

**WARCOP ARMY TRAINING ESTATE NMP :
SUMMARY REPORT**

CUMBRIA

NewHIS Parent Collection UID: EHC01/012

NewHIS EVENT UID: 1361591

Aerial Survey Report Series AER/11/2002

Air Photo Interpretation and Mapping: July-September 2002

Air Photo Interpretation and Mapping: Yvonne Boutwood, Ann Carter, Dilwyn Jones,
and Sally Radford

Report: September 2002

Project Report by Yvonne Boutwood

© **English Heritage**

English Heritage 37 Tanner Row, York YO1 6WP

Tel: 01904 601901 **Fax:** 01904 601999 **World Wide Web:** <http://www.english-heritage.org.uk>

The National Monuments Record is the public archive of English Heritage

National Monuments Record National Monuments Record Centre, Great Western Village, Kemble Drive, Swindon
SN2 2GZ

Tel: 01793 414700 **Fax:** 01793 414859 **e-mail:** NMRinfo@english-heritage.org.uk

World Wide Web: <http://www.english-heritage.org.uk>

CONTENTS

1	SUMMARY	1
2	INTRODUCTION	2
3	SCOPE OF THE SURVEY.....	3
3.1	Physical Landscape.....	3
3.2	Archaeological Scope.....	3
3.2.1	Earthwork archaeology	4
3.2.2	Levelled archaeology	4
3.2.3	Post medieval and modern field boundaries.....	4
3.2.4	Medieval and post medieval ridge and furrow	4
3.2.5	Industrial features and extraction	4
3.2.6	20 th century military features	4
3.2.7	Buildings	5
3.2.8	Geological features	5
4	SOURCES	6
4.1	Air Photographs.....	6
4.2	Monument Data	6
4.3	Previous Survey Work and Research	6
5	METHODOLOGY AND RECORDING.....	7
5.1	Mapping Methods.....	7
5.2	Recording Practice.....	7
5.3	Project Archive	7
6	PROJECT MANAGEMENT	8
7	SUMMARY OF RESULTS	9
8	BIBLIOGRAPHY.....	10
9	FIGURES	11
9.1	Figure 1 - Location.....	11
9.2	Figure 2 – Warcop project area.....	11
10	APPENDIX 1.....	12
10.1	NewHIS Records by Period	12
11	APPENDIX 2.....	13
11.1	AutoCAD MAP® Drawing Conventions.....	13
11.2	AutoCAD MAP® Layers	14
12	APPENDIX 3.....	15
12.1	AutoCAD MAP® Attached Data Tables.....	15

1 SUMMARY

At the request of Defence Estates, the Ministry of Defence's Army Training area at Warcop, Cumbria was surveyed by the National Mapping Programme. Digital maps at a nominal scale of 1:10,000 and supporting records were created by English Heritage's Aerial Survey team based in York. The project identified and mapped sites varying in date from a possible Neolithic mortuary enclosure through to post medieval industrial remains and twentieth century military remains. Records were made for 97 sites, half of which were new to the record.

2 INTRODUCTION

The aim of the National Mapping Programme (NMP) is to produce a comprehensive record of archaeological sites from prehistory to modern times through interpretation and mapping, at a scale of 1:10,000, of features visible as earthworks and cropmarks on air photographs.

Defence Estates is required to produce an Integrated Land Management Plan (ILMP) for the Ministry of Defence's Army Training area at Warcop, Cumbria. The plan requires an evaluation of archaeological sites to assess their extent and condition within the area. Discussions between the Environmental Advisor (Archaeology) for Defence Estates, the Sites and Monuments Officer for Cumbria, the English Heritage Inspector of Ancient Monuments and English Heritage Aerial Survey section, resolved that the management objectives could best be achieved within the required timescale by surveying the area as part of NMP. From an English Heritage perspective, the acceleration of NMP, and particularly the chance to include areas in the north-west of England, was welcome.

The data provided by NMP will be the foundation for further fieldwork and ground survey, which in turn will evaluate the condition of the archaeological sites and produce an integrated record within a GIS system. The dataset will facilitate the implementation of a conservation plan for the archaeology within the military training area.

3 SCOPE OF THE SURVEY

The Warcop army training area lies north-west of Brough in Cumbria and covers approximately 65 square kilometres, extending into seven, 1:10,000 scale, Ordnance Survey map sheets (NY71NW, NY71NE, NY72NW, NY72NE, NY72SW, NY72SE, and NY82SW). Mapping for the NMP usually records archaeology in units of full 1:10,000 Ordnance Survey quarter sheets, but for Warcop NMP the timescale dictated that only the project area was mapped. The project area was defined by the limits of the army training area with a 200 metre wide corridor added around the perimeter (Figs 1 & 2).

3.1 Physical Landscape

The land rises from the valley of the River Eden in the south-west of the project area to the Pennine hills, which extend over much of the area. The land on the western edge of the Pennine Alston Block rises steeply to a series of fells (Murton Pike, Roman Fell, Long Fell and Middle Fell), which are dissected by numerous becks flowing westward. The highest points are at Murton Fell and Burton Fell at 673 metres OD and 745 metres OD respectively. Numerous becks flowing east and north-east also dissect the eastern moorland area.

The underlying geology comprises Permo-Triassic sandstones and Carboniferous limestones, shales and sandstones. Glaciation has effected much of this Pennine area and deposits of glacial drift occur locally (Taylor *et al* 1971). The latter gives rise to loamy, slowly permeable, seasonally waterlogged soils. On the lower valley slopes glacio-fluvial and river terrace drift give rise to well drained loamy soils used for pasture, primarily sheep grazing. On the western edge of Alston Block, there are areas of limestone scar with shallow loamy soils (Soil Survey Of England and Wales 1983).

There are small areas of coniferous and mixed woodland, notably Helbeck Wood, north-west of Brough. The higher moorland is extensively covered in blanket peat with thin, acid peaty soils, which are prone to erosion. There is some small scale quarrying and exploitation of mineral veins within the Lower Carboniferous rocks for lead and copper.

3.2 Archaeological Scope

The aim of the National Mapping Programme is to increase our understanding of the historic environment. It achieves this by identifying, interpreting and recording all probable and possible archaeological features visible on air photographs as cropmarks, soilmarks, parchmarks and earthworks. The landscape of the Warcop project area primarily contains earthworks, with a few areas having a potential for cropmark sites. The NMP Sphere of Interest draft report (RCHME 1977) documents the scope of the NMP. The main aspects relevant to the type of landscape at Warcop are summarised below:

3.2.1 Earthwork archaeology

All extant earthworks identified as archaeological in origin were recorded. All available ground survey plans were used to assist and enhance the air photograph interpretation and transcription. These were the RCHME surveys at Burtergill Wood and Burton Hall (Lax 1994, 1998). However, not all of the details depicted on these higher level survey plans, at scales of 1:2500 and 1:1000, were visible on air photographs and therefore not all these features were mapped.

3.2.2 Levelled archaeology

Within the type of terrain in the Warcop project area, only a few cropmark sites were identified as archaeological in origin and were recorded.

3.2.3 Post medieval and modern field boundaries

Field boundaries (upstanding or levelled) which are visible on air photographs, and depicted on first edition Ordnance Survey or later edition maps were not mapped.

3.2.4 Medieval and post medieval ridge and furrow

All ridge and furrow visible on air photos was mapped, using a simple graphical depiction, delineating the extent of area and direction of the furrows. The difference between levelled and earthwork ridge and furrow are distinguished (see Appendix 2). The state of preservation of the latter was evaluated from the latest photography, which was mainly 1970s verticals and in some cases oblique photographs taken in 2000.

3.2.5 Industrial features and extraction

Widespread and common small-scale extraction of stone resources was not mapped, except for small limestone quarries associated with lime kilns. Large-scale quarries were recorded, especially when in close proximity to archaeological features, or when not depicted on any Ordnance Survey map. Lead, copper and barytes mining and associated features were recorded.

3.2.6 20th century military features

It is within the brief of English Heritage to record former military features up to and including the Cold War period. The army training estate at Warcop was acquired by the MOD in 1942, and there are many more recent modern military features associated with these training manoeuvres. No attempt was made to comprehensively record these features. However, where built structures, vehicle tracks, shell grazes and craters have had a considerable impact on the archaeological remains, or where military features lie in close proximity to archaeological features, these were mapped. Such features occur primarily in the southern half of the project area, on the lower ground south-west of Musgrave Fells.

3.2.7 Buildings

The foundations of buildings visible as earthworks or ruined stonework were recorded. Standing roofed or unroofed buildings or structures were not generally recorded, unless they had a particular association in the context of industrial or military sites.

3.2.8 Geological features

Geological features were not depicted and recorded. In some cases prehistoric enclosures were positioned against scarp faces and this has been mentioned in the NewHIS monument data text.

4 SOURCES

4.1 Air Photographs

All readily available air photographs from the three most important collections were consulted. A total of 292 specialist oblique and 1428 vertical photographs were examined for the project area. The National Monuments Record (NMR) was the prime source with 143 oblique and 1428 verticals (loan reference AP 38063/0203). The vertical photographs comprise RAF, Ordnance Survey and Meridian sorties and range in date from 1948 to 1981. The specialist oblique photographs held by the NMR range in date from 1975 to 2000, the latter as a result of recent English Heritage reconnaissance. From the Photograph Library of Cambridge University Unit for Landscape Modelling, forty-seven photographs were examined, ranging in date from 1948 to 1976. The Sites and Monuments Records office for Cumbria had an additional 102 oblique photographs flown in 1987 that provided some important information.

4.2 Monument Data

The National Monuments Record database NewHIS (formerly MONARCH) was consulted. Relevant data from the Sites and Monuments Record for Cumbria was made available by Bette Hopkins the SMR Officer. Where possible concordance of SMR and NewHIS data was done and 31 NewHIS records now have SMR numbers added. Archaeological information held by Defence Estates for the Warcop Army Training area was also used. There are 21 Scheduled Monuments in the project area.

4.3 Previous Survey Work and Research

A number of landscape research projects have covered sites in the Warcop project area. These studies take the form of inventories or gazetteers, which simply classify and index sites, or give an overview of the archaeology of the landscape including distribution maps (Clack and Gosling 1976; Medieval Village Research Group 1974; RCHM 1936). A study of Iron Age and Romano-British settlement in Cumbria using aerial survey and field survey (Higham and Jones 1975) lists some sites within the project area. A study of industrial sites by the RCHME in the Northern Pennines (RCHME: Northern Pennines Industrial Archaeology Project, Event UID 922755) identified a range of post medieval sites, such as mining and quarrying. More detailed ground survey of some sites was undertaken by the RCHME. A medieval moat and wood bank at Burtergill Wood were surveyed at a scale of 1:1000, with an additional 1:500 plan of the moat (Lax 1994). Medieval settlement and a group of fishponds at Burton Hall were surveyed in 1977, also at a scale of 1:1000 (Lax 1998). Warcop Roman camp and the course of a Roman road, were recorded as cropmarks on air photographs, as part of the thematic study of Roman Camps in England (Welfare and Swan 1995, 50-51, figs 40-41).

5 METHODOLOGY AND RECORDING

5.1 Mapping Methods

Mapping methods were in accordance with practices developed for the National Mapping Programme. Oblique and vertical photographs were scanned and rectified using appropriate software (AERIAL 5.18). Topographic information was derived from Ordnance Survey Land-Form PROFILE™ (scale 1:10,000) and the height data used to create Digital Terrain Models for photo rectification. Ordnance Survey raster 1:10,000 maps were used for control and as a base for mapping in AutoCAD MAP® release 3. Accuracy for the Ordnance Survey map is in the range of $\pm 8\text{m}$ and rectification of photographs is normally within $\pm 2\text{m}$. However, on some parts of the higher fells, the location of control points presented some problems, given the terrain and absence of enclosure. Here the locational accuracy depends on the quality of the available vertical photography for derived control, but is probably within the range $\pm 10\text{m}$ - 15m .

5.2 Recording Practice

All features drawn in AutoCAD MAP® have data attached to them. The two data tables and data fields used are listed in Appendix 3. The data recorded in these tables reflects the equivalent monument data that is entered into NewHIS. All mapped features were recorded on the English Heritage monuments database, NewHIS (formerly MONARCH), except for the military features. Within the AutoCAD MAP® drawing military features were not given an explicit interpretation, but simply flagged as 'military feature'. All information is made available to the local SMR and English Heritage's Inspector of Ancient Monuments for sites to be evaluated as part of the Monuments Protection Programme. Morphological information for selective sites was entered on the Aerial Survey Morphological Recording Module.

5.3 Project Archive

All mapping is produced digitally using AutoCAD MAP® release 3 and copies of the digital drawing files are deposited in the archive of the NMR. Aerial Survey York and Swindon retain copies of the digital files. The digital graphical data is printed on to film transparencies at a scale of 1:10,000 and supplied to the NMR and Sites and Monuments Record for Cumbria. Copies of the specification (AER/10/2002) and summary report (AER/11/2002) are also deposited in the NMR archive.

6 PROJECT MANAGEMENT

The Aerial Survey team in English Heritage's York Office carried out the mapping and recording. This team comprised Yvonne Boutwood, Ann Carter and Dilwyn Jones, and Sally Radford, a Bradford University student placement. Pete Horne was responsible for the management of the project. Yvonne Boutwood acted as project co-ordinator and dealt with both internal and external liaison. The project started on 1 July 2002 and the mapping and recording phase were completed by 20 September 2002.

7 SUMMARY OF RESULTS

- As one would expect from the topography, the main concentration of archaeological features recorded occurs on the western side of the project area. To the north-east the only recorded features relate to some mining activity.
- As a result of this project the total number of monument records created or amended in the NewHIS database was 97. Of these records 46 (47.4%) were new and 51 (52.6%) were amended. Out of the overall total 31 (32%) have an SMR reference number (see Appendix 1).
- A high proportion of the 46 new records are of post medieval features, particularly industrial features, but there are also several important new prehistoric records. These include a field system on Murton Fell, several small enclosures located on the north side of Roman Fell and a ring cairn on Musgrave Fell.
- There are 21 scheduled sites in the project area and most had to be transcribed from vertical air photographs as this was the only source of photography.
- Archaeological aerial reconnaissance in the area has been very limited; in part this due to the ATE being designated a Danger Area on flying maps. Most sites would benefit from further aerial reconnaissance and specialist oblique photographs.
- The complex phasing of some sites, particularly the extensive field systems to the north of the project area, suggest they would benefit from field investigation. The known extent of these systems is also likely to be increased by field work.
- A re-assessment of the Roman camp at Warcop (Sandford) on the basis of its morphology, landscape setting, archaeological context and material evidence, leads to the conclusion that it is probably a Late Neolithic mortuary enclosure.

8 BIBLIOGRAPHY

- Boutwood, Y 2002 Warcop Army Training Estate NMP project specification.
- Clack, P A G and Gosling, P F 1976 *Archaeology In The North: report of the Northern Archaeological Survey*
- Higham, N J and Jones, G D B 1975 Frontier, Forts and Farmers: Cumbrian Aerial Survey 1974-5. *The Archaeological Journal* 132, 48
- Lax, A 1994 *Burtergill Wood, Warcop, Cumbria*
- Lax, A 1998 *Burton Hall: An Archaeological Survey Report*
- Medieval Village Research Group 1974 Deserted Medieval Villages of North West England: a provisional list 1971-3, supplement to the *MVRG Annual Report*
- RCHM 1936 *Westmorland*.
- RCHME 1997 *The National Mapping Programme – Sphere of Interest* (internal draft document)
- Soil Survey of England and Wales 1983 *Legend for the 1:250,000 Soil Map of England and Wales*.
- Taylor B J, Burgess, I C, Land, D H, Mills, D A C, Smith, D B, and Warren, M A 1971 *British Regional Geology Northern England* (fourth edition)
- Welfare, H and Swan, V 1995 *Roman Camps in England: the Field Archaeology*

9 FIGURES

9.1 Figure 1 - Location



9.2 Figure 2 – Warcop project area

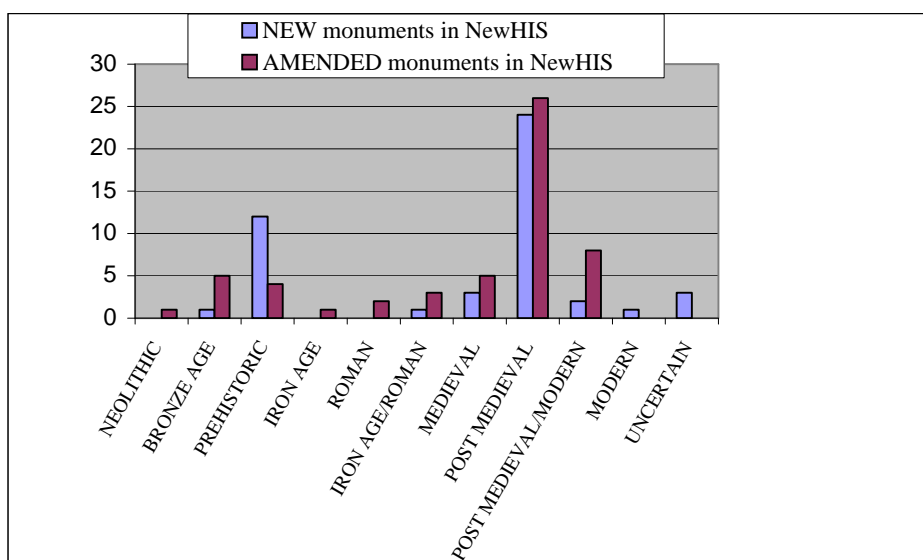


10 APPENDIX 1

10.1 NewHIS Records by Period

	NEW monuments in NewHIS	AMENDED monuments in NewHIS
Neolithic		1
Bronze Age	1	5
Prehistoric	12	4
Iron Age		1
Roman		2
Iron Age/Roman	1	3
Medieval	3	5
Post Medieval	24	26
Post Medieval/Modern	2	8
Modern	1	
Uncertain	3	
Totals	53	55

N.B. Multiple dates in a single record have been counted therefore the totals differ to actual number of records.



11 APPENDIX 2

11.1 AutoCAD MAP® Drawing Conventions

BANK	for built up features e.g. banks drawn as a single polyline or closed polygon
BANKFILL	hatch fill
DITCH	for cut features e.g. ditches, ponds, pits drawn as a single polyline or closed polygon
DITCHFILL	hatch fill
EXTENT OF AREA	to outline areas of activity e.g. mining
GRID	grid lines at 1km intervals
LARGE_CUT_FEATURE	for large cut features e.g. quarries
MONUMENT_POLYGON	for a polygon surrounding all features recorded within a single NewHIS record.
MONUMENT_UID	a text label giving the NewHIS MonumentUID, placed at the centre of the monument polygon.
RIGARREWK	for showing the direction of the furrows of extant ridge and furrow
RIGARRLEVEL	for showing the direction of the furrows of levelled or cropmark ridge and furrow
RIGDOTSEWK	for defining the extent of area of extant ridge and furrow
RIGDOTSLEVEL	for defining the extent of area of levelled or cropmark ridge and furrow
SHEET	an administrative layer to allow printing
STONWORK	for exposed stonework e.g. walls, cairns, standing stones
STRUCTURE	for concrete, metal and timber features e.g. military features
VIEWPORT	an administrative layer to allow printing

11.2 AutoCAD MAP® Layers

LAYER	COLOUR	LINE TYPE
0	7 (white)	CONTINUOUS
BANK	1 (red)	CONTINUOUS
BANKFILL	1 (red)	CONTINUOUS
DITCH	3 (green)	CONTINUOUS
DITCHFILL	3 (green)	CONTINUOUS
EXTENT_OF_AREA	2 (yellow)	DASHEDX2
GRID	7 (white)	CONTINUOUS
LARGE_CUT_FEATURE	5 (blue)	ACAD_ISO02W100
LAYER	7 (white)	CONTINUOUS
MONUMENT_POLYGON	7 (white)	CONTINUOUS
MONUMENT_UID	7 (white)	CONTINUOUS
PROJECT_AREA	7 (white)	CONTINUOUS
RIGARREWK	4 (cyan)	CONTINUOUS
RIGARRLEVEL	6 (magenta)	ACAD_ISO03W100
RIGDOTSEWK	4 (cyan)	DOTX2
RIGDOTSLEVEL	6 (magenta)	DOTX2
SHEET	7 (white)	CONTINUOUS
STONWORK	171	CONTINUOUS
STRUCTURE	142	CONTINUOUS
VIEWPORT	7 (white)	CONTINUOUS

12 APPENDIX 3

12.1 AutoCAD MAP® Attached Data Tables

MONARCH DATA TABLE

Field:

MONARCH NewHIS UID: e.g. 960073

MONUMENT DATA TABLE

Fields:

MONARCH NewHIS UID e.g. 960073

PERIOD date of feature e.g. Bronze Age

TYPE monument type e.g. enclosure

EVIDENCE form e.g. earthwork

PHOTO photograph from which feature was plotted and date flown

If you would like this document in a different format, please contact
our Customer Services department:
Telephone: 0870 333 1181
Fax: 01793 414926
Textphone: 01793 414878
E-mail: customers@english-heritage.org.uk