THE WIDER LANDSCAPE CONTEXT
flood risk, climate change and biodiversity

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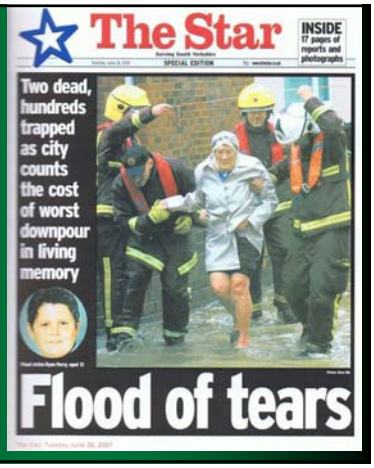
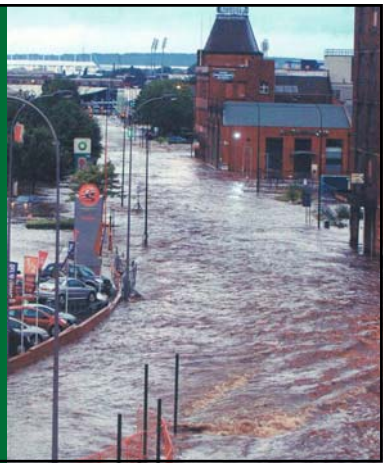
Summer 2007


The Star
INSIDE 17 pages of reports and photographs
SPECIAL EDITION
Two dead, hundreds trapped as city counts the cost of worst downpour in living memory
Flood of tears

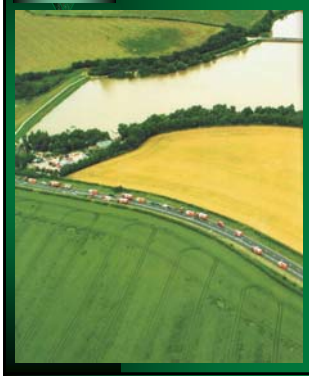
Sheffield centre



England and Wales around five million people live in areas at risk from flooding

- Perpetually surprised when we get wet
- Take a map of the flood risk areas and overlay a map of the land wrested by drainage and 'improvement' from the once great fenlands
- The two are virtually the same

Ulley Reservoir



IMPACTS ON THE 'GREEN INFRASTRUCTURE'??

- **Have historic changes helped caused the crises today?**
- **Can remediation or re-construction help avoid, minimise or mitigate for current and future problems?**

LONG-TERM STUDY AREA

Looking for
Yorkshire's fens

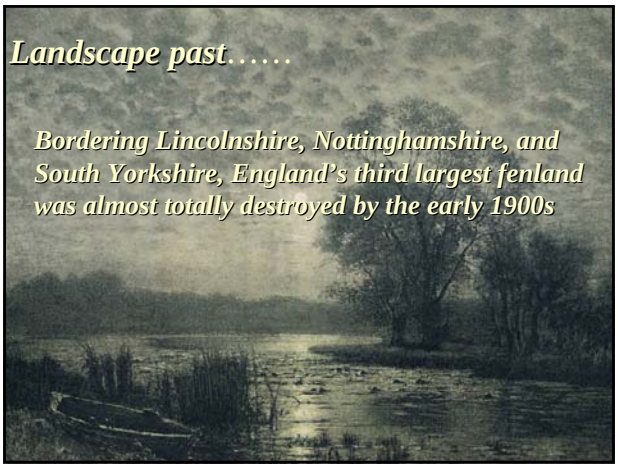
BEFORE DRAINAGE

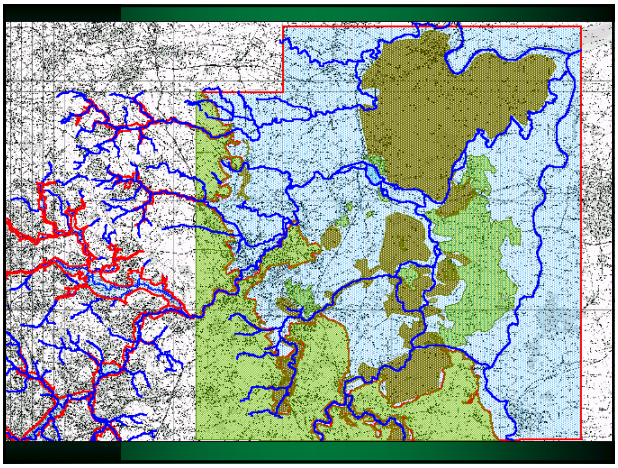
36,420 hectares of the Humberhead Levels (De La Pryme, 1699),

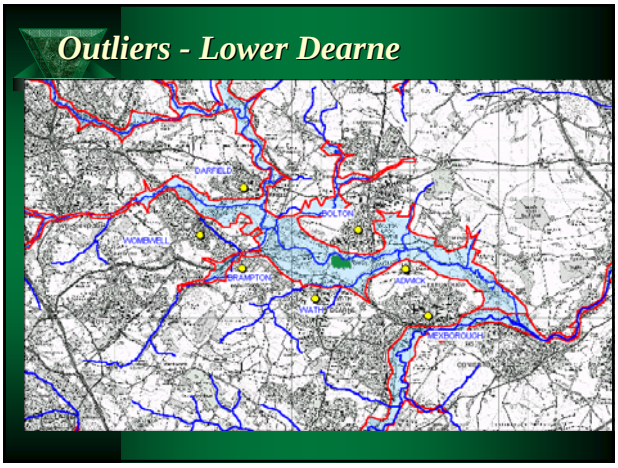
the area was

'…….A continual lake and a rondezvous of ye waters of ye rivers…'

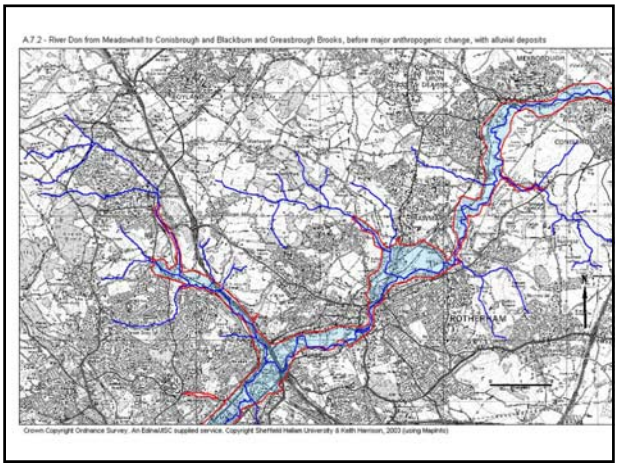
The Map of Inclesmore c.1410


Landscape past……
Bordering Lincolnshire, Nottinghamshire, and South Yorkshire, England's third largest fenland was almost totally destroyed by the early 1900s




Outliers - Lower Dearne
DARFIELD
BOLTON
HOYLANDSWAIN
BRAMPTON
ADWICK
WATHBROOK
MEXBOROUGH


Thornfoe
Darfield
Wombwell
Bolton upon Dearn
Dearn River
Wath upon Dearn
Mexburgh
Swinton
Wentworth


A.7.2 - River Don from Meadowhall to Conisbrough and Blackburn and Greasbrough Brooks, before major anthropogenic change, with alluvial deposits
ROTHERHAM
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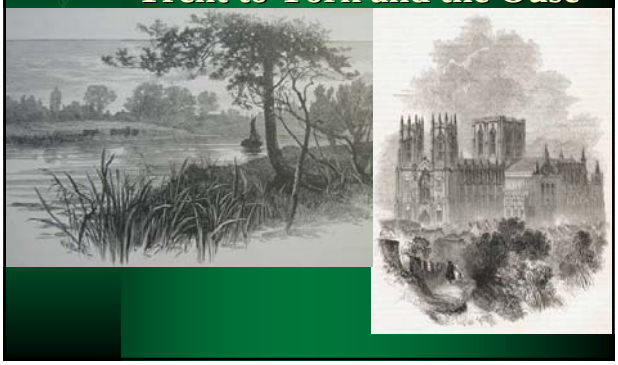
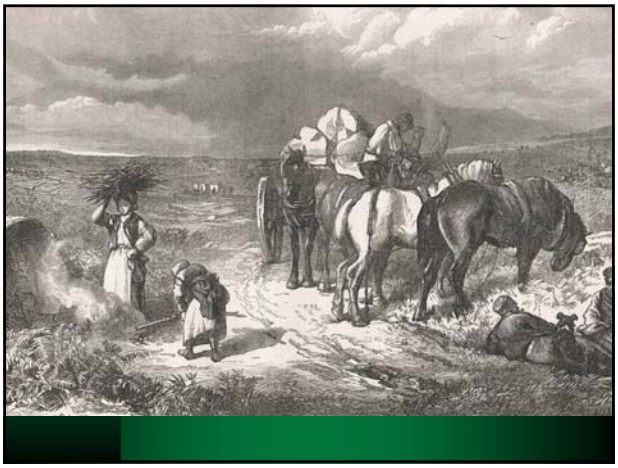
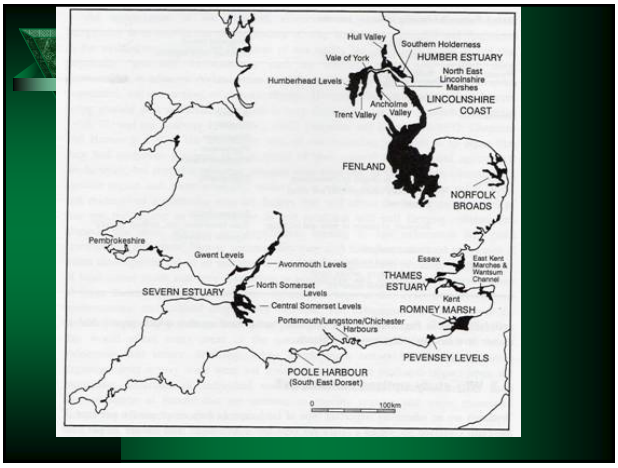
A huge landscape
From Lincoln to the East coast and Hull

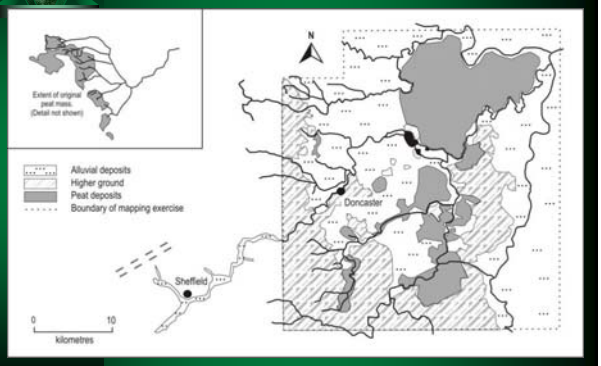
From Nottingham and the Trent to York and the Ouse







A summary map to display the research findings



LIDAR

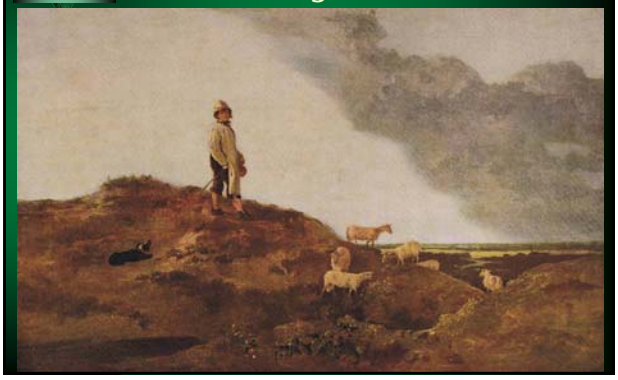
Rich in mammals too



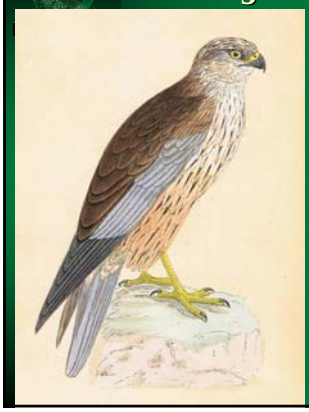

Introduction: Climate, Weather and Floods

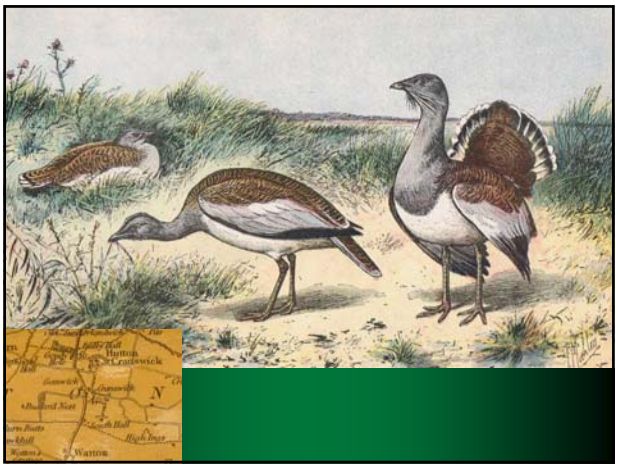
- Weather and climate clearly influence food-risk and storm damage in many, though not all, situations.
- Relationships and trends are not simple.
- Important to recognise that flood and drought are flip sides of the same issue.
- A flood today does not diminish the chances of a drought tomorrow.


Not just wetland but extensive heath and grassland too



Teeming with birds of prey

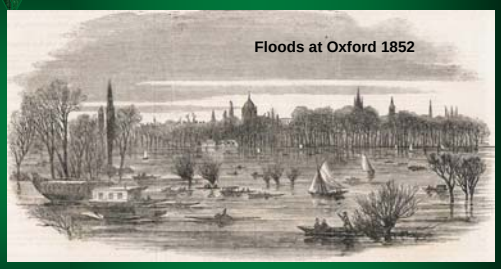




Climate manifested as weather is changing - more extreme - both hot and dry

- As in 2007, torrential deluges of rain.
- There are other factors too and in particular the way people have changed the landscape over the centuries.
- Over hundreds of years, but increasingly during the late twentieth century, we have changed the environment in which we live, work, and recreate.

The '*the rules of engagement*' between people, weather and landscape have changed.



- In the future we will need to plan in order to absorb the effects of a more extreme climate, and this extends not just to infrastructure and engineering, but to the wider landscape too.
- Landscape change has clearly generated some flooding problems, and at the very least, it has exacerbated the risks through bad weather and through development-related impacts.

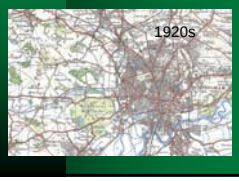
Urban areas have sprawled out over floodplains, turning soft, porous surfaces to tarmac and concrete.

- Impacts NOT restricted to the built environment
- Drained and 'improved' huge areas of farmland.
- Drainage was an obsession of the Victorians. From the highest parts of the Pennines, the North York Moors, and mid Wales with their 'gripping', to the lowlands of the Vale of York, the flatlands of Doncaster, the Severn Valley, and the Cambridgeshire Fens, the story is the same: drain, drain and drain.
- But issues of extremes climates in earlier times too.

Tyneside early 1900s

Settlements and water

Nottingham



Tallahassee, Florida 1920s

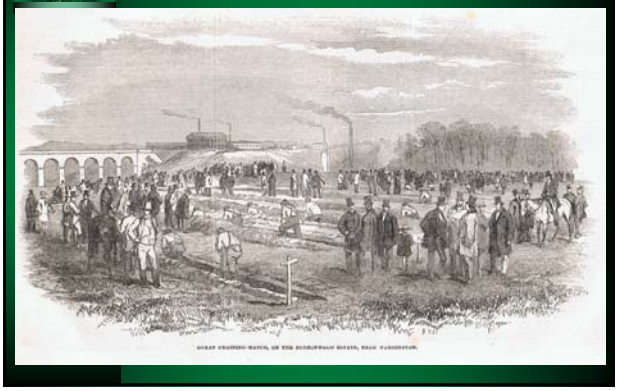
Charleston, South Carolina late 1800s

Lessons of History → Landscape Change

- Changed the landscape over the centuries.
- Over hundreds of years, but increasingly during the late twentieth century, we have changed the environment in which we live, work, and recreate. Urban areas have sprawled out over floodplains, turning soft, porous surfaces to tarmac and concrete.
- Impacts not restricted to the built environment → we have ***drained and 'improved' huge areas of farmland.***
- Drainage was an ***obsession of the Victorians***.
- From the highest parts of the Pennines, the North York Moors, and mid Wales with their 'gripping', to the lowlands of the Vale of York, the flatlands of Doncaster, the Severn Valley, and the Cambridgeshire Fens, ***the story is the same: drain, drain and drain***.

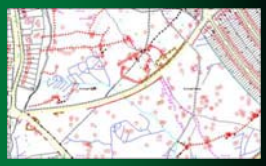
Landscape change from macro- to micro-

Victorian Drainage Competition



An Example of Green Infrastructure at Work– studies of urban woodlands

- Woodland internal drains still active and desiccating; many actively maintained and even enhanced during the twentieth century amenity woodlands phase;
- Continuing drainage maintenance associated with recreational and amenity uses and perceptions of an urbanised population;
- Urbanisation and 'water theft' have left woods as isolated islands of habitat; now more-or-less surrounded by development and roads, services and drains sunk into trenches and beds of aggregate. Soft surfaces extensively replaced by tarmac and concrete;
- New urban developments impacting on surface drainage.

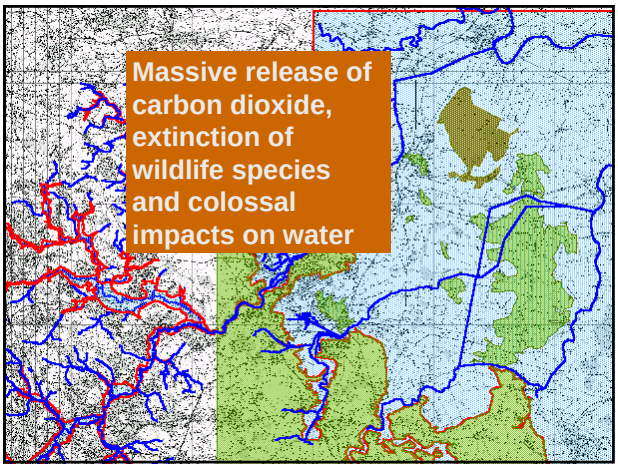


SOME HYDROLOGICAL TRENDS

Services Networks

- Cables and drains in aggregate beds acting as subterranean drainage systems.
- Combined with impermeable surfaces and deliberate drainage, these have a huge impact on water behaviour.
- Despite policies on hydrological sustainability in both urban and rural areas, there is little positive action and desiccation continues.
- In the regional study, wooded landscapes, urban and rural, all suffer water-loss.

IMPACTS ON WATER BEHAVIOUR LARGELY IGNORED



COSTING THE EARTH?
A recent review of the literature on the value of Greenfield land suggests a range for different types of undeveloped land in £/ha

- Urban core public space (city park) £10.8 million
- Urban fringe (greenbelt) £0.2 million
- Urban fringe (forested land) £0.5 million
- Rural (forested land, amenity) £1.3 million
- Agricultural land (extensive) £0.6m
- Agricultural land (intensive) £0.02m
- Natural and semi-natural land (wetlands) £1.3m

ODPM (2002) *Valuing the External Benefits of Undeveloped Land - A Review of the Literature.*

Changes in the provision of environmental goods and services may result from a '3R INTERVENTION' (regeneration, renewal and regional development).

Projects that remediate contaminated land need to consider the environmental benefits (amenity, ecological *etc.*) that might arise from soft end-use restoration (e.g. parkland), and which could be lost with a hard end-use option (such as commercial development).

RSPB DEARNE VALLEY

- Relevant in considering for example the impact of liveability and quality of environments and the role these factors play in encouraging or discouraging private investment.
- Using this approach we can place a value on for example habitat creation at such as at the Old Moor Centre at RSPB Dearne Valley (75 ha x £1.3m = £97.5m for Old Moor, and ultimately for RSPB Dearne Valley 200 ha x £1.3 m = £260 m).
- The HLF support to RSPB and partners for this project therefore generated an ecological service value of around **£98 million**, ultimately rising to around **£350 million**.

Areas at Risk and Positive Planning

- Beyond the increasing risk of inundation across the wider landscape, there is a specific worry for those living or working in many of the lower-lying coastal zones, with the additional threat of climate-induced sea level rise.
- Yorkshire around Hull and Holderness for example, or in the south-east areas around the Thames estuary are all at risk.
- For areas already at or even below sea level, this is a serious menace in decades to come, and of course the south-eastern seaboard of Britain is also slowly sinking anyway.
- It is not just in the coastal zone that people are now at risk. Across huge areas of landscape, the natural wetlands have been removed and replaced by intensive farming, by industry and commerce, and often by housing.

South Yorkshire alone, 99% of England's third biggest fenland destroyed + most moorland removed or drained, much funded by the public purse.

- There are now pioneering developments such as the RPSB Old Moor Nature Reserve in the Dearne Valley and the Potteric Carr Nature Reserve in Doncaster that begin to help reinvigorate this landscape.
- But whilst these major new wetlands helped lessen recent flood impacts, they are not enough.

Working ***WITH*** the Grain of Nature

- The years to come will undoubtedly see massive investment in the engineered infrastructure that manages water and combats floods.
- This will include barriers, embankments, upgraded drainage systems and the rest, costing millions of pounds.
- At the same time though, there is still the threat of further development on the floodplain, nature's water management system.
- So we are essentially working *against* the grain of nature and not *with* it.
- The human suffering and individual dilemmas then kick in, and those at risk may be trapped and unable to move.

PAYING FOR THE LANDSCAPE AND ITS SERVICES

- **In July 2007, I spoke with Stephen Watkins, a farmer near Tewksbury with 1,500 acres under flood water.**
- **His argument was that if he and his neighbours had not allowed their land to flood the downstream damage would have been even more catastrophic.**
- **Major utilities such as the Gloucestershire power station, which were so close to flooding, would have gone down.**
- **The impacts of this would have been appalling.**

- However, he and his neighbours soaked up the floods at their own expense and the greater catastrophe was averted.
- But surely, as the costs and the human tragedy of the events were lessened by the farmers' actions, we as the wider community should foot the bill.
- Isn't this what 'farmers as custodians of the countryside' is all about?

- Like the boy with his finger in the dyke, we need something more sustainable, and the key players in a more secure future will be farmers.
- We need to work with, and pay farmers, as custodians of the landscape, to manage their land to hold back the floodwaters.
- This won't be cheap, but it will cost less than the alternative of repeated damage and disruption, and the continued distress and suffering of home-owners and other across the region.

- To remediate the damage of centuries of environmental degradation, the longer-term solution must be landscape-scale, and centred around those who manage the landscape i.e. our farmers.
- In this context, in recent years there's been much talk about how farmers are '*custodians of the countryside*' and that they should be rewarded for this role.

It is time to deliver on such talk.

Changes in EU funding to *Single Farm Payments* and *Environmental Stewardship* are moves in the right direction and towards broader outputs rather than just food production.

However, it still seems there is a gulf between policy, need, and action.

The Gloucestershire situation in 2007 could have been much worse; without Stephen Watkins and his farmer colleagues the waters would have risen the extra inch and the electricity sub-station would have gone down.

- That extra inch may be the key.
- The approach needs to include innovative developments such as green roofs, soakaways, swales, and porous surfaces – as the rule and not the exception.
- However, it also needs to address the 1.3 million hectares of agricultural land in England and Wales that are on floodplains and the extensive areas of woodlands and plantations too.

In the wider catchment there needs to be a long-term programme of environmental re-construction to remediate for decades and even centuries of damage.

- This cannot be achieved overnight, but there are signs of things moving in the right direction.
- From Peak District moorland restoration to lowland fen re-creation, there are projects that begin to halt the damage.

Alongside any woodland re-establishment there will need to be a programme of restoration of bogs and marshes; again to hold back and slow down the flood waters

- This will include targeted re-construction of both long-term wetter landscapes and new areas for flood water storage when the need arises.
- Part of what needs to be done, is the restoration of an old landscape.

Conclusions: SOME KEY POINTS ABOUT FLOODING, CLIMATE and Green INFRASTRUCTURE

- Historic loss of wetlands and massive drainage of landscape, for example 99% of the South Yorkshire Fens, and most moors and heaths lands removed or drained.
- These are long-term changes but the impacts have probably peaked about now.
- Intensive farming for example throughout the Rother Valley from 1950s-1990s with the impacts of this massive drainage of farmland and simplification of the ecosystems, driven by UK and EU agricultural policies, peaking in the early twenty-first century.
- Even woodlands across the region have been intensively drained over the last 200 years.

- Straightening and canalisation of rivers, now locked into artificial banks, and de-coupled from their floodplains. There has also been the almost total removal of valley bottom woodlands.
- ENTIRELY PREDICTABLE - Building - housing, industry, retail and offices - on flood plains - Abercrombie 1920s warned specifically against building on floodplains in the West Riding region. This was largely ignored.

REGIONAL INITIATIVES to help alleviate the problems:

- Great Yorkshire and Humber Fen Project – could have a major impact on carbon sequestration too, and would help grow regional tourism and leisure economies.

- Northern Heaths and Commons Project - promised major support by the former English Nature but yet to deliver; launched in Doncaster in 2004 and could have a big impact.

RE-WETTING THE WOODS

- Re-wetting the woodlands – across the region this would make a big difference – especially if combined with targeted new woodlands in the landscape.
- 'Moors for the Future' is a project taking a positive approach to these issues and it needs to be supported and extended.
- To benefit Sheffield it will need to focus on the Eastern Moors rather than just the North Peak

Bentley, Doncaster, 1932