

# WHAT FUTURE FOR THE SOMERSET LEVELS AND MOORS?

CHRISTOPHER HANCOCK

## Abstract

The historical development of the drainage system of the Somerset Levels and Moors has given rise to the present-day network of freshwater channels and has constrained the accompanying agricultural practices. The whole area, lying at or below high tide level, is under threat from flooding and marine inundation due to global warming. Various strategies for coping with the possible events are outlined with examples from Holland and Poland.

## HISTORY AND DEVELOPMENT

Post-glacial rising sea levels caused a build up of peat and sediments across the Somerset Levels. By the late Iron Age, the raised bogs and Meare Pool were at maximum in what is today the Brue Valley. Tidal events deposited Romano-British estuarine silts through the Axe Valley and into Godney Moor. The raised bogs, whose levels would have been subject to seasonal fluctuation, appear to have grown above the floodwater, and close to the present-day site of Meare three lake village sites can be identified. Much of the surrounding marshland held carr woodland (Fig. 1).

In the late Middle Ages, the river channels were defined. The River Sheppey, previously flowing down the River Axe, flowed to Meare Pool, but in spite of this, Meare Pool became reduced in size. This was due to the River Brue being formed by an artificial cut through from Meare Pool to the sea near Highbridge. In the 1490s a clyce was constructed near Highbridge to reduce sea flooding and the first drains were made on the raised mires, with extensive peat cutting for fuel (Fig. 2).

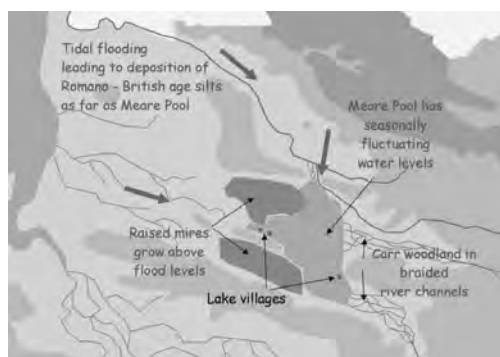


Fig. 1 Somerset wetlands during the Iron Age

In the early 19th century, with the Agricultural Enclosure Awards, the whole area was drained and divided and, where there were raised mires, industrial-scale peat digging for fuel and horse bedding was carried out (Fig. 3).

## CURRENT POSITION

While most of the Levels and Moors is privately owned and farmed, several organisations are presently involved in influencing the management of the Levels and Moors.

- English Nature (EN) has designated, and is responsible for maintaining the quality of a large area of nationally important Sites of Special Scientific Interest (SSSIs) and internationally important Special Protection Areas (SPAs) on the Levels and Moors for the Department of the Environment, Food and Rural Affairs (DEFRA). Public Service Agreement (PSA) targets require

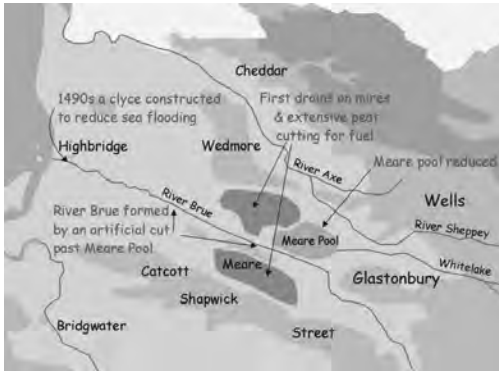


Fig. 2 Somerset wetlands in the late Middle Ages with river channels defined

that by 2010 these areas must be in a favourable condition. Currently, many of the sites are not – this is due largely to water shortage for much of the year.

- The Environment Agency (EA) is responsible to DEFRA for managing air and water. It has produced a succession of plans and strategies for managing rivers and catchments, attempting to raise standards through consensus. The most recent and relevant of these are the Catchment Flood Management Plans. Part of the Parrett Tone Plan includes the more detailed Lower Tone and Parrett Flood Management Strategy.
- The Internal Drainage Boards (IDBs) are responsible for managing water on the Levels and Moors away from the main EA managed water courses. As well as dealing with drainage, IDBs are responsible for ‘penning’ – i.e. providing wet ditches in summer for stock drinking and wet fences. IDBs are statutory bodies but with a local membership representation and a land drainage remit. DEFRA has recently required IDBs with SSSIs in their operating area to produce Water Level Management Plans with the aim of ensuring that PSA targets are achieved.
- DEFRA has a broader environmental remit than the old Ministry of Agriculture and Fisheries (MAAF) and has responsibility for SSSIs through English Nature and for flood management through the Environment Agency. In addition, DEFRA runs the Environmentally Sensitive Area (ESA) agricultural/environmental support for farmers.
- Somerset County Council set up and runs the Levels and Moors Partnership (LAMP), a forum to foster cooperation and agreement. LAMP runs

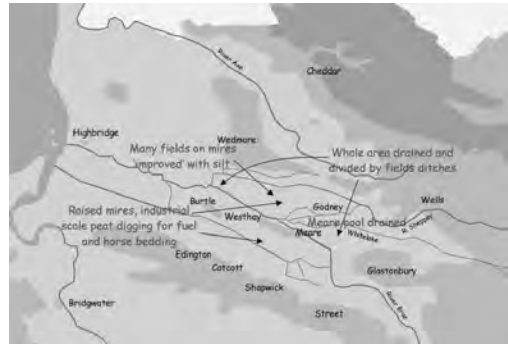


Fig. 3 Somerset wetlands in the early 19th century with the Agricultural Enclosure awards

a EU-funded Leader+ scheme to encourage and promote economic development appropriate to the Levels and Moors.

On the sidelines there are also Non Governmental Organisations such as: Somerset Wildlife Trust, Royal Society for the Protection of Birds, National Farmers Union, Country Landowners Association, Council for the Preservation of Rural England, and the Peat Producers Association.

#### CURRENT ECONOMIC FACTORS AFFECTING FARMING ON THE MOORS

Low milk prices are leading to the loss of dairy herds and hence to a reduction of stock numbers and a fall off of young farmers working on the Moors. BSE in cattle has previously caused a fall in demand for beef. This is now picking up, but the 30-month slaughter rule leaves it very difficult to finish high-quality grass-fed beef animals on coarse Levels’ grassland. Increased use of silage leads to pressure for flood-free early access to grassland. There is increased use of maize as a high energy forage crop for cattle, with the consequent need for flood-free conditions from April to November.

#### THE LOWER TONE AND PARRETT FLOOD MANAGEMENT STRATEGY

Although this strategy is based on widespread and prolonged consultations, it is insufficiently bold and locks the Moors into the present drainage approach. The main hard actions proposed in the strategy are capital works to renew or improve the capacity of

flood defence and water management structures. Although these will reduce the number of small and medium-sized floods, they will fail to control big floods and thus leave housing and roads still at risk. The strategy relies on other parties agreeing new water management agreements on the Moors to achieve the nature conservation benefits from the proposed capital works necessary to accomplish PSA (nature conservation) targets. Currently it is the small floods that help many SSSIs achieve the condition favourable for wintering wildfowl and waders, but these floods will be 'controlled'.

If the final Strategy proposes that it should go ahead with new capital works, without first making them conditional on finalising positive water management agreements, then it may risk damaging the nature conservation value of the Lower Parrett and Tone rather than help PSA targets. Moreover, as is discussed in the Strategy, environmental conditions are not stable.

#### CLIMATE CHANGE: GRADUAL

A gradual change scenario for climate change over the next 50 years predicts higher temperatures leading to:

- Fewer and, eventually, no winter frosts
- Earlier spring grass growth
- Higher water temperatures leading to faster decomposition and nutrient cycling and lower dissolved oxygen concentrations (anoxia)

These factors will change species competitive advantage in both flora and fauna – an example being in freshwater Mollusca that have been shown to be particularly sensitive to warm anoxic conditions. Increasing climate instability is predicted initially, leading on to more storms and unseasonable events.

In the longer term a 10% to 20% increase in winter rainfall and more concentrated rainfall events will lead to more extensive winter floods. A decline in summer rainfall coupled with increasing temperatures will bring more frequent summer drought. This will lead to the shrinking and cracking of peat soils, damage to ditch invertebrates and depressed grass growth. A sea level rise, in the order of 0.2– 0.5m over 50 years, will increase tide lock, especially during high spring tides, but will reduce river discharge, further increasing the risk of winter flooding.

#### UPCOMING POLICY DRIVERS

The Strategic Environmental Assessment is designed to ensure that the environmental impacts of all the pertinent aspects of major projects are investigated, not just those in the immediate area.

The Water Framework Directive requires good ecological condition in rivers. This is also taken to include hydro-geomorphological condition. Derogations may be sought for areas of existing importance, such as existing urban areas.

#### UPCOMING ECONOMIC DRIVERS

Reform of the Common Agricultural Policy will mean a change to a system of payments on the basis of area of land farmed rather than the number of stock. While there are major advantages in that farmers will have to deliver environmental benefits (cross compliance), it also brings a real risk of a further reduction in stock numbers available to graze.

Whilst, unlike the Fens, the Levels and Moors are still considered unspoilt, nevertheless they are a highly artificial system. Since at least medieval times, there have been continued efforts to exert control over the flood plain in order to gain greater economic benefit. This has resulted in attempts to gain greater control, in the most part aimed at getting flood-free grass. During the last 50 years economic imperatives have driven farmers on the Levels towards a gradual, more intensive system, using grass and maize silage rather than hay. The need to take earlier cuts of better quality grass has driven some farmers to re-seed with more productive grasses that are prone to damage by flooding. Consequently, even though many farms on the Levels are only marginally viable, economic pressures still leave farmers with a desire to keep the grasslands as flood-free as possible.

Many feel that the most appropriate way to manage the Levels and Moors is by greater control, for example, where possible, by preventing flood water getting on to fields and, when that fails, by getting it off again immediately. It is good to let water on to fields to achieve the conditions needed to fulfil PSA targets, such as keeping SSSIs in good condition, where there is agreement and with payments. However, we hear that climate change is going to bring more winter flooding, which will increasingly overwhelm new flood defences. It will also increase the frequency of summer droughts. Consequently, using the current system, in order to keep the Levels as flood-free as possible, it will be necessary to



Fig. 4 The Biebrza marshes in Poland

remove excess water quickly to accommodate possible further flooding, rather than retaining as much water as possible to counter summer droughts.

With few young recruits and many farmers nearing retiring age, there will soon be fewer stock to graze SSSI grasslands, so that there will be a risk of these turning to scrub. As farming on the moors becomes increasingly uneconomic, it needs nature conservation importance to justify further flood defence spending. However, currently this is not delivering PSA targets and so perhaps it is time to consider a new future for the Levels and Moors.

In Holland, a country as crowded as Britain, the Dutch have set aside large areas for nature conservation – one is a wetland at Oostvaardersplassen that they are managing with herds of free-living, water-loving Polish ponies, Hech cattle, a primitive, bison-like breed, and Red Deer. Deliberately left to their own devices, these animals have created an exciting mosaic of grasslands, carr, and reed-fen, conditions difficult to mimic by artificial management and that have attracted thousands of wildfowl and waders.

The Biebrza Marshes in Poland (Fig. 4) are a mosaic of grassland sedge, reed and carr woodland, set in meandering active and former river channels. They are managed by a combination of free-ranging, summer-grazing cattle and European Elk.

It is suggested that the time has come to start the process of proactively restoring the function of part of the flood plain. This would be supported by the national policy drivers such as the Water Framework Directive.

Environmental trends arising from probable climate change make it advisable to give better separation of floodplain from housing and infrastructure. It is the view of conservation organisations that this approach will give a better chance of securing the long-term nature conservation value of the Levels and Moors than the current proposed strategy.

Much of the potentially affected land is in private ownership. However, at some point owners will have to decide whether it is viable to go on farming it with increasing economic and flood pressures.

Their options include: to sell, to land swap, or to 'manage' for flood payments, with some, but in the future possibly increasingly valuable, late summer grazing.

Inevitably there would be nature conservation as well as archaeological and social losses. However, the long term gain of a high quality, multifunctional nature conservation site along the lines of Oostvaardersplassen or Biebrza, along with the security of the long term separation of people and infrastructure from flooding, is well worth pursuing.

#### CLIMATE CHANGE: SUDDEN

An increase in rainfall and ice melt in the Arctic and North Atlantic may lead to a sudden switch-off of the Gulf Stream. Currently we have a much milder climate than is reasonable for our latitude, courtesy of the warming waters of the Gulf Stream. Loss of the Gulf Stream in the next 20 years would bring our climate more in line with that of northern Newfoundland, with the following consequences:

- Cold seas, leading to regular sea fog around the coasts and an overall cooling of both winter and summer temperatures
- Precipitation totals uncertain, but approximately similar
- Winter snow lying for up to 3 months, leading to major spring snow melts and potential flooding
- Possibly a greater risk of tropical storms as sub-tropical seas heat but cannot lose the heat currently dissipated by the Gulf Stream.