Survey of Ancient Semi-natural Woodland in Wales; working with an ecologist

John Roberts: Gwynedd Archaeological Trust

The following has been compiled from sections of Roberts, J. and Thompson, D. 2002 "Archaeological potential of ancient and semi-natural woodland" Gwynedd Archaeological Trust Report number 441 by Jon Hoyle with comments from David Thompson and John Roberts. For further information on this project contact gat@heneb.co.uk

Introduction

The project was intended as a possible pilot project for of an all-*Wales* initiative to undertake a series of historic audits of privately owned woodland. These were designed to compliment and extend the recently-completed Welsh Heritage Assets Project (WHAP) appraisal of Forest Enterprise land in order, at this stage, to test methodologies and establish guidance for further work.

Desk-top research and survey work was carried out by an archaeologist and ecologist::-

- To assess the quantity and nature of unrecorded archaeological remains in private woodland areas.
- To supply information on the age and management of the wood itself as a component feature of the historic landscape in order that the historical development of ancient and semi-natural woodland, and the contribution that it makes to the present day landscape, can be better understood.

Project Aims and Objectives

The project sought to establish a methodology for assessing the archaeological importance of ancient and semi-natural woodland in private ownership in Gwynedd. An important part of the project was the involvement of an ecologist from North Wales Environmental Services (a wholly owned subsidiary of the North Wales Wildlife Trust). The main objectives of the project were:-

- To define the known archaeological resource within areas of ancient and semi-natural woodlands in north-west Wales on the basis of the regional Sites and Monuments Record.
- To undertake a series of pilot historic audits of privately owned woodland, to include desk-top research (based on historic maps, archive collections and the regional Sites and Monuments Record) and field survey to assess the quantity and nature of the history of areas of privately owned ancient woodland areas and of the hitherto-unrecorded archaeological remains that exist within them.
- To develop a field methodology for application in north-west Wales, and more generally.
- To make predictions concerning areas of high archaeological potential which would allow predictions to be made of which woodland areas were most likely to require further archaeological attention, and to establish generalised criteria against which priorities can be measured.
- To evaluate the benefits of adopting a more integrated archaeological and ecological approach to the study of the woodland history of north-west Wales and to assess the value of working in tandem with an ecologist as well as the methodological and practical considerations that this entails..;

Where pertinent, the project also touched upon:-

- Discussion of the management of archaeological sites in woodland at a general level.
- The historical development of ancient and semi-natural woodland in north-west Wales.
- The contribution made by woodland to the quality of the present day landscapes of the area.

Identification of the known archaeological resource within areas of ancient and semi-natural woodland in Gwynedd

The project made use of the following sources to produce gazetteers of the current known archaeological resource within these areas:-

- The Register of Ancient and Semi-Natural Woodland in Gwynedd produced in 1989. This drew on primary research, as well as on a number of published works, including a 'Survey of Amenity Woodlands' (undertaken by Snowdonia National Park between 1975-7), as well as a 1985 publication 'Broad-leaved woodlands in the North Wales Region' (P Day), and a 'Broad-leaved Woodlands in east Gwynedd Survey Evaluation' (M E Smith, 1981).
- Digital data on the distribution of areas of ancient and semi-natural and ancient replanted woodland in north-west Wales provided by the Forestry Commission.
- Sites and Monuments Record data.

Selection criteria of woods for study

Six discrete woodlands were selected from sites included on the Register of Ancient and Semi-Natural Woodland, for detailed documentary work and rapid survey. The selection of the sites was based on the following broad criteria:-

- To reflect a range of historic influences on woodland management and exploitation, as well as known areas of woodland management (commercial and recreational) in north-west Wales.
- To reflect, as far as possible, a broad geographical spread across the area.
- To reflect a range of topographical situations.
- To reflect a range of different ownership and woodland management regimes.
- To include both 'ancient semi-natural', and 'ancient replanted' woodlands as defined in the Register.

The above themes were considered in conjunction with the results of a series of searches made of the regional Sites and Monuments Record combined with professional knowledge of local historic influences on woodland. These were intended to ensure that the study could:-

- Assess areas of woodland with known presence of archaeological sites.
- Assess areas of woodland with no recorded presence of archaeological features but considered to have potential for this.

Survey methodology

First edition 6" Ordnance Survey (OS) maps (surveyed in the 1880s and published in the late 1880s to early 1890s) were consulted in conjunction with the larger scale second edition 25" OS maps, where available, in advance of undertaki g the fieldwork. The maps were scanned to digital form and registered into a GIS against the British National Grid. All potential archaeological features were digitised from these early OS maps for corroboration in the field. Survey base-maps were produced using GIS for each of the woods by overlaying the modern 1:10000 scale OS data with information from the SMR and that transcribed from the early OS maps.

Field work was carried out in February 2002 by two members of staff, an archaeologist from Gwynedd Archaeological Trust (John Roberts) and an Ecologist from North Wales Environmental Services (Geoff Radford). Field survey was undertaken to rapid walk-over survey specifications at a level comparable to farm visits carried out as part of the ongoing Tir Gofal agri-environmental scheme (For further information on this project contact *gat@heneb.co.uk).* A day was spent on each of the six woods with traverses structured to allow as full a coverage of the wood as possible within the time available.

All identified features of archaeological interest were mapped onto drawing film covering the base-line maps, along with a full description which included details of form, dimensions, function / interpretation, condition, management recommendations and any other factors such as aspect, landscape setting and so on. A photographic record was made of each feature (35m colour transparencies). The original field record of annotated survey plan and photographic record is held in the project archive, lodged with the regional Sites and Monuments Record.

Many drystone walls and other field boundaries were located within the woodland survey areas. Making a full record of these boundaries was not possible within the time available. Therefore, where boundaries were shown on the present day OS maps, rather than record them individually, an indicative assessment of the range and form of boundary types in the woods was made. However, boundaries were generally recorded if they appeared in locations not shown on the present day OS map, in case they represented arrangements of boundaries or fields of greater historic interest. They were compared against the nineteenth century OS maps back in the office. Boundaries were also recorded where they showed unusual characteristics or were especially good examples of particular types (for example, boundary furniture, coping styles, size, estate influence, style / tradition, consumption walls etc), or where their form / location suggested some function beyond standard field boundaries relating to stock management, such as parish / geopolitical boundary or as an enclosure around different type of landuse such as coppice coupes. The presence of a large number of walls in the woodlands surveyed suggests episodic changes of landuse between pasture and woodland, although some form of wood-pasture may have been pursued at some of them.

An ecological record was made at three levels. At a general level, the vegetation of each wood was mapped to assess the nature and distribution of the main vegetation types present. Any ecological records available for the various woodlands (such as SSSI descriptions, NNR management plans, NVC (national vegetation classification) survey data and so on) were consulted in advance and used to inform recording work carried out during the survey visit. At a more particular level, any indications of anthropogenic influence on the woodland were noted, including coppicing, pollarding and thinning. Finally, an ecological assessment was made of each of the archaeological sites recorded during the survey, to record the species present and consider the historical ecology of the site where appropriate, and to make management recommendations sensitive to both the site and its flora.

Presentation of project findings

For each of the woods, results were presented in the following format:-

1. Location
2. Topography
3. Known history derived from primary and secondary research during the desk-top phase of the study.
4. Brief ecological descriptions of the woodland accompanied by a map showing the distribution of the main vegetation categories.
5. Brief description of archaeological survey findings, accompanied by a map showing the location and extent of all features recorded during the survey.
6. Summary breakdown of archaeological sites recorded within the woodland by site type and period.
7. Discussion of selected archaeological sites, this includes:-
    - Sample descriptions of a number of key features recorded during the survey work.
    - Information on condition.
    - Management recommendations where appropriate.

Classification of woodland types

For broad mapping purposes, stands were attributed to categories broadly equivalent to communities of the National Vegetation Classification (NVC) (Rodwell 1991). However, it should be borne in mind that this was done by rapid observation rather than by use of the formal samples that NVC methodology would normally require.

Site importance categories
The relative value and importance of each of the features recorded during the survey was assessed using the following categories, which include comments on generalised management responses appropriate for the different categories:

Category A Sites of national importance
This included scheduled Ancient Monuments, Grade I and II* (and some Grade II) Listed Buildings and sites of similar quality, i.e. those which would meet the requirements for scheduling or listing at the top two grades. There is a presumption in favour of preservation of all such sites and their settings should they come under threat. These sites require detailed management plans. Such sites might include those which survive principally as buried remains.

Category B Sites of regional importance
This included sites which would fulfil the criteria for listing at Grade II (if a building), but not for scheduling (if a relict archaeological site). Nevertheless, such sites are of particular importance within a regional context and, if threatened, should ideally be preserved in situ, although complete excavation and/or recording may be an acceptable alternative. In management terms, general guidelines might be sufficient for sites in this category, adapted to the peculiarities of individual sites. Most sites of archaeological and/or historical interest will fall within this category.

Category C Sites of local importance
This category included components of the historic environment (such as walls, gateposts, tracks etc.) which help define local distinctiveness and character. They may not be of sufficient importance to justify a recommendation for preservation if threatened, but they nevertheless have an interest and importance in their local context. In management terms, general guidelines will almost certainly be adequate for such sites/features.

Category D Minor and damaged sites
These were sites of minor importance, or so badly damaged that too little remained to justify their inclusion in a higher category. All contribute to the character of the local historic landscape, but it is useful to be able to differentiate them from category C. Features may include for example, distinctive gates, the majority of boundaries recorded (although some boundaries will be included in category C), boundary furniture (such as stiles, sheep throughs (tyllau defaid), stone gateposts / pillars etc). In management terms, general guidelines are adequate for such sites, and if threatened with destruction, rapid record in advance of destruction should be sufficient.

Category E Sites of potential archaeological value - sites requiring further investigation (including damaged sites or sites with no physical definition)
This category included sites/features known only as slight above-ground remains, possibly because they were so badly damaged, hidden or obscured that their importance was undetermined. They require further work before they can be allocated to Categories A-C. Recommendations for further work may be appropriate in order to determine the most appropriate management recommendations. The category also includes sites with no defined physical presence such as findspots, sites noted but not accurately located in antiquarian references, sites known only from place-name evidence and other sites reported at the specified location but cannot be verified by

archaeological fieldwork. It may not, therefore, be possible to determine management for these sites, although information about them should be made available to the landowner / manager.

Towards an integrated survey methodology

One of the aims of this project was to assess the value and efficacy of woodland projects jointly undertaken by an ecologist and an archaeologist working in tandem in the field. The experience proved very useful and it is possible to make a series of observations and recommendations to be taken into consideration when undertaking work of a similar nature in future, as well as to comment on the extent to which an integrated approach enhances the study of the historic environment of woodlands.

A number of recommendations can be made for future surveys. These are:-

1. It is essential that the archaeologist and ecologist work as a team from the outset, and that the joint aims of the work and the project are agreed and established in advance.
2. The extent of work needed prior to the actual survey, also needs to be agreed. Documentary and archive searches are probably best done by the archaeologist who should be aware of the sort of information required by the ecologist (photocopies of early Ordnance Survey and estate maps are essential as most of the sites and features recorded on these will be found during the survey), but examination of aerial photographs might be a joint undertaking as, while it is useful for providing information for ecological survey, woodland cover obscures most individual archaeological sites.
3. Surveys should preferably be carried out in winter or early spring months before the canopy vegetation has developed (although it should be borne in mind that daylight hours are short at this time of year and in light of this, it is essential to estimate a realistic area for coverage in single day).
4. There are Health and Safety issues to consider (woods can be dangerous places especially to those not familiar with the terrain), but these are better met by a two-person team than by working alone. Risk assessments will be essential prior to any woodland survey.
5. It is preferable for the archaeologist and the ecologist to survey the wood at the same time, so that ideas and findings can be shared to maximise the results of the work. However, they tend to survey, map and record at different 'scales', so allowance should be made for working separately within the same overall context. Ecologists tend to work from the larger landscape inwards, dealing with habitats as mappable units; whilst archaeologists tend to record individual features and move from these to the wider landscape context.
6. It is important that the field annotations of archaeologist and ecologist can be dovetailed reliably at the stage of compilation. The two approaches necessarily diverge to some extent, and doubts as to correspondence of information can easily arise. The use of GPS references by both is highly recommended as a means of helping to reduce these.
7. The archaeologist tends to traverse the area looking for locations of specific interest; the ecologist is initially more concerned with broad area mapping, and then, within the context of these mapped areas, the finer detail associated with the archaeological finds. This means that the two may often be working separately.
8. The archaeologist will generate a unique reference code for each recorded feature. It is recommended that this is relayed to the ecologist with its GPS location, either at the time of recording, or when the two next meet. The ecologist should then make appropriate records at this location, either at the same time or later, having relocated the site.
9. The use of photography should be carefully considered: fixed-point photography will be required for monitoring purposes, and thus good vantage points will need to be established and recorded (and be retrievable). The use of digital cameras is now the norm for this type of work, although these were not readily available (as an affordable option) when the surveys were undertaken.
10. Successfully integrated archaeological and ecological survey provides indications of a much broader range of features and habitat information relating to previous

human influence over the development of the woodland than would single-subject survey. Knowledge of both disciplines is essential to understanding the full history of the development of the wood, and thus influencing its subsequent successful future management. It is able to consider the historic environment as a whole, and in terms of management considerations will lead to practical suggestions and mutually acceptable solutions: it will overcome any potential conflict of interest, protecting the archaeology whilst not being detrimental to ecology.

Specific archaeological survey
It will be necessary to record a consistent series of archaeological site information during the survey: this will include a site's location, dimensions, orientation, condition and so on; notes should also be made of any perceived potential threats, and there will be a need to assess its management needs and make recommendations for any works required. Where possible, a brief discussion of the site's interpretation and function should also be made.

A large proportion of recorded sites will be boundary features: some boundaries will need to be given individual reference numbers (*e.g.* those which are considered rare, early or unusual), and it may be possible in small woods to record any such features individually. However, in most cases it will not be possible (or even necessary) to record in this manner, and an approach based on 'characterisation' will be more appropriate (*i.e.* a single reference number given to the boundaries in the wood should summarise a general impression of their type, condition, constructional form *etc*).

On a practical note, the presence of bramble in the understorey has implications for survey in terms of visibility and penetrability (and ease of working). Other vegetation types, as well as the density of planting, also have an impact on survey methodology and success, especially conifers, alder, hazel and younger growth. Mature woods are easier to work in as the trees tend to be more widely spaced and there is less in the way of impenetrable understorey growth.

Specific ecological survey
It is useful to refine the boundary of interest and identify features of possible relevance within the woodland using aerial photographs, at around 1:10000 scale, prior to the field visit. In particular, the following should be considered and any features potentially significant for archaeological/historical associations should be indicated on the base map for use in the field:

- Canopy homogeneity – distinguish areas of obvious difference, based on the following characters in so far as they permit the identification and use of mappable units:
    - Crown spacing – use simple categories based on canopy spacing, eg:
        - Closed canopy - crowns more or less touching or overlapping
        - Open canopy - crowns mostly not separated by more than their mean diameter
        - Sparse canopy - crowns mostly separated by more than their mean diameter (normally indicative of severe ecological limitation or of agricultural use, eg. parkland)

    - Texture (usually correlated with crown size):
        - Smooth (usually closely spaced small crowns that are barely distinguishable, often indicative of relatively young regeneration/plantation)
        - Regularly textured (often indicative of even aged stands, and possibly single species dominance)
        - Irregularly textured (often indicative of uneven aged stands, and possibly mixed species composition)

- Tonal range – even or mixed, taking possible aspect and terrain irregularities into account. Differences often indicate that the woodland is of mixed species composition (or possibly of markedly uneven age)

- Discontinuities – note the location, size and shape of obvious irregularities within or between otherwise more or less homogeneous units:
  - Linear features, eg:
    - Crown alignment – probable evidence of planting when not beside a boundary
    - Simple lines in the canopy, with no associated differences in canopy tone or texture, usually caused by tracks, paths, etc
    - Compound lines, showing differences in tone and/or texture, often caused by drainage features, but may be associated with a former woodland margin (different species or different growth forms), or possibly with planting
  - Areal features, eg:
    - Clearings, glades
    - Outcrops, quarries
    - Buildings, installations
    - Ponds, lakes

It is recommended that an ecological record for mappable units within woodland should be made from among the following:

- Structure:
  - Closed canopy, open canopy or scattered trees
  - Dense, open, sparse or no understorey of shrubs
  - Estimated mean height and dbh of tree component
  - Homogeneity: high, moderate, or low

- Composition:
  - Dominant, co-dominant and sub-dominant species of canopy and understorey
  - Dominant types of ground cover (see list below)
  - Homogeneity: high, moderate, or low

- Presence, and possibly level (high, moderate or low) of land management features:
  - Agriculture
  - Turbary
  - Tree planting
  - Coppicing
  - Pollarding
  - Charcoal burning
  - Other

- Woodland management condition
  - Recently planted
  - Young regeneration
  - Maturing/mature – potentially harvestable condition now or in the near future
  - Overmature/ unmanaged – unlikely to be harvested
  - Other

It is recommended that an ecological record for archaeological sites within woodland should be made from among the following:_

- Canopy (tree) cover (rooted within or outside the site limits)
  - Complete, partial or none
  - Dense, moderate, light
  - Species involved
  - Estimated mean dbh
  - Estimated mean height

- Understorey (shrub) cover (rooted within or outside the site limits)
  - Complete, partial or none
  - Dense, moderate, light
  - Species involved
  - Estimated mean height

- Field (ground) cover - proportion within the site of:
  - Bramble
  - Bracken
  - Herbs/Ferns
  - Graminoid species (grasses, rushes or sedges)
  - Bryophytes
  - Leaf litter/Bare ground
  - Open water

- For each woody plant rooted within a relatively small site:
  - Species
  - Estimated dbh for trees only (cms) - <10, 10-20, 20-30, 30-40, 40-50, 50 – 75, 75 – 100, >100
  - Estimated height (m) – Individually 1 to 5, 5-10, >10
  - Rooted:
    - Among stones comprising the feature
    - Beside stones comprising the feature
    - Clear of stones comprising the feature

- Evidence of land management inherent in or around the site:
  - Woodland boundary
  - Agriculture
  - Tree planting
  - Pollarding
  - Coppicing
  - Charcoal burning
  - Other

- Potential damage to the site from ecological features - high, moderate or low for:
  - Disruption from windthrow
  - Disturbance to stones from the roots of woody plants
  - Damage to low walls by grazing animals
  - Disruption from future forestry operations
  - Obscurity of the site because of vegetation
  - Other

- Recommended management (expand where appropriate):
  - Removal of woody elements from within the site
  - Removal of woody elements from within and around the site
  - Management of woody elements around the site (eg. coppicing)
  - Management of water features (eg. realignment of drainage)
  - Management of access (eg. re-routing or creating paths)
  - Reduction/removal of obscuring ground vegetation (eg. cutting or grazing)
  - Other

Photography is one of the most useful ways of recording baseline information against which any subsequent change can be measured. It is recommended that in addition to photographs of specific features taken from the most appropriate viewpoints, one or more relocatable positions should be chosen from which to take shots of the general condition of the feature and its surroundings. A photograph and GPS reading should be taken of each point from which these have been taken so that someone else can return to the same spots and repeat the coverage.

Digital photography may prove adequate and convenient for this purpose, but performance in poor weather conditions under tree canopy should be assessed for any medium beforehand.

Management considerations
The recommendations made during the survey followed general guidelines for management and good practice published in Forestry and Archaeology Guidelines, and Designed Landscapes, and the suggested management recommendations generally related simply to control of regrowth, removal of trees, preventative surgery and so on. It was not a part of this project to advance the nature of management recommendations, although the fact that a joint archaeological/ecological survey was carried out would enable more holistic recommendations to be proposed.

Suggestions for further research
The project clearly demonstrated the importance of woodlands to the historic environment, the cultural life and the landscapes of Wales, but much more work is required to allow the history of woodlands and their management to play a full role in the lives and landscapes of the Wales of the future.

For example, detailed work needs to be undertaken on nineteenth century features in woodland, such as settlements and enclosures, game-related activities (breeding birds, game keepers), timber management (labourers cottages) and so on, all of which have left traces in woods which are little-understood. Estate papers relating to woodlands remain a largely untapped resource.

The extensive rural industries related to woodland management appear to have left behind surprisingly few features in north-west Wales, and yet we know that they were flourishing at times in the past. It may be that many of the activities left no major traces in the woods, or that subsequent felling, replanting and management have destroyed features associated with these activities. However, it may also be that survey work has not yet been sufficiently extensive in woodland areas, certainly in north west Wales, to have identified and recorded features of this kind. It is also possible that in some cases we are not entirely sure what to look for or what to expect in terms of such associated features. The current survey has contributed to these issues, with the secure addition of a charcoal burning platform (in Coed Dolgun) to the regional SMR (the only other example being that revealed by Peter Crew's excavations at Llwyn Du, Coed y Brenin). A number of terraces and platforms of unknown function were recorded in the woodland areas surveyed. It is important that this impetus is now maintained and that a programme of work aimed at a better understanding the history of Welsh woodlands is established.

Illustrations

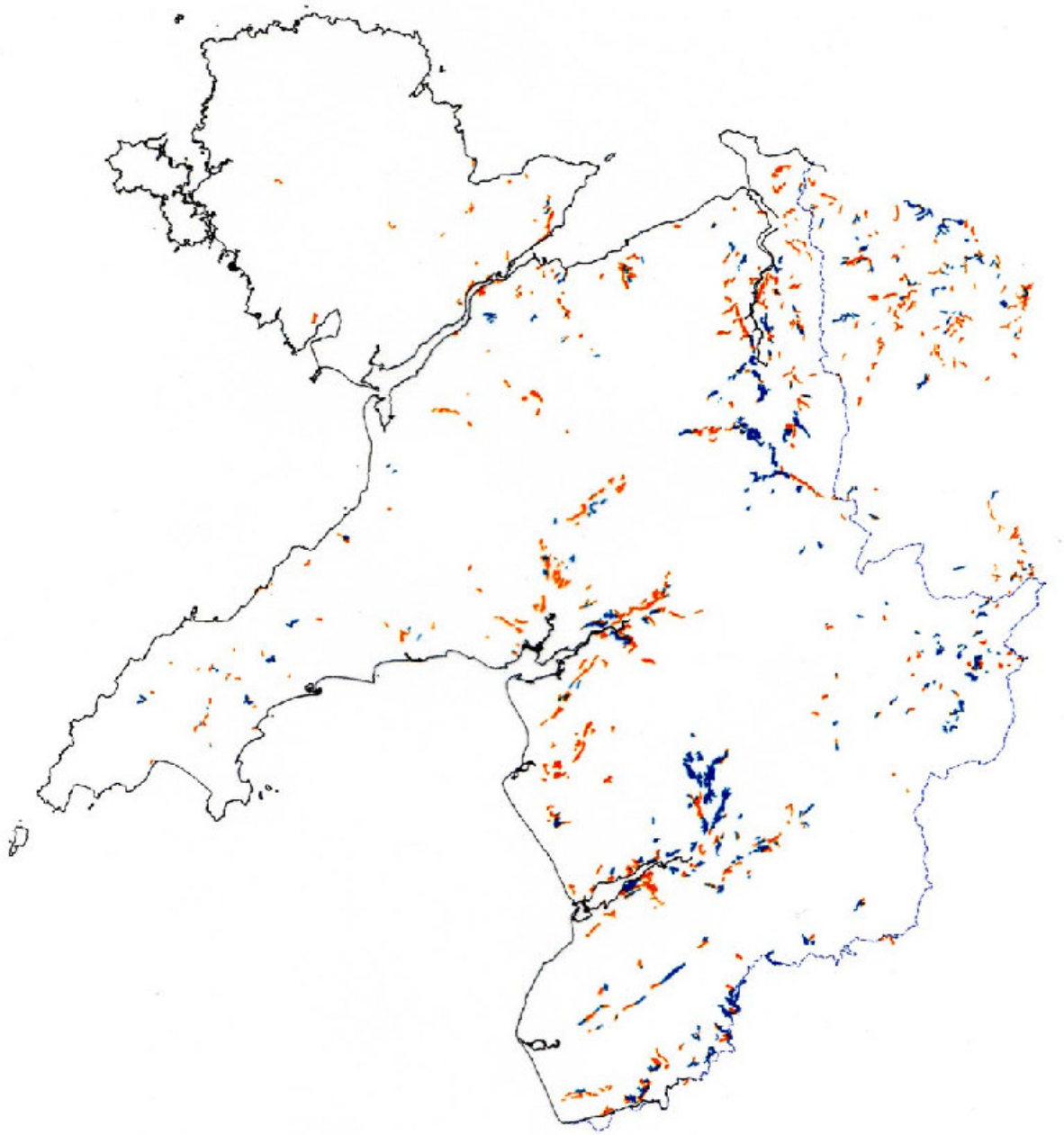

Figure 1. Distribution of areas of ancient and semi-natural (orange) and ancient replanted (blue) woodland in north west Wales

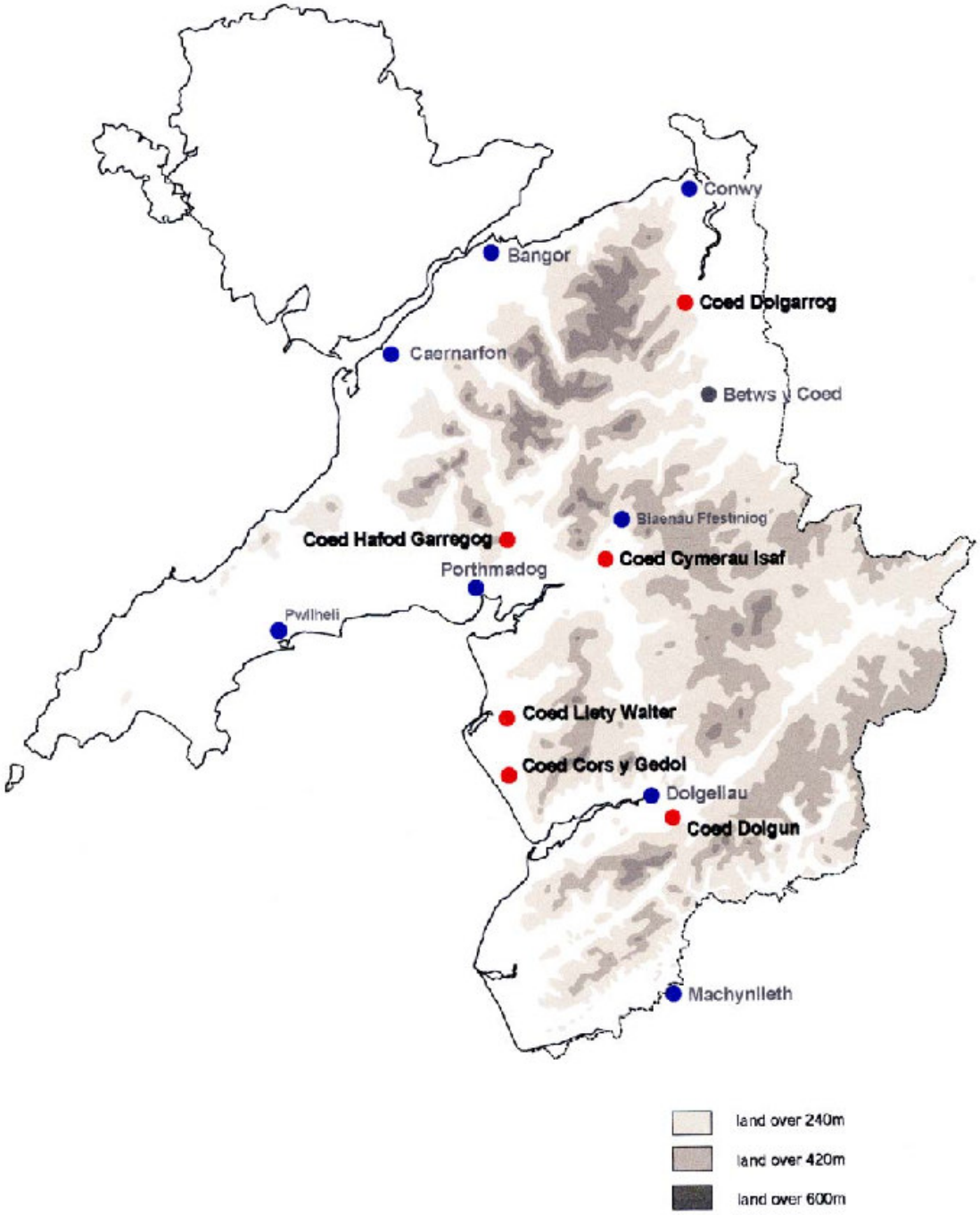

Fig 2. Location of the woodland survey areas

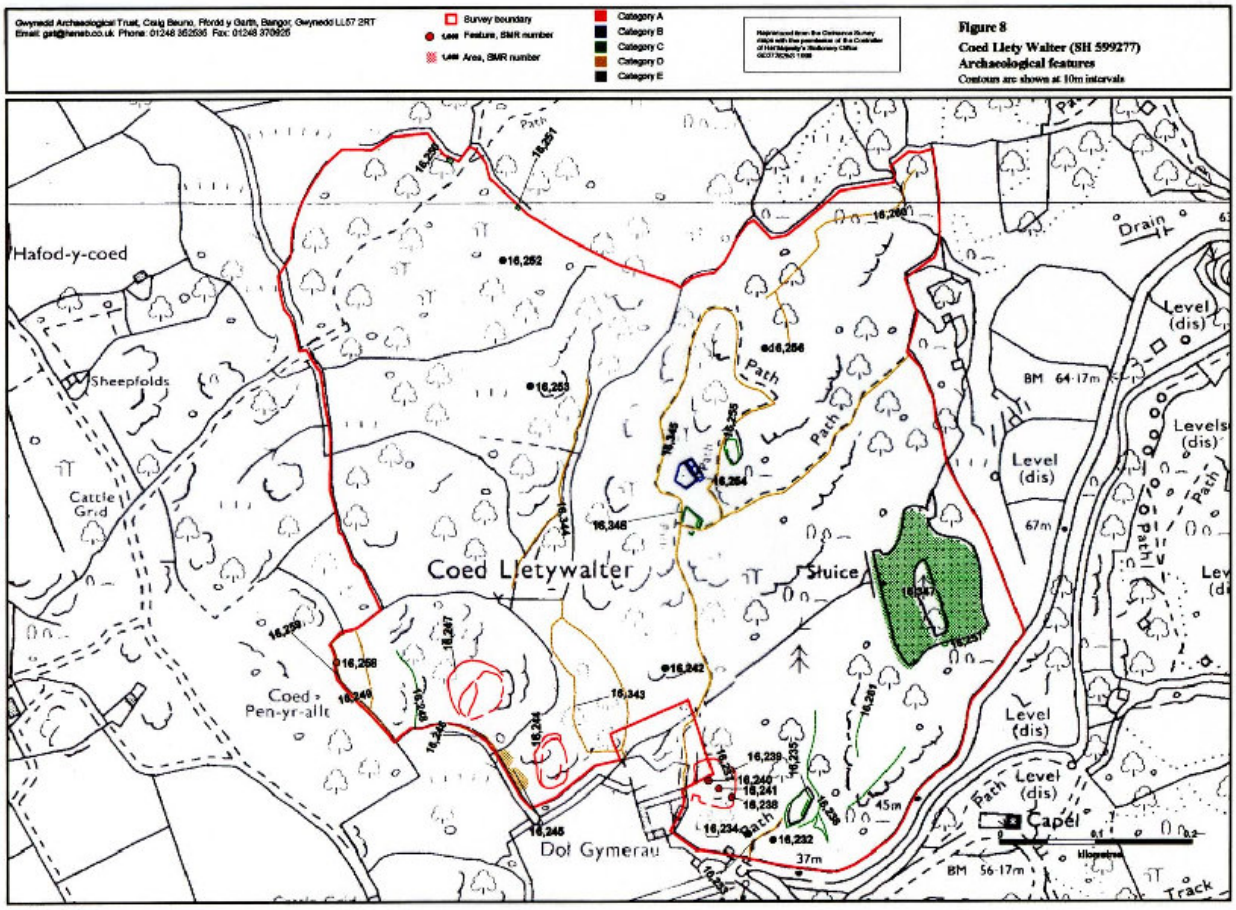

Fig 3. Archaeological features in Coed Llety Walter – post-survey

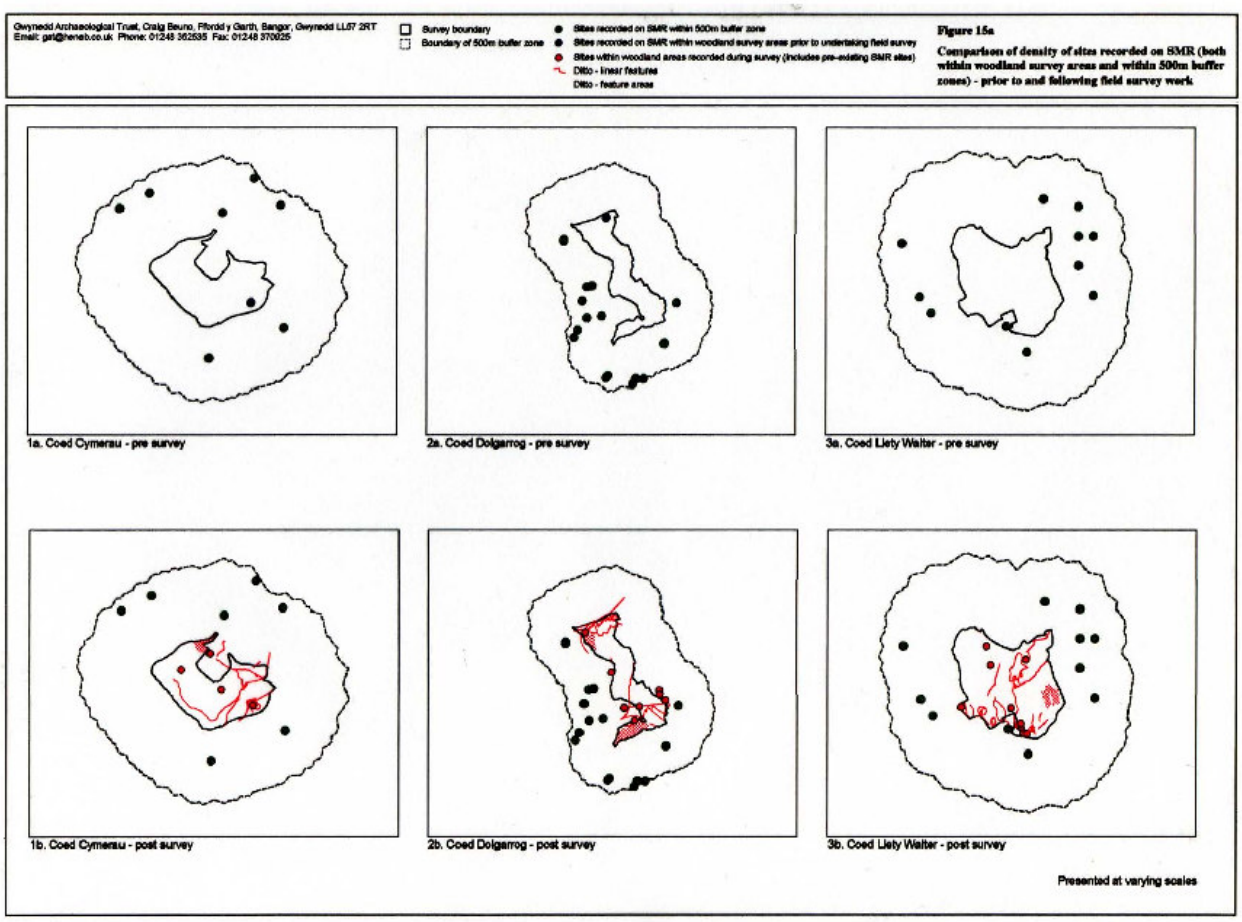

Fig 4. Comparison of known archaeological features within three of the woodland study areas – before and after survey

Summary of identified features

By type

Site type	Count
Agricultural building	1
Aqueduct	1
Bank	1
Barn	2
Bloomery	3
Building	14
Cairn	2
Cairn - field clearance	10
Enclosure	1
Farmstead	1
Field system	1
Findspot	2
Foot bridge	1
Gold level	1
Gold mine	10
Hillfort	1
Hut circle	4
Hut circle settlement	2
Hut circle, long hut	1
Landscape	2
Lead mill	1
Lead mine	8

Site type	Count
Lead mine, gold mine	1
Leat	1
Level	30
Lime kiln	1
Milestone	1
Mill	2
Mine	5
Park	1
Pier, bridge	1
Quarry	6
Reservoir	1
Shaft	10
Sheepfold	8
Slate quarry	6
Stepping stones	1
Structure	8
Tank	1
Tramway	2
Trial	3
Trial level	2
Wall	7
Winding drum	1

By chronological period

Period	Count
Prehistoric	8
Romano British	2
Medieval	3
Post medieval	121
?Post medieval	1
Modern	13
Multi period	2
Undetermined	19

Questions

What was the use of GPS on this survey?
Handheld GPS units were used, with an accuracy of approximately 10 to 20 metres.

What was the use of aerial photographs on the survey?
Oblique aerial photographs, and aerial photos taken by the RAF in the 1940's were examined, with particular reference to blocks of vegetation.

How rapid were the surveys?
On average approximately 40ha per day were covered.