

A Landscape History of Leighton Moss Nature Reserve

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(17,980 words)

Abstract

This work examines the history of Leighton Moss Nature Reserve, north-west Lancashire. It looks specifically at how land-form has changed over time, and what the impacts of changes have been on wildlife, specifically avifauna. It relates well to the academic field of historical ecology, and employs a plethora of evidence types, including documentary sources, palaeoenvironmental discovery, and archaeological excavation. Its underlying aim is to show the huge potential of historical research to nature conservation strategy.

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Preface

This research project was devised after having spent nine months as a voluntary warden with the RSPB (Royal Society for the Protection of Birds) at Leighton Moss Nature Reserve, during 2010-11. Much of the visitor engagement programme was tailored around the reserve's specialist flora and fauna, and the management undertaken by the RSPB towards the enhancement of it. The *history* of Leighton Moss though was never made a main feature of guided walks, school visits, or attempts to broaden the reserve's appeal to potential guests and supporters, despite its massive potential. It is felt that the historic dimension could be exploited more fully not only to promote the site and the organisation, but also to enforce links to the wider landscape for the betterment of the human and non-human communities that abide there.

It is the concern of this work to provide a historical context for Leighton Moss and its environs - a landscape history - that also incorporates a look at some of the characteristic species present at particular junctures, given prevailing habitat conditions and land-uses. The underlying processes involved in physical landscape change and species composition will also be examined, placing this

work into the academic realms of historical ecology, archaeology and nature conservation (specifically wetland archaeology), and a more broad school of historic landscape investigation.

The approach, main sources of information and structure will be explained in detail in the introductory chapter, but a brief word on style is required here. The chief stylistic ambition has been to achieve simplicity so as to make all discussion and diagrams accessible and appealing to a wide audience. Specialist software such as GIS has therefore not been made use of, as it is not readily available in non-academic circles, and so goes against the underlying ethos of this piece: that anyone and everyone should feel empowered to write on local history. It was also felt that the use of GIS in particular would complicate the study by introducing another means of *viewing* the landscape; most maps and diagrams are therefore derived from one source, the OL Explorer 7 Ordnance Survey map. Brian Jones of the Mourholme Local History Society has applied for Heritage Lottery funding for a project that will incorporate the use of GIS to map historic features in the locality (pers. comm. 2012), so if a greater degree of spatial analysis is sought, it may be afforded there.

The scope of this work in terms of its spatial framework has been left undefined; this was decided at the outset so as not to reduce the pool of available evidence, or dilute the applicability of conclusions. There is a limit to the temporal range of this study however, as the consulted evidence stretches only as far back as the late Mesolithic period. The classification of time periods here will follow that listed by Rackham for England (Rackham 1987, xvi), as below (note there is some overlap between periods).

Mesolithic	c. 10,000-4500 BC
Neolithic	4500-2000 BC
Bronze Age	2400-750 BC
Iron Age	750 BC-AD 40
Roman	AD 40-410
Anglo-Saxon	AD 410-1066
Medieval	AD 1066-1536
Post-medieval	AD 1536 onwards

Acknowledgements

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Concessions

Due to time-constraints and financial limitations, which allowed only a finite number of research excursions, it was not possible to examine all available material, to follow every lead. Early on it became apparent that only after having completed this project would it be possible to realise the full potential of the evidence; so much more could be achieved, and this work should be seen as something to build upon. Despite these limitations, it has been the author's aim to present and interpret consulted evidence impartially. Any and all mistakes in this work are the author's own.

1

Introduction

Today, Leighton Moss holds the largest reed-bed in northern England (Middleton et al 1995, 134), and as such provides vital habitat for a number of specialist species of flora and fauna. It is situated on the north-west coast of Lancashire, and lies adjacent to a north-east portion of Morecambe Bay (Fig 1.1), making it part of a particularly dynamic landscape.



Fig 1.1: Location of Leighton Moss (small map of Britain adapted from defra.gov.uk; large map adapted from OL Explorer 7 2011).

The dominant geology of the region is limestone (Fig 1.2), and the surrounding area has been described by English Nature as comprising “upstanding blocks of limestone with scars, cliffs, scree and pavement separated by fertile valleys and broadleaved woodland” (English Nature Cumbria Team 1997).

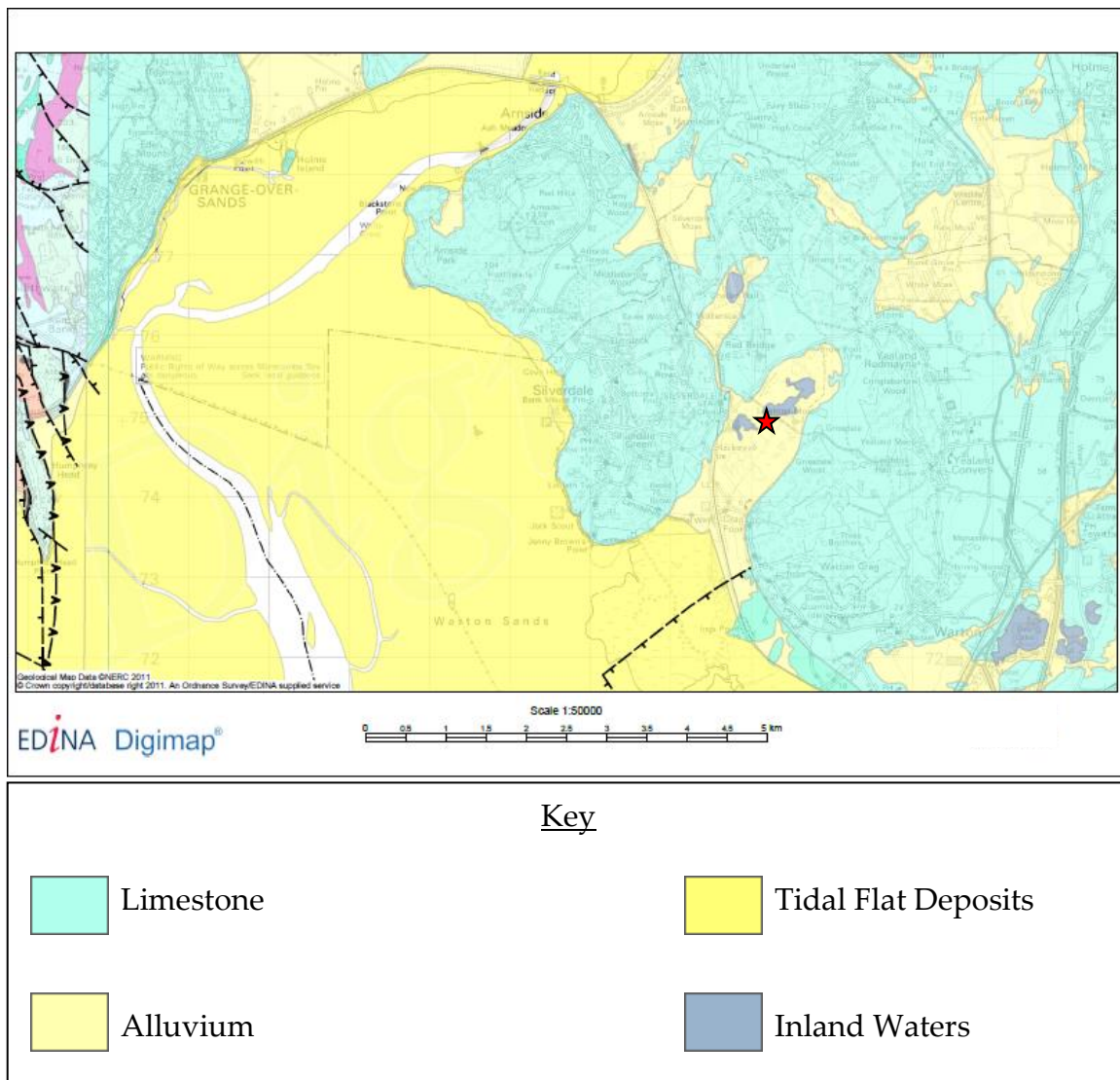


Fig 1.2: Geology Map (adapted from Edina Digimap 2012).

The mosaic of habitats afforded by this diverse range of landscape forms sustains a varied wildlife composition, and is conducive to a number of land uses. This special character of the locality is pronounced by its classification in 1972 as part of the Arnside/Silverdale AONB (Johnston 1986, 6), and Leighton Moss itself being designated SSSI status (Middleton et al 1995, 134).

Now an RSPB nature reserve, it is a place where one can see tens of thousands of starlings flocking together for winter roost, and on the lucky occasion at dawn or dusk in spring, hear a bittern “boom”. It is a place that resonates with the seasons, and one would imagine, always has. The walkways and bird-watching hides are obviously modern, as are many features of the surrounding landscape, but the reed-bed appears a natural oasis, a constant feature. Clues that large-scale changes have occurred in the past though are present, and perhaps none are more tantalising than relic gate-posts lying within the reeds (Fig1.3).



Fig1.3: Gate-post from the Causeway (Author's own 2012).

Immediately questions arise over the past and present character of the landscape. Why, for instance, are there gate-posts in the reed-bed? Did another land-use dominate in the past? This curiosity is further compounded by piles of brash-wood scattered at path-sides across the reserve, providing evidence of vegetation management and indication of direct human-influence on the configuration of the immediate landscape. A mystery surrounding the very nature of Leighton Moss thus emerges, a mystery that can only be solved by delving into its past.

In a broad sense, the aim of this work is to solve this mystery; to chart the history of Leighton Moss and its environs, and to reveal the main influences that have acted to create current landscape form. Throughout, the landscape will be scrutinized for the habitat mosaic it provides, with changes therein being viewed as the evolution and revolution of habitat. Changes in the composition of wildlife – non-domestic animals - will be chronicled in tandem, allowing for links to be made between landscape configuration, wildlife distribution and the processes that have combined to determine both. The results of this study will therefore be directly relevant to nature conservation, indicating which species inhabited the area in the past, and perhaps highlighting which species should be safe-guarded in the present (Robinson 1985, 11) – or at least which conditions should be safeguarded.

The potential to apply results of historical research to management of nature reserves is becoming increasingly acknowledged, and evidence that this is a highly topical issue today has been provided by Peter Jones, Reserves Officer with Cumbria Wildlife Trust. It transpires that there is archaeological interest in the Brown Robin reserve near Grange-over-sands in Cumbria, which contains evidence of land-use thought to date back to at least the early Industrial Revolution (pers. comm. 2012). Multi-stemmed mature trees provide evidence of

an abandoned coppice, while damage to the limestone-pavement implies extraction of limestone. The implications for management of what is known of the reserve's history are detailed below:

"The history of the site [Brown Robin reserve]... gives insights into what habitats and species were traditionally there. We know that fritillary butterflies used to be on the site. Why are they not now? Knowing that there used to be lots of coppicing going on there tells us that when the coppicing stopped, the habitat became unsuitable for them and they disappeared. By coppicing now we are hoping to get them back on the reserve" (pers. comm. Peter Jones 2012).

So the pertinence of historical research to nature conservation is not simply a hypothesis, but an accepted and embraced fact. It is also an issue dealt with in the academic discipline of historical ecology, which is concerned with drawing out the intricacies of the human/environment relationship by moving away from mono-causal explanations of change, and more recently, providing "reference ecosystems" (Egan and Howell 2001), from which conservationists may base ecological management. This current work most readily falls into the categories of *landscape history and nature conservation* and *historical ecology*, but there are many other schools of thought to which it could be linked.

In terms of structure, what follows is a two-part investigation into the history of Leighton Moss. The first section will form a historical narrative, moving

chronologically from present to prehistory, presenting evidence for change on a landscape-scale through time, and examining the concomitant make-up of flora and fauna. The first chapter of this section will begin by relating the current configuration of land forms and features, introducing the main stake-holders and users of the land. The current wildlife composition will be discussed, with a focus throughout on avifauna (birds). With a large proportion of visitors to the reserve, and supporters of the RSPB at large, being avid bird-watchers, it seemed fitting that the spotlight for this foray should be placed on birds.

The remaining chapters in the first section will explore what is known of the reserve's disposition in the past. Chapter two will move from the 21st century to the early 20th, and will see Leighton Moss transformed from reed-bed to a large freshwater lake; chapter three will continue the story and see the freshwater lake become productive arable land - and a terrestrial habitat - up to the early nineteenth century; chapter four presents evidence from the mid-eighteenth century, revealing a raised bog, and giving for the first time some indication of the vegetation cover of the Moss in this period, querying the findings of the North-West Wetlands Survey (Middleton et al 1995) in the process; chapter five will complete the historical narrative by revealing what glimpses exist of the area from the medieval period up to prehistory.

The first section will also attempt to provide “views” of the landscape, which aim to impress how the land may have looked at various points in the past, given the dominant vegetation cover. A fixed point in the contemporary landscape, Lillian’s hide, has been chosen as a reference point for these views, offering perhaps the best-known vantage-point on the reserve today, and thus providing a familiar frame of reference to patrons. Allusion to how the land may have physically looked will be afforded only up-to the eighteenth-century, beyond which time consulted evidence is too scant for the attempt to be made. Glimpses to fuel the imagination will though be provided of a history further removed.

The second section of this work will attempt to analyse the constructed narrative, working counter-clockwise from the past to the present. This is so as to follow changes as they occurred, as obviously, processes do not happen backwards (even if due to cyclical rhythms they can manifest themselves to this effect). The interplay between facets such as geology, climate, and sea-level fluctuations will be appraised alongside human-induced factors such as land-use, management and legislation.

It is in this section that key concepts associated with historical ecology will come into play as analytical tools. Two concepts of particular relevance are: *heterachy* -

the notion that relationships between humans and the environment are reciprocal, rather than determinant or hierarchical (Meyer & Crumley 2011, 120); and Balee's "tripartite division of human time" (Balee 2006, 80), which comprises events, cycles, and long duree (interaction over large time-scales). This section will argue that water, and the manipulation of it through time, has been instrumental in forming the current landscape. It will end with a look at how the findings of this project could be used, and discuss the potential for extending the remit of research in future.

What follows is predominantly a desk-based analysis of evidence, though previous experience of the Leighton Moss landscape has allowed for a high resolution of interpretation. The gate-posts mentioned at the top of this piece, for instance, were not identified by the rapid survey undertaken for English Heritage's PastScape project (English Heritage 2012), due to both access restrictions and the camouflage afforded to these features by the dense covering of reeds. The strength of local knowledge thus becomes apparent to a holistic exercise such as this.

In its approach this study could be labelled as "standard", as its concern is with physical changes in land-form and configuration, rather than the way in which

these features would have been perceived by their human inhabitants (Tilley 1994, 11). The landscape experience will though be commented on for the way in which it has altered perceptions and thereby the human-wildlife-habitat relationship. A more phenomenological approach could be applied in future, but any findings would need to be viewed with caution given the differential survival and acknowledgement of historical evidence; it would be very difficult to claim understanding of, for instance, the significance of certain features in the landscape versus others, without a fully intact landscape. Williamson demonstrates this assertion clearly in discussion of evidence for intermediate exploitation of animals, showing that physical remains of rabbit warrens survive as “pillow-mounds” in the landscape, while duck-decoys are remembered only for the names that they bestow (Williamson 1997). Thus any form of landscape interpretation must be undertaken with recognition that pieces of the puzzle are, and will forever be, missing.

Sources of Information

Details regarding the history of the landscape and its human and non-human inhabitants have been gleaned from a plethora of sources, covering topics including local history, ecology, archaeology and environmental studies, as well as primary documents. Below, the main sources of data consulted for this study are divided into the main topics they cover; there is some overlap between the categories each could be placed in.

Local Interest

A start-point of the data gathering process was making contact with those individuals and organisations with a stake in the contemporary landscape, those with indigenous knowledge. These included the RSPB, Leighton Hall Estate, and the Mourholme Local History Society, all of which provided a different milieu from which to start building-up a picture of landscape change. The RSPB provided much information about habitat change, management and species composition, at Leighton Moss and numerous other local sites in which they are

involved. Records stretch back to 1964, and of particular use was the 25th anniversary reserve report, collated by John Wilson: *Leighton Moss and Morecambe Bay Reserve, Lancashire: the first 25 years, 1964-88* (Wilson et al 1988). Also available are various Annual Reports, detailing management and monitoring efforts more recently. These are public documents available on request, held by the particular reserve to which they pertain.

Leighton Hall Estate owns much of the surrounding land to the Moss, and ceded management, ownership and shooting rights to the RSPB, in 1964, '74 and '84 respectively (Wilson et al 1988, 3-5). As will be shown later, the estate is also the likely supplier of the name "Leighton Moss", which was apparently bestowed at the turn of the nineteenth century. Permission to study the Game-keeper's accounts (Fig 1.4), which date back to 1923, was granted by the current owners, and is a valuable indicator of changes in land-use and wildlife composition and management since that date.

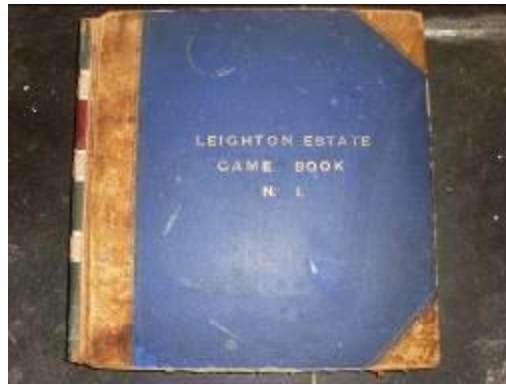


Fig 1.4: Leighton Estate Game Book (Author's own 2012).

The Mourholme Local History Society (hereafter MLHS) is *the* authority on the history of what was the Old Parish of Warton, which includes Leighton Moss along with seven proximate townships (MLHS 1998). They have several publications that cover all aspects of local life through the ages (e.g. MLHS 1998, MLHS 2005), and a compendium of magazines, available digitally on-request in CD format, produced since the early 1980s.

An earlier work by Mrs Ford, *Sketches of Yealand* (1931), provides useful commentary on the inter-war period, as well as anecdotal information stretching back to the nineteenth century. While the research of Booth into the medieval character of the area should be seen as a landmark in local literature, revealing many interesting glimpses of a past further removed (Booth 2004).

Archaeology

Archaeological investigation, replete with reports, has taken place in the vicinity of the nature reserve, with excavations at Little Haweswater (Taylor et al 1994) and Storrs Moss (Powell et al 1971) providing evidence of environmental disposition in prehistory. Palaeoecological work was the central concern of these investigations, with analysis of pollen cores allowing for recreation of vegetation composition, and thus allusion to prevailing physical conditions. The online Pastscape project, which has catalogued archaeological sites and finds across the country, is also informative; over 400 historic features have been identified and recorded within 5km of Leighton Moss (English Heritage 2012).

Two works are particularly noteworthy for dealing with the theme of archaeology in the lowland wetlands of north-west England: *The Wetlands of North Lancashire* (Middleton et al 1995) and *Peat and the Past* (Howard-Davis et al 1988). Issues relating to the relationship between nature conservation and wetlands archaeology more broadly are well-covered in *Wetlands Archaeology and Nature Conservation* (Cox et al 1994), while a collection of articles detailing the general state of archaeological knowledge in Lancashire is also available (Newman 1996).

Ecology

A wide range of source material concerned with the relationship between flora, fauna and the environment is obtainable. *The Ecology of Plant Communities* (Rieley & Page 1990) and *The Biology of Freshwater Wetlands* (Van der Valk 2006) were found to be of particular use in relating the key characteristics of habitat types. For information regarding the relationship between bird species and particular habitats, Fuller's *Bird Habitats in Britain* (1982) is an excellent resource, and can be used handily alongside existing histories of Britain's avifauna (see Yalden & Albarella 2009; Shrubbs 2003; Holloway 1996).

For volumes that deal more broadly with the history of British wildlife, Harting (1972), Yalden (1996) and Lovegrove (2007) provide the most vivid accounts, detailing the changing fortunes of non-domestic animals through time and giving good allusion to primary source material.

Primary Sources

Many of the primary documents consulted here are housed at Lancashire Record Office (hereafter LRO) in Preston. The most useful of which were Tithe Maps and accompanying Tithe Schedules, dating from 1846. The maps provide the spatial layout of the land, while the schedules detail land-use, such as arable farmland or meadow, and so a recreation of the historic habitat mosaic can be attempted. Church Wardens' Accounts for Warton parish were also examined there on microfiche, after Lovelock was able to demonstrate the use of such accounts in discerning the history of British wildlife (Lovelock 2007). These are lists of church expenditure, and include information on which species were being persecuted, and critically *when* they were present to be persecuted. Enclosure Awards are also housed in the archives at Preston, though due to time constraints and the unwieldy nature of attendant paraphernalia, rigorous examination did not take place.

The single most vital document for information regarding the eighteenth century landscape is *John Lucas's History of Warton Parish* (Ford & Fuller-Maitland, 1931). It was compiled 1710-40, and close reading of its detail allows the vegetation

composition of Leighton Moss to be recreated for this period; a fact that has not before been acknowledged.

Photocopies of vertical aerial photographs were obtained from English Heritage, and digitised Ordnance Survey maps of various dates were accessed via the online Edina Digimap service. In tandem, these items allow for examination of landscape form and change from differing perspectives (the aerial photographs were not rigorously examined here). In order to re-imagine how the land may have looked from the ground, a call was also made for old photographs and postcards, though few were uncovered. Copies of a poster asking for these were displayed around the nature reserve; these were located in the RSPB visitor centre, café, and in two of the hides (see Appendix 2). One poster was also placed in the Post Office at Silverdale, and this request for pictorial evidence was kindly posted digitally onto the RSPB Leighton Moss Community Forum by Annabel Rushton (RSPB 2012). A final online resource worthy of note is the British Newspaper Archive, which was accessed for historic copies of newspapers including the Lancaster Gazette.

Method

Having made contact with the various stakeholders mentioned above, via email and telephone conversations which in most cases led to face-to-face meetings, a good idea as to the state of existing knowledge was established. Following on from this, it became clear after exploration of archive material that Tithe Maps and Schedules held the most potential for land-use analysis. The decision was made to concentrate efforts on transferring data stored by these two mediums onto an OS map of the same period – effectively re-creating the landscape of the 1840s that could be compared to a series of more modern maps. This was made possible due to the nature of these sources: Tithe Maps record each strip of land held in a given township, according each one with a number; Tithe Schedules record using the same numerical-code, what the “state of cultivation” was for each strip. It is therefore possible to determine where in the landscape parcels of arable land were situated, in comparison with other land uses, such as pasture, wood, plantation, meadow etc. The creation of a land-use map of this nature could then be compared directly to other such models, such as that produced by Stamp’s land-use survey of 1931 (to be discussed subsequently).

In order to create a land-use map for 1846, Tithe Maps of four townships were examined: Silverdale, Yealand Conyers, Yealand Redmayne, and Warton-with-Lindeth. The enormous size of (most) of these maps meant that the only way to capture their detail was to physically copy them using tracing-paper. In total 27 sheets of A4 tracing-paper were used to record their data, and the land-use information detailed in the Tithe Schedules for each township was noted. A colour-code was then applied to each of the different “states of cultivation”, and a historic OS map, obtained from Edina Digimap, was coloured-in accordingly.

Most other sources of information were more straightforward to access, and their information was simply noted. Some documents though, such as John Lucas’ account, were afforded a closer degree of examination than others, due to the high level of detail they could relate. Once the dominant vegetation cover and land-uses had been discerned from historical and archaeological sources, comments could be made as to the types of available habitat, and therefore what the attendant composition of wildlife is likely to have been. An indication of how the landscape may have looked and what species may have been seen it was the desired result. This point leads rather nicely onto a brief discussion over the definition of *landscape*; the term having already been deployed in a number of ways to denote a number of things.

Conventions: Defining *Landscapes*

This brief discussion will examine some of the ways scholars have defined the term *landscape*, but will be primarily concerned with how the concept will be employed in this work. *Landscape* has been used above and throughout in two main ways. Firstly, to denote the area around the site; a landscape history of Leighton Moss will comprise a study of it and its surroundings. Secondly, the term has been used to describe a particular view of the land; the *gist* of everything that can be seen from a point of greater vantage. In a landscape view the focus is relaxed, and sites merge to form one expansive sight. These two classifications accord directly with the two “elements” that Johnson identifies as forming a part of most definitions of the term (Johnson 2007, 4).

Now the fact that there is more than one connotation of the phrase will probably be of little surprise, as *landscape* really has no definition of itself; it is defined relative to other things, of which there are many. The instant association conjured by the term, which for most involves some aspect of how the land *looks*, is also the most apt descriptor for its wide ranging application; attempts to

further mark-out its definition often amount to nothing more than distinctions without difference.

When it comes to analysing and interpreting physical features, grouped together to form *landscapes*, the call for a more critical definition has been made. Authors such as Tilley (1994) and Schama (1995) argue through their own examples that landscapes are inherently cultural constructs, in that both their physical form and classification according to this form, is determined by particular belief systems that promote certain types of interaction. This is of course a reasonable assertion, as are most others that deal with this issue, but the land is also subject to forces acting independently of culture, and culture is not independent of these forces.

Thus it would seem that actually there is no *one* suitable definition of the term; in fact there are several that could even be applied to the same area of land by the same author, as here. One point that many authors make in common however is that landscapes are palimpsests: they have been worked and re-worked through time, retaining aspects of the past in their present form, and in many cases, have been moulded by such remnants. This claim is particularly well illustrated by the example of relic gate posts lying in the reed-bed.

2

Historical Narrative

1

Introduction



Fig 2.1: A contemporary view of Leighton Moss from Lillian's Hide (Author's own 2012).


This chapter will provide an overview of the contemporary landscape, detailing its most recent manifestation as a freshwater reed-bed. Below is an annotated map (Fig 2.2) of named places and features that will be referred to in this chapter, and throughout the section.



Fig 2.2: The Leighton Moss Landscape (small map of Britain adapted from defra.gov.uk; large map adapted from OL Explorer 7 2011). Key overlaid.

Key

 Reserve Boundary

 Lillian's Hide with direction of view

 Leighton Hall

Site of Archaeological Investigation:

 Storrs Moss

 Little Haweswater

 Dog Hole Cave

RSPB Managed Sites:

1 LEIGHTON MOSS

2 Inner salt-marsh

3 Outer salt-marsh

4 Barrow Scout Field

5 Warton Crag

6 Silverdale Moss

7 Challan Hall Allotment

Warton Settlement Area

Leighton Moss

The most distinctive feature of the contemporary landscape is its wetness. The large pools of open water, as depicted in Fig 2.1, are only the most obvious exemplars of this fact, with reed and rush colonizing the shallower reaches where water-level is also above that of the substrate; typically 0.2-2m above for *phragmites* (Rieley and Page 1990, 92). The table below shows the approximate coverage of different habitat types in 2006/07:

Habitat Component	Coverage Target (Out of 131ha)
Reed-bed	>80ha
Scrub	<4%
Open Water	>25ha
Dry Reed-bed	5-10%

Table 2.1: RSPB Habitat Targets 2006-07 (derived from Horner & Birnie 2007, 2). Total extent of Leighton Moss (131ha) taken from Wilson et al (1988, 6).

The distinction between “Reed-bed” and “Dry Reed-bed” here can be taken to profess the “wet” nature of the former component, and when combined with the

area of land covered by open water, exemplifies the preponderance of a wet landscape.

Water-inputs to Leighton Moss are therefore of fundamental importance to its configuration, allowing the assertion that understanding the hydrological catchment is key to relating the site to the landscape. These inputs include ground-water run-off, direct precipitation and surface-springs, as below:

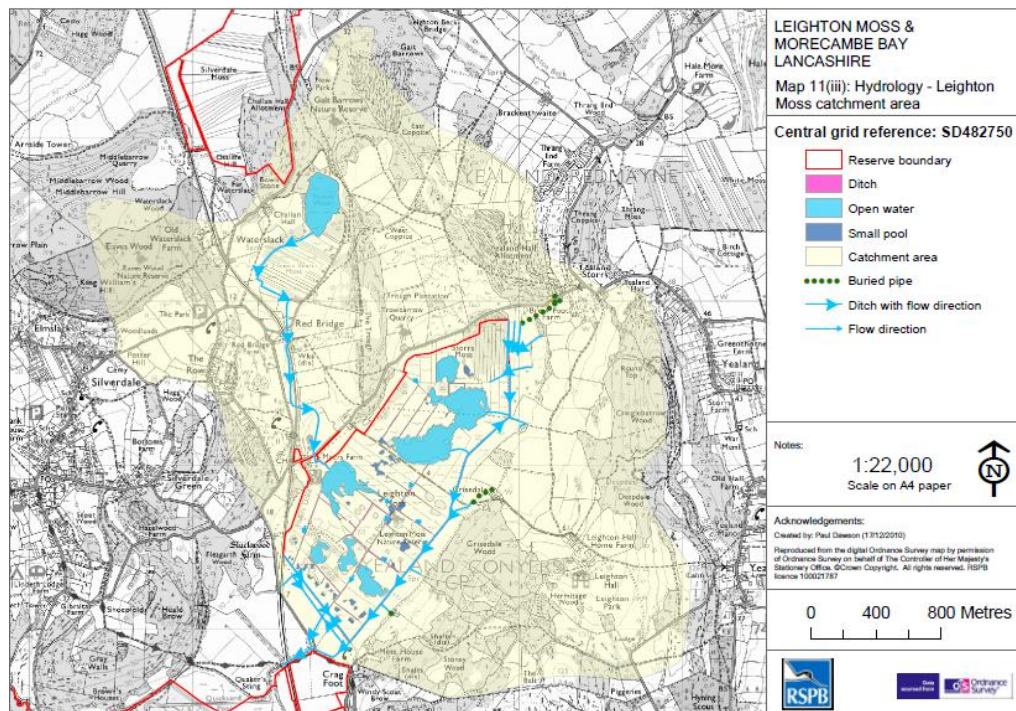


Fig 2.3: Leighton Moss Catchment Area (RSPB Leighton Moss).

The current land-use of the Moss as a nature reserve also demands a certain level of infrastructure, for the use of both RSPB staff and affiliates. The immediate

landscape is therefore comprised of a network of paths that lead-out from the RSPB visitors centre, and into the reed-bed. Bird-watching hides are a nodal feature, allowing expansive views across the larger water-bodies on the reserve, and a closer inspection of its wildlife.

The Wider Landscape

The environs of Leighton Moss are diverse in both their land-uses and forms. The reserve is surrounded by pockets of farmland and woodland, with several outlying sectors of the landscape also under some form of nature conservation management. The main sites governed by the RSPB are outlined on the map above (Fig 2.2), and show the interest in maintaining a mosaic of vegetation-types over a large space. Silverdale Moss and Barrow-Scout Field are examples of “satellite” reed-beds, providing subsidiary habitat to Leighton Moss for reed-dwelling species. The inner and outer salt-marshes (I/O in subsequent reference to avoid confusion with Silverdale salt-marsh) adjacent to the coast are also particularly noteworthy for the distinctive flora and fauna they support, largely influenced by the tidal cycles of Morecambe Bay and the dynamic regimes of the rivers Kent to the north and Keer to the south.

Impressive limestone outcrops such as Warton Crag give a varied topography to the area, and support rare wild-flowers such as violets, as well as populations of threatened butterfly species. Myers Allotment, which is owned by Leighton Hall Estate and managed by Butterfly Conservation (pers. comm. Mrs Arthurs 2012), is another example of limestone-specific habitat; limestone pavement (Fig 2.4).



Fig 2.4: Myers Allotment (Author's own 2012).

When taken together, the various land-form types and attendant vegetation create a rich mosaic that is both aesthetically varied and ecologically diverse.

The relationship between how the land looks, and what can be seen in it is a strong one, and some examples of the characteristic wildlife prevalent today will now be introduced.

Wildlife

There are many bird-species that inhabit the Leighton Moss landscape, but three in particular are noteworthy for being closely linked to the reed-bed; these are the bittern, the bearded-tit, and the marsh harrier (Fig 2.5). Extensive reed-beds are the preferred habitat of all of these birds, with the former two being exclusively dependant on them in order to successfully breed (Holden & Cleeves 2006). In total, over all RSPB-monitored areas, 74 species of bird were listed as breeding in 2006/07 (Horner & Birnie 2007, 26-7). These included 35 pairs of bearded-tits; two confirmed marsh harrier nests; and one displaying male bittern (Horner & Birnie 2007, 26-7). Other examples of breeding birds at Leighton Moss included sedge warbler, reed warbler, reed bunting, moorhen and coot, with pairs of avocet and lapwing also noted. These latter two will most likely have been concentrated at the inner salt-marsh; as they are currently.



Fig 2.5: From top to bottom: Bittern; Male Bearded-Tit; Male Marsh Harrier (all © Mike Malpass).



Fig 2.6: From top to bottom: Reed Warbler; Avocet; Lapwing (all © Mike Malpass).

Some of the species mentioned above are more conspicuous than others, and their prominence in the landscape is also subject to change with the seasons. The bittern for instance has a distinctive mating call, or “boom”, which it emits from early spring in order to attract a mate. In favourable conditions, the call can be heard up to three miles away from the bird making it (Wilson 1987, 5). The lapwing and bearded-tit are also good examples of species that give a place a distinctive acoustic character, with both birds having particularly recognizable calls.

The seasonal aspect is important, as outside of the breeding season most species stop singing and the composition of bird-life changes dramatically. This change is even more pronounced at Leighton Moss due to the mix of habitats in close proximity of each other. Fuller notes that for the intertidal zone and salt-marshes: “the number of migrant and wintering bird species...is large by comparison with the number of nesting species” (Fuller 1982, 21), and that “the total populations of most lakes [and large water bodies]...are far greater in winter than in summer” (Fuller 1982, 130). Leighton Moss typically sees a substantial increase in the numbers of ducks in winter, such as pintail and wigeon, while its marsh harriers migrate south. One notable spectacle associated with the reed-bed during autumn and winter is the starling-roost (Fig 2.7); tens

of thousands of birds can be present each evening for a number of weeks, and the impacts on the reeds themselves are often dramatic with large areas being damaged by the birds when they emerge each morning.



Fig 2.7: Starlings flocking together before roosting in the reed-bed (outdoorsmagic.com 2012).

The number of individuals present from each of the species will also affect the degree to which they impress upon the landscape, with large flocks like the starlings pictured above having a significant physical and aesthetic impact. The size of birds is also something to bear in mind, especially when one considers

that smaller species would have been much more difficult to recognise without the use of binoculars, telescopes and cameras. The elusive nature of birds such as the woodcock (Fig 2.8) also means that the presence of certain species is often more understated than that of others, and so the appreciation of avifauna composition in any place at any time will always be subject to a wide-range of obscuring factors.



Fig 2.8: Woodcock (© Stanley Porter, RSPB-images.com).

Summary

A snippet of the contemporary landscape has been provided above, with allusion to the diverse range of vegetation and species make-up that predominates today. Leighton Moss is a freshwater wetland, dominated by tall stands of dense vegetation, while the wider landscape hosts both terrestrial and marine ecosystems and species. Taken together the combination of habitats afforded in the vicinity supports a rich variety of sights and sounds, often associated with birds. Mammals such as the otter and red deer are also present, and give further indication of the high-diversity of the area.

2

Freshwater Wetland

This chapter will chart the history of Leighton Moss as a freshwater wetland.

The main focus will be the period under RSPB management, from 1964 to present, though there will be some allusion to the disposition of the Moss directly prior to this era when, it will be shown, reed-growth and the colonisation of willow-scrub vegetation was already at an advanced stage.

Evidence of some of the key changes in and around the reserve will be presented, and will include the creation of satellite reed-beds and the extension of freshwater pools at Leighton Moss. Small changes to vegetation structure occur seasonally and annually, and while they are important, a work of this size and resolution cannot deal with them all. Instead, snapshots of large-scale alterations will be presented. Significant events in the wildlife make-up, such as the arrival of marsh harriers and bearded-tits to the reserve, will also be related.

Leighton Moss

During its tenure as an RSPB nature reserve, the most striking change at Leighton Moss has been the expansion of open water, and the reduction of juncus in its place (see Fig 2.9) – juncus being the Latin name for rushes and other such vegetation (Gilbert-Carter 1955, 44). This has been achieved through a mixture of short-term, large-scale, management techniques such as the deployment of heavy machinery to dredge the reed-bed (Wilson et al 1988), and through continuous smaller scale management such as rotational reed-cutting and coppicing of willow-scrub.

As evidenced by the habitat maps below, the reed-bed was much drier in 1965 than it was in 1987, especially in its western section (the approximate location of Lillian's hide has been added to aid with orientation). Drainage dykes were also cleared of reed (Wilson et al 1988, 7) in order to facilitate water egress, and will have provided new areas of reed-water interface in the process, which was a particular ambition of management work (Wilson et al 1988, 7).

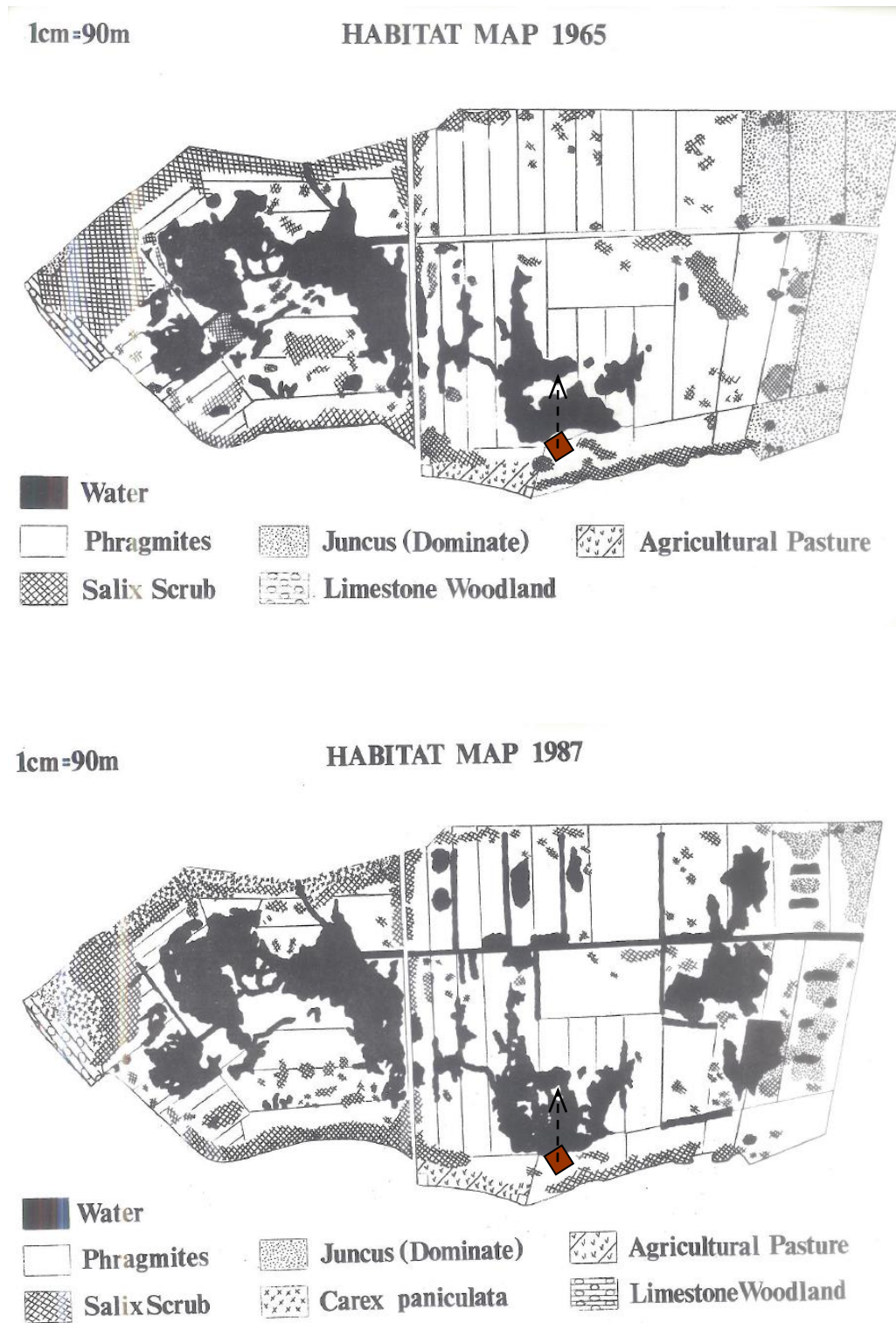


Fig 2.9: Changes in habitat cover 1965-1987 (adapted from Wilson et al 1988).

Changes in the area (ha) covered by each of the different habitat types is quantified in the table below, and shows an increase in the coverage of reed-bed and open water, at the expense of rush areas and willow-scrub.

Habitat type	1965	1988
Willow Scrub	23	20.5
Reed-beds	70.5	79
Rush Areas	17	8.5
Tussock Sedge Areas	5	6
Open Water	16	20.5

Table 2.2: Changes in habitat coverage 1965-1987 (derived from Wilson et al 1988, 7).

The changes discussed above will have acted to rejuvenate the reed-bed, and as Wilson states, effectively reversed the process of natural succession therein (Wilson et al 1988). Of course this point alludes to the existence of a reed-bed before RSPB involvement began in 1964, and given the extent of *phragmites* colonisation by this date, indicates that it had been the dominant habitat-type for a number of years. Evidence from the Leighton Estate Game Book suggests that by about 1950, the density of reed-coverage was proving a difficult obstacle to

wildfowling. In the 1923-4 season for instance, the number of coot, teal, and mallard taken respectively were 391, 320 and 190; by 1951-2, figures for these same species had been significantly reduced to 35, 178 and 118 (Leighton Estate Game Book). There may of course have been other factors involved to account for this lower yield, but Richard Gillow-Reynolds, the then owner of Leighton Estate, states clearly that by the end of the Second World War, “reed growth made picking up of wildfowl difficult” (Wilson et al 1988, 23). Thus perhaps from the 1940s, the dominant feature of Leighton Moss was the reed-bed; Middleton puts this date at 1939 (Middleton et al 1995, 134).

Interestingly, evidence for the disposition of Leighton Moss circa 1931 is provided by a land-use map drawn up as part of Dudley Stamp’s land-use survey (Fig2.10). It shows the Moss to be “meadowland and permanent grass”, implying that the covering of reed was not so dense at this date. It is more interesting though because according to the history of the site written by Richard Gillow-Reynolds, Leighton Moss was dominated by a freshwater lake in 1918-9 (Wilson et al 1988,23), and so the implication is that vegetation had quickly colonised between this date and that of the survey. Exactly what type of vegetation “meadow” can be taken to represent is obscure though, and cannot indicate expansive grassland in this case because, as alluded to above, the Moss

“established a reputation as an excellent duck shoot” (Wilson et al 1988, 23) over this period; there must have been at least some areas of shallow water to accord the diets of the three species of water-bird highlighted above (Holden & Cleeves 2006). It is highly likely then that at the time of the survey, Leighton Moss was occupied by wet grassland, interspersed with pockets of shallow water.

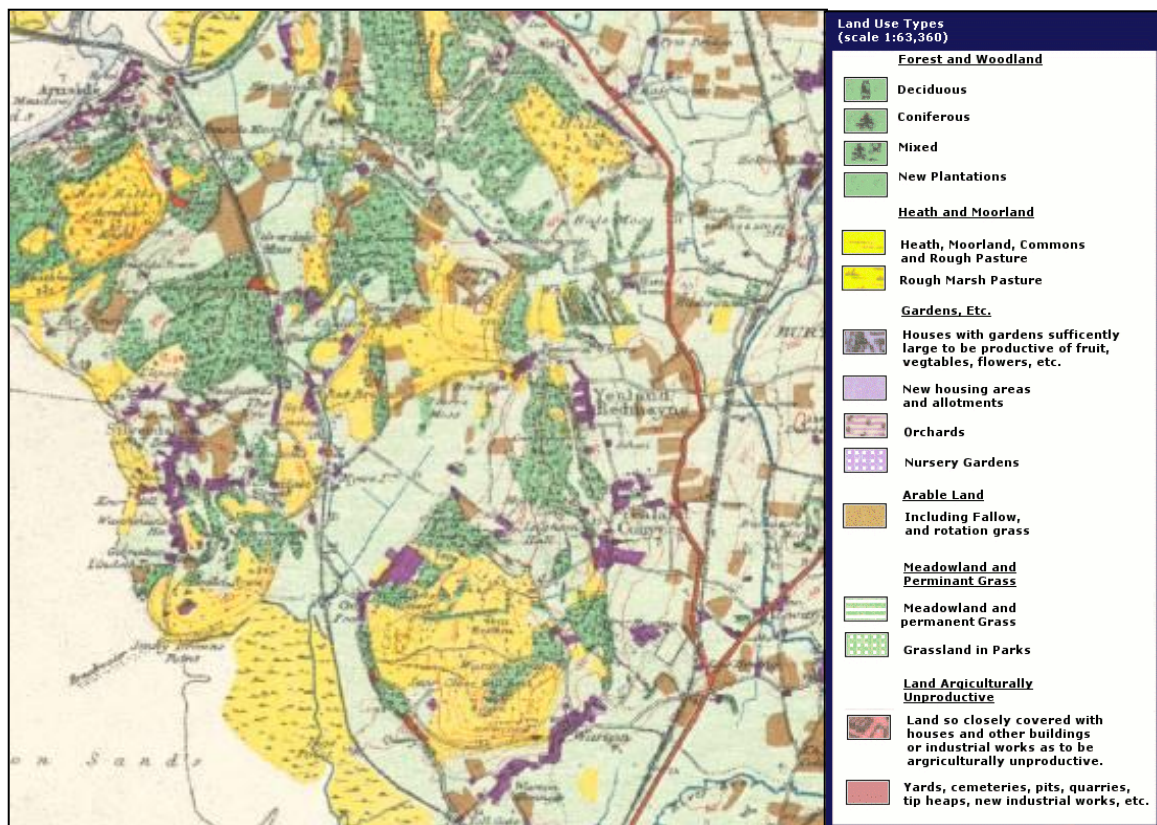


Fig 2.10: Dudley Stamp's Land-use Survey Map (adapted from Edina Digimap, 2012).

The state of Leighton Moss immediately prior to this has already been touched on above, with a freshwater lake covering its entire surface (Wilson et al 1988, 6).

The Wider Landscape

A number of land-form changes have occurred in the vicinity of Leighton Moss since the mid-twentieth century. Two of the most substantive alterations have occurred at Silverdale Moss and Barrow Scout Field, which have both been transformed to reed-bed within the last ten years. Photographs held at Lancashire Record Office show Barrow Scout Field before operations began, and at various stages throughout the RSPB's project (LRO, RSPB Leighton Moss). From these it would appear that grassland was the dominant vegetation cover prior to development, with bunds and ditches becoming part of the landscape in the process of its transformation from hard-land to wetland (LRO, RSPB Leighton Moss). In 2000 the RSPB liaised with Lancaster University's archaeological unit, seeking a field-walk survey to be undertaken at the end of each phase of the project "due to the presence of a potentially historic salt-pan" (LRO, RSPB Leighton Moss). Construction work was completed in 2001, and no archaeological remains were discovered throughout the process. This episode not only provides evidence of physical land-form change, through the conversion of grassland to reed-bed, and allusion of salt-workings sometime in the past, but also demonstrates neatly a further role of archaeology in nature conservation; giving the go-ahead to large-scale planning projects.

Over 2006/07, 22,000 reed plugs were planted between the two newly created satellite reed-beds, with the majority being concentrated on Barrow Scout Field due to it having a more favourable water-level to reed colonisation (Horner & Birnie 2007, 4). These two areas in particular have seen profound changes in their vegetation-structure in little more than a decade. Another zone that has seen recent modification is Challan Hall Allotment, whereat the removal of “alien” tree species such as sycamore and Scots pine has been underway for a number of years (Horner & Birnie 2007, 7). The removal of large trees such as these will of course have dramatic impacts on how the land looks.

The extent of the salt-marsh (I/O) has also waxed and waned considerably since the 1960s, with rapid erosion taking place 1976-81 (Wilson et al 1988, 25). More than two-thirds of the salt-marsh at Silverdale was also lost between 1967 and '96 (MLHS 1998, 19), with very little remnant of it in existence today. This erosion is caused by sideways shifts of the major channel in the Kent estuary, a process well summarised by Pringle: “when the channel lay on the eastern side of the estuary erosion occurred at Silverdale, but when it moved to the western Grange side accretion took place here [Silverdale]” (Wilson et al 1988, 25). Thus the dynamic nature of the coastal aspect of this landscape is made apparent.

A further adjustment worthy of note, which had a profound impact on the composition of wildlife in the immediate vicinity, was the canalisation and embanking of the river Keer in the late 1950s (Woods 1997, 8-9). Prior to this, Woods relates that the Keer valley was subject to seasonal flooding, which created water meadows in the Dockacre and Baderholme areas; the river-banks themselves also supported ash, alder and crack-willow trees (Woods 1997, 8). As part of the canalising-process, much of the vegetation, including the aforementioned trees, was removed from the river-banks, and the water-table in the Keer valley was lowered through the sinking of five water bore-holes (Woods 1997, 9). It becomes apparent then that the sum-landscape modification since the mid-twentieth century has been dramatic, with Leighton Moss, Barrow Scout Field and Silverdale Moss becoming “wetter”, the Keer valley becoming drier, and less-well vegetated, and the salt-marsh at Silverdale almost completely disappearing.

Wildlife

For the period under scrutiny here, it is possible to distinguish changes in wildlife composition between Leighton Moss and its surrounding area. On the reserve itself, the number of breeding bitterns increased from five to six pairs at

its establishment, to 11-12 pairs by 1981 (Wilson et al 1988, 10), falling again “after a succession of cold winters and two very dry summers” (Wilson et al 1988, 10). Bearded-tits and marsh harriers were not counted amongst the resident avifauna in 1964 (Wilson et al 1988, 3), but are a much more common species at Leighton Moss today than the bittern is. Bearded-tits first colonised in 1973, with numbers building up to between 20-30 pairs by the 1980s (Wilson et al 1988, 10), while the first marsh harrier pair bred in 1987, raising three young (Wilson et al 1988, 69). Marsh harriers were a regular sight at the reserve before this date, but attendant only as summer migrants (Wilson et al 1988, 69). This seasonal variation in species composition is of course a factor of bird’s biology, but fluctuations in summer arrival dates for the marsh harrier suggest that climate is also a determining factor of movements. For the twelve-year period between 1976 and ’88, the earliest arrival date (5th April) was separated by almost a month from the latest arrival date (3rd May) (Wilson et al 1988); thus providing evidence that *when* a bird maybe present in the landscape can alter radically over a relatively short time-period.

The number of freshwater wading-birds increased in-line with the provision of larger areas of shallow water (Wilson et al 1988, 10), while this development also saw the colonisation of the reed-bed by pochard and tufted duck (Wilson et al

1988, 16). The creation of artificial islands, in providing safe sites inaccessible to terrestrial predators, encouraged nesting of a number of species, including coot, moorhen, and lapwing, as well as a number of duck and gull-species (Wilson et al 1988, 8).

In the wider landscape, a conspicuous change since the mid-twentieth century has been the exponential increase in the number of pheasants present. This has come largely as a result of rearing and releasing by Leighton Hall Estate. For instance, between 1977-8, 2,000 pheasants were “put in woods” by the keepers; this number had increased to 5,500 by 2004-5 (Leighton Hall Game Book). This increase no doubt reflects changes in land-use and sources of revenue, with pheasant-shoots taking place annually.



Fig 2.11: Male pheasant (© Mike Malpass).

Certainly it would seem that the transformation of the Keer meadows had a profound impact on wildlife composition there. Woods had the following to say for the period prior to canalisation:

“...otters were common, king fishers and sand-martins nested in the river-banks, dippers nested under most bridges, conveys of partridges were about and corn-crakes nested in the surrounding meadows. The hay meadows were also feeding grounds for thousands of butterflies” (Woods 1997, 8).

Corn-crakes and partridges are not familiar birds in the locality nowadays, with the latter being described as an uncommon species in Wilson’s work (1988, 72).

Although the mammalian composition is not the main focus here, it is worth noting that the reserve was re-colonised by otter in 2006-7 (Horner & Birnie 2007, 16). Also, it is likely that a similar blend of terrestrial animals that prevail today were also present throughout the twentieth century, given details held at Leighton Hall. A list of vermin taken by keepers of Leighton Estate between 1937-9 is instructive for which species were present, and in what numbers:

	1937	1938	1939
Stoat	21	31	20
Weasel	3	4	7
Rat	104	244	351
Crow	11	10	15
Jay	13	20	20
Magpie	10	19	25
Hedgehog	3	5	4
Fox	2	1	1
Mink	-	1	-
Hawk	-	8	14

Table 2.3: Vermin Seasons 1937-9 (Leighton Estate Keeper's Book). Data takes into account all of the land owned by Leighton Estate at this time, estimated to be around 2000 acres (pers. comm. Gillow-Reynolds 2012.)

A brief overview has thus been provided of the wildlife composition of the landscape for the most recent past. It is by no means extensive, and more detail can be found in the documents referred to throughout.

Summary

It has been made apparent then that since the mid-twentieth century, there have been a series of radical changes to both the habitat-types afforded by the Leighton Moss landscape, and the composition of bird species within it. The reed-bed itself has seen an increase in the area of open water, and the landscape has seen two smaller reed-beds added. The Silverdale salt-marsh is all but gone now, but the inner and outer salt-marshes remain extensive, with alterations to the Keer floodplain having had a huge impact on the very nature of the neighbouring land there, rendering it dry throughout the year.

These changes can be shown to have contributed to the alteration of avifauna make-up, with notable losses including the common partridge and corn-crake, and additions including the bearded-tit and marsh harrier as breeding species. There are of course many other factors involved in changing distributions and populations of wildlife, but the habitat afforded by an areas' vegetation matrix must surely be considered an important one.

3

Arable Farmland

In the previous chapter, the narrative was left at 1918-9, when it was related that the dominant landscape feature of Leighton Moss was a freshwater lake. For over a century prior to this, the Moss was an extremely productive tract of arable farmland, known locally as the “Golden Bowl”, and as an excellent partridge-shoot (Wilson et al 1988, 23). This chapter will recount what is known of Leighton Moss and its attendant wildlife during this period.

Leighton Moss

A good exemplar for the lay-of-the-land is provided by the postcard below, dated to 1913 (Fig 2.12).



Fig 2.12: View over Leighton Moss 1913 (Author's own 2012, taken of blown-up postcard at RSPB Leighton Moss).

The view looks south across Leighton Moss, which is the same direction of view as that afforded by Lillian's hide. The homogeneity of the Moss-surface is striking, with the most obvious difference to the landscape today being an

absence of open water. From the Tithe Schedule of Yealand Coniers dated 1846, in which township Leighton Moss fell, oats, wheat, and barley appear to have been the dominant crops (LRO, Yealand Coniers T/S). Whether this was still the case in 1913 is not known for certain, but one can imagine that a dense crop of any of these cereals, standing tall as they do, would closely resemble the appearance of a dense stand of reeds; aside from the absence of open water, the landscape may have appeared much the same as parts of the reed-bed today. This could be especially true of the reed-bed in autumn/winter, when the reeds change to a golden-yellow colour.

From the mid-1840s it would appear that Leighton Moss was under intensive arable crop. Relating a flood event in October 1845, the Lancaster Gazette records that: “The Moss lands about Leighton and Silverdale were very much flooded, and as *much corn is grown* on it, a great quantity of grain in hattocks was standing in water” (Lancaster Gazette 1845). The extent of land under arable production is made clear by the map below (Fig 2.13), which characterises the whole of the Moss as being in a state of arable cultivation.

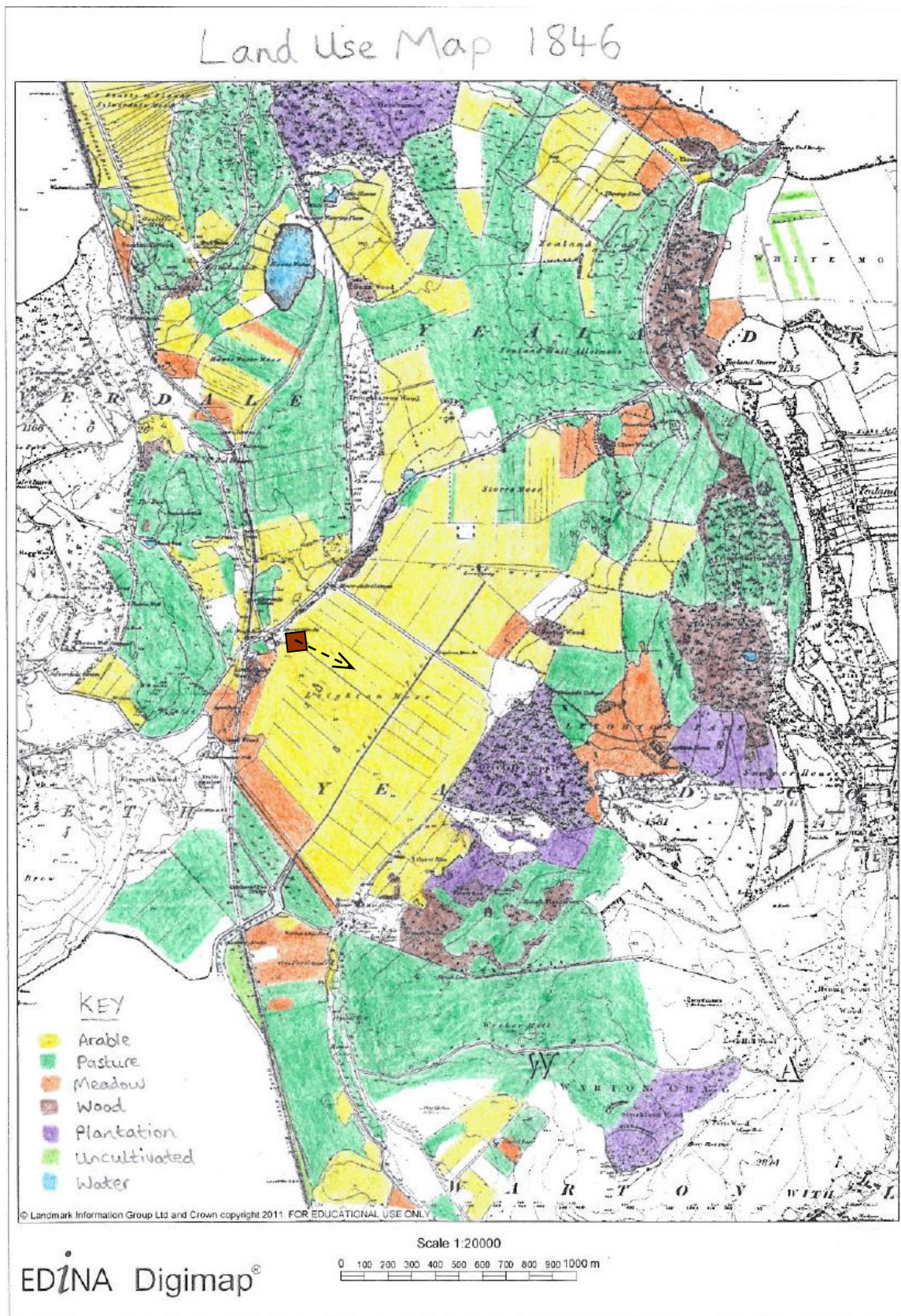


Fig 2.13: Land-use Map 1846 (base map from Edina Digimap 2012; adapted using Tithe Map and Tithe Schedule data, LRO; data not recorded by the author for areas left blank).

Now although there has been a marked shift to dry-land, it is apparent that water management was still an important aspect of the landscape in the nineteenth and early twentieth century. Apart from the flood event related above, high-tides caused inundation of the Moss in 1842 (MLHS 2005, 25), 1852 (Ford 1931, 28) and 1907 (Ford 1931, 29). In an attempt to offset this problem, the construction of an embankment towards the seaward-end of the Moss was undertaken in 1840 (Middleton et al 1995, 134), without which it can be speculated that more inundations would have occurred. Management of freshwater entering Leighton Moss from the surrounding area was also ongoing, manifesting itself physically as a series of drainage dykes, pumps and sluice systems. Speaking of this management infrastructure, Middleton relates that: “By 1848, perimeter dykes, to take surface run-off from surrounding slopes, had been excavated and a pump installed at Crag Foot” (Middleton et al 1995, 134). In 1890-1, a pump and tidal sluice were also installed at the seaward end of the Moss (Middleton et al 1995, 134).

It is clear from consulted evidence that Leighton Moss was under some form of arable cultivation from at least 1815, when the owner, a Mr Worswick, had cropped it with oats, turnips, carrots and cabbage (MLHS 2005, 25). These latter three examples are all low-growing vegetables; a fact which insinuates that

although the land was still arable by classification, it will have been quite different in appearance. An estate map from Leighton Hall shows drainage dykes at the south-western end of the Moss in 1804, and the causeway (which still exists today) had already been constructed by this date (Middleton et al 1995, 134). These features suggest that the land was being readied for settlement by farms at this time; an assertion that is corroborated by a "To Let" notice in the Lancaster Gazette from the same year, which reads:

"All that compact and desirable farm, situate in Leighton, in the Parish of Warton, in the county of Lancaster, called THE MOSS HOUSE; with the new-built Dwelling house, Barn, Stable, Skippon, Garden, and from seventy to one hundred acres (customary measure) of excellent land.

"And also, at the same time and place, will be LET in lots, several FIELDS and PARCELS OF LAND, part of Leighton Hall Estate, and situate on the Northern side of the Main Drain upon Leighton Moss. N.B. Nearly the whole of the said farms and lands are tithe-free; and the same are well fenced and watered, and in good cultivation" (Lancaster Gazette 1804, original emphasis throughout).

Thus it would seem that for much of the nineteenth century, Leighton Moss was an expanse of arable fields, interspersed with drainage ditches and crossed by a causeway. With fields ready to let in 1804, it is probable that these modifications began even earlier in time, perhaps following Acts of Enclosure that occurred across Warton Parish in the last decades of the eighteenth century. In 1776 for instance, a scheme to enclose Yealand Redmayne Common was underway, with

a plan of the allotments it held, along with those of Storrs Moss (at the northern end of Leighton Moss), drawn up as part of the enclosure process (LRO, Warton-with-Lindeth E/A). Re-organization of lands neighbouring the Moss seem also to have coincided with a re-shuffle of rights to it, with Leighton Estate buying-out peat digging rights (Wilson et al 1988, 21), presumably before large-scale changes occurred thereon. It is at this time, between the late eighteenth and early nineteenth century, that the Moss appears to have gained the prefix “Leighton”, presumably as entitlement now belonged solely to Leighton Estate.

The Wider Landscape

Alterations to the configuration of the wider landscape can be seen in part by comparison of the two land-use maps depicted above. The starkest change between 1846 and 1931 is actually the disposition of Leighton Moss, with surrounding areas most often retaining their land-uses, typically in places under pasture. The salt-marsh (I/O), clearly depicted by Stamp, was labelled as “sands” in the Warton-with-Lindeth Tithe Schedule (LRO, Warton-with-Lindeth T/S), perhaps indicating that the marsh had undergone a period of accretion since 1846. It is recorded that in 1840 Silverdale had a sand-beach, but that by the later part of the century a salt-marsh had developed there (Wilson et al 1988, 25); this

would suggest that a period of salt-marsh growth occurred in the mid-nineteenth century.

One significant change to the locality was the completion in 1857 of the Ulverston to Carnforth Railway. According to Millward: “Its two great embankments and iron viaducts stretching across the tidal sands of the Leven and Kent, effectively broke the isolation of the peninsula” (Millward 1955, 118). The ramifications of the rail-network will have been dramatic in opening-up the area to the even wider landscape.

Wildlife

The wildlife composition of the area around Leighton Moss was quite different to that of the present day. The bittern was lost as a breeding species in Lancashire before 1845 (Shrubb 2003, 132), with its growing rarity being recognised by one lecturer in a call for the establishment of museums:

“...the lecturer truly observed that the progress of improvement made the study of natural history more difficult, in as much as in the case of the bittern, the cultivation of land rendered observation of living species less and less attainable...” (Lancaster Gazette 1851).

Many of the wetland birds mentioned at the beginning of this section will not have been present while the land-cover was arable crop. It is known that the marsh harrier became extinct as a breeding species in Lancashire by 1860 (Shrubb 2003, 132), while the bearded-tit appears to have been restricted to a south-eastern distribution in England (Holloway 1996, 354-5), and may never have bred as far north as Lancashire before recent times. Exceptions are likely to have been the lapwing and the snipe, both of which are noted as having been common birds to north-Lancashire throughout the nineteenth century (Holloway 1996). Reed-bed specialists though would not have found correct habitat at Leighton Moss throughout much of the nineteenth century, and given what has been related above, may have disappeared from the locality before the dates provided by Shrubb and Holloway for north-Lancashire generally.

During this period avian records are scarce and more general, and so much of what can be related struggles even to be landscape-specific to Leighton Moss. From what can be gleaned of the available habitat though, some broad suggestions can be made as to the likely wildlife composition. Simmons lists rook, skylark, and grey partridge as birds that are likely to have benefited from cultivated land (Simmons 2001, 76); a list augmented by Holloway who adds lapwing, swallow and corn-crake (Holloway 1996, 27). None of these species

seem too out-of-place, and the food source presented by arable crops will probably have also led to an increase in finch populations (Shrubb 2003, 47).



Fig 2.14: Grey partridge (© Mike Langman, RSPB-images.com).

This period may also have seen the incidence of several mammal species that have since ceased to be regular sights; namely, the wild-cat, pine marten, and polecat. In his work, Yalden notes that the latter two had disappeared from north-Lancashire by the early twentieth century, while the wild-cat is thought to have vanished sometime in the early nineteenth (Yalden 1999, 177-9). It is also noteworthy that the grey squirrel did not reach Lancashire before 1940 (Yalden 1999, 185).

Summary

Throughout the nineteenth century Leighton Moss was an area of arable farmland. A complex water management system was in place, and the habitat afforded was much different to that of the present day. Farmland birds such as the grey partridge and corn crake were much more common, while for much of the period, none of the three key species of the reserve today, namely the bittern, marsh harrier and bearded-tit, were present as breeding species.

4

Raised Bog

Having left-off in the late eighteenth century in the previous chapter, and witnessed the early stages of Leighton Moss' transformation into productive arable land, the story will pick-up in the mid-eighteenth century. Almost all of the information related in this chapter originates from the writings of John Lucas, who was born in Warton, and wrote a history of the parish between 1710 and 1740 (Fuller-Maitland 1931). From details provided it will be shown that Leighton Moss at this time was actually known as *Warton Moss*, that it was used as a source of peat-fuel for the inhabitants of that town, and that the dominant vegetation cover was heather-ling. It will also be related that the bittern was a common bird in the area, as were woodcock, snipe and lapwing. This chapter will also include allusion to the sixteenth century disposition, and tell of the episode that gave the Moss its title.

Leighton Moss

When John Lucas wrote his history “Leighton” Moss did not exist. A thorough examination of his work reveals no reference to a place of this name, but of course, in the absence of an enormous rise in sea-level, it must have existed (no evidence has been unearthed to suggest such a rise in sea-level!). Now given that the last-known owners of the Moss were Leighton Hall Estate, and that Leighton Hall lies close to the site under discussion, it seemed likely that it would be described along with them (Lucas’ account is a geographical one). *Warton Moss* is the only named Moss in the work to which a full description is afforded, and comes directly after discussion of Leighton Park (Fuller-Maitland 1931, 84), making it a candidate despite its title. This candidacy is strengthened by Lucas’ description of the position of the Moss in the landscape, and the reason for its name:

“[Warton Moss] is adjacent to the North part of this [Leighton] Park, so called from its furnishing Warton with fuel, and not that it is in that Township, tho’ joyning [sic] to it...” (Fuller-Maitland 1931, 84 [627]).

This position in the landscape certainly accords with that of Leighton Moss in 1840 (the earliest date a map could be obtained for), lying adjacent to the north part of Leighton Park as demonstrated below (Fig 2.15).

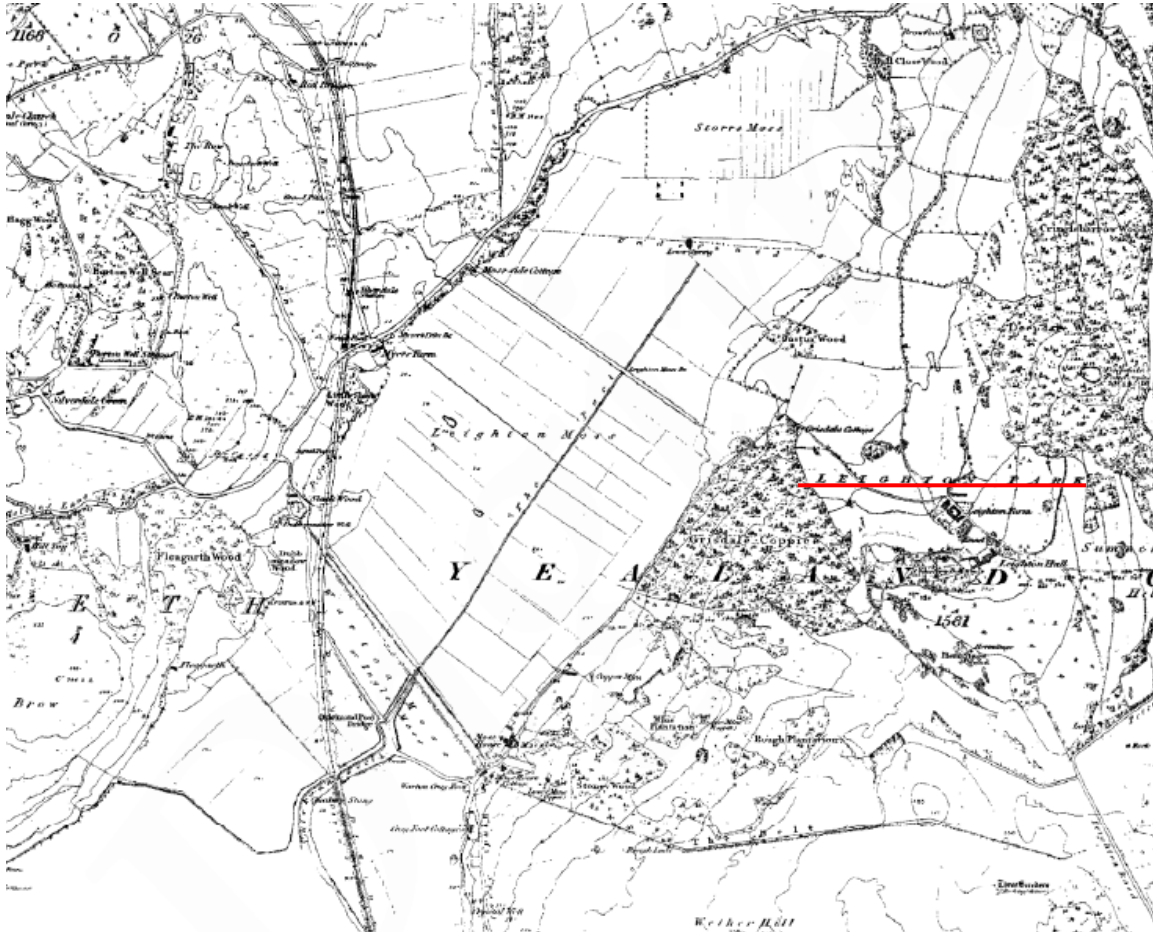


Fig 2.15: Position of Leighton Park 1840 (adapted from Edina Digimap 2012).

The boundary of the park is not known, but its approximate position suffices here to locate Lucas' Warton Moss; there are no other contenders that fit the geographical description. In the north-west wetlands survey, confusion seems to

have been caused by the existence in the modern landscape of a different Warton Moss, which “occupies an area of low-lying ground around the River Keer between Carnforth and Warton” (Middleton et al 1995, 137). This cannot be the same Warton Moss as that referred to by Lucas because it lies to the *south* of, and not at all adjacent to, Leighton Park. In the diagram above, the astute reader may have noticed that directly below Leighton Moss there is a small strip of land labelled “Warton Moss or Ings Moss”; this is a likely remnant of a time when the whole basin was known as Warton Moss.

Having established beyond reasonable doubt that Lucas’ Warton Moss is synonymous with modern-day Leighton Moss, it is possible to extend the vegetation-history of the reserve beyond usual bounds. Lucas gives exquisite detail in his account, naming the dominant flora as heather-ling: “Almost the whole of the surface of this Moss is covered with Heather-Ling...in the places not covered with Ling, the *Tormentilla Quadrifolia* grows in great plenty” (Fuller-Maitland 1931, 85-6 [633]). This gives good indication not only as to how the landscape would have looked in the first half of the eighteenth century (see Fig 2.16), but also provides clues as to the physical properties of the Moss; this vegetation is representative of conditions associated with raised bog.



Fig 2.16: Heather-Ling (geograph.org.uk 2012).

It is known that peat extraction was carried out by inhabitants, an activity referred to as “digging Torff” (Fuller-Maitland 1931, 84 [629]). Lucas describes how as a result of this activity the land was divided into long Dales, each about an acre in extent (Fuller-Maitland 1931, 84 [629]); these are most likely tantamount to the turf rooms identified at Storrs Moss (Middleton et al 1995, 134).

Beyond the era covered by Lucas' work, little is known about the disposition of Leighton Moss, with snippets that do exist providing a more general picture of the area. A piece of incidental information though, provided in a series of footnotes, does allow something to be said about the site in the sixteenth century, and resolves beyond doubt the earlier equation of Leighton Moss with Warton Moss. The said footnotes are repeated below:

"[In 1530] inhabitants of Bolton [le Sands] claimed an ancient right to drive their beasts over Lindeth Marsh to Yealand Conyers Moss, but in the year named Robert and John Kitson, with others of Warton, to the number of a thousand, resisted the passage with arms in their hands" (Farrer & Brownbill 1914, 161-5 [3]).

"Leighton Moss, *otherwise Warton Moss*, was claimed as part of the manor by the inhabitants of Warton in 1532" (Farrer & Brownbill 1914, 161-5 [1]).

It thus appears that the Moss gained the prefix *Warton* around the year 1532, after an altercation over grazing access; prior to this it was known as Yealand Conyers Moss. The first quoted passage is particularly insightful, for it profoundly illuminates a picture of sixteenth century Leighton Moss. It was a valuable asset, and the allusion to an ancient right over its use suggests that it may have been used for pasture prior to the 1530s. The fact that this right belonged to inhabitants of Bolton-le-Sands also shows the importance of wider

landscape associations, with this settlement lying several miles to the south of the site.

The Wider Landscape

For details of the form of the wider landscape in this period, Lucas is again the champion of sources. He mentions land improvement through the removal of stones (Fuller-Maitland 1931, 3 [25]), which most likely indicates an expansion of the area under arable cultivation; the removal of stones facilitated the use of a plough. The growth of “Oates, Barley and Pease” is noted as forming the dominant crop of the Parish (Fuller-Maitland 1931, 4 [26-7]), while it is also related that oxen were used for ploughing (Fuller-Maitland 1931, 44 [365]). It can be ascertained that the landscape was fragmented in places by fences and hedges, which had been incorporated as part of the creation of pre-Enclosure enclosures (Fuller-Maitland 1931, 5 [31]), and that sycamores were present on the grounds of the vicarage at Warton (Fuller-Maitland 1931, 27 [283]). The presence of sycamore trees in the eighteenth century landscape is a detail of particular resonance today, given that the contemporary view of them as an alien species has led to their removal (see page 45).

The general impression given by Lucas is that the landscape was much wetter during his lifetime. He describes large tracts of wetlands which must have dominated the lower-lying districts: “[the] large Flat of Meadows and Mosses now lying in Warton, Carnford [sic], Borwick and Caponwray” (Fuller-Maitland 1931, 28 [287]). That reeds were growing alongside the River Keer is mentioned, a fact that suggests the water-level of the adjacent land must have been relatively high in order to support them. While the existence of a tarn – “the Ware” – is also noted as having been situated at the lower end of Warton (Fuller-Maitland 1931, 28 [287]); no such tarn exists today.

This rather soggy disposition led unsurprisingly to attempts at water management; a point well illustrated by the following extract pertaining to Carnforth:

“Between the inner and outward Marshes is a Ridge or Bank call’d the Strand, raised from two Points of higher Ground, on purpose to preserve their Mosses from being spoiled by the Spring Tides” (Fuller-Maitland 1931, 140 [885]).

A sluice system was also constructed on the Black-Dykes (situated on the Carnforth side of the River Keer, near its mouth) to prevent salt-waters from entering the Mosses, so as to protect “Turf Grounds” (Fuller-Maitland 1931, 140

[885]). Harnessing the power of water seems also to have altered the landscape somewhat, with a “Groit” (artificial channel) being drawn from Leighton Beck in order for the smelting of iron to take place (Fuller-Maitland 1931, 56 [464]).

The state of the salt-marsh during the period under discussion is also related.

Lucas states that at the beginning of the eighteenth century, the river Kent diverted its course southward, and that combined with the violence of the tides, common marshes and enclosed ground was destroyed (Fuller-Maitland 1931, 12 [65]). It is assumed that he is referring to the Silverdale salt-marsh, given its proximity to the Kent-channel, but Lucas does not make this specific. In subsequent discussion of this township, Lucas states: “The Salt Marshes bear a short Grass which is very valuable for its Excellency in recovering, feeding and preserving Sheep... [they also] abound in the choicest mushrooms...” (Fuller-Maitland 1931, 49 [387]). Thus it may be the case that a period of accretion had subsequently occurred, enabling the introduction of sheep to Silverdale marsh.

It is known that Silverdale Moss was used by some inhabitants for the retting of hemp and flax, and that this Moss was also divided into dales, each compartment referred to as a “Mosssdale” by the Silverdale Manor Court (MLHS 1998, 145). Haweswater Moss was also being exploited at this time; the water

level was artificially lowered in the eighteenth century to facilitate peat extraction (MLHS 2005, 22). The contemporary landscape is also littered with physical traces of the charcoal and lime industries of this era, with pits, platforms and kilns being strongly represented among sites and find listed by the PastScape project (English Heritage, 2012). Physical traces of arable farming are present in the form of ridge and furrow, listed again by the Pastscape project.

Evidence that land was under arable production in the Parish since at least the sixteenth century is also made apparent by research undertaken by MLHS, from which the following passage has been extracted:

“Mabell Saul. Widow of Thomas Saul.
One Tenement 1A and 1R of arrable land lying in a Close called Boodhams Close.
One Close lying at the North end of the said Tenement = 1A.
Close called Slackwood = 2A.
2 A of arrable lying in 7 pieces in the Common Field” (Thomas 1985, 13).

The passage appears to come from the Silverdale Manor Court, and is dated to 1563. In the sixteenth century, Silverdale Manor is said also to have held a fishery, salt-cotes and iron-mines as part of its appurtenances (Farrer & Brownbill 1914, 180-2).

Wildlife

Discerning the wildlife composition of the landscape for this period is fraught with difficulties, and not least because a number of passages from Lucas' history, pertaining to birds, were omitted by Fuller-Maitland in his translation of the work (Fuller-Maitland 1931). Only positive evidence of the existence of certain species will be presented here, with a focus on that taken from local sources.

Lucas states clearly that Leighton Park contained both a rookery and a heronry, and that it also "gave harbour to several birds of Prey, and among the rest to the Kite" (Fuller-Maitland 1931, 83 [625-6]). It is also related that the Middleton's, owners of Leighton Estate at this time, had released peacock around the grounds in the hope of reducing the number of serpents (Fuller-Maitland 1931, 80 [594]).



Fig 2.17: Red Kite (©Mike Langman, RSPB-images.com).

Much of the detail given of the avifauna of Warton Parish is centred round the Keer-wetlands. Lucas mentions snipe and woodcock as being common summer migrants to the area, indicating also that snipe were regularly breeding at this time:

“...young snipes are so frequently found in the Bank-End-Moss...and in other neighbouring Mosses, that they are not looked upon as any rarity at all. In these Mosses the Bittour, or Bittern, *Ardea Stellaris*...is very common” (Fuller-Maitland 1931, 126 [758]).

The fact that the bittern is also mentioned as being common is particularly exciting, and gives this species a firm historical root in the landscape. The Latin name Lucas uses does not accord with the modern scientific name of the bittern, which is *Botaurus Stellaris* (Holden & Cleeves 2006, 78), but it almost certainly represents the same bird.



Fig 2.18: Snipe (© Mike Malpass).

It is related subsequently that the eggs of various birds were often found on the inner marsh and neighbouring Mosses, with “those of the Lapwing or Tewet, the Sea-Pye, and other Sea-fowls” being most common (Fuller-Maitland 1931, 141 [886]). Sea-Pye is an obscure name, but is fortunately listed by Holden & Cleeves as a local name for the oystercatcher (2006, 295). The lapwing is of course a familiar bird to this study, but it is interesting to note the alternative name given for it above: *tewet*. This is no doubt derived from the birds’ call, with *peewit* being the modern, alternate name for the lapwing for this reason. Now the association of the lapwing with the area has already been shown to run-deep, appearing as it does in each chapter, but it could be postulated that its connection to the landscape is stronger still: Tewitfield, situated north-east of Warton, just above Pine Lakes (see Fig 2.2), could surely have been named after the “tewet”. It existed as a named place in Lucas’ day just as it does in the present.

The names of other landscape features that appear to remember an animal species include “Partridge Hills” and “Polecat-well” (Fuller-Maitland 1931, 125 [747] and 132 [839]). Whether both species were present at the time of writing would need further substantiation, though Lucas does expressly say that Partridge Hills “had their name from that fowl” (Fuller-Maitland 1931, 125 [747]). The Church Wardens’ Accounts for Warton Parish are not particularly helpful in

relating the wildlife composition of the locality, as while they do record vermin payments for rook, raven and foxes, they are equally as concerned with purchasing of flax and parchment, bread and wine, and the repair of the church-clock (LRO, Church Wardens' Accounts 1739-1865). The Wardens' accounts from Beetham Parish, adjoining Warton Parish to the north, do tell that the wild-cat and pine-marten were present in the late seventeenth century (Lovelock 2007), and so it is possible that some individuals may have resided in Warton Parish at this time. The wild-cat specifically is last recorded from Burton-in-Kendal in 1759 (Lovelock 2007, 226).

A sample of the wildlife composition has thus been provided, to which conies at Barrow Scout (Fuller-Maitland 1931, 40 [354]) and otter in the River Keer (Fuller-Maitland 1931, 122 [725]) may also be added. Given that Leighton Moss had taken the form of a raised bog during this period, it could also be suggested that skylark and meadow pipit were in attendance, being as they are the most characteristic bird species of this habitat-type today (Fuller 1982, 148). The land-uses discussed above, such as peat-cutting may also have acted to alter the vegetation composition of parts of the Moss surface, perhaps providing opportunities to a larger array of species (Fuller 1982, 150).

Summary

This chapter has followed the history of Leighton (or Warton) Moss from the mid-eighteenth century to the mid-sixteenth, during which time evidence suggests it had taken the form of a raised bog. The dominant vegetation of the Moss has been shown to have been heather ling, with the surrounding landscape offering a diverse range of habitats to wildlife. Overall, the landscape of this era was much wetter than that of the nineteenth century, with expanses of meadows and mosses, especially between Warton and Carnforth, supporting species such as lapwing, snipe and bittern.

5

Medieval and Beyond

The history of Leighton Moss beyond the sixteenth century is difficult to recount with any degree of intricacy. References to the site are non-existent, but glimpses of information are provided from the medieval period up to prehistory that infer the predominance of a wetland landscape. This chapter will provide those glimpses, and attempt to give some indication as to the wildlife composition attending them.

What follows will be divided in two parts. The first will examine evidence pertaining to the medieval period, and that extending beyond it to the ninth century. The second will encompass the “pre-ninth century” – the relatively huge expanse of time from the ninth century up unto the late Mesolithic age. This split is due largely to the nature of the evidence, with slightly larger glimpses being afforded for the first part.

The Medieval Landscape

It is evident that the medieval landscape had many elements in common with that of the eighteenth century. A variety of land-uses occurred side-by-side, with indication that both arable and pastoral forms of agriculture prevailed. The following extract demonstrates this point neatly, indicating also that the land was rigorously organised and exploited:

“In 1347 it was found that William de Coucy held the manor-house of Mourholme, with the herbage of a little marsh adjacent thereto, 320 acres of arable land in demesne, with meadow; a dovecote at Warton near Mourholme, the pastures of Ellerholm and Bradenagh, windmill, watermill and moiety, a pasture of the park called Bardeholme, assarts, 20 oxgangs of land held by tenants at will...” (Farrer & Brownbill 1914, 161-5 [17]).

The geographical setting of the areas described is highlighted on the diagram below, with each of the yellow shapes representing a named place from the extract (see Fig 2.19).

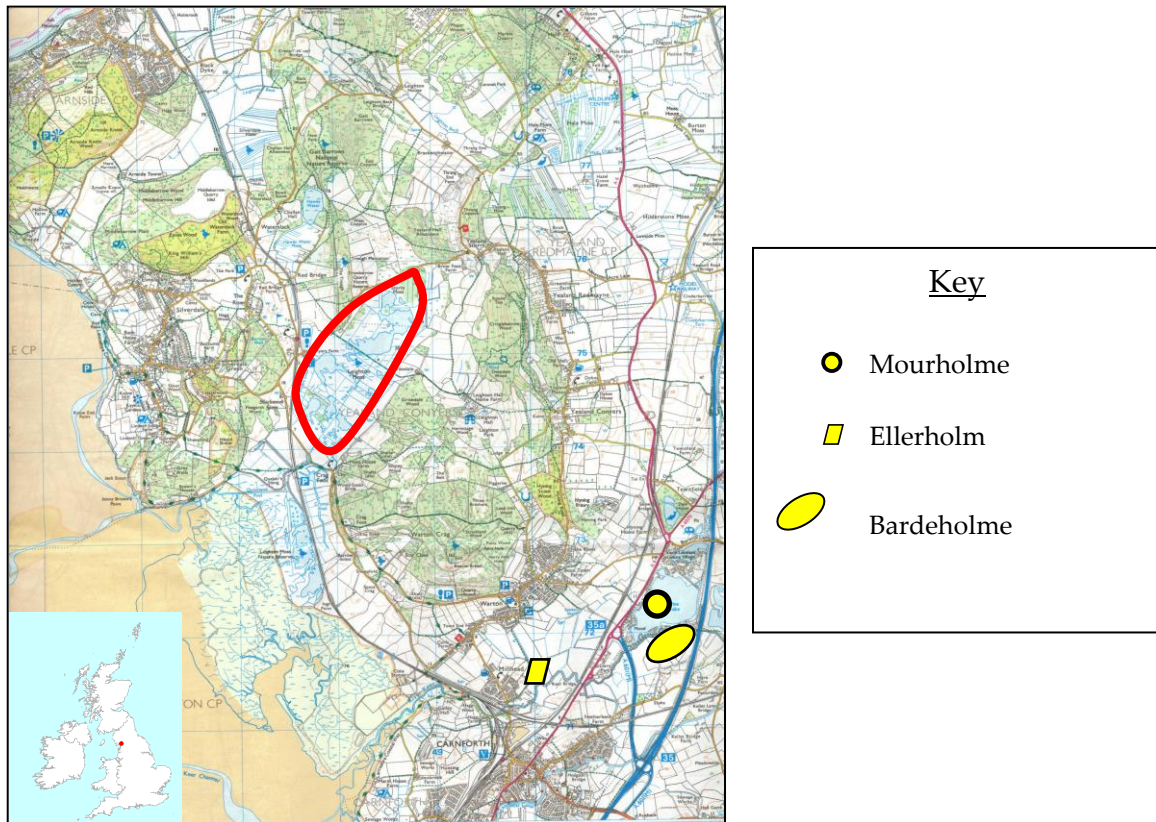


Fig 2.19: Location of named features in the medieval landscape (map adapted from OL Explorer 7 2011; position of Mourholme and Ellerholm taken from Booth 2004; position of Bardeholme derived from Lucas' account in Fuller-Maitland 1931 and 1840 Edina Digimap 2012).

The passage above reveals not only that extensive areas of arable land lay in the vicinity, but also mentions meadow, marsh, a park, and by reference to assarts, perhaps indication that a royal forest lay close-by (assarts often being described as encroachments into the juridical bounds of a forest). Thus a vivid picture is revealed of the fourteenth century disposition of a pocket of the landscape. It is somewhat disappointing that 200 years pass by without comment in this work, between 1347 (above quote) and 1530 (previous chapter), especially given the

particularly tumultuous ramifications of the Black Death which will have been made manifest in this void. The remains of a deserted medieval village (DMV) at Yealand Storrs may owe something to this interlude, though this supposition is not possible to prove. Both Ford (1931, 25) and the PastScape project (English Heritage 2012) record the Yealand Storrs DMV, but neither can attribute more than an approximate date to it.

It is known that following English defeat at Bannockburn, the Scots raided Lancashire in 1322, visiting much damage around Carnforth and Warton (Booth 2004). Booth notes that the Inquisition Post Mortem of a local inhabitant, dated to 1324, records the fact that cattle were taken and houses and gardens burned by the assailants (Booth 2004, 11). These settlements may have been targeted owing to their high status, with Warton having been elevated to the rank of a borough in the mid-thirteenth century (Booth 2004, 5). The fact that Lancaster and Preston were destroyed by the Scots during this particular series of raids may add further credence to this suggestion.

The borough charter, which was granted to Warton sometime between 1246 and 1271 (Booth 2004, 5), provides further fascinating insight into the medieval

landscape around Leighton Moss. The charter demarcates the lands which are *not* to be included within the borough (Booth 2004, 5), and reads:

“The wood of Staynhusslac bounded by the ditch which comes from Lindeth to Warton on the west side, and as far as the wood goes towards Barraht. The wood and pasture of Ellerholm (within the ditch) with its appurtenances. The park of Mourholme by the bounds fixed on the day of making this charter. The pasture of Southou, from Southou by the sea-dyke up to Quytesandpole and to Quitsandpole from the side up to Lindeth and from Lindeth, the whole area of enclosed land up to Blackdyke, and going up Blackdyke to the crag beyond Blackwell, and so from the crag to Southou” (quoted in Booth 2004, 5).

Now even just for the land-features it relates this charter is immensely valuable, alluding to the existence of wood, a ditch, pasture, a park, a sea-dyke and enclosed land. The mention of a sea-dyke is of particular significance, especially given its position which by inference must have been close to Quicksand Pool in the modern landscape; directly south-west of Leighton Moss. The sea-dyke was presumably built as a means of protecting the land behind it, suggesting Leighton Moss was a valuable asset in the thirteenth century. Attempting to locate the areas outlined by the charter has not been entirely possible in this work, with not enough named features being readily identifiable even with assistance from historic maps and Lucas’ account. Below is Booth’s attempt to map-out the landscape according to the charter:

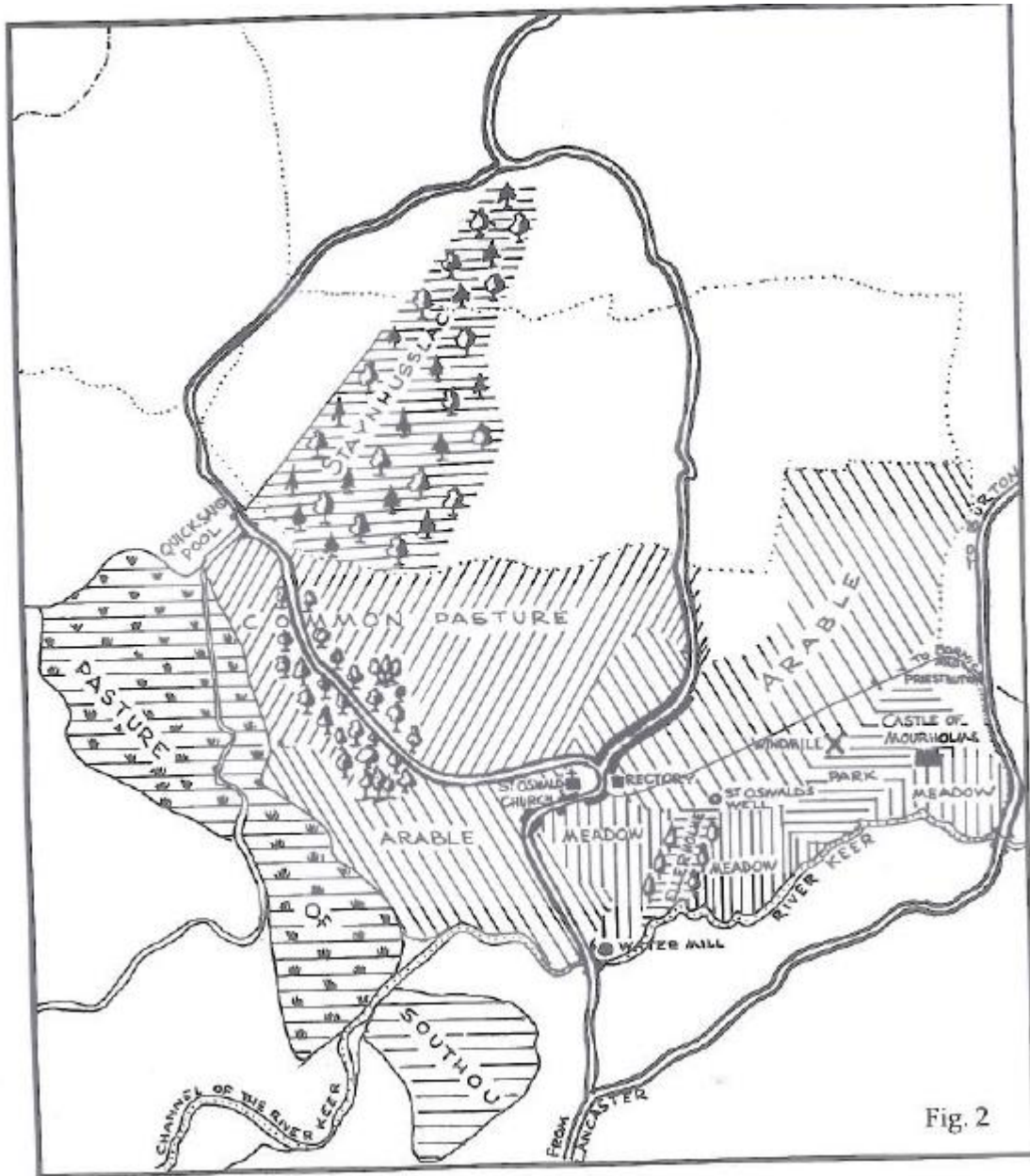


Fig 2.20: Thirteenth century Warton according to Booth (Booth 2004, 5).

Now without knowledge of the full extent of Booth's evidence, his interpretation of the charter is difficult to appraise. He states that Lindeth, Ellerholm,

Quicksand Pool and Black Dyke have modern equivalents (though he does not locate Black Dyke on his diagram), but admits that the positions of Staynhusslac wood, Barraht and Southou are educated guesses (Booth 2004, 5-6). Perhaps Staynhusslac wood could be better equated with the modern Slackwood, which Mabell Saul was shown above to have held in 1563, but it is difficult to substantiate this claim further. One point to make though is that the named features do not necessarily have to have formed one coherent block of land, as Booth represents above, but instead could have been separate fragments of private ground dotted about the landscape.

At the turn of the thirteenth century, a grant of 20 acres of land in Yealand was made by a “Henry son of Herman” (LRO, c.1200 grant), and one would assume that it was this same Henry, Henry de Redmayne, who granted Haweswater to Cartmel during the reign of King John (Farrer & Brownbill 1914, 180-2 [1]).

These snippets of information imbue the sense that human presence in the landscape was strong at this time, but as aforementioned, the nature of Leighton Moss remains a mystery for this period. The Domesday Book, which is frequently quoted when researching the early history of places, sheds no light on the configuration of the physical landscape, detailing only its ownership (Farrer & Brownbill 1914). Indeed, as Terrett asserts, very little information is held for

Lancashire north of the Ribble (Terrett 1962, 397), thus very little can be said about the disposition of the area beyond the early thirteenth century.

The origins of the names of proximate settlements are noteworthy though, and may tell something of the landscape in which they were coined. “Mourholme” for instance, is thought to mean “island in the marsh” (Clarke 1982, 3), which would accord with the earlier supposition that the medieval landscape was a wet one. The derivation of “Carnforth” supports this claim, being “crane-ford” (Yalden & Albarella 2009, 116); the crane being of course a bird associated with wetlands. The origin of “Yealand” is also interesting; thought to mean “land newly taken under cultivation” and dated to the late Saxon-period (Gelling 2007, 28-34), it could give some idea as to when the area was being settled.

The Landscape Beyond

The earliest evidence for the disposition of the Leighton Moss landscape is disparate to say the least. Various sites and finds have been identified and logged by the PastScape survey (English Heritage 2012), yet a comprehensive picture is difficult to create. This is perhaps due in the early first millennium to a period of marine transgression, which Gardiner asserts effectively left coastal

wetlands a clean-slate for medieval settlers (Gardiner 2008, 300). A suspected Roman wharf site is recorded by the PastScape survey as having been located near to modern-day Pine Lake (English Heritage 2012). This could indicate that sea-level was much higher in the locality in the early first millennium - to facilitate a functioning wharf the site of which now lies approximately three kilometres inland - or simply that the river Keer had much the same position as it does today, and that the wharf was accommodated by the river.

Warton crag and Dog Holes cave are well-known Iron Age sites, with the latter containing evidence that alludes to both arable and pastoral forms of agriculture taking place in the neighbouring area. Jackson, who excavated the cave in the early twentieth century, related that a small iron sickle was discovered, and came to the conclusion it will have been used for harvesting crops (Jackson 2007, 128). Sheep, goat and domestic pig were also amongst the livestock represented during excavations spanning 1907-12 (Jackson 2007, 129).

Palaeoenvironmental work has been undertaken in the vicinity of the reserve, with that at Storrs Moss (Powell et al 1971) and Little Haweswater (Taylor et al 1994) representing the most local to Leighton Moss. Both investigations used coring to extract pollen samples, with subsequent analysis of these cores

allowing inference to be made about local vegetation composition and environmental conditions, as well as levels of human interaction. Pollen samples were representative of the Neolithic period and beyond, with peat layers above those pertaining to this era being too badly damaged by peat extraction to allow analysis (Taylor et al 1994).

At Storrs Moss, the conclusion of research was that in the late Mesolithic/early Neolithic period, the site was covered by a carr-forest transition zone, within which some utilization of wood-resources was taking place (Powell et al 1971, 135). It is thought that closed forest conditions prevailed in the surrounding area (Powell et al 1971, 131), with wood samples dominated by alder; oak, willow, Scots pine and alder buckthorn were also represented in the pollen samples taken (Powell et al 1971, 129). At Little Haweswater, a similar conclusion was reached, with evidence of minimal human activity occurring at the transition zone between forest and open ground (Taylor et al 1994).

Wildlife

Much of what can be related of the wildlife composition of the area for the medieval period and beyond is subject to supposition, but some comments can be made. Place-name evidence has been used extensively to mark the presence of an animal species in a given locality, with Yalden supporting this method, asserting that often they make ecological sense (Yalden & Albarella 2009, 120). He notes for instance that cranes are most often combined with springs or marshes, while eagles and ravens are associated with cliffs and dales (Yalden & Albarella 2009, 120-1). Thus “Carnforth” could have emerged from a wetland landscape, to which cranes were linked. The name is thought to date to the Saxon period (Yalden & Albarella 2009, 115), and cranes are believed to have been fairly widespread in early medieval England, becoming extinct as a breeding species in the seventeenth century (Yalden & Albarella 2009, 144). An individual bird was seen at Leighton Moss in 1977 (Wilson et al 1988, 73).

It cannot be said whether cranes were a common sight or a relative rarity, but one pertinent question is why, when many species must have been present in the landscape, would one accord greater significance than another? There is no space here to provide a rigorous debate, but it is worth noting that when trying

to discern the *composition* of fauna as opposed to the presence of a single species, place-name studies may actually act to obscure the wildlife make-up. In the song “the riddle”, Nik Kershaw provides an apt line that can be related to this topic: “blackbird sings on bluebird hill” (Kershaw 1984); the relation of a place to a species may mask the presence of other species thereabout. What other species may have been singing at crane-ford?

The archaeological record of birds could provide answers to this question, though avifaunal remains were not identified in any of the major archaeological investigations mentioned above. Only at Manor Farm in Borwick, which lies less than half-a-kilometre east of Pine Lake, have bird-bones been recorded.

Excavation here of a two-phase ring cairn, dated to the Bronze Age, revealed “mallard, plovers, woodcock, thrush (including song), finch and wren” (Huntley & Stallibrass 1995, 115). It is fascinating that all of these species inhabit the area today, providing a direct link between the sights and sounds experienced perhaps three thousand years ago. Indeed, Yalden and Albarella suggest that even as far back as the Neolithic period, the birds present would have been much as might be expected in the same locations today (2009, 78).

Illustrations in the Sherborne Missal, produced in fifteenth century Dorset (Backhouse 2001, 5), show this general consistency in Britain's avifauna. Within are 48 images of birds, the majority of which can be directly identified with birds of the modern day. Below is the depiction of a familiar one to Leighton Moss, the teal:



Fig 2.21: Depictions of male teal (left: © Mike Langman, RSPB-images.com; right: Sherborne Missal, 371 in Backhouse 2001, 32 [Plate 19]).

It is likely that birds of prey abounded in the medieval landscape, with royal protection of their nests imposed in the Forest of Wyresdale, located between Lancaster and the Forest of Bowland (Farrer & Brownbill 1920, map in-between 439-40). In 1245 Roger Gernet and his heirs were charged with keeping the eyries of hawks for the king's use (Farrer & Brownbill 1920, 440), which was presumably falconry.

Wolves may have been a feature of the wider landscape in the thirteenth century, with Yalden relating that “...in the Royal Forest of Lancaster, a man was paid 1S 2d to guard the calves against the wolves in 1295-6, while seven calves were killed that year and a further eight cattle were killed by them 1304-5” (1999, 168). Wolf remains were also identified during excavations at Dog Holes cave, and were attributed a Romano-British date (Jackson 2007, 129). Bones of fox, badger, common hare and fallow deer were also recorded as being contemporary to the wolf.

The beaver may have been present north of the study site at Barbon; the name being taken to mean “beaver-stream” (Coles 2006, 144). That “Barbon” is likely to derive from Old Norse (Coles 2006, 144) may also provide indication as to when beavers were present to bestow the name. Norsemen are known to have settled north-west England in the ninth century (Peter 1987, 18), giving a likely earliest date for the designation of Barbon. A likely latest date for the origin of the name may be placed before 934, after which point the Saxon king Athelstan became the dominant political force in the region (Fellows-Jensen 2007, 18-27), and thus place-names coined after this date are unlikely to have been Norse. Beavers may thus have been a feature of the wider landscape around 900AD.

Summary

This chapter has revealed glimpses of the landscape around Leighton Moss from the medieval period to prehistory. These glimpses are somewhat larger for the medieval period, and when combined with detail provided in previous chapters, insinuate that lower lying reaches were probably at least seasonal wetlands, with marshes, and islands in them – Mourholme – mentioned. The existence of a thirteenth century sea-dyke was also related, which tells that water management was being undertaken, and again suggests the predominance of a wetland landscape; presumably it was constructed to combat tidal inundation. That arable and pastoral agriculture was also undertaken has been evidenced, and the sea-dyke was likely built to protect the longevity of these valuable areas.

Wildlife composition has been largely determined by educated guesswork, with place-name evidence used to suggest the presence of cranes and beavers in the wider landscape. Archaeological and documentary evidence suggests that the wolf may have been in attendance as late as the thirteenth century, and excavations dating to the Bronze Age at Borwick have been summarised to show that birds prevalent three thousand years ago would be familiar features of the modern day landscape around Leighton Moss.

3

Analysis and Discussion

1

What Made Leighton Moss?

Having presented the “what” and “when” of landscape disposition in the historical narrative of Leighton Moss, this section will examine the “how” and “why then” of changes highlighted. Key underlying processes – mechanisms and management – that have led to the current landscape configuration and wildlife composition will be identified. Focus will be placed on understanding and explaining the three most recent phases of landscape form; that is, on developments since the early eighteenth century. Beyond this period the evidence unearthed is not conducive to detailed analysis. Suggestions will though be made as to the reasons behind the timing of modifications, with some allusion to earlier periods.

Initially, the setting will be provided by looking at the origins of the land and the effects of tidal inundation of it. It will be related that changes in relative sea-level formed Leighton Moss, in the truest sense, and that throughout its history water has been the dominant element in landscape change. Water depth, chemistry and the frequency of fluctuations in both, largely determine vegetation composition (Van der Valk 2006), thereby influencing how the land looks, and what can be seen in it. Human-management of water will be shown to have had the most recent, profound effect on land-form and function.

Forming the land

Leighton Moss started-out as a flooded embayment of Morecambe Bay (Middleton et al 1995, 134). Its origins could therefore be attributed to either a rise in sea-level, which will have begun the process of alluvial deposition in the basin (see Fig 1.2); or a fall in sea-level, which will have revealed a new land surface. Sea-level changes in Morecambe Bay have been studied by Zong and Tooley (1996), who assert that relative sea-level in the area rose between 6510BC and 1500BC, with fluctuations at rates between -8mmyr^{-1} and $+12\text{mmyr}^{-1}$ (Zong & Tooley 1996, 55). They also relate that after 1500BC, fluctuations in relative sea-level are likely to have stabilised, with rises and falls probably occurring within $\pm 2\text{mmyr}^{-1}$ (Zong and Tooley 1996, 55). This would suggest that while the land surface of Leighton Moss could have been unveiled earlier, it is likely that prolonged exposure will not have occurred until around 1500BC.

Fluctuations in relative sea-level can therefore be posited as having had a major impact upon the landscape, effectively producing the land surface on which Leighton Moss sits today. Aside from significant changes in sea-level, periods of tidal inundation also appear to have influenced the configuration of the landscape, and perhaps posthumous interpretation of it. An episode of marine

transgression is thought to have occurred in the early first millennium (Gardiner 2008, 299; Simmons 2001, 70; Coles 2006, 6), which Gardiner asserts will have effectively erased the wetland landscapes that preceded inundation, covering them with sediment (Gardiner 2008, 299). The extent to which this claim is applicable to Leighton Moss though is difficult to ascertain; Gardiner is speaking of evidence pertaining to Romney Marsh in Kent, and the consulted evidence in this work does not allow for detailed comment. It is clear however, from the construction of sea defences in the medieval period, and seasonal flooding of the Moss noted in the nineteenth century, that inundation has a legacy of influence in the vicinity.

The physical conditions imposed by cycles of inundation would of course limit the colonization potential of the land to vegetation, favouring species with resilience to it. In the case of Leighton Moss, it is known that following the initial fall in sea-level, the exposed “[silty] clay was colonised by a *phragmites* - dominated reed bed” (Middleton et al 1995, 134). Relatively stable conditions seem then to have allowed natural succession to take place, with the subsequent development of a fen, and then a fen-carr (Middleton et al 1995, 134). The plants themselves act to alter the immediate landscape through annual growth-cycles, which in the case of reeds involve the dying back of the plant in winter, and the

deposition of litter. Over a number of years a build-up of litter will occur, and if left un-interrupted, will begin to dry-out the reed-bed through raising the level of the substrate. Species such as willow can then begin to colonise, accelerating the progression from reed-bed to a new phase of succession.

It is thus apparent that in providing base conditions for a select group of plants, tidal cycles have been instrumental to landscape form. The growth cycles of the plants themselves have been shown to have their own impact, but this is subject to prevalent physical conditions, as well as exploitation by humans and animals. Mowing of tall reeds is mentioned by Rieley and Page as an action that prevents succession (1990, 92); presumably grazing by livestock would have a similar effect. One ramification of Leighton Moss having been a wetland for much of its discernable history has also influenced subsequent interaction with humans: the growth of vegetation on waterlogged soils provides ideal conditions for the formation of peat (Fuller 1982, 147). As will be related below, this ready source of fuel is likely to be a key reason Leighton Moss was not “improved” until the end of the eighteenth century.

Fashioning the land: raised bog to arable farmland

Between the mid-eighteenth and early nineteenth century, Leighton Moss was transformed from a raised bog to arable farmland. This change was achieved in part by *reducing* the amount of water entering the Moss, through drainage dykes to intercept freshwater run-off, and sluice systems to reduce the incidence of tidal inundation. Embankments were also constructed at the seaward end of the Moss to further reduce the risk of flooding. The *removal* of water from the saturated peat-soils was also undertaken through the installation of two coal-powered pumps. In tandem, these management techniques made the land suitable for the sowing of arable crops.

It is likely that the dehydrated Moss surface will have been altered directly by processes of “paring and burning”, which involved setting fire to the peat; a technique employed during conversion of the Yealand mosses around the same time (MLHS 2005, 23). Burning will presumably have had the added benefit of returning nutrients to the soil, thus further facilitating crop growth. The fact that Leighton Moss was formed of alluvial deposits makes it likely that the substrate already had a high level of fertility.

There are a number of reasons that can be posited for the timing of the alterations described above. First of all, for much of the eighteenth century Leighton Moss was a useful source of fuel, “Torff”, for the areas’ inhabitants. It seems this had been the case since at least the medieval period (MLHS 2005, 25), and so there was little positive incentive to damage this useful resource. On the flip-side, a negative incentive to landscape-investment prior to the period of improvement seems to have been the geo-political position of Leighton Moss, lying close to the Anglo-Scottish border. As Newman asserts, although north Lancashire only suffered raids twice in the fourteenth century, the threat is likely to have dissuaded intensive development (Newman 1996). It is also possible, in an uncertain environment, that the Moss could have provided a buffer to enemy advance, and a refuge from it.

Demographic changes could also have applied pressure to increase agricultural productivity, with rises in Parish population coinciding with the conversion of Leighton Moss (see Table 3.1).

Date	Number of People
1563	1207
1664	1233
1701	1200
1801	1574
1851	2099

Table 3.1: Population estimates for Warton Parish (figures taken from MLHS 1998).

It would seem that the outward perception of mosses was finely balanced as early as 1600, with Camden writing of Lancashire: “[the soil] is in general good except in certain swampy places called mosses, which, however, make ample amends for these disadvantages by greater advantages [referring to the fuel afforded]” (quoted in Farrer & Brownbill 1920, 420). Whether the peat reserves of Leighton Moss would forever be able to “make amends” and replenish fuel at the same rate it was being extracted is unlikely. It is even possible that by the eighteenth century peat-digging had caused the land surface to sink, leaving it increasingly vulnerable to flooding: “Its [Leighton Moss’] peat had been dug for fuel since medieval times and by the end of the eighteenth century parts of the Moss lay below the level of the highest tides” (MLHS 2005, 25). This assertion

may be reading too much into the quote, but it would serve to consider the prolonged impact of peat extraction on a raised bog. Over time the formation of peat causes the surface of the bog to “rise” above its original level; persistent removal of peat would presumably cause it to fall-back. If this was the scenario, it is likely that the Moss would lose its viability as a fuel source, and therefore become more prone to calls for improvement.

These calls for improvement, embodied in Acts of Enclosure, will also have created an air of change; this, combined with technical advancements in water management and the various other factors mentioned above, will have contributed to the transformation of Leighton Moss to arable farmland.

Fashioning the land: arable farmland to freshwater wetland

After a century of producing arable crops, Leighton Moss was covered by a shallow lake, and subsequently colonised by a *phragmites*-dominated reed-bed. The lake was formed as a result of the water-pumps charged with drainage ceasing to operate in 1918/9, allowing freshwater from the surrounding area to collect in the basin. The embankments constructed to prevent tidal incursion

remained intact, and so the Moss had the beginnings of a solely *freshwater* wetland. It is uncertain, given the propensity of tidal-flooding throughout its history, whether Leighton Moss had ever been a freshwater wetland before the early twenty-first century.

The shallow lake was quickly colonised by *phragmites*, owing to the physical conditions this state provided. Natural succession of vegetation appears to have gone un-interrupted until the acquisition of the site by the RSPB in 1964, from whence management commenced to halt and reverse this process. Rotational reed-cutting was begun, and was carried out annually to prevent further drying-out of the reed-bed. The area of open water was expanded through the use of dredging machines, and water management infrastructure such as drainage dykes and sluices were revitalised. Such infrastructure allowed for efficient control of water levels at Leighton Moss (Fig 3.1), and thereby, over time, to the configuration of the landscape observed today.

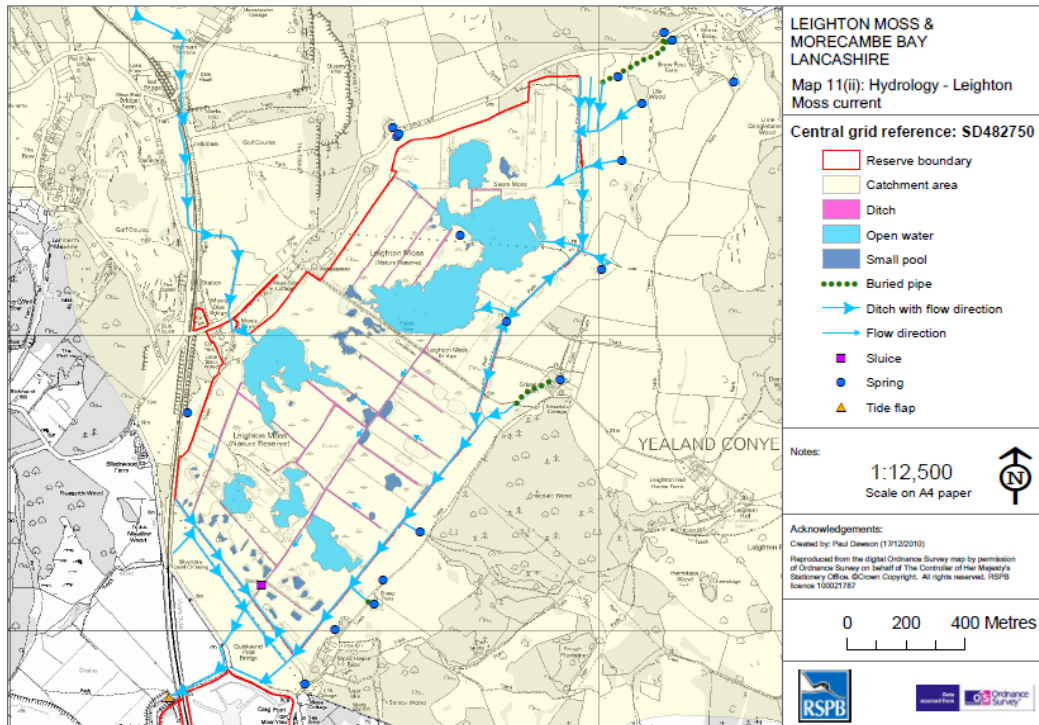


Fig 3.1: RSPB water management at Leighton Moss (RSPB Leighton Moss).

The timing of the change in state between arable farmland and freshwater wetland can be explained by a number of factors. The flooding of Leighton Moss coincided with the end of World War I; coal prices had risen sharply during the war (Wilson et al 1988, 23), and so the monetary cost of arable production through pumping of the Moss had increased. It is possible that this increase in capital investment was not being met with an increase in yield, given that tidal floods were still occurring as late as 1907 (Ford 1931, 29). Events such as this

would have damaged crops and perhaps raised questions over continued drainage efforts.

It also happened that the flooding of the Moss increased the numbers and species of birds inhabiting it that were sought for sport, occasioning a land-use that required little investment of labour or finances: wildfowling. The lucrative exploitation of birds in the 1920s, as evidenced by the Leighton Estate Game Book (see page 42), suggests that there was no economic incentive for the land-owners to revert the wetland back to a state of arable production. Wildfowling though was a short-lived land-use, due largely to rapid colonization by *phragmites*. The obstruction caused by dense-reed growth occasioned Leighton Moss to be leased to the RSPB in 1964, and owing to the allure of the site to a diverse range of species, and the financial support provided by growing membership of the organization, the site was purchased in 1974.

This growing membership of the organization – from 20,000 in 1964 (Wilson et al 1988, 3) to over a million today – reflects a change in attitudes towards flora and fauna, which has undoubtedly affected land use and thereby, landscape form. Legislation, such as the Wildlife and Countryside Act (1981), can be posited as a reason for this change in attitude, through influencing moral stance (Carman

1994, 19). Legal regulation, according to Carman, is also the father of preservation agencies such as English Nature (Carman 1994, 23), who themselves have a hand in determining landscape composition at Leighton Moss. The table below shows the RSPB's "ecological objectives" for 2006/07, many of which are influenced by English Nature:

Objective 1	To maintain 134ha of freshwater reed-bed/fen and open water at Leighton Moss in <i>favourable SSSI & SPA condition</i> and if possible to increase the number and productivity of breeding bitterns.
Objective 2	To establish a further 46ha of freshwater reed-bed/fen and open water on the two satellite sites, Silverdale Moss and Barrow Scout Fields capable of supporting breeding bittern.
Objective 3	To maintain <i>favourable SPA & SSSI condition</i> of the 2476ha of intertidal sand flats and saltmarsh.
Objective 4	To manage in <i>favourable SSSI condition</i> the 610ha of saltmarsh, principally to maintain and enhance the regionally important breeding wader populations.
Objective 5	To manage the 8ha of brackish lagoons, principally to provide feeding areas for breeding waders, wintering wild-fowl and a varied visitor spectacle.
Objective 6	To manage the 4ha of old slag tips, principally to provide nesting areas for the regionally important population of breeding ringed plovers.
Objective 7	To manage in <i>favourable SSSI condition</i> the 9.7ha of calcareous grassland on Warton Crag.
Objective 8	To manage in <i>favourable SSSI condition</i> the 28ha of northern hazel-ash-yew woodland at Challan Hall.

Table 3.2: Ecological Objectives 2006-07 (derived from Horner & Birnie 2007).

Summary

A multitude of factors can be said to have “made” Leighton Moss; above focus has been placed on discerning dominant land-forming processes, and the most recent land-fashioning processes. It has been shown that changes in relative sea-level are behind the physical formation of the land on which Leighton Moss sits, through the deposition of silt and its subsequent exposure. The interplay between tidal inundation and vegetation succession has been important throughout the history of Leighton Moss, allowing different habitat conditions to prevail for humans and wildlife alike. The growth of plants on waterlogged soil created ideal conditions for the formation of peat, which was a feature of huge significance for the subsequent development of the land surface through peat extraction.

The degree of “wetness” at any given time can be said to have been vitally important to landscape disposition, affecting at once how the land looked, how it was used and perceived, and what could be seen in it. The influences of the human social sphere have had, and continue to have, key impacts on current landscape configuration, often determining human interaction with wetlands. In

the case of Leighton Moss socio-economic factors appear to have heavily induced intensification of water management, for one purpose or another.

The composition of wildlife is inherently linked to changes in land-form, as has been demonstrated in the first section of this work, with each individual species being affected differently to realised changes. Factors such as climate change and human persecution often rank highly amongst explanations of bird distributions (e.g. Shrubbs 2003; Holloway 1996), but it is periods of relative stability in land-form, rather than *change* as explored here, that need to be analysed for the full range of determinant processes to be revealed.

It has thus been shown that a multitude of factors have coalesced through time to create the landscape today. Had creationism been an accepted archaeological concept, this would have been a much shorter piece.

2

Reflections

Hopefully this work will have shown the huge potential for historical research to be incorporated into nature conservation strategy at Leighton Moss. There is no insinuation as to what habitat management priorities should be, but rather information that could inspire a new visitor experience to the reserve. Currently the bittern, bearded-tit and marsh harrier are the most celebrated species, but the snipe, woodcock and lapwing also have strong associations with the site – arguably stronger associations. Guided walks could be engineered solely around the history of Leighton Moss, and/or aspects of the history could be incorporated into current walk-themes; the gate-posts could be re-incorporated into the modern landscape.

That nature and history go hand-in-hand is not something often recognised, but an existing interpretation board at the reserve is proof that there are many ways these subjects can relate to each other (Fig 3.2):

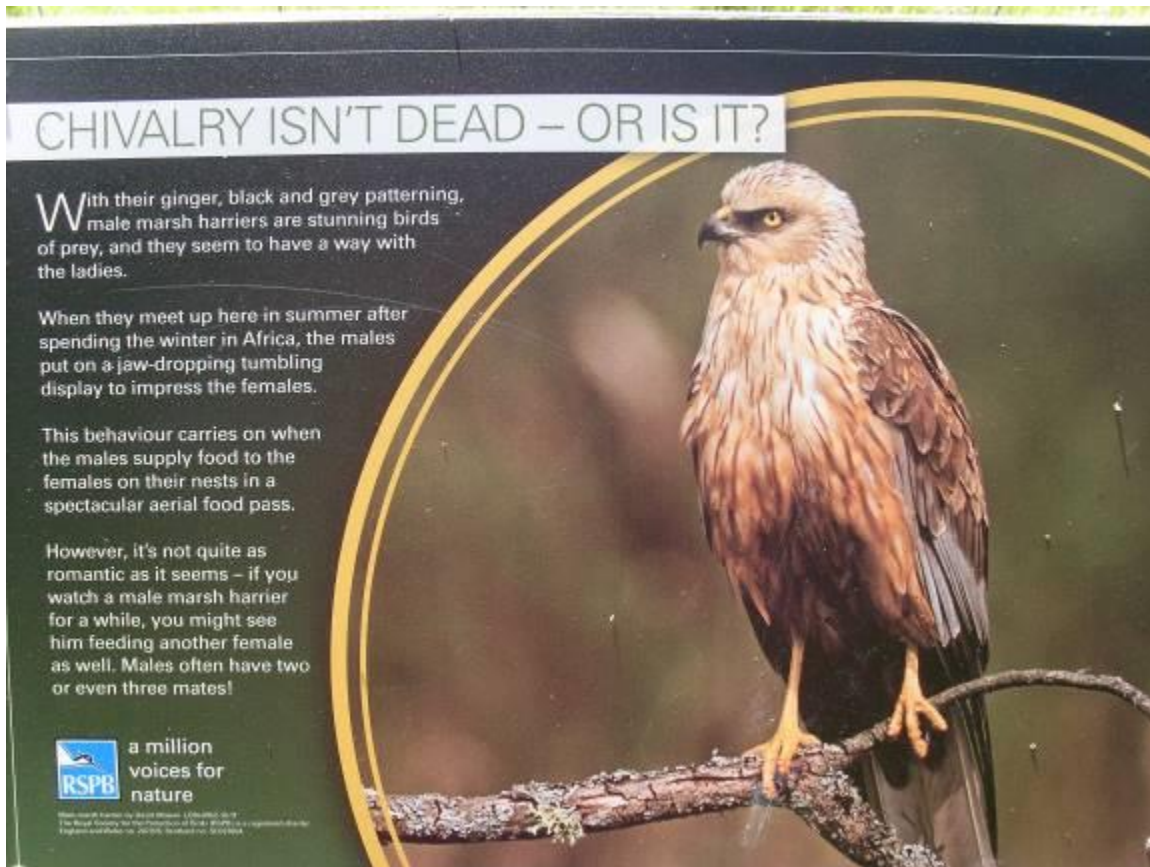


Fig 3.2: Marsh Harrier interpretation board (Author's own 2012).

Future research could follow a number of directions, but should start with a more in-depth examination of landscape process in most recent times. To advance this project it would be wise to appoint a steering group, perhaps with adherents from each of the stakeholders aforementioned, to assist with synthesis of material. Possibilities abound for the future, but for the present the author is content in having proven that there is more to Leighton Moss than meets the eye.

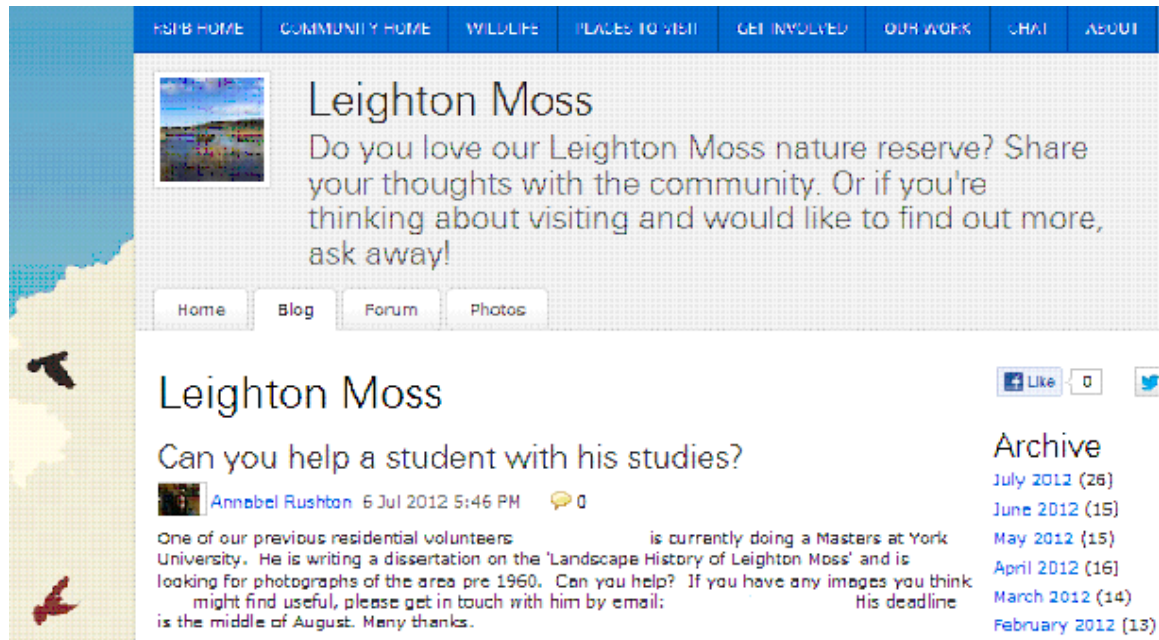
Appendix 1

Scientific names of birds mentioned in the text (from Holden & Cleeves 2006).

Common Name	Scientific Name
Bittern	<i>Botaurus stellaris</i>
Starling	<i>Sturnus vulgaris</i>
Bearded Tit	<i>Panurus biarmicus</i>
Marsh Harrier	<i>Circus aeruginosus</i>
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>
Reed Warbler	<i>Acrocephalus scirpaceus</i>
Reed Bunting	<i>Emberiza schoeniclus</i>
Moorhen	<i>Gallinula chloropus</i>
Coot	<i>Fulica atra</i>
Avocet	<i>Recurvirostra avosetta</i>
Lapwing	<i>Vanellus vanellus</i>
Pintail	<i>Anas acuta</i>
Wigeon	<i>Anas penelope</i>
Woodcock	<i>Scolopax rusticola</i>
Pochard	<i>Aythya ferina</i>
Tufted Duck	<i>Aythya fuligula</i>
Teal	<i>Anas crecca</i>
Mallard	<i>Anas platyrhynchos</i>
Pheasant	<i>Phasianus colchicus</i>
Kingfisher	<i>Alcedo atthis</i>
Sand Martin	<i>Riparia riparia</i>
Dipper	<i>Cinclus cinclus</i>
Partridge (Grey)	<i>Perdix perdix</i>
Corn Crane	<i>Crex crex</i>
Crow	<i>Corvus corone</i>
Jay	<i>Garrulus glandarius</i>
Magpie	<i>Pica pica</i>
Rook	<i>Corvus frugilegus</i>
Skylark	<i>Alauda arvensis</i>
Swallow	<i>Hirundo rustica</i>
Snipe	<i>Gallinago gallinago</i>
Heron (Grey)	<i>Ardea cinerea</i>
Kite (Red)	<i>Milvus milvus</i>
Oystercatcher	<i>Haematopus ostralegus</i>
Raven	<i>Corvus corax</i>
Meadow Pipit	<i>Anthus pratensis</i>
Crane	<i>Grus grus</i>
Thrush (Song)	<i>Turdus philomelos</i>
Wren	<i>Troglodytes troglodytes</i>
Ringed Plover	<i>Charadrius hiaticula</i>

Appendix 2

Evidence for promotion of the project:



(i) Call for historic photographs of the study area posted onto RSPB Leighton Moss blog.
Available at: <http://www.rspb.org.uk/community/placestovisit/LeightonMoss/b/LeightonMoss-blog/archive/2012/07.aspx?Page1>



(ii) Poster displayed around the reserve, seeking historic photographs.

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