flour, and for bread flour where the variety and quality are good enough. Wheat is grown in rotation with other crops to reduce the establishment of associated pests, weeds and disease. The main break crop is oilseed rape, the familiar mass of yellow which appears early in the summer and produces oil for lubrication and cooking. The pulp produced as a by-product of oil production is used as an animal feed, or increasingly, as a biofuel. Other break crops include field beans which are grown for animal and human consumption and, as a legume, to improve the soil fertility for a subsequent wheat crop, and oats which are grown as animal feed, and



Map 3.2 The Eye Brook catchment showing the distribution of arable, pasture and woodland.

for human consumption. Barley is sometimes grown on the lighter land. Different cultivation techniques and herbicides containing different active ingredients with different modes of action can be used in break crops to combat grass weeds. Less familiar crops which have been grown on individual farms in recent years include borage (for medicinal use) which is a blue-flowering crop that is favoured by bees, and hemp and flax (for fibre). In one case, Rectory Farm (between Caldecott and Great Easton), conventional wheat and rape crops, as well as the less conventional millet, are grown to provide seed food for garden birds.

A novel approach to marketing cereals is also taken at Loddington where oats and wheat are grown as 'Conservation Grade' and sold into a guaranteed market at a slight premium. To achieve this, the farm agrees to restrict pesticide use and create habitats that will benefit wildlife on the farm, including strips of 'pollen and nectar' legumes for bumblebees and wild bird seed mixtures that provide winter seed food for birds. More generally, arable crops are sold to dealers in the general market with little if any connection between the producer and consumer. Much of it probably ends up being processed locally though as there is a flour mill and a gluten factory at Corby, and a Weetabix factory at Burton Latimer. Wheat prices fluctuate and selling at the appropriate time is as important to the profitability of farming as judicious use of inputs and achieving optimum yields. The balance between profit and loss has become a delicate one in the face of increasing costs of inputs such as fertiliser and pesticides which are linked to rising oil prices.



Flowering oilseed rape with Robin a Tiptoe Hill in the background.

Local wheat yields have increased considerably during the post-war expansion of the arable area, from about 1½ tonnes per acre in the 1960s to up to a maximum of 4 tonnes per acre (10 tonnes per hectare) today. This has been possible because of the development of manufactured nitrogen fertiliser and wheat varieties that are able to exploit this additional source of nitrogen. Plant breeding has seen the introduction of 'dwarf' straw genes producing short, stiffer-strawed varieties that are able to support heavier ears without 'lodging' (falling over). The control of fungal diseases, weeds and insect pests such as aphids by chemical means has also made a major contribution to the increase in crop production. Table 6 provides an outline of the inputs now applied to the arable crops grown on Eye Brook farms. Although concern is currently being expressed about future food security, over-production in the 1980s and '90s led to the imposition of set-aside in 1991. A varying proportion of arable land (up to 15%) was taken out of production to reduce European surpluses as part of the Common Agricultural Policy.

Table 6. Inputs and operations for typical crops

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wheat			h	f,fu,g	f,fu,g	f, fu		H	C, D	h, i		
Oats				F	fu, g			H	C, D			
Beans			D	H		Fu, i	Fu, i		H		D,h,C	
Rape			f	f, h	fu		H	C, D	h, i		H	

C=cultivation, D=drilling, f=fertiliser, fu=fungicide, g=growth regulator, h=herbicide, i=insecticide, H=harvest

The Eye Brook catchment is not one of those areas to have interesting arable plant communities as the clay soils have precluded a long continuous history of arable cultivation. Long-headed poppy is perhaps the scarcest arable 'weed' to be found in the catchment. New arable weed communities have developed in recent years and now species such as black grass, sterile brome and cleavers are presenting an increasing challenge to local farmers, especially on the clay soils that predominate in the Eye Brook area. Not only are these weeds very competitive in arable crops, reducing the amount of grain produced, but they are developing resistance to the herbicides available to control them. With such a small profit margin, there is little incentive for the agro-chemical companies to incur the very substantial costs involved in the development of new more effective herbicides so there is considerable concern about how these competitive weeds will be combated in future. For example, mid-September, the best sowing time for wheat is also when blackgrass normally germinates. One potential option is to switch to spring-sown crops,

Long-headed poppy, one of the rarer arable plants to occur on clay soils in the catchment.

Two grass weeds that are an increasing threat to arable production: sterile brome in wheat (above) and blackgrass (below).

allowing a chance to remove grass weeds between the harvesting of one crop and planting of the next, but this is currently not economically viable because of the low yields and profitability of spring cropping.

Most farms cultivate using the traditional plough which turns over the soil, burying weed seeds and preparing a seed bed for the following crop, while others use a 'minimal tillage' (or non-inversion) approach which is quicker and reduces soil disturbance. The Allerton Project uses minimum tillage, although the plough is still used when the ground is wet or when beans are sown in the rotation. Research at Loddington has compared minimum tillage with ploughing and found that there is little difference between the two approaches in terms of crop yield. The cost and time involved in establishing a crop is much lower when minimum tillage is used, although this approach can increase the need for herbicides to control some weeds, and this increases the cost again.

Earthworms break down crop residue, and increase water infiltration and aeration of the soil. They are encouraged by reduced cultivations.

The soil fauna seem to benefit from minimum tillage with some evidence of more earthworms than is the case when using the plough, but the greatest difference found at Loddington was for soil fungi which were much more prevalent in minimum tillage than plough plots. Soil fungi, earthworms, and a larger amount of crop residue on the soil surface all help to increase the capacity of the soil to take up water during storms and retain it during drought. This helps to buffer the stream from flooding during heavy rain, facilitate crop rooting, and maintain soil moisture for crops in summer.

Many local crops are established without ploughing. A Cultipress with Cambridge roller at Loddington. © Alex Butler

Simba Solo discs with double press and air seeder at Oxey Farm. © Alex Butler.

Farmland birds

The numbers of birds on British farmland declined during the period of increasing use of external inputs and increasing yields in the 1970s and '80s. These increasing yields were at the expense of the plants whose seeds birds eat in winter, and the insects that provide essential food for nestlings in summer. Despite this, and the reputation farmland gained for being devoid of wildlife, farmland has continued to support a wide range of bird and other wildlife species, including some that are strongly associated with farmland habitat. Graph 3.2 shows the range of species present at Loddington. More bird species are present than in woodland (see Graph 3.1, page 75) because of the range of habitats present on farmland, including small woods, hedges, streams and ponds, as well as pasture and arable land.

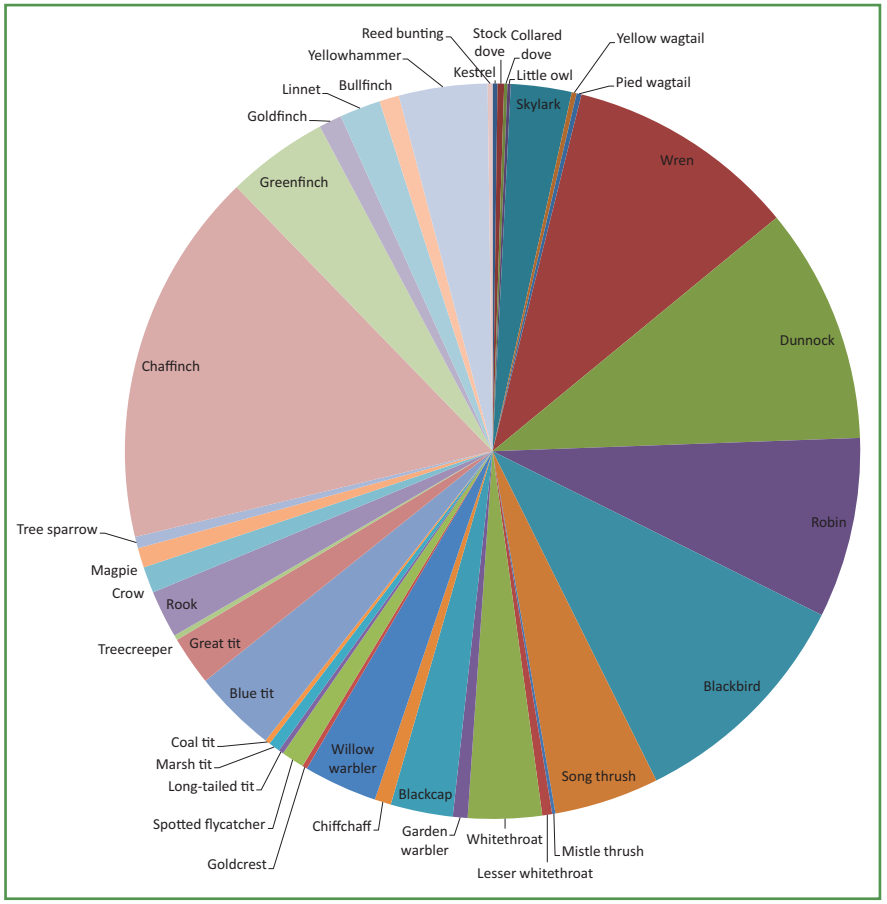
Most farms throughout the catchment now support game bird shoots of one sort or another, each of them managed in a slightly different way, but with most relying on the release of pheasants and red-legged partridges in late summer for shooting

during the winter. A shoot concentrating on wild pheasants was started at Loddington in 1993. The system adopted at Loddington included the creation of a range of habitats, provision of grain as food in winter, and control of nest predators such as foxes, rats, crows and magpies in the breeding season. The songbird community at Loddington has been studied in considerable detail through the research of the Allerton Project. Since the project started in 1992, numbers of many species increased in response to the management system introduced there. Overall numbers of songbirds doubled between 1992 and 2001. The predator control part of the system was stopped in 2001 to see what effect there would be on both the pheasants and the songbirds. Pheasant numbers dropped dramatically so that no further shoots could be held, and numbers of hares which had also increased in response to the introduction of predator control, declined again once this was stopped. Some of the bird species that increased in numbers during the early years such as song thrush, spotted flycatcher, bullfinch and linnet, declined during the period when predator control was stopped, while for other species, numbers remained the same.

The Allerton Project farm at Loddington, with the Eye Brook in the foreground and the disused railway line on the left.

Pheasant shooting at Loddington.

A PhD study at Loddington found that predator control appeared to be a major influence on changes in numbers of breeding birds for species such as blackbird, dunnock, chaffinch and yellowhammer. Some species such as blackbird and song thrush can have several nesting attempts each year and so can withstand quite high levels of nest predation, but the recent research has revealed that four out of the six main study



Graphs 3.2: Breeding bird community on farmland at Loddington (based on numbers of territories – some species are not recorded using this method).

Linnet, one of the bird species to increase in numbers at Loddington in response to the management there.

species would need to make twice as many nesting attempts without predator control as with it, just to maintain a stable breeding population.

Blackbird nesting success improved and more young were fledged when predators were controlled than when they weren't. How well nests were hidden also influenced the survival of nests when predators were abundant at Loddington, but not when they were controlled. This implies that blackbirds were able to nest successfully in more 'risky' exposed sites when predators were controlled than when they weren't. The changes in nesting success were reflected in changes in breeding numbers, with numbers of blackbirds increasing during the period with predator control and declining during the period without it. The background blackbird population trend for the East Midlands over the same period was stable.

Blackbird nests in exposed sites are susceptible to predation when crows and magpies are abundant, but not when their numbers are reduced.

As is the case on most local shoots, wheat was provided at Loddington for pheasants through the winter in metal feed hoppers suspended from posts. Ten of these hoppers were filmed to see what animals were using them, apart from the pheasants and red-legged partridges for which they were intended. Blackbirds, robins, dunnocks, chaffinches, yellowhammers and tree sparrows were all recorded feeding from around the hoppers, and together formed about a third of hopper use. Mammals also made considerable use of the feeders, and included squirrels, badgers, muntjac deer, wood mice and numerous rats! This raises the question as to whether winter feeding of this sort really has a net benefit to songbirds if it also encourages their predators whose numbers are not controlled. There is no doubt that the birds benefited in the short term though. Yellowhammers, the most abundant species, made significantly more use of the feeders in March, when alternative sources of food are in very short supply, than in January and February. This is a critical time in terms of food supply. Since 2006, winter feeding at Loddington was stopped and breeding numbers of the species mentioned above declined. After nine years without predator control and four years without winter feeding, overall songbird numbers stabilised at 20% higher than the initial 1992 baseline. This suggests that habitat, predator control and winter feeding have combined to influence songbird numbers.

The area of managed wildlife habitat at Loddington has ranged from about 4% to 9% of the productive area and has included habitats created as part of Environmental Stewardship agreements and within the set-aside area. The project retained set-aside on the farm after the requirement for set-aside was withdrawn in order to continue the research work into 2010. Since the national withdrawal of a requirement for set-aside there has been considerable debate about how the conservation benefits of set-aside can be maintained, and the proportion of the land area required to achieve this. The results from the research at Loddington suggest that, in practice, how much land is required is likely to differ considerably between farms, depending on other management practices such as winter feeding and control of nest predators, as well as on the amount and quality of existing habitats.

Yellowhammers make increasing use of pheasant feed hoppers in late winter when alternative sources of food are not available.

The development of wildlife habitats has been a major focus of research activity for the Allerton Project since it started in 1992. These habitats include wild bird seed mixtures, grass margins, beetle banks and others. As a result of this research, these habitats are now incorporated into the government's Environmental Stewardship scheme which provides payments for farmers across the country to create these habitats on their own farms. Wild bird seed mixtures were a development of game crops that are grown on shoots to provide food and cover for pheasants and partridges in the winter. The best crops for birds are kale which provides seed food for several bird species such as linnet and reed bunting, the South American staple crop, quinoa, and a cereal such as the wheat/rye hybrid, 'triticale' which is used by yellowhammers, tree sparrows and others. As well as providing seed food in winter, these crops often also provide insect food for birds during the breeding season when insects are an essential part of nestling diet, even for otherwise seed-eating species. A diversity of commercial crops also benefits birds through the year.

Grass margins are now a common feature of arable fields across the country, but in 1992 when the Allerton Project started, fields were generally cropped to the hedge base and there was little permanent vegetation between the hedge and the crop. Research at Loddington has shown that grass margins provide good over-wintering sites for ground beetles and rove beetles which help to control aphids in the growing crop during the summer. Grass margins are also the preferred nesting habitat for birds such as whitethroat and yellowhammer whose nesting success is better in this vegetation than in adjacent hedges. In fact, this habitat is so important to whitethroats that the amount of it present in field boundaries determines how many whitethroats establish breeding territories. In other words, there is a direct relationship between habitat and bird numbers. Grass margins also help to reduce surface runoff from arable fields into ditches and streams, and to protect hedges from spray drift.

Kale being grown to provide seed food for farmland birds in winter.

Farmland insects

The Allerton Project continued the pioneering research carried out by the then Game Conservancy Trust into the development of 'beetle banks' in southern England. These low banks across the centres of fields are sown with coarse grasses such as cocksfoot to encourage beneficial insects out into field centres to control aphids there. At Loddington, they have also proved to be a great habitat for harvest mice and other small mammals, as well as their predators such as barn owls and kestrels. The holes made by mice and voles are also used as nest sites by bumblebees, of which there are ten species on the farm.

Whitethroats escape nest predation by nesting in grass margins.

Pollinating insects such as bumblebees, and less well known groups such as solitary bees, have declined on farmland in recent decades and this could have an impact on the pollination of some field crops, orchard fruit, and wild hedgerow fruit. Blackberries, haws, sloes and ivy berries are all important food for small mammals and some birds such as fieldfares, redwings, blackbirds and robins. A recent PhD study at Loddington found that dog rose and bramble didn't need pollination by insects to produce fruit, but hawthorn, blackthorn and ivy produced no fruit if insects were excluded. Blackthorn was pollinated mainly by bumblebees, hawthorn mainly by solitary bees, and ivy mainly by wasps. The work revealed that current numbers of bumblebees and solitary bees at Loddington were limiting fruit production, so for blackthorn and hawthorn, increasing bee numbers would result in more fruit. Fortunately, there seemed to be sufficient numbers of wasps for the production of ivy berries!

Bumblebees and other pollinating insects are essential for production of sloes (inset) on blackthorn.

At Loddington, pollen and nectar mixtures (mixtures of native perennial legumes) are planted to provide alternative foraging sites for pollinating insects, extending the period in which food is available to them. Grass margins and beetle banks provide nest sites for bumblebees, and dead wood and other vegetation is left in woodland and hedges to provide nesting sites for solitary bees.

Hawthorn is mainly pollinated by solitary bees.

While bees have been declining, other insects have been increasing in numbers and expanding their range across England in response to climate change. Grasshoppers and crickets were very scarce in the Eye Brook area until a decade ago when lesser marsh grasshoppers started to colonise the area from the south. Since then, Roesel's bush cricket and long-winged conehead have also expanded their northern range to include the Eye Brook catchment. It is remarkable to think that this should have

happened in such a short time. Lesser marsh grasshoppers first appeared in the area in 1997, and Roesel's bush cricket in 2002. Grass field margins around arable fields, and beetle banks through their centres provide ideal habitat for these colonising species.

The geographical range of several insect species has been expanding northwest in response to climate change, reaching the Eye Brook catchment in the first decade of the 21st century: Roesel's bush cricket (top left), lesser marsh grasshopper (top right), tree bumblebee (bottom left) © John Szczur, **and hornet** © Peter Thompson **(bottom right).**

A genetic study of lesser marsh grasshoppers, carried out with Leicester University, revealed that grasshoppers at Loddington showed as much genetic affinity with individuals from Somerset as from neighbouring farms and other local sites,

providing further evidence of a rapid range expansion across the country, rather than colonisation from a previously over-looked local site. Other examples of insects responding to climate change include the common hornet which, until about 2002, was thankfully a rare sight, but is now becoming all too familiar. More benign is the green carpet moth which has increased in numbers considerably at Loddington. It is thought that this is because longer summers now enable it to have two broods of caterpillars each year, rather than just one. Tree bumblebees were recorded in the area for the first time in 2009, following their initial colonisation of England from continental Europe in 2001. Another species that is spreading northwards is the white-legged damselfly which was first recorded in the Eye Brook catchment at Tugby Wood in 1999.

The Eye Brook in context

These species range expansions are a reminder that individual villages or farms, or indeed individual catchments such as the Eye Brook, are not isolated from each other but are very much influenced by what is happening in the wider countryside, and in the case of climate change of course, the wider world.

Other examples of spatial inter-relationships are more local. Bird ringing in the catchment provides detailed information on the extent to which different species move from their place of hatching. For example, a nestling blackbird ringed at Horninghold in 1995 was found breeding in Bolt Wood, at the lower end of the catchment, the following spring, and another ringed at Loddington in 1996 was present at Ridlington the following spring. A song thrush nestling from Loddington moved to Hallaton the next spring, while a chaffinch and a greenfinch moved to East Norton and Allexton respectively. Some of the species that we normally consider to be very sedentary sometimes travel further afield though. A dunnock nestling ringed at Loddington in 1992 had moved 38 miles to Northampton by March of the following year, and a young great tit ringed at Loddington in June 1995 was present in Creaton (also Northamptonshire) the following February.

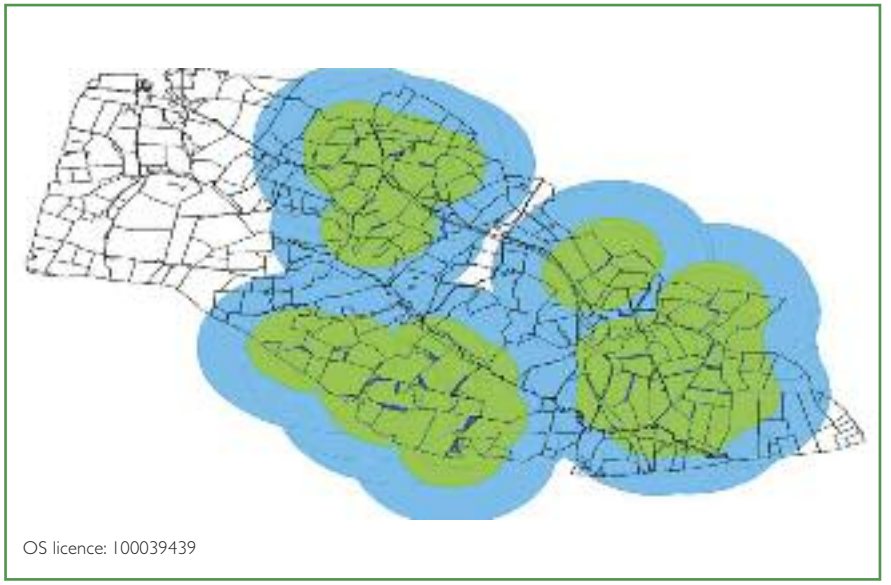
Ringing also highlights migratory movements. These include movements to northern and eastern Europe, such as the black-headed gull ringed at Eyebrook Reservoir in June 1996 which was found dead in Lithuania in October 2000, and a lesser black-backed gull ringed at the reservoir in July 1991 which was found dead in Norway more than twelve years later in December 2003. In 1997, we know that a young whitethroat from Loddington moved east to Ketton by the end of August before making its southward migration to West Africa. A blackcap ringed at Eyebrook Reservoir in August 1998 was recovered on its southward migration at Icklesham

(Sussex coast) the following month, and another blackcap recorded at Halstead in August 2009 was originally ringed at the same site at Icklesham the previous September. A lesser whitethroat at Eyebrook Reservoir in July 2000 had travelled as far as Italy by mid-September, and a chiffchaff at the reservoir in summer 2004 was found dead in Morocco the following January.

Whitethroat caught for ringing in its West African wintering area.

Conditions in the African wintering areas of some migratory bird species can influence the numbers of birds present each breeding season. Whitethroats are associated with scrubby farmland in West Africa and breeding numbers were low in the 1980s, following severe drought in the wintering area, but numbers have been recovering since. Numbers and body condition of wintering whitethroats are very much influenced by the management of trees in West African farmland and agro-forestry systems that integrate trees with crop production support more migratory birds such as whitethroats, while also being more sustainable in terms of long-term food production. Nightingales no longer breed in the Eye Brook catchment and are dependent on sub-tropical woodland. This is a habitat that has been lost throughout West Africa because of increasing pressure on land for human food production.

A jackdaw nestling ringed at Billesdon in 1984 lived for nine years before meeting its end at Loddington in June 1993. That was the first year in which the control of crows, magpies and jackdaws took place as part of the game management system being introduced at Loddington. The control of magpies and other nest predators on the farm at Loddington was stopped in 2001 but it was five years before magpie numbers were restored to the number present before the control started. The reason seems to have been that many other people in the surrounding area started to control magpies, having seen the increases in songbird numbers achieved at Loddington. Numbers of magpies in the surrounding area were reduced so that there were fewer to colonise the farm at Loddington. What was happening at Loddington influenced what people did elsewhere in the Eye Brook catchment, and this in turn influenced what happened at Loddington.

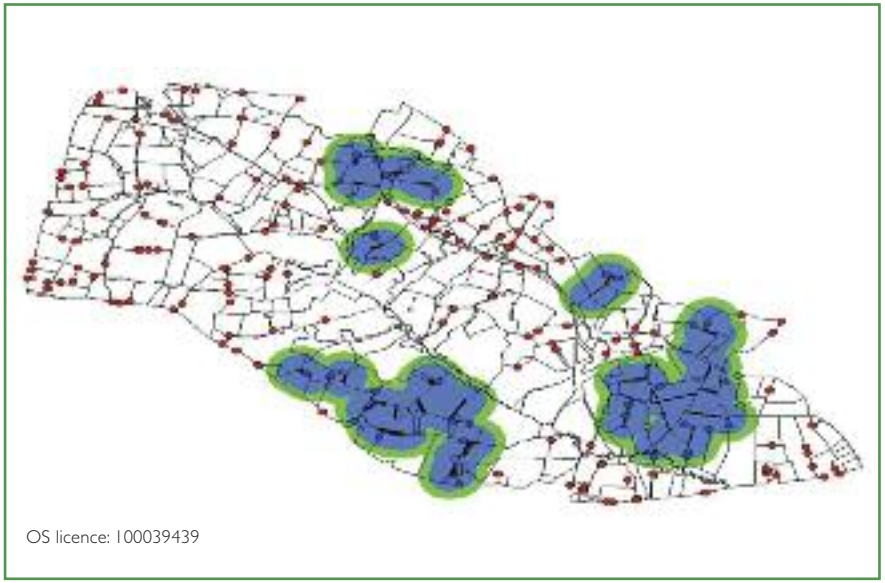


Map 3.3: 1,000 metre (light blue) and 500 metre (light green) buffers around wild bird seed crops (dark blue) to represent the availability of this winter food source in the upper Eye Brook catchment.

As foraging birds in winter travel about one kilometre in search of food, the wild bird seed crops planted for birds at Loddington provide food for birds across a large part of the upper Eye Brook catchment. Some other farms in the catchment have more recently started planting these crops under their own Environmental Stewardship agreements so that birds from most of the upper catchment benefit in winter (Map 3.3).

In the breeding season the story is slightly different as birds are constrained by the location of their nest. We know from research at Loddington that some bird species travel up to 300 metres to gather insect food for their young but the distance is usually considerably less than this. On the assumption that nesting birds travel up to 200 metres from the nest to gather food, the maximum distance for tree sparrows for example, only 8% of nests in the upper catchment would have access to wild bird seed crops (Map 3.4). In the breeding season most birds would need to rely on other sources of insect food.

There are several pheasant and partridge shoots in the catchment. The one at Holyoaks is part of a much larger shoot which is centred on Neville Holt. The others are relatively small syndicate or family run shoots. These shoots are part of



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Map 3.4: Randomly distributed 'nest sites' in the upper Eye Brook catchment, with breeding season foraging ranges for those within 200 metres (light blue) and 300 metres (light green) of wild bird seed mixtures (dark blue).

a number of local and more distant networks associated with the supply of young poults, and the sale of shot birds. There is a neat local loop, with locally reared pheasant poults being supplied to shoots for release, and the same dealer then buying the shot birds back for sale as food. Food doesn't come much more local than this. Chicks are supplied from much further away though, as is much of their feed, and shot pheasants are sold as far away as London, France and the Netherlands. This illustrates the combination of local and global networks of which the Eye Brook area is a part.

Pheasants from local shoots are traded locally, as well as further afield.

Some of the ecological changes that have taken place recently have occurred through the medium of the air. Increased use of nitrogen fertiliser in arable and livestock systems, intensive indoor livestock units, and increased traffic along the A47, all contribute to high concentrations of ammonia and nitrogen oxides in the

air. While the latter are major greenhouse gases (contributing to climate change), both ammonia and nitrogen oxides enrich the surrounding landscape with nitrogen. Lichen communities change in response to such changes in air quality and nitrogen deposition. A survey of lichens growing on churches, conducted in 1996 found that lichens at East Norton, Loddington and Stoke Dry were typical of communities associated with high levels of ammonia and nitrogen oxides in the air. Overall, between 43 and 67 lichen species were recorded on churches throughout the catchment. Woodland lichens are also affected. In the outer 50 metres of woods, trees have become covered with green algae, while in the well-lit areas at the field margins, lichens known to be nitrogen-loving are dominant and this seems to be because of agricultural nitrogen applied to fields. Many are eye-catching, especially *Xanthorias polycarpa,* which turns elder twigs bright orange.

The bark of ash, hazel and field maple supports the most interesting lichens. Tree canopies that are well-lit have the largest and most obvious lichens including the grey tassels of *Evernia*. These become obvious to walkers when high winds bring down branches. The rarer species though, occur on tree boles near to ground level, especially in ravines, and include species previously thought to be extinct in the Midlands. The most noteworthy are on the bark of large hazel and ash trees. These lichen species seem to have been common in the Midlands up to mid-Victorian times, but the rise in industrial air pollution, especially sulphur dioxide, effectively fumigated local woods, as it did in other parts of the country.

Lichens provide an indicator of air quality.
© John Szczur

So, why have some lichens survived in the Eye Brook woods? It seems likely that polluted winds pass over the top of woods leaving the still air in the body of the wood relatively unmixed with pollutants. The alkaline bark of ash, hazel and field maple may also help to neutralize the acidic pollutants. Another contributing factor may be the historic management by coppicing which allowed lichens to survive on the coppice stools and recolonise the new growth. Since the 1980s the lichens

have been coming back as the sulphur dioxide concentration in the air throughout Britain has declined to less than 1% of its 1960s levels, thanks to the Clean Air Acts. Strangely, only young trees support these returning lichens. Perhaps pollutants remain in the bark of older trees, inhibiting new lichen colonization. Around the edges of woods, especially on young ash trees, round, grey spots of species such as *Lecanora chlarotera* are becoming very common, being formerly considered locally extinct, along with yellow-green *Evernia prunastri* and other large leafy species. So lichens have been affected both by industrial air pollution many miles away, and by farming practices and motorists nearby.

Mud, water and wildlife

Arable crops are dependent on the quality of the soil they are growing in, although this can be manipulated through addition of fertilisers (mainly nitrogen, but also phosphorus and potassium), and through different cultivation methods. Fertiliser application and cultivation methods also have an impact on water quality and wildlife in streams and ponds associated with farmland. The impact can also be felt much further afield in rivers and coastal waters. For example, the river Welland, of which the Eye Brook is a tributary, suffers from one of the highest nitrogen concentrations of all UK rivers, delivering this at its mouth to the Wash. The Witham, Nene and Great Ouse also contribute to high levels of nitrogen in the Wash which is the country's most important area for shellfish and breeding flatfish, and a wide range of wading birds, as well as common seals.

It is encouraging that brown trout and many other fish and other wildlife species are present in the Eye Brook. The stream has a healthy population of dace and some roach, and bullheads are very common, as well as minnows, stone loach and three-spined sticklebacks. In the lower stretches, there are perch, gudgeon and the occasional pike. One species to have declined is the eel which no longer appears in the upper stretches of the River Welland,

Wild brown trout are present throughout the stream, although only in low numbers, and their breeding success is low because of sedimentation of the stream bed.

including the Eye Brook. This species is currently the subject of research by the Environment Agency which is taking steps to improve conditions for eels, for example by creating fish passes to assist the migration of elvers from the sea.

The Eye Brook following rain, showing colouration of the water by sediment.

Surveys of fish in the Eye Brook and its tributaries carried out in 2004 and 2008 revealed that although wild brown trout were present along the whole length of the stream they were generally not in large numbers. More telling was the fact that reasonable numbers of first year fish were only present at one of the ten sampling sites in 2004, and in only two out of thirteen tributaries surveyed in 2008. Brown trout lay their eggs in clean gravel in the early winter and water flowing through the gravel brings oxygen to the developing eggs until they hatch in late winter. Sediment carried into the stream from the surrounding catchment clogs up the gravels and kills the eggs so that few sites are suitable for successful breeding.

Aquatic insect communities also reflect the amount of sedimentation taking place in the stream. Recent Environment Agency research at Stockerston and Caldecott, and in other Welland tributaries, has shown that the types of insect present in streams can be used as indicators of the level of sedimentation. Mayflies include a large number of species, all of which have relatively long-lived nymph stages in their life cycle. The nymphs reflect the type of water in which they live. For example, *Baetis* mayflies are associated with clean water with little sediment as they have large feathery external gills that get clogged up with sediment where this is present. The larger and more familiar *Ephemera* mayfly is more tolerant of sediment, and in fact has a larval stage that lives in coarse silt. More strongly associated with fine sediment and mud are the Chironomid midges whose larvae are the red 'bloodworms' that can be found in muddy streams and ponds.

Easily over-looked, but a clear indication that the stream is not all bad, especially in the upper stretches, are a number of insects such as caddisflies that are known only

by their scientific names (*Halesus digitatus, Hydropsyche pellucida, Hydropsyche saxonica* and *Sericostoma personatum*). These are all associated with relatively clean water and are cause for celebration that the Eye Brook fares better than many others in the country. In fact, the Eye Brook is one of the better streams in the Welland river basin for the quality of its water and aquatic life.

Freshwater mussels.

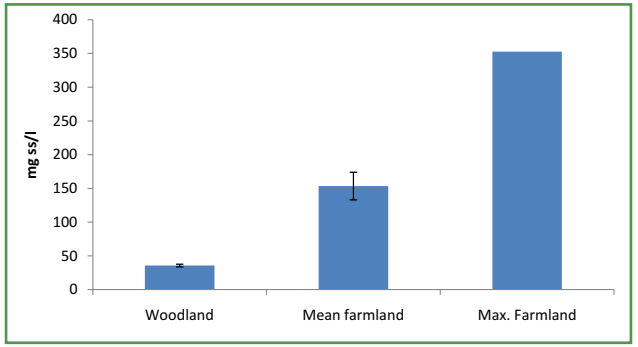
Native bivalves such as duck mussel, painter's mussel and giant pea mussel are present at a small number of sites along the stream, living in the silt and gravel, while alien zebra mussels are abundant in the reservoir, and in the stream below it. Native white-clawed crayfish have succumbed to a fungal disease associated with introduced signal crayfish which have expanded their range rapidly across the country in recent years. White-clawed crayfish were recorded in the upper Eye Brook in 2010 but if experience from other catchments across the country is anything to go by, they now face a rather short future there.

There were reports of water voles in the past, but this species has not been seen on the Eye Brook for a while. The most recent records are from Stockerston in 1997 and 1998. Otters had a hard time through the second half of the last century because of the use of organochlorine pesticides, and were absent from the Eye Brook for many years, but their fortunes have changed dramatically. Initial signs that they were on the way back took the form of 'spraints' (droppings) found at Eyebrook Reservoir in 1997 and 1998. By 2003, there were more frequent sightings and otters were recorded as far upstream as East Norton, although most of the records have been from the lower catchment. Despite the fact that records often take the form of road casualties, all the signs are that otters are now once again well established in the Eye Brook.

While the main issue for the Eye Brook is sedimentation, an associated problem is phosphorus. Phosphorus in water causes plants and algae to grow. It is the cause of the familiar blanket weed on ponds, and the occasional blue-green algal blooms

found in reservoirs. It is one of the nutrients applied to crops, but this is less of a problem in itself than its strong association with fine soil particles. The fact is that the more soil moves from land to water, the more phosphorus moves with it. Algal growth causes ecological problems by shading out other life and by depleting the water of oxygen when it dies back and decays. It also creates substantial additional water treatment costs for the water companies supplying us with drinking water.

A comparison of an arable catchment at Loddington with a grass one at Tilton on the Hill revealed that the amount of phosphorus bound to soil particles in stream water was ten times higher in the arable catchment than in the grass one. The difference was greatest during rain when most runoff and erosion takes place. Pasture was able to absorb some of the water when it rained whereas water poured off arable land much more quickly, carrying some soil with it. Looking at the Eye Brook tributaries as a whole, there is enormous variation in the concentration of sediment suspended in water during storms. The sediment concentration in the highest yielding stream was ten times that in the streams flowing through semi-natural woodland and four times the overall average for all the farmland tributaries (Graph 3.3).



Graph 3.3: Suspended sediment (ss) concentration during storm events in woodland (representing pristine habitat) and farmland tributaries (mean and maximum). The mean for farmland is derived from 20 tributaries.

Farming accounts for an estimated 90% of the phosphorus ending up in the main stream because of the large amounts that move with soil during storms. Most of this is exported from the catchment and ultimately ends up in the River Welland and the Wash. However, farming is not the only source of nutrients. The Eye Brook is a very rural area with low human population density and so there are only two sewage treatment works in the catchment (at Belton and Tilton on the Hill). Most households in the catchment have septic tanks and these do not perform well on clay soils as waste water flows directly through the soakaways that receive water discharged from the septic tanks. The water is high in phosphorus which has a strong influence on the quality of streams. Combined with increased use of water,

sewage treatment works and septic tanks have increased the connectivity between households and the stream. Although the effect is localised to small headwater streams, it can be long lasting through the summer and early autumn when stream water is not diluted by water from agricultural land as it is in winter, so the impact in small streams is sometimes high. Clearly, those of us with septic tanks have a responsibility to address this issue. Roads can also be major pathways for sediment and phosphorus to get into the stream and so those of us who use the A47 and lesser roads through the catchment share some of the responsibility for sediment and phosphorus in the Eye Brook.

Buffer pools between field drains or ditches and the main stream can be used to reduce the movement of sediment and nutrients from land to water.

There are clear advantages in reducing sediment and associated phosphorus in water, both in terms of the quality of our environment, and in terms of its ability to provide us with clean affordable drinking water. Restoring arable land to pasture would clearly reduce the impact of farming on the stream, but would reduce the capacity of the area to provide food. Reducing cultivation can reduce the movement of soil and nutrients to water but the tractor wheelings ('tramlines') running up and down slopes are the main pathway in arable fields, accounting for about 80% of the runoff. Recent Allerton Project research showed that changing the orientation of these tramlines so that they follow contours can reduce runoff but it is rarely a practical option because of the shape or topography of fields in the undulating landscape that is characteristic of the Eye Brook, and for health and safety reasons. Research at Loddington is currently investigating to what extent tramlines can be managed to increase infiltration and reduce surface runoff, erosion and therefore impacts on water.

While these efforts may reduce the impact of surface runoff on the stream, the contribution of field drains remains largely unaffected. Allerton Project research on several farms in the upper Eye Brook catchment has investigated the potential of small field margin and field corner ponds, fed by ditches and field drains. These ponds simply act as silt traps, reducing the flow of water through ditches and allowing sedimentation to take place. The smaller the pond, the smaller the proportion of suspended sediment that is retained, and in practice, only the coarsest material is deposited in the ponds. There is a compromise to be reached here. The larger the pond, the more effective it is, but the larger the amount of land that is no longer available for food production. A number of small ponds located strategically in unproductive corners, close to the source of sediment, may help to reduce the impact of food production on the stream.

Frogs often spawn in field corner ponds.

Ditch and pond wildlife

Small field corner ponds, fed by ditches, hold back water on the farm during summer, extending the period in which wet areas are available for wildlife. This could benefit wildlife associated with the adjacent farmland, and with the ditches themselves. For example, recent research reveals that birds make greater use of dammed sections of ditch than ordinary lengths of ditch that are not dammed, especially in summer and autumn when farmland is otherwise dry. The benefits are small, but so are the features created. The larger the area of water, the more birds make use of them. In fact, the area of exposed mud left as the water recedes in summer is as important as the water itself. The mud is an important source of insects which live as larvae in the wet mud and emerge as free-flying adults during the summer, providing potential food for farmland birds. Exposed mud and lack of shading seem to be the main influences on the numbers of insects emerging, so trimming back adjacent hedges will improve conditions for insects and make the site more accessible for birds. Insect numbers declined as the ditches filled up with silt, which took about four years. Half of the bunded ditches were then dredged out and insect numbers returned to their original levels. There was a tendency for grassland ditches to support a larger number of species than arable ditches, with crustaceans dominating the latter.

Grass snakes are associated with water where they feed on frogs and small mammals.

There can be considerable conservation benefits of field corner ponds fed by field drains and ditches, at least to aquatic invertebrates, despite the fact that the water can be high in nutrients. Some of the pools support frogs, newts and grass snakes. Insects such as mayflies are generally excluded, but water beetles are well represented, including several scarce species. A PhD student compared the invertebrates in field corner ponds and bunded sections of ditch fed by field drains with traditional field ponds. The number of species and the overall abundance of individuals varied considerably between ponds. The relatively recently created field corner ponds and bunded ditches generally supported as many individual invertebrates and species as mature ponds in arable or grassland fields. For the microscopic zooplankton, there was also little difference in numbers between the newly created features and the older field ponds, due to the ability of these animals to colonise rapidly, but the number of species was lower in the field corner ponds and bunded ditches than in traditional field ponds, possibly because of lower flow through the latter. Eye Brook ponds also support many more wetland plant species than ditches or streams do.

Eyebrook Reservoir

Eyebrook Reservoir acts as an enormous silt trap. Water slows as it enters the reservoir and silt is deposited. Analysis of sediment cores taken from the bed of Eyebrook Reservoir has suggested that there had been an increase in the rate of sedimentation in the reservoir during the second half of the 20th century. This period coincides with the switch from pasture to arable following the Second World War. The period also saw government support for drainage of arable land. This would have increased the rate at which water leaves the fields and the amount of soil that went with it into ditches and streams. A decline in sediment grass pollen and spores from field mushrooms and other fungi associated with animal dung reflects the switch from pasture to arable, and an increase in cereal pollen in the bed sediment in the 1980s is probably due to the widespread introduction of field drains at that time.

Eyebrook Reservoir from the northwest.

Sedimentation within the reservoir reduces its water storage capacity. On the other hand, exposed mud around the inlet provides an important habitat, especially for some of the water birds for which the reservoir was designated a Site of Special Scientific Interest in 1956. The stream flow is also altered by the presence of the reservoir. The flow is lower downstream of the reservoir than upstream and the stream invertebrate community reflects this, with more species associated with sluggish water such as the North American shrimp *Crangonyx pseudogracilis*, water boatman and pond skater downstream than upstream of the reservoir. Environment Agency staff working on the Eye Brook and elsewhere have developed invertebrate community indices that can be used to assess stream flow through the year.

The reservoir trout fishery now caters for 11,000 rods who catch in the region of 29,000 trout per year. 35,000 fish are introduced into the reservoir each season at a minimum weight of 2 lbs (900g). Recent years have seen the introduction of generally larger trout in the 3lb to 4lb range and the average size of fish caught at Eyebrook Reservoir is now 2lb 12oz. Double figure fish are being caught on a regular basis. Anglers travel from all over the world to fish at the reservoir, especially from the Czech Republic, Belgium and France. The most prestigious annual event

held at Eyebrook Reservoir is the Lexus European Fly Fishing Championship which is attended by the world's leading fly fishers. Although relatively small numbers of brown trout are stocked, the small size and good condition of a few of the brown trout caught in the reservoir suggests that wild fish may enter the reservoir from the stream. However, there is no firm evidence that there is a continuous population between the reservoir and the stream, with young fish produced in the upper stretches ultimately entering the reservoir.

Happy angler with an exceptionally large rainbow trout at Eyebrook Reservoir.

The reservoir also supports a wide range of naturally occurring fish species such as roach, carp and tench. As with the trout, large individuals have been recorded, including tench of 10lb and carp in excess of 40lb. At one time, eels used to be trapped in the reservoir for export to Holland. In the 1960s, an enormous eel of 8lb 10oz, considerably larger than the record rod-caught eel, was found in the fish traps at the Caldecott pumping station. Since a couple of records of eels in the early 1990s, this species appears to have been lost from the Eye Brook, as is the case for much of the rest of the upper Welland.

Recent conservation work carried out at the reservoir includes the installation of two tern rafts to replace older rafts that had previously been very successful in encouraging common terns to breed. Local bird ringers use the site which boasts a large colony of tree sparrows in nest boxes on the western bank. There are approximately one hundred nest boxes at the site, with about half of them being used by tree sparrows and the rest by other species such as blue tits, robins, kestrels and barn owls.

Counts of migratory ducks carried out by the Leicestershire and Rutland Ornithological Society have revealed winter peaks of nearly 3,000 tufted duck, 2,000 wigeon, 1,000 teal, 500 gadwall and pochard, and 300 mallard. Smaller numbers of pintail, shoveler, goldeneye, goosander and smew are also frequently recorded. Wintering Mallard numbers have been declining steadily since the 1970s, and peak counts occur earlier in the autumn than previously. This may be because of an increase in

the British breeding population and a decline in the number of birds migrating from Eastern Europe as a result of less severe winters in northwest Europe in recent years. The decline in wintering Bewick's swans since the 1970s may also be due to less severe winter weather in north-west Europe. Numbers of whooper swans, on the other hand, although relatively low, have been increasing since the late 1980s, but arrival times have been getting later. Again, this may reflect the later onset of severe winter weather in their northern breeding range. Climate change is also likely to be a contributory influence in the dramatic range expansion of little egrets. Until the 1980s, little egrets were confined to southern Europe, but numbers have increased considerably at Eyebrook Reservoir since the mid 1990s.

Little egrets have expanded their range northwest in response to climate change and have been a regular sight at Eyebrook Reservoir since the mid 1990s.

The long view

Clearly, a wide range of wildlife in the Eye Brook area is considerably influenced by global changes, not least in climate, just as crop and livestock production are influenced by a global market rather than a local one. Regulation and economic incentives are increasingly set at European or global levels and this also influences what happens at the local scale. For example, farmers receive annual area payments (a set amount according to the area they manage), the rates being determined largely by EU policy. The payments are conditional on compliance with basic agricultural and environmental criteria (cross-compliance), and additional payments are available for more targeted environmental management through Entry Level and Higher Level Stewardship schemes. Payments are also sometimes available from government sources for even more targeted management to meet specific environmental objectives. As part of Leighfield Forest, much of the Eye Brook

catchment is currently targeted for woodland creation and management, with grants being available specifically for this purpose. Such economic incentives have influenced the way land is managed since the Second World War and will continue to do so.

The European Union's Water Framework Directive sets targets for the chemical and ecological status of watercourses across the continent. This is what has focused attention on nutrients and sediment in streams across the country, and the relationship between streams and the land through which they flow. The intention is to reduce the costs of cleaning water for domestic use, to reduce the deterioration of streams and ponds as habitats for wildlife (including fish that are valued for fishing), to reduce the incidence of flooding, and to stop the reduction in water storage capacity in reservoirs. The Water Framework Directive also aims to address the problem of pollution of groundwater that is a major source of our drinking water, and of the coastal waters on which our fisheries and coastal tourism depend.

Targets set by the Water Framework Directive include measures of nutrients and other chemicals in water, and the fish and invertebrate communities for which that water is a habitat. Targets are set, and conditions scored, against the conditions that might be expected in the absence of human impact. The Eye Brook is classified as being 'good', just one level below pristine status which is classified as 'high'.

The land use maps presented earlier in chapter one (pages 21 & 28) were used as a focus for discussion with six water quality and land use experts in an attempt to place the current targets in a historical context. The experts agreed that in medieval times, although the cultivated area was relatively large, there would have been little cultivation close to the stream as this would have flooded seasonally, especially in the lower reaches, or otherwise been too boggy to cultivate. In addition, there was a fallow stage in the rotation and cultivated land was interspersed with woodland and 'waste' which would have been less susceptible to erosion. In the 1840s, the cultivated area was much smaller, but livestock densities had increased considerably and stream sides are unlikely to have been fenced to keep livestock out. This would have contributed to bankside erosion and loss of soil to the stream. In the second half of the 20th century, the cultivated area increased considerably, field drains had been extensively introduced and piped water to houses, sewage treatment works and septic tanks increased the flow and connectivity of water and associated waste between domestic houses and the stream. There was general agreement amongst the experts that the chemical and ecological status of the Eye Brook would have been better in medieval times, and in the 1840s, than it is today.

The Eye Brook at Skeffington Wood.

This raises the question of what the current 'good' status allotted to our stream actually means! Current targets are in effect somewhat subjective. A parallel example is that of targets set for bird conservation which are based on numbers present in the late 1960s when breeding abundance of birds was first quantified and therefore represents a very recent and arbitrary reference period. The historical land use exercise explored a period of a thousand years of human occupation, but conditions would presumably have been considerably more benign before human occupation, when woodland predominated. The closest we can get to understanding this is to compare the amount of sediment carried in streams flowing through ancient semi-natural woodland, which may represent near pristine conditions, with that in streams flowing through land used for food production. As we have seen in this chapter, the amount of sediment in the latter is up to ten times higher. It is unlikely that we can bridge this gap while still producing enough food for a growing population in future. There are trade-offs and compromises to be made, as well as complementarities in land use to be explored. Such issues for our future management of the catchment are the subject of the next chapter.

Chapter 4. The Eye Brook catchment in future

There are more of us living in the Eye Brook catchment than at any time in the past, and as we saw in chapter one, half of the population increase over the past millennium has taken place in the past century. There have been some key changes in farming systems. In the 9th century, dispersed farmsteads gave way to nucleated settlements and the introduction of the feudal open field system. Later, enclosure marked the end of this system and a switch from mixed farming to livestock production, and the associated removal of people, even whole villages, from the land.

The 19th and 20th century increase in population reflects the changes that occurred in the country as a whole over this period, and especially the exploitation of resources associated with the Empire, industrial development, and improvements in agricultural production. The latter marked a 'Green Revolution' with considerable increases in external inputs such as fertiliser and pesticides to farming systems, and improvements in plant and livestock breeding. All of these benefits to society, and contributors to population growth, were to a large extent fuelled by the increasing availability of fossil fuels. Today, there is concern that those fuels, whether coal, gas or oil, are a finite resource. Even the supplies of uranium for nuclear power generation and of the rare earth metals that are essential for 'renewable' energy technology are exhaustible.

Much of the increase in agricultural productivity can be attributed to greater use of nitrogen fertiliser, the making of which is a highly energy intensive process requiring fossil fuels to maintain it. The increased use of phosphate fertiliser has also been a major contributor to increased agricultural production. Unlike nitrogen fertiliser, phosphate cannot be made but must be mined and imported, just as fossil fuels are, and as with fossil fuels, supplies are limited. While alternative sources of energy could be adopted for making nitrogen fertiliser, this is not an option for phosphate. As we saw in chapter three, as well as being wasteful, inefficient use of

West African port used for export of phosphate fertiliser.

nutrients results in negative impacts on wildlife, and on the fundamental resources that we need for our own survival, such as air and water. There is general agreement that supplies of both oil and phosphate are peaking around about now. This does not mean that they are about to run out, but with a growing human population, increasing consumption, and a declining supply of these essential resources, their cost is likely to increase considerably faster than it has to date. There has already been a four-fold increase in the cost of fertiliser in the past decade.

Of even greater concern at the global scale is the supply of water, a renewable resource, but a finite one. Much of the food we import is dependent on massive water use for its production, often in countries that have much lower supplies of water than we have. Across the world, the frequency of wars over water supply is predicted to increase, alongside similar disputes over fossil fuels and food. Eye Brook residents are fortunate to be living in central England! But, as we have seen, people in the Eye Brook catchment are far from isolated from the wider world and very much influenced by global issues. This is illustrated by the food we eat.

Food

Yields of both arable crops and livestock products have increased substantially over the past half century or so, driven by increasing use of inputs such as fossil fuels and fertilisers, and by the development of crops and livestock that are able to respond to them. Much of our food is imported from abroad, most of the rest is imported from elsewhere in the UK, and very little of the food produced locally is consumed locally. There is only limited consumption of locally seasonal food in this global market place, and a popular expectation that all foods should be available throughout the year. Transport of food is an energy intensive process with accompanying implications for climate change through emissions of greenhouse gases. It is in response to these concerns that there has been a gradually growing interest in locally produced food, with an increase in the popularity of farm shops, and farmers' markets in local communities, as in others across the country. Such developments offer an opportunity for revitalising rural communities, both in terms of their economy and their social cohesion, strengthening the link between people and the land that supports them.

Locally produced food is not the whole answer, or even the main answer, for many people though. How feasible would it be to grow all or most food locally, say within the parish for each village? This question has wider implications than simply understanding whether it would be possible. Perhaps most revealing is knowledge of the land area needed to feed us, whether that land is local or spread further afield. What

are the implications for the vast majority of the population with no immediate access to productive land? We can take Tilton on the Hill, at the head of the Eye Brook catchment, as an example area to explore this issue.

Tilton has a population of about 530 and the area of Tilton parish is 609 hectares (1,506 acres). There is no reason to assume that the diet of people in Tilton differs very much from that of the rest of the British population. For example, national statistics reveal that, on average, we each eat 18kg of red meat, 10kg of eggs, 145kg of dairy products, 82kg of potatoes, and 99kg of other vegetables each year. Based on yields for current farming methods, this would require a minimum area of about 83 hectares (205 acres) to feed the parish of Tilton. That is about 14% of the Tilton parish area. Tilton could currently feed itself very easily.

If food was to be produced locally, there would, of course need to be a change in our diet. No more bananas or oranges for example! In a questionnaire survey carried out in Tilton in 2010, 78% of the 76 respondents agreed to some extent that local food production might benefit the community, with women being more inclined to adopt a local food diet than men were, but only 3% of the respondents said that they would be prepared to give up imported fruit. This may partly be as a result of the loss of fruit varieties and the knowledge of storage methods used to prolong the availability of locally produced fruit beyond the harvesting period. There is an increasing recognition of this, and a move towards the valuing of, for example, the very wide range of apple varieties available, each with different storage and eating properties. There is also increasing interest in methods of fruit storage such as preserving, or simply boxing up apples for the winter, that would reduce the need for imported fruit.

The upper Eye Brook catchment, showing Tugby Wood, with Skeffington and Tilton Woods in the distance.

This analysis has concentrated on the ability of Tilton to feed itself. However, not far away are the towns of Uppingham, Oakham, Market Harborough and Corby, to say nothing of the city of Leicester, the people of which all also require food, but have little land to produce it. In fact, 80% of the UK population lives in towns and cities. If Tilton was to feed its share of the urban population, the land area needed increases to 75% of the parish area, leaving 25% for houses, roads, streams and woodland. Of course, this makes no allowance for the export of products to other countries. Given a rapidly increasing population, the pressure on land is becoming apparent. This implies that there might need to be more dietary changes if there is to be enough land to produce food for others, as well as the people of Tilton.

The most land-hungry types of food are meat and dairy products. If the use of these is cut to a bare minimum, perhaps only eating meat at times of celebration, and dairy products less often than we currently do for example, then the land area needed to provide food would be reduced by about 30%. The questionnaire survey revealed considerable unwillingness to adopt a low meat diet. 16% were already on a low meat diet, and 5% would consider changing, but 40% would consider only some moderate change in meat consumption, and a further 40% would not consider any change at all. That will be reassuring news for the livestock farmers who produce meat from sloping land with poor soils that can be used for little else! The Eye Brook catchment is well suited to meat production. However, eating less meat than we currently do could have additional benefits such as reduced risk of health problems such as stomach cancer and coronary heart disease.

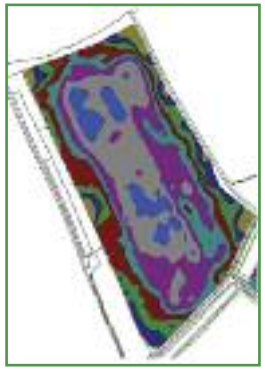
Estimating the area of land needed to produce food locally is also interesting from a wider perspective as the same principles apply wherever that food is produced. The land area can be considered as being indicative of the area needed to provide food, rather than being illustrative of the area that might actually be used. What we choose to eat influences how much land is needed to provide it, wherever it is. Current highly productive farming means that a large population can be fed from a much smaller area than was the case just half a century ago. However, the increases in yields

Hemp cut prior to baling.

of wheat and other commodities have slowed in the past decade and could even decline if inputs cannot be maintained because of limited availability or high price, or regulatory restrictions for other reasons. As oil prices rise, the price of synthetic textiles is likely to do the same, and there is already a developing interest in the production of plant fibres such as hemp and flax which would require additional land. New methods of farming need to be developed to maintain, let alone to increase yields. This is currently the subject of much debate, but rather limited original applied research, in the UK or internationally.

Flax ready for harvest.

Organic farming, in which external inputs are greatly reduced and most resources come from within the farming system, tends to be lower yielding than high external input food production methods and so requires a larger area to feed the same number of people. The extent to which this is the case remains the subject of debate as direct comparisons between organic and high external input farming systems are difficult to make, and there is considerable variation between the performance of individual commodities under the two systems. It has been suggested that organic farming produces two thirds of wheat yield of conventional farming for example, although yields of other organic foods may range from 70% to 100% of their high external input equivalent. Organic farming is



Modern New Holland combine harvesting wheat at Loddington in 2010 with (right) yield map for a field of winter wheat. © Alex Butler

also often dependent on relatively high use of fossil fuels for operations such as mechanical weeding.

At least for the major staple foods such as cereals that perform relatively poorly under organic conditions, integrated crop management, in which judicious use of external inputs is combined with on-farm resources, may offer greater promise. An expansion of activity in plant and animal breeding may offer other opportunities. Greater precision in the use of inputs is already being adopted as a result of increases in input prices. For example the use of Geographical Positioning Systems (GPS) ensures that cultivations and applications of fertiliser and pesticides are carried out precisely, according to the needs of the crop, improving efficiency of use and reducing negative environmental impacts at the same time. Fertiliser spreaders can respond to changes in crop colour, applying more fertiliser to pale struggling plants and less to those that are growing vigorously. Variation in crop yields across fields can now be mapped accurately by modern combines so that inputs can be adjusted accordingly for following crops. Local farms are already adopting this type of technology. There are therefore numerous opportunities to combine traditional knowledge and methods with new technology. Such improvements in resource use efficiency also help to reduce emissions of CO_2 and other greenhouse gases.

Further research into weed control, nutrient management, crop varieties that are resilient to climate change, and other climate change adaptation and mitigation measures will be essential to developing food production methods that are sustainable in the long term. Some natural resources that are currently available may be under-utilised. Treated sewage sludge from sewage treatment works is increasingly used to improve the condition and nutrient status of agricultural soils for example. Rabbits that were once a major source of food are now a major pest species that is not fully exploited as a source of food, and numbers of deer are increasing, representing another source of meat that could be exploited more than is currently the case.

Rabbits are now as much a pest as they were in the 1930s, but are an under-utilised resource as a source of meat.

At the household scale in the Eye Brook catchment, there is increasing interest in home-produced food, reflecting a similar trend nationally. The demand for allotments has increased across the country, but in the Eye Brook catchment, only the villages of Tugby and Caldecott currently have any. In addition, many formerly large and potentially productive gardens have been built on in recent years. There is currently some small-scale land sharing in the catchment in which local people grow food in gardens or on other land that would not otherwise be used productively.

Although there has been a move towards larger farms in the past half century, there has also been an increasing interest in managing smallholdings. About 600 scythes are bought annually in the UK, many of which are presumably being used to mow lawns, control weeds, and produce hay for small-scale livestock production, while also keeping their owners fit. 'Productive leisure' of this sort has an important role to play in addressing the increasing issue of obesity and associated health problems. For some, this can be countered by leisure pursuits such as cycling and walking, or even drives into town to exercise in the gym! However, as we found in chapters one and two, walking and cycling were once the only means of getting about for most people and offer considerably more potential than a leisure pursuit. As well as the health benefits, such activities are empowering individually and increase social cohesion within the community, while also reducing environmental impacts and the demands on resources.

Soil and water

The climate is changing. The emergence of new weather patterns means that the weather becomes more uncertain, with more extreme weather events for example. Climate change predictions are for drier summers and for more frequent heavy storms in winter, with generally milder weather in winter than has been the case in the past. Clearly, Eyebrook Reservoir is going to be an increasingly valuable resource in terms of water storage, but its capacity to perform this function may be limited by increased sedimentation associated with winter erosion of land used to produce food. We may see the construction of smaller scale reservoirs on farms in the catchment to provide water for food production. There is inevitably a trade-off between food production and other issues such as water quality and quantity. Nevertheless, as we saw in chapter three, methods are being developed to reduce erosion from arable land. It is unlikely to be possible to improve water quality to that of pristine streams associated with ancient semi-natural woodland, but new methods of soil management and other measures enable steps to be taken in that direction. These approaches may also help to reduce the incidence of flooding

that can otherwise be expected to increase, as well as improving water quality for people and wildlife alike.

Climate change is predicted to have a number of impacts on farming. Some pests and diseases are expected to increase, as we saw in 2007 when the midge associated with Blue-tongue disease of cattle spread into the UK. Waterlogged ground in winter may mean that livestock need to be housed more than is currently the case, while drought in summer requires careful storage of water and management of soils to improve their moisture retention. Some crops that are currently only grown in southern Europe may find a place in central England, but these will often require irrigation. At the household level, adapting to these changes may include taking on board some approaches from the past. There was a time when most houses had a water butt but these went out of favour when mains water was introduced. Now, they are seeing a revival.

Reservoirs such as Eyebrook will have an increasingly important role as summer drought conditions become more frequent in future.

In the 1930s and '40s, each person used about one bucket of water per day, or about 15 litres. Today, we each use about 150 litres of water per day. This represents a considerable increase in demand in terms of water supply, but also in terms of discharge and treatment of waste water. There are climate change implications as well. Each litre of water consumed is associated with about one gram of CO_2, 30% of which is associated with supply, and 70% with treatment of waste water. That amounts to about 55kg of CO_2 per person over the course of a year.

Large amounts of water are also used to produce food and other goods, many of which are imported, often from countries that are more water-stressed than the UK. The concept of a water footprint can be used to estimate the amount of water required to provide basic foodstuffs and could provide the basis for a labelling system that would make consumers more aware of their demand on water resources. Using water footprints as an indicator of water consumption associated

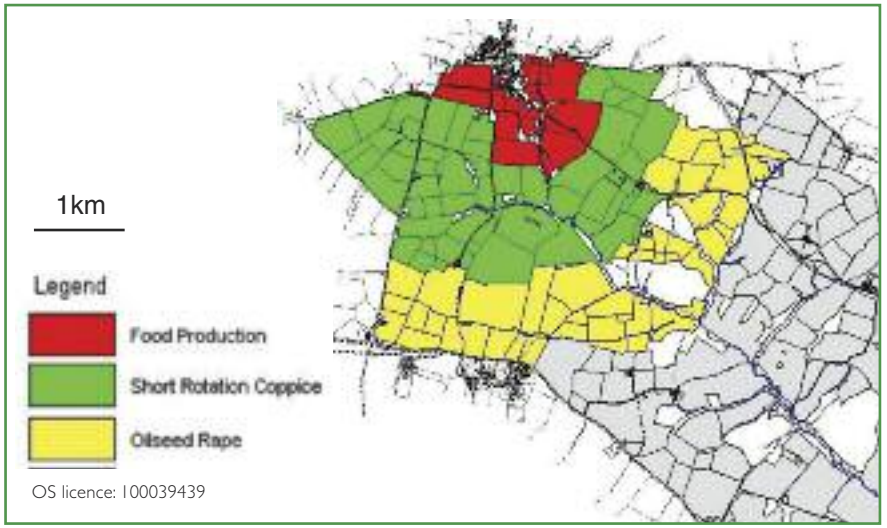
with food was met positively in a recent small survey of the people of Tilton, but there is a need to make it clear what the footprint means, especially as price was the key factor for most of the people interviewed. Different forms of education from primary school level to broader public information drives were suggested to add weight to any water footprint figures that might be used.

Energy

There are also numerous examples of innovation in terms of energy generation and use. Renewable energy in its various forms is seen both as a means of reducing carbon emissions and their contribution to climate change, and of countering our reliance on fossil fuels. Included under this mantle are solar thermal and photo-voltaic panels, ground-source heat pumps, wind turbines, and biofuels such as logs, woodchip from short rotation coppice willow, and biodiesel from oilseed rape. These provide potential economic opportunities for local people, and for the wider economy. Could we produce our own energy locally? In order to answer that question, we need to know how much we use. Again, work carried out at Tilton can help us answer this question. A survey of forty households carried out for the environmental group, Tilton Green, revealed an enormous range in the amount of energy used.

Freight lorries pass the coal powered Ratcliffe on Soar power station that provides electricity into the national grid. Local goods and micro-generation of renewable energy may play an increasingly important role in future.

If we assume that the energy needed for household use is provided by woodchips and that the additional energy used for travel comes from biodiesel, given current yields, 356 hectares of short rotation coppice willow and 322 hectares of oilseed rape would be needed to meet the requirements of the population. That amounts to 110% of the parish area (Map 4.1). Although these are only very rough estimates, this approach is clearly not the answer to the energy supply problem. Other alternative or additional means of providing renewable energy are required. As with our diet, reducing energy consumption makes the aim of meeting the community's



Map 4.1: The village of Tilton on the Hill with the area of land needed for local production of food (red), woodchip fuel (green) and biodiesel (yellow), based on current food and energy consumption and production methods.

needs locally more realistic. If the average energy consumption for Tilton was that of the current lowest consuming household (for both household and travel use), then the total area needed to provide energy from biofuels would be 177 hectares. That is about 26% of the Tilton parish area. Using energy less, and more efficiently, could make a big difference, although as with the supply of food, there is still a very large urban population to consider. Using energy less also means considerable economic savings in terms of household running costs.

At current levels of food and energy consumption, the land area needed for the population of Tilton, without export to urban areas, is about 125% of the Tilton parish area. Clearly, we could only sustain ourselves through local production if we reduced our consumption, or adopted different means of generating renewable energy. Recently introduced feed-in tariffs for wind and solar electricity generation, amongst others, provide economic incentives for energy production methods that involve minimal diversion of land from food production, bring income to rural communities, and can empower individuals to live more sustainably and independently.

Tilton on the Hill is the highest point in the catchment and the site of the most recent windmill in the catchment, so it was perhaps the inevitable choice for the first

Photo-voltaic panels being installed on a local house.

planning application for a medium-sized modern wind turbine which took place in 2010, exactly a century since the previous windmill closed. The application was refused on the grounds that the turbine would impinge on views of historic buildings and insufficient information was provided on the extent to which nearby residents would be affected by noise. However, most of the debate was focused on other areas of concern and revealed conflicting views about the visual impact of the turbine, and for some people there were conflicting objectives between the future provision of sustainable energy, and retaining what was perceived to be a traditional landscape. As pressure on the land for production of food and fuel increases to meet the rising demands of a growing population, it will become increasingly important that we adopt new, clean, energy producing technologies. While solar and wind energy generation can make important contributions, they cannot meet all our energy needs and additional sources such as wood fuel and anaerobic digestion of farm slurry, human sewage and food waste to produce 'biogas' are likely to become increasingly important. Other means of energy generation will need to be developed if current energy consumption is to be maintained, but it would seem sensible to reduce consumption in order to ease this pressure on energy generation.

As has always been the case, there will continue to be changes in the landscape to meet our changing demands on it. What future changes would local people like to see? In 2007, 108 residents in the upper Eye Brook catchment took part in a questionnaire survey about future land use. They were asked to comment on the relative merits of:

- continuing the current land use *(status quo)*
- a scenario in which biofuels were the main objective
- a scenario that was driven by the need to improve water quality under the Water Framework Directive (WFD), and
- a scenario devoted to wildlife conservation ('rewilding').

The biofuels scenario was the least favoured at a personal level, but the most favoured for the community as a whole, with the more educated members of the community especially tending towards this opinion. Rewilding was most favoured at a personal level but ranked in third position for the community as a whole. Men especially preferred the rewilding option. Younger respondents favoured the biofuels scenario more than older ones did. There was considerable disagreement amongst women over and under 55. Older women ranked biofuels last and the water quality scenario first, while the reverse was true for younger women. Respondents with farming links favoured the *status quo* and biofuels options. The water quality scenario provided the strongest common ground between farming and non-farming respondents providing an opportunity for developing a strategy that meets multiple objectives. In practice, a multi-functional landscape is likely to be the most acceptable and the most resilient to future uncertainties.

A modern high-tech woodfuel heating system for a local four bedroom house.

This survey was a snapshot in time and attitudes may well have changed since the survey was conducted. For example, the negative side of biofuels production has come to public attention only after the survey was completed. The relatively low input to output energy ratio of biofuel crops in England compared to those in the tropics, and the considerable negative environmental impact of biofuel production in Asia for example, may have influenced opinions about the merits of this scenario had the information been more widely available at the time. Nevertheless, the results reveal that there are differences in opinions between various members of the community, according to their age, gender and involvement in farming. Acknowledging and accepting these differences is essential to any plans that might be made for the future.

Wildlife

Given this increasing pressure on the land, what are the implications for wildlife? The resources available to wildlife, and to us, are limited, and we are competing for them. The greater the production of food from farmland, the fewer the wildlife species that are able to live there. Given the severity of the challenges that seem to face us, we might ask whether wildlife warrants any consideration. There are several examples from chapter three to suggest that it does. Apart from the intrinsic cultural values attached to wildlife, there are numerous ways in which wildlife has more tangible values to us.

Common reeds being used to purify waste water, just outside the Eye Brook catchment at Lowesby sewage treatment works.

These values to society are termed 'ecosystem services' which, while a rather cumbersome example of current jargon, serves to represent these more tangible benefits. As we have seen in chapters two and three, wildlife provides food, albeit a small proportion of our overall diet. Procuring such food, such as hedgerow fruit, game birds, mammals and fish by gathering, shooting and fishing is embedded in our cultural heritage. The presence of wildlife in the countryside is also valued for the sense of well-being it brings and is an integral part of our enjoyment of the local area. Numerous insects are important for pollination and subsequent fruit-set, not just of the hedgerow shrubs referred to in chapter three, but many of the crops that we rely on for our food. Beetles, spiders and various parasitoid insects have an important role in the control of crop pests, and the importance of this role is likely to increase as the cost of control methods based on pesticides increases in future. Earthworms and soil fungi provide an important function in maintaining soil structure, and in improving its capacity to absorb and retain water. Mycorrhizal fungal communities may perform an increasingly important role in future by increasing the availability of phosphorus and other nutrients to crop plants, although this potential is currently poorly understood. Trees sequester carbon, both above and below ground. Plants growing in ponds and ditches help to purify water from productive land, and reeds are used specifically to treat domestic waste water in some small sewage treatment works such as the one at Belton.

Earthworms and soil fungi provide an indicator of soil health and therefore its ability to support crop production. Other wildlife also serves as an indicator of the quality of the environment that we share with it. Various insect communities can be used to assess water flow, nutrient concentration, or sedimentation. Lichens provide an indicator of air quality, and the range expansion of some insects, the flowering dates of some plants, and the migration and nesting dates of some bird species provide indicators of climate change. This role for wildlife could become increasingly important as we move into a more uncertain future. The records we have of wildlife in the Eye Brook catchment may provide a valuable barometer of the health of our air, land and water.

Although, on the face of it, there seem to be trade-offs to be made between food production and wildlife, there are clearly also complementarities, with some species benefiting crop production, and also benefiting from it, if the appropriate habitats are integrated within farmland. Linear features such as hedges and grass strips make

The upper Eye Brook catchment, showing Oxey Farm and the disused railway line in the foreground, and Halstead at the head of the catchment on the skyline.

productive land accessible to wildlife. On a larger scale, the disused railway line connects up small farm woods with the larger ancient semi-natural woodlands in the catchment. Such linear, relatively unproductive land may become increasingly important in enabling wildlife to respond to future changes in climate.

While some species certainly benefit from land that is undisturbed over long periods of time, such as the rare woodland plants of local ancient semi-natural woodland, others can be more closely associated with productive land. A matrix of natural and intensively managed land, interspersed with pockets of relatively undisturbed habitat such as woodland, would seem to be the optimum landscape to meet the needs of both people and wildlife. It is this sort of landscape that currently characterises the Eye Brook catchment. This provides a good foundation on which to build a system of food production which also supports wildlife and incorporates the multiple means of producing water, energy, fibre and recreation discussed in this chapter.

How this will be achieved is not yet clear and is likely to vary between individual farmers according to their varying interests and the varying landscapes in which their farms are located. It may require greater collaboration between farms than is currently the case. In a recent survey, 37% of farmers collaborated on farming activities for their businesses, 30% collaborated on shoots, but only 7% collaborated through Environmental Stewardship agreements for wildlife conservation. Wildlife has direct cultural and agri-cultural benefits to individual farmers, while many of the benefits that are delivered by farmers are enjoyed by the wider public. The way in which public benefits, whether in terms of wildlife, or wider benefits involving wildlife, can be delivered without impinging on the core objectives of a productive landscape, continue to be debated and developed. To be successful, they are likely to require the combined knowledge and resources of policy makers, scientists and individual farmers in local landscapes.

Chapter 5. Conclusions

The previous chapters are the result of the work of numerous individuals, including those living and working in the Eye Brook catchment, and others living outside it. They have included farmers and other rural workers, historians, naturalists, academics and others. Learning about the area and the way it is used to meet our needs from different perspectives has been an enlightening process.

In chapter one, we learned that there have been very considerable changes to the landscape and the way it has been managed, according to the changing needs of society. The landscape we enjoy today is far from timeless and is constantly changing. Food security was a major issue during the early medieval period when crop yields were very low by today's standards and a large proportion of the land area was cultivated to meet the needs of the population. That changed radically following plague and later enclosure between the 16th and 18th centuries when the emphasis switched to the production of meat and wool for sale outside the system. Agricultural productivity improved through the following centuries.

Belton historian Audrey Walker discusses the occupations of the Belton residents of 1881 with other Eye Brook catchment residents.

Throughout much of human history in the catchment the use of woods and agricultural land has been integrated, although the relative proportion of each fluctuated according to the requirements for food production. Woods provided foraging areas for pigs, a source of fuel, timber for building houses and vehicles, and an area for recreation. Farming systems were also more integrated than they are today, with rotations involving livestock and arable crops, and use of manure from humans and farm animals to fertilise those crops. Nutrients were recycled within the system. Water, wind and woods were exploited as sources of energy to supplement that from human power and animals that were harnessed for farm work, transport and domestic energy.

In chapter two, we heard from local people with memories of the 1930s and '40s, a period of rapid transition into the fossil fuel based society with which we are familiar today. This transition was largely responsible for the massive increase in population that took place in the 20th century, and continues today. With the exception of the influence of the railways that were introduced in the late 19th century, many of the requirements of the population were still sourced locally. A substantial proportion of that population still worked on the land in some way, or provided services to those who did, and communities were still more integrated than they are today. Many people kept their own pig, grew their own food, harvested wild food, and preserved fruit for the winter. Seasonality of food production and consumption was assumed and appreciated. Walking and cycling were the main means of getting about, and water was still from private or village wells. In this period, sanitation improved, increasing hydrological connectivity between human settlements and the stream, the first pesticides and synthetic fertilisers became widely used, and a larger area of land was cultivated to address the issue of post-war food security. The move from horses, fuelled by locally grown grass and oats, to tractors and cars fuelled by fossil fuels increased mobility outside the community and marked a massive and symbolic change to a society that was increasingly dependent on external sources of energy, food and other goods.

Colborough Hill, with Robin a Tiptoe Hill in the background.

Historically, change has often been top-down, imposed from above, such as the 9th century development of nucleated settlements and their feudal societies, or the ploughing up of pasture for arable crop production during the Second World War. The latter was a policy that was implemented rapidly as a necessity to feed the population. The Enclosure Acts of the 16th to 18th centuries were stimulated by economic opportunities for those in power. On the other hand, late medieval society found itself better able to feed itself as a result of substantial depopulation resulting from plagues.

We are not in the position of the 14th century population who had little or no warning of the arrival of the Black Death. We know that we have challenges ahead and that we need to make changes of our own today, but the mechanisms for doing so are not yet clear. Are we to follow the top-down policy driven approach, follow economic drivers, or embrace the need for change at the level of the community, and as individuals with some degree of choice over the directions to take? In practice, it is likely to be a combination of these. As was the case with enclosure, communities at a range of scales are likely to respond to today's challenges at different rates, although certainly not over the course of three centuries!

The economically driven enclosure of land benefited some and disadvantaged others, in many cases very considerably. Peter de Neville's plundering of the medieval woodland to the detriment of everyone but himself also reminds us of the risks associated with personal greed. On the other hand, enclosure in Belton and East Norton is an example of how the needs of the poorer members of the community were accommodated by providing access to land.

As we learned from chapter two, even in the 1930s and '40s, people in the Eye Brook catchment were still living more sustainably and with less, although no less happily, than we are today. Most resources were sourced locally. Even some vehicles were still made locally out of materials from local woods, and when necessary were repaired locally, providing a high degree of independence to rural communities. This is a sharp contrast to the built-in obsolescence of today's technology which is dis-empowering and wasteful of resources. The skills for procuring and managing resources were passed between generations through day to day interactions and social activities. The high degree of mobility associated with modern life has broken these ties within communities and contributed to the loss of many practical and sustainable skills.

Catchment residents learn about Eyebrook Reservoir and its links with the upper catchment.

In chapter three, today's land management within the catchment was explored in relation to its impact on the environment. Woodland is largely managed specifically to meet conservation objectives. Grassland and arable farming systems are more isolated from each other than they have been in the past. Meat, milk and arable crops are often produced independently on different farms for a global market, with inputs of pesticides and fertiliser also bought in a global market. The Eye Brook catchment is far from isolated from the wider world in other respects too. It has an impact on the coastal waters of the Wash and beyond, its bird species are part of an international population that extends to Africa, and wildlife species are influenced by global changing climate, as indeed we are. Wildlife provides an indicator of our impact on climate, soil, air and water.

Joe Nourish discusses his wildlife conservation work with visitors to his farm at Beaumont Chase.

Environmental problems associated with food production, such as declines in wildlife species and sedimentation of the stream are being investigated by the Allerton Project at Loddington, and practical methods for addressing these impacts are continuing to be developed there, and applied nationally. Following several decades of emphasis on food production alone, we are increasingly recognising what previous generations have known all along, that the environment performs multiple functions that have benefits for us, and that we need to manage the interactions between them. Understanding these interactions and prioritising the various 'services' provided to society by the environment is our current challenge. For example, the requirements of wildlife conservation in terms of the land area lost from food production are likely to differ between farming systems and scales and remain difficult to quantify. Despite the policy focus on improving water quality in agricultural catchments, the trade-off between, for example, sediment load and food production still needs to be adequately defined.

Proper popular understanding of these trade-offs in ecosystem services is poor. In 1881, a third of the population of Belton was involved in farming. Today the equivalent figure is 2%, and most of the rest of the population has little connection with the land and the wildlife associated with it. Many are from urban backgrounds and commute outside the area to work. An aim of this project, the events and publications arising from it, including The Eye newsletters and this book, is to share knowledge of the issues associated with the management and use of natural resources. A teaching pack also arises from this project and provides primary school children with information on issues associated with the sustainable use of natural resources in the catchment, and more widely. The project has helped to stimulate interest in such issues and to strengthen local identity within the catchment.

Small woodland tributaries such as this one in Skeffington Wood have high water quality compared to those that are compromised by food production on farmland.

In chapter four, the broad historical principle of local production was explored in a modern context, using Tilton parish as an example. Modern production methods could easily feed the population of Tilton from a relatively small proportion of the parish area. However, when the needs of the urban population are added, the land area needed increases considerably and there would be few opportunities for international trade. Added to this is the fact that global supplies of essential phosphate fertiliser and the oil and gas needed as fuel for food production and transport, and to make and transport nitrogen fertiliser, are currently peaking. Restrictions on supply would reduce yields in future, increasing the area needed for food production. Despite this, in the Tilton example, the greatest demand on land was for energy. If this was to be sourced locally it would far exceed the parish area, based on current levels of consumption within the community. At the individual or household level, modifying diet, reducing water and energy use in the home, and cutting back on vehicle use, would all help to reduce the land area

needed to meet our requirements, whether that land is local or global. Such changes have personal benefits in terms of improved health and economic savings for individuals, as well as reducing the environmental impacts on society as a whole and increasing social cohesion. Renewable energy offers economic opportunities to individuals and businesses to provide the public with clean energy in the future. Wind and solar energy require little or no land.

Anglian Water's Pete McCabe tells Tilton residents about the treatment of the village's waste water at the sewage treatment works.

Throughout human history in the catchment, people have been resourceful in developing new technologies and approaches to meet changing needs. That is continuing now, with the adoption of precision farming and micro-generation of renewable energy for example. Medieval farmers pooled resources such as oxen to manage their land, and modern farmers in the catchment are also looking for ways of spreading fixed costs by sharing machinery and labour between neighbouring farms. Emphasis is increasingly on efficient use of resources and on low carbon agriculture. The land provides numerous 'ecosystem services' to society as a whole, whether local or further afield. Under current Common Agricultural Policy reform, transferring the area payments that farmers currently receive to payments focused more on the provision of ecosystem services will place a value on them and highlight the need to manage the interactions between them for a more sustainable future. However, food production for the growing population will need to be maintained against a background of volatile crop prices on the global market.

We have many challenges ahead, not least the uncertainties associated with climate change, an increasing human population, and the declining non-renewable resources on which we currently rely, such as productive land, oil and phosphate. Exploring the Eye Brook catchment has helped to inform us about these issues and to indicate some ways ahead. We need to ensure that our landscape and its management will continue to change to meet the needs of future generations. While trade over large distances has been a feature of our society for most of our history, and is likely to continue to be so, understanding the more or less self-contained communities of previous centuries is useful in terms of developing plans for wise use of natural resources in future.

The point of this project, and this book, has been to stimulate discussion about issues relating to resource use, based on the wealth of information that local people and others have already contributed. What do local people want to see in future? Have the specific issues raised by the group of local people who met back in 2003 been addressed? The concerns raised then were that there was a cultural gap between rural and urban people within the community, that visitors valued the countryside but not those responsible for the management of it, that the economic returns on local products were low, and that the community had no sense of local identity that might aid marketing of these products or strengthen community cohesion. There are already signs that, by involving a wide range of local people, the process of gathering information for this book has contributed to addressing these issues, but this is just the start.

There is now an opportunity to use the results of this project, and of continuing activities arising from it, to inform those responsible for making policies. Within the catchment, options for the future need to be considered in terms of how we best use natural resources within the community, on farms, and in individual households.

If you have views on the issues raised in this book, or ideas for the future, please contact Chris Stoate at:

The GWCT Allerton Project,
Loddington House,
Loddington,
Leicestershire LE7 9XE
or: *cstoate@gwct.org.uk*

Points on policy

Publication of this book is highly topical. It precedes the publication of the government's Natural Environment White Paper which is expected to identify overarching challenges for future policy such as population growth and increasing consumption, and to highlight the role of the natural environment in managing the impacts of climate change, and as a source of renewable energy for example. It is also likely to highlight the impacts of climate change and population growth on future water supply, and the need to recognise the essential multiple functions of soil. It challenges the misconception that we must choose between economic growth and a healthy natural environment and accepts the links between our behaviour as consumers and our concerns for the natural environment, including the hidden impacts of imported goods and services on the global environment on which we depend. There is a need to move towards more integrated approaches that encompass the wide range of benefits that arise from our environment. The White Paper is also expected to accept the need to give local communities across the country the necessary freedom to take control and find innovative ways of protecting and enhancing the natural environment. This book has raised similar issues at a local scale, providing evidence that can inform future policy at local and national levels, and confirms that local community involvement, especially of those responsible for management of the land, brings important knowledge of rural issues and processes that has real practical relevance to environmental management.

Government policy is for greater public participation in meeting the needs of society. Values differ between people, and public engagement in decision making is increasingly recognised as being important to establish consensus on these values and to prioritise future actions. This is nowhere more apparent than in the context of ecosystem services in which the services provided to society by the environment are diverse and often poorly understood, especially in terms of the interactions between them. The forthcoming UK National Ecosystem Assessment stresses the need to explore synergies between ecosystem services and where these seem to be lacking, to reach consensus on priorities for a sustainable society. This is especially important in the face of uncertainties associated with climate change, economic recession, demographic change, declining resources, and erratic agricultural commodity prices.

This project demonstrates how the social learning approach, in which people from a range of knowledge cultures learn together, can be applied to achieve a shared understanding of environmental issues. The process has been informed by sound science, involving interdisciplinary research into a wide range of environmental issues of relevance to sustainable living, as well as by local and historical knowledge. An improved understanding of historical land use has strengthened community 'ownership' of environmental problems and opportunities, while scientific research has strengthened understanding of ecosystem services, environmental problems and their practical mitigation. Together, these provide a sound basis for developing plans for land use that are practically grounded and scientifically based, while also being locally relevant and applicable.

Key points:

- There is a need to develop a strategy for meeting the needs of society that is adaptable and resilient to the challenges of climate change, increasing population size and consumption, and depletion of natural resources.
- The approach is likely to be a combination of top-down regulation and market intervention at a range of scales, and bottom-up active involvement of local communities, especially those involved in land management.
- There needs to be greater popular recognition of the local and global impacts on and of the management and use of land and other natural resources.
- A multifunctional approach to land use, encompassing a wide range of ecosystem services, will be required. Greater integration of resource use, including nutrient cycling, spatial distribution of 'natural' and productive land, and renewable energy generation and biofuels, would strengthen society's capacity to meet its long term needs.
- Local seasonal production and preservation of food and other resources has an important role to play, including 'productive leisure' activities that contribute to personal health and community cohesion.
- Modification to behaviour at individual and household level such as improvements in energy and water use efficiency, dietary change and reduction in travel would relieve pressure on the supply of resources, mitigate against climate change and bring personal health, social and economic benefits.

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Chapter 5

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(cont.)

Biographical Notes

The Game and Wildlife Conservation Trust's 'Allerton Project' is a research and demonstration farm at Loddington in the central section of the Eye Brook catchment. The farm is 333 hectares of mainly arable land, with pasture grazed by sheep and woodland. It also runs an agricultural plastics recycling enterprise for local farmers. Since 1992, the project has been researching environmental management that can be incorporated into its own farm business, including the development of many Environmental Stewardship options. There has also been a strong focus on the relationship between land use and water and this has developed into broader issues associated with catchment management. Research results often feed directly into government agri-environment policy. The project regularly receives visits from policy makers, academics, farmers, land managers and others as part of its demonstration work and runs additional training courses at other sites. For more information, visit: www.gwct.org.uk/research__surveys

Dr Chris Stoate is Head of Research at the Allerton Project research and demonstration farm at Loddington where he has worked since 1992. He has researched the ecology of farming systems in West Africa and southern Europe, as well as in England, and has contributed to numerous EU and UK government funded research projects. He was a Lead Author of the National Ecosystems Assesment Enclosed Farmland chapter and is a trustee of the Welland Rivers Trust. He is the author of more than eighty research papers and has co-supervised several PhD and MSc projects. He lives with his wife, Miriam, and two children at Halstead where they have a small farm.

Notes to this pdf version of 'Exploring a Productive Landscape'

Minor changes and corrections have been made to this pdf version of the book, the main ones being replacement of the hornet photograph on page 92, the addition of the final paragraph on page 124, and the addition of this page.

The book has received commendation from a number of high profile readers, some of which are reproduced below.

Government Farming Minister, **Jim Paice MP**, in a personal tribute said:
"The Defra Business Plan recognises that the environment is the natural foundation on which our society and economy are built and that our long-term prosperity, economic success and quality of life are enhanced by our environment. As this book highlights, if we use and manage our natural assets in a sustainable way, they will continue to meet not only our needs, such as for energy, sustenance, minerals, fresh water, clean air and fertile soils, but the needs of future generations."

Mary Creagh MP, Shadow Secretary of State for the Environment Food and Rural Affairs said:
"There is a growing body of evidence about the impact of climate change and human behaviour on our environment. Yet too often policy and science is developed at an abstract level. 'Exploring a productive landscape' provides a practical example of the benefits of involving people in the environmental decisions that affect their community, and their role in creating a sustainable future. It tells the story of how a community project in Leicestershire has responded to the challenges it faces and draws wider lessons on the issues of land management and conservation."

Jonathan Dimbleby, current affairs presenter, organic farmer and former president of the Soil Association and Campaign to Protect Rural England (CPRE), said:
"This book is a great example of the 'Big Society' in action. Skill, expertise, dedication and enthusiasm have brought together, in one small place, a host of very important issues that face the whole country."

The Right Reverend Tim Stevens, Bishop of Leicester said:
"This excellently produced book reveals how the farmed landscape shapes everyone's lives, despite most being far removed from that environment. It will stimulate the debate over how the farmed landscape should be used in the future."

This book will appeal to anyone with an interest in the countryside, including people from far beyond the area it describes, as well as those within it. The book is about the history and wildlife of a farmed landscape, and the context is topical and relevant to researchers and to future policy. There has never been a more crucial time for us to understand the land on which we depend. There has also never been a time when we have been so isolated from it.

The book takes a novel approach to understanding our long and constantly evolving relationship with the land, how it has been managed in the past, and how it can continue to sustain us in future. It concentrates on the catchment of the Leicestershire Eye Brook, an area that is home to a thriving research and demonstration farm and an active community, members of which have contributed to this book in numerous ways. Combining local knowledge with scientific knowledge in this way to develop a shared understanding of how the catchment might be managed in future is a unique approach that is likely to be emulated elsewhere.

"This fascinating and thoroughly researched book... exemplifies the importance of historical knowledge in making contemporary land management decisions and concludes with an examination of the links between food production and wildlife conservation and how both may be sustained."

From the foreword by Charles Watkins
Professor of Rural Geography,
Nottingham University

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