Our ancient landscapes:

Peatland Archaeology

An Chomhairle Oidhreachta
The Heritage Council

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Cover image: The Edercloon Neolithic trackway, Co. Longford (Carlo Zito).

Stacks of peat drying on cut bog at Bunowen, Connemara, County Galway.

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What is peatland archaeology?

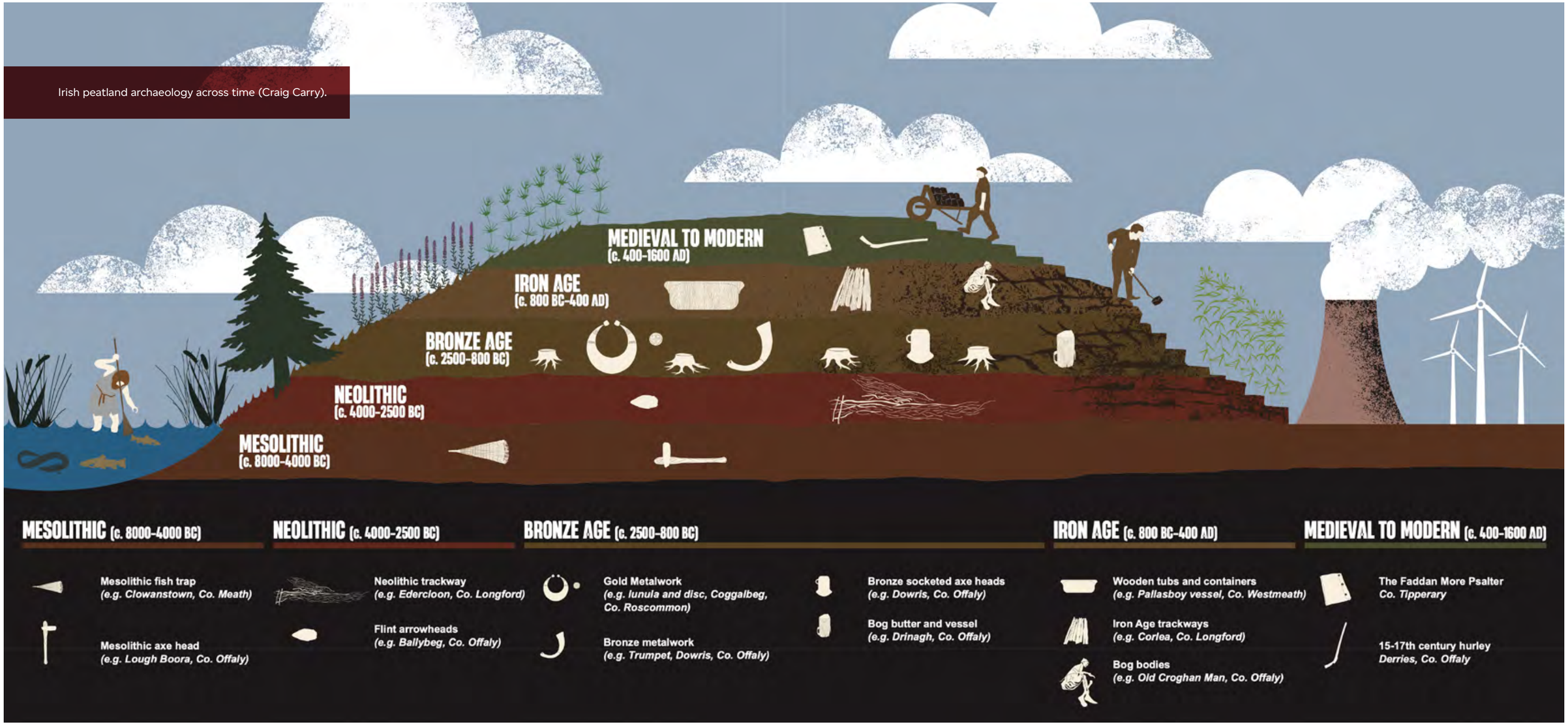
The Corlea trackway, Co. Longford, discovered in 1984, was constructed of large oak planks. Dendrochronological dating revealed that it dates from 147 - 148 BCE. A section of this togher is now on display at the Corlea Visitor Centre (Prof Barry Raftery).

Peatlands are exceptional environments for the preservation of unique and invariably fragile archaeological remains. The waterlogged, anoxic (without oxygen) conditions that are responsible for the accumulation of peat, also permit the survival of organic materials which may have deliberately or accidentally been incorporated into these peatlands in the past. The only other environments that can preserve organic remains over long (centuries to millennia) time scales, are those at the extremes of hot and cold (desiccation and freezing), neither of which prevail in Ireland, in the current day at least!

Some of the most iconic archaeological finds of the modern period have come from the 'bog': the Medieval vellum and leather bound Faddan More Psalter, Co. Tipperary, the monumental Iron Age (c. 800 BCE-AD 400) wooden 'road' of Corlea 1, Co. Longford, and the exceptionally preserved prehistoric human remains such as the world's oldest 'bog mummy', the Bronze Age (c. 2500-800 BCE) Cashel Man, Co. Roscommon. But these are just a small proportion of the finds from peatlands; past human activities have left numerous traces in and beneath our bogs, mainly in the lowlands (midlands) but also in upland areas. Ireland has a remarkable peatland archaeological record, although ironically our knowledge of this is due to the extensive drainage and extraction of peat, which has unwittingly exposed and often destroyed many sites and artefacts, long preserved within the once saturated deposits.

In 2006, a book of psalms, or Psalter, was found in Faddan More bog, Co. Tipperary. The book was a chance discovery, noticed by the driver in the bucket of his peat-harvesting machine. The Psalter is comprised of sixty sheets of vellum and contains 150 psalms, it dates from circa AD 800 (© National Museum of Ireland).

Irish peatland archaeology across time (Craig Carry).



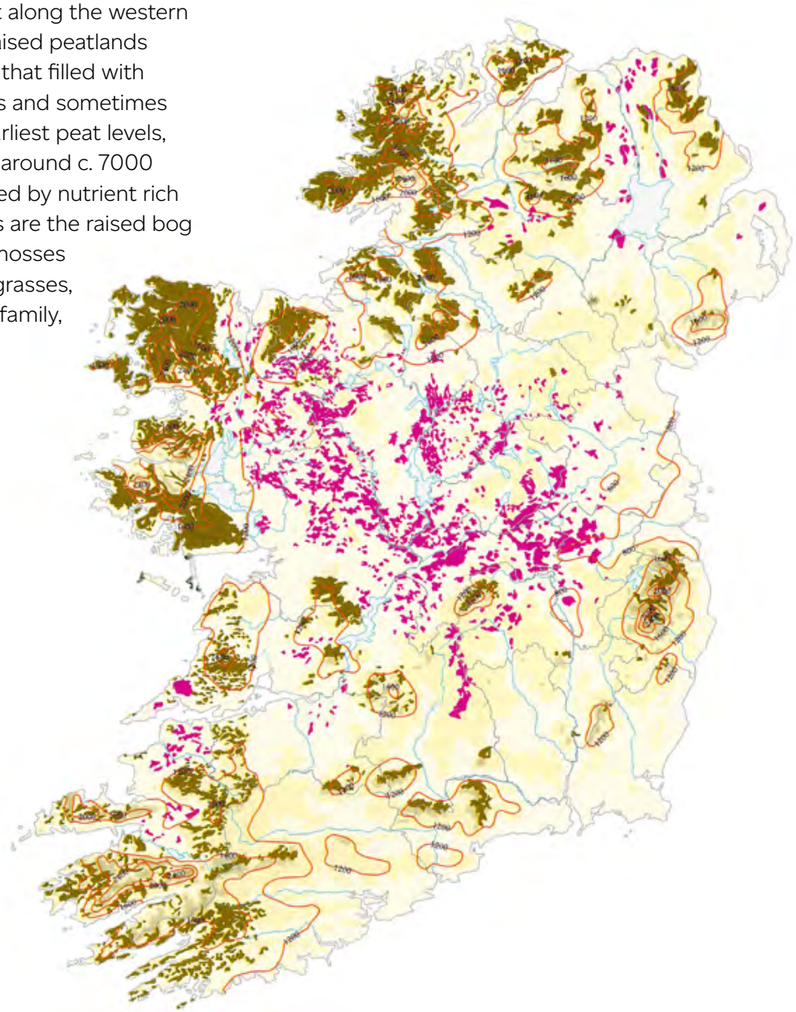
These sites represent human activity from the earliest known prehistoric settlement of Ireland (c. 8000 BCE, the Mesolithic period) through to recent times. This record is made up of wooden trackways and platforms of various size, length and complexity, through to settlements, dwellings, and associated and individual artefacts, including objects of wood, plant materials, leather, bone, stone and metal. Some of these, such as containers, shoes and tools, were everyday items that may have been lost or discarded, whilst others were clearly of great value, for example, the Faddan More Psalter, and the Later Bronze Age Dowris hoard of metalwork, found in Co. Offaly. These precious objects were deliberately deposited in the watery peatland environment, for reasons that remain the subject of archaeological debate and discussion.

It is clear that peatlands were important locations of past human activity in Ireland, but the perception, use and exploitation of these wetlands changed across time. Viewed in more recent centuries as bleak, inhospitable places, the archaeological record suggests they were often a busy and important part of the landscape.

Stacking turf by the roadside near Lough Conn Co. Mayo.

What is peat?

Almost one fifth of the land surface of Ireland is covered by peat (around 11,700 km^2), mainly in the midlands and west of the country, but it is found across the island. Raised peatlands generally occur in the midlands and blanket peat along the western Atlantic coasts. The lowland or raised peatlands formed as a result of lake basins that filled with reeds, sedges, herbaceous plants and sometimes trees (willow, alder, birch). The earliest peat levels, many of which were established around c. 7000 BCE are known as fens and are fed by nutrient rich ground waters. Above these fens are the raised bog peats which develop from bog-mosses (various species of *Sphagnum*), grasses, sedges and shrubs (the heather family, for example).



Map of Irish raised and blanket bogs (from Aalen et al., 1997).

Raised Bog

Blanket Bog

A healthy raised bog at Cloneydonnin, Co. Offaly/Westmeath (Claire Nolan).

Blanket peats are also formed from partially decomposed remains of plants, which have built up slowly over thousands of years, in areas where the climate is cool and wet. Blanket peats are generally shallower than raised bog peats.

The accumulation of organic compounds (roots, wood, bark and leaves) in varying states of decomposition means grains of pollen from these peat forming plants and vegetation that once grew around the peatlands, are preserved, alongside traces of other plant and animal life, such as chitinous fragments of insects. As peat builds up in successive layers through time, this material survives as a record of past vegetation and environments on and around the peatland: this is what we call the palaeoenvironmental record.

Peat forms where drainage is prevented, although a humid climate is also necessary to allow vegetation adapted to wet conditions to flourish: this is an imbalance between precipitation and evaporation. The accumulation of peat is generally quite slow (around 1mm/year), and thus the timescales required for the development and spread of the extensive peatlands of Ireland is measured in millennia. As peat built up over thousands of years, it spread laterally out across the landscape, gradually building large 'mounds', consisting predominantly of *Sphagnum*, that eventually accumulated above the level of the adjacent drylands: hence the expression 'raised' mires (bogs). However, the drainage of peatlands leads to de-watering, collapse and shrinkage of the deposits, and few intact 'raised mires' survive into the present day. As bogs have been exploited in this way, archaeological remains once hidden and preserved, have emerged and are often damaged and destroyed.

Whilst the age of these landscapes varies, many are of great antiquity, and some have their origins shortly after the end of the last glaciation of Ireland (c.12,000 years ago). Some of the earliest archaeological evidence for human activity in Ireland was identified at Lough Boora, Co. Offaly, in 1977, when peat cutting exposed the remains of a Mesolithic camp, originally located next to a shallow lake. The faunal and floral assemblage recovered at the site included the bones of red deer, wild pig, hare, birds and fish and a large quantity of hazelnut shells.

The drainage and cutting of peat for fuel, throughout the twentieth century, in particular, has contributed to the loss of value of these rich peatland habitats. However, recent years have seen a profound shift towards the recognition that peatlands play a key global environmental role in terms of biodiversity, hydrology and the net storage of carbon, all of which are critical for mitigating the impact of the climate crisis. This has led to changes in the perception and treatment of peatlands, with rehabilitation and restoration now replacing drainage, peat extraction and tree plantations. The preservation of the nation's surviving peatland archaeological resource depends on the management and protection of peatlands through appropriate re-wetting and ecological rehabilitation.

Archaeological Significance

Mesolithic stone axe fragments discovered at Lough Boora, Co. Offaly (© National Museum of Ireland). ▸

Perhaps the most distinctive aspect of peatland archaeology is the survival of organics, including wood, fabrics, and even human and animal skin - materials that are susceptible to decay and rarely preserved in dryland environments. These remains are sometimes described as 'the silent majority'; wood, plant materials and other organics, grown, collected and gathered. These would have formed the greater part of materials utilised by past peoples in their everyday lives (bowls, plates, ornaments, cordage, basketry, clothes and more besides), but which are seldom found on terrestrial (dryland) excavation. Stone, flint and other inorganic remains that are typical of the latter, can also be a component of peatland archaeology, especially in 'pre-peat' contexts.

Although organic archaeology that has survived through waterlogging, might look strikingly fresh and pristine upon exposure, the effects of burial for centuries or millennia, alters the physical condition of most materials. For example, wood absorbs the acidic water of the peatland environment into its cells, which slowly replaces the cellulose and lignin that make up its structure. Upon exposure to air, decay processes begin again very rapidly as the water evaporates, leading to shrinkage and cracking and eventually to complete degradation. Appropriate storage and conservation are necessary to stabilise material for long term storage and museum display. The fate of this irreplaceable archaeological record is hence intimately related to the fate of peatlands themselves. Destruction and damage to peatlands inevitably means the same for any remains sealed within or beneath the peat.

A late Bronze Age wooden yoke for linking animals together for ploughing from Toberdaly, Co. Offaly (Rob Sands/Irish Archaeological Wetland Unit/School of Archaeology UCD).

The Annaghbeg 2 trackway, Co. Longford (Barry Raftery).

Pre-peat, Intra-peat and Supra-peat Archaeology

We can define three categories of peatland archaeological remains: sites and finds preserved *beneath* the peat (pre-peat), those found *within* (intra-peat) the peat itself, and lastly, archaeology located on the *surface* (supra-peat) of the peat. The Mesolithic site of Lough Boora is an example of 'pre-peat' archaeology. This site consisted largely of chert (stone) tools and related artefacts associated with charred deposits indicating campfires at the edge of what was then a shallow lake. No wet-preserved organic material such as wood survived, as the peat growth post-dated the human activity, and thus the conditions were not suitable for the preservation of anything aside from inorganic or charred remains. The camp was sealed beneath peat deposits which preserved it and the buried prehistoric landscape for nearly 8000 years. Here we see the importance of peat as a medium which *seals* and essentially protects prehistoric land surfaces and any associated archaeological remains, undisturbed and in situ, until the removal of the overlying peat by cutting, either by machine or by hand. In general, fewer of these pre-peat sites have been excavated, as peat cutting does not always reach down to the deepest basal layers, but there are important exceptions.

The second category, *intra-peat archaeology*, refers to sites that were originally located on the past surface of a peatland, and became submerged in the bog as the growing wetland deposits accumulated around and over them. This process leads to the preservation of organic remains, predominantly wood but also plants and insects, as processes of decay are slowed down in the anoxic

environment. Intra-peat sites have been found in their thousands in Irish raised bogs, mostly wooden trackways and platforms which allowed people to safely cross and access the wetlands. Trackways, also known as toghers (from the Irish word tóchar meaning causeway), have been found to date from the Neolithic to the late medieval period and range from small paths built to cross short distances, to monumental 'roads' that traverse the wetlands forming regional routeways (see Corlea). Platforms also vary widely in scale and date and were likely built to facilitate activities such as hunting, gathering and processing of plant resources.

Finally, there is archaeology that is located on the surface of the peatland (supra-peat), for example turf stacks that have been cut by hand, and even the remains of past extractive infrastructure, or what can be referred to as 'industrial archaeology'. Traditional turf cutting for domestic fuel was carried out by hand using a specialised tool called a sleán. A sleán has a long shaft or handle, and a steel blade with a wing set at right angles, which enables the cutting of a rectangular sod of turf in a single movement. Sleáns were used throughout Ireland, but their design varied from region to region. Once cut, the sods were often piled onto a wooden turf barrow and taken a short distance to be spread out to dry. This method of turf cutting is rarely if ever used today. In the 1940's the requirement for large scale peat extraction to provide economic benefit to the midlands and produce energy for the country, saw the establishment of Bord na Móna and the mechanisation of peat extraction. Opening up and working vast areas of peatlands, Bord na Móna shaped much of the midlands landscape.

Their extensive network of narrow-gauge railways, complexes of industrial buildings and villages which housed their workers, are an integral part of rural Ireland and lie at the core of many midland communities. Although peat extraction on this scale has ceased, its remnants form a unique type of cultural and industrial heritage, which alongside the traditional tools of 'hand won' turf cutting, is worthy of preservation and inclusion in the context of a just transition to peatland restoration and rehabilitation.

The last peat train on the morning of on the 29th March 2024 at Bellair North bog, between Ballycumber, Co. Offaly, and Moate, Co. Westmeath. The bog was linked by rail to Shannonbridge power station and Derrinlough briquette factory (Ted McAvoy).

Bord na Móna Construction Corps bog workers 1940s-1950s. Facilities for workers such as these included temporary accommodation hostels and workshops. The remains of these facilities still survive in places and there is a rich oral history from these activities (Bord na Móna Living History website).

Bog Bodies

Certain ‘intrapeat’ archaeological finds are comparatively well known: for example, ‘bog bodies’ or ‘bog mummies’ (human remains, often with soft tissue preservation). Over 100 bog bodies have been recovered in Ireland, although many of these were historical discoveries, which now only survive as written records. An important example of the latter is the Drumkeragh Body, Co. Down, which was unearthed in 1780 by a ‘surveyor’ on the estate of Lord Moira. Although the largely skeletal body itself has not survived the passage of over two centuries, an account and associated speculation concerning the find were compiled by Countess Moira (Elizabeth Rawdon 1731-1808) and were published in the journal *Archaeologia* (The Journal of the Society of Antiquaries) in 1783. This piece entitled, *‘Particulars relative to a Human Skeleton, and the Garments that were found thereon, when dug out of a Bog at the Foot of Drumkeragh, a Mountain in the County of Down, and Barony of Kinalearty, on Lord Moira’s Estate, in the Autumn of 1780’* has a very good claim to being the first ever formal scientific investigation of human remains from a peatland, and includes perceptive comments on the preservative properties of peat and the life and death of the individual. There have been other well reported finds in more recent times, including the Cashel Man, Co. Laois, and the remains of Old Croghan, Co. Offaly, and Clonycavan Man, Co. Meath, both of whom can be viewed alongside other relevant finds from peatlands, at the *Kingship and Sacrifice* exhibition at the National Museum of Ireland, Dublin. Ireland can also lay claim to one of the very few formal excavations of an in situ bog body, following the discovery of partial human remains in the Lemanaghan Bog complex, Co. Offaly, in 1998, during an archaeological survey of the cut-over surface of Tumbeagh Bog.

Examination of the human remains and associated peat deposits at Tumbeagh provided important evidence about this individual: a teenager of about 18 years, who lived and died in the medieval period and had either accidentally strayed into, or was deposited by people/persons unknown, in a very wet part of the peatland less than 50m from a routeway across the bog. Analyses of the insects from the associated peat deposits indicated that only one possible carrion beetle was present, demonstrating that the human remains must have been very rapidly submerged in the cold waters of the peatland.

Almost every bog body ever found, with a few exceptions, is partial, having been damaged by processes responsible for the initial unearthing. In the case of the Tumbeagh Bog body, only the lower legs of the individual survived intact. As is the case for many other bog bodies, the Tumbeagh remains were largely destroyed by mechanical peat extraction machinery and if it were not for the work of the former Irish Archaeological Wetland Unit (IAWU) this ‘bog body’ would have been destroyed completely, milled into thousands of fragments.

Other Artefacts Typically Found in Bogs

Whilst there is a popular perception that ‘bog bodies’ from the prehistoric period in particular, were ‘sacrificed’ in gruesome rituals, this does not seem to have been the case for many examples. Nevertheless, the deposition of beautiful and clearly once very valuable and rare objects in wetlands, are often interpreted as indicating past human activities that demonstrate a ‘ritual’ focus or intention. Examples of these finds include hoards of prehistoric metalwork, such as Dowris, Co. Offaly, and Coggalbeg, Co. Roscommon. Some objects, for example the Fadden More Psalter, and medieval coins from Lemanaghan could have been deliberately hidden with the intention of later recovery. Another class of find that represents deliberate deposition and is largely, but not entirely, restricted to Irish peatlands is ‘bog butter’. There are around 700 of these distinctive deposits of animal fat, sometimes found in wooden and other containers, dating from the Bronze Age through to the early Modern period (c. AD 1536-1691). Interpretations range from the practical storage of excess butter through to ‘votive’ offerings associated with fertility rituals and religious beliefs.

A Late Bronze Age hoard of bronze objects from Dowris, Co. Offaly, comprised a total of perhaps 218 objects that included swords, spearheads, axes, gouges, knives, razors, cauldrons, buckets, horns, crotals and other objects found in a bog in the 1820s (© National Museum of Ireland).

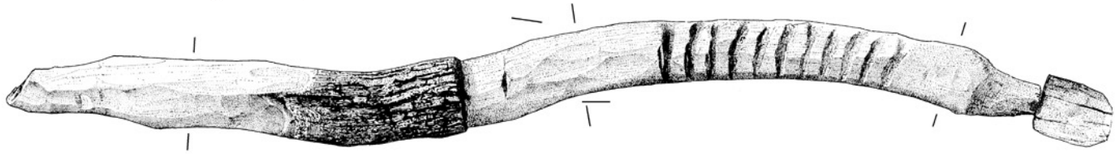
The Coggalbeg hoard, Co. Roscommon, consists of an Early Bronze Age gold lunula and a pair of matching sun discs. This hoard was discovered in bogland in 1947 during turf cutting (© National Museum of Ireland).

Bog butter recovered from a bog at Rosberry, Co. Kildare, was radiocarbon dated to between 360 - 200 BCE, alongside the wooden keg it was found in (© National Museum of Ireland).

Bog bodies and bog-butter, as evocative and compelling as they might be, account for a relatively small proportion of known peatland archaeological remains. Thousands of artefacts have been recovered from Irish peatlands, found within sites such as trackways and platforms, but also in isolation. Many hoards of objects of gold and bronze were found during turf cutting in the last century. Less immediately spectacular perhaps, but nonetheless important, are the many organic objects which rarely survive on dryland. Wooden artefacts such as domestic vessels, bows, agricultural tools, wheels, cart pieces, tubs and stylised human figures have been found by archaeologists, as well as by individuals involved in peat cutting or extraction. These objects offer rare glimpses into domestic and agricultural life and demonstrate the exceptional skills of ancient wood workers. Items of clothing or leather shoes are rarer still and provide a very immediate and tangible connection to past people. With some notable exceptions, human settlements tend not to be located on peatlands, and so most of the artefacts found were deliberately transported and buried in bogs. The reasons for this may vary from discard of broken and used objects, or burial for safekeeping, to ritual deposition. Concealment and votive offerings almost certainly account for many hoards of Bronze Age gold, but archaeologists have also identified the deposition of items of wood and stone as also being potentially ritual in nature.

The Pallasboy vessel was found during an archaeological survey of Toar Bog, Co. Westmeath. The vessel measures 1.29 m high, 0.57m wide and 0.49m deep, and was carved out of a single piece of alder wood. It was taken into the peatland, using hazel withies and pinned down in a shallow bog pool using hazel wood stakes, sometime between 197 BCE and 68 AD during the Iron Age (Simon Dick/Irish Archaeological Wetland Unit/School of Archaeology UCD).

Humanlike Early Bronze Age wooden figure discovered in Ballykean bog, Kilbeg, Co. Offaly. This measures 2.31m in length with a diameter of 16cm (Simon Dick/Irish Archaeological Wetland Unit/School of Archaeology UCD).



Archaeology in Blanket Bogs

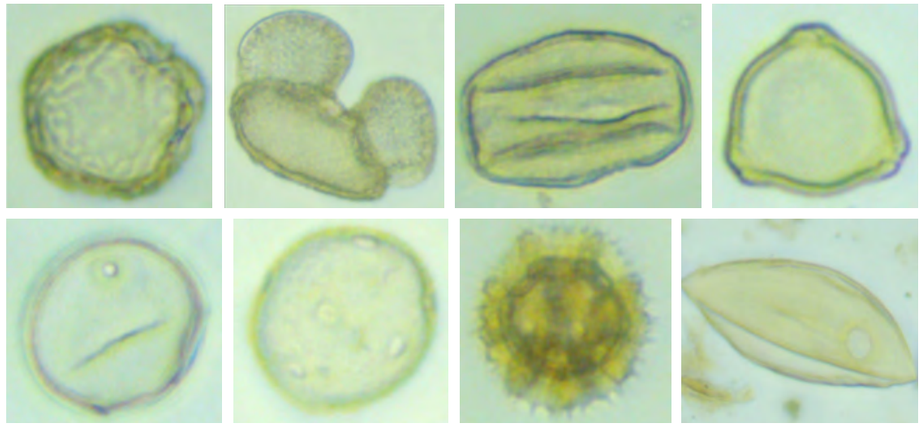
There are extensive tracts of peatland in the Irish uplands, mainly in the west and north of the country, known as ‘blanket bogs’. This expression describes very well how the peat deposits ‘blanket’ the landscape, even covering slopes and summits. These landforms are also found in the lowland coastal fringes of Ireland. The underlying processes of peat growth are similar to the ‘raised mires’ of the lowlands, with long term imbalances between precipitation and evaporation leading to waterlogged soils. Based in part on palaeoenvironmental analyses and dating of deposits, it has been argued that past human impacts on the uplands may also have contributed to peat growth and spread.

There are comparatively few archaeological finds from Irish blanket peats. This is in part because these deposits have never been subject to industrial scale drainage and extraction, as have their lowland counterparts. However, important sites have been found by hand cutting of peat, including the famous Céide Fields, Co. Mayo: these extensive stone field systems were built during the Neolithic (c. 4000-2500 BCE), on land surfaces that only later became enveloped by peat growth. An interpretative centre dedicated to the Céide Fields can be visited at Glenulra, Co. Mayo.

While other ‘pre-peat’ field walls and settlements are known, only some have been surveyed and fewer have been excavated. Archaeological research by Professor William O’ Brien from University College Cork on the uplands of the Beara peninsula, Co. Cork and Co. Kerry, has established that farming and other activities took place from the Bronze Age to Medieval periods, during which peat growth partially ‘buried’ sections of stone walls.

The Palaeoenvironmental Record

Peat also preserves the remains of ancient plant and animal life, referred to as the ‘palaeoenvironmental record’: pollen grains, fragments of insects and other microscopic evidence that can be analysed to reconstruct changes in past vegetation and climate. We can therefore consider peatland archaeology as comprising two interrelated strands of evidence: past cultures evidenced by artefacts, sites and other finds, and the palaeoenvironmental record, which allows cultural changes to be placed within broad frameworks of vegetation change and human impact on the landscape, through settlement, agriculture and later on by urban and industrial expansion.



Slide of different pollen types viewed under a microscope. Top row, from left to right: Elm, Pine, Oak, Hazel. Bottom row, from left to right: Grass, Plantain, Aster type, Cereal (Daisy Spencer).

How are sites discovered?

Archaeological survey of Bord na Móna’s Derries Bog, Co. Offaly, in 1997 with Ferbane Power Station in the distance. Archaeological sites are being recorded in the face of the drain as milled peat production continues. Industrial peat production ceased in this bog circa 2005 (Conor McDermott/Irish Archaeological Wetland Unit/ School of Archaeology UCD).

Almost all Irish peatland archaeological sites and finds are discovered as a result of the drainage and extraction of peat, especially the large-scale cutting of the midland peatlands. Occasionally, sites exposed via peat cutting were documented, and sometimes artefacts made their way to the National Museum of Ireland. However, no programmes of archaeological survey or mitigation, and few formal excavations of archaeological remains, were carried out until the later 1980s with the investigation of the ancient roadway at Corlea in the Mountdillon Bog complex in Co. Longford.

The large wooden timbers of the Corlea trackway that emerged from the drained, cutaway peat had been known locally for some time. In 1984, an oak plank from the structure was sent to Queens University Belfast where it was precisely dated using the science of dendrochronology (tree-rings) to 147/148 BCE, demonstrating that the 'road' was built during the Iron Age. Subsequent excavations by the late Professor Barry Raftery and his team from University College Dublin, demonstrated this plank was one of many, measuring 3-3.5m long, that had been used to construct a 1km long wooden trackway, now known as Corlea 1. Moreover, Corlea 1 was one of over 100 trackways identified in the peats of Moundillon, indicating human activity from the Neolithic through to the Medieval Period. These sites were destroyed by further peat cutting. However, a section of Corlea 1 was conserved and can be seen in the excellent Corlea Trackway Visitor Centre.

The subsequent establishment by Prof Raftery of the Irish Archaeological Wetland Unit, University College Dublin, led to the survey and identification of thousands of archaeological sites in peatlands across the midlands. Related excavations in 1990 included the remains of a Bronze Age settlement that had been exposed by peat cutting at Clonfinlough, Co. Offaly. This identified two circular timber platforms (possibly roundhouses) and two hut-like structures, which were encircled by a palisade of ash posts. Hearths, crushed stone, animal bone, pottery, wooden oars and two precious amber beads were recovered during the excavations. The enclosure had been built at the edge of a shallow lake and it was preserved as peat filled the lake basin and spread over the site. A dendrochronological date from one of the larger timbers indicated construction during the late Bronze Age c. 910 BCE. Subsequent campaigns of survey and excavation funded by both the state and Bord na Móna have seen the excavation of many such peatland sites.

It is rarely possible to remotely identify archaeological material buried in peat, as the geophysical techniques employed for dryland survey, do not often work well for wetland deposits. The main way to discover wetland sites has been field walking across the milled surface to look for surface remains and by checking the sides of drainage channels for exposed material.

Whilst the exposure and loss of the archaeological record through industrial peat extraction was the impetus for much of the work carried out in the later 1980s and 1990s, other interventions into peatlands in the last twenty years have also led to important discoveries and related developments. The late 1990s excavations at Lisheen Bog, Co. Tipperary, in advance of the construction of a zinc mine, represent the most detailed archaeological and palaeoenvironmental investigation ever undertaken in an Irish peatland.

Conserved section of Corlea trackway, Co. Longford. This oak Iron Age road was dated to 147/148 BCE and is over 1km in length. It has a width of 3 - 3.5m and 18m of the trackway is visible at the Corlea Trackway Visitor Centre.

Late Bronze Age paddles from the Clonfinlough wetland settlement (Conor McDermott/ Irish Archaeological Wetland Unit/ School of Archaeology UCD).

Archaeologists excavating a wooden hurdle at Edercloon, Co. Longford (John Sunderland).

Archaeology and the Story of Peatlands

The pattern and focus of human activity in peatlands seems to have changed through time. For some periods, such as the Bronze Age, the peatland record appears to track its 'dryland' counterpart, suggesting that intensification in settlement and related activities such as agriculture on the dryland, also involved expansion into wetland environments for a range of possible reasons. For example, the late medieval date of the Tumbeagh Bog body falls in a period in which timber trackways, wooden platforms and related structures were constructed in places across the Lemanaghan complex. These structures would have facilitated access to essential resources, such as birds, edible plants, and materials like reeds and sedges. The analysis of the palaeoenvironmental record also hints that certain changes in human activity in peatlands might be associated with past climatic deterioration to wetter and colder conditions. The Little Ice Age began in the early 14th century AD and Europe endured many cold turbulent years. This climatic deterioration led, in turn, to renewed peatland growth, which necessitated solutions for bridging previously drier bog surfaces.

Integrating and correlating the archaeological and palaeoenvironmental records to investigate these complex relationships between human societies and their environment is another unique aspect of peatland archaeology, which is especially visible in the excavations carried out at Edercloon in Co. Longford.

Edercloon

In 2006, excavations in advance of the N4 Dromod-Roosky By-pass, uncovered a previously unknown complex of peatland archaeological sites at Edercloon, Co. Longford. Funded by Transport Infrastructure Ireland, the excavation at Edercloon sought to study not just the archaeological sites and finds, but also the development of the bog and surrounding landscape. While archaeologists worked to excavate an intricate complex of 45 wooden trackways and platforms, palaeoenvironmental scientists studied peat sequences, wood samples and the preserved remains of insects. These analyses could trace the development of the bog and vegetation in the surrounding landscape, and reconstruct the forests exploited to build the sites and ground conditions local to each structure.

The bog at Edercloon began to develop c. 6000 BCE, with the growth of a reed and alder-rich fen, surrounded by a mixed wooded landscape. Around 3750 BCE this landscape saw significant change as Neolithic farmers felled trees and established pastures. Soon after this, a trackway of loosely woven brushwood and roundwoods, which had been felled with stone axes, was built across the wet fen, meandering around standing alder trees and crossing small pools of water. Extending from the adjacent dryland, this trackway would have provided a routeway out into the fen and access to its abundant resources such as plants and waterfowl.

By the start of the Early Bronze Age (c. 2500–1700 BCE), raised bog began to replace the fen, its surface rich in grasses, heather and *Sphagnum* moss. These years saw occasional trackway building at Edercloon and evidence for an important technological change, as the wood used in their construction was felled with sharp metal axes. During the Bronze Age the bog at Edercloon suffered two bog bursts, an often calamitous event whereby the internal water control systems of a bog are pushed beyond capacity, causing it to overflow. These difficult conditions meant that there was little human incursion into the bog, but pollen records indicate human activity in the area at the time.

The Edercloon block wheel has been dated to 1260 – 970 BCE. This is a C-shaped piece of alder wood. A second C-shaped piece and a central board with a hole for an axle would have made up the rest of the wheel (John Sunderland).

At the start of the Late Bronze Age (c.1200–900 BCE) conditions at Edercloon began to stabilise, heralding a new phase of trackway construction which continued into the centuries of the Iron Age. This was characterised by very large deep structures, some of which endured for several centuries. Unlike the earlier sites, many of these trackways skirted the adjacent dryland, forming routeways within the wetlands. These large trackways were also, at different points in time, inter-connected with crossing points, perhaps forming platforms that could be accessed by people travelling from different directions. The large sites of this period were accompanied by several smaller paths and platforms. Despite the scale of activity on the bog, the local pollen record suggests low level human interaction with the surrounding landscape, and no strong indications of farming. The local woodlands were varied and plentiful and a wide variety of wood species were exploited for building materials.

The sites of the Late Bronze Age and Iron Age were also the focus of repeated artefact deposition, with objects buried at regular intervals or specific locations such as the junctions between sites. Forty-six wooden objects included domestic vessels, spears, tool hafts, parts of wheels, decorative shafts and items of unknown function. Some of the objects were broken and used, others were pristine, unused and in some cases unfinished. The assemblage includes the earliest evidence for the wheel in Ireland, as a piece of brushwood lying over a wheel component was radiocarbon dated to 1260–970 BCE. The inclusion of artefacts in the trackways of Edercloon is unlike anything seen elsewhere and was clearly a deliberate act. During the Later Iron Age very wet conditions returned to the bog and trackway building ceased. It was not until the seventh century AD when ground conditions had improved, that toghers were once again constructed there.

Peatland Archaeology Beyond Ireland

Cutting and harvesting peat for fuel, Isle of Sky, Scotland.

Extent of peatland in northwestern Europe, comprising both lowland mire and upland blanket bog (from Gearey & Chapman 2022).

Countries across northwest Europe have also produced archaeological finds. Similar to Ireland, those areas have seen extensive peatland drainage and extraction. This includes parts of England (the Somerset Levels and the uplands of Dartmoor, Devon, in particular), Scotland, as well as in the Netherlands, Scandinavia (Sweden, Finland and Denmark) and Germany (Lower Saxony). The loss and damage of archaeological sites through peat cutting and processes including drainage and agriculture continues to be a significant problem. The impact of climate change on wetlands is likely to make this situation worse. Global warming, in particular, may lead to longer, hotter summers and drier conditions, causing deeper water tables and the desiccation or drying of peat.

The Future of Peatland Archaeology

Archaeological survey of Bord na Móna's Toar Bog, Co. Westmeath, in 2000. The archaeologists are tracing and recording archaeological remains that were identified in the drain faces and on the milled field surfaces. We hope that the need for archaeological rescue work like this has now come to an end (Conor McDermott/ Irish Archaeological Wetland Unit/School of Archaeology UCD).

The story of peatland archaeology in Ireland is, in many ways, not necessarily a very happy one. The past large-scale interventions through drainage, peat cutting, agriculture, and other reclamation processes, have led to the destruction of peatlands and the associated loss of thousands of sites and an unknown number of associated finds, such as artefacts and human remains. All archaeological work that has been carried out over the last few decades has aimed to document, recover and record in advance of the inevitable loss. This has led to some key discoveries and research, but all our knowledge of sites and structures, and all the artefacts displayed in museums or recovered for conservation, have come against a backdrop of peat extraction. The rehabilitation and restoration of degraded peatlands present opportunities to preserve whatever archaeology is left intact alongside benefits for biodiversity and carbon storage. Rehabilitation projects should consider the archaeological and cultural heritage value of bogs in parallel with natural environmental values.

Ireland's peatlands are rich with archaeological evidence and we hope that, due to changes in energy and environmental policy, the remains surviving in the deeper, wetter raised peatlands, will in future not need to be excavated and recorded and that they can be preserved in situ.

Where can I learn more about peatland archaeology?

Informative Websites

- Irish Peatland Archaeology Across Time
  www.ucc.ie/en/peatlands
- The Pallasboy Project
  https://thepallasboyvessel.wordpress.com
- Archaeological Finds in the Peatlands of Ireland – Bord na Móna: Living History
  www.wordnamonalivinghistory.ie
- Wetfutures - Ireland
  www.wetfutures.eu/ireland.html

Museums and Visitor Centres

- Bog Bodies Research Project – National Museum of Ireland
  www.museum.ie
- Cavan County Museum
  www.cavancoco.ie
- Corlea Trackway Visitor Centre
  www.heritageireland.ie
- Lough Boora Discovery Park
  www.loughboora.com
- The National Museum of Ireland
  www.museum.ie
- Museum of Country Life: Working on Land and Water
  www.museum.ie
- Céide Fields Heritage Centre
  www.ceidefields.com

Educational videos and talks

- Gortnacrannagh Idol
  youtube.com gortnacrannagh idol
- May the Road Rise to Meet You: Irish Toghers and the Stories they can tell us
  youtube.com National Monuments Service
- John Feehan: Story of the Bogs Part 3
  youtube.com Story of the Bogs Part 3
- Clara Bog for World Wetlands Day
  www.offalyindependent.ie
- Information and videos on the heritage of commercial peat extraction
  www.bordnamonalivinghistory.ie

Further Information

Map Viewers

- Heritage Council Heritage Maps Viewer www.heritagemaps.ie
- National Monuments Historic environment viewer www.archaeology.ie

More information on peatlands

Clara Bog Visitor Centre, Clara Bog Visitor Centre, Ballycumber Road, Clara, Co. Offaly

Abbeyleix Bog, Co. Laois

Wetland archaeology is protected under the National Monuments Act 1930-2014/ Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023

Report all new finds to the National Monuments Service to ensure their protection www.archaeology.ie

Finders are obliged to report discoveries of archaeological objects to the National Museum of Ireland (or to a Designated County Museum)

Aalen, F. H. A., Whelan, K., & Stout, M. (Eds.). (1997). *Atlas of the Irish rural landscape*. Toronto: University of Toronto Press.

Gearey, B. R. & Chapman, H. P. (2022). *An Introduction to Peatland Archaeology and Palaeoenvironments*. Oxbow Books.

Gowen, M., O' Neill, J. & Philips, M. (2005). *The Lisheen Archaeological Project: 1996-1998*. Dublin: Wordwell.

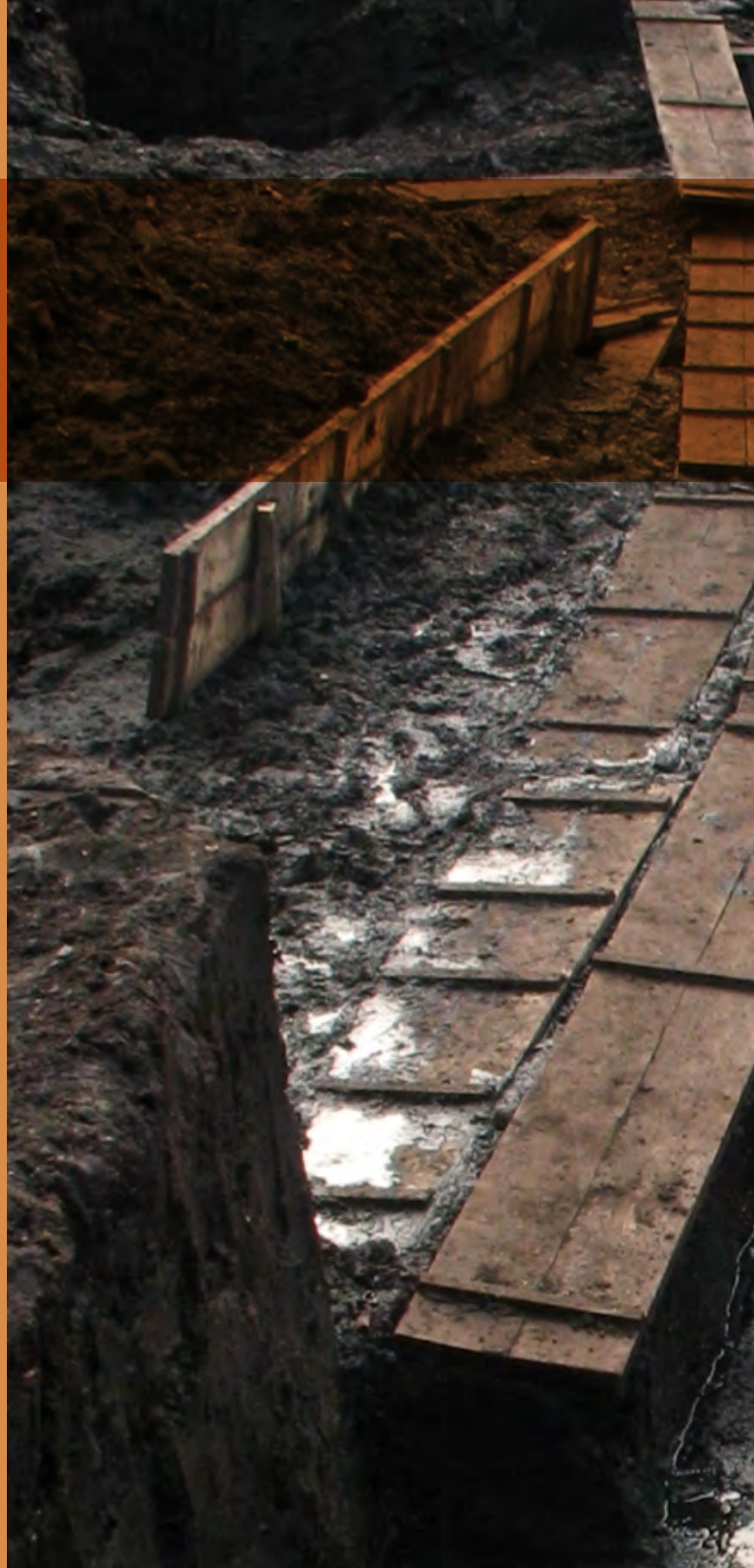
Moloney, A., Jennings, D., Keane, M., & McDermott, C. (1993). *Excavations at Clonfinlough County Offaly*, Irish Archaeological Wetland Unit Transactions: Volume 2, Dublin: Crannóg Publishing.

Moore, C. (2021). *Between the Meadows: The archaeology of Edercloon on the N4 Dromod–Roosky Bypass: 11 (TII Heritage)*, Dublin: Transport Infrastructure Ireland.

O'Carroll, E. (2018). Six Thousand Years of Peatland and Archaeological history in Lemanaghan, Co. Offaly Quaternary of the Irish Midlands. *Irish Quaternary Association Field Guide*, 35, 59-70.

Raftery, B. (1996). *Trackway Excavations in the Mountdillon Bogs, Co. Longford*, Irish Archaeological Wetland Unit Transactions: Volume 3, Dublin: Crannóg Publishing.

A train or 'rake' is loaded with 'sod peat' beside a drain. This industrial scale turf cutting has now come to an end (Bord na Móna Living History)



An Chomhairle Oidhreachta
The Heritage Council