
History and ecology in the reconstruction of the South Yorkshire fens: past, present and future

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England’s third largest fenland, bordering North Lincolnshire, Nottinghamshire, and South Yorkshire was almost totally destroyed by the early 1900s, by the long-term impact of intensive land management and the drainage efforts of the Dutch engineers. The consequences and impacts of these changes are discussed. This paper reports the mapping and reconstruction of the former wetlands across South Yorkshire and adjacent counties. Field and archival research have informed the generation of GIS computer maps indicating the extent of wetlands in the region from pre-Roman to the present day. A variety of sources was accessed to provide insight into the likely fauna of this wetland, and area-based case studies demonstrate the drivers for change through history.

The outcomes of this research are being used to inform proposals to reconstruct the wetlands in the post-industrial and post-agricultural landscapes. These changes are justified by a matrix of drivers and factors issues including water management (both flood and drought) and the need to foster rural economies through farm diversification and related leisure and tourism. Other key drivers of this process are the need to comply with the Water Framework Directive, to halt and reverse regional declines in biodiversity, and to address issues of carbon sequestration through wetland creation. The latter is in response to UK Government policy on climate change and is made more urgent by developments such as the new international airport at Finningley. Barriers to change and issues arising from short-term approaches and a lack of corporate vision are discussed.

Key Words: wetland, mapping, landscape reconstruction, landscape history

Introduction

"Wetlands are not always, and for some not ever, the most pleasant of places. In fact they have often been seen as horrific places. In the patriarchal western cultural tradition wetlands have been associated with death and disease, the monstrous and the melancholic, if not, the downright mad. Wetlands are 'black waters’. They have even been seen as a threat to health and sanity, to the clean and proper body, and mind. The typical response to the horrors and threats posed by wetlands has been simple and decisive: dredge, drain or fill and so 'reclaim' them. Yet the idea of reclaiming wetlands begs the questions of reclaimed from what? For what? For whom? A critical history of wetlands' drainage could quite easily be entitled 'Discipline and Drain’." Rod Giblett (1996).

Potential revenue was the driver for draining much of the lowland fens of England. In 1600 AD Parliament passed An Act for the recovery and inning of drowned and surrounded grounds and the draining of watery marshes, fens, bogs, moors and other grounds of like nature. The idea developed with James I and was implemented on behalf of Charles I. The build up to, and the impact of the drainage of Hatfield Chase are discussed in detail by Van de Noort (1997). Before drainage 36,420 hectares of the Humberhead Levels (De La Pryme, 1699), the area was "…… A continual lake and a rendezvous of ye waters of ye rivers ....". Wilcox (1933) produced a map that suggested the extent of prehistoric marsh, moss, and fen. This was produced nationally but considered only the major lowland floodplains as
historically wetland sites. Two maps were produced, one based on geological, topographical and climatic evidence, the other on early literature. In general terms, this same approach has been adopted for the present study.

Map 1. The Prehistoric wetlands of the region from Wilcox (1933)

Darby and Maxwell (1962) presented maps of the region with wetlands and related features (peat and alluvium deposits, fisheries and mills for example) shown. These begin to provide a picture of the once extensive wetland landscape of the study area.

Map 2. The extent of wetlands from Darby and Maxwell (1962)

Oliver Rackham (1986) suggested that "about a quarter of the British Isles is, or has been, some kind of wetland". On the same theme, Smout (2001) states that: "There are many thousands of hectares of what is now prime arable land, especially in northern England, that were in the 17th century, fen and mire" and "it is surprising how...Yorkshire...fenlands have
evaporated from general memory". This paper outlines the preliminary reconstruction of these historic wetlands. The study has provided new observations and conclusions in respect of the historic wetlands and the impacts, scale and effect of anthropogenic change. In recent years, the region has been surveyed and recorded in incredible detail.

Van de Noort and Davies (1993), and Van de Noort and Ellis (1997) for example report the findings of major archaeological studies across the Humberhead Levels and surrounding areas. Buckland, Whitehouse et al. (for example Whitehouse et al., 1998; Buckland, 1979) have researched the palaeo-ecology of the region in great detail. Alongside this has been a huge amount of meticulous research and recording by entomologists and others at Doncaster Museum (Howes, Limbert, and Skidmore; for example Skidmore et al, 1985). There is also a series on the area published as the Thorne and Hatfield Moors Papers. A consequence is a unique understanding of the ecological resource now and past. Finally, a five-year programme of the Countryside Agency called ‘Value in Wetness’, has co-ordinated detailed studies of land use, economics, soil water potential, hydrology, and potential carbon sequestration through re-wetting. However, so far there has been no attempt to join the focused work in the lowlands, to the wider area, particularly the upper catchment of the south Pennines. Furthermore, there has been no attempt to draw together the information to present an interpretation of the historic landscape ecological resource.

Methodology: Wetland Mapping

In order to re-construct the extent and occurrence of wetlands across the Humber region, it is necessary to map evidence from topographic, geological, and pedological, sources, and from earlier maps. MapInfo Geographical Information System was used to create layers of landscape history, built up to show key changes in the wetland landscape. The rivers were mapped from Ordnance Survey Geological Maps of Drift (Ordnance Survey 1949-1969), and maps of the sixteenth to nineteenth centuries (Saxton, 1577; Saxton and Goodman, 1616; Vermuyden, 1626; Burdett, 1767; Jeffrys, 1772; Colbeck, 1782; Ordnance Survey First Edition). Alluvial deposits were mapped to indicate original wetland, with over 100,000 hectares (over 1,000 sq. km.) of wetland identified. Anthropogenic change through construction of watermills, drainage for agriculture, urban expansion and industrial development, dumping of mine spoil, building of reservoirs, and transport systems, were incorporated into the mapping process. Case studies of different parts of the river system were chosen, with contrasting topographies and drivers of change. The study attempted to re-construct former wetland areas across the region, looking in detail at sub-areas and specific case studies. Time-sliced maps of former wetlands were produced, the lowland and upland wetland landscapes mapped as one, the Humber fens united with the south Pennine mires.

Re-constructing the former landscape ecology

To understand the nature of these wetlands, it is important to map their extent, and to reconstruct their former ecology. In order to do this, early accounts, itineraries and other sources such as feast menus and game books provide insight into ecology and use. This work is at a very early stage but still gives a glimpse into the historic wilderness.

Results

A series of computer maps was generated showing the original watercourses of the Rivers Don and Went, before the Roman Turnbridge Dyke. These now confluent rivers were formerly parts of different river systems. Thorne Mere and two satellite meres are plotted. Vermuyden's map of these lakes was used though Taylor's study of the Old River Don,
suggested different locations. The extensive wetlands suggested by alluvial deposits, particularly peat, are imposed on maps of rivers. The watercourses and wetlands are shown in 1600, shortly before Vermuyden's drainage works. The Turnbridge Dyke, known to be Roman (Buckland, 2002), and the first major anthropogenic change to the watercourses in the region, captured the River Went diverting part of the River Don into the River Aire. The Dyke may have been for the transport of goods and livestock, an extension from the Fens to Lincoln.

Map 3. A summary map to display the research findings

The Dutch Drainage obliterated Thorne Mere and the original course of the River Don and diverting several major channels in the area (Taylor, 1987). Agriculture, or generation of capital from sales of land for agriculture, was the driver. The Turnbridge Dyke north of the Dutch River disappeared by 1800 (Jeffrys, 1772; Ordnance Survey First Edition, and drainage of Potteric Carr, south of Doncaster, took place in the late eighteenth century (Colbeck, 1782). Finally, nineteenth century drainage in the area west of the River Don north of Doncaster almost total obliterated wetlands apart from remnants of peat on Thorne and Hatfield Moors.

A Former Wetland Lost from Memory

There is a wealth of anecdotal evidence to suggest that the area teemed with wildlife, with birds in their hundreds of thousands. Human predation on a huge scale, peaked in the eighteenth and nineteenth centuries, and declined, presumably because of almost total loss of wild stock, massive loss of habitat, and improved availability of imported food. The wild harvest was uneconomical, but birds could not recover because of landscape change. Around 98% of the historic wetland was destroyed.

Cornish in 1895 describes the carrs south-west of Doncaster as an outlier of the great fen that originally extended north to the River Humber, east to the Trent lowlands, and south to Nottinghamshire, with the Isle of Axholme, Thorne Waste, Marshland and Hatfield Chase fen. Eagle Clarke (1887) wrote of Pottrick Carr having vast numbers of duck, bittern, ruff and reeve, black-tailed godwit, marsh harrier, great crested grebe and water rail, breeding
commonly, before Smeaton’s drainage in the late 1700s. Vermuyden’s drainage of Thorne Moor and Hatfield Chase in the 1600s century is well documented, with anecdotal evidence of a huge wetland resource. Taylor (1987) believes the pre-Vermuyden landscape in the east would have rivalled the present day Coto Doñana in its wealth of birdlife. Chris Firth (1997) remarks that: "the destruction of the wetland habitats (here) would, by today's standards, be regarded as an ecological disaster of enormous proportions..... (that) could be argued as equal in proportion to the present day destruction of rainforests". Yet drainage of Hatfield Chase was only part of the loss of the wetland scene of South Yorkshire. Noting how in Yorkshire south of the confluence of the Ouse and the Trent, 70,000 acres of Hatfield Chase were constantly inundated before Vermuyden and his fellow Dutch undertakers commenced to drain it in 1626. At its heart was Thorne Mere, almost a mile over. Close by, Potterick Carr 4,000 acres near Doncaster fell to Smeaton and his engineers after a private Act of Parliament in 1764. This was one of many outliers known as the Yorkshire Carrs.

A feel for this long vanished landscape can be gathered from the status of some of the wildlife species – the bittern was sufficiently common to have its own vernacular name and to feature in local folk rhymes: 'When on Potteric Carr the Butter Bumps cry, The women of Bulby say summer is nigh'. Even in the early 1900s, older people around Beverley could still recall hearing the local bitterns. However, for over two hundred years the pressure has been to tame the wilderness and to 'improve' the land. Cobbett in 1830 described the land reclaimed from the Humber area as (with the exception of the Cambridgeshire fenland) the richest and most fertile he had seen in the whole of England. The value of land at Hatfield Chase was raised from 6d per acre to 10s by the Dutch improvers. This was the value to the farmer and landowner and does not reflect that to the community living and working in and around the wetlands.

A productive landscape

Conisbrough Castle park (South Yorkshire) dates from around 600-700 AD (Colin Merrony pers. comm.). From shortly after the Norman Conquest to 1347, 70,000 low-lying, often inundated acres of Hatfield Chase were the private forest of the de Warennes of Conisbrough. The Chase then reverted to the Crown. In 1607, it held Red (1,000) and Fallow Deer, once as common ‘as sheep upon the hills’, and ‘so unruly that they almost ruined the country’. The last major hunt occurred in 1609, the royal party in 100 boats pursuing 500 deer across Thorne Mere (Jones, 1996). Hatfield Chase famous for its fisheries and swans, was disforested (1629) and drained in the 1600s. In the accounts of Leland (Henry VIII’s antiquary), there is a description of the feast for the enthronement of George Neville as the Archbishop of York in 1466. This may have a degree of exaggeration, and much of the food would have been supplied from the Derwent Washlands, south of York. Nevertheless, it does give insight into the likely wildlife at the time in the South Yorkshire and Humber marshes and fens:

Oxen 104; Wild Bull 6; Muttons 1,000; Veales 304; Porkes 304; Piggs 3,000; Kidds 204; Conyes 4,000; Staggs, Bucks and Roes 504; Pasties of venison cold 103; Pasties of venison hot 1,500; Swans 400; Geese 5,000; Capons 7,000; Mallard and Teal 4,000; Plovers 400; Quails 100 dozen; Fowles called Rayes 200 dozen; Peacocks 400; Cranes 204; Bytternes 200; Chickens 3,000; Pigeons 4,000; Hernshawes (young herons) 400; Ruff 200; Woodcock 400; Curlews 100; Pheasants 200; Partridges 500; and Egritts 1,000.

Other regional household accounts confirm cranes, herons, snipe, bittern, quail, larks, dotterel, and bustards for the table (1526), peacocks, cranes, and bitterns (1530), and twelve
spoonbills at 1s each, and ten bitterns at 13s and 4d (1528). Many are wetland birds and mammals from forest or chase; these were extensive, productive landscapes. Little bittern, night heron, and purple heron probably survived in English wetlands until the 1600s. Cranes and spoonbills were extinct as breeding birds in England for around 300 years, but ruff bred at Hatfield Chase until the 1820s. Thomas Pennant (1766) described the taking ruff in nets, fattening in captivity, and selling them for the table at 2s each.

New techniques in wildfowling were important, before modern guns. The Dutch duck decoy came in the 1600s, with Dutch drainage engineers. Thousands of wildfowl were captured every year from South Yorkshire’s fens. Even Doncaster Corporation had a duck decoy, paid for as an investment or from money for the upkeep of the poor. Making the decoy and a special embankment, ‘Decoy Bank’, (over three-quarters of a mile) to reach it cost £160. The decoy pond was circular, with 6½ acres of water and 6 ‘pipes’ to collect ducks. In 1662, it was let for 21 years at an annual rent of £15, which fell in 1707 to only £3 per year; perhaps reflecting the impact of drainage. The lessee of 1707 specialised in pochards, one of the best ducks for the table. They were caught by nets raised by pulleys on poles after the birds settled on the water. All the duck pipes were still there in 1778. The last decoy man died in 1794, and by the late 1800s the Great Northern Railway ran straight through what had been the decoy.

The wetlands provided fish, reed and rushes (for thatching, flooring and candles), peat fuel, brushwood from the carrs for fuel and light constructional work, and pasture for cattle. As Smout notes it was not only the marshes and meres of Yorkshire and Lancashire that wetlands had economic value for people, but the same across northern Britain.

Conclusions

The study confirms the scale of wetland loss across the area, and presents evidence for its former extent. It demonstrates continuity of wetland habitats throughout the catchment, lowland areas linking along the river valleys to the upland blanket mires. Drivers for change are noted and discussed briefly here. In terms of wetland loss, there has been a partial redress in the middle and upper parts of the catchment, through remnant millponds, later reservoirs, and more recently new wetland nature reserves, from subsidence flashes, flood management washlands, and purpose-built sites. It is likely that large wetlands will be developed across at least parts of the study area in years to come. But all these areas are a tiny fraction of the once extensive and varied wetland. The work shows that the research approach adopted, following the earlier studies of Wilcox (1933) is both valid and informative. It begins to indicate the ecological richness of the region, a theme developed further elsewhere.

This study was in parallel with work on potential tourism to the area, and on farm and landscape diversification. Interestingly the multi-agency sponsored research on the future of these wet landscapes specifically ignored the Water Framework Directive, and the implications of on-going strategies for major managed flood-lands for flood alleviation. Both have significant policy and economic implications for future management of these wetlands.

In the light of issues of global climate change, atmospheric carbon dioxide is identified as a major causal agent. The massive drainage of wetlands and wet landscapes has clearly impacted on this. It is a major contributor in the to both carbon release in the past, and to hugely modified hydrology today. Hogan and Maltby (2005) considered the potential for carbon sequestration in the wetlands of the Humberhead Levels. They note that carbon sequestration can be effective as part of a range of measures to bring down carbon dioxide
levels in the atmosphere. In this context, they suggest that a strategic approach to wetland conservation and management that also delivers other social, economic, and environmental benefits can be especially effective in this. They also suggest that the freshwater restoration across key parts of the area could make the biggest contribution to carbon sequestration. Coastal inundation for example, would be relatively ineffective in this respect.

Interestingly, they point out the need for a broad strategic response to carbon issues, especially in relation to projected increase in air travel etc. This is a particularly pertinent here since during the course of the study, the new Robin Hood (Sheffield and Doncaster) International Airport came into being at Finningley. So far, there has been no attempt to mitigate or moderate any adverse environmental impacts (including carbon dioxide) by any positive action at any level, political, strategic, or otherwise. Although there are Integrated Catchment Management Plans, and Catchment Abstraction Management Plans, these are not multi-disciplinary in terms of joining up with initiatives such as Value in Wetness. Neither do they consider the whole catchment (the upland zone above the supply / balancing reservoirs is ignored in models), or the history of change across the region.

We suggest that a more holistic approach, informed by knowledge of change at a landscape scale over the last two thousand years, is necessary in order to address the future challenges. Failure to do this will lead to a continuation of under-achievement in environmental restoration and remediation, in water management, and in a wetland-based tourism revival of the rural economy.

It is clear that much contemporary intensive farming in the lowland region is environmentally unsustainable. This is discussed elsewhere. To resolve deep-seated issues of centuries of land drainage and ‘improvements’, requires farmers to ‘buy into’ a new approach. Without their co-operation further progress will be slow. The future vision needs to incorporate bold and large-scale reversion to wetlands, and conversion of a wider landscape to wetter farmland. Farming diversification and tourism combined can provide economic drivers, but there needs to be a strategic vision with effective funding.

References


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