Cornish Mining World Heritage Site Bid

NMP Mapping in West Devon

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November 2002

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Acknowledgements

This study was commissioned by the Cornish Mining World Heritage Site Bid.

Help with the historical research was provided by:

Cornwall Archaeological Unit- Nicholas Johnson, Peter Herring, Peter Rose, Andrew Young

National Monuments Record Centre

English Heritage- Martin Fletcher, Simon Probert

Dartmoor National Park Authority- Debbie Griffiths

Devon County Sites and Monuments Record- Francis Griffith, Bill Horner, Ann Dick

Advice on the use of software applications:

John Smith, Bryn Tapper

Within Cornwall Archaeological Unit, the Project Manager was Jeanette Ratcliffe

Cover illustration

Wheal Jewel Reservoir, leats and mining remains. Photograph number: SX 5281/5 SX523815 NMR 21100/08,

14 JAN 2001

Contents

List of Figures

Abbreviations

AONB	Area of Outstanding Natural Beauty
CAU	Cornwall Archaeological Unit
CCC	Cornwall County Council
COMP	Cornwall and Isles of Scilly Mapping Project
DCC	Devon County Council
EH	English Heritage
GIS	Geographical Information System (ArcView)
HER	Cornwall and the Isles of Scilly Historic Environment Record
ICT	Information and Communications Technology
NMP	National Mapping Programme
NMRC	National Monuments Record Centre
OS	Ordnance Survey
PRN	Primary Record Number in Cornwall HER
RAF	Royal Air Force
RCHME	Royal Commission on the Historic Monuments of England
SMR	Sites and Monuments Record
WHS	World Heritage Site

1 Summary

As part of the Cornish Mining World Heritage Site bid project (WHS), two members of the National Mapping Programme (NMP) team were seconded to plot all archaeological sites visible on aerial photographs from seven OS 1:10000 quarter map-sheets in the Tamar Valley area of west Devon. This work was carried out between June 2001 and January 2002. Two of the map-sheets were sited partly within the Dartmoor National Park.

As a result of the mapping, almost 1,500 sites were recorded, of which 500 are new to the Devon Sites and Monuments Record (SMR).

The project has not only made a significant contribution to Devon's SMR, but has also added new information to the overall archaeological record. Many twentieth century military features, numerous destroyed field boundaries and some settlements from the medieval period, and a smaller number of prehistoric settlements and fields that were previously unrecorded were mapped.

Coincidentally, by recording the extent of the Tamar Valley's orchards and gardens in the immediate post-war years from photographs of that date, the project has contributed invaluable information to the Tamar Valley Market Gardens Project, a current initiative devised and funded by Tamar Valley AONB.

In some parts of the project area (within Dartmoor National Park) problems were encountered with regard to insufficient physical control points within the landscape necessary to create accurate air photo plots. To overcome these problems, Geographical Positioning System Readings (GPS) were made on the ground and, in this way, a network of control points was established. This is probably the first time that such technology has been used in the NMP, thereby enhancing the methodology of this national project.

2 Introduction

2.1 Project background

The NMP is a project devised and funded originally by the Royal Commission on the Historic Monuments of England (RCHME), now English Heritage (EH). The aim of the programme is to 'map, describe, and classify all archaeological sites recorded by aerial photography in England to a consistent standard' (RCHME 1995).

Some NMP projects are carried out by the EH Aerial Survey (AS) team in Swindon whilst others are contracted out to county units or other organisations. The mapping of Cornwall is one of these external projects and has been carried out by Cornwall Archaeological Unit (CAU) since 1994.

The WHS project commenced in March 2001. It is a 2.5 year project, the end result of which will be the submission of the nomination documents to UNESCO. In addition to its central aim of achieving World Heritage Site status for Cornwall's mining remains this project is regarded as a pilot nationally in terms of pioneering a new approach to the recording, conservation, and promotion of the historic environment.

The WHS Bid project has a strong emphasis on the use of Information and Communication Technology (ICT) as a means of collating and presenting data. One of the key aspects of the project methodology was to incorporate NMP data into the Geographical Information System (GIS) in order to illustrate the historic extent of mining

and mining-related activity. This process formed part of the initial phase of the WHS Bid project and the data has helped to determine where the boundaries for the WHS Bid areas should be drawn. The Cornwall NMP team brought forward the mapping of Cornwall's key mining areas in order to facilitate the achievement of this timetable. However, the WHS study area also includes a small area of west Devon which was historically part of the Tamar Valley Mining Area (Fig. 1), and there is currently no NMP project for Devon.

In order to achieve a consistent data standard across the whole of the WHS study area a grant from English Heritage Archaeology Commissions programme (Aerial Survey) was made to enable NMP mapping to be carried out in the west Devon part of the study area.

As well as funding from English Heritage, other contributors in the west Devon project are West Devon Borough Council, Devon County Council and Tamar Valley Area of Outstanding Natural Beauty (AONB).

The purpose of this report is to assess the results of mapping the west Devon part of the WHS Bid.

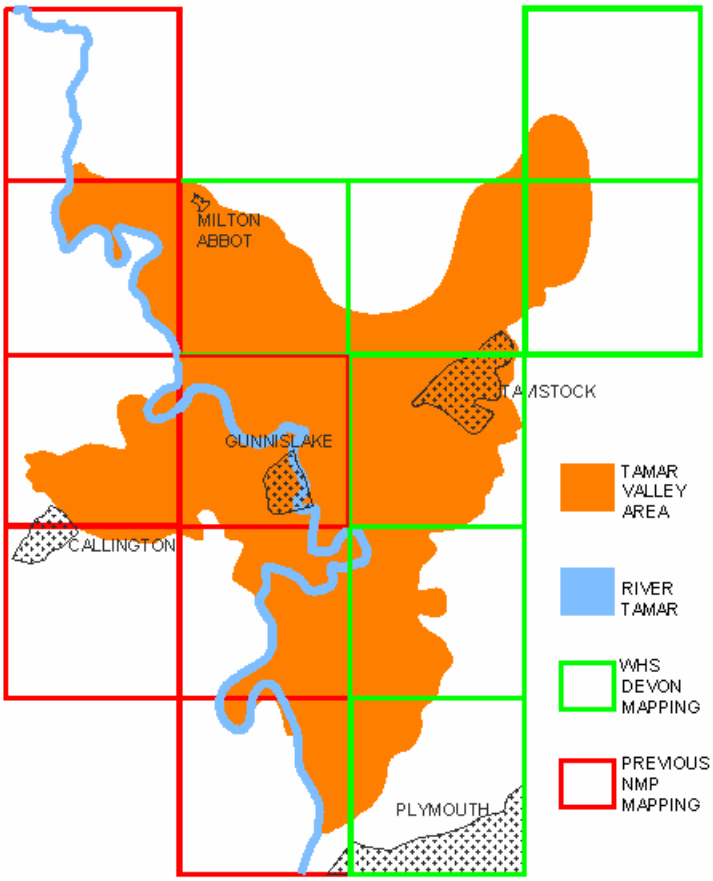

Fig 1: NMP coverage for the Tamar Valley area of the WHS Bid (from Young, 2001). Red outline shows the seven OS quarter sheets already mapped by COMP, while green shows the seven sheets covered by the west Devon project.

2.2 The Study Area

2.2.1 Physical extent

The Tamar Valley Mining District straddles the Cornwall/Devon border. It lies within thirteen 1:10,000 OS quarter map sheets, six of which have already been mapped as part of Cornwall's NMP (Fig. 1). The west Devon part of the WHS Bid comprises the remaining seven sheets. These are SX46NE, SX46SE, SX47NW, SX47NE, SX47SE, SX57NW, and SX58NW. The basic unit for NMP mapping is the 1:10,000 OS quarter map-sheet. Thus, in order to attain standards consistent with the NMP nationally, the entire seven sheets were mapped, not merely the area within the WHS bid project specification. In this way, the south western edge of Dartmoor was included in the survey, but no attempt was made to record mining remains elsewhere on Dartmoor.

2.2.2 Geology and soils

In terms of geology and soils the area is similar to Block 1 of the Cornwall NMP (Tamar Valley). The predominant soils in the lowland areas (SX46SE, SX46NE) are brown earths overlying either Carboniferous shale and limestone or Devonian limestones. Intrusive bands of igneous felsite run east-west across West Down and Morwelldown, and again further south across Collytown and South Wood. The Mid Tamar area (SX47SE) is composed of brown earths which rest on old red sandstone slate or chert. At its northern reaches (SX47NW, SX47NE) the study area is characterised by hilly pasture and woodland, the landscape of central and North Devon which signifies the Culm Measures. On Dartmoor (SX57NW, SX58SW), the granite from which the moor is comprised is overlain by peaty sub-soils with frequent out-croppings of granite, the largest of which form the Tors (Hoskins, 1992). This granite bedrock is the source of the richest seams of tin in the study area, and the two quarter-sheets which contain part of Dartmoor have produced the greatest quantity of mapped industrial features.

2.2.3 Characterisation

The Tamar Valley is assessed in three parts in the 1994 Cornwall Landscape Assessment (Cornwall County Council, 1994). All three, the Tidal Tamar, Mid Tamar and Upper Tamar are relevant to this survey.

The area is characterised in the south by river valleys (notably those of the Tamar and Tavy), coniferous and mixed woodland, medieval-derived field-patterns and a mixture of arable and pasture. In the north, areas of upland indicate the encroaches of Dartmoor National Park.

Overall, the area is not heavily populated. The northern edge of Plymouth lies on the southernmost map-sheet, and the stannary town of Tavistock is located in the north. Apart from these, much of the area consists of dispersed farmsteads, nucleated villages and small towns, such as Lydford and Buckland Monachorum.

The western edge of Dartmoor is framed by the towns of Peter Tavy, Mary Tavy and Merrivale.

2.2.4 Air photo coverage

Air photo coverage of the study area consisted of 350 specialist oblique and 1,622 vertical prints held at EH's National Monument Record Centre (NMRC) in Swindon. These figures are comparable with the average photo densities experienced in Cornwall. In addition Devon County Council (DCC) air photo collection including 2001 colour vertical cover for the area was made available to the project.

2.2.5 The Sites and Monuments Record

In terms of density of archaeological remains, there are on average 270 SMR records per map sheet in the study area. However, two of the sheets (SX57NW and SX58SW) are situated within the Dartmoor National Park area and have a far higher density of SMR records (SX57NW has 518 records).

2.2.6 Archaeological character

Evidence for prehistoric settlement is most visible on Dartmoor. There are Bronze Age barrow groups however on heathland at Lamerton, in the Upper Tamar region. Enclosed settlement remains do survive, though sparsely, across the region, but they are for the most part within plantation or upland.

In terms of land-use the region is dominated by Anciently Enclosed Land, that is, land which was enclosed for agricultural purposes during or preceding the medieval period. There is abundant earthwork evidence for shrunken and deserted medieval settlement, and at Buckland Monachorum, the remains of a thirteenth century Cistercian Abbey.

The area of west Devon which lies within the Tamar Valley boundary does not possess the extent of large-scale mine works notable within Cornwall, but areas of lodeback pits and quarrying are evident on upland areas on both Dartmoor and further south.

The Dartmoor National Park area is notable for its extensive mining remains, including medieval tin streaming and lode-back pits. Other prominent archaeological features nestling among the granite tors include Bronze Age and Iron Age settlement remains, extensive boundary walls or 'reaves' and strip-fields still visible as earthworks within later enclosed field systems.

2.3 Aims

The aims of the west Devon NMP mapping were:

1. To contribute to at least two of the aims set out in the Cornwall WHS Bid Project Design (Ratcliffe 2001):
    - Identify, map and describe the landscapes, sites and features that collectively demonstrate the international importance of the Cornish Mining Industry form the mid-18th century to the end of the 19th century.
    - Assess the extent of potential survival and condition of the various mining landscapes
2. In line with NMP projects nationally, to map all visible archaeological sites (not just mining remains) from prehistoric periods to the project cut-off date of 1945 (RCHME 1995).

3 Methods

There were five stages comprising the method that was used to meet the objectives of the project. These are consistent with the methods used in Cornwall's NMP with adaptations to take account of the logistics of some work having to take place in Exeter.

1. Preparation
2. Transcription
3. Data processing
4. Post-recording
5. Miscellaneous

3.1 Preparation

3.1.1 Sourcing photographs

3.1.1.1 NMRC collection

The main photographic collection used by the project is housed at the National Monuments Record Centre (NMRC). Photographs are ordered prior to beginning each Block of work (the west Devon Block consisted of seven 1:10,000 map sheets). For the west Devon Block 1,972 photographs were available for consultation. On arrival in Truro, these were checked against the NMRC listing and sorted into separate files for each map sheet before beginning transcription of the Block.

All available aerial photographs were used. These included RAF vertical series from 1946 to 1964, the Meridian Airmaps Ltd 1:10,000 and 1:12,000 series (1971 and 1978) and Ordnance Survey flights at 1:7,500 (1974 and 1984). Oblique photographs taken by both Devon SMR (1986 to 1989) and by EH air photo services (1979 to 2001) were used. Colour vertical coverage at 1:10,000 of west Devon, taken in 2001 courtesy of the West Devon Borough Council, was available as a layer via the Cornwall GIS.

3.1.1.2 Other collections

An assessment was made of two further photo collections: the Devon SMR collection of specialist obliques and the DCC vertical collection. In the first case, the SMR collection contained no prints which were not available to the project team through the NMRC collection. With regard to the vertical collection, the 1946/47 RAF 1:10,000 series was included in the NMRC collection: the only verticals held solely by DCC were at 1:20,000 scale and this was considered too small a scale to be useful for NMP mapping. In the event, neither Devon collection was consulted.

3.1.2 Sourcing maps and other information

Prior to transcription of each map sheet the following maps and relevant associated records were consulted:

- Devon SMR maps
- NMR record maps

At this stage, and prior to transcription of individual sites, further sources of information were consulted where appropriate:

- NMR Excavation Index

- 1st and 2nd Edition Ordnance Survey maps
- 1984 RCHME Dartmoor Archaeological Survey

3.2 Transcription

Transcription was carried out in three stages.

3.2.1 Manual/Aerial/AutoCAD plotting

Sketch plotting was used in mapping some features (such as field boundaries) from vertical photographs. This was done by the creation of polylines in AutoCad made by tracing the relevant features from scanned photographs.

Where appropriate, computer-generated plots were produced. This was always the case with sites too complex to be sketch plotted and those visible on oblique photos which needed to be rectified. Rectification and digitisation of photographs was carried out using Aerial 5.12, and Aerial 4.3 rectification software.

3.2.2 Ink overlay

After checking, final ink drawings were made by tracing over the print-outs of computer-generated plots. The original ink drawings will be housed at the NMRC archive and a copy housed at Devon SMR.

3.2.3 Digitization

All NMP quarter sheets were digitized using AutoCAD2000iMAP software. This enabled transfer of digitised plots into the HSIS system at NMRC and into the Cornwall County Council GIS system (ArcView GIS 3.2a software).

There are two final versions of the completed digitised data. The first is that created in AutoCAD, which presents mapped features as coloured layers; each layer represents a feature type such as ditch, bank or structure. AutoCAD drawings also provide information on line width, length and whether a feature is positive or negative. The second is the theme displayed in GIS. This is effectively the same as the AutoCAD drawing, but all features have been amalgamated into one layer or 'theme', and some dimensional information is lost.

The MAP software holds data in text form within AutoCAD, such as photo numbers and dates, and it is retrievable by querying the polyline drawings created in AutoCAD. This text can be transferred along with the drawings from AutoCAD into ArcView, so that the same information can be retrieved from the plots displayed in the GIS.

3.3 Data processing

3.3.1 Manual record

3.3.1.1 Site Records

During the transcription process, notes about each site were attached to the AutoCad drawings. These notes take the form of outline descriptions of the site and initial interpretation. The forms record the relevant serial numbers and dates of the photos used for transcription of each site. (See 3.2.3).

3.3.1.2 Map Note Sheets

A record was made of the time taken for transcription and recording of each map sheet using the customised Map Note Sheet.

3.3.2 Morph 2 database

The raw information produced by mapping of the west Devon area was input to a Morph 2 database. This database enables rapid analysis of the data for later assessment.

3.3.3 Devon SMR

Sites with existing SMR records plotted during the project were updated by WHS Bid staff. The SMR numbers were entered into the Morph 2 database, as were any applicable NMR numbers. For this purpose NMP staff consulted the Devon SMR in Exeter, and all applicable SMR data was provided for the project team. No other SMR recording was undertaken during the project.

Any existing record numbers for sites on the seven map-sheets, are visible as point data on a separate layer in the GIS. This can be viewed in conjunction with NMP mapping.

3.4 Post-recording

After transcription and recording there were three further tasks.

3.4.1 Return of photographs

This comprised re-sorting the photographs and returning them to their respective collections. Return of NMRC photographs took place after completion of the west Devon Block of work.

3.4.2 Data exchange

There are two elements to data exchange

1. Completed transcription overlays have been sent to the NMRC, and will also be sent to Devon SMR. Copies of the digitized map sheets have been sent to the NMRC and will be incorporated into Devon's GIS system at a later date.
2. Copies of the Morph 2 database will be sent to the NMRC, and to Devon SMR.

3.4.3 Project archive

Now that transcription and data processing has been completed for the entire study area, the resulting body of work comprises a complete project archive consisting of ink drawings, digitized images, a written report, and the Morph 2 database.

The west Devon mapping will be sent to Devon, to be available as part of their County

Sites and Monuments Record (SMR), and as a layer on their GIS.

3.5 Miscellaneous

3.5.1 Liaison and monitoring meetings

Prior to the commencement of mapping, Andrew Young and Bryn Tapper travelled to Exeter to liaise with the Devon SMR staff, and established systems for NMP staff to consult the Devon SMR.

Two liaison visits were made later in the mapping process. These were intended to introduce the work of the WHS and NMP (Cornwall) teams to groups and individuals with an interest in the study area. Firstly, a meeting was arranged with Debbie Griffiths, archaeologist for the Dartmoor National Park Authority, and secondly with Martin Fletcher and Simon Probert of the English Heritage Survey team based in Exter.

Both visits were deemed very successful. An important outcome of the English Heritage meeting was that mapping of Cox Tor, Cudlipptown Down and Wilsworthy Down on the south west edge of Dartmoor which had already been plotted by EH, were loaned to the west Devon project, in order that a more accurate and complete plot could be made for those areas.

3.5.2 Use of GPS

Two days were used to travel to Dartmoor, where grid references were taken in the area of Merrivale using a hand-held Garmin 12 GPS. The reason for this was that although mining remains were visible on aerial photographs for this area, there were insufficient control points provided on the OS map-sheets to enable accurate air photo mapping..

In order that the archaeological features could be accurately plotted, a hand-held GPS was used to acquire grid references from Little, Middle and Great Staple Tors, 1km north of Merrivale. These natural features are clearly visible on the RAF 1964 aerial photographs, and could be reliably expected to have remained unchanged in appearance and location.

With good signals being received from nine satellites, the accuracy of the readings taken was excellent for rectification at a scale of 1:10000. The points at which readings were taken were noted on a copy of the photographs to be used: visible on these were both clear images of the Tors, and a variety of archaeological features, including mining remains (fig. 2).

Once back in Cornwall, the readings were plotted as points in AutoCAD 2000i, over a 1:10000 OS map of the area. This map and the additional control points were then used to rectify photographs of the area around Merrivale.

The rectified photographs were brought into AutoCAD, where all visible archaeology was then plotted.

Fig 2: GPS readings taken on Dartmoor, including north and south ends of a prospecting trench clearly visible on the ground.

4 Results

4.1 Summary of the Morphological data

Since it was not possible to access or input to the Devon SMR database, no new PRNs were created. A great deal of new information has however been added via MORPH 2 and AutoCAD.

Analysis of the MORPH data revealed that 1,436 MORPH records have been created for West Devon, of which 1063 (74%) were new to the Devon SMR. Less than 10% of recorded features were plotted from cropmark remains. Far from suggesting a paucity of archaeological sites in the study area, this figure indicates an excellent level of surviving above-ground remains ranging from the stone foundations of hut-circles and field walls, to engine-houses and anti-aircraft batteries.

In total, 26 industrial complexes were recorded, including two large quarry sites of early twentieth century origin. Six mining sites were plotted which had not previously been recorded.

A variety of military features were recorded including three complex sites, two of which had not been plotted prior to the West Devon survey (see 4.2.2). Nine bomb craters were mapped. Eighteen military sites were recorded in total.

The majority of field systems plotted were of medieval or later origin; 197 were classed as unknown medieval date, 9 as prehistoric and 5 as post-medieval.

Of the 60 enclosures recorded, 50% were of probable prehistoric origin.

4.2 Archaeological Themes

4.2.1 The Industrial Landscape

The primary aim of this project was to map the mining landscape. Much of this is now hidden by tree cover in the form of either natural woodland or plantations. Some mining areas however, are still highly visible, notably in the region of Mary Tavy. Extensive remains, a great deal of which were previously unmapped, were recorded at Devon Friendship mine (SX 5059 7933), Wheal Betsy (SX 5083 8113) and Wheal Jewell (SX 5182 8134).

The plotting of workings around Wheal Jewel especially, was useful in identifying the extent of the mine. Lines of lode-back pits running for over a kilometre across Kingsett Down were mapped, along with associated leats and openworks (fig 3).

The network of leats to the north and east of Mary Tavy was also plotted. About two thirds of these were marked on the latest OS 1:10000 quarter sheet. Using the evidence from air photographs, gaps in the record were filled. Leats to the north-east of Blackdown, for example, preserved in places as field boundaries, (SX 5041 7969) were visible to either side as cropmarks.

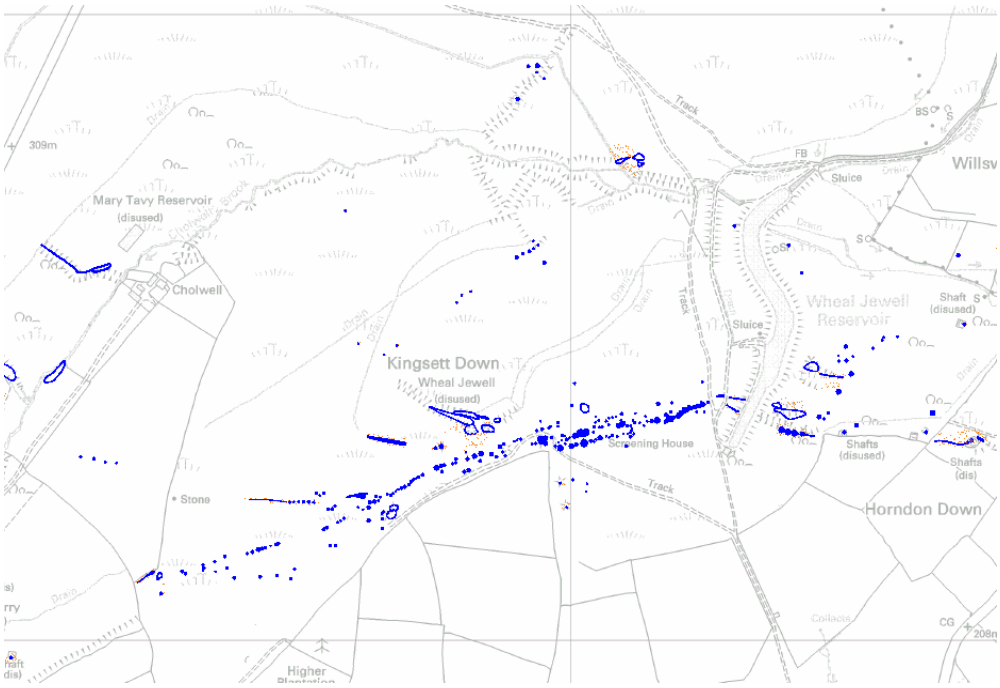

Fig 3: Wheal Jewel. Mining remains, routes of pits and shafts across Kingsett Down

The direction of lodes was easily discernable in the areas discussed above, and also in the plots on OS 1:10000 quarter sheets SX47SE and SX47NE, where lines of lode-back pits running north-east to south-west were evident once the plotting was complete. This was a pleasant surprise, since neither sheet had appeared too promising with regard to mining remains: the amount of tree cover, and lack of visible remains around the mining areas marked on the quarter sheets had seemed discouraging.

Small-scale extraction, not directly associated with any specific mine, was also plotted.

Previously unrecorded lines of prospecting pits and lode-back pits were mapped in the Merrivale area of Dartmoor (SX 5410 7640), and on West Down, to the south of Tavistock (SX 4830 7848). This information, although not of direct relevance to the WHS project which is concerned with post-Industrial Revolution mining remains, is nonetheless important in providing a comprehensive picture of the extent of mining activity within the survey area.

When compared with plotting based on OS 1st edition maps, it is clear that NMP has contributed substantially in the Mary Tavy area, adding roughly a third as much again to recorded mining extents.

4.2.2 Military Remains

Most of the military features recorded in this area date from World War II, but the range at Willsworthy on the edge of Dartmoor has earlier origins, possibly dating back to the late nineteenth century.

One still discernible example of its early military use is a dewpond to the south of the camp (SX 5228 8240), the only one known in the region. It is thought to have been used for horses stationed at the camp from at least the end of the 19th century (Martin Fletcher, pers comm.)

The firing range, one of three currently active on Dartmoor, has recently been mapped on the ground by English Heritage, and a copy of their survey was provided for use by this project (see 3.5).

Even in a landscape as comprehensively surveyed as this however, air photo mapping can still provide additional information. The extent of the main enclosure complex, for example, has contracted since the end of WW2, and its original boundaries now survive only as cropmarks. These were not surveyed by the EH team as no above-ground remains survive, but were added using plots from RAF 1946 photographs.

On these same photographs a number of shell craters could be seen (SX 5228 8308) which were added to the plot.

Directly south of the main enclosure are the cropmark remains of military trenches (SX 5221 8220). They form a broken line running east-west for 675m across Black Down in a crenellated pattern characteristic of 20th century entrenchments (Roger Thomas, pers. comm.). They may have formed part of the camp's active defences and could have been a continuous feature. Alternatively they may have been used for training purposes.

Away from the range itself, in open moorland 1km to the south-east, are the remains of more possible trenches, but of a different design to those described above (fig 4). On the photographs these appear as a linear pattern of narrow mounds, approximately 10m long and 7m apart. It is likely that these features are the upcast from slit trenches. Although the trenches themselves are not visible on the photographs, this is not unusual with features so small and carefully made (A. Young, pers. comm). One possible interpretation is that they are anti-glider trenches/mounds which one would expect to find in moorland areas (Goonhilly Downs on the Lizard Peninsula, Cornwall, is covered in anti-glider features [A. Young, pers. comm]), although the fact that they are so white suggests they are freshly dug yet the invasion threat had receded some time before the photos were taken. A final alternative interpretation is that these are mounds of china clay and formed some sort of target for the Willsworthy gunners.

Both these latter features suggest the far wider extent of the area once controlled by the

military on Dartmoor.

Fig 4: Possible training trenches near Willsworthy Camp

Away from Dartmoor, the military presence during WWII is noticeable in the form of rows of barracks sited along roads to the south of Buckland Monachorum, and a heavy anti-aircraft battery, still upstanding, to the south of Bere Alston. In a field about 200m to the north of this battery were a group of buildings, now vanished, which were accommodation blocks for the battery (Dobinson 435, 1996).

One unusual site, with likely World War II origin, covers an area approximately 350m x 350m (SX 4717 6159) about 1km north of Plymouth. It is a dense complex of regulation-sized buildings, spaced equidistant, and served by a network of custom-built roads and tracks. The buildings are all curved-profile huts characteristic of WW2 camp accommodation (Roger Thomas, pers. comm.), and the existence of several large (presumably communal) buildings in the centre of the complex suggest that this is a military camp. What makes this site unusual is that each of the huts has a small out-building attached, the huts are far wider-spaced than is the norm (certainly in Cornwall) and that the roads and tracks are curving rather than dead straight (A. Young, pers. comm.). These doubts suggest the possibility that this site is a pre-fabricated estate to house homeless survivors of the Plymouth blitz. Recent photographs show that the urban spread of the city has covered the site which, in 1945, was situated in farmland.

Further research into the history of Plymouth's post-war development might shed some light on this.

4.2.3 Field Systems

The most extensive field systems in the survey area were those on the north and east edges of Dartmoor. These are parallel strip-fields which survive as prominent earthworks, and their layout probably has its origins in the thirteenth and fourteenth centuries, when they would have formed part of the open-field system that was widespread in Devon at that time (Greeves 12, 1985). The present field pattern reflects the earlier layout, but many of the strips have been incorporated into larger, enclosed fields.

One strip-field system (NMR SX57NW/236), on Cudlipptown Down at SX 5472 7924, is

still partially marked on the most recent OS maps, but is no longer in use. It consists of a number of parallel banks running northwest to southeast. The system is enclosed by a boundary wall separating it from the moorland. Even more extensive is the series of strip fields (NMR SS57NW/86) to the south-east of Smeardon Down at SX 5318 7762. Both of these systems of fields appear to have small settlements associated with them: at Cudlipptown Down, there are two deserted farmsteads to the north-east edge of the strips; the larger system near Smeardon is flanked by Lower Godsworthy and Wedlake.

To the north-west of Cudlipptown is a more irregular field pattern, also surviving as earthwork banks, and situated between the edge of Cudlipptown Down to its south and in the north the expanse of woodland stretching from Woodland Wood to Coffin Wood (SX 5325 7985). This may pre-date those systems described above, being of a possible prehistoric origin. The curved shape of some of the fields is suggestive of enclosure banks, fossilised in the existing field pattern. Alternatively they could just be part of an irregular field system.

In addition to the well-preserved field systems on and around Dartmoor, there were earthwork strip-lynchets visible on the steep western banks of the River Burn at Grendon (SX 4969 7802), and the remains of other parallel field systems visible as both earthworks and cropmarks, over the entire survey area. The Landscape Characterisation Assessment of this region suggests that the majority of these are likely to be medieval in origin (Cornwall County Council, 1994).

4.2.4 Prehistoric sites

The north-eastern part of the survey area, around and within Dartmoor National Park, is characterised by a great variety of prehistoric remains, many of which were well recorded. These include the Neolithic enclosure at White Tor, and extensive boundary works known as reaves. The various hut-circle settlements on Dartmoor had already been plotted by Ordnance Survey and RCHME, but the NMP survey recorded 312 hut-circles, thus adding 91 previously unplotted sites to the existing Devon SMR. Most of the newly recorded features were in the areas of Cox Tor and Roos Tor. Also at Cox Tor, the extent of recorded remains of the prehistoric field system was increased, using evidence from aerial photographs.

A number of possible prehistoric or Roman settlement enclosures were plotted, including eleven that were new to the Devon SMR. Of these, four survived as earthworks.

Two sites were of particular note.

The first is a possible round, an enclosed settlement of Iron Age/Romano-British date, at Rowan Heights (SX 4905 7159), which has not previously been recorded. Its dimensions are approximately 114m by 91m; the line of the enclosure bank is preserved for about two thirds of its entirety in a field boundary, but the remainder is only visible as a cropmark bank, with a likely inner ditch. No development is visible in the 1946 RAF photograph, but the most recent OS 1:10000 map shows buildings situated within the enclosure (see fig. 6).

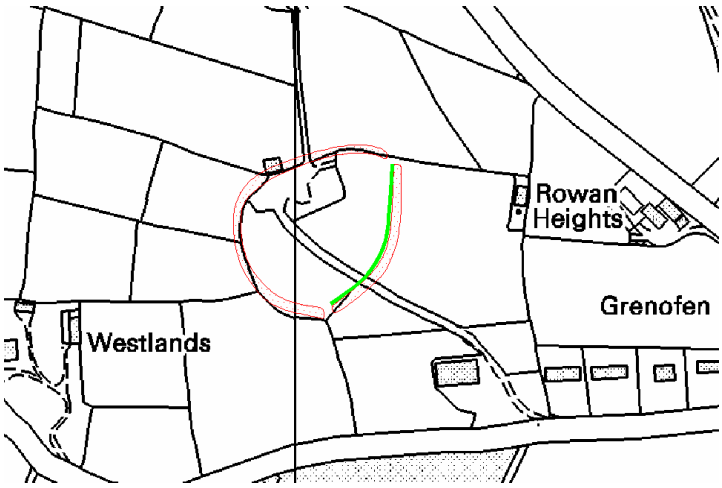

Fig 5: Enclosure site at Rowan Heights, plus internal features.

The second site of note is that of rectilinear enclosures to the north of Plymouth which are visible as cropmarks (SX 4636 6125), and are suggestive of a possible settlement complex (see fig. 7). One of these features is recorded as an enclosure of prehistoric or Roman date in the NMR, number SX46SE/50, but no further interpretation of the site has yet been carried out.

The shape and dimensions of this site are comparable with a cropmark complex (PRN 50052) recorded at Dewcombe in Cornwall (SX 35945 81495). In both cases the enclosures appear to be associated with a field system, traces of which are also visible.

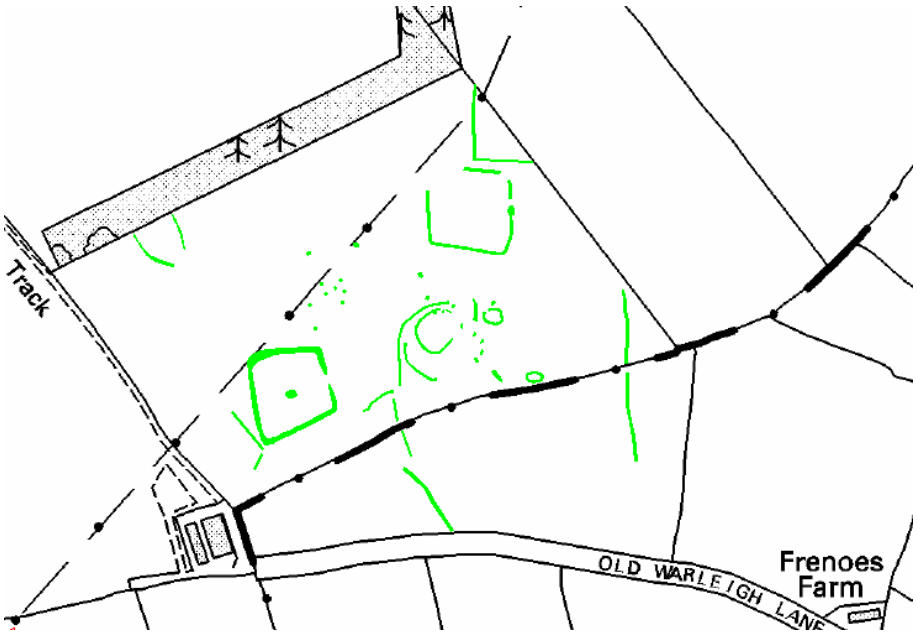

Fig 6: Cropmark enclosure complex 1km north of Plymouth

4.2.5 Orchards, Market Gardens and Allotments

As a consequence of this project, another feature of the Tamar Valley landscape has been added to the HER: the market gardens and orchards that were widespread until the late 20th century.

Market gardening is especially visible on 1946-1964 RAF vertical photographs, in the region directly to the north of Plymouth, and its extent has been plotted. Orchards tend to occur in the same areas, though some of these appear to have been swallowed by recent plantations.

In view of the fact that these two types of site were being plotted, an effort was made to also record any large allotment gardens visible in the 1946 RAF photographs. It is likely that some of these allotments pre-date not only WWII, but also the First World War: at least one is marked on the OS 1st edition map of 1880. They are an important social feature of both urban and rural communities, and it is hoped that by recording them this will be recognised.

Seven allotments were plotted, three of which were in or near Tavistock. Other allotment gardens were visible in the town of Plymouth, but these have been mapped under the broader term of 'market gardening'.

Towards the end of the west Devon NMP mapping another project, the 'Tamar Valley Market Gardens Project' was undertaken by the CAU. This aimed to map the extent of orchards and market gardens in the whole of the Tamar Valley region, and was carried out by the CAU on behalf of AONB Tamar Valley. The information outlined above proved to be extremely useful for this purpose, and prompted the use of 1946-7 RAF aerial photographs for mapping these features throughout the entire Tamar Valley region.

4.2.6 Other Features

In addition to the intriguing, possibly military remains discussed in section 4.2, other features appeared over the course of the project that were not immediately identifiable.

Of these, the most interesting was a series of roughly rectangular stone-built mounds nestling on the border of Coffin Wood (fig. 7) north of Peter Tavy (SX 5421 8094). They are laid parallel to one another, and face downslope towards the river Tavy. In a field situated between the two that contain these mounds, is a hollow feature, probably a shallow quarry with associated spoil. The proximity of this feature to the mounds suggest that its function was to supply the material for them.

The most likely function of these features is that they are stone-built pillow mounds, and therefore of possible medieval origin. The size and shape are very similar to earthwork pillow mounds found on other parts of Dartmoor (Greeves 13, 1985), and they are aligned so that they could be easily drained into the river.

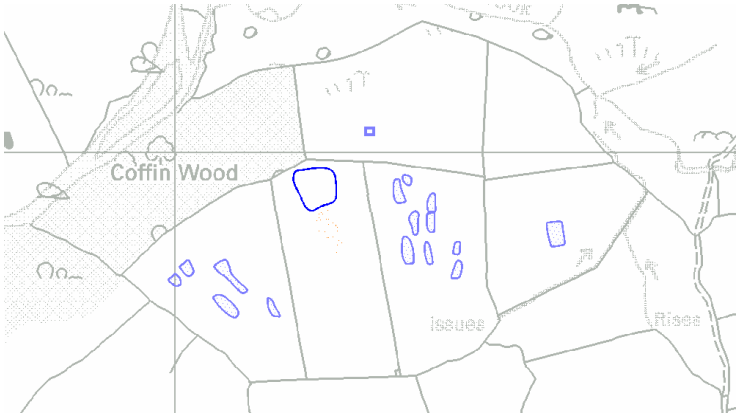

Fig 7: possible stone-built pillow-mounds and associated quarry at Coffin Wood

5 Discussion

The west Devon NMP project has been successful on a number of levels:

1. It has met the aims of the original specification, in that the extents and condition of surviving mining remains visible in air photographs have been recorded. In areas such as Mary Tavy, these are particularly substantial
2. As well as contributing to research for the WHS Bid, the survey has plotted a number of WW2 features not previously recorded in detail by either the Devon SMR or the Dartmoor National Park Authority.
3. The addition of the orchards and market gardens layer to the HER will hopefully set a precedent for future NMP mapping of this type of feature, at least in the south-west.
4. The use of a hand-held GPS to create control points for rectification purposes was deemed a success, and could be potentially of further use for NMP projects.
5. As well as contributing to the scope of the WHS project, the mapping of west Devon is in line with the NMP acceleration programme. Six map-sheets on the Devon/Cornwall border have already been mapped, and the seven map-sheets completed for the WHS project will bring the total number of completed Devon map-sheets to thirteen.
6. COMP will have mapped a further eleven map-sheets which lie on the Cornwall/Devon border by the time the project is completed, thus providing 24 map-sheets for Devon altogether.
7. This will provide a strong case for the future mapping of more parts of Devon.

6 References

6.1 Primary sources

National Monuments Record Centre aerial photograph archive

1880 OS 25 inch map

1907 OS 25 inch map

2000 OS 1:10000 map

1984 RCHME Dartmoor archaeological survey.

1999-2000 EH archaeological survey

6.2 Publications

Cornwall County Council 1984 'Cornwall Landscape Assessment' Cornwall

Dobinson C. S. 1996 'Twentieth Century Fortifications in England: Volume 1.3' Council for British Archaeology, York

Greeves, T. 1985 'The Archaeology of Dartmoor From the Air' Dartmoor National Park, Devon

Hoskins, W. G. 1954 'Devon' Tiverton, Devon.

Ratcliffe, J. 2001 'Cornish Mining World Heritage Site Bid: Project Design' Cornwall Archaeological Unit, Truro

Young, A. 2001 'NMP mapping in west Devon: Project Design' Cornwall Archaeological Unit, Truro

http://www.dartmoor-npa.gov.uk/dnp/factfile/archopenmoor.pdf 1999 'A Guide to the Archaeology of the Open Moor' (Dartmoor National Park Authority Website)

7 Project archive

The CAU project number is **HEXQPR1007**

The project's documentary archive is housed at the offices of Cornwall Archaeological Unit, Cornwall County Council, Kennall Building, Old County Hall, Station Road, Truro, TR1 3AY. The contents of this archive are as listed below:

1. This report held in digital form as: \\GCKNCH21\GROUPS\CAU\NMP_DATA\COMP\NMPDevon\NMPDevonreport.doc
2. See also 3.4.3