ART. IV – Environmental changes in Roman north-west England: a synoptic overview of events north of the Ribble

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Perhaps surprisingly, comparatively little off-site palynological research (sensu Edwards, 1991) has been focused on the Roman period in north Lancashire and Cumbria, apart from within the vicinity of Hadrian’s Wall military complex (e.g. Dumayne, 1993a,b; Dumayne, 1994; Dumayne and Barber, 1994). Nevertheless, broad trends in environmental change bracketed by the period 1st millennium B.C. – mid-1st millennium A.D. can be discerned obliquely from a wealth of information available from studies in the region. Despite this, most recent archaeologically-inspired overviews of the environment (e.g. Higham, 1986; Bewley, 1993) have continued to rely heavily on data and syntheses of research produced three decades ago or more (e.g. Walker, 1966; Pennington, 1970). A probable reason for this lies in the fact that although much new information of relevance has been produced in the intervening period, it remains difficult to source by archaeologists, being embedded in unpublished reports, theses and geo- and plant-science journals. Another difficulty which has formed a formidable barrier to clear interpretation of palaeoenvironmental events centred on the Roman period has been the imprecision inherent in conventional independent dating methods such as \(^{14}\text{C}\) (Pilcher, 1993; Dumayne et al., 1995). Because of this poor dating control, major palaeoenvironmental changes (such as deforestation signals) which appear superficially to have occurred around the millennial divide, have often been automatically attributed to Roman influence in a classic case of the “suck in and smear” effect (Baillie, 1991). However the problem has begun to be addressed in most recent studies by the use of more precise AMS dating. This, together with the application of modern calibration to extant \(^{14}\text{C}\) dates, has begun to unravel the sequence of events more clearly, revealing a more complex situation than previously assumed, and enabling a clearer perspective with which to view the relative importance of Roman influence on the environment.

Here, an attempt is made to summarise the more significant pieces of recent research, both published and unpublished, and to revise the general picture of the environmental sequence either side of the millennial divide.

The late Bronze Age/early pre-Roman Iron Age period north of the Ribble

It is well known that the north-west of England suffers from a poor archaeological record relating to the late Bronze Age/early Iron Age (Fell, 1973a; Haselgrove, 1996). Haselgrove (1996) and McCarthy (1997), however, have argued that the lack of early Iron Age evidence in the North-West may be due to a matter of archaeological visibility, rather than actual absence of material remains and that more intensive field survey may identify an increased number of sites relating to this period. It has also been suggested that 1st millennium B.C. activity may be “masked” in the archaeological record by the possibility that the region saw the
FIG. 1. Locations where Late Iron Age deforestation has been detected in northern and western UK.
continuation of a basically Bronze Age economy and material culture during this time, compounding problems of interpretation (Webster, 1969; Higham, 1986). The essentially aceramic nature of most known sites (Bewley, 1993) only helps to confuse matters further.

Nevertheless, the most recent detailed field surveys in the region have failed to produce the predicted Iron Age material. The latest intensive archaeological field surveys in south Cumbria, for example, have located very few monuments ascribable to the Iron Age (Quatermaine, 1994, 1995), while in the lowland zone of the Fylde of north Lancashire only two artefactual finds and no settlement evidence referable to the first millennium B.C. were discovered despite three recent seasons of extensive field survey (Middleton et al., 1995).

Can the palaeoecological record help to shed light on the meaning of this “gap” in the archaeological record? The available evidence suggests there are good grounds for arguing that the dearth of Iron Age archaeological material represents a real decline in economic activity during the first two-thirds of the first millennium B.C. in Cumbria and north Lancashire (Fig. 2). In the uplands Pearsall and Pennington (1973) suggested, on the basis of woodland regeneration signals in pollen evidence from the Lake District, that occupation declined at this time, leaving the fell slopes littered with a redundant infrastructure of Bronze Age field boundaries and cairns. More recent work has also indicated widespread palynological signals of woodland regeneration in lowland environments (Wimble, 1986; Wells, Huckerby and Hall, 1997; Wimble, Wells and Hodgkinson, 2000). Where clearance signals are detected during this time, as in parts of south Cumbria (Wimble, Wells and Hodgkinson, 2000), they are small-scale and short-lived and probably best characterised as limited woodland “assarts” (sensu Mercer and Tipping, 1994, 15). Nevertheless, even if this interpretation is accepted, the causal factors behind the apparent decline in activity remain unknown. There has certainly long been speculation that an apparent late Bronze Age retreat from peripheral upland landscapes in the north and west of Britain may have been linked to climate deterioration (e.g. Turner, 1964). Within the North-West, it is arguable that this view has been bolstered by recent work on the stratigraphy of raised mires surrounding Morecambe Bay, which has produced evidence that seems to record the onset of wetter conditions around the late Bronze Age/early Iron Age transition (Wimble, 1986; Wells, Huckerby and Hall, 1997).

The Late pre-Roman Iron Age

A radical change in the palynological record occurs in the final centuries of the first millennium B.C. Pollen diagrams from numerous sites in the region display a marked upsurge in forest clearance dating to the late pre-Roman Iron Age (Fig. 3). This phenomenon is not confined to the North-West (Fig. 1). Late Iron Age clearance is known to have occurred over a broad swathe of western and northern Britain, from the South-West (Merrifield and Moore, 1974; Simmons, 1964), Wales (Turner, 1964; Moore, 1968) through Shropshire (Twigger, 1988; Wells and Huckerby, 1998), Cheshire (Leah et al., 1997), Lancashire (Wells et al., 1997), into Northumberland and southern Scotland (Mercer and Tipping, 1994, 15; Tipping, 1995; Dumayne-Peaty, 1999) and also the central lowlands of Scotland (Dumayne-Peaty, 1998). Within Cumbria and north Lancashire, the start of this deforestation
Fig. 2. Pollen sites with evidence for early 1st millennium B.C. forest regeneration.
FIG. 3. Pollen sites showing a strong Late Iron Age deforestation signal.
is recorded from virtually all areas (Fig. 3).

Archaeologically, this is also the period to which many of the cropmark enclosures in the Solway Plain have been speculatively ascribed (Bewley, 1993, 63) and it may be significant that in the north of Cumbria, dramatic falls in tree pollen are recorded at Walton Moss before c.165 cal B.C.–75 cal A.D. (Dumayne and Barber, 1994) while a pollen diagram from Midgeholme Moss, situated immediately to the east of the north Cumbrian plain (Innes pers comm), also shows a late Iron Age clearance initiated before 355 cal B.C.–cal A.D. 125 (2040±80 BP, OXA-2325). Across the Solway at Burnfoot Hill Moss, Tipping (1995) records a similar process beginning before 131 cal B.C. – cal A.D. 71 (2015±45 BP, SRR-3752). An intriguing consequence of this widespread deforestation is the possibility that it may have resulted in a paucity of trees older than 250 years in age in the vicinity of Carlisle during the Roman period. This could be reflected in the fact that a detailed analysis of dated timbers from *Luguwalium* has shown the majority to have started growing in the first or second centuries B.C. (McCarthy, 1995).

In the south and east of Cumbria, many of the relatively abundant “Romano-British” settlement sites known from the peripheral uplands may well have their origins in late pre-Roman Iron Age (Webster, 1969, 42, Fig. 6). A settlement site at Ings, for instance (RCHME 1936), is situated only c.7 km east of Blelham Bog, where the renewed forest clearance of the late Iron Age caused erosion of soils in the immediate catchment area c.399-192 cal B.C. (2245±47 BP, SRR-258) (Pennington and Lishman, 1984). It is conceivable therefore, that the appearance of these settlements could represent a physical manifestation of a major change in the scale of land-use in the later Iron Age. The deforestation has been identified as setting in c.362 cal B.C. – cal A.D. 52 (2009±65 BP, CAR-549) in the Lyth Valley, and before c.110 cal B.C.-120 cal A.D. (1980±50 BP, SRR-1872) at Coniston Water (Pennington, 1997, 44), suggesting that the resurgence of clearance activity spanned most of South Cumbria. In the western fells at Tewit Moss tree pollen values can be seen to fall sharply c.400-123 cal B.C. (2230±60 BP, CAR-914) at the same time as grassland and weeds of cultivation increase (Wimble pers comm). In eastern Cumbria the phase also appears to be associated with increased levels of erosion in some localities, such as the Howgill Fells (Cundill, 1976, Harvey et al., 1981) while in north- and mid-Lancashire, steep falls in arboreal pollen dated to the late 1st millennium are also recorded from the mosslands of Over Wyre in the Fylde (Wells et al., 1997) and the Bowland Fells (Mackay and Tallis, 1994).

The explanation for this widespread phenomenon across the region must lie in population increase and/or technological development. If one accepts the idea of an extended Bronze Age material culture in the region, one possibility may be that the renewed clearance of the late-1st millennium B.C. may reflect the adoption of new technologies which were making their presence felt in the north and west for the first time, such as the adoption of the iron-tipped ard (Haselgrove, 1996). The consistent later Iron Age dating of this increase in agricultural activity may also have implications for the dating of the Cumbrian and north Lancashire hillforts. Mercer and Tipping (1994, 16), for instance, have suggested that in the Cheviots a similar change from “small-scale assarts” to organised landscape-wide deforestation in the Late Iron Age might have coincided with the construction of hill-forts there after the mid-third century B.C.
The Roman Period

In most of the places it is recorded, the trend towards deforestation intensifies during the Roman period. Within the central Lake District it seems probable, on the basis of current evidence, that little of this may be attributable to the activities of the Roman military presence itself. Although this was extensive, it seems that, apart from within the immediate vicinity of Roman installations, comparatively little disturbance occurred to the nearby vegetation. A good example of this phenomenon is provided by a pollen record from a peaty hollow which developed on top of disused buildings at Hardknott Fort (Pearsall and Pennington, 1973, 234). This indicated that extensive oakwoods still remained in the local vicinity of the site after its abandonment. However, within a short time these were being attacked and cultivation of cereals such as rye was being undertaken within the near vicinity of the abandoned fort.

Overall it seems more likely that most of the renewed clearance activity was attributable to indigenous farming populations whose activities transformed the fellsides generally. Their deforestation signal is widespread (Fig. 4), being present in sediments as diversely situated as Devoke Water, Burnmoor Tarn, Tewit Moss and Low Water in the south-western fells; Overwater and Bowscale Tarn in the northern hills; Helvellyn’s Red Tarn, Wet Sleddale and Haweswater in the east, as well as in several other of the larger lakes (Pearsall and Pennington, 1973, 234; Chinn and Innes, 1995).

South-west Cumbria

The pollen record relating to this phase has been extensively studied in the south-western fells. Here, an episode of upland cereal cultivation (Pennington’s so-called “Brigantian” episode), is dated to c.cal A.D. 210-680 (1560±130 BP, NPL-116) at Burnmoor Tarn and c.20 cal B.C. – 592 cal A.D. (1750±130 BP) at Devoke Water (Pennington, 1970, 72). At Burnmoor, this agricultural activity seems to have resulted in an increase in soil erosion, as witnessed by a peak input of acid organic matter contemporary with the peak of the deforestation episode (Pennington, 1991).

At nearby Tewit Moss an unpublished study (Wimble pers. comm.) has demonstrated that an increase in clearance activity which, like those at Devoke and Burnmoor, had similarly begun in the late Iron Age, can also be seen to intensify during the Roman period, reaching a peak shortly after c.0-334 cal A.D. (1860±70 BP, CAR-913), thereby confirming Pennington’s original findings and suggesting that, in the south-west fells at least, agricultural activity in these mid-uplands was stimulated towards the latter part of the Roman period.

Eastern Cumbria

Currently, the best palynological record from the eastern uplands with which to chart the landuse changes contemporary with this phase of expansion is that from Wet Sleddale (Chinn and Innes, 1995). This reveals a marked increase in clearance of woodland and the resumption of cereal cultivation dated to c.110-380 cal A.D. (1785±50 BP, AA-28374) together with the expansion of heather moorland – a process which continued to intensify immediately after this time.
Further to the south-east across the Lune valley in the Howgill Fells, renewed deforestation led to the expansion of open grassland and moorland communities at the same time. This appears to have been associated with the initiation of considerable erosion of the west-facing hillslopes which has recently been dated to c. cal A.D. 219-417 (1720±45 BP, AA-28398). This episode may well represent the first significant phase in the formation of the nexus of deeply gouged gullies and alluvial fans which characterises Carlingill today (Wells, 2000). It is possible this renewed activity may have affected a wide area of the Howgills; at Langdale c.4 km east of Carlingill, possible late Iron Age or Romano-British catchment disturbance has also been detected in a palaeomagnetic profile in peat indicating low intensity erosion, which coincided with a reduction in arboreal pollen and increase in ericaceae pollen, suggestive of increasingly open heather moorland (Harvey et al., 1981).

There is an abundance of archaeological evidence relevant to this period from the adjacent Lune valley (Higham and Jones, 1975; Shotter and White, 1995; Lambert et al., 1996, 45-78). Several potential Iron Age settlement sites have been pinpointed in the vicinity of Low Carlingill although they may equally be of Romano-British age. The density of Romano-British settlements associated with Low Borrowbridge fort (Lambert et al., 1996, 46, 48) is certainly suggestive of a sizeable concentration of population at this time, along with a commensurate expansion of demand for agricultural produce. It seems likely that increased settlement in the Lune Gorge may have commenced in the late Iron Age resulting in greater pressure on the upland grazings and the initial deforestation/erosion episodes within the Howgills but it seems probable that it was not until the arrival of the Roman fort of Low Borrowbridge that major inroads into the woodland and scrub cover led to significant gully ing and alluvial deposition on the western Howgills.

North Cumbria

North of the Lake District uplands, in the Solway Plain and north Pennines, the relatively open landscape conditions initiated in the late Iron Age were maintained and expanded during the Roman period. In the vicinity of Hadrian’s Wall, it was originally argued that the initiation of the major forest clearance episode was actually related to the Wall’s construction, the impetus being provided by the timber requirements of the military infrastructure (Davies and Turner, 1979; Barber, 1981, 113). This assertion has subsequently been repeated many times (Dumayne, 1993a; Dumayne, 1993b; Dumayne, 1994; Dumayne and Barber, 1994), but nevertheless always relied on data with relatively poor dating control (Dumayne et al., 1995). The arguments have been challenged as a consequence (McCarthy, 1995) and a revised view of the evidence has been formulated, which suggests that sites close to Hadrian’s Wall also fit into the regional pattern, now established, of clearance initiated in the late Iron Age for agrarian purposes. A recent site-specific palynological study from ditch-fills at Vindolanda has tended to support this reappraisal (Manning et al., 1997), with evidence showing that deforestation had already occurred in the vicinity of the site before c.85 A.D. This conclusion also adds credence to Wiltshire’s interpretation that an extant open landscape was also present at Birdoswald at the time of the Wall’s construction (Wiltshire, 1992), although the lack of precise dating continues to stymie its definite confirmation at
this particular site. Across the Solway in southern Scotland, the late Iron Age clearances persisted into the Romano-British period, and appear to have intensified until after c.150 cal A.D. by which time little woodland remained (Tipping, 1995).

**South Cumbria**

So far, all the sub-regions discussed have vegetational histories largely derived from widely dispersed, single pollen cores. Although this has allowed the broad-scale qualitative changes to be inferred, along with their approximate chronology, the archaeological usefulness of the data is limited to identification of broad qualitative changes and the effects of localised human activity. In order to discern more detailed sequences of activity, or to make semi-quantitative estimates of human impact a multiple coring programme is required.

One area for which such a relatively high resolution, multi-core palynological dataset has now been generated is south Cumbria (Wimble, 1986; Wimble et al., 2000). The results indicate that at some point at, or just after, the end of the first millennium B.C. there is a distinct divergence in the vegetational history between the Duddon Estuary and Lyth Valley. The White Moss diagrams show a decline in the non-arboreal pollen curves after c.167 cal B.C.-130 cal A.D. (2005±60 BP, CAR-681), implying a reduction in activity. The Foulshaw and Helsington diagrams, however, display no similar decline until a later period, with a date range of 29-381 cal A.D. (1840±65 BP, CAR-537) to 184-539 cal A.D. (1685±60 BP, CAR-547). It seems possible, therefore, that forest regeneration (and by implication land abandonment) began a century or so earlier in the Duddon valley compared to the Lyth.

It is difficult to assess what this time lag in putative land abandonment may represent in terms of historical differences between two sites only 25 km apart. The most obvious contrast of archaeological significance between the two areas in the early Roman period are their relative proximities (c.30 km and 5 km respectively) to the Roman fort at Watercrook, Kendal. The fort, garrisoned from the late first to the late fourth centuries, is likely to have produced a demand for locally grown provisions, perhaps encouraging local populations to continue occupation and cultivation of its hinterland (Fell, 1973b). It is also possible that the very presence of a fort and its garrison may have afforded protection to settlements in the Lyth Valley. Given the indications of unrest among the native population during this period (Shotter, 1994, 23; 1995, 74) it is conceivable that the Duddon Estuary (along with the rest of the south Cumbrian fringe), being more isolated from the main policing grid of Roman forts (Shotter, 1984, 25) may have suffered from more political instability.

**Relative sea-levels during the Roman period**

Recent archaeological literature relating to the Roman period in Lancashire has tended to assume that a higher relative sea-level was present in the region at that time than is the case today (Buxton and Shotter, 1996). This supposition, however, is based on uncalibrated data published nearly twenty years ago (Tooley, 1980) when it was thought that the MHWM at Lytham on the River Ribble was c. +5.4 m at 1700 BP, interpreted as representing a metre higher than present altitude of
Fig. 4. Sites showing evidence for initiation or intensification of deforestation or erosion in the Romano-British period.
Fig. 5. Pollen sites with clear indications of immediate post-Roman woodland regeneration.
MHWST. This has subsequently been used as a basis for justifying the position of Kirkham Roman Fort (Howard-Davis and Buxton, 2000). However, the original sea-level estimate was based on a single data point which gave a $^{14}$C date range of 1975±200 BP to 1370±110 BP bracketing a marine transgression at Lytham. When calibrated this gives a probability range of 400 cal B.C.-440 cal A.D. to 540-853 cal A.D., making it difficult to pin down in calendar years.

Recent work in the north of Morecambe Bay has since produced a further date for a transgressive overlap at Arnside of c.434-603 cal A.D. (1545±35 BP) (Zong and Tooley, 1996), possibly indicating that higher relative sea-level in the region may have largely post-dated the Roman period, and thus making it a largely irrelevant factor in determining the strategic positioning of coastal installations. On the basis of the current evidence therefore, it is probably safe to say that although there is certainly evidence for a period of higher relative sea-level in the region dating to some period in the 1st millennium A.D., it is far from certain exactly when this occurred (Tooley pers. comm.).

**Post-Roman period**

*Climatic improvement in the late Roman-early post-Roman period*

The concentration of probable Romano-British sites in the eastern uplands, sometimes situated at altitudes up to 1000 ft in what are today bleak areas of fellside (RCHME 1936; Webster, 1969, Fig. 6), together with the re-appearance of agricultural activity in marginal environments, hints at the improved climatic conditions which seem to have characterised the later Roman period in north-west Europe (Lamb, 1977, 374). The notion is lent credence locally by the occurrence of humified peats, indicating slower mire growth, contemporary with the later Roman period in the Morecambe Bay mires. These are dated to c.cal A.D. 261-680 at Foulshaw Moss, and to between cal A.D. 350-590 and cal A.D. 560-768 (1590±50 BP – 1380±60 BP, GU-5144-5143) across the bay at Fenton Cottage (Wells et al., 1997). The probable existence of a drier, possibly warmer, climate in the later Roman and immediate post-Roman centuries may have a bearing on the palynological evidence for the continued intensification of clearance and agriculture in several areas in the immediate centuries following the end of the Roman period.

Most dated pollen diagrams from the marginal uplands of the Lake District, for example, point to this phenomenon (Fig. 4). In the south-western fells, for example, the pollen record from Burnmoor Tarn displays further rises in grass pollen, heather and other herbs of open ground during the immediate post-Roman period (Pennington, 1970, fig. 15a) while at Tewit Moss the peak of clearance activity is indicated as having occurred in the same time-frame (Wimble pers. comm.). To the east, the increase in clearance and expansion of open heather moor apparent during the Roman period also appears to have intensified in its immediate aftermath (Chinn and Innes, 1995).

Evidence from most of the central valleys of the Lake District is much harder to interpret for this period because of the lack of good dating controls and the relatively low resolution of the diagrams available which cover the later periods. However, recent work at Coniston Water (Pennington, 1997, fig. 8) indicates that a peak of
Fig. 6. Distribution of “Romano-British” settlements in Westmorland (after Webster, 1969).
clearance activity also occurred in the vicinity during this period, suggesting that the increase in land-taking was a widespread phenomenon in more central areas of the Lake District.

Following these post-Roman peaks of clearance activity, a period of short-lived, but marked woodland regeneration is recorded in several places (Fig. 5). The exact nature and dating of this episode is unclear at most sites, save for Coniston Water where the latter part of the episode appears to have taken place immediately prior to c.660-880 cal A.D. (1270±50 BP, SRR-1871). It comprises a marked recovery of oak, alder and hazel, together with a decline in grassland (Pennington, 1997, fig. 8). The episode is less well defined at Burnmoor Tarn because of the low resolution of the pollen diagram at this level but a marked drop in grass and heather pollen at a stratigraphic level approximating to this time may possibly record a similar relaxation of landuse pressure (Pennington, 1970, fig. 15a).

Further south in Cumbria and north Lancashire a period of high tree pollen values also prevails in all areas where stratigraphy relevant to this period has been studied (Mackay and Tallis, 1994; Wells et al., 1997; Wimble et al., 2000), also suggesting a recession in activity at and just after the end of the Roman period. Similarly, in the east of Cumbria, a post-Roman segment of the pollen diagram from Archer Moss, overlooking the Lune gorge, shows an initial regeneration of trees and shrubs, followed by a gradual decline and a large expansion of heather (Cundill, 1976). The clear indications here are of a temporary reduction in pressure on the hill grazings of the western Howgills, perhaps in response to the abandonment of Low Borrowbridge and associated Roman infrastructure.

In northern Cumbria too, palynological trends from north of the Solway demonstrate that partial woodland regeneration occurred after c.300 cal A.D., (Tipping, 1995). There has been speculation that this could be associated with a gradual diminution of Roman control in the area after c.350 A.D., leading to a reduction in economic activity (Higham, 1986). This, however, contrasts with the view posited by Davies and Turner (1979), who, on the basis of 14C pollen diagrams from four sites near Hadrian's Wall, argued that a high degree of political and economic stability persisted for some time after the Roman withdrawal; a view shared by Barber (1981, 114) on the basis of palynological data from Bolton Fell Moss. One interpretation of these apparently conflicting signals might be that they reflect radically contrasting local responses to the major political events of the fourth and fifth centuries, with economic activity retrenching to areas of security provided by military infrastructure. However, as Tipping (1995) has cautioned, the imprecision inherent in 14C dating and the limits in resolution of most pollen datasets ensures that the majority of attempts to correlate palynological data with discrete historical events must remain, at best, speculative.

However, another factor possibly discouraging to agricultural activity, certainly in the uplands at any rate, is a probable return to wetter climatic conditions in the post-Roman period. The “dry phase” recorded from the mires of north-west Fylde for instance, appears to have ended c.cal. A.D. 560-768 with the return of Sphagnum imbricatum dominance signifying a resumption of wetter conditions in the south of the region. Blackford and Chambers (1991) have also demonstrated a shift to less humified peats in blanket mires from the north of England and western Britain at this time, which they also ascribe to a change to a wetter climate. Their age ranges of
c.cal. A.D. 550-750 for the “wet-shift” accord well with the date obtained for the resumption of *S. imbricatum* dominance at Fenton Cottage.

**Conclusions**

In recent years the sequence of palaeoenvironmental events centred on the millennial divide has become clearer. It is now largely accepted that a marked shift from small-scale woodland “assarting” to large-scale, organised forest clearance, which began at this time and which was hitherto assumed to be attributable to Roman influence, was in fact initiated before the establishment of Roman control. A significant socio-economic implication of this observation is that it points to the establishment of a highly developed agricultural economy in the region by the end of the 1st millennium B.C. This in turn perhaps helps to explain how and why a decision was taken by the Roman authorities to initiate the deployment of a large and resource-demanding military force in the area. If a hypothetical Roman invasion had been possible 250 years earlier for example, it seems unlikely that the North-West would have possessed an economic base large enough to support such an occupying army, nor, presumably, would there have been much incentive to permanently annex the region. However, although the agricultural expansion had undoubtedly been initiated in most places before the arrival of the Romans, the signs are that the presence of a large military infrastructure acted as a catalyst for further expansion. Once the increase in demand for agricultural products had become established, it appears that continued expansion by native farmers into more peripheral areas commenced, possibly encouraged by a shift to a drier period of climatic conditions. In certain upland areas, such as parts of south-western and eastern Cumbria, this appears to have initiated large-scale soil erosion and hillslope gullying. These permanent physical changes to the north-western landscape demonstrate the power of the economic changes wrought by Roman influence.

However, although our palaeoenvironmental knowledge of the period has advanced considerably in recent years, it is still largely constrained to inferring sequences of events at a broad scale. Fortunately, this need not necessarily remain a permanent state of affairs, for Cumbria and north Lancashire hold exciting possibilities for future research. The region is exceptionally endowed with relatively well-preserved environmental archives and, because it already possesses arguably the best known history of regional vegetation change of any part of England, it affords excellent opportunities for building on this with specifically-targeted, high-resolution palaeoenvironmental studies. The potential for generating detailed models of late 1st millennium B.C.-late 1st millennium A.D. environmental change at the regional and site-specific scales therefore, is probably greater in the North-West than any other part of England, and major advances in our understanding of the period’s palaeoenvironmental and socio-economic context are clearly attainable, given the future application of focused research.
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