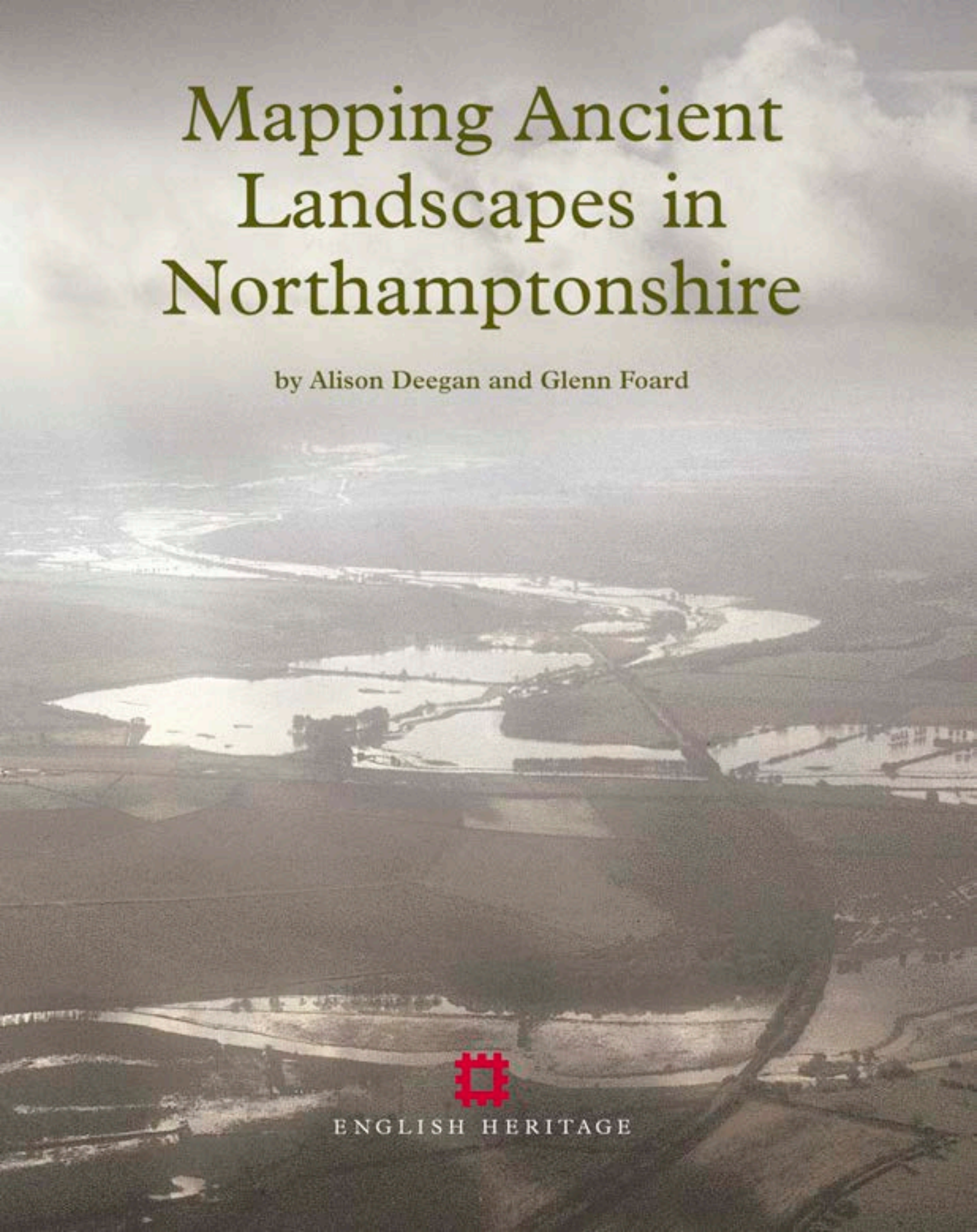
# Mapping Ancient Landscapes in Northamptonshire

by Alison Deegan and Glenn Foard



ENGLISH HERITAGE

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# Contents

# Contributors


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|---|---|
| Graham Cadman | Historic Environment Officer, Historic Environment Team, Built & Natural Environment, Northamptonshire County Council |
| Alison Deegan | Air Photo Interpreter, 8 Malt Kiln, Clayton, Bradford BD14 6QP |
| Glenn Foard | Archaeological Consultant, 40 Brixwoth Road, Creation, Northamptonshire NN6 8NQ |
| Alex Gibson | Reader in British Prehistory, Department of Archaeological Sciences, University of Bradford |


# Abbreviations

| | |
|---|---|
| ADS | Archaeology Data Service |
| BGS | British Geological Survey |
| CAA | Civil Aviation Authority |
| CUCAP | Cambridge University Committee for Aerial Photography (now ULM) |
| DoB | Defence of Britain project |
| EIA | Early Iron Age |
| GIS | Geographical Information System (computerised mapping) |
| HLC | Historic Landscape Characterisation |
| LBA | Late Bronze Age |
| MPP | Monuments Protection Programme |
| NA | Northamptonshire Archaeology |
| NCC | Northamptonshire County Council |
| NMP | National Mapping Programme |
| NMR | National Monuments Record |
| NMRC | National Monuments Record Centre |
| NRO | Northamptonshire Record Office |
| OAU | Oxford Archaeological Unit |
| RAP | Raunds Area Project |
| RCHME | Royal Commission for Historical Monuments of England |
| SSEW | Soil Survey of England and Wales |
| SMD | Soil Moisture Deficit |
| SMR | Sites and Monuments Record (Northamptonshire's, unless specified otherwise |
| SSEW | Soils Survey of England and Wales |
| VAP | Vertical Aerial Photograph |
| ULM | Unit for Landscape Modelling (formerly CUCAP) |

# Periods

These dates are approximate ranges only. Dates represent calendar years, ie the equivalent of calibrated radiocarbon dates (source: Monarch Recording Guidelines Version 3.1 30 June 1998 English Heritage Internal Document).

Mesolithic 10 000 BC–4000 BC
Neolithic 4500 BC–2200 BC
- Early Neolithic 4500 BC–3000 BC
- Middle Neolithic 3500 BC–2700 BC
- Late Neolithic 3000 BC–2200 BC

Bronze Age 2500 BC–700 BC
- Early Bronze Age 2500 BC–1500 BC
- Middle Bronze Age 1600 BC–1000 BC
- Late Bronze Age 1000 BC–700 BC

Iron Age 800 BC–AD43
- Early Iron Age 800 BC–400 BC
- Middle Iron Age 400 BC–100 BC
- Late Iron Age 100 BC–AD43

Later Prehistoric 4000 BC–AD43
Roman AD 43–410
Saxon AD 450–1066
- Early Saxon AD 450–649
- Mid Saxon AD 649–870
- Late Saxon AD 870–1066

early medieval AD 410–1066
medieval AD 1066–1540
post-medieval AD 1540–1901

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The authors would like to thank the wide range of individuals, too numerous to list, who have contributed in one way or another to the original collection of data or who have worked directly on the Northamptonshire NMP project. First, there are the various private pilots, together with flying instructors and staff at the Northamptonshire School of Flying, who made the original Northamptonshire County Council (NCC) reconnaissance programme possible between the mid-1970s and late 1990s. Of these particular mention must be made of Derek Richardson and the late Derek Cowley, who gave hundreds of hours of their time to the flying programme. Thanks are also due to the various other aerial archaeologists who have contributed to the aerial archaeological record of the Northamptonshire landscape. Also we must acknowledge the various assistants who worked at NCC on the cataloguing and mapping of the material from the late 1970s onwards, most notably Phil Markham who was the first project assistant on the Northamptonshire NMP project, John Robinson Aerial Archaeological Assistant from 2000 to 2002 and for one block of mapping, Rog Palmer. Christine Addison, SMR Officer at NCC, has played a key role in managing the data and, during the 1990s, assisting with the management of the project and of staff employed on the project. Various specialists have given advice and made specific contributions to the text. These are Damian Grady for his update on English Heritage's reconnaissance programme for Northamptonshire in chapter 2; Frances Healy and Jan Harding for their advice on the prehistoric aspects of the Raunds Area Project for chapter 4; Jeremy Taylor, for his comments on the original draft of chapter 6; David Hall who made available the extensive records of his countywide field-walking survey and for his contributions to chapters 7 and 8. Last but not least, we must acknowledge English Heritage, the former RCHME, and NCC, each of which have provided resources for the reconnaissance and mapping programmes, and most importantly the various staff of those organisations who have helped to see the project established and who have overseen its implementation, especially Bob Bewley and Simon Crutchley.

The geological, permeability and amenability to cropmark data used extensively in chapters 2 to 6 are derived from geological, landuse and Historic Landuse Characterisation data supplied by the copyright holder, Northamptonshire County Council.

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# Summary

Aerial reconnaissance and the National Mapping Programme project in Northamptonshire have recovered and mapped evidence of archaeological activity of widely varying character, from field systems through settlement remains to funerary monuments, and ranging in period from the Neolithic to the 20th century.

This volume presents research and analyses of the project's results. The introduction is followed by two chapters that consider the reasons for the biases in the distribution of aerial photographic evidence. The first of these chapters reviews the history of aerial reconnaissance and mapping in Northamptonshire. The second considers the impact of soils, geology and past and present land use on the survival and visibility of earthworks, cropmarks and soilmarks.

The subsequent analyses of the project's results are presented primarily by period. First there is a discussion of the monuments and landscapes of the Neolithic and Bronze Age in the context of results from archaeological excavations, and in particular from the Raunds Area Project. This is followed by a review of the wider evidence for these periods in Northamptonshire and the Midlands by Alex Gibson.

Reflecting the wealth of information revealed by aerial archaeology for these periods, a large proportion of this volume in concentrated on the Iron Age and Roman periods, in an attempt to characterise the settlements, boundaries and communications across different landscape zones. The three chapters on the Anglo-Saxon, medieval and post-medieval landscapes, and on 20th-century military remains review the contribution of the aerial archaeological evidence and consider whether this was maximised by the project.

The final chapter assesses the methodology that evolved during the course of the project and its impact on data creation and subsequent data manipulation, interrogation and dissemination.

The Northamptonshire National Mapping Programme data is archived by and disseminated through the National Monuments Record, Northamptonshire Sites and Monuments Record and also the Archaeology Data Service, York.

# Résumé

Dans le Northamptonshire la reconnaissance aérienne et le projet de Programme de Cartographie National (*National Mapping Programme*) ont recouvré et cartographié des indices d'activité archéologique de types extrèmement variés qui vont de systèmes de champs à des monuments funéraires, en passant par des vestiges d'occupation, et qui couvrent une période allant du néolithique au vingtième siècle.

Ce volume présente les recherches et analyse les résultats de ce projet. L'introduction est suivie de deux chapitres qui examinent les raisons de la disparité dans la répartition des indices de la photographie aérienne. Le premier de ces chapitres examine l'histoire de la reconnaissance aérienne et de la cartographie dans le Northamptonshire. Le second étudie l'impact des sols, de la géologie et de l'usage de la terre, passé et présent, sur la survivance et la visibilité des levées de terre ainsi que des traces dans les cultures et dans le sol.

Les analyses des résultats du projet qui ont suivi sont essentiellement présentées par période. D'abord, une discussion des monuments et des paysages du néolithique et de l'âge du bronze dans le contexte des résultats des excavations archéologiques, et en particulier du projet de la région de Raunds. Elle est suivie d'une étude, signée Alex Gibson, des indices plus étendus concernant ces périodes dans le Northamptonshire et les Midlands. Une grande partie de ce volume se concentre sur l'âge du fer et la période romaine, reflétant en cela la richesse des renseignements révélés par l'archéologie aérienne pour ces périodes, dans une tentative de caractériser les occupations, les limites et les communications à travers différentes zones du paysage. Les trois chapitres consacrés respectivement au paysage anglo-saxon, médiéval et post-médiéval et aux vestiges militaires du vingtième siècle examinent la contribution des témoignages archéologiques aériens et considèrent si elle a été mise en valeur par le projet. Le dernier chapitre évalue la méthodologie dans son évolution au cours du projet et son impact sur la création de données et sur la manipulation, l'interrogation et la diffusion de ces données.

Les données du Programme National de Cartographie du Northamptonshire sont archivées et diffusées par l'intermédiaire des Archives des Monuments Nationaux (*National Monuments Record*), des Archives des Sites et Monuments du Northamptonshire (*Northamptonshire Sites and Monuments Record*) et également par le Service de Données Archéologiques (*Archaelogy Data Service*).

**Traduction: Annie Pritchard**

# Zusammenfassung

Luftaufklärung und das National Mapping Programme in Northamptonshire haben Nachweise archäologischer Aktivitäten von Feldsystemen über Überreste von Siedlungen bis hin zu Grabmälern verschiedenster Art ermittelt und kartiert, die vom Neolithikum bis in das 20. Jh. reichen.

Dieser Band legt die Forschungsarbeit dar und analysiert die Ergebnisse des Projekts. Der Einführung folgen zwei Kapitel, in denen die Gründe für die Gewichtung- bei der Verteilung der fotografischen Nachweise im Luftbildmaterial dargelegt sind. Das erste Kapitel bringt einen Überblick zur Geschichte der Luftaufklärung und Kartographie in Northamptonshire. Im zweiten Kapitel werden die Auswirkungen untersucht, die Erdreich, geologische Gegebenheiten sowie die derzeitige und frühere Landnutzung auf Überdauern und Sichtbarkeit von Erdarbeiten, sowie von Bewuchs- und Bodenmerkmalen haben.

Die nachfolgenden Analysen der Projektergebnisse werden vorrangig auf Grundlage von Zeitabschnitten präsentiert. Angefangen mit einer Diskussion der Grabmäler und Landschaften in Neolithikum und Bronzezeit anhand archäologischer Ausgrabungen, insbesondere im Rahmen des Raunds Area Projekts. Dem folgt ein Überblick umfassender Zeugnisse für diese Zeiträume in Northamptonshire und den Midlands von Alex Gibson. Ein Großteil dieses Bandes konzentriert sich auf Eisen- und Römerzeit unter Bezugnahme auf die reichhaltigen, dafür von der Luftbildarchäologie gelieferten Informationen, um damit die Siedlungen, Grenzlinien und die Kommunikation über verschiedene Landschaftszonen hinweg zu charakterisieren. Die drei Kapitel über die angelsächsischen, mittelalterlichen und nachmittelalterlichen Landschaften und die militärischen Überreste aus dem 20. Jh. untersuchen den Beitrag, den die Ergebnisse der Luftbildarchäologie geleistet haben und ob diese durch das Projekt bereichert worden sind. Das letzte Kapitel bewertet die Methodologie, die sich im Projektverlauf entwickelt hat, sowie deren Auswirkung auf die Schaffung von Daten sowie die nachfolgende Manipulation, Abfrage und Verbreitung derselben.

Die Daten des Northamptonshire National Mapping Programms werden von National Monuments Record, Northamptonshire Sites and Monuments Record und vom Archaeology Data Service archiviert und verbreitet.

**Übersetzung: Ingrid Price-Gschlössl** für First Edition Translations Ltd, Cambridge

# 1
# Introduction

*by Glenn Foard*

The aim of the National Mapping Programme (NMP), established in 1992, is 'to enhance our understanding about past human settlement, by providing primary information and syntheses for all archaeological sites and landscapes (visible on aerial photographs) from the Neolithic period to the twentieth century.' (Bewley 2001, 78). The Northamptonshire NMP project (hereafter described as *the project*) was one of a handful of projects within NMP that were conducted at a county level, rather than in house by English Heritage, at that time. The project has dealt with 3,250 square kilometres, centred on the modern county of Northamptonshire, but as the mapping dealt with complete Ordnance Survey 1:10 000 quarter sheets it also included small areas of eight adjacent counties and two unitary authorities (Fig 1.1).

The project and this publication are the work of a number of individuals. One of the authors (Deegan) has been responsible for a substantial part of the mapping (from 1999), conducted most of the analysis, has written the greater part of the text and prepared all the illustrations. The other (Foard) was been responsible for the aerial reconnaissance programme, designed the mapping methodology, undertook digital mapping in the 1980s but, though contributing to discussion on the other themes, has written only this introduction, 'Aerial Reconnaissance in Northamptonshire' and the greater part of the chapters concerning the Anglo-Saxon and medieval to post-medieval evidence. Both authors have edited the full text. The assessment of the Neolithic and Bronze Age research, '*Ex Tenebris Lux*' was contributed by Alex Gibson, Reader in British Prehistory, Department of Archaeological Sciences, University of Bradford and Graham Cadman, Historic Environment Officer, NCC wrote 'Studying Modern Military Remains'. The publication texts were researched, drafted, discussed and developed between December 2002 and December 2005. Specifically, 'Aerial reconnaissance in Northamptonshire' was first drafted in May 2002; 'The significance and limitations of the project data' in October 2002; 'Monuments and landscapes in the Neolithic and Bronze Age' and '*Ex Tenebris Lux*' in September 2003; 'Late Bronze Age, Iron Age and Roman settlements and landscapes' in July 2004; 'The contribution of aerial photography to Anglo-Saxon studies' July 2005; 'The contribution of aerial photography to medieval and post-medieval studies' in August 2005; and 'Studying modern military remains' in December 2002.

The majority of the NMP mapping was undertaken in the 1990s by Philip Markham, with substantial work by John Robinson and some additional work by Christine Addison and Rog Palmer.

The archive of aerial archaeology data generated by the project is available online via the Archaeology Data Service (ADS). It is also locally available at the Northamptonshire Sites and Monuments Record (SMR), where it has been integrated with the other evolving resources. These resources include the photographic index and the archive of Northamptonshire County Council (NCC) aerial reconnaissance, comprising most of the 20,000 black and white photographs and colour transparencies in the SMR. The majority of the NCC aerial reconnaissance photographic archive, including most of the negatives, is also available at the National Monuments Record (NMR).

Northamptonshire lies in the East Midlands, encompassing most of the catchment of the River Nene as well as parts of neighbouring river system of the Welland, and a small part of the Ouse, all of which drain north eastward to the Wash (*see* Fig 1.1). The county extends almost to the former fen edge in the east, while in the south-west it stretches into the upper reaches of the Cherwell, part of the Thames catchment, and on the west crosses the national watershed into the very upper reaches of the Avon, part of the catchment of the River Severn.

The character of the county is determined in large part by the alternating bands of permeable and impermeable

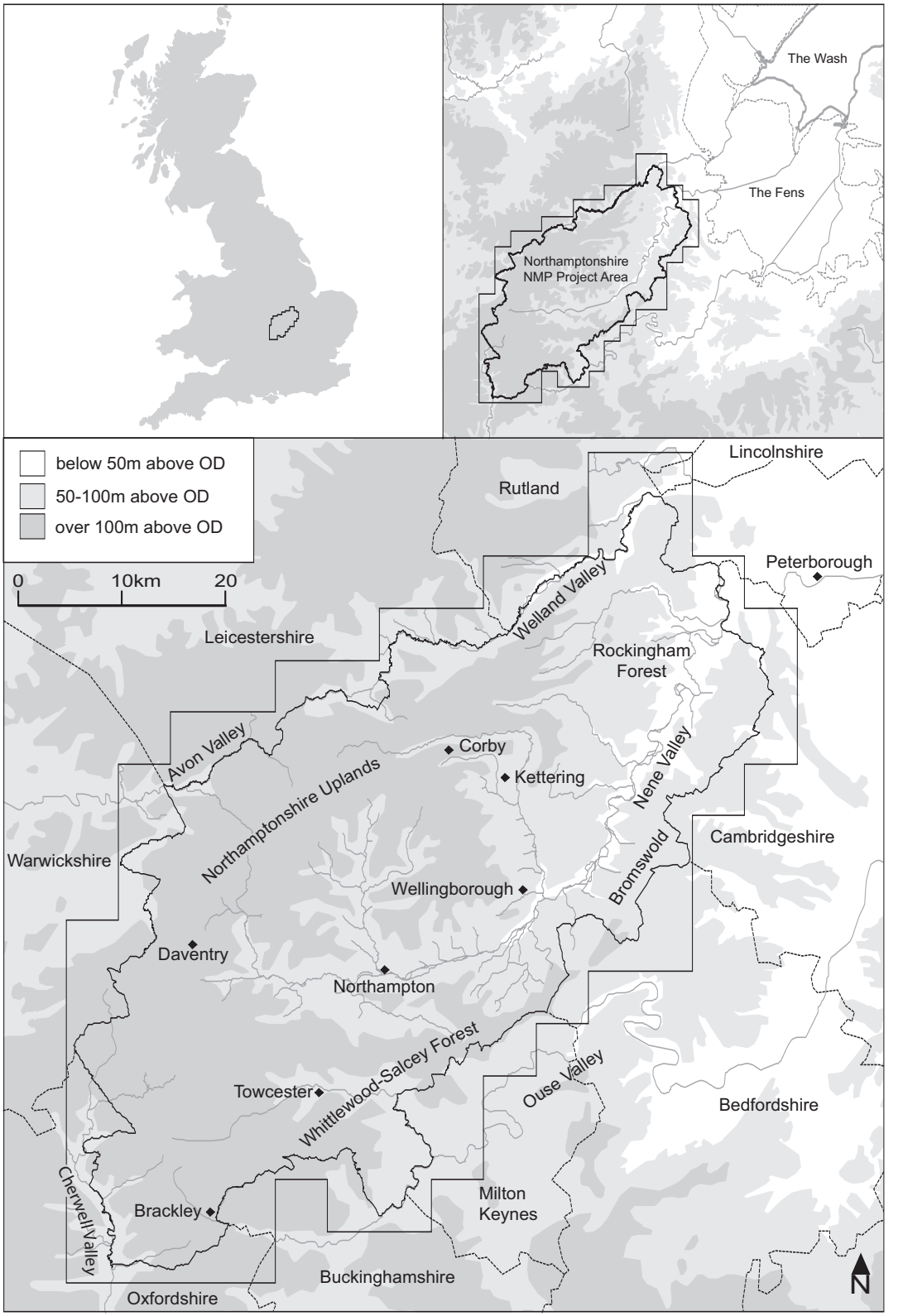



*Fig 1.1*
*Location plan of the Northamptonshire NMP project.*

Jurassic rocks, which trend south-west to north-east, and dip gently south eastward (*see* chapter 3, Panel 1). As discussed in chapter 3, this underlying geological framework has been a major influence on the visibility of archaeological sites from the air, alongside other significant factors, which also bias the distribution of evidence.

Human activity in the county has tended to focus on the permeable geologies, particularly in the Neolithic and Bronze Age (*see* chapter 4). Even in the Iron Age and Roman period the character and density of settlement and land use appears to have been greater on the better soils than on the heavy clays, even though settlement and fields extended at this time across all geological types (*see* chapter 6). The concentration of settlement on the permeable geologies was repeated in the Anglo-Saxon period, as a result of a late Roman retraction from the clay land. Although the late Anglo-Saxon and medieval periods saw a massive expansion of arable onto the poorer clay soils, settlement became highly nucleated and remained on the permeable geologies. On the extensive tracts of boulder clay woodland persisted, particularly in Rockingham and Whittlewood-Salcey Forests. It was also the clay land townships that proved most vulnerable to desertion and conversion to pasture in the centuries after the massive recession that accompanied the Black Death and other plagues, from the mid-14th century onwards.

The modern county of Northamptonshire is one of the most intensively studied of England's historic landscapes. Since at least the early 1960s, it has been subject to intensive investigation through field-walking and aerial survey by local amateur and professional archaeologists (eg Hollowell and Brown 1971; Hall 1972). It has also seen nationally important detailed studies of particular historic landscapes, most notably in the Raunds Area Project and the Whittlewood Project (Jones and Parry 2003; Parry 2006; Harding and Healy 2007). Also, like many other counties, from the 1960s onwards it has seen a large number of excavations, large and small, undertaken in response to mineral extraction and development threats. In addition a major contribution was made in the 1970s and early 1980s by the Royal Commission on the Historical Monuments of England (RCHME), which published an archaeological inventory covering the whole county (RCHME 1975, 1979, 1981, 1982, 1984, 1985). The past history of archaeological investigation the current state of knowledge of the archaeological record for the county has recently been subject to a major review (Tingle 2004).

The first aerial archaeology conducted in the county was from the late 1940s onwards as part of the national reconnaissance programme of the Cambridge University Committee for Aerial Photography (CUCAP). This was greatly enhanced by locally based reconnaissance, particularly by Hollowell in the 1960s and early 1970s, and then by a sustained intensive campaign of reconnaissance from 1974 to late 1990s by NCC, with funding from RCHME and subsequently from English Heritage (*see* chapter 2). The latter included the integration into the Sites and Monuments Record (SMR) of all aerial survey results. There was manual plotting of cropmark data by RCHME as part of their research for the Inventory (RCHME 1975, xxi), while from 1977–9 NCC manually plotted all new sites at 1:2 500 scale using the mobius network technique. Following a critical assessment of aerial archaeology in the county, computer-aided techniques of transcription, using Aerial software, were adopted by NCC in the early 1980s (Foard 1980b; Haigh 1993). The resultant digital files were archived from the mid-1980s and in the early 1990s these aerial data from previous mapping were integrated into the MapInfo Geographical Information System (GIS) system, which was applied to the SMR in 1991. During the 1970s and early 1980s the development of both the reconnaissance and mapping programme benefited greatly from discussion with colleagues through the Aerial Archaeology Research Group.

In the light of this intensive reconnaissance and digital mapping programme, Northamptonshire was selected as one of the first phase of NMP projects in 1994. Although at this time NMP was paper-based and conducted at scale 1:10 000, Bewley recognised the potential of the computerised approach being taken and the Northamptonshire project was allowed to continue the mapping in digital form, at high resolution (scale 1:2 500), with the integration of the data in the SMRs GIS, and output for RCHME computer generated as acetate overlays. The project was thus the first attempt for a single county to systematically computer map at high resolution all aerial archaeology data in a consistent and accurate manner and to bring together the evidence from all available photography into one coherent whole in GIS, with referencing of every graphic object to its original source photograph (Northamptonshire Heritage 1994). However, it should be noted that, as the methodology was developed and the

mapping undertaken over many years, with a number of individuals involved and before regular training was provided nationally for NMP staff, there is a degree of inconsistency within the dataset, which has only partly been mitigated by efforts at enhancement over the last five years during the analysis phase.

The vast majority of the aerial archaeology evidence collected by reconnaissance and mapped in the project is of cropmarks. The soilmark data are restricted largely to recently ploughed medieval and later earthworks of deserted settlement and ridge and furrow. The exception is the area of former medieval woodland, where extensive soilmarks mainly of medieval charcoal burning, and restricted areas of prehistoric and Roman settlement field systems have been recorded. Earthwork data are restricted largely to the extensive ridge and furrow, which was not systematically mapped in the project because the NMP methodology was not considered adequate to the task; and settlement remains of medieval and later deserted settlement, although, as with the soilmarks, small numbers of earlier sites have been identified in the former woodland areas. Industrial monuments of the 19th and 20th centuries were not systematically photographed or mapped, although in parallel to the NMP work was undertaken by Cadman on military remains in the county of the 20th century as part of the Defence of Britain project, drawing upon the NMP mapping (*see* chapter 9).

The project examined all aerial photographs for the county available in the NMR, including the RAF vertical aerial photographs, and in the CUCAP collection that were available at the time of mapping. However, by far the greatest archive of photography used was that produced by NCC itself between 1974 and 1996. Just one element of the collection of 20,000 or more images was not consistently exploited: the large number of colour transparencies. These are mostly duplicates of black and white photographs taken during NCC reconnaissance for lecture purposes, but some are now realised to be the best or only record of a few sites and so significant information contained on some slides may not have been included in the NMP mapping. In addition there is a small amount of other material that, at the time, was not held in the SMR, NMR or in the CUCAP collection and was not examine for the project – most notably air photographs taken by Upex.

The methodology applied in the mapping process aimed to achieve a wholly digital and fully referenced dataset linking together in GIS all the NMP data with relevant elements of the SMR's record system, both spatially in GIS and via the photo index, with every element of the aerial data fully linked to its source photo. All relevant air photos in each collection were examined, and where significant features were recognised, the best photographs were selected for interpretation and rectification.

For the greater part of the project the detail was traced onto acetate and this interpretation then rectified in AERIAL version 4. The digital files for each rectification were archived and the data imported into MapInfo in an 'applots' table with the NCC photo reference and other metadata appended to each graphic object, providing a base dataset combining all rectified data. From 1999 onwards AERIAL version 5 was used, enabling a scan of the original photograph to be rectified, registered in MapInfo and then archived for future reference, with the interpretation then being digitised on screen in MapInfo. As with the previous method, the resulting data from each photo were then integrated into the 'applots' table. The applots table thus provides a fully referenced base dataset integrating all rectified aerial photographic data generated by the project. It therefore typically has complementary data from several photos for any site, often with overlapping data with the same feature slightly displaced owing to the errors inherent in the rectification process. From this table data were then extracted according to form (cropmark, soilmark, earthwork or structure) onto separate interpretive tables where the information was integrated, with reference to the original photographs, to produce a final interpretation each site. Thus it is possible to view separately, or to overlay and compare, each form of data for the same site and to relate this to other GIS datasets from the SMR and elsewhere, enabling a final interpretation to be compiled for the MORPH classification system. Wherever possible each separate element identified in MORPH was drawn in the interpretive tables as separate graphic objects with the MORPH number appended. This procedure has produced a highly flexible dataset with integrated metadata that

enables all elements of the record and its interpretation to be tracked to its source and to be compared to every other element in the SMR. For a full review of the methodology and its implementation, reference should be made to the Management Report, which is available online via the ADS.

This system has enabled the data generated by the project to be made available to all users of the Record, through the SMRs GIS, progressively as each photograph was interpreted and mapped. The NMP data have thus been available for management and research purposes since 1994, and have had a substantial influence on both the interpretation and the management of the historic environment of the county for the last decade, representing arguably an even more important outcome from the project than the publication of the present volume of overview and analysis.

The Northamptonshire project has produced a database recording the location, size, morphology, interpretation and date of 14,142 archaeological sites linked to graphic representations of those sites, plotted at a nominal scale of 1:2 500. In addition, the project has produced a large number of graphic objects that record selected ridge and furrow, modern and geological features and sites. Of the 14,142 sites recorded, approximately 57% were new to the NMR at the time of mapping, based on the number of records with no concordance to the NMR. However, on the same basis, as would be expected given the history of post-reconnaissance work in Northamptonshire, less than 15% of the records were new to the county SMR.

Aerial reconnaissance and the NMP project have recovered and mapped evidence of archaeological activity of widely varying character, from field systems through settlement remains to funerary monuments, and ranging in period from the Neolithic to the 20th century. The quality and quantity of the evidence are seen to vary enormously by period, as well as by the region of the county. There is a particular wealth of information regarding Iron Age and Roman landscape and also of funerary monuments of the Bronze Age, but some other aspects, particularly Anglo-Saxon archaeology, are significantly under-represented (*see* chapter 7). The results of the project are presented here primarily by period, but with introductory chapters that consider the reasons for the biases in the distribution of evidence by period and region. The first of these chapters reviews the history of aerial archaeology in Northamptonshire, while the second considers the distribution of aerial archaeological evidence across the county, explaining where this reflects the underlying distribution of past human activity and where it is the result of subsequent destruction or the relative responsiveness of each period and type and each region of the county to the production of cropmark, soilmark and earthwork aerial data.

# 2
# Aerial reconnaissance in Northamptonshire

*by Glenn Foard*

## Introduction

This chapter represents the first substantial review of the history of aerial reconnaissance in Northamptonshire, although a brief overview of the history of aerial reconnaissance in Northamptonshire up to the late 1970s was published by this author in 1979 (Foard 1979a, 91). This chapter briefly considers the work of all practitioners but focuses primarily upon the intensive reconnaissance programme of Northamptonshire County Council between 1977 and 1996. The analysis is based on published reports, flight logs by Foard and Cowley 1977–96, unpublished reports, and the SMR photo index. Although the latter was substantially updated as part of the NMP as a record of the project, there were various limitations in the potential for the present analysis resulting from inconsistencies in the entries in the index; but it is not believed that these limitations have significantly compromised the analysis presented here.

### Aerial reconnaissance by others

There have been six substantial programmes of archaeological aerial reconnaissance that included all or part of the county: conducted by Hollowell, Upex, Pickering, RCHME, CUCAP and NCC (Everson and Cowley 1974–5; Foard 1976–96). The remainder of the reconnaissance by others comprises together no more than perhaps 300 frames (Table 2.1 and Fig 2.1). There are two major archives of aerial photographs

Table 2.1 Number of photographs by photographer listed in the SMR photo index

| *photographer* | *dates* | *cropmark photographs* | *earthwork photographs* | *soilmark photographs* | *total number of photographs* |
|---|---|---|---|---|---|
| NCC | 1973–1997 | 10259 | 3176 | 1269 | 15406 |
| CUCAP | 1947–2000 | 1791 | 2810 | 79 | 5129 |
| RCHME | 1971–2000 | 1963 | 402 | 76 | 3184 |
| Pickering | 1963–1986 | 779 | 113 | 13 | 1008 |
| Hollowell | 1961–1977 | 329 | 4 | 0 | 446 |
| Upex | 1971–1979 | 285 | 77 | 18 | 449 |
| Others | — | 209 | 32 | 0 | 283 |
| OTHERS | | | | | |
| Ashmolean | — | 0 | 5 | 0 | 5 |
| Baker | — | 25 | 0 | 0 | 30 |
| Buckinghamshire Museum | — | 8 | 2 | 0 | 34 |
| Crawford (RAF) | — | 3 | 1 | 0 | 13 |
| Field | — | 22 | 0 | 0 | 26 |
| Foster | — | 4 | 2 | 0 | 6 |
| Hartley/Leics Museum | — | 25 | 3 | 0 | 28 |
| Lyall | — | 14 | 0 | 0 | 14 |
| Moore | — | 73 | 6 | 0 | 79 |
| Poulton | — | 15 | 0 | 0 | 15 |
| Rollings | — | 4 | 4 | 0 | 8 |
| Warhurst/Northampton Museum | — | 6 | 9 | 0 | 15 |
| Williams | — | 10 | 0 | 0 | 10 |

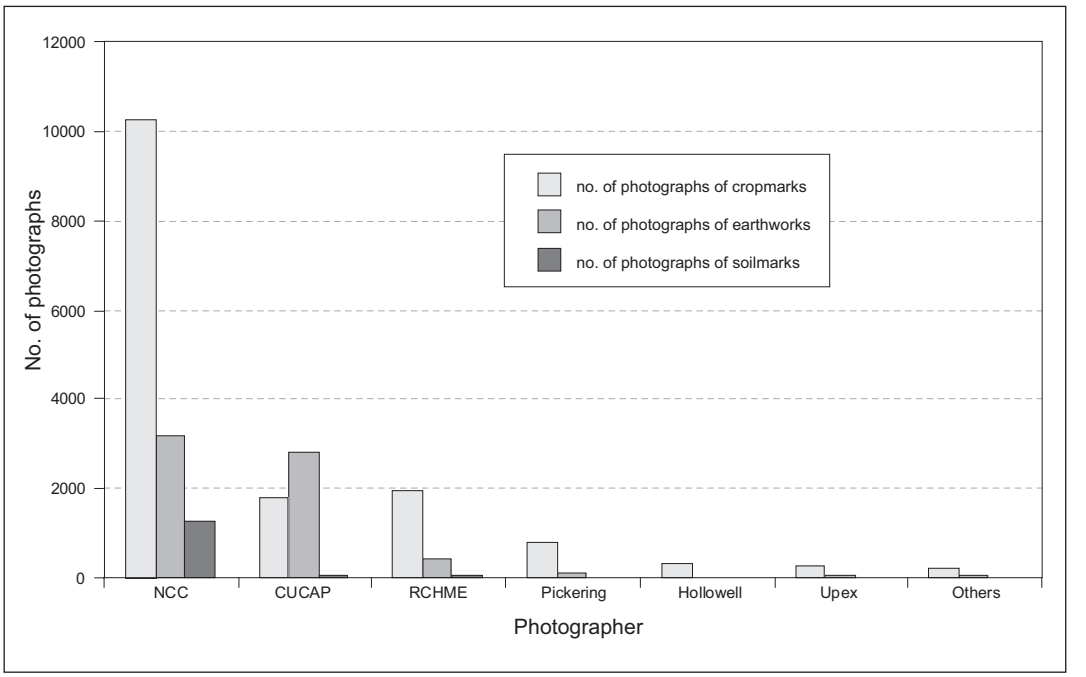



*Fig 2.1*
*Number of photographs by photographer listed in the SMR photo index.*

for the county: one in the National Monuments Record Centre (NMRC) in Swindon and the other in the Northamptonshire SMR, which was established with the SMR in 1973. The latter was, at first, largely a collection of photographs taken by other aerial archaeologists, mainly copies of CUCAP and NMR photographs, but also included some of Hollowell's material. However, the Northamptonshire SMR collection rapidly came to be dominated by the photographs from NCC reconnaissance, and by 1980 it comprised some 5,000 frames and in 2000 the total was more than 20,000, more than 15,000 of which had been taken by NCC.

The earliest archaeological aerial photographs of Northamptonshire, now in the NMRC, are the handful of RAF verticals taken in the 1920s and collected by Crawford. Significant archaeological reconnaissance only began in the late 1940s with the work of CUCAP. This represents the most important oblique air photo evidence of earthwork sites in the county, in some cases recording sites not long before they were levelled by cultivation. It is also the second most important collection in terms of cropmarks. It is almost completely catalogued in the photo index of the SMR, but copies of only a small percentage of the photographs are held in the SMR. The spatial distribution of CUCAP photographs broadly matches the overall distribution of photography countywide (Fig 2.2).

From the early 1970s onward this was supplemented by the national survey programme of the RCHME (Fig 2.3).

This reconnaissance has been fairly evenly distributed across the county, but with the poorest coverage in the south-west. The regional reconnaissance of Jim Pickering also extended into Northamptonshire, mainly in the north-west of the

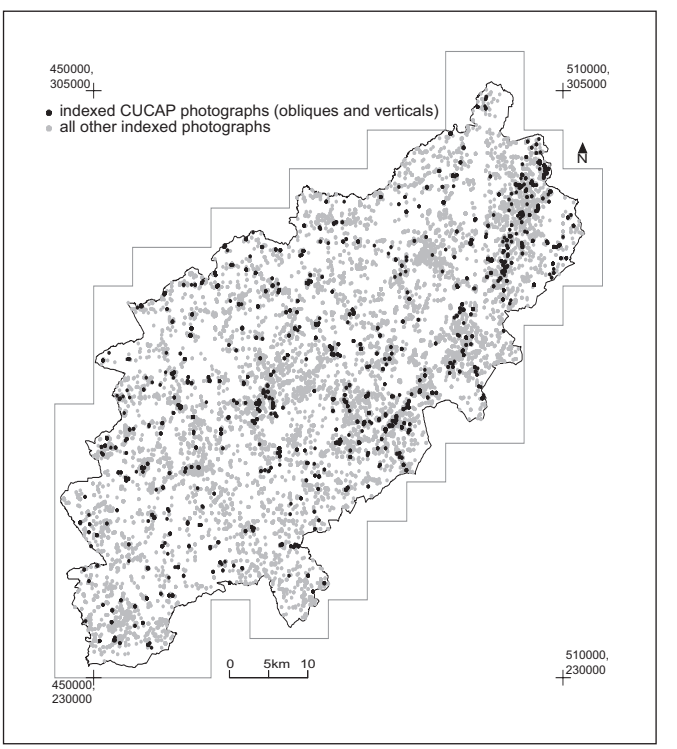
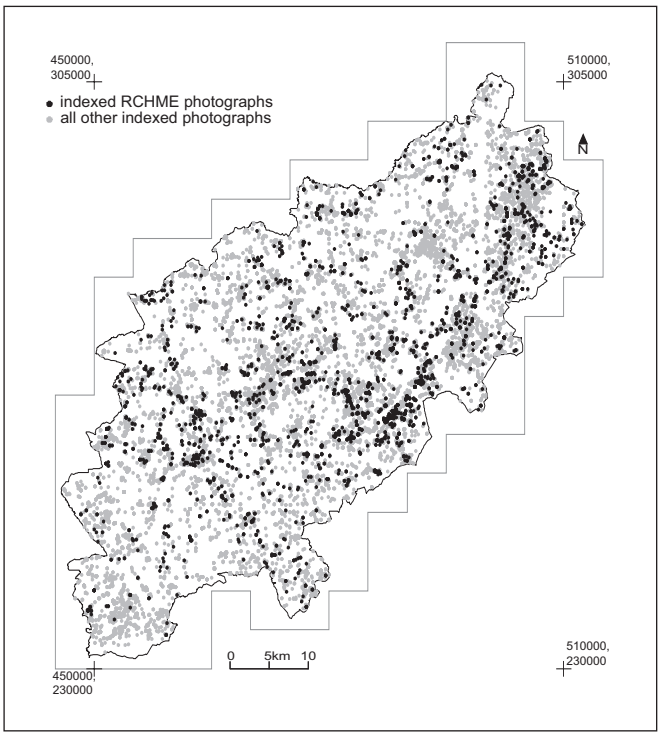



*Fig 2.2*
*Distribution of CUCAP photographs relative to all other photographs listed on the SMR photo index.*



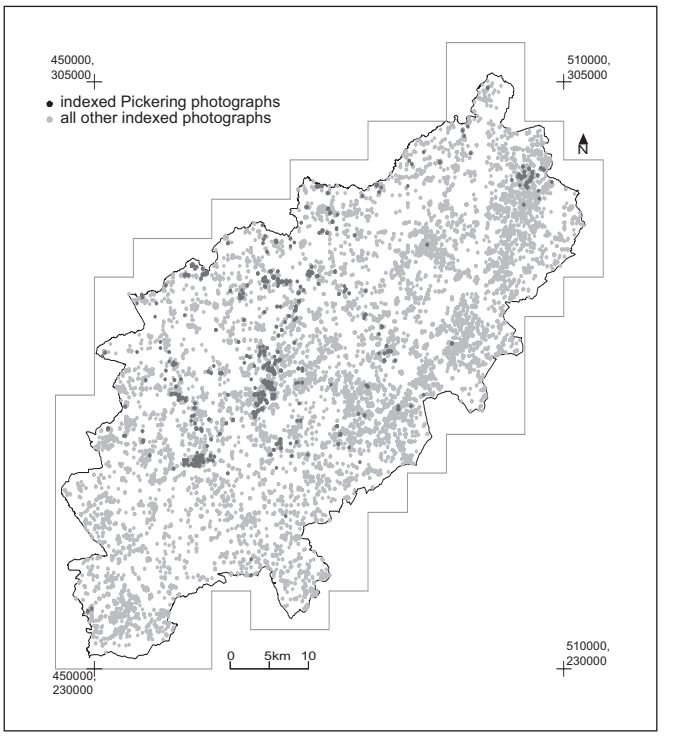




*Fig 2.3*
*Distribution of RCHME photographs relative to all other photographs listed on the SMR photo index.*

*Fig 2.4*
*Distribution of Pickering's photographs relative to all other photographs listed on the SMR photo index.*

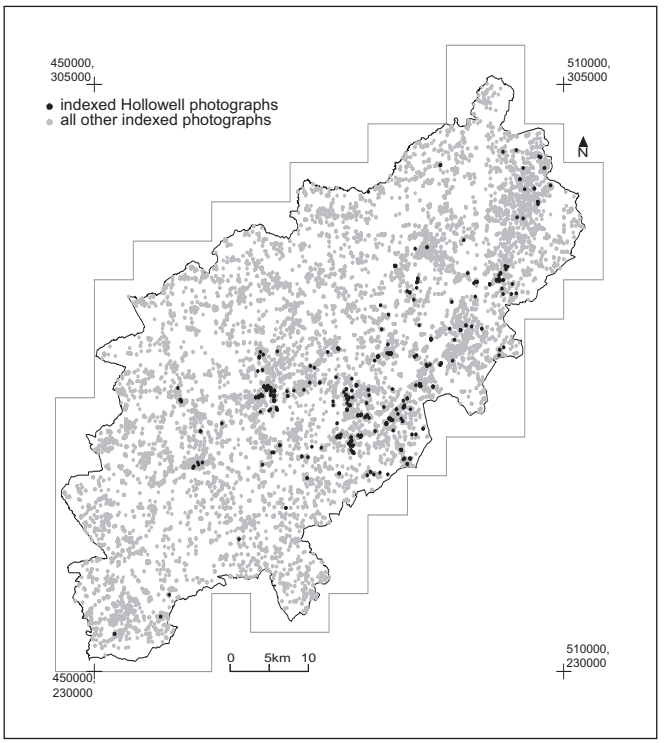
county, with images taken between the early 1960s and the late 1980s (Fig 2.4). These two collections are largely catalogued in the SMR photo index, but prints of only a proportion of the images are held there.

Locally, various archaeologists, both amateur and professional, have conducted aerial survey ranging from just a few flights to extensive reconnaissance over many years.

A rapid assessment of this work was undertaken in 1977, and the results integrated into the SMR photo index and summarised in print (Foard 1979a, 91). This revealed that in 1959 Warhurst (Northampton Museum) made several flights, leaving a small collection of aerial photographs in the Northampton Museum collection, all now copied in the SMR. In the early 1970s there were several others who carried out flights. The late Alex Rollings had a collection of *c* 200–50 transparencies, mainly of sites along the middle and upper Nene. Although the location of his archive is not known, copies of a few of his images are in the SMR. Ken Field photographed a number of sites, especially on the Northamptonshire/Buckinghamshire and Bedfordshire border, and copies of some of these are in the SMR. Others include Moore (Northampton Museum), whose slides are in the Northampton Museum collection but are copied in the SMR, and Williams (Northampton Development Corporation) whose whole archive is in the SMR.

By far the most important of this early local work was that conducted by Hollowell. Impressed by the results achieved by Warhurst, Hollowell persuaded various pilots to allow him to accompany them on flights (Moore 1980). Working from 1961 to the early 1970s his aerial reconnaissance was concentrated in central Northamptonshire, especially immediately to the north and east of Northampton and along the Nene valley as far as Nassington (Fig 2.5) (Brown 1998). The results of this reconnaissance together with his ground-breaking field-walking survey and other fieldwork, were reviewed in a volume edited by Brown in 1971, which included sketch plans of several of the most extensive cropmark complexes (Hollowell and Brown 1971). The slide copies and copy-negatives for this book, comprising an almost complete copy of the Hollowell collection, have been deposited in the SMR and the NMRC. The original slides from his work were retained by Hollowell until his death in 1998, but their current whereabouts are not known.

The other significant local work was by Upex (Nene Valley Research Committee), who carried out intensive reconnaissance 1971–9 in the Middle Nene Valley from



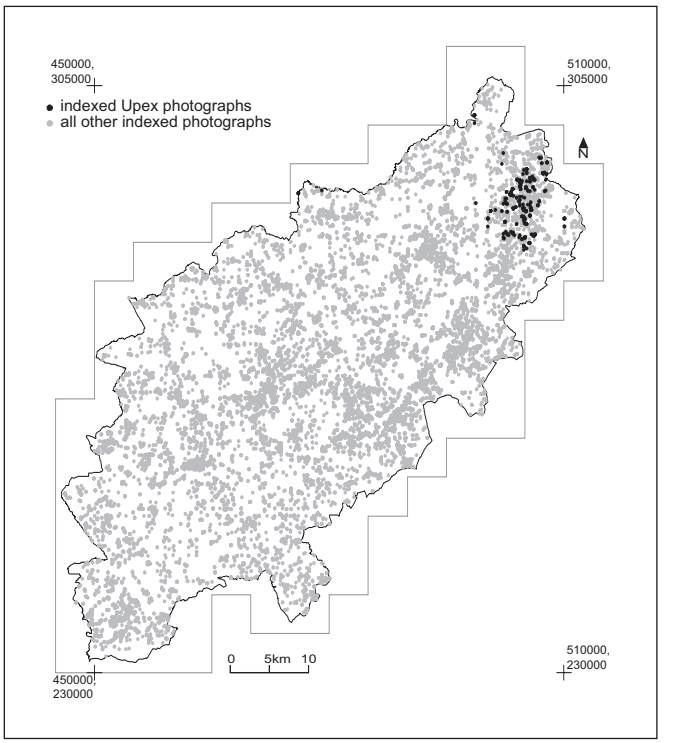




*Fig 2.5*
*Distribution of Hollowell's photographs relative to all other photographs listed on the SMR photo index.*

*Fig 2.6*
*Distribution of Upex's photographs relative to all other photographs listed on the SMR photo index.*

Oundle north-eastward, including the Soke of Peterborough, producing an archive of more than 2,500 frames (Fig 2.6) (Upex 1977). While some of Upex's early photographs were available to the project, results from more recent reconnaissance was not mapped as part of the Northamptonshire NMP project.

In addition to this oblique, specifically archaeological photography there are the wide range of vertical surveys from the 1940s onwards by the Luftwaffe, RAF, Ordnance Survey and others, most of which are held in the NMRC. There are also a number of vertical surveys of the county conducted for or purchased by NCC, which can be accessed there. The most important are from 1979 and 1990, as well as the 2000 national survey, for which NCC holds a copy of Northamptonshire in GIS format.

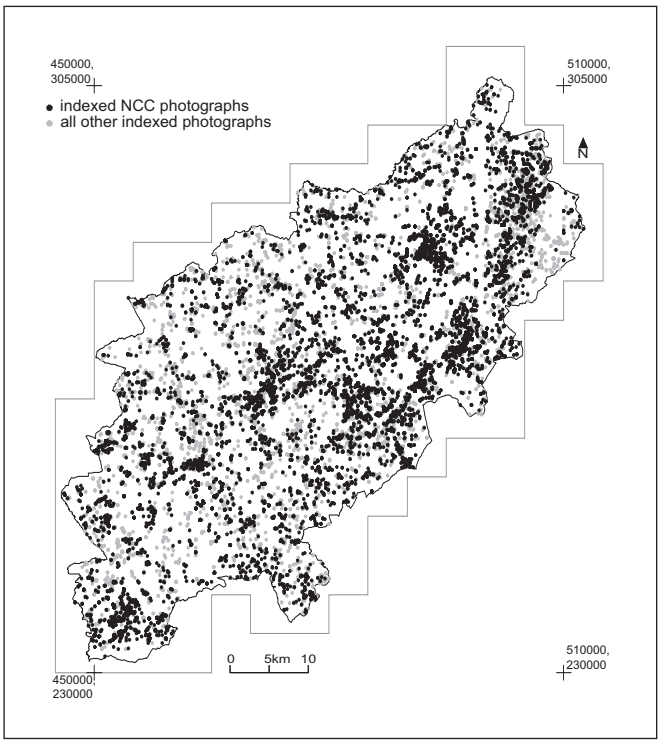
South Northamptonshire Council also hold a district-wide vertical survey conducted in 1999.

While the verticals held in the NMRC were generally used for the NMP mapping, the locally-held vertical surveys were not.

## Aerial reconnaissance by NCC

The air photo collection produced by NCC reconnaissance is by far the largest of all such collections for the county, comprising more than 15,000 frames. It dominates the cropmark record for the county, is the only collection with substantial soil mark evidence and in earthwork coverage is exceeded in terms of the range and importance of targets only by the CUCAP collection. Although the distribution is still inevitably dominated by the effects of geology and land use, especially through its influence on cropmark formation, the collection provides by far the most consistent countywide coverage. In the south and south west of the county it is almost the only significant cropmark record and in Rockingham Forest it provides almost the only soilmark coverage (Figs 2.7 and 2.8).

The County Council began archaeological reconnaissance following the appointment of Paul Everson as the first Northamptonshire County Archaeologist, 1973–4. He carried out a number of flights with pilot Derek Cowley, the Deputy County Architect. Cowley continued survey work in the year following Everson's departure. The author, who was appointed as SMR Assistant in December 1976, joined Cowley as the photographer on most of the flights undertaken in 1977. A re-assessment of the reconnaissance programme was conducted at the end of that season. This indicated that earthwork photography, which had dominated the earlier work, was not the most productive use of the limited



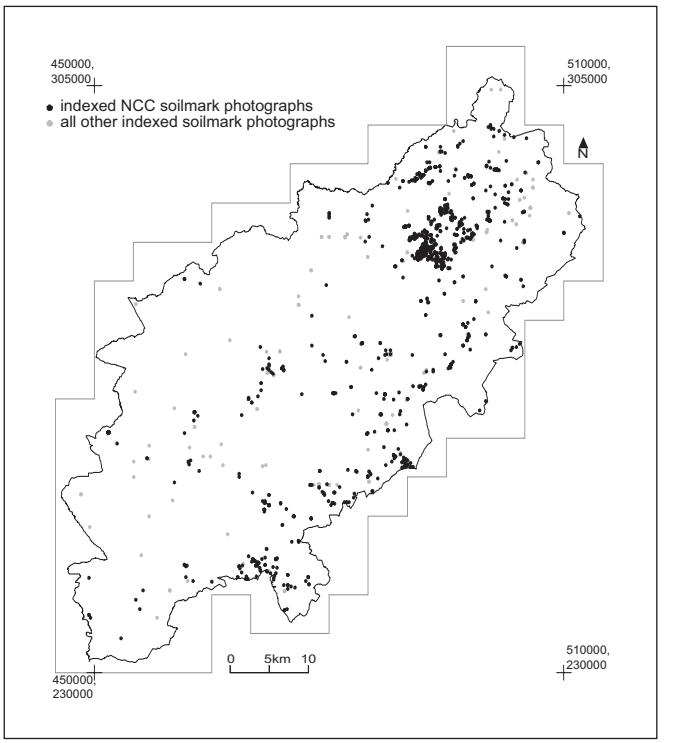




*Fig 2.7*
*Distribution of NCC photographs relative to all other photographs listed on the SMR photo index.*

*Fig 2.8*
*Distribution of NCC soilmark photographs relative to all other soilmark photographs listed on the SMR photo index.*

resources. Thereafter, such photography was only to be conducted incidentally with other reconnaissance or under exceptional weather conditions: good snow/frost, the very best clear winter weather with low angle sunlight or exceptional parchmark conditions. The focus was to be upon cropmark photography where major new discoveries were to be expected from a systematic survey programme.

From 1978 until 1996 reconnaissance flights were undertaken on a regular basis when conditions were favourable. Thereafter, up to 2002, only a handful of flights were undertaken. When and where significant cropmark development was identified, more intensive survey was undertaken, limited only by the level of resources and the availability of aircraft. The programme of reconnaissance was developed in the context of the ongoing threats to the archaeology of the county and the priorities defined for the management of that resource (Foard 1979b).

While the earlier photography was simply integrated into the SMR, in 1978 the first annual report was published, together with a brief review of previous aerial archaeology in the county. This compared the results of 1978 with all previous photography and provided plans and analysis of two of the major sites photographed, Irchester Roman town and a major complex adjacent to the causewayed enclosure north of Northampton (Cowley and Foard 1979). Progress was reviewed in a more substantial fashion in 1980 (Foard 1980b). The reconnaissance programme was outlined and an analysis of the distribution of results achieved during 1978–80 was presented, considering the likely reasons for the recovery pattern. It also challenged the view expressed previously by Taylor, in the light of his review of aerial archaeology data for the RCHME Inventory of the county, that cropmark evidence had not significantly enhanced our understanding of the archaeology of the Northamptonshire. Annual reports were also published on the 1979, 1980, 1981 and1982 seasons (Cowley and Foard 1980; Foard 1981a, 1982a, 1982b, 1983).

Given the increasing volume of new data generated and other SMR commitments it was only possible to integrate the data into the SMR and no further reports were published. A further review of the reconnaissance programme 1977–94 was conducted for RCHME in 1995 (Foard 1995). Extensive use was made in 1995 of the reconnaissance results for the publication of an education resource pack on Aerial Archaeology in the county (Shaw and Foard 1995). A brief review of the soilmark evidence for the medieval charcoal

and iron industries of Rockingham and Whittlewood Forests was published in 1982 and then in far greater detail in 2001 (Foard 1982c, 2001a). The results of aerial reconnaissance in the Raunds Area, using the plotting conducted by the author in 1985, have been discussed in Parry (2006).

External funding for the reconnaissance programme was initially from the Inspectorate of Ancient Monuments (later English Heritage), and then subsequently from RCHME. These were grants for aircraft hire, ranging between £500 to £1000 in most years, while during much of the 1980s RCHME also provided additional support in the form of photographic film, processing and printing. Throughout the period, from the initial time contributed by Cowley through to the funding of aircraft hire, equipment, film and the time of staff, NCC provided the greater proportion of the resources for the reconnaissance programme, especially after RCHME ceased to provide film processing and printing services. Funding levels in any one year from all sources are not, however, a good guide to the intensity of the flying programme, as resources were carried from one year to another where practicable in response to variable reconnaissance conditions.


*Fig 2.9*
*Generalised NCC flight paths 1977–1996 and the local Military Air Traffic Zones (compiled from CAA 1991).*

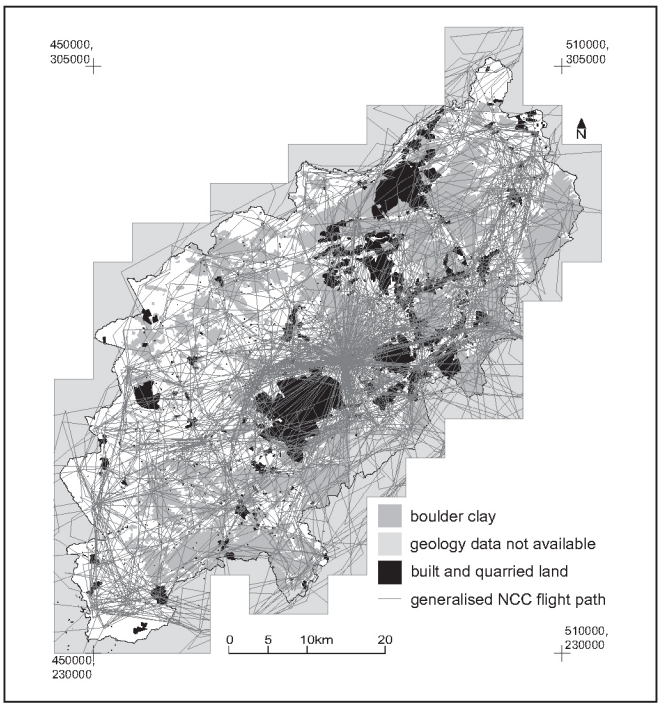



*Fig 2.10*
*Generalised NCC flight paths in relation to boulder clay, built and quarried areas.*

The intensity of the flying programme is best assessed through the number of minutes flown as indicated on the flight logs, which survive for almost all flights.

At first reconnaissance was restricted to Northamptonshire, but during the 1980s it extended on a modest scale during productive cropmark seasons to cover parts of adjacent counties, in north Oxfordshire, north Buckinghamshire, east Warwickshire, west Cambridgeshire, south Lincolnshire and Rutland, where this did not act to the detriment of the systematic survey of Northamptonshire (Fig 2.9). When RCHME funding declined and disappeared in later years it became necessary to restrict work once more to Northamptonshire. The main waypoints on most flights are recorded on the manuscript flight logs and these have been used to map, in simplified form, the broad coverage by flight (*see* Figs 2.9 and 2.10). For a small proportion of flights no log survives, but for these, and to achieve more complete detail for other flights, the location and sequence of frames recorded in the NCC photo index could be used to reconstruct the exact flight paths.

There was relatively little restriction on the spatial coverage, although for most of the period work in the far south-west of the county was limited to some degree by USAF Nether Heyford. It was usually possible to enter their zone under radar control. A similar problem existed in the north-east of the county immediately around RAF Wittering, although it was often possible to approach close to the airfield under radar control with the most effective time being late afternoon to early evening, when the airfield was normally inactive. The only other significant restrictions were the small exclusion zones around the USAF communications centre at Croughton and, for a short time, around Molesworth airfield when missiles were based there. The immediate environs of Sywell airfield were covered adequately, both while in the circuit or by agreed over flight. Of the other airfields Sibson near Peterborough and Husbands Bosworth were rarely active enough to significantly restrict reconnaissance. Despite the lack of significant restrictions on access, the flight paths do show a high level of focussing on particular areas (Fig 2.10). The urban and quarried areas were generally avoided, but it is comparison with the geological mapping that explains much of the distribution of coverage, reflecting the negative impact of boulder clay on cropmark development and the targeting of most reconnaissance towards the permeable geologies. Notable concentrations of flights are seen along the Nene, Welland and Ouse valleys, together with the permeable geologies to the north of Northampton as well as in the north-west and especially the south-west of the county. However, there was sufficient overflight of boulder clay areas to ensure recognition of cropmark development there in exceptional years, which was then followed up by intensive survey flights when appropriate.

Flight logs survive for almost all flights 1978–96. In 1986 there was experimental introduction of a standard form for logs by RCHME for regional flyers and these were used for the remaining years of the reconnaissance programme. From 1978 to 1981 places were listed in the logs, sometimes in brackets, to indicate significant waypoints where no photography was undertaken. From summer 1981 a record was kept on the back of the log of the main places passed over, as a guide to the route taken, and this practice was maintained on the standardised logs from 1986 onward. In the early 1990s attempts were made to maintain detailed records of flight paths through the use of GPS, but these were unsuccessful, owing mainly to the use of inappropriate and unreliable GPS equipment. In 1995 the use of GPS with a moving map, including existing

digital cropmark mapping, running in GIS (MapInfo) on a laptop computer was tried. Again it was not effective, partly owing to the inadequacies of the hardware.

The flying programme was almost exclusively undertaken from Sywell airfield, Northampton, using both private aircraft and those from Northamptonshire School of Flying. Until August 1978 a low wing Robin was normally used, in the absence of a more suitable aircraft, but the photographic results were poor. From then until 1992 a Cessna 150 was the normal platform (a small, two-seat, light aircraft with a high wing giving a largely unobstructed view of the ground) (Fig 2.11). There was also occasional use of a two-seat Cessna 152 and of a four-seat Cessna 172. The 150 was a slow aircraft but it was very stable and by far the best photographic platform used. The 152s were less stable, while the 172s, although somewhat faster in transit, were much more awkward to photograph from. However, from summer 1992 onward almost all photography was conducted from a Cessna 172 to enable both aerial archaeologists in Northamptonshire Heritage to contribute to the reconnaissance programme as photographers and navigators.

The photography was all oblique, taken with hand-held cameras. Initially 35mm cameras were used for all photography. From July 1978 a larger format Bronica ETRS with 50mm lens was used for black and white photography on 220 Ilford FP4 film. This black and white photography formed the basic record, comprising some 90% of the images taken. From 1979 a 35mm Pentax ME with Vivitar 35–105 zoom lens was used for colour slides, mainly for lecture purposes. From May 1990 this was replaced by a Nikon F801 with 35–105 zoom, although its autofocus proved problematic. The majority of transparencies were on Ektachrome 200 in the 1970s and 1980s, and on Agfachrome 200 in the 1990s. The transparencies were copied by RCHME for the NMRC until the late 1980s, and all prints continued to be copied for the NMRC until the mid-1990s. Shots from flights from the late 1990s onward are the only ones for which the negatives remain at NCC and copies were not taken by NMRC.

From 1978 all photography was carried out by the author, with the exception of a few flights by Cowley and by Hannan in the late 1970s. In 1994 Phil Markham was the photographer and the author the navigator. From 1974, apart from a few flights in the summer, Cowley was the pilot until forced to stop flying through ill health at the end of 1980. This was a great misfortune, for a very effective partnership had been built up over the previous years. Cowley, however, identified another private pilot, Derek Richardson, who worked with us to enable the flying programme to continue. From 1981 until 1992 Derek Richardson was pilot, other pilots occasionally standing in for a few flights in mid-summer.


*Fig 2.11*
*Cessna 150 at Sywell airfield in the 1980s (copyright Glenn Foard).*

1981–92 was not only the longest but also by far the most productive period of reconnaissance in the county, made possible by the close understanding and team work that developed between pilot and archaeologist. Unfortunately the team was broken up at the end of 1992 when Richardson, like several other private pilots, was barred from further aerial archaeology work by the CAA, who thereafter required the use of commercial pilots and aircraft operated with an Air Operator's Certificate (AOC). However, following successful negotiations by Gordon Maxwell in Scotland, NCC also managed to negotiate a special exemption from the AOC requirement as it would otherwise have been impossible to continue the local flying programme. This exemption was developed into a national scheme, which ran until the end of 2001.

As a result, during 1994–7 Mike Boardman, an instructor at Northamptonshire School of Flying, was the main pilot. Although an excellent replacement for Richardson, there was not time to build up the effective understanding between pilot and photographer that had existed in before 1993. But other things were also changing. There was now a full-time NMP project assistant, Phil Markham, to be brought into the flying programme. In 1993 he took over photography with the author as navigator, but there was no way that he could develop in 20 hours flying over a few months the level of experience built up in more than 400 flying hours over nearly 20 years, and so from 1995,

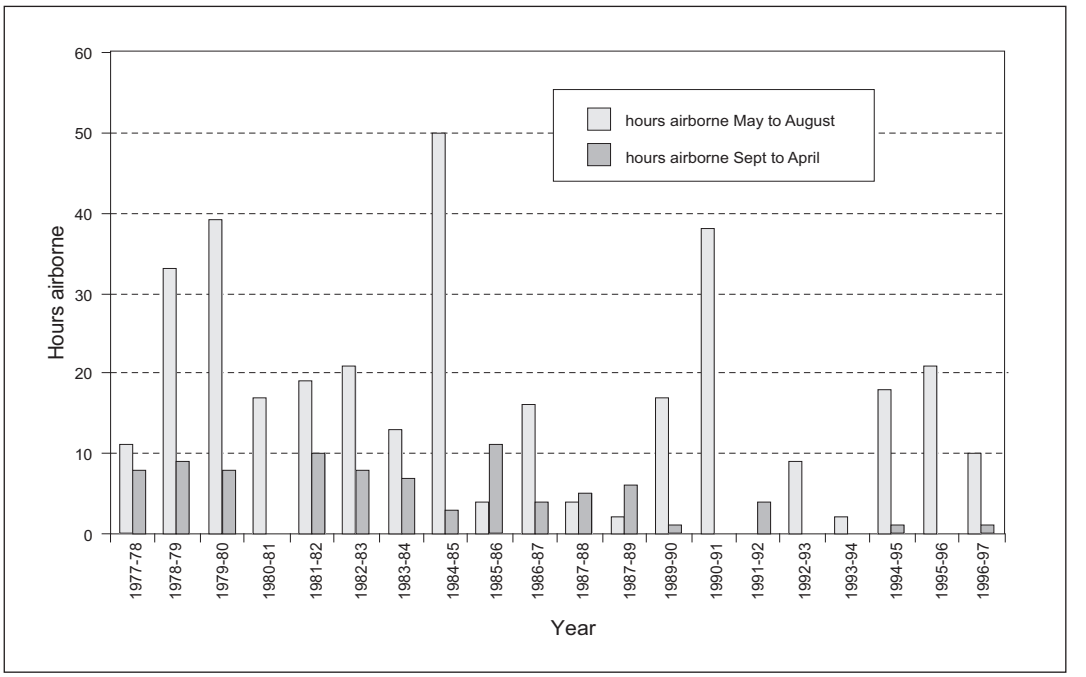



*Fig 2.12*
*Hours flown by NCC in the years 1977 to 1996.*

roles were reversed. After 1996 other responsibilities for both photographer and navigator, combined with poor cropmarks seasons, brought the systematic reconnaissance programme to an end. Only a handful of flights took place between 1997 and 2002. Additional problems arose with the changing approach of RCHME, subsequently subsumed into English Heritage, including copyright and other matters, at a time when their funding levels for regional reconnaissance had declined dramatically.

In 2002 all such work from Sywell was rendered impossible with the final removal by the CAA of the exemptions for archaeological aerial reconnaissance.

Table 2.2 Hours flown and photographs taken by NCC in the years 1977 to 1996

| *year* | *hours flown May to August* | *hours flown September to April* | *number of photographs taken May to August* | *number of cropmark photographs taken* |
|---|---|---|---|---|
| 1977–78 | 11 | 8 | 390 | 76 |
| 1978–79 | 33 | 9 | 753 | 553 |
| 1978–80 | 39 | 8 | 1233 | 846 |
| 1978–81 | 17 | 0 | 636 | 490 |
| 1978–82 | 19 | 10 | 664 | 590 |
| 1978–83 | 21 | 8 | 722 | 532 |
| 1978–84 | 13 | 7 | 376 | 305 |
| 1978–85 | 50 | 3 | 1558 | 1602 |
| 1978–86 | 4 | 11 | 201 | 29 |
| 1978–87 | 16 | 4 | 670 | 678 |
| 1978–88 | 4 | 5 | 191 | 31 |
| 1978–89 | 2 | 6 | 59 | 6 |
| 1978–90 | 17 | 1 | 124 | 238 |
| 1978–91 | 38 | 0 | 1497 | 1183 |
| 1978–92 | 0 | 4 | 0 | 14 |
| 1978–93 | 9 | 0 | 276 | 235 |
| 1978–94 | 2 | 0 | 20 | 0 |
| 1978–95 | 18 | 1 | 491 | 573 |
| 1978–96 | 21 | 0 | 1054 | 1143 |
| 1978–97 | 10 | 1 | 760 | 801 |

Reconnaissance in 1978 and 1979, although focussing particularly on cropmarks from May to August, also included a wide distribution of flights through much of the year to enable wider potentials to be more fully assessed. As a result, it was recognised that soilmark photography could make a major, if secondary, contribution and enabled the reconnaissance to settle into a more focussed pattern. However, by the late 1980s the results from soilmark photography had tailed off and reconnaissance then concentrated even more on cropmarks.

Over the 20 years of intensive work over 75% of the flying was conducted between May and August, almost solely for cropmark evidence (Fig 2.12 and Table 2.2). The remaining 25% between September and April was largely for earthwork and soilmark evidence, although a few early cropmarks and some late parchmarks were recovered in April and September, respectively.

In some years cropmark development was so poor that only a handful of flights were made to test conditions. In 1991 no cropmark flights were undertaken because very poor cropmark results were reported from other regions. In some other years many more hours were flown than normal to enable the exceptional cropmark evidence to be recorded. The effectiveness of the reconnaissance strategy appears to have improved significantly over the years, with the number of photographs taken increasing significantly in relation to the number of hours flown, suggesting that far better targeting of flights was accomplished in the most productive periods (Fig 2.13). Large quantities of new data were recovered in exceptional years, most notably in 1979, 1984, 1990 and 1995–6. High quality results were achieved roughly once in every five years through the two decades of reconnaissance. One of the best indicators of exceptional years is the return seen on the usually poorly responsive boulder clay geology, where the years 1990, 1995 and 1996 stand out (Fig 2.14).

Reconnaissance in 1978 and 1979 showed that, particularly in the autumn and early winter, there was a high potential to recover soilmark evidence of medieval field systems and of deserted settlement remains. Systematic survey of this evidence was not, however, undertaken in subsequent years owing to the need to concentrate limited resources on cropmark and the other soilmark targets. While cropmark photography was not generally proving effective in filling in the massive gaps in our evidence of Iron Age and Roman activity on the boulder clays, soilmark photography in the formerly wooded areas proved an important way to tackle part of this otherwise apparently inaccessible

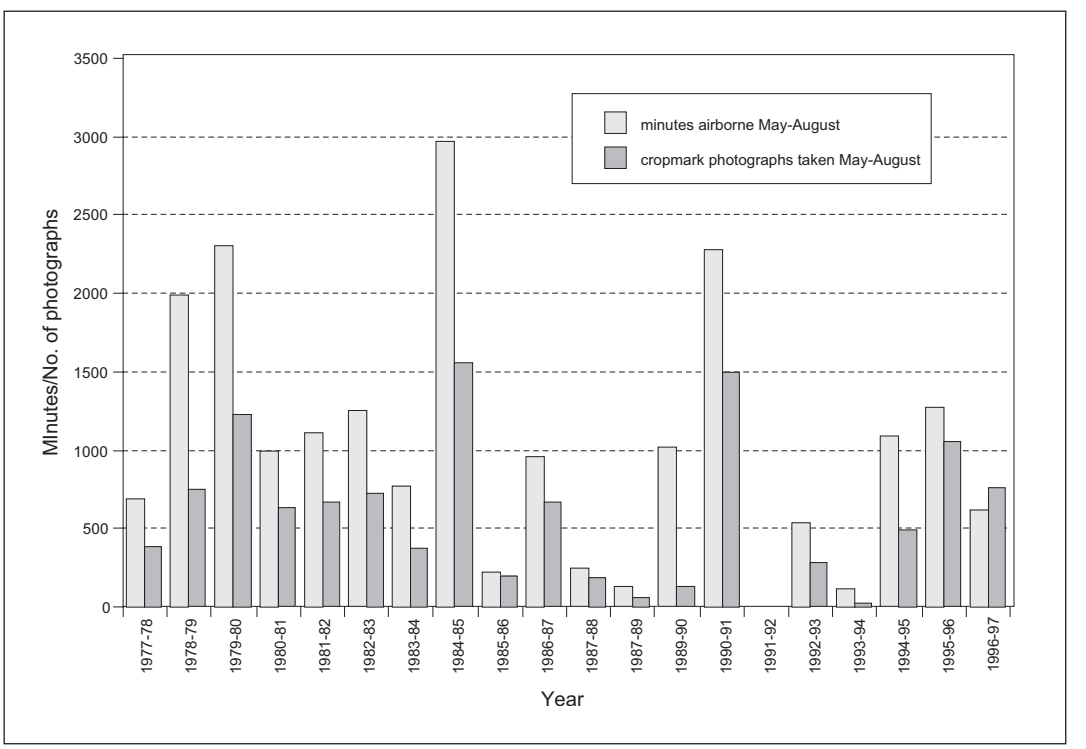



*Fig 2.13*
*Number of NCC cropmark photographs taken relative to minutes spent airborne on the years 1977 to 1996.*

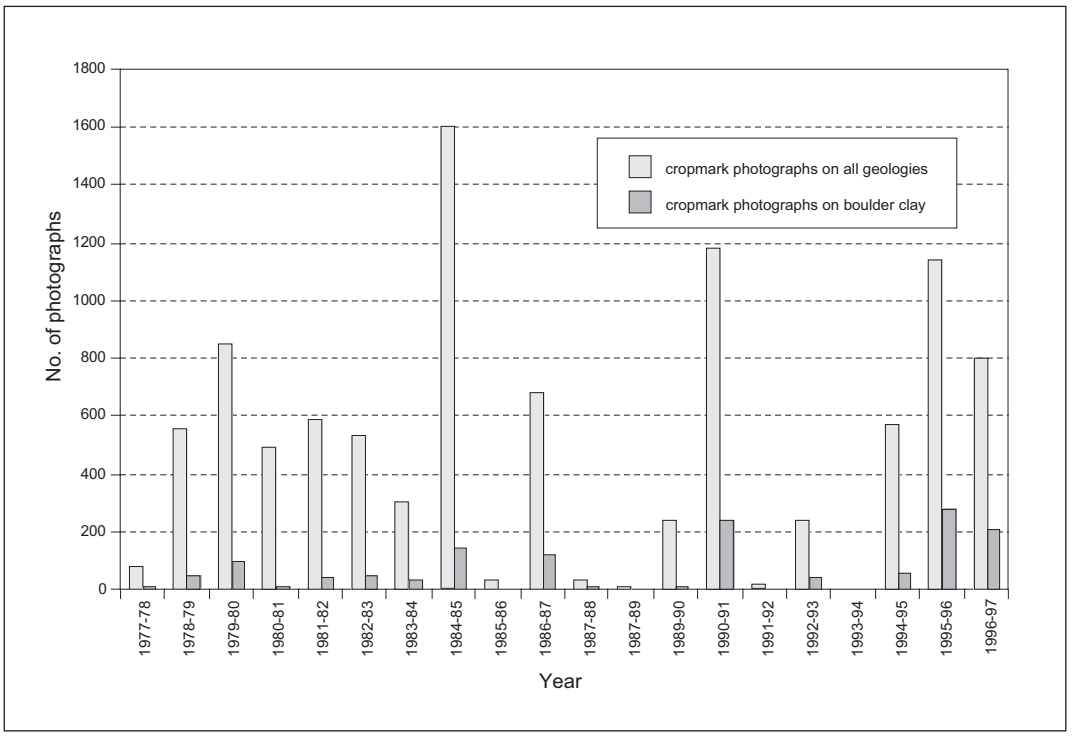



*Fig 2.14*
*Number of NCC cropmark photographs taken on boulder clay relative to NCC cropmark photographs taken on all geologies.*

resource. Mainly on boulder clay in Whittlewood-Salcey Forest and especially Rockingham Forest, exceptional evidence was recorded in the early 1980s through systematic recon-naissance (Fig 2.15). These settlement and field system remains complement the cropmark results on boulder clay, especially along the Nene–Ouse watershed, achieved in exceptional cropmark years. But in the forest areas these sites had survived as earthworks until the 20th century and were, at the time of photography, undergoing rapid destruction by ploughing. At the time, it proved impossible to persuade English Heritage to respond to this destruction with a campaign of scheduling. This reconnaissance also yielded extensive, national, and at least at that time, rare aerial evidence of the medieval charcoal industry, which supplied the iron furnaces of medieval Northamptonshire.

Other formerly wooded areas in the county were also examined for such soilmarks, but all that was identified was a small area on the eastern edge of Salcey Forest to the south of Bozeat. Several other flights were conducted to check the Forest of Arden and Rutland Forest, particularly for charcoal burning evidence, but none was found.

The actual reconnaissance in any year did not necessarily match the objectives laid out in the grant applications for that year, set down to meet the requirements of the funding body, because developing conditions often demanded a revision of priorities. It is also clear, with hindsight, that some themes were not afforded the priority that was appropriate, although to a considerable degree such omissions were the results of a conscious decision to target the available resources to the most productive evidence.

Ridge and furrow in particular were ubiquitous in 1977, and so were largely ignored for much of the reconnaissance period. However, by the early 1990s the rate of loss was enormous. On the log for 17 July 1992, a flight made for ridge and furrow survival recording, it is stated: 'Extensive areas of arable now exist even where ridge and furrow was extensive 10–15 years ago. Most of the county [has] just occasional fields and some [of these are] not [of] good quality due to one or two modern ploughings. Very few distinctive areas of extensive ridge and furrow [now remain].' In response to this situation some limited recording was begun and a report commissioned from Hall to quantify the loss.

This work, however, was too late to enable effective recording action for most areas of the county. (Hall 1993). With hindsight, having now assessed a large

sample of the 1940s RAF verticals as a record of ridge and furrow, this failure to conduct intensive recording in ideal conditions in the mid-1970s can be seen as the major failure of the 20-year campaign of reconnaissance.

Photography, of excavations and of wider historic landscapes, was conducted incidentally as part of the other reconnaissance. Only in the 1990s were a few flights undertaken specifically to record parks and gardens, and ridge and furrow, associated with the initiation of projects to assess their survival and condition. The former related to the work of the Northamptonshire Gardens Trust, while the latter led to an English Heritage-funded project to assess the survival of ridge and furrow. This incorporated a specially commissioned programme of reconnaissance in 1999 by CUCAP, targeting the best surviving ridge and furrow townships in the Midlands and published by Hall (2001a).

Another specific reconnaissance target was cropmark evidence in the Raunds area, which was more intensively overflown in the early 1980s than any other part of the county, in order to contribute to the Raunds Area Project (Parry 2006). Several flights were also conducted in flood conditions to identify the very slight earthworks of palaeo-channels on the floodplains of the Nene and Ouse, because of their importance as reservoirs of environmental evidence.

Some themes that might have justified more systematic reconnaissance, such as earthwork and standing remains of World War II, were never incorporated into the

*Fig 2.15*
*NCC soilmark photographs relative to wooded, built and quarried land in the Rockingham Forest area.*

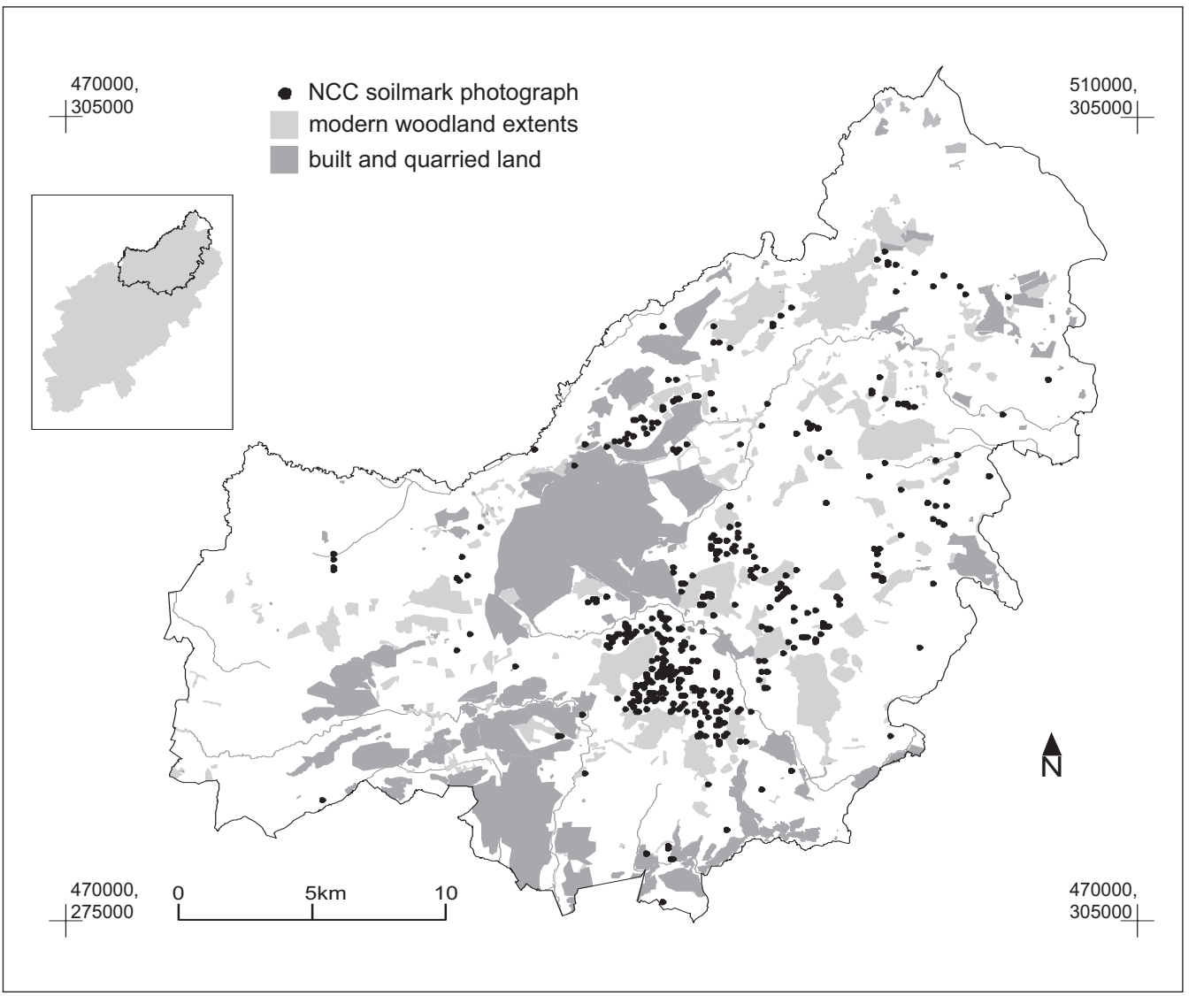


*Fig 2.16 (below) Distribution of NCC cropmark photographs on boulder clay in 1984.*

*Fig 2.17 (opposite, top left) Distribution of NCC cropmark photographs on boulder clay in 1986.*

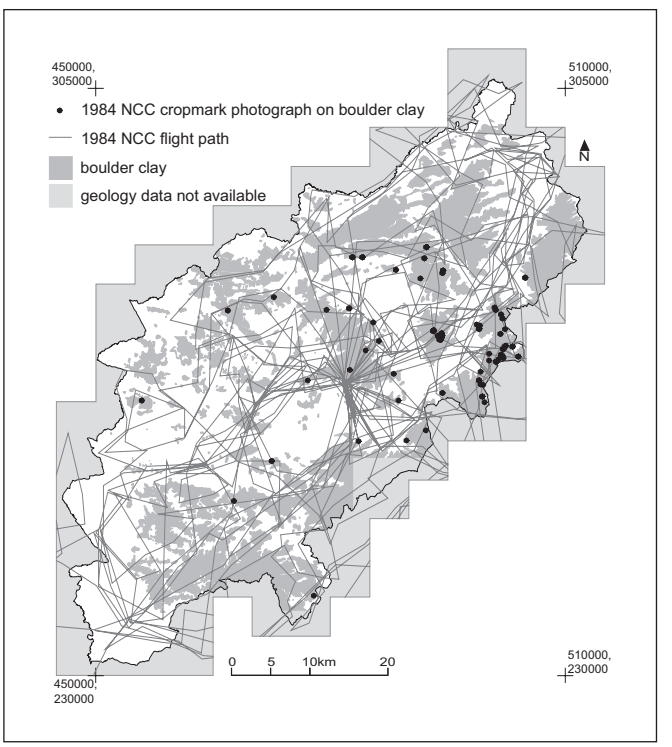
*Fig 2.18 (opposite, top right) Distribution of NCC cropmark photographs on boulder clay in 1990.*

*Fig 2.19 (opposite, bottom left) Distribution of NCC cropmark photographs on boulder clay in 1995.*

*Fig 2.20 (opposite, bottom right) Distribution of NCC cropmark photographs on boulder clay in 1996.*

flying programme. For these types, only incidental photography was undertaken in the course of other reconnaissance.

From May to August, where practicable and appropriate, and with reference to weather conditions and reports from other aerial archaeologists nationally, flights were conducted to monitor cropmark development. Progress on different geologies was assessed, including examination of sites known to appear in most years. Where a particular geology began to show good cropmark development, that geology was targeted across the county. The generally mixed nature of the geology of the county did, however, ensure overflight of other geological types on a regular basis, hence maintaining a check on progress county-wide. This was essential, as in some years cropmark development varied significantly in different parts of the county, probably mainly in response to thunderstorm tracks. From 1981 to 1993 brief summaries of the developing conditions were made on most flight logs. They provided, together with the crude mapping of the flight paths (not retained), the evidence on which to base the flight paths in the following flights and indeed the timing of those flights. When taken together for a year these give a broad overview of the perception of the photo-grapher as to the nature and location of cropmark development and the way in which conditions appeared to be developing.

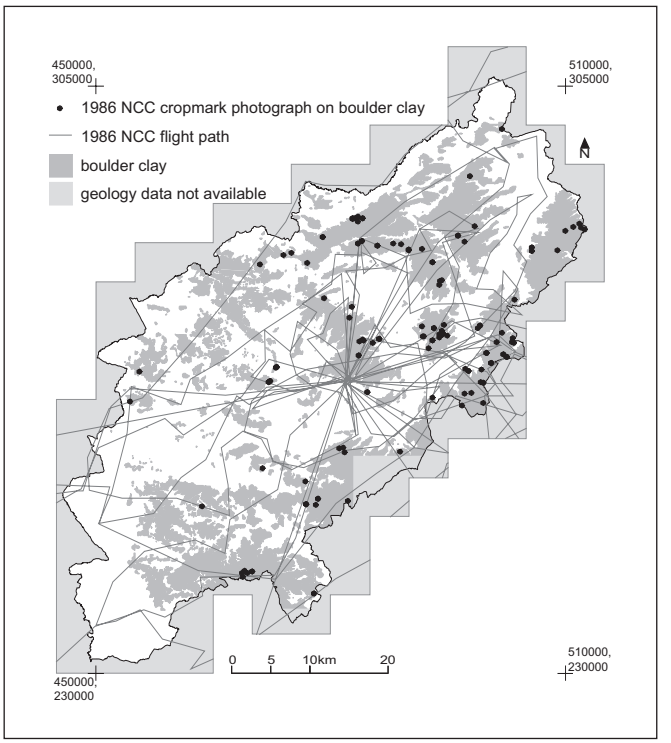


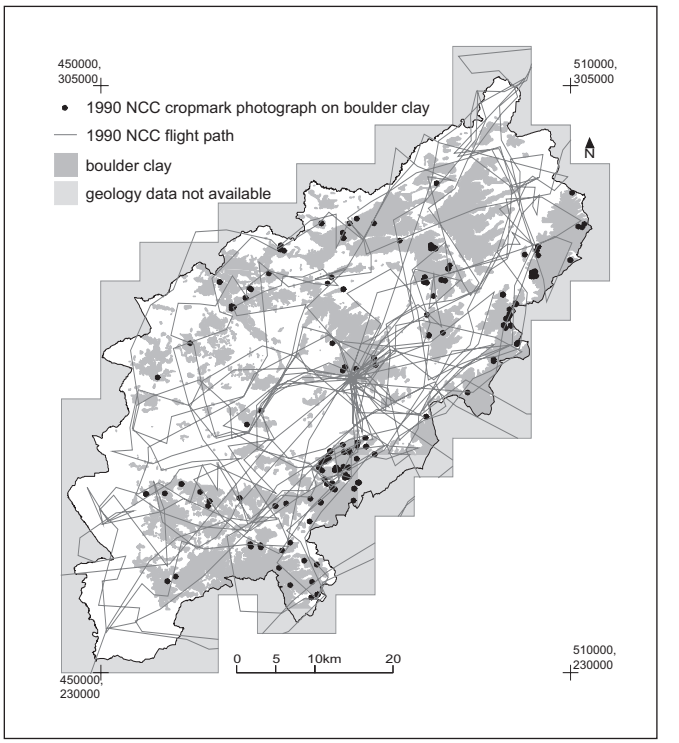

Throughout the 20 years it was the most responsive, permeable geologies that still produced the greatest return, both in number and complexity of new data. In a few exceptional years, typically towards the end of very dry seasons, some of the main 'blank' areas, on boulder clay, began to yield significant results (*see* Fig 2.14). The clay land that produced the most extensive cropmarks was that between the Nene and the Ouse in Northants and the adjacent areas of north Bedfordshire and west Cambridgeshire (Figs 2.16–20). The reconnaissance programme demonstrated that in most years, and for most of the season, the absence of cropmarks on the clay lands was a result of the lack of cropmark development rather than lack of reconnaissance.

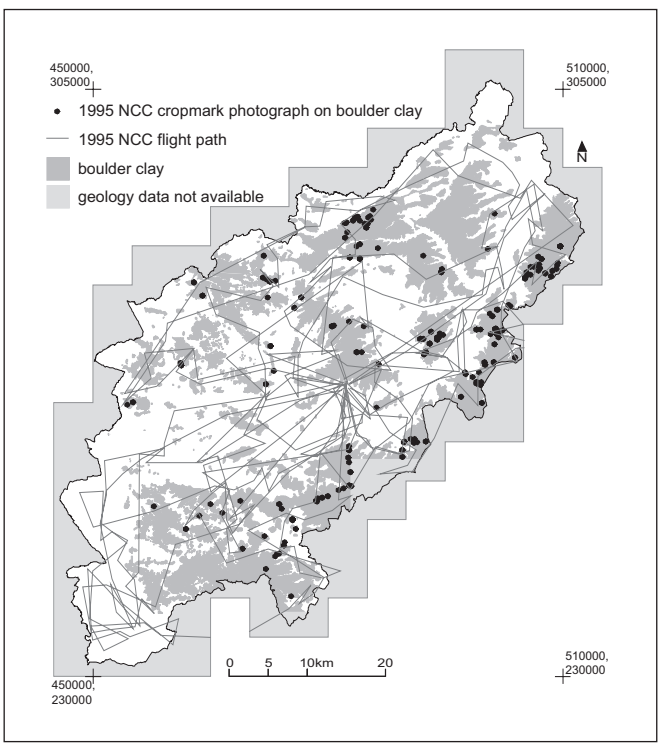
It became clear that flying to fill in gaps in evidence on the less responsive geologies, the 'blank' areas identified in 1980, had to be carefully targeted to short periods in exceptional years. Identifying these key moments – usually no more than a week or two in a handful of years over two decades of flying – was the critical task and one that could only be achieved by maintaining a local reconnaissance programme in all but the worst years. It also seems clear that both the recognition of and the ability to respond to such cases can only be effectively achieved where there is a local flying programme and where the needs and opportunities with regard to the local geology and archaeological record are clearly understood.

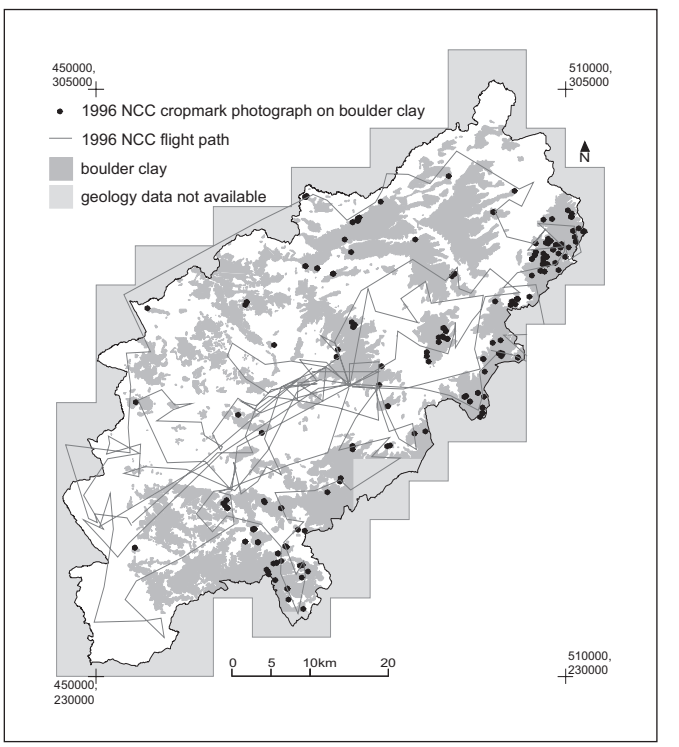
By the late 1980s so many sites had been photographed that it was no longer possible to grasp the nature of the resource and its meaning. Crude patterns were recognisable, related to geology, topography and region – as with the apparent planned, rectilinear 'Celtic' landscape of part of the boulder clay between Nene and Ouse – but it was recognised that only through a programme of systematic plotting and analysis would the meaning be drawn out of the morphology of the sites countywide.

It is hoped that the project and the analysis presented in the following chapters, has achieved enough to unlock at least part of the enormous potential revealed by the aerial reconnaissance campaigns of all those archaeologists who have flown in the county over the last 50 years or more.




## Reconnaissance update January 2006

NCC aerial reconnaissance ended in 2002 and EH's own programme of flying has responded to different priorities and a general paucity of cropmarks caused by wet weather at key stages in the crop growing season, not just in Northamptonshire (D Grady pers comm). EH aerial reconnaissance has contributed to a number of national and regional surveys and has targeted the Cold War architecture at the Thor missile site at Harrington and

supported the Northamptonshire Shoe and Boot Project with a record of the workshop and factory complexes in Northampton, Kettering and Wellingborough. The county was also part of a pilot for the Scheduled Monuments at Risk project, which aimed to assess all the scheduled monuments in the East Midlands and discover which sites were under the highest risk from damage caused by ploughing, animal burrows, excessive scrub and so forth. Future aerial reconnaissance will be guided by this report on the results of the NMP.

# 3
# The significance and limitations of the project data

*by Alison Deegan*

The project has produced a varied and exciting dataset in a flexible digital environment. The objective of this chapter is to detail the known external influences on the record of cropmarks, soilmarks and earthworks in order that the resultant biases can be isolated, and to reveal patterning of archaeological significance.

## Quantifying the results

The main constituents of the NMP data are the linear features, predominantly ditches and banks, and area features, such as pits, mounds and platforms. The GIS-based methodology employed has enabled database information to be attached to each mapped feature, including whether it was identified as a cropmark, soilmark or earthwork. Thus the smallest recording unit, referred to here as an "object", can be used to study the relative distribution of archaeological cropmarks, soilmarks and earthworks. As ridge and furrow is so ubiquitous in the aerial photographic record, and would thus distort all analysis, and because the project only recorded it in limited circumstances, such field system evidence is excluded from all of the quantifications, distributions and discussions below. Figure 3.1 illustrates the distribution of objects recorded this project.

## Sources of information

NCC has generated extensive digital data documenting historic and present land use, most recently through the HLC project. This study draws upon these datasets, particularly those relating to the main period of aerial photography, between 1948 and 2000, and especially to the period of intensive NCC reconnaissance between 1978 and 1996. The HLC data for the early 1950s, based on the Ordnance Survey 1:25 000-scale mapping, have been used as an indication of the land use near the beginning of the period of photography because, at the time of writing, there are no extensive digital datasets for the 1940s. This, together with the HLC data for the 1880s, from the Ordnance Survey 1st edition 1:10 560 mapping, and from the 1928 Land Utilisation maps (Field and Holland 1928), gives an overview of the county at the end of the 19th and the first half of the 20th centuries. Digital mapping in the SMR also charts the modern extent of woodland, urban development and quarried land. NCC has also digitised surface (drift and solid) geology from the unpublished British Geological Survey 1:10 000 or 1:10 560-scale mapping, including, importantly, the extent of made ground.

With the exception of sheet SP66, for which a 1:25 000 survey is available, the largest scale soil survey coverage available for the whole of the county is at 1:250 000 scale (Soil Survey of England Wales (SSEW) 1983). The latter is too coarse for this study, but the SSEW soil descriptions have been useful in defining the characteristics of the soils and underlying geology.

The present study also makes use of data extracted from the Ordnance Survey Landline and Mastermap series, the MultiMap seamless vertical aerial photograph coverage for 2000 and the Land Cover Map 2000 (Centre for Ecology and Hydrology 2000).

## Influences of geology and soils

The modern county has a complex surface geology (*see* Panel 1) which significantly influences the distribution and frequency with which cropmarks, soilmarks and earthworks occur.

### Cropmarks

The average density of archaeological cropmark objects across the county is 4.5 per km$^2$. The density is greatest on the

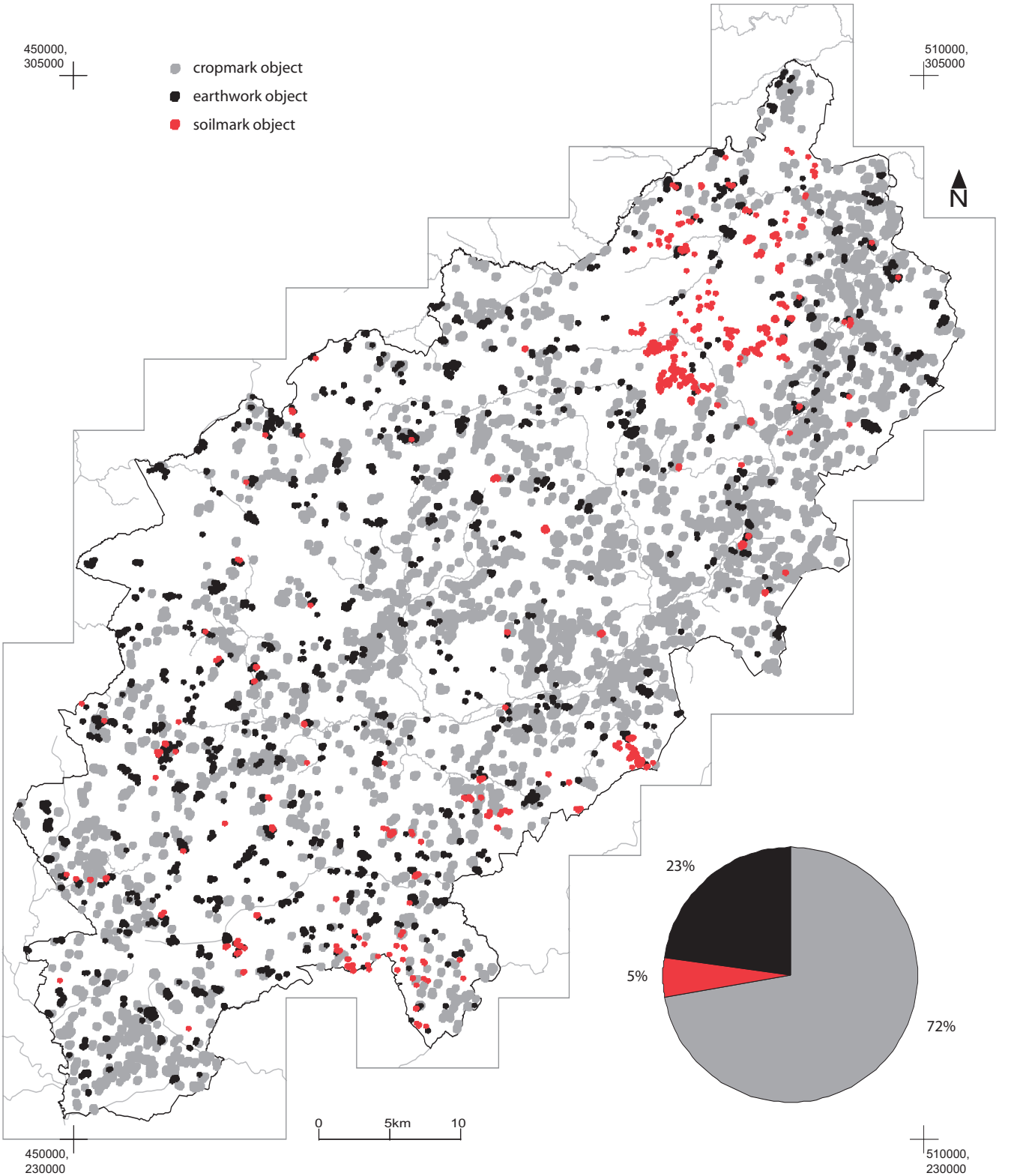



*Fig 3.1*
*The distribution of cropmark, soilmark and earthwork objects (excluding ridge and furrow).*

Table 3.1 The relative distribution of cropmarks, earthworks and soilmarks on each of the surface geological strata encountered in Northamptonshire (based on the NCC geology data variously dated from 1941 to 1977)*

| *geology* | *area km²* | *number cropmark objects* | *cropmark objects per km²* | *number earthwork objects* | *earthwork objects per km²* | *number soilmark objects* | *soilmark objects per km²* |
|---|---|---|---|---|---|---|---|
| 1st terrace | 36.08 | 663 | 18.38 | 42 | 1.16 | 11 | 0.30 |
| 2nd terrace | 18.86 | 160 | 8.49 | 59 | 3.13 | 7 | 0.37 |
| 3rd terrace | 1.45 | 17 | 11.75 | 1 | 0.69 | 0 | 0.00 |
| alluvial fan | 2.25 | 20 | 8.91 | 0 | 0.00 | 1 | 0.45 |
| alluvium | 139.74 | 370 | 2.65 | 216 | 1.55 | 16 | 0.11 |
| boulder clay | 745.63 | 1826 | 2.45 | 624 | 0.84 | 447 | 0.60 |
| calcareous tufa | 1.47 | 0 | 0.00 | 14 | 9.51 | 0 | 0.00 |
| cornbrash | 22.60 | 401 | 17.74 | 35 | 1.55 | 12 | 0.53 |
| glacial lake | 2.90 | 28 | 9.67 | 10 | 3.45 | 0 | 0.00 |
| glacial sand and gravel | 80.38 | 457 | 5.69 | 76 | 0.95 | 8 | 0.10 |
| Great Oolite Clay | 22.65 | 62 | 2.74 | 17 | 0.75 | 16 | 0.71 |
| Great Oolite Limestone | 102.96 | 862 | 8.37 | 177 | 1.72 | 41 | 0.40 |
| head | 3.37 | 0 | 0.00 | 7 | 2.08 | 0 | 0.00 |
| Kellaways Clay | 4.86 | 15 | 3.09 | 10 | 2.06 | 0 | 0.00 |
| Kellaways Sand | 6.55 | 31 | 4.73 | 7 | 1.07 | 0 | 0.00 |
| Lower Lias siltstone and silty mudstone | 1.35 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Lower Estuarine Series | 51.86 | 393 | 7.58 | 96 | 1.85 | 16 | 0.31 |
| Lower Lias Clay | 89.85 | 95 | 1.06 | 172 | 1.91 | 7 | 0.08 |
| Lower Lincolnshire Limestone | 46.53 | 171 | 3.68 | 67 | 1.44 | 8 | 0.17 |
| Marlstone Rock Bed | 43.06 | 303 | 7.04 | 50 | 1.16 | 3 | 0.07 |
| Middle Lias Silts and Clays | 106.22 | 258 | 2.43 | 238 | 2.24 | 14 | 0.13 |
| Northampton Sand and Ironstone | 194.74 | 3067 | 15.75 | 322 | 1.65 | 26 | 0.13 |
| opencast mining | 52.43 | 71 | 1.35 | 6 | 0.11 | 3 | 0.06 |
| Oxford Clay | 41.65 | 31 | 0.74 | 29 | 0.70 | 25 | 0.60 |
| reservoir | 4.17 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| unsurveyed | 57.53 | 198 | – | 35 | – | 69 | - |
| Upper Estuarine Clay | 66.00 | 207 | 3.14 | 209 | 3.17 | 15 | 0.23 |
| Upper Estuarine Limestone | 25.37 | 279 | 11.00 | 58 | 2.29 | 1 | 0.04 |
| Upper Lias Clay | 384.88 | 747 | 1.94 | 742 | 1.93 | 28 | 0.07 |
| Upper Lincolnshire Limestone | 4.99 | 11 | 2.21 | 10 | 2.01 | 3 | 0.60 |
| *total area/objects* | 2362.38 | 10743 | 4.55 | 3329 | 1.41 | 777 | 0.33 |

* This table excludes geological strata that outcrop over less than 1km² in the whole county; Upper Lias Thin Nodular Limestone (1 cropmark object), Made ground (11 earthwork objects), Landslip (3 earthwork objects); Limestone Raft, Mid Lias Limestones & Sandstones, Kellaways Beds, Lacustrine Deposits and Peat (all no objects).

permeable geologies: the gravels of the river terraces, Cornbrash, Northampton Sand and Ironstone and Great Oolite Limestone (Table 3.1 and Fig 3.2). Over 28% of all cropmark objects were recorded on the Northampton Sand and Ironstone. On these geologies the difference between the nutrient-rich, water-retaining archaeological fills and the very freely draining nutrient-poor soils is most marked (*see* Panel 2). In free-draining areas, individual crop plants that are rooted in localised archaeological deposits, such as pit and ditch fills, will continue to thrive long after surrounding plants have begun to wilt and it is this difference that is visible from the air. Localised variations in topsoil depth can also effect cropmark formation; even on

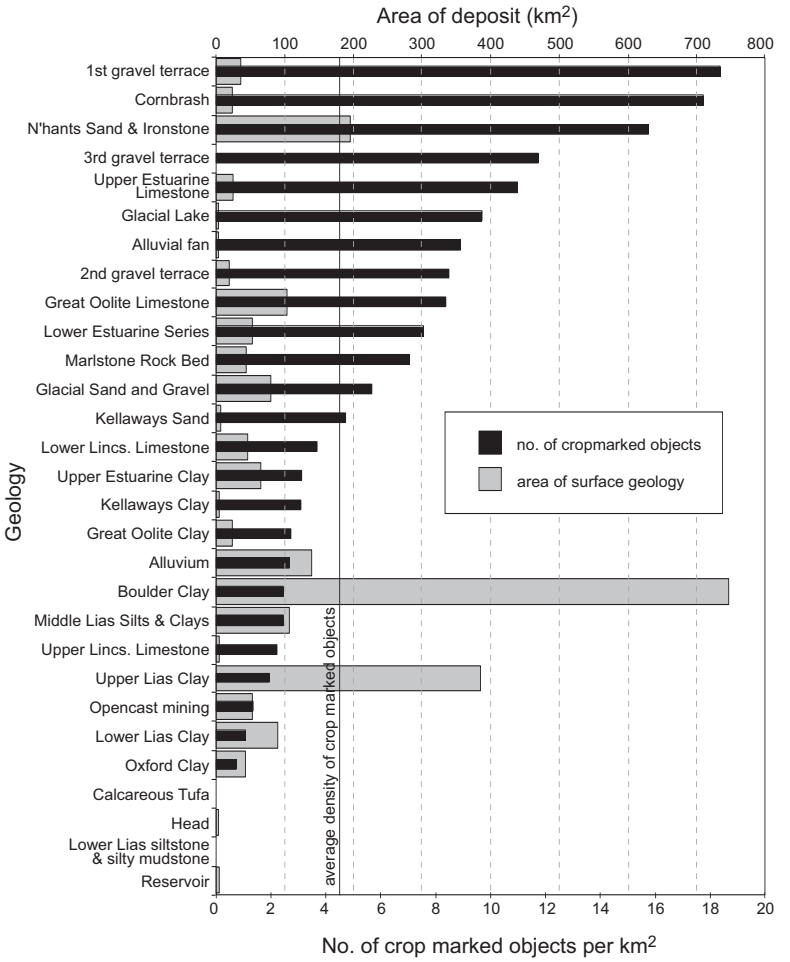



*Fig 3.2*
*The total area covered in km² by each of the surface geological strata and the average number of cropmarks per km².*

well-drained soils, an accumulation of hill wash in a hollow, for example, masks buried archaeological features.

The density of cropmark objects falls below the county average on the heavier, slower draining soils of the impermeable geologies: the boulder clay, Oxford Clay, Great Oolite Clay, Middle Lias Silts and Clays and Lower Lias Clay. Soils developed on clay geologies contain negatively-charged particles that attract water. In periods of SMD the release of water from the soils to the plants is moderated by the increasing surface-tension created by the charge, preventing sudden water-stress (Jones and Evans 1975, 3). Thus in clay areas the plants rooted in archaeological deposits have little advantage over their neighbours and visual differences in their growth and ripening is less common.

Looking at the boulder clay statistics in more detail, with fewer than 2.5 objects per km² (*see* Fig 3.2) the overall density values are low, but it is a very extensive geology and thus 17% of all cropmark objects occur on the boulder clay (*see* Table 3.3 in panel 3.1). Only the highly permeable Northampton Sand and Ironstone has produced more cropmark objects than the boulder clay, but their distribution across the boulder clay is not even (Fig 3.3).

Across the extensive boulder clay deposits covering the Nene–Ouse interfluve cropmark objects are well-distributed. complex networks of cropmarks in this area, although often less-well defined than those on more permeable geologies, reveal Roman and Iron Age settlements and field systems (Fig 3.4). In this area there are 5.3 cropmark objects per km², a figure higher than the county average and more than double the average for all boulder clay.

North of the Nene there are extensive boulder clay deposits, but rarely have they yielded cropmarks to the same level as seen south of the Nene. Indeed, in the north-eastern parts of Rockingham Forest archaeological cropmarks are all but absent. In the west of the county areas of boulder clay deposits are far more fragmentary and heavily interspersed with other permeable and non-permeable geologies. This situation is reflected in the sporadic occurrence of cropmark sites on boulder clay.

The available geological and soils data offer no clues as to why some areas of boulder clay should produce significantly more cropmarks than others: the soils of the HANSLOPE (411d) and RAGDALE (712g) soil associations are common to the three areas described above. Both are slowly permeable calcareous clayey soils produced from Chalky Till (SSEW 1983). The boulder clay in the west of the county also bears ASHLEY (572q) and BECCLES 3 (711t), both of which share the characteristics of the HANSLOPE and RAGDALE soils. Soilmark photography and field-walking studies, such as that at Brigstock (Foster 1988), have demonstrated that these differences do not reflect the choices of prehistoric and Roman settlers and farmers, so unidentified variations in soils character or the impact of more recent land use practices need to be considered.

On the valley floodplains deposits of fine, silty alluvium covering otherwise well-drained soils are a significant impediment to site visibility. It is important to remember that major alluviation in the Nene Valley did not apparently begin until the late Saxon period or early medieval period, and that previously the valley floor was characterised by the exposed and irregular

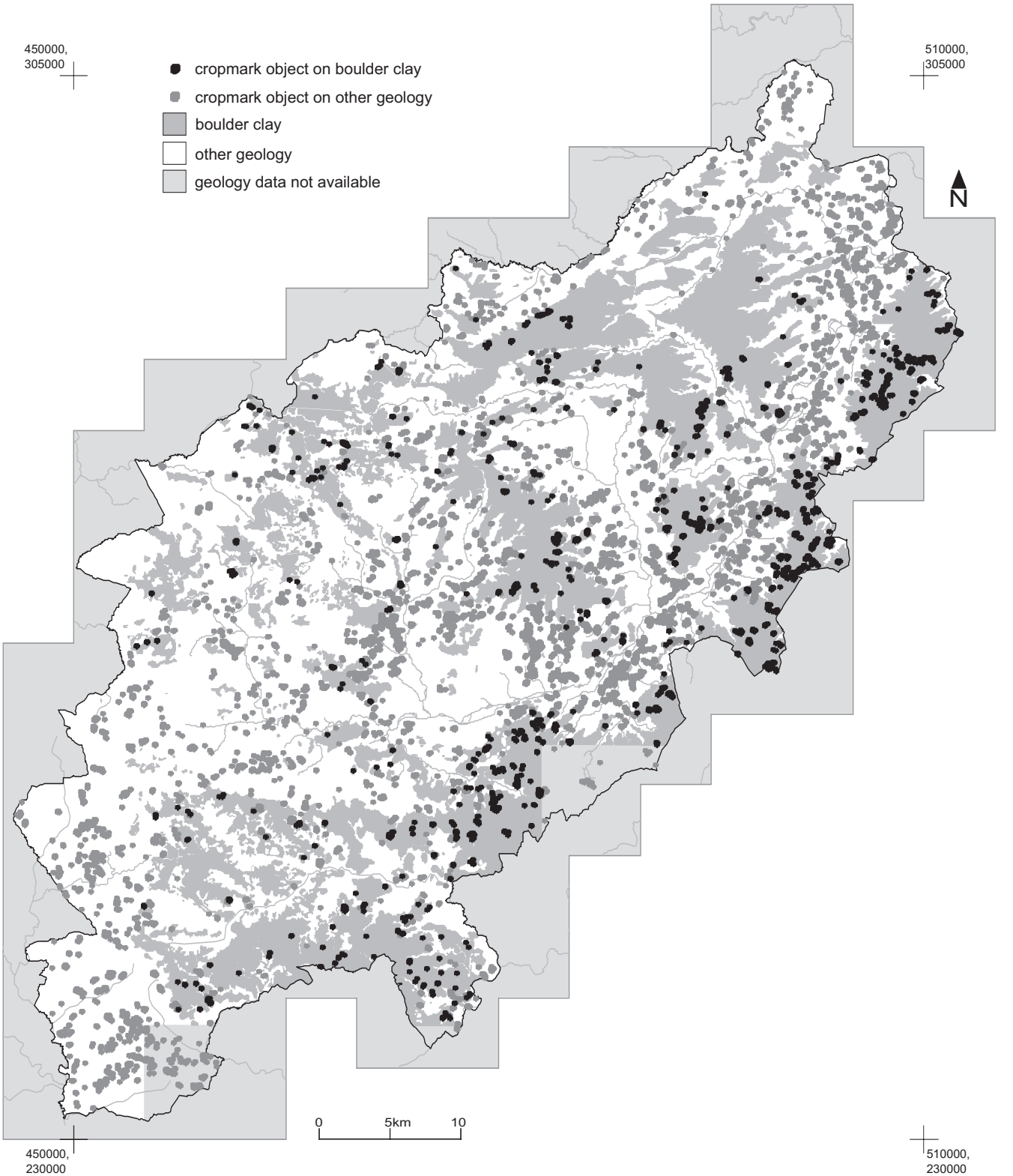



*Fig 3.3*
*The extent of boulder clay and distribution of cropmarked objects.*

*Fig 3.4*
*These faint and diffuse cropmarks on the plateau to the east of Raunds, probably Iron Age or Roman settlement and agricultural enclosures, are typical of cropmarks in the boulder clay (NCC photograph TL0271/005 28 July 1986 NCC copyright).*

topography of the gravel terraces (Brown 2005). The depth of the alluvial deposits along the major valley floors is variable and gravels come to the present ground surface in parts, often unrecorded on the BGS mapping. Cropmarks often form small 'islands' where the alluvium is more shallow, or absent. Where the alluvium is deeper, Roman or earlier archaeological remains are rarely, if ever, detected by aerial survey or other non-intrusive prospection techniques, although as a consequence of their burial they are likely to be much better preserved.

Clearly geological and soil permeability are a key factor influencing the occurrence of cropmarks above buried archaeological sites. Using this data it is possible to define those areas that, in the absence of any other obstacles, are most and least likely to produce cropmarks. This analysis shows that the soils and geology of just one-third of the county are conducive to cropmark formation (Fig 3.5).

## Parchmarks

The distribution of parchmarks is strongly linked to that of the earthwork settlement remains from the medieval and post-medieval periods. There is a strong geological factor in the distribution of parchmarks, but this is via the availability and use of building stone rather than an influence on the formation of this type of cropmark.

## Soilmarks

Soilmarks, although far more rare than cropmarks, have made a significant contribution to the study of medieval settlement remains and, in restricted areas, the medieval charcoal industry and settlement and field systems of the Iron Age and Roman period. The latter has been particularly important in areas where cropmarks rarely develop.

The average density of soilmark objects across the county is 0.3 per km$^2$ and there is very little variation between the different geological strata (*see* Table 3.1 and Fig 3.6). Boulder clay covers nearly a third of the county and produced 57% of all soilmark sites, but again the distribution of these sites is very uneven.

The overall distribution of soilmark sites is concentrated in a few main clusters, giving a more widespread but much sparser distribution of isolated sites (Fig 3.7). Any association with geology is typically from intermediate agencies: hence the concentration of Iron Age and Roman soilmarks on the boulder clay is a result of the medieval woodland surviving almost exclusively on extensive areas of that geology, and hence the sites escaping medieval cultivation; while the charcoal hearths are there because of the presence of the woodland. A significant qualitative difference has been observed between the crisper, clearer soilmarks in the main clusters (Fig 3.8) and the more indistinct, dispersed soilmarks seen elsewhere, probably a result of how recently the sites were first ploughed up. Importantly the pattern of the main soilmark clusters compliments rather than mirrors the distribution of cropmarks on the same geology (*compare* Figs 3.3 and 3.7).

## Earthworks

The variation in the distribution of earthwork objects between different geological strata is relatively small compared to that observed for cropmarks (Fig 3.9). The significance of the distribution on calcareous tufa is greatly exaggerated by the presence of a few earthwork sites on such a minor deposit (*see* Table 3.1). Together the boulder clay and Upper Lias Clay produced

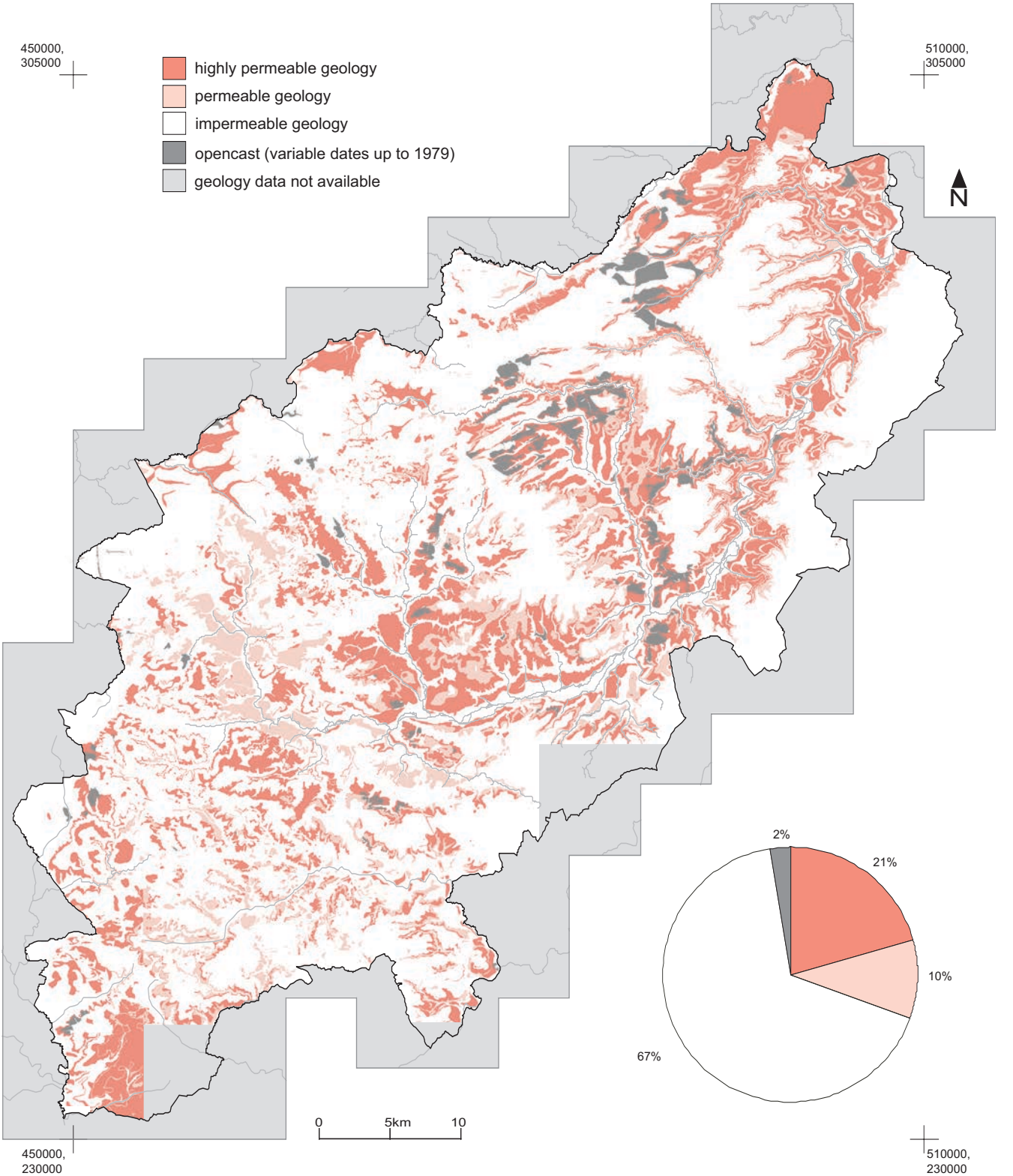



*Fig 3.5*
*The main zones of permeability based on surface geology and soil type.*

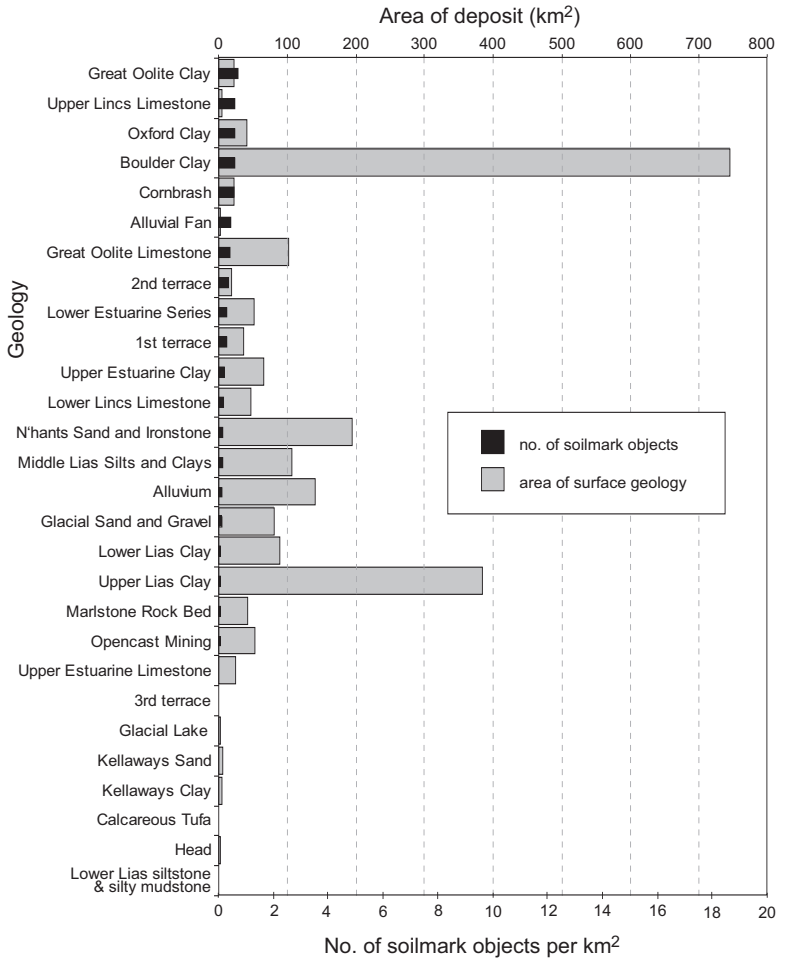



*Fig 3.6*
*The number of soilmark objects per km² on each of the surface geological strata encountered in Northamptonshire.*

over 40% of objects, but as they cover nearly 50% of the county this is perhaps not overly significant. Certainly substantial banks and ditches may survive better on heavy, tenacious clay soils, but the indirect influence of the soils and geology on the land use subsequent to site abandonment is undoubtedly more significant.

## Climatic conditions

Mean temperature, sunshine hours and precipitation levels and hence the potential Soil Moisture Deficit (SMD) vary little over such a relatively small and compact county situated beyond the maritime influences from the west. (Hodge *et al* 1984, fig 7).

Locally, the higher ground to the north-west may be slightly wetter than the south and east, but these differences are unlikely to have had a major impact on the relative distribution of cropmarked archaeology. Snow cover is slightly more persistent in the north and west of the county, a few hours or several days making the difference to the opportunity to arrange reconnaissance in time, but the impact of this on the record of earthwork sites has been negligible. There are no significant variables in the weather patterns of the county that would bias the record for soilmarks.

On a regional level Northamptonshire enjoys a relatively low level of precipitation. The Pitsford Weather Station has recorded average rainfall of 586mm per year between 1961 and 1990 (www.northantsweather.org.uk). In comparison, the Meteorological Office records averages of more than 2000mm for the Lake District, 1005mm for St Mawgans (Cornwall) and 584mm for Lowestoft (Suffolk) over the same period (www.met-office.gov.uk). In general, cropmark reconnaissance in Northamptonshire has proved to be productive even in some years when high early summer rainfall has led to a poor showing of cropmarks in other areas of the country. When conditions have been favourable across the country, results from Northamptonshire have generally been very good, although occasionally thunderstorm tracks have caused localised reconnaissance failures.

## Land use

In normal circumstances buried, levelled and upstanding archaeological features will only be visible from the air when under crops or grass. Archaeology under woodland or urban development will be masked, and where these conditions have prevailed throughout the period of photography no cropmarks, soilmarks or earthworks can have developed or survived. Quarrying will generally destroy archaeological remains and so the aerial photographs cannot reveal any features that were on ground removed before the mid-1940s. However, land use in the county has not been static during the period of photography and this makes calculating the potential visibility of archaeological features more complicated. For land converted from arable and pasture to development, extraction or even woodland, the later the date of the conversion the more likely that features now masked or destroyed will have been recorded on photographs pre-dating those changes. Conversely, the earlier that woodland was converted to new pasture or arable during the period of photography, then the greater opportunity for exposed features to be recorded.

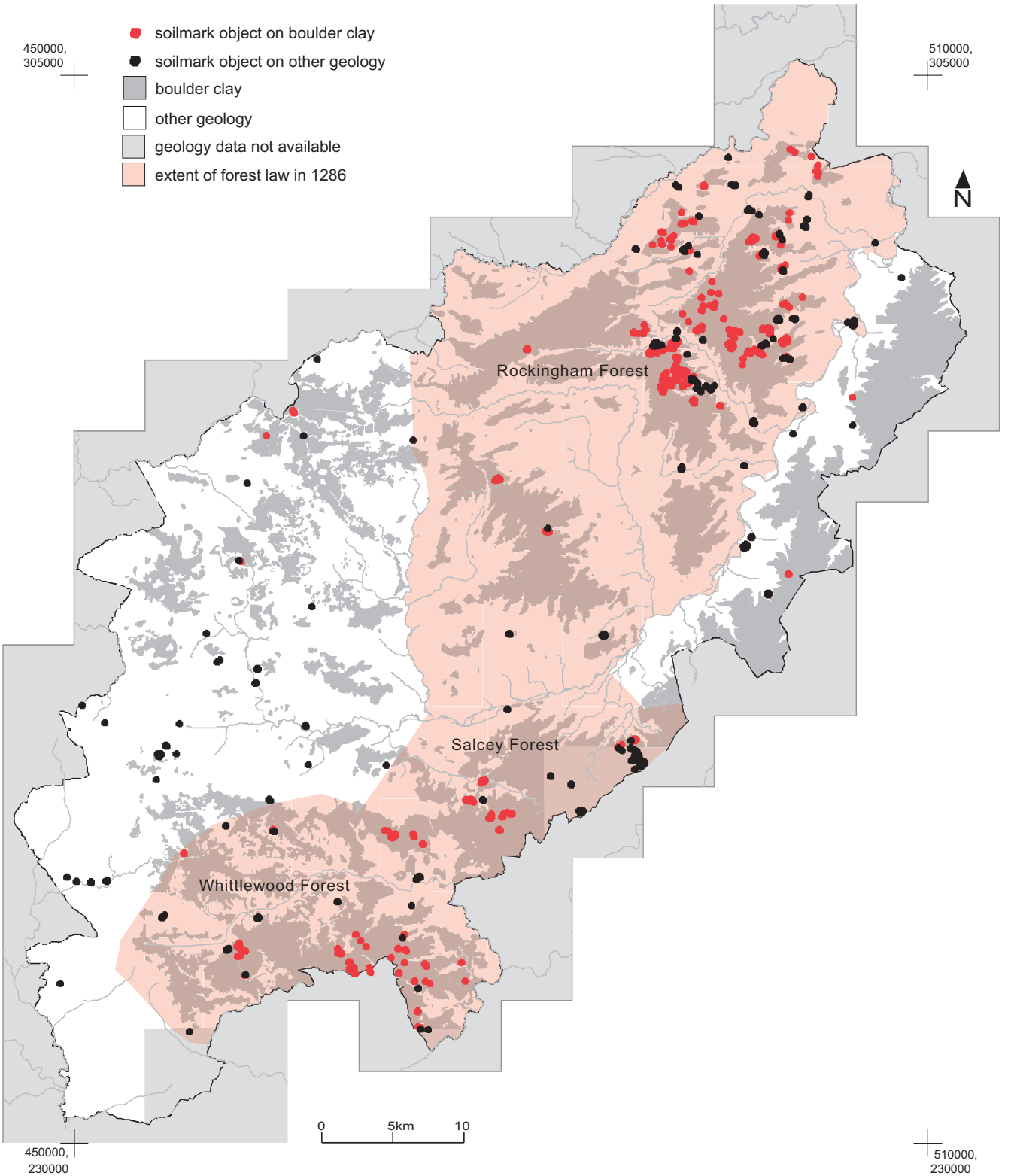



*Fig 3.7*
*The extent of boulder clay and ancient forest and the distribution of soilmark objects.*

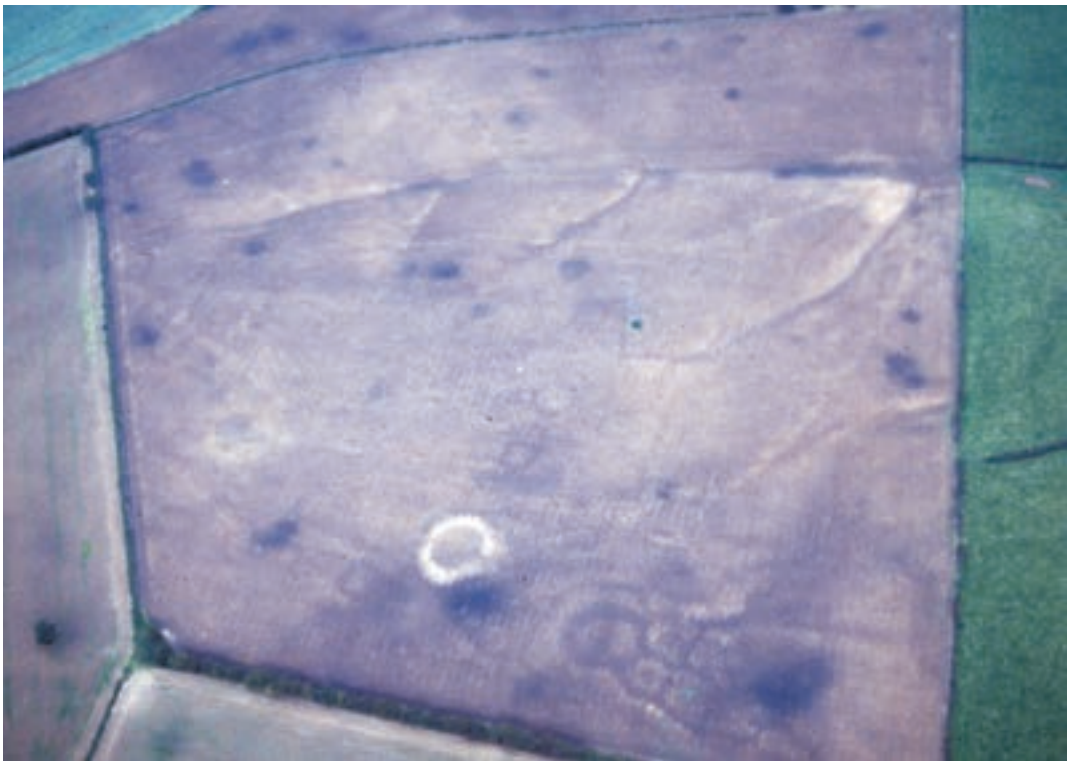
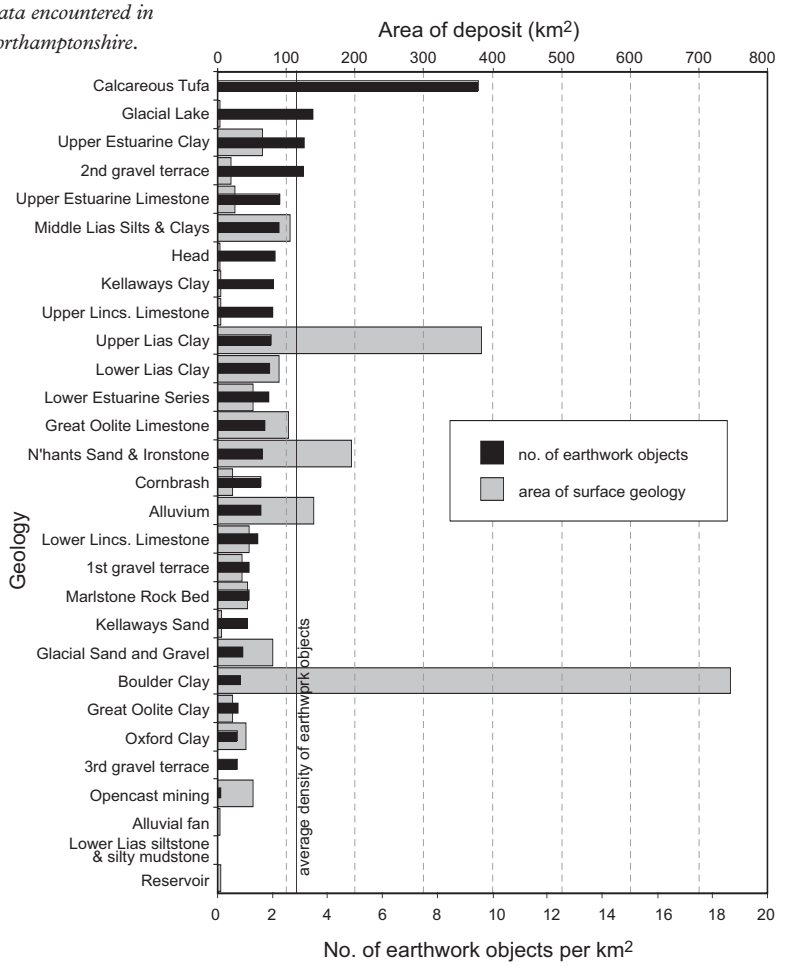


*Fig 3.8*
*The light soilmark of one circular embanked enclosure and the dark soilmarks of various other mainly conjoined ditched enclosures, all of Iron Age date, together with the numerous intense black patches of soil revealing medieval charcoal burning hearths. These soilmarks, in the medieval Great Park at Brigstock, are typical of those recorded in much of the formerly wooded areas which escaped medieval ploughing and have only been intensively cultivated since the mid-20th century (NCC photograph SP9284/117 24th July 1987 NCC copyright).*

*Fig 3.9*
*The number of earthwork objects per km² on each of the surface geological strata encountered in Northamptonshire.*




## Agriculture

The pioneering Land Utilisation Survey of the County Northamptonshire in 1928 mapped the extent of arable and grassland on a field-by-field basis (Beaver 1943). It showed that arable cultivation was widespread on the lighter soils on the permeable geologies: around Northampton, along the Nene Valley downstream of Northampton, in the Ise Valley and in the far south-west of the county. Significantly, crops were also grown on the boulder clay-capped watershed between the Nene and the Great Ouse, in contrast to the predominance of pasture on the boulder clay to the north and west of the county. It was noted above that relatively high density of cropmarks were recorded in just this area and the long history of modern ploughing compared to other boulder clay areas may have been a contributory factor, although conversely such early cultivation may reflect a subtle difference in the land use capability that also influences cropmark formation.

The summary of land use based on Agricultural Census parish statistics, compared with the picture from 1927, shows that there had been a substantial reduction of pasture in the intervening decades (Foard 1980b, fig 7). It is estimated that in the 1980s 38% of land was under cereal crops, 5% under other arable crops and 32% under

agricultural grassland (Hodge *et al* 1984, table 4). In 2000, the Land Cover Map showed that 24% of the county was under cereal crops, 29% other arable crops and 30% covered by grasses, although this underrepresents the massive loss of permanent pasture as recognised from mapping of ridge and furrow survival (Centre for Ecology and Hydrology 2000; Hall 2001b). It would seem that this represents a real increase in the land that has been cultivated, and thus the number of fields capable of producing cropmark or soilmark evidence at some time, other conditions permitting. The most significant development has been an increase in arable cultivation on the uplands in the north and west of the county.

It is possible to define those areas that had undergone little or no ploughing since enclosure, until the end of the last millennium, from the data of the Open Fields project, which mapped ridge and furrow survival in the 1990s. Although not all permanent pasture has ridge and furrow, its distribution is a reasonable indicator of the general distribution of permanent pasture, and hence where soilmarks and cropmarks will generally be absent, although ditches and pits underlying extant ridge and furrow can produce marks in grass in exceptional conditions (Palmer 1996). However, this situation has rarely been observed in Northamptonshire, probably because most of the concentration of surviving ridge and furrow is on the heavy and impermeable clay land. Nearly all of the cropmarks recorded in permanent pasture were parchmarks caused by buried structures and surfaces.

The extent of arable land recorded in 1928 was actually a very substantial contraction of the land that had been under the plough during the medieval period, when in most townships over 85% of the land was under open field arable (Foard *et al* 2005). Such widespread ploughing hastened the levelling of most pre-medieval landscapes, except where they were protected by deep alluvial deposits or within woodland areas that were never ploughed.

Land that is under pasture today does not necessarily have a high potential for the survival of medieval and later earthworks because much of the pasture has been under cultivation during the 20th century. The presence of massive undulating earthworks may actually impede any attempt at cultivation, but this is rarely enough to deter cultivation, and many such sites have been levelled in the second half of the 20th century, as at Coton in Raventhorpe (*see* Fig 3.15), Kingsthorpe in Polebrook, Downtown in Stanford, Hemington and Lilbourne. The loss rate of ridge and furrow remains has been even more dramatic over this period.

## Woodland

According to the HLC 1950s data and modern sources, woodland has covered *c* 4.5% of the county during the period of aerial reconnaissance (Fig 3.10). Since circa 1950 there has been some change, just over half a percent of woodland having been removed for other land use and a similar percentage been planted in different locations, but the impact of this on the distribution of cropmarks, soilmarks and earthworks is negligible. Over 70% of woodland lies on impermable geology, mainly the boulder clay, and so its presence is unlikely to have had a significant negative impact on the distribution of cropmark sites. However, some woodland masks features that may otherwise have appeared as soilmarks or earthworks if they were under crop or grass, as can be seen from the distribution of charcoal hearths in Rockingham Forest (Foard 2001a).

The historic presence of woodland and other unploughed zones are fundamental to the survival of pre-medieval earthworks and the appearance of the better soilmark sites. The woodland that was extant in the 1950s was a substantial contraction from that of the early 19th century, which in turn was the remnant of the more expansive medieval woodlands (Foard *et al* 2005). The pressures for arable cultivation in the medieval period had ensured that woodland was restricted to the least productive soils: those on the heavy, poorly-drained boulder clay (Foard 2001a, 42). The ancient woodland, including the medieval deer parks, was largely protected from cultivation and often even where cleared they remained as pasture until the middle of the 20th century.

Such areas can be identified through the integration of a variety of datasets. Detailed mapping of the medieval furlongs in Rockingham Forest, undertaken by Hall reveals those areas that escaped ploughing. This is complemented by the extents of the deer parks and medieval woodland, as reconstructed from cartographic and archaeological sources. The conclusion that

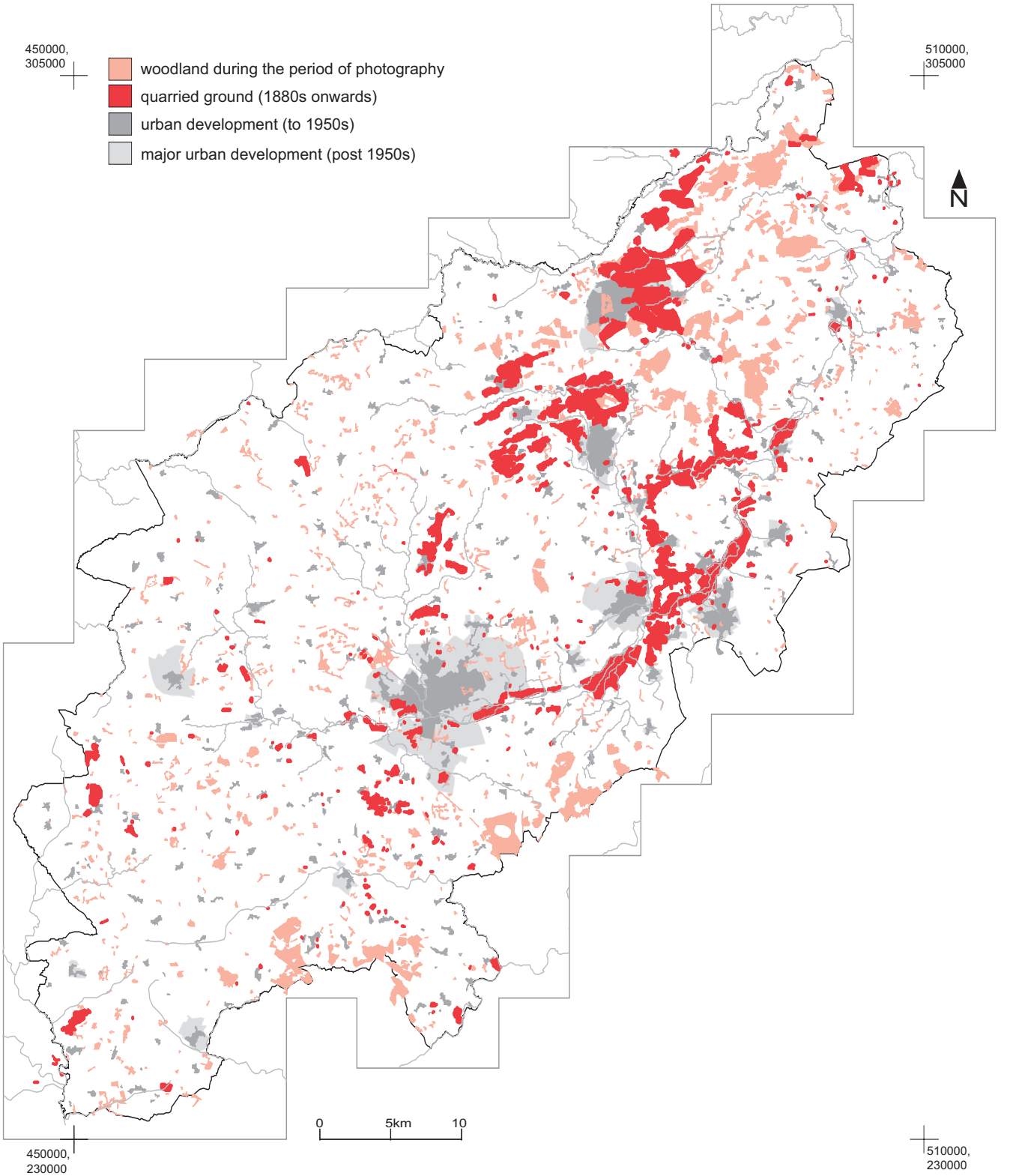



*Fig 3.10*

*The extent of woodland during the period of photography (units of woodland > 1 hectare), the extent of pre- and post-1950s urban development and the extent of quarrying 1880s to 2000 (derived from HLC from the 1880s and 1950s; Field and Holland 1928; NCC geological and land use data).*

areas devoid of ridge and furrow were formerly under woodland is also supported by historic map analysis and by the concentrations of charcoal burning hearths (Foard 2001a, fig 11; Foard *et al* 2004a, 2005). Such data enable the mapping of the areas that escaped ploughing from the medieval period until the 20th century (Fig 3.11). In these circumstances pre-medieval remains survived in pasture until recent times and, based on rapid survey of the woodland across the county, can be seen still to survive in remaining ancient woodland (Hall 2001b). There is a strong correlation between these zones and the clusters of soilmarks (excluding those for charcoal burning hearths). When these previously well-preserved remains finally succumb to ploughing, the soilmarks they produce are clearer and sharper. Although initial ploughing, and sometimes an increase in plough depth in previously ploughed areas can produce soilmarks, continued cultivation mixes the soil, ensuring that soilmarks are progressively dissipated.

Thus, in areas that have been ploughed in the medieval period and later, which covers the majority in Northamptonshire, soilmarks other than of ridge and furrow are infrequent and faint. In areas of former ancient woodland the newly truncated features show crisp and clear but, in time, these soilmarks also fade as material is dispersed across the ploughed area.

## Development

Between 1931 and 2000 the population of the county more than doubled, from 309,474 to an estimated 625, 895 (Beaver 1943, NCC 2002). In the 1950s just over 3% of the county was built up (1950s HLC). By the mid-1990s over 7.5% of the county had been developed, the greatest growth being around the existing medium to large urban centres, with Northampton, for example, more than quadrupling in size (*see* Fig 3.10).

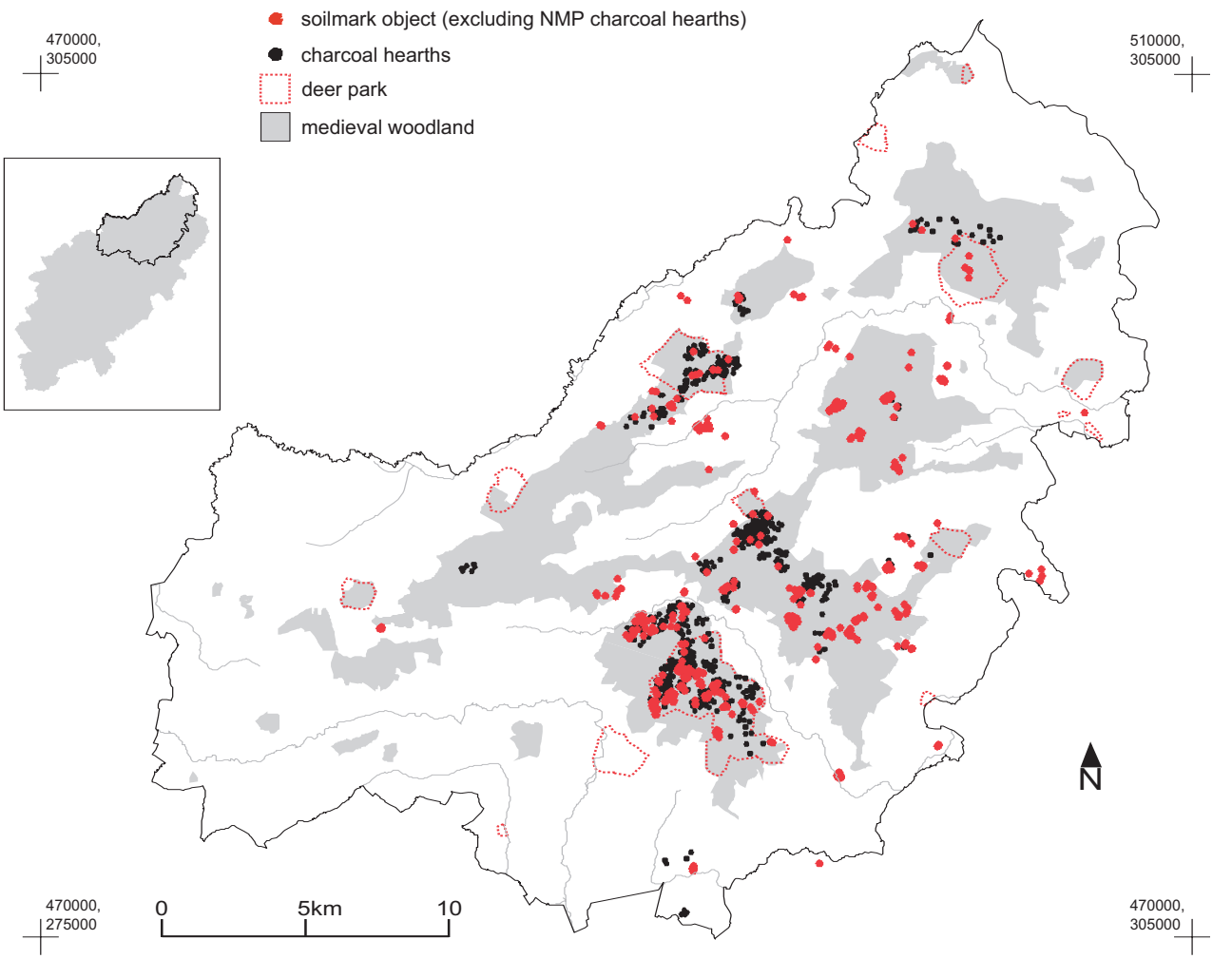



*Fig 3.11*
*The concentration of soilmarks sites in the unploughed zone as defined by surviving medieval woodland (after Foard et al 2004), deer parks (after Foard 2001, fig 6) and the presence of charcoal burning hearths (after Foard 2001, fig 11).*

This major urban expansion has encroached equally on the permeable and impermeable geologies, but the number of archaeological sites recorded prior to development is fairly low. Because settlement of the last millennium in the county was highly nucleated, so the smaller-scale infilling and expansion in rural villages has also often destroyed the earthwork remains of more extensive medieval and post-medieval settlement.

### Quarrying

In the 1880s there were small-scale ironstone workings at Findon, Gayton and Blisworth and other smaller, dispersed operations (together covering less than 22ha). The Collyweston slate industry was on a much smaller scale, and also had a lesser effect on the landscape because much of the slate was extracted underground rather than from open cast quarries (Ballinger 2001).

The ironstone industry expanded rapidly with the development of mechanised extraction techniques in the late 19th century. The impact of the large open-cast ironstone quarries is substantial. Data from the 1880s and 1950s HLC, the 1928 Land Utilisation map (Field and Holland 1928) and the cropmark, soilmark or earthwork quarry evidence mapped in the project suggest that at least 0.5% of the county had been quarried by the middle of the 20th century. The greatest foci of activity were around Kettering and Corby and between Islip and Cranford St. John. Obviously these quarried areas have produced no evidence of earlier crop mark, soilmark or earthwork remains on air photographs.

In surveys dating variously from 1941 to 1979 the British Geological Survey (BGS) recorded 'opencast mining' in extensive swathes around Kettering and Corby, and in a sweeping arc between Finedon, Cranford St John and Islip. Most of this activity absorbed the earlier ironstone quarries. The BGS survey indicates that at least 5243ha, over 2% of the county, had been disturbed by 1979. In the 1960s it was generally deemed uneconomic to continue working low-grade iron sources when higher-grade imports could be processed at coastal steel plants, but British Steel continued extraction around Corby until the late 1970s (Foard 1979b, fig 5; Moore-Colyer 1996, 68).

Since the 1950s, in common with many gravel terraces in England, there has been a growing demand on the resources of the Nene Valley (RCHME 1960). Open cast workings for gravels have had a substantial effect on the landscape, and by 2000 approximately 4098ha of land had been extracted, mainly from the gravel terraces of the Nene between Northampton and Aldwincle. Much of the gravel extraction has occurred during or since the period of intensive NCC reconnaissance. Deliberately targeted flights across threatened areas went some way to mitigate the loss of the archaeological information, providing data supporting the case for recording action through excavation prior to destruction. The project records 287 cropmark objects and 20 soilmark objects that were subsequently destroyed by quarrying.

The combined sources suggest that over 4% of the county has been extracted for ironstone and gravel. Although a proportion of this loss has been on the exposed permeable geologies, deposits masked by boulder clay and alluvium have also been heavily exploited (*see* Fig 3.10).

### Reservoirs and water features

There are several reservoirs in the county, mainly in the centre and north-west. The earliest are linked to the London to Birmingham Grand Union Canal, built in 1805, but most are associated with improvements to public utilities, and were in place by the 1880s. The latest, at Pitsford, was created *c* 1950, and it is the only reservoir for which photographs pre-dating the flooding are available. Although together the major reservoirs occupy under 0.4% of the county, individually they obscure areas up to 300ha and their local impact can be significant.

## Photography and specialist reconnaissance

It is reasonable to enquire whether the level of specialist and non-specialist air photographic coverage may bias the distribution of cropmarks, soilmarks and earthworks.

The vertical photographs held by the NMR and consulted in the project provided complete coverage for the county, the scale ranging from 1:5 000 to 1:20 000 and the quality also varying. Most of the county was covered by at least one sortie from each

decade between 1940 and 1980, while some areas had even greater coverage. With so many sorties, there was usually at least one taken in favourable lighting conditions for earthwork recording, and upstanding remains could be detected stereoscopically on most photographs, providing these were not obscured by vegetation.

However, the occurrence of cropmarks and soilmarks is determined by more complex variables and rarely were the sorties flown when all appropriate conditions were met (*see* Panel 2).Thus, vertical photographs rarely contributed to the recording of levelled sites. When features did show on the verticals there was invariably better coverage from the specialist oblique photographs. Notable exceptions are some of the CUCAP verticals flown specifically for recording archaeological cropmarks, but their coverage is sparse.

The combined results of the NCC reconnaissance programme and photographs from other sources provide extensive and comprehensive specialist cover. Although there were inevitable obstacles to and biases in the data-collection processes, where feasible these were mitigated for by the NCC programme (*see* chapter 2).

## The archaeological resource

Variations in the nature of the archaeological resource are reflected in the mapping from the project. Activities that resulted in substantial ditches and banks will be more visible either as earthworks, soilmarks or cropmarks than those that have left more ephemeral traces. Thus, for example, a short-lived or seasonally-occupied unenclosed Bronze Age settlement is less likely to be visible than a long-standing enclosed Romano-British settlement.

The age of archaeological remains is also a factor, with the majority of Anglo-Saxon and earlier sites having been levelled by medieval and later ploughing and settlement. Normally only substantial earthwork monuments, such as the massive ramparts of hill forts, survive from these earlier periods. In addition, the effect of age on the potential of a buried ditch or bank's ability influence crop growth is little studied, and it is not clear whether actions such as soil leaching can, over time, reduce the potential of deposits to produce cropmarks.

## Project methodology

Although the project specification includes remains from the Neolithic to 1945, certain monument types were specifically excluded. In particular, upstanding and levelled ridge and furrow was not systematically mapped; only occurances over or underlying other monument types were recorded. Thus, open field systems, including associated features such as boundaries and trackways defined solely by gaps between ridge and furrow, are poorly represented in the NMP data. However, these data are complimented by a comprehensive ongoing survey of the open field systems of the county (Hall 2001b; Foard *et al* 2005). Twentieth-century military remains were also not specifically targeted by NCC reconnaissance, but, although under-represented in the oblique photographic record, these monuments are still well represented on the early vertical photographs. It was the lack of specialist training in the identification of military remains and the low priority given to such remains that has resulted in a relative dearth of these sites (*see* chapter 8).

## Conclusion

From the preceding discussion it is clear that certain types of sites are likely to be under-represented in the project data: because of the age and/or nature of their remains; because they lie beyond the scope of the survey or the experience of the interpreter; or because they are under-represented in the photographic record. These issues, which are period-specific will be dealt with the subsequent period chapters. However, the various general influences on cropmark and soilmark distribution discussed above, because relevant to all the succeeding chapters, are synthesised here.

Most importantly it must also be recognised that the distribution of earthwork remains, when taken together with the detailed documentary record, is likely to be far more representative of the original distribution of medieval and later settlement than the cropmark and soilmark records, with all their biases, will ever be for the earlier periods. Ironically, however, the project has a potential to inform analyses of the prehistoric and Roman periods that far exceeds the contribution it can make to the medieval studies.

From 1996 the NCC reconnaissance programme was wound down, and it ceased completely in 2002. However, the trends in land use change suggest that more areas will become more favourable for cropmark and soilmark formation and that a new strategy of aerial reconnaissance in the county should be considered.

## Cropmarks

With this understanding of the influences, particularly of geology and land use, on cropmark development, enhanced with reference to influences that may have destroyed or obscured monuments, it is possible to map the different zones of cropmark amenability (Fig 3.12). Thus, land quarried or developed prior to the 1950s, or under enduring woodland, has been inaccessible to photography and has yielded no cropmark data. Archaeology in areas that were developed or quarried from the 1950s to 1970s could has been revealed by cropmarks on the earlier photographs, but, as this predates the period of intensive reconnaissance, the potential was very low, even on permeable geologies, and thus they are mapped here as having low amenability to cropmark formation. The highly permeable and permeable geologies disturbed from the 1980s onward, especially given deliberate targeting of reconnaissance to vulnerable zones, have been classified as medium to low amenability.

The biases resulting from agricultural use are more difficult to quantify. Permanent pasture has persisted over greater areas in the north and west. While boulder clay under arable cultivation in 1928 appears to produce more cropmarks than that converted from pasture in more recent years, this factor cannot be explained and thus all boulder clay has been classified as of low cropmark amenability.

Conditions for cropmark development can be classed as favourable or very favourable in just over a quarter of the county, thus substantially biasing the distribution of aerial data, particularly for Roman and earlier landscapes. Although in some contexts, particular on the boulder clay, there may be broad swathes that are poorly represented, over the greater part of the county conditions change rapidly over relatively small distances, and so at least a limited amount of amenable land should exist in most areas. However, it must be remembered that even in the most favourable conditions not all archaeological sites will have produced cropmarks. Even where they did, those marks will often not have been captured by the reconnaissance programme, especially where the areas of amenable land are fragmented and thus subject to less frequent reconnaissance that the more extensive areas. These biases will have a fundamental influence upon the conclusions that can be drawn in the following chapters. To a limited degree the biases in the cropmark data are mitigated by the distribution of the soilmark evidence, but in most cases one remains dependent upon the field-walking record to correct for the more extreme biases in the cropmark record.

## Soilmarks

While small numbers of sparse, ill-defined soilmarks have been revealed on most geologies, clusters of well-defined sites occur in specific areas. The underlying geology appears to have little direct influence: the distinct concentration of soilmarks on boulder clay is a reflection of land use history rather than of soilmark amenability. Only land that had escaped intensive cultivation through the medieval period and into the mid-20th century provides the conditions favourable for soilmark formation (*see* Fig 3.11). Hence soilmarks are clustered in the areas of former woodland in the medieval forests of Rockingham, Salcey and Whittlewood. The importance of this evidence, especially in Rockingham Forest is that it reveals evidence of Iron Age and Roman settlement and land use where cropmarks do not readily form, and reveals some types of monument restricted to the woodland zone – most notably medieval charcoal hearths – that do not produce cropmark evidence.

Ironically the appearance of good soilmarks is also a graphic indication of rapid, ongoing destruction of sites that until recently enjoyed exceptional preservation, and thus this data should be used as a guide to areas requiring urgent conservation action.

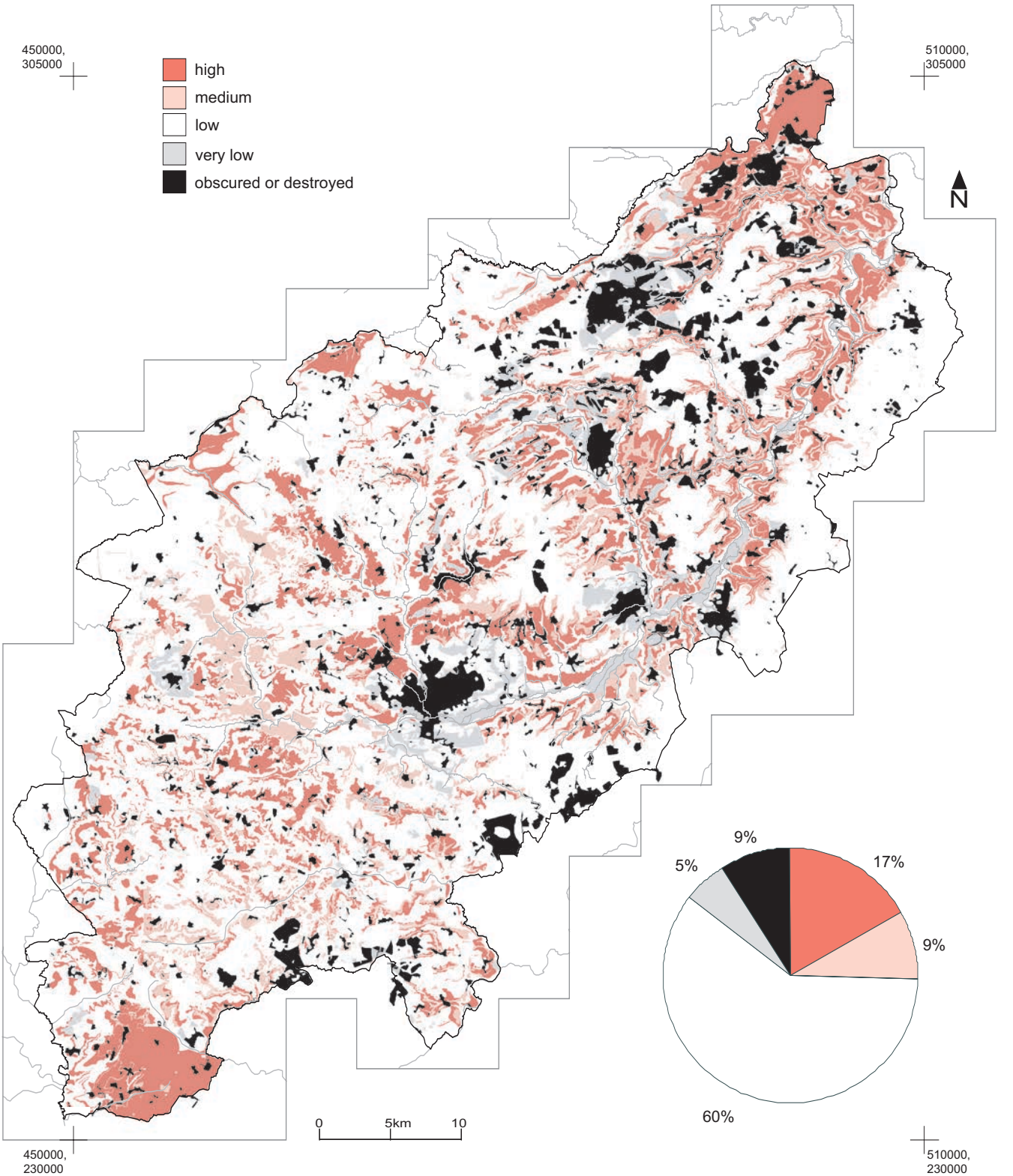



*Fig 3.12*
*The amenability of the land to cropmark formation.*

## Panel 3.1
## An overview of Northamptonshire's geology

Geological uplift and the presence of the more resistant Jurassic formations, particularly the Marlstone Rock Bed, have resulted in higher ground to the west and north-west gently dipping to the south-east. The Oxford Beds, outcropping in the east of the county, are the most recent surviving solid formations, as the Cretaceous and Tertiary deposits were all but removed by later events in this area. In the west and north-west of the county the Upper Jurassic and subsequent deposits were eroded from the higher ground and the Middle and Lower Jurassic strata outcrop.

In the Pleistocene these structures were overlain by glacial and periglacial deposits. Material suspended in the melt-water, dammed by the higher ground, was forced by the approaching ice sheet through the Watford Gap and along the lower ground now occupied by the River Nene. The ice sheets moved and redeposited large quantities of material that had been released from the land surface by periglacial events and glacial erosion; boulder clays of varying composition and depth were laid down by the ice sheets. The nature of these deposits depends on their source, but in Northamptonshire they are predominantly chalky in character. Head deposits of mixed sandstone and limestone rubble, created by solifluction events in periglacial conditions, are found on some slopes and dry valley floors. Sorted sand and gravels were deposited by melt-waters in warmer periods.

Subsequent action by melt-waters and later erosion cut through the glacial and earlier deposits, in parts exposing the various solid strata and re-working the gravels, resulting in a complex geological landscape.

Table 3.2 The stratigraphic sequence of the major geological strata outcropping in Northamptonshire and their attributes (based on Martin and Osborn 1976)

| *years BP* | *geological period* | *geological stratum* | *geological sub-types* | *general attributes* |
|---|---|---|---|---|
| 14,000 approx | HOLOCENE | Alluvium | Alluvial Fan | Generally impermeable but with some reworked gravel |
| | | Terrace | | Permeable |
| 1.5M | PLEISTOCENE | Head | | Dependent on source material |
| | | boulder clay | | Impermeable |
| | | Gravels | | Permeable |
| | | Glacial Lake Deposits | Permeable | |
| 65M | TERTIARY | | | |
| 135M | CRETACEOUS | | | |
| | | Oxford Clay | | Impermeable. Heavy and tenacious clay. |
| | | Kellaways Beds | Kellaways Sand | Permeable |
| | | | Kellaways Clay | Impermeable. Heavy and tenacious clay. |
| | | Cornbrash | | Permeable. Hard shelly limestone |
| | | Great Oolite Series | Blisworth Clay | Impermeable. Heavy and tenacious clay. |
| | | | Blisworth Limestone | Permeable |
| | | | Upper Estuarine Series | Impermeable clay inter-leaved with permeable limestone |
| | | Inferior Oolite Series | Lincolnshire Limestone | Permeable |
| | | | Lower Estuarine Series | Impermeable |
| | | | Northampton Sand and Ironstone | Permeable |
| | | Upper Lias | | Impermeable |
| | | Middle Lias | Marlstone Rock Bed | Permeable |
| | | | Middle Lias Silts & Clays | Impermeable |
| 195M | JURASSIC | Lower Lias | | Impermeable |

Table 3.3 The major geological formations and soil types in Northamptonshire (after Soil Survey of England Wales 1983)

| *geology* | *soil association* | *SSEW Unit* | *permeability* |
|---|---|---|---|
| river valley floor | FLADBURY 1 | 813b | poorly drained |
| terrace | WATERSTOCK | 573a | well drained |
| | SUTTON 1 | 571u | well drained |
| head | various | | mixed |
| boulder clay | RAGDALE | 712g | poorly drained |
| | HANSLOPE | 411d | poorly drained |
| | ASHLEY | 572q | poorly drained |
| | BECCLES 3 | 711t | poorly drained |
| gravels | WICK1 | 541r | well drained |
| glacial lake deposits | WICK1 | 541r | well drained |
| Oxford Clay | OXPASTURE | 572h | poorly drained |
| Kellaways Sand | various | | mixed |
| Kellaways Clay | various | | mixed |
| cornbrash | Moreton | 511b | generally well drained |
| Blisworth Clay | various | | mixed |
| Great Oolitic Limestone | | | |
| NE of county | Moreton | 511b | generally well drained |
| S of county | ABERFORD | 511A | well drained |
| Upper Estuarine Series | various | | mixed |
| Lincolnshire Limestone | ELMTON 1 | 343A | well drained |
| Lower Estuarine Series | various | | mixed |
| Northampton Sand and Ironstone | BANBURY | 544 | generally well drained |
| Upper Lias Clay | WICKHAM 2 | 711f | poorly drained |
| | DENCHWORTH | 712b | poorly drained |
| Marlstone Rock Bed | BANBURY | 544 | generally well drained |
| Middle Lias Clays and Silts | WICKHAM 2 | 711f | poorly drained |
| | DENCHWORTH | 712b | poorly drained |
| | OXPASTURE | 572h | poorly drained |
| Lower Lias Clay | WICKHAM 2 | 711f | poorly drained |
| | DENCHWORTH | 712b | poorly drained |
| | OXPASTURE | 572h | poorly drained |

In more recent times human activity, particularly the massive expansion of arable land in the late Saxon and early medieval periods, has precipitated large-scale soil erosion, resulting in substantial alluvial deposition along the river valleys.

It is the surface geology of today and the recent past that is most pertinent to understanding the archaeological evidence, rather than the deeply stratified structures themselves. It is the character of the exposed formations and the soils developed from them that has influenced human activity and affects the survival and visibility of remains. Tables 3.2 and 3.3 summarise the key characteristics of the major exposed geologies and the soils they bear.

Of the exposed permeable geologies the Northamptonshire Sand deposits are the most common, capping the higher land to the west and exposed in the incised river valleys in central parts. The Marlstone Rock Bed outcrops are limited to the west of the county. Lincolnshire Limestone outcrops in the north-east of the county, particularly around Collyweston and in the Welland Valley. The Great Oolitic Limestone, known locally as Blisworth Limestone, appears in the far south around Brackley and along valley sides in central and eastern Northamptonshire. The Cornbrash is exposed in the Nene Valley, downstream of Irthlingborough, in the east of the county.

Glacial sands and gravels are found in a band arcing from the Watford Gap to the south of Northampton where they peter out and appear only sporadically in the River Tove basin and further down the Nene Valley. Fragmentary terrace gravels are exposed downstream of Towcester on the River Tove and Northampton on the

Nene, while larger expanses survive around the head waters of the rivers Ise and Welland and north-east of Rugby on the River Avon, all in the north of the county.

In general the distribution of impermeable rocks is more extensive. The Lias clays outcrop in a series of bands from the west of the county, predominating on all but the higher ground, where they are capped by Northamptonshire Sand, or where glacial deposits survive. In the east of the county younger Jurassic rocks survive and outcrop along the river valleys. Of note are the particularly heavy and tenacious Kellaways Clay and Oxford Clay.

In all but the far south-west of the county boulder clay blankets the plateaux between tributaries and watersheds between river systems. Alluvial deposits line the valley floors of the rivers and tributaries.

Table 3.3 identifies the soils occurring on the more extensive geological outcrops and shows that these generally reflect the character of the immediate underlying strata. However, the detail and accuracy of the soil survey is generally insufficient to relate the narrow bands of strata exposed in the river valleys to specific soil types.

## Panel 3.2
## The influences on cropmark, parchmark and soilmark formation and earthwork visibility

### Cropmarks

Cropmarks are variations in leaf and stalk colour, and in plant height and vigour. The cropmarks recorded in the county were in the main visible to the naked eye and photographed on (panchromatic) black and white film. Infrared photography can record different variations in vegetation and has made a significant contribution to mapping at Great Harrowden, but for practical reasons and cost effectiveness, this medium has not had widespread use in the county.

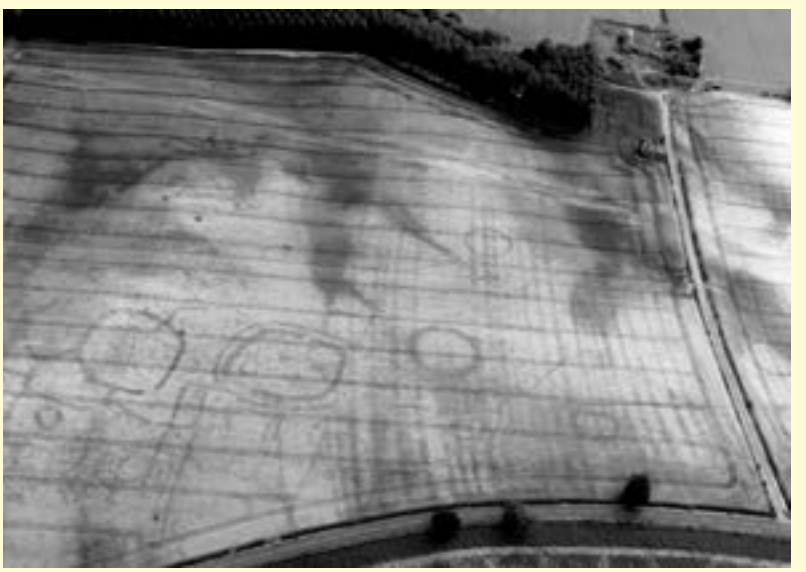


*Fig 3.13*
*Cropmarks at Ecton. On the hilltop in the foreground the geology is Northampton Sand and Ironstone and the ditches, pits, medieval open field furrows, and natural fissures are clearly revealed by slower ripening plants against the ripe crop. Towards the far side of the field the ground falls into a valley of Upper Lias Clay and here the crop has yet to ripen and cropmarks cannot be seen – the narrow tongues of the smaller side valleys are also clearly picked out (NCC photograph SP8265/081 20th June 1996 NCC copyright).*

Cropmarks occur where there are variations below the ground, such as in-filled hollows, palaeochannels, frost cracks, archaeological pits, ditches, surfaces and banks, or modern disturbances such as land drains. Cropmarks can also be created by variation in the treatment of the topsoil and ground cover – the uneven application of fertilizers, pesticides and herbicides, or physical damage, for example. It is the role of the air photo interpreter to distinguish the archaeologically-significant cropmarks from those that have other explanations.

Cropmarks that delineate buried and levelled archaeological features are the effect of differential growth and ripening between the vegetation on the archaeological deposits and that on surrounding undisturbed ground. Variations in growth and ripening are most visible when there is a significant difference in the water and nutrient availability between the archaeological and natural deposits. Cropmarks can form at any stage from crop germination to ripening, but the optimal conditions are during periods when precipitation is exceeded by transpiration. This results in potential soil moisture deficit (SMD) and water-stressed plants (Jones and Evans 1975).

Prolonged periods of SMD halt plant growth and then cause wilting of the plant leaves, stem and finally root; it is the leaf wilt in particular that is visible from the air. Water-stress is exacerbated by free-draining sub-surface deposits, such as archaeological walls or road surfaces, but mitigated by rich and humic ditch and pit deposits (Fig 3.13). Even after ripening, differences in crop height and bulk can indicate the presence of buried features

*Fig 3.14*
*Cropmarks on Northampton Sand and Ironstone at Boughton. Ditches, pits and even the fine outlines of hut circles as well as numerous natural fissures are clearly visible in this field even though much of the crop is well-ripened. The cropmarks are defined by the bulkier and taller plants, accentuated by the low sunlight (NCC photograph SP7666/025 12th July 1990 NCC copyright).*

where there are no tonal differences. The specialist photographer is able to manipulate the available lighting conditions, circling monuments until the optimal balance of light and shadow is achieved; vertical photographs rarely record these cropmarks as effectively unless there is low angle sunlight (Fig 3.14).

Even once all the variables required for cropmark formation are met the appearance of these marks can change by the day; and they can disappear overnight. It takes the skill of the experienced aerial photographer to achieve maximum results from limited air time by exploiting their local knowledge of the developing conditions.

These responses can be seen most clearly in large areas of homogenous, fast-growing plants such as cereal crops and, less frequently, in root crops and grass.

Exaggerated and ill-defined cropmarks caused by differential lodging, usually following heavy rain or wind, can also indicate the presence of underlying archaeological features. Lodging tends to occur when plants experience over-vigourous growth and stand higher than their surroundings, encouraged by nitrate-rich water reserves, such as in archaeological ditch fills (Jones and Evans 1975). Similar effects can be observed among plants on near-levelled ridges, banks and mounds, where their slightly elevated position renders them more susceptible to damage in strong winds. In Northamptonshire this type of cropmark is usually associated with very recently truncated earthworks, which are usually of medieval or later date (Fig 3.15). It is often difficult to distinguish which agency led to the damage – over-vigourous growth or topographic elevation, and thus whether the lodging indicates the presence of an in-filled ditch or a near-levelled bank.

*Fig 3.15*
*Cropmarks at Ravensthorpe. Lodged crop outlines the heavily truncated hollow-way and close boundaries of the shrunken medieval hamlet of Coton. These features still survived as slight earthworks on 1947 RAF photographs (CPE/UK/1994 1370) (NCC photograph SP6771/016 10th August 1979 NCC copyright).*

## Parchmarks

Parchmarks appear in grass at times of significant moisture stress, usually over buried

*Fig 3.16*
*Parchmarks at Catesby. These parchmarks reveal the buried remains of the Cistercian priory and the Country House that replaced it, some of which do not survive as earthworks (see chapter 8) (NCC photograph SP5159/055 July 1996 NCC copyright).*

stone structures or other highly permeable archaeological deposits such as metalled surfaces (Fig 3.16). Aerial photographs of parchmarks have made a valuable contribution to archaeological research in the county, particularly with regard to deserted medieval settlements. On various earthwork sites, parchmarks have revealed buried structures that do not survive as earthworks or, where they do, have added detail. They have also revealed a few Roman stone structures on sites that are under pasture, most notably the massive Cotterstock villa and within the walled area of Irchester Roman town. More often, however, Roman structures have been revealed by negative cropmarks in cereal crops.

The overall distribution of parchmarks is quite different to that of other cropmarks. Although unfortunately parchmarks were not specifically distinguished from other cropmarks in the associated databases, they can be identified by the parchmark mapping convention used by the project and thus may be quantified separately. There are 10,736 cropmark map objects recorded by the NMP, of which approximately 481 are parchmarks in grass or cereal. Cropmarks contributed nearly 72% of all the NMP objects. The average density of cropmark objects (including parchmarks) over the whole county is 4.5 per km$^2$; there is less than 0.2 parchmark per km$^2$.

In the absence of supporting evidence it is often difficult to date cropmarked archaeological sites and nearly 40% of the objects mapped by the project are currently recorded as 'date unknown'. Of those that have been given possible dates, over 85% are attributed to the Roman period or earlier; it is likely that the majority of the undated sites are also of pre-Anglo-Saxon date.

## Soilmarks

Soilmarks are the colour and tonal differences between soil above archaeological deposits and the surrounding plough-soil. Ploughing, which can penetrate the ground to a depth of 450mm, brings to the surface previously buried material, and with its rotation exposes the cut surface uppermost. Where the plough cuts sub-surface banks or in-filled ditches and furrows it brings slices of these deposits to the surface; bank material will often appear lighter than surrounding soil and ditch fill, darker (Fig 3.17). If these slices are sufficiently differentiated from the natural plough or sub-soil, they can be

*Fig 3.17 (opposite top) Soilmarks at Bugbrooke. The levelled medieval ploughing is clearly visible as the parallel pale tone ridges and darker tone furrows. An embanked, sub-divided enclosure lies above the ridge and furrow and is clearly outlined by very pale material. The zig-zag effects of the soilmarks are a characteristic caused by the alternating modern plough direction, part of the process which over a number of years will intermix the soil and thus destroy the soilmark (English Heritage (NMR) photograph SP6656/118th June 1980 RCHME copyright).*

visible from the air. A significant contrast was recognised between the visual definition of soilmarks in different parts of the county and at different times during the 1970s–1990s, something that seems to relate to the initiation of ploughing of permanent pasture, or to phases of deep ploughing.

Soilmarks can be observed in bare ground and occasionally through germinating crop or harvest stubble. Soilmarks are often clearest after ploughing and before harrowing, but can also be enhanced by increased soil moisture. Harrowing breaks down the newly-exposed clods, disperses and mixes material, often, though not always, leading to a softening of visual differences, while weathering and drying will also reduce the clarity of soilmarks. Timing is thus just as critical to the recovery of good soilmark evidence as it is to the recovery of crop mark evidence.

Large-scale topsoil stripping in advance of ground works, most typically where archaeological excavation is underway, also reveals any buried archaeological deposits, but this form of evidence has rarely been photographed in the county, although they have occasionally been captured incidentally on vertical photography.

Just 5% of the objects recorded were revealed primarily as soilmarks. With a total of 777 map objects the average density of soilmarks over the whole county is only 0.3 per km$^2$, although such marks are particularly common in Rockingham Forest. Two-fifths of the soilmark features are undated, as soilmarks can be more difficult to interpret than cropmarks, because the morphological characteristics are often less well-defined. Of those objects given possible dates, one third of them are attributed to the Roman period or earlier and the rest to the medieval period or later.

## Earthworks

Detection and recording of earthworks from the air is determined by their survival and visibility. The survival of earthworks is determined by past and present land use, rarely to natural erosion processes. Occasionally deliberate levelling, but most commonly ploughing, has flattened earthwork sites. Extensive arable cultivation in the medieval period levelled most earlier monuments, with under 2% of the earthworks recorded by the NMP attributed to the Roman period or earlier; most of the latter were revealed in the formerly wooded areas of the county, which escaped medieval cultivation.

Most of the earthworks recorded by this project were revealed by the pattern of sunlight and shadow, but visibility of upstanding features can also be enhanced by differential frost or snow cover, or by the distribution of standing and flood water (Figs 3.18 and 3.19). Even heavily truncated earthworks can be visible in the

*Fig 3.18 (below) The earthworks of the moat, fishpond and closes of the medieval monastic grange called Kalendar, near Cottesbrooke, are revealed by long shadows in low angle winter sunlight (NCC photograph SP6974/008 6th January 1984 NCC copyright).*

*Fig 3.19*
*Earthworks of part of the shrunken village of Kelmarsh with associated closes, fishpond and ridge and furrow, highlighted by light snow cover (NCC photograph SP7379/052 4th April 1988 NCC copyright).*

appropriate conditions, particularly when their appearance is enhanced by changes in vegetation cover or soil tone (as on Fig 3.15). Photographers of specialist oblique views can manipulate the available lighting conditions while in the air, circling monuments until the optimal balance of light and shadow is achieved, something impossible with vertical sorties, where each frame is taken at timed intervals along a predetermined route.

Large and subtle variations in ground relief are further accentuated when viewed stereoscopically. Most stereo images are the vertical photographs taken in long regular sorties, but stereo overlapping can also be achieved from appropriately positioned pairs of oblique views. Stereoscopic photographs are invaluable to the mapping and interpretation of earthworks.

Nearly 23% of all the objects were recorded as earthworks. This is not an indication of current survival of upstanding monuments, as many earthwork features were mapped from early, especially vertical, photographs of sites subsequently levelled. Although this figure suggests that there are far fewer earthworks than there are cropmarks, this is misleading. Most earthwork mapping in the project took the form of complex articulated medieval and post-medieval settlements and associated field system features that were more difficult to resolve into separate graphic objects than the fragmentary, disparate and often less complex elements of cropmarked landscapes. With a total of 3378 objects, the average density of earthworks over the whole county is 1.3 per $km^2$.

## Structures

Most standing structures were excluded from the project specification, with the exception of specialised military and airfield installations. Only 51 objects of this type were recorded, which includes several extant airfield runway surfaces.

# 4
# Monuments and landscapes in the Neolithic and Bronze Age

*by Alison Deegan*

## Introduction

The extensive and detailed NMP dataset can contribute to a meaningful narrative for the broad trends in monument building in Northamptonshire between the beginning of the 4th and the end of the 2nd millennia BC. This, however, cannot be achieved with NMP data alone; cropmarks, soilmarks and earthworks are essentially undateable, yet chronology is the essential framework to this study. The project's data have therefore been integrated with the broad range of archaeological, geological and topographical data available in the Northamptonshire SMR.

Much of what is known of the Neolithic and Bronze Age in Northamptonshire has been acquired through excavations, often under difficult rescue conditions, at gravel extraction sites such as Aldwincle, Earls Barton and Grendon or in advance of development, as at Briar Hill (Jackson 1976a, 1984; Bamford 1985; Gibson and McCormick 1985). Then, between 1985 and 1993, an extensive area of the Nene Valley was investigated in the Raunds Area Project (RAP) with geophysical survey, field walking and small to large scale excavations in advance of gravel extraction and road and housing construction, providing a 40km$^2$ sample of the middle Nene Valley and the interfluve between the Nene and the Ouse to the south-east (Harding and Healy 2007, 1). More than 20 Neolithic and early Bronze Age monuments, many previously unsuspected, were uncovered at Stanwick and West Cotton. Together these works provide both the springboard and framework for the analysis of the cropmark, soilmark and earthwork sites mapped by the Northamptonshire NMP project.

Surprisingly, the contribution of work required through the planning process has been limited. With the notable exception of the published works on the Tansor mounds and the Bronze Age burials at Irchester Quarry and Brackmills Link Road (Chapman 1997, 2003), the pertinent results are difficult to extract from the burgeoning weight of client reports, interim statements and research designs. This situation is further complicated because investigations are frequently multi-disciplinary, employing geophysical survey and other specialist services, and the excavation stage of a single site may be in the hands of several different archaeological contractors. However, an extensive trawl in October 2002 of the grey literature then held in the SMR, suggests that Neolithic and Bronze Age monuments had received relatively little intrusive attention in recent years.

Neolithic and Bronze Age studies in the county have also benefited from extensive field-walking by D Hall and P Martin (Hall 1985), who have made available those results currently available in a digital format. At the time of writing these had not been integrated into the county SMR, so in order to create a comprehensive dataset of artefactual evidence Hall's data were combined with the results published in 1985 (Hall 1985, table 1) and the SMR records for the periods, excluding those derived from aerial photography. Hall (1985, 30) suggests that lithic scatters of fewer than 20 flints may give a misleading impression of activity on small scale maps, but it has not been possible to exclude these smaller sites from the data used here. Neither has it been possible to correct for repeated collection at some sites, compared to the single visits made at others (Hall 1985, 34–5). Although this dataset cannot be said to be consistent for the whole county – the uneven application of field collection techniques alone predicate against this – by concentrating on the presence of material, rather than on absence or quantity, the data do provide an adequate sample for investigating broad trends.

The record for the prevailing environment of Neolithic and Bronze Age Northamptonshire is scant, although informative work

has been published for the Nene Valley and is forthcoming from the Raunds project area (Robinson 1992; Brown and Meadows 1998; Campbell and Robinson 2007).

From neighbouring counties there are several published research projects that are significant to the analysis of the Northamptonshire data (Fig 4.1). In particular the multi-disciplinary investigations at the Etton and Maxey complex in Cambridgeshire, Malim's survey of the existing record of the ritual landscapes of the middle and lower Ouse Valley in Bedfordshire, and the accumulated reports on excavations in Oxfordshire (Case and Whittle 1982; Pryor 1985; Malim 2000).

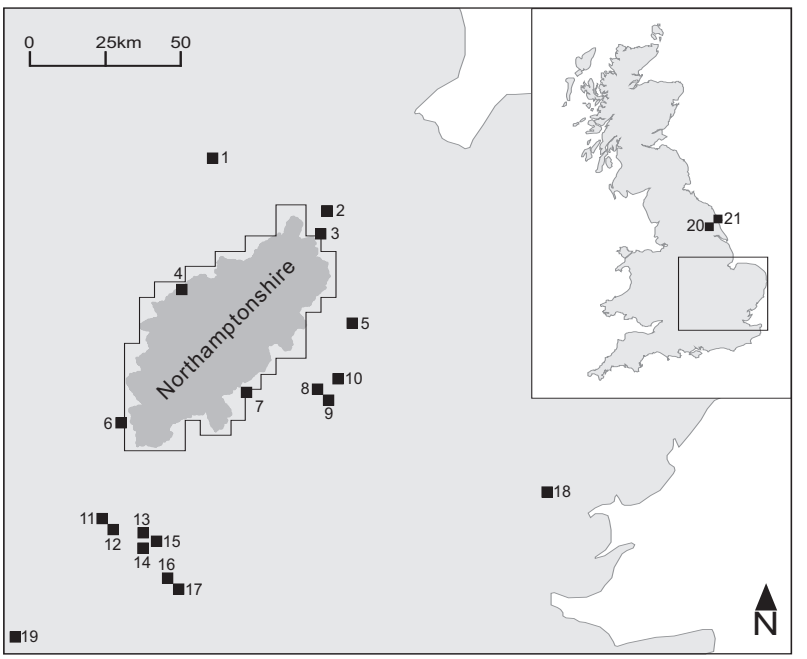



*Fig 4.1*
*The location of Neolithic and Bronze Age sites mentioned in the text and appendices (those outside Northamptonshire): 1 Two rectangular splodges, Hazeltongue Lodge, Leicestershire (Harding with Lee 1987, 93); 2 Causewayed enclosure, Etton, Cambridgeshire (Pryor 1998); 3 Causewayed enclosure, Upton, Cambridgeshire (Oswald et al 2001); 4 Causewayed enclosure, Husbands Bosworth, Leicestershire (Butler et al 2002); 5 Palisaded enclosure, Brampton, Cambridgeshire (Malim 2000, fig 8.6); 6 Causewayed enclosure, Banbury, Oxfordshire (Oswald et al 2001, 154); 7 Beaker burial monument, Ravenstone, Bedfordshire (Allen 1981); 8 Mortuary enclosure ring ditch, Cardington/Cople, Bedfordshire (Malim 2000, fig 8.13); 9 Causewayed enclosure, Cardington, Bedfordshire (Malim 2000, 75); 10 Barrow cemetery, Roxton, Bedfordshire (Taylor and Woodward 1985); 11 Six ring ditches, Standlake, Oxfordshire (Catling 1982, 88–101); 12 Four ring ditches, Stanton Harcourt, Oxfordshire (Linington 1982, 81–6); 13 Causewayed enclosure, Abingdon, Oxfordshire (Avery 1982, 10–24); 14 Oval Barrow, Abingdon, Oxfordshire (Bradley 1982); 15 Beaker ring ditch, Radley, Oxfordshire (Riley 1982, 76–9); 16 Neolithic ring ditch, Newnham Murren, Oxfordshire (Moorey 1982, 55–9); 17 Linear ditches and southern enclosure, North Stoke, Oxfordshire (Case 1982, 60–74); 18 Long barrow/mortuary enclosure, Rivenhall, Essex (Buckley et al 1986); 19 Causewayed enclosure, Longstones Field, Beckhampton, Wiltshire (Gillings et al 1999; Gillings et al 2000); 20 Short linear ditch pairs, Huggate, N Yorkshire (Stoertz 1997, fig 8.10); 21 Short linear ditch pairs, Rudston, N. Yorkshire (Stoertz 1997, fig 8.13).*

In the light of these combined data sources, many of which were not available at the time of mapping, the Northamptonshire NMP data have been thoroughly reassessed and interpretations revised where necessary.

This chapter first seeks to categorise the monuments present in the project data by type, and reports any supporting evidence such as excavations, surface finds and excavated morphological comparisons. This is followed by a consideration of the distribution and context of these monument types and, expanding on the firm foundations of the RAP, proposes an overview of the development of Neolithic and Bronze Age landscape of Northamptonshire.

## Monument types

### Causewayed enclosures

Aerial photography and mapping have made considerable contribution to the study of causewayed enclosures nationally, particularly through Palmer's catalogue and plans (1976) and, more recently, by English Heritage's thematic synthesis on Neolithic enclosures (Oswald *et al* 2001).

All three known causewayed enclosures in the county were discovered in the 20th century by aerial reconnaissance (Fig 4.2: 1–3). The Briar Hill enclosure was the subject of intensive investigations in advance of housing development between 1974 and 1978 (Bamford 1985, 6). The combined evidence of the aerial photographs, excavation and geophysical survey has revealed a large oval enclosure, defined by a pair of causewayed-ditch circuits. Within this, and laying flush against its eastern side, was a smaller enclosure of more circular plan, which was described by the excavator as a 'spiral extension' or 'spiral arm' (Bamford 1985, 133). All three circuits were considered to be original to the enclosure. A long sequence of re-cutting was observed in the excavated ditch segments, but the early origins and longevity suggested by Bamford have been questioned, and the radiocarbon dating of this monument has recently been reassessed (Kinnes and Thorpe 1986; Meadows 2003). Meadows suggests that the earliest dates arise from intrusive material, but that a date of middle of the 4th millennium cal BC, given to the primary fill of the first re-cut of one of the enclosure segments 'appears to be accurate' (2003, 34).

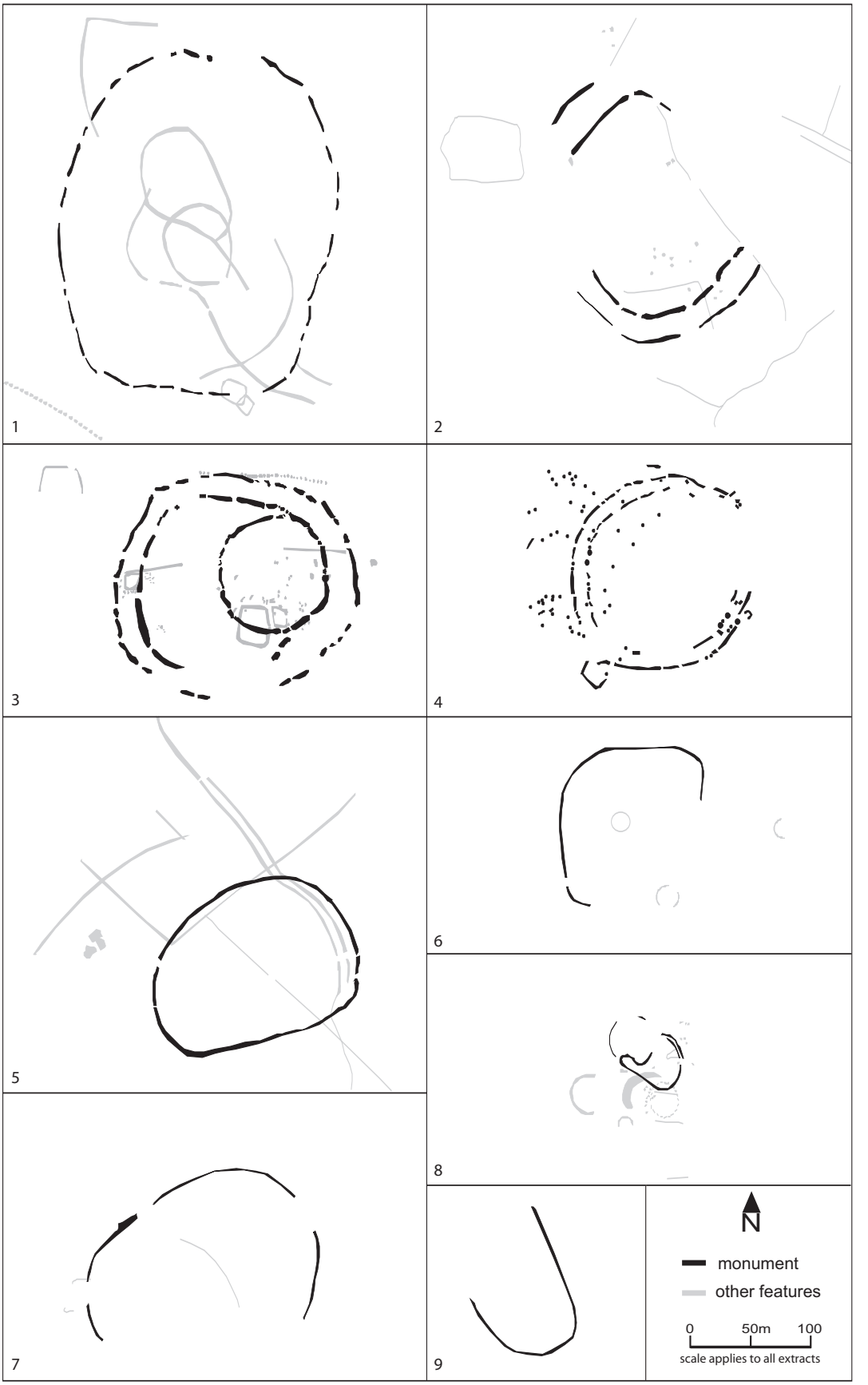



*Fig 4.2*
*Causewayed enclosures and other large curvilinear enclosures in the project area. (Causewayed enclosures:*
*1 Northampton (Dallington) (NH461.8.1);*
*2 Southwick (NH9.14.1);*
*3 Northampton (Briar Hill) (NH542.11.1–2);*
*4 Husbands Bosworth, Leicestershire, simplified plan from geophysical survey (Clay 1999).*
*Large curvilinear enclosures:*
*5 Chipping Warden (NH345.18.14);*
*6 Polebrook (NH400.21.1);*
*7 Bulwick;*
*8 Staverton A (NH18.1.1);*
*9 Stoke Albany (NH181.8.1).*

The Dallington causewayed enclosure lies just 4.5km north-west of Briar Hill. Despite various evaluations in the area, little is known about it (OAU 1991; NA 1993). Its segmented ditches define a large oval area, with a notable bulge in the south-east quadrant. There are several other cropmarked features in this area, including a possible henge enclosure and a large oval enclosure both within the causewayed-ditch circuit.

The third causewayed enclosure lies *c* 50km downstream, at Southwick. Like Briar Hill, this monument consists of two near-concentric segmented ditch circuits enclosing an area presumed to be near oval. The eastern section is not visible, because it is masked by alluvium, but this may mean better preservation and perhaps even waterlogged deposits.

Despite a rigorous re-examination of all the mapped features in the Northamptonshire NMP data, no other convincing example of this monument type was found; cropmarks at Tansor (TL0529 9169), suggested by Palmer (1976, cat no. 38), and considered to be a pair to the Southwick example (Bamford 1985, 133), are dismissed as geological features both here and by Oswald *et al* (2001, 153, gazetteer no. 59).

Another causewayed enclosure in the project area has recently come to light at Husband's Bosworth in Leicestershire. It was revealed by geophysical survey targeted on the location of flint scatters, and then investigated further by trial trenching (Butler *et al* 2002). This enclosure is similar in plan and size to Southwick and the outer circuits of the Briar Hill monuments (Fig 4.2: 4).

The function or functions of the causewayed enclosures are poorly understood, and the two-dimensional plans generated by the project probably have little to contribute to this debate.

There are a number of other curvilinear enclosures within the survey area that are of similar scale, but that lack the distinctive features of causeways (Fig 4.2: 5–9 and Appendix 2). None has so far been excavated and they may be of significantly later date, but it is worth flagging them here as possible Neolithic enclosures. As Darvill and Thomas point out, there are a large number of undated enclosures in Britain and Northern Europe, and it would be highly significant if even a small proportion of these prove to be Neolithic in origin (2001, 10–11).

The largest of these possible Neolithic enclosures is an oval example at Bulwick. This feature was photographed in 1995 (SP9493/002) after NMP mapping for the area was complete, but has been plotted as part of the post-reconnaissance programme. The Chipping Warden enclosure is slightly D-shaped in plan and is closely associated with a long double-ditched linear feature. This area has also been field-walked. No finds were recovered from the enclosure interior, but the field to the north-east produced a wide scatter of Neolithic worked flints (D Hall pers comm; Hall SMR 266)

A Neolithic enclosure similar to these examples has recently been investigated in Longstones Field at Beckhampton, Avebury, Wiltshire, beneath a second avenue leading from the Avebury henge. This oval enclosure, measuring 140m by 100m, was identified by geophysical survey and on air photographs. Upon excavation it was found that the ditch circuit was actually semi-segmented with the causeways between cut segments having been subsequently removed (Gillings *et al* 1999). That enclosure has been radiocarbon dated to the mid-3rd millennium BC but its excavators suggest that it is more akin to the earlier causewayed enclosures (Gillings *et al* 2000). Like the Chipping Warden example there was a notable absence of flint material to be recovered from the plough soil of the enclosure's interior (Gillings *et al* 1999).

## Long barrows, elongated monuments and mortuary enclosures

Within the Raunds Area Project the elongated monuments – named the Long Barrow, the Avenue and the Long Mound – were among the earliest constructions in a complex that developed over two millennia, followed slightly later by the Long Enclosure.

The Redlands Farm Long Barrow originated as a freestanding façade and a limestone cist. The façade was re-cut by a narrow palisade trench, which surrounded a 50m-long mound that buried the cist (Healy *et al* 2007, 73–80). The mound was flanked by two broad ditches along its entire length; these were possibly the source of gravel in its gravel and turf make-up. The ditches widen slightly to the middle and south-east, and taper towards their terminals, giving a waisted outline to the space between (Fig 4.3: 4).

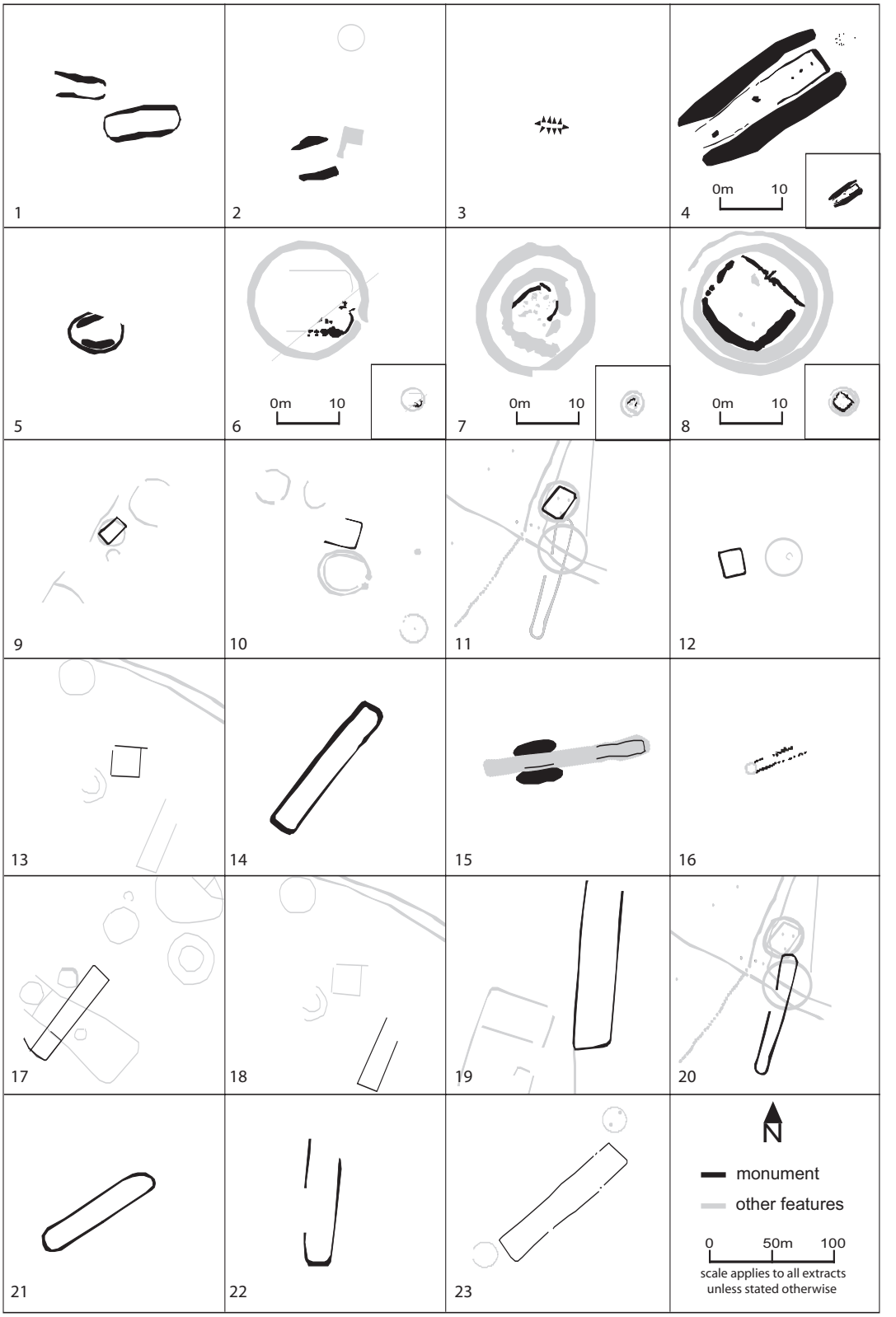



*Fig 4.3*
*Long barrows, elongated monuments and known and possible mortuary enclosures in the project area.*
*Long Barrows:*
*1 Flore A & B (NH466.12.1–2);*
*2 Flore C (NH466.20.1);*
*3 Pitsford (NH471.8.1);*
*4 Raunds (Redlands Farm) simplified excavation plan (after Healy et al 2007, fig 3.23);*
*5 Sutton Bassett (NH140.1.1).*
*Mortuary enclosures:*
*6 Tansor (Tansor Crossroads Mound 1) simplified excavation plan (after Chapman 1997, fig 5);*
*7 Henslow Meadow mortuary enclosure, Aldwincle, simplified excavation plan (after Jackson 1976, fig 4);*
*8 Grendon mortuary enclosure, simplied excavation plan (after Gibson and McCormick 1985, fig 9);*
*9 Elton A, Cambridgshire;*
*10 Naseby (NH507.43.3);*
*11 Ketton B, Rutland;*
*12 Flore D (NH457.23.1);*
*13 Cosgrove B (NH289.1.3).*
*Elongated monuments:*
*14 Raunds (Long Enclosure) simplified excavation plan (after Healy et al 2007, fig 3.40);*
*15 Raunds (Long Mound) simplified excavation plan (after Healy et al 2007, fig 3.7);*
*16 Raunds (The Avenue) simplified excavation plan (after Healy et al 2007, fig 3.15);*
*17 Grendon (Grendon Quarry) (NH45.20.22);*
*18 Cosgrove A (NH289.1.1);*
*19 Hardingstone (NH448.2.1);*
*20 Ketton A, Rutland;*
*21 Walcote, Leicestershire;*
*22 Dodford (NH465.63.1);*
*23 Barnack, Cambridgeshire (after Harding with Lee 1987, fig on p 76).*

Nearly 1.75km to the north-east, at West Cotton, a mound of even greater length was discovered beneath the medieval settlement earthworks (Fig 4.3: 15). The 135m Long Mound consisted of turf and possibly topsoil, which in parts were built over a bayed substructure that may have held supporting hurdles

(Healy *et al* 2007, 54–64). A narrow gully was cut into the top of the mound, but there were no ditches around its base. At a significantly later date, two hollows, *c* 20m in length, were excavated either side of a short mid-section of the mound. Although there was some evidence of refurbishment of the mound, these pits are not considered to have been the source of any mound material and their function is unknown.

Over half a metre depth of mound material had survived in parts at both the Long Barrow and the Long Mound, but both were largely submerged by alluvial deposits dated to the Saxon period, and the Long Mound was buried beneath medieval settlement earthworks (Healy *et al* 2007, 54 and 82). Although such burial results in excellent preservation, as a consequence neither these nor many of the other monuments in the Raunds Area were identified from the air prior to excavation; in fact, their existence was largely unsuspected in advance of archaeological works.

Although of superficially similar form, aside from differences of scale there are significant distinctions between the Long Barrow and the Long Mound. The Redlands Farm Long Barrow was constructed in an area of recent clearance, but in relative isolation from other known monuments, and had a clear mortuary function. In contrast, the Long Mound was built on established grassland and was part of a contemporary monument complex, which continued to develop. As at other sites of this period there was a burning episode at the Long Mound, which was absent at the Long Barrow, and funereal deposits were limited to the possibly later hollows that flanked the main body of this monument.

Few extant Neolithic long barrows or mounds are known in the rest of the county. Heavily disturbed, possible barrows survive at Longman's Hill, Pitsford (Fig 4.3: 3), investigated in the early 19th century; near Rainsborough Camp, Newbottle; and at Wallow Bank, Chipping Warden. The last was not recorded by the NMP Project, and during the period of photography Longman's Hill and Rainsborough Camp mounds have been obscured by trees, so the NMP mapping is based on the results of ground survey (RCHME 1981, fig 123; 1982, fig 87). A slight ridge on the floodplain at Upton, barely perceptible on the aerial photographs, and originally thought to be a long barrow, has been investigated on the ground and is probably of natural origin (Jackson 1993–4, 70–3).

Of the possible levelled long barrows, three are in the parish of Flore, and were discovered during single flight in 1996 in an area that has produce significant Mesolithic and Neolithic material (Hall 1985, table 1, SMR903, 907, 910 and 912) Two of the three (Flore A and B) consist of a pair of broad ditches set approximately 10–15m apart (Fig 4.3: 1). Both display the same waisted appearance as the Redlands Farm Long Barrow. The shorter is 40m long and the longer, which is closed off by narrow gullies at either end, is 60m long. The latter, in particular, is similar to the form of some long barrows photographed and excavated in Lincolnshire, for example Giants Hill, Skendleby, Calceby and Stenigot (Jones 1998, fig 2 K, nos. 20 and 28).

The third example (Flore C) lies 1km to the north-east, and consists of a pair of short, broad ditches or trenches (Fig 4.3: 2). Thirty metres long, these trenches are some 20m apart. While their outer edges are irregular and convex, the facing sides are straight and parallel, suggesting that they are indeed related. A comparable site, described as 'two sub-rectangular splodges', is noted in close proximity to a possible hengiform enclosure at Hazeltongue Lodge, Leicestershire (Harding with Lee 1987, 179). Stoertz has identified similar 'short' long barrows at Huggate and Rudston in the Yorkshire Wolds (1997, figs 8.10 and 8.13). If this is a form of Neolithic long barrow, then other examples may easily be mistaken for small, hand-dug quarries. Owing to ploughing, survival of any mound is unlikely at any of these three long barrows, but the cut features may contain useful deposits and even cremated remains, as did the hollows flanking the Redlands Farm Long Barrow and Long Mound (Healy *et al* 2007, 92 and 94).

Features at Sutton Bassett, consisting of a ditched oval enclosure with two broad inner arcs, may also be the remains of a type of long barrow (Fig 4.3: 5). Unfortunately the photographic evidence is very poor, and this identification should be used with extra caution.

The Early Neolithic Avenue and the late 2nd to mid-3rd millennium Long Enclosure at Raunds were enclosed areas rather than mounded features (Healy *et al* 2007, 64–7 and 94–8). The Avenue, 60m-long, was defined by two parallel rows of segmented ditches and pits, incorporating natural

features and set 7–9m apart (Fig 4.3: 16). Other pits and gullies at both ends defined narrow causeways, which may have been entrances. The circuit of the Long Enclosure, although greatly disturbed by later features, was traced around an area 17m wide and 117m long (Fig 4.3: 14). This enclosure was rectangular in plan and had neat, rounded corners; the only internal features were probable tree throw holes. The ditch fills suggested the presence of an internal bank.

There are several elongated enclosures within the project data. The 97m-long enclosure at Ketton A, Rutland has rounded ends, but its circuit is discontinuous (Fig 4.3: 20). This break may be a real gap in the ditch rather than just a hiatus in the cropmarks. A similar break appears in the long 'paperclip' enclosure in the Octogon Farm complex, Cardington-Cople, Bedfordshire, which is thought to be one of the earliest monuments in a complex of mortuary enclosures, cursus, possible henges and ring ditches (Malim 2000, 78 and fig 8.13). A possible mortuary enclosure and several ring ditches have been recorded in the vicinity of the Ketton A long enclosure. There is, unfortunately, no contextual support for dating the elongated enclosures at Dodford and near Walcote, Leicestershire to the Neolithic period, but the latter has been categorised by Loveday and Petchey alongside other monuments of this date, including the Rivenhall 'mortuary enclosure' in Essex (1982, 32) (Fig 4.3: 22 and 4.3: 21).

Excavations at Grendon demonstrated that the narrow ditches of a 84m-long rectangular enclosure predated an Iron Age enclosure, and similarity of the fills to those in nearby Early Bronze Age ring ditches suggests an even earlier date (Jackson 1997, 13). The straight sides and angular corners distinguish this enclosure from those at Ketton A, Dodford and Walcote, but it is similar to an incomplete feature at Cosgrove A (Fig 4.3: 17–18). Both are comparable to the 110m-long 'short cursus' at Barnack in Cambridgeshire (McOmish 2003, 13) (Fig 4.3: 23).

Three sides of a possible elongated enclosure, at least 135m long and 32m wide, were recorded at Hardingstone, close to the River Nene (Fig 4.3: 19). This feature and other cropmarks of probable Iron Age or Roman date were photographed on just one occasion (ULM BVP85 5 June 1964). The northern section had already been lost to quarrying, and now the later prehistoric elements appear to have been lost to development. While its original overall length is unknown, the plan of this feature is similar to the other 'short cursus' or long enclosure monuments although unlike the others it runs perpendicular to the course of the river.

Unexcavated elongated enclosures of probable Neolithic date are often described as mortuary enclosures, but this is an ill-defined class of monument (cf Loveday and Petchey 1982; Buckley *et al* 1986; Jones 1998; Malim 2000, fig 8.13). The investigations at the Raunds Long Enclosure suggest that although there was funereal activity at the site, this took place some time after it was built and, unlike Redlands Farm Long Barrow, burial was not its primary function. For this reason the descriptive 'long enclosure' is preferred to 'mortuary enclosure' for this form of monument.

Enclosures of proven mortuary function have been excavated at Aldwincle (Site 1) and Tansor Crossroads (Mound 1) (Jackson 1976a; Chapman 1997). Both examples are part of complex multi-phase monuments of which the most tangible elements are pits and small rectilinear enclosures encircled by later ring ditches (Figs 4.3: 7 and 4.3: 6). Similar to these are the rectilinear enclosure and façade that was excavated at Grendon Quarry, which although devoid of any human remains, are considered to be an example of a diverse monument type akin to the long barrows (Gibson and McCormick 1985, 63; Chapman 1997, 14–16) (Fig 4.3: 8).

Some elements of the multi-phase Tansor Crossroads and Grendon Quarry monuments were visible from the air. However, the surviving elements of the mortuary enclosures themselves were only slight gullies and pits, which if alone may not have been visible from the air. At Flore D, Cosgrove B and Naseby there are small, rectangular enclosures, which, although slightly larger, may also be mortuary enclosures (Fig 4.3: 12, 4.3: 13 and 4.3: 10). Worked flints have been recovered from the immediate vicinity of the Naseby enclosure, but so have many sherds of Roman grey ware (SMR1025, RCHME 1981, 143).

There are two cropmark arrangements that are reminiscent of the complex monuments at Tansor Crossroads, Aldwincle and Grendon Quarry. Both are outside Northamptonshire, in the Welland Valley

at Ketton B, Rutland and Elton A, Cambridgeshire (Fig 4.3: 11 and 4.3: 9). The latter is also similar to a mortuary enclosure identified in the Octogen Farm complex in Bedforshire (Bedfordshire SMR1480/12; Malim 2000, fig 8.13). In the Elton A and Octogen Farm examples the inner rectangular enclosure extends slightly beyond the circuit of the ring ditch.

It is possible that other ring ditches recorded by Northamptonshire NMP may also have started as mortuary enclosures, but are unrecognised because the rectangular elements are too slight to produce cropmarks. Chapman noted that the ring ditches that encircled the known Northamptonshire mortuary enclosures were larger than those of the average Beaker barrow (1997, 17).

Countrywide a broad range of largely unexcavated ovate, trapeziform and oblong plan cropmarked enclosures have been attributed to the Neolithic period (Loveday and Petchey 1982, fig 32; Jones 1998, fig 2), but these plan forms are Iron Age and Roman period settlement enclosures, which are far more prevalent in the county. Inevitably only where the wider archaeological context suggests earlier activity have these less diagnostic forms been tentatively identified as potential Neolithic monuments, such as the rectilinear enclosure within the circuit of the Elton Henge (*see* Fig 4.5: 6).

## Ring ditches, round barrows and henges

The nomenclature for circular monuments of possible or known Neolithic and Bronze Age date is often applied in a rather loose and inconsistent manner. Cotton 'Henge' for example, which is thought to date to the late-4th or 3rd millennia (Healy *et al* 2007, 108–9), consists of an irregular outer ditch circuit, approximately 75m in diameter with a smaller, more regular circuit near the centre. However, trial trenching and geophysical survey have so far failed to demonstrate the presence of any entrances, the presence of which are one of the defining characteristic of the henge monuments.

At the end of the mapping phase and despite strict adherence to the NMP thesaurus, the project database was similarly encumbered by ambiguous and muddled terminology. A rigorous re-assessment of the data, undertaken with reference to the existing SMR information and the known excavation, geophysical survey and field-walking results (notably by Hall and Martin) has produced a more robust and informative record.

A particular problem was the differentiation between the remains of round barrows and the eaves-drip gullies and drains that surround round houses. In their analysis of the distribution of ring ditches in the Nene Valley, Gibson and McCormick (1985, 65) excluded enclosures of 10m or less as possible hut-circles and used the local context to filter out any larger examples. However smaller ring ditches have been excavated in Northamptonshire: F7 in Field 12 at Grendon had a 9m diameter, Barrow 8 at Stanwick was 6m and the Double Ring Ditch at West Cotton was less than 4m in diameter (Gibson and McCormick 1985; Jackson 1997; Healy *et al* 2007, 169 and 136–41). Furthermore, a significant proportion of the excavated hut circles match or exceed this 10m-diameter cut-off: Kings Heath (10–20m), The Lodge and the Long Dole DIRFT (10–20m), Swan Valley (11m), Pineham Barn, Upton (12.5m) and in Enclosure A at Grendon (14.5m) (NA 1990; NA 1994a; NA 1994b; NA 1989; Jackson 1997).

In practice, interpretation of the more ambiguous circular and sub-circular monuments draws heavily on their relationship to other monuments, and as a consequence the record may under-represent funereal sites in areas where later settlement and agriculture remains are also visible.

There were 457 complete, or near complete, ring ditches and circular and sub-circular enclosures of possible Neolithic or Bronze Age date identified in the project data (Table 4.1). A further 35 possible ring ditches were very incomplete.

Table 4.1 The ring ditches, barrows and henges recorded by the project

| | |
|---|---|
| *total number of circular monuments of all types, 493 of which:* | |
| complete or near complete simple ring ditches | 383 |
| multi-ring ditches | 40 |
| causewayed ring ditches | 18 |
| large ring ditches and henges | 17 |
| incomplete simple ring ditch | 35 |
| *and in addition:* | |
| round barrow (mound) | 7 |

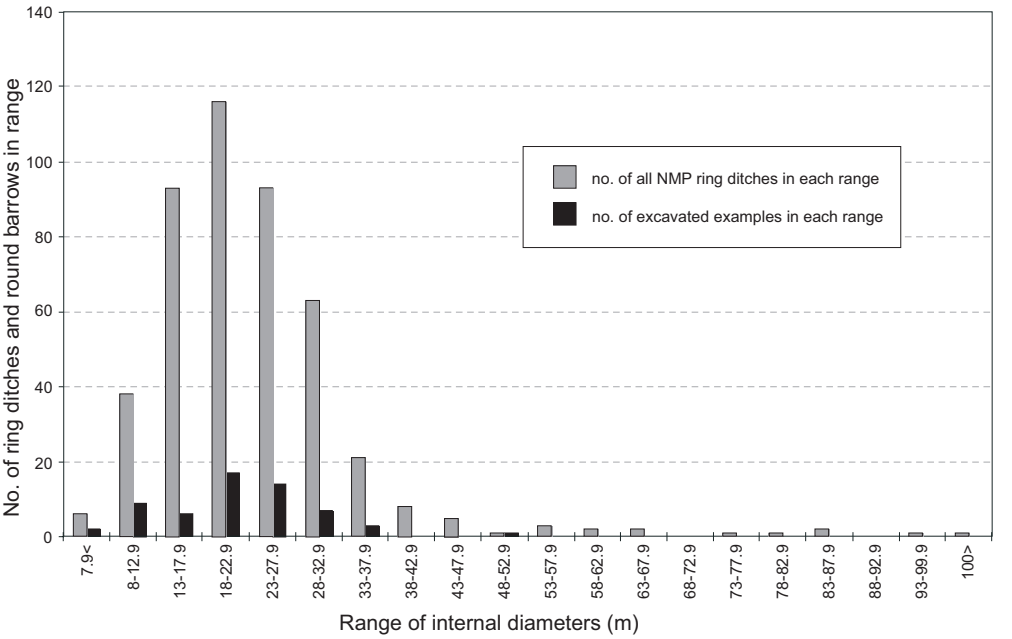



*Fig 4.4*
*Comparison of the internal diameters of excavated and NMP ring ditches and round barrows.*

A substantial number of ring ditches and round barrows have been excavated in Northamptonshire and neighbouring counties since the early 1970s. From the published and grey literature a sample of some 60 excavated or geophysical surveyed ring ditches were available for analysis (*see* Appendix 1). The diversity in the range of size and form in this sample provides a useful comparison for the Northamptonshire NMP examples. There is a small degree of overlap between the excavated and Northamptonshire NMP samples (those with NH numbers in Appendix 1).

For purposes of diameter comparisons, all measurements are read internal to ring ditch, and from the inner-most where more than one circuit is present (*see below*). Figure 4.4 shows that the distribution of diameter ranges of the Northamptonshire NMP sample is similar to that observed in the excavated examples. The average diameter of the excavated barrow ditches is 21–2m and the actual range is between 3m and 50m. Over half of all the excavated examples are 18m or greater, and less than 28m in diameter; six are between 28m and 32m, and just five measure more than 32m. Just over one quarter is less than 18m in diameter.

The average diameter of the Northamptonshire NMP ring ditches is 23m, but the overall range is much wider than the excavated sample and includes enclosures up to 104m in diameter. Forty-one percent of all enclosures are between 18m and 27m in diameter. Thirty percent of ring ditches are less than 18m in diameter – a close reflection of the representation of smaller enclosures within the excavated sample. There are progressively fewer examples as the diameter range increases greater than 37m, but the sample does include a significant number of large circular and sub-circular enclosures up to 95m, while monuments of comparable scale were not included in the excavated sample.

There are few comparative datasets or size criteria against which to consider these two samples, although there are clearly perceptions as to what the normal size range of ring ditch is. Ashbee had observed bowl barrows from 9m to 45m in diameter, and pond barrows and saucer barrows over narrower ranges, 9–36m and 18–27m, respectively (1960). Chapman noted that the ring ditches surrounding Neolithic mortuary enclosures at Tansor Mound (34m in diameter), Aldwincle (oval 34 ? 39.5m) and Grendon Barrow V (inner ditch 26m in diameter) '…certainly exceed the mean [diameters] for Bronze Age round barrows', and went on to suggest that other larger ring ditches may have Neolithic origins (1997, 17). Similarly, Bradley described the 32m-diameter round barrow excavated within the henge at Maxey as 'outsize' (1993, 101).

Analysis of a similar, though smaller, sample of ring ditches in the Stour Valley suggested a quite different profile to the

Northamptonshire size range (Strachan *et al* 2000). In this sample nearly 60% of ring ditches were less than 20m in diameter and 30% were between 20–39m, conversely, in Northamptonshire, 38% are less than 20m and 56% between 20 and 39m. Importantly though, the Stour Valley sample was selected on morphological criteria alone, and did not attempt to distinguish ring ditches of round barrows from hut circles and other domestic enclosures. In common with Northamptonshire, the Stour Valley has a handful of larger ring ditches, in this case up to 79m in diameter.

Morphology within the Northamptonshire sample of ring ditches is, by definition, fairly uniform, but there are certain aspects that warrant further discussion; the nature of the very large enclosures, the presence of entrances in ring ditches and multi-ditched enclosures.

## Large ring ditches and henges

Fewer than 4% of the ring ditches and circular enclosures mapped by the Northamptonshire NMP were 45m or greater in diameter (*see* Table 4.1 and Fig 4.4). A few of these have been the subject of archaeological intervention but none have been thoroughly investigated. The sub-circular or oval 'ring ditch' F13 at Grendon Quarry, defined by a broad, well-defined cropmark, was only partially examined before its destruction (Fig 4.5: 1). Observations made during its removal record a very broad ditch encircling an area approximately 50m in diameter. This was covered by approximately 500mm of mound material, possibly retained by a kerb or walling (Jackson 1997, 5) No entrance was found during excavation, although photographic sources suggest there was one facing south-west. Unfortunately, this enclosure and its mound could not be dated but the excavator did believe them to be of prehistoric date (Jackson 1997, 5).

Limited excavation at West Cotton 'henge' supports a Neolithic date, but geophysical survey has so far failed to produce any evidence for an entrance (Fig 4.5: 2) (Healy and Harding 2007, 210). The slightly irregular, sub-circular perimeter ditch and smaller internal ring ditch are comparable to the Maxey 'henge', but are perhaps closer to the smaller enclosure to the south-west at TF1307 (Fig 4.5: 4 and 4.5: 5). Although even more irregular in shape, the large enclosure at Swinehead, Bedfordshire may be another example of this monument type (Fig 4.5: 3).

Elton Henge, Cambridgeshire, is unusual in that it appears to contain three sides of a large rectangular enclosure (Fig 4.5: 6). A slot trench through the ring ditch circuit suggested the presence of an internal palisade, and produced pottery of possible Neolithic date (Taylor 1979, 332). This enclosure has a narrow, causewayed entrance opening to the south. In addition the 'henge' circuit cuts or is cut by a smaller ring ditch with internal pits.

The ovoid enclosure near the centre of the Dallington causewayed enclosure has been mooted as a possible henge monument, but dismissed elsewhere (RCHME 1979, 30 and fig 2; Harding with Lee 1987, 198) (*see* Figs 4.2: 1 and 4.5: 8). There is a south-east facing causewayed entrance, and limited trial excavation has recovered material, including polished axe fragments, that support a Neolithic date (OAU 1991). This possible henge cuts or is cut by the ditches of a large oval enclosure (discussed below).

The large ring ditch at Misterton, Leicestershire appears truly circular, but others at Staverton B, Naseby and Earls Barton are notably less regular and slightly polygonal (Fig 4.5: 18, 4.5: 13, 4.5: 10 and 4.5: 12). The cropmarks defining the Staverton B and Naseby examples are particularly narrow, and may indicate palisade trenches rather than ditches. A rather egg-shaped enclosure at Staverton C has two circuits; the outer circuit is incomplete, probably masked by the modern hedgeline (Fig 4.5: 14). Towards the centre of the inner enclosure there is an arrangement of four large pits. Smooth arcs of ditch, such as those at Holcot and Lamport, may also be sections of large ring ditches, and the two mentioned have east-facing causewayed entrances (Fig 4.5: 15–17). The Holcot examples are part of a loose group of five larger than average ring ditches.

At Shawell, Leicestershire, a substantial ring ditch 47m in diameter lies within an even larger ring of 87m in diameter (Fig 4.5: 11). Unusually these are not arranged concentrically; instead, the smaller enclosure abuts the north-east segment of the perimeter of the larger. A similar layout is apparent in the Beaker 'palisaded enclosure' at Brampton, Cambridgeshire (Malim 2000, fig 8.6), and both Shawell and Brampton are reminiscent of the 'spiral arm' arrangement within the Briar Hill causewayed enclosure.

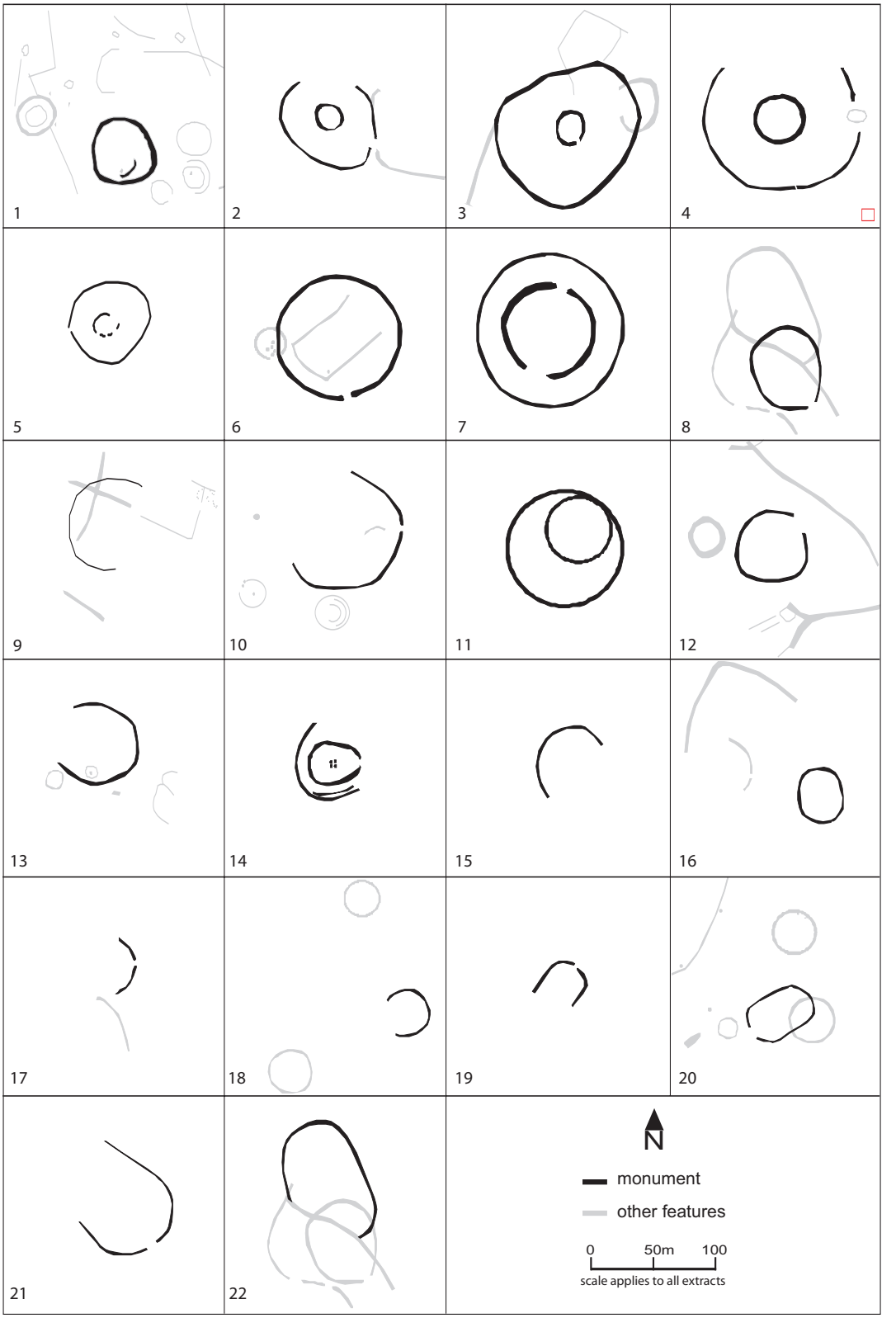



*Fig 4.5*
*Large ring ditches (diameter > 45m), henges and oval enclosures in the project area. Large ring ditches/henges:*
*1 Grendon (Grendon Quarry) (NH45.24.2);*
*2 Raunds (Cotton Henge) (NH389.1.1);*
*3 Swinehead, Bedfordshire;*
*4 Maxey henge, Cambridgshire, simplified excavation plan excluding later features (after Pryor 1985, fig 40);*
*5 Maxey hengiform no. 80 (after RCHME cropmark plan);*
*6 Elton C, Cambridgeshire;*
*7 Kings Sutton (NH237.1.1);*
*8 Northampton (Dallington) (NH461.8.3);*
*9 Raunds (Stanwick) (NH387.27.1);*
*10 Naseby B (NH507.43.8);*
*11 Shawell A and B, Leicestershire;*
*12 Earls Barton (NH14.6.1);*
*13 Staverton B (NH17.5.1);*
*14 Staverton C (NH352.1.1);*
*15 Holcot A (NH473.27.4);*
*16 Holcot B (NH473.27.2);*
*17 Lamport (NH491.3.1);*
*18 Misterton, Leicestershire.*
*Oval enclosures:*
*19 Raunds (Southern Enclosure, Stanwick) (NH387.30.1);*
*20 Fotheringhay (NH431.18.1);*
*21 Flore E (NH466.19.1);*
*22 Dallington (NH461.9.1)).*

At Kings Sutton a narrow, continuous outer ditch surrounds a broader inner ditch that has opposed causewayed entrances oriented on a NNE to SSW axis (Fig 4.5: 7). There are no visible entrances in the narrower outer circuit, but this may have been a precursor to the henge, or a later addition.

There is slight evidence for a large, incomplete ring ditch, perhaps 77m in diameter, between the Roman villa at Stanwick and the Southern Enclosure (Fig 4.5: 9). Visible only on a single set of oblique photographs from ULM, this enclosure lies within an area trenched during investigations at the villa. Although some features were located in its vicinity, they were not pursued and did not produce any material (F Healy pers comm).

Few of these large ring ditches are easily reconciled with the description of the classic henge monuments: 'a circular area of variable size enclosed by a bank and a ditch, the former normally sited outside the latter and broken by one or more entrances' (Wainwright 1989, 14). Only the inner ring ditch at Kings Sutton has two entrances, a feature of the Class I monuments, and visible entrances are absent in several examples, excluding them from the Class II group (Piggot and Piggot 1939). In none of the unexcavated examples is it possible to discern the presence or position of a bank, because these monuments lie in areas of intensive medieval and modern cultivation and have been levelled by ploughing. The limited excavations at Cotton 'Henge', Elton Henge and Dallington have also failed to demonstrate the presence of an external bank. However, it is unlikely that any of the other monuments originally incorporated massive mounds as did the Grendon enclosure, because the perimeter ditches alone were insufficient to provide enough material to raise a mound of any great spread or height over the whole enclosed platforms.

So, with the exception of the Grendon example, the large ring ditches do provide the most basic requirements of the henges: an enclosed space of near circular plan. It has been observed elsewhere that the imperative of the henge builders, be it social and/or functional, may also have been expressed in other monuments and activities, such as the digging of pits into the existing Briar Hill interrupted ditches (Chapman 1999), or the construction of the pit circle at East Stoke, Nottinghamshire (Deegan 1999, 29).

Such variability, as expressed in diverse monument types, is to be expected.

## Causewayed ring ditches

The term 'hengiform' is commonly used to describe a diverse range of unexcavated curvilinear enclosures united by the common presence of one or more entrances and an outer bank (*see* EH Thesaurus). However, 'causewayed ring ditch', as appropriated for the Neolithic example at Stanwick, is used here in preference to 'hengiform' because evidence for bank location is generally unforthcoming from air photographs.

Less than 4% of the sub-45m ring ditches identified in the project have one or more entrances, although they are present in a higher proportion of the very large rings, as described above. Causewayed ring ditches are likely to be significantly under-represented in the project data, because a real break in a ditch circuit cannot always be distinguished from a brief interruption in the cropmarks. Some causewayed ring ditches may have been misinterpreted as hut circles and vice versa. This form is also likely to be under-represented in the excavation record, because total excavation at ring ditch and barrow sites has been rare, and has often been carried out in difficult rescue conditions.

Most of the examples identified in the project have wide entrances and slightly flared ditch terminals. Others, with less clearly defined entrances, may have been overlooked. The Causewayed Ring Ditch at Raunds did not appear have had a mound, and its ditch, dated to 3340–3020cal BC, is thought to have either been revetted or held a close-set timber circle (Healy *et al* 2007, 98–104). Given the rarity of excavated examples, this project's causewayed ring ditches are probably best considered as a diverse group of monuments that is distinctive from the round barrows and possibly significantly under-represented.

## Multiple ring ditches

Just 36 of the ring ditches recorded by the Northamptonshire NMP have two circuits, and only four have three. Few excavations in the region have been able to demonstrate the sequence of development in multi-ring ditches, but those that do have always shown the smallest, innermost circuit to be the oldest and the outer ring to be a later addition. Elsewhere, however, this is not always the case: excavation of the multiple ring ditch excavated at Site 5m, Llandysilio, Powys has shown the larger, outer ring to be earlier than a smaller internal circuit (Warrilow *et al* 1986, 64 and fig 64).

None of the inner rings of the Northamptonshire NMP multi-ring ditch

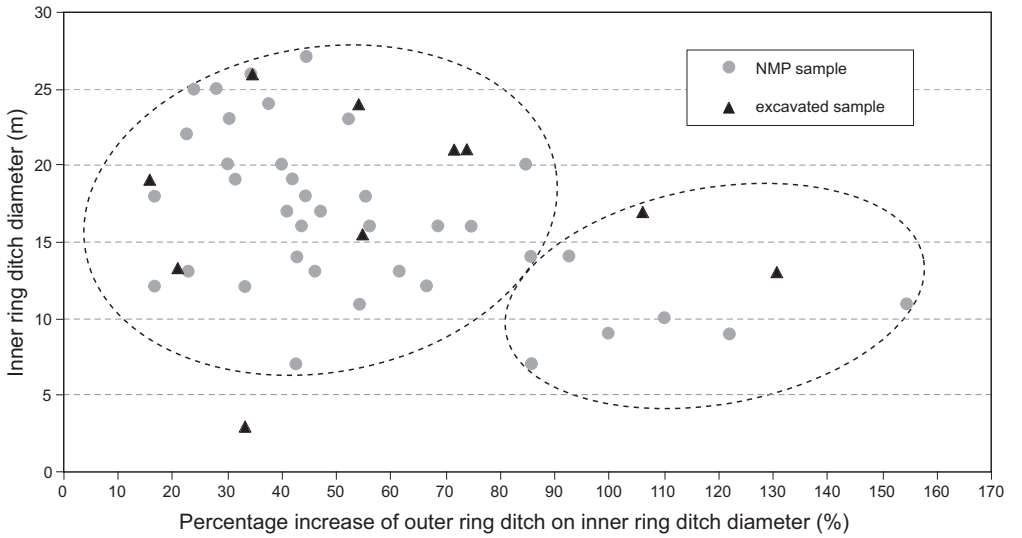



*Fig 4.6*
*The relationship between the diameter of inner ring ditch and the percentage increase to outer ditch of multi ring ditches.*

sample exceeds 27m in diameter. The increase in diameter between inner and secondary circuits ranges from *c* 17% to 155% and falls into two groups (Fig 4.6). In the majority of examples, and across the whole size range, the outer ditch was less than 80% larger than the inner ditch. In fact, because two ditches separated by a narrow gap may appear as a single broad cropmark, there is likely to be an under-representation of the rings with the more modest increments, particularly those that are smaller in diameter to start with.

In the second, smaller group where the increase between inner and outer is greater, the inner enclosures are all between 9m and 17m in diameter, which is significantly lower than the average for all ring ditches. The ring ditches excavated around the Aldwincle Mortuary Enclosure and ring ditch F14/15 in Field 12 at Grendon also fall within this range, but as a group these monuments do not share any other visible characteristics.

If extra circuits around ring ditches are later additions, then their presence has little to do with the original barrow architecture. The digging of further ditches may have been required for enlargement of barrow mounds, but materials such as turf would not have required such excavations, and it has been demonstrated in some cases that ditch spoil was not added to mounds (eg inner ditch and mound of Barrow 5 (Healy *et al* 2007, 141–7). The actual act of re-defining these monuments with fresh ditches: a re-enactment of previous works, may have been the motivation for such efforts.

Table 4.2 Examples of significant earlier features associated with multi ring ditches

| *site name* | *comments* |
|---|---|
| Site 1. Mortuary enclosure, Aldwincle, Northamptonshire | preceded by Neolithic mortuary enclosure (Jackson 1976) |
| Area B Ring Ditch I, Grendon, Northamptonshire | some pre-mound features including possible plough scrapes. (Gibson and McCormick 1985, 64) |
| Area C Ring Ditch V, Grendon, Northamptonshire | preceded by possible Neolithic mortuary enclosure. (Gibson and McCormick 1985, fig 24) |
| Radley 15, Barrow Hills, Oxfordshire | Pit 1 contained disarticulated remains of one or more individuals. Probably reinterred from elsewhere, Middle Neolithic sherds associated with the remains were dismissed as "random inclusions". (Riley 1982) |
| Barrow 6, West Cotton, Northamptonshire | significantly earlier features including small stone setting. Burials include reinterred Neolithic remains. (Healy *et al* 2007, 130–6) |
| Barrow 1, Irthlingborough, Northamptonshire | rich and elaborate primary burial in oak chamber, topped with limestone cairn and large quantity of animal teeth and bone including auroch tooth and boar tusk that were significantly older than the primary burial (Healy *et al* 2007, 153–64) |
| Barrow 5, Irthlingborough, Northamptonshire | preceded by possible timber circle. (Healy *et al* 2007, 141) |

That just 8% of the ring ditches mapped by the project had received such modification implies a high degree of selectivity. A brief survey of multi-ring barrows excavated in Northamptonshire and neighbouring counties highlights some striking similarities. Some features of selected monuments are listed in Table 4.2. The common theme of longevity runs through this selection: in some cases the initial ring ditch was itself a modification of a pre-existing monument, or the primary deposits included already old material. This is not to say that simple ring ditches never reveal such complexities, but only that with the multi-ring ditches the probability is high.

Barrows 1, 3, 5 and 6 at West Cotton and Irthlingborough were also significant sites of secondary burials (Healy *et al* 2007, 134, 145-147, 151 and 159). Secondary burials were inserted into mounds, but have also been recovered from barrow ditches and, interestingly, in the berms between circuits. The wide berm between the secondary and tertiary ditches of Barrow 6, further enclosed by the arc of the Ditched Enclosure, and the space between the ditches of F14/15 Grendon, had both been cut by pits containing human remains (Jackson 1997, 5; Healy *et al* 2007, 134). This may indicate the significance of the broad berms created by the widely-spaced ditches of the second group (above): they may have been deliberately constructed to accommodate further interments and possibly above-ground features that do not survive. The use of such an area can be seen on a larger scale at Maxey, where pit circles were built on the 'berm' between the henge circuit and the inner ring ditch (Simpson 1985, 251–4).

### Other monuments

Excavations at Stanwick revealed the north-east end of an enclosure with parallel sides and a well rounded end with a wide entrance (Healy *et al* 2007, 101–8). The Southern Enclosure, as it is known, was 30m wide, but its overall length is unknown; the air photographs depict no more than was excavated and the long sides of the enclosure project into a heavily disturbed area (Fig 4.5: 19). The apparent absence of food remains and dearth of cultural material, together with the evidence of the charred plant remains from internal pits, indicate that this enclosure was an element of the monument complex and probably of Neolithic date (Healy *et al* 2007, 101–8). There is nothing about the form of this enclosure, in so far as it is known, that is diagnostic of a Neolithic ritual monument, and there is nothing in the shape to distinguish it from numerous Iron Age and Roman period settlement enclosures. However, in view of their local context, the oval enclosures at Fotheringhay and Dallington may be of similar date (Fig 4.5: 20 and 4.5: 22). The Fotheringhay example is surrounded by, and possibly cut by, ring ditches, while the Dallington one lies within the causewayed enclosure and is cut by, or cuts, the putative henge.

At Flore E, close to the squat quarry ditches of the possible long barrow, lie the remains of a large, probably palisade-defined enclosure (Figs 4.5: 21 and 4.8). The slightly trapezoidal form is without parallel in the county but contributes to the growing diversity of monument architecture in these periods.

## Settlement and subsistence

There is scant excavated evidence for Neolithic and Early to Middle Bronze Age settlement in Northamptonshire, which is surprising in view of the wealth of information on monument building produced from the excavations at Raunds, Briar Hill, Grendon and Tansor.

A scatter of hollows and hearth debris at Ecton comprise the best known Neolithic occupation site in the county at the time of writing (Moore 1975, 5–8). Although pits containing Neolithic material are occasionally discovered by chance during excavation of later settlement sites, it is difficult to collate this evidence into a cohesive body from the vast quantity of grey literature produced by developer-funded archaeology. Such ephemeral remains are unlikely to be recognised as evidence of early settlement on air photographs.

The valley floor at Stanwick and Raunds has yielded evidence of stock control gullies, ditches and trackways constructed in the 2nd millennium (Healy *et al* 2007, 191–4). The layout of these boundaries appears to have been planned with some reference to the existing monuments (Healy *et al* 2007, 194). Upstream at Grendon, ditches cut by a double-ring are suggested to be the remains of an early prehistoric field or boundary system (Jackson 1997, 5). This and nearby ditches of similar alignment were visible on air photographs.

Table 4.3 Numbers of Neolithic and Bronze Age findspots within 500m of cropmarked sites recorded by the project

| *period* | *total combined records for the county* | *no. within 500m of any cropmarked site* | *no. within 500m of Neo & BA monument* |
|---|---|---|---|
| Neolithic | 377 | 276 | 82 |
| Bronze Age | 355 | 225 | 78 |

Field-walking and the collection and analysis of flint scatters have made significant contributions to the study of Neolithic and Bronze Age settlements sites (Martin and Hall 1980; Hall 1985). The combined data for the Neolithic from Martin and Hall and the SMR, as discussed in the introduction, contains 377 records in the county, ranging from single find spots to extensive lithic scatters; there are slightly fewer records for the Bronze Age (Table 4.3). The distribution of find spots can be compared to that of the cropmarked features mapped by this project. Three-quarters of the Neolithic finds were recovered within 500m of the site of cropmarked features, but less than a third of those were recognised Neolithic or Bronze Age monuments; a similar relationship is observed in the distribution of the Bronze Age material. Furthermore, there are relatively few examples of find spots or scatters that have been retrieved from the same modern field unit as known Neolithic and Bronze Age monuments. There are exceptions, however: the flint scatters at Cotton Henge (SMR 870); at Titchmarsh, where a large scatter of Mesolithic and Neolithic material was recovered from the same location as a number of ring ditches (Hall 1985, table 1 Titchmarsh 19–23); and Flore, where Neolithic material was found close by the location of a possible palisaded enclosure, a short long barrow and a small ring ditch (*see* Fig 4.8).

Thus, it would appear that known Neolithic and Bronze Age material is absent from within 500m of three-quarters of the possible monuments of those dates, supporting Hall's observation that lithic settlement distribution avoids areas of barrows (1985, 33). This may suggest that there was a real distinction between the place of lithic production and use, and the location of the monuments and their associated activities.

Where flint scatters fall among the cropmarks of Iron Age and Roman activity they may indicate the presence of earlier settlement; such knowledge can inform the strategy for ground investigations in the event that the site is threatened.

## Landscape and chronology

### The environmental background

Studies of environmental conditions in Northamptonshire in the Neolithic and Bronze Age have focussed on the major river valleys because most environmental evidence is derived from excavations along the river terraces and valley floor (Brow and Meadows 1998; Brown 2000; Campbell and Robinson 2007). These areas have faced the greatest threat from gravel extraction and, while the Northampton Sand and Ironstone and the covering boulder clay deposits have also been heavily exploited, these are less conducive to the preservation of organic materials than the valley bottom sites. Some of the deposits sealed by alluvium on the valley floor were also waterlogged, and organic preservation was exceptional (Campbell and Robinson 2007, 18).

The environment of the Nene Valley floor in the Neolithic and Bronze Age was of a very different character to the floodplain landscape of the last millennium. Robinson characterises the Nene in the prehistoric period as a relatively stable, multiple cross-linked system, a simplification of the minor braided channels that had cut across the earlier gravel terraces (Robinson 1992, 198–200; Robinson 2007, Panel 2.1). With a seasonally-low water table the brown soils that developed on the higher gravel terraces and islands were well drained and suitable for cultivation, while the soils on the lower gravels and the channel margins were gleyed and supported marsh vegetation. Not until the early medieval period was there significant alluviation of the valley floor, and then it was a relatively sudden phenomenon precipitated by large-scale ploughing of the valleys sides and, most importantly,

the mainly boulder clay plateau. The effect was to bury the former land surface under as much as 2m of fine-grained silty and clayey alluvium, and a levelling of the topography of the valley floor. A few of the higher gravels protrude above the blanket of alluvium but others are buried to variable depths.

Based on the combined environmental evidence from the Raunds excavations, Campbell and Robinson have proposed a sequence of vegetational changes during these periods (2007, 21–8). Clearance of the valley floor in the early Neolithic at Raunds created a corridor of grassland within which the first monuments were built. Scrub regenerated in parts, but was episodically cleared when existing monuments were refurbished and new monuments constructed. The effect on a wider scale was to create a mosaic of different land cover as these sequences were replayed at different times along the valley floor. In the Early Bronze Age woodland and scrub was increasingly replaced by grassland, resulting in an open landscape by the Middle Bronze Age.

Extrapolating from the picture for the valley floor, it seems unlikely that during the Neolithic and Bronze Age woodland clearance was any more organised or intensive on the valley sides and is unlikely to have penetrated far into the heavy claylands.

Today, springs, brooks, streams and rivers are abundant in most parts of the county, and hence most prehistoric sites are not far from a source of water, but, as Hall observes, this should not detract from a probable genuine preference for riverine locations in these periods (1985, 32). There are, however, a few areas that are today less well supplied: the extensive limestone outcrops in the north-east and in the south-west of the county, and in some areas of extensive boulder clay cover. Robinson notes that the water table was relatively low during these periods and did not rise until the Roman period, and this may have exacerbated the effect of a poor surface-water supply (1992, fig 19.3).

The landscape and topography of Northamptonshire are characterised by the heavily dissected uplands to the north and west, the broad river valley and the boulder clay plateau to the east, but the gradations between them are subtle. Northamptonshire Archaeology had produce a physiographic model for NCC as part of the county's Landscape Characterisation Assessment, which identifies ground as either Valley Floor, Valley Side, Lias Upper Ground, Ironstone Upper Ground, Limestone Plateaux or Clay Plateaux (Northamptonshire Archaeology 2003). Although not definitive – the distinction between Valley Side and the Upper Ground

Table 4.4 The presence of monuments in the different landscape zones of Northamptonshire (based on the monuments listed in Appendix 2, and Northamptonshire Archaeology's Physiographic Model of Northamptonshire 2003)

| *monument type* | *period* | *sample size* | *valley floor* | *valley side* | *lias upper ground* | *ironstone upper ground* | *clay plateaux* | *limestone plateaux* |
|---|---|---|---|---|---|---|---|---|
| proportion of county | | | 9% | 36% | 21% | 6% | 26% | 2% |
| causewayed enclosures | Early Neolithic | 4 | ● | ● | ● | ● | – | – |
| non-causewayed enclosures | Early Neolithic? | 5 | – | ●●● | ● | – | – | – |
| long barrows | Early Neolithic | 8 | ● | ● | ●●● | ● | – | – |
| avenue & long enclosures | Middle to Late Neolithic | 7 | ●●● | ●● | | – | – | – |
| mortuary enclosures | Middle to Late Neolithic | 8 | ●●● | ● | ● | | | |
| large ring ditches and henges | Middle Neolithic to Early Bronze Age | 17 | ● | ● | ●● | ● | – | – |
| causewayed ring ditches | Unknown / Neolithic–Bronze Age? | 17 | ● | ●● | ●● | ● | – | – |
| ring ditches (multi) | Mainly Bronze Age but some with Neolithic origins | 40 | ●● | ●● | ●● | ● | ● | – |
| simple ring ditches<28m diam | Some Neolithic but mainly Bronze Age | 337 | ●● | ●● | ● | ● | ● | ● |
| simple ring ditches 28– 45m diam | Some Neolithic but mainly Bronze Age | 91 | ●● | ●● | ● | ● | ● | – |

– not represented, ● 1–25%, ●● 26–49%, ●●● >50

is contentious in some areas – if the model is used consistently this should not detract from the overall significance of variations in the distributions of different monuments types as summarised in Table 4.4.

### The Mesolithic background

The excavations at West Cotton and Raunds demonstrated Mesolithic activity in both the general area and preceding the construction of certain of the earlier monuments (Healy *et al* 2007, 47–53). Whether this should be seen as evidence of continuum or coincidental use of a common location is debated (Healy *et al* 2007, 87–8).

The information sources of the Mesolithic record for Northamptonshire, and its shortcomings, were well documented by Phillips as part of the Regional Research Frameworks initiative for the East Midlands, but still it is useful to consider the distribution of the known Mesolithic sites alongside what may be the earliest monuments recorded by this project (Phillips 1998). Hall has previously observed that all the identified Mesolithic sites lie on the permeable geologies, although some outcrops may be so small and localised that they are absent from the relatively coarse BGS mapping (1985, 31). It has been argued that this preference for lighter soils was less pronounced in the claylands of the East Midlands. In his survey, which included a large part of Northamptonshire, Clay observed that 20 of 44 Late Mesolithic 'core sites' were sited on impermeable geology (Clay 2002, 27). However, clay sub-strata cover approximately 60% of his survey area and, moreover, this analysis is based upon relatively small-scale geological mapping, which may omit localised outcrops of freer-draining geology (Clay 2002, 27).

Figure 4.7 demonstrates the strong preference towards both lighter soils and riverine locations that Hall has previously identified in the distribution of Mesolithic sites in Northamptonshire (Hall 1985).

## The earliest monuments

The causewayed enclosures, the non-causewayed enclosures and the handful of known and possible long barrows recorded as earthworks and cropmarks are possibly the earliest monuments recorded by this project. The Briar Hill causewayed enclosure was built on a north-facing slope, overlooking the confluence of the Brampton Arm of the Nene with the main river valley. The Dallington causewayed enclosure lies no more than 4.75km to the north-west and sits on the edge of a small plateau between the Brampton Arm of the Nene and a small brook. The two enclosures are just inter-visible, but tall trees on the higher ground between them would have obscured the view of one from the other. The Southwick enclosure lies much farther downstream, on the approach to the fenland, between two tributaries of the Nene on the edge of the valley floor.

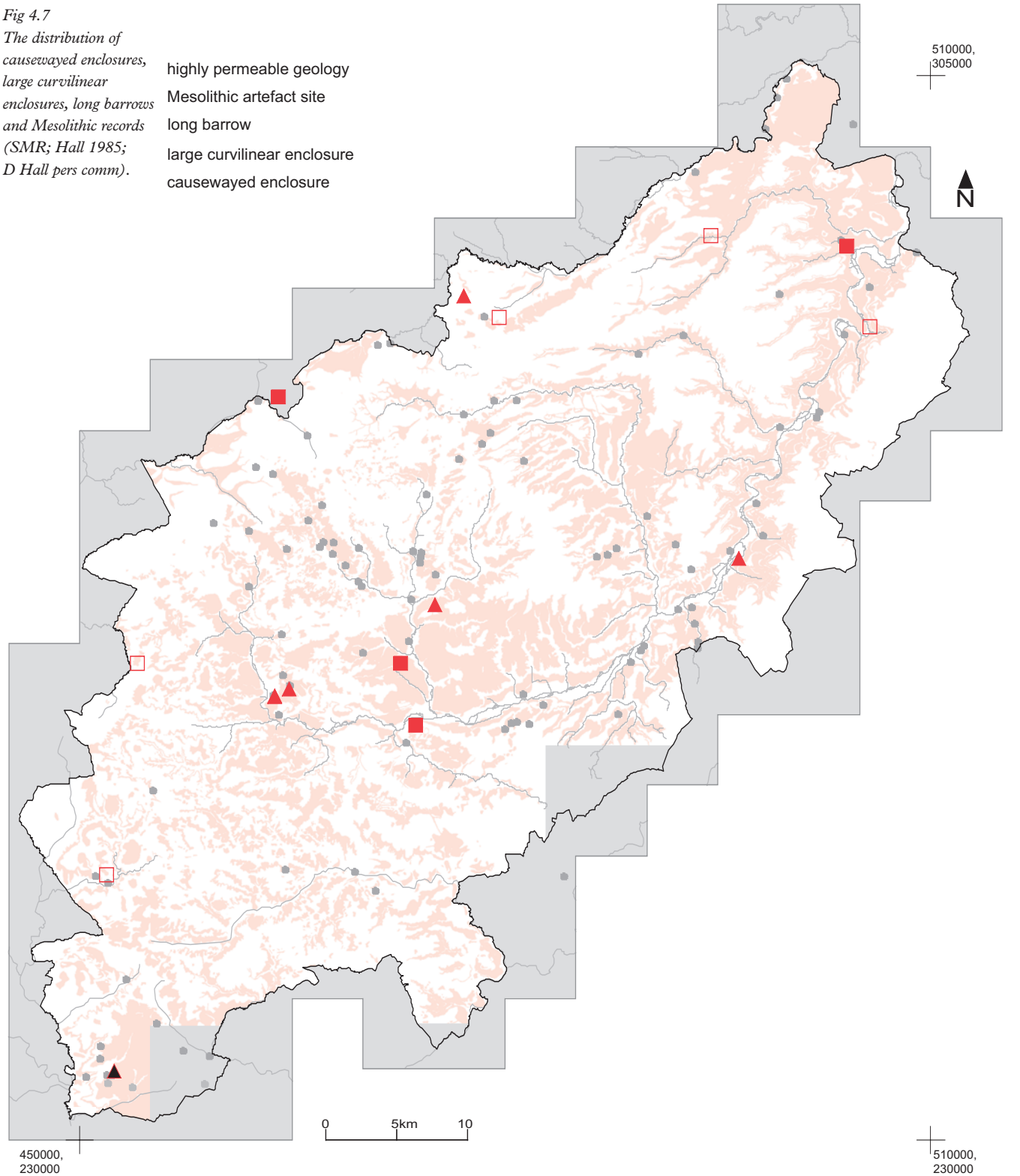
There is evidence of earlier activity in the environs of these enclosures: a Mesolithic component in the Briar Hill tool assemblages; an antiquarian collection from Duston *c* 1km south-west of Dallington, and Mesolithic material collected less than 500m upstream of the Southwick enclosure (Phillips 1998, 1–2; SMR2782/0/1). What the Mesolithic tool users were doing at these locations and how this relates to the activities of the later monument builders is largely unknown, not least because an adequate analysis of the Mesolithic material is lacking (Phillips 1998, 1–2).

The possible Neolithic non-causewayed enclosures are distributed widely across the county, but in similar situations (*see* Fig 4.7). The Bulwick enclosure lies on the banks of a minor brook, close to its confluence with the Willow Brook, and the Stoke Albany example is sited near the head of a small valley off the River Welland. Both the Chipping Warden and Staverton A example sit at the head of spurs, overlooking the Rivers Cherwell and Leam, respectively, with the ground rising behind them.

The Polebrook and Bulwick sites are within 10km of the Southwick causewayed enclosure and perhaps are part of the growing concentration of Neolithic enclosures found in the neck of land between the rivers Welland and Nene, which reaches its greatest density beyond the survey area at Maxey and Etton. The Chipping Warden, Staverton A and Stoke Albany sites lie close to the watersheds between the Nene and the Cherwell, Avon and Welland river basins, respectively. There are no examples in the Nene catchment around the Briar Hill and Dallington causewayed enclosures.

At Flore, three levelled long barrows and a large, trapezoidal, palisaded enclosure lie on either side of a broad, flat tongue of exposed

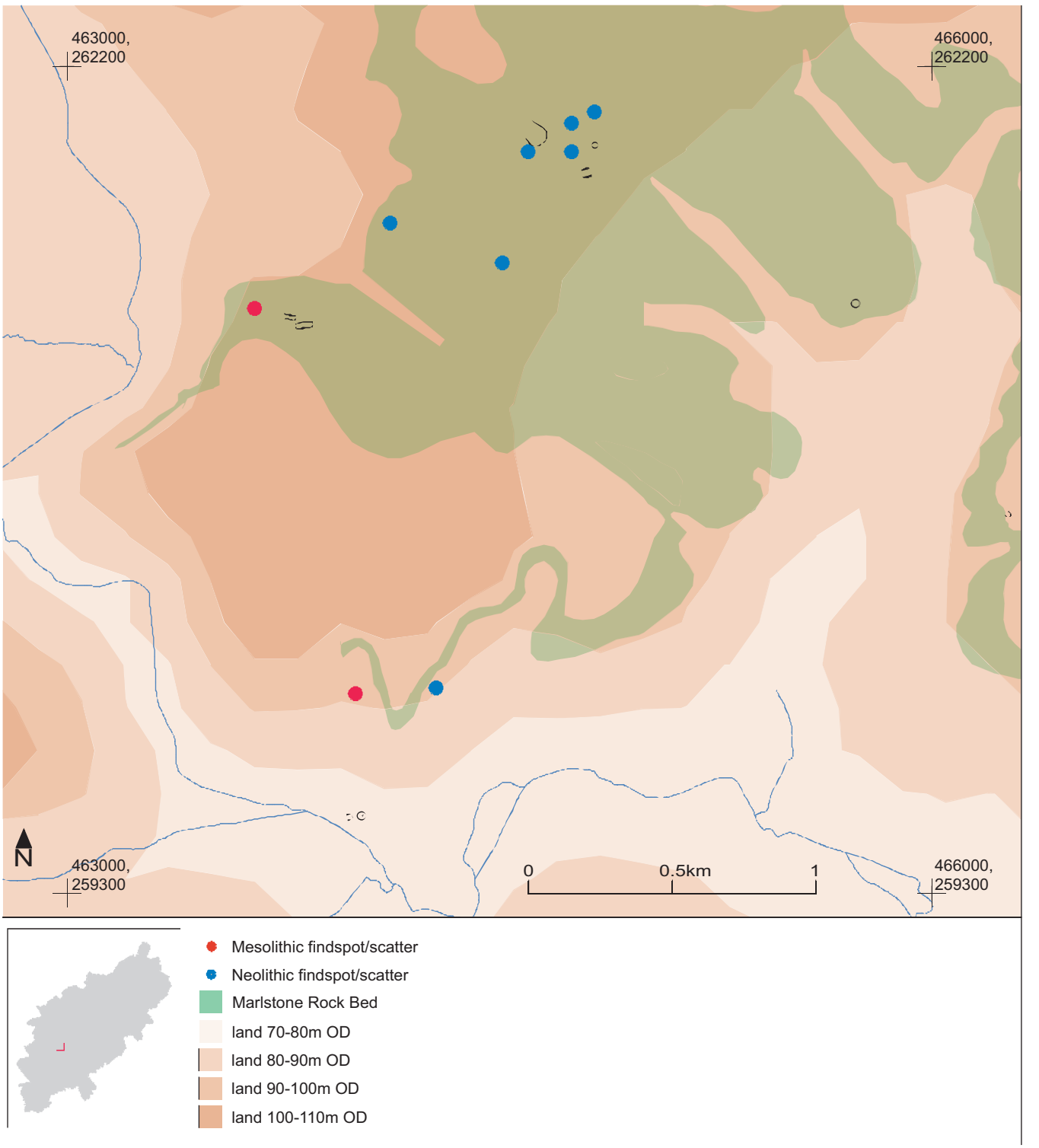
*Fig 4.7*
*The distribution of causewayed enclosures, large curvilinear enclosures, long barrows and Mesolithic records (SMR; Hall 1985; D Hall pers comm).*




Marlstone Rock Bed, flanked by the River Nene and a small brook (Fig 4.8). The long barrows (Flore A–C) sit below the local high points, just short of the crest of the very shallow valley sides. Two of the long barrows lie close to one of the richest Mesolithic flint scatters Hall has reported (1985, table 10). The Pitsford long barrow sits on the edge of a similarly flat area of Northampton Sand and Ironstone, between tributaries of the

Brampton Arm of the Nene. At a slightly higher altitude, the Rainsborough/Newbottle long barrow sits just below the crest of the hill on a north-facing slope overlooking a tributary of the River Cherwell. Again, Mesolithic material has been recovered from the immediate vicinity (D Hall pers comm); Hall SMR196–7). The possible early Neolithic funerary monument at Sutton Bassett lies on a gentle west-facing slope, between two small brooks that drain into the River Welland. The Wallow Bank long barrow at Chipping Warden is located on a very gentle slope that descends down to the River Cherwell.

*Fig 4.8*
*The Flore long barrows and oval enclosure and Mesolithic and Neolithic findspots and flint scatters in the vicinity (SMR; Hall 1985; D Hall pers comm).*



In contrast the long barrow excavated at Redlands Farm, Stanwick is located down on the valley floor of the River Nene. It sat on a small, low, gravel island in the floodplain, overlooking a lower-lying area (Healy *et al* 2007, 73). There was no indication of the presence of this monument on air photographs taken prior to its excavation because it was covered, at least in part, by alluvium. Although there are obvious problems for monument detection in this location – alluviation and extensive quarrying being the main issues – no other long barrows have been discovered on the valley floor, either from the air or by the extensive excavations at Grendon, Aldwincle and Wollaston.

Environmental evidence from the Early Neolithic Long Barrow at Redlands Farm suggests an open grassland, perhaps cleared of trees not long before construction of the monument, with a background of mixed woodland of oak, lime alder and hazel, and, significantly, the perhaps distant presence of Scots Pine (Campbell and Robinson 2007, 23).

The distribution of these early monuments demonstrates that the woodland clearance identified at Raunds at this time must have extended beyond the valley floor. The majority of the known causewayed enclosures, large enclosures and long barrows lie well above the valley floor on the freely-draining Northampton Sand and Ironstone or the similarly-ferruginous Marlstone Rock Bed (Fig 4.9). It is on these geologies, where the soil is acidic, that the Scots Pine detected at the Redlands Farm Long Barrow may have stood (Campbell and Robinson 2007, 23). Uniquely among the trees of Mesolithic and Neolithic Britain, the pine can be killed by fire (Rackham 1996, 34). Clearance by this means is significantly less labour intensive than the exertions required to kill, uproot and remove other tree species. Undoubtedly this advantage was understood in the Mesolithic and Neolithic; indeed, Mesolithic burning is considered to be a major factor in the disappearance of pine from large parts of the country (Rackham 1996, 34). It is perhaps no coincidence that the earliest monuments were built in areas where the woods offered less resistance to clearance by fire. Clearance work may have exploited, maintained and expanded naturally occurring gaps in the tree cover caused by lightening strikes and may have been well-established and long-lived by the time monument construction began.

The interpretation of the Hardingstone ditches as a short cursus monument is a cautious one. The immediate vicinity of the feature has been developed or quarried, thus removing any clues that may have been gained from seeing its wider prehistoric context. What is known is that the surviving long ditches run perpendicular to the present course of the Nene, which lies some 400m to the north. The closest known early Neolithic monument is the causewayed enclosure at Briar Hill, 3km to the east.

Like the short cursus at Barnack, Cambridgeshire, both the Grendon and Cosgrove A long enclosures lie on the valley floor. Their environs are now alleviated, but they were probably built on low gravel islands that are now less-deeply buried than the surrounding terraces. The Barnack and Grendon examples lie parallel to the general trend of the modern river courses, but the Cosgrove A enclosure runs perpendicular to the Great Ouse.

Whereas most of the long barrows are relatively isolated features, the long enclosures are commonly found in association with other monument types. The Grendon long enclosure is aligned with the mortuary enclosure within Barrow V, although unfortunately the former is not dated (Gibson and McCormick 1985, fig 1). Another possible mortuary enclosure lies within 100m of the Cosgrove A example, in association with two ring ditches, while other monuments may be masked by the alluvium, and as a consequence may be better preserved than these cropmarked features.

The elongated enclosure at Ketton A, Rutland is part of a dispersed complex of Neolithic and Bronze Age monuments and later land divisions. This enclosure lies at the edge of the valley bottom, in alignment with the general course of the River Welland. The Walcote and Dodford long enclosures also run parallel to local water courses, but the latter example is located slightly higher up the valley side than the other examples.

These long enclosures, like the West Cotton example, and the undated Rivenhall mortuary enclosure in Essex (Buckley *et al* 1986), are concentrated on or close to the valley floor, in spite of the likely under-representation of pre-alluviation features in these locations (*see* Fig 4.10). In general the long enclosures do not occur in the same places as most of the known long barrows; even at Raunds the Redlands Farm Long

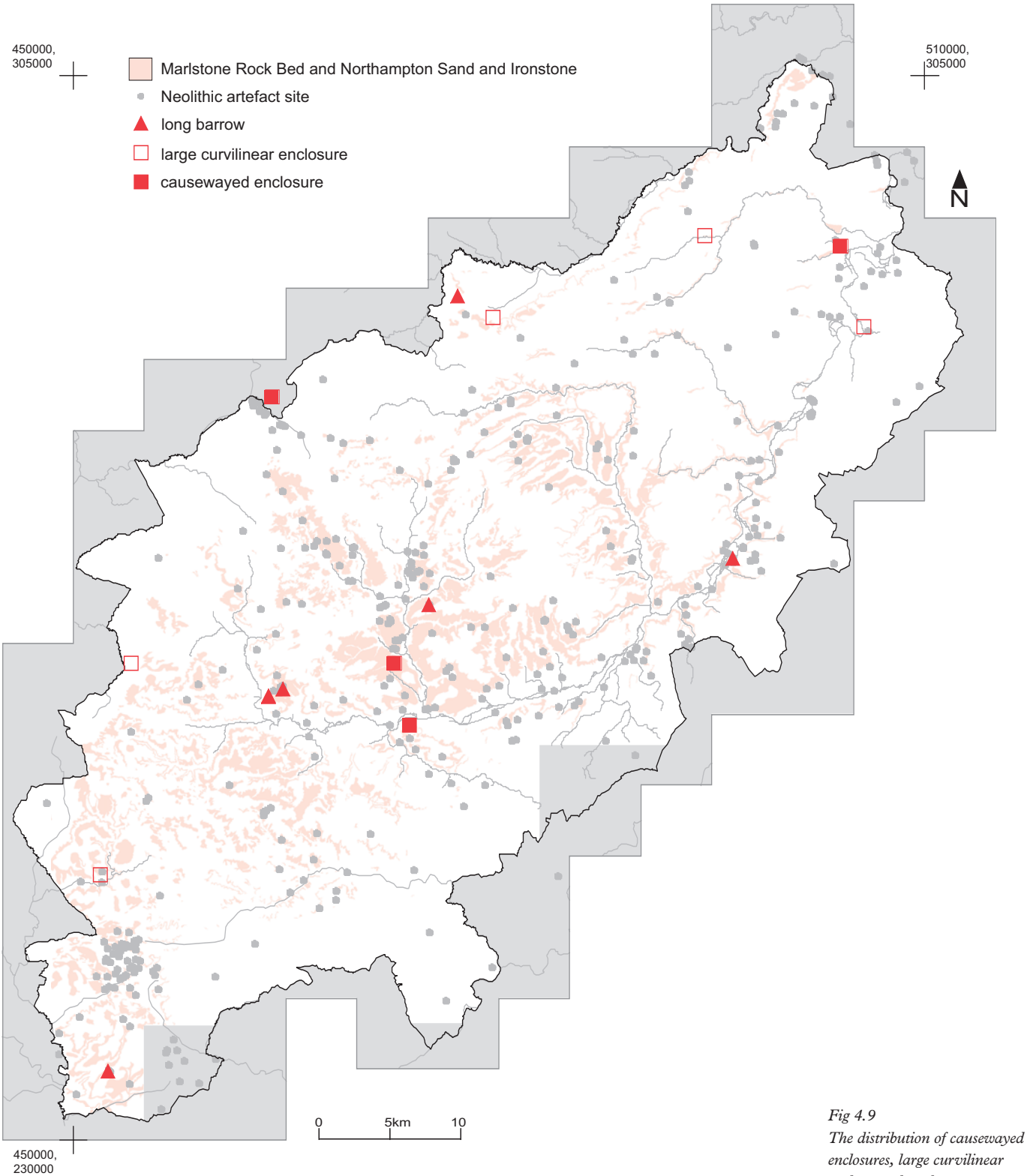



*Fig 4.9*
*The distribution of causewayed enclosures, large curvilinear enclosures, long barrows, Neolithic flint scatters and the Marlstone Rock Bed and Northampton Sand and Ironstone (NCC SMR; Hall 1985; D Hall pers comm).*

Barrow and the later Long Enclosure are separated by a distance of some 1.75km. There appears to be a distinct spatial separation of these monuments with the long barrows occupying the valley sides, often on false crests, and the long enclosures running alongside the rivers on the valley floors.

All three of the excavated mortuary enclosures are located on or close to the valley floor of the Nene, as are the possible

examples at Flore D, Elton A, Cambridgeshire, and at Ketton B, Rutland. The possible mortuary enclosure at Cosgrove B is located alongside the long enclosure (Cosgrove A) on the valley floors of the Great Ouse, but, by contrast, the Naseby example is sited in one of the higher parts of the county on the watershed between the Nene and the Avon catchments, among a varied group of ring ditches.

There appears to be a significant relationship between the long enclosures and the mortuary enclosures. They occur together at Ketton A and B, Grendon, and Cosgrove A and B, and also occupy similar parts of the landscape. Within each site, however, the chronological relationship is unclear. The mortuary enclosures appear to have served a similar function to the long barrow, but, like the long enclosures, they appear on the whole to occupy different landscape zones.

The West Cotton Causewayed Ring Ditch is the only reported excavated example of its kind. It was apparently near contemporary with the Long Enclosure, yet the distribution of the NMP sample suggests that this form was considerably more numerous and widespread than the other Early to Middle Neolithic monuments (*see* Table 4.4). It may well be an over-simplification to consider all these cropmarks as indicators of a uniform monument type and further excavations are required to understand the role of the causewayed ring ditches within the Neolithic and Bronze Age landscapes of Northamptonshire.

## Late Neolithic and Bronze Age monuments

There is a varied group of large ring ditches and possible henge monuments that is widely distributed across the landscape of the project area (Fig 4.10 and Appendix 2). The unusual, and undated, large, mounded ring ditch at Grendon lay on the valley floor in an area also occupied by ring ditches and a multi-ring ditch. Significantly the multi-ring ditch is recorded as overlying a possible field boundary, which may indicate that the area had been cleared and partitioned for stock grazing prior to the construction of these monuments.

The large ring ditch at Stanwick is similarly located on the valley floor, and the Elton henge sits within a broad river meander where the valley widens towards the fen. Aside from the internal enclosures and the associated ring ditch and pits, Elton henge is apparently isolated, although other monuments may be masked by alluvium. In contrast, the Stanwick large ring ditch is located within 200m of both the undated Southern Enclosure and the Segmented Ditch Circle and Avenue. At the time at which the large ring and henge monuments were being constructed, in the Middle to Late Neolithic, the early 4th millennium BC Avenue had long been abandoned, although it was probably still perceptible when the Segmented Ditch Circle was cut into its southern end in the Early Bronze Age (Healy *et al* 2007, 147).

In the Cherwell Valley the Kings Sutton henge sits on the Lias Upper Ground above the valley, some 2.5km down-slope from the Rainsborough long barrow. In common with the West Cotton 'henge', several of the henges and large ring ditches are located just above the floor of a major valley along the sides of minor valleys. The Lamport and Misterton ring ditches appear to be isolated. The Holcot and Earls Barton examples are associated with ring ditches.

The Dallington, Shawell, Staverton B and C and the Naseby large rings or henges occupy more elevated positions, although at Dallington this is only a minor, localised advantage. The Dallington henge is located at the centre of the causewayed enclosure and either cuts or is cut by a large oval enclosure. The Shawell rings sit on a low spur, alongside other small ring ditches overlooking the Misterton large ring ditch on the opposite side of a small valley. The egg-shaped, multi-ditched enclosure at Staverton C occupies a commanding position near the source of the Nene, facing down the valley. This site is on the shoulder of the watershed, between Studborough and Big Hills, which leads into the neighbouring river valley.

The large rings at Naseby and Staverton B sit on north-west-facing slopes just below two of the highest points in the county. Both are found in conjunction with numerous ring ditches, including multi-ring ditches and causewayed ring ditches. A possible mortuary enclosure and a rare triple-ditched ring are also known within 100m of the Naseby example.

The analysis of the monuments in the RAP identified a shift of focus in the early 3rd millennium BC to the valley sides, concurrent with an apparent lull in construction on the valley floor (Harding

*Fig 4.10 (opposite) The distribution of long enclosures, mortuary enclosures, oval enclosures, henges and large ring ditches and Neolithic records (after NCC SMR, Hall 1985 and D Hall pers comm).*

and Healy 2007, table 5.1). Within the RAP this trend is expressed by the building of the West Cotton henge away from the extensive valley floor monument complex. The large ring at Stanwick may have been built on the valley floor at this time, but it is in an area that was apparently under-used after the abandonment of the Avenue until the construction of the Segmented Ditch Circle. If they are taken to be broadly

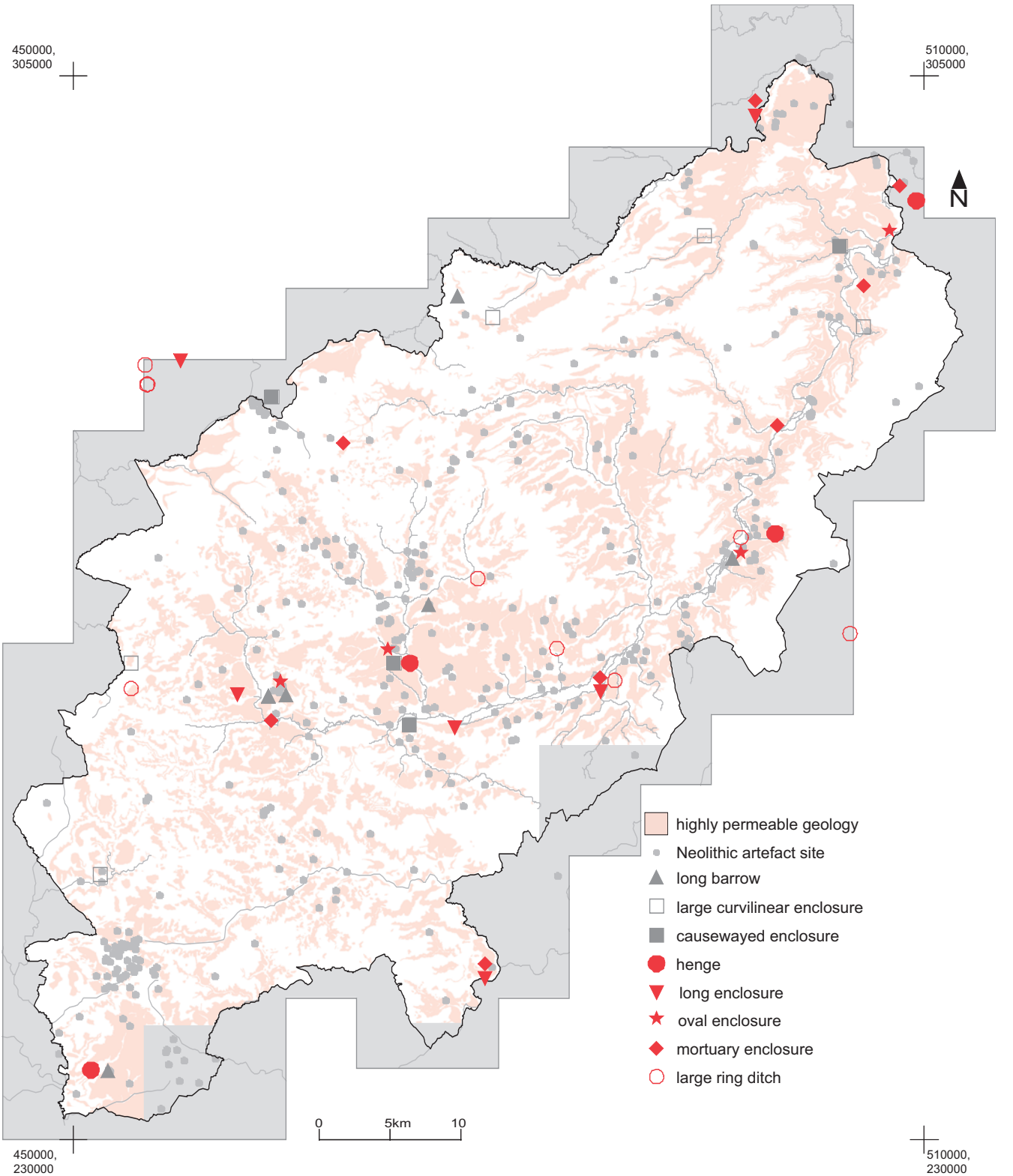
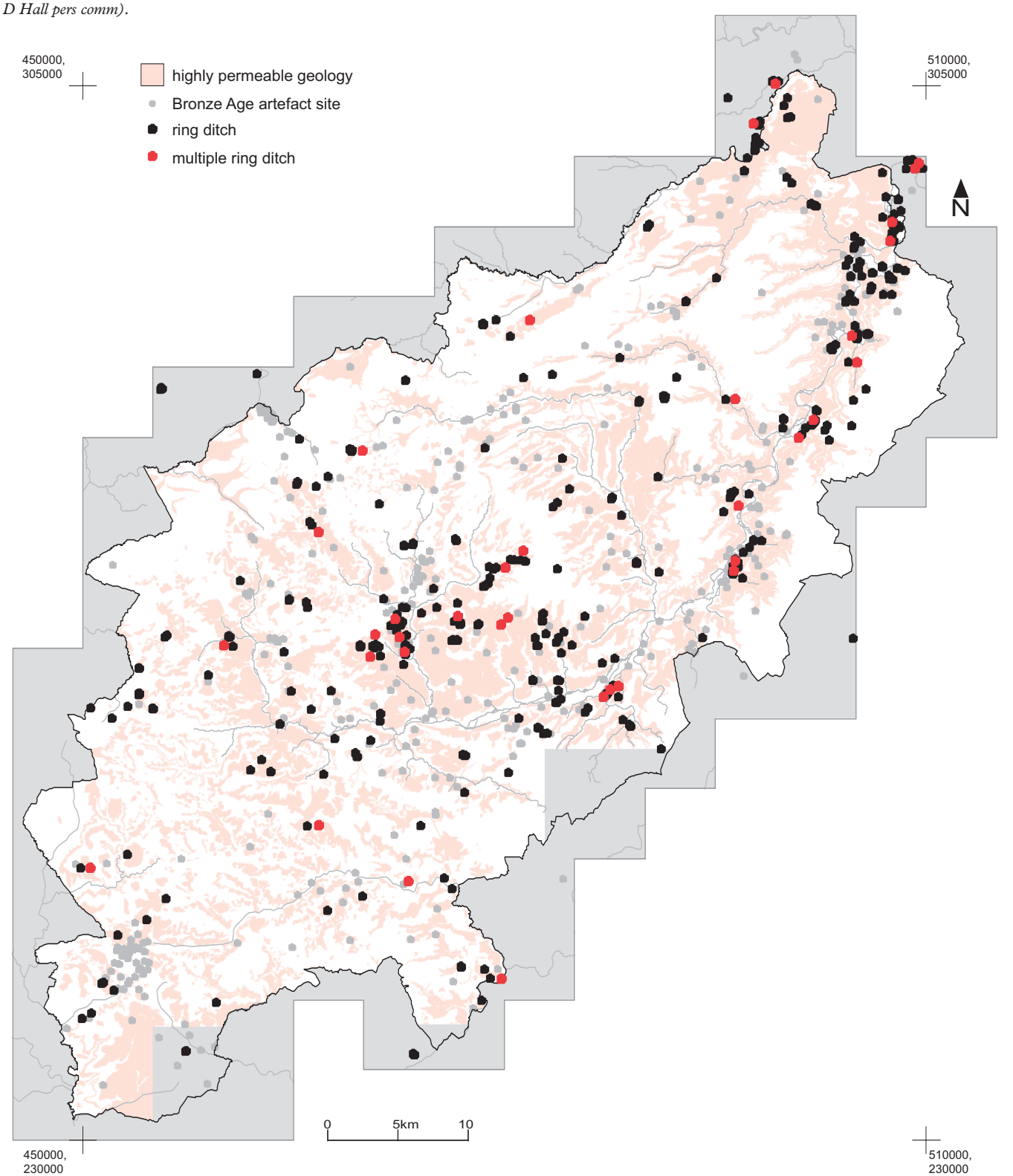


*Fig 4.11*
*The distribution of simple ring ditches, multi-ring ditches and Bronze Age records (SMR; Hall 1985; D Hall pers comm).*

contemporary then the location of most of the henges and large ring ditches also reflect this trend on a wider scale across the county (*see* Fig 4.14). As observed by Harding and Healy, at Dallington this shift is also a return to the site of earlier activity: the construction and use of the causewayed enclosure (2007, 281). At Briar Hill, re-cutting of the causewayed enclosure pits was increasingly concentrated on the more



circular, inner circuit, and activity was subsequently focussed on the interior of that enclosure with the construction of a timber structure. Bradley has already observed that the circularity of the inner enclosure, as at Flagstones, Dorset, and Stonehenge 1, pre-empted the henge monuments (2002, 79).

Ring ditches are by far the most ubiquitous of Neolithic and Bronze Age monuments recorded by the project, and they have a much wider distribution than any of the monument types discussed so far (Fig 4.11).

The majority of the ring ditches are probably of Early to Middle Bronze Age date but a proportion may have been constructed earlier or had earlier foundations. Chapman has suggested that the 'larger than average ring ditches', like those around the Tansor and Aldwincle mortuary enclosures, may have Neolithic origins (1997, 17). The sample of investigated ring ditches is inconclusive in this respect (*see* Appendix 1). Eleven rings ditches with diameters in excess of 28m have been excavated, including the unusual and undated mounded or kerbed ring ditch at Grendon. Certainly the Tansor ring ditch was based on an earlier structure, but the actual ditch produced a spurious radiocarbon date and Beaker sherds were recovered from the secondary fills (Chapman 1997, 13). At Aldwincle a Neolithic date is suggested for Site 3, which is nearly 28m in diameter, but also for Site 4, which is only 22m wide. Moreover Barrows 1 and 2 at that site, approximately 36m and 30m, respectively, are in the Beaker tradition (Jackson 1976a, 41 and 30). Barrow 4 at Irthlingborough, was 29m in diameter and firmly dated to the Bronze Age (Healy *et al* 2007, 185). The 32m ring ditch within the henge at Maxey has been dated to the Neolithic, although there was no indication that it had a burial function (Pryor 1985, 70).

Of the simple cropmarked ring ditches, 91 are between 28m and 45m in diameter. If only one in two of these examples had Neolithic origins this would more than double the number of Neolithic monuments known from Northamptonshire.

Only 8% of all the cropmarked ring ditches have more than one visible circuit; in contrast, multi-ring ditches constitute over 25% of the ring ditches and barrows investigated at Raunds. The preponderance of these monuments at Raunds is suggested to indicate the special significance of the area and possibly of the rich and elaborate Barrow 1 in particular (Harding and Healy 2007, 281—3). However, this project's sample may significantly under-represent multi-ring ditches because, as discussed above, multiple circuits may not be discernible in the cropmarks where there is little or no intervening berm between ditches.

Woodward has suggested that the double-ring ditches acted as a foci for later cemetery expansion (1986, 7). He observed that the Early Bronze Age ring ditches in the Great Ouse Valley were rarely greater than 23m in diameter and that when other larger barrows were built near by the smaller, earlier monuments were re-modelled with supplementary ditches and modified mounds. Analysis shows that the inner circuits of the Northamptonshire multiple ring ditches are smaller than the average (*see above*), but there is insufficient well-dated evidence to link this characteristic firmly to the Early Bronze Age. It is perhaps more significant that excavations in Northamptonshire and beyond have demonstrated that multiple ring ditches are often the simple cropmark expression of monuments of great longevity and complexity, often with origins in the Neolithic (*see* Table 4.2).

At Raunds the multi-ring ditches fall into three spatially distinct groups: Barrows 1–3 on Irthlingborough Island, those clustered around the Long Mound and Long Enclosure, and, at the very edge of the area, Barrow 9. All are found in association with simple ring ditch forms. Countywide, 24 of the 40 multi-ring ditches occur singly, but 19 of those occur in association with one or more simple ring ditches. Twelve of the examples are paired: one pair occurs alone, while the others are among groups of between 3 and 11 simple ring ditches. At Sutton, Cambridgeshire, there is a group of four multi-ditched rings in conjunction with two large circular pit-like features and a simple ring ditch.

Multi-ring ditches are present at the three locations where long and mortuary enclosures are found together: Cosgrove A and B; Ketton A and B; Grendon; and near the possible mortuary enclosure at Naseby. At West Cotton, the Double Ring Ditch, Barrows 5 and 6, and Ring Ditch 5 are clustered to the north-east and south-west of earlier monuments (the Long Enclosure, Long Mounds and the Turf Mound).

It might be expected that if a substantial proportion of the larger ring ditches and

multi-ring ditches were of Neolithic date, then the distribution of these features would mirror that of other monuments of that period, but Table 4.4 suggests that this is not the case. In general the distribution of multi-ring ditches and larger ring ditches is closer to that of the smaller simple ring ditches, which are presumed to be mostly of Early to Middle Bronze Age date.

On the whole there are no large cemetery groupings of ring ditches, even where they are most prolific, such as in the wide, shallow valley downstream of Irthlingborough. Undoubtedly this is in part due to the fragmentary nature of exposed gravel terraces, but it is perhaps surprising that complexes like the closely-spaced linear barrow cemetery at Barrow Hills appear to be absent from the county.

Simple ring ditches are common around the long enclosures, mortuary enclosures and multi-ring ditches, but sparser around the causewayed enclosures and long barrows. There are relatively few examples of ring ditches intersecting other enclosures and thus, if the presumed phasing is correct, of barrow mounds being built over parts of earlier monuments, so it is interesting to note where this does occur. A ring ditch was cut into the northern section of the Ketton A long enclosure, and the ring ditch of the barrow built over the mortuary enclosure clips its northern tip. At Fotheringhay the circuit of a large oval enclosure intersects with another ring ditch.

Similar arrangements are known from Cambridgeshire and Essex. At the Octagon Farm 'ceremonial complex', a ring ditch (Cambridgeshire SMR 1480–29) overlies the north-eastern end of a long enclosure that is thought to be a cursus (Malim 2000, fig 8.13). In the same complex, another ring ditch (Cambridgeshire SMR 1480–3) straddles the ditch of one of the large, rectangular mortuary enclosures.

Strachan *et al* observed five cases of superimposition in the Stour Valley area, three involving the intersection of a circular monument with an elongated or 'sub-elongated' enclosures (2000, 22–3). The two examples illustrated at Long Melford are reminiscent of the arrangements at Ketton and Fotheringhay (2000, fig 18). According to Strachan *et al*, the later monuments were built 'without respecting the former monument, and presumably involving partial or total destruction' (2000, 22). There is evidence from excavation that these relationships are more complex and may each represent quite different scenarios. At Stanwick the Segmented Ditch Circle was cut into the southern end of the short-lived Avenue some 19 centuries after the latter's construction (Healy *et al* 2007, 147). Presuming the latter survived as a shallow earthwork and that this positioning was not merely a coincidence, it is difficult to reconcile the insertion of the Segmented Ditch Circle with an act of disrespect and destruction. Similarly the act of raising mounds over the mortuary enclosures at Tansor, Aldwincle and Grendon is generally considered to be an enhancement rather than defacement of the earlier monuments.

The intersection of Barrow 6 with the Ditched Enclosure at West Cotton demonstrates how complex this apparently simple arrangement can be (Harding and Healy 2007, fig. 4.1). Initially built as two separate monuments, the final enlargement of the Barrow 6 ditch and mound encroached upon the Ditched Enclosure. The resultant 'lens-shaped' segment shared between them became a focus for cremations, but later the ditches dividing the two were slighted to create one figure-of-eight-shaped monument. The Ketton A long enclosure or Fotheringhay oval enclosure may have undergone similarly complex modifications.

Most of the Bronze Age round barrows at Raunds were constructed within a 250–500 year period, the latest being built in the first quarter of the 2nd millennium BC (Healy *et al* 2007, 173–9). If nothing else, the distribution of ring ditches indicates just how extensive woodland clearance must have been by the Middle Bronze Age and how this had been achieved over a relatively short period.

At Raunds some mound enlargement and refurbishment continued and further cremations were inserted in an around the monuments throughout the 2nd millennium BC (Healy *et al* 2007, 173–9). Evidence for Late Bronze Age funereal activity elsewhere in the county is sparse compared to the profusion of ring ditches that survive from the preceding centuries. Only three cremation cemeteries of any size have been identified in the county and all were unknown prior to excavation (Chapman 1999).

In the late 2nd millennium BC, perhaps even while some barrows were still receiving cremations, others were being used as markers in the planning of a system of fields

and droveways at Stanwick and West Cotton (Healy *et al* 2007, 191–4). There is even evidence from other sites, although it is slight, that land division may have been initiated prior to the construction of some barrows. Both the double ring ditch (F14/15) at Grendon and a ring ditch at Brackmills Link Road cut possible linear ditches (Jackson 1997, 5; NA 1999a, 6–7).

## The distribution of the evidence

Chapter 3 investigated the biases inherent in the distribution of cropmarked features in Northamptonshire and concluded that the permeability of the underlying geology was a significant factor. As only a very small number of the Neolithic or Bronze Age sites survive as earthworks or appeared as soilmarks, so it may be expected that the distribution of these sites is similarly biased. If visibility were the only factor determining the known distribution of early monuments then the number recorded on each geologic type might be expected to be proportionate to the overall number of cropmarks on each geologic type. Figure 4.12 demonstrates that this is not the case, and it is likely that variations from the overall cropmark distribution reflect the preferences of the monument builders for particular locations.

As discussed above, there is a striking correlation between the distribution of many of the earliest monuments and that of well-drained acidic soils, although the significance of this could be overstated given the small sample size. As Figure 4.12 shows, a disproportionately high percentage of Neolithic monuments were built on the Marlstone Rock Bed, although their relationship to the Northampton Sand and Ironstone is more proportionate to that of all cropmark sites. The apparent preference for the Marlstone Rock Bed in the Neolithic is not repeated in the Bronze Age data.

The first and second terrace river gravels have produced more Bronze Age monuments than the overall cropmark distribution would suggest, indicating that these may have been favoured locations for monuments building. There are also significantly high proportions of Bronze Age ring ditches in areas mapped as alluvium, and an even higher proportion of Neolithic monuments are recorded there. It is important to remember that monuments in these locations were constructed on river gravel terraces that were not covered by alluvial deposits until a much later date.

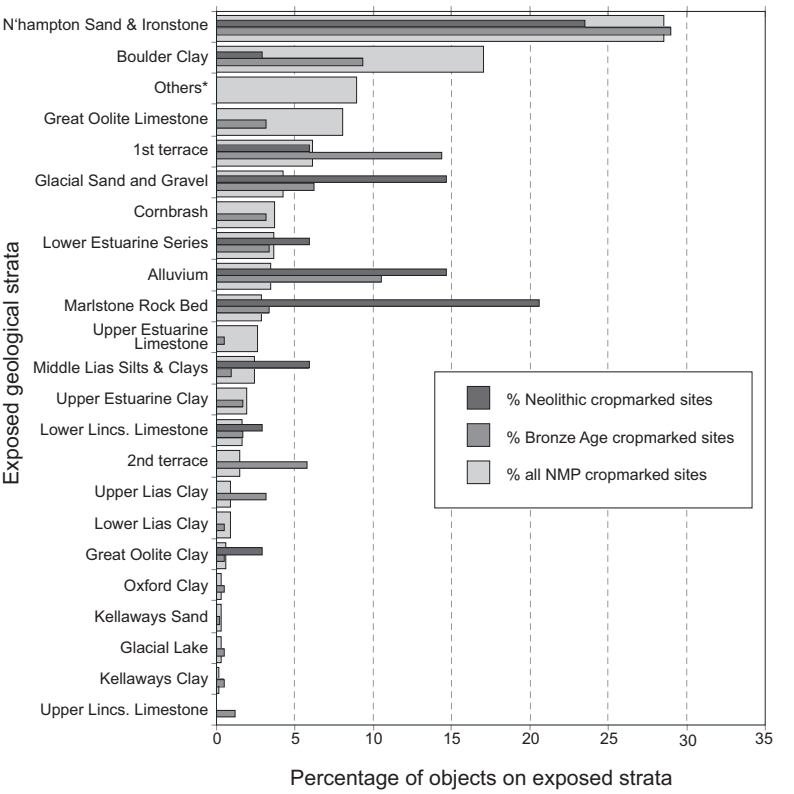
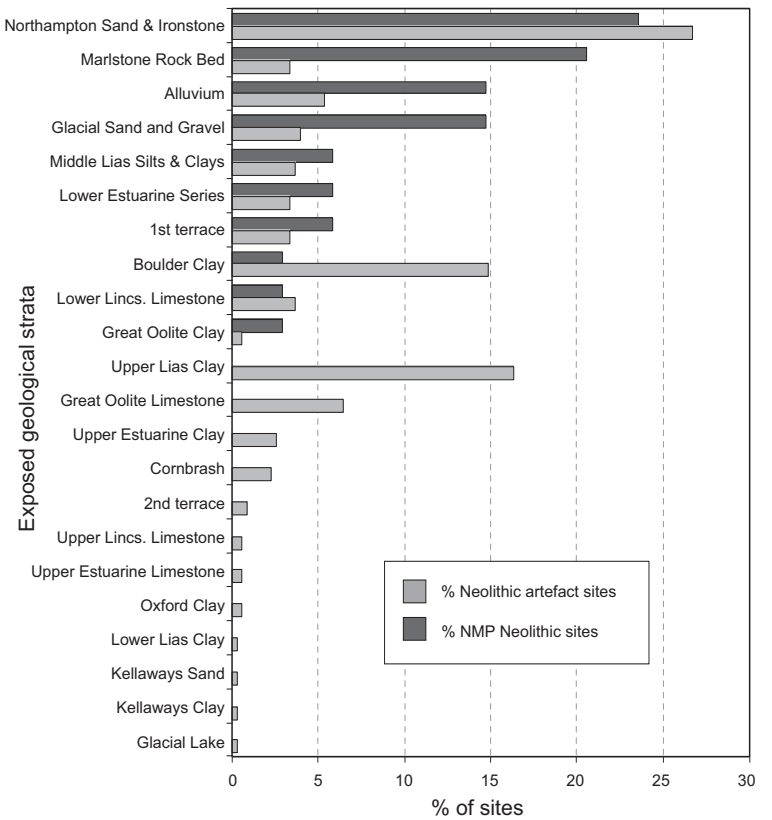


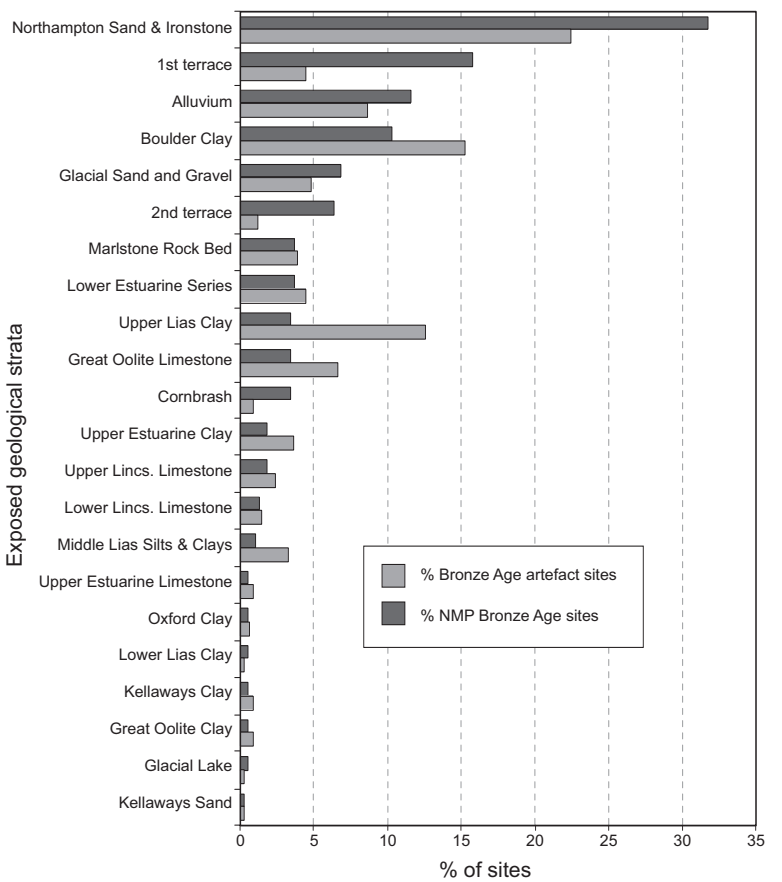

*Fig 4.12*
*The distribution of ring ditches and other Neolithic and Bronze Age monuments compared to that of all cropmark sites by geology (sample sizes: Neolithic = 34, Bronze Age = 418 & all cropmark = 10744).*

The chart suggests that because relatively few early monuments have been recorded on the Great Oolite Limestone and Upper Estuarine Limestone most cropmarks found there are probably of Iron Age or Roman date. Cropmark sites of all dates are sparser on the highly permeable Upper Lincolnshire Limestone and Lower Lincolnshire Limestone, which may reflect a real aversion to these areas, perhaps because of the scarcity of surface water.

The heavy soils of the boulder clays cover a substantial proportion of the county and have produced 17% of all cropmarks sites, although the distribution of those sites is highly inconsistent. However, just 9% of Bronze Age ring ditches and only 3% of Neolithic monuments were recorded on the boulder clay. The highest proportion of boulder clay cropmarks are on the Nene–Great Ouse interfluve and in the area of Rockingham Forest, but it is clear that the majority of these sites are Iron Age or later in date.

As discussed above, the known artefact spots and scatters are rarely coincident with known monuments. Comparing proportions of artefact sites and known monuments on each geological outcrop highlights some




interesting differences (Figs 4.13 and 4.14). Clearly, the Neolithic flint scatters, and the activities from which they originated occurred over a wider range of geologies than were used for monument building and use (or are visible on). In contrast ring ditches are present on all geologies where Bronze Age artefacts have been recovered, and overall the number of monuments and artefact sites is more proportionate.

The largest proportion of known Neolithic and Bronze Age monuments are found on the Northampton Sand and Ironstone, and so are the highest proportion of artefacts from those periods. By contrast, nearly a fifth of Neolithic monuments are found on the Marlstone Rock Bed, while fewer than 4% of artefacts come from this geology. Similarly, a quarter of Neolithic monuments are found in areas of alluvium, but this has yielded only 5% of all Neolithic artefacts. This is perhaps because the Neolithic ground surface, and any artefacts that lie on it, are buried under deposits of alluvium, but the monuments may be buried sufficiently shallowly to produce cropmarks.

Nearly a third of Neolithic artefacts reported by the SMR and Hall have been recovered from the boulder clay and Upper Lias Clay. However, only one Neolithic monument has been identified on the former and none on the latter. These geologic types do produce cropmarks, but reluctantly and inconsistently. Moreover the apparent high incidence of Neolithic artefacts on boulder clay and Upper Lias Clay may well be misleading. Most of these scatters are documented in the NCC SMR rather than by Hall, and thus do not include the more accurate field observations regarding soil conditions made by Hall. These figures may also be biased by the inclusion of flints found in the largely clay-covered parish of Marston St Laurence, which Hall has already noted were actually collected over a period of some 20 years, and probably do not represent settlement or other related activities. Similarly, the Great Oolite Limestone was apparently avoided by Neolithic monument builders, but not excluded from the activities that produced flint scatters.

## Conclusion

Aerial photographic data has exceeded the potential attributed to it by Chapman (1999) by populating the county with a larger and more diverse range of Neolithic and Bronze Age monuments than was previously

thought. Moreover, with the firm basis of evidence from excavation, particularly at Aldwincle and the RAP, together with the NCC datasets it has been possible to demonstrate some broad trends in monument building through these periods.

The builders of the earliest monuments chose free-draining soils, possibly in pre-existing openings or where burning could hasten clearance. Soon after, corridors were opened and new and diverse monuments were built on the gravels of the valley floor. Sequences of clearance, monument building, abandonment and refurbishment were repeated along the valley, creating a mosaic environment of woodland, grassland and regenerated shrub. Towards the end of the Neolithic emphasis shifted away from the valley bottom to the valley sides, minor valleys and even on the plateaux. The new large circular enclosures were built in more diverse locations, but some activity continued at the older sites. At the end of the Neolithic and through the Bronze Age there was an explosion in monument building, which must have been accompanied by an upsurge in woodland clearance. Towards the middle of the Bronze Age barrow building ceased, although the existing monuments continued to be used for burials. At the same time there is evidence that land division and stock management superseded mon-ument building as the principal earth-moving activity along the valley bottom.

It is tempting to see differences in the distribution of monuments and artefacts as evidence for the conscious separation of tasks. However, the resolution of both the cropmark and the finds data, particularly in the aspect of dating, is far too crude to develop such an idea further. At most, it suggests that monument construction in the Neolithic was limited to a far more restricted zone than settlement and farming. The more even distribution of Bronze Age ring ditches and artefacts indicates that, if such preferences were still exercised, they were expressed at a more local level and cannot be reduced to the broad divisions of geology.

*Fig 4.13 (opposite) Comparison of the distribution of Neolithic monuments and artefact sites by geology (SMR; Hall 1985; D Hall pers comm).*

*Fig 4.14 (opposite) Comparison of the distribution of Bronze Age monuments and artefact sites by geology (SMR; Hall 1985; D Hall pers comm).*

## Appendix 4.1 Excavated or investigated ring ditches and round barrows

### Bedfordshire

1 Ring ditch A, Roxton, Bronze Age: ring ditch = 25m (Taylor and Woodward 1985, table 1)
2 Ring ditch B, Roxton, Bronze Age: ring ditch = 24m (Taylor and Woodward 1985, table 1)
3 Ring ditch C, Roxton, Bronze Age: ring ditch = 23m (Taylor and Woodward 1985, table 1)
4 Ring ditch D, Roxton, Bronze Age: ring ditch = 29m (Taylor and Woodward 1985, table 1)
5 Ring ditch E, Roxton, Bronze Age: ring ditch = 27m (Taylor and Woodward 1985, table 1)

### Buckinghamshire

6 Ravenstone, Beaker: ring ditch = 8.5m (Allen 1981, fig 3)

### Cambridgeshire

7 Ring ditch, Maxey, Neolithic: ring ditch = 32m (Prior 1985)

### Northamptonshire

8 AML site 1 (NH387.6.1), undated: ring ditch = 20m
9 AML Site Flat Top (NH387.8.1), undated: ring ditch = 28m
10 Barrow 1, RAP, 2140–1800 cal BC: inner ring ditch and mound = 15.5m (Healy *et al* 2007, 153 and fig 3.96)
11 Barrow 1, Site 2, Aldwincle, Beaker: Beaker ring ditch (with badly truncated mound) = 36.6m (Jackson 1976, 32)
12 Barrow 2, RAP (NH387.13.1), undated: inner ring ditch = 11m (Harding and Healy 2007, 10)
13 Barrow 2, Site 2, Aldwincle, Beaker: Beaker ring ditch (with badly truncated mound) = 30.5m (Jackson 1976, 33)
14 Barrow 3, RAP (NH387.14.1), 2180–1930 cal BC: inner ring ditch = 21m (Healy *et al* 2007, 148 and fig 3.88)
15 Barrow 4, RAP, 2020–1600 cal BC: ring ditch = 29m (Healy *et al* 2007, 165)
16 Barrow 5, RAP, before 2140–1880 cal BC?: inner ring ditch = 17m (Healy *et al* 2007, 141 and fig 3.78)
17 Barrow 6, RAP, 2140–1890 cal BC: inner ring ditch and mound = 13.25m (Healy *et al* 2007, 130 and fig 3.71)
18 Barrow 7, RAP, undated: ring ditch (and inner mound) = 20.25m (Healy *et al* 2007, 169)
19 Barrow 8, RAP, undated: ring ditch (and

inner mound) = 6m (Healy *et al* 2007, 169)
20 Barrow 9, RAP (NH387.7.1), 2150–1950 cal BC: inner ditch = 24m (Healy *et al* 2007, 169, fig 3.112)
21 Brackmills Link Road (NH446.93), 1685–1525 cal BC (68% confidence 132789): ring ditch = 20m (Chapman 2003, 5–9)
22 Double Ring Ditch, RAP, undated: inner ring ditch = 3m ((Healy *et al* 2007, 136, fig 3.76)
23 F13, Field 12, Grendon (NH45.24.2), undated: oval enclosure = 50m (Jackson 1997, 5)
24 F14/15, Field 12, Grendon (NH45.24.1), Undated: inner ring ditch = 13m (Jackson 1997, 5)
25 F7, Field 12, Grendon (NH45.24.9), Pre-dates context containing biconical food vessels: ring ditch = 9m (Jackson 1997, fig 2)
26 Field D, Upton (NH451.16.1), Neolithic or Iron Age: ring ditch = 23m (Jackson 1994, 74 but no diameter given so measured from NH451.16.1)
27 Floodplain, Upton (NH451.22.1), undated: round barrow mound (no ditch) = 27m (Jackson 1994, 73)
28 Irchester Quarry, 3300–2580 cal BC (95% confidence Beta 102248) or late Beaker: ring ditch = 15m (Chapman 2003, 3–5)
29 Mortuary enclosure, Site 1, Aldwincle, Neolithic: Inner ring ditch = 18.6m (Jackson 1976, 20)
30 Mound 1. Tansor Crossroads (NH427.3.1), Late Neolithic/ Early Bronze Age: ring ditch = 35m (Chapman 1997, 13)
31 RAP F192143, undated: ring ditch = 23m (Healy *et al* 2007, 147)
32 Ring ditch 1/AML M5, R9, R10, RAP, undated: ring ditch = 20m (Harding and Healy 2007, fig 1.4)
33 Ring ditch 2/AML M4, R8, RAP, undated: ring ditch = 22m (Harding and Healy 2007, fig 1.4)
34 Ring ditch 3/AML M6, RAP (possibly NH. 389.6.1), undated: ring ditch = 24m (Harding and Healy 2007, fig 1.4)
35 Ring ditch 4/AML M7, RAP (NH389.6.2), undated: ring ditch = 22m (Harding and Healy 2007, fig 1.4)
36 Ring ditch 5, RAP, undated: outer ring ditch = 10 (Harding and Healy 2007, fig 1.4)
37 Ring Ditch I, Area B, Grendon (NH45.20.15), Early Bronze Age: inner ring ditch = 21m (Gibson and McCormick 1985, 28 and 60–5)
38 Ring Ditch II, Area D, Grendon (NH45.20.8), Early Bronze Age: ring ditch = 26m (Gibson and McCormick 1985, 31 and 60–5)
39 Ring Ditch III, Area B, Grendon, Early Bronze Age: ring ditch = 10m (Gibson and McCormick 1985, 31 and 60–5)
40 Ring Ditch IV, Area A, Grendon (NH45.20.18), Early Bronze Age: ring ditch = 20m (Gibson and McCormick 1985, 32 and 60–5)
41 Ring Ditch V, Area C, Grendon (NH45.20.1), Early Bronze Age: inner ring ditch = 26m (Gibson and McCormick 1985, 35 and 60–5)
42 Ring Ditch VI, Area G, Grendon (NH45.20.5), Early Bronze Age: ring ditch = 17.5m (Gibson and McCormick 1985, 35 and 60–5)
43 Ring Ditch VII, Field 15, Grendon (NH45.27.1), Undated: ring ditch = 20m (Jackson 1997, 5)
44 Ring ditch, Earls Barton (NH44.1.1), Bronze Age: ring ditch = 39m (Jackson 1984, 7)
45 Segmented Ditch Circle, RAP, 2020–1680 cal BC: = 8.5m ((Healy *et al* 2007, 147)
46 Site 3. Aldwincle, Neolithic: ring ditch = 27.5m (Jackson 1976, 34)
47 Site 4. Aldwincle, Neolithic: ring ditch = 22m (Jackson 1976, 39 and 41)
48 The Causewayed Ring Ditch, RAP (NH389.4.1), 3340–3020 cal BC: ring ditch = 23m (Healy *et al* 2007, 98)

## Oxfordshire

49 Newnham Murren, Neolithic: inner ring ditch = 19m (Moorey 1982, 56)
50 Radley 15, Barrow Hills, Beaker: inner ring ditch = 21m (Riley, 1982 76)
51 Ring Ditch 15, Standlake, Late Neolithic/ Early Bronze Age: ring ditch = 29m (Catling 1982, 88)
52 Ring Ditch 16, Standlake, Late Neolithic/ Early Bronze Age: ring ditch = 22.5m (Catling 1982, 91)
53 Ring Ditch 17, Standlake, Late Neolithic/ Early Bronze Age: ring ditch = 32m (Catling 1982, 93)
54 Ring Ditch 19, Standlake, Late Neolithic/ Early Bronze Age: ring ditch = 36.5m (Catling 1982, 93)
55 Ring Ditch 20, Standlake, Iron Age: Inner ring ditch = 10m (Catling 1982, 97)
56 Ring Ditch XXIII 2, Stanton Harcourt, Middle Bronze Age: ring ditch = 23m (Linington 1982, 86)

57 Ring Ditch XXIX 1, Stanton Harcourt, Bronze Age: ring ditch = 21m (Linington 1982, 81)
58 Ring Ditch XXIX 3, Stanton Harcourt, Bronze Age: ring ditch = 11.5m (Linington 1982, 83–4)
59 Ring Ditch XXIX 4, Stanton Harcourt, Bronze Age: ring ditch = 12m (Linington 1982, 85–6)

## Appendix 4.2 Monument types

Format: parish (site name), county (if not Northamptonshire): monument type, suggested date, (MORPH2.2 reference or source photograph number); physiographic location (after NAA 2003); dimensions; Notes; (bibliographic reference); figure number in this volume.

### Curvilinear enclosures

1 Bulwick: large curvilinear enclosure, Early Neolithic? (SP9493/002); valley side; length 195m, width min 150m; Fig 4.2: 7.
2 Chipping Warden: large curvilinear enclosure, Early Neolithic? (NH345.18.14); Lias upper ground; length 170m, width 125m; Fig 4.2: 5.
3 Husband's Bosworth, Leicestershire: causewayed enclosure, Early Neolithic; valley side; internal area 1.5ha. Bulge in north-east quadrant (Butler *et al* 2002); Fig 4.2: 4.
4 Northampton (Briar Hill): causewayed enclosure, Early Neolithic (NH452.11.1–2); Ironstone upper ground; length (internal to the outer circuits) 155m, width (internal to the outer circuits) 145m, diameter (internal to the inner circuit) 86m. Comprises an outer oval-shaped enclosure of two causewayed circuits and an inner sub-circular enclosure with interrupt ditch circuit (Bamford 1985); Fig 4.2: 3.
5 Northampton (Dallington): causewayed enclosure, Early Neolithic (NH461.8.1); Lias upper ground; length 280m, width 225m. Bulge in south-east quadrant; Fig 4.2: 1.
6 Polebrook: Large curvilinear enclosure, Early Neolithic? (NH400.21.1); valley side; length *c* 125m, width *c* 110m; Fig 4.2: 6.
7 Southwick: causewayed enclosure, Early Neolithic (NH9.14.1); valley floor; length 180m, width min 125m; Fig 4.2: 2.
8 Staverton A: large curvilinear enclosure, Early Neolithic? (NH18.1.1); valley side; length min 45m, width 37m; Fig 4.2: 8.
9 Stoke Albany: large curvilinear enclosure, Early Neolithic? (NH181.8.1); valley side; length min 120m, width 75m; Fig 4.2.9.

### Elongated enclosures

10 Cosgrove A: long enclosure, Middle to Late Neolithic? (NH289.1.1); valley floor; length min 56m, width 15m. Elongated enclosure with square ends; Fig 4.3: 18.
11 Dodford: long enclosure, Middle to Late Neolithic? (NH465.6.1); valley side; length min 96m, width 24m; Fig 4.3: 22.
12 Grendon (Grendon Quarry): long enclosure, Middle to Late Neolithic? (NH45.20.22); valley floor; length 84m, width 17m. Excavated monument: elongated enclosure with square ends (Jackson 1997); Fig 4.3: 17.
13 Hardingstone: long enclosure, Early Neolithic? (NH448.2.1); valley side; length min 130m, width 30m; Fig 4.3: 19.
14 Ketton A, Rutland: long enclosure, Middle to Late Neolithic? (SK9702/020); valley floor; length 97m, width 10m. Elongated enclosure with rounded ends; Fig 4.3: 20.
15 Raunds (Long Mound): long mound, Early Neolithic; valley floor; length 135m. Excavated monument (Healy *et al* 2007, 54–64); Fig 4.3: 15.
16 Raunds (The Avenue): avenue, Early Neolithic?; valley floor; length 60m, width min 7m. Excavated monument (Healy *et al* 2007, 64–7); Fig 4.3: 16.
17 Raunds (The Long Enclosure): long enclosure, Middle to Late Neolithic; valley floor; length 117m, width 17m. Excavated monument (Healy *et al* 2007, 94–8); Fig 4.3: 14.
18 Walcote, Leicestershire: long enclosure? Middle to Late Neolithic? (SP5785/003); valley side; length 98m, width 17m. Elongated enclosure with rounded ends; Fig 4.3: 21.

### Elongated monuments

19 Chipping Warden (Wallow Bank): long barrow?; Early Neolithic? Lias upper ground; length 32m, width 13m. Earthwork mound, no date or function attributed by RCHM(E) field investigation (1982, 32); not illustrated.
20 Flore A: long barrow, Early Neolithic? (NH466.12.2); Lias upper ground; length 42m, width 10m; Fig 4.3: 1.
21 Flore B: long barrow, Early Neolithic?

(NH466.12.1); Lias upper ground; length 61m, width 18m; Fig 4.3: 1.
22 Flore C: long barrow, Early Neolithic (NH466.20.1); Lias upper ground; length 30m, width 21m; Fig 4.3: 2.
23 Newbottle: long barrow? Early Neolithic? (NH236.16.1); Lias upper ground; length 30m, width 4m. Earthwork mound, no date or function attributed by RCHM(E) field investigation (1982, 105); not illustrated.
24 Pitsford (Longman's Hill): long barrow? Early Neolithic? (NH471.8.1); Ironstone upper ground; length 17m, width 5m. Earthwork mound: site of antiquarian investigation, provenance not confirmed (RCHME 1981, 161–2); Fig 4.3: 3.
25 Raunds (Redlands Farm Long Barrow): long barrow, Early Neolithic; valley floor; length 50m. Excavated monument (Healy *et al* 2007, 73–80); Fig 4.3 4.
26 Sutton Bassett: long barrow? Early Neolithic? (NH140.1.1); valley side; length 40m, width 30m. Possible enclosed long barrow? Fig 4.3: 5.

## Rectilinear enclosures

27 Aldwincle (Henslow Meadow): mortuary enclosure, Middle to Late Neolithic; valley floor; length 13.7m, width 10.7m. Excavated monument (Jackson 1976); Fig 4.3: 7.
28 Cosgrove B: mortuary enclosure? Middle to Late Neolithic? (NH289.1.3); valley floor; length 23m, width 22m; Fig 4.3: 13.
29 Elton A, Cambridgeshire: mortuary enclosure, Middle to Late Neolithic (TL0896/008); valley floor; length 20m, width 10m. Rectilinear enclosure within a ring ditch; Fig 4.3: 9.
30 Elton B, Cambridgeshire: rectilinear enclosure, Neolithic? (TL0896/018); valley side; length min 65m, width 35m. Possible Neolithic enclosure located within a henge monument; Fig 4.5: 6.
31 Flore D: mortuary enclosure? Middle to Late Neolithic? (NH457.23.1); valley side; length 19m, width 16m; Fig 4.3: 12.
32 Grendon (Ring Ditch V, Grendon Quarry): mortuary enclosure, Middle to Late Neolithic (NH45.20.2); valley floor; length 16m, width 14m. Excavated monument (Gibson and McCormick 1985); Fig 4.3: 8.
33 Ketton B, Rutland: mortuary enclosure? Middle to Late Neolithic? (SK9802/046); valley floor; length 23m, width 16m. Rectilinear enclosure within a ring ditch; Fig 4.3: 11.
34 Naseby A: mortuary enclosure? Middle to Late Neolithic? (NH507.43.3); Lias upper ground; length min 22m, width 20m Fig 4.3: 10.
35 Tansor (Mound 1, Tansor Crossroads): mortuary enclosure, Middle to Late Neolithic; valley floor/valley side; overall dimensions unknown. Partially excavated monument (Chapman 1997): the ring ditch encircling the mortuary enclosure was recorded (NH427.3.1); Fig 4.3: 6.

## Circular and sub-circular enclosures

36 Earls Barton: large ring ditch, Late Neolithic/Bronze Age? (NH14.6.1) Ironstone upper ground; diameter 54m; Fig 4.5: 12.
37 Elton C, Cambridgshire: large ring ditch, Late Neolithic/Bronze Age (TL0896/018); valley side; diameter 95m. Partially excavated monument (Taylor 1979); Fig 4.5: 6.
38 Grendon (Grendon Quarry): large ring ditch, Late Neolithic/Bronze Age (NH45.24.2); valley floor; diameter 47m. Partially excavated monument (Jackson 1997); Fig 4.5: 1.
39 Holcot A: large ring ditch, Late Neolithic/Bronze Age? (NH473.27.4); Ironstone upper ground; diameter 57m; Fig 4.5: 15.
40 Holcot B: large ring ditch, Late Neolithic/Bronze Age? (NH473.27.3); Ironstone upper ground; diameter 50m; Fig 4.5: 16.
41 King's Sutton: henge, Late Neolithic /Early Bronze Age (NH237.1.1); Lias upper ground; diameter 67m; Fig 4.5: 7.
42 Lamport: large ring ditch, Late Neolithic/Bronze Age? (NH491.3.1); valley floor; diameter 45m; Fig 4.5: 17.
43 Misterton, Leicestershire: large ring ditch, Late Neolithic/Bronze Age? (SP5583/002); valley side; diameter 55m; Fig 4.5: 18.
44 Naseby B: large ring ditch, Late Neolithic/Bronze Age? (NH507.43.8); Lias upper ground; diameter 85m; Fig 4.5: 10.
45 Northampton (Dallington): large ring ditch, Late Neolithic/Bronze Age (NH461.8.3); diameter max 65m; Fig 4.5: 8.
46 Raunds (Cotton Henge): large ring ditch, Late Neolithic/Bronze Age (NH389.1.1); Lias upper ground; diameter 81m; Fig 4.5: 2.
47 Shawell A, Leicestershire: large ring ditch, Late Neolithic/Bronze Age?

(SP5583/0033); Lias upper ground; diameter 47m. Circular enclosure lying within large ring ditch; Fig 4.5: 11.
48 Shawell B, Leicestershire: large ring ditch, Late Neolithic/Bronze Age? (SP5583/0033); Lias upper ground; diameter 87m. Circular enclosure enclosing smaller ring ditch; Fig 4.5: 11.
49 Raunds (Stanwick): large ring ditch, Late Neolithic/Bronze Age? (NH387.27.1); valley floor; diameter 73m; Fig 4.5: 9.
50 Staverton B: large ring ditch, Late Neolithic/Bronze Age? (NH17.5.1); Lias upper ground; diameter 61m; Fig 4.5: 13.
51 Staverton C: large ring ditch, Late Neolithic/Bronze Age? (NH352.1.1); Lias upper ground; length (inner circuit) 33m, width (inner circuit) 31m, diameter (outer ring) 63m; Fig 4.5: 14.
52 Swinehead, Bedfordshire: large ring ditch, Late Neolithic/Bronze Age (TL0465/008); valley side; diameter max 113m; Fig 4.5: 3.

## Oval enclosures

53 Flore E: oval enclosure, Neolithic? (NH466.19.1); Lias upper ground; length min 87m, width max 69m; Fig 4.5: 21.
54 Fotheringhay: oval enclosure, Neolithic? (NH431.18.1); valley floor; length 54m, width 33m; Fig 4.5: 20.
55 Northampton (Dallington): oval enclosure, Neolithic? (NH461.9.1); Lias upper ground; length 96m, width 60m; Fig 4.5: 22.
56 Raunds (Southern Enclosure, Stanwick): oval enclosure, Neolithic (NH387.30.1); valley floor; length min 33m, width 30m. Excavated monument (Healy *et al* 2007, 104–8); Fig 4.5: 19.

# 5
# *Tenebris Lux Ex*

*by Alex Gibson*

In 1989, I was privileged to edit *Midlands Prehistory: Some Recent and Current Researches into the Prehistory of Central England* (Gibson 1989). This compilation was, I believe, the first volume to be purely devoted to a regional view of the prehistoric archaeology of the English mid-shires. Francis Pryor and, earlier, the 'Cambridge school' had demonstrated the richness of the neighbouring Fenlands, but the density of archaeological data here did not seem to extend into the fen-feeding valleys.

Conventionally, the region between the Thames Valley in the south, the Fenlands to the east, Wales and the Severn Valley to the west, and the uplands of Derbyshire and the Lincolnshire wolds in the north and north-east had been a virtual desert as far as prehistoric archaeology was concerned. Various theories had been put forward to explain this. The dense forest cover was beyond the clearing capabilities of prehistoric populations, or that the heavy Midlands clay soils were unyielding to the scratching of primitive ards (early ploughs). Others acknowledged that the large tracts of ridge and furrow cultivation over much of the Midlands and the deeply-silted river valleys may well have been rendering extant sites invisible.

By the time *Midlands Prehistory* was published, however, the Raunds Area Project was underway and the excavations at the West Cotton medieval village under Dave Windell had reached prehistoric features. Work on barrows in Leicestershire and Rutland by Patrick Clay, as well as Northamptonshire under Tony McCormick and Dennis Jackson, had produced exciting results. Pippa Bradley was investigating the Charnwood 'axe factory' and Helen Bamford had published the causewayed enclosure at Briar Hill. Trial excavations at cursus mounuments under the direction of myself and Roy Loveday, and of Graeme Guilbert, had taken place at Aston and Potlock. Field-walking had been underway for several years by investigators such as David Hall, and the popularity of this activity was increasing among local groups. Finally, vast amounts of exciting data were being fed into the SMRs by national and local flyers such as St Joseph, Riley, Pickering and Hartley, among others. This list is purely illustrative and by no means exhaustive. During the late 1970s and 1980s the Midlands were almost coming of age archaeologically: they were discovering their prehistoric heritage.

Having come of age, development continued and, in this instance for Northamptonshire, the current state of Midlands prehistory is excellently presented in this report, which admirably integrates the field-walking, excavation, geological and aerial photographic data. It can now be seen that the Neolithic and Bronze Age record for Northamptonshire is as rich and diverse as it is elsewhere in lowland Britain. In the Neolithic, the full range of major monument types is present in numbers. Long barrows and the so-called mortuary enclosures may be among the earliest, closely followed by causewayed enclosures, cursus and related elongated monuments, and ring ditches. Henges and hengiforms, and possible palisade enclosures, represent the 3rd and 2nd millennia, overlapping with a large range of barrow and ring-ditch forms. In keeping with other areas of Britain, these monuments increase in numbers and distribution through time, suggesting a numerical and geographical expansion of population.

Causewayed enclosures have recently been summarised (Oswald *et al* 2001), and the Briar Hill, Dallington and Southwick sites, along with those of the upper Trent Valley, the Fens and Husbands Bosworth in Leicestershire, form the northern limits of the distribution of known classic sites. There seems little doubt in the interpretation of these sites, and excavations at Husbands Bosworth and Briar Hill have confirmed their earlier Neolithic origins. The long barrow sites also appear convincing, and once again the excavation at Redlands Farm has provided chronological data. Indeed, it would have been surprising if this monument type had not been recognised in the project area, given its national distribution. The mortuary

enclosures are more difficult to interpret, although their existence, as demonstrated at Aldwincle and Grendon, cannot be denied. Nevertheless the absence of human remains at some excavated sites raises the question, 'when is a mortuary enclosure not a mortuary enclosure?' More trial excavation and geophysical survey on these monument groups is highly desirable.

The cursus and related elongated ditched enclosures are notoriously difficult to define, given that few are known in their entirety, and confusion with other linear features, such as field boundaries or trackways, is a constant danger. The Northamptonshire sites have their riverine locations in common with the national corpus. The way that these monuments functioned in contemporary society is far from understood (papers in Barclay and Harding (eds) 1999; Barclay *et al* 2003), but given their liminal situations, they may have territorial or boundary implications. This observation is also relevant to some of the monument complexes, such as those encountered in the Nene Valley at Raunds.

Fascinating in this study are the non-causewayed enclosures. Undated by excavation, these sites certainly are contenders for Neolithic enclosures and, particularly, the larger palisaded enclosures that are becoming increasingly recognised in British archaeology. One type of these enclosures comprises perimeters of contiguous timbers, as at Mount Pleasant or West Kennet in Wiltshire, while another type is formed by a perimeter of close-set timbers such as Hindwell in Powys (*see* Gibson 2002 for a summary). Both types tend to be recognised from the air as ditch-defined enclosures and field-walking over the Hindwell enclosure, in particular, produced very little cultural material. The enclosures also tend to have upper riverine locations, possibly on formalised route-ways.

At 34ha, the area of the Hindwell enclosure is remarkable, but the other sites range between 1ha and 10ha. Consequently, the Bulwick, Chipping Warden and Polebrook enclosures, in particular, fall well within the expected size range. Furthermore, West Kennet, Hindwell and Mount Pleasant are broadly circular or oval, but with at least one flattened side, and this is another morphological feature that the Northamptonshire sites share. Clearly only excavation can confirm this tentative identification, but if correct, these palisaded sites span most of the 3rd millennium BC, broadly contemporary with Grooved Ware and early Beakers. The oval enclosures are also interesting in this light and their morphological similarity suggests a common date and cultural affinity. Once again, one feels that targeted excavation will shed more light on this class.

Henges and related sites encompass a panoply of circular and sub-circular ditched enclosures. The 'mixed bag' nature of the term 'hengiform' has long been recognised in archaeological circles and is epitomised by the corpus compiled by Harding and Lee (1987). Once again, this is within the national trend and one cannot help wonder how much our interpretations may change, given more targeted and detailed study of these monuments.

Round barrows and ring ditches probably make up the majority of single cropmark sites nationally. The Northamptonshire material demonstrates a greater exploitation of the county in the 2nd millennium. The multi-period nature of some sites also demonstrates a permanency of place and prolonged interest at some of these individual monuments. This prolonged interest may also have manifested itself in other ways, archaeologically invisible except through excavation, such as episodic burial or the re-visiting of earlier burials, as at Irthlingborough. It is becoming increasingly obvious in the study of Bronze Age burials that 'rest in peace' was not a 2nd millennium concept. While the present writer does not agree that multiple ring ditches necessarily always represent enlargement of the site (given the contraction noted in the Four Crosses ring ditch cemetery in Powys (Warrilow *et al* 1986), and again at Meole Brace, Shropshire (G Hughes pers comm), this quibble clearly does not alter the continued and prolonged nature of many site narratives.

One worry of the present writer is that this NMP survey will be regarded as a definitive statement, and that blank areas will be regarded as truly blank by planners, developers and less diligent researchers; also that monument identifications will be regarded as positive rather than theoretical or speculative. Our need to characterise and define can lead to inaccurate pigeonholing and over-confident identifications. This is no criticism of the researchers involved in this project, who are all aware of the limitations of their data and interpretations, but there is always

a danger that what archaeologists publish as hypothesis later becomes accepted as fact. To qualify the title of this section, *lux non perspicuitas non veritas est*.

The wealth of data presented in this report will demonstrate that the Midlands desert is now well irrigated and that Northamptonshire has become recognised as a fertile valley for further research and investigation. This will be augmented by the recent completion of the prehistoric section of RAP and the vast and important data contained therein. This data, (RAP and NMP) will have a national impact and will establish Northamptonshire as having several key sites for our national understanding of the Neolithic and Bronze Age, particularly in the fields of burial and ritual.

# 6
# Late Bronze Age, Iron Age and Roman settlements and landscapes

*by Alison Deegan*

## Late Bronze Age and Early Iron Age settlement and boundaries

Although numerous, the monuments of the Middle Bronze Age and earlier, discussed in the previous chapters, represent a very small proportion of the cropmarked and soilmark features mapped by the project. The majority of cropmarks and soilmarks, and a handful of surviving earthworks, are probably the remains of settlements dating from the Late Bronze Age to the Roman period. However, as most are undated, this evidence may include a proportion of so far unrecognised earlier or later features.

After the increasingly prolific monument building of the Neolithic and Early to Middle Bronze Age, the Late Bronze Age appears to signal a return to relatively low levels of archaeological visibility, from the air as well as on the ground. Ritual or funereal landscapes, which dominate our knowledge of earlier periods, are known in the Middle and Late Bronze Age only from the chance discovery of a few cremation cemeteries (Chapman 1999, 7). As with the earlier periods, Late Bronze Age and Early Iron Age settlement evidence is sparse, relatively ephemeral and, at favoured sites, often overwhelmed by the more abundant cropmarks of later activity. Nevertheless it is possible that some elements of Late Bronze Age and Early Iron Age landscapes can be found among the wealth apparently later cropmarks recorded in the project.

### Open settlement

The project has generated a significant, although undoubtedly very incomplete, record of later prehistoric open settlement in Northamptonshire. This contrasts with the experience of other Midlands NMP projects, which have reported an absence of any air photo evidence of unenclosed round houses (Winton 1998, 53; Deegan 1999, 41). During reconnaissance it can be very difficult to detect ephemeral settlement remains that are not enclosed or associated with more substantial ditches, and so unenclosed settlement is probably under-represented in the aerial photographic record for the county.

The excavation record for Late Bronze Age and Early Iron Age open settlement in Northamptonshire is slim, but does indicate considerable diversity. The site at Great Oakley consisted of just two huts or shelters of probable Early Iron Age date, which were possibly associated with nearby iron smelting (Jackson 1982). In contrast, Early and Middle Iron Age open settlements at Crick developed into extensive and long-lived sites: Long Dole and Crick Covert were subsequently enclosed, but the settlement at the Lodge remained unenclosed into the Late Iron Age (Chapman 1995). On Rainsborough Hill, Newbottle, sparse remains of an open settlement were found on the site of a later hillfort (Avery *et al* 1967). None of these examples of Early Iron Age open settlement, or others excavated at Weekley Hall Wood and Wilby Way, had been recorded from the air.

Almost all of the round houses identified by the project are represented by circular or sub-circular gullies, and very few post-defined structures have been identified where gullies are not also present. Based on the excavated evidence, Jackson suggested that the gullied form, although possibly influenced by geological conditions, was 'rarely found before the Middle Iron Age' (1979b, 14). If Jackson is correct, then the Early Iron Age house is largely unrepresented in the air photographic record for the county and, while some of the many Middle to Late Iron Age open settlements had earlier origins, it is probably a very incomplete record of Late Bronze Age and Early Iron Age open settlement as a whole.

## Late Bronze Age and Early Iron Age hillforts

The earliest defended sites are the small, Late Bronze Age ringwork at Thrapston, which covers less than 1ha, and the large, undated,

contour fort at Borough Hill, Daventry, which encloses some 52ha (Jackson 1996–7, 152; Hull 2001). The small, sub-rectangular, defended enclosure at Thenford may also be early, as may the initial defences at Hunsbury and Rainsborough, Arbury Camp (also known as Arbury Banks) at Chipping Warden, and Arbury Hill, Badby (Jackson 1993–4, 16–20; Kidd 1999, 20). RCHME dismissed the latter as a natural feature, but the archaeological interpretation was recently revived by Kidd (RCHME 1981, 8–9; Kidd 1999, 20). Kidd also suggested that the large, undated curvilinear enclosure on Warden Hill, Chipping Warden, was an Iron Age hillfort (1999, 20. Field-walking in this area has not retrieved any Iron Age material but a substantial Neolithic flint scatter was recovered from a neighbouring field (D Hall pers comm.). It is suggested here that the enclosure was built in the Neolithic, but the trackway or boundary that skirts the inside of the enclosure is probably of later date (*see* Chapter 4, Fig 4.2: 5).

## Land boundaries and communications

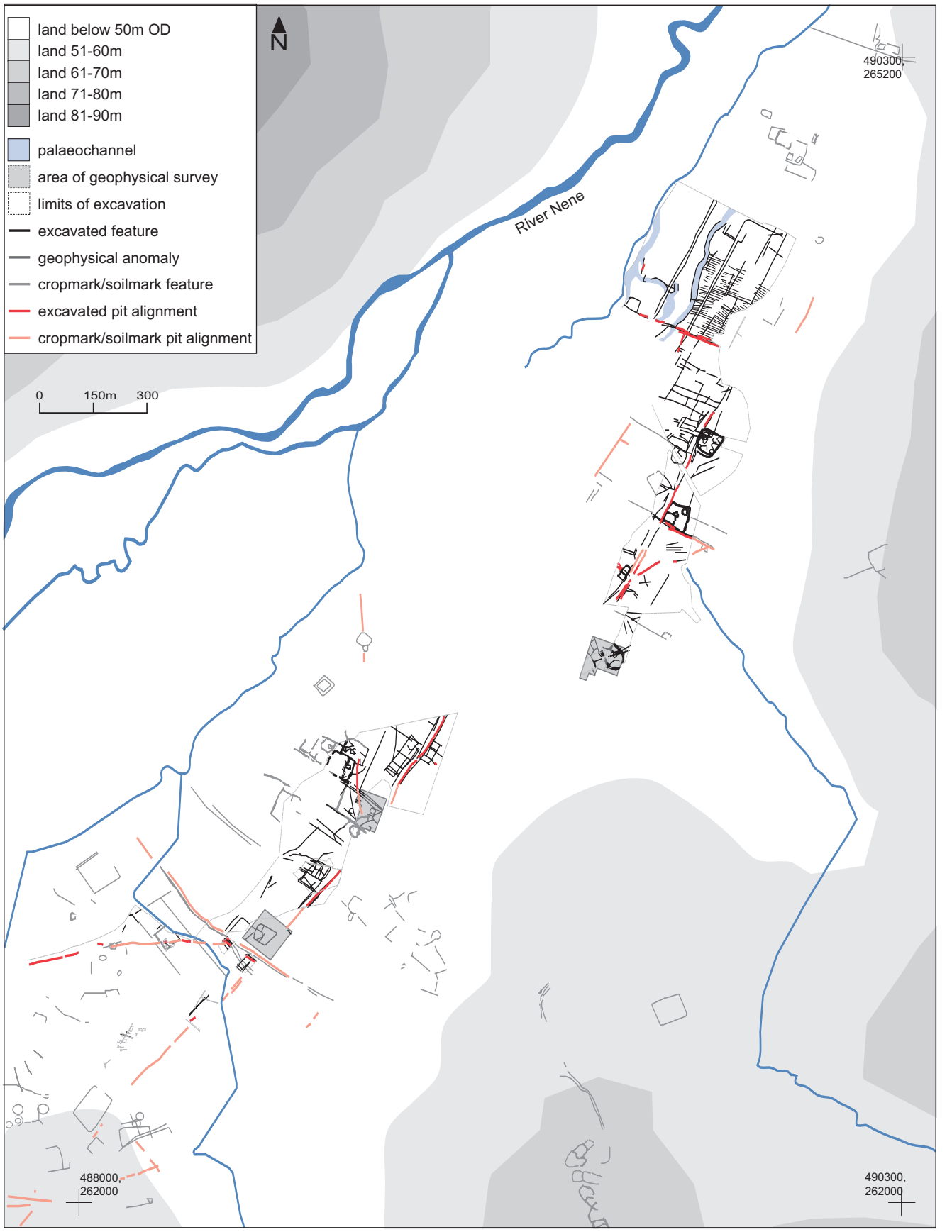
The earliest known ditched land divisions come from excavations on the floor of the Nene Valley. At Grendon a small arrangement of ditches may have predated a double-ditched ring ditch of probable Bronze Age date, and at Stanwick and Raunds the 2nd-millenium stock-control gullies, ditches and trackways appear to have been planned with reference to the existing Bronze Age monuments (Jackson 1997, 5; Healy *et al* 2007, 191–6). At Wollaston, extensive open-area investigations have unravelled the development of land division defined by pit alignments, and ditches and farmsteads, which were first identified through aerial reconnaissance (Meadows 1995, 44). Here the valley floor appears to have been cleared of woodland during the Bronze Age, then maintained as open grassland, and ultimately divided up into large rectangular blocks of land. The earliest boundaries were demarcated by pit alignments, many of which were subsequently re-defined by ditches. This framework persisted through the Iron Age, when small, enclosed farmsteads were built at the corners of the land parcels; some of these settlements, or their successors, were still occupied in the Roman period.

The most striking feature, known from excavated and aerial data, is a pit alignment that runs along the valley for more than 2km (Fig 6.1), parallel to, and approximately 550m south east of a tributary of the Nene, together with traces of a second parallel alignment 230m farther south-east, at the edge of the valley floor. A series of shorter boundaries traverse the valley floor, from its edge to the tributary, intersecting the main pit alignment at right angles. Together these divide the valley floor into relatively regular rectangular blocks, suggesting a significant element of planning. There are other pit alignments that run diagonally across the orientation of the main alignment, which may relate to an earlier and abandoned phase of land division, as they are not respected by the later settlement enclosures.

Pit alignments occur in many other parts of the county (*see* Panel 1 and Fig 6.2). Some of these pit alignments are arranged in coherent rectilinear systems, often associated with single and double-ditched boundaries, which are similar to the orderly land division seen at Wollaston. The most extensive and coherent examples are in the south-west of the county, at Newbottle (Fig 6.3); to the north of Northampton, in the parishes of Harlestone, Church Brampton and Chapel Brampton, and near by in Pitsford, Moulton and Boughton (Figs 6.4 and 6.5); Stowe-Nine-Churches (Fig 6.6) and at Ketton in Rutland (Fig 6.7). Inevitably the cropmarks disappear as they cross onto the less permeable geologies, and, as the geology of the county can change significantly over short distances, most of our evidence for these landscapes is regrettably disjointed. However, the distribution of long lengths of single pit alignments in between these fragmentary arrangement hints that the landscapes defined by pit alignments were far more extensive and represent a dramatic phase of land division in late Bronze Age and/or Early Iron Age Northamptonshire (*see* Fig 6.2).

This phase of landscape development extended into some, but probably not all, areas of poorer agricultural land on the less permeable geologies. Evidence for pit alignments is absent from the boulder-clay-capped plateaux of Rockingham Forest and the Nene–Ouse watershed. Though cropmarks do show surprisingly well on the latter, experience, particularly from reconnaissance, would suggest that the definition of the cropmarks there is generally insufficient to distinguish chains of pits from continuous ditches. There are pit alignments on the clays of the Nene–Avon

*Fig 6.1 (opposite) Schematised and simplified overview of the air photo, geophysical survey and excavation evidence of the ancient landscapes at Wollaston (geophysical survey and excavation evidence reproduced with the kind permission of Northamptonshire Archaeology) (scale 1:15 000).*


land below 50m OD
land 51-60m
land 61-70m
land 71-80m
land 81-90m
palaeochannel
area of geophysical survey
limits of excavation
excavated feature
geophysical anomaly
cropmark/soilmark feature
excavated pit alignment
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River Nene
490300,
265200
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262000
490300,
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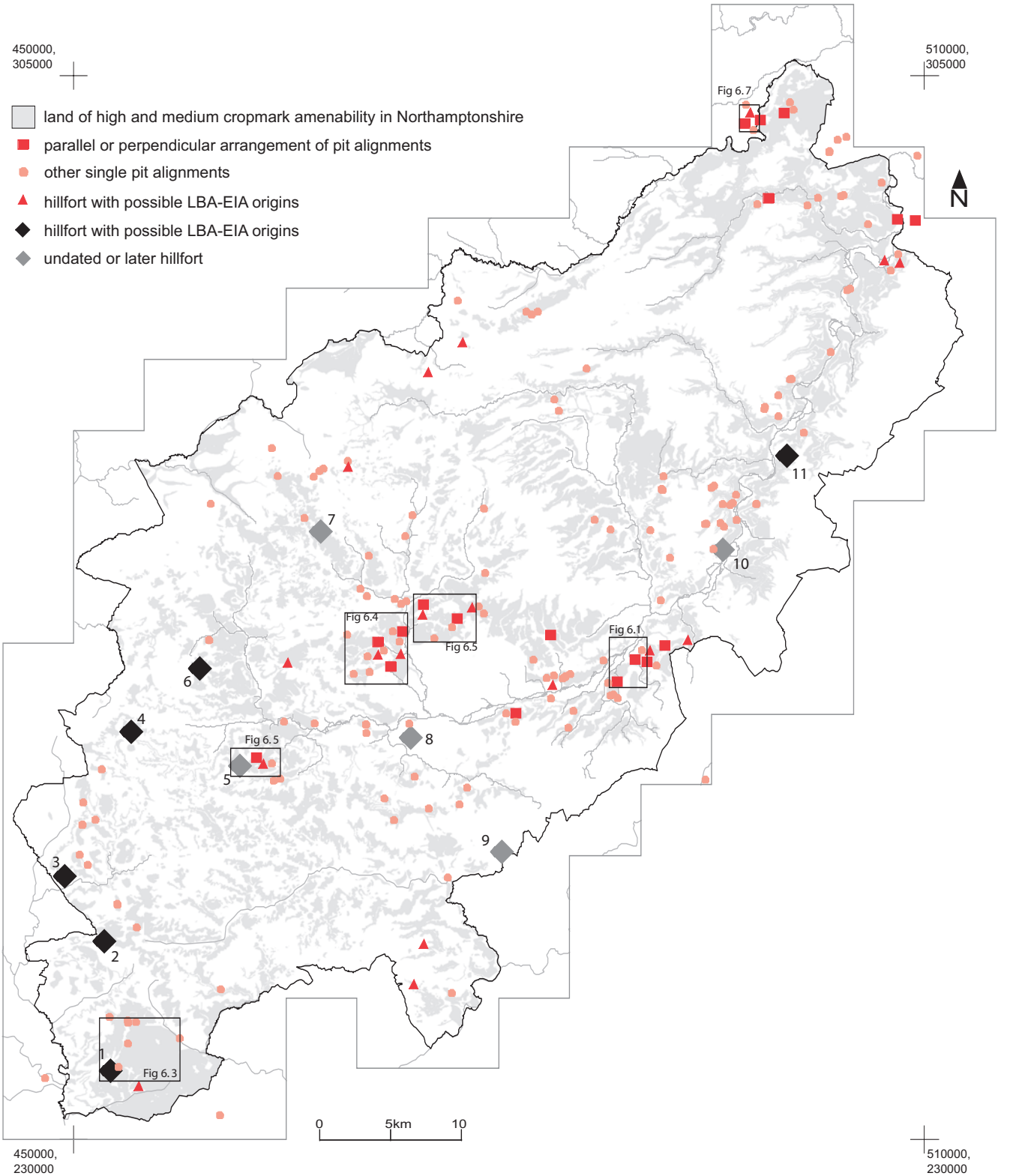
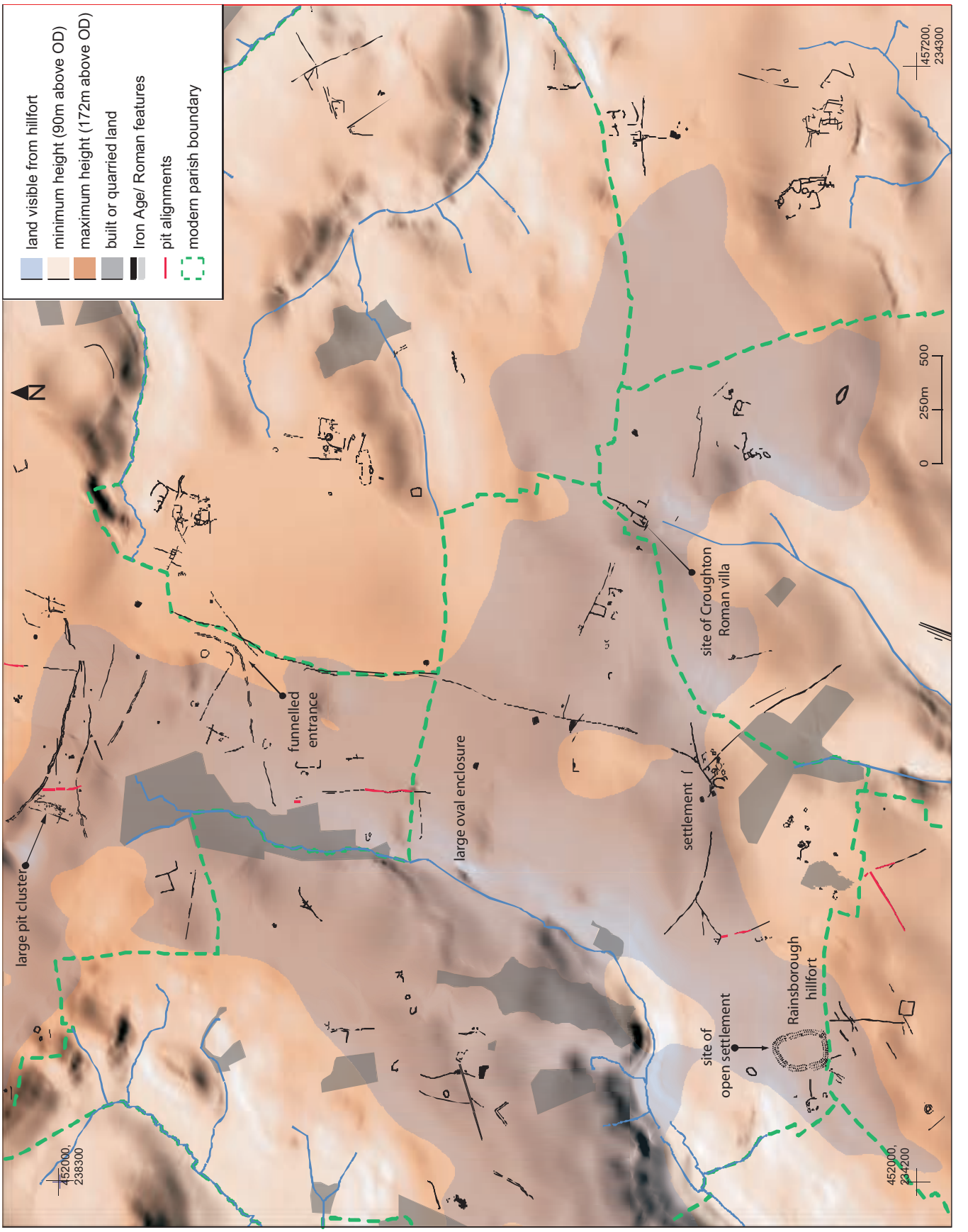



*Fig 6.2*
*Distribution of pit alignments and known and possible hillforts: 1 Newbottle (Rainsborough); 2 Thenford; 3 Chipping Warden (Arbury Banks or Camp); 4 Badby (Arbury Hill); 5 Farthingstone (Castle Yard); 6 Daventry (Borough Hill); 7 Guilsborough; 8 Northampton (Hunsbury); 9 Hartwell (Egg Rings); 10 Irthlingborough (Crow Hill); 11 Thrapston) (scale 1:400 000).*

*Fig 6.3 (opposite)*
*Overview of the ancient landscapes at Newbottle and environs and viewshed from Rainsborough hillfort (scale 1:25 000).*


land visible from hillfort
minimum height (90m above OD)
maximum height (172m above OD)
built or quarried land
Iron Age/ Roman features
pit alignments
modern parish boundary
N
0
250m
500
large pit cluster
452000,
238300
funnelled
entrance
large oval enclosure
settlement
site of Croughton
Roman villa
site of
open settlement
Rainsborough
hillfort
452000,
234200
457200,
234300

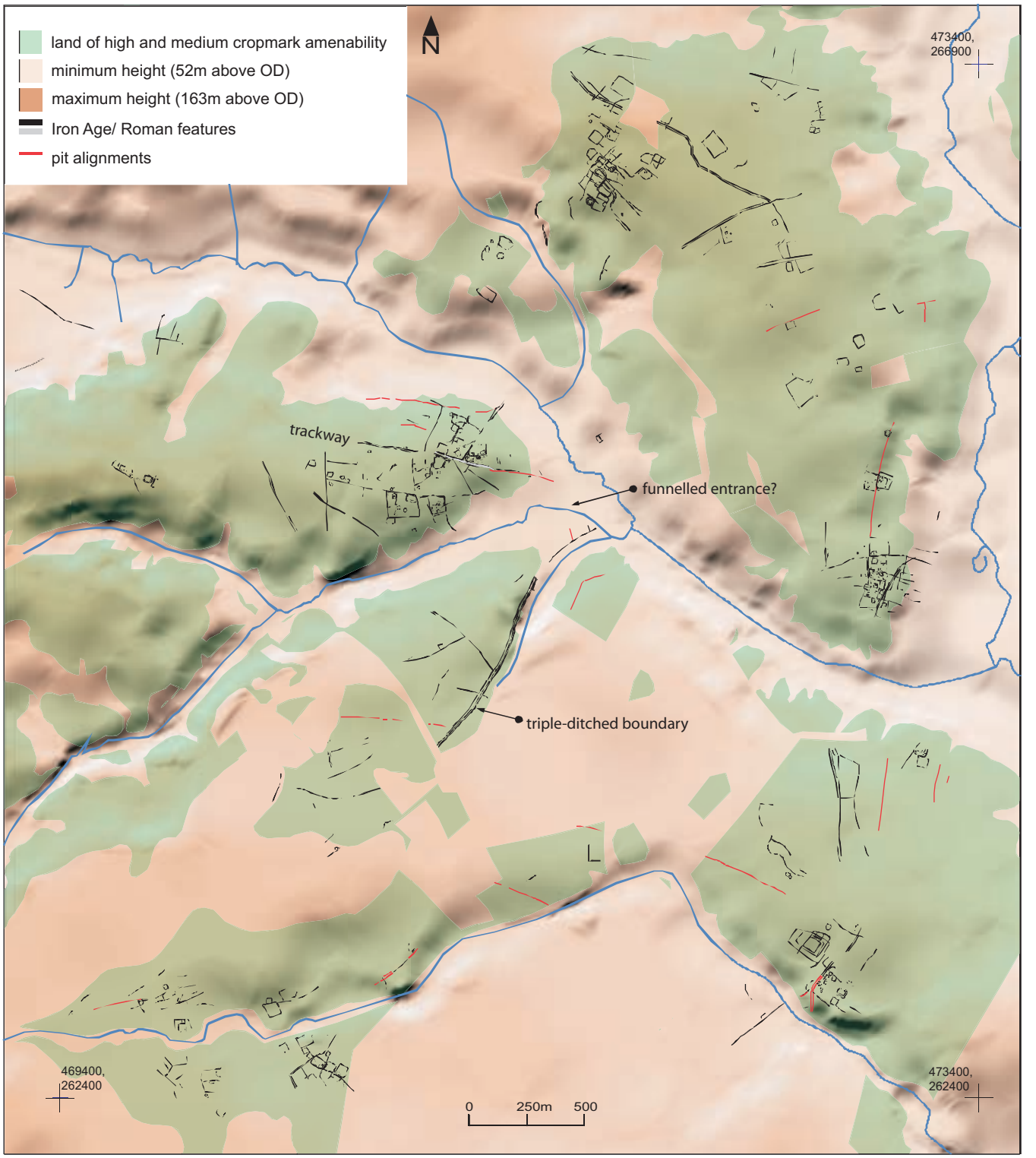



*Fig 6.4*
*Overview of the ancient landscapes at Harlestone, Church Brampton and Chapel Brampton (scale 1:25 000).*

watershed at Naseby, while excavations at Crick revealed other clayland examples, suggesting that pit alignment land divisions may well have extended onto the highest ground in the north-west of the county (Kidd 1999, 5). Long pit alignments are also largely absent from the basin drained by the River Tove, although here it may be because the areas of permeable geology are widely dispersed among heavier soils.

A significant element in the prehistoric landscapes at Stowe-Nine-Churches, the

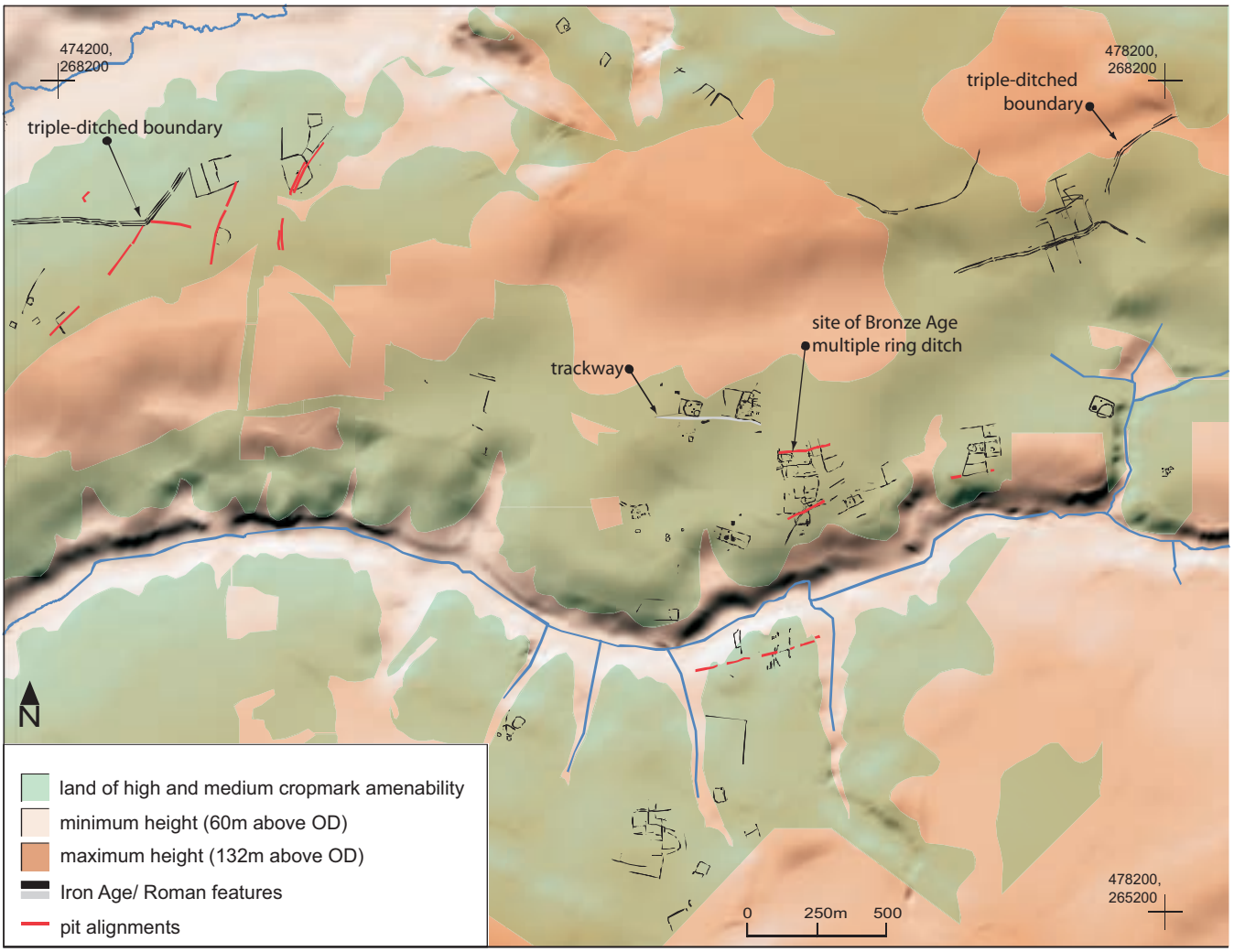



*Fig 6.5 (above)*
*Overview of the ancient landscapes at Pitsford, Moulton and Boughton (scale 1:25 000).*

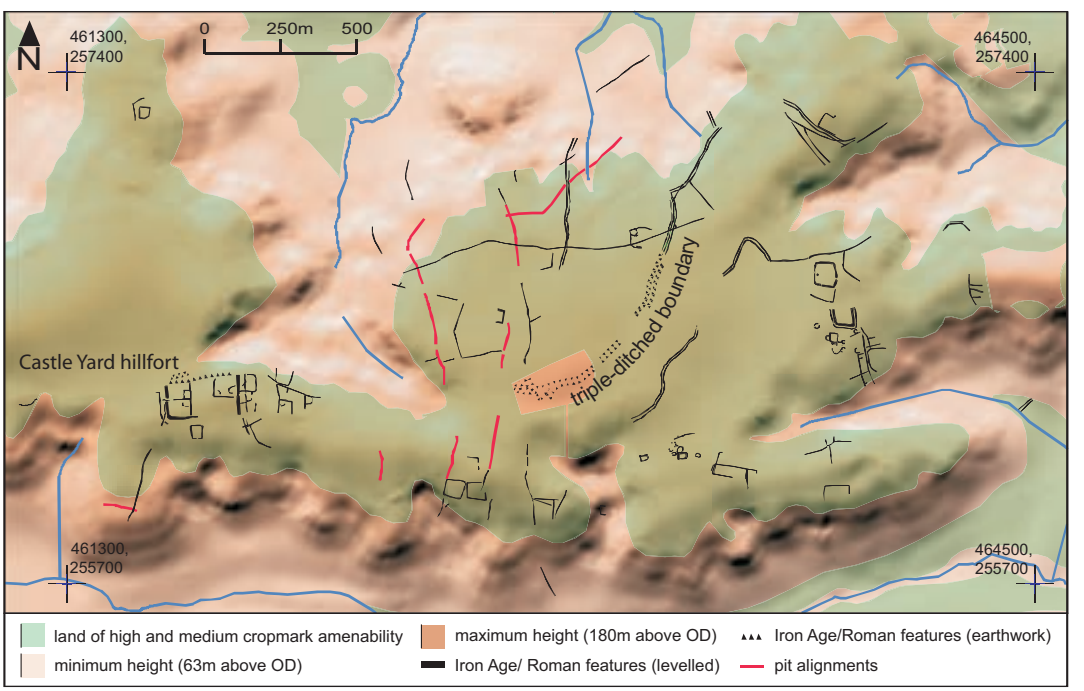



*Fig 6.6*
*Overview of the ancient landscapes at Stowe-Nine-Churches (scale 1:25 000).*

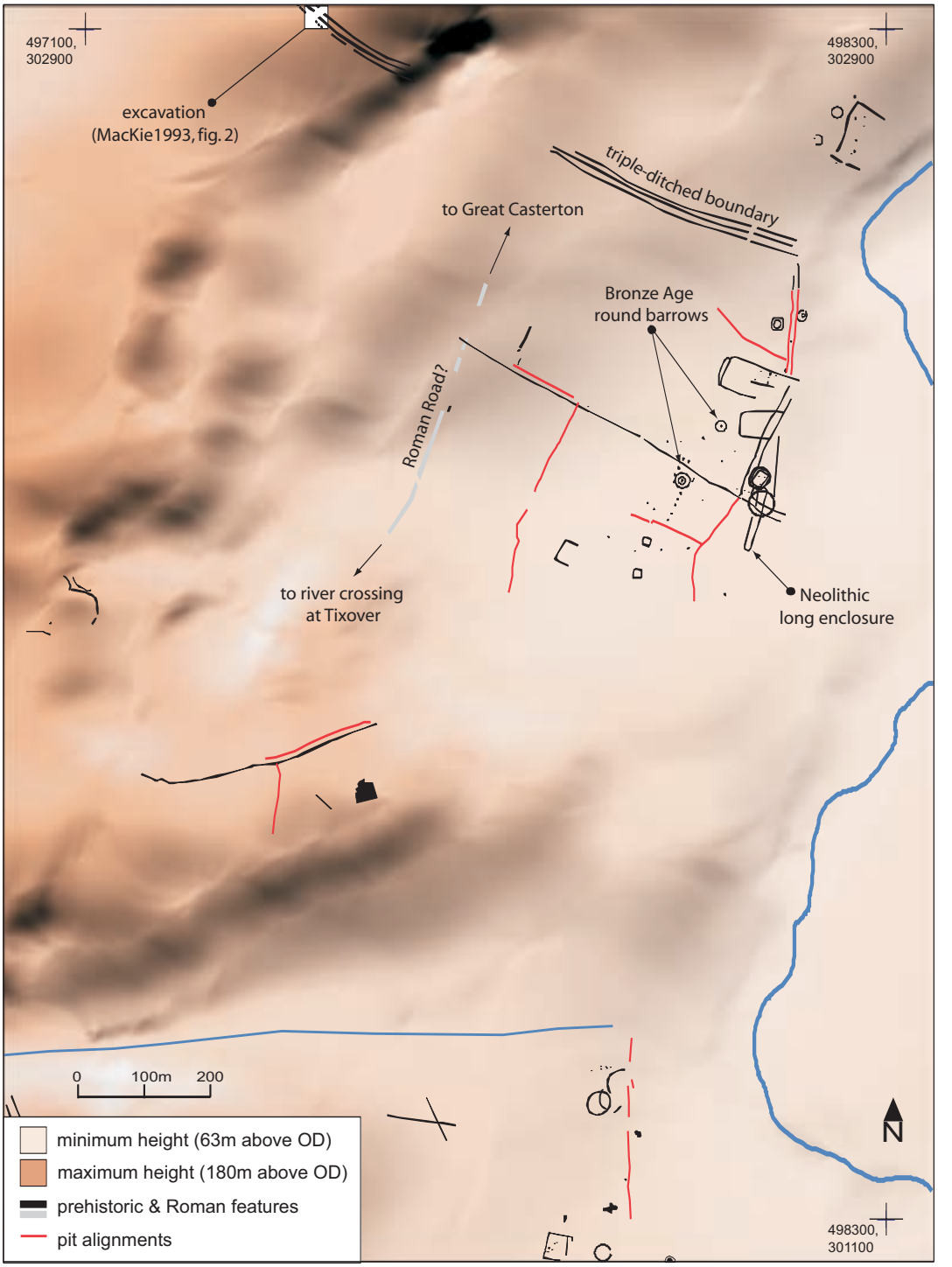



*Fig 6.7*
*Overview of the ancient landscapes at Ketton, Leicestershire (scale 1:10 000).*

Bramptons and Ketton is the triple-ditched boundary (*see* Figs 6.4–7) Elsewhere there are other examples, including the pit and double-ditched linear features at Naseby. The coupling of the pits and ditches at Nosey and the manner in which pit alignments and triple-ditch boundaries articulate at Harlestone, Pitsford and Ketton suggest some degree of contemporaneity in their use, or at least a high degree of continuity of the boundaries replaced by or evolved into triple boundary systems. The Stowe-Nine-Churches example, which survives in part as an earthwork, shows that some, if not all, triple ditch systems may originally have been accompanied by banks, forming massive earthwork boundaries (Moore 1973; RCHME 1981, fig 136).

Pit alignments yield little dateable evidence. For example, the Wollaston pit alignments were initially dated on the evidence of a single sherd of Early Iron Age pottery although they were also demonstrably earlier than the Wollaston Middle to Late Iron Age farms (Meadows 1995, 44). However, sufficient absolute and relative dates are now available from excavated sites to suggest that the regular, oblong pits that form most of the cropmark alignments probably date from the Late Bronze Age or Early Iron Age (*see* Panel 1).

Multi-bank and ditch boundaries also tend to lack dating evidence. Although sites in other counties have produced varied dates, a Late Bronze Age to Middle Iron Age date is suggested by excavations at the Ketton (Mackie 1993, 7; Boutwood 1998, 38–9). The function or symbolism of these boundaries, and the pit alignments in particular, is still much debated (for example Wilson 1978; MPP 1989; Pollard 1996; Waddington 1997; Thomas 2003). However from the Northamptonshire evidence it may be reasonable to conclude that, in this region at least, such boundaries were part of a large-scale and planned division of land initiated during the Late Bronze Age or Early Iron Age, of which only small, disjointed fragments are visible from the air.

## Discussion

The evidence from Wollaston indicates that the pit-defined boundaries were built in a landscape that had been cleared in the Bronze Age and subsequently maintained as grassland. Interestingly, no Neolithic or Bronze Age monuments were reported in the area, but there was tentative evidence for some Neolithic activity (Meadows 1995); Kidd has also remarked on the absence of Late Bronze Age and Early Iron Age settlement evidence from the Wollaston area (1999, 5). However, at Ketton the sites of probable Bronze Age round barrows are found on land divided by pit alignments and ditches, although interestingly the possible Neolithic long enclosure may have been deliberately avoided by some boundaries (*see* Fig 6.7). At Pitsford a pit alignment was cut through the centre of a possible multi-ditched barrow (*see* Fig 6.5).

The Early Iron Age open settlement at Great Oakley, Corby, was sited on boulder clay in the Rockingham Forest area, apparently well beyond any known area of planned landscape (Jackson 1982). In contrast, at Weekley Hall Wood, open settlement lay within an area that at some time was divided by a near-parallel arrangement of boundaries. These land divisions consisted of a north–south aligned Late Bronze Age or Early Iron Age double-ditched linear boundary and, 200–300m to the north-east, a pit alignment. The pit alignment was also associated with a perpendicular ditch. Early Iron Age settlement remains were found near both the double-ditched linear and the area of the pit alignment (Jackson 1976b). The pit alignment was not securely dated, and although some pits produced Early Iron Age pottery the excavator, using comparisons from other counties, favoured a later date.

The settlement and later hillfort at Rainsborough, Newbottle, were situated within an extensive landscape of long, linear boundaries (*see* Fig 6.3), which hints at a planned layout of regular rectilinear blocks, although central to the area is a large sub-oval enclosure defined by single and double ditches. This large enclosure encompasses a small valley and appears to have been entered through a broad funnelling trackway or drove road to the north-east, where the land is highest. Other boundaries of more rectilinear form radiate from the circuit of this enclosure, suggesting that it predates their imposition. It may be highly significant that part of the enclosure circuit is followed by the parish boundary (*see* chapter 7). There has been relatively little modern development in this area and, as a consequence, few excavations, so none of the elements of this landscape have been dated except the hillfort and the earlier open settlement. Although on current cropmark evidence it appears that the site of the hillfort was slightly peripheral to this system, it did have a good command over this landscape and, in particular, a full view of the large curvilinear enclosure (*see* Fig 6.3).

The photographic evidence for the large funnel-entranced enclosure was slowly gathered through years of repeat reconnaissance in this area. It is possible that there are other examples in the county that are either are unrecognised so far, or too poorly understood; the convergence of the multi-ditch boundary and trackway on a tributary of the Nene at Harlestone may be one such example (*see* Fig 6.4), and fragmentary evidence of another funnelled entrance, later largely filled by settlement,

may exist at Chapel Brampton (*see* Fig 6.12: 5). Other possible examples have been tentatively identified, not from aerial data, but rather fossilised in later medieval and post-medieval landscapes. This is a theme subject to ongoing research (*see* Chapter 7 and Foard *et al* 2005, 25).

For the most part, there is no tangible relationship between the known hillforts and the planned landscapes. Castle Yard is again seemingly peripheral to a well-demarcated system of pit alignments and other boundaries; the sequence of development is unknown, but, as the hillfort is dated to the Middle Iron Age, it is possible that it was built sometime after these divisions were first laid down. The hillfort's rectilinear plan may reflect a pre-existing rectilinear pattern of land division (*see* Fig 6.6). The rectilinear plan of other hillforts, such as Irthlingborough and Guilsborough, may also prove to have originated in this way.

The evidence from excavations alone may imply that the Late Bronze Age and Early Iron Age population was very low and widely dispersed. The Northamptonshire NMP does not contradict this with evidence of hitherto unsuspected settlements, but does suggest a population of sufficient size and level of organisation to take into hand large tracts of land. The population may well have been low but still mobile, perhaps engaged largely in pastoral, rather than arable, farming.

## Rural settlement in the Middle to Late Iron Age and Roman period

### Open settlement

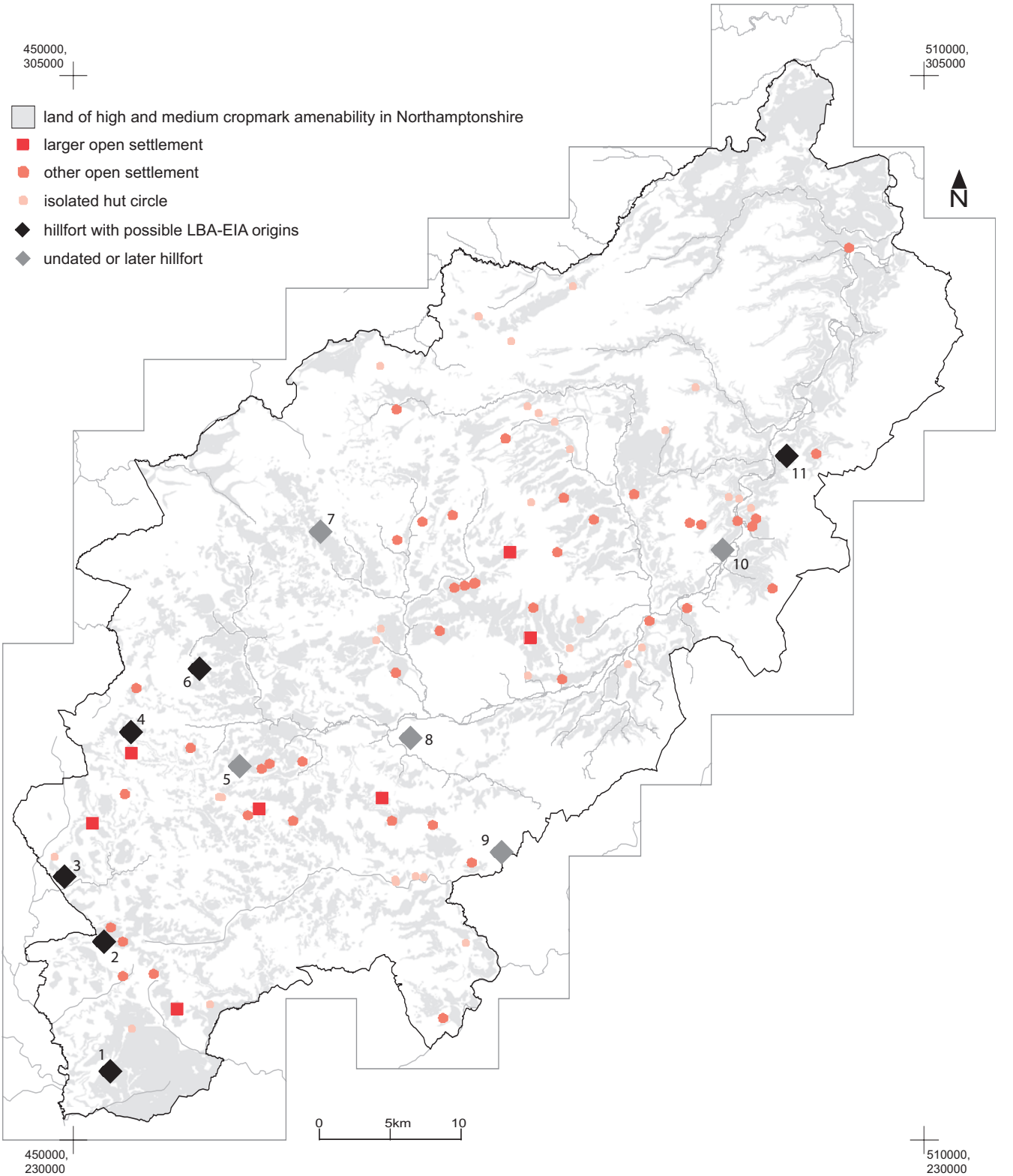
Based on Jackson's observation that most ring-gullied huts were built in the Middle Iron Age or later, most such houses recorded by the project are attributed to these periods. The construction of post-built houses did continue throughout the Iron Age; remains of this type have been found preserved under villas at Deanshanger, and Alderstone Field, Ashley, but they were not visible on the air photographs consulted. (RCHME 1982, 41; Taylor and Dix 1985).

Hundreds of hut circles have been recorded from air photographs, but because it is difficult to identify open settlement among the cropmarks of complex multi-period landscapes, many more are likely to have gone unseen or unrecognised. The enclosure of previously open sites, or the expansion of settlements beyond their earlier bounds, creates a particular problem when the chronological details are unknown.

The small settlement at Wakerley consisted of a sequence of huts, up to seven in total, arranged to the north of a large polygonal enclosure (Jackson and Ambrose 1978, fig 4). In a later phase the area of the huts was enclosed by a massive ditch, but the excavators suggest that by that time perhaps only one was in use, and that this was abandoned soon afterwards (Jackson and Ambrose 1978, 124; cf Gwilt 1997, 163–4). Similarly, at Twywell one or two structures were built within a palisaded enclosure; the palisade was later replaced by a ditch, but subsequent settlement developed outside the confines of the enclosure (Jackson 1975).

The project has revealed a dispersed pattern of single hut circles, but again this is undoubtedly incomplete (Fig 6.8). Some may be the mistaken ring ditches of round barrows; others may be the only visible indications of larger unseen settlements, but Dawson has noted similar singular sites in the Ouse Valley, such as Biddenham, which co-existed with the larger open settlements (2000, 115). The Northamptonshire examples are scattered throughout most of the county, although they appear to be absent north-east of Harpers Brook and in the area between the Nene–Avon watershed and the River Avon; both are areas where cropmarked sites are fewer and sparser (*see* chapter 3, Fig 3.1). Where such sites are spatially associated with otherwise unrelated features, it is unlikely that they will have been recognised as potential isolated settlements.

The open settlements mainly comprise loose groups of hut circles, together with small rectilinear, polygonal or curvilinear enclosures and clusters of pits (Fig 6.9). Small, square or rectilinear enclosures, often no larger than hut circles, are a particularly common feature at these sites (for example in Fig 6.9: 1, 6.9: 5, 6.9: 12). Shaw and Blinkhorn have suggested that the examples investigated at Top Lodge, Ringstead, may have been building enclosures or stock pens (1992, 5). Features of similar plan and scale have been excavated in the Ouse Valley and found to be stone-filled gullies, which Dawson has suggested are the remains of a new type of house structure that




appeared in the 1st century BC (2000, 115). Slightly larger enclosures, up to 0.1ha in size with an oval, rectangular, polygonal or even triangular plan are present at many of the open settlements (*see* Fig 6.9: 1, 6.9: 7, 6.9: 17, 6.9: 18). Two small, oval enclosures investigated at Sywell Aerodrome and Great Houghton were associated with nearby huts and considered to be related to stock management (Atkins *et al* 2000; Chapman 2000–1).

*Fig 6.8*
*Distribution of isolated hut circles, open settlements and forts (see Fig 6.2 for key to hillforts) (scale 1:400 000).*

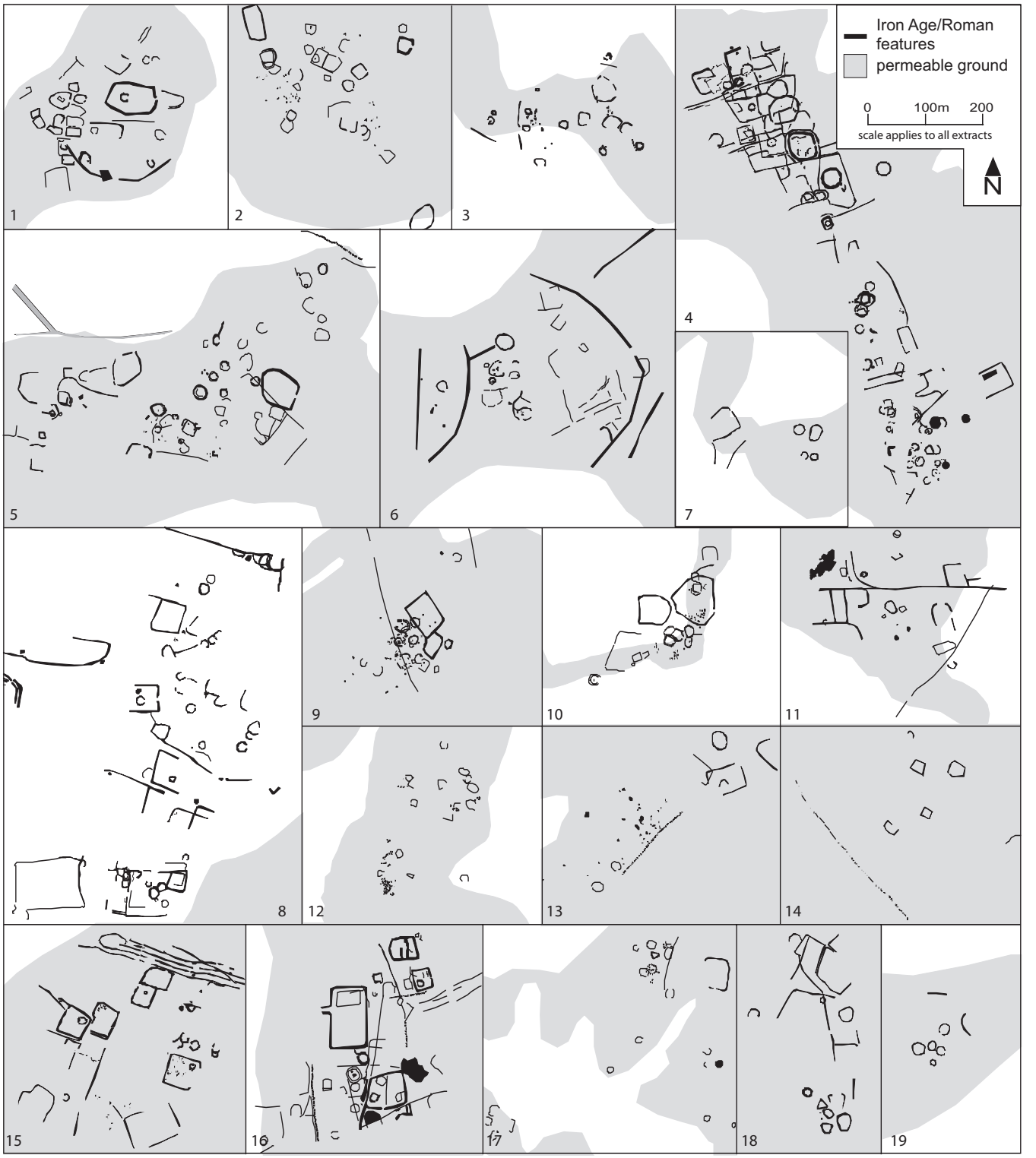



*Fig 6. 9*
*Open settlements:*
*1 Charwelton;*
*2 Catesby;*
*3 Gayton;*
*4 Ecton A;*
*5 Byfield;*
*6 Everdon;*
*7 Scaldwell A;*
*8 Little Addington A;*
*9 Rushden A;*
*10 Marston St Lawrence;*
*11 Greatworth;*
*12 Brackley;*
*13 Blisworth;*
*14 Titchmarsh;*
*15 Cold Higham;*
*16 Earl's Barton;*
*17 Litchborough;*
*18 Moulton A;*
*19 Bugbrooke)*
*(scale 1:10 000).*

A second, perhaps slightly earlier enclosure at Great Houghton yielded evidence for domestic activity and iron working, but also contained a pit group with a crouched inhumation (Chapman 2000–1, 31).

Similar small enclosures also occur in loosely-grouped clusters where evidence of round houses is absent (*see* Fig 6.9: 14) Some of these may also be the remains of open settlements with dwelling structures that remain hidden, either because their ring gullies are too slight to produce cropmarks in the local ground conditions, or have been ploughed out, or perhaps because they were solely post-built structures without any trench or eaves drip.

Pits appear at many of the open settlements, but their apparent absence at some may be due in no small part to the underlying soils and geology, and is not necessarily an accurate reflection of the buried archaeology. Large pit clusters were recorded adjacent to the open settlements at Marston St Lawrence, Brackley, Blisworth and Cold Higham (*see* Fig 6.9: 10, 6.9: 12, 6.9: 13 and 6.9: 15). There are other significant clusters at Staverton (*see* Fig 6.16: 5) and at Farthinghoe (*see* Fig 6.3). These groups of pits, often tightly-clustered, were long considered to be receptacles for grain storage, and thus an indication of the relative importance of arable cultivation to the settlement's economy (for example Keighley 1981, 119–20). Interestingly though, many of the settlements with pit clusters are located on rather small exposures of permeable geology and are surrounded by heavier clay soils that at the time would have been more conducive to pastoral than to arable farming. Generalised interpretations of pits as storage or refuse receptacles have been disputed by Hill (1992), and the ritualistic elements of pit deposits in the county are beginning to be recognised as a result of work at Great Houghton and Twywell (Chapman 2000–1, 31).

At Great Doddington, the massive ditch of the D-shaped enclosure appeared to cut across at least one hut circle in the unexcavated section, and close by, at Wilby Way, Wellingborough, open settlement was detected during excavations of the long-lived settlement (Windell 1981, 66; Thomas and Enright 2003). At Ecton A, Rushden A, and Marston St Lawrence there is clearly some degree of overlap between enclosures and hut circles, but at Charwelton, Little Addington A, and Cold Higham the arrangement of features does not preclude coexistence or contemporaneous use, although it does not prove it either (*compare* Fig 6.9: 4, 6.9: 9, 6.9: 10 with 6.9: 1, 6.9: 8 and 6.9: 15).

There are great differences in the size of the cropmarked unenclosed settlements; they range from 0.5ha to almost 20ha, but comparison based on size alone is unlikely to have much archaeological significance. One of the larger cropmark complexes with evidence of unenclosed settlement runs along a low spur in the parishes of Sywell and Ecton (*see* Fig 6.9: 4). The spur is bounded on two sides by minor streams and it gently descends south-eastward towards the River Nene. This was an area of dense prehistoric activity and the evidence for the open settlement is intermingled with earlier monuments and later enclosures and fields. A small area of settlement has been excavated and dated to the 4th–2nd centuries BC (Atkins *et al* 2000). However, even the most extensive sites may be the result of 'short distance settlement drift' of one or more foci, and may have actually supported a much smaller community at any one time than the total hut count would suggest (Jackson 1975, 66).

The cropmark evidence is further complicated by the differences in crop response to buried features in different locations. The analyses in chapter 3 identified the areas where cropmarks could develop most readily, but this does not mean that all cropmarks in these areas will develop with equal clarity and detail, let alone be photographed when showing at their optimum. The NMP process does not record the quality of the cropmarks and, while this can only ever be a subjective appraisal, this may have been useful when comparing the presence or absence of features between sites. Thus, while the appearance of the sites at Byfield and Scaldwell A is very different, the rather faint and ill-defined cropmarks of the latter may belie a site of greater complexity and size (*compare* Fig 6.9: 5 with 6.9: 7).

Substantial open settlements occur more frequently in the south-east of the county on the watersheds between the Nene, Tove (Great Ouse tributary) and Cherwell (*see* Fig 6.8). Other, apparently smaller sites are scattered between the Brampton Arm of the Nene and the River Ise, on the slopes of minor valleys and across the Ironstone upper ground, as defined by Physiographic Model of the county (Northamptonshire

Archaeology 2003). Open settlements are more sparsely distributed along the Nene Valley floor and sides, although other examples may have been concealed by the superimposed cropmarks of unrelated enclosures and field boundaries that are so densely distributed across the permeable geologies in this zone.

At Byfield and Blisworth pit alignments run along the edge of the visible settlement remains but at Ecton A, Rushden A, Greatworth, and Thorpe Mandeville long linear boundaries appear to act as the focus of the settlement (*compare* Fig 6.9: 5, 6.9: 13 with 6.9: 4, 6.9: 9, 6.9: 11 and Fig 6.10: 7).

The same juxtaposition of pit alignment and open settlement was found under the villa at Wootton Fields but unfortunately the nature of the relationship could not be tested (NA 1999b). Assuming that the suggested chronology is correct, these arrangements indicate that, although perhaps originally intended as peripheral markers, the pit alignments and ditches later became the focus of activity and settlement.

## Hillforts

The defences of the Crow Hill, Irthlingborough, and Castle Yard, Farthingstone, hillforts may have been constructed in the Middle Iron Age (Knight 1986–7, 39; Kidd 1999). Both are of sub-rectangular plan and about 2.5ha in size. The recently recognised hillfort at Guilsborough, which survived only as a very low earthwork and was not visible from the air, is of a similar plan and may be of this period, as may any of the undated possible hillforts at Arbury Camp, Arbury Hill, and unusual Egg Rings enclosure at Salcey (Woodfield 1980; Pattison and Oswald 1993–4).

The defences of the Hunsbury, Rainsborough and Guilsborough hillforts were probably remodelled at times in the Middle Iron Age, but only Crow Hill has produced evidence for Late Iron Age hillfort strengthening (Kidd 1999, 6 and 8).

The majority of the known and possible hillforts were built on the higher ground in the west of the county and, although they are clearly not all contemporary, they are relatively evenly distributed there (*see* Fig 6.8). The hillforts at Arbury Hill, Castle Yard, Hunsbury and Crow Hill are each situated in elevated positions overlooking the Nene Valley.

## Land division and boundaries

The land parcels established on the valley floor at Wollaston in the Late Bronze Age and Early Iron Age continued in use through the Middle and Late Iron Age (Meadows 1995). At Gretton, a hoard of currency bars was buried near the intersection of a pit alignment and ditch, probably in the last century BC (Jackson 1974). Although the pits and ditch have not been securely dated, the insertion of the hoard into the edge of one of the pits suggests that these boundaries were probably visible in the landscape at the time of burial.

It is likely that the systems of land division recorded in many other parts of the county also persisted through to the Roman period, but this is not to suggest that, once established, there was stasis in the planned landscapes. The maintenance and development of pit and ditch-defined boundaries from the Early Iron Age and the subsequent millennium is an intriguing issue and one not yet fully resolved by excavation.

On Briar Hill an alignment of regular oblong pits had cut the line of an early boundary. This consisted of two, presumed contemporary, rows of smaller, more circular pits, some of which may have held timber uprights (Jackson 1974, 15). The later Briar Hill pit alignment and the Gretton example appeared to have been deliberately back-filled, in the case of the latter possibly within a year of construction (Jackson 1974).

It has already been noted that the grid-like arrangement at Wollaston may have been preceded by an earlier system on a different alignment (*see above*). Minor rearrangements of the pit alignments observed during excavations in the neighbouring parish of Grendon may have been a response to changing ground conditions and, in particular, increasing wetness from a rising water table (Jackson 1997, 9–10).

At Wollaston some of the pit alignments were re-cut by ditches or replaced by hedges, and it was noted that the usual detritus of occupation, including charcoal and pot sherds, was absent from the pit fills (Meadows 1995; Kidd 1999). The sterility of fills is a frequent observation, and, while this may often reflect rapid back-filling, it does not preclude a long history that was interspersed with events of

scrupulous cleaning or re-cutting of the pits. Clearly the apparent transience of the excavated pit alignments is incongruous with both the considerable labour required for their construction and the impact they had on the pattern of subsequent settlement (*see below*).

At Harlestone, Pitsford, and Ketton elements of these rectilinear frameworks were further formalised with the development of well-established trackways and, later, perhaps roads, which bear evidence of considerable compaction or even hard surfacing, although these events are untested and undated (*see* Figs 6.4, 6.5 and 6.7).

However, there are, in certain parts of the county, boundaries or trackways that do not conform to the regular rectilinear characteristics of the apparently planned landscapes. These display a degree of sinuosity that sets them apart from the trackways seen at Harlestone, Pitsford and far exceeds any influence the often rather gentle local topography may have had. The most extensive example is a double-ditched feature that meandered for nearly three kilometres across boulder clay and Oxford Clay through the parish of Titchmarsh. Another is the broad-ditched linear feature that descended from the boulder-clay-capped plateau down to Harper's Brook through Brigstock (*see* Fig 6.13: 1). Inevitably, dating of these long linear features is lacking, and in many cases it is not clear if the features are boundaries or ditched trackways. Recent photography of a sinuous double-ditched trackway at Strixton shows it was defined in parts by pits, which may indicate an Early Iron Age date (*see* Fig 6.13: 2).

## Enclosed settlement

A record of nearly 5,000 possible Iron Age and Roman period enclosures demonstrates the expansion in enclosure building during the Middle and Late Iron Age. However, the persistence of open occupation at least through the Middle Iron Age, as at Geddington and Twywell, and probably up to the last century BC, as at Great Houghton, Sywell, Ecton and Wakerley, suggests that there was not a complete shift to enclosed settlement (Jackson 1975, 1979a; Jackson and Ambrose 1978; Atkins *et al* 2000; Chapman 2000–1).

The rural landscape of Iron Age and Roman Northamptonshire was apparently characterised by both single enclosures and groups of varying complexity and longevity, although not all would have contained settlement. Enclosure B at Wakerley was contemporary with the open settlement, but apparently never occupied, and when it was reinstated during the Roman period it was the focus of agricultural and industrial activity (Jackson and Ambrose 1978). Enclosures probably served a range of functions, including stock management, agricultural processing, industrial and craft activities; doubtless their function changed and developed over time, but in most cases they do indicate nearby occupation.

The predominant trend is a dispersed settlement pattern of mainly rectilinear enclosures or small groups of conjoined rectilinear enclosures. Often the cropmarks are too fragmentary or intermittent to establish the relationship of these settlements to the wider landscape, but in some cases it is possible to postulate a close relationship to the framework of pit and ditch-defined land boundaries. Commonly, rectilinear enclosures were built along one side of a long ditch or trackway. Excavations at Weekley demonstrated that a long, east-to-west-aligned ditch was one of the earliest features at the site and formed the axis for the subsequent settlement (Jackson and Dix 1986–7). Three simple, rectilinear enclosures were built along the boundary and then a fourth, more substantially-constructed example, was inserted between two of them, partially straddling the ditch (Fig 6.10: 1). At the western-most extent of the excavations the boundary consisted of two ditches, and in this part at least was recognised as a possible trackway (Jackson and Dix 1986, 70). This linear feature influenced the layout of the settlement from its earliest phases in the later Iron Age through to the beginning of the Roman period.

Two Iron Age settlements at Swan Valley, Rothersthorpe were arranged in a comparable manner (*see* Fig 6.10: 2). In each, enclosures containing hut circles and other small enclosures were arranged along ditches that ran along the valley side, parallel to the Wootton Brook. The lower settlement developed along the banks of the brook and the other was in an area 150m up-slope. The cropmark evidence was fragmentary and determined the positioning of excavation trenches, so little is known of the immediate environs, but it is likely that the parallel ditches were

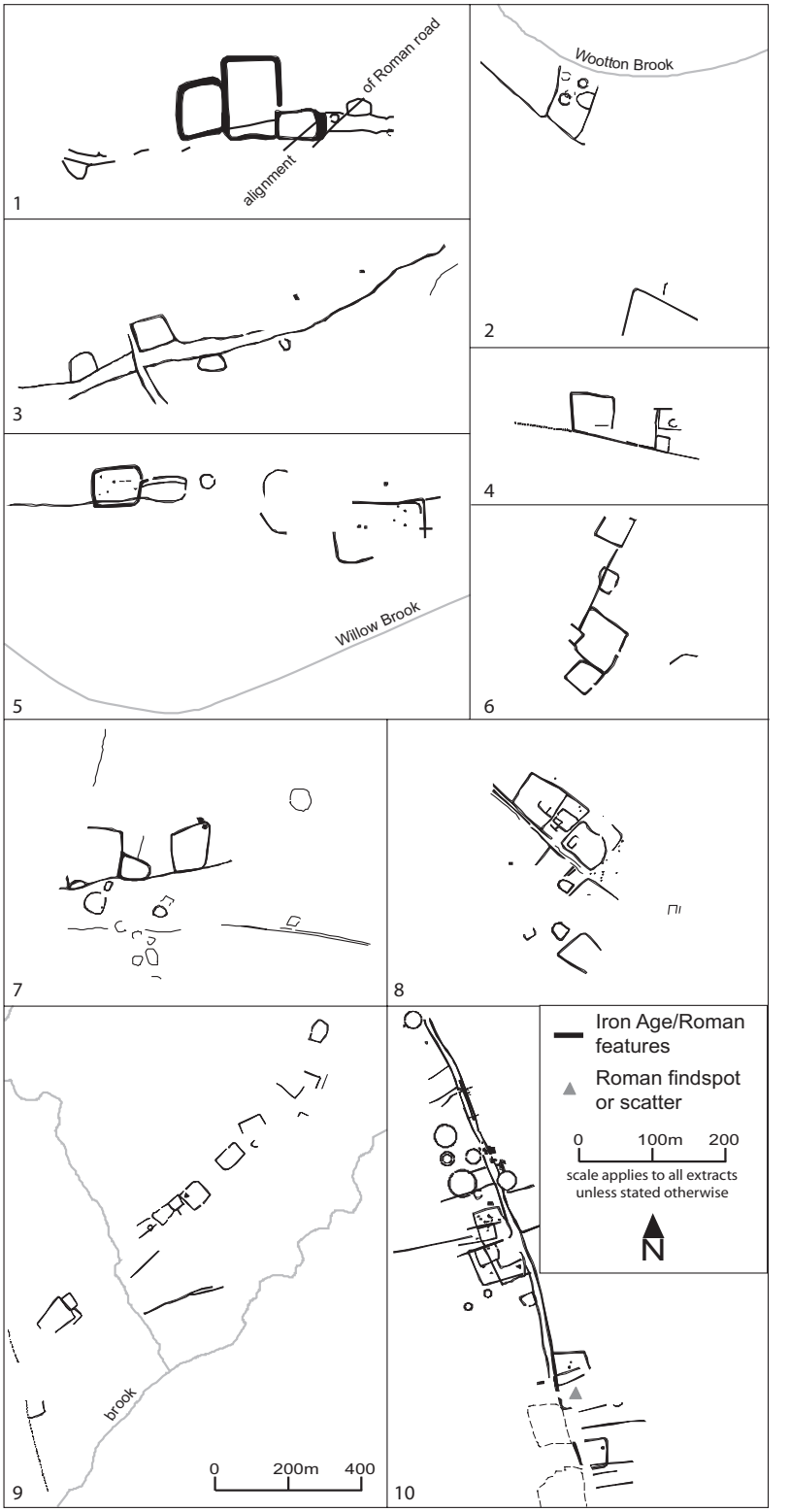



*Fig 6.10*
*Settlements in linear arrangements:*
*1 Weekley (after Jackson 1986–7, fig 3);*
*2 Rothersthorpe (Swan Valley) composite evidence from NMP and geophysical survey (after Northamptonshire Archaeology 1994, fig 3);*
*3 Wilbarston A;*
*4 Nether Heyford;*
*5 Fotheringhay A;*
*6 Spratton A;*
*7 Thorpe Mandeville;*
*8 Culworth;*
*9 Lamport;*
*10 Nassington A)*
*(scales 1–8 & 10, 1:10 000; 9 1:20 000).*

part of a more extensive framework of land boundaries (NA 1994b; Holmes 1995, 41).

A similar scenario of ditched enclosures abutted to possibly earlier boundaries is seen in most areas of the county where cropmarks develop (Fig 6.11). At Nether Heyford the defining linear feature was clearly a pit alignment that had been partially re-cut by a ditch (*see* Fig 6.10: 4). This settlement sat along the edge of

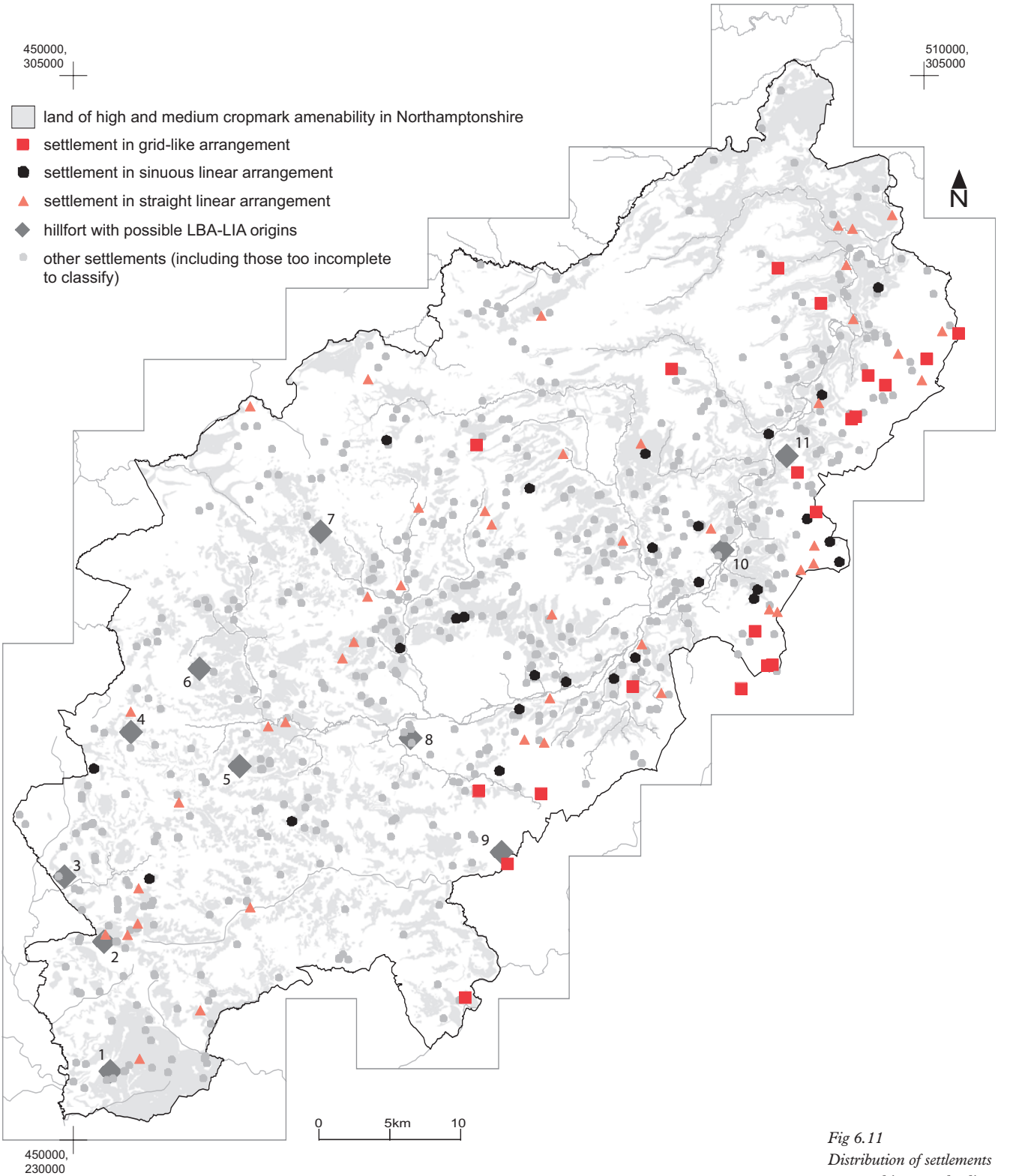
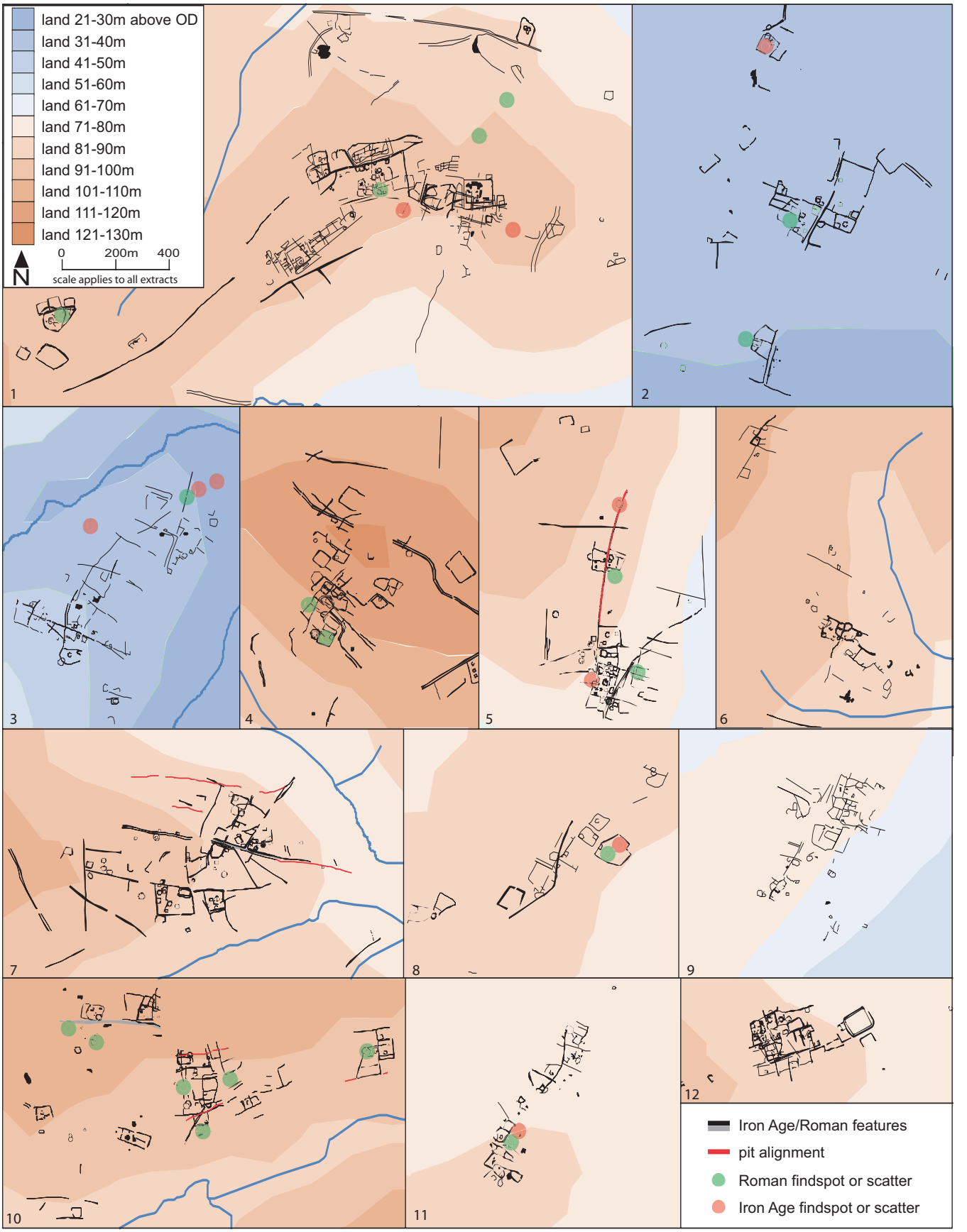



*Fig 6.11*
*Distribution of settlements arranged in a regular linear or grid-like pattern and those associated with more sinuous and irregular boundaries or trackways (scale 1:400 000) (see Fig 6.2 for key to hillforts).*

the valley floor with the river to the north. A similar arrangement of small, rectilinear enclosures developed on the same orientation 1km to the south-west, and on the north side of the river the same trend was observed in a second pit alignment and the positioning of other ditches and enclosures.

The string of enclosures at Lamport maintained a common orientation over a


land 21-30m above OD
land 31-40m
land 41-50m
land 51-60m
land 61-70m
land 71-80m
land 81-90m
land 91-100m
land 101-110m
land 111-120m
land 121-130m
0
200m
400
N
scale applies to all extracts
1
2
3
4
5
6
7
8
9
10
11
12
Iron Age/Roman features
pit alignment
Roman findspot or scatter
Iron Age findspot or scatter

distance of more than 1km, and perhaps over a long period of development, although no axial boundary was visible (*see* Fig 6.10: 9). These remains lie on Upper Lias Clay, and the enclosure ditches produced rather faint cropmarks. The alignment of the settlement continued northwards in a long trackway that climbed up onto the Northamptonshire Sand and Ironstone.

A possible settlement at Wilbarston A developed in small rectilinear enclosures either side of a broad track or droveway (*see* Fig 6.10: 3). The trackway ran along the edge of the boulder-clay-capped plateau and overlooked a tributary of the River Welland. On the valley side below and parallel to this, the fragmentary remains of a pit and ditch-defined series of land units were visible.

On Thenford Hill, Thorpe Mandeville, three rectilinear enclosures abut the north side of an east-to-west-aligned ditch (*see* Fig 6.10: 7). A second ditch or trackway, of near parallel orientation defined the southern limit of a narrow strip of land and was perhaps the focus for the unenclosed settlement. The hillfort was constructed on the southern edge of the same hilltop.

At Wollaston it was the intersections between the boundaries that appear to have been the focus of settlement (*see* Fig 6.1). Farmsteads were built into the corners of the land parcels laid out some centuries before. The result was a community of small settlements dispersed across a grid of land boundaries on the valley floor. At Hardwick Park, Wellingborough, in an area now covered by housing, excavators revealed an orderly series of enclosures overlooking a stream (Foster *et al* 1977). The enclosures are thought to have been stockyards, and occupation evidence was identified in small enclosures built into the corners of one such yard.

Similar arrangements have been recognised from the air photo evidence farther downstream at Islip and Thorpe Achurch, and on higher ground at Cranford A and Chapel Brampton A (Fig 6.12). Even on the boulder-clay watershed between the Nene and the Great Ouse there is good cropmark evidence of settlements strung along long linear boundaries at Hargrave A and B and Raunds B.

The well-defined divided landscape at Harlestone contains enclosed and unenclosed settlement elements (*see* Figs 6.4 and 6.12: 7). The axial feature appears to have been a broad, straight track or road that ran down the middle of the spur towards the streams confluence. Through the settlement the trackway appears to have been compacted or even metalled, but as it descends to the confluence it is defined only by a single pit alignment. The track was flanked by a series of rectangular pit or ditch-defined parcels, most of which probably exceeded 4ha. Small rectilinear enclosures and possible hut circles are dispersed across the area, but do tend to be concentrated along the boundaries and, in particular, boundary intersections. Others are grouped in large, well-defined enclosures built into the framework. Somewhat anomalous to this pattern was the large, broad-ditched, curvilinear enclosure that may have been cut by the road (*see* Fig 6.18: 14).

In a neighbouring valley at Pitsford much of the settlement appears to have been concentrated in a number of broad or double ditched enclosures that abut the long boundaries that divided up the valley side (*see* Fig 6.5).

It is notable that of the linear boundaries associated with groups of enclosures, few are visibly defined by pits, the Chapel Brampton A example being a rare exception (*see* Fig 6.12: 5). The alternation between ditch and pits along some linear features, such as the trackway through the Harlestone landscape and the linear at Nether Heyford, suggests that many boundaries originally marked by pits were later re-cut by ditches in the immediate vicinity of the settlements (*see* Figs 6.12: 7 and 6.4). This redefinition of pit alignments is commonly observed during excavation throughout the country (J Taylor pers comm).

Evidence from Wollaston, Weekley, Swan Valley at Rothersthorpe, and Hardwick Park, indicates that the enclosed settlements that became embedded within the planned landscapes of large rectilinear blocks originated in the Middle to Late Iron Age and also continued in use into the Roman period. At Wollaston, Roman farms with stone-founded buildings were constructed outside some of the Iron Age enclosures (Meadows 1995). At Hardwick Park, Roman debris, including a stony floor, was found to spread over the ditches of some of the Iron Age enclosure system that had already been left to silt-up, although some may have continued in use as before (Foster *et al* 1977). However, the main physical expression of Roman activity at this site was the numerous pottery and limekilns found among the earlier enclosures (Foster *et al* 1977, fig 3).

*Fig 6.12 (opposite) Settlements in orderly, grid-like arrangements: 1 Great Harrowden; 2 Thorpe Achurch; 3 Islip; 4 Church Brampton; 5 Chapel Brampton A; 6 Cranford A; 7 Harlestone; 8 Hargrave A; 9 Hargrave B; 10 Pitsford/Moulton; 11 Raunds B; 12 Pytchley) (scale 1:20 000).*

*Fig 6.13 (opposite) Settlements arranged along sinuous and irregular boundaries or trackways: 1 Brigstock; 2 Strixton; 3 Hackleton; 4 Barnwell; 5 Sharnbrook, Bedfordshire; 6 Kelmarsh; 7 Raunds A; 8 near Salcey Forest, Milton Keynes; 9 Southwick (scale 1: 10 000).*

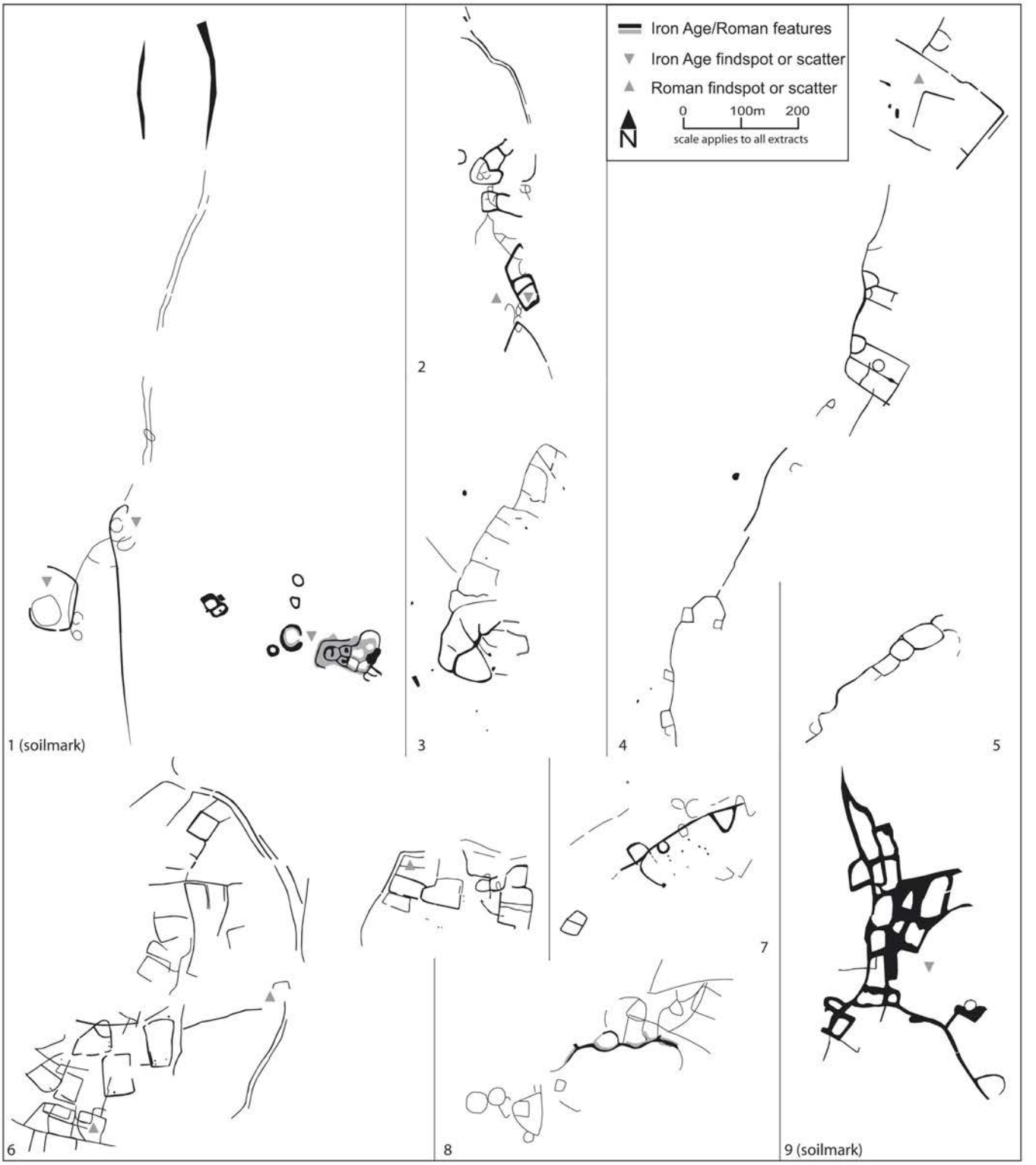
The presence of Iron Age and Roman surface scatters on many of the cropmarked sites, such as Hargrave A, Thorpe Achurch, Islip and Woodford, also points to the probably continuity of use of these sites (*see* Fig 6.12). The problems inherent in using surface material to date buried sites are well established. It is also likely that Iron Age material will be less well represented than the Roman because of the differences in durability, wealth and diversity. However, many of the limitations are a result of the way in which the field-walking data were collected, which was often aimed simply to locate sites. What is now needed is a programme of systematic field-walking, complemented by systematic metal detecting, on a large number of these cropmark sites with known surface scatters, to seek more complex interrelationships between surface scatter and plan form. This may resolve not just the present question, but also contribute to the resolution of many of the issues raised throughout the present text, and representing one of the most important and straightforward research opportunities that flow immediately out of the Northamptonshire NMP project.

It appears likely that earlier frameworks of land division also influenced the layout of larger, more expansive settlements at Great Harrowden, Woodford and Pytchley, and that these continued to grow and develop through the Roman period (*see* Fig 6.12). It is unlikely that the extent of the cropmarks at any of these sites mirrors the extent of settlement at any one time; the remains at Great Harrowden in particular attest to a shift in occupation, which is reflected in the very different form and layout of enclosures in different parts of the visible site. There is considerable evidence for the rearrangement of features within the Harlestone, Pitsford and Church Brampton settlements.

As discussed above not all of the cropmarked boundaries and trackways appear to part of a planned, largely rectilinear system of land division. The sinuous linear features seen in the Rockingham Forest area and across the Great Ouse–Nene watershed are also associated with enclosures and probable settlements. The distinction between these two landscape patterns is exemplified at Strixton where a sinuous double-ditched boundary or trackway meandered down a spur that overlooked the straight grid-like arrangement of boundaries and farmsteads on the valley floor at Wollaston (*compare* Figs 6.1 and 6.13: 2). The Strixton linear group is the focus for a series of rectilinear and irregular enclosures, one of which has been excavated and dated to the Iron Age (Hall 1971).

At Barnwell a long sinuous ditch is flanked by small, widely spaced, rectilinear and curvilinear enclosures, and some larger enclosures or fields, in a manner that is reminiscent of the 'washing line' systems identified in Lincolnshire (Winton 1998, fig 6) (*see* Fig 6.13: 4). These enclosures are undated, but the rather anomalous large rectilinear compound at the north-visible extent of this system enclosed the site of a Roman villa that was partially excavated in 1973 (RCHME 1975, 12). Significantly, these examples, and others at Hackleton, Brigstock, south of Salcey Forest (Milton Keynes), and near Sharnbrook (Bedfordshire), are mostly located on boulder clay, where they are interspersed with the evidence of more rectilinear landscapes like those at Hargrave and Raunds B (*see* Fig 6.11). Further examples are known from this project just across the Bedfordshire and Cambridgeshire borders. Moreover, many of the cropmarked sites on the boulder clay have only come to light in recent years, some after the area had been mapped by the project, and it is likely that others have been and will be discovered by recent and future aerial reconnaissance.

Among the enclosures of possible Iron Age and Roman date there are some particular forms that warrant further discussion. Dix and Jackson have identified a specific type of Iron Age enclosure, the Wootton Hill (WH) style enclosure, which they suggest is primarily defensive in nature (1989). Although as many as 16 examples are now known from excavation, only four of those were visible from the air, and it is difficult to identify comparisons among the unexcavated cropmark enclosures (Kidd 1999, 7). The main feature, the deep, v-shaped profile of the ditches, cannot be ascertained without excavation. While it is fortunate that this project recorded the widths of most cropmarks 'as seen', rather than with a standard line width as is normal NMP practice, this is not always an accurate indication of the width of the underlying ditch, let alone its depth. The remains of the four-post structures and posts and slots for gates that characterise these sites are also generally too slight to produce recognisable cropmarks. Indeed,




at Stanwell Spinney they were not identified on the air photographs, though excavation has shown them to be present on the ground. As a whole, the excavated WH-style enclosures are a morphological diverse group ranging from the near square plan of Briar Hill to the oval layout of Stanwell Spinney. Most are defined by a single ditch, but examples at Briar Hill, Blackthorn and Wootton Hill have two, although there is a plausible argument for the inner ditch at the latter being a drain (Jackson 1988–9, 10).

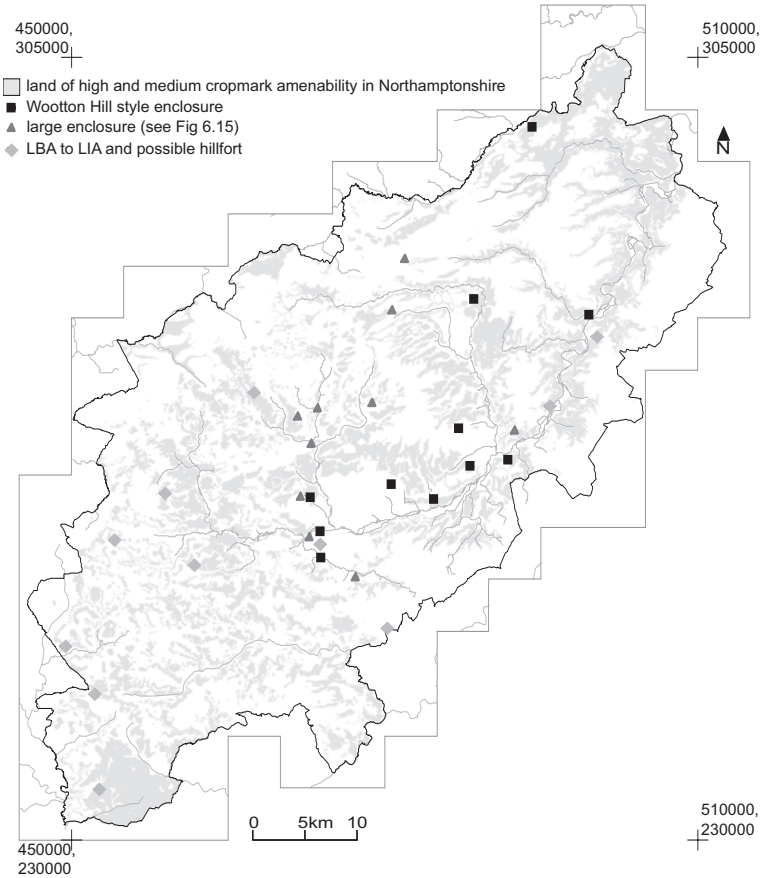



*Fig 6.14*
*Distribution of excavated Wootton Hill style enclosures (after Jackson 1998–9, Kidd 1999, 7) and large enclosures (see Fig 6.15) (scale 1:725 000).*

Moreover if, as is suggested by Dix and Jackson (1989, 166), the WH-style enclosures were specifically a defensive response to the situation in the area between 100 BC to 100 AD, then any further candidates for this type must of be of this date and un-excavated enclosures simply cannot be dated with such accuracy, if at all.

The majority of the known WH-style enclosures are evenly distributed on either side of the Nene, between Briar Hill in the west and the Ise confluence in the east, with outliers at Weekly, Aldwincle and Wakerley (Fig 6.14). Most were built on the permeable geologies. Proximity to the rich nodular iron at the Estuarine Clay outcrops is a common factor, but the possibility of coincidence should not be overlooked; there is little evidence from the excavations that iron-working was a significant activity at these sites.

While the Wootton Hill Farm enclosure enjoyed very extensive views of the valleys to the south and west, its outlook to the north and north-east was obscured by Briar Hill, and it would have been difficult to defend against an attack from this direction. Conversely, the possible WH-style enclosure on the other side of Briar Hill had those views, but land to the south was shielded. Only the enclosure at Great Doddington has the topographic advantage of these two enclosures. Those at Blackthorn, Weekley, Stanwell Spinney and Wakerley are in inferior positions with some dead ground in their immediate vicinity, and views from the Aldwincle, Irchester, Kings Heath and Wilby Way examples are very limited, or greatly interrupted. As many of these enclosures were founded on earlier settlements (Jackson and Dix 1989, 164), defendability was presumably not a primary consideration in the choice of site.

Double-ditched enclosures are numerous in Northamptonshire, and a proportion of these were probably built in the Middle to Late Iron Age. Many are smaller than 0.2ha, rectilinear in plan and occur in association with either dispersed groups of simple enclosures, or more ordered linear or polyfocal arrangements. The Blackthorn WH-style enclosure is of this form, but most examples probably fulfilled a range of functions from settlement to stock management, and the presence of two ditches may have been incidental to their use.

The possible double-ditched WH-style enclosure on Briar Hill was significantly larger, and trial excavation produced a small amount of Iron Age pottery. The ditches were more than 2m wide and set 13m apart, which, even allowing for a generous berm, may indicate the presence of a very substantial bank or rampart. Enclosures of comparable plan and size have been recorded at Old A, Creaton, Quinton and Finedon (Fig 6.15). The interior of the Briar Hill enclosure could not be investigated before development and thus the context and function of the site are unknown. By comparison the unexcavated Old A enclosure provides a wealth of detail (Fig 6.15: 3). The inner ditch is narrower than the outer, a characteristic common to the Creaton enclosure and more exaggerated in the Quinton circuits (Fig 6.15: 5 and 6.15: 4). These may have been trenches that held a timber retainer against an inner bank similar to the arrangement visible in the cropmarks of Irthlingborough hillfort and confirmed by excavation (Parry 2006, 145). Narrow gullies divide the interior of the Old A example into four uneven sections, and huts fall within each section, although these arrangements were not necessarily all contemporary. The enclosure's north-west facing entrance opened into an area divided

into small narrow plots by straight ditches and to the north-west there were at least eight conjoined paddocks or fields. There was no evidence for houses within the Creaton and Quinton enclosures, but the former has a small corner enclosure and there are other enclosures or paddocks clustered around the entrance of the latter. These examples are similar to the Briar Hill WH-style enclosure, which Dix and Jackson 1989 suggested was defensive in function, but, as discussed above, it difficult to assess the defensive capabilities of enclosure ditches and long removed banks from the cropmarks alone. Perhaps similar to these are the large broad-ditched enclosures at Spratton B, Wilbarston B and Rothwell (*see* Fig 6.15: 9–11).

The Briar Hill enclosure was built on a north-facing slope, with the Hunsbury hillfort on the summit and the River Nene below, and the enclosures at Finedon, Spratton B

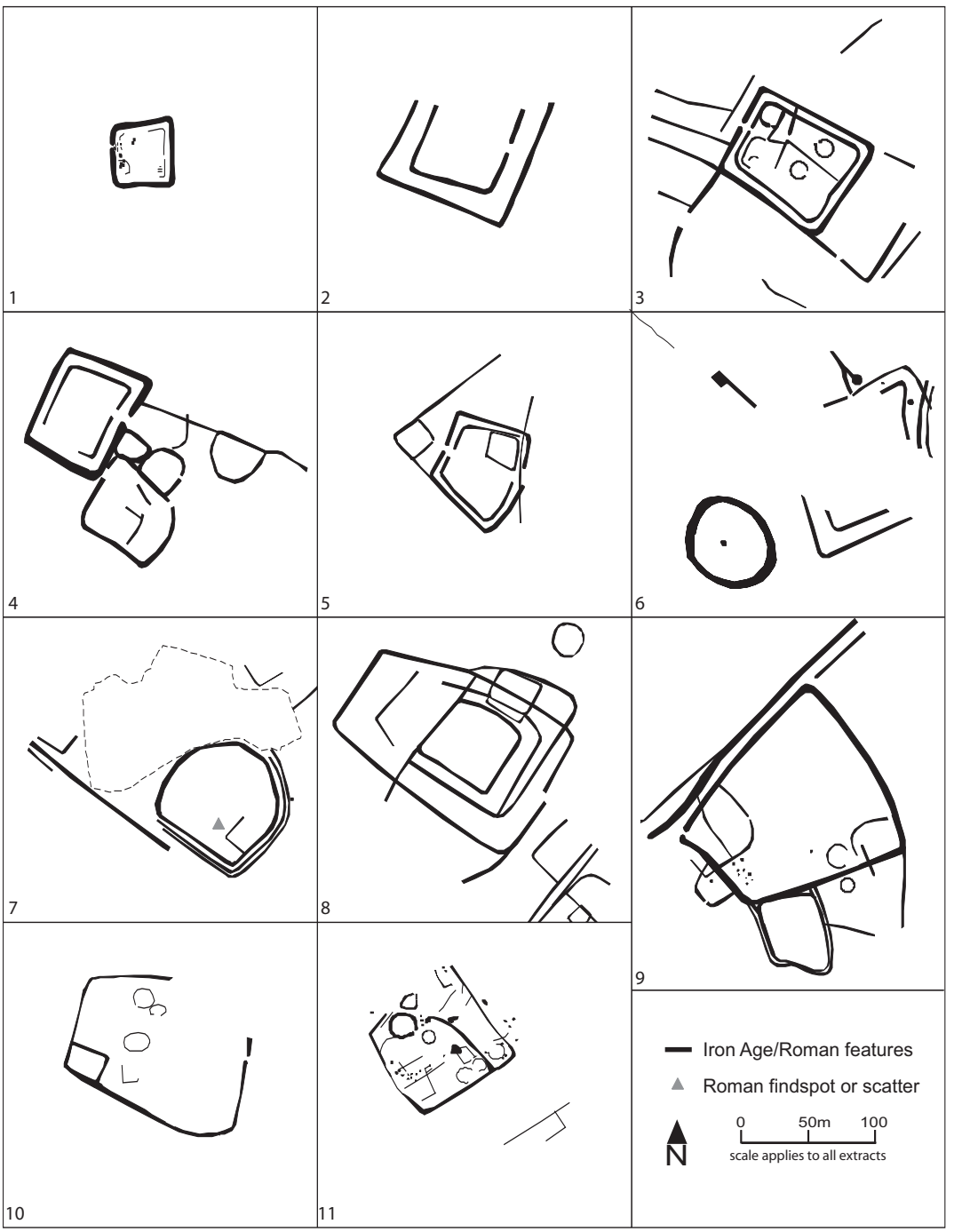



*Fig 6.15*
*Large enclosures:*
*1 Wootton Hill Farm (after Jackson 1988–9;*
*2 Northampton (Briar Hill);*
*3 Old A;*
*4 Quinton;*
*5 Creaton;*
*6 Finedon;*
*7 Chapel Brampton B;*
*8 Northampton (King's Heath);*
*9 Spratton B;*
*10 Wilbarston B;*
*11 Rothwell)*
*(scale 1:5 000).*

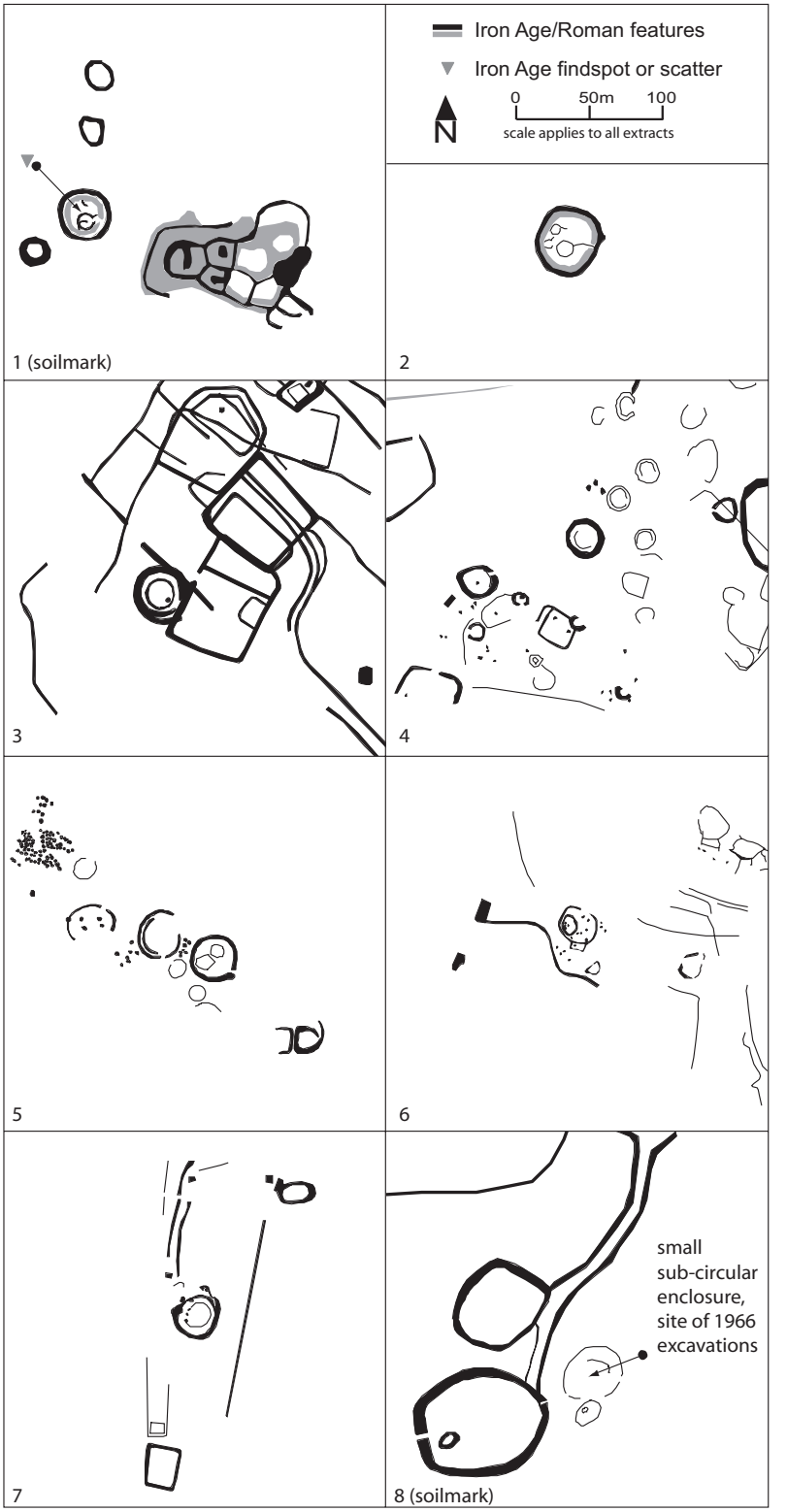



*Fig 6.16*
*Small sub-circular enclosures:*
*1 Brigstock, composite NMP and excavation plan (after Jackson 1983, figure 3);*
*2 Draughton, excavation plan (after Grimes 1961, figure 11.3);*
*3 Church Brampton;*
*4 Byfield;*
*5 Staverton;*
*6 Newbottle;*
*7 Cranford B;*
*8 Bozeat A)*
*(scale 1:5 000).*

and Rothwell likewise occupy mid-to-top-of-slope positions. Each of the examples at Old A, Quinton and Creaton were constructed in low-lying positions, but within 500m of a major stream and with water courses on three sides.

Only the Chapel Brampton B enclosure has produced surface finds, but this may be due simply to a lack of field-walking at the other sites.

In their discussion of the Wootton Hill Farm and other defended enclosures, Dix and Jackson also alluded to the possible defensive nature of two small, sub-circular enclosures at Draughton and Brigstock (1989, fig 10.3). The Monuments Protection Programme description for the WH-style enclosure specifically excludes these two sites, and the excavator of the Draughton enclosure conceded that it did not hold a strong defensive position (Grimes 1961, 21; MPP 1989a). Both enclosures have been dated to the Iron Age and were characterised by broad ditches and substantial internal banks (Grimes 1961; Jackson 1983) (Fig 6.16). Space within the enclosures was limited; at Draughton, 0.07ha and Brigstock just 0.04ha. Both enclosures contained one substantial hut and possibly other smaller huts or shelters, some of which may have preceded the enclosures. Both were built on boulder clay, and survived as earthworks into the 20th century. The Draughton enclosure was destroyed during the construction of a wartime airfield and the Brigstock example was visible as the soilmark of a recently denuded earthwork. The Brigstock example lay within 30m of a tight clustered arrangement of curvilinear enclosures, but although these are probably of Iron Age date they have not been fully investigated and the relative chronology of the two sites is unknown (Jackson 1983, 18–19).

Similar to the Draughton example are the sub-circular enclosure and its internal hut circle that were excavated at Bozeat A (*see* Fig 6.16: 8). The enclosure ditch was 2.4m wide but only 0.9m deep, although soilmarks at this site suggested that it too once had an internal bank (Hall 1971, SP8656/005). The internal area was again very small. The settlement was part of a group of recently-levelled enclosures, tracks and boundaries on the boundaries of Easton Maudit and Bozeat parishes, and among which there may be other comparable sites (*see* Fig 6.16).

Beyond this area there were few direct comparisons, and evidence for the presence of banks is generally unforthcoming from long-levelled, cropmarked sites. At Church Brampton, Byfield, Staverton and Cranford B there are enclosures of similar size and plan with broad ditches, each with one or more internal hut (*see* Fig 6.16: 3–7). The Cranford B example had a small, rectangular annex outside the broad ditch, an arrangement that is mirrored at Newbottle (Fig 6.16: 6). The narrow circuit of the Newbottle example suggests that it was enclosed by a palisade trench rather than by a ditch and bank.

Although these small sub-circular enclosures are characterised by defensive-scale boundaries it is far from clear that defence was their primary function. None is in a particularly strong position and their small size would have left them easily surrounded by attackers. The economy at Brigstock is thought to have centred on sheep farming and associated crafts (Jackson 1983), but there would have been little space to harbour livestock within these enclosures in the face of an external threat. Grimes has suggested that the Draughton enclosure was the dwelling of iron workers who kept their raw materials close at hand (1961). Although there was little to indicate it in the material retrieved from the excavated examples, these sites may have been the expression of the different, perhaps elevated status and standing of a small family group. It may be of further significance that several of the examples where located close by other, larger settlements.

Thirty metres east of the small sub-circular enclosure at Brigstock lie the remains of a tight cluster of small sub-circular and curvilinear enclosures of possible Iron Age date (Brigstock B) (Jackson 1983, 19). A recently-denuded earthwork, the well-defined soilmarks suggest the presence of internal banks and small internal areas (Fig 6.17: 1). Similar clusters have been recorded 8km to the north-east at Benefield and in the south of the county at Easton Maudit (*see* Fig 6.17: 5 and 6.17: 3). Unfortunately, bank material rarely survives in areas with a long ploughing history, so other direct comparisons are difficult to make. However, the accreted arrangement of small curvilinear enclosures is reflected in settlements at Great Houghton, Loddington, Finedon and Old B (*see* Fig 6.17: 2, 6.17: 4, 6.17: 6 and 6.17: 9.). Trial excavations of the cluster of curvilinear enclosures at Bozeat B have confirmed the presence of Late Iron Age to Roman period activity in the area, but interestingly also Early to Middle Saxon remains (*see* Fig 6.17: 7). The nature of the elements that were visible from the air has yet to be fully revealed, but geophysical survey has confirmed their presence, as well as an unseen extensive system of small fields and paddocks and enclosures in the area to the south.

The small sub-circular enclosures and clustered small curvilinear enclosure settlements are rather anomalous to the generally more regular and rectilinear plan of most Middle to Late Iron Age enclosures, although this apparent conformity doubtless belies a great variety of date, function and longevity. Among the other enclosures types there are small, irregular enclosures and settlements that are undated, have no

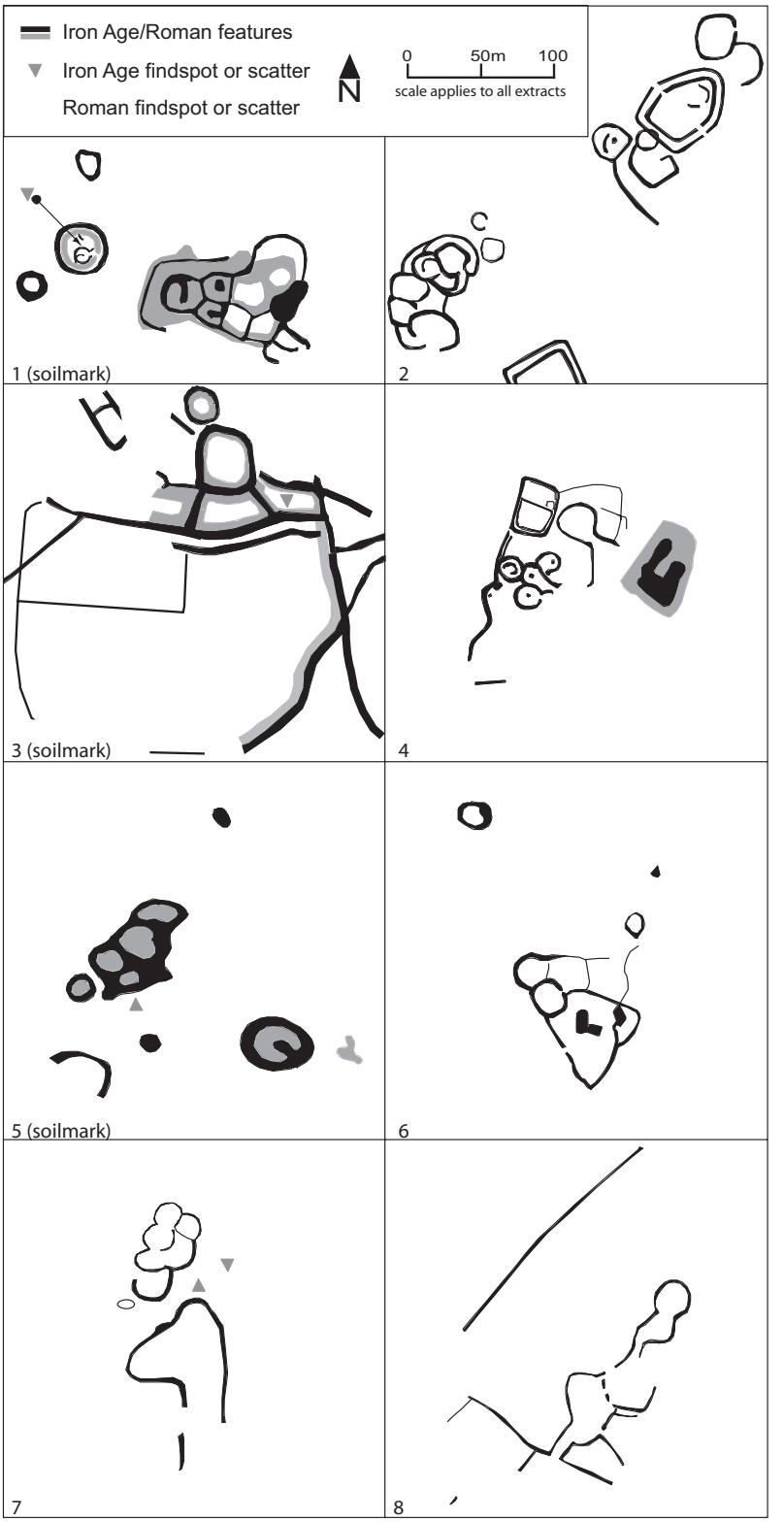



*Fig 6.17*
*Clustered small curvilinear enclosures:*
*1 Brigstock B, composite NMP and excavation plan (after Jackson 1983, fig 3);*
*2 Great Houghton;*
*3 Easton Maudit;*
*4 Loddington;*
*5 Benefield;*
*6 Finedon;*
*7 Bozeat B;*
*8 Old B)*
*(scale 1:5 000).*

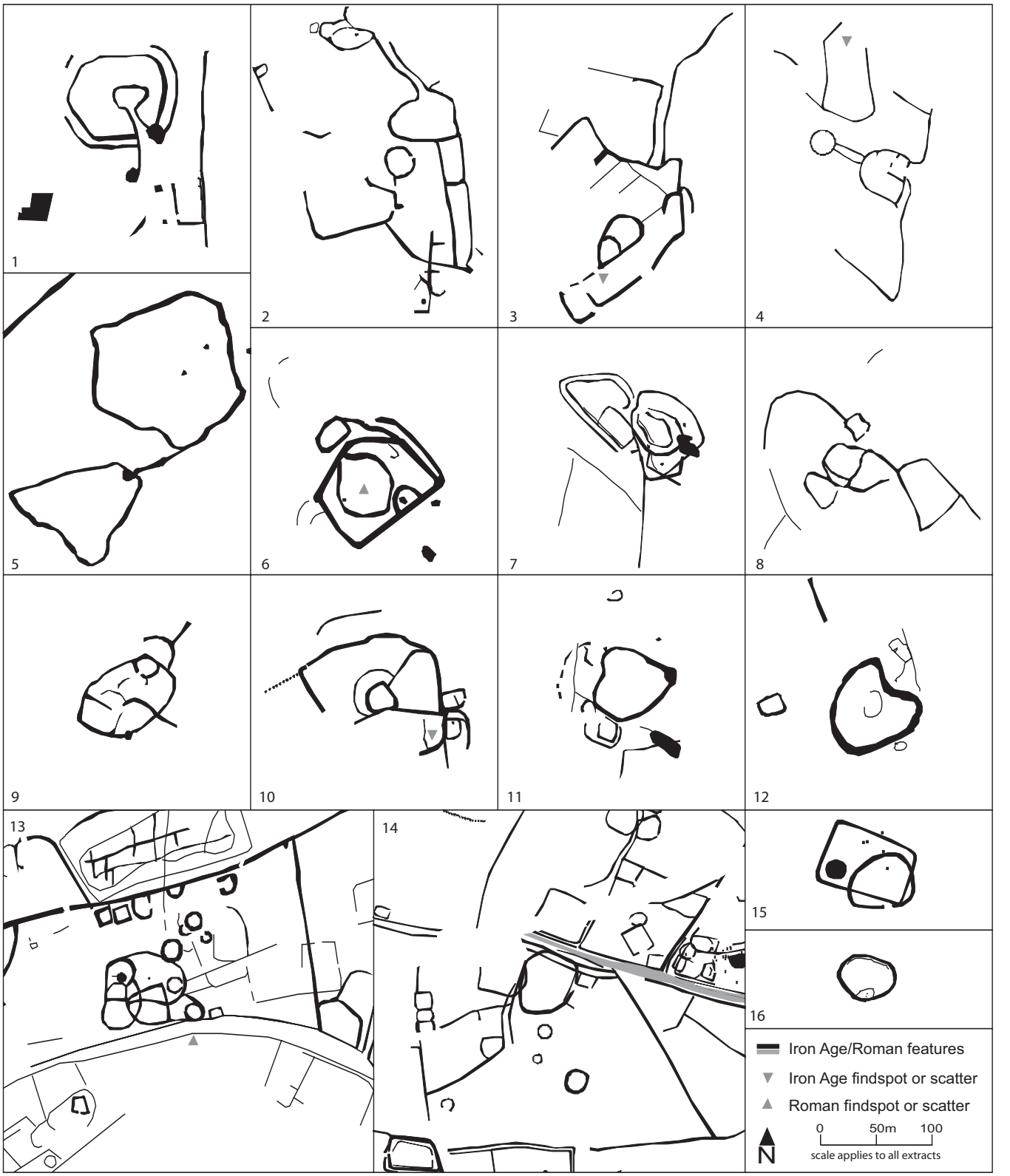



*Fig 6.18 Irregular and curvilinear enclosures: 1 Bozeat C; 2 Evenley; 3 Castle Ashby A; 4 Brafield on the Green; 5 East Carlton; 6 Irchester; 7 Sulgrave A; 8 Rushden B; 9 Castle Ashby B; 10 Little Houghton A; 11 Cranford C; 12 Mears Ashby A; 13 Great Harrowden; 14 Harlestone; 15 Moulton B; 16 Wellingborough) (scale 1:5 000).*

excavated parallels and generally resist classification. Settlements at Bozeat C, Evenly, Castle Ashby A, Brafield, Irchester and Sulgrave A each contain a diverse range of enclosures and other elements, but the common presence of a funnel-like entrance or track invites their comparison with Middle to Late Iron Age banjo enclosures (Fig 6.18: 1–4 and 6.18: 7).

Groups at Great Harrowden, Harlestone and Moulton B are united by the common juxtaposition of the curvilinear enclosure against a landscape of otherwise rectilinear arrangements (*see* Fig 6.18: 13–15). It is interesting to note that each appears to be an early development of each site. The Wellingborough curvilinear enclosure is distinguished by the presence of a possible internal palisade trench (*see* Fig 6.18: 16). The distinctive lobed plan of the Cranford C and Mears Ashby A enclosures is also seen in an element of the linear settlement at Strixton (*see* Figs 6.18: 11–12 and 6.13: 2). Such irregularity may arise from the presence of unseen constraints rather than a choice of style, and so any coincidence of plan form may be meaningless.

## Farming and industry

Understanding of the nature and character of later prehistoric farming in Northamptonshire is not particularly well-developed, and is limited to the evidence of a few key sites (*see* Kidd 1999, 9).

The evidence from sites along the Nene Valley floor and sides – Wollaston, Raunds, Blackthorn and Wilby Way – is consistent with a landscape that was cleared of woodland by the Bronze Age and remained open through the Iron Age. (Williams and McCarthy 1974; Meadows 1995; Thomas and Enright 2003; Campbell and Robinson 2007). Environmental evidence of the conditions on the higher ground, the boulder clay-capped plateaux and Lias upper ground, is sparse.

Farmers in the Iron Age settlements at Wollaston and Stanwick are thought to have engaged in a mix of pastoral and arable cultivation (Robinson 1992, 205; Meadows 1995, 44). The valley-side settlement at Twywell may have cultivated some crops, but the predominant activity was probably pastoralism complemented by associated crafts, such as weaving and possibly dyeing (Jackson 1975, 66). Beyond the valley and up onto the boulder clay, Jackson observed that the soil was fertile but thin and, with underlying clay, would have been difficult to plough; and that, again, the economy of the settlement was focussed on sheep rearing and the processing of wool (1983, 21).

The small rectilinear and curvilinear enclosures, interpreted by some as animal pens, are ubiquitous at the known open settlements and common at most other Iron Age settlements, and may attest to the significance of pastoralism at this time.

The management of the livestock in the wider landscape is more difficult to reconcile with landscapes revealed by the project. The pit-defined and ordered land parcels laid down in the Late Bronze Age and Early Iron Age are unlikely to have been the sole agent in the containment of stock, not least because the pit alignments would have been a permeable and thus ineffective barrier. It has been suggested that the large, sub-oval area at Newbottle, with its funnelled uphill exit, may have been a large cattle corral, and it is interesting that this feature appears to be embedded within the more regular rectilinear landscape (*see* Fig 6.3). The funnel-like entrances of the enclosures at Bozeat C, Evenley, Castle Ashby A, Brafield, Irchester and Sulgrave A may also point to the importance of controlling stock movement at these sites.

On the valley floor at Grendon a system of undated spade-dug trenches, possibly for growing grape-vines, appears to be have been contained by the arrangement of pit alignments (Jackson 1997). In general though, it is perhaps unlikely that land parcels thus defined were conceived as individual fields. It is possible that they were subdivided by more ephemeral features, such as hedgerows or fences, marking the divisions of ownership and to protect crops from animals, both wild and domesticated.

It has been argued that the density of Iron Age settlement, the predominance of sheep over pigs and deer, and the presence of quernstones in the claylands around Brigstock indicate an open landscape with the possibility of cereal production (Jackson 1983, 22). However, there is insufficient evidence to support or refute this inference. Robinson has noted that although the boulder clay areas of both the Rockingham Forest area and the Nene-Ouse watershed were occupied at this time, this affected no major changes on the Nene floodplain in the manner that extensive ploughing was to do in the Late Saxon and medieval periods, when arable expansion over most of the boulder clay plateaux is well documented

(1992, 206). The absence of any indication of a major alluviation event on the valley floor at this time suggests that ploughing and cultivation on the boulder-clay-capped watersheds were minimal, and that a stable ground surface was maintained by permanent grassland and, in some areas, woodland as the following industrial evidence implies.

Of the other crafts and industries practised in the Iron Age, iron smelting has left the most tangible physical remains (*see* Panel 2). Direct evidence for possible Iron Age smelting, in the form of hearths or furnaces, has been recovered in the parishes of Great Oakley, Wakerley and Harringworth, all in the Rockingham Forest area (Jackson and Ambrose 1978; Jackson 1981, 26; Jackson 1982). A wider distribution of iron working activities can be inferred from the distribution of iron smithing and smelting slags. Slags of Iron Age, Roman or uncertain date have been recorded at more than 160 sites, either during excavation or field-walking (from the SMR and D Hall pers comm). The dating of such material is often based on spatial associations to other features, a particularly precarious method for surface finds.

At approximately one fifth of these sites the iron working slag has been tentatively dated to the Iron Age. The greatest concentration of possible Iron Age slag has been found in south-west of the county in the Whittlewood and Salcey Forest areas (Fig 6.19). Relatively little of Iron Age date has been recovered and identified from the Rockingham Forest area beyond the known Iron Age hearths. In the south, slag has been recovered from an area largely covered by boulder clay and where, although the nodular outcrops found in the north-east of the county are absent, iron-rich erratics could have provided a local source of ore. The fuel requirements of even small-scale iron working imply the availability of appropriate fuel and possibly even managed coppice woodland. It may be no coincidence that the main foci for iron working were on boulder clay soils that have always been the least suited to arable or pastoral agriculture and the most appropriate for woodland (Beaver and Allen 1943).

In the Whittlewood and Salcey Forest areas much slag was recovered from the vicinity of probable Iron Age enclosures, particularly in the parishes of Bozeat, Yardley Hastings and Easton Maudit. However, the evidence of the excavated Rockingham Forest hearths suggests that smelting often took place beyond the confines of settlements. The distinction between smithing and smelting slags is an important one (*see* Panel 2); unfortunately they cannot be readily differentiated in the record sources, although the majority are thought to be the result of smelting.

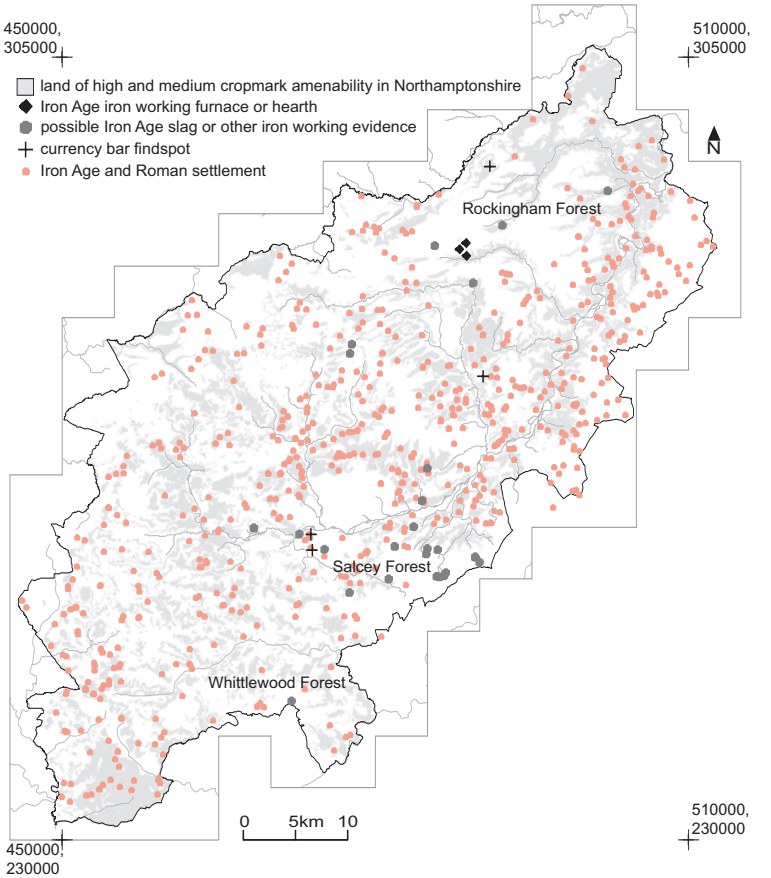



*Fig 6.19*
*Distribution of Iron Age iron working furnaces and hearths, possible Iron Age slag or other iron-working evidence and iron currency bars (after SMR and D Hall pers comm) (scale 1:750 000).*

Looking elsewhere for evidence of iron working, the quantity of slag recovered from the Castle Yard hillfort, Farthingstone, suggests some industrial processing, but, as it came from within the rampart core, it is possible that this took place prior to the hillfort's construction (Knight 1986–7, 39). Smaller quantities have been recovered from the Daventry and Rainsborough hillforts and, although slag was notably absent from Hunsbury hillfort, the discovery of unfinished iron goods suggests some iron working was also undertaken on that site or in the surrounding area (Jackson 1993–4, 44). At Draughton, on the edge of Rockingham Forest, Grimes interpreted the presence of rich ironstone blocks as evidence of its occupation by a small group of iron workers, although presumably all work took place beyond the enclosure, as no

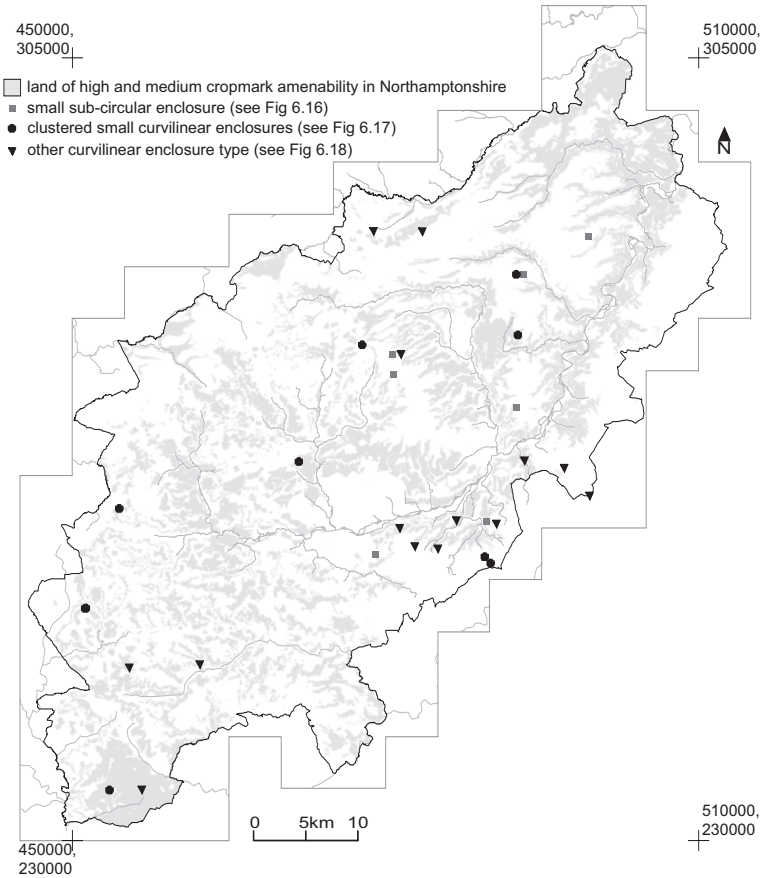



*Fig 6.20*
*Distribution of small sub-circular enclosures, clustered small curvilinear enclosures and other curvilinear enclosures (see Figs 6.16–6.18) (scale: 725 000).*

slag was reported. (1961, 21–3). A small quantity of slag was recovered from the Wootton Hill Farm enclosure, as was part of single currency bar, but on the whole iron working does not appear to have been a significant activity at the other WH-style enclosures that have been excavated.

Iron currency bars have been recovered from the Wootton Hill Farm enclosure and Hunsbury hillfort; hoards of more than 80 and 40 bars were found at Burton Latimer and Gretton, respectively, and others come from just outside the county at Madmarston Castle, near Banbury, Oxfordshire, and from Orton Meadows, near Peterborough (Hingley 1990). Their presence is undoubtedly of some relevance to the state of the iron industry of the time, but their precise significance is debated. Ehrenreich has suggested that the bars were the stock of a mobile blacksmithing community and others have claimed that they were buried for safekeeping (Allen 1967, 318; Ehrenreich 1985, 78). Hingley, though, has refuted the solely practical interpretation of the bars, which come in at least three different forms – plough, sword and spit – and he doubts that any iron worker would be ignorant of the likely degradation to iron work that burial would cause (Hingley 1990). He suggests that in the context of burial (or, as in the Orton Meadow example, watery deposition), often of bars that were deliberately broken or bent, these acts with the bars fulfilled some symbolic function. This alternative interpretation should not detract from the significance of these objects being available in the county, and that perhaps processed iron was sufficiently abundant that substantial quantities could, as Hingley puts it, be 'decommissioned'.

## Discussion

The character of Middle to Late Iron Age and Roman rural settlement in Northamptonshire is variable. The dominant pattern seems to have been one of dispersed settlement in small groups, either in or around small clusters of rectangular enclosures or small open settlements. Distinctive among these are the Iron Age small sub-circular enclosures and possibly some of the WH-style enclosures, whose massive ditches and banks, although suggestive of defence, may have been an expression of higher or different status.

There are expansive open settlements, such as at Ecton A, Catesby and Byfield, but it is unclear if these represent substantial communities or simply settlement drift and longevity. The arrangements of huts within some of larger enclosures, such Old A, Wilbarston B and Rothwell, may have supported larger groups.

In many areas, such as like Wollaston and Harlestone, numerous small settlements and farmsteads developed within a framework of older boundaries, suggesting that communities of were unified in their common observance of the inherited boundaries.

There is recurrent, albeit piecemeal, evidence that many of the Middle to Late Iron Age settlements developed within and with reference to planned landscapes established in the preceding centuries.

However, from certain areas, particularly on the claylands, impressions of different landscapes are emerging. The claylands are as yet poorly understood, despite a considerable history of investigation and excavation. Nonetheless, some key trends can be identified. The distribution of settlements like Brigstock A and B, which are quite distinctive from the majority of rectilinear-plan settlements, show a bias towards the less well-drained soils, in the

Rockingham Forest area and in the Nene-Ouse watershed (Fig 6.20). Other unusual forms, such as the antennae entrance enclosure, are similarly concentrated on the boulder clay between the Nene and the Ouse. The distinctive plan form of these settlements may reflect a specific strategy for farming and general landscape management in these areas.

Cropmarks or soilmarks of extensive boundary and settlements systems are sparse in the Rockingham Forest area, where the combined influence of soils, geology, historic and present land use reduce visibility from the air. However, such landscapes do occur extensively on the boulder clay of the Whittlewood-Salcey and Bromswold areas, where they are visible as cropmarks. Some of these settlements, like those at Hargrave A and B and Raunds B, display the regularity seen elsewhere on more permeable geologic conditions, but they are interspersed with more sinuous linear settlements and more meandering trackways, as at Strixton and Barnwell (*compare* Figs 6.12: 8, 6.12: 9, 6.12: 11 with 6.13: 2 and 6.13: 4). While topography is a possible influence in the overall routing of these features, it does not appear to be a direct factor in the localised irregularities and sinuosity, and there may have been other unseen influences. Despite Jackson's doubt that any extensive woodland existed on the claylands in the Iron Age, accumulated circumstantial evidence suggests that the heavier soils may have supported a mosaic of grassland and managed woodland. The apparent absence not only of Neolithic and Bronze Age monuments, but also of any contemporary sites or find spots, may be significant (*see* chapter 4, Figs 4.10 and 4.11). This evidence may indicate that these parts were not substantially cleared of trees in these periods. Certainly the demand for timber for building, and underwood fuel for the iron and pottery industries, can only have increased through the Iron Age and Roman periods, and it is to be expected that, as in later centuries, these industries were located very close to their sources of fuel.

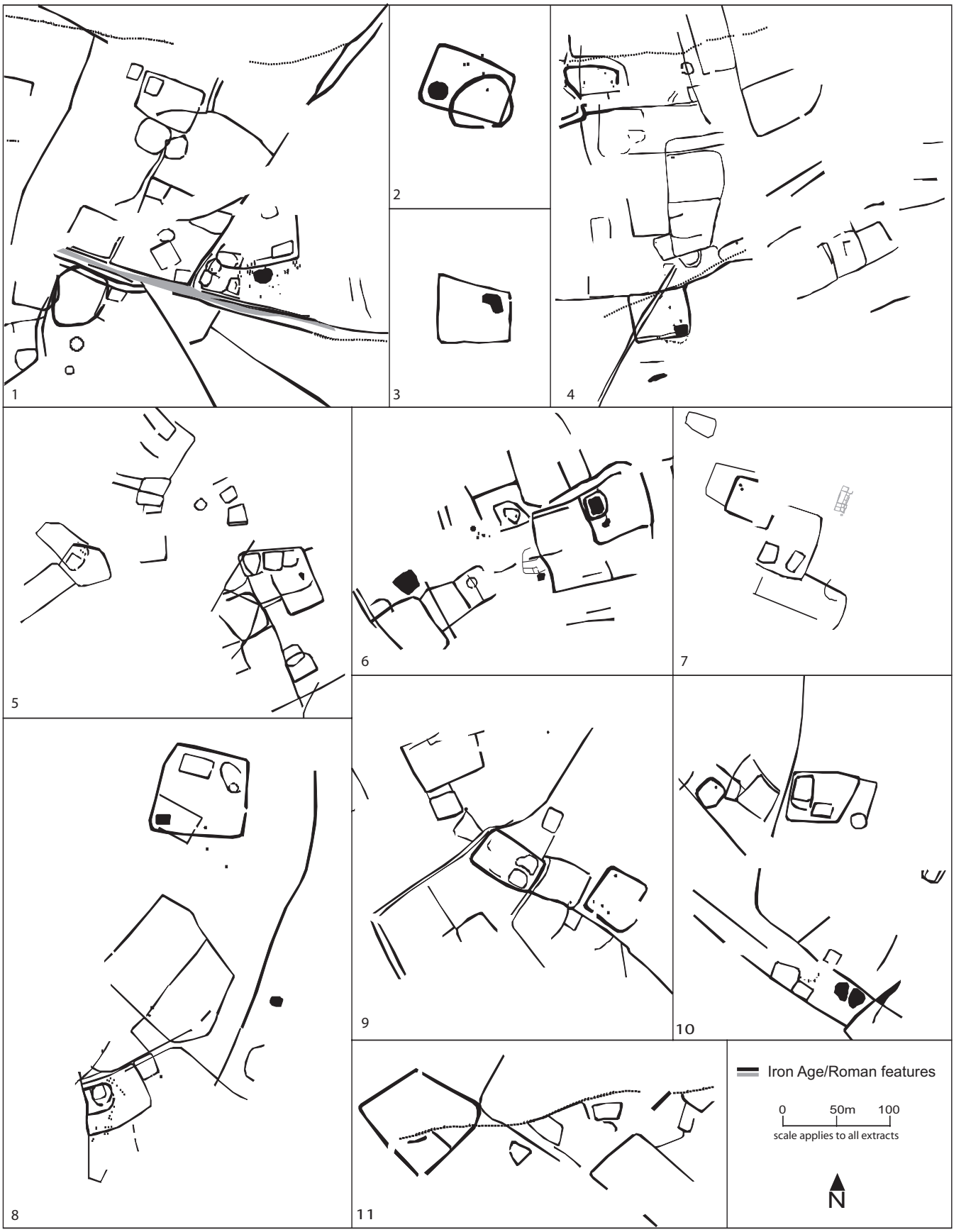
## Roman Northamptonshire

### Rural settlement

Many of the rural settlements established in the Iron Age continued in use in the Roman period, as demonstrated by mixed Iron Age and Roman surface scatters, including many from cropmarked sites (*see* Figs 6.11–12 and 6.16–18). However, at most sites it is difficult to distinguish any Roman elements from earlier settlement from NMP mapping alone, and in the absence of intensive, targeted and systematic field-walking studies, the correlation between surface finds and individual cropmarked features is too crude. Thus, some of the following suggestions of distinctions between Iron Age and Roman enclosures await more rigorous testing.

During the Roman period there was a change in building architecture from circular to rectilinear plan, and from timber construction to the increasing use of stone, but these developments were gradual and occurred with some geographic variations (Taylor 1999, 4). At Moulton D a large, well-defined, rectilinear cropmarked maculae or pit-like feature was revealed to be a stone-built, cellared structure of Roman date (feature 280 in NA 1999c, 10 and 91). This building was found at the south-east corner of a large rectangular, ditch-defined enclosure, which itself abutted a longer linear ditch that lay parallel to the stream below (Fig 6.21: 4). Farther east, a series of at least three enclosures or paddocks abut the same ditch. Interestingly though, the ditch and enclosure cut obliquely across a pit alignment, which is presumed to be of earlier date and part of a wider land division (*see above*). Farther east again, along this small valley, and in the same parish, there is a second enclosure with a similar, although less regular, corner macula, perhaps an indication of a similar structure (Moulton B) (*see* Fig 6.21: 2). Interestingly, the rectilinear enclosure intersects the ditches of a distinctly curvilinear enclosure, which may be an earlier settlement or, as the name Castle Field suggests, a small ringwork of medieval date (Brown and Foard 1994, 121). There is a third example of a possible building in the same parish (Moulton C) and others at Scaldwell B (*see* Figs 6.21: 3 and 6.21: 8).

At Little Houghton B there are a series of enclosures and paddocks within which there are traces of similar possible buildings, and a round house (*see* Fig 6.21: 6). One of the possible buildings is enclosed by a ditch. This site has produced some evidence of Iron Age occupation, but also Roman pottery production, and it is likely that most of the visible enclosures and possible buildings relate to this phase of the site's occupation (RCHME 1979, 86).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Roman pottery production is also in evidence at a settlement at Long Buckby, where the cropmarks have revealed a dispersed arrangement of fields and enclosures, and of smaller rectilinear enclosures, across the hillside (*see* Fig 6.21: 10). There is a similar poly-focal settlement less than 2km east at East Haddon (*see* Fig 6.21: 5). Common to these, and to other settlements at Harlestone, Wollaston and Harpole, are the small rectilinear enclosures inserted at the edges or corners of rectilinear or polygonal enclosures. At present there are no known excavated correlates for these features, so any interpretation or dating is supposition. Certainly these enclosures are too large to be the actual foundation trenches of buildings, but they may have been dug to separate rectangular-plan buildings of either timber or stone from other activities and/or livestock. It may be significant that the Wollaston examples lie so close to the villa building.

The nature of continuity at sites of Iron Age settlement is undoubtedly complex. At Wakerley, during the Roman period, activity continued and indeed increased around the large Iron Age enclosure that lay south of the largely unenclosed settlement (Jackson and Ambrose 1978). The enclosure was re-defined and extended, and became the focus for corn-drying, pottery firing and iron-working. An aisled barn was built within the enclosure, but most occupation appears to have shifted, presumably beyond the area of investigation, possibly to a nearby villa. A similar scenario was played out at Weekley, with the addition that a Roman Road was cut oblique across the dominant alignment that had so influenced the development of the Late Iron Age settlement (Jackson and Dix 1986–7) (*see* Fig 6.10: 1).

Even at Great Doddington, where the great ditches of the enclosure were infilled in the Roman period, the presence of Romano-British debris in the ditch fills indicates the likelihood of contemporary settlement near by (Windell 1981).

## Villas

At the time of writing there were 93 known or suspected villas in the county. Much of the evidence has been collated from the existing records and publications in a country-wide survey by Scott (1980, 139–49). The location information in this publication is very coarse, and so wherever possible SMR data have been used to more accurately locate the known sites for this discussion. There may be an over-estimation of the number of villas because interpretation is based solely on surface finds of building materials.

This project has recorded possible evidence for 34 of these villas. In 22 cases the foundations or robber trenches of former buildings were visible from the air, and in four of those they were surrounded by a large enclosure or compound (Fig 6.22). The evidence for the villa structures themselves indicates considerable variability in architecture and size. Compounds, enclosures or ditches have been recorded at the sites of the other 11, but it is possible that these relate to other periods of occupation on the same site (Fig 6.23). The enclosures recorded at Thurning, Nassington B and Sulgrave B may also have been built around villas, but no evidence of any internal structures at these sites has yet come to light. Taylor has noted that enclosure of villa sites occurred relatively late (Taylor 1999, 3).

The known and potential villas are densely concentrated along the River Nene and the valleys of minor tributaries, in places the distance between neighbouring sites is no more that 1km to 2km, although of course not all were necessarily contemporaneous (Fig 6.24). There is a much more sparse distribution on the Lias clays in the north and west of the county, but there is a considerable presence on the boulder clays of both the Rockingham Forest area and the Nene-Ouse watershed. The concentration in the north-eastern part of Rockingham Forest may, in part, reflect the proximity of the major Roman town of Durobrivae, while management of the substantial iron industry by villa estates might also have played its part in generating this distribution.

Roman stone buildings of circular plan have been excavated at Ringstead, Overstone and Thorplands, and are visible at the villa sites of Cotterstock, Great Doddington, Stoke Bruene and Blather-wycke, and at the small town of Titchmarsh. The nature of the evidence at Thorplands, a settlement of 'reasonable prosperity' engaged in animal husbandry and small-scale iron working, suggests that the circular stone building was not in itself a dwelling of high status (Hunter and Mynard 1977, 108). In the other examples, the spatial relationship between the circular buildings

*Fig 6.21 (opposite) Possible Roman elements among Iron Age and Roman rural settlement: 1 Harlestone; 2 Moulton B; 3 Moulton C; 4 Moulton D; 5 East Haddon; 6 Little Houghton B; 7 Wollaston; 8 Scaldwell B; 9 Harpole; 10 Long Buckby; 11 Holdenby) (scale 1:5 000).*

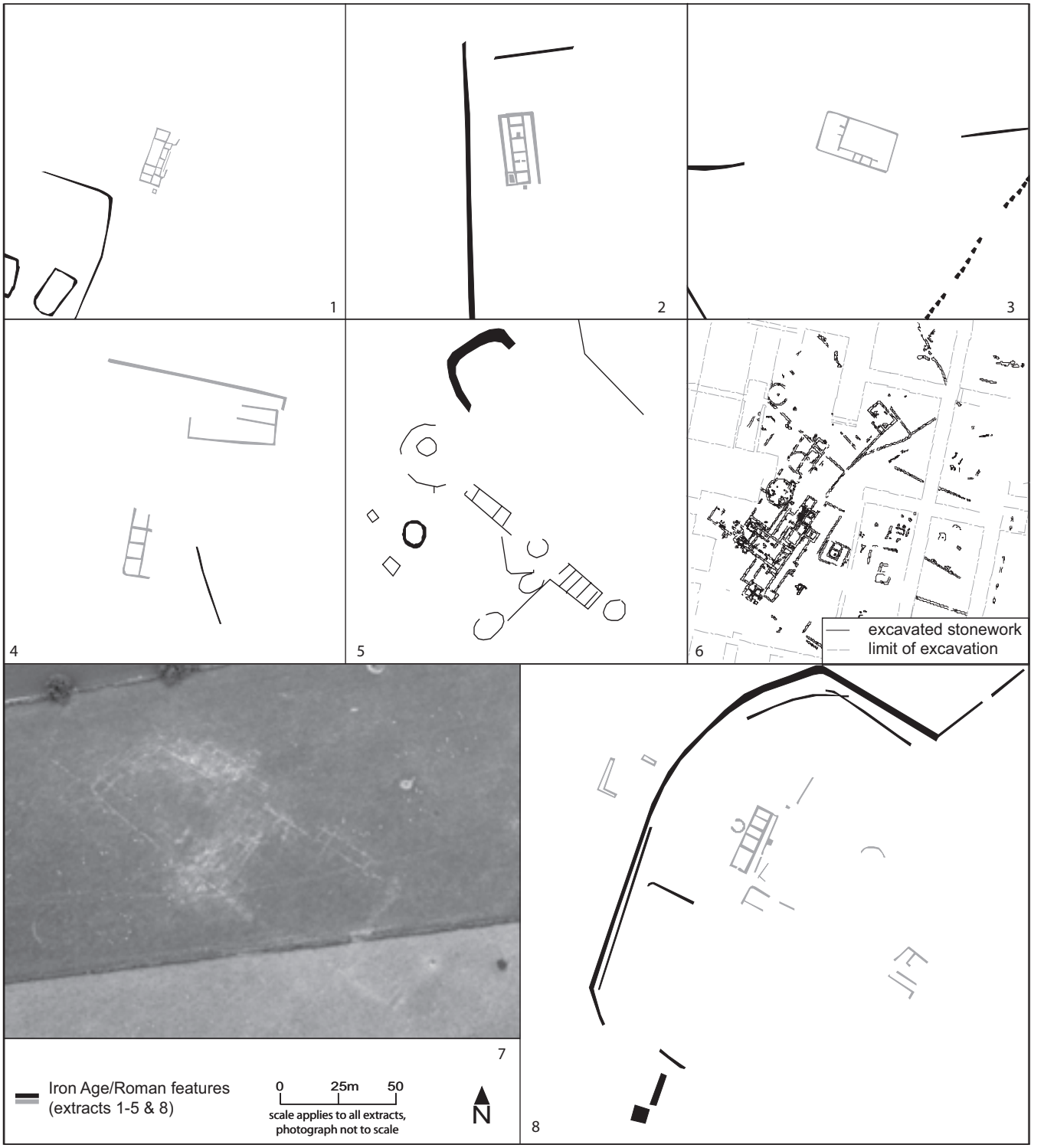
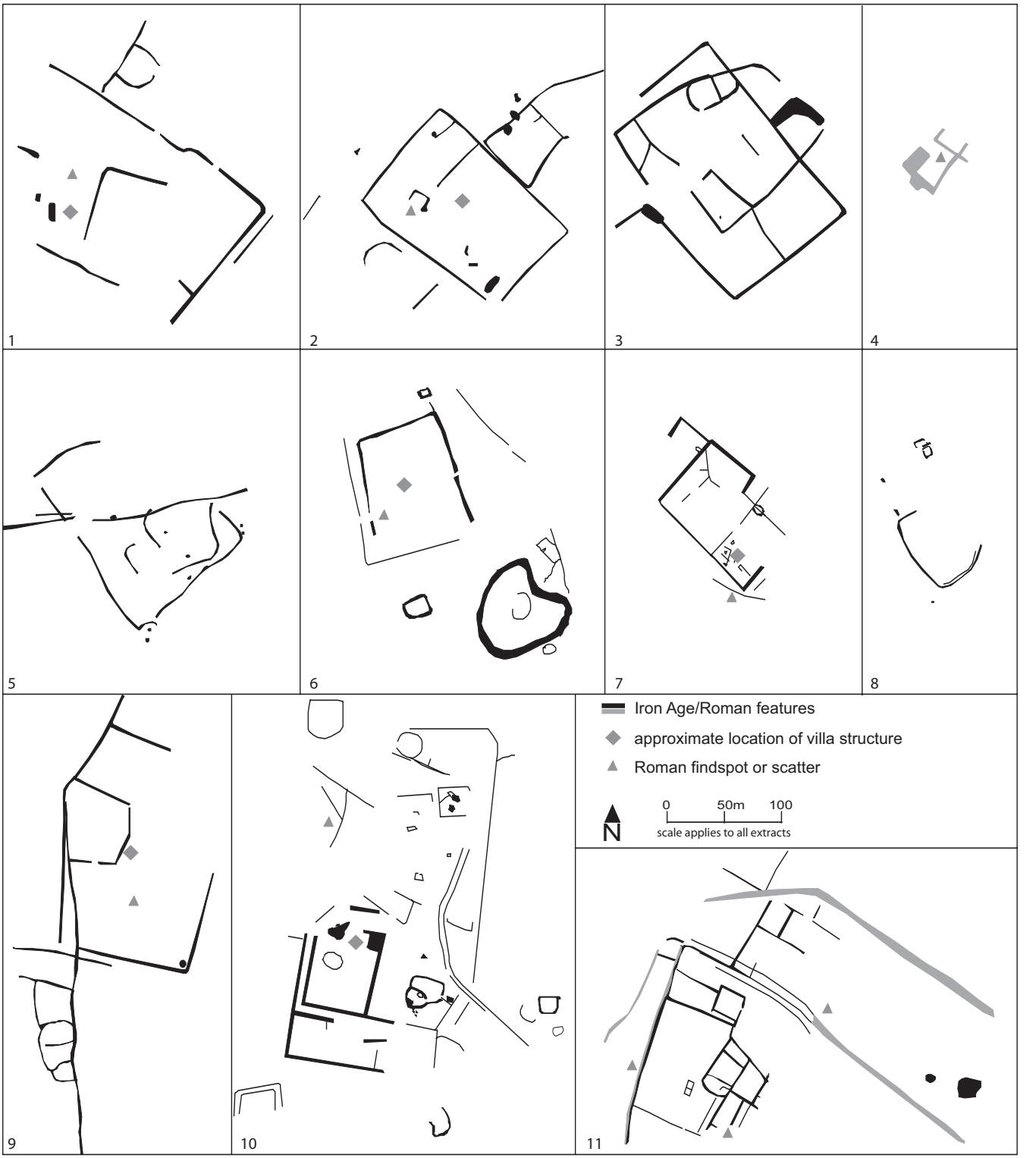



*Fig 6.22 (above) Villa structures: 1 Wollaston; 2 Little Addington B; 3 Fotheringhay B; 4 Wakerley; 5 Great Doddington; 6 Stanwick; 7 Cotterstock; 8 Blatherwycke) (scale 1:2 500).*

*Fig 6.23 (opposite) Large rectilinear enclosures at known and possible villa sites (SMR; Scott 1980; D Hall pers comm): 1 Barnwell; 2 Hemington; 3 Thurning; 4 King's Cliffe; 5 Nassington B; 6 Mears Ashby B; 7 Glapthorn; 8 Sulgrave B; 9 Clopton; 10 Thenford; 11 Higham Ferrers) (scale 1:5 000).*




and main villa ranges is a close one, and appears to be the results of contemporaneity rather than succession. The possibility that some were temples in the manner of the Brigstock shrines has already been mooted (Williams 1976, 112).

## Nucleated settlements

Excavations of the villas and their immediate environs at Higham Ferrers, Stanwick and Cosgrove have revealed nucleation of Roman settlement on these

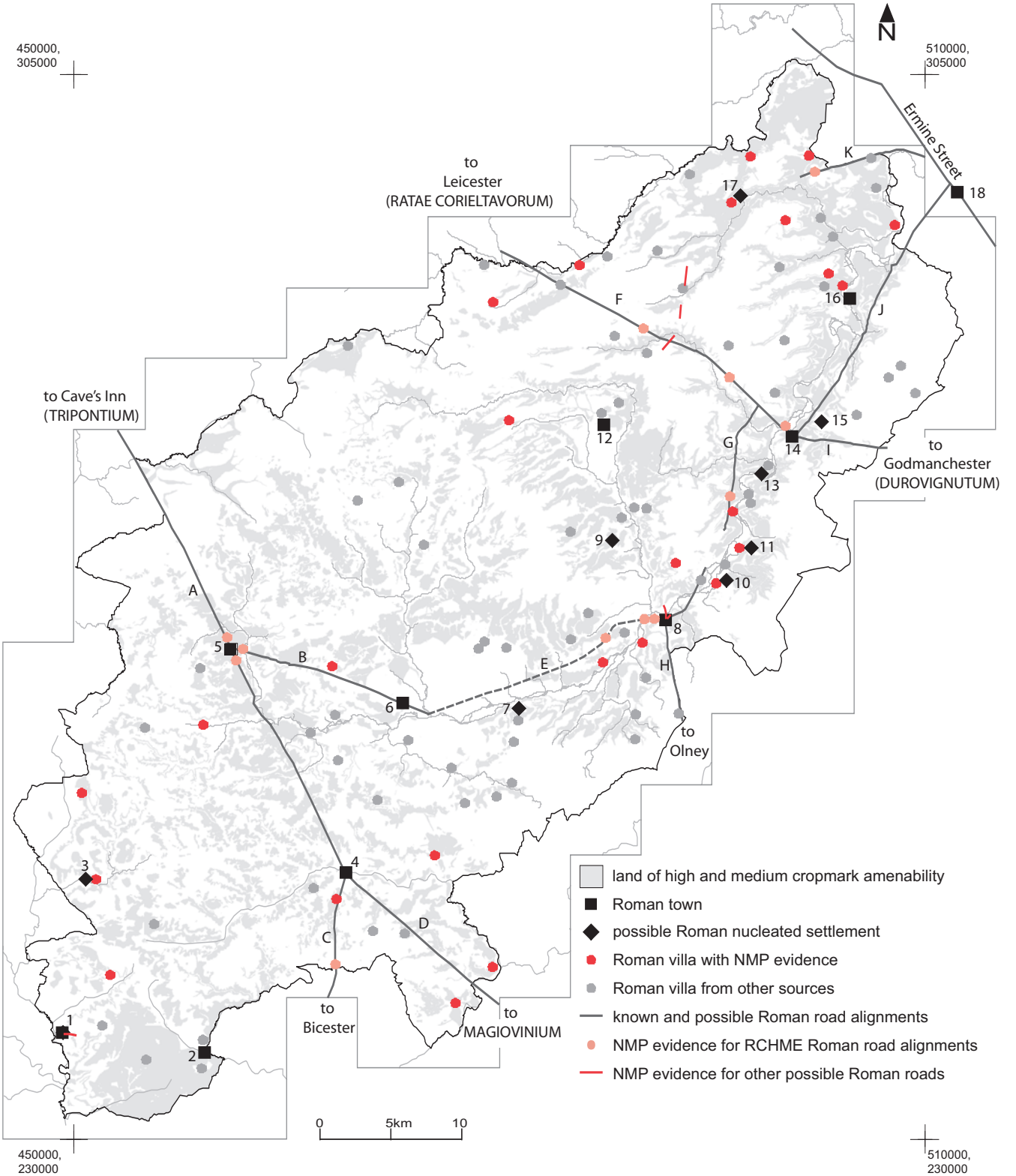



*Fig 6.24*
*Distribution of Roman towns, nucleated settlements, villas and the layout of the road network (for roads see Table 1): 1 Blacklands, Kings Sutton; 2 Brackley; 3 Black Grounds, Chipping Warden; 4 Towcester; 5 Whilton Lodge (Bannaventa); 6 Duston; 7 Little Houghton; 8 Irchester; 9 Little Harrowden; 10 Higham Ferrers; 11 Stanwick, Raunds; 12 Kettering; 13 Woodford Huxloe; 14 Titchmarsh (town); 15 north of Titchmarsh village (?nucleated settlement); 16 Ashton; 17 Laxton; 18 Waternewton (Durobrivae) (D Hall pers comm; RCHME 1975, 1979, 1981, 1985; Scott 1980; SMR) (scale 1:400 000).*

high-status settlements. Although the villa structures at Higham Ferrers and Stanwick were visible on air photographs, there was little to distinguish the surrounding features from the more common fragments of Late Iron Age or Roman rural settlement.

A combination of surface finds and cropmark evidence around the villas at Black Grounds, in Chipping Warden, and Woodford Huxloe, in Woodford, suggests that they may also have been the focus of associated settlements. Large quantities of Roman finds have been recovered from the area around Black Grounds, indicating that it was a larger settlement than the rather sparse cropmarks suggest (RCHME 1982, 29). South-west of the second Woodford villa there is a linear arrangement of tightly clustered enclosures, boundaries and pits visible over an area of approximately 4.5ha.

Complex cropmarks at Little Harrowden and north of Titchmarsh village may represent similar concentrations of population, but there is no supporting evidence from surface finds of the status or even the likely date of these remains. Little is known about the complex buildings and enclosures at Little Harrowden. These were mapped from infra-red photography and the prints were not available for review at the time of writing. However, the example north of Titchmarsh village is much clearer and may be associated with a possible temple site, which is 0.5km to the south-west, in the direction of the small town at Titchmarsh (*see below*).

RCHME suggested that the crop marks recorded at Little Houghton B (*see* Fig 6.21: 6) were part of a 'semi-urbanised or at least very densely occupied settlement' (1979, xiv), but this interpretation appears not to be supported by the NMP evidence, the surface scatter or related evidence in the SMR. Excavation of a large cemetery and buildings attest to the presence of a nucleated settlement at the industrial-scale iron works at Laxton, but there is no evidence for this visible on the air photographs consulted (Jackson 1998–9, 159).

## Small towns

Aerial photography has revealed details of the plan and layouts of the Roman small towns at Whilton Lodge (Bannaventa), Irchester, Titchmarsh and Ashton, and some features at Blacklands at King's Sutton (Figs 6.25 and 6.26). No information was recorded from the air photographs for the small towns of Brackley, Duston, Towcester (Lactodorum) and Kettering. This is because Duston and Kettering were largely quarried and built over in the late 19th and early 20th centuries, and Towcester's Roman levels are masked because the site was refortified as a Late Saxon *burh* and developed into a medieval and modern town.

At Bannaventa air photographs have revealed the plan of an expansive settlement that developed at the junction between Watling Street and a spur road that led to the small town at Duston (*see* Fig 6.26: 2). Only the western side of the town is well defined, whereas the section east of Watling Street, which was partly quarried in the 1970s, is barely visible. The dominant features are the ditches of the town's defences, which appear to cut across other elements.

*Fig 6.25*
*View of cropmarks and parchmarks at Irchester Roman town, looking east (NCC photograph SP9166/307 10th July 1994 NCC copyright).*

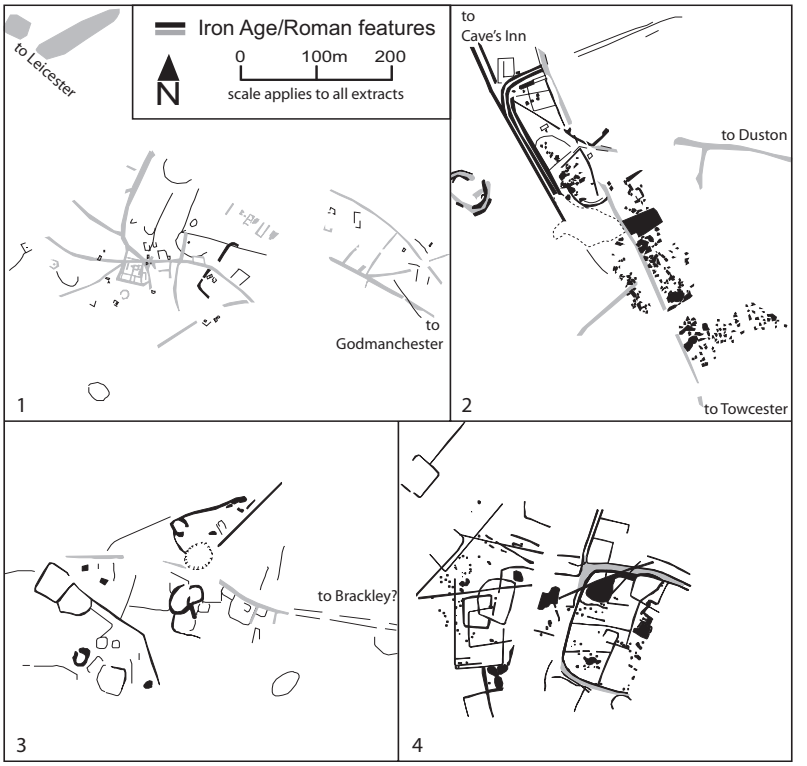



*Fig 6.26*
*Roman towns:*
*1 Titchmarsh;*
*2 Blacklands, Kings Sutton;*
*3 Ashton;*
*4 Whilton Lodge (Bannaventa)*
*(scale 1:10 000).*

Possible buildings have been detected along the road some 650m south of the town.

The majority of the town at Irchester is visible on air photos in exceptional detail (*see* Fig 6.25). The town core occupies a modern field unit of some 7ha with a high density of buildings, enclosures and streets, but other more dispersed elements are visible in neighbouring fields up to 300m away. The town appears to have been planned along a series of streets branching from the main north–south road, although some elements may predate the final road layout. More than 200 possible buildings or structures are visible within the town. Roads can be clearly seen leaving the settlement heading west to Duston, north to Kettering via a causeway across the floodplain, and east to Titchmarsh. A fourth road is known from fieldwork to extend southward to Dungee Corner and possibly beyond to Olney in Buckinghamshire.

The visible remains at Titchmarsh are rather more fragmentary and dominated by a complex, dendritic pattern of roads (*see* Fig 6.26: 1). A handful of buildings front the road that leads to Leicester, a road visible 300m to the north-west as a causeway crossing the valley floor. Less than 200m south-west, a second concentration of structures is visible, focussed on the junction of several minor roads. These structures are arranged within a rectangular compound and may represent the remains of a mansio or perhaps a temple complex (J Taylor pers comm); 100m to the south-west the air photographs have recorded four sides of a pentagonal or hexagonal structure: another possible temple.

The town of Ashton is located close to the river but over 1.5km from the presumed line of the Roman road that ran between Waternewton (Durobrivae) and Titchmarsh. Unlike Titchmarsh and Irchester, there are few structural remains visible on the air photographs at this site, the principle elements being large, superimposed rectilinear enclosures, sub-divided by a network of metalled roads, and with a high density of large pits (*see* Fig 6.26: 4). However, extensive excavation has demonstrated buildings lining the main north-east–south-west road, immediately south-east of the cropmarks mapped here.

At Ashton, Titchmarsh and probably Irchester, the plan form thus appears to be based upon a main through-road lined with structures, but with the majority of the settlement focussed around a loop road running off the main route and back again. In the case of Irchester, only this core area was enclosed by defences.

By contrast the visible elements at Blacklands, Kings Sutton, in the far south-west of the county do not distinguish themselves as the remains of a town and could perhaps be mistaken for a smaller road-side settlement, although the distinction between the two may be largely artificial in any case (J Taylor pers comm.) (*see* Fig 6.25: 4).

## Roman roads

This project has recorded more then 50 sections of possible road from air photographs, some as earthworks, but mainly as cropmarks, parchmarks or soilmarks. The majority are undated and, although many are believed to be Roman, few can be securely attributed to this period. Some, such as the embankments at Laxton and Fineshade, can be demonstrated to be of post-medieval date by reference to contemporary maps (AHRC Project digital archive). It has not been possible to undertake detailed historic map work of potential road-like features as part of the NMP, so a detailed reconstruction of the Roman network must await the analysis phase

of the AHRC-funded Northamptonshire Landscape project (Foard *et al* 2005).

Some good sections of cropmark or soilmark road do run along the routes of Roman roads suggested by the RCHME (1975; 1979; 1981; 1985), but these represent only a small proportion of the overall sample (*see* Fig 6.24 and Table 6.1). The other, more secure, examples can be found in and around the known Roman towns of Irchester, Titchmarsh, Blacklands in Kings Sutton and Ashton (*see* Figs 6.25and 6.26). The longest sections of possible Roman road are visible as soil-marks over a distance of more than 3km across the parishes of Stanion and Weldon. These probably link to the road excavated on the Weekley Iron Age and Roman settlement, and suggest a route from Kettering north-eastward to Great Casterton (Jackson and Dix 1986).

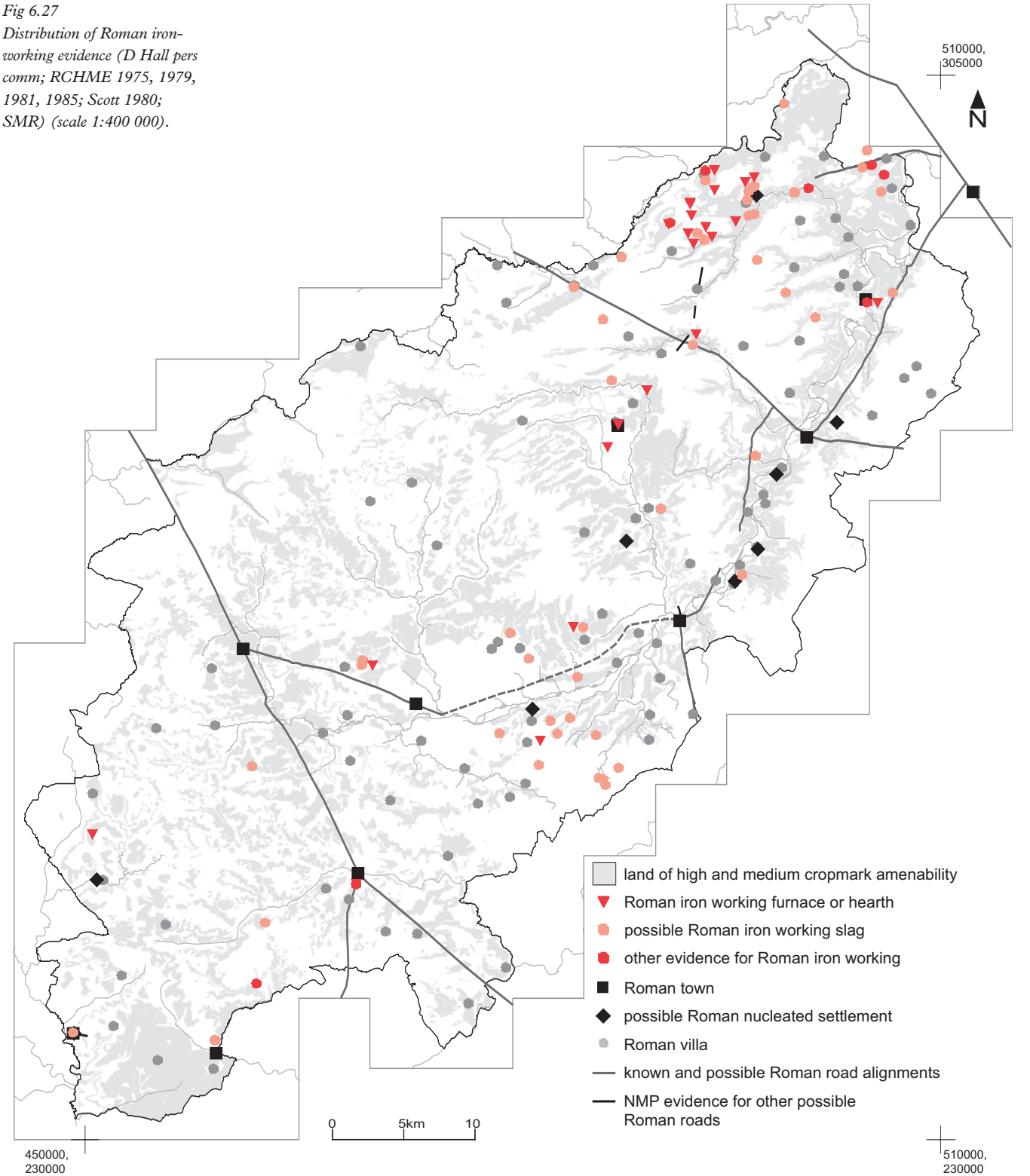
## Iron working

The Whittlewood and Salcey Forest areas continued to produce iron through the Roman period, but the evidence suggests that the Rockingham Forest area came to dominate the industry (*compare* Figs 6.19 and 6.27). Beyond these two areas

Table 6.1 Summary of the evidence for Roman roads in Northamptonshire

| *label on Fig 6.24* | *road name* | *Margary no.* | *route (local)* | *RCHME source* | *NMP evidence* |
|---|---|---|---|---|---|
| A | Watling Street | 1f | Towcester (Lactodurum) to Whilton Lodge (Bannaventa) to Cave's Inn (Tripontium) | RCHME 1985, figs 129–130 | NH399.1.2 –parchmarks of road to the north and south of Bannaventa Roman town |
| B | – | 17 | Whilton Lodge (Bannaventa) to Duston | RCHME 1981, fig 158 | NH399.1.2 – parchmarks of road leading east from Bannaventa Roman town |
| C | – | – | Towcester (Lactodurum) to Bicester | RCHME 1985, fig. 13 | NH258.1.1 cropmarks of road |
| D | Watling Street | 1f | Towcester (Lactodurum) south-east to Magiovinium | RCHME 1985, fig. 130-131 | – |
| E | – | – | Irchester to Duston | RCHME 1979, 188 | NH38.4.1 parchmark of road, NH52.56.1 parchmark of road, NH52.59.2 parch mark of road leading west from Irchester Roman town |
| F | Gartree Road | 57a | Titchmarsh to north-west to Leicester (Ratae Corieltavorum) | RCHME 1979, fig. 169-170; RCHME 1975, fig.125-126 | NH87.1.1 soilmark of road, NH26.6.1 cropmarks of road, NH398.6.1 soil marks of causeway |
| G | – | ?570 | Titchmarsh to Irchester | RCHME, 1979, fig. 170; RCHME 1975, fig. 124 | NH195.2.1 cropmarks of trackway on this alignment |
| H | – | 170 | Irchester to Olney | RCHME 1979, fig. 171 | – |
| I | Gartree Road | 57A | Titchmarsh south-east to Godmanchester (Durovignutum) | RCHME 1975, fig. 125 | – |
| J | – | 570 | Titchmarsh north-east to Waternewton (Durobrivae) | RCHME 1975, fig. 122-123 | – |
| K | – | 571 | ?Leicester to Waternewton (Durobrivae) | RCHME 1975, fig. 127 | NH435.44.1 soilmark of road |

*Fig 6.27*
*Distribution of Roman iron-working evidence (D Hall pers comm; RCHME 1975, 1979, 1981, 1985; Scott 1980; SMR) (scale 1:400 000).*




the evidence for Roman ironworking is more widespread than for the Iron Age, but is still sparse.

Significant numbers of iron-working hearths or furnaces have been excavated in the Rockingham Forest parishes of Harringworth, Bulwick, Laxton and Wakerley, while the furnaces and slag recovered at Laxton indicate iron production on an industrial scale (Jackson and Ambrose 1978; Jackson 1979b;

Jackson 1981; Jackson 1998–9;). Finds of slag are also common elsewhere in these and neighbouring parishes. In this area the evidence for iron working is strung along the sides of the minor valleys, where the thin bands of nodular ironstone are accessible below the Upper Estuarine Series formations. The upper ground is covered with a blanket of boulder clay, which again is the most likely source of the charcoal fuel. As the demand for iron increased, so must the need for intensive management of the woodland to support an expanding charcoal industry.

Evidence for charcoal-burning hearths is common in the Rockingham Forest area, and although it is accepted that the majority relate to medieval or later production, among these there may be earlier, Iron Age and Roman survivors, for the methods of production were probably similar (*see* chapter 7; Foard 2001a, 85).

Evidence for Roman period iron working has been recovered from the small towns of Kettering and Ashton, both on the fringes of the Rockingham Forest area, and from Blacklands, King's Sutton, in the far south-west of the county. Kettering and Ashton are part of a wider group of small towns in Leicestershire, Rutland and south Lincolnshire that were associated with Roman iron production and working (Schrufer-Kolb 1999). Condron has suggested that Ashton was a specialised smithing centre that could have out-supplied the local demand (1997, 10).

There is evidence of iron working in or around several of the Rockingham Forest villas: Great Weldon, Cottingham, Gretton, Harringworth, Blatherwyke and Kings Cliffe. Ironworking slag has also been recovered from villas at Brafield, Burton Latimer, Brackley, Harpole and Thorplands, and an iron-smelting furnace was found at the villa at Piddington. Whereas the evidence from some sites, such as Great Weldon, is securely stratified, for most sites the finds are from field-walking and the association does not therefore prove that iron-working activity was contemporary with the occupation of the villas, although this is likely.

Iron working does not appear to have been a major activity within non-villa rural settlements of the period. There is relatively little correlation between the distribution of the highly numerous cropmarked enclosure and complexes and that of iron-working evidence. This may be because investigations, particularly those of an antiquarian nature, were biased towards the villas or because resolution of find-spot recording is too coarse. However, it is interesting to note that there was no known nearby settlement to the furnaces discovered at Bulwick and Gretton, and that those at Wakerley were not directly associated with any contemporary domestic occupation. Indeed at Wakerley, while kilns for corn drying and pottery firing lay mainly within the Roman enclosure, the smelting hearths were constructed outside the enclosure ditch (Jackson and Ambrose 1978, figs 1 and 25).

Many of the Roman iron-working sites in the Rockingham Forest area are well placed to exploit the road network that provided links to the major centres of population within the county and large urban centres beyond, particularly Durobrivae.

## Discussion

Although there is considerable evidence for continuity of Iron Age settlements into the Roman period this was often accompanied by a change in use or adjustment of the settlement layout. At Harlestone and Holdenby possible Roman enclosures were built slightly against the grain of the earlier pit alignments, as was observed at Moulton D (*see* Fig 6.21: 1, 6.21: 11 and 6.21: 4). It is worth reiterating that most pit alignments in the close vicinity of Iron Age settlement appear to have been re-cut by ditches. That these examples survived as pits and were not re-cut may suggest that they were beyond the focus of earlier settlement; by the end of the Iron Age and beginning of Roman period their presence may have been undetectable. Excavation showed that the enclosure around the villa at Wootton Fields cut across a pit alignment and the remains of unenclosed settlement (NA 1999b).

Excavations at Ashley, Weekley, Ringstead, and Wakerley have suggested that areas of older settlement were frequently re-used for a range of craft, industry and agricultural activities, but that the site of the main villa range was slightly removed (Jackson and Ambrose 1978; Jackson 1980; Taylor and Dix 1980; Jackson and Dix 1986–7). A localised shift of settlement was also noted at Wollaston (Meadows 1995). While this may reflect the increasing status of the occupants of the original settlement, it might alternatively reflect the displacement of the earlier inhabitants.

Dix and Jackson considered the proximity of villa sites to the defended enclosures at Wootton Hill Farm and Weekley to be indicative of the growing status of the latter (1989, 164). Certainly the WH-style enclosures at Blackthorn and Great Doddington are also within 700m of sites of possible Roman buildings, but given the relative density of villas in the areas of these enclosures, such longer-distance correlations are perhaps better attributed to coincidence.

## Conclusion

Although the aerial photographic evidence for the Iron Age and Roman landscape is extensive and widespread, despite the efforts of carefully-targeted reconnaissance and intensive analysis the recovered pattern is still highly fragmented. It may be that this reflects the reality of the Northamptonshire landscape during this period, and that it lacked the type of contiguous articulated landscapes seen in other parts of England, as on the North Nottinghamshire sandstones and the Yorkshire Wolds. Through the various datasets available to this study it has been possible to define where cropmark and soilmark evidence might be present, and hence where the presence or absence is significant. The next stage should be to identify those areas where survival might be expected. Paradoxically these will probably be the areas where visibility from the air is acknowledged to be poor: the unploughed zones, longstanding woodland and under alluvial deposits on the valley floors. Once mapped, these zones might be prioritised for other intrusive and non-intrusive invest-igations, which could be either research-led or achieved through the planning process in response to development threats. One clear path for investigation, as discussed earlier, would be for a systematic, intensive field-walking programme to complement the data and to test and elaborate the analysis presented here.

### Panel 6.1
### Pit alignments

The pit alignments excavated in England and Scotland have yielded a broad range of dates, from the Neolithic to the Roman period. It has been suggested that while alignments of oval-plan pits may have had a long period of currency the more rectangular or oblong-shaped features, characterised by straight sides and flat bottoms are often Late Bronze Age to Middle Iron Age in date (MPP 1989).

Both forms are present in Northamptonshire. Pits of variable but predominantly round or oval shape were cut along the northern edge of the Briar Hill causewayed enclosure and, although undated, were considered by Bamford to be of possible Neolithic date (1985, 49). Approximately 500m to the south-east, farther up Briar Hill, there were two close-set alignments of small, round- to oval-plan pits, which had subsequently been cut by substantially larger rectilinear pits along the same path. Again there was no dating evidence, but it was suggested as a multi-phase part of the surrounding Iron Age landscape (Jackson 1974, 24). Pits excavated at Grendon, Gretton and Wollaston, Ringstead, like the later boundary at Briar Hill, are characterised by their regular oblong shape, size and spacing.

In 1974 there were 25 pit alignments known in the county, mainly from aerial photography, but very few had been excavated (Jackson 1974, 44, fig 1). Three decades later the project has mapped some 144 pit alignments as either single features or elements of more complex systems, while a rapid survey of mapping from later photography not yet integrated into the NMP dataset has revealed yet more, giving a total of more than 36km of pit alignments in the county. The geographic range has also been extended with some areas previously devoid of evidence, such as that between Aldwincle and Grendon, now well endowed with examples (*see* Fig 6.2; cf Jackson 1974). The majority of them, in part probably owing to the biases of recovery, lie on permeable geology. They are most numerous on Northampton Sand and Ironstone (44 examples, averaging 1 per 4.2 $km^2$) and Great Ooolite Limestone (26; 1 per 4 $km^2$), but the density is highest on the terrace gravels (1 per 2.6 $km^2$). Surprisingly nearly a quarter of all pit alignments appeared or extended onto less permeable geologies, mainly the Upper Lias Clay, and although in some cases the resolution of the geological data on which these analyses are based may be too coarse, excavation at Crick suggests that pit alignments are

indeed present in some areas of clay soils (Kidd 1999, 5).

It was recognised early in the project that the general shape of each pit was potentially significant and, in a departure from standard NMP recording practice, the pit shape was represented in the mapping. Over three-quarters of the alignments mapped consist of pits that are oblong or rectangular, with the remainder unknown or possibly round. The oblong or rectangular pits are generally less than 2.5m long and less than 1.8m wide, although they can range from rather elongated slots to near square features. The longer axis of each pit is always in line with the overall orientation of the alignment and the spaces between pits are rarely longer than the pits themselves. The alignments of oblong pits are characterised by a high degree of regularity in pit size, shape and spacing, although many make abrupt changes in direct or take curving paths; and some show possible groupings of pits and minor realignments between groups that may be indications of gangwork. These characteristics are consistent with Late Bronze Age to Early Iron Age excavated examples and thus they are also assumed to be of this date. However, excavation has repeatedly demonstrated that these boundaries are more complex in form and development than the simple cropmark evidence would suggest.

## Panel 6.2
## An Overview of the Evidence for Iron Working in the Iron Age and Roman Period

Iron working in this period comprised two distinct processes: smelting and smithing. Iron first had to be separated from the parent ore. The furnace technology developed during the Iron Age and Roman period was insufficient to take iron to its melting point of 1534°C. Without achieving melting point, impurities in iron are less readily expelled and richer ores are required, but this was not necessarily detrimental to the finished object's function (Salter and Ehrenreich 1984, 146). Then, unlike bronze, which could be cast in moulds, objects in iron had to be forged and complex items rivetted or hammer welded (Salter and Ehrenreich 1984).

The raw materials for iron smelting and smithing were readily available in Iron Age and Roman Northamptonshire. The Northampton Sand and Ironstone outcrops widely in central Northamptonshire, but, although exploited on a massive scale in the 19th and 20th centuries, it is not clear if these ores were sufficiently rich for successful Iron Age and Roman smelting. The hardpan formed in sandstone by chemical leaching of the iron may have provided a more concentrated deposit (Salter and Ehrenreich 1984). An alternative source is the narrow band of nodular ironstone that outcrops beneath the Upper Estuarine Series in the north-east of the county, which can also be reached by quarrying. Evidence for iron ore extraction of this period is rather scarce in the excavation record and all but absent in the NMP record. At Great Oakley, scoops thought to be prospecting for ironstone erratics in the boulder clay may have been associated with two Early Iron Age structures (Jackson 1982), and at Bulwick Roman quarry pits would have accessed the underlying nodular ore (Jackson 1979b). There are many small hollows and pits visible on the air photographs, but it would be near impossible to distinguish those that were excavated for other purposes. Bellamy *et al* noted an association between the naturally-occurring pits in the Upper Estuarine Series along the edge of the exposed Lincolnshire Limestone and the presence of slag finds from all periods (2000, 108). They suggest that the nodular ironstone may have been quarried along the horizontal beds from where it was exposed in the walls of these natural shafts (Bellamy *et al* 2000, fig. 3). While this formation survives best in woodland, the NMP has recorded a narrow swathe of swallow holes as earthworks and soilmarks across the parishes of Harringworth, Laxton and Duddington. These are in an area rich with the evidence of early iron working, not least the industrial-scale complex of Roman furnaces and slag heaps at Laxton (Jackson 1998–9), less than 1km to the south-east. It seems unlikely that, if nodular ironstone beds were exposed in these shafts, such an easily accessible and rich source would not have been exploited to supply this

burgeoning industry. Clay for furnace construction was widely available, and again its extraction leaves little identifiable trace.

The third major ingredient for iron smelting and other working is fuel. Salter and Ehrenreich estimate that, in the conditions obtained by Iron Age and Roman smelting, 90kg of fuel was required to process 20kg of ore into 1kg of iron (1984, 146–7). Moreover, although wood was sufficient for ore roasting, the hotter processes would have required charcoal. On Cleere's estimations the ratio of wood input to charcoal output is 7:1 (1976, 240). In terms of the economics of resource availability, then, the supply of prepared fuel would appear to be a significant consideration in the siting of iron smelting activity. Importantly, to give optimum airflow the charcoal particle size is crucial, and best obtained from wood of managed, that is coppiced, trees, where this factor could be controlled by the duration left between cropping (Salter and Ehrenreich 1984, 149). Managed woodland of this period is almost invisible in the archaeological record, but must have been a significant element of the Iron Age and Roman landscapes.

While the sites of iron production are rarely identifiable from the air, the impact the developing iron had on the landscape as a consequence of improved tool technology is inescapable.

# 7
# The contribution of aerial photography to Anglo-Saxon studies

*by Glenn Foard and Alison Deegan*

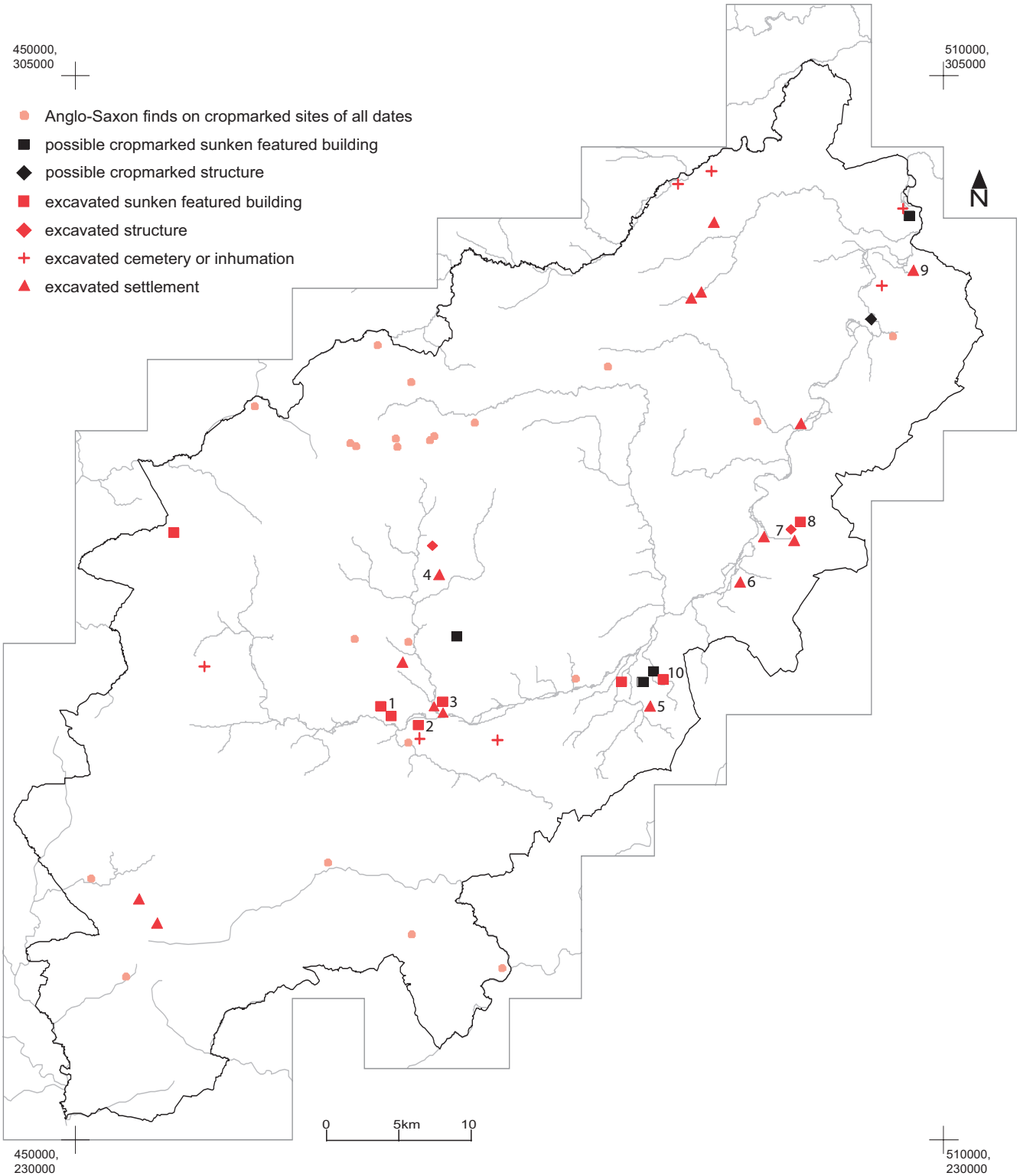
## Introduction

In the study of the post-Roman landscape of Northamptonshire, archaeological evidence is complemented by documentary and place-name evidence, although even by the Late Anglo-Saxon period this is still a minor contribution compared to that from archaeological investigations. Of the latter, aerial archaeology is, however, perceived to have a very limited contribution to this period. The Lincolnshire NMP project yielded little positive evidence of Anglo-Saxon settlement, other than that excavated at Riby Crossroads (Steedman 1994; Boutwood 1998, 58), while an earlier project in the Yorkshire Wolds identified just a few sites where groups of pits were interpreted as possible sunken-featured buildings (SFBs), and by association the groups of curvilinear enclosures in which they are found, as the possible remains of Anglo-Saxon settlement (Stoertz 1997, 17 and 59). Of the county-based resource assessments that informed the Regional Research Framework (RRF) for the East Midlands, only the Northamptonshire assessment discussed the contribution of aerial photography to the Anglo-Saxon resource (Foard 2001b, 1, 6, 9, 27), while mention of this remote-sensing technique is entirely absent from the main regional overview RRF chapter on the Anglo-Saxon period (Vince 2004). However, sites as diverse as the palace at Yeavering, Northumberland and the rural farmstead at Catholme, Staffordshire, both of which were recorded by air photographs, demonstrate that aerial photography does have a part to play in the identification and understanding of some Anglo-Saxon settlement (Hope-Taylor 1977; Losco-Bradley *et al* 2002). The present chapter assesses the degree to which this potential has been realised by aerial archaeology in Northamptonshire and what avenues there may be for further exploitation of this dataset.

The archaeology of the Anglo-Saxon period in Northamptonshire has been subject to intensive study over the last 30 years: through field-walking surveys; in large-scale research projects involving field survey and excavation at Raunds and in the Whittlewood area; in other large- and small-scale excavations and related fieldwork required through the planning process; as well as through analysis of place-names and of the very slim documentary record of the period and through back projection from evidence in post-Norman conquest sources. The archaeological investigations have been particularly effective because there is reasonably good ceramic evidence in the region throughout most of the 5th to 11th centuries, even if there are some problems with the detail of dating within this evidence. As a result, unlike many other counties, there is extensive stratified and surface scatter evidence against which the aerial archaeology evidence can be assessed (Brown and Foard 1998; Brown and Foard 2004). The county's aerial reconnaissance programme since 1976, and the NMP project, were also conducted with the issues of Anglo-Saxon activity clearly in mind. Northamptonshire is thus an ideal area within which to assess the potential contribution of aerial archaeology to the understanding of the Anglo-Saxon period.

## Evidence from archaeological survey

Field-walking has identified by far the largest number of sites of Anglo-Saxon settlement in the county (Brown and Foard 2004). The sites excavated at Brixworth, Upton and Higham Ferrers were found beneath scatters of Anglo-Saxon artefacts. Shaw observed that the Brixworth and Upton scatters were both relatively meagre: the former produced just 37 sherds and those were recovered over a number of visits (Shaw 1993–4). The quantity of scatters and find spots producing Anglo-Saxon material is considerable and well distributed across the county. Even if some of these




sites are no more than the results of manuring (Shaw 1993–4, 91–2), it is clear that where there has been intensive field-walking, most notably in the Raunds area, the known examples represent just a small percentage of the total number of Anglo-Saxon settlements (Parry 2006).

A significant number of Anglo-Saxon pottery scatters coincide to some degree with the cropmarks, earthworks or soilmarks of earlier or later activity (Fig 7.1). At Welford, the site of a series of cropmarked

rectilinear enclosures, collections produced Anglo-Saxon as well as Roman sherds. At Naseby Anglo-Saxon sherds, along with Roman sherds and prehistoric flints, were from an area containing possible Neolithic and Bronze Age ritual monuments and possible Roman enclosures. The large complex of enclosures and trackways at Kelmarsh similarly produced Anglo-Saxon as well as Roman sherds. In these cases it has not been possible to distinguish any Anglo-Saxon features among the many cropmarks.

The absence of sherd distribution mapping on most sites makes it impossible to seek direct correlation between Anglo-Saxon surface scatters and particular cropmark elements. There is clearly an important potential here for further research based on systematic field-walking of good cropmark sites that have yielded both Roman and Anglo-Saxon ceramics.

Evidence of Anglo-Saxon activity has also been recovered from the Iron Age hillforts at Hunsbury; Crowhill, Irthlingborough; Borough Hill, Daventry; and Rainsborough. The re-use of some of the hillforts can be reconciled with the pressures of the prevailing political situation in the 5th century (Foard 2001b), but in several cases the evidence is primarily in the form of burials.

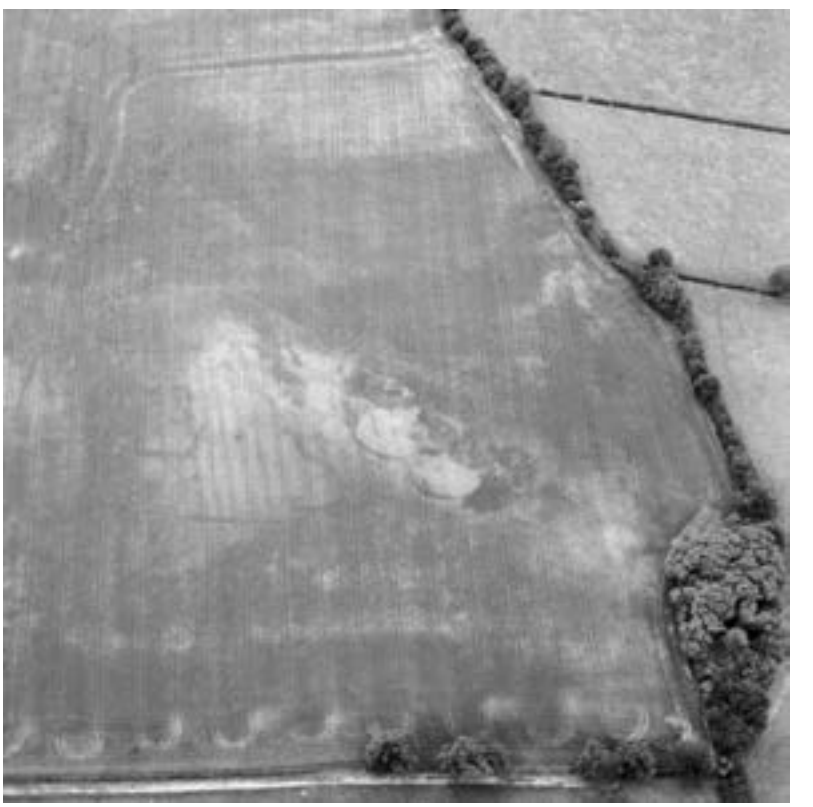
Perhaps the most common spatial association is to the sites of Roman villas with burials at Stanwick and Piddington and other remains or scatters recovered at Wollaston, Brixworth, Redlands Farm, Nether Heyford and Aynho (Foard 2001b). In some cases these may be no more than Saxon burial on abandoned sites (*see below*), but in various other examples there is clear occupation evidence, although issues of continuity can often only be satisfactorily resolved, if at all, through comprehensive excavation, and this has taken place only on one or two sites (Brown and Foard 2004). It could be argued that the apparent association with villas sites may owe more to the biases of the archaeological record than it does the real distribution of Anglo-Saxon settlement, but in Northamptonshire so many lower-status sites have also been investigated that such bias seems unlikely.

## Excavated Anglo-Saxon sites

According to the SMR, an Anglo-Saxon element was identified in more than 150 sites of archaeological excavations or observations. Although the failure of many of these to appear in the published literature implies that the Anglo-Saxon activity was of limited significance, many of the sites have yielded extensive evidence. The sites range in status from possible royal provincial centres down to modest peasant occupation, and, include major excavations at Northampton; Furnell's Manor and Langham Road, Raunds; Brixworth; Briar Hill; Warmington and Wollaston. Smaller-scale evaluations on various other sites, including recent work at Bozeat, have also yielded Anglo-Saxon evidence (*see* Fig 7.1). However, in most cases there has been little visible evidence for these remains on air photographs, even on the permeable geologies. In a substantial proportion of cases this is because the evidence was concealed beneath existing settlements, which have been occupied continuously since the Late Saxon or medieval period, as at Northampton, or beneath medieval settlement earthworks, as at Wollaston and Raunds. Even where cropmarks were present, for example at Warmington and Bozeat, where they provided part of the case for archaeological investigations prior to development, the features visible on the photographs are more likely to relate to Roman or Iron Age activity (Fig 7.2).

*Fig 7.1 (opposite) The distribution of excavated Anglo-Saxon sites, Anglo-Saxon find spots associated with cropmarked sites and possible cropmarked structures and sunken featured buildings (main excavated sites:*
*1 Upton;*
*2 Briar Hill;*
*3 Northampton;*
*4 Brixworth;*
*5 Bozeat;*
*6 Higham Ferrers;*
*7 Langham Road (Raunds);*
*8 Furnell's Manor (Raunds);*
*9 Warmington;*
*10 Wollaston).*

*Fig 7.2 Curvilinear cropmarked features at Bozeat (NCC photograph SP8960/11 30th June 1989 NCC copyright).*



## Oval enclosures

Whereas at Northampton the high-status site has always been inaccessible to aerial survey, at Higham Ferrers the opposite was true. A large oval enclosure, on a spur overlooking the River Nene at Higham Ferrers, was identified by aerial survey. In later fieldwork, geophysics revealed more extensive detail of plan form for the occupation associated with the enclosure, while field-walking and then trial trenching indicated an Early to Late Anglo-Saxon date for the occupation and Early Anglo-Saxon for the enclosure. Large-scale excavation prior to development then revealed the detail of the plan, demonstrating that the enclosure was empty, but surrounded and respected by a sequence of occupation from the Early and Middle Anglo-Saxon period, replaced in the Late Anglo-Saxon by settlement that fitted the medieval and post-medieval plan of the town (Fig 7.3). Significantly, although there were substantial numbers of timber buildings and several SFBs, none of these had been revealed in the cropmark evidence, although the large enclosure and nearby Iron Age enclosures had shown clearly.

The Higham site lay within 300m of a nucleated Roman settlement associated with a villa, and on the northern edge of the medieval small town of Higham Ferrers. Other comparable oval enclosures were sought and found within the NMP data, but these are tentatively dated to the Iron Age or Neolithic period. It is likely that the Higham Ferrers site was a settlement of high status or specialist function within a royal multiple estate, and thus the form may be a rare element of the Anglo-Saxon settlement landscape. The existence of the Higham Ferrers example beyond the medieval settlement area may be the result of medieval replanning, with the addition of a market place to the south, probably by 1086, which led to the settlement expanding southward away from its earlier focus. The other examples of such enclosures are based largely on evidence of post-medieval settlement plan form, as they all lie below areas of subsequent medieval and later development. The high level of continuity of settlement from the Anglo-Saxon period to the medieval period means that such features are even less likely to be revealed by aerial archaeology than even the rarity of the site type might suggest (Brown and Foard 1998, 77–9).

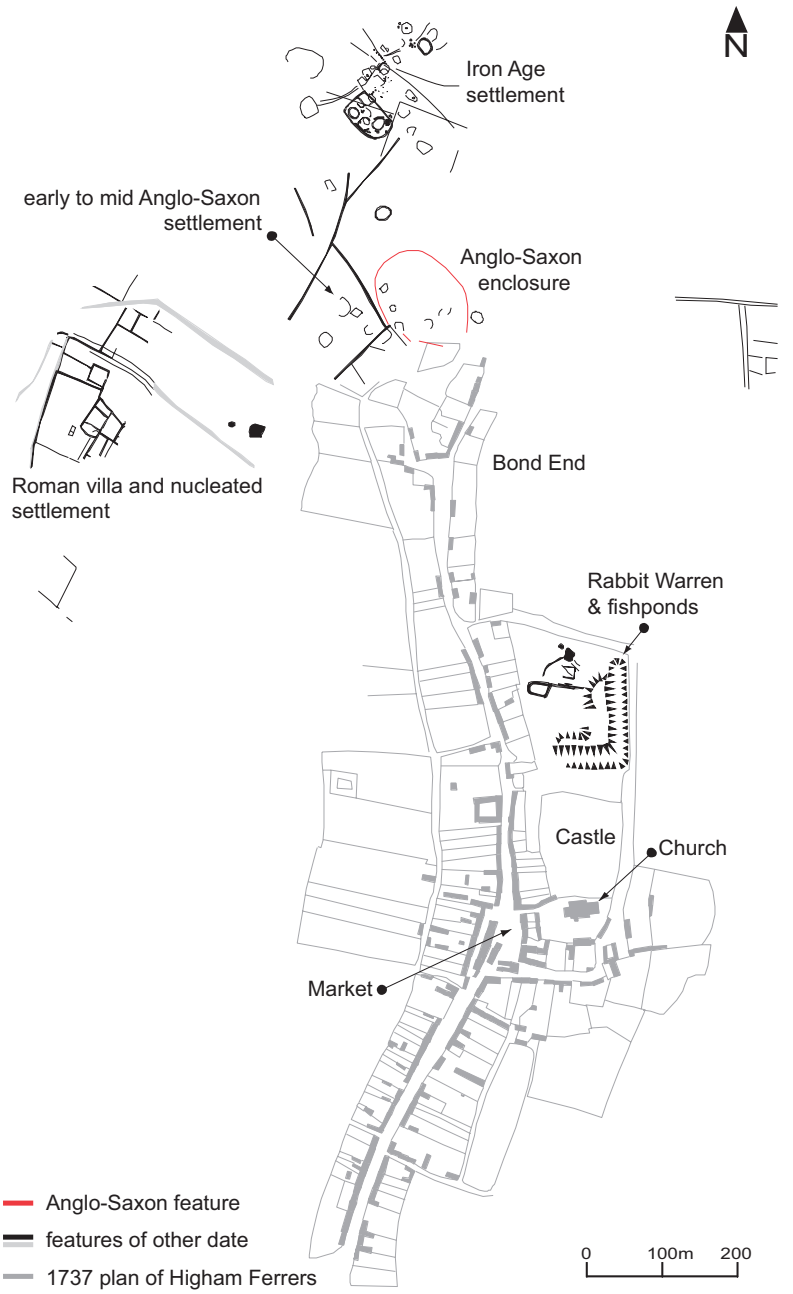



*Fig 7.3*
*The Anglo-Saxon oval enclosure at Higham Ferrers.*

## Other settlements

Considerably more sites of lower status have been excavated, some of manorial and others of lesser importance. While a significant number of examples, such as Wollaston and Raunds, have been found beneath later occupation, a few have been excavated in open landscape contexts. With the exception of the oval enclosure from Higham Ferrers, settlements of this period are rarely associated with the sort of deep-ditched enclosure systems that make Iron

Age and Roman sites such a common feature of the cropmark record for Northamptonshire. Where ditch systems are associated with Anglo-Saxon sites they tend to be narrow, shallow features, which rarely produce good cropmark evidence. The identification of the sites from the air is therefore far more dependent on the cropmark evidence for the buildings and related settlement features. As has been seen with the unenclosed Iron Age settlements, this situation can cause problems of identification from the air, and is further complicated by the character of the domestic structures of the 6th to early 9th century, which take two distinctive forms: sunken-featured buildings, which were constructed above shallow rectangular hollows; and timber halls, which were supported by paired rows of timber uprights. Not only are they often fairly small and ephemeral features, the architecture of these structures is also not so unique that the resulting cropmarks are reliably diagnostic of Anglo-Saxon settlement. When reduced to a two-dimensional cropmark the SFB form is indistinguishable from a large pit, a small hand-dug quarry or a natural hollow of any date. The footprint of the Anglo-Saxon timber halls is perhaps more distinctively structural in origin, but there is potential for confusion with earlier buildings, particularly Roman aisled buildings. These various factors, together with the problem of continuity with later, medieval to modern occupation, conspire together to make the identification of Anglo-Saxon sites through aerial archaeology particularly problematic.

## Sunken-featured buildings

Sunken-featured buildings have been excavated on various sites, including in Northampton town centre; Briar Hill; Furnell's Manor, Raunds; Grendon quarry and two locations at Upton (Jackson *et al* 1969; Bamford 1985, 55; Dix 1986–7; Shaw 1993–4; Jackson 1997). Recent development-lead investigations have identified further examples at Wollaston; Kilsby; and Sol Central, Marefair, Northampton (short note in *South Midlands Archaeology* **31** (2001), 33–4; SMR6428; short note in *Medieval Archaeology* **45** (2001), 307–8). At least 22 known or potential SFBs have been recorded at these sites. They occur singly and in small groups, although exceptionally the group at Dando Close, Wollaston consisted of eight possible buildings (Council for British Archaeology Group 9 2001, 33–4).

During rescue excavations of the Neolithic causewayed enclosure on Briar Hill, up to five sunken-featured buildings of probable Early–Middle Anglo-Saxon date

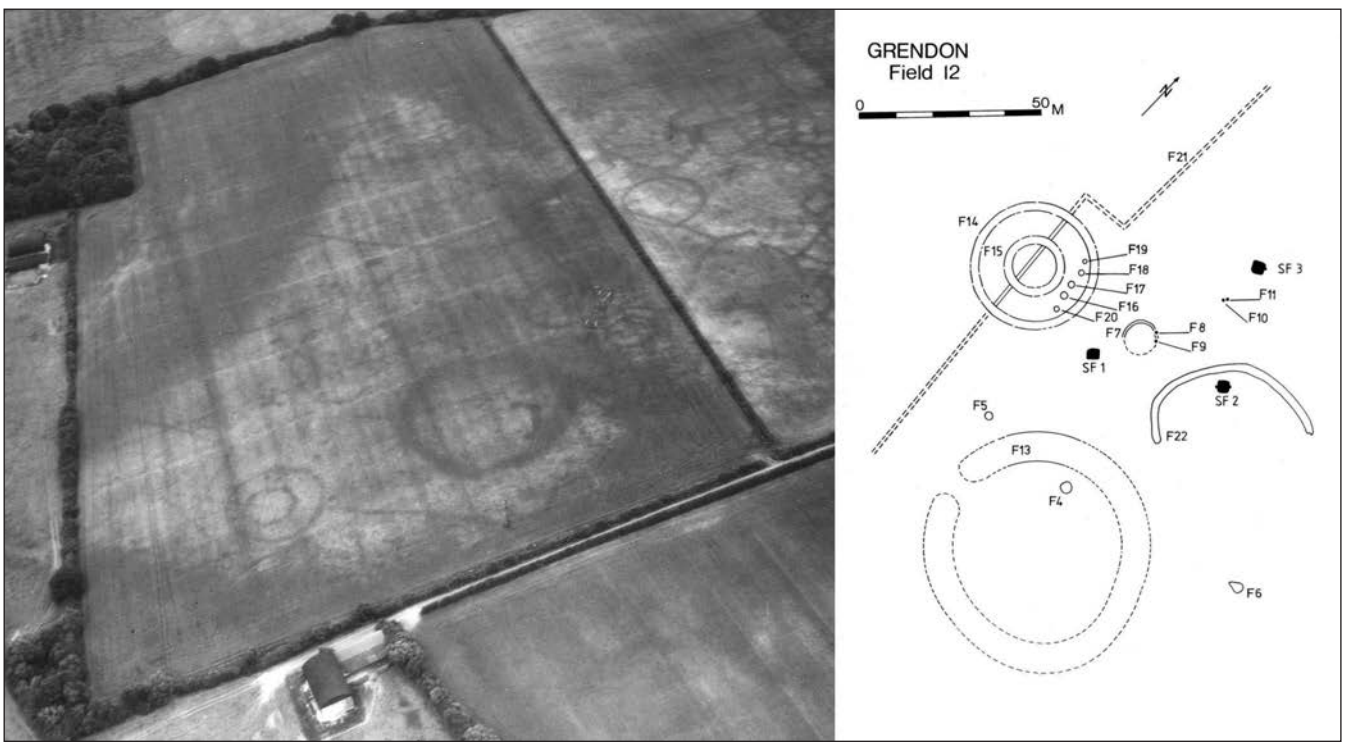
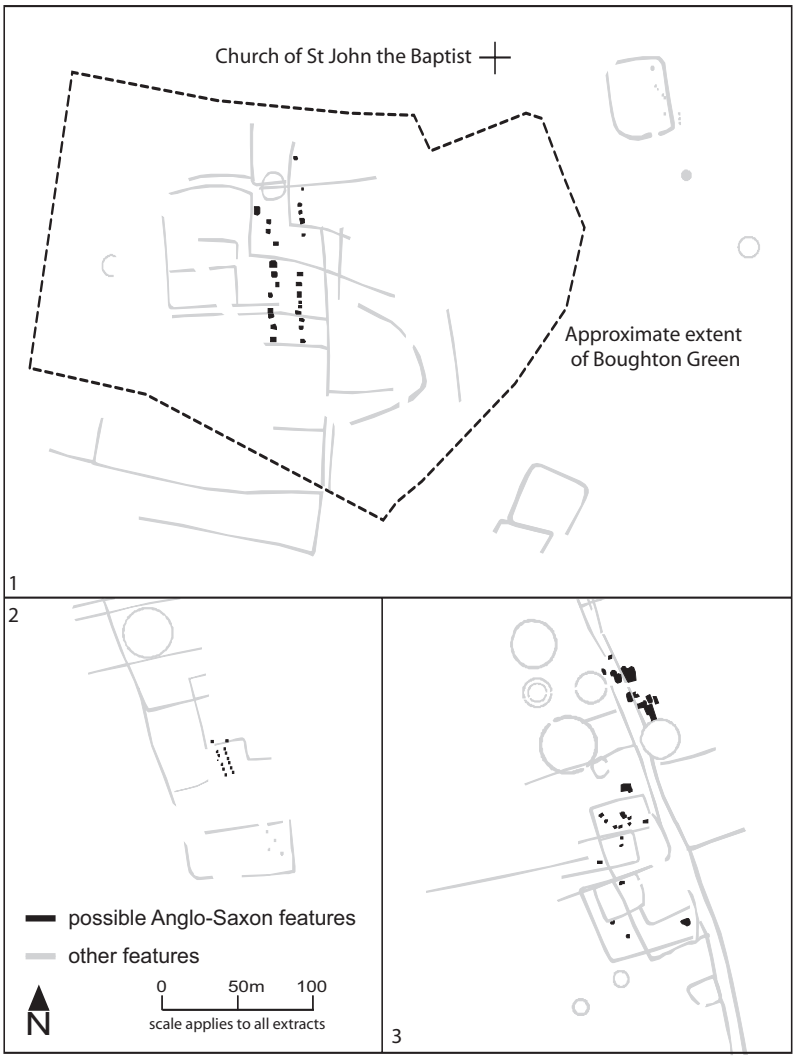



*Fig 7.4*
*Sunken featured buildings and earlier features at Grendon Quarry (left, ZE59 30th June 1959 copyright ULM, right Jackson 1995, fig 2).*





were identified within and just outside the circuits of the Neolithic enclosure (Bamford 1985, 55). The causewayed enclosure was discovered by aerial photography, but the presence of the SFBs was unsuspected, and even in retrospect these cannot be discerned on the available photography. The site lies on Northampton Sand and Ironstone, but the cropmarks of even the major linear features were not particularly well defined. A proportion of the causewayed enclosure's three circuits were excavated and found to be of variable depth, but the base of some lay up to 1.5m from the stripped surface, in contrast the SFBs were no deeper than 0.4m. Unlike the rock-cut segments of the Neolithic enclosure, the SFBs seem to have cut only the sub-soil, which was a mix of weathered ironstone rubble in a matrix of sandy clay, and this may have been a factor in their apparent failure to produce cropmarks.

The remains of the known SFBs are characterised by rectangular-shaped, straight-sided hollows. The Grendon, Upton and Briar Hill examples were all less than 5m long and 2m to 3m wide. None of these examples survived to a depth of more than 0.5m. Only at Grendon do the air photographs indicate the presence of the buried SFBs. One of the known SFBs is visible as a faint cropmark, as is another possible unexcavated example (Fig 7.4). These features were mapped by the project, but their potential as the remains of Anglo-Saxon activity was not recognised at the time of recording. The cropmarks of SFBs, where they form at all, are relatively undistinguished and easily confused with the remains of other pits or small quarries of any date.

A few potential unexcavated examples can be seen on the air photographs and in the NMP mapping. At Nassington, among the complex cropmarks of Iron Age and Roman period settlement and earlier burial monuments, there are at least 20 rectilinear maculae of various sizes (Fig 7.5: 1). These features are arranged singly and in clusters and range in size between 3m ? 2m and 5m ? 3m. One group of smaller maculae, arranged in a common alignment, is concentrated within one of the presumed Iron Age or Roman enclosures; another group of slightly larger examples were cut within and to the side of the trackway that formed the main axis of the late prehistoric settlement. Undoubtedly some of these features relate to the Iron Age or Roman

occupation of this area, or perhaps even earlier activity, while others may be the remains of small hand-dug quarries exploiting the gravels below, but some may represent Anglo-Saxon SFBs. That SFBs are found intentionally placed within Iron Age and Roman enclosures seems clear from several excavations, for example at Stanwick, although there it is far from clear whether this indicates direct continuity of settlement (Brown and Foard 2004).

A substantial number of Early–Middle Anglo-Saxon sites known from field-walking and excavation is, however, in isolation. Thus, maculae identified in isolation at Wollaston may also prove to be the remains of Anglo-Saxon sunken-featured buildings (Fig 7.6). The identification of such small features during reconnaissance seems to occur when they are associated with more substantial features of other dates or natural features, and various other sites producing similar cropmarks without such associations may be regularly missed. In the Wollaston case, although there are not ditch systems, the possible SFBs are visible on the bands of freer draining soils, visible in the cropmarks where light and dark banding reflects the underlying geological variation between permeable and impermeable deposits. It was this geological cropmark that was the initial target identified from the air, not the potential SFBs.

Also of interest, if only to illustrate the ambiguity of some of the cropmark evidence, is the arrangement of rectilinear maculae at Boughton (*see* Fig 7.5: 3). Here, on almost level ground, there are two rows of at least 27 SFB-shaped and -sized cropmarks. The rows are relatively straight and separated by a distance of approximately 14m. Such large arrangements of SFBs are not without precedent: a single building targeted and excavated at New Bewick is known to be one of at least 20 possible examples visible on air photographs (O'Brien and Gates 1988). The arrangement of the New Bewick examples is less formal than the tentative Boughton group, but there is a suggestion that the buildings were arranged with respect to some of the pre-existing linear features. However, it should be noted that these features lay on the former Boughton Green, which was the site of a major medieval fair that may have generated a range of cut features. It was associated with a holy well and a turf maze, both perhaps suggestive of Early Anglo-Saxon pagan significance, while Boughton is also one of only a handful of medieval churches in the county isolated from its village (RCHME1981, 16). In addition, Roman coins are said to have been found by metal detectorists (R Moore pers comm), while as late as 1813 there were also several small stone buildings standing on the Green in the general area of the cropmarks (British Library, Ordnance Surveyors' Drawings, 253c0204–05). This evidence could either support the Anglo-Saxon interpretation of the cropmark features or even suggest a medieval origin related to the fair (Foard 2001d).

## Timber-post structures

Timber-post structures have been revealed by excavations on various sites including at Brixworth, Polebrook and Raunds Furnells, and aisled halls are reported from Dando Close, Wollaston (S Upex pers comm; Dix 1986–7, 3; Shaw 1993; short note in *South Midlands Archaeology* **31** (2001), 33–4). The larger of the two structures excavated in advance of the Brixworth by-pass was at least 10m long and 5m wide, and was defined by rows of pits that were no more than 30cm in diameter and spaced less than 1m apart (Shaw 1993). It seems unlikely that features of such scale could produce a recognisable and distinctive effect on growing crops, and indeed only one potential example was identified by the NMP. This consists of six paired pits arranged in two straight rows, suggesting a building 16m long and 5m wide (*see* Fig 7.5: 2). This probable structure is located among a rectilinear arrangement of enclosures, and in this context it is perhaps as likely that this is the footprint of a Roman aisled villa, especially as the site has produced Roman pottery during field-walking.

The Brixworth excavations were in an area that had produced a small quantity of Anglo-Saxon material (Ford 1995). The site of this settlement lies on the well-drained Northampton Sand and Ironstone, was regularly under arable during the period of reconnaissance, and the Brixworth area was kept under regular reconnaissance given the publication of extensive Anglo-Saxon evidence in 1979 (Hall and Martin 1979). Cropmarked features have been photographed and recorded within 140m of the site, but these were indistinct, ill-defined linear features of probable Iron Age or Roman date. There was no trace in the crop of the Anglo-Saxon structures that lay

*Fig 7.5 (opposite) Possible Anglo-Saxon cropmarked sites: 1 Nassington; 2 Oundle; 3 Boughton Green, Boughton).*

*Fig 7.6 (opposite) Possible sunken featured buildings at Wollaston and Strixton (NCC photograph SP8962/43 19th July 1996 NCC copyright)*

below. The post-holes left by the structures, though numerous, were only 300mm in diameter and there were few other substantial features. So it is not surprising that these had little effect on the crops growing above.

One of the only major exceptions to this failure of aerial archaeology to reveal Early–Middle Anglo-Saxon sites in the county is at Polebrook, where a settlement of rectilinear plan was identified through aerial reconnaissance by Upex in 1988. These photos, which were not available to the NMP project, show up to six buildings, recognised from the timber slots, associated with a number of ditches. The site is on very shallow limestone subsoil, and unrelated ditches of possible earlier date on the same site have been recorded in later photography, but the Anglo-Saxon features themselves were not revealed on the latter images. Upex has suggested that the shallow nature of the features on a very well-draining shallow limestone may mean they have a very brief window of visibility, as cropmarks (S Upex pers comm). The site was subsequently field-walked, producing a small quantity of sherds of 5th–8th century date, including two decorated sherds. In 2002 the site was partially surveyed using geophysics, confirming and slightly elaborating the aerial archaeology evidence. It was then partially stripped and excavated, confirming the layout, but only recovering 19 sherds of Anglo-Saxon pottery (Upex 2003). The site lies approximately 300m west of the medieval village of Polebrook and appears to have a very closely associated alignment to the regular rectilinear plan of the post-medieval and hence medieval village.

## Cemeteries

In all, some 58 pagan Anglo-Saxon cemeteries, both inhumation and cremation, have been identified in Northamptonshire (Brown and Foard 2004). While some, as with the 'princely' burial at Wollaston, were in isolation and others seem to represent no more than a handful of burials inserted into earlier barrows, as at Tansor (Chapman 1996), a cemetery at Kettering produced 100 and that at Wakerley 85 burials. With the exception of the last, most of the discoveries were made in the 19th and early 20th centuries, but clearly substantial numbers of large cemeteries must survive elsewhere. None has been securely identified from the air. At Luddell Field in Paulerspury a substantial known cemetery, demonstrated by $C^{14}$ dating and suggested by metal finds as at least partly of Anglo-Saxon date, has been subject to regular reconnaissance, yet has produced no secure evidence of burials. It has, however, produced cropmarks of a number of substantial ditches and fragmentary evidence of stone buildings, possibly temple or villa buildings of Roman date, given the metal and ceramic finds from the site (B Kings pers comm).

It is unclear whether the placing of the burials on such sites was due to cultural associations with the sites or simply because the abandoned Roman settlements represented suitable unused land within an otherwise wholly agricultural landscape, but it may explain the presence of Anglo-Saxon material on at least some Roman sites. A good modern excavated example of such association can be seen at Oundle (Council for British Archaeology Group 9: South Midlands archaeology newsletter Vol 30/2000).

There is also a clear association between Anglo-Saxon burial and earlier ritual monuments. Anglo-Saxon elements are reported from the vicinity of both Briar Hill and Dallington causewayed enclosures (Bamford 1985, 55; SMR5792). At Tansor, two Early Anglo-Saxon burials were recovered from the mound of a Neolithic burial monument (Chapman 1996–7, 19). A similar association is suggested at Pitsford between the possible Neolithic long barrow and Anglo-Saxon burials, but modern excavation of the earthwork would be required to confirm the Neolithic interpretation (RCHME 1981, 162). Elsewhere there are several Anglo-Saxon surface scatters that correlate with ring ditches mapped by the project, and these may represent other cases of burials inserted in earlier barrows.

Most of the cemetery sites currently on the SMR were discovered during destruction for mineral extraction and development, mainly before the 1950s, and so it is impossible to effectively assess whether aerial archaeology data do exist for Anglo-Saxon cemetery sites. No cemetery sites were identified by the project. Thanks to the Portable Antiquities Scheme, it may soon be fruitful to review the existing air photographs and mapping in light of the substantial new body of evidence arising from metal detecting discoveries and so to

investigate the associations between finds and cropmarks, and perhaps even to focus new reconnaissance on likely cemetery sites.

In light of this situation, it may soon be possible to review the existing aerial photography and mapping to seek associations with cropmark sites, or even to conduct new, targeted reconnaissance of probable cemetery sites.

## Continuity or discontinuity between Roman and medieval landscapes

A major research theme in landscape studies concerns the degree to which there was continuity between the Early–Middle Anglo-Saxon and the preceding Roman landscape, and when and within what framework the medieval open field system was laid out. While it now seems clear that in Northamptonshire the medieval open field system originated in large part in a major Late Anglo-Saxon replanning of the landscape, it is still uncertain how early some elements of the system began to be created, or indeed what skeleton it inherited from the earlier landscape (Brown and Foard 1998).

The Anglo-Saxon landscape has always been invisible. It is unclear whether this was because Roman systems continued in use and hence there was no need for large-scale new land division, or because the land management did not involve the digging of major deep ditched boundaries, as was certainly true in the settlements themselves. But there are ways in which the problem can be addressed, and aerial archaeology has a major contribution to make in the investigation of this critical transition from the 'Celtic' to the 'English' landscape. This is because it can provide detailed and extensive, if often fragmentary, evidence for the layout of that Celtic landscape. However, the value of this data can only be fully realised once the large-scale patterning of the medieval open field landscape is also available in GIS, to overlay upon the 'Celtic' dataset provided through the NMP. Only then will it be possible to recognise the fine detail of continuity or discontinuity between the two.

This key issue cannot therefore be addressed here and must await the results of the ongoing AHRC funded project (2005–9) to map and analyse the historic landscape of Northamptonshire (Foard *et al* 2005). All that can be considered here are associations with the basic mapping of township boundaries prepared in GIS from post-medieval mapping by Hall and Foard (Foard 2001c).

Some authors have suggested that medieval townships in general have very ancient origins (Taylor 1983, 104–5 and 124). In specific cases there is equivocal evidence that some of the medieval townships do indeed owe their origins, in part at least, to the administrative or tenurial arrangement of the Roman landscape (Foard 2001b, 5–6). It has been argued that the presence of Roman villas at the centre of townships is evidence that township origins lay in the estates of former villas. An assessment of the location of all the known villas suggests that in fact at least half lie on or close to township boundaries. Many township boundaries follow natural water courses and many villas were sited close to water sources, so it could be argued that any such association is coincidental. However, 'dry' township boundaries also pass through or close by known and possible villas, as at Overstone (SMR 2064), Wakerley (SMR site 5644), Yarwell (2729), Mileoak (734), Weekley (3910), Wellingborough (3636), Kettering (3957), Geddington (2571) and Gretton (3064). In effect, the areas that had been occupied by these villas seem to have become rather peripheral by the medieval period. This association is not restricted to the villa sites, for many township boundaries cut across the location of other Iron Age open settlements, and across Iron Age and Roman enclosed rural settlements.

In reality, however, if the argument has any validity, the associations are likely to be far more complex, as for example has been suggested for the massive Cotterstock villa. This lies in the centre of a large area of intercommoned land between the townships of Cotterstock and Glapthorn (Foard 1988). At present it does, however, seem that there is actually a high level of discontinuity between the two landscapes. But the detailed investigation of this theme lies outside the scope of the present study.

By far the clearest association between the township pattern and the underlying Celtic landscape is seen at Charlton, where there is a probable Iron Age boundary system representing a massive oval enclosure, with an apparent drove leading north out of it, ditched boundaries radiating out from it and with at least one Iron Age or Roman settlement set on its periphery

(*see* chapter 5). The townships boundaries between Hinton and Steane follow the eastern boundary of the enclosure for 1.2km, while on the west the existing road system and part of the village of Charlton itself may follow its course, thus obscuring the boundary on that side (Fig 7.7).

There are other instances where sections of township boundaries are demarcated by cropmarked ditches, for example between Paulerspury and Alderton, and between Collyweston and Easton-on-the-Hill, but in these cases it is impossible to ascertain the antiquity of the ditches from the air photo evidence alone. These cropmarks may indicate no more than the remains of recently removed (19th–20th century) medieval or post-medieval boundaries that had themselves respected the township boundaries. More significant perhaps are those township boundaries that appear to observe or respect Iron Age or Roman period settlements. Boundaries between Croughton and Charlton, and between Weston by Welland and Ashley appear to accommodate the sites of a Roman villa and a possible Roman building. Similarly the boundary between Thorpe Mandeville and Culworth skirts around a series of Iron Age or Roman enclosures.

To set against these examples there are other examples of a high level of discontinuity between the Iron Age and Roman landscapes and township boundaries, but the clearest evidence of continuity or discontinuity is only revealed when the medieval furlong pattern can be compared to the underlying cropmark patterns. This is most vividly demonstrated

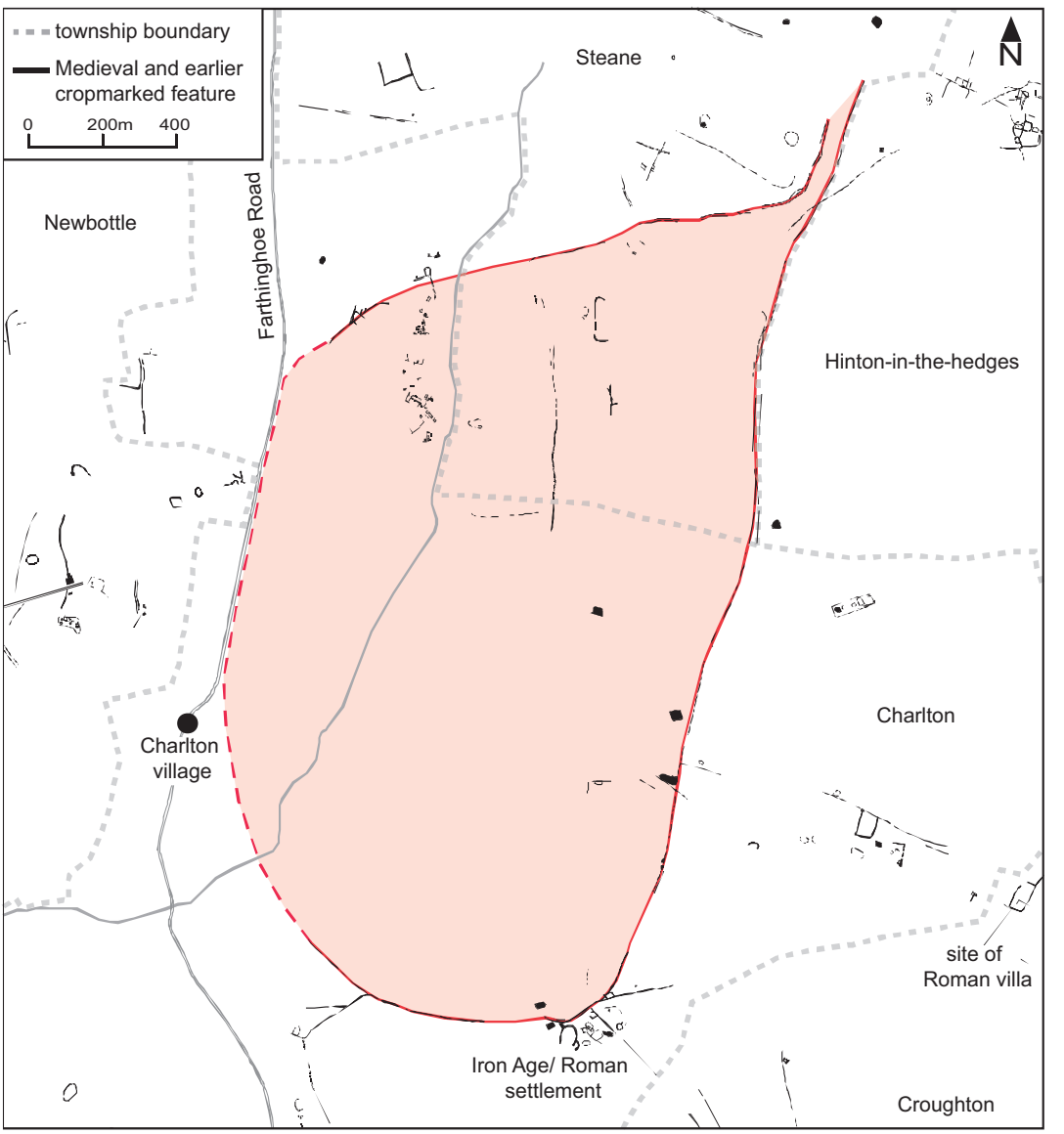



*Fig 7.7*
*A large oval enclosure, with conjectural western boundary, at Charlton. It is entered via a wide drove at the north east corner and has radiating linear ditches. Although presumably of Iron Age origin, given the associated settlement on the south east side, it may have continued in use in the Anglo-Saxon period as it is respected by a township boundary.*

*Fig 7.8*
*Discontinuity between the Iron Age/Roman boundary system and the pattern of medieval furlongs at Faxton. (NCC photograph SP7874/018 1st August 1986 NCC copyright)*

at Faxton where complete discontinuity between the two systems is demonstrated (Fig 7.8). When such comparison is undertaken on a countywide scale using the NMP data, it is likely that some tracts of land will show high levels of discontinuity while others will show continuity, thus perhaps revealing a great deal about the nature of the Anglo-Saxon landscape.

## Discussion and conclusion

Aerial survey has produced only limited evidence for the physical remains of Anglo-Saxon settlement and burial sites. It is likely that intensive and targeted research, particularly through well-recorded systematic field-walking of cropmark sites and by reassessment of cropmark evidence on Anglo-Saxon cemetery and other sites indicated by metal detecting finds, would improve this situation. However, given the often ephemeral nature of Anglo-Saxon evidence where it has been revealed through excavation, one cannot expect anything comparable to the results aerial archaeology has yielded for the Iron Age and Roman landscape of Northamptonshire. Ironically, however, it is perhaps through the latter that aerial data may deliver by far the greatest contribution to the study of the Anglo-Saxon landscape, by making it possible to compare on a large scale the Iron Age / Roman landscape and the open field furlong pattern that was laid out in the Late Saxon period, enabling a detailed exploration of issues of continuity and discontinuity between AD 400 and 1000.

# 8
# The contribution of aerial photography to medieval and post-medieval studies

*by Glenn Foard and Alison Deegan*

## Introduction

Northamptonshire lay at the heart of the region comprising almost solely nucleated villages and open field in the medieval period. Although a significant number of townships saw early enclosure by agreement in the late medieval and post-medieval, over 50% of the land area remained as open field until enclosed by the Parliamentary Enclosure Act in the 18th and 19th centuries, the highest proportion of any county in England (Tate 1949). While most of the land was under open field, it also included two large tracts of woodland: the royal forests of Rockingham and Whittlewood/Salcey. The archaeology of the period has been extensively investigated, including ground survey of most of the earthwork sites by the RCHME in the 1970s and early 1980s (RCHME 1975, 1979, 1981, 1982, 1985), ground survey of the open field systems of the whole county by Hall (Hall 1995), and intensive investigation of settlement and landscape in small sample groups of townships in both the Raunds Area Project (Foard and Pearson 1985; Parry 2006) and the Whittlewood Project (Page and Jones 2003). The general landscape history of Northamptonshire between the 11th and 18th centuries has recently been reviewed (Foard 2004; Hall 2004).

This NMP project has mapped a wide range of aerial archaeology evidence relating to the medieval and post-medieval landscape of the county. The vast majority of the evidence is in the form of earthworks because, as a result of the progressive ancient and then parliamentary enclosure largely for conversion of arable to pasture, until the late 1940s land use in the county was largely pastoral. Many of the earthwork remains are well recorded on the RAF vertical photographs of the late 1940s, while intensive photography, in many cases exploiting exceptional light and ground conditions, by CUCAP and then from the mid-1970s by NCC, produced a detailed aerial archaeology record of the earthwork sites, many of which are now levelled. This campaign of photography in the 1970s onwards also recorded a small but increasing amount of soilmark and cropmark evidence for these sites, as they were levelled, as well as limited, but very detailed, complementary evidence from surviving earthwork sites in the form of parchmarks in grass.

If one excludes the unique problems posed by the extensive landscapes of ridge and furrow, 3,761 individual 'sites' that date to the medieval or post-medieval have been mapped by the project.

Impressive though this figure is, it actually reveals very little about the contribution the NMP data have to make to the study of the medieval and post-medieval Northamptonshire. Working from cartographic, documentary and archaeological sources, more than 500 settlements of probable medieval date have been identified in the county, comprising approximately 11 towns, 430 nucleated villages and hamlets and the remainder being isolated farms, lodges, castles and so forth (Foard 2004b).

Aerial archaeology provides a poor record of the medieval towns, because of a high level of settlement continuity and expansion. In contrast, approximately 200 of the other nucleated medieval settlements are represented in the NMP data, although in some cases the actual features recorded may prove to be later or, occasionally, earlier. This evidence ranges from a few banks, ditches and house platforms surviving in and around living settlements to the extensive remains of now wholly-deserted or extensively-shrunken or shifted villages, occasionally covering more than

10ha or 15ha, mainly in the form of earthworks. Other site types include a small number of the 100 or so known dispersed settlements, such as isolated farms, deer park lodges, moated sites and castles, and a wide range of other non-settlement remains, including fishponds, deer parks, post-medieval gardens and landscape parks, and the remains of industrial or craft activity. Many of these lesser monuments have never been subject to earthwork survey, and so the aerial data currently represent the only substantial record of these monuments.

A good example is the site of Biggin near Oundle. This is the site of Peterborough Abbey, the largest monastic grange, with its associated deer park (Fig 8.1).

In addition the county had in the 1940s one of the best preserved of all medieval open field landscapes in England. Since that date it has, however, been subject to rapid destruction (Hall 1993). The earthworks were, to a varying level of clarity, recorded on the RAF verticals in the late 1940s, but unfortunately these remains were not subject to the same intensive recording by CUCAP and NCC as were the individual monuments. Only in the later stages of the rapid destruction of this resource did the significance of this failure become apparent, when it was realised the contribution that intensive aerial survey might have made as a complement to the countywide mapping of the resource by Hall's ground survey.

Overall the medieval and post-medieval landscape raises a number of distinct problems for the NMP programme. A simple mapping exercise from the aerial archaeology data is justified, to provide a basic record of the presence of features and their general form. However, it is not realistic to expect the specialised level of interpretation of the evidence that is required to enable the mapping itself to be in any way definitive. One is dealing with specialised aspects of the landscape, where there is substantial other data available: documentary (in both written and historic map form) and archaeological (earthwork ground survey and, where now ploughed, potentially field-walking) for many if not most of the remains being recorded. If the aerial data are to be fully exploited, and the significance of much of the detail understood, then it is essential for a specialist in that period or theme to undertake the detailed mapping and analysis, combining all the relevant datasets. The assessment of the approach taken and of the datasets it produced in the Northamptonshire NMP for the medieval and post-medieval needs to take this into consideration, as well as the implications of the remit and strategy of the NMP generally and of the Northamptonshire project in particular.

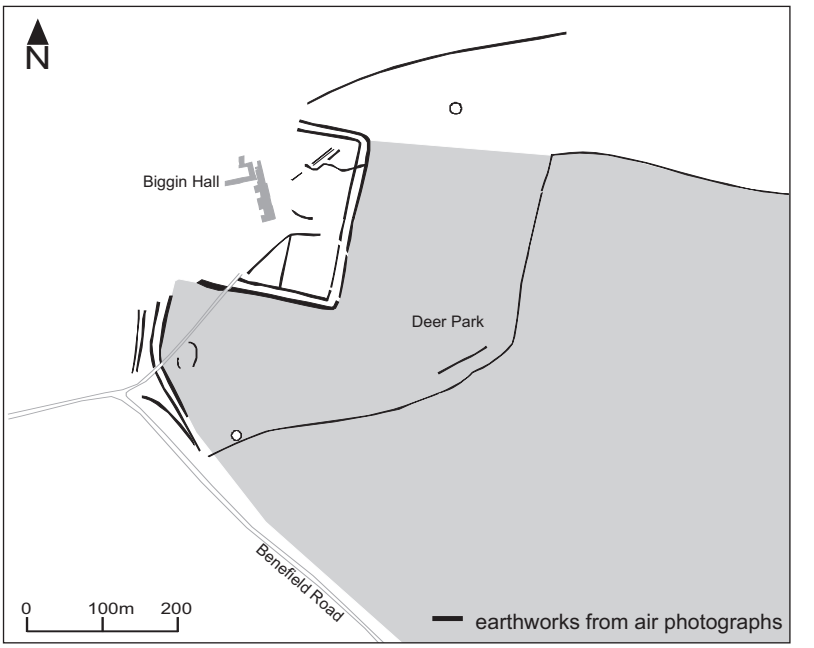



*Fig 8.1*
*Extending from beneath the 18th century Biggin Hall are the irregular earthworks remains of Biggin monastic grange, covering a rectangular area encompassed by the pale of the associated deer park, which can be seen running south west from the grange and then south eastward alongside the modern road.*

## Earthworks

There is a small number of prehistoric and Roman monuments in the county that still survive or are recorded on earlier aerial photographs as earthworks, including a handful of round barrows, four hillforts, and a few areas of fields with associated settlement enclosures, the latter all within woodland or in former woodland areas. The remainder, the vast majority of earthwork sites mapped by the project, as in much of lowland England, are from the medieval and post-medieval, with a handful of even later date. The RCHME inventories of Northamptonshire include ground survey plans of many of these earthwork sites that survived into the 1970s or beyond, surveyed at a large scale and published at a variety of scales from 1:7 500 to 1:1 500 (RCHME 1979, 1981, 1982, 1984, 1985). In addition, others have surveyed sites not dealt with by the RCHME and in a few cases have conducted more intensive re-survey of individual sites already dealt with by RCHME (for example Brown 1991); a small number of paced surveys have also been undertaken (for example Hall and Nickerson 1969).

Air photographs, particularly the RAF verticals from the 1940s, have long been exploited as a record of medieval and later earthworks, particularly for those that were levelled or destroyed before ground survey could be undertaken. At Daventry, for example, Brown mapped medieval settlement remains associated with the village of Drayton, which was engulfed by development in the 1970s: the southern area was recorded by field survey, but the northern part was mapped from aerial photographs (Brown 1991, 38). The NMP has recorded the same areas, but has mapped more extensive detail on the northern area and varies in detail on the southern area. In the absence of any record as to which aerial photographs were used by Brown, the discrepancies may merely reflect NMP's access to additional photography. Aerial photographs were also used in the RCHME inventory to assist in the production of plans of levelled medieval and later sites, but, like their mapping of prehistoric and Roman cropmarks and soilmarks, these were sketch plans with a low level of positional accuracy and limited detail. Hence, as at Daventry, the NMP data provide a supplement to the RCHME work, but there is substantial opportunity for further analysis of such aerial data.

Such photography has also been extensively used by Hall, as an important complement to ground survey, in his mapping of the open field systems of the county, particularly to provide complementary detail where ridge and furrow is now levelled, but also to provide the primary evidence in areas subsequently quarried or developed before ground survey was completed (Hall 1995; Foard *et al* 2004b). As a result of such work, the majority of medieval and post-medieval earthworks recorded on aerial photographs had been registered in the SMR before the NMP project began, and thus the level of 'resource discovery' achieved by the project has been relatively low.

## Ground survey versus aerial data

A significant, though rarely-documented principle of the NMP is that higher-level survey, where available, should be incorporated into the NMP maps in preference to the presumed lower-level of information that might be gleaned from air photographs. This approach is still advised for current NMP projects (Y Boutwood pers comm). With regard to earthwork survey, the NMP policy was adhered to in the Northamptonshire project until 1998, with existing earthwork surveys being used in preference to independent mapping from the air photos.

With hindsight, it was a significant mistake to have integrated earthwork ground survey data directly into the NMP dataset, especially as it was then already known that substantial additional data for many sites was available from the aerial photographs. Thus for many sites mapped in NMP prior to 1999 there is additional information to be retrieved from the air photographs than is present on the NMP data taken from the RCHME plans, while on some other sites there is a hybrid dataset combining information from both ground survey and air photo, but not distinguishing the two.

The review of the project undertaken in 1999 led to a modification of this policy and for the data generated thereafter, which fortunately encompasses the area of the county with the highest density of earthwork sites, an independent vector dataset was created, drawn purely from the air photographs. In addition the earthwork plans themselves were all geo-referenced, to enable them to be viewed beneath the earthwork transcription from the air photographs and other aerial data in the GIS. Based on the Northamptonshire experience we would argue that this represents the most effective solution to the complex problems posed for NMP when dealing with extensive earthwork remains of the last millennium.

## Use of hachures

A second problem relates to the way in which earthworks have been represented in GIS in the project. Rendering of multi-layered, three-dimensional earthwork data into a two-dimensional map poses particularly problems for all NMP projects, and these have yet to be adequately resolved nationally. Until recent advances in digital survey, the use of hachures to depict the direction and, by varying their length and width, the length and relative steepness of slopes, was the method almost always used in ground survey to record earthworks (for example Taylor 1974, 36–52). It is by far the most effective, simple way to represent the fine detail of information that

exists in many earthwork remains, and is thus still the most common form of representation of earthworks. For the same reasons hachures also have value for the recording of earthworks from aerial archaeological sources.

In contrast, the other conventions of recording earthworks applied in NMP, most notably the same bank and ditch conventions employed for cropmarks and soilmarks, are difficult for the user to interpret, as they do not effectively convey the direction and intensity of slope; and problems can also arise, as the direction of slope may not always be apparent from the aerial data. Hachures also provide for rapid recognition, as they are sufficiently distinct from crop- and soilmark representation, something that is important in a digital environment where separate layers of data from soilmark, cropmark, parchmark and earthwork sources may need to be superimposed, often in conjunction with other datasets.

Several pre-cursors to the NMP, such as surveys in the Hertfordshire, Thames Valley, Kent and Yorkshire Wolds, were limited to the recording of cropmark or soilmark archaeology, and this bias has perhaps had an unconscious influence on the way earthwork mapping is tackled in the NMP nationally. This bias was apparent in the early models of morphological classification published in *Antiquity* in 1989 (Edis *et al* 1989). The Yorkshire Dales, also a pre-cursor to the NMP, and other early NMP projects such as those for the National Forest and Lincolnshire, recorded earthwork sites with simple T-hachures, or, for narrower features, the same bank and ditch conventions employed for cropmarks and soilmarks. These projects preceded the digitisation of the NMP, in which mapping, usually sketch-plotting, was hand-drawn onto acetate sheets with pen. In this manner the creation of a T-hachure plan did not require a significantly greater input of time compared to levelled features of similar complexity.

The Northamptonshire project, being the first comprehensively digital NMP project was the first to encounter the problems of adequately recording complex earthworks in a digital environment. Given the number of earthwork sites in the county, many of them large and complex, this represented a major challenge. Although we believe that the correct decision was taken in deciding to represent earthworks using hachures, with hindsight it is clear that far more wide-ranging experiment should have been conducted at the outset to establish a more efficient and cost-effective method to produce digital hachuring. This was only finally achieved in the light of the experience of the earlier work when a review of the project was undertaken in 1999, resulting in a simple but effective method.

A distinctive line convention was used, placed along the top of the earthwork slope with equal sized hachures pointing down slope. Although the sophistication of varying length and width of hachure was thus abandoned, this was a reasonable compromise to rapidly achieve clear digital representations. Moreover, such a convention is appropriate given the often limited information available from basic rectification of single oblique air photos regarding the scale and character of slopes concerned, although this practice can of course be substantially enhanced where viewing of stereo pairs is possible. This approach does cause problems when transferred to some software, such as the Autodesk drafting package preferred by English Heritage. Autodesk cannot easily replicate the MapInfo line convention, but all leading GIS packages should be able produce similar output.

## The value of aerial data for earthwork sites

Comparison of the earthwork ground surveys to the aerial data produced from 1999 onwards shows that significant differences exist between the NMP mapping and the RCHME ground survey plans. Some of the variation between the air photographic data and ground surveys may reflect limitations inherent in the aerial view: distinguishing the top of a slope can be a far more subjective task from an air photograph than it is on the ground, and at times even distinguishing the direction of slope can pose a problem. However, in other cases the NMP mapping is significantly at odds with the ground survey in detail and/or extent. Although usually this mapping was the simple continuation of linear elements, in some cases significant archaeological features lay beyond the extent of the ground survey and were not described in the text, as at Lamport, Clopton and Welford. In other cases there was omission of significant features, as for example at Barby and Winwick.

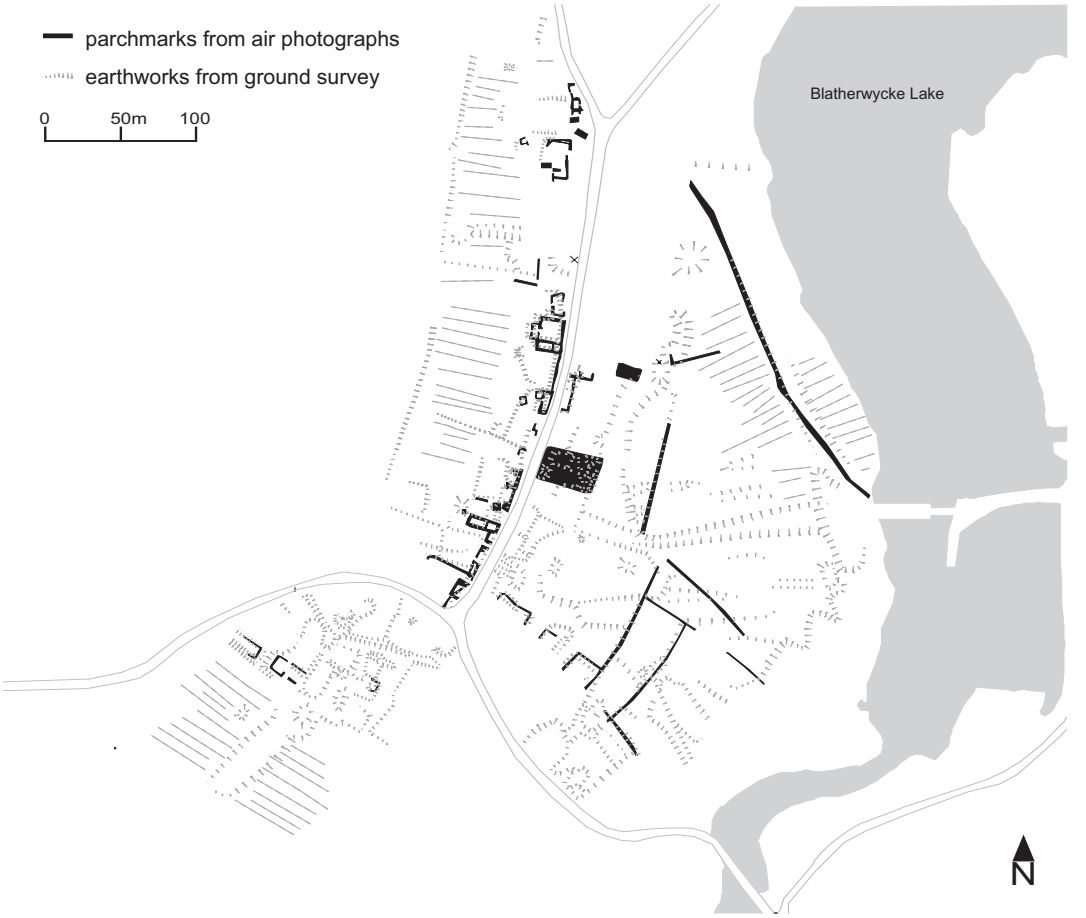



*Fig 8.2*
*English Heritage ground survey plan of earthworks at Blatherwycke, superimposed with the parchmarks mapped from air photographs by the NMP (after unpublished plan NMR Event UID 1208535, Monument UID 347630)*

However, this comparison is not a straightforward one of the potential contribution of aerial and ground survey, because the RCHME plans were produced as a rapid survey intended to deal with all major earthworks in the county in a reasonable timescale. It was carried out as a rapid survey, between the early 1970s and early 1980s, by two investigators, requiring limitations to be set in the amount of detail that could be recorded. It thus did not claim to be a definitive survey of each site or to provide comprehensive coverage of all surviving earthwork sites. The RCHME plans typically provide the broad extent and character of the site, but in many cases far more fine detail can be seen on ground inspection where the earthworks still survive.

Where sites have been re-surveyed on the ground since the RCHME surveys were done, far more detail has often been revealed. At West Cotton, Catesby and Blatherwycke subsequent earthworks surveys are both of a higher standard of accuracy and represent a more comprehensive record, particularly of the finer details (Windell *et al* 1990; Giggins and Laughton 2003; *NMR Event UID 1208535*). Most of the earthwork sites that were not surveyed, being only briefly mentioned in the inventory text, were small sites, such as isolated fishpond and windmills, or limited areas of settlement remains on the peripheries of villages. However, a few cases of large areas of settlement that had not been mapped have been identified, for example at Pilton (Brown 1996–7, 211). For these reasons the RCHME survey is not a valid yardstick against which to judge the value of aerial, as opposed to ground survey, data for earthwork sites, and recourse must be made to subsequent more detailed surveys.

At West Cotton the western half of the deserted medieval hamlet was omitted from the RCHME survey. However, the ground survey by Foard and Windell in the 1980s shows the whole site, and the air photographic earthwork evidence adds nothing new (Windell *et al* 1990). Also, for Blatherwycke the new ground survey by English Heritage in 1999 (unpublished plan in NMR), the RCHME plan is seen to omit

the northern half of the settlement earthworks (*compare* Figs 8.2 and 8.3). Figure 8.2 also provides a more accurate spatial representation of features, which correlate closely with the position of features independently mapped from the aerial earthwork data, as well as providing finer detail. Significantly, at the southern end of the site the RCHME plan does communicate more of the form of the earthwork than the computer-generated modern survey, because the hachures on the latter do not provide a coherent form to key features (Fig 8.3). The limitations of the graphic representation in the modern ground survey, in part, is perhaps merely because the plan was never prepared for final publication, but also perhaps resulting from the lack of direct, on-site interpretation contributing to the earthwork plan, which means that the earthwork air photography adds clarity to the understanding to the monument that it would not normally provide (Fig 8.2). Where the aerial data contribute dramatically to the interpretation is in the evidence provided by the parchmarks. They reveal a range of new features, most of which are buildings, some simple single-cell structures, but others apparently arranged around a courtyard. There are also various boundary walls and a later metalled road, probably associated with emparking. Many of these structures correlate closely with, but substantially enhance the ground survey earthwork features and, since none of structure appears on the Tithe map of the 1840s, it is likely that they are the result of late medieval population decline in the 18th century or earlier imparking.

At Catesby the new ground survey by Foard and Giggins confirms the accuracy of position of most features on the RCHME survey, but, as at Blatherwycke, it demonstrates that significant and finer detail is missing from the latter. For example specific buildings are not recorded, as well as a few substantial, important features, such as the probable mill building and tail race. When the new ground survey is compared to the earthwork aerial photography it is found that the only significant details added by the latter are the tree pits from the avenues and a little more clarity or extent to several faint features visible on the ground (Giggins and Laughton 2003).

In contrast, when the parchmark data are added, a broad range of new features, mainly buildings and boundary walls, are revealed, which complement the earthwork evidence (Figs 8.4 and 8.5).

The rectification of actual photographic images from 1999 onwards, and the registration of the RCHME plans in GIS, have made it possible to overlay vectorised and raster data in various combinations to enable rapid assessment to be done across the rest of the county. This assessment provide a similar picture to that provided by the case studies, suggesting that where intensive ground survey is conducted, and carefully prepared interpretive hachured

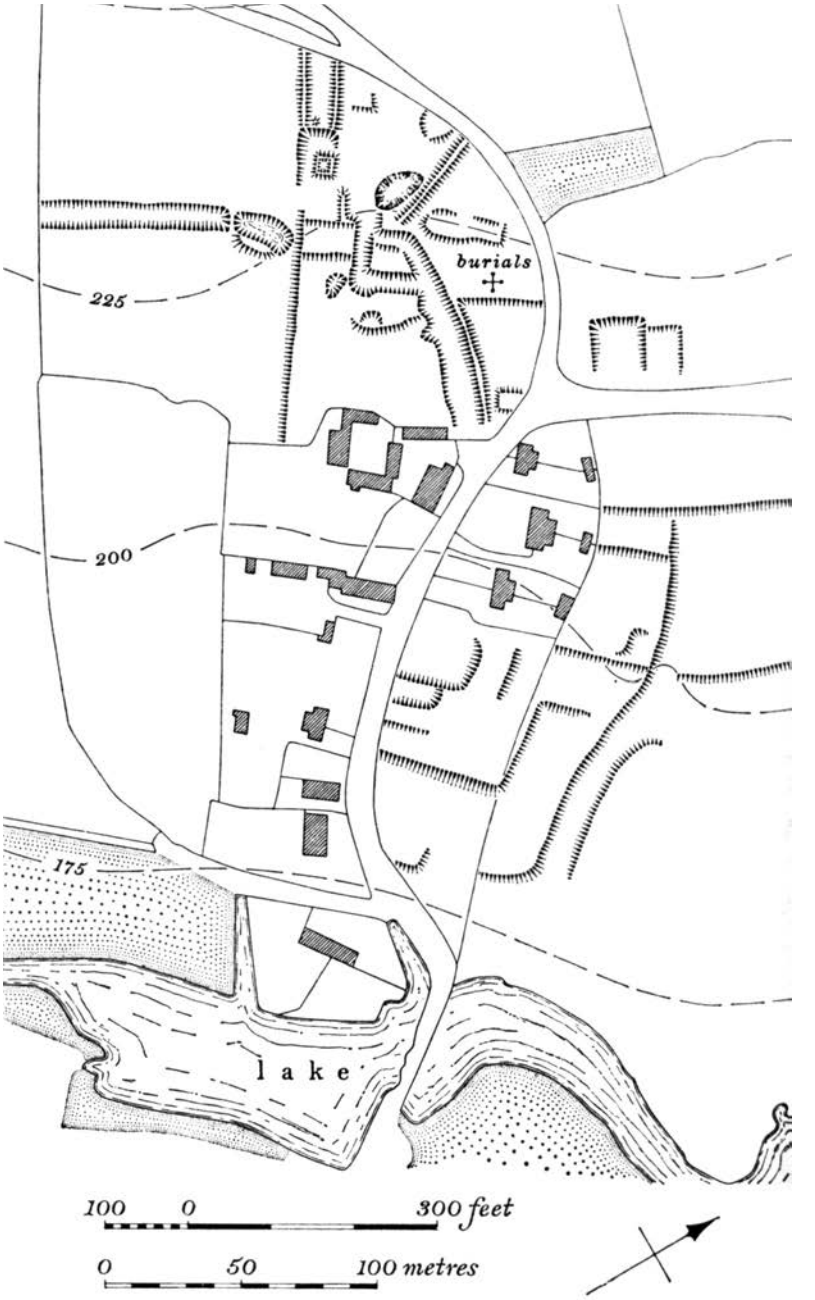



*Fig 8.3*
*RCHME survey plan of earthworks at Blatherwycke (RCHME 1975, fig 31).*

*Fig 8.4*
*Parchmarks of buildings within the medieval market village of Lower Catesby, mainly along the hollow way on the left, the foundations of the buildings of the monastery and the post dissolution country house to the right, and the mill leat to the centre bottom. (NCC photograph SP5159/060 July 1996 NCC copyright)*

*Fig 8.5*
*Earthworks emphasis different aspects of Lower Catesby. The avenues of the formal gardens of the post dissolution house are very clearly seen between the two sets of surviving buildings (NCC photograph SP5159/047 4th March 1988 NCC copyright).*

plans produced, the aerial earthwork data rarely add significant evidence, even when the latter have been taken in the very best light and ground conditions.

The overall assessment has, however, shown that high-quality aerial photography can enable valuable independent validation upon the level of accuracy and completeness of existing ground surveys, in addition to providing a far more immediate and intelligible representation of the sites than do ground surveys, particularly for the layman.

## Parchmarks

On earthwork settlement sites, as mentioned above for Blatherwycke and Catesby, it is with parchmark evidence that aerial archaeology has potential to make a major contribution to the understanding of earthwork sites that have already been subject to detailed ground survey. At some 33 locations the NMP mapping shows stone buildings, structures and walls. Unfortunately, following national practice, parchmarks have been recorded alongside cropmarks in NMP, without separate classification. Given their unique character and the rarity of their appearance, but also the important and distinctive nature of the evidence they tend to reveal when they do appear, it would have facilitated easier analysis if all parchmarks could have been distinguished from all other cropmarks.

Examples of complex building and boundary evidence are seen at the deserted village of Glassthorpe (Fig 8.6). One of the most striking examples is at Pilton, where parchmarks complement the earthwork evidence of buildings along an abandoned street running parallel to the present High Street. Although this area is described in the RCHME inventory as '…covered with low banks, mounds and scarps, forming no coherent pattern…' (RCHME 1975), the value of the aerial data must be considered in the light of a detailed earthwork survey by Brown, which revealed a regular pattern of tenements lining both sides of a road (Brown 1996–7, fig 1). The aerial data complement the latter, providing detail of stone buildings in association with some platforms, but showing far more detail of layout. It also reveals for part of the site a far more coherent, clearer rectilinear plan to the occupation. While in some places the lack of close correlation between the

*Fig 8.6*
*Parchmarks revealing fine detail of a number of medieval farms within the deserted village of Glassthorpe (NCC photograph SP6661/062 July 1994 NCC).*

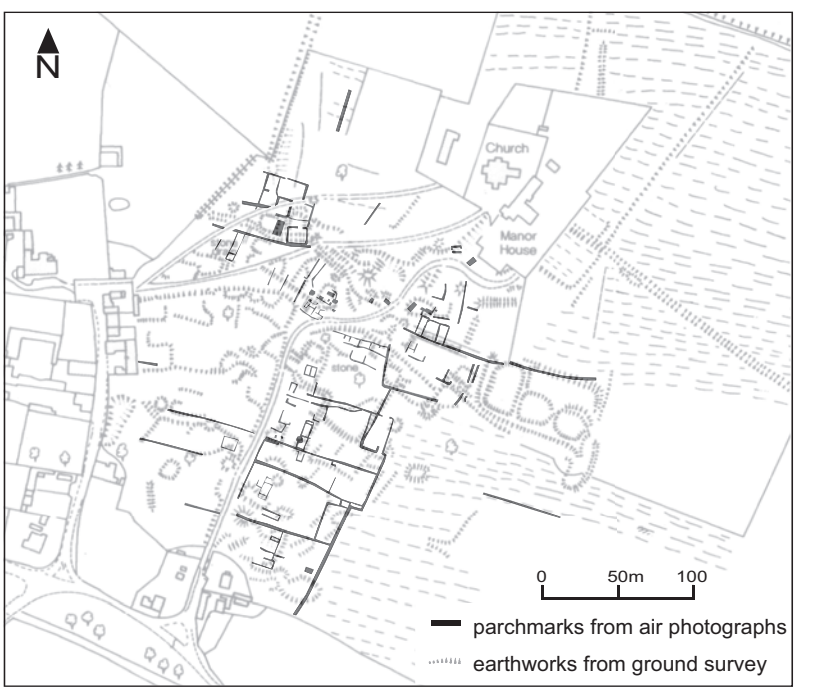



*Fig 8.7*
*Earthwork plan by Brown (1996–7, fig 1) superimposed with the parchmarks mapped by the NMP).*

two datasets may reflect minor inaccuracies in one or other of the surveys, it must be remembered that some of the earthworks may reflect a different phase in the development of the settlement to that shown by the stone walls revealed by the parchmarks, which are only recording stone structures that lie sufficiently close to the surface to affect grass growth (Fig 8.7).

While such data can represent a major enhancement of our understanding of earthwork sites, during more than two decades of intensive reconnaissance substantial parchmark evidence was only revealed on a handful of occasions following intense dry periods, and in almost every case only once on any individual site. The results were achieved by specially targeted reconnaissance of known earthwork sites when exceptional conditions occurred, and it is likely that such an approach would continue to be a cost-effective strategy. The one caveat is that those conditions are so rare and it is so unpredictable as to which earthwork site will respond with the production of good parchmarks, that in general it may be far more productive and cost-effective to recover comparable data through geophysical survey. However, in the absence of extensive resistivity survey of any of the good parchmark sites in Northamptonshire one cannot determine whether the aerial data provides any detail that geophysical survey cannot recover, or vice versa. In support of aerial survey, what can be stated with certainty is that images of good parchmark evidence have a far higher potential for the general communication of the character of medieval settlements and other monuments, for it is so much more immediate and intelligible to layman and professional alike, and as such may more than justify the costs of reconnaissance.

## Soilmarks and cropmarks

Where earthwork sites have been levelled, air photography has occasionally revealed extensive new data in the form of soilmarks or cropmarks. While earthworks are a diminishing resource, at the same time, at least in the short to medium term, the soil and cropmark data increase. Soilmark evidence does generally decay in quality over time and finally disappears in the long term, as soils are homogenised by ploughing. In contrast, cropmarks may tend to improve over time, as confusing stratified deposits are destroyed, enabling cut features to stand out more distinctly. But of course the potential of stone structures, which may occasionally produce cropmarks, will also be destroyed in the same process, as the stone scatters on a handful of settlement sites bear witness.

However, crop and soilmark data for medieval and post-medieval sites represent an even smaller percentage of the data mapped in the NMP project than earthworks.

In one particular case aerial survey has contributed significantly to the understanding of the archaeology of medieval and post-medieval Northamptonshire, as a result of intensive targeted reconnaissance as part of a wider programme of research into the medieval landscape. This is the soilmark evidence of the medieval charcoal industry. The evidence, in the form of roughly circular patches of intensely black soil of some 10–20m in diameter, is concentrated solely in the former woodland areas, in Whittlewood, Salcey, but most clearly in Rockingham Forest (Fig 8.8).

The significance of the black patches were recognised initially only as a result of ongoing ground survey by various individuals (Foster 1988), and then were targeted by intensive aerial survey in the late 1970s and 1980s (Foard 2001a). The absence of charcoal hearth evidence on any non-NCC archaeological aerial photography, other than some visible on the RAF verticals of the 1940s, demonstrates the importance of targeted aerial reconnaissance based on a detailed knowledge of the medieval landscape of an area, which enables recognition of potentially significant evidence. However, comparison of the small-scale published plan of the distribution of charcoal hearths (Foard 2001a) with the mapping of the soil marks in NMP records a substantial number of additional soilmarks that are unlikely to represent charcoal hearths, but does not distinguish one from the other. A similar problem, of the lack of recognition of the importance of a particular type of evidence in particular locations, is seen in the failure in NMP to adequately map the many stone quarries in the Collyweston / Easton on the Hill area from earthwork, cropmark and soilmark data. These quarries represent the main evidence for a regionally-important stone slate industry of the medieval and post-medieval periods. The potential of the aerial data were only recognised in 1999 when the

*Fig 8.8*
*Soilmarks of charcoal burning hearths at Brigstock (NCC photograph SP9283/036 24th September 1987 NCC copyright).*

*Fig 8.9*
*This hollow way lined with the earthwork remains of peasant houses lies in the southern part of the deserted medieval hamlet of Kirby, near Corby. Within the pasture field the stone walls clearly define the stone buildings, which include at least one courtyard farm. In the arable immediately to the left other buildings a represented by stone scatters. This street had been deserted long before the first map of Kirby was draw in the 1580s, for Kirby had by then already seen extensive enclosure for sheep farming (NCC photograph SP9292/027).*

subject was briefly assessed for the first time (Hall 2004). When detailed study is undertaken of the industry, aerial photographic data will undoubtedly complement that from past and new ground survey and documentary sources (for example the Ordnance Surveyor's Drawings of the 1810s and the Enclosure maps and Awards for Collyweston and Easton). In the meantime, however, the available NMP mapping does not provide an adequate record of the evidence available on aerial photographs.

The same is true of ironworking evidence. As a result field-walking and trial excavation on various sites, it is now possible very occasionally to recognise the faint traces of iron furnaces as slight soilmarks and earthworks on aerial photographs, features that were, understandably, not recognised in the NMP mapping. Examples are the soilmarks and earthworks of furnaces immediately north of, and a large slag heap immediately south of, Fineshade Castle, of which only the latter was recorded by this project (Bellamy *et al* 2001).

Unfortunately, with regard to medieval settlement, the potential of neither soil mark nor cropmark data can be adequately assessed in comparison to earthwork data because of the lack of consistency and completeness in the NMP mapping of such datasets for medieval sites. For example, at the deserted hamlets of Newbold and of Barton Thorpe much of the earthwork, soilmark and cropmark aerial data have not been mapped. There are, however, only about a dozen cases each of significant soil and cropmarks on medieval nucleated settlements, and this in part accounts for the severe limitations in the NMP handling of this type of data.

The significance of some small sites has undoubtedly been missed altogether, and will only be recognised when detailed documentary work is undertaken. A good example if this is the site of the medieval hermitage to the north of Rockingham, where the significance of the cropmark evidence was only revealed during detailed research on the history of the nearby medieval village (Foard 2001c). Other isolated sites are sometimes more obvious and easy to identify, as with the ring ditches of windmill mounds where the cross tree is visible, for example at Ringstead; but more often, as at Tansor, they may be confused with Bronze Age ring ditches, with which in the latter case it was associated.

Where soilmark data have been mapped, as at Hale – a hamlet whose plan form is known primarily from soilmark aerial data – the failure of NMP data to clearly distinguish stone scatter from dark soil areas is a problem, as it means that evidence for probable stone structures cannot be clearly distinguished. The same is seen with several farms on the periphery of Kirby in Deene, although such problems are not restricted to soilmarks of medieval sites (Fig 8.9). It also occurs with the occasional soilmarks of Roman stone structures, as at Easton Maudit and at Sewardsley.

cropmark data, excluding parch marks, appear somewhat more difficult to interpret in terms of the plan of settlements than many earthwork datasets. Generally, compared to earthwork evidence, it would

appear that cropmarks can produce good evidence for the systems of ditched enclosures, and of tenement boundaries and closes, but tends to poorly represent the structures within those enclosures. Wythemail, a deserted hamlet whose plan is known in part from cropmark data, is a good example. Only rarely have cropmarks revealed stone structures on medieval sites. One of the few exceptions is in the double-moated site at Grendon, this site is not in the project data because it was photographed after NMP mapping of that area had been completed.

The data clearly need to be reviewed, and in some cases remapping undertaken, but this needs to be undertaken as a single task, integrating all types of archaeological and also any relevant historic map data in a single study. It is hoped that this will be achieved within the AHRC Northamptonshire landscape project (*see below*), which would then enable an effective assessment of the contribution of aerial data to the understanding of medieval settlement in the county.

## Ridge and furrow

A decision was taken when the Northamptonshire project was developed, unlike in later NMP projects in other counties, to exclude the detailed recording of ridge and furrow, whether recorded as earthworks, soilmarks or cropmarks. In common with certain other Midlands counties, Northamptonshire had, until the 1950s, very extensive areas of medieval ridge and furrow representing vast swathes of near-continuous archaeological evidence for medieval landscapes (Hall 2001a). In addition, ground survey of the county's open field systems, by Hall, was already well advanced by the 1990s. In consultation with Hall it was concluded that the mapping of the resource to the NMP standard (an outline extent of visible remains with an arrow to indicate the direction of ploughing) could not significantly contribute to this theme (Figs 8.10 and 8.11).

This is a conclusion supported by various other specialists, who consider that it would have been a very weak record, unworthy of the effort required to produce it (S Wrathmell and R Palmer pers comm). The detail of mapping required to enable a valuable contribution would have required a far higher level of resourcing and specialist expertise than could reasonably be expected within NMP. NCC also recognised that such a programme of recording ideally needed application across the Midlands, and thus a wider involvement with its planning (Northamptonshire Heritage 1994, section 4.3). Initial ideas for recording had been outlined in 1993 (Hall 1993), but when a regional study was undertaken it only dealt with issues of survival and management of the resource, and the report still identified the need for a recording strategy to be defined and implemented (Hall 2001a).

Thus, it was always conceived that more expansive work on medieval field systems would be undertaken in parallel with this NMP project, drawing upon Hall's ground survey. Such a strategy for recording was finally developed and implemented through the Rockingham Forest Project, developed in collaboration with the Rockingham Forest Trust, with Heritage Lottery Fund, English Heritage and NCC funding. This project mapped the medieval and post-medieval landscape of 577 km$^2$ of the former Rockingham Forest, representing about 25% of the county (Foard *et al* 2004a, 2004b). This is being enhanced and extended to the whole historic county in an Arts and Humanities Research Council funded project at the University of East Anglia. For this a methodology has been developed to enable the integration of information from aerial archaeology with the more comprehensive dataset from ground survey, supplemented where appropriate with documentary evidence. Only when this project is completed in 2009 will be possible to effectively assess the contribution of aerial data to the mapping and understanding of the open field systems of the Midlands.

## Conclusions

While the greatest strength of NMP is in the mapping of the Iron Age and Roman landscape, where large amounts of cropmark data dominate, its greatest weakness is in the mapping of the medieval and post-medieval, where earthworks dominate, but where there are also extensive comp-lementary data of various types, both archaeological and documentary.

Given the intensive amateur and professional field survey carried out in the county since the early 1960s, together with intensive aerial survey by NCC, CUCAP and others, and with detailed SMR

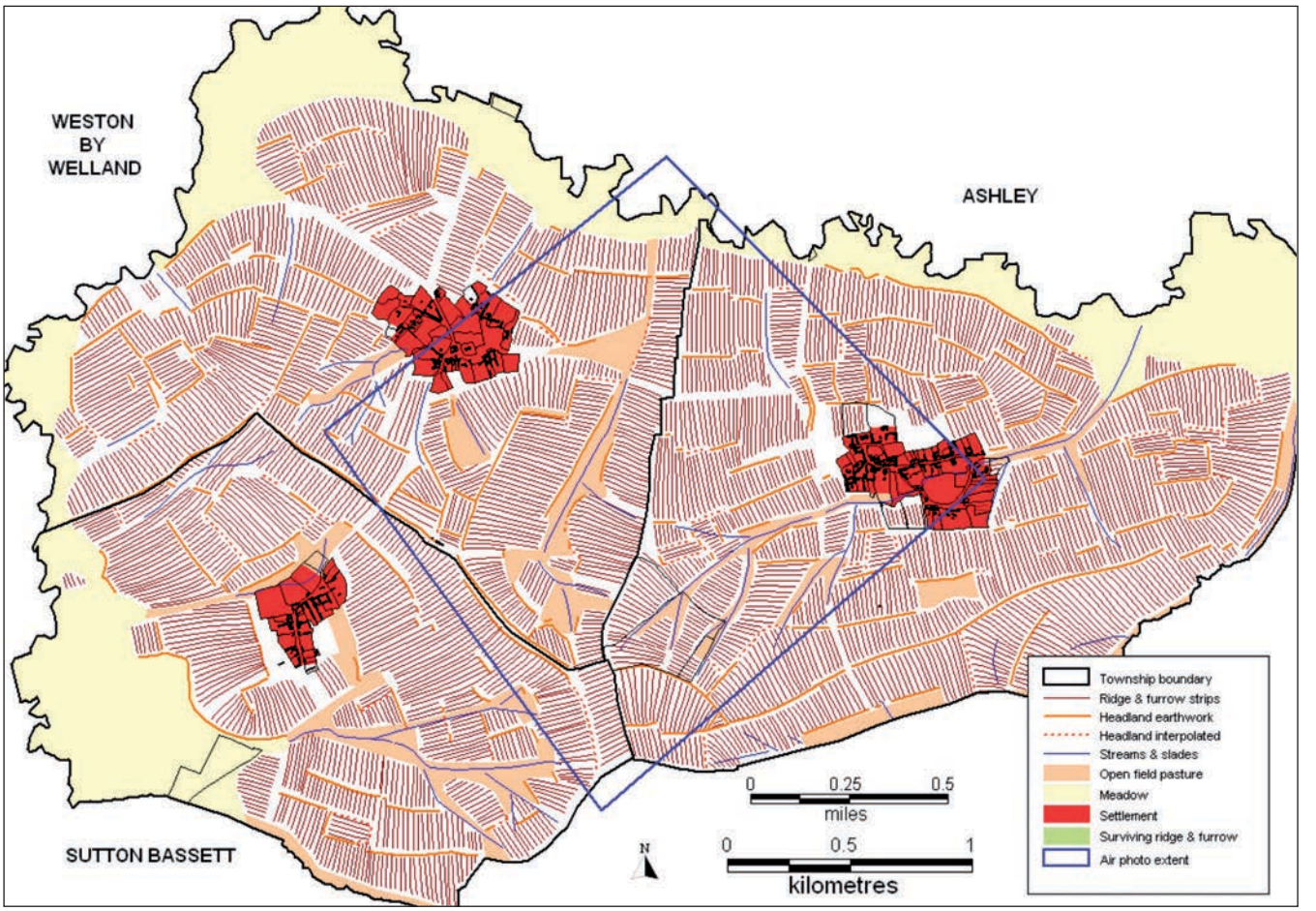



*Fig 8.10*
*The open field furlong pattern of part of Weston by Welland and Ashley, mapped by Hall from ground survey of remnant headlands and surviving ridge and furrow, compared with the earthwork evidence of ridge and furrow recorded on the vertical air photos of the 1940s (Reproduced from Foard et al 1994b, fig 26).*

enhancement since 1974 from all the sources, it is not surprising that the NMP mapping in Northamptonshire has revealed almost no major new medieval or post-medieval sites. Almost the only potential for this was in the systematic searching of the RAF vertical aerial photography, which had already been extensively consulted for the RCHME inventories. In very specific ways aerial survey has, however, yielded important evidence that complements that from ground survey and documentary research.

In some cases this has been earthwork evidence for sites subsequently levelled or destroyed; in some cases it has been the result of intensive, targeted reconnaissance work, as with the soilmark evidence for the medieval charcoal industry; in other cases it has been through the recovery of parchmark evidence, again as a result of carefully targeted reconnaissance during exceptional dry conditions. As a result, the NMP mapping has provided important initial, and in some cases the sole graphical, interpretation of earthwork sites that were not included in the RCHME inventories. However, because one is dealing with a millennium where a vast documentary record is available, and where other archaeological techniques can yield evidence on an intensive and on a landscape scale, it must be recognised that NMP has a limited role, primarily of providing a basic graphic index to what aerial data exist. Only when that data are analysed in more detail by medieval specialists, drawing upon the full range of available evidence, can the full potential of the aerial data in some cases be realised, whether this be for medieval and post-medieval settlement, land use or industry.

In view of the policy, before 1999, of working from existing earthwork plans, it is likely that re-examination of some earthwork aerial photography for sites that were surveyed by RCHME may yield more data than are currently available within the NMP mapping. It may also be that other monuments scattered through the wider landscape, such as windmill mounds and water mill sites, may occasionally have been missed because there was no systematic

*Fig 8.11*
*1940s RAF vertical air photograph showing earthwork ridge and furrow (English Heritage (NMR) RAF photography CPE UK 1925/1179 copyright MOD)*

mapping of the ridge and furrow. However such omissions are likely to be corrected in the AHRC project.

The upstanding medieval and post-medieval remains of lowland Britain pose a significant, but rarely acknowledged, problem for the NMP. A consistent solution to the problems of how to render these complex multi-layered, three-dimensional landscapes within a two-dimensional digital drawing has not been established. The Northamptonshire NMP Project tested a variety of options and finally settled upon a cost-effective method that we believe provides a sensible role for the NMP: that is, to provide an initial guide to the extent and character of the earthworks evidence. What is clear is that NMP cannot attempt the sort of intensive analysis and mapping that can only be effectively implemented through the integration, by medieval specialists, of aerial data with that from various types of ground survey and documentary research. One of the two author's wider experience of the NMP is that such issues have not been adequately addressed, either for current projects or for those in planning.

# 9
# Studying modern military remains

*by Graham Cadman*

The Northamptonshire NMP Project was designed in 1994 at the time when Britain's 20th century military remains, defined for the purposes of this report as monuments up to the end of the Cold War in 1989, were only just beginning to be accepted as an archaeological resource worthy of study and selective preservation (Dobinson 2000). Only after the start of the Defence of Britain Project (DoB) in 1995 was detailed guidance available on the recording of such remains, and only then did significant evidence begin to be systematically collected by the SMR in Northamptonshire (Dobinson 1996, 2000; Dobinson *et al* 1997; English Heritage 1998, 2000). In 1994 such data were not routinely sought, and only a handful of entries for modern military sites existed in the SMR, compared with more than 600 records by 2002.

Twentieth century sites had not been specifically targeted by the intensive NCC aerial reconnaissance programme that ran from the mid-1970s to the mid-1990s, so there were few specialist oblique photographs of known sites (*see* chapter 2). Although in 1994 the archaeological scope of the NMP did encompass military remains up to 1945, the remit of the North-amptonshire project was only to record airfield and other defence sites that were not already on Ordnance Survey maps (Northamptonshire Heritage 1994, 10). Buildings, including those with military functions, either by design or appropriation were not normally to be mapped at all, although there was provision for significant structures such as pillboxes to be noted and reported to the SMR (North-amptonshire Heritage 1994, 10). In practice this meant that the majority of the military sites of the last century were beyond the scope of the mapping project. As a result, while the NMP mapping has contributed some useful new data to the understanding of the resource, its contribution is more limited than it might have been had the reconnaissance programme and the project been initiated later.

A total of 106 sites in 34 groups were identified by the project as 20th-century military features. Few of these were previously unknown, although the project has added important detail in some cases.

The majority of records for 20th-century military remains now in the SMR originate from DoB recording, carried out by volunteers, whom NCC helped to coordinate; work by the author on the aerial photographs; and supplemented from the national documentary assessments undertaken by Colin Dobinson on behalf of the CBA for MPP. Aerial photography as utilised by NMP has contributed relatively few new sites.

## The 20th-century military resource in Northamptonshire

There is an enormous range of 20th-century military remains across Britain, including civil defence and related works, all of which reflect the changing nature of threats to national security and the new and varied counter-measures built in response to them. Although less vulnerable than many parts of the country, there was a significant military impact on Northamptonshire. The county had only small numbers of many of the main categories of 20th-century military sites, as defined by the MPP (English Heritage 2000), and some types, such as the 'stop line' static defence anti-tank ditches of early World War II, were entirely absent (Table 9.1). Many of the sites known in the county presently lay outside the MPP classes at the time of writing, mainly those of a Civil Defence and quasi-military nature, including Prisoner of War (POW) camps, hospitals, training camps, barracks and drill halls, stores, and facilities for agriculture and evacuees.

While military exercises held before World War I may have left some archaeological traces, the principal remains of this era are those of barracks and drill halls, including the large, nationally-important Royal Ordnance Depot at

Table 9.1 Northamptonshire twentieth century military sites with comparative national data.

| *category/type* | *UK estimated total* | *Northamptonshire estimated total* | *observations and references (Northamptonshire references are to SMR and other NCC records unless specified)* |
|---|---|---|---|
| *inland or 'defence in depth':* | | | |
| pillboxes | 20,000 minimum | 38 | national total from Dobinson (2000, vol. II). Northamptonshire total includes all recorded pillboxes including those built for airfield defence |
| road blocks | unknown | 75 | no national estimate traced |
| Spigot mortars | *c*28,000 | 1 minimum | national total from Dobinson (1996, vol II). Estimated total issued to Home Forces |
| anti-tank ditches | 752km (467miles) | 0 | total national length is that planned in July 1940. Dobinson (1996, vol II). None were constructed in Northamptonshire |
| *airfields and airfield defences:* | | | |
| WW1 military airfields (1918) | 301 | 3 | National total from Dobinson (2000, vol IX.1). Northamptonshire total includes emergency landing ground at Clipston |
| military airfields (1936) | *c*150 | 2 | National total from English Heritage (2000a) |
| WW2 military airfields (1945) | 740 | 7 | National total from Dobinson (2000, vol IX.1) |
| military airfields (2000) | not available | 3 | |
| bombing ranges | 108 | 3 | National total for WW2 inland ranges from Smith (1989) |
| Thor missile sites | 20 | 2 | National total from from Cocroft (2001) |
| *anti-aircraft defences:* | | | |
| WW1 AA | 376 | ?2 | National total from Dobinson (1996, vol I.1) |
| WW2 AA | 2270 | 44 | National total from Dobinson (1996, vol I.1). Comprising 981 HAA, 1238 LAA and 51 minimum Z batteries. Northants 5 HAA, 39 LAA. |
| WW2 searchlights | 1000s | 79 | |
| WW2 bombing decoys | 797 | 11 | National total from Dobinson (2000); 797 locations with *c*1100 'decoy functions'. Northants 10 sites with 11 decoys (Cadman 1998-9) |
| U/G ROC Posts | 985 | 20 | National total from Dobinson (2000, vol XI.1). Northamptonshire total included information from Subterranea Britannica |
| *infrastructure:* | | | |
| PoW camps WW1 | unknown | 15 | Northamptonshire WW1 and 2 sites range from parent camps to local PoW hostels |
| PoW camps WW2 | 1500 | 20 | National total from English Heritage (2002). Northamptonshire WW2 sites range from parent camps to local PoW hostels |
| air aid shelters (domestic) | 3.5 million | 33 | Estimated numbers of Anderson and Morrison shelters from Dobinson (2000 Vol VIII). Northamptonshire figure is for all SMR recorded civil and domestic shelters |
| *miscellaneous:* | | | |
| aircraft crash sites | 11,000 min | 550 | National figure is for UK in WW2 only from Holyoak (2002). Northamptonshire figure us for military aircraft destroyed 1917 to 1964 from Gibson (1982) |

*Fig 9.1*
*The Royal Ordnance Depot at Weedon on the 13th April 1947. A superb vertical view of the stores, magazines, barracks and hospital at what was clearly a busy period shortly after the end of WW2. Rows of Romney and other temporary 20th century hutting, since demolished with little if any recording, are clearly evident together with what appear to be overflow stores lined up alongside the A45. Such photographs provide a rare opportunity to witness the working site with practices that may not be wholly recoverable from the documentary record. The Depot was constructed in the early 19th century and continued in military use until the latter part of the 20th century (extract from English Heritage (NMR) RAF photography CPE/UK/1994 1268).*

Weedon (Fig 9.1) ((Menuge and Williams 1999). During World War I the main military impact in the county was represented by military camps and training areas, POW camps, wartime production – most notably of munitions at Warkworth and Northampton – plus the building of two military airfields. During the interwar period the concept of offensive deterrence was adopted and guided the siting and layout of RAF stations until World War II. Offensive bomber bases originated in East Anglia and Oxfordshire, although only during World War II did a rapid airfield building programme extend into Northamptonshire. Government re-armament from the early/mid-1930s included establishment of some anti-aircraft (AA) and searchlight provision, along with Civil Defence arrangements (English Heritage 1998, 2000b).

In World War II Northamptonshire was far enough away from important centres of population and heavy industry to avoid concentrated bombing, but it did have offensive RAF and US bomber stations, which played an important role in the training of air crews, and had other training and storage facilities. Munitions and other wartime materials were also produced, and POW camps established.

During the Cold War Northamptonshire moved into the front line with the deployment, albeit short lived, in the late 1950s of nuclear missiles. It also had a 'V' bomber base, nuclear bomb stores, communications facilities along with part of the national network of Royal Observer Corps posts and civilian buffer stores, some continuing in use to the end of the Cold War.

## Aerial photography and modern military archaeology

Lowry has noted that 'although the use of aerial photographs to identify archaeological sites is well established, few people have used such photographs to locate former military sites. This is a little surprising, given that aerial photographic reconnaissance was devised for this very purpose' (Lowry 1996, 9). The MPP has used air photographs to check for survival and completeness of select classes of site after they had had their primary sources assessed (English Heritage 1998, 2000a), and they were used in the evaluation of Cold War, AA and radar sites (English Heritage 1998; Anderton 2000). Air photographs also assist in understanding and assessing very select World War II civil defence sites for preservation, although only where full location lists from primary sources exist to enable evaluation in a targeted programme. Most other civil defence sites currently lack the assessment of primary sources, and along with other classes of site – such as

searchlights and town defence plans – require a different, more reactive approach.

As part of the research undertaken in preparing this paper, a limited sample of documented and/or fieldwork confirmed World War II AA sites was identified and a check made to establish which of these are identifiable on historic and/or contemporary air photographs. This confirmed the presence of some military remains on air photographs that had not previously been recognised.

Table 9.2 demonstrates that the number of sites so recognised exceeded that identified by either NMP or MPP. In the case of heavy anti-aircraft gun sites, all documented sites have been identified on both historic and modern aerial photographs, but none by NMP. To reinforce this point, two heavy AA gun sites, forming part of the Banbury Gun Defended Area, not previously documented as both being in the county have been discovered to survive at least partly *in situ* since completion of NMP. It is also now clear that both are discernable on 1940s and modern aerial photographs. Further examples of military sites in Northamptonshire that are identifiable on air photographs are provided in the supplementary web-based resources for the NMP project available through the ADS (http://ads.ahds.ac.uk/).

Targeted use of aerial photography in Essex was identified as being 'one of the most effective methods of recording change in modern industrial plants', as applied to an explosives factory of the 1890s to 1919 (Strachan 1998), as well as to World War II defensive features around Harwich (Strachan and Ingle 1998). Also in Essex, the importance of contemporary aerial photographs as a source for studying World War II remains has been recognised as in many instances 'the only surviving record' (Strachan 1998, 86). As experience in Northamptonshire now confirms, the RAF vertical photography of the 1940s provides the best aerial dataset for locating sites at or soon after the time of use, as many features have subsequently been destroyed, while modern vertical colour photography of the whole county in 2000 provides a useful source for rapid assessments of present-day survival of sites.

The Northamptonshire NMP thus presented an opportunity to identify new and existing sites during its systematic trawls through this photographic record, although unfortunately this was not fully pursued. Indeed, until recently air photographs had been but little used in Northamptonshire for the identification of 20th-century monuments, apart from the identification of a handful of cropmarks of the sites of anti-aircraft (in reality searchlight) batteries by RCHME prior to 1981. While the RAF verticals for the county held in the NMR were examined for the project, there was no systematic examination of these for modern military features, as this lay outside the remit of the project.

The failure of the project to identify or correctly interpret some 20th-century military sites, even when they did exist as earthwork, soilmark or cropmark features was compounded by the lack of specialist recognition training of NMP staff and an absence of comparative material to aid recognition, at least in the early years of the programme. Moreover, many sites, especially civil defence/anti invasion monuments, are extremely small, as well as being constructed with a view to concealment – for example, hedgerow-located pillboxes, spigot mortars, and road- and rail-blocks – while some types were located in woodland. Other more ephemeral types can be very difficult to identify even to the trained eye, such as some temporary

Table 9.2 WW2 heavy and light anti-aircraft, decoy, Z battery and searchlight sites in Northamptonshire

| *type* | *total currently recorded* | *identified on air photographs by the author* | *identified on air photographs by NMP* | *identified on air photographs by MPP* |
|---|---|---|---|---|
| Heavy AA | 5 | 5 | 0 | 1 |
| Light AA | 39 | 9 | 1 | 0 |
| Decoy | 11 | 5 | 0 | 4 |
| Z Batteries | ?2 | N/A | 0 | 0 |
| Searchlight | 79 | 24 | 15 | N/A |

fieldworks. In future it might be appropriate to carry out pilot work on locations where such defences are well planned in order to establish what evidence may be recovered on aerial photography, as a guide to identification elsewhere.

Many features will therefore be visible on the air photographs that were not consulted by this project. In addition, there are other sources that were not available at the time that may contain useful information, such as the military obliques held by the NMR and the wartime German air photographs now held in the USA.

## Other sources and resources

The air photographs are just one element of a wide range of resources that pertain to this subject. Information can be retrieved from contemporary and post-war ordnance survey maps. Site plans for RAF airfields and non-flying stations are available from the RAF Museum (London), and copies are held in the SMR. The Northamptonshire Record Office and the Public Record Office at Kew both contain useful information, and local information from farmers, landowners and residents is also invaluable. Much of this information, together with the results of fieldwork, has been collated and contributed to the SMR either via the DoB project, reports by NCC staff (including this author) and reports by local volunteers, notably by Mr Adrian Armishaw (now Sywell Aviation Museum). There are also reports on work at on such sites arising from planning process, either among the grey literature or published in local journals and newsletters such as *Northamptonshire Archaeology*, alongside notes and articles from special interest groups, such as the Pillbox Study Group, the Fortress Study Group and the Society for the Protection of Ancient Buildings. There are reference works such as the reports compiled for the CBA by Dobinson (1996, 2000) and the online resources of *Subterranea Britannica*.

On a county and national level the state of knowledge varies considerably between the different monuments types and groups (*see* Schofield 2004) and it is clear that information on some civil defence sites is still very sparse.

## Conclusions

NMP was largely successful in identifying 20th-century military remains that appeared as 'conventional' cropmarks, soilmarks and earthworks in rural areas, even if the interpretations were sometimes awry as a result of insufficient training and an absence of comparative evidence. This is largely because the primary purpose of the mapping and analysis was to distinguish modern features that may otherwise have been mistaken for earlier archaeology. In this it follows the approach used in the RCHME county inventories. The most numerous type of military site recorded by the project is therefore the searchlight battery, yet even for this type the number mapped is small in comparison with overall population estimated from DoB (Fig 9.2). This is not surprising given the mobility of some of these batteries, which would have left little physical trace even at the time of

*Fig 9.2*
*Earthworks of the WW2 'Potters Clay' cluster searchlight site, Yardley Hastings. Note the distinctive clover-leaf pattern fieldwork which accommodated what were often a single 150cm and two 90cm projectors. The separate ring ditch emplacement may have been the location for the battery's sound locator or alternatively have been the site of an earlier single searchlight emplacement (NCC photograph SP8555/018 11/12/82).*

use, and the fact that other sites have been subject to rapid deterioration and loss through agriculture.

Thus, NMP has identified only a very small proportion of the modern military sites in the county in comparison with those recorded from other sources. The project identified no new major classes of 20th-century military monument, while, in contrast, volunteer recorded fieldwork and documentary research utilising aerial photographs – conducted by the writer as an adjunct to the DoB and NMP projects – and directly targeted to the topic, has resulted in various new additions. The results of this additional research are published in the supplementary web-based resources for the NMP project, which are available through the ADS (http://ads.ahds.ac.uk/).

It is to be hoped that the evidence from this assessment is sufficient to demonstrate the potentially wider value of the air photographic record in helping identify and understand modern military remains in Northamptonshire.

Air photographs have a valuable role in confirming the exact location of sites and permitting verification or amendment of transcribed military grid references, as well as providing information on the extent, general condition and development of military sites at a particular point in time, including variations from the documented. In addition, contemporary wartime/immediate post-war vertical air photographs can also be used to identify new sites not yet traced through documents. More recent oblique photographs can contribute to understanding current survival, and inform longer-term management of individual sites. Such recording should extend to built structures as well as to earthwork and cropmark monuments.

In summary, a strong case exists for a systematic search of historic vertical air photographs to identify all military activity, urban and rural, and to encourage photography of modern military features when encountered by aerial photographic flyers.

# 10
# A critique of Northamptonshire's NMP project

*by Glenn Foard and Alison Deegan*

This final chapter assesses the methodology that evolved during the course of implementation of the National Mapping Programme in Northamptonshire between 1994 and 2001, and considers its impact on data creation and subsequent data manipulation, interrogation and dissemination. It also compares some aspects of the NCC approach with that employed for contemporary and subsequent NMP projects in other areas, discussing the lessons that can be learned now that this large project has been completed. This analysis draws heavily upon the Management Report for the Northamptonshire NMP Project, available online from the Archaeology Data Services (ADS) (http://ads. ahds.ac.uk), which provides essential background information, explains in detail the development of the methodology and documents the sources and timescale of the work.

## Data creation

The direct acquisition of aerial photographic data through aerial reconnaissance, discussed in chapter 2, was integral to the NCC approach to aerial archaeology. From the start of the intensive reconnaissance programme in 1977, long before the inception of the NMP project, NCC employed a rolling programme of examination, SMR record creation, rectification (first manually and then, from the early 1980s, by computer, using Aerial software) and reporting of the results of the NCC aerial reconnaissance programme (Foard 1979a, 1980a, 1980b, 1981, 1982a, 1983; Deegan 2002, 19–20). This rolling programme was intended both to enable the results to influence further reconnaissance and also to be available for resource management purposes. Thus, the archaeological data were quickly assimilated into the SMR and, although the rectification was unable to keep up with rate of new discovery, a considerable quantity of data had already been interpreted, rectified and some data entered into the SMR for all sites when the NMP project began in 1994. As a consequence, it is not easy, nor indeed useful, to quantify the results of the reconnaissance programme and the NMP project in terms of the numbers of sites identified through NMP that were new to the SMR, a standard that is often used to measure the contribution of many other NMP projects. However, the analyses and results reported in the preceding chapters of this volume provide a more effective definition of the contribution of this project than do simple statistics based on the previous shortcomings of the SMR.

From the beginning the Northamptonshire NMP Project was conceived as a wholly digital project, drawing upon experience gained in GIS mapping of the county's historic environment since 1993, and exploiting the digital rectifications that had been retained from previous years of mapping using AERIAL. Although at that time it was NMP policy not to use or produce large-scale (1:2 500) mapping. RCHME made an exception for the Northamptonshire project because the efficiency of the process could be demonstrated, and, using a large-format computer plotter, the project was able to generate the high-quality hard copy quarter-sheet output then required by the RCHME (Northamptonshire Heritage 1994, 21).

An effective methodology and efficient implementation had been achieved through the NCC IT advisor's careful choice of leading GIS software (MapInfo) and their provision of ongoing high-quality specialist support, largely by Phil Sydee. It was also a result of careful design of the data structure to facilitate the intended objectives, building upon the principles of analysis of historic environment data, initially developed in 1979, which underpinned the design of the whole SMR and its associated GIS datasets (Foard 1978). As far as practicable, this methodology was further enhanced over the lifetime of the project. The use of MapInfo

Professional (versions 2.1–6.0) as a common platform for most aspects of data creation and manipulation was critical. Most internally-derived datasets were created or, if created in other software, delivered in MapInfo. This included SMR point data, the index of air photographs, AERIAL transcriptions, base map data (including both modern OS Landline and georeferenced OS First Edition 1:10 560 mapping) and supplementary datasets such as the BGS geological mapping, contour data, land use mapping, and mineral plans, all of which have been used in the analyses in the preceding chapters. Even the complex morphological data entered into the original RCHME MORPH2.2 database was retrieved and linked to the relevant individual graphic objects in the MAPINFO tables. Each dataset was linked through consistent reference numbering to enable automated concordance between different datasets. This obviated many of the data migration problems that are still regularly experiences by other NMP projects where no common platform is employed.

Analysis of the timescales of past and present NMP projects suggests that the Northamptonshire approach was highly efficient. The average time spent on each quarter sheet (5km ? 5km area) in the Northamptonshire project was 11.5 days (Deegan 2002, table 9). The average times spent per sheet on a contemporary non-digital project in Lincolnshire was more than 16.5 days (Kershaw 1997). More recent digital projects with which one of the authors has been involved: Till-Tweed, Lower Wharfedale, and Thornborough Henges have taken on average 24, 21, and 24 days respectively (Deegan 2003, 2004, 2005). Direct comparison between these projects is not possible: the Northamptonshire project did not record all ridge and furrow features, and had the benefit of access to existing plots. However, we believe that the methodology and processes employed by the Northamptonshire project were far simpler to apply and, most importantly, to check, than the Auto CAD-based strategy used by most current NMP projects.

## Data interrogation

One of the important principles of the Northamptonshire NMP dataset is the one-to-one relationship between the smallest recording unit, which is the MORPH2.2 site, and the map object. For example the data entry for a single ring ditch has a unique relationship with a single graphic object in the map data. Although there are some exceptions to this rule, these can be easily be accounted for within any GIS query. The result is that the data can be searched on any of the MORPH2.2 fields and the results accurately quantified, and distributions analysed. It is worth noting that GIS can automatically generate accurate grid references from mapped objects and, importantly, almost without exception will actually be positioned on part of the object, which is preferable to the practice of manual reading and input used by most current NMP projects. Detailed quantifications and distributions cannot be automatically generated from the data produced by recent and current NMP projects because the unique one-to-one relationship was abandoned along with the MORPH2.2 database in favour of the National Monuments Record standard database (currently known as AMIE). Moreover, although some morphological recording is still practised by some current NMP project, because there is no link between the record and object it is not possible to retrieve and display the map objects based on any morphological criteria. Put simply, one cannot, for example, retrieve, count and display all the ring ditches that are less than 10m in diameter, as is possible with the NCC NMP data.

Such methods of data interrogation have been fundamental to the analyses in the preceding chapters, in particular the investigations into the distribution of cropmark, soilmark and earthwork sites, and of the monuments of the Neolithic and Bronze Age. Although under the current NMP methodology similar work could perhaps be repeated on smaller projects, it is unlikely that any other county-wide projects could be tackled in this way.

Another important aspect of the Northamptonshire NMP data is the complete traceability of each mapped object back to the source photography. Mapping for each site is generated from one or more rectified plots or photographs, the information for which is stored in a separate GIS table (*see* Deegan 2002 for more information about the data structure). This not only allows users to easily return to the original photographs, but is also an important aspect of maintaining data standards, much like providing a full

bibliographic reference for a cited work. Other NMP projects have been slow to adopt this principle. The NMR record only documents the best illustrative photographs for any site or group of sites, but more recent NMP projects have started to record the source photograph within the tables attached to the AutoCAD drawing, although this is not yet a universal standard.

## Project shortcomings

Some of the shortcomings to the Northamptonshire approach and its application have been discussed in previous chapters, but are worth re-iterating together here.

We have noted the effect that a lack of specialist knowledge has had on the NMP mapping of medieval, post-medieval and modern military archaeology (*see* chapters 8 and 9). The use of historic and modern oblique and vertical aerial photographs in the identification and recording of 20th-century military remains has developed considerably since the completion of the Northamptonshire project. This development has been precipitated by a general increased awareness brought about by the work of the Defence of Britain project and associated publications, improved training for NMP interpreters and the high profile of the Suffolk Coastal NMP project, which recorded a wealth of military detail (Newsome 2003). Even recent inland NMP projects, such as those at Lower Wharfedale, Till-Tweed, Thornborough Henges and the ongoing Magnesian Limestone project, have benefited significantly from the expert guidance of English Heritage's Roger Thomas and produced records of 20th-century military remains that reflect his specialist input.

Unfortunately this overall improvement in recognition and understanding of 20th-century military remains is not mirrored for the medieval and post-medieval periods. As discussed in chapter 8, other problems for these periods were experienced by the Northamptonshire NMP project and are not unique to this project: approaches to mapping ridge and furrow, depiction of earthwork features, and the use and integration of ground survey data. Most current NMP projects persist with recording ridge and furrow at a very simple level – an outline around the greatest visible extent with internal arrows depicting the various alignments of the furlongs. Others have attempted a more detailed approach: identifying and defining individual furlongs with a single arrow to depict the direction of ploughing (for example NMP projects for Lower Wharfedale, Till-Tweed, Thorn-borough Henges and the Magnesian Limestone in South Yorkshire). The contribution of the latter approach has yet to be tested and may never be clear from these projects alone, given the relative infrequency of surviving medieval open fields in these project areas. While recent NMP projects have reported on medieval and post-medieval themes in their relative publications, these have tended to deal with specific monument types or activities, for example salt extraction, pillow mounds and township boundaries, rather than tackle more integrated themes like the nature of settlement (Grady 1998; Harrison forthcoming; Horne forthcoming). It is important that before another NMP project is run in the heartlands of ridge and furrow survival, which includes limited areas of various counties such as Northumberland and Cheshire as well as substantial areas of the Midlands (Hall 2001a), that this issue is explored in detail in consultation with specialists in medieval landscape, taking account of related ongoing research (for example Foard *et al*, 2005), and an effective and efficient methodology established that will produce relevant data and analysis.

## Distinguishing cropmarks, soilmarks and parchmarks

Neither the MORPH2.2 database nor the current NMP system of recording distinguishes between the different types of levelled sites: cropmarks, soilmarks and soilmarks. From the beginning, the NCC process of recording distinguished cropmark from soilmarks sites, and this information was included in a field that was added to the MORPH2.2 when it was exported to the GIS. The significance of the appearance of soilmarks has been discussed in chapters 3, 6 and 8. Unfortunately this practice was not extended to soilmark sites in grass, but it can now be seen that to have done so would have significantly aided the analysis of some medieval remains (*see* discussion in chapter 8). It would not be an onerous task to record such distinctions in all future NMP projects, but would require a major programming change to the NMR database.

On a related note, the various analyses employed for this publication have brought to light the difficulties met when attempting to compare different sites with differing levels of cropmark or soilmark clarity. The Northamptonshire NMP data, like other projects, are intended for use without necessitating recourse to the original photographs. The MORPH2.2 database did record for the user the quality of the original image, but not the interpreter's perception of the quality of the cropmark or soilmarks. It would have been useful if there was some measure of the perceived clarity and completeness of archaeology that is visible in the photographs, although in the absence of excavation this could only ever be a subjective statement. This would also have been an interesting adjunct to the mapping of cropmark amenable ground undertaken for chapter 3.

## Project implementation

There can be little doubt that despite some of the shortcomings discussed above, the Northamptonshire approach to the NMP project and aerial photography in general was balanced and well-considered. Even as the first of the digital NMP projects, its principles and methodology have not, in the opinion of the authors, been advanced upon in more recent projects. However, the results of the Northamptonshire NMP Project reflect not only the methodology, but also the manner of its implementation. Unfortunately, although efficient and effective methodology and process is an essential prerequisite for a high-quality product, this also requires a high level of skill and consistency in implementation of the interpretation, rectification and mapping of individual sites. Substantial limitations in this can be seen in the Northamptonshire dataset. In part this has been identified above as a result of lack of appropriate training and guidance in specialist areas of interpretation, something that was recognised as a problem nationally and has been addressed over the past few years; in some themes, such as medieval landscapes, it has been seen that it also reflects a weakness in the NMP process, working as it does purely from aerial data, when extensive other datasets and contextual information is required to enable effective interpretation. As we have seen, such shortcomings have not as yet been addressed nationally. However, from the beginning of the formal Northamptonshire NMP project in 1994 until its review in 1999, there was also a failure in the Northamptonshire project to implement the processes with a consistently high level of care. This failing points up the need for closer monitoring of the fine detail of interpretation, not just the overall throughput of data, something that was not carried out with sufficient vigour either by NCC or by English Heritage/ RCHME. As a result, the preparation of this publication had to be preceded by extensive data tidying, which helped to resolve some of the recording issues, but there remain within the project dataset some poor graphic representations and weak interpretations; and in certain important cases information is absent.

## Conclusion

Despite its limitations, the Northamptonshire NMP should be assessed above all on the degree to which it has advanced understanding and accessibility of aerial data. The effective implementation of GIS technology has made aerial data in high resolution digital map form an integral part of the historic environment record of the county since the early 1990s. This has enabled that evidence to significantly influence both practical day-to-day management of the historic environment as well as facilitating intensive analysis as part of the definition of research agenda for the county (Tingle, 2004; http://www.le.ac.uk/archaeology/research/projects/eastmidsfw/index.html). A great deal has been achieved in the present volume in the analysis of both spatial pattering and the analysis of plan form, at both the landscape and the individual element level. However, wider potentials remain in the Northamptonshire NMP dataset for computer-based analysis, to fully exploit the way in which the individual graphic objects have been created and indexed in GIS.

The Northamptonshire NMP shares many of the successes and failings of the NMP process nationally. Rather like the first Ordnance Survey 1-inch mapping of the contemporary landscape in the early 19th century; 200 years on the NMP is producing the first national mapping of the pre-medieval landscapes. Like its predecessor, although the overall product is broadly consistent nationally, the work of different surveyors is being undertaken according to slightly different methods and so producing a slightly different end

product. Just as with the Ordnance Survey mapping it will be necessary to improve and enhance the datasets in future decades, not only to improve consistency, but also integrate new data and, building upon the lessons learned, to tackle issues like that of the medieval landscape not adequately dealt with in this initial programme of work.

It is often said that the NMP product is intended for use without necessitating recourse to the original photographs. This is valid, but only to a degree, for such mapping can only ever represent an initial guide to the evidence. There will often be additional non-aerial data that can be brought to bear on any individual site, which it was not practicable to exploit in NMP, while another interpreter with more time or different experience will often bring new insights to the primary aerial data itself. The Northamptonshire project has thus, from the outset, saved all the digital data it created, including all the rectified images, to make them available not just for individual reference, but also to enable the images themselves to be integrated fully into a future enhanced mapping system. Using GIS technology, it should be possible in the near future to effectively integrate the digital images themselves within the system, thus going far beyond the system implemented in the Northamptonshire NMP. In such ways it is to be hoped that this project, for all its limitations, has shown the importance of both exploiting to the full the current potentials of information technology and attempting to identify and facilitate longer-term research opportunities.

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*Front cover*
*Panoramic view of the Nene Valley looking north-east. Floods reveal the extent of the Nene floodplan and in a few places show the course of new abandoned river channels.*
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