

10. Seeing the woods for the trees: unravelling woodland resource usage in the Irish midlands over the last five millennia

Ellen OCarroll & Fraser J G Mitchell

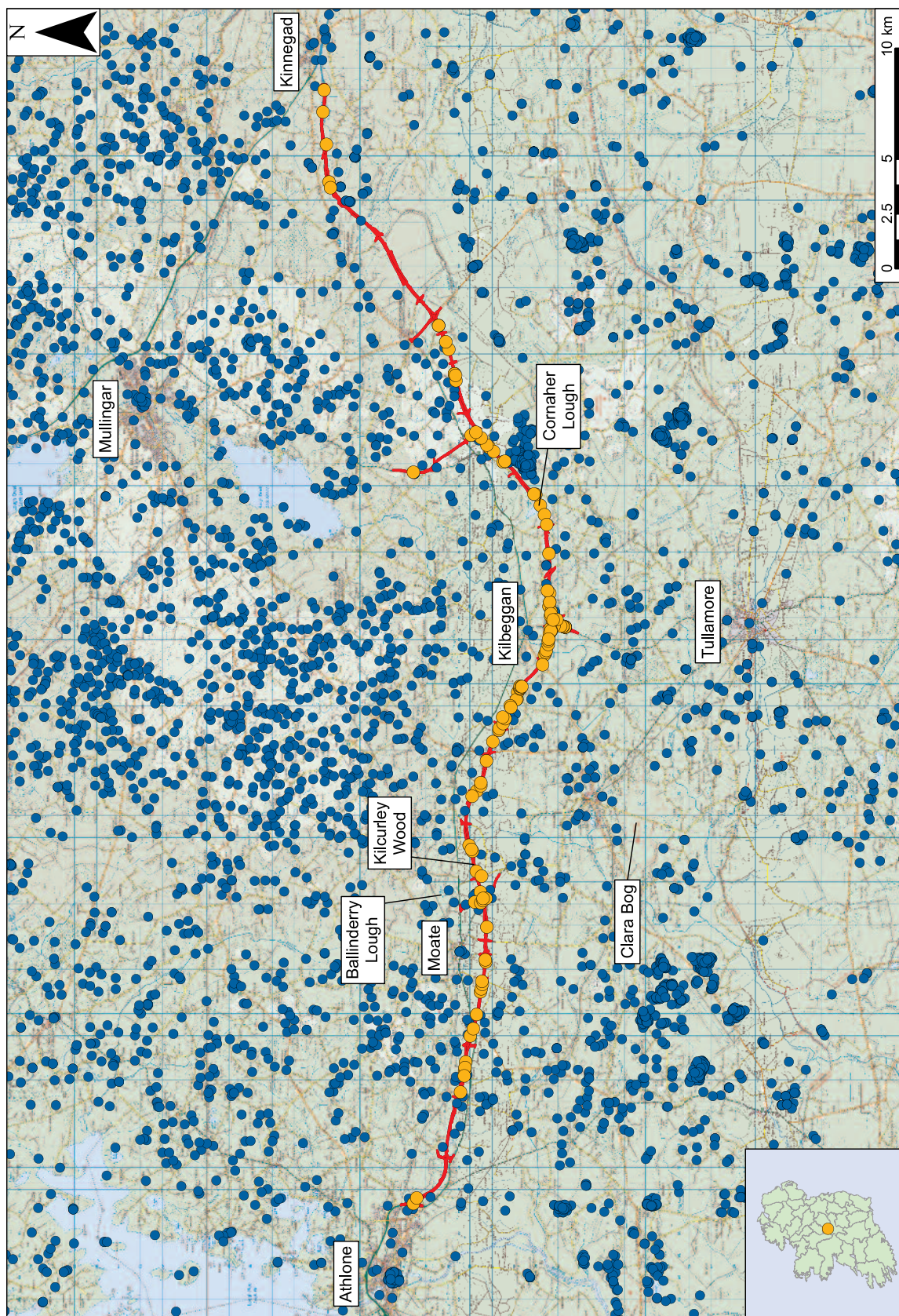
The investigation of the place of humans within the natural environment and the interaction between man and his surrounding landscape has always played a significant role in defining and understanding past events and periods of change. The midlands of Ireland are today very open and treeless, in contrast to their past history as a wooded landscape during certain periods. This paper highlights some of the changes within woodland resource usage. Research recently completed by the authors, under the NRA Fellowship Programme, explored the landscape dynamics of the Irish midlands. This paper focuses on one aspect of the research—unravelling woodland resource usage in the study area (see below) since Mesolithic times, using data from pollen and charcoal samples coupled with the results of archaeological excavation on the route of the M6 motorway.

The route of the M6, which traverses the Irish midlands, is the main focus for this research, starting at Athlone, Co. Westmeath, and running eastwards through north County Offaly to Kinnegad, Co. Meath, for a distance of approximately 61 km (Illus. 1). Charcoal data from archaeological excavations along this section of the new road, as well as new and existing pollen data from sites adjacent to the M6, were used in the study. The availability of hundreds of charcoal samples associated with scientifically dated archaeological monuments, together with pre-existing palaeoecological analysis, made this a very suitable location to conduct this work.

Materials and methods

Charcoal data were obtained from excavations carried out between 2006 and 2009 in advance of the construction of two new sections of the N6 from Kinnegad to Athlone (subsequently upgraded to motorway status and reclassified as the M6). Over 18,000 charcoal species identifications were carried out and 113 wood samples from 56 archaeological excavations were identified (Table 1). The range of archaeological sites from which the charcoal was extracted included some small-scale Neolithic activity, two Bronze Age settlement sites and numerous *fulachtaí fia* (burnt mounds) and Iron Age metal-working sites and furnaces. All of the wood was from *fulachtaí fia*. Historical sites included an early medieval ringfort, a monastic settlement (Stevens 2007) and a multiphase enclosure (Coughlan 2007; 2009), and medieval cereal-drying kilns, charcoal production pits and a cemetery (Channing & Randolph-Quinney 2008). Later medieval and post-medieval industrial sites were also excavated along the road scheme. Charcoal data from these sites were used in defining past landscape use with regard to woodland dynamics.

The main palaeoecological or pollen data used for this study were interpreted from lake and peat cores taken from Ballinderry Lough and Cornaher Lough in County Westmeath and from Clara Bog and Kilcurley Wood in County Offaly (Illus. 2). Ballinderry Lough and Kilcurley Wood, east of Moate, Co. Westmeath, are both in close proximity to the route of



Illus. 1—The M6 study area, incorporating main towns (Ballinderry Lough, Kilcurley Wood, Clara Bog and Cornaher Lough), M6 excavated sites (orange dots) and previously recorded archaeological sites (blue dots) (based on the Ordnance Survey Ireland Discovery Series map).



Illus. 2—Pollen coring at Kilcurley Wood, Co. Offaly (Ellen OCarroll).

the M6, while Clara Bog is 7 km south of the motorway. Cornaher Lough abuts the M6 on its eastern side; consequently, the Cornaher Lough diagram provides a closely linked palaeoecological dataset with regard to comparative analysis of the archaeological resource and charcoal data.

Table 1—Charcoal data from archaeological site types.

Site type	Charcoal sample no.	Wood sample no.
Burial	3	
Burnt spreads	6	
<i>Fulachtaí fia</i>	157	113
Industrial	65	
Occupation	240	
Pit	4	

Discussion

The archaeological, palaeoecological (pollen and charcoal) and historical background of the study area suggests a number of key periods in the past when humans may have had a strong influence on this landscape.

Mesolithic period (8000–4000 BC)

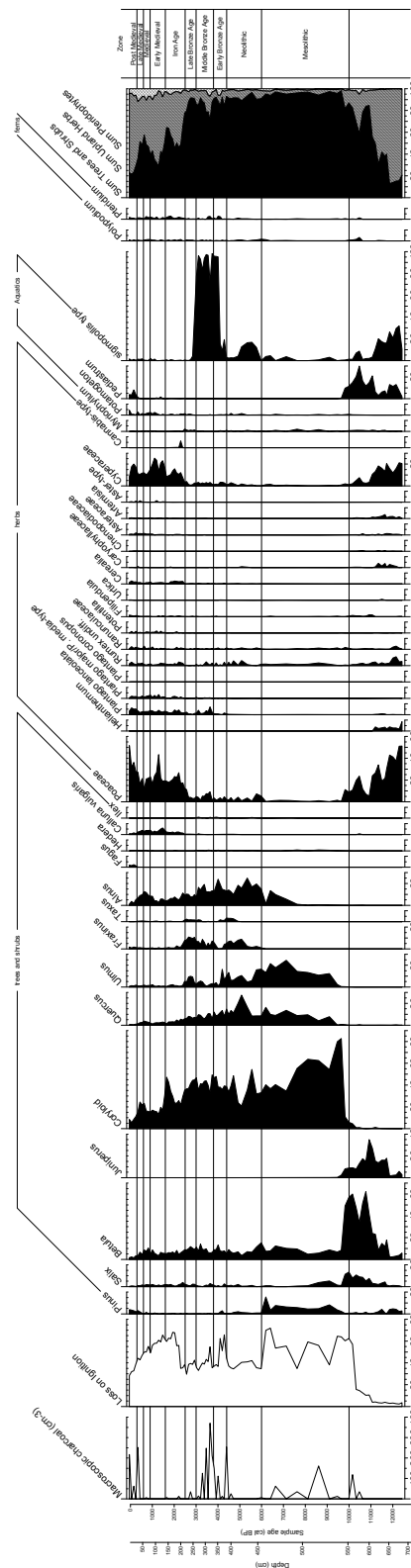
Beginning with the Mesolithic period, we see little evidence for human occupation in the study area apart from a chert flake recovered from Derryarkin Bog, Co. Westmeath, and attributed to the Late Mesolithic population of the area (Murray et al. 2002, 16–17). Evidence of definitive cultural remnants associated with the earliest inhabitants of Ireland still remains undiscovered in the study area.

Pollen evidence shows that birch (see *Betula* in Illus. 3) and juniper (*Juniperus*) woodlands declined at the beginning of this period, to be replaced by hazel (*Coryloid*), oak (*Quercus*) and elm (*Ulmus*) woodlands. Subsequently, hazel shaded out the birch woodlands and this reduction is apparent in the pollen diagram (Illus. 3). Pine (*Pinus*) was also a component of this woodland but was more prolific in the peatland areas when compared with pollen sources from lakes (Heery 1998; Connolly 1999).

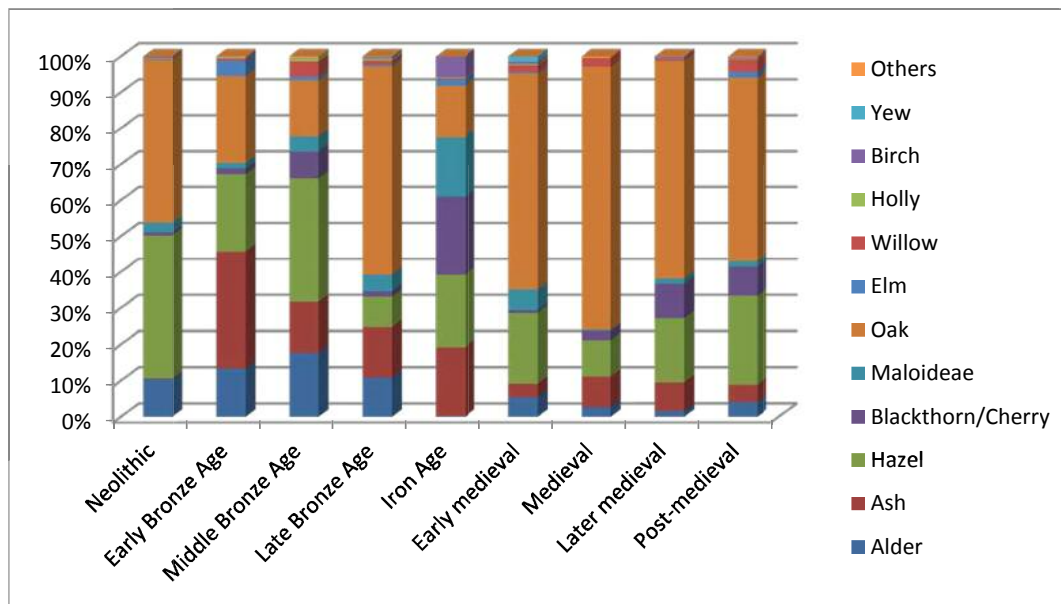
Neolithic period (4000–2400 BC)

Archaeological evidence for activity during the Neolithic period is also scarce. The limited occupation evidence from the M6 excavations and archaeological sites recorded in the nearby bogland do, however, indicate a small-scale, transient presence of Late Neolithic settlers in the area in the latter half of the third millennium BC (Murray et al. 2002, 17; OCarroll 2003).

Neolithic remains in the study area consist of enigmatic pits and small-scale occupation evidence, most notable in the vicinity of wooden trackways in the Derrygreenagh area of bogland in counties Offaly and Westmeath, south of the M6. Moreover, spatial evidence associated with these features shows that the Neolithic people lived and communicated in a restricted area. Neolithic habitations and trackways are mainly located in the eastern



Illus. 3—A pollen percentage diagram (redrawn with data of selected taxa from Heery 1998) based on the pollen core from Cornaher Lough, Co. Westmeath (Ellen OCarroll).



Illus. 4—Mean percentage charcoal proportions of wood taxa through time in relation to the archaeological charcoal data (Ellen OCarroll).

portion of the study area, close to Kilbeggan, Co. Offaly. Oak and hazel charcoal were the dominant taxa identified from the Neolithic features examined from excavations in the area (Illus. 4). On the basis of the archaeological evidence, coupled with the evidence from all of the pollen cores, it is concluded that there were no major Neolithic *Landnam* (large-scale woodland clearance) events in the study area (Illus. 3). The trees and shrubs shown on the pollen diagram during this period represent over 90% of the identified pollen grains.

The dense woodland cover, a possibly large lake system and thin, poorly drained soils may all have contributed to the dearth of occupation evidence in the Neolithic period (Grogan et al. 2007, 18). The area was obviously unattractive to the earliest farmers when contrasted with the western seaboard around the Céide Fields, Co. Mayo (Verrill & Tipping 2010), areas of County Sligo (Danaher 2007) and Tullahedy, Co. Tipperary (OCarroll 2011). The available strands of evidence suggest that Neolithic people were passing through the area via the peat bogs but not occupying it to any great degree.

Bronze Age (2400–500 BC)

In contrast to the Neolithic period, there was considerably more human activity in the area during the Bronze Age. Nevertheless, this was rather limited during the Early and Middle Bronze Age (c. 2400–1100 BC) and was mainly associated with *fulachtaí fia* along the M6 routeway, with a corresponding low settlement density. (*Fulachtaí fia* are sites defined by troughs in which water was heated by hot stones. They generally survive as horseshoe-shaped mounds of burnt stone and charcoal around an earth-dug trough (or troughs).) It is not until the later Bronze Age (c. 1100–500 BC) that high settlement density and high-status sites emerge. A similar pattern has been recorded from peat bog archaeology in Lemanaghan Bog, Co. Offaly (OCarroll & Whitaker 2009). Subsurface and upstanding sites associated with the Late Bronze Age and the early medieval period were the most commonly encountered during this research.



Illus. 5—Elevated view of Moyally 1 ringfort, Co. Offaly, during excavation (Studio Lab).

The pollen evidence shows a more intensive period of occupation in the area, apparent as a steady but rather slight reduction in arboreal (wood) taxa or tree types throughout the Bronze Age. All of the profiles show multiple (albeit not synchronous) elm declines during this period, most likely related to woodland clearance phases (Illus. 3). Overall, evidence for plant remains such as wild berries, cereal and grasses is low; any cereal seeds recovered from the M6 archaeological sites generally relate to the Late Bronze Age occupation sites and *fulachtaí fia*, indicating a small increase in arable farming and other human activities in the area (Lyons 2009). The seeds of fruit-bearing plants, including brambles, are also identified as gathered foodstuffs. A wide range of wood taxa were collected for use at the *fulachtaí fia*, with hazel being dominant. Oak occurred more frequently at the occupation sites and ash (*Fraxinus*) was identified in greater quantities in relation to hearths and pits at these sites, suggesting the gathering of wood in previously cleared woodland where ash may have grown as a secondary species.

Iron Age (500 BC–AD 400)

The palaeoenvironmental evidence for the Early Iron Age shows a continuing decrease in wood pollen as recorded in the pollen cores for the area. In fact, the Early Iron Age pollen record indicates a substantial depletion of the woodland resource, with trees and shrubs dropping to 50% (Illus. 3). Iron Age furnaces and associated metal-working activities were excavated along the M6, but the pollen evidence indicates more extensive settlement than is apparent from the archaeological evidence. It is, however, possible that the consumption of firewood and charcoal in relation to the smithing hearths and associated activities was on such a scale that it has left a strong expression in the pollen record. The ritual killing and deposition of the Early Iron Age ‘Oldcroghan Man’ bog body near Croghan Hill, Co.

Offaly, during a period of woodland clearance and social and economic change (Plunkett et al. 2009) may also be linked with the dominant Early Iron Age culture expressed in the pollen record for this study area. More evidence in relation to the role that this culture played in the depletion of the surrounding woodlands is only just emerging. Bog iron ore, which is plentiful in the surrounding peat bogs, may have made a significant contribution to the development of this Iron Age culture. The identification of bog ore used in the manufacture of Iron Age objects at the early medieval settlement of Clonfad, Co. Westmeath (Stevens & Ó Maoldúin 2005), may indicate that this practice of extracting iron ore for metal-working activities in the areas surrounding the midland bogs was more widespread than previously thought.

The ‘Late Iron Age Lull’, a term coined by Frank Mitchell to describe a period when human impact on the landscape was at a low level (Mitchell & Ryan 1997), is clearly evident in both the archaeological and environmental records for the study area. The archaeological remains from this period are limited and wood taxa increase in the pollen diagrams, indicating forest regeneration and decreased cultivation (Illus. 3).

Early medieval (AD 400–1100)

The early medieval landscape of the M6 route comprised a series of important, well-organised secular settlements interspersed with ecclesiastical centres, all of which were linked through established routeways. Ringforts are particularly dominant in the northern portion of the study area, where the soils are more amenable to agriculture, unlike the poorer peat soils to the south. Very few of the c. 300 ringforts recorded here have been excavated (Stout 1997), but some aspects of a ringfort excavated at Moyally 1, Co. Offaly, along the M6 can contribute to the environmental and cultural history of the period (Illus. 5).¹ Most of this ringfort was outside the road corridor, and only a 39-m-long arc of the enclosing ditch was available for excavation. An internal bank had been created with the upcast material from the digging of the enclosing ditch; this survived to a maximum height of 0.45 m. Cattle bone dominated the animal bone assemblage analysed from Moyally, reflecting the importance of cattle in both economic and dietary terms during the early medieval period (Lofqvist 2009).

The beginning of the early medieval period shows a sharp drop in hazel pollen, with evidence of increased agricultural activities associated with the rise in grass pollen and plantain pollen (Illus. 3). Archaeological evidence, as shown from the Moyally 1 investigations, indicates that farming in the study area was mainly pastoral rather than arable (ibid.). Cattle were of exceptional importance in the lives of people at this time (Lucas 1989) and continued to be so until at least AD 800 (Kelly 1997; McCormick & Murray 2007). The evidence for cereal-growing during this period is muted in both the archaeological and the pollen record. Only two early medieval cereal-drying kilns are recorded from the M6 (at Clonfad 3 and Hallsfarm 2). Furthermore, the proportions of cereal pollen grains are never very high in the pollen diagrams and the higher concentrations are related only to the medieval and post-medieval periods (see Illus. 3).

The quantity of charcoal production pits from the M6 is an important aspect of the industrial use of woodlands in the study area. The date range for these charcoal pits is also significant, as they were in use for over 700 years from the ninth century to the 17th

¹ NGR 221040, 237791; height 79 m OD; Excavation Reg. No. E3274; Ministerial Directions No. A016; Excavation Director David Bayley.

century, although their pinnacle of use centres on the 11th century, particularly in the area around Kilbeggan (Kenny 2010, 112).

Excavations along the N5 Charlestown Bypass have shown that charcoal pits are most likely related to large-scale settlement sites such as that excavated at Lowpark, Co. Mayo (Gillespie & Kerrigan 2010). The high-status site of Ballinderry II, Co. Offaly, where much precious metalwork was found, is close to charcoal production sites at Curries and Moyally along the M6. Charcoal pits at Kilgoran, Ballinderry Big 3, Tonaphort, Kilbeggan South and Stonehouse/Mearspark Farm, also along the M6, are all in close proximity to and may be associated with early ecclesiastical metal-working at Clonfad or the early medieval crannog at Newtownlow, Co. Westmeath (Johnston 1999). The existence of these charcoal pits indicates the demand for charcoal, particularly oak charcoal, at this time. They also reflect the presence of oak woods in the vicinity to supply these centres of industrial activity. Consequently, oak is the most commonly identified charcoal from the M6 sites of this period, owing to the selection and use of this species for charcoal production and for construction (Illus. 4).

Medieval period (AD 1100) to present day

The Anglo-Norman invasion in 1169 heralded the beginning of a new era in Ireland, coinciding with the initial stages of the medieval period. It resulted in the foundation of many walled borough towns, castles and churches, and an increase in agriculture and commerce (Gibson 2007). The motte and bailey in Moate town, Co. Westmeath, is one of the first earthen fortifications within the study area attributed to the Anglo-Normans. The excavated evidence from the M6 indicates that charcoal production pits were still in use, albeit not as frequently, while kilns associated with cereal- and pulse-drying became more frequent, as evidenced at Clonfad 3. The Black Death of 1348 is synchronous with a rise in wood pollen, particularly hazel, in the pollen profiles, possibly related to a decrease in the population of this area.

Tree pollen, particularly hazel, rises throughout the medieval period (Illus. 3). Cartographic sources show that woodlands were still a common feature in the landscape in the 16th century (Illus. 6) and many woodlands would have survived in the midlands (Cole & Mitchell 2003). Wooden structures such as platforms were being constructed in the bogs at this time, highlighting a tradition of exploitation of the natural flora and fauna available in these areas (O'Carroll 2001). Tower-houses were also being constructed during the later medieval period and many are recorded from the study area.

The late medieval and post-medieval periods show a dramatic decline of arboreal taxa, most notably hazel. This reflects a rise in agricultural activities and the export of timber to Europe and beyond (Illus. 3).

The charcoal identifications show interesting patterns of wood selection. There was a preference for oak wood for various cultural uses in the historical period, which is in contrast to prehistory, when wood selection patterns are not as apparent (Illus. 4).

Summary and conclusions

The principal aim of this work was to provide an environmental backdrop to the landscape and to investigate human effects on the woodland in relation to archaeological sites



Illus. 6—Map of counties Laois and Offaly c. 1559–1603, showing the extent of woodlands in the midlands. (© The British Library Board. Cotton Augustus I. ii. 40.)

investigated as part of the M6 excavations. The importance of palaeoenvironmental sampling in conjunction with archaeological excavation is shown by the wide and varied nature of the information presented above.

On the basis of the pollen evidence from all of the cores, it is concluded that there was no major Neolithic woodland clearance in the study area. This is corroborated by both the archaeological and charcoal records and contrasts with the evidence for widespread woodland clearance in other parts of the country, such as the western seaboard, during this time (O’Connell & Molloy 2001; Molloy & O’Connell 2012). Although there is a definite increase in indicators of human activity throughout the Bronze Age, populations do not appear to have been as extensive as in other areas of Ireland. Successive elm declines are recorded throughout this period, indicating sporadic and possibly small-scale human occupation in the landscape.

It is not until the Early Iron Age that we begin to see widespread clearance and use of the native woodlands and extensive occupation. This continues to be evident during the early medieval period. Secondary woodland is recognised after the woodland clearance phases through an increase in ash woods at both Clara Bog and Cornaher Lough, but there are subtle differences in the proportions of taxon types that recover across both pollen study areas, showing that responses to human interactions with the landscape can differ over small distances. The Clara pollen diagram displays a different pattern of woodland use, whereby the percentage of hazel pollen falls in the medieval period and the species never recovers in the post-medieval period. Grass pollen dominates the pollen diagram during the later historic period around the Clara area, while both hazel and grasses remain dominant in the Cornaher Lough area.

Animal husbandry, particularly cattle-raising, was an important economic mainstay in the early medieval period, while cereal becomes more important in the later medieval period. The number of excavated oak charcoal production pits shows that oak woods were possibly managed and highly prized resources during the medieval period for use in large-scale industrial sites, such as Clonfad 3 and Ballinderry I crannog, Co. Westmeath.

The pollen profiles for the later medieval period show a sharp drop in all arboreal taxa and the woodland never recovers. Pine increases at both pollen sites in Clara Bog and Cornaher Lough in the post-medieval period, and this is related to the plantation of pine woods in the 18th century (McCracken 1971).

Discussion within this paper is limited to a history of woodland resource usage in the area, which entails one aspect of this woodland project. Detailed research into other aspects of the cultural use of woodland, which includes new methodological approaches to the quantification and identification of charcoal samples retrieved from archaeological sites, has been published elsewhere (O'Carroll & Mitchell 2012). This methodological research and its associated outcomes have been incorporated into NRA procedures relating to the procurement of archaeological services, whereby all deposits with a high potential for the preservation of palaeoenvironmental material (such as charcoal and wood) are to be sampled for possible subsequent analysis, in accordance with a sampling strategy overseen by a specialist with appropriate expertise. Studies of wood charcoal from archaeological sites are important for an understanding of the ways communities used the plants and trees around them.

This ongoing research, from which further publications will emanate, has made a significant contribution to our understanding of the cultural use of woodlands. It has also recorded new insights into the vegetation history and human dynamics of the study area through multiproxy research. In addition, the project has generated a large, detailed charcoal and archaeological dataset on which future research can be based.

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