

The English Heritage National Mapping Programme

Pete Horne

Head of Aerial Survey and Investigation

Research Department

Conservation and Protection

English Heritage

Remote-sensing mapping
programmes in archaeology:
planning, organisation, results

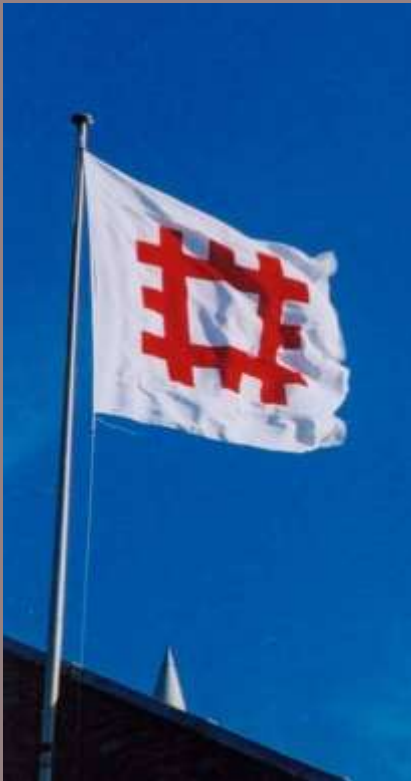
Aerial Archaeology Research Group

Pre-conference workshop

Bucharest

15 September 2010

Managing the Historic Environment



“Before we do anything, we need knowledge. Without understanding what exists today, its value and its condition, we cannot take sound decisions about its future. We need targeted, integrated research ... to identify priorities and provide the basis for informed decisions.”

Power of Place
(English Heritage, 2000)

“For all organisations concerned with the historic environment, a solid evidence base for policy-making is an essential. For grant-givers such as English Heritage ... good quality research is vital to inform the direction of resources.”

The Historic Environment: A Force for Our Future
(Department of Culture, Media & Sport, 2001)



ENGLISH HERITAGE

Research Department Conservation and Protection Group, English Heritage

Aerial Survey and Investigation

Archaeological Projects

Archaeological Science

Archaeological Survey and
Investigation

Building and Landscape
Survey and Investigation

Imaging, Graphics and Survey

Survey of London



ENGLISH HERITAGE

Aerial Photography and English Heritage

The Aerial Survey and Investigation team are part of English Heritage's Research Department. The team of 14 are all archaeologists who specialize in the use of aerial photography.



Two members of staff undertake aerial reconnaissance and photography using a light aircraft.

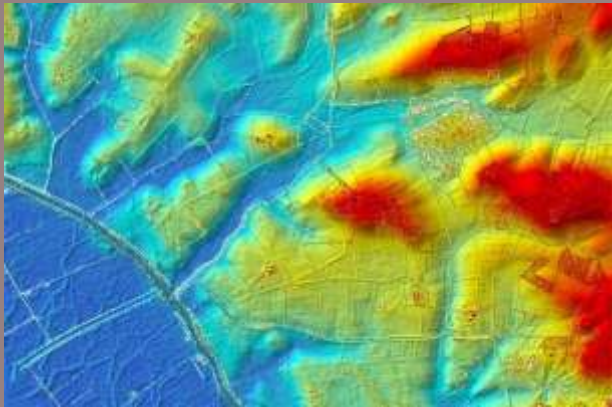


Other staff are all involved with the analysis of existing aerial photographs to identify and record archaeological sites.

Setting standards and training



The Aerial Survey and Investigation team provide training and guidance in all aspects of aerial photography and interpretation.



The team also test the value of new techniques such as airborne laser scanning (also known as lidar).

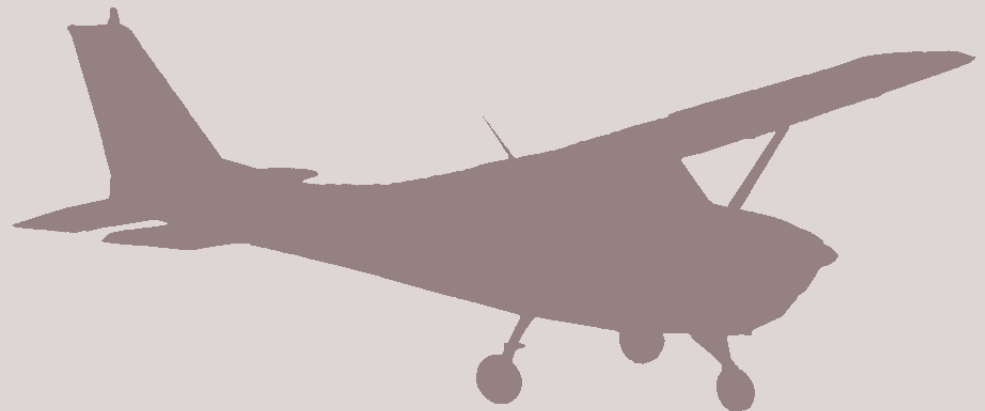
Aerial Reconnaissance



Most flying is undertaken using high-winged Cessna aircraft.



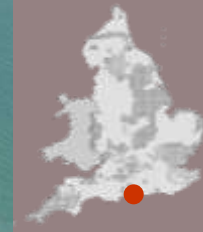
Each year 280 hours of flying are undertaken and more than 2000 sites photographed



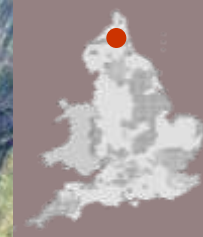
Flying costs are c. £50000 per year (60,000 euros)









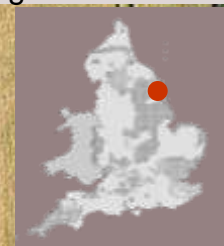


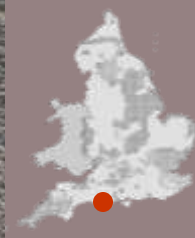






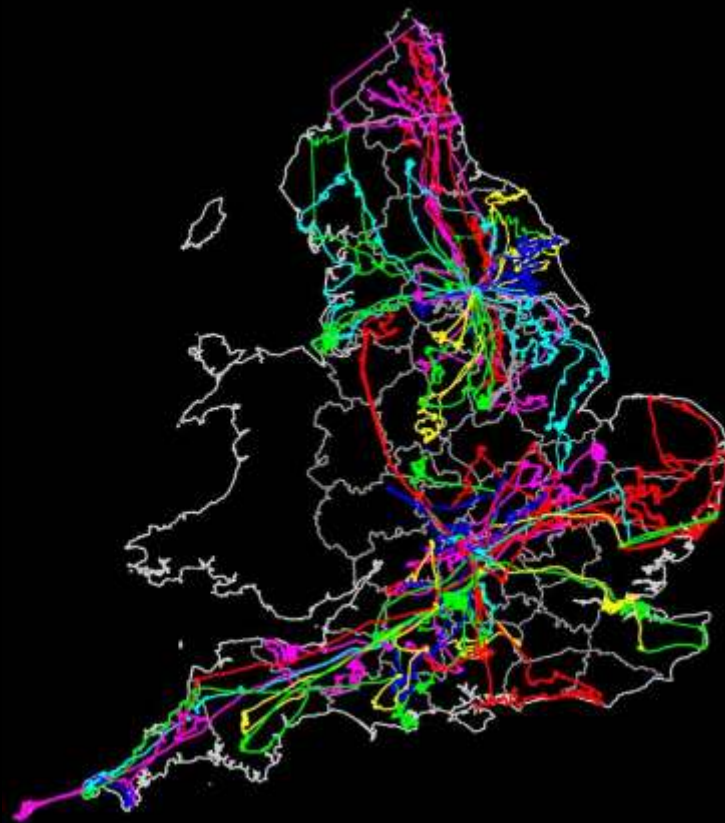
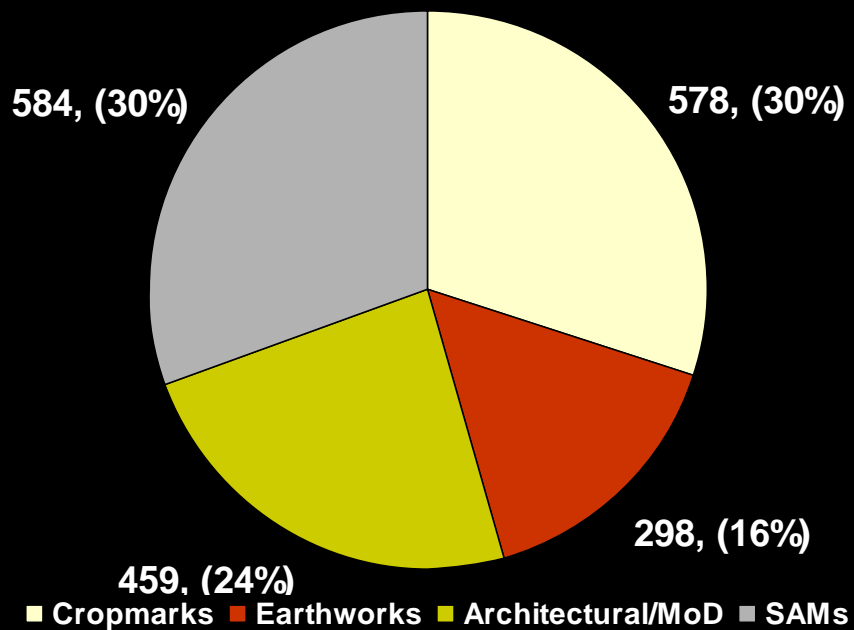




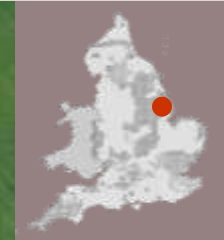
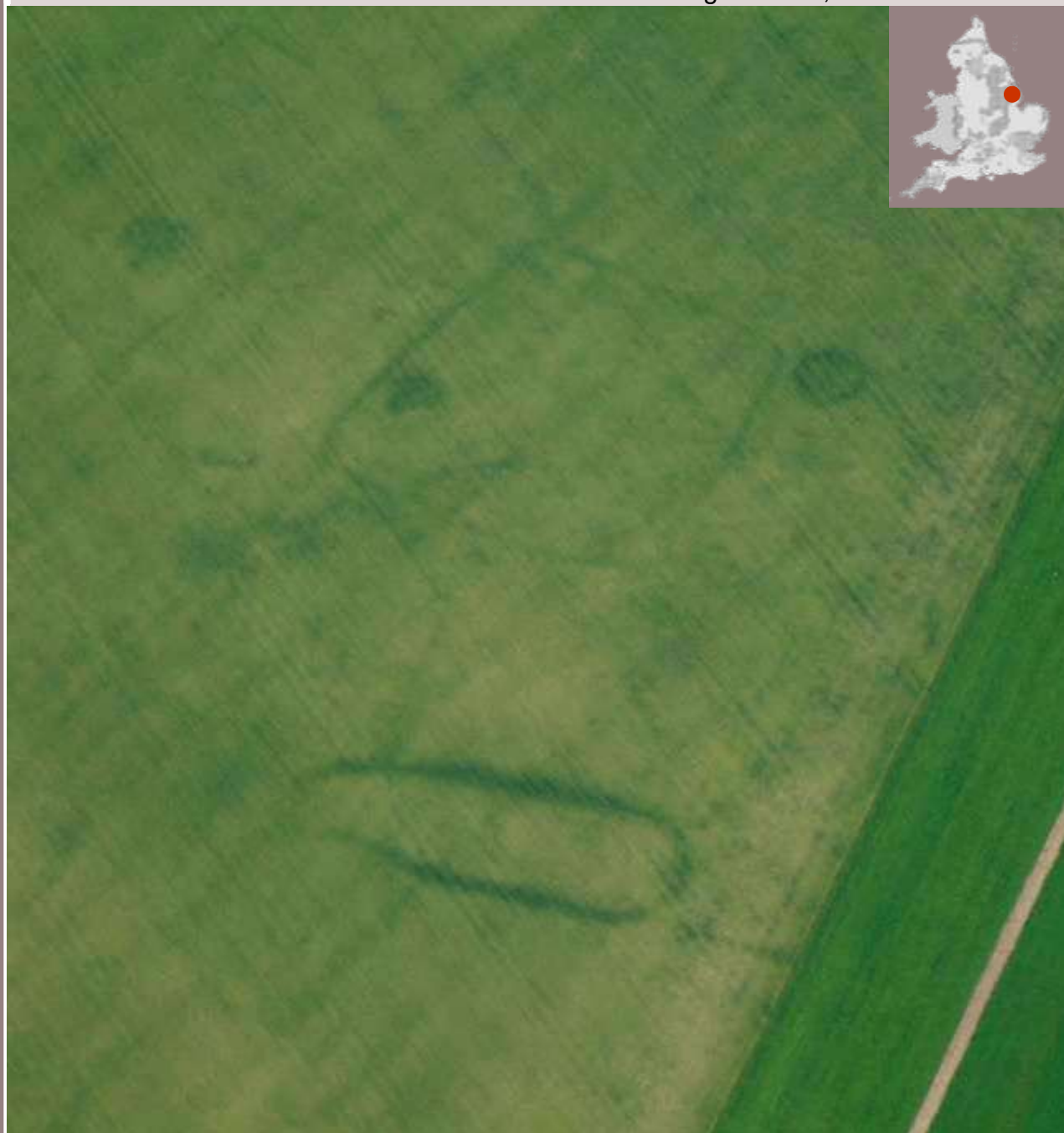
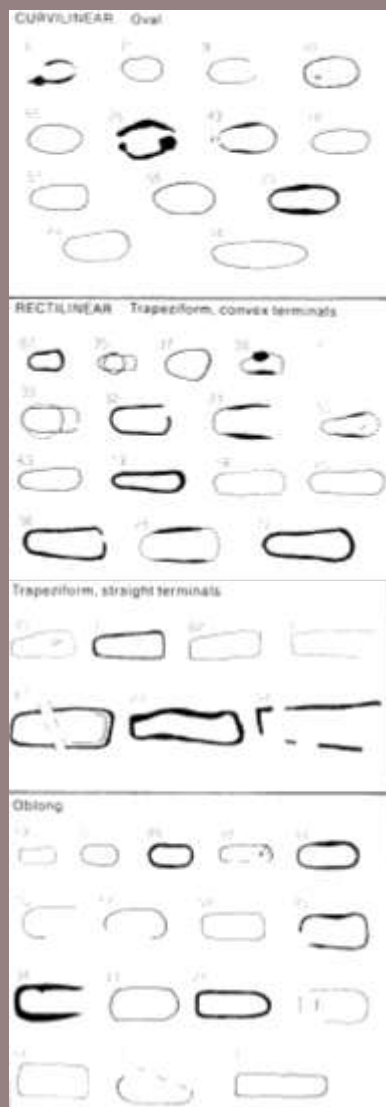


English Heritage Aerial Reconnaissance 2005-6

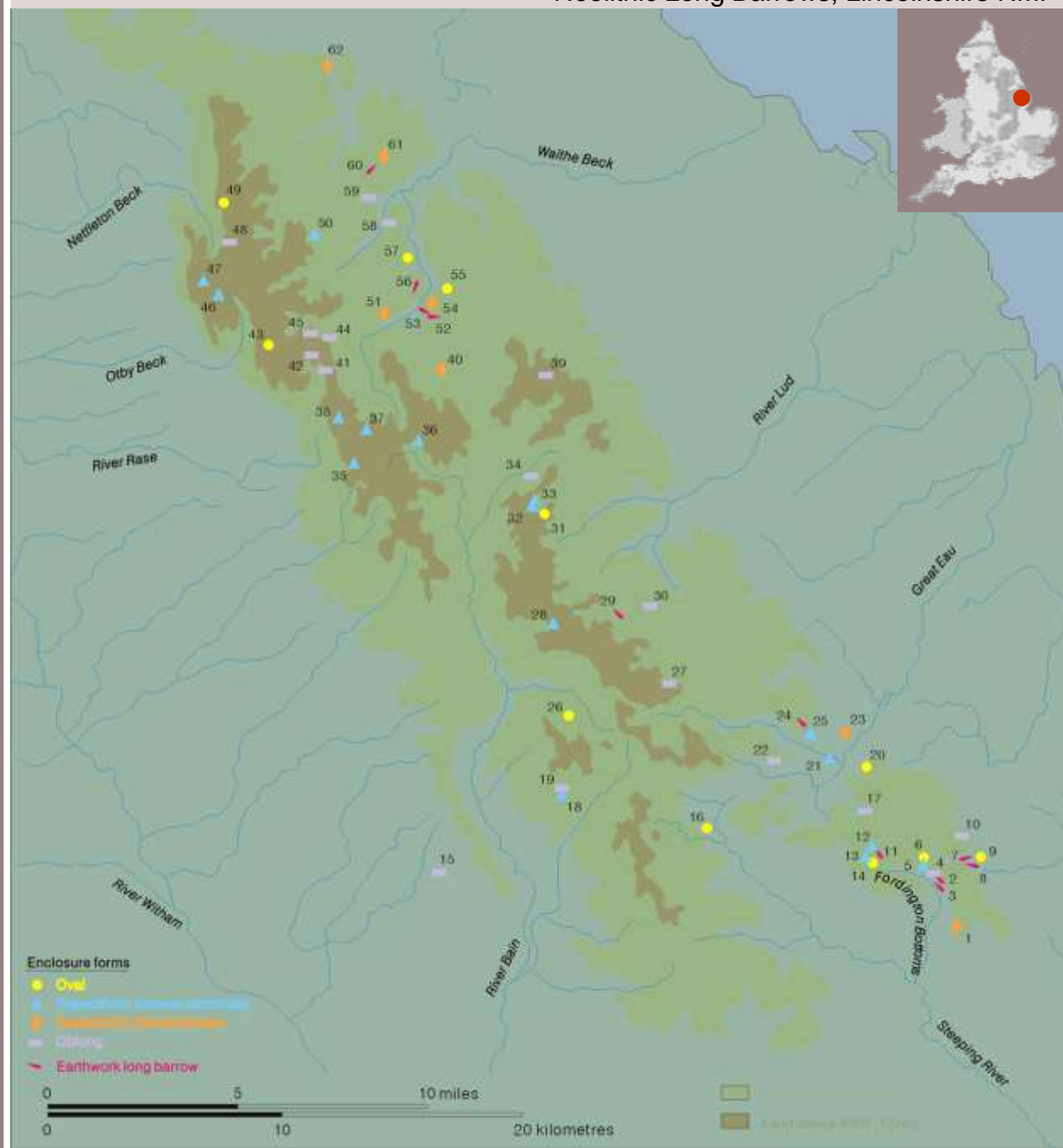
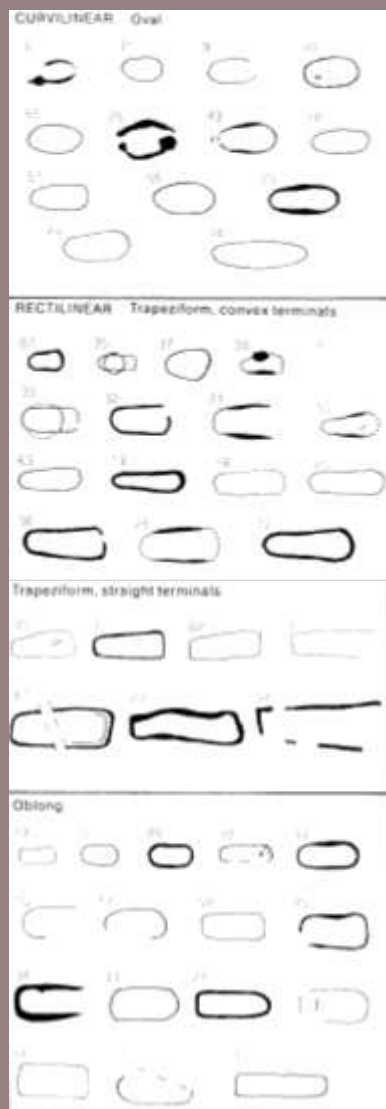
276 hours 1919 targets

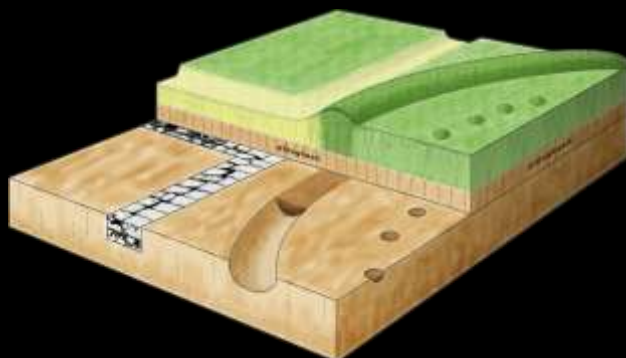


Neolithic long barrows and elongated enclosures



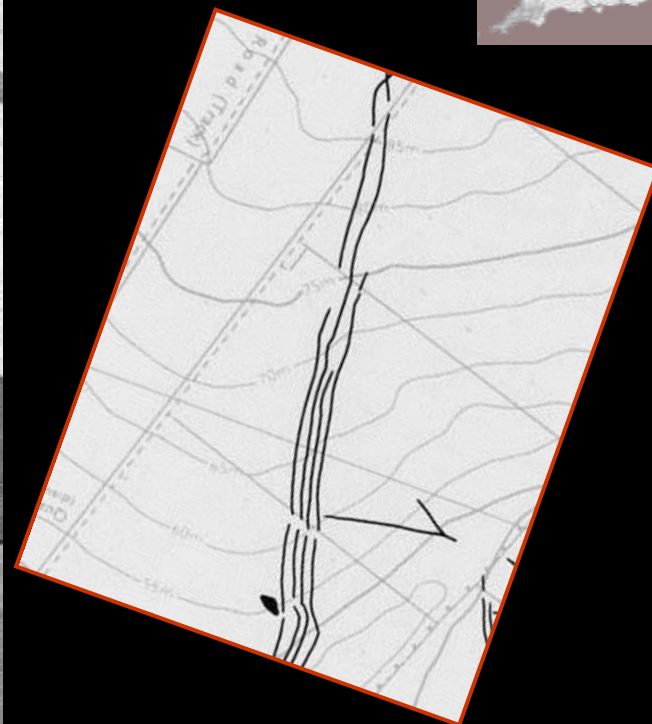
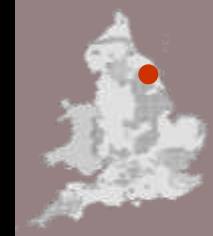
Neolithic long barrows and elongated enclosures

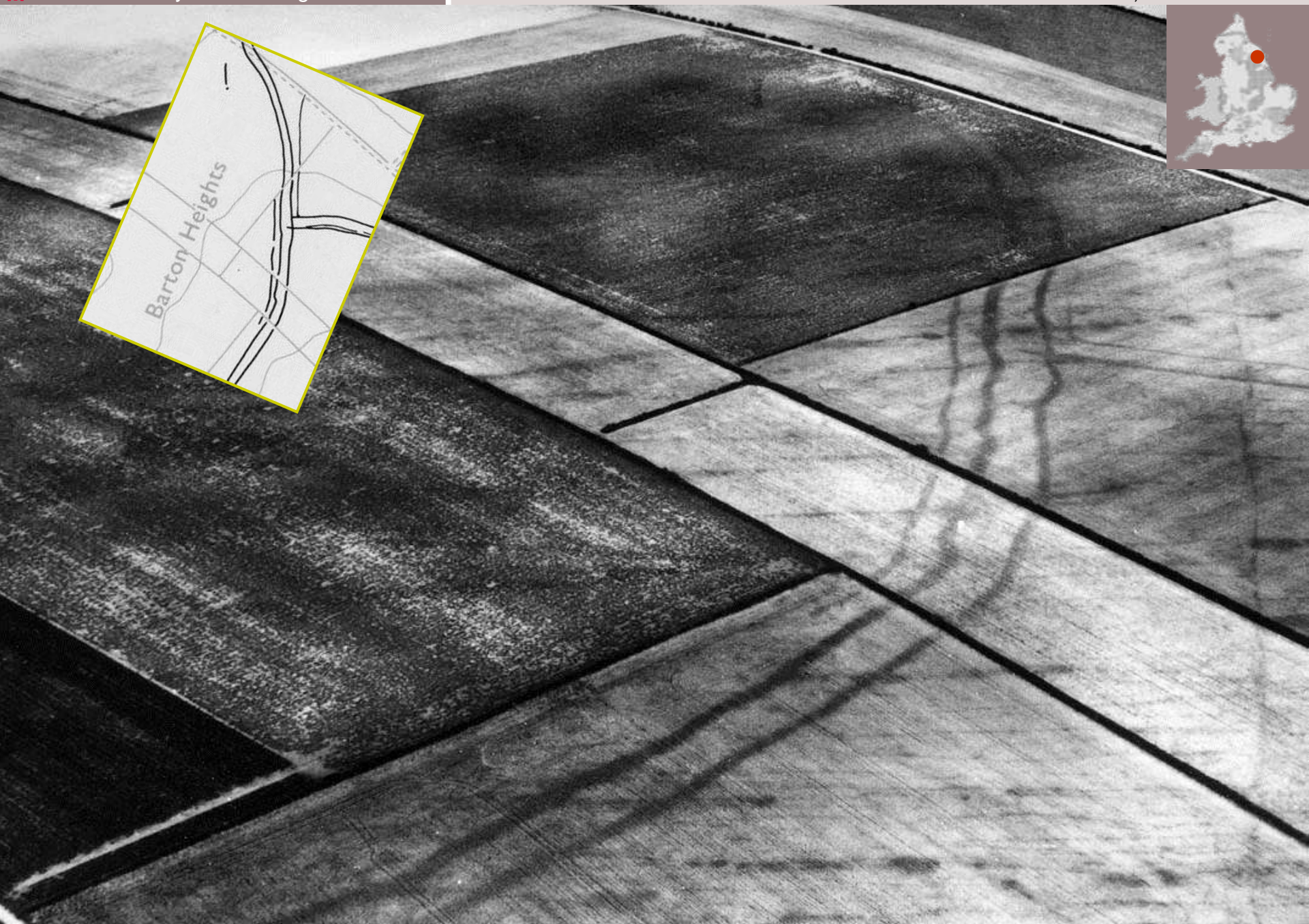
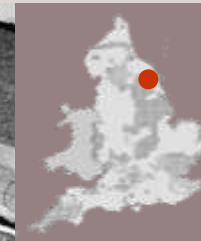


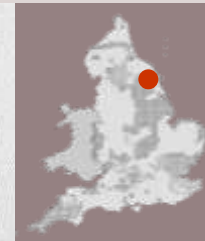


Cropmark results
need to be gathered
over many years





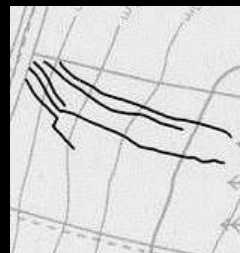
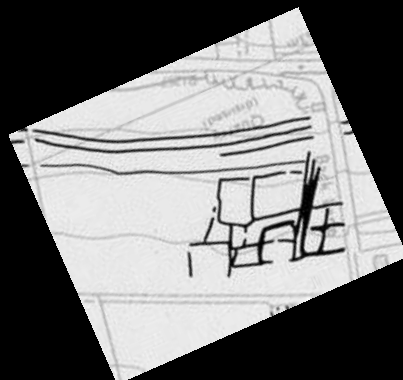
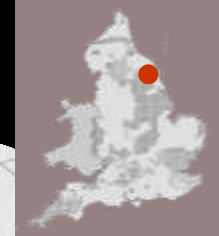


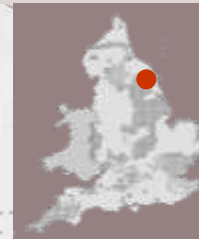












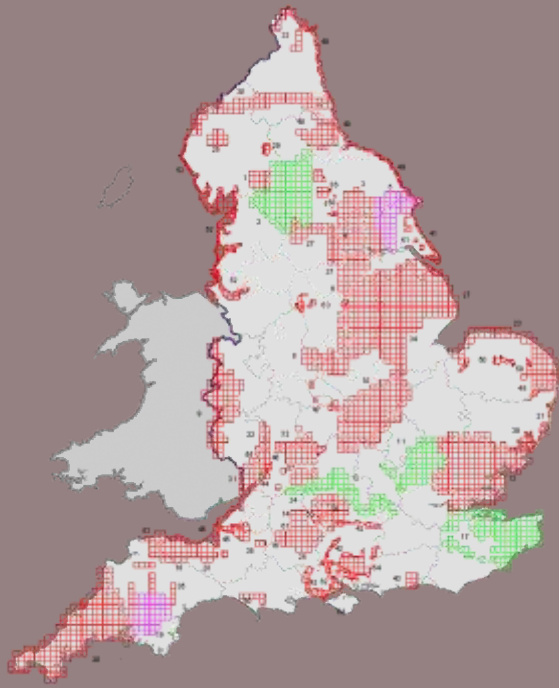


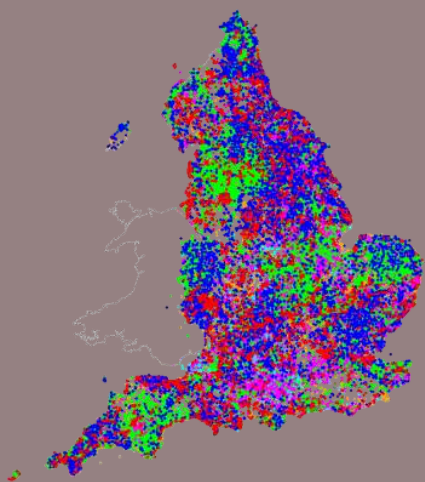
What is the National Mapping Programme?

The National Mapping Programme (NMP) aims to help our understanding of the Historic Environment by unlocking the information held in the extensive archives of aerial photography available in England.

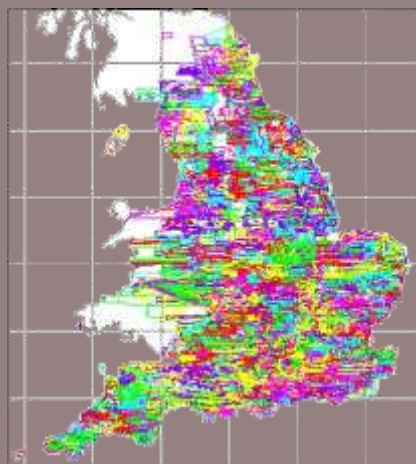
It delivers high-quality baseline information for the management of change in the historic environment through the planning and other statutory systems, and as the basis for more detailed research.

The programme is undertaken through external HEEP funded projects supported by a core team within English Heritage that set standards, provide training and quality control and also undertake key projects.





Oblique photos



Vertical photos

NMP Aims and Methodology

- unlocking the archives
- interpretation/analysis
- create maps and records
- use results



nmrinfo@english-heritage.org.uk

Vertical Aerial Photographs in the National Monuments Record



SAC. GEORGE GARDNER with the "plot" of the Hensall District (near Selby, Yorkshire, which has been photographed for the Ministry of Housing and Local Government). While training the aircrew map areas of U.K. for various Government depts. for town planning, Ordnance survey maps, and help fishermen by photographing sea areas around the Scottish coast where the disposition of seaweed indicates shoals of fish. They also did a lot of work map of the Lancs coast for flood assessment after the 1954 floods



Specialist Aerial Photographs in the National Monuments Record

Earliest photo in each
kilometre square

1920s

1930s

1940s

1950s

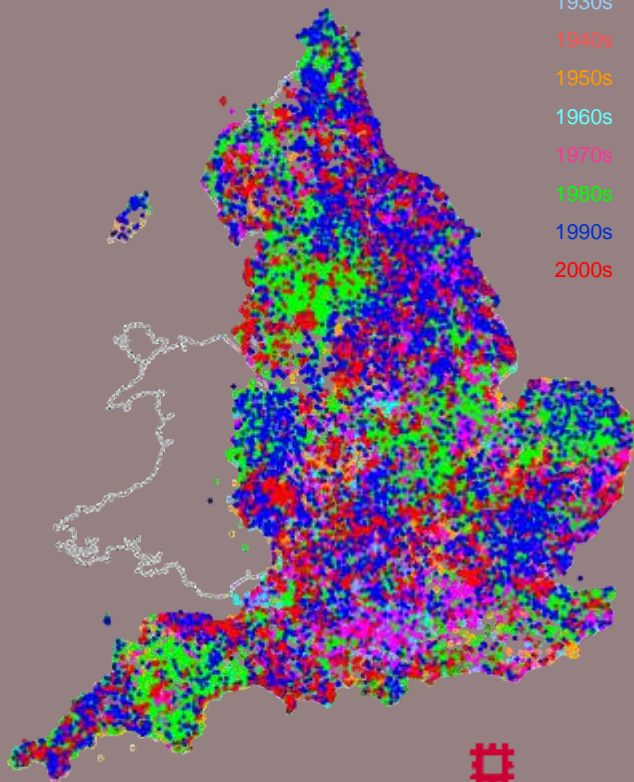
1960s

1970s

1980s

1990s

2000s





Air photo

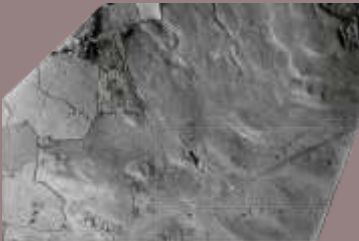
NMP Aims and Methodology

- unlocking the archives
- interpretation/analysis
- create maps and records
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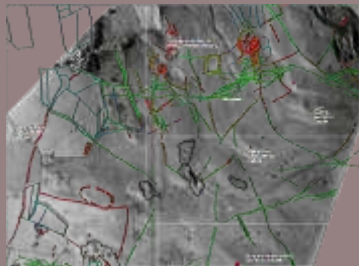




Air photo



Air photo - rectified



Air photo - interpretation



Map

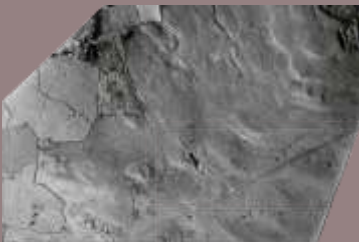
NMP Aims and Methodology

- unlocking the archives
- interpretation/analysis
- create maps and records
- use results

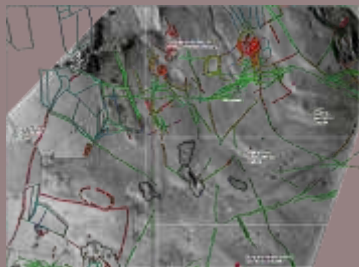




Air photo



Air photo - rectified



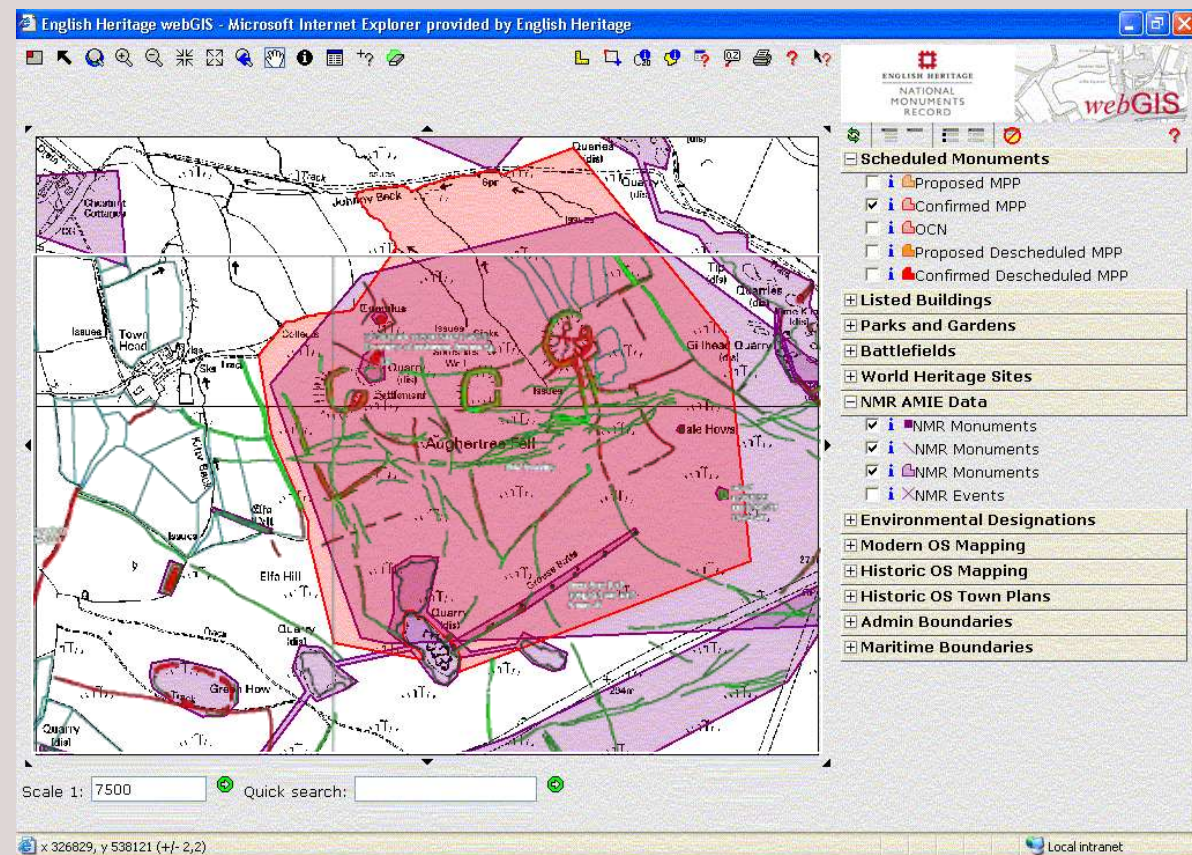
Air photo - interpretation



Map

NMP Aims and Methodology

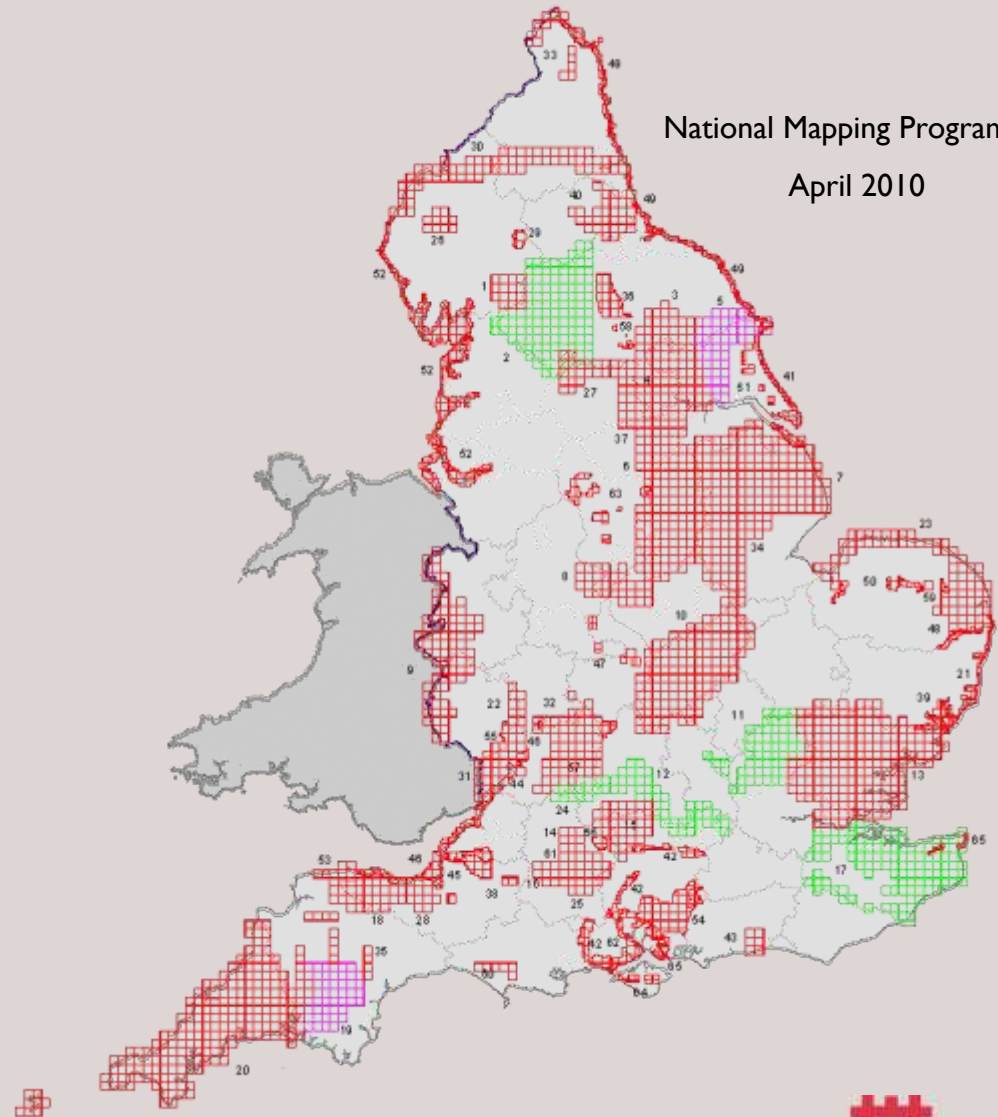
- unlocking the archives
- interpretation/analysis
- create maps and records
- use results



The National Mapping Programme

Now in 2010

- hundreds of thousands of photographs have been examined
- more than forty projects have been completed
- more than 50,000 square kilometres have been surveyed, 42% of England



National Mapping Programme

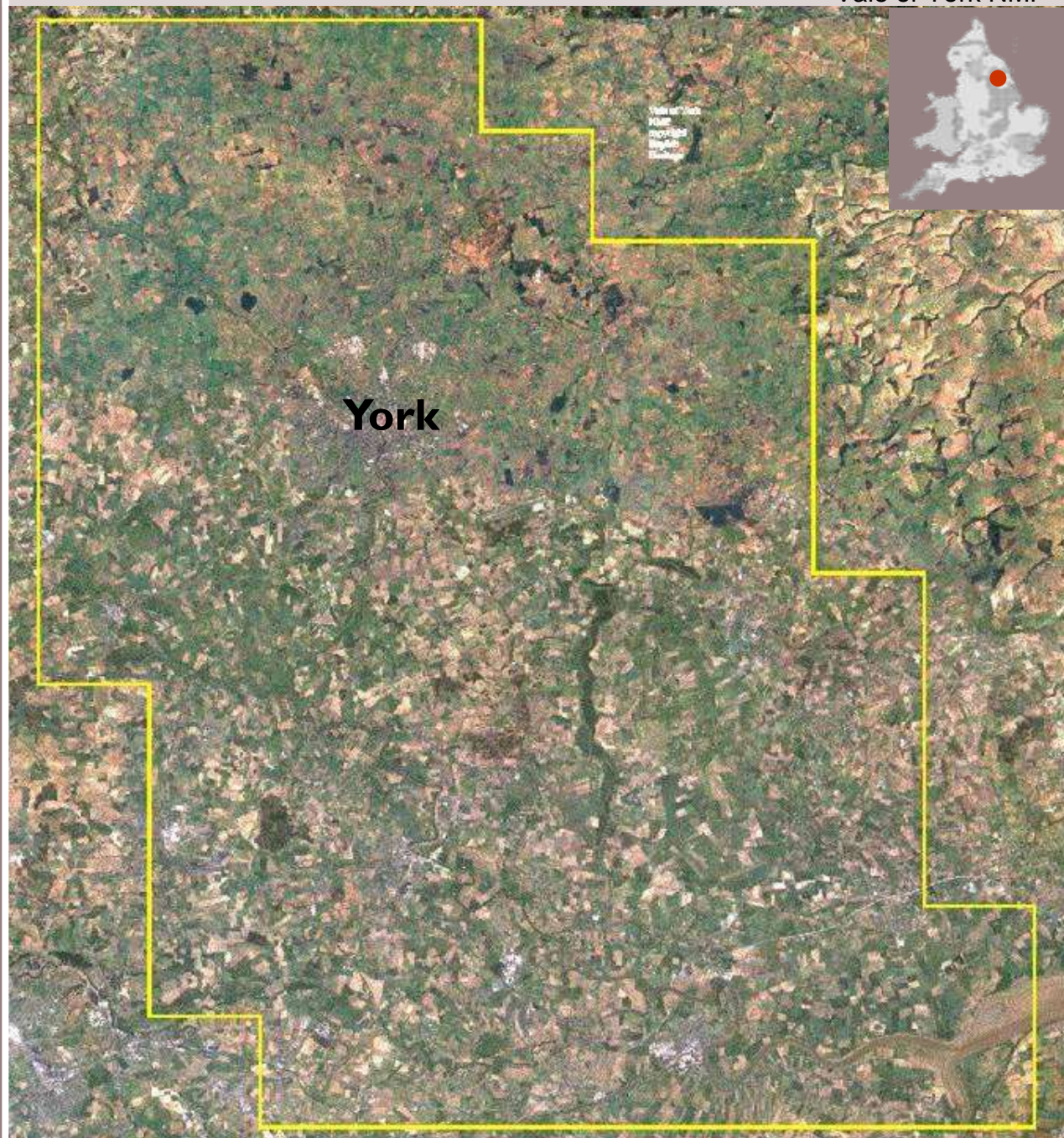
April 2010



ENGLISH HERITAGE

Vale of York NMP

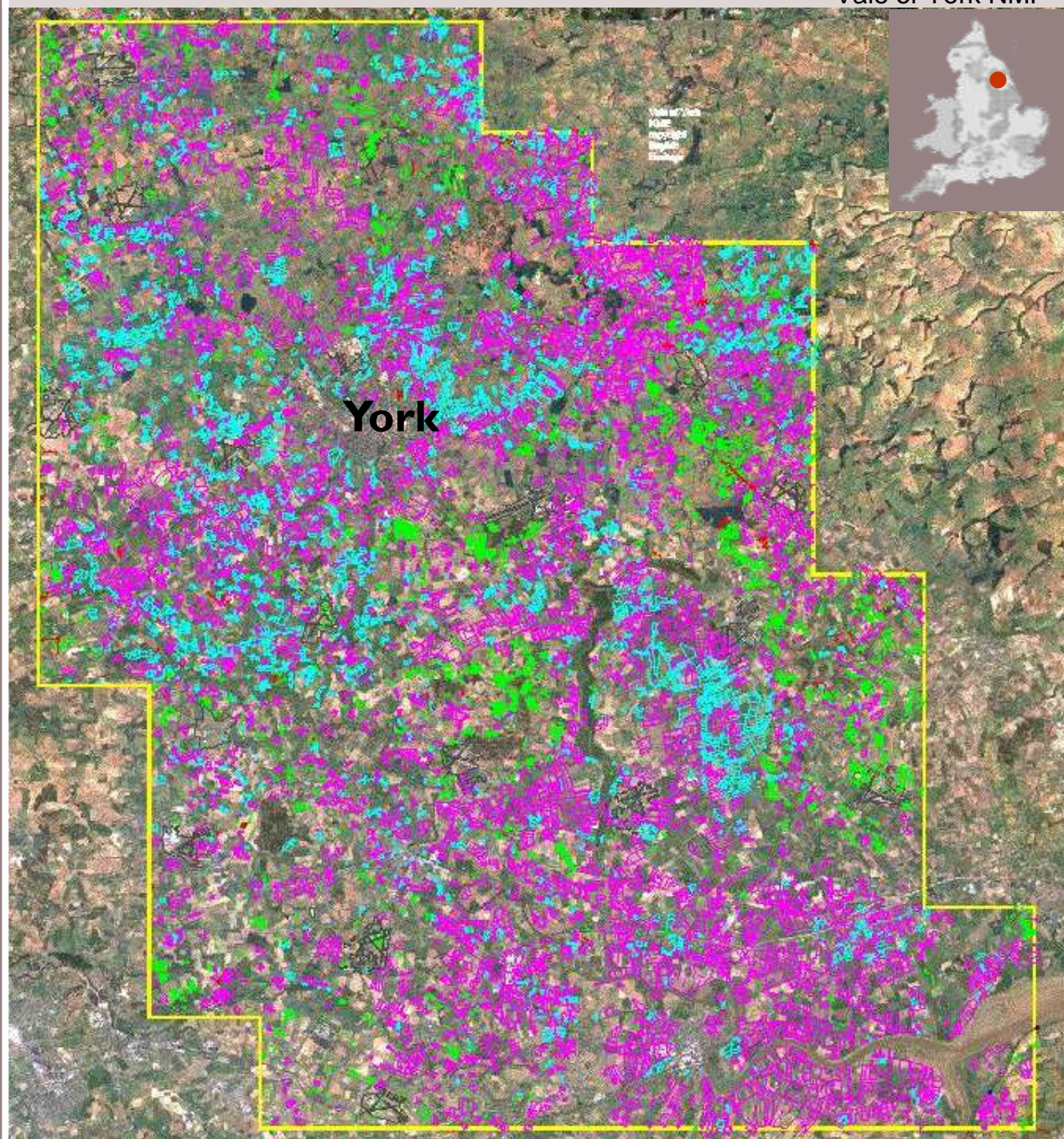
1675 sq km surveyed



Vale of York NMP

1675 sq km surveyed

1704 sites recorded



Vale of York NMP

1675 sq km surveyed

1704 sites recorded

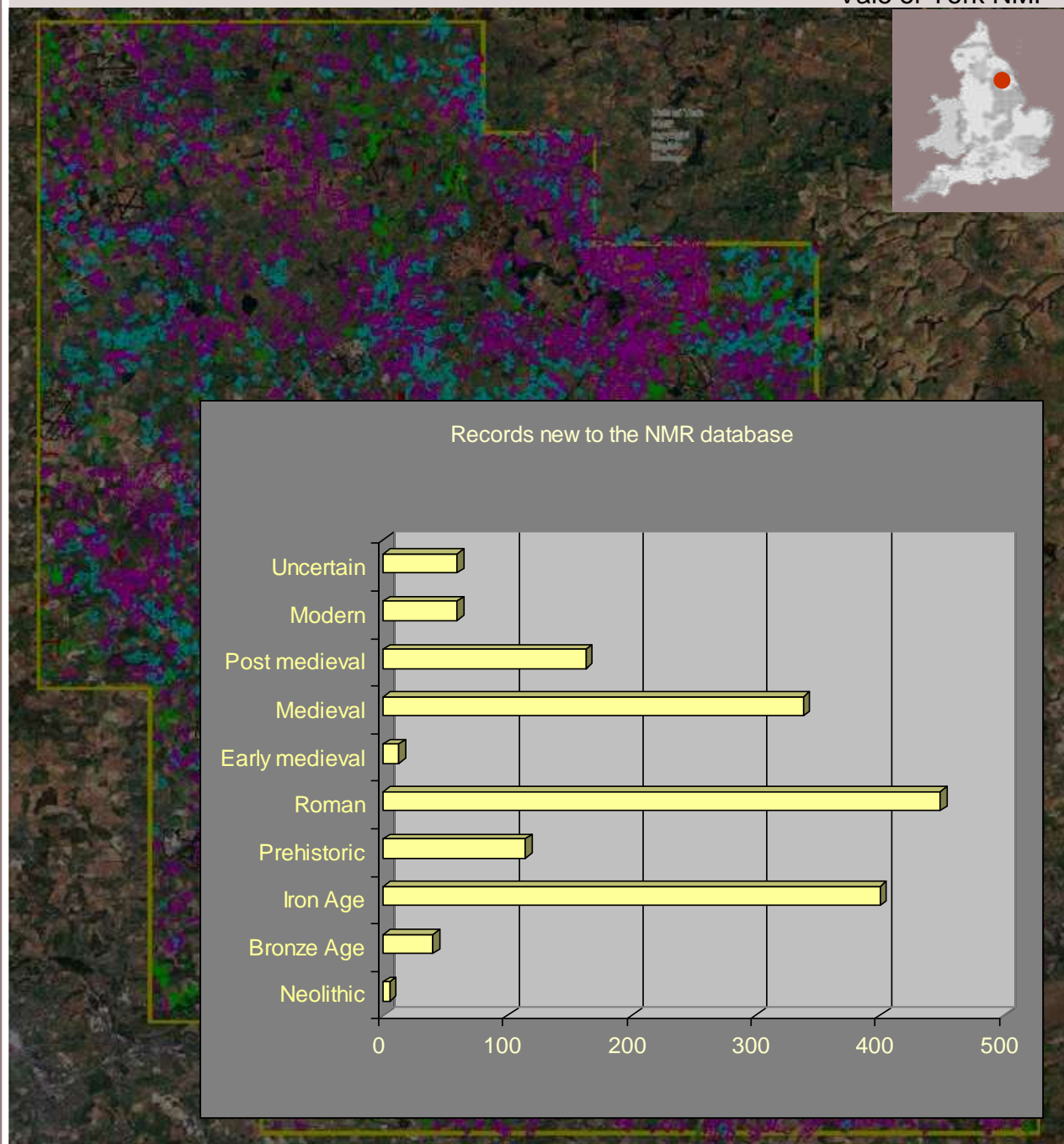
100%

1312 new records

77%

393 enhanced records

23%





Neolithic Tor Enclosure?



Little Hangman

Vale of Evesham

A medieval landscape



RAF/CPE/UK/1929 3014 16-JAN-1947

Vale of Evesham

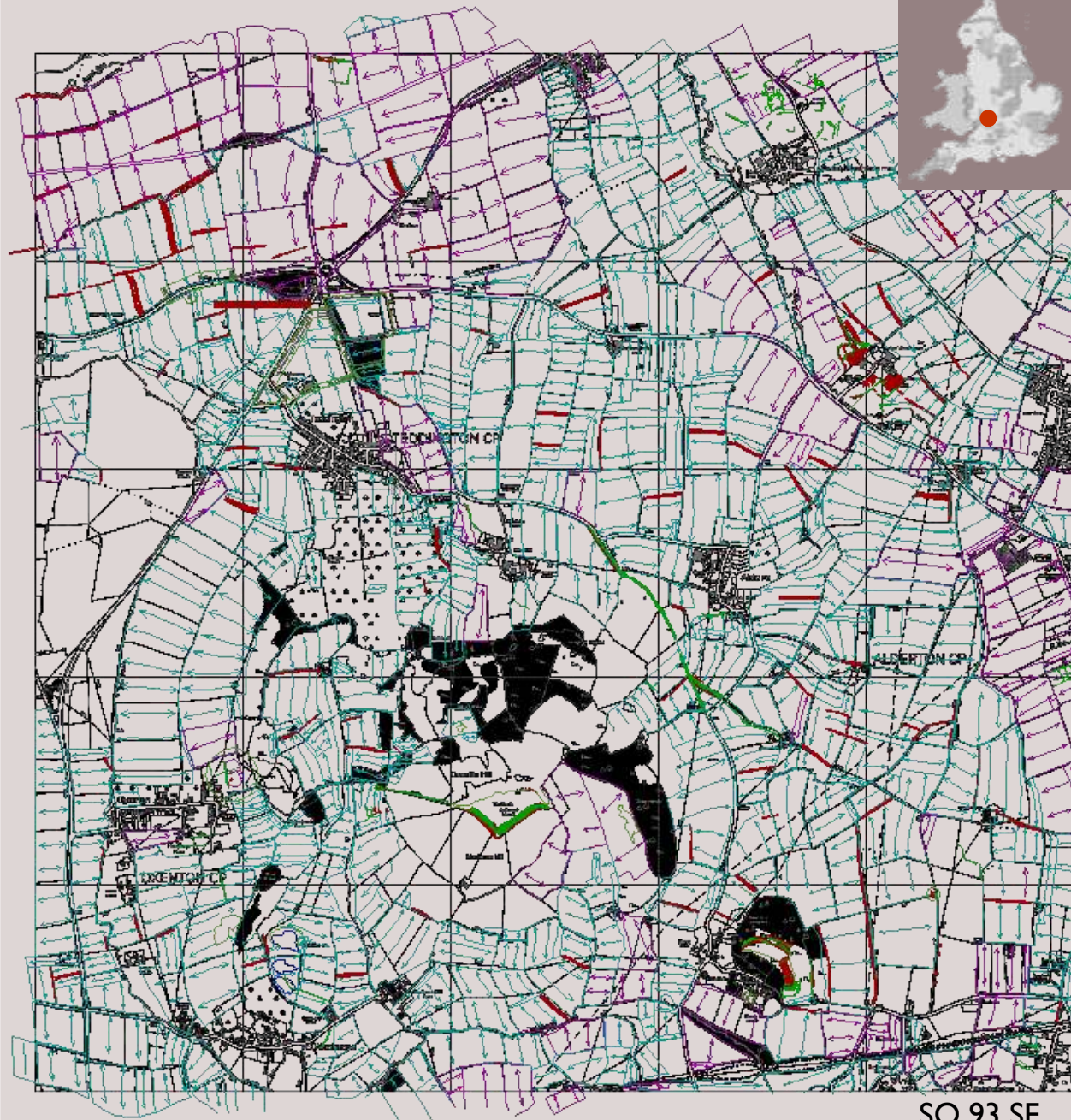
A medieval landscape



SO 93 SE

Vale of Evesham

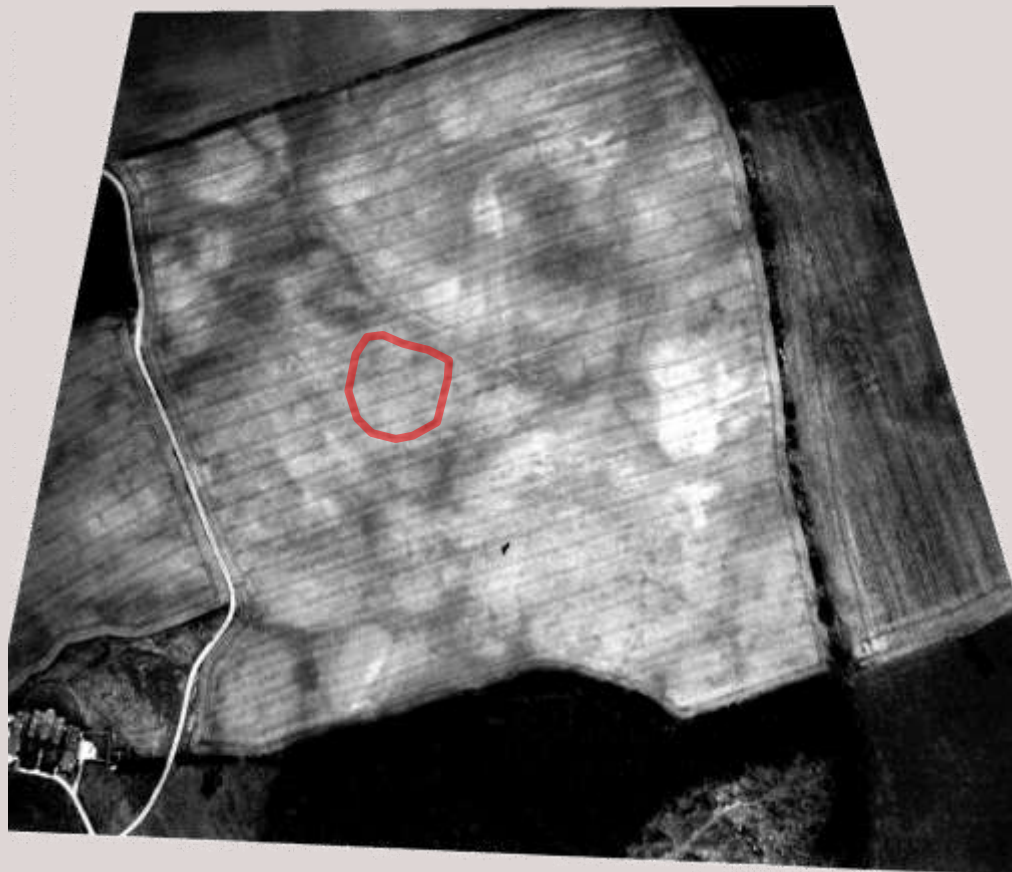
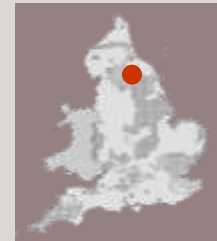
A medieval landscape



SO 93 SE

Yorkshire Henges and their Environs NMP

Cropmarks in Hornby Park
16-AUG-1991



Yorkshire Henges and their Environs NMP

Cropmarks in Hornby Park
16-AUG-1991

Earthworks in Hornby Park
06-DEC-1946

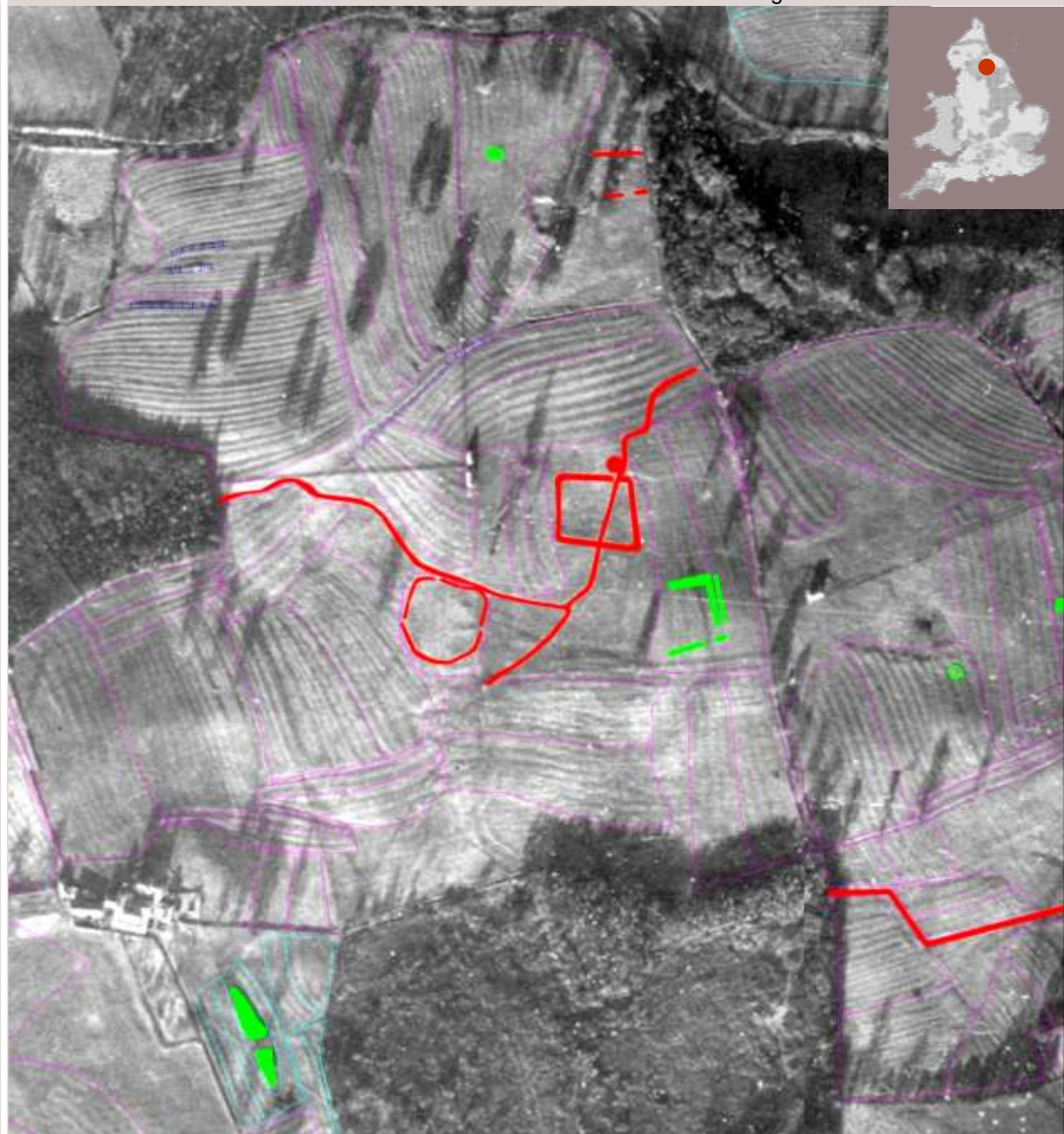


Yorkshire Henges and their Environs NMP

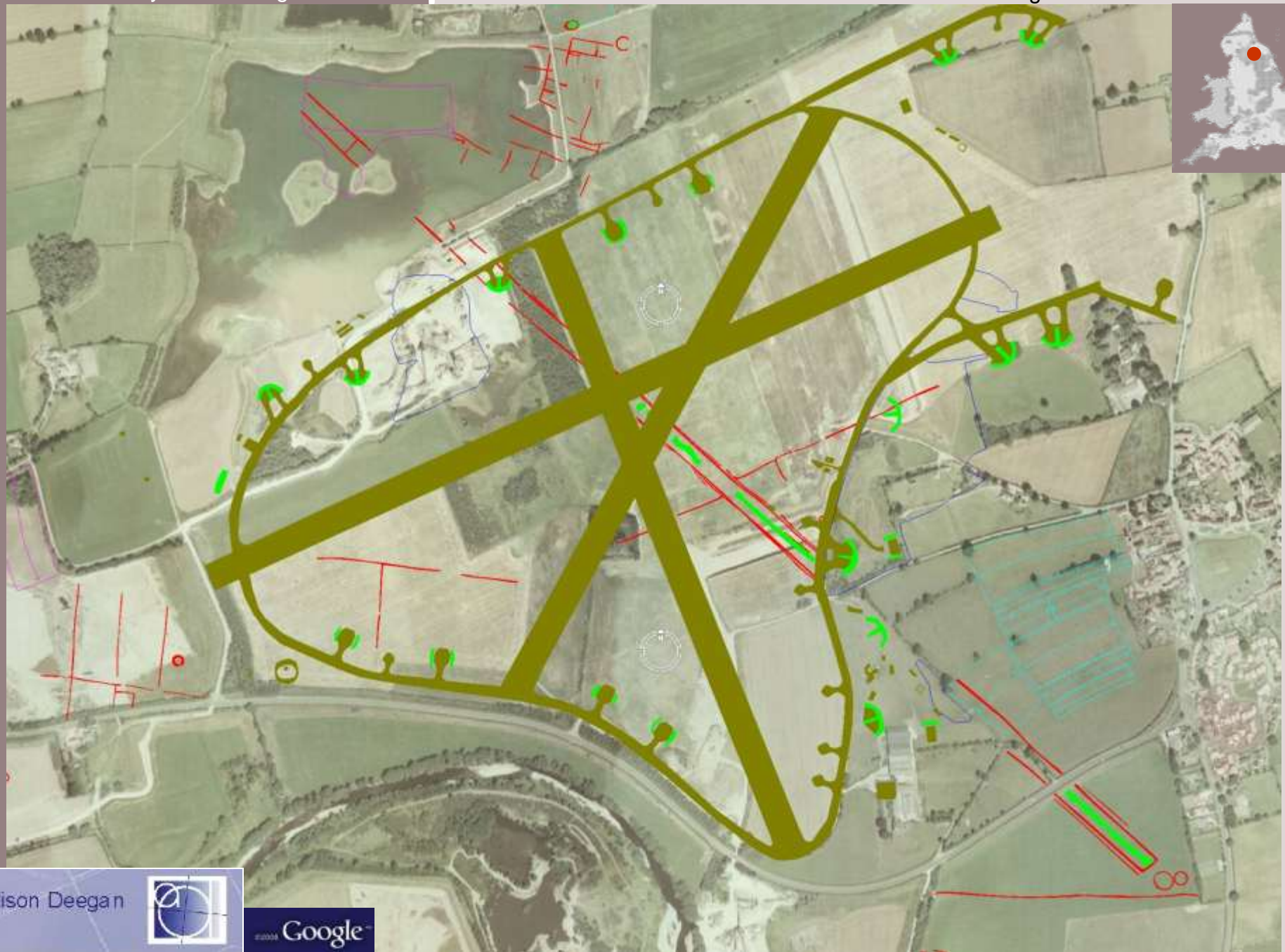
Cropmarks in Hornby Park
16-AUG-1991

Earthworks in Hornby Park
06-DEC-1946

Air photo mapping of
earthworks, cropmarks and
soilmarks in Hornby Park
2009





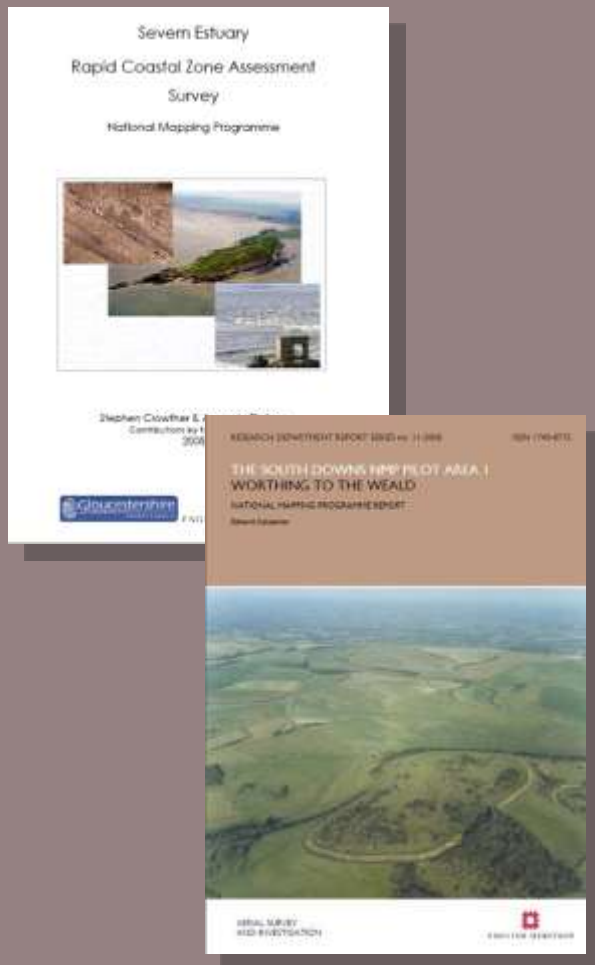




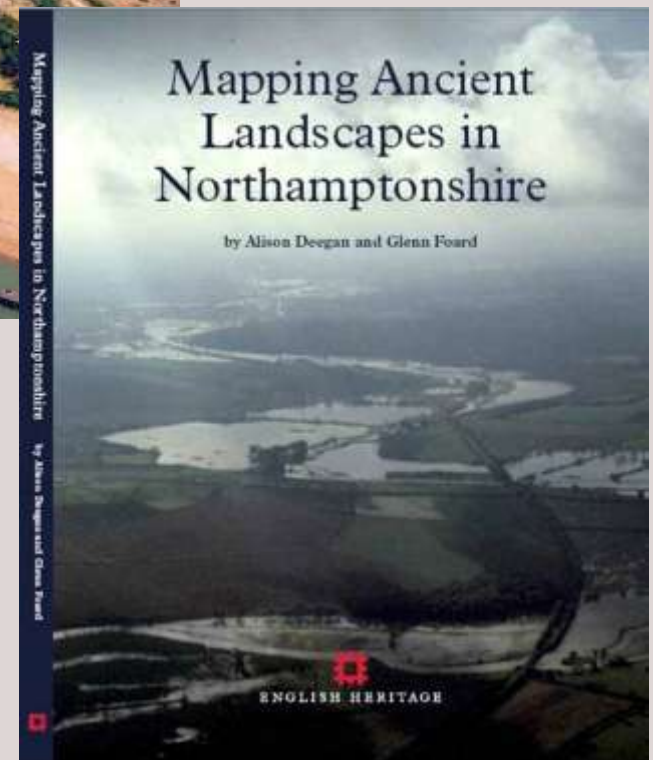
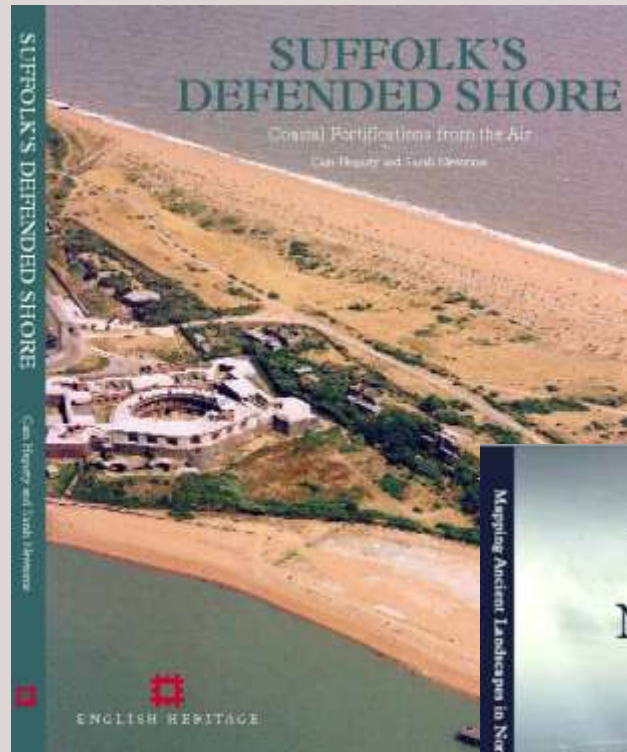
Extracted for aggregates



Making NMP accessible

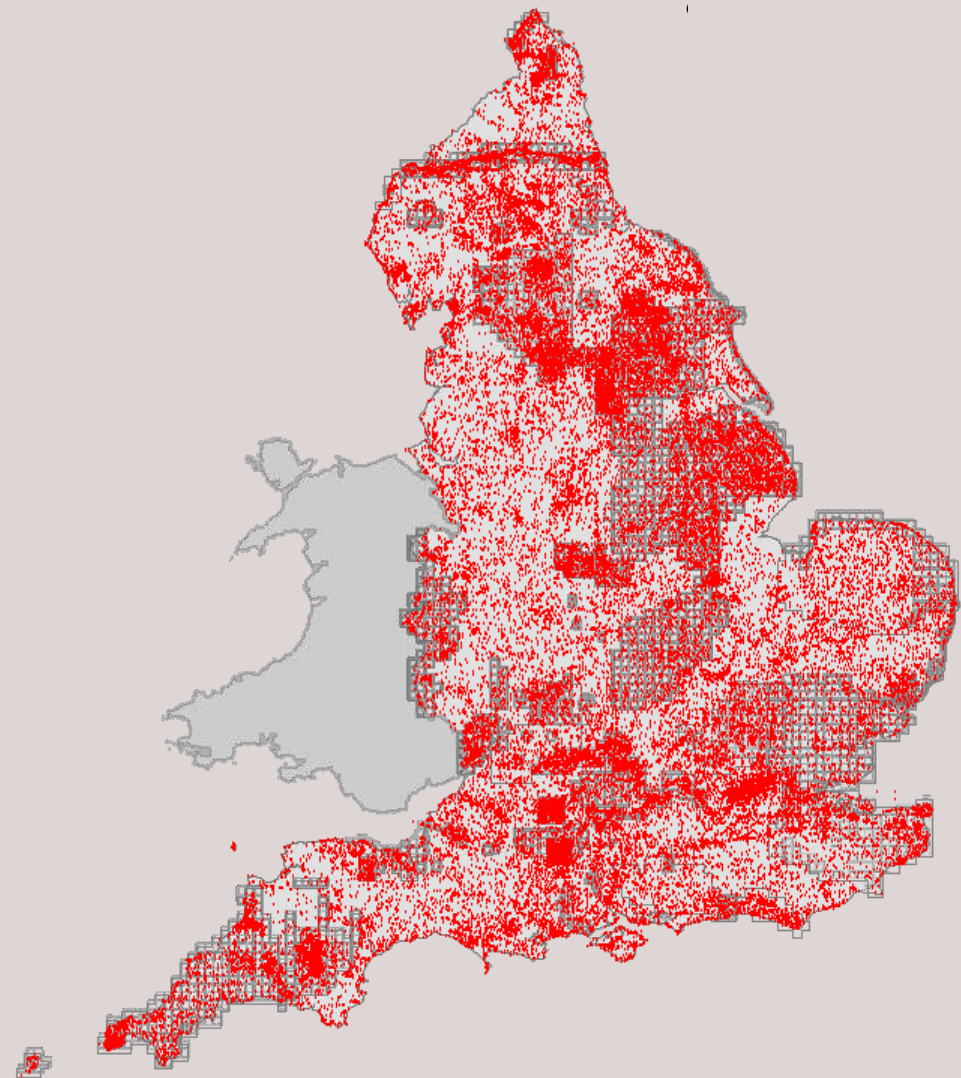


grey literature



publications

Making NMP accessible



AMIE records in the National Monuments Record

Making NMP accessible

<http://ads.ahds.ac.uk>



Information

Search

Project Archives

Special Collections

Library

National Mapping Programme

Northamptonshire County Council, 2003 (updated 2008)

NMP Introduction | **Site List**

[Introduction](#) | [Overview](#) | [Interactive Map](#) | [Downloads](#) | [Download Support](#) | [Viewers](#) | [Help](#)

Interactive Map:

This interactive Map displays the results of the Northamptonshire National Mapping Programme Project, which covers Northamptonshire and small parts of neighbouring counties. The original data was created by Phil Markham, John Robinson, Alison Deegan and others for Northamptonshire County Council. The map was generated between 1994 and 2001, some interpretations were revised in March 2004. **Note:** Pop-up blocker must be turned off to identify features in the map.

overview map



layer selection

- All Layers
- Info
- Archaeology
- Aerial Photo Index
- AP Plot
- Ridge & Furrow
- Morph Polygons
- Morph Polygons
- Boundaries

key to layer table:

A dotted group, click to open.
A solid group, click to close.

The AERIAL PHOTO INDEX layer is a distributive

FLYING THROUGH CORNWALL'S PAST

Home | About the Project | Aerial Photos & Archaeology | Explore Cornwall's Past | Downloads

WELCOME TO FLYINGPAST.ORG

How Cornwall's landscape has developed, exploring it through aerial photographs.

Ceremony and Ritual | Farms, Villages and Towns | Defended Cornwall
The Industrial Landscape | Decoding the Landscape

Flying Through Cornwall's Past

Flyingpast.org is the culmination of a twelve year project mapping archaeological and historical sites visible on aerial photos in Cornwall and the Isles of Scilly. The project was commissioned and paid for by English Heritage and the mapping was carried out by the Historic Environment Service of Cornwall County Council.

The mapping team studied more than 50,000 aerial photos taken between 1926 and 2005. Read more about [aerial photos](#) and [archaeology](#), the different types of photo we use, how we find the sites, and how we map Cornwall's past from the photos.

We have mapped more than 30,000 archaeological sites, many of which we discovered during the course of the project. Look at our [interactive historic environment map](#) and see for yourself all the sites we have mapped.

The project has enhanced our knowledge of the past and added to our understanding of Cornwall's ancient landscape. By [exploring Cornwall's past](#) you can read the story of how this landscape has developed over time.

Promoting Cornwall's heritage to the world

[flyingpast.org](#)

Interactive Design & Multimedia by Ughn Circa Digital Media

www.flyingpast.org

HERITAGE GATEWAY

[Login](#) | [Register](#)

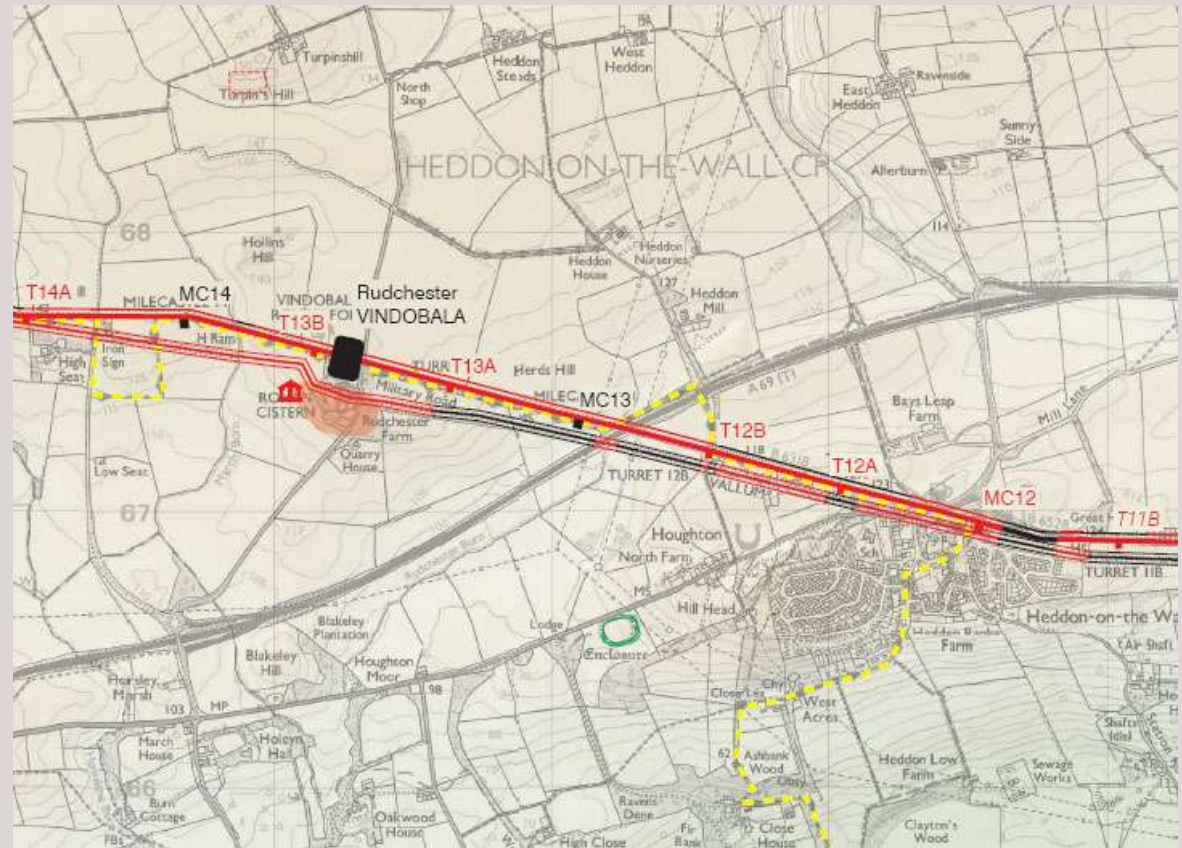
PASTSCAPE

What is PastScape? PastScape is a free online resource for exploring the history of the British Isles. It is a collaborative project between the British Library and the British Museum. It is a free online resource for exploring the history of the British Isles. It is a collaborative project between the British Library and the British Museum.

[Home](#) | [About](#) | [Contact](#) | [Privacy](#) | [Terms](#) | [Help](#)

Making NMP accessible

An Archaeological Map of Hadrian's Wall

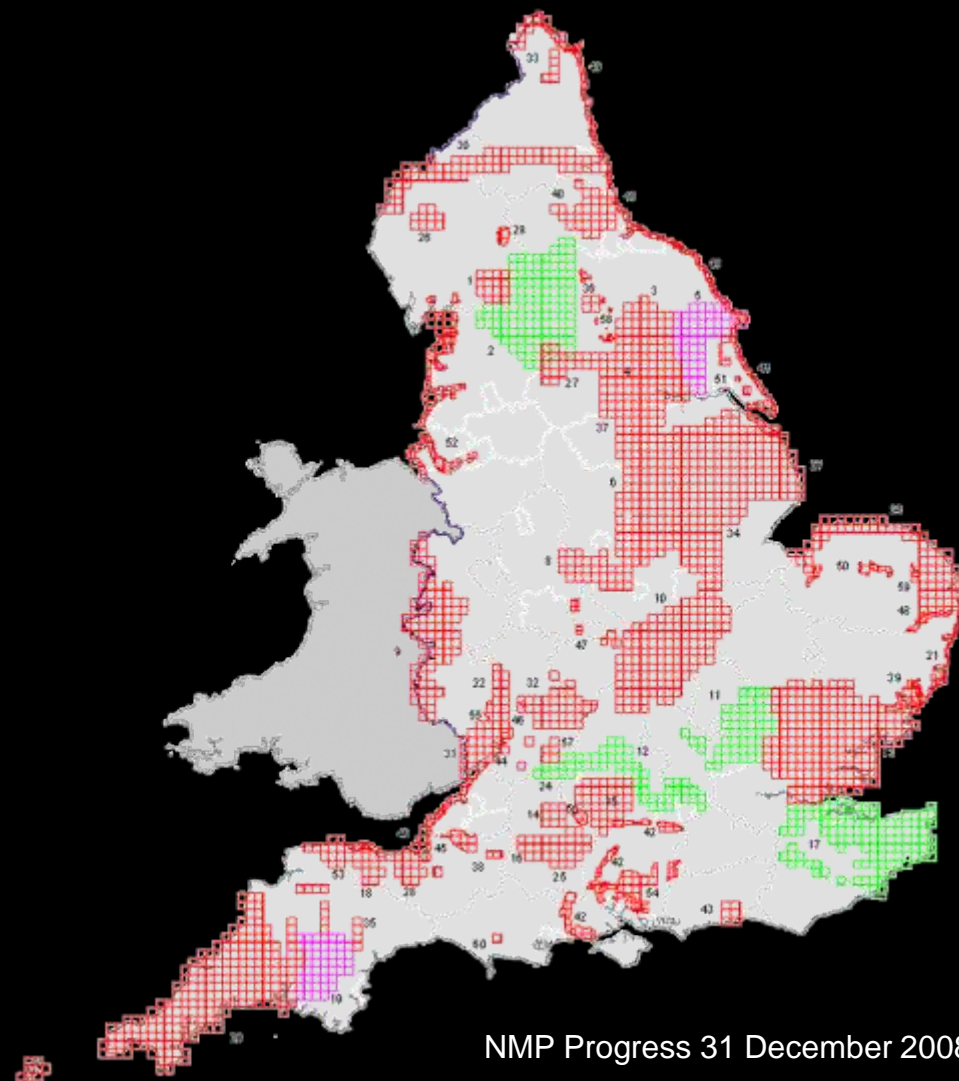


What is the future of the National Mapping Programme?

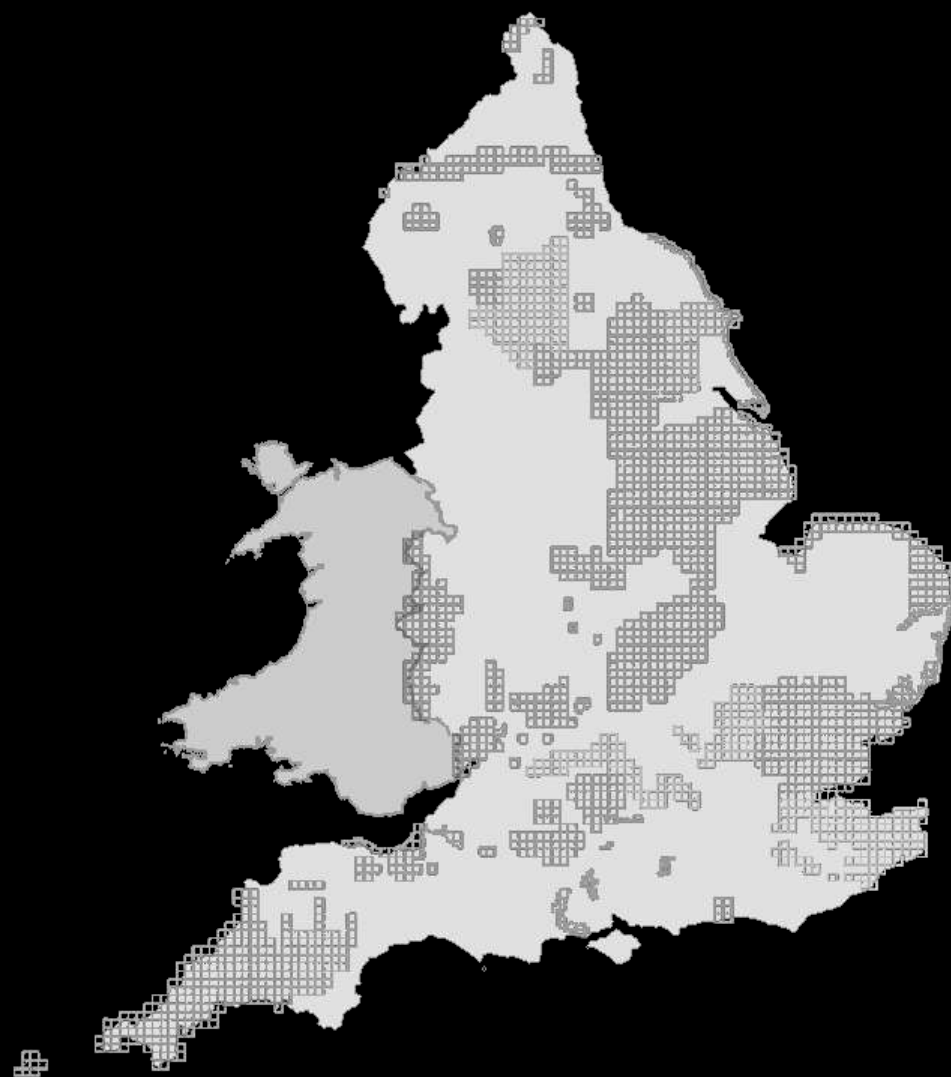
The NMP strategy identifies the key priorities to ensure that resource is directed to where it is most needed, both to inform conservation management and to enhance understanding and enjoyment of the historic environment.



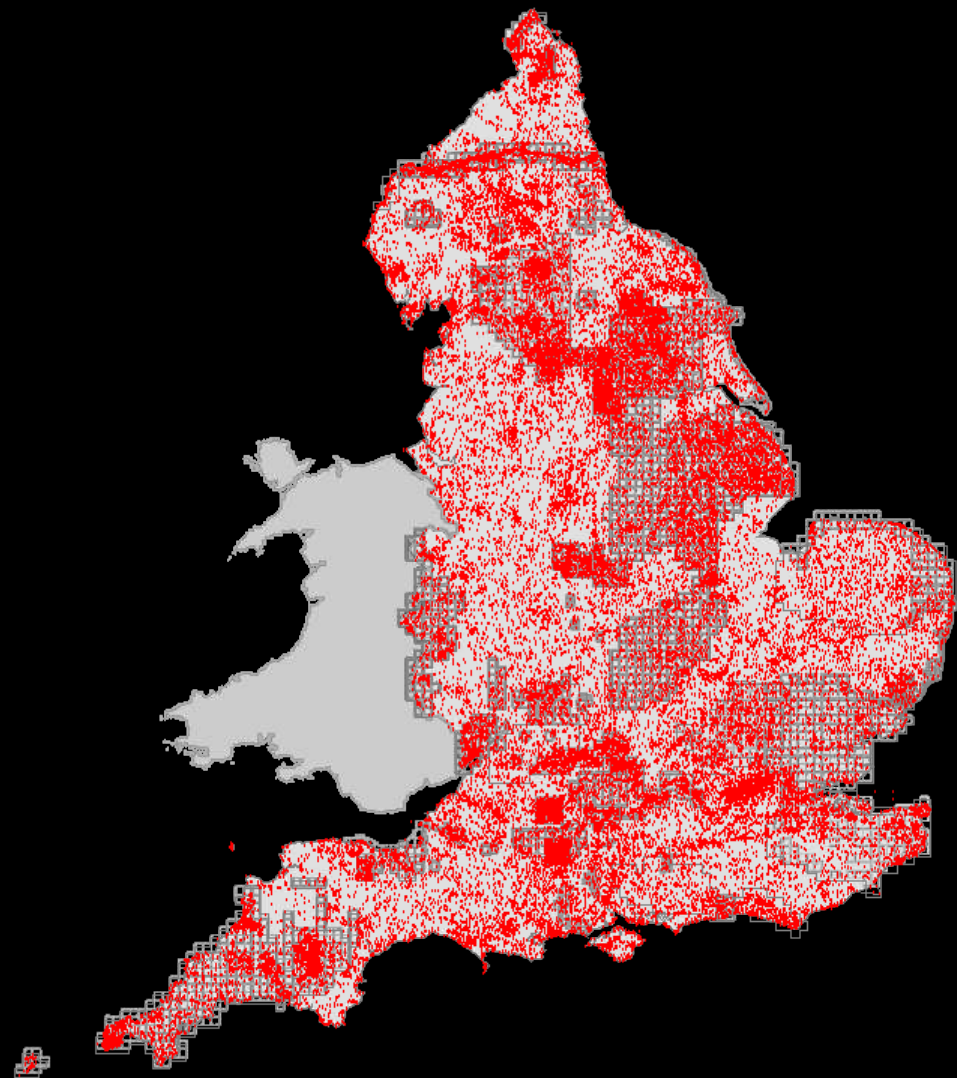
National Mapping Programme



Priorities for NMP include



Priorities for NMP include
areas of greatest benefit
low monument density

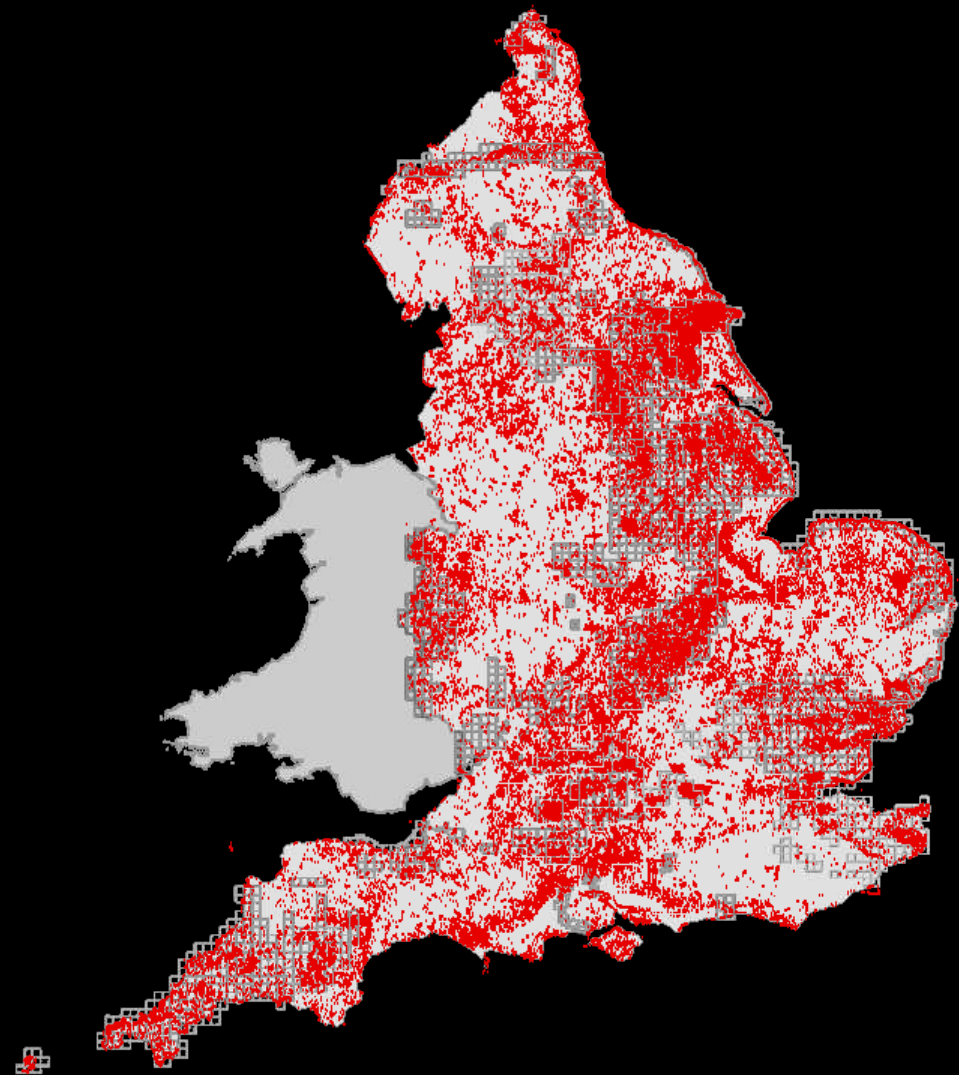


AMIE records in the National Monuments Record

Priorities for NMP include areas of greatest benefit

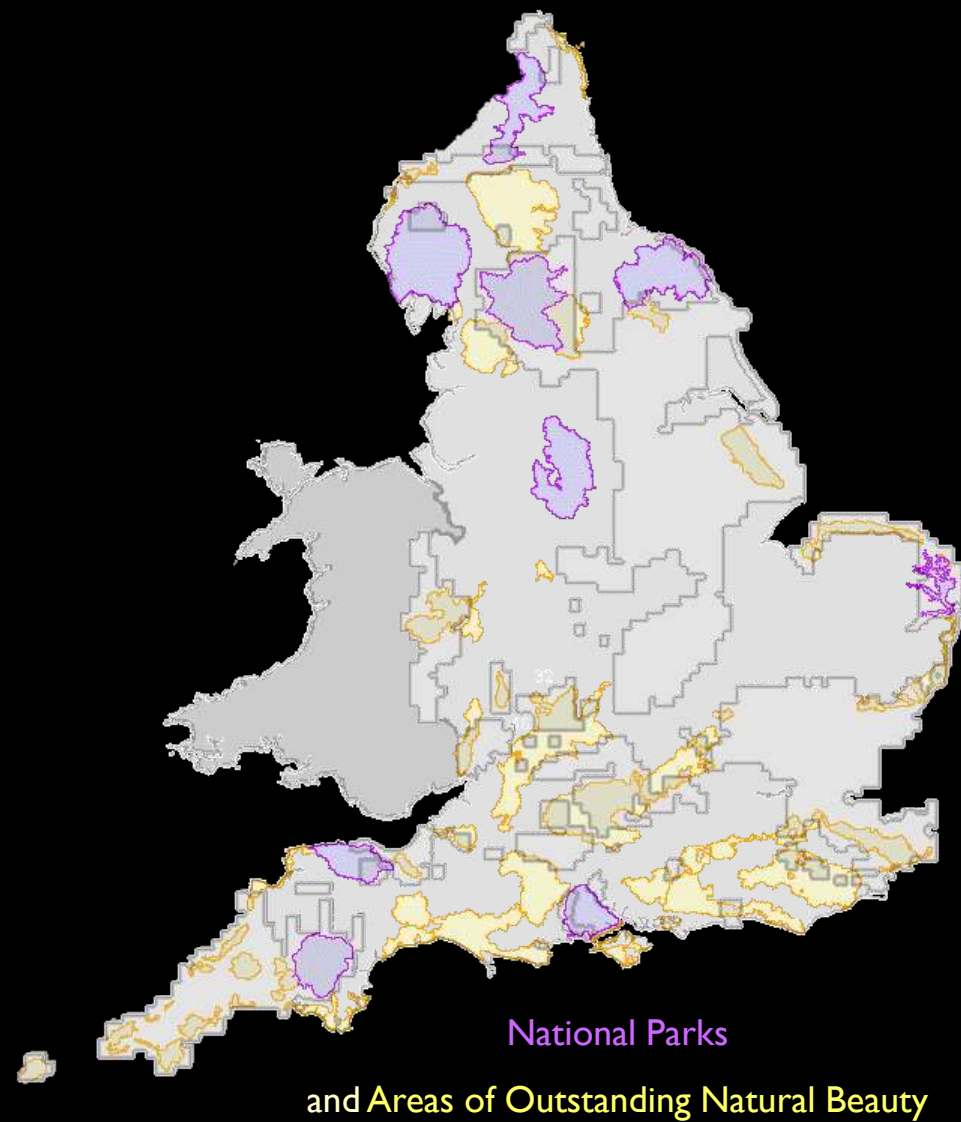
low monument density

lots of oblique photos

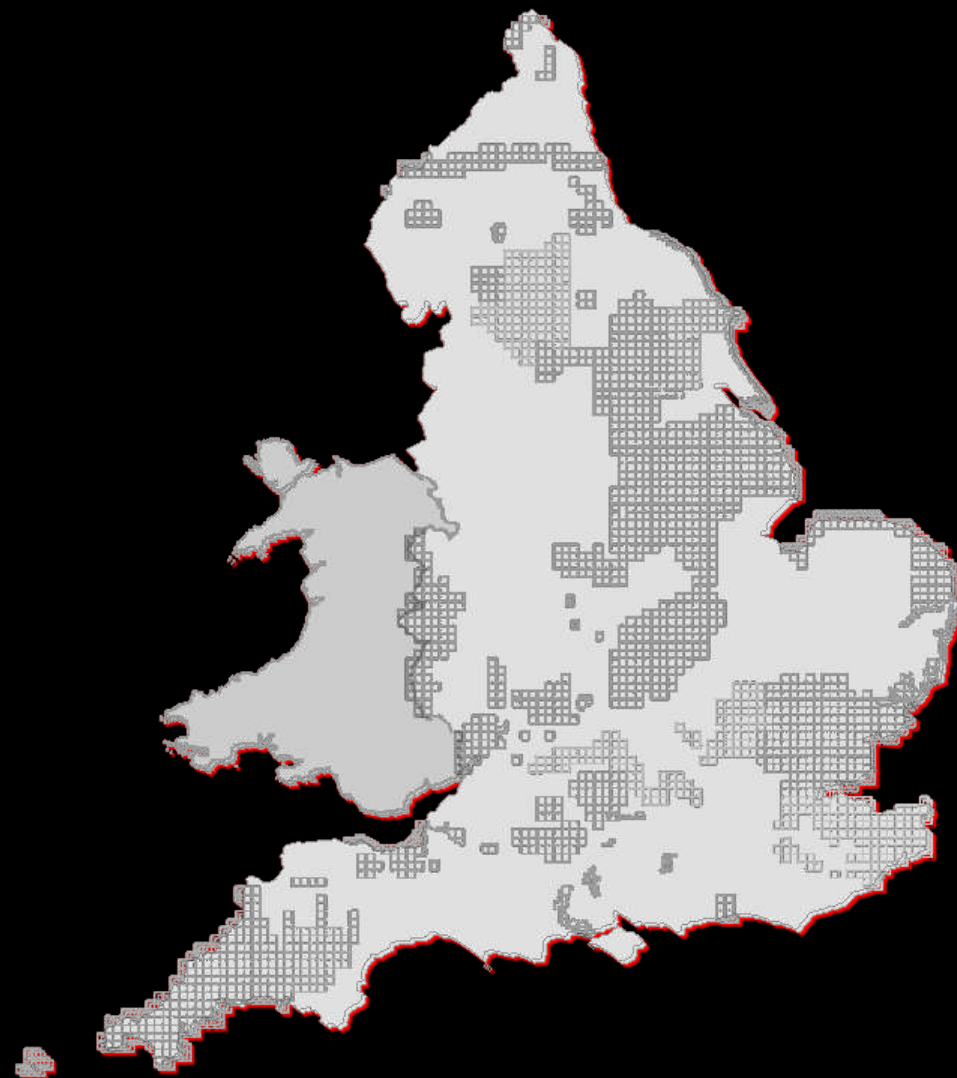


Oblique photos in the National Monuments Record

Priorities for NMP include
areas of greatest benefit
protected landscapes

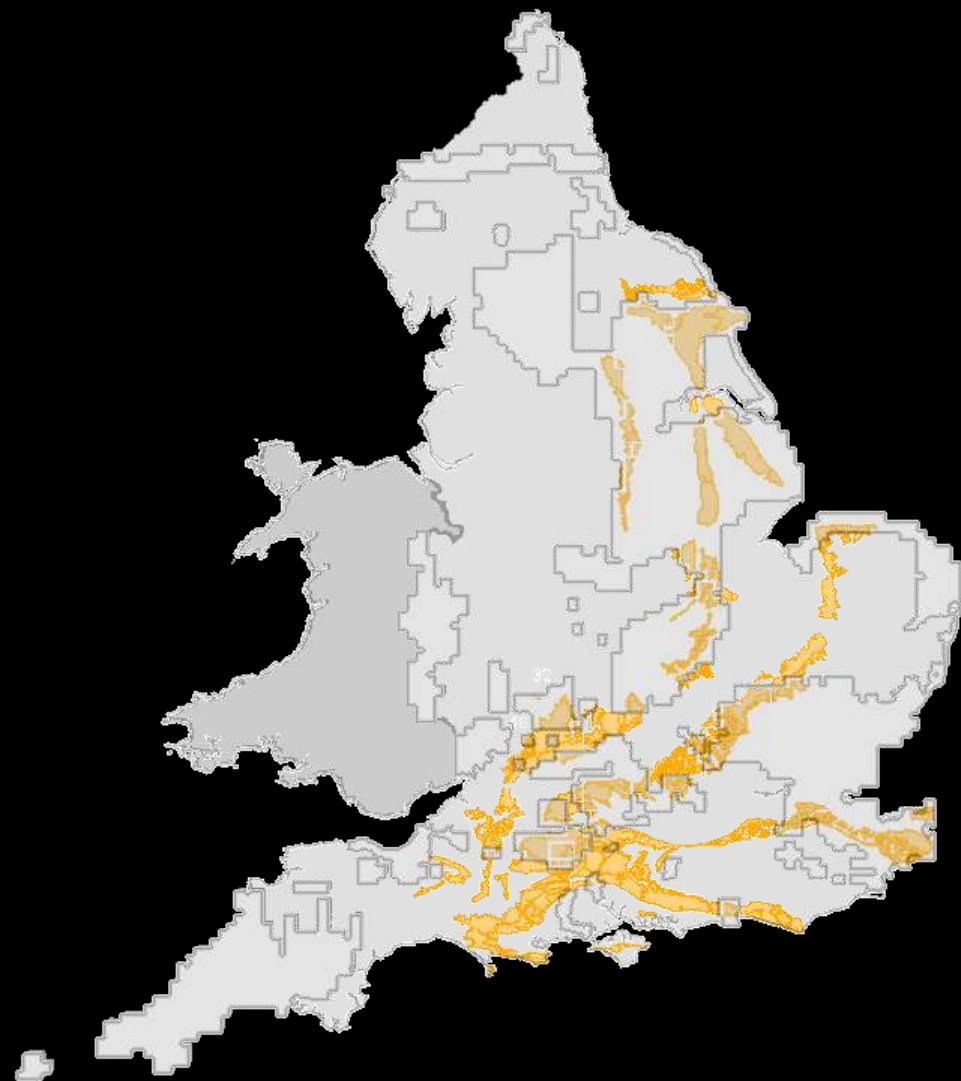


Priorities for NMP include
areas of greatest threat
the coast



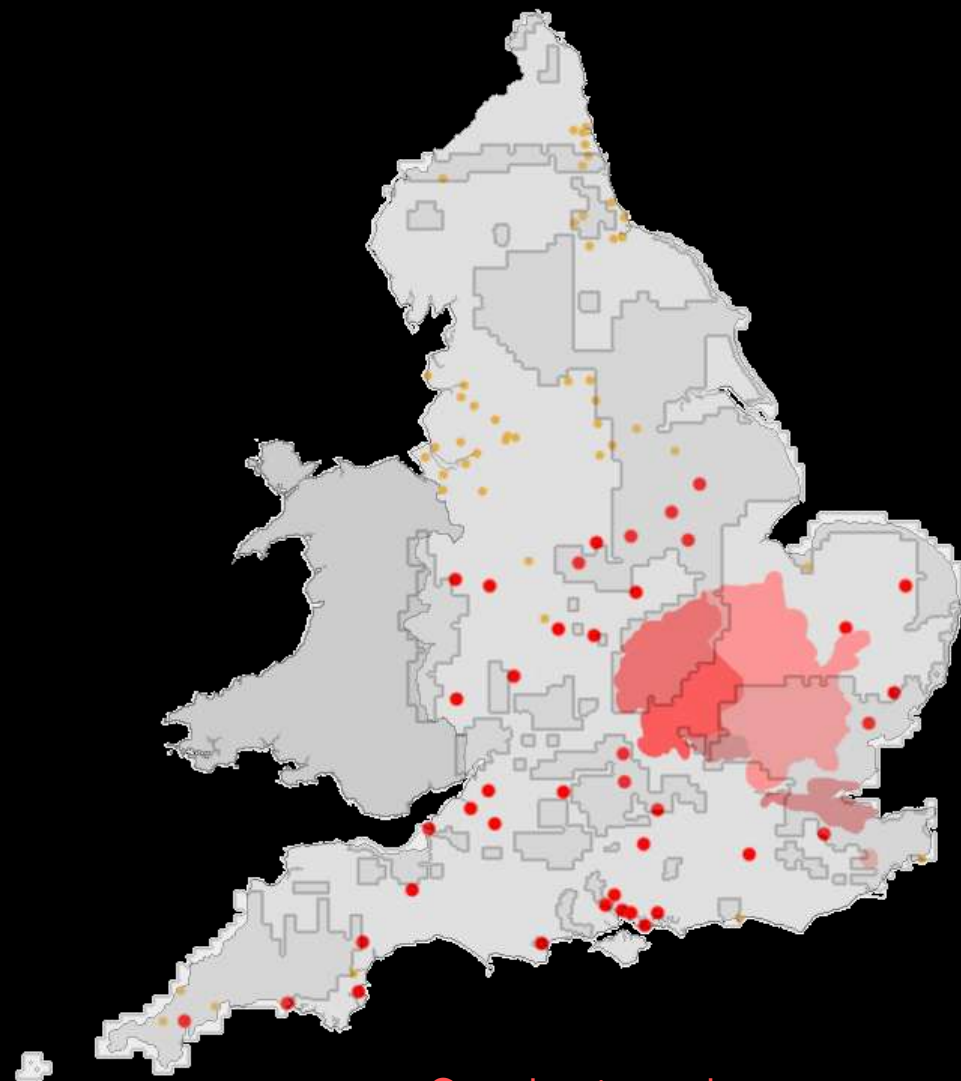
The Coast

Priorities for NMP include
areas of greatest threat
chalk/limestone arable areas



Solid Geology - Chalk and Limestone

Priorities for NMP include
areas of greatest threat
new development areas



Growth points and areas

Beyond the National Mapping Programme

Contributing to other programmes

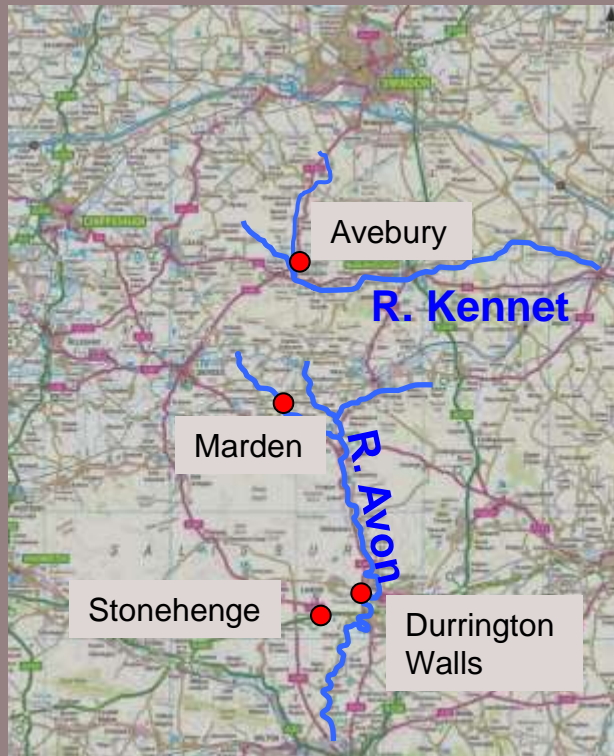
Combining methodologies



ENGLISH HERITAGE



Marden and environs multi-disciplinary project



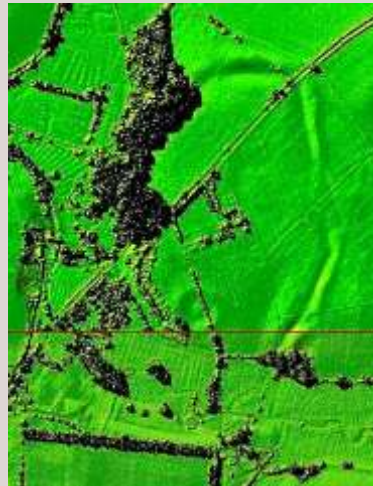
‘the intermediate circle at Marden, placed about half-way between Avebury and Stonehenge, and connected with each by a track-way’ (Colt Hoare 1821, 117).



Coalt-Hoare Ancient Wiltshire 1821



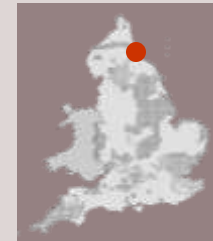
OS 76183 frame 43 21-AUG-1976



Lidar data © Environment Agency
copyright 2008. All rights reserved

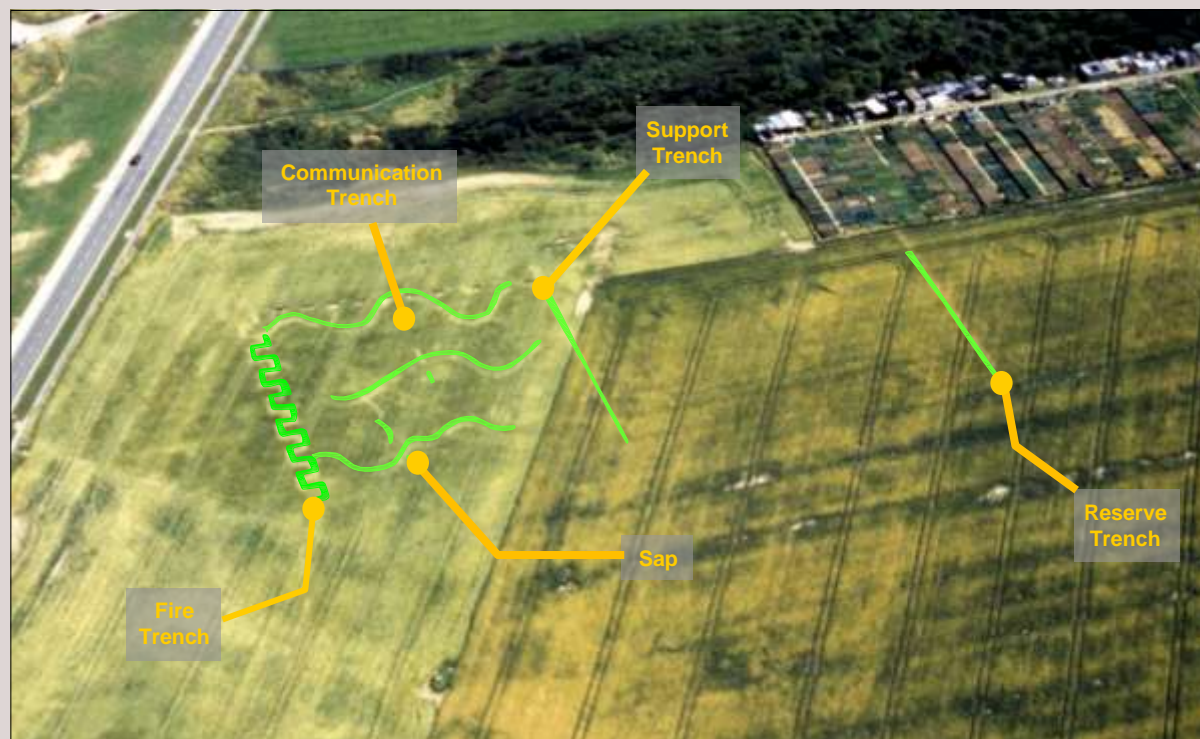
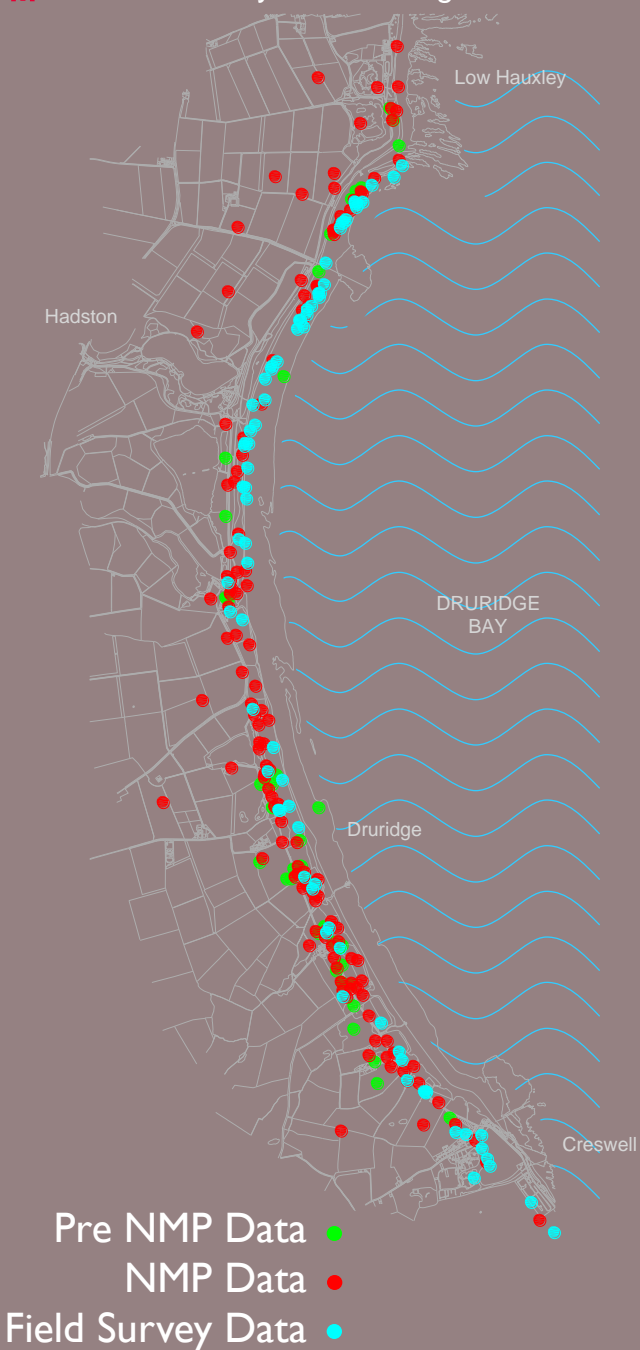


Results of earth resistance trial
(Louise Martin 2008)



Rapid Coastal Zone Assessment Survey

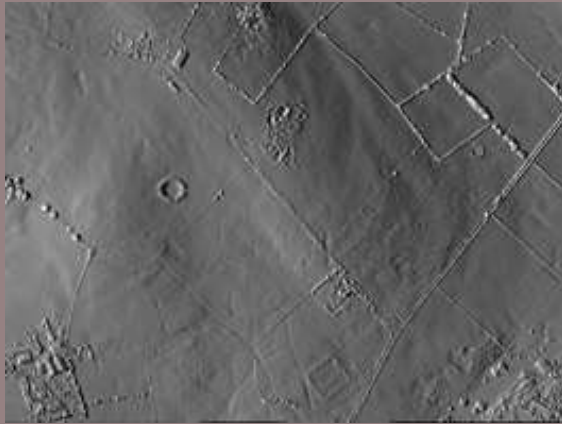
Desktop Survey, NMP and Field Survey



NMR NZ 6223/22 (19846/12) 30-JUL-2001



ARCHAEOLOGICAL RESEARCH
SERVICES Ltd



The Mendip Hills AONB Survey a multi-disciplinary approach

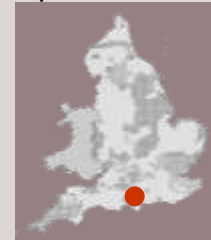
air photo and lidar interpretation

analytical field survey

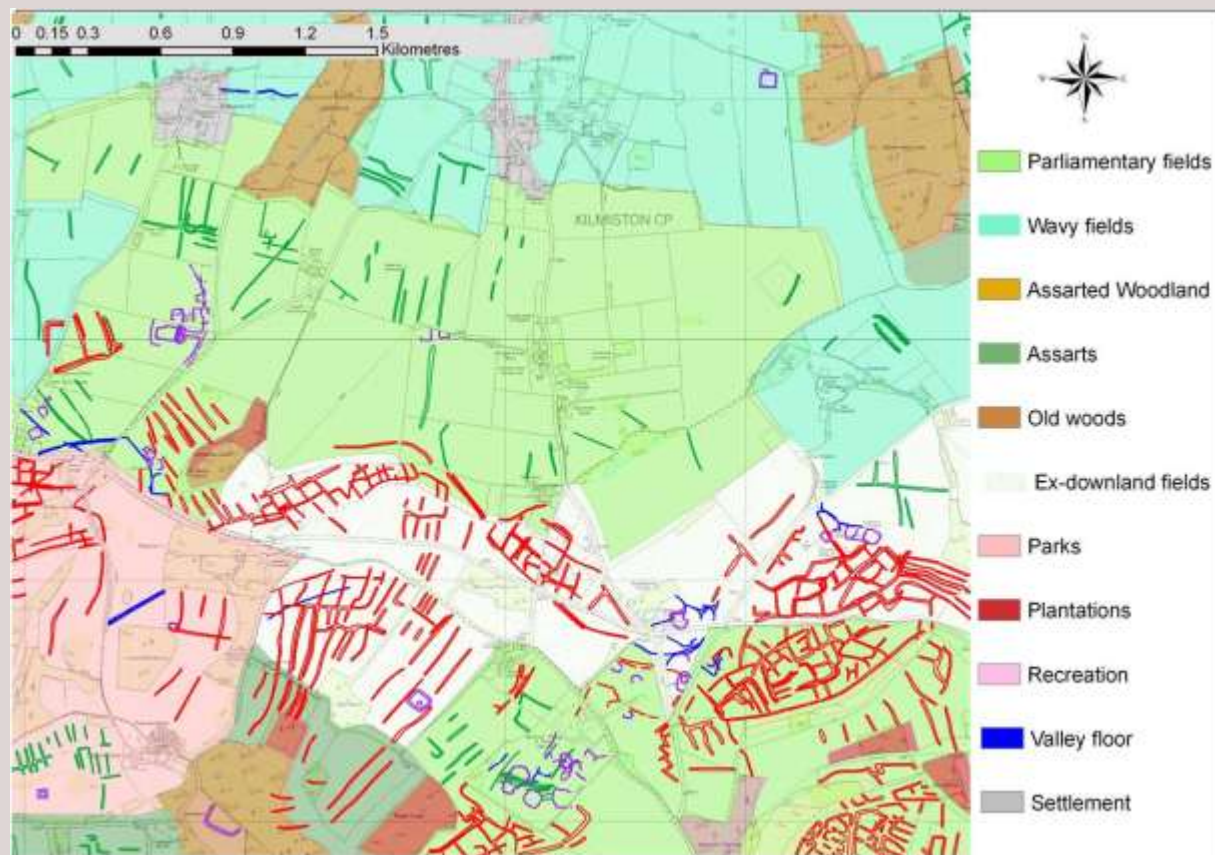
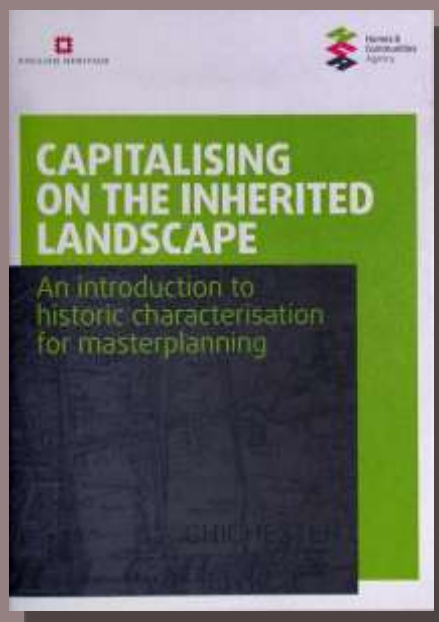
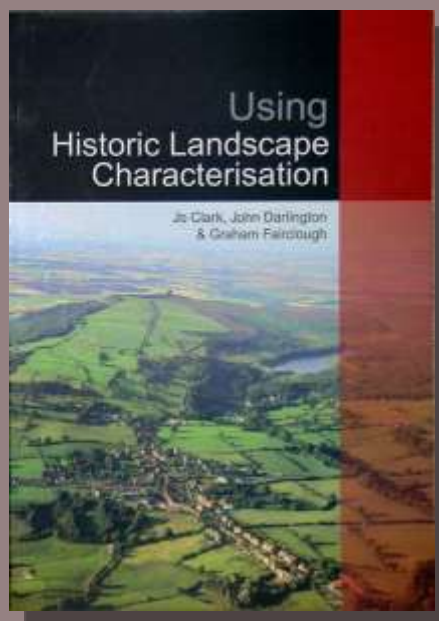
buildings survey



Different scales, complementary approaches

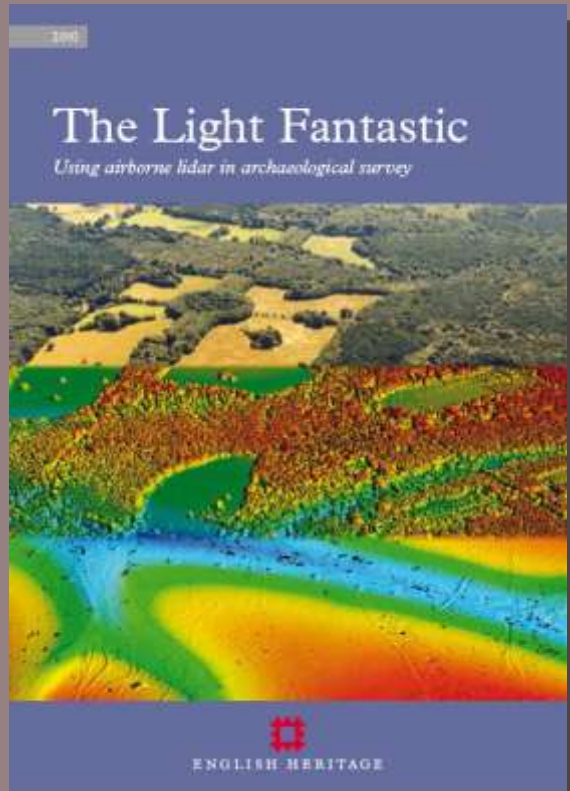


Historic Landscape Characterisation and the National Mapping Programme



Prehistoric features mapped by the NMP and Historic Landscape Characterization data around Kilveston

Will new technologies change the National Mapping Programme?



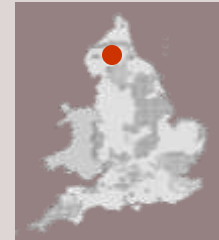
Airborne laser scanning, also known as lidar, is a particularly exciting new tool for archaeological survey



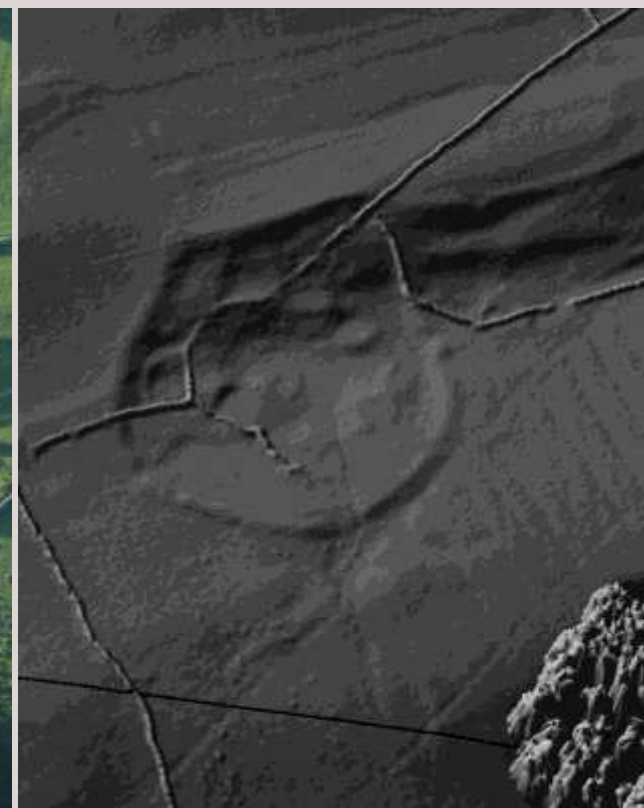
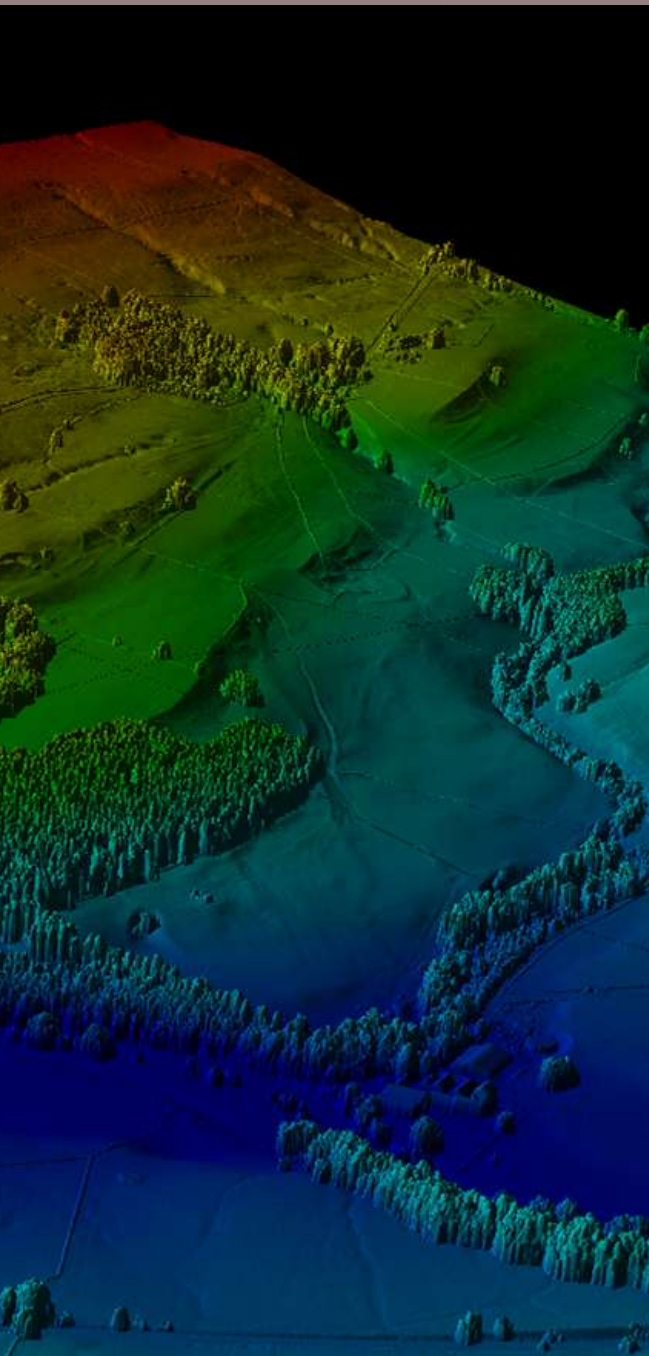
Carrawburgh, Hadrian's Wall, lidar digital surface model



ENGLISH HERITAGE



Miner-Farmer Landscapes of the North Pennines AONB an integrated approach



Online Reconnaissance



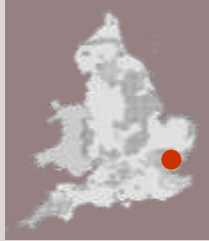
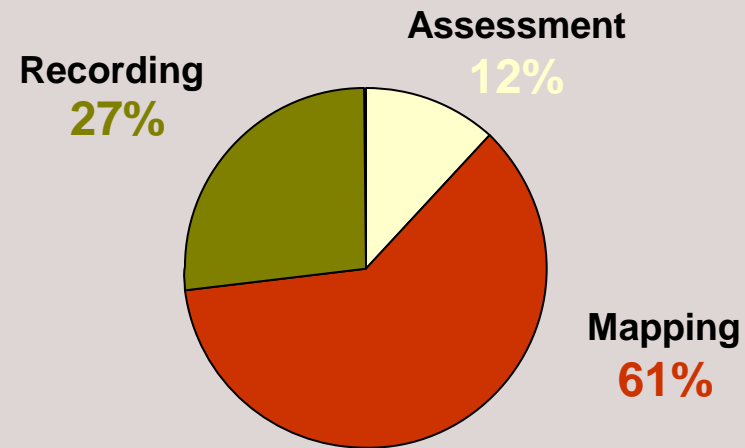
Online Aerial Reconnaissance in Essex

Final Report for the Online Aerial Reconnaissance Project in
Essex



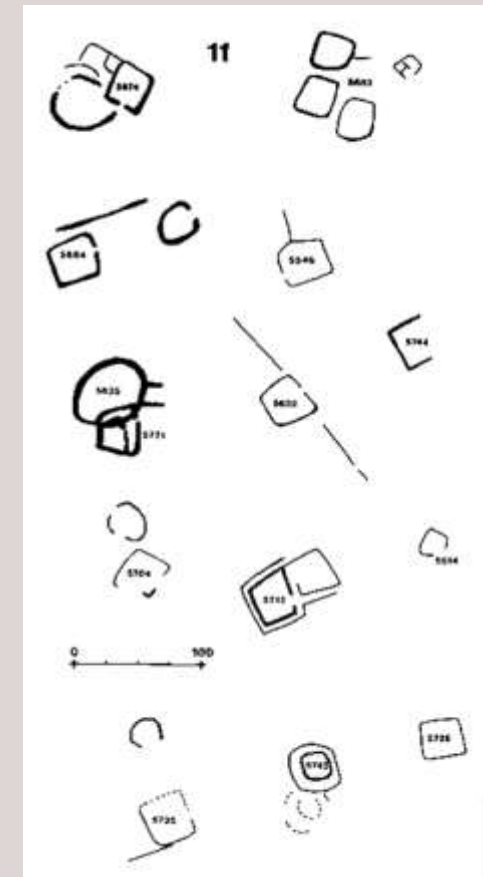
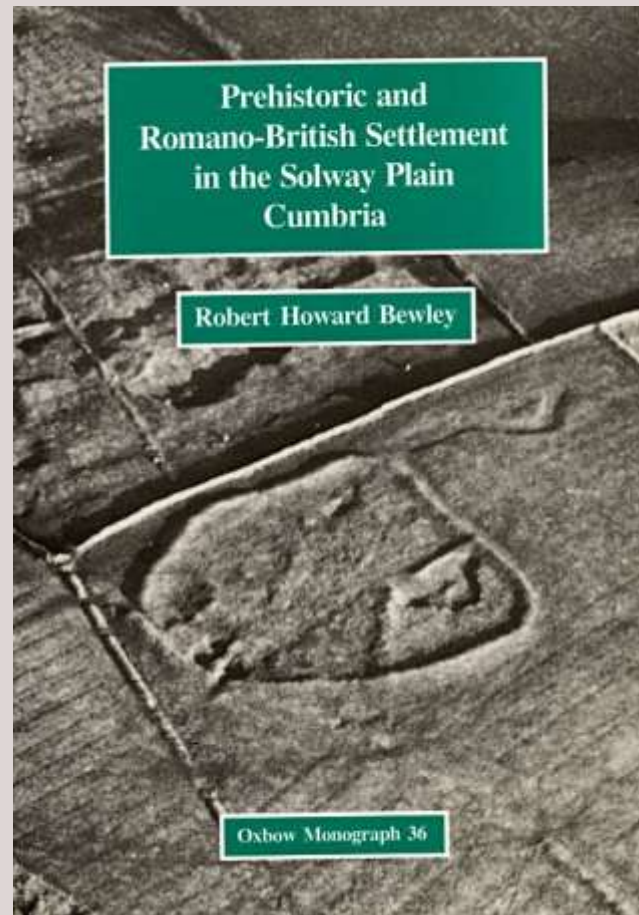
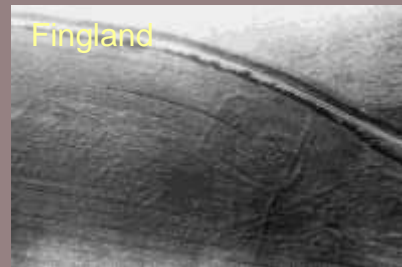
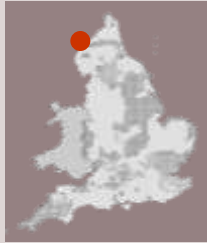
Helen Saunders
June 2008

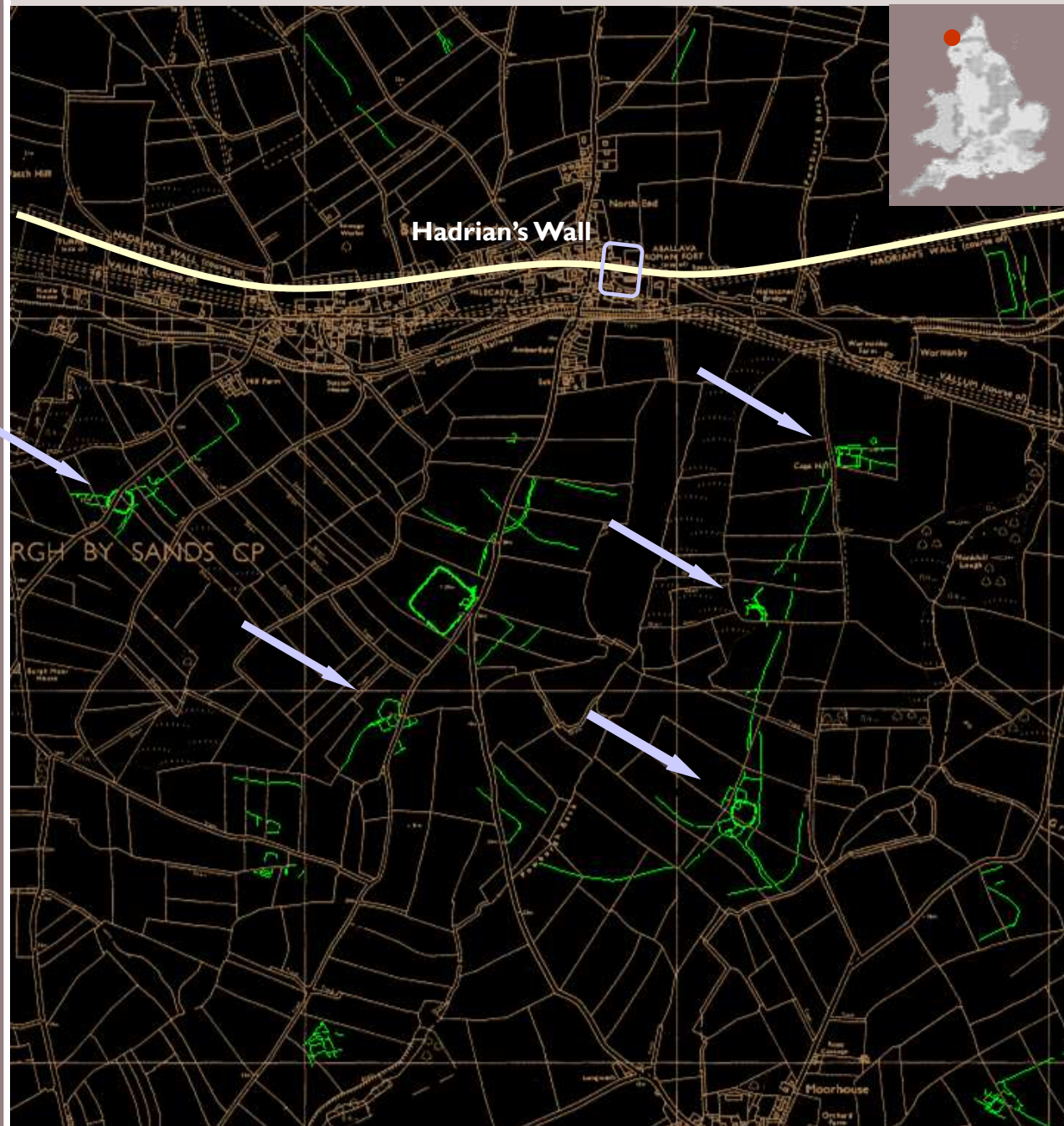
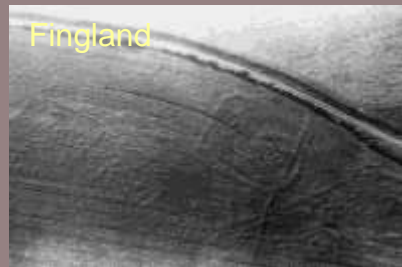
Time spent

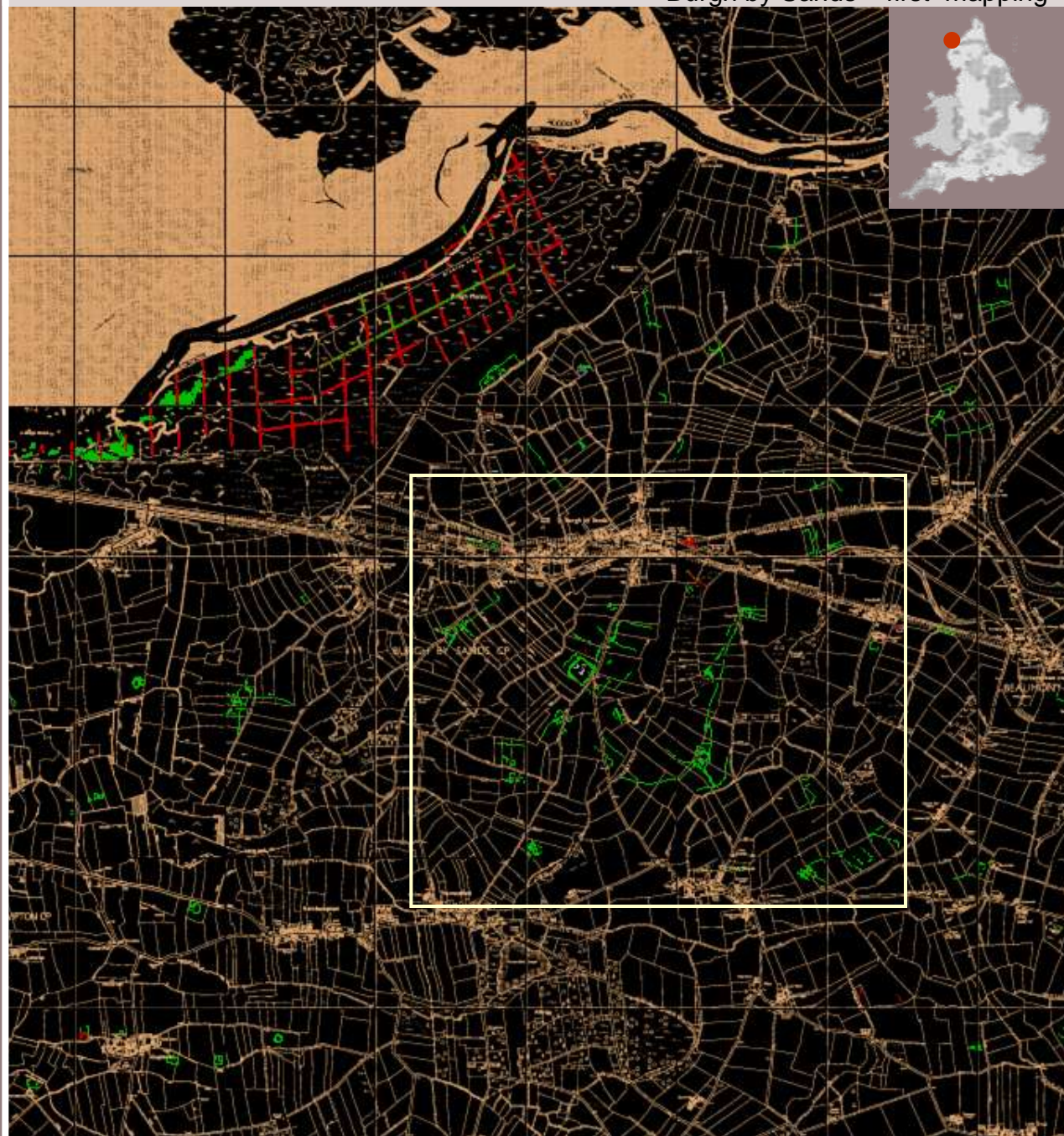


Results

Block (sq km)	Time (days)	New sites	Updated sites
One 100 sq km	15.5	61	26
Two 100 sq km	8.5	29	31
Three 100 sq km	3.5	19	13
Four 75 sq km	4.5	36	23
Total 375 sq km	32	145	93





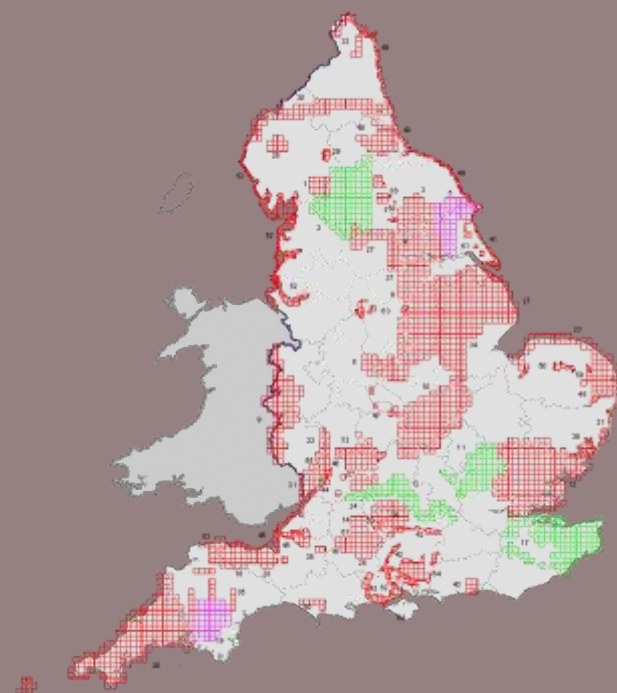




Flight N642
28 July 2006
Solway Plain



The National Mapping Programme in the 21st century



Funding

Sources

archives

reconnaissance

lidar/multispectral

Skills



Remote-sensing mapping
programmes in archaeology:
planning, organisation, results

Aerial Archaeology Research Group

Pre-conference workshop

Bucharest

15 September 2010

With thanks to all those who have worked on

The English Heritage National Mapping Programme

Pete Horne

Head of Aerial Survey and Investigation

Research Department

Conservation and Protection

English Heritage



The purpose of this workshop is to discuss the utility of multiannual aerial mapping programmes for archaeology and cultural heritage protection in European countries.

Are they necessary? Or can Google Earth replace them?

What are the costs and benefits?

How many people are needed, with what expertise?

How many flights a year?

How many sites identified on average during a flight?

How many hours needed to analyse, georeference and interpret the photos?

What about the resulted archives: who get access? What are the maintenance costs?

There are many questions people from countries at an early stage in this field put. There is no easy answer but we want to learn about good parts and mistakes to avoid, if possible.